नेपाल सरकार

ऊर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय

प.सं.: ०८१।८२

च.नं.: ३७४

☎ | ९७७-१-४२११५१६
९७७-१-४२११५३१
फ्याक्स : ९७७-१-४२११५१०
सिंहदरबार, काठमाण्डौं

मितिः-२०८१/११/२८

श्री जलस्रोत तथा सिंचाइ विभाग,
जावलाखेल, ललितपुर ।

दर्ता नं.: २४२७
मितिः २०८१/१२/३

विषयः- Rate Analysis Norms for Works 2081 Norms स्वीकृती सम्बन्धमा ।

प्रस्तुत विषयमा प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालयको च.नं.म.बै./३२१/४६२३, मिति २०८१/११/२६ को पत्र अनुसार Analysis Norms for Works 2081 को मन्त्रिपरिषद् बैठकको मिति २०८१/११/२६ को निर्णय बमोजिम स्वीकृत भएकोले तहाँको जानकारी एवं आवश्यक कार्यान्वयनको लागि पठाईएको व्यहोरा अनुरोध छ । साथै स्वीकृत भएको Norms को प्रतिलिपि थान-१ यसैसाथ संलग्न गरी पठाईएको व्यहोरा अनुरोध छ।

☐ योजना, कार्यक्रम तथा समन्वय महाशाखा
☐ बहुउद्देश्यीय तथा सिंचाइ महाशाखा
☐ जल उत्पन्न प्रकोप व्यवस्थापन महाशाखा
☐ भूमिगत जल तथा भौगर्भिक महाशाखा
☐ सिंचाइ व्यवस्थापन महाशाखा
☐ प्रशासन शाखा
☐ आर्थिक प्रशासन शाखा
☐ ऐन कानून परामर्श शाखा

२०८१/११/२८

(बिराट ज्ञवाली)
सि.डि.ई.

नेपाल सरकार

प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय

पत्र संख्या :
च.नं. : म.बै./३२१/४६२३

सिंहदरबार, काठमाडौं
नेपाल ।

मितिः २०८१/११/२६
नेपाल संवत् ११४५

ऊर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय
जलस्रोत महशाखा
दर्ता नं. : १०५
मिति : २०८१।११।२८

श्री सचिव (जलस्रोत तथा सिँचाइ),
ऊर्जा, जलस्रोत तथा सिँचाइ मन्त्रालय।

Rate Analysis Norms for Works 2081 स्वीकृत गर्ने विषय म.प.बै.सं. ५९/०८१ मिति २०८१/११/२६ को मन्त्रिपरिषद्को बैठकमा पेश हुँदा त्यसमा नेपाल सरकार, मन्त्रिपरिषद्ले देहायबमोजिम निर्णय गरेकोले सोबमोजिम कार्यान्वयन हुन नेपाल सरकार (कार्यसम्पादन) नियमावली, २०६४ को नियम २९ बमोजिम अनुरोध गरेको छु–

नेपाल सरकारको निर्णय–

"Rate Analysis Norms for Works 2081 स्वीकृत गर्ने विषयको ऊर्जा, जलस्रोत तथा सिँचाइ मन्त्रालयको दर्ता नं. ४/३२-०८१/७/११ को प्रस्ताव म.प.बै.सं. ३८/०८१ मिति २०८१/७/१३ को मन्त्रिपरिषद्को बैठकमा पेश हुँदा "मन्त्रिपरिषद्, आर्थिक तथा पूर्वाधार समितिमा छलफल गरी पेश गर्ने" निर्णय भएअनुसार मिति २०८१/७/२६ मा बसेको मन्त्रिपरिषद्, आर्थिक तथा पूर्वाधार समितिको बैठकबाट परिमार्जन भएबमोजिम यसैसाथ संलग्न "Rate Analysis Norms for Works 2081" स्वीकृत गर्ने।"

(एकनारायण अर्याल)
मुख्यसचिव

बोधार्थ:
श्री सचिव,
मन्त्रिपरिषद्, आर्थिक तथा पूर्वाधार समिति।

टेलिफोन : ५९७१०००, ५९७१००१, ५९७१०२५, ५९७१०१४, पो.ब.नं. २३३१२, काठमाडौं, नेपाल
ई-मेल : info@opmcm.gov.np
वेब साइट : http://www.opmcm.gov.np

नेपाल सरकार

प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय

पत्र संख्या ४२/०८१
च.नं. मं.स.सं./३२२/२२१६

सिंहदरबार, काठमाडौं
मितिः २०८१/७/२६
नेपाल संवत् ११४५

श्रीमान् मुख्यसचिवज्यू,
प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय।

मिति २०८१/७/२६ मा बसेको मन्त्रिपरिषद्, आर्थिक तथा पूर्वाधार समितिको बैठकबाट देहायबमोजिम निर्णय भएको व्यहोरा अनुरोध गर्दछु।

"Rate Analysis Norms for Works 2081 स्वीकृत गर्ने विषयको उर्जा, जलस्रोत तथा सिँचाइ मन्त्रालयको दर्ता नं. ४/३२-०८१/७/११ को प्रस्ताव म.प.बै.सं. ३८/०८१ मिति २०८१/७/१३ को प्रस्ताव मन्त्रिपरिषद्को बैठकमा पेस हुँदा "मन्त्रिपरिषद्, आर्थिक तथा पूर्वाधार समितिमा छलफल गरी पेस गर्ने" निर्णय भएअनुसार आजको बैठकमा पेस भइ छलफल हुँदा छलफलका क्रममा उठेका विषयहरूसमेत समावेश गरी परिमार्जन गरिएको यसैसाथ संलग्न "RATE ANALYSIS NORMS FOR WORKS 2081" स्वीकृतिका लागि मन्त्रिपरिषद्समक्ष पेस गर्ने।"

(राजकुमार श्रेष्ठ)
सचिव

टेलिफोन : ५९७१०००, ५९७१००१, ५९७१०२५, ५९७१०१४, पो.ब.नं. २३३१२, काठमाडौं, नेपाल
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च.नं. ६६२३

Government of Nepal

Ministry of Energy, Water Resources and Irrigation

Department of Water Resources and Irrigation

RATE ANALYSIS NORMS FOR WORKS

2081

TABLE OF CONTENT

General Guidelines for Use of this Norms for Rate Analysis Norms for Work, 2081

1. The description of items is given briefly and linked with the relevant sections and Clauses of the "Standard Specification for Irrigation and River Training Works, 2081".

2. Department of Water Resources and Irrigation does not have any intention to promote or suggest any particular commercial brand or company; however, new technologies available in market are suggested without prejudice and if may be the case of any particular commercial brand or company, equivalent product readily available in market could be used.

3. If technological advancement may be the case and with that more economical means and method may be available in market, in such, economical means and methods could be used for the estimation purpose until revision of this Norms.

4. Estimate preparation with the use of equipment in average working conditions are mentioned for each activity. Hire charge of equipment at work site (including transportation if not mentioned separately payable item) has to be used to find cost of equipment component. Hire charge shall include ownership charges and operation charges (Fuel Component+ Crew Component+ Maintenance Component). Separate guideline for Estimating Equipment Ownership and Operating Costs shall be approved by Department of Water Resources and Irrigation.

5. For machinery and equipment used across multiple sections and subsections of these standards, the time required (in hours) to complete the specified quantity is based on the most efficient machines available in the market at the time the standards were established. Therefore, the estimator should apply the rates of those machines and equipment capable of completing the referenced quantity of task within the time frame (in hours) specified in the standards. If the estimator selects machinery with different efficiency levels (either higher or lower), due to factors such as machine unavailability or rate unavailability/ differences etc, the corresponding time (in hours) outlined in the standards should be adjusted accordingly.

SECTION 1: GENERAL

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
1.1	111	**Providing and establising camp with mobilization and demobilization for contractor's labour and staff and demolishing after completion of works as per Specification and instruction of the Engineer.** ***As per Site Condition***	Job									
1.2	104	**Providing, operation and maintenance of temporary diversion of road/bridge/ culvert to keep the road serviceable throughout the contract period as per Specification and instruction of the Engineer.** **Remarks: As per design and cost estimation of diversion works**	LS									
1.3	109	**Providing, operation and maintenance of temporary access road / Village road to construction site to keep the access road serviceable throughout the contract period as per Specification and instruction of the Engineer.** **Remarks: As per design and Cost Estimation**	LS									

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
1.4	111, 105	**Relocation of services /minor infrastuctures, as per Specification and instruction of the Engineer.** **Remarks: As per site condition**	PS									
1.5	104	**Construction of cofferdam,Maintenance of cofferdam and demolishing after completion of works as per Specification and instruction of the Engineer** **Remarks: As per design and Cost Estimation**	Job									
1.6	112	**Supply of as built drawings (Hard and Soft copy) of construction of different structures, canal, drains, cofferdam, etc whichever is applicable, after completion of the project as per specification and instruction of the Engineer.** **Remarks: 0.05 percent of construction cost**	Job									

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
1.7	119	Supply of Project record (Digital Records of project events such as status of each work before start, during various stages of construction and after construction, quarry sites, plant site, camp site,labour camp, access road,accident events on project site,etc including coloured photographs & maximum 1 hour videography covering interesting and novel features of the work) as per Specification and instruction of Engineer. Remarks: As per Project Site	Set									
1.8	111	Reinstatement of quarry sites at the completion of works as instructed by the Engineer. Remarks: As per design and Cost Estimation	LS									
1.9	113	Lab Establishment, performing different required tests, maintenance of lab equipment and demolishing after completion of works as per Specification and instruction of the Engineer. Remarks: As per design and Cost Estimation based on project size and complexity	LS									
1.10	112	Commission for performance Bond Remarks:0.10 % of Construction cost	PS									

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
1.11	114	**Insurance**										
		a) Insurance of Works, Plants and Materials	PS									
		b) Insurance of equipments and machines	PS									
		c) Insurance of Workers and Staffs	PS									
		d) Third Party Insurance	PS									
		Remarks: Insurance items shall be estimated as per the Guidelines of National Insurance authority, Nepal										

SECTION 2: SITE PREPARATION

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
2.1	201	Cutting of trees along with branches and their disposal 15m away from the construction site and staking the same all complete in Terai area. (Girth of tree is measured 1.3m above the ground)										
I		By Manual Means										
		a) Above 12 cm upto 30 cm girth	1 no.	Unskilled	M-day	0.156						
		b) Above 30 cm upto 60 cm girth	1 no.	Unskilled	M-day	0.468						
		c) Above 60 cm upto 90 cm girth	1 no.	Unskilled	M-day	0.624						
		d) Above 90 cm upto 120 cm girth	1 no.	Unskilled	M-day	0.672						
		e) Above 120 cm upto 180 cm girth	1 no.	Unskilled	M-day	3.000						
		f) Above 180 cm upto 240 cm girth	1 no.	Unskilled	M-day	4.000						
		g) Above 240 cm upto 300 cm girth	1 no.	Unskilled	M-day	8.000						
		h) Above 300 cm girth	1 no.	Unskilled	M-day	10.000						
		Remarks:										
		1) Add 25% labour in above norms for mountain area.										
2.2	201	Uprooting of stumps and their disposal 15 m away from the construction site.										
I		By Manual Means										
		a) Above 12 cm upto 30 cm girth	1 no.	Unskilled	M-day	0.20						
		b) Above 30 cm upto 60 cm girth	1 no.	Unskilled	M-day	0.40						
		c) Above 60 cm upto 90 cm girth	1 no.	Unskilled	M-day	0.60						
		d) Above 90 cm upto 120 cm girth	1 no.	Unskilled	M-day	1.00						
		e) Above 120 cm upto 180 cm girth	1 no.	Unskilled	M-day	1.50						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		f) Above 180 cm upto 240 cm girth	1 no.	Unskilled	M-day	2.00						
		g) Above 240 cm upto 300 cm girth	1 no.	Unskilled	M-day	3.00						
		h) Above 300 cm girth	1 no.	Unskilled	M-day	5.00						
2.3	201	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and upto a lead of 1km and earth filling in the depression/pit. (Girth of tree is measured 1m above the ground)										
I		By Mechanical Means										
		a) 30-60 cm girth	30 no.	Unskilled	M-day	25.00				Tractor-trolley	hr	6
		b) 61-90 cm girth	10 no.	Unskilled	M-day	25.00				Tractor-trolley	hr	6
		c) 91-180 cm girth	5 no.	Unskilled	M-day	35.00				Tractor-trolley	hr	6
		d) 181-250 cm girth	2 no.	Unskilled	M-day	32.00				Tractor-trolley	hr	6
		e) above 250 cm girth	1 no.	Unskilled	M-day	50.00				Tractor-trolley	hr	12
2.4	201	Clearing and grubbing land including uprooting rank vegetaion, grass, bushes, shrubs, saplings and trees girth upto 30cm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, upto a lead 30m including removal and disposal of top organic soil not exceeding 15cm in thickess.										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		In area of light jungle (upto 15 number per 100 sqm)										
I		By Manual Means	1 ha	Unskilled	M-day	200.00						
II		By Using Mechanical Means	1 ha	Unskilled	M-day	6.00				Dozer	hr	12
B		In area of thorny/dense jungle (more than 15 number per 100 sqm)										
I		By Manual Means	1 ha	Unskilled	M-day	300.00						
II		By Using Mechanical Means	1 ha	Unskilled	M-day	9.00				Dozer	hr	12
2.5	201	Felling and uprooting of bamboo, clearing the area including stacking of bamboo and disposal of wastes. (Volume of excavated ditch to be measured)										
I		By Manual Means	100 m³	Unskilled	M-day	200.00						
II		By Using Mechanical Means	100 m³	Unskilled	M-day	20.00				Excavator	hr	6
2.6	201	Stripping of top soil (beyond jungle area) for a minimum depth of 15 cm including disposal upto 15m outside the periphery of the area.										
I		By Manual Means	100 m²	Unskilled	M-day	12.00						
II		By Using Mechanical Means	1000 m²	Unskilled	M-day	2.00				Dozer	hr	12

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
2.7	201	Cutting, uprooting and disposal of grasses with light compaction, levelling and clearing the site.	100 m²	Unskilled	M-day	2.30						
2.8	201	Surface dressing works including filling dipressions, cutting humps and ground levelling (service roads etc.)	100 m²	Unskilled	M-day	1.00						
2.9	201	Spreading top soils at the required slope	100 m³	Unskilled	M-day	4.00						
2.10	201	Spreading top soils in slope including dressing, levelling and light compaction.	100 m²	Unskilled	M-day	1.00						
2.11	202	Dismantaling of Structures Dismantaling of existing structures like culverts, bridges, aqueducts, syphons, retaining walls and other structure comprising of masonry,cement concrete, wood work, steel work, including Tools & Plants and scaffolding wherever necessary, sorting the dismantaled material, diposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1km.										
(i) A		Lime concrete / Cement concrete Lime concrete / cement concrete M-10 and below										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
I		**By Manual Means**	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	24.00						
B		**Cement concrete M-15 and M-20**										
I		**Bny Manual Means**	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	30.00						
II		**By Mechanical Means**	10 m³	Skilled	M-day	1.00				Air-compressor	hr	6
				Unskilled	M-day	6.00				Drilling Machine with bit and accessories	hr	6
										Tractor-trolley	hr	6
C		**Prestressed/ RCC grade M-20 and above**										
I		**By Manual Means**	10 m³	Technician	M-day	1.00				Tractor-trolley	hr	6
				Skilled	M-day	3.00						
				Unskilled	M-day	30.00						
II		**By Mechanical Means**	10 m³	Skilled	M-day	2.00				Air-compressor	hr	6
				Unskilled	M-day	10.00				Drilling Machine with bit and accessories	hr	6
										Tractor-trolley	hr	6

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
(ii)		**Brick/Tile Works**										
A		In lime mortar	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	12.00						
B		In cement mortar	10 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	10.00						
C		In mud mortar	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	10.00						
D		Dry-brick pitching/ soling	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	12.00						
(iii)		**Stone masonry**										
A		Rubble stone masonry in lime mortar	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	15.00						
B		Rubble stone masonry in cement mortar	10 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	10.00						
C		Rubble stone masonry in mud mortar	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	12.00						
D		Dry rubble masonry	20 m³	Skilled	M-day	1.00				Tractor-trolley	hr	6
				Unskilled	M-day	10.00						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
E		**Stone pitching/dry stone spalls**	20 m³	Skilled Unskilled	M-day M-day	1.00 8.00				Tractor-trolley	hr	6
F		**Boulders laid in wire crates including opening of crates and stacking dismantaled materials.**	20 m³	Skilled Unskilled	M-day M-day	1.00 15.00				Tractor-trolley	hr	6
(iv)		**Removing all types of hume pipes and stacking within a lead of 50m including earthwork and dismantaling of masonry works**										
A		**Upto 60cm dia.**	10m	Skilled Unskilled	M-day M-day	1.00 5.00						
B		**Above 60cm to 90 cm dia.**	10m	Skilled Unskilled	M-day M-day	1.00 8.00						
C		**Above 90 cm dia.**	10m	Skilled Unskilled	M-day M-day	1.00 12.00						
(v)		**Dismantling of barbed wire fencing/wire mesh fencing including posts, foundation concrete,back filling of pit by manual means including disposal of dismantaled material with all lift and upot a lead of 1km, stacking serviceable material and unserviceable material seperately.**	100m	Skilled Unskilled	M-day M-day	2.00 12.00				Tractor-trolley	hr	6

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
(vi)		**Removal of telephone/electric poles and lines including excavation and dismantaling of foundation concete and lines under the supervision of authorized representative of concerned department, disposal with all lifts and upto a lead of 1km and stacking serviceable material and unserviceable material seperately.**	30nos.	Skilled Unskilled	M-day M-day	3.00 15.00				Tractor-tralley	hr	6
		Remarks: Skilled labour means electrician/lineman.										

SECTION 3 - EARTHWORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
3.1	305	**Earthwork in Excavation including disposal (upto 10 m lead and 1.5 m lift) as per Drawing, Specifications and instruction of the Engineer.**										
A		**In soft clay and silty soil**										
I		**Manual Means**	1 m^3	Unskilled	m-day	0.70						
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	360 m^3	Skilled	m-day	1.00				Hydraulic excavator	hr	6
				Unskilled	m-day	3.00						
B		**In hard clay and soil mixed with soft moorum, GBM soil (stones upto 30 cm).**										
I		**Manual Means**	1 m^3	Unskilled	m-day	0.80						
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	360 m^3	Skilled	m-day	1.00				Hydraulic excavator	hr	6
				Unskilled	m-day	3.00						
C		**In ordinary / medium rock without blasting**										
I		**Manual Means**	1 m^3	Unskilled	m-day	3.00						
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	120 m^3	Skilled	m-day	1.00				Hydraulic excavator	hr	6
				Unskilled	m-day	3.00						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
D		**In ordinary / medium rock with drilling and blasting**										
I		**Manual Means**	1 m^3	Blaster	m-day	0.50	Gelatin	Kg	0.18			
				Unskilled	m-day	2.00	Detonator	Nr.	2.00			
							Fuse wire	m	2.00			
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	90 m^3	Skilled	m-day	0.50	Gelatin	Kg	16.00	Jack hammer /	hr	15
				Unskilled	m-day	15.00	Detonator	Nr.	126.00	rock drill		
				Driller	m-day	2.00	Fuse wire	m	180.00	Air compressor	hr	6
				Blaster	m-day	1.00						
										Dozer	hr	6
E		**In hard rock without blasting**										
I		**Manual Means**										
a		**Without chiselling**	1 m^3	Unskilled	m-day	5.00						
b		**With chiselling**	1 m^3	Unskilled	m-day	17.00						
c		**With use of chemical**	16 m^3	skilled	m-day	2.00	Chemical	kg	80.00			
				Unskilled	m-day	16.00						
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	16 m^3	Skilled	m-day	1.00						
				Unskilled	m-day	10.00				Hydraulic excavator with rock breaker attached	hr	6

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
F		**In hard rock with drilling and blasting**										
I		**Manual Means**	1 m^3	Blaster	m-day	0.20	Gelatin	Kg	0.25			
				Unskilled	m-day	1.00	Detonator	Nr.	2.00			
							Fuse wire	m	2.00			
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
II		**Using Mechanical Aids**	90 m^3	Skilled	m-day	1.00	Gelatin	Kg	32.00	Jack hammer /	hr	30
				Unskilled	m-day	20.00	Detonator	Nr.	126.00	rock drill		
				Driller	m-day	3.00	Fuse wire	m	180.00	Air compressor	hr	12
				Blaster	m-day	1.00						
										Dozer	hr	6
		Remarks (for item 3.1):										
		1. If disposal lead is more than 10m and/or lift is more than 1.5m for manual and mechanical earthwork, additional consideration for extra lead and/or lift shall be included.										
		2. Additional consideration for extra lead and lift for manual earthwork shall be as follows: (i) For each additional haulage distance of 10m (haulage 50% by basket and 50% by wheel barrow), unskilled labour to be added shall be 0.12 m-day / cu.m. (ii) For each additional lift of 1 m, unskilled labour to be added shall be 0.08 m-day / cu.m.										
		3. Additional consideration for extra lead and lift for mechanical work shall be as follows: (i) For each additional haulage distance of 10m, and lift 1m, 20% of cost of mechanical excavation per m3 shall be added.										
		4. In case of use of Blasting(Explosive) material add cost for security personal for handling and storage of explosive.										
3.2	305	**Excavation in Marshy Soil as per Drawing and Specifications including disposal (upto 30 m lead) as per instruction of the Engineer.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
I		**Using Mechanical Aids**	**300 m^3**	Skilled	m-day	1.00				Hydraulic Excavator	hr	6
				Unskilled	m-day	4.00				Tipper	hr	18
		Remarks:										
		1. In case the cut material is suitable to be used in canal embankment in the immediate vicinity, the item of carriage in the tipper shall be omitted.										
		2. If disposal lead is more than 30m, additional consideration for extra haulage shall be included.										
3.3	**305**	**Excavation and removal of soil unserviceable for embankment as per Drawing and Specifications including disposal upto 1 km as per instruction of the Engineer.**										
I		**Using Mechanical Aids**	**360 m^3**	Skilled	m-day	1.00				Excavator	hr	6
				Unskilled	m-day	4.00				Tipper	hr	18
		Remarks: Incorporate additonal haulage for haulage distance > 1 km										
3.4	**305**	**Removal of stones and disposal (upto 10 m lead and 1.5 m lift) as per Drawing and Specifications.**										
I		**Manual Means**	**1 m^3**	Unskilled	m-day	1.00						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
3.5	304	**Breaking of boulders by drilling, blasting and disposal (upto 10 m lead and 1.5 m lift) as per Drawing and Specifications.**										
I		**Manual Means**	1 m^3	Skilled	m-day	0.05	Geltain	Kg	0.15			
				UnSkilled	m-day	3.35	Detonator	Nr.	1.00			
							Fuse wire	m	1.00			
3.6	307	**Earthwork in Excavation of foundation of structures, including construction of soring and bracing, trimming of bottom and side slopes (in case of machinery use) all complete as per Drawing and Specifications**										
A		**Ordinary Soil**										
I		**Manual Means**										
(i)		**Depth upto 3 m**	10 m^3	Skilled	m-day	1.00						
				UnSkilled	m-day	8.00						
(ii)		**Depth 3 m to 6 m**	10 m^3	Skilled	m-day	1.00						
				UnSkilled	m-day	12.00						
(iii)		**Depth above 6 m**	10 m^3	Skilled	m-day	2.00						
				UnSkilled	m-day	18.00						
		Remarks:										
		1. Cost of dewatering may be added where required upto 10% of labour cost (in case depth is upto 3m), 15 % of labour cost (in case depth is 3m to 6m) and 20% of labour cost (in case depth is above 6m). Assessment for dewatering shall be made as per site conditions.										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
		2. The excavated earth, if suitable, can be used for backfilling of foundation pit, for which separate payment shall be made as per the approved applicable rate.										
		3. The cost of shoring and bracing, if needed, may be added @ 1% on cost of excavation for open foundation.										
II		**Using Mechanical Aids**										
(i)		**Depth upto 3 m**	**240 m^3**	Skilled UnSkilled	m-day m-day	1.00 3.00				Hydraulic Excavator	hr	6
(ii)		**Depth 3 m to 6 m**	**210 m^3**	Skilled UnSkilled	m-day m-day	1.00 3.00				Hydraulic Excavator	hr	6
(iii)		**Depth 6 m to 9m**	**210 m^3**	Skilled UnSkilled	m-day m-day	1.50 3.50				Hydraulic Excavator	hr	7
(i)		**Depth 9m to 12m**	**210 m^3**	Skilled UnSkilled	m-day m-day	2.00 4.00				Hydraulic Excavator	hr	8
(ii)		**Depth 12m to 15m**	**210 m^3**	Skilled UnSkilled	m-day m-day	2.50 4.50				Hydraulic Excavator	hr	9
(iii)		**Depth 15m to 18m**	**210 m^3**	Skilled UnSkilled	m-day m-day	3.00 5.00				Hydraulic Excavator	hr	10
(i)		**Depth 18m to 21m**	**210 m^3**	Skilled UnSkilled	m-day m-day	3.50 5.50				Hydraulic Excavator	hr	11

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
		Remarks: **1. Cost of dewatering may be added where required upto 5% of labour and equipment cost (in case depth is upto 3m), 7.5 % of labour and equipment cost (in case depth is 3m to 6m) and 10% of labour and equipment cost (in case depth is above 6m). Assessment for dewatering shall be made as per site conditions.** **2. The excavated earth, if suitable, can be used for backfilling of foundation pit, for which separate payment shall be made as per the approved applicable rate.** **3. The cost of shoring and bracing, if needed, may be added @ 1% on cost of excavation for open foundation.**										
B		**Ordinary Rock** (Not Requiring Blasting)										
I		**Manual Means**										
(i)		**Depth upto 3 m**	**10 m^3**	Skilled UnSkilled	m-day m-day	1.00 10.00						
		Remarks: **1. Cost of dewatering may be added where required upto 10% of labour cost. Assessment for dewatering shall be made as per site conditions.**										
II		**Using Mechanical Aids**										
(i)		**Depth upto 3 m**	**90 m^3**	Skilled UnSkilled	m-day m-day	1.00 3.00				Hydraulic Excavator	hr	6
		Remarks: **1. Cost of dewatering may be added where required upto 10% of labour and equipment cost. Assessment for dewatering shall be made as per site conditions.**										
C		**Hard Rock** (Requiring Blasting)										
I		**Manual Means**										
(i)		**Depth upto 3 m**	**10 m^3**	Skilled Driller	m-day m-day	1.00 0.50	Gelatin Detonator	Kg Nr.	3.50 14.00	Air Compressor	hr	1.00

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
				Blaster	m-day	0.25	Fuse wire	m	20.00	Jack hammer / Rock drill	hr	3.00
				UnSkilled	m-day	12.00						
		Remarks:										
		1. Cost of dewatering may be added where required upto 10% of labour and equipment cost. Assessment for dewatering shall be made as per site conditions.										
D		**Hard Rock** (Blasting prohibited)										
I		**Using Mechanical Aids**										
(i)		**Depth upto 3 m**	**10 m^3**	Skilled	m-day	1.00				Air Compressor	hr	3.00
				UnSkilled	m-day	10.00				Jack hammer / Rock drill	hr	3.00
		Remarks:										
		1. Cost of dewatering may be added where required upto 10% of labour and equipment cost. Assessment for dewatering shall be made as per site conditi0ns.										
		2. In case of rock, foundation beyond 3 m is not dug and hence not included.										
E		**Marshy Soil**										
I		**Manual Means**										
(i)		**Depth upto 3 m**	**10 m^3**	Skilled	m-day	1.00				Tractor-trolly for removal	hr	6.00
				UnSkilled	m-day	15.00						
		Remarks:										
		1. Cost of dewatering may be added where required @ 30% of labour cost. Assessment for dewatering shall be made as per site conditions.										
		2. Cost of shoring and strutting may be added where required @ 15% of labour cost.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
II		**Using Mechanical Aids**										
(i)		**Depth upto 3 m**	**10 m^3**	Skilled	m-day	0.08				Hydraulic Excavator	hr	0.30
				UnSkilled	m-day	4.00				Tipper	hr	1.00
		Remarks:										
		1. Cost of dewatering may be added where required @ 20% of labour and equipment cost. Assessment for dewatering shall be made as per site conditions.										
		2. Cost of shoring and strutting may be added where required @ 10% of labour cost.										
3.7		**Foundation excavation under shallow water depth including dispoal upto 10m lead and 1.5m lift all complete as per specifications.**										
A		**Manual means**										
I		**In Hard gravel mix soil (Dia of gravel > 10 cm)**	**1 m^3**	UnSkilled	m-day	2.50						
II		**In Hard gravel mix soil (Dia of gravel < 10 cm)**	**1 m^3**	UnSkilled	m-day	2.30						
3.8	307	**Foundation excavation under water in GBM soil including dispoal upto 10m lead all complete as per specifications.**										
A		**Manual means**										
I		**1m deep excavation and 4 m lift**	**1 m^3**	UnSkilled	m-day	3.51						
II		**2m deep excavation and 4 m lift**	**1 m^3**	UnSkilled	m-day	3.60						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
III		3m deep excavation and 4 m lift	1 m^3	UnSkilled	m-day	3.70						
IV		4m deep excavation and 4 m lift	1 m^3	UnSkilled	m-day	3.80						
V		5m deep excavation and 7.5 m lift	1 m^3	UnSkilled	m-day	4.20						
VI		6m deep excavation and 7.5 m lift	1 m^3	UnSkilled	m-day	4.30						
		Remarks: **1) Reduce one labour for foundation excavation in GBM soil in dry condition.** **2) Add 3% of unskilled labour cost for machinary tools for item 3.7 and 3.8.**										
3.9	308	**Backfilling of structures/pipeline pits in 20cm layers with all types of excavated soil (soft soil, medium hard soil, hard soil, GBM soil, Medium rock, hard rock) including compaction with water sprinkling all complete as per Drawing and Specifications**										
I		**Manual Means(Using hand rammer)**	10 m^3	UnSkilled	m-day	6.50	Water	KL	1.00			
II		**Using Mechanical Aids**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 5.00	Water	KL	1.00	Plate compactor / power rammer	hr	2.5
		Remarks: **1. Cost of earthwork excavation shall be added only in the case of available excavated earth is not sufficient for backfilling.** **2) Add 3% of unskilled labour cost for machinary tools for item 3.9 (I).**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
3.10	308	**Providing suitable material and back filling behind abutment, wing wall, return wall and other structures in 20cm layers including compaction all complete as per Drawing and Specifications**										
A		**Granular Material (Compaction by Plate compactor /Power Rammer)**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 5.00	Granular material Water	cum KL	11.00 1.00	Plate compactor / power rammer	hr	2.50
B		**Sandy Material (Compaction by Plate compactor /Power Rammer)**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 5.00	Sandy material Water	cum KL	11.00 1.00	Plate compactor / power rammer	hr	2.50
C		**Locally available Material (Compaction by tamping rod)**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 5.00	Locally available material Water	cum KL	12.00 1.00			
		Remarks: Add 3% of labour cost for machinary tools for compaction by tamping rod.										
D		**Locally available Material (Compaction by tamping rod without watering)**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 4.00	Locally available material	cum	12.00			
		Remarks: Add 3% of labour cost for machinary tools for compaction by tamping rod.										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
3.11	308	**Providing and filling sand in Foundation Trenches including hand compaction with water sprinkling all complete as per Drawing and Specifications**	10 m^3	Skilled UnSkilled	m-day m-day	0.20 5.00	Sand Water	cum KL	11.00 1.00			
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
3.12	309,310	**Embankment (Bank)Construction:** **Embankment construction with excavated soils (excavation cost not included) including laying, spreading and compacting embankment (bank) to the required density as per Drawing and Specifications all complete. (haulage distance 10m).**										
I		**Manual Means**										
(i)		**With Sprinkling water, using hand rammer** **Remarks: Add 3% of unskilled labour cost for machinary tools.**	100 m^3	Skilled UnSkilled	m-day m-day	2.00 50.00	Water	KL	10.00			
(ii)		**Without Sprinkling water, using hand rammer** **Remarks: Add 3% of unskilled labour cost for machinary tools.**	100 m^3	Skilled UnSkilled	m-day m-day	1 25						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
(iii)		With Sprinkling water, using vibratory roller	100 m^3	Skilled	m-day	2.00	Water	KL	24.00	Vibratory Roller	hr	6.00
				UnSkilled	m-day	50.00						
II		Using Mechanical Aids										
(i)		With Sprinkling water	300 m^3	Skilled	m-day	1.00	Water	KL	72.00	Dozer	hr	6.00
				UnSkilled	m-day	10.00				Water Tanker	hr	6.00
										Vibratory Roller	hr	6.00
3.13	309,310	Embankment construction with borrowed material including excavation and providing material, laying, spreading and compacting embankment (bank) to the required density as per Drawing and Specifications all complete. (haulage distance upto 30m and lift upto 1.5m).										
I		Manual Means	300 m^3	Skilled	m-day	3.00	Water	KL	72.00			
				UnSkilled	m-day	150.00						
		Remarks:										
		1) Add 3% of unskilled labour cost for machinary tools.										
		2) Add cost of excavation in borrow pit for 360 m3 of borrowed material.										
		3) Add Compensation for borrowpit material as required. If borrowpit material is available from Govt. land, compensation for borrowpit material, in that case, will not be considered.										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
		4) If disposal lead is more than 30m and/or lift is more than 1.5m for manual earthwork, additional consideration for extra lead and/or lift shall be included.										
		5) Additional consideration for extra lead and lift for manual earthwork shall be as follows: (i) For each additional haulage distance of 10m (haulage 50% by basket and 50% by wheel barrow), unskilled labour to be added shall be 0.12 m-day / cu.m. (ii) For each additional lift of 1 m, unskilled labour to be added shall be 0.08 m-day / cu.m.										
II		**Using Mechanical Aids**	**300 m^3**	Skilled	m-day	1.00	Water	KL	72.00	Hydraulic excavator	hr	6.00
				UnSkilled	m-day	4.00						
										Tractor with rotavator	hr	12.00
										Dozer	hr	3.00
										Motor grader	hr	3.00
										Vibratory Roller	hr	6.00
		Remarks:										
		1. Add Compensation for borrowpit material as required. If borrowpit material is available from Govt. land, compensation for borrowpit material, in that case, will not be considered.										
		2. If lead is more than 30m, cost of transportation of material by tipper shall be added as required. In that case, cost of Tractor with rotavator shall be excluded.										
3.14	**309,310**	**River Bank Embankment construction with river bed materials including excavation and providing material, laying, spreading in 30-30 cm thick layers and compactingas per Drawing and Specifications all complete. (upto 50 m lead)**										
I		**Using Mechanical Aids**	**300 m^3**	Skilled	m-day	1.00				Hydraulic excavator	hr	6.00
				UnSkilled	m-day	4.00						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
										Vibratory Roller	hr	3.45
		Remarks:										
		1. If lead is more than 50m, cost of transportation of material by tipper shall be added as required.										
3.15	**309,310**	**Raising bank in existing embankment (bank) by filling with all type of soils in 22 cm thick layers including breaking soil lumps and simple dressing (Excavation not included) as per Drawing and Specifications.**										
I		**Manual Means**										
(i)		**Up to 1.5 m lift and 10 m lead**	**10 m3**	Skilled	m-day	0.10						
				Unskilled	m-day	3.60						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
(ii)		**Up to 1.5 m lift and 30 m lead**	10 m3	Skilled	m-day	0.1						
				Unskilled	m-day	5						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
3.16	**309,310**	**Making bank by using soil obtained from the canal excavation in ordinary soil, breaking soil lumps, forming profile including dressing and adjustment of slopes and grade of bank as well as canal (Excavation not included) as per Drawing and Specifications.**										

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
I		**Manual Means**										
(i)		**Up to 1.5 m lift and 30 m lead**	10 m3	Skilled	m-day	0.3						
				Unskilled	m-day	5						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
3.17	318	**Landslides clearance (including trimming and maintaining uniform slope) in various types of soils as per Drawing and Specifications.**										
I		**Manual Means**										
(i)		**Ordinary soils**	**10 m3**	Unskilled	m-day	4.20						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
(ii)		**Gravel and boulder mix soils**	10 m3	Unskilled	m-day	5.30						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
(iii)		**Soft rocks**	10 m3	Unskilled	m-day	8.80						
		Remarks: Add 3% of unskilled labour cost for machinary tools.										
(iv)		**Hard rocks**	10 m3	Unskilled	m-day	11.00						
		Remarks: Add 4% of unskilled labour cost for machinary tools.										

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinary		
				Class	Unit	Qty	Type	Unit	Qty	Type	Unit	Qty
3.18	307	**Pumping water out of fundation pit or depression as per Drawing, Specifications and instruction of Engineer.** **Remarks:** **1. Input of the machine (Pump) shall be changed based on the capacity of pump.**	5000 lit	Skilled	m-day	0.06				Pump (1 HP)	hr	0.50
3.19	319	**Desilting (Silt Clearance) of Canal including disposal of excavated silt as per instruction**										
I		**Manually** Remarks: 1.Add 3% of unskilled labour cost for machinary tools. 2. Add 0.12 m-days/cum if canal bed is more than 5 m.	1 m3	Unskilled	m-day	0.35						
II		**Mechanical Means**										
A		**Single Lift**	360 m3	Skilled Unskilled	m-day m-day	1.00 3.00				Hydraulic excavator	hr	6.0
B		**Double Lift**	360 m3	Skilled Unskilled	m-day m-day	1.00 3.00				Hydraulic excavator	hr	12.0

SECTION 4: COLLECTION AND PROVIDING OF MATERIALS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
4.1	400	**Collection, screening / seiving and providing sand (haulage dis. 10m).**										
A		**Quarry output /Source capacity < 30%**										
i		**Manual Means**	1 m^3	Unskilled	m-day	4.5						
ii		**Mechanical means**	15 m^3	Unskilled	m-day	16				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
B		**Source capacity 31% - 50%**										
i		**Manual Means**	1 m^3	Unskilled	m-day	3.25						
ii		**Mechanical means**	15 m^3	Unskilled	m-day	11				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
C		**Source capacity 51% - 65%**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	2.50						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	7				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Source capacity >65%**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	1.25						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	2				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
E		**In hilly area (excavting slides in slopes)**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	1.50						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	3				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
F		**In Local Rivers**										
i		**Manual Means**	1 m^3	Unskilled	m-day	1.5						
ii		**Mechanical means**	15 m^3	Unskilled	m-day	3				Excavator	hr	1.4
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
4.2	400	**Collection, screening /seiving and providing of gravel (haulage dis. 10m).**										
A		**5mm-70mm**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	2.00						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	5				Excavator	hr	1.54

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
B		**5mm- 40mm**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	3.0						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	9				Excavator	hr	1.54
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
C		**5mm-20mm "**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	4.0						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	14				Excavator	hr	1.54
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
D		**5mm-8mm "**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	6.0						
ii		**Mechanical means**	**15 m^3**	Unskilled	m-day	23				Excavator	hr	1.54
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
E		**40mm-70mm "**										
i		**Manual Means**	**1 m^3**	Unskilled	m-day	4.0						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		Mechanical means	15 m^3	Unskilled	m-day	14				Excavator	hr	1.54
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
F		70mm-100mm "										
i		Manual Means	1 m^3	Unskilled	m-day	3.0						
ii		Mechanical means	15 m^3	Unskilled	m-day	9				Excavator	hr	1.54
		Remarks: Add 3% of labour cost for machinary tools in items i & ii.										
4.3	400	Collection of rubble stone of required size including stacking (haulage dist.10m)	1 m^3	Unskilled	m-day	1.40						
		Remarks: Add 3% of labour cost for machinary tools.										
4.4	400	Wasing and cleaning construction materials by water										
A		Sand /Gravel / Cut (broken) stone	1 m^3	Unskilled	m-day	1.0						
		Remarks: Add 3% of labour cost for machinary tools.										
B		Rubble stones	1 m^3	Unskilled	m-day	0.5						
		Remarks: Add 3% of labour cost for machinary tools.										
4.5	400	Manually breaking stones (excluding collection of rubble)										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**70mm-100mm**	1 m^3	Unskilled	m-day	1.5						
		Remarks: Add 3% of labour cost for machinary tools.										
B		**40mm-70mm**	1 m^3	Unskilled	m-day	2						
		Remarks: Add 3% of labour cost for machinary tools.										
C		**20mm-40mm**	1 m^3	Unskilled	m-day	3.0						
		Remarks: Add 3% of labour cost for machinary tools.										
D		**10mm-20mm**	1 m^3	Unskilled	m-day	4.0						
		Remarks: Add 3% of labour cost for machinary tools.										
E		**5mm-10mm**	1 m^3	Unskilled	m-day	6.0						
		Remarks: Add 3% of labour cost for machinary tools.										
4.6	400	**Mechanically crushing stone aggregates**										
		Crushing of stone boulders of 150 mm and below size in an integrated stone crusher unit comprising of primary and secondary units, belt conveyor and vibrating screens.										
A		**13.2 mm nominal size**	600m^3	Skilled	m-day	2.0	Stone /	cum.	800.0	Crusher	hr	12.0
				Unskilled	m-day	18.0	boulder			Loader	hr	18.0

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										Tipper	hr	18.0
B		**20 mm nominal size**	**670m^3**	Skilled	m-day	2.0	Stone /	cum.	800.0	Crusher	hr	18.0
				Unskilled	m-day	18.0	boulder			Loader	hr	18.0
										Tipper	hr	18.0
C		**40 mm nominal size**	**750m^3**	Skilled	m-day	2.0	Stone /	cum.	800.0	Crusher	hr	6.0
				Unskilled	m-day	17.0	boulder			Loader	hr	20.0
										Tipper	hr	20.0
4.7	400	**Making rubble stone of required size including drilling, blasting, breaking with chisel or hammer hauling up to a dist. of 10m and stacking all complete.**	**1 m^3**	Skilled	m-day	0.1	Gelatin	Kg	0.25			
				Unskilled	m-day	2.5	D-nator	nos.	2.00			
							F-wire	m	2.00			
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.8	400	**Making rubble stone of required size including breaking with chisel or hammer (without blasting) hauling up to a distance of 10m and stacking all complete.**	**1 m^3**	Skilled	m-day	0.1						
				Unskilled	m-day	4.0						
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.9	400	**Making required size rough blocks from boulders including drilling, blasting, breaking, dressing one side, hauling up to a distance of 10m and stacking all complete.**	**1 m^3**	Skilled	m-day	0.1	Gelatin	Kg	0.25			
				Unskilled	m-day	4.5	D-nator	nos.	2.00			
							F-wire	m	2.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.10	400	Making required size rough blocks from boulders with chisel or hammer (without blasting) including one side dressing, hauling up to a distance of 10m and stacking all	1 m^3	Skilled Unskilled	m-day m-day	0.1 8.0						
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.11	400	Making required size blocks from bedding rocks, hammer dressing, hauling up to a dist. of 10m and stacking all complete.	1 m^3	Skilled Unskilled	m-day m-day	0.1 4.0						
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.12	400	Making required size square blocks with five sides rough and one side smooth from boulders using chisels including haulage up to 10m and stacking all complete.	1 m^3	Skilled Unskilled	m-day m-day	0.1 16.0						
		Remarks: Add 3% of labour cost for machinary tools and traffic control signs.										
4.13	400	Piling / staking aggregates, stones , bricks, cement bags etc. in the construction site.										
A		Bricks	1000 nos	Unskilled	m-day	0.30						
B		Aggregates	10 m^3	Unskilled	m-day	3.40						
C		Cement bags	100 Bag	Unskilled	m-day	2.0						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
4.14	**400**	**Collecton of Big boulder (weight not less than 40 kg), using mechanical means all complete**										
A		**Loose boulder**	**15 m^3**							Excavator	hr	1.00
B		**Embedded boulder**	**15 m^3**							Excavator	hr	2.00

SECTION 5 - TRANSPORTATION OF MATERIAL

5.1 TRANSPORTATION BY TRUCK / TIPPER

SPEED OF TRUCK

I SPEED OF LOADED TRUCK

	Earthen Road (ER)	Gravelled Road(GR)	Black Top (BT)
Terai	**20**	**30**	**40**
Hill/Mountain	**10**	**15**	**20**

II SPEED OF EMPTY (UNLOADED) TRUCK = 1.25 x Speed of loaded truck

Assumptions:

1 Distance = D

2 Speed of loaded truck = S_1 kmph

3 Speed of Unloaded truck = S_2 kmph

4 Loading and unloading time = 0.75 hrs

5 Time for single trip = T hrs

= (Distance/Speed of loaded truck + Distance/Speed of Unloaded truck + Loading and Unloading time) hrs

= $(D/S_1 + D/S_2 + 0.75)$ hrs.

Table 1:

Distance - D	Full time taken by Truck per Trip-T hours					
	10 kmph	15kmph	20 kmph	30 kmph	40 kmph	50 kmph
1.0	0.93	0.87	0.84	0.81	0.795	0.786
2.0	1.11	0.99	0.93	0.87	0.84	0.822
3.0	1.29	1.11	1.02	0.93	0.885	0.858
4.0	1.47	1.23	1.11	0.99	0.93	0.894
5.0	1.65	1.35	1.2	1.05	0.975	0.93
Above 5 km per km	0.18	0.12	0.09	0.06	0.045	0.036

Table 2:

S.N.	Materials	Weight kg/m³	Void %	Per trip transportation by trucks				Labour for Loading and Unloading							Remarks
				5 MT truck	6 MT truck	8 MT truck	12 MT truck	First 1 km	First 2 km	First 3 km	First 4 km	First 5 km	Above 5km /km	Truck Idle hr.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Dug Soil	1450	20	4.14 m³	5 m³	6.62 m³	9.93 m³	0.21	0.254	0.298	0.344	0.386	0.044	0.221	
2	Sand Surkhi, Muram	1450	30	4.48 m³	5.38 m³	7.17 m³	10.76 m³	0.204	0.246	0.289	0.332	0.375	0.043	0.214	
3	Gravel 40mm	1600	25	3.9 m³	4.69 m³	6.25 m³	9.38 m³	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
4	Broken stone 40mm	1600	30	4.06 m³	4.87 m³	6.5 m³	9.75 m³	0.204	0.246	0.289	0.332	0.375	0.043	0.214	
5	Broken stone 40mm	1450	40	4.83 m³	5.79 m³	7.72 m³	11.59 m³	0.221	0.267	0.313	0.36	0.406	0.046	0.232	
6	Brickbat	1000	35	6.75 m³	8.1 m³	10.8 m³	16.2 m³	0.221	0.267	0.313	0.36	0.406	0.046	0.232	Number of
7	Soling Stone, boulder	2400	40	2.92 m³	3.5 m³	4.67 m³	7 m³	0.221	0.267	0.313	0.37	0.406	0.046	0.232	bricks per
8	Big boulder/ Stone	2400	20	2.5 m3	3.0 m3	4.0 m3	6.0 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	cubic meter
9	Dug Stone	2400	50	3.13 m³	3.76 m³	5 m³	7.5 m³	0.221	0.267	0.313	0.37	0.406	0.046	0.232	= 500
10	Brick	1600	30	2000 Nr	2400 Nr	3200 Nr	4800 Nr	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
12	Cement, Steel			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
13	Bitumen			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
14	Stone Block			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
15	GI CI Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
16	CC Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
17	HDPE Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
18	Lime, wood			5 MT	6 MT	8 MT	12 MT	0.168	0.203	0.238	0.274	0.306	0.035	0.176	

Depending upon the type of materials and the quantity possible to be transported, select the type of truck to be used from tab 2. For example , assume a quantity to be transportated is Q. then for a determinded distance and given speed of truck read out the time required per trip form table 1. Assume this time as T. the figure obtained by dividing T. by Q is the time in hours taken by that truck for transportion unit quantity of the material to that distance. Assume this time is t. By knowing the per hour hiring rate of the truck, the hire charege of transportation of material to that distance per unit will be equal to hire charge per hour *t.

Note: Hire Charge of Trucks/Tipper is included separately in Estimation of Equipment Ownership and Operating Costs

5 TRANSPORTATION BY TRACTOR

SPEED OF TRACTOR

I SPEED OF LOADED TRACTOR

	Earthen Road (ER)	Gravelled Road(GR)	Black Top (BT)
Terai	10	15	20
Hill/Mounta	7	10	15

II SPEED OF EMPTY (UNLOADED) TRACTOR = 1.25 x Speed of loaded TRACTOR

Assumptions:

1 Distance = D

2 Speed of loaded Tractor = S_1 kmph

3 Speed of Unloaded Tractor = S_2 kmph

4 Loading and unloading time = 0.75 hrs

5 Time for single trip = T hrs

= (Distance/Speed of loaded Tractor + Distance/Speed of Unloaded Tractor + Loading and Unloading time) hrs

= $(D/S_1 + D/S_2 + 0.75)$ hrs.

Table 1:

Distance - D	Full time taken by Tractor per Trip-T hours					
	3 kmph	3.5kmph	4 kmph	5 kmph	6 kmph	7 kmph
1.0	1.35	1.26	1.2	1.11	1.05	1.01
2.0	1.95	1.78	1.65	1.47	1.35	1.26
3.0	2.55	2.29	2.1	1.83	1.65	1.52
4.0	3.15	2.81	2.55	2.19	1.95	1.78
5.0	3.75	3.32	3	2.55	2.25	2.04
Above 5 km per km	0.60	0.51	0.45	0.36	0.30	0.26

Table 2:

S.N.	Materials	Weight kg/m³	Void %	Per trip transportaion by trucks 4.1 MT tractor	Labour for Loading and Unloading							Remarks
					First 1 km	First 2 km	First 3 km	First 4 km	First 5 km	Above 5km /km	Tractor Idle hr.	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Dug Soil	1450	20	3.39 m3	0.21	0.254	0.298	0.344	0.386	0.044	0.221	
2	Sand Surkhi, Muram	1450	30	3.68 m3	0.204	0.246	0.289	0.332	0.375	0.043	0.214	Number of bricks per cubic meter = 500
3	Gravel 40mm	1600	25	3.20 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
4	Shingle 40 mm	1450	35	3.82 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
5	Broken stone 40mm	1600	30	3.33 m3	0.204	0.246	0.289	0.332	0.375	0.043	0.214	
6	Broken stone 40mm	1450	40	3.96 m3	0.221	0.267	0.313	0.36	0.406	0.046	0.232	
7	Brickbat	1000	35	5.54 m3	0.221	0.267	0.313	0.36	0.406	0.046	0.232	
8	Soling Stone, boulder	2400	40	2.39 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
9	Big boulder	2400	20	2.05 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
10	Dug Stone	2400	50	2.56 m3	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
11	Brick	1600	30	1500 Nr	0.221	0.267	0.313	0.37	0.406	0.046	0.232	Number of bricks per cubic meter = 500
12	Cement, Steel			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
13	Bitumen			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
14	Stone Block			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
15	GI CI Pipe			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
16	CC Pipe			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
17	HDPE Pipe			4.1 MT	0.221	0.267	0.313	0.37	0.406	0.046	0.232	
18	Lime, wood			4.1 MT	0.168	0.203	0.238	0.274	0.306	0.035	0.176	

Depending upon the type of materials and the quantity possible to be transported, select the type of tractor to be used from tab 2. For example , assume a quantity to be transportated is Q. then for a determinded distance and given speed of tractor read out the time required per trip form table 1. Assume this time as T. the figure obtained by dividing T. by Q is the time in hours taken by that tractor for transportion unit quantity of the material to that distance. Assume this time is t. By knowing the per hour hiring rate of the tractor the hire charege of transportation of material to that distance per unit will be equal to hire charge per hour *t.

Note: Hire Charge of tractor is included separately in Estimation of Equipment Ownership and Operating Costs

5.3 TRANSPORTATION (HAULAGE) BY LABOUR

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
5.3.1	500	**Loading, Hauling, Unloading and Piling of materials by labour using baskets such as doko, Tokari, Kharpan, thunse, etc. all complete.**										
A		**Clay, sand and stone dust**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	0.4						
II		**For every additional**	1 m³	Unskilled	m-day	0.12						
B		**Pebble, gravel and aggregates**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	0.3						
II		**For every additional**	1 m³	Unskilled	m-day	0.13						
C		**Rubble, block stone, dressed stone andbricks**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	1.1						
II		**For every additional**	1 m³	Unskilled	m-day	0.19						
D		**Planks, logs and timber**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	0.5						
II		**For every additional**	1 m³	Unskilled	m-day	0.08						
E		**Cement and lime**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	0.5						
II		**For every additional**	1 m³	Unskilled	m-day	0.13						
F		**Boring tools, paint, grill, oil, iron and crippled trucks**										
I		**First 10m haulage**	1 m³	Unskilled	m-day	0.15						

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
II		**For every additional 10m.**	**1 m³**	Unskilled	m-day	0.13						
G		**Iron rods required for main beam, bridge deck slab etc.**										
I		**First 10m haulage**	**1 m³**	Unskilled	m-day	1.11						
II		**For every additional 10m.**	1 m³	Unskilled	m-day	0.364						
H		**Water**										
I		**First 10m haulage**	**1 m³**	Unskilled	m-day	2						
II		**For every additional**	**1 m³**	Unskilled	m-day	0.5						
		Note:										
		1) Add 3% of labour cost for tools and plants.										
5.3.2	500	**Loading, Hauling, Unloading and Piling of materials by labour using wheel barrow all complete.**										
A		**Clay and soils**										
I		**First 10m haulage**	**1 m³**	Unskilled	m-day	0.2						
II		**For every additional**	**1 m³**	Unskilled	m-day	0.13						
B		**Pebble, gravel and aggregates**										
I		**First 10m haulage**	**1 m³**	Unskilled	m-day	0.5						
II		**For every additional**	**1 m³**	Unskilled	m-day	0.1						
C		**Rubble, block stone, dressed stone and bricks**										
I		**First 10m haulage and piling**	**1 m³**	Unskilled	m-day	0.67						
II		**For every additional 10m.**	**1 m³**	**Unskilled**	**m-day**	**0.143**						

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Note: **1) Add 3% of labour cost for tools and plants.**										
5.3.3	500	**Loading, Hauling and Unloading timber pole by labour all complete.**										

First 10m haulage	0.5 man day/m^3
For every additional 10m.	0.08 man day/m^3
Hauling by porter for first 1000m. distance (0.5 + 0.08*99)	8.42 man day/m^3
Hauling by porter for every additional 1000m. distance (0.08 man day/m3 X 100)	8 man day/m^3
Hauling by porter for first 5000m. (8.42 + 4*8)	40.42 man day/m^3

If two number labours are required for carrying a piece of pole, the mandays should be multiplied by the coefficient given below. For calculation take 20 kg. of weight for a man if the pole length is 6m. and 25 kg. if the pole length is

S.N.	Total number of labour	Pole length 4.6m coefficient	Pole length 6m coefficient
1	4	1.05	1.10
2	6	1.10	1.15
3	8	1.20	1.30
4	10	1.35	1.40
5	12	1.65	1.55
6	14	1.85	1.70
7	16	2.20	2.00

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
5.3.4	500	Material collection and haulage by labour (assuming 1 labour can carry 40kgs per day upto 13km) all										
A		Collection, screening and haulage of river sand	1 m³	Unskilled	m-day	40						
B		Collection and haulage of broken stone or river bed stone	1 m³	Unskilled	m-day	60						
C		Collection, screening and haulage of stone aggregates	1 m³	Unskilled	m-day	80						
D		Breaking and halauge of 13mm to 19mm aggregates	1 m³	Unskilled	m-day	120						
5.3.5	500	Haulage of river sand and pebbles all complete										
A		upto 5 km distance	1 m³	Unskilled	m-day	20						
B		Above 5km distance	1 m³	Unskilled	m-day	40						
5.3.6	500	Hauling pipe by labour (assuminig 1 labour can cover following distance per day carrying 25kg pipe load)										
i		First day 13km										
ii		Second day 26 km										
iii		Third day 39 km										
iv		Fourth day 52 km										
v		Fifth day 65 km										
vi		Sixth day 77km										
vii		Seventh day 89 km										
viii		Eight day 101 km										
ix		Ninth day 113 km										

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
x		**Tenth day 125 km**										
xi		**Eleventh day 136 km**										
xii		**Twelvth day 147 km**										
xiii		**Thirteenth day 158 km**										
xiv		**Fourteenth day 169 km**										
xv		**Fifteenth day 180 km**										
5.4	**500**	**Hauling by mules (assuming 72 kg haulage upto 13 km per day)**	**1 m³**	Mules	nr	20						
5.5	**500**	**Loading of RCC hume pipes (each pipe of 2.5m length) including lead upto 30m all complete.**										
A		**900mm/1000mm/1200mm dia. pipe**										
I		**By Mechanical Means**	15m	Skilled	m-day	0.5				Tipper Truck	hr	1
				Unskilled	m-day	2				Crane (3T)	hr	1
II		**By Manual Means**	15m	Skilled	m-day	0.3				Tipper Truck	hr	4
				Unskilled	m-day	3				Tools and Plants	3% of Labour Cost	
										Wooden Slippers	hr	4
B		**600mm/750mm dia. pipe**										
I		**By Mechanical Means**	25m	Skilled	m-day	0.5				Tipper Truck	hr	1
				Unskilled	m-day	2				Crane (3T)	hr	1
II		**By Manual Means**	25m	Skilled	m-day	0.3				Tipper Truck	hr	4
				Unskilled	m-day	4				Tools and Plants	3% of Labour Cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
C		**300mm/450mm dia. pipe**								Wooden Slippers	hr	4
I		**By Mechanical Means**	37.5m	Skilled	m-day	0.5				Tipper Truck	hr	1
				Unskilled	m-day	2				Crane (3T)	hr	1
II		**By Manual Means**	37.5m	Skilled	m-day	0.3				Tipper Truck	hr	4
				Unskilled	m-day	5				Tools and Plants	3% of Labour Cost	
										Wooden Slippers	hr	4
5.6	500	**Unloading of RCC hume pipes (each pipe of 2.5m length) including lead upto 30m all complete.**										
A		**900mm/1000mm/1200mm dia. pipe**										
I		**By Mechanical Means**	15m	Skilled	m-day	0.1				Tipper Truck	hr	0.5
				Unskilled	m-day	1				Crane (3T)	hr	0.5
II		**By Manual Means**	15m	Skilled	m-day	0.3				Tipper Truck	hr	3
				Unskilled	m-day	1.5				Tools and Plants	3% of Labour Cost	
										Wooden Slippers	hr	3
B		**600mm/750mm dia. pipe**										
I		**By Mechanical Means**	25m	Skilled	m-day	0.5				Tipper Truck	hr	0.5
				Unskilled	m-day	1				Crane (3T)	hr	0.5
II		**By Manual Means**	25m	Skilled	m-day	0.3				Tipper Truck	hr	3
				Unskilled	m-day	1.5				Tools and Plants	3% of Labour Cost	
										Wooden Slippers	hr	3
C		**300mm/450mm dia. pipe**										
I		**By Mechanical Means**	37.5m	Skilled	m-day	0.1				Tipper Truck	hr	0.5
				Unskilled	m-day	1				Crane (3T)	hr	0.5
II		**By Manual Means**	37.5m	Skilled	m-day	0.3				Tipper Truck	hr	3

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
				Unskilled	m-day	1.5				Tools and Plants	3% of Labour Cost	
										Wooden Slippers	hr	3
		Note:										
		1. Wooden Slipper shall be 3 in numbers of size 250mm*250mm*125mm										
		2. Hire Charge of Wooden Slipper shall be as per market reasoable hire charge.										

SECTION 6: BRICKWORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
6.1	600	**Brick masonry works including supplying of materials and making mortar as per drawing and specifications, haulage upto 30m.**										
A		**Machine made bricks**										
I		**1:3 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	530			
				Unskilled	m-day	2.2	cement	M.t.	0.13			
							sand	cu.m.	0.27			
							Water	KL	0.065			
II		**1:4 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	530			
				Unskilled	m-day	2.2	cement	M.t.	0.1			
							sand	cu.m.	0.27			
							Water	KL	0.05			
III		**1:5 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	530			
				Unskilled	m-day	2.2	cement	M.t.	0.09			
							sand	cu.m.	0.31			
							Water	KL	0.045			
IV		**1:6 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	530			
				Unskilled	m-day	2.2	cement	M.t.	0.07			
							sand	cu.m.	0.3			
							Water	KL	0.035			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Chimney (Bhatta) bricks**										
I		**1:3 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	560			
				Unskilled	m-day	2.2	cement	M.t.	0.13			
							sand	cu.m.	0.27			
							Water	KL	0.065			
II		**1:4 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	560			
				Unskilled	m-day	2.2	cement	M.t.	0.1			
							sand	cu.m.	0.28			
							Water	KL	0.05			
III		**1:6 cement sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	560			
				Unskilled	m-day	2.2	cement	M.t.	0.07			
							sand	cu.m.	0.3			
							Water	KL	0.035			
IV		**1:1:1 Lime surkhi sand mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	560			
				Unskilled	m-day	2.2	Lime	cu.m.	0.14			
							Surkhi	Nr	0.14			
							Sand	cu.m.	0.14			
							Water	KL	0.07			
V		**1:2 Lime surkhi mortar**	**1 m³**	Skilled	m-day	1.5	Bricks	Nr	560			
				Unskilled	m-day	2.2	Lime	cu.m.	0.14			
							Surkhi	cu.m.	0.28			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Water	KL	0.07			
VI		**Mud mortar**	1m³	Skilled	m-day	1	Bricks	Nr	560			
				Unskilled	m-day	1.7	Soils	cu.m.	0.42			
							Water	KL	0.273			
		Remarks: If concrete mixture is used to mix mortar, provide concrete mixture 0.15 hrs and reduce 1 unskilled m-day on every 1 cum work in above item no. 6.1.										
6.2	600	**Additional requirement (labour and support materials) for making support for brickwork in cement mortar**										
A		**For ground floor**	1m³	Unskilled	m-day	0.2	Planks, bamboo, ropes, nails, etc.		3% of labour cost			
B		**For each additional storey**	1m³	Unskilled	m-day	0.7	Planks, bamboo, ropes, nails, etc.		3% of labour cost			
C		**For well construction**	1m³	Unskilled	m-day	1	Planks, bamboo, ropes, nails, etc.		3% of labour cost			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
6.3	600	**Removing damaged bricks from wall face and repairing it with cement sand mortar (1:6)**	1m³	Skilled Unskilled	m-day m-day	3.53 7.06	First class bricks Cement Sand	Nr kg cu.m.	560 84 0.36			
6.4	600	**Removing damaged bricks from wall face & repairing it with limed surkhi mortar (1:2)**	10 m³	Skilled Unskilled	m-day m-day	35.28 70.56	First class bricks Lime Surkhi	Nr cu.m. cu.m.	5600 1.4 2.8			
6.5	600 1403	**Wiping the old brick surface with linseed oil and painting it by prepared enamel paint (single coat)**	10 m³	Skilled Unskilled	m-day m-day	0.538 0.538	Linseed oil Prepared enamel paint	Ltr. Ltr.	0.538 1.614			
		Remarks: **1. Size of Brick considered here is 224mm*108mm*57 mm. For the other size of brick, number of brick and mortar per unit of work can be increased or decreased accordingly.** **2. For Rectangular, Circular Works in Pile and circular works in other structures, labour cost shall be increased by 15% and number of bricks per unit of work shall be increased by 5%.**										

SECTION 7: STONE WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
7.1	702, 703, 708	**Providing and laying of Stones in the foundation and levelling all complete as per Drawing and Specifications, haulage distance up to 30 m.**	1 m³	Unskilled	m-day	1.5	Stone	cu.m.	1.1			
7.2	702, 703, 708	**Providing and laying of Random Rubble Stone masonry works all complete as per Drawing and Specifications, wall upto 5m high and haulage distance up to 30m.**										
A		**Drywall**	5 m³	Skilled	m-day	5	Stone	cu.m.	5.5			
				Unskilled	m-day	10						
		Remarks: Add 1.17 man-days unskilled labour per cum of work for wall 5-10m high										
B		**Mud mortar wall**	5 m³	Skilled	m-day	5	Stone	cu.m.	5.5			
				Unskilled	m-day	11	Mud (Clay)	cu.m.	2.00			
							Water	KL	1.00			
		Remarks: Add 1.17 man-days unskilled labour per cum of work for wall 5-10m high										
7.3	702, 703, 707	**Providing and laying of Random Rubble Stone masonry works in cement sand mortar in foundation all complete as per Drawing and Specifications, haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:3)**	5 m³	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	14	Cement	Mt	0.72			
							Sand	cu.m.	1.65			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Water	KL	0.43			
B		**Cement Sand Mortar (1:4)**	**5 m³**	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	14	Cement	Mt	0.58			
							Sand	cu.m.	1.76			
							Water	KL	0.35			
C		**Cement Sand Mortar (1:6)**	**5 m³**	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	14	Cement	Mt	0.42			
							Sand	cu.m.	1.89			
							Water	KL	0.25			
		Remarks: If concrete mixture is used to mix mortar, provide concrete mixture 0.75 hrs and reduce 5 unskilled m-day on every 5 cum work in above mentioned value of unskilled manpower in item no. 7.3.										
7.4	702, 703, 707	**Providing and laying of Random Rubble Stone masonry works in cement sand mortar in structure all complete as per Drawing and Specifications, haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:3)**	**5 m³**	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	20	Cement	Mt	0.72			
							Sand	cu.m.	1.65			
							Water	KL	0.43			
		Add 5% of cost of labour and materials for scaffolding										
B		**Cement Sand Mortar (1:4)**	**5 m³**	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	20	Cement	Mt	0.58			
							Sand	cu.m.	1.76			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Water	KL	0.35			
		Add 5% of cost of labour and materials for scaffolding										
C		**Cement Sand Mortar (1:6)**	**5 m³**	Skilled	m-day	7	Stone	cu.m.	5.75			
				Unskilled	m-day	20	Cement	Mt	0.42			
							Sand	cu.m.	1.89			
							Water	KL	0.25			
		Add 5% of cost of labour and materials for scaffolding										
		Remarks: If concrete mixture is used to mix mortar, provide concrete mixture 0.75 hrs and reduce 5 unskilled m-day on every 5 cum work in above mentioned value of unskilled manpower in item no. 7.4.										
7.5	702, 703, 707	**Providing and laying of coursed Rubble Stone masonry (first sort) works in cement sand mortar in structure all complete as per Drawing and Specifications, haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:3)**	**5 m³**	Skilled	m-day	8	Stone (sorted)	cu.m.	5.75			
				Unskilled	m-day	22	Cement	Mt	0.72			
							Sand	cu.m.	1.65			
							Water	KL	0.43			
		Add 5% of cost of labour and materials for scaffolding										
B		**Cement Sand Mortar (1:4)**	**5 m³**	Skilled	m-day	8	Stone (sorted)	cu.m.	5.75			
				Unskilled	m-day	22	Cement	Mt	0.58			
							Sand	cu.m.	1.76			
							Water	KL	0.35			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Add 5% of cost of labour and materials for scaffolding										
C		**Cement Sand Mortar (1:6)**	**5 m³**	Skilled	m-day	8	Stone (sorted)	cu.m.	5.75			
				Unskilled	m-day	22	Cement	Mt	0.42			
							Sand	cu.m.	1.89			
							Water	KL	0.25			
		Add 5% of cost of labour and materials for scaffolding										
		Remarks: If concrete mixture is used to mix mortar, provide concrete mixture 0.75 hrs and reduce 5 unskilled m-day on every 5 cum work in above mentioned value of unskilled amnpower in item no. 7.5.										
7.6	702, 703, 707	**Providing and laying of Random Rubble Stone masonry works in cement sand mortar in arch, curved and sloped/slanted structure all complete as per Drawing and Specifications, haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:3)**	**1 m³**	Skilled	m-day	2	Stone	cu.m.	1.1			
				Unskilled	m-day	5.4	Cement	Mt	0.194			
							Sand	cu.m.	0.42			
							Water	KL	0.12			
		Add 5% of cost of labour and materials for scaffolding										
B		**Cement Sand Mortar (1:4)**	**1 m³**	Skilled	m-day	2	Stone	cu.m.	1.1			
				Unskilled	m-day	5.4	Cement	Mt	0.159			
							Sand	cu.m.	0.45			
							Water	KL	0.10			
		Add 5% of cost of labour and materials for scaffolding										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Cement Sand Mortar (1:6)**	**1 m³**	Skilled	m-day	2	Stone	cu.m.	1.1			
				Unskilled	m-day	5.4	Cement	Mt	0.106			
							Sand	cu.m.	0.47			
							Water	KL	0.06			
		Add 5% of cost of labour and materials for scaffolding										
		Remarks: If concrete mixture is used to mix mortar, provide concrete mixture 0.75 hrs and reduce 5 unskilled m-day on every 5 cum work in above mentioned value of unskilled manpower in item no. 7.6.										
7.7	702, 703, 706	**Providing and laying of quarry (broken) Stone works in lime sand mortar all complete as per Drawing and Specifications.**										
		Lime Sand Mortar (1:2)	**10 m³**	Skilled	m-day	15	Stone	Cu.m.	11.00			
				Unskilled	m-day	42	Lime	Cu.m.	1.60			
							Sand	cu.m.	3.20			
							Water	KL	1.04			
7.8	702, 703, 706	**Providing and laying of dressed quarry Stone works in cement Sand mortar all complete as per Drawing and Specifications.**										
		Cement Sand Mortar (1:6)	**10 m³**	Skilled	m-day	15	Dressed Stone	Cu.m.	11.00			
				Unskilled	m-day	30	Cement	Mt	0.84			
							Sand	cu.m.	3.78			
							Water	KL	0.504			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
7.9	702, 703, 710	**Providing and laying of Concrete mesh blocks in cement sand mortar (1:4) all complete as per Drawing and Specifications, haulage distance up to 30m.**	10 m^2	Skilled	m-day	1.1	5cm thick Concrete mesh	sq.m.	10.50			
				Unskilled	m-day	1.8						
							Cement	Mt	0.121			
							Sand	cu.m.	0.431			
							Water	KL	0.100			
7.10	702, 703, 710	**Providing and laying of Concrete hollow blocks in cement sand mortar all complete as per Drawing and Specifications, haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:4) Hollow blocks (200mm*200mm*150mm)**	10 m^2	Skilled	m-day	2.5	Hollow blocks	nos.	190.00			
				Unskilled	m-day	2.5	Cement	Mt	0.14			
							Sand	cu.m.	0.44			
							Water	KL	0.120			
B		**Cement Sand Mortar (1:6) Hollow blocks (200mm*200mm*150mm)**	10 m^2	Skilled	m-day	2.5	Hollow blocks	nos.	190.00			
				Unskilled	m-day	2.5	Cement	Mt	0.10			
							Sand	cu.m.	0.42			
							Water	KL	0.050			
7.11	702, 703, 710	**Providing and laying of Autoclaved Aerated Concrete (AAC) blocks in cement sand mortar all complete as per Drawing and Specifications,haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:4)**	1 m^3	Skilled	m-day	2	AAC blocks	nos.	39.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		AAC blocks (600mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.024			
							Sand	cu.m.	0.067			
							Water	KL	0.012			
B		**Cement Sand Mortar (1:6)**	**1 m^3**	Skilled	m-day	2	AAC blocks	nos.	39.00			
		AAC blocks (600mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.017			
							Sand	cu.m.	0.072			
							Water	KL	0.008			
7.12	**702, 703, 710**	**Providing and laying of Concrete Solid blocks in cement sand mortar all complete as per Drawing and Specifications,haulage distance up to 30m.**										
A		**Cement Sand Mortar (1:4)**	**1 m^3**	Skilled	m-day	2	Solid blocks	nos.	58.00			
		Solid blocks (400mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.027			
							Sand	cu.m.	0.075			
							Water	KL	0.013			
B		**Cement Sand Mortar (1:6)**	**1 m^3**	Skilled	m-day	2	Solid blocks	nos.	58.00			
		Solid blocks (400mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.019			
							Sand	cu.m.	0.053			
							Water	KL	0.009			
		Remarks:										
		1. For Other Sizes of Hollow Concrete Blocks (HCB)/ Autoclaved Aerated Concrete (AAC) blocks / Concrete Solid Blocks, number and mortar per unit can be increased or decreased accordingly.										
		2. Add 3% of the cost of unskilled labour for tools and plants in all masonary works items.										

SECTION 8 - CEMENT CONCRETE WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
8.1	814	**Providing and laying Plum Concrete in foundation, vertical faces, walls and abutments as per Drawing and Specifications, haulage distance upto 30 m.**										
A		**60% M 15 Concrete and 40% Boulder / Stones**										
I		**Using Mechanical Aids**	**10 m^3**	Skilled	m-day	3	Cement	Mt.	1.700	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate				hr	6
							20-40 mm	cu.m.	3.450	Concrete Vibrator		
							10-20 mm	cu.m.	1.560			
							5-10 mm	cu.m.	0.720			
							Course Sand	cu.m.	3.000			
							Boulder/ Stones	cu.m.	4.400			
							Water	KL	0.850			
II		**Manual Means**	**1 m^3**	Skilled	m-day	1	Cement	Mt.	0.185			
				Unskilled	m-day	4	Aggregate					
							20-40 mm	cu.m.	0.156			
							10-20 mm	cu.m.	0.072			
							5-10 mm	cu.m.	0.299			
							Course Sand	cu.m.	0.299			
							Boulder/Stone	cu.m.	0.440			
							Water	KL	0.093			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**70% M 15 Concrete and 30% Boulder / Stones**										
I		**Using Mechanical Aids**	**10 m^3**	Skilled	m-day	4	Cement	Mt.	1.950	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate				hr	6
							20-40 mm	cu.m.	4.000	Concrete Vibrator		
							10-20 mm	cu.m.	1.800			
							5-10 mm	cu.m.	0.800			
							Course Sand	cu.m.	3.450			
							Boulder/ Stones	cu.m.	3.300			
							Water	KL	0.975			
II		**Manual Means**	**1 m^3**	Skilled	m-day	1	Cement	Mt.	0.214			
				Unskilled	m-day	4	Aggregate					
							20-40 mm	cu.m.	0.398			
							10-20 mm	cu.m.	0.180			
							5-10 mm	cu.m.	0.082			
							Course Sand	cu.m.	0.345			
							Boulder/ Stones	cu.m.	0.330			
							Water	KL	0.107			
C		**60% M 10 Concrete and 40% Boulder / Stones**										
I		**Using Mechanical Aids**	**10 m^3**	Skilled	m-day	3	Cement	Mt.	1.200	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate				hr	6
							20 mm	cu.m.	4.230	Concrete Vibrator		

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							10 mm	cu.m.	1.410			
							Course Sand	cu.m.	2.820			
							Boulder/ Stones	cu.m.	4.400			
							Water	KL	0.600			
II		**Manual Means**	**1 m^3**	Skilled	m-day	1	Cement	Mt.	0.130			
				Unskilled	m-day	4	Aggregate					
							20 mm	cu.m.	0.423			
							10 mm	cu.m.	0.141			
							Course Sand	cu.m.	0.282			
							Boulder/ Stones	cu.m.	0.440			
							Water	KL	0.065			
D		**70% M 10 Concrete and 30% Boulder / Stones**										
I		**Using Mechanical Aids**	**10 m^3**	Skilled	m-day	3	Cement	Mt.	1.500	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate				hr	6
							20 mm	cu.m.	4.900	Concrete Vibrator		
							10 mm	cu.m.	1.700			
							Course Sand	cu.m.	3.300			
							Boulder/ Stones	cu.m.	3.300			
							Water	KL	0.750			
II		**Manual Means**	**1 m^3**	Skilled	m-day	1	Cement	Mt.	0.160			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	4	Aggregate					
							20 mm	cu.m.	0.490			
							10 mm	cu.m.	0.170			
							Course Sand	cu.m.	0.330			
							Boulder/ Stones	cu.m.	0.330			
							Water	KL	0.080			
8.2	800	**Providing and laying concrete (PCC) in foundation, vertical faces, walls and abutments as per Drawing and Specifications, haulage distance upto 30 m.**										
A		**PCC : Grade M 10**										
I		**Using Mechanical Aids**	**1 m^3**	Skilled	m-day	0.13	Cement	Mt.	0.230	Concrete Mixer	hr	0.4
				Unskilled	m-day	1.4	Aggregate			Generator	hr	0.4
							40mm	cu.m.	0.650		hr	0.25
							20mm	cu.m.	0.240	Concrete Vibrator		
							Course Sand	cu.m.	0.450			
							Water	KL	0.130			
		Remarks: In case of manual mixed, add 50% of Labour component and reduce equipment										
B		**PCC : Grade M 15**										
I		**Using Mechanical Aids**	**1 m^3**	Skilled	m-day	0.2	Cement	Mt.	0.275	Concrete Mixer	hr	0.4
				Unskilled	m-day		Aggregate			Generator	hr	0.4
							40mm	cu.m.	0.540	Concrete Vibrator	hr	0.25

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							20mm	cu.m.	0.270			
							10 mm	cu.m.	0.090			
							Course Sand	cu.m.	0.450			
							Water	KL	0.130			
		Remarks: In case of manual mixed, add 50% of Labour component and reduce equipment										
C		**PCC for RCC : Grade M 20**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	5.210	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10 mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	2.500			
D		**PCC for RCC : Grade M 25**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	6.050	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10 mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	24.2			
E		**PCC for RCC : Grade M 30**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	6.100	Concrete Mixer	hr	6

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	30	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10 mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	24.4			
F		**PCC for RCC : Grade M 35**										
1		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	6.330	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10 mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	25.32			
		Remarks:										
		1) Add @ 3.5% on cost of concrete i.e. cost of materials, labours and equipments for formwork for PCC for RCC Grade M30.										
		2) Add @ 3% on cost of concrete i.e. cost of materials, labours and equipments for formwork for PCC for RCC Grade M35.										
		3) Cost of formwork shall be seperately considered for other grade of concrete (except M30 and M35).										
		4) Provision of quantities of cement, admixture, sand and aggregate for M30 and M35 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.										
8.3	**800**	**Providing and laying Concrete in abutment seats, pier caps etc. as per Drawing and Specifications, haulage distance upto 30 m.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**PCC : Grade M 10**										
I		**Using Mechanical Aids**	1 m^3	Skilled	m-day	0.13	Cement	Mt.	0.220	Concrete Mixer	hr	0.4
				Unskilled	m-day	1.4	Aggregate			Generator	hr	0.4
							40mm	cu.m.	0.650		hr	0.25
							20mm	cu.m.	0.240	Concrete Vibrator		
							sand	cu.m.	0.470			
							Water	KL	0.100			
B		**PCC : Grade M 15**										
I		**Using Mechanical Aids**	1 m^3	Skilled	m-day	0.2	Cement	Mt.	0.320	Concrete Mixer	hr	0.4
				Unskilled	m-day	2	Aggregate			Generator	hr	0.4
							40mm	cu.m.	0.520		hr	0.25
							20mm	cu.m.	0.220	Concrete Vibrator		
							10mm	cu.m.	0.110			
							sand	cu.m.	0.445			
							Water	KL	0.130			
8.4	800	**Providing and laying concrete in super structures, columns, deck slabs, beams as per Drawing and Specifications, haulage upto 30m.**										
A		**PCC for RCC : Grade M 15**										
I		**Using Mechanical Aids**	1 m^3	Skilled	m-day	0.5	Cement	Mt.	0.320	Concrete Mixer	hr	0.4
				Unskilled	m-day	3.5	Aggregate			Generator	hr	0.4
							40mm	cu.m.	0.520		hr	0.25
							20mm	cu.m.	0.220	Concrete Vibrator		
							10mm	cu.m.	0.110			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Course Sand	cu.m.	0.445			
							Water	KL	0.130			
B		**PCC for RCC : Grade M 20**										
I		**Using Mechanical Aids**	**1 m^3**	Skilled	m-day	0.5	Cement	Mt.	0.400	Concrete Mixer	hr	0.4
				Unskilled	m-day	3.5	Aggregate			Generator	hr	0.4
							20mm	cu.m.	0.570		hr	0.25
							10mm	cu.m.	0.290	Concrete Vibrator		
							Course Sand	cu.m.	0.425			
							Water	KL	0.200			
C		**PCC for RCC : Grade M 25**										
I		**Using Mechanical Aids**	**1 m^3**	Skilled	m-day	0.5	Cement	Mt.	0.610	Concrete Mixer	hr	0.4
				Unskilled	m-day	3.5	Aggregate			Generator	hr	0.4
							20mm	cu.m.	0.640		hr	0.25
							10mm	cu.m.	0.210	Concrete Vibrator		
							Course Sand	cu.m.	0.425			
							Water	KL	0.300			
							Admixture	Kg	2.44			
D		**PCC for RCC : Grade M 30**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	6.100	Concrete Mixer	hr	6
				Unskilled	m-day	32	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10mm	cu.m.	5.400	Concrete Vibrator		

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	24.4			
		Remarks: **1) For height upto 5m, add @ 20% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging** **2) For height above 5m to 10m, add @ 25% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.** **3) For height above 10m , add @ 30% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.** **4) Provision of quantities of cement, admixture, sand and aggregate for M30 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.**									
E		**PCC for RCC/PSC : Grade M 35**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	3	Cement	Mt.	6.330	Concrete Mixer	hr	6
				Unskilled	m-day	32	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	25.32			
		Remarks: **1) For height upto 5m, add @ 18% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.** **2) For height above 5m to 10m, add @ 23% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.** **3) For height above 10m , add @ 28% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.** **4) Provision of quantities of cement, admixture, sand and aggregate for M35 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.**									

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**PCC for RCC/PSC : Grade M 40**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	4	Cement	Mt.	6.450	Concrete Mixer	hr	6
				Unskilled	m-day	33	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	25.8			
		Remarks:										
		1) For height upto 5m, add @ 20% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		2) For height above 5m to 10m, add @ 25% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		3) For height above 10m , add @ 30% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		4) Provision of quantities of cement, admixture, sand and aggregate for M40 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.										
G		**PCC for RCC/PSC : Grade M 45**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	4	Cement	Mt.	6.975	Concrete Mixer	hr	6
				Unskilled	m-day	33	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	27.9			
		Remarks:										
		1) For height upto 5m, add @ 20% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		2) For height above 5m to 10m, add @ 25% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		3) For height above 10m , add @ 30% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		4) Provision of quantities of cement, admixture, sand and aggregate for M45 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.										
H		**PCC for RCC/PSC : Grade M 50**										
I		**Using Mechanical Aids**	**15 m^3**	Skilled	m-day	5	Cement	Mt.	7.350	Concrete Mixer	hr	6
				Unskilled	m-day	30	Aggregate			Generator	hr	6
							20mm	cu.m.	8.100		hr	1.5
							10mm	cu.m.	5.400	Concrete Vibrator		
							Course Sand	cu.m.	6.750			
							Water	KL	3.000			
							Admixture	Kg	29.4			
		Remarks:										
		1) For height upto 5m, add @ 20% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		2) For height above 5m to 10m, add @ 25% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		3) For height above 10m , add @ 30% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.										
		4) Provision of quantities of cement, admixture, sand and aggregate for M50 PCC for RCC is for estimating purpose only; exact quantity shall be as per the mix design.										
8.5	**800**	**Providing and laying Concrete using Batching Plant, Transit Mixer and Concrete Pump as per Drawing and Specifications all complete.**										
A		**PCC : Grade M 15**	**120 m^3**	Skilled	m-day	4	Cement	Mt.	38.400	Batching Plant	hr	6
				Unskilled	m-day	18	Aggregate			Generator	hr	6

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							40mm	cu.m.	62.400	Loader	hr	6
							20mm	cu.m.	26.400	**Transit Mixer**		
							10mm	cu.m.	13.200	Lead upto 1km	hr	15
							Course Sand	cu.m.	53.400	Lead beyond 1 km, L- lead in km	t-km	300L
							Water	KL	15.600			
							Admixtures	Kg	153.600			
										Concrete Pump	hr.	6
										Concrete Vibrator	hr	30
B		**PCC : Grade M 20**	**120 m^3**	Skilled	m-day	4	Cement	Mt.	41.660	Batching Plant	hr	6
				Unskilled	m-day	18	Aggregate			Generator	hr	6
							20mm	cu.m.	64.800	Loader	hr	6
							10mm	cu.m.	43.200	Transit Mixer		
							Course Sand	cu.m.	54.000	Lead upto 1km	hr	15
							Water	KL	24.000	Lead beyond 1km, L- lead in km	t-km	300L
							Admixtures	Kg	166.640			
										Concrete Pump	hr.	6
										Concrete Vibrator	hr	30
C		**PCC : Grade M 25**	**120 m^3**	Skilled	m-day	4	Cement	Mt.	48.380	Batching Plant	hr	6
				Unskilled	m-day	18	Aggregate			Generator	hr	6
							20mm	cu.m.	64.800	Loader	hr	6
							10mm	cu.m.	43.200	Transit Mixer		
							Course Sand	cu.m.	54.000	Lead upto 1km	hr	15

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Water	KL	27.000	Lead beyond 1km, L- lead in km	t-km	300L
							Admixtures	Kg	193.520			
										Concrete Pump	hr.	6
										Concrete Vibrator	hr	30
D		PCC : Grade M 30	120 m^3	Skilled	m-day	4	Cement	Mt.	48.800	Batching Plant	hr	6
				Unskilled	m-day	18	Aggregate			Generator	hr	6
							20mm	cu.m.	64.800	Loader	hr	6
							10mm	cu.m.	43.200	Transit Mixer		
							Course Sand	cu.m.	54.000	Lead upto 1km	hr	15
							Water	KL	24.400	Lead beyond 1km, L- lead in km	t-km	300L
							Admixtures	Kg	195.200			
										Concrete Pump	hr.	6
										Concrete Vibrator	hr	30
E		PCC : Grade M 35	120 m^3	Skilled	m-day	4	Cement	Mt.	50.640	Batching Plant	hr	6
				Unskilled	m-day	18	Aggregate			Generator	hr	6
							20mm	cu.m.	64.800	Loader	hr	6
							10mm	cu.m.	43.200	Transit Mixer		
							Course Sand	cu.m.	54.000	Lead upto 1km	hr	15
							Water	KL	25.320	Lead beyond 1km, L- lead in km	t-km	300L
							Admixtures	Kg	202.560			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										Concrete Pump	hr.	6
										Concrete Vibrator	hr	30
		Remark:										
		1) Add @ 3.5% on cost of concrete i.e. cost of materials, labours and equipments for formwork for PCC for RCC Grade M30.										
		2) Add @ 3% on cost of concrete i.e. cost of materials, labours and equipments for formwork for PCC for RCC Grade M35.										
		3) Cost of formwork shall be seperately considered for other grade of concrete (except M30 and M35).										
8.6	**800**	**Providing and laying Concrete using designed Ready Mix Concrete (RMC) for superstructure including transportation upto site as per Drawing and Specifications.**	**1 m^3**	Skilled Unskilled	m-day m-day	0.25 1.00	Ready Mix Concrete	cu.m.	1.000	Concrete Vibrator	hr	0.25
8.7	**815**	**Supplying, cutting, bending and placing in position as per drawings and specification and binding by binding wire of reinforcement steel bars for R.C.C works including haulage upto 30m.**										
A		**Manual Means**	**1 Mt.**	Skilled Unskilled	m-day m-day	4 12	M.S. Bars Binding Wires	Mt. Kg.	1.100 8.000			
B		**Using Mechanical**	**1 Mt.**	Skilled Unskilled	m-day m-day	2 6	M.S. Bars Binding Wires	Mt. Kg.	1.100 8.000	Steel Bar Cutter M/c Steel Bar Bending M/c	hr hr	1.5 2.5
		Remarks:										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		1) Above norms (8.7 A & 8.7 B) is for works upto 4m height/depth. 2) For every additional height/depth of 3m beyond normal height/depth of 4m, add 10% of cost of labour in 8.7 A and 8.7 B whichever is applicable.										
8.8	**800**	**P.C.C works for precast slabs, beams etc. including concrete preparation and hauling up to 30m distance and pouring in place.**										
A		**P.C.C M15 (Using Mechanical Means)**	**1 m^3**	Skilled	m-day	0.5	Cement	MT	0.320	Concrete Mixer	hr	0.4
				Unskilled	m-day	3.5	Sand	cu.m.	0.445	Generator	hr	0.4
							Aggrts				hr	0.25
							40mm	cu.m.	0.520	Concrete Vibrator		
							20mm	cu.m.	0.220			
							10mm	cu.m.	0.110			
							Water	KL	0.160			
8.9	**819**	**Providing, mixing and applying waterproof coat including haulage up to 30m. (in three coats @10.76 litre/ 10 sqm, one coat of self-priming of fibre reinforced elastomeric waterproofing liquid (dilution with water in the ratio of 3:1) and two coats of undiluted fibre reinforced elastomeric waterproofing liquid)**	**100 m^2**	Skilled	m-day	7.5	Water					
				Unskilled	m-day	7.5	Proofing material	Ltr	112.980			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: Add 3% of cost of unskilled labour for tools and plants (Wire brush brushes, rollers etc.)										
8.10	**819**	**Providing and applying of asphalt including melting & haulage upto 30m.**	**10 m^2**	Skilled	m-day	1	Asphalt	Kg	10.000			
				Unskilled	m-day	1	Coal	Kg	2.000			
8.11	**800**	**Underwater Concreting**										
		Providing and laying cement concrete (PCC for RCC : Grade M 30) for under water concreting works as per drawing and technical specification all complete (haulage distance upto 30 m).										
I		**Using Mechanical Aids**	**1 m^3**	Skilled	m-day	0.2	Cement	Mt.	0.407	Concrete Mixer	hr	0.4
				Unskilled	m-day	2	Aggregate			Generator	hr	0.4
							20mm	cu.m.	0.540			
							10 mm	cu.m.	0.360			
							Course Sand	cu.m.	0.383			
							Fine sand	cu.m.	0.067			
							Water	KL	0.183			
							Admixtures	kg	4.067			
		Remarks:										
		1) Add 10% of cost of cement for Concrete pouring tools and arrangement.										

SECTION 9: FORM WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.1	903, 905	**Providing, preparing and installing Form Work for foundation including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using timber (soft wood/ Ku- Kath)**	**10 m^2**	Skilled Unskilled	m-day m-day	1.5 2.0	38 mm thick planks	cum	0.42			
							Struts, ballies, etc	cum	0.18			
							Nails, spikes, etc.	kg	1.00			
B		**Using steel (14 gauge) & angles stiffeners (35mm*35mm*5 mm)**	**10 m^2**	Skilled Unskilled	m-day m-day	1.5 2.5	MS sheet & angle stiffners	kg	495			
							MS pipes 40 mm dia.	m	36			
							Clamps	nos.	21			
							Nuts & bolts 6 mm dia	nos.	178			
		Remarks: **1. Salvage value of planks 25% of its original value.** **2. Salvage value of MS sheets 35% of its original value.** **3. Planks 38mm thick - 6 times usage.** **4. Struts, Ballies, etc.- 9 times usage.**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		5. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.										
		6. MS pipes - 60 times usage.										
9.2	**903, 905**	**Providing, preparing and installing Form Work for walls (guide wall, abudment wall, wing wall, vertical plain surface,etc) including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using timber (soft wood/ Ku- Kath)**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	1.5	38 mm thick planks	cum	0.42			
				Unskilled	m-day	2.0	Struts, ballies, etc	cum	0.25			
							Nails, spikes, etc.	kg	2.00			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	1.8	38 mm thick planks	cum	0.42			
				Unskilled	m-day	2.6	Struts, ballies, etc	cum	0.35			
							Nails, spikes, etc.	kg	3.00			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	2.2	38 mm thick planks	cum	0.42			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	3.1	Struts, ballies, etc	cum	0.45			
							Nails, spikes, etc.	kg	4.00			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
B		**Using Plywood 9mm thick**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	2.2	Plywood	sqm	11.00			
				Unskilled	m-day	2.2	Struts, ballies, etc	cum	0.40			
							Nails, spikes, etc.	kg	2.50			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	2.6	Plywood	sqm	11.00			
				Unskilled	m-day	2.8	Struts, ballies, etc	cum	0.50			
							Nails, spikes, etc.	kg	3.50			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	3.2	Plywood	sqm	11.00			
				Unskilled	m-day	4.0	Struts, ballies, etc	cum	0.60			
							Nails, spikes, etc.	kg	4.50			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
C		**Using steel (14 gauge) & angles stiffeners (35mm*35mm*5 mm)**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	1.6	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	2.2						
							MS pipes 40 mm dia.	m	70			
							Clamps	nos.	40			
							Nuts & bolts 6 mm dia	nos.	178			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	1.9	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	2.8						
							MS pipes 40 mm dia.	m	88			
							Clamps	nos.	50			
							Nuts & bolts 6 mm dia	nos.	178			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	2.3	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	4.0						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							MS pipes 40 mm dia.	m	112			
							Clamps	nos.	64			
							Nuts & bolts 6 mm dia	nos.	178			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
		Remarks: **1. Salvage value of planks and plywood 25% of their respective original value.** **2. Salvage value of MS sheets 35% of its original value.** **3. Planks 38mm thick - 6 times usage.** **4. Ply wood 9mm thick - 6 times usage** **5. Struts, Ballies, etc.- 9 times usage.** **6. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.** **7. MS pipes - 60 times usage.**											
9.3	903, 905	**Providing, preparing and installing Form Work for columns (square / rectangular section) including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using timber (soft wood - Jamun or equivalent)**										
i		**Height upto 3m**		Refer 9.2 A i								

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Height above 3m to 6m**		Refer 9.2 A ii								
iii		**Height above 6m to 9m**		Refer 9.2 A iii								
iv		**Height above 9m**		Refer 9.2 A iv								
B		**Using Plywood 12mm thick**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	2.75	Plywood	sqm	11.00			
				Unskilled	m-day	2.40	Timber	cum	0.50			
							Nails, spikes, etc.	kg	3.00			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	3.2	Plywood	sqm	11.00			
				Unskilled	m-day	3.2	Timber	cum	0.60			
							Nails, spikes, etc.	kg	4.00			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	4.0	Plywood	sqm	11.00			
				Unskilled	m-day	4.4	Timber	cum	0.75			
							Nails, spikes, etc.	kg	5.00			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Using steel (14 gauge) & angles stiffeners (35mm*35mm*5 mm)**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	2.0	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	2.4						
							MS pipes 40 mm dia.	m	90			
							Clamps	nos.	51			
							Nuts & bolts 6	nos.	178			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	2.3	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	3.1						
							MS pipes 40 mm dia.	m	108			
							Clamps	nos.	62			
							Nuts & bolts 6 mm dia	nos.	178			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	2.9	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	4.4						
							MS pipes 40 mm dia.	m	137			
							Clamps	nos.	78			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Nuts & bolts 6 mm dia	nos.	178			
iv		Height above 9m	Increase the rate by 10% for every additional meter height to the rate for previous height									
		Remarks: 1. Salvage value of planks and plywood 25% of their respective original value. 2. Salvage value of MS sheets 35% of its original value. 3. Planks 38mm thick - 6 times usage. 4. Ply wood 12mm thick - 6 times usage 5. Struts, Ballies, etc.- 9 times usage. 6. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage. 7. MS pipes - 60 times usage.											
9.4	903 905	Providing, preparing and installing Form Work for columns (Circular section) including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.										
A i		Using Plywood 9mm thick Height upto 3m	10 m^2	Skilled Unskilled	m-day m-day	3.6 3.3	Plywood Timber Nails, spikes, etc.	sqm cum kg	11.00 0.75 5.00			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Height above 3m to 6m**	**10 m²**	Skilled Unskilled	m-day m-day	4.2 4.2	Plywood Timber Nails, spikes, etc.	sqm cum kg	11.00 1.00 6.50			
iii		**Height above 6m to 9m**	**10 m²**	Skilled Unskilled	m-day m-day	5.2 5.9	Plywood Timber Nails, spikes, etc.	sqm cum kg	11.00 1.20 8.00			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
B		**Using steel (14 gauge) & angles stiffeners (35mm*35mm*5 mm)**										
i		**Height upto 3m**	**10 m²**	Skilled Unskilled	m-day m-day	2.4 3.3	MS sheet & angle stiffners MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	kg m nos. nos.	495 135 77 178			
ii		**Height above 3m to 6m**	**10 m²**	Skilled Unskilled	m-day m-day	2.9 4.2	MS sheet & angle stiffners	kg	495			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
iii		**Height above 6m to 9m**	**10 m^2**	Skilled Unskilled	m-day m-day	3.6 4.9	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia MS sheet & angle stiffners MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos. kg m nos. nos.	162 93 178 495 206 118 178			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
		Remarks: **1. Salvage value of plywood 25% of its original value.** **2. Salvage value of MS sheets 35% of its original value.** **3. Ply wood 9mm thick - 6 times usage** **4. Struts, Ballies, etc.- 9 times usage.** **5. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.** **6. MS pipes - 60 times usage.** **7. For inclined column, multiply the rate of vertical column by 1.1**											

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.5	903 905	**Providing, preparing and installing Form Work for slab structure including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using timber (soft wood - Jamun or**	**10 m^2**	Skilled Unskilled	m-day m-day	1.8 2.5	38 mm thick planks	cum	0.42			
							Rafters, beam,battens, strut etc.	cum	0.12			
							Nails, spikes, etc.	kg	2.50			
B		**Using Plywood 12mm thick**	**10 m^2**	Skilled Unskilled	m-day m-day	1.5 2.50	Plywood	sqm	11.00			
							Rafters, beam,battens, strut etc.	cum	0.10			
							Nails, spikes, etc.	kg	2.00			
C		**Using steel (14 gauge) & angles stiffeners**	**10 m^2**	Skilled Unskilled	m-day m-day	1.25 2.5	MS sheet & angle stiffners	kg	495			
							MS pipes 40 mm dia.	m	32			
							Clamps	nos.	18			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Nuts & bolts 6 mm dia	nos.	178			
		Remarks: **1. Salvage value of planks and plywood 25% of their respective original value.** **2. Salvage value of MS sheets 35% of its original value.** **3. Planks 38mm thick - 6 times usage.** **4. Ply wood 12mm thick - 6 times usage** **5. Struts, Ballies, etc.- 9 times usage.** **6. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.** **7. MS pipes - 60 times usage.**										
9.6	**903** **905**	**Providing, preparing and installing Form Work for beam structure including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using timber (soft wood - Jamun or equivalent)**										
i		**Depth of beam upto 0.30 m**	**10 m^2**	Skilled	m-day	4	38 mm thick planks	cum	0.42			
				Unskilled	m-day	6.0	Rafters, beam,battens, strut etc.	cum	0.30			
							Nails, spikes, etc.	kg	2.50			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Depth of beam upto 0.30 m to 0.8 m**	**10 m^2**	Skilled	m-day	2.67	38 mm thick planks	cum	0.42			
				Unskilled	m-day	4.0						
							Rafters, beam,battens, strut etc.	cum	0.25			
							Nails, spikes, etc.	kg	2.50			
iii		**Depth of beam upto 0.8 m to 1.2 m**	**10 m^2**	Skilled	m-day	2.4	38 mm thick planks	cum	0.42			
				Unskilled	m-day	3.6						
							Rafters, beam,battens, strut etc.	cum	0.20			
							Nails, spikes, etc.	kg	2.50			
B		**Using Plywood 12mm thick**										
i		**Depth of beam upto 0.30 m**	**10 m^2**	Skilled	m-day	3.2	Plywood	sqm	11.00			
				Unskilled	m-day	4.8	Rafters, beam,battens, strut etc.	cum	0.30			
							Nails, spikes, etc.	kg	3.00			
ii		**Depth of beam upto 0.30 m to 0.8 m**	**10 m^2**	Skilled	m-day	2.1	Plywood	sqm	11.00			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	3.2	Rafters, beam,battens, strut etc.	cum	0.25			
							Nails, spikes, etc.	kg	3.00			
iii		**Depth of beam upto 0.8 m to 1.2 m**	**10 m^2**	Skilled	m-day	1.92	Plywood	sqm	11.00			
				Unskilled	m-day	2.88	Rafters, beam,battens, strut etc.	cum	0.20			
							Nails, spikes, etc.	kg	3.00			
C		**Using steel (14 gauge) & angles stiffeners**										
i		**Depth of beam upto 0.30 m**	**10 m^2**	Skilled	m-day	1.5	MS sheet & angle stiffners	kg	400			
				Unskilled	m-day	2.0						
							MS pipes 40 mm dia.	m	32			
							Clamps	nos.	18			
							Nuts & bolts 6 mm dia	nos.	178			
ii		**Depth of beam upto 0.30 m to 0.8 m**	**10 m^2**	Skilled	m-day	1.4	MS sheet & angle stiffners	kg	400			
				Unskilled	m-day	1.9						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
iii		**Depth of beam upto 0.8 m to 1.2 m**	**10 m^2**	Skilled Unskilled	m-day m-day	1.3 1.8	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia MS sheet & angle stiffners MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos. kg m nos. nos.	32 18 178 400 32 18 178			

Remarks:

1. Salvage value of planks and plywood 25% of their respective original value.
2. Salvage value of MS sheets 35% of its original value.
3. Planks 38mm thick - 6 times usage.
4. Ply wood 12mm thick - 6 times usage
5. Struts, Ballies, etc.- 9 times usage.
6. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.
7. MS pipes - 60 times usage.

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.7	903 905	**Providing, preparing, and installing form work for arch structure including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
A		**Using Plywood 12mm thick**	**10 m^2**	Skilled Unskilled	m-day m-day	3.5 3.0	Plywood Rafters, beam,battens, strut etc. Nails, spikes, etc.	cum cum kg	11 0.30 4.00			
B		**Using steel (14 gauge) & angles stiffeners**	**10 m^2**	Skilled Unskilled	m-day m-day	2.5 3.0	MS sheet & angle stiffners MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	kg m nos. nos.	495 32 18 178			
		Remarks: **1. Salvage value of plywood 25% of its original value.** **2. Salvage value of MS sheets 35% of its original value.** **3. Ply wood 12mm thick - 6 times usage** **4. Struts, Ballies, etc.- 9 times usage.**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		5. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.										
		6. MS pipes - 60 times usage.										
9.8	**903** **905**	**Providing, preparing, and installing form work for precast element including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**										
I		**Square/Rectangular section**										
A		**Using Plywood 9mm thick**	**10 m^2**	Skilled	m-day	2.5	Plywood	cum	11			
				Unskilled	m-day	2.0	Rafters, beam,battens, strut etc.	cum	0.20			
							Nails, spikes, etc.	kg	2.00			
B		**Using steel (14 gauge) & angles stiffeners**	**10 m^2**	Skilled	m-day	2.0	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	2.0						
							MS pipes 40 mm dia.	m	32			
							Clamps	nos.	18			
							Nuts & bolts 6 mm dia	nos.	178			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**Circular section**										
A		**Using Plywood 9mm thick**	**10 m^2**	Skilled	m-day	3	Plywood	cum	11			
				Unskilled	m-day	2.5	Rafters, beam,battens, strut etc.	cum	0.20			
							Nails, spikes, etc.	kg	3.00			
B		**Using steel (14 gauge) & angles stiffeners**	**10 m^2**	Skilled	m-day	2.5	MS sheet & angle stiffners	kg	495			
				Unskilled	m-day	2.0						
							MS pipes 40 mm dia.	m	42			
							Clamps	nos.	24			
							Nuts & bolts 6 mm dia	nos.	178			
III		**For curved precast elements, multiply the rates for straight elements as determined above in 9.8 by 1.25**										
		Remarks:										
		1. Salvage value of plywood 25% of its original value.										
		2. Salvage value of MS sheets 35% of its original value.										
		3. Ply wood 12mm thick - 6 times usage										
		4. Struts, Ballies, etc.- 9 times usage.										
		5. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.										
		6. MS pipes - 60 times usage.										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.9	**904**	**Providing and assembling in postion falsework for the construction of RCC superstructure and removing after completion including desgin and drawing as per Specifications and direction of Engineer.**										
I		**For RCC Beam (Bridge/ Aqueduct)**										
A		**Using timber (soft wood - Jamun or equivalent)**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	14	Timber	cum	2.00			
				Unskilled	m-day	14.0	Nails, spikes, etc.	kg	6.00			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	28	Timber	cum	4.00			
				Unskilled	m-day	32.0	Nails, spikes, etc.	kg	12.00			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	40	Timber	cum	7.00			
				Unskilled	m-day	50.0	Nails, spikes, etc.	kg	21.00			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
B		**Using steel**										
i		**Height upto 3m**	**10 m^2**	Skilled	m-day	7	MS pipes 40 mm dia.	m	300.00			
				Unskilled	m-day	11.0						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Clamps	nos.	171.00			
							Nuts & bolts 6 mm dia	nos.	178.00			
ii		**Height above 3m to 6m**	**10 m^2**	Skilled	m-day	14	MS pipes 40 mm dia.	m	600.00			
				Unskilled	m-day	25.0	Clamps	nos.	342.00			
							Nuts & bolts 6 mm dia	nos.	178.00			
iii		**Height above 6m to 9m**	**10 m^2**	Skilled	m-day	20	MS pipes 40 mm dia.	m	980.00			
				Unskilled	m-day	40.0	Clamps	nos.	560.00			
							Nuts & bolts 6 mm dia	nos.	178.00			
iv		**Height above 9m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
		<u>Remarks:</u> **1. Salvage value of planks 25% of its original value.** **2. Salvage value of MS Pipes 35% of its original value.** **3. Timber - 8 times usage** **4. Clamps and nut and bolts - 40 times usage.** **5. MS pipes - 60 times usage.** **6. Add 3% of total unit rate of false work for the design and drawings**											

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**For Slab and Box culverts**										
A		**Using timber (soft wood - Jamun or equivalent)**										
i		**Height upto 2m**	**10 m^2**	Skilled	m-day	8	Timber	cum	0.80			
				Unskilled	m-day	8.0	Nails, spikes, etc.	kg	2.50			
ii		**Height above 2m to 4m**	**10 m^2**	Skilled	m-day	16	Timber	cum	1.40			
				Unskilled	m-day	18.0	Nails, spikes, etc.	kg	4.00			
iii		**Height above 4m to 6m**	**10 m^2**	Skilled	m-day	24	Timber	cum	1.90			
				Unskilled	m-day	28.0	Nails, spikes, etc.	kg	5.50			
iv		**Height above 6m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
B		**Using steel**										
i		**Height upto 2m**	**10 m^2**	Skilled	m-day	4	MS pipes 40 mm dia.	m	240.00			
				Unskilled	m-day	6.0	Clamps	nos.	137.00			
							Nuts & bolts 6 mm dia	nos.	178.00			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Height above 2m to 4m**	**10 m^2**	Skilled Unskilled	m-day m-day	8 14.0	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.	42.00 24.00 178.00			
iii		**Height above 4m to 6m**	**10 m^2**	Skilled Unskilled	m-day m-day	12 20.0	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.	570.00 325.00 178.00			
iv		**Height above 6m**	**Increase the rate by 10% for every additional meter height to the rate for previous height**									
		Remarks: **1. Salvage value of planks 25% of its original value.** **2. Salvage value of MS Pipes 35% of its original value.** **3. Timber - 8 times usage** **4. Clamps and nut and bolts - 40 times usage.** **5. MS pipes - 60 times usage.** **6. Add 3% of total unit rate of false work for the design and drawings**											
9.10	903	**Making Wooden forms including selection of material, measuring as per drawing, cutting, fixing nails etc, hauling up to 30m and piling (staking) all complete**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		(Excluding the cost of material)										
I		**Simple Standard form (Each form < 1 sq.m)**	**10 Nos**	Skilled	m-day	2.220						
				Unskilled	m-day	3.330						
II		**Simple Standard form (Each form < 2 sq.m)**	**10 Nos**	Skilled	m-day	1.816						
				Unskilled	m-day	2.724						
III		**Simple form (Each form < 1 sq.m)**	**10 Nos**	Skilled	m-day	1.584						
				Unskilled	m-day	2.375						
IV		**Simple form (Each form < 2 sq.m)**	**10 Nos**	Skilled	m-day	1.268						
				Unskilled	m-day	1.902						
V		**Form for Circular Arch (Radius < 1 m)**	**10 Nos**	Skilled	m-day	4.000						
				Unskilled	m-day	6.000						
VI		**Form for Circular Arch (Radius 1 to 3 m)**	**10 Nos**	Skilled	m-day	3.000						
				Unskilled	m-day	4.500						
VII		**Form for Circular Arch (Radius 3 to 6 m)**	**10 Nos**	Skilled	m-day	2.600						
				Unskilled	m-day	3.890						
VIII		**Form for Simple Structure (Staircase,etc)**	**10 Nos**	Skilled	m-day	4.200						
				Unskilled	m-day	6.300						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.11	**903**	**Making forms for Precast Concrete unit including fixing, nailing, oiling, dismantling, removing and hauling upto 30m all complete.** **(Excluding the cost of material)**										
I		**Length of Beam upto 8m**	**1 No**	Skilled	m-day	0.800						
				Unskilled	m-day	1.200						
II		**Length of Column upto 4m and section 0.15m*0.15m**	**1 No**	Skilled	m-day	0.800						
				Unskilled	m-day	1.200						
III		**Pipe Diameter upto 0.75m and length upto 1m**	**1 No**	Skilled	m-day	0.400						
				Unskilled	m-day	0.600						
9.12	**903**	**Making Suspension forms including selection of material, hauling up to 30m, erection, fitting, nailing, dismantling and removing all complete.** **(Excluding the cost of material)**										
I		**Vertical Surface**	**10 m^2**	Skilled	m-day	2.030						
				Unskilled	m-day	3.042						
II		**Sloped Surface**	**10 m^2**	Skilled	m-day	2.800						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	4.200						
III		**Steeped Surface (Non- Load bearing)**	10 m^2	Skilled	m-day	2.400						
				Unskilled	m-day	3.600						
9.13	903 905	**Making Forms for Intake including selection of material, hauling up to 30m, erection, fitting, nailing, dismantling and removing all complete.** **(Excluding the cost of material)**										
I		**Side Arch**	10 m^2	Skilled	m-day	1.720						
				Unskilled	m-day	2.750						
II		**Crown Arch**	10 m^2	Skilled	m-day	2.010						
				Unskilled	m-day	2.010						
III		**Transition Arch**	10 m^2	Skilled	m-day	2.640						
				Unskilled	m-day	3.960						
9.14	903 905	**Making Keyway Forms including selection of material, hauling up to 30m, erection, fitting, nailing, dismantling and removing all complete.** **(Excluding the cost of material)**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
I		**Horizontal keyway**	**10 m^2**	Skilled	m-day	0.400						
				Unskilled	m-day	0.600						
II		**Vertical keyway**	**10 m^2**	Skilled	m-day	0.750						
				Unskilled	m-day	1.130						
III		**Sloped/Slanted keyway**	**10 m^2**	Skilled	m-day	1.200						
				Unskilled	m-day	1.800						
9.15	903 905	**Providing and fixing open type of wood works required to protect fairly firm soils in trench excavation works all complete as per drawing and specification.**										
A		**Depth upto 1.5m**	**100 m^2**	Skilled	m-day	0.250	Planks	sq.m	33.33			
				Unskilled	m-day	0.250	Walling and Struts	Cum	2.03			
B		**Depth 1.5m to 3m**	**100 m^2**	Skilled	m-day	0.500	Planks	sq.m	33.33			
				Unskilled	m-day	1.000	Walling and Struts	Cum	2.03			
C		**Depth above 3m**	**100 m^2**	Skilled	m-day	1.000	Planks	sq.m	33.33			
				Unskilled	m-day	1.750	Walling and Struts	Cum	2.03			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: **1. Salvage value of planks 25% of its original value.** **2. Timber/Planks - 8 times usage**										
9.16	**903** **905**	**Providing and fixing closed type of wood works required to protect loose soils in trench excavation works all complete as per drawing and specification.**										
A		**Depth upto 1.5m**	**100 m^2**	Skilled Unskilled	m-day m-day	0.500 1.000	Planks Walling and Struts	sq.m Cum	100.00 2.47			
B		**Depth 1.5m to 3m**	**100 m^2**	Skilled Unskilled	m-day m-day	1.000 2.000	Planks Walling and Struts	sq.m Cum	100.00 2.47			
C		**Depth above 3m**	**100 m^2**	Skilled Unskilled	m-day m-day	1.500 2.600	Planks Walling and Struts	sq.m Cum	100.00 2.47			
		Remarks: **1. Salvage value of planks 25% of its original value.** **2. Timber/Planks - 8 times usage**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
9.17	**903 905**	**Providing and fixing open type of wood works required to protect fairly firm soils nearby excavation works all complete as per drawing and specification.**										
A		**Depth upto 1.5m**	**100 m²**	Skilled	m-day	0.250	Planks	sq.m	33.33			
				Unskilled	m-day	0.250	Walling and Struts	Cum	1.65			
B		**Depth 1.5m to 3m**	**100 m²**	Skilled	m-day	0.500	Planks	sq.m	33.33			
				Unskilled	m-day	1.000	Walling and Struts	Cum	1.65			
C		**Depth above 3m**	**100 m²**	Skilled	m-day	1.000	Planks	sq.m	33.33			
				Unskilled	m-day	1.750	Walling and Struts	Cum	1.65			
		Remarks:										
		1. Salvage value of planks 25% of its original value.										
		2. Timber/Planks - 8 times usage										
9.18	**903 905**	**Providing and fixing closed type of wood works required to protect loose soils nearby excavation works all complete as per drawing and specification.**										
A		**Depth upto 1.5m**	**100 m²**	Skilled	m-day	0.500	Planks	sq.m	100.00			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	1.000	Walling and Struts	Cum	1.36			
B		**Depth 1.5m to 3m**	**100 m^2**	Skilled	m-day	1.000	Planks	sq.m	100.00			
				Unskilled	m-day	2.000	Walling and Struts	Cum	1.36			
C		**Depth above 3m**	**100 m^2**	Skilled	m-day	1.500	Planks	sq.m	100.00			
				Unskilled	m-day	2.600	Walling and Struts	Cum	1.36			
		Remarks:										
		1. Salvage value of planks 25% of its original value.										
		2. Timber/Planks - 8 times usage										
9.19	903 905	**Providing, preparing and installing Form Work for cutoff/core wall including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.**	**10 m^2**	Skilled	m-day	1.5	38 mm thick	cum	0.42			
				Unskilled	m-day	4.0						
							Struts, ballies, etc	cum	0.18			
		(Using timber (soft wood - Jamun or eqivalent))					Nails, spikes, etc.	kg	1.00			
		Remarks:										
		1. Salvage value of planks 5% of its original value.										
		2. Timber/Planks - 3 times usage										

SECTION 10: ROOFING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
10.1	1000	**Providing and laying C.G.I sheet (Plain / Coloured) or Corrugated Fiber Glass sheet of required gauge roofing works all complete.**	10 m^2	Skilled	m-day	1.1	C.G.I. /Fiber Glass sheet	Sq.m.	12			
				Unskilled	m-day	1.25	8mm Nut-Bolt	No.	30			
							J-hooks	No.	25			
							Bitumen washer	No.	55			
10.2	1000	**Providing, making and fixing ridge of G.I. plain /coloured sheets of required gauge (2' wide) or Corrugated Fiber Glass Sheet of required gauge and fittings all complete.**	10 m	Skilled	m-day	2	Plain Sheet	m	12			
				Unskilled	m-day	3	Nut-bolt	No.	24			
10.3	1000	**Providing and making G.I plain/coloured sheet (width 150mm to 450mm) gutter and fitting to rainwater pipe including fixing of accessories (iron bracket, nut-bolt etc.) all complete.**	10 m	Skilled	m-day	1.75	Plain Sheet	m	13.5			
				Unskilled	m-day	2	Bracket	Nr	32			
							Washer	Nr	48			
							Bolt	Nr	48			
10.4	1000	**Providing and making slate roof all complete.**	10 m^2	Skilled	m-day	4	Slates	Sq.m	24			
				Unskilled	m-day	5	Nails	kg	0.5			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
10.5	1000	Providing and making clay tile roof all complete. Size of Clay Tile = 21"*7.5"*1.5"	10 m^2	Skilled	m-day	0.5	Tile	Nr	125			
				Unskilled	m-day	1.5						
10.6	1000	Providing and making clay tile ridge all complete. Size of Clay Ridge = 8"*5.5"	10m	Skilled	m-day	0.5	Ridge	Nr.	80			
				Unskilled	m-day	0.5						
10.7	1000	Providing and laying 10cm thick lime concrete (1:1:3) for terraced roof work all complete.	10 m^2	Skilled	m-day	1.5	Brick aggregates	cu.m.	0.942			
				Unskilled	m-day	12	Lime	MT	0.69			
							Surkhi	cu.m.	0.314			
10.8	1000	Providing and making thatched roof using bamboo frame and straw (thatch) all complete.										
A		Thickness of roof 8cm	10 m^2	Skilled	m-day	1.5	Straw	Bundle	83			
				Unskilled	m-day	1.5	Bamboo	No.	30			
							Babiyo Ropes	kg.	3.5			
							Straw Mat (if required)	sq.m.	12			
B		Thickness of roof 15cm	10 m^2	Skilled	m-day	2	Straw	Bund	166			
				Unskilled	m-day	2	Bamboo	No.	40			
							Babiyo Ropes	kg.	5			
							Straw Mat (if required)	sq.m.	12			

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: Diameter of a bundle khar is 15cm										
10.9	1000	**Providing and laying coloured cement concrete tile of different sizes over 1:4 cement sand screed all complete.**	**10 m^2**	Skilled Unskilled	m-day m-day	1 2	Concrete tile Cement Sand	sq.m MT cum	10.05 0.024 0.09			
10.10	1000	**Providing and fixing UPVC sheet on roof all works complete.** **Thickness of UPVC sheet 2mm/3mm**	**10 m^2**	Skilled Unskilled	m-day m-day	1.5 1	2mm /3 mm Clip Screws	sqm Nr. Nr.	12 14 28			
10.11	1000	**Providing and fitting 20mm thick wooden ceiling with fixing 40mm x 20 mm beads in joints all complete.** **(For frame, see 11.18)**	**10 m^2**	Skilled Unskilled	m-day m-day	1.8 1.5	Timber Nails 40mm screw	cu.m kg. Nr.	0.26 0.4 160			
10.12	1000	**Making main beam, cross beam etc. from sal wood and fitting all complete.** **(Applicable upto 9m span)**	**1m^3**	Skilled Unskilled	m-day m-day	17.65 1.76	Sal wood Nails	cu.m. kgs	1.05 1			
10.13	1000	**Making truss of sal wood and fitting all complete.** **(Applicable upto 9m span)**	1m^3	Skilled Unskilled	m-day m-day	19.415 26	Sal wood Iron strap Nut-bolt Nails	cu.m. kg Nr. kg	1.05 Approx. Approx. Approx.			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
10.14	1000	**Making 25mm. salwood eaves-board and fittings all complete.**	10m²	Skilled Unskilled	m-day m-day	1.43 0.143	Sal wood Nails	cu.m. kg	0.275 0.5			
10.15	1000	**Providing and making plywood false celling including making wooden frame, fixing in position with necessary stainless steel crews, nails, etc. and fixing plywood all complete as per specification.** **(Wooden main rafter and cross battern =6no*3300mm*50mm*125mm+6nos*3000mm**	9 m²	Skilled Unskilled	m-day m-day	1.5 1.5	Sal wood for frame 12 mm thick Plywood Screw, Nails, etc	cu.m. sq.m kg	0.166 9.9 1			
10.16	1000	**Making various types of false ceiling (ceiling size = 9.75m x 3.65m) using sal wood frame of size 600m x 900mm made from sal wood of size 50mm x75mm all complete.**										
A		**Using 3mm commercial plywood**	35.6 m²	Skilled Unskilled	m-day m-day	23 2.3	Sal wood timber Plywood 3mm Beads Nails	cu.m. sq.m. m kg	0.45 37.5 30 0.3			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Using 12mm hardboard**	**35.6 m^2**	Skilled	m-day	23	Sal wood	cu.m.	0.45			
				Unskilled	m-day	2.3	timber					
							Hardboard 12mm	sq.m.	37.5			
							Beads	m	30			
							Nails	kg	0.3			

SECTION 11 - TIMBER, DOORS AND WINDOWS WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.1	1100	**Providing and Making sal wood frame for door and fixing all complete.**										
A		**Door size - 900mm x 2100mm** **Frame wood size - 100mm x 75mm**	each	Skilled Unskilled	m-day m-day	1.50 0.15	Salwood Holdfast 250mm Screw	cu.m. No. No.	0.044 4 8			
B		**Providing and Making sal wood frame (For Doors and Windows) and fixing all complete.**	$1 m^3$	Skilled Unskilled	m-day m-day	34.0 3.40	Salwood Holdfast 250mm Screw	cu.m. No. No.	1.1 92 184			
11.2	1100	**Providing and Making shutter in 38mm. thick sal wood frame all complete (shutter size 1.07m x 1.982m).**	each	Skilled Unskilled	m-day m-day	10 1	Salwood 100mm Hinge 150mm Bolts 300 mm Bolts 250mm Locking set Handles Screws	cu.m. No. No. No. No. No. No.	0.084 6 1 1 1 2 76			
11.3	1100	**Providing and Making 38mm x 75mm sal wood frame and fitting glazed shutter (3mm/4mm/ 5.5mm/6mm) all complete (shutter size 1.892m x 1.22m).**	each	Skilled Unskilled	m-day m-day	9 0.9	Salwood Glass 3/4/5.5/6mm 75mm Hinges	cu.m. Sq.m. No.	0.049 1.085 8			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							100mm Bolts	No.	4			
							Handles	No.	2			
							Screws	No.	112			
11.4	1100	**Providing and Making and fixing flush shutter in 38mm. thick sal wood frame with shutter size 1.092m x 2.058m.**										
A		**3mm thick commerical plywood on bothside**	**each**	Skilled	m-day	7	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.7	Commercial plywood	Sq.m.	4.65			
							Hinges 100mm	No.	3			
							Bolts 150mm	No.	2			
							Mortise Lock	No.	1			
							Screws	No.	46			
B		**3mm thick teek plywood on bothside**	**each**	Skilled	m-day	7	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.7	Teek plywood	Sq.m.	4.65			
							Hinges 100mm	No.	3			
							Bolts 150mm	No.	2			
							Mortise Lock	No.	1			
							Screws	No.	46			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**18 gauge G.I. plain sheet on both sides**	each	Skilled	m-day	7	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.7	G.I. Plain Sheet	Sq.m.	4.65			
							Hinges 100mm	No.	3			
							Bolts 150mm	No.	2			
							Mortisr Lock	No.	1			
							Screws	No.	46			
							Handle	No.	1			
D		**24 gauge mosquito proof G.I. wire mesh**	each	Skilled	m-day	5	Salwood	cu.m.	0.026			
				Unskilled	m-day	0.5	G.I. wire mesh	Sq.m.	2.13			
							Hinges 100mm	No.	3			
							Bolts 150mm	No.	2			
							Handle	No.	2			
							Spring	No.	1			
							Screw	No.	46			
11.5	1100	**Providing and Fixing glass of various thickness (3mm/4mm/ 5.5mm/6mm) in frame using timber beads (listi) all complete.**	$1m^2$	Skilled	m-day	0.06	Glass 3/4 /5.5 /6 mm	Sq.m.	1.00			
				Unskilled	m-day	0.006	Timber beads	m	4.05			
							Nails	kg	0.10			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.6	1100	**Providing and Fixing 3mm. commercial plywood in frame using timber beads (listi) all complete.**	$1 m^2$	Skilled	m-day	0.06	Plywood 3mm	Sq.m.	1.05			
				Unskilled	m-day	0.006						
							Timber beads	m	4.05			
							Nails	kg	0.1			
11.7	1100	**Providing and Cutting 16 to 20 mm. dia. steel bars and fitting in window frame including boring holes in frame.**	MT	Skilled	m-day	20	Steel rods	MT	1.05			
				Unskilled	m-day	20						
11.8	1100	**Making and fixing flush shutter in 38mm x 100mm sal wood frame using 8mm thick commerical plywood and 4mm thick teek plywood lamination on one side all complete.**	$2.245 m^2$	Skilled	m-day	9.00	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.90	Commercial Plywood	Sq.m.	1.9			
							Teek plywood	Sq.m.	1.9			
							Timber beads	m	7.43			
							Gum	kg	0.25			
							Hinges					
							100mm	No.	3			
							Bolts 150mm	No.	2			
							Mortise Lock	No.	1			
							Screws	No.	46			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.9	1100	**Making and fixing flush shutter in 38mm x 100mm sal wood frame using 8mm thick commerical plywood and 4mm thick teek plywood lamination on both side all complete.**	**2.245 m^2**	Skilled	m-day	9.00	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.90	Commercial Plywood	Sq.m.	1.9			
							Teek plywood	Sq.m.	3.8			
							Timber beads	m	14.87			
							Gum	kg	0.5			
							Hinges 100 mm	No.	3			
							Bolts 150mm	No.	2			
							Mortise Lock	No.	1			
							Screws	No.	46			
11.10	1100	**Making and fixing flush shutter in 38mm x 100mm sal wood frame using 8mm thick water-proof plywood and 4mm thick teek plywood lamination on one side all complete.**	**2.245 m^2**	Skilled	m-day	9.00	Salwood	cu.m.	0.0346			
				Unskilled	m-day	0.90	Commercial Plywood	Sq.m.	1.9			
							Teek plywood	Sq.m.	1.9			
							Timber beads	m	7.43			
							Gum	kg	0.25			
							Hinges 100 mm	No.	3			
							Bolts 150mm	No.	2			
							Mortise Lock	No.	1			
							Screws	No.	46			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.11	1100	**Making and fixing sunmica/formica lamination on one side of shutter all complete.**	1 m^2	Skilled	m-day	0.06	Sunmica/ formica	Sq.m.	1.05			
				Unskilled	m-day	0.01						
							Mobical	kg	0.25			
							Nails	kg	0.1			
11.12	1100	**Making and fixing aluminium sliding window frame, glass and other fittings all complete.**	1.49 m^2	Skilled	m-day	5.33	Aluminium	kg	8.53			
				Unskilled	m-day	5.33	PVC plug	No.	8			
							Aluminium screw	No.	30			
							Rubber beading	m	9.75			
							4mm thick glass	sq.m.	1.64			
							Wheel runner	No.	8			
							Handle with lock	No.	2			
11.13	1100	**Making and fixing openable aluminium window frame, glass and other fittings all complete.**	2.23 m^2	Skilled	m-day	8.00	Aluminium	kg	13.44			
				Unskilled	m-day	8.00	PVC plug	No.	15			
							Aluminium screw	No.	60			
							Rubber beading	m	10.97			
							4mm thick glass	sq.m.	2.45			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Friction Stay	No.	4			
							Handle with lock	No.	2			
11.14	1100	**Making and fixing aluminium door with prelaminated board and other fittings all complete.**	**2.16 m²**	Skilled	m-day	6.22	Aluminium	kg	15.99			
				Unskilled	m-day	6.22	4" Aluminium Hinge	No.	4			
							Aluminium screw	No.	50			
							Rubber beading	m	18.29			
							Prelaminated board	m	2.38			
							Automatic closer	No.	1			
							Handle with lock	No.	2			
11.15	1100	**Making and fixing aluminium door with glass on upper panel and prelaminated board on lower panel and other fittings all complete.**	**1.81 m²**	Skilled	m-day	6.22	Aluminium	kg	14.72			
				Unskilled	m-day	6.22	4" Aluminium Hinge	No.	4			
							Aluminium screw	No.	50			
							Rubber beading	m	18.29			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							4mm glass	sq.m.	0.92			
							Prelaminated board	m	1.07			
							Automatic closer	No.	1			
							Handle with lock	No.	2			
11.16	1100	**Making wooden partition wall (Wall size = 9.75mx3.65m) from frame of size 0.61 m x 0.915m. using sal wood of size 38mm. x 75mm. and attaching shutter on both sides including covering of the joints by timber beads all complete.**										
A		**Using 3mm commericial plywood shutter**	**each**	Skilled	m-day	23	Sal wood	cu.m.	0.35			
				Unskilled	m-day	2.3	timber					
							Plywood 3mm	sq.m.	75			
							Beads	m	55			
							Nails	kg	0.5			
B		**Using 12mm. hardboard**	**each**	Skilled	m-day	23	Sal wood timber	cu.m.	0.35			
				Unskilled	m-day	2.3	Hardboard 12mm	sq.m.	75			
							Beads	m	55			
							Nails	kg	0.5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Using 19mm salwood planks**	each	Skilled	m-day	30	Sal wood timbe	cu.m.	1.767			
				Unskilled	m-day	3	Beads	m	55			
							Nails	kg	0.5			
11.17	1100	**Sawing timber logs including loading, unloading, sawing, hauling and piling all complete.**										
A		**Dry timber sawing**	$1 m^2$	Skilled	m-day	0.5						
				Unskilled	m-day	0.166						
B		**Wet timber sawing**	$1 m^2$	Skilled	m-day	0.625						
				Unskilled	m-day	0.208						
		Remarks: Measure four sides if beam and measure one side if planks										
11.18	1100	**Making 3 to 4m long round or square column by striping sawed logs by axe/cutter and smoothing by jack plain including boring holes all complete.**										
A		**By Manual Means**	No.	Skilled	m-day	1.785						
				Unskilled	m-day	0.595						
B		**By Mechanical Means**	No.	Skilled	m-day	0.5355				Electric Jack	hr	0.5
				Unskilled	m-day	0.1785				Electric Cutter	hr	0.5

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.19	**1100**	**Making 3 to 4m long round or square column by striping rough logs by axe/cutter and smoothing by jack plain including boring holes all complete.**										
A		**By Manual Means**	**No.**	Skilled	m-day	3						
				Unskilled	m-day	1						
B		**By Mechanical Means**	**No.**	Skilled	m-day	0.9				Electric Jack	hr	0.5
				Unskilled	m-day	0.3				Electric Cutter	hr	0.75
11.20	**1100**	**Making 5m long staircase from timber logs including striping four sides, smoothing by jack plane, boring holes and fitting all**	**No.**	Skilled	m-day	12						
				Unskilled	m-day	4						
11.21	**1100**	**Smoothing planks by jack plane and making all of equal width all complete.**	**$1m^2$**	Skilled	m-day	0.135						
				Unskilled	m-day	0.045						
11.22	**1100**	**Making rectaangular shaped timber from 4 to 5m long timber log by axe/cutter all complete.**										
A		**By Manual Means**	**No.**	Skilled	m-day	0.975						
				Unskilled	m-day	0.325						
B		**By Mechanical Means**	**No.**	Skilled	m-day	0.2925				Electric Cutter	hr	1
				Unskilled	m-day	0.0975						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.23	1100	**Providing, fabricating, assembling and erecting timber super structure including necessary hardware all complete.**										
A		**Beam Structure**										
I		**Height upto 4m**	$1 m^3$	Skilled Unskilled	m-day m-day	10 15	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber cost
		Remarks: **1) Add 15% of labour, materials and equipment cost for staging works if required.**										
II		**Height 4m to 6m**	$1 m^3$	Skilled Unskilled	m-day m-day	10 15	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber cost
		Remarks: **1) Add 20% of labour, materials and equipment cost for staging works if required.**										
III		**Height above 6m**	$1 m^3$	Skilled Unskilled	m-day m-day	10 15	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber cost
		Remarks: **1) Add 25% of labour, materials and equipment cost for staging works if required.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Truss Structure**										
I		**Height upto 4m**	**1m³**	Skilled Unskilled	m-day m-day	13 20	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber
		Remarks: **1) Add 20% of labour, materials and equipment cost for formworks and staging works if required.**										
II		**Height 4m to 6m**	**1m³**	Skilled Unskilled	m-day m-day	13 20	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber
		Remarks: **1) Add 25% of labour, materials and equipment cost for form works and staging works if required.**										
III		**Height above 6m**	**1m³**	Skilled Unskilled	m-day m-day	13 20	Sal wood Hardwares and Other Consumables	cum LS	1.1 5% of timber cost	Tools and Plants	LS	1% of timber
		Remarks: **1) Add 30% of labour, materials and equipment cost for form works and staging works if required.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
11.24	1100	General labour needs for doors, windows and their fixtures all complete.										
A		Frames	$1m^3$	Skilled	m-day	34						
				Unskilled	m-day	3.4						
B		Shutter	$1m^3$	Skilled	m-day	66.360						
				Unskilled	m-day	6.63						
C		Plywood	$1m^2$	Skilled	m-day	0.108						
				Unskilled	m-day	0.011						
D		Glass	$1m^2$	Skilled	m-day	0.108						
				Unskilled	m-day	0.011						
E		Hinges	No.	Skilled	m-day	0.08						
F		Handle	No.	Skilled	m-day	0.1						
G		Bolt 300mm	No.	Skilled	m-day	0.04						
H		Mortise Lock	No.	Skilled	m-day	0.67						
I		Tower bolt	No.	Skilled	m-day	0.17						
J		Door closer										
i.		hydraulic	No.	Skilled	m-day	0.25						
ii.		Spring	No.	Skilled	m-day	0.1						
K.		Beads	m.	Skilled	m-day	0.033						

SECTION 12 : FLOORING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.1	1200	**Providing and casting 1:2:4 concrete for floor incl. finishing by cement rubbing as per specification all complete.**										
A		**Floor thickness 25mm.**	**10m²**	Skilled	m-day	1.1	Cement	M.T.	0.09			
				Unskilled	m-day	1.5	Sand	cu.m.	0.12			
							Aggregates 12mm	cu.m.	0.23			
B		**Floor thickness 38mm.**	**10m²**	Skilled	m-day	1.25	Cement	M.T.	0.13			
				Unskilled	m-day	2	Sand	cu.m.	0.18			
							Aggregates 12mm	cu.m.	0.36			
C		**Floor thickness 50mm.**	**10m²**	Skilled	m-day	1.25	Cement	M.T.	0.17			
				Unskilled	m-day	2.5	Sand	cu.m.	0.23			
							Aggregates 12mm	cu.m.	0.46			
D		**Floor thickness 75mm.**	**10m²**	Skilled	m-day	1.25	Cement	M.T.	0.26			
				Unskilled	m-day	3	Sand	cu.m.	0.34			
							Aggregates 12mm	cu.m.	0.68			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.2	1200	**Providing and Laying 25mm. thick mosaic flooring with 20mm. thick 1:2:4 cement concrete base course & 5mm. thick 1:1 white cement & marble chips surface course incl. finish by rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	2.5	Cement	M.T.	0.065			
				Unskilled	m-day	16	Sand	cu.m.	0.088			
							Aggregates 12.5 mm	cu.m.	0.176			
							White cement	M.T.	0.061			
							3mm Marble chips	cu.m.	0.061			
							Oxalic acid	kg.	0.365			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx.			
12.3	1200	**Providing and Laying 25mm. thick mosaic flooring with 19mm. thick cement concrete plaster (1:2) base course & 6mm. thick (1:1) marble chips & white cement surface course including rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	3.5	Cement	M.T.	0.121			
				Unskilled	m-day	36	Sand	cu.m.	0.165			
							White cement	M.T.	0.069			
							Marble chips 3mm	cu.m.	0.047			
							Oxalic Acid	kg.	0.34			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.5			
							Carborandum		Approx.			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.4	1200	**Providing and Laying 20mm thick (3/4")mosaic flooring with 13.5mm thick cement plaster (1:2) base course and 6.5mm thick 1:1 marble chips & white cement surface course including rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	3.5	Cement	M.T.	0.089			
				Unskilled	m-day	36	Sand	cu.m.	0.122			
							White cement	M.T.	0.089			
							Marble chips 3mm	cu.m.	0.061			
							Oxalic Acid	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx.			
12.5	1200	**Providing and Laying 20mm thick terrazo tiles on 20mm thick 1:4 cement sand mortar incl. rubbing and plastering all complete.**										
A		**Manual means**	$10m^2$	Skilled	m-day	2	T-tiles 20mm	sq.m.	11			
				Unskilled	m-day	26.1	Cement	M.T.	0.081			
							Sand	cu.m.	0.22			
							Oxalic Acid powder	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx			
B		**Using Mechanical Aids (For Rubbing)**	$10m^2$	Skilled	m-day	2	T-tiles 20mm	sq.m.	11	Rub Machin	hr	6
				Unskilled	m-day	12.6	Cement	M.T.	0.081			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Sand	cu.m.	0.22			
							Oxalic Acid powder	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx			
12.6	1200	**Providing and Laying 15mm thick marble (450mm X 450mm) on 20mm thick lime surkhi mortar incl. rubbing and polishing all complete.**										
A		**Manual Means**	$10m^2$	Skilled	m-day	2	Marble 15 mm	sq.m.	11			
				Unskilled	m-day	21.5						
							Surkhi	cu.m.	0.183			
							Lime	cu.m.	0.091			
							Oxalic Acid	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx.			
B		**Using Mechanical Aids (For Rubbing only)**	$10m^2$	Skilled	m-day	2	Marble 15mm	sq.m.	11	Rub machine	hr	6
				Unskilled	m-day	8	Surkhi	cu.m.	0.183			
							Lime	cu.m.	0.091			
							Oxalic Acid	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Carborandum		Approx.			
12.7	1200	**Providing and laying Porcelain glazed tiles (normal size 40cm x 40cm; 60cm x 60cm) in 1:4 cement sand mortar all complete.**	$10m^2$	Skilled	m-day	1	P.G tiles	sq.m.	11			
				Unskilled	m-day	3	Cement	M.T.	0.056			
							Sand	cu.m.	0.152			
							White cement	kg	3.228			
12.8	1200	**Providing and laying flagstoone in 1:4 cement sand mortar all complete.**										
A		**50mm thick flagstone**	$10m^2$	Skilled	m-day	2	F-stone 50mm	sq.m.	11			
				Unskilled	m-day	4.5						
							Cement	Mt.	0.063			
							Sand	cu.m.	0.171			
B		**37.5mm thick flagstone**	$10m^2$	Skilled	m-day	2	Stone 37.5mm	sq.m.	11.00			
				Unskilled	m-day	4.5						
							Cement	M.T.	0.06			
							Sand	cu.m.	0.165			
12.9	1200	**Providing and Laying Flagstone (upto thickness 50mm) on sand all complete.**	$10m^2$	Skilled	m-day	1	Stone	sq.m.	11			
				Unskilled	m-day	3	Sand	cu.m.	0.71			
12.10	1200	**Providing and Laying 25mm thick flat stone in 1:4 cement sand mortar all complete.**	$10m^2$	Skilled	m-day	1.5	Stone 25 mm	sq.m.	11			
				Unskilled	m-day	4.5	Cement	M.T.	0.056			
							Sand	cu.m.	0.152			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.11	1200	**Providing and Laying 25mm thick dense brick(TeliyaBrrick) in 1:2 lime surkhi mortar with pointing and 1:1 cement sand mortar all complete.**	$10m^2$	Skilled	m-day	4.5	Densed bricks	Nr.	440			
				Unskilled	m-day	4.5						
							Lime	cu.m.	0.122			
							Surkhi	cu.m.	0.244			
							Cement	Mt.	0.016			
							Sand	cu.m.	0.11			
12.12	1200	**Providing and Laying Flat brick on cement sand and pointing joints with 1:2 cement sand mortar all complete.**	$10m^2$	Skilled	m-day	2.25	Brick	Nr.	430			
				Unskilled	m-day	3.25	Cement	Mt.	0.078			
							Sand	cu.m.	0.229			
12.13	1200	**Providing and Laying Brick on edge flooring in 1:6 cement sand mortar and pointing joints with 1:2 cement sand mortar all complete.**	$10m^2$	Skilled	m-day	1.1	Brick	Nr.	750			
				Unskilled	m-day	1.8	Cement	Mt.	0.121			
							Sand	cu.m.	0.431			
12.14	1200	**Providing and Laying parquet in floor including rubbing with sandpaper and polishing all complete.**	$10m^2$	Skilled	m-day	1.75	Parquet	Sq.m.	10.5			
				Unskilled	m-day	0.75	Sandpaper	each	Approx			
							Wax polish	kgs	Approx			
12.15	1200	**Providing and Laying Dry brick / Dry Stones all complete.**										
A		**Flat Brick**	$10m^2$	Skilled	m-day	0.5	Brick	Nr.	420			
				Unskilled	m-day	1	Sand	cu.m.	0.71			
B		**Edge Brick**	$10m^2$	Skilled	m-day	1	Brick	Nr.	750			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	3.25	Sand	cu.m.	0.71			
C		Dry stone laying(10 cm thick)	$10m^2$	Skilled	m-day	1.00	Stone	cu.m.	1.1			
				Unskilled	m-day	3.5	Sand	cu.m.	0.71			
12.16	1200	Providing and Laying 125mm thick Brick on edge soiling incl. filling sand in joints and flush pointing on the top surface of the joint in 1:3 cement sand mortar all complete.	$10m^2$	Skilled	m-day	2	Cement	Mt.	0.02			
				Unskilled	m-day	4	Brick	Nr.	750			
							Sand	cu.m.	0.1			
12.17	1200	Providing and pointing of stone pavements (stone size 46cm X 46cm) in 1:1 cement sand mortar all complete.	$10m^2$	Skilled	m-day	0.5	Cement	kg	4.2			
				Unskilled	m-day	0.5	Sand	cu.m.	0.003			
12.18	1200	Providing , Filling and Compacting (Manually) with water sprinkling in earthen floor.										
A		By sand	$10m^2$	Skilled	m-day	6.5	Sand	cu.m.	11			
B		By 15-150 mm brick bats	$10m^2$	Skilled	m-day	10	Brick bats	cu.m.	11			
12.19	1200	Providing and laying 3mm thick fine cement rubbing (Punning) works.	$10m^2$	Skilled	m-day	1	Cement	kg	53.2			
				Unskilled	m-day	1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.20	1200	**Providing and Laying 600mm X 600mm sal timber frames made from 50mm X 75mm sal timber and fixing 25mm thick sal timber planks on top surface as timber floor.**	$10m^2$	Skilled	m-day	6.5	Sal wood	cu.m.	0.421			
				Unskilled	m-day	0.65	Nails	kgs	Approx.			
12.21	1200	**Providing and Laying 16mm Granite in 20mm thick 1:2 Cement sand Mortar Including rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	2	16mm Granite	sq.m.	11			
				Unskilled	m-day	21.5						
							Cement	M.T.	0.13			
							Sand	cu.m.	0.183			
							Oxalic Acid powder	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx			
12.22	1200	**Providing and laying heavy duty interlocking concrete block on 50mm thick crusher stone dust all complete.**										
A		**50mm thick Block**	$10m^2$	Skilled	m-day	1	Interlocking block	sq.m	11			
				Unskilled	m-day	10						
							Crusher Stone Dust	cu.m	0.55			
B		**60mm thick block**	$10m^2$	Skilled	m-day	1	Interlocking block	sq.m	11			
				Unskilled	m-day	11						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Crusher Stone Dust	cu.m	0.55			
12.23	1200	**Providing and laying Machine made Clay tiles (nominal size 10.5"x6.5") on wall surface all complete.**	$10m^2$	Skilled Unskilled	m-day m-day	2 3	Clay Tiles Cement Sand	sq.m MT cu.m	11 0.056 0.152			
12.24	1200	**Prroviding and Laying 25mm thick Anti-Slip Cement Tiles (300mm*300mm) in 1:4 Cement Sand Mortar all complete.**	$10m^2$	Skilled Unskilled	m-day m-day	1.5 1.5	Cement Tile Cement Sand	sq.m MT Cu.m	11 0.081 0.22			
12.25	1200	**Providing and Laying Glazed Ceramic Tiles on wall surface in 1:4 Cement Sand Mortar all complete.**	$10m^2$	Skilled Unskilled	m-day m-day	13 4.5	Glazed Tile Cement Sand Epoxy Grout Pigment	sq.m MT Cu.m	11 0.13 0.29 Approx			
12.26	1200	**Providing and Laying 12mm thick Non Glazed tiles in 1:3 Cement sand Mortar and flushing joints with white cement all complete.**	$10m^2$	Skilled Unskilled	m-day m-day	13 4.5	Non Glazed Tile Cement Sand White cement Epoxy Grout Pigment	sq.m MT Cu.m kg	11 0.056 0.12 3.228 Approx			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.27	1200	**Providing and Laying 10mm thick Vetrified tiles in 1:6 Cement sand Mortar all complete.**	$10m^2$	Skilled	m-day	13	Vetrified Tile	sq.m	11			
				Unskilled	m-day	4.5	Cement	MT	0.15			
							Sand	Cu.m	0.5			
							Epoxy Grout Pigment		Approx			
12.28	1200	**Providing and Laying 10mm thick Anti-Acid / Alkali Tiles (300mm*300mm) in 1:4 Cement Sand Mortar all complete.**	$10m^2$	Skilled	m-day	6.5	Anti Acid /Alakli Tile	Nos	120			
				Unskilled	m-day	6.5						
							Cement	MT	0.18			
							Sand	Cu.m	0.52			
							Anti Chemical Cement	Bag	0.66			
12.29	1200	**Providing and Laying PVC tiles in Rubber Based Adhesives and Rolling all complete.**	$10m^2$	Skilled	m-day	1.5	PVC Tiles	sq.m	11			
				Unskilled	m-day	1.5	Adhesives	Kg	3			
12.30	1200	**Providing and Laying 15mm thick marble (size-300mm X 300mm) in 20mm thick 1:2 Cement Sand mortar incl. rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	2	Marble 15 mm	sq.m.	11			
				Unskilled	m-day	21.5						
							Cement	MT	0.13			
							Sand	cu.m.	0.183			
							Oxalic Acid	kg.	0.37			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx.			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
12.31	1200	**Providing and Laying 15mm thick marble on stair steps, skirting,wall, pillar,etc in 12.5mm thick 1:3 Cement Sand mortar incl. rubbing and polishing all complete.**	$10m^2$	Skilled	m-day	14	Marble 15 mm	sq.m.	11			
				Unskilled	m-day	12						
							Cement	MT	0.063			
							Sand	cu.m.	0.128			
							Oxalic Acid	kg.	0.128			
							Wax polish	kg.	0.118			
							Tarpentine	Ltr.	0.538			
							Carborandum		Approx.			
12.32	1200	**Labour requirement**										
A		**For Marble nosing in stair steps**	10m	Skilled	m-day	2.5						
				Unskilled	m-day	3.5						
B		**For Marble Polishing**	$10m^2$	Unskilled	m-day	13.5						
12.33	1200	**Providing and Laying wooden skirts in rooms by 12mm thick 100mm high wooden parquets.**	$10m^2$	Skilled	m-day	6.5	Ready made	sq.m	10			
				Unskilled	m-day	0.65	Parquet					
							Fevicol (Glue)	kg	1			
12.34	1200	**Providing and Laying 100mm high Non glazed tiles for skirting in 12mm thick 1:6 Cement Sand mortar all complete.**	1m	Skilled	m-day	0.15	Non Glaze	sq.m	0.11			
				Unskilled	m-day	0.1	Tile					
							Cement	MT	0.001			
							Sand	Cu.m	0.003			
							Epoxy Grout		Approx			
							Pigment					

SECTION 13: PLASTERING AND POINTING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Plastering Works:										
13.1	1300	**Providing and plastering with 12.5 mm thick cement sand mortar on brick masonry works all complete as per Drawing and**										
A		**Cement Sand Mortar (1:2)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.90			
				Unskilled	m-day	16	Sand	cu.m.	1.22			
							Water	KL	0.18			
B		**Cement Sand Mortar (1:3)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.625			
				Unskilled	m-day	16	Sand	cu.m.	1.280			
							Water	KL	0.120			
C		**Cement Sand Mortar (1:4)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.538			
				Unskilled	m-day	16	Sand	cu.m.	1.460			
							Water	KL	0.100			
D		**Cement Sand Mortar (1:6)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.382			
				Unskilled	m-day	16	Sand	cu.m.	1.570			
							Water	KL	0.070			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
13.2	1300	**Providing and plastering with 12.5 mm thick cement sand mortar on ceiling works all complete as per Drawing and Specifications.**										
A		**Cement Sand Mortar (1:2)**	**100 m^2**	Skilled	m-day	15	Cement	Mt.	0.90			
				Unskilled	m-day	20	Sand	cu.m.	1.22			
							Water	KL	0.18			
B		**Cement Sand Mortar (1:3)**	**100 m^2**	Skilled	m-day	15	Cement	Mt.	0.625			
				Unskilled	m-day	20	Sand	cu.m.	1.280			
							Water	KL	0.120			
C		**Cement Sand Mortar (1:4)**	**100 m^2**	Skilled	m-day	15	Cement	Mt.	0.538			
				Unskilled	m-day	20	Sand	cu.m.	1.460			
							Water	KL	0.100			
13.3	1300	**Providing and plastering with 12.5 mm thick cement, lime and sand mortar on brick masonry works all complete as per Drawing and Specifications.**										
A		**Cement, Lime and Sand Mortar (1:1:6)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.338			
				Unskilled	m-day	16	Lime	cu.m.	0.230			
							Sand	cu.m.	1.370			
							Water	KL	0.123			
B		**Cement, Lime and Sand Mortar (1:2:12)**	**100 m^2**	Skilled	m-day	12	Cement	Mt.	0.18			
				Unskilled	m-day	16	Lime	cu.m.	0.24			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Sand	cu.m.	1.46			
							Water	KL	0.094			
13.4	**1300**	**Providing and plastering with lime surkhi mortar (1:2) on brick masonry works all complete as per Drawing and Specifications.**										
A		**Lime Surkhi Mortar 12.5mm thick**	100 m^2	Skilled	m-day	12	Lime	cu.m.	0.61			
				Unskilled	m-day	16	Surkhi	cu.m.	1.22			
							Water	KL	0.12			
B		**Lime Surkhi Mortar 20mm thick**	**100 m^2**	Skilled	m-day	14	Lime	cu.m.	0.92			
				Unskilled	m-day	19	Surkhi	cu.m.	1.83			
							Water	KL	0.18			
13.5	**1300**	**Providing and plastering with 20 mm thick cement sand mortar on brick masonry works all complete as per Drawing and**										
A		**Cement Sand Mortar (1:3)**	**100 m^2**	Skilled	m-day	14	Cement	Mt.	0.96			
				Unskilled	m-day	19	Sand	cu.m.	1.95			
							Water	KL	0.20			
B		**Cement Sand Mortar (1:4)**	**100 m^2**	Skilled	m-day	14	Cement	Mt.	0.81			
				Unskilled	m-day	19	Sand	cu.m.	2.20			
							Water	KL	0.16			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Cement Sand Mortar (1:6)**	100 m^2	Skilled	m-day	14	Cement	Mt.	0.57			
				Unskilled	m-day	19	Sand	cu.m.	2.35			
							Water	KL	0.12			
13.6	1300	**Providing and plastering with 20 mm thick cement sand mortar on ceiling works all complete as per Drawing and Specifications.**										
A		**Cement Sand Mortar (1:3)**	100 m^2	Skilled	m-day	17.5	Cement	Mt.	0.96			
				Unskilled	m-day	23.75	Sand	cu.m.	1.95			
							Water	KL	0.2			
B		**Cement Sand Mortar (1:4)**	100 m^2	Skilled	m-day	17.5	Cement	Mt.	0.81			
				Unskilled	m-day	23.75	Sand	cu.m.	2.20			
							Water	KL	0.16			
13.7	1300	**Providing and plastering with 25 mm thick mud mortar including cleaning and soaking surface and hauling upto 30m distance all complete as per Drawing and Specifications.**	100 m^2	Skilled	m-day	20	Soils	cu.m.	3.0			
				Unskilled	m-day	25	Grain Cells	kg.	10.0			
							Cow dungs	kg.	120.0			
							Water	KL	1.0			
13.8	1300	**Providing and plastering with 12 mm thick mud mortar including cleaning and soaking surface and hauling upto 30m distance all complete as per Drawing and Specifications.**	100 m^2	Skilled	m-day	15	Soils	cu.m.	1.5			
				Unskilled	m-day	20	Grain Cells	kg.	50.0			
							Cow dungs	kg.	60.0			
							Water	KL	0.5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
13.9	1300	**Providing and making 20 mm thick water band (panipatti) on plastering works in (1:1) cement sand mortar all complete as per Drawing and Specifications.**	100 m	Skilled Unskilled	m-day m-day	2.5 1	Cement Sand Water proofing Water	Mt cu.m. ML KL	0.7 0.4 10 0.14			
13.10	1300	**Providing and making 30 mm thick roof tile pattern design on plastering works in (1:1) cement sand mortar all complete as per Drawing and Specifications.**	10 m^2	Skilled Unskilled	m-day m-day	1.25 0.5	Cement Sand Water proofing Water	Mt cu.m. ML KL	0.22 0.15 5.0 0.04			
13.11	1300	**Providing and plastering 2 mm thick plain white putty on plastering works on walls and ceiling all complete as per Drawing and Specifications.**	10 m^2	Skilled Unskilled	m-day m-day	1.0 1.0	Plain white putty Water	Kg KL	10.64 0.003			
13.12	1300	**Providing and making 3 mm thick cement punning works including curing all complete as per Drawing and Specifications.**	10 m^2	Skilled Unskilled	m-day m-day	1.0 1.0	Cement Water	Mt KL	0.0432 0.0080			
13.13	1300	**Providing and Ferro Cement Plastering work 50 mm thick in Cement Sand mortar (1:3) including fixing of formwork, hoop wire, chicken wire, finishing surface and curing all complete as per drawing.**	10 m^2	Skilled Unskilled	m-day m-day	6.50 7.50	Cement Sand Hoop Wire Chicken Wire Binding Wire	kg cu.m kg sq.m kg	250.00 0.50 9.00 12.00 2.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Pointing Works:										
13.14	1300	**Providing and flush pointing in brick masonry works all complete as per Drawing and Specifications.**										
A		**Cement Sand Mortar (1:1)**	100 m^2	Skilled	m-day	10.5	Cement	Mt.	0.316			
				Unskilled	m-day	12.0	Sand	cu.m.	0.220			
							Water	KL	0.060			
B		**Cement Sand Mortar (1:2)**	**100 m^2**	Skilled	m-day	10.5	Cement	Mt.	0.21			
				Unskilled	m-day	12	Sand	cu.m.	0.29			
							Water	KL	0.04			
C		**Cement Sand Mortar (1:3)**	**100 m^2**	Skilled	m-day	10.5	Cement	Mt.	0.155			
				Unskilled	m-day	12	Sand	cu.m.	0.320			
							Water	KL	0.030			
D		**Cement, Lime and Sand Mortar (1:1:3)**	**100 m^2**	Skilled	m-day	10.5	Cement	Mt.	0.125			
				Unskilled	m-day	12	Lime	cu.m.	0.085			
							Sand	cu.m.	0.255			
							Water	KL	0.040			
E		**Lime Surkhi Mortar (1:1)**	**100 m^2**	Skilled	m-day	10.5	Lime	cu.m.	0.22			
				Unskilled	m-day	12	Surkhi	cu.m.	0.22			
							Water	KL	0.05			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**Lime Surkhi Mortar (1:2)**	100 m²	Skilled	m-day	10.5	Lime	cu.m.	0.150			
				Unskilled	m-day	12	Surkhi	cu.m.	0.290			
							Water	KL	0.036			
		Remarks: Add 50% unskilled labour for ruled pointing works in all items of 13.14.										
13.15	1300	**Providing and flush ruled pointing with cement sand mortar in boulder/stone masonry works all complete as per Drawing and**										
A		**Cement Sand Mortar (1:1)**	100 m²	Skilled	m-day	10.0	Cement	Mt.	0.612			
				Unskilled	m-day	14.0	Sand	cu.m.	0.430			
							Water	KL	0.100			
B		**Cement Sand Mortar (1:2)**	100 m²	Skilled	m-day	10	Cement	Mt.	0.408			
				Unskilled	m-day	14	Sand	cu.m.	0.57			
							Water	KL	0.07			
C		**Cement Sand Mortar (1:3)**	100 m²	Skilled	m-day	10	Cement	Mt.	0.306			
				Unskilled	m-day	14	Sand	cu.m.	0.630			
							Water	KL	0.050			
13.16	1300	**Providing and flush ruled pointing with cement sand mortar in asler masonry works all complete as per Drawing and**										
A		**Cement Sand Mortar (1:3)**	100 m²	Skilled	m-day	8.0	Cement	Mt.	0.11			
				Unskilled	m-day	10.0	Sand	cu.m.	0.20			
							Water	KL	0.02			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
13.17	**1300**	**Providing and pointing with cement sand mortar on flat stone pavement works (45cm*45cm stone) all complete as per Drawing and Specifications.**										
A		Cement Sand Mortar (1:3)	100 m^2	Skilled	m-day	5	Cement	Mt.	0.042			
				Unskilled	m-day	5.0	Sand	cu.m.	0.030			
							Water	KL	0.008			
13.18	**1300**	**Providing and pointing with cement sand mortar on Teliya brick (special brick) pavement works all complete as per Drawing and Specifications.**										
A		**Cement Sand Mortar (1:1)**	**100 m^2**	Skilled	m-day	10.0	Cement	Mt.	0.15			
				Unskilled	m-day	10.0	Sand	cu.m.	0.10			
							Water	KL	0.03			
13.19	**1300**	**Providing and flushing plaster with 3 mm thick cement sand mortar all complete as per Drawing and Specifications.**										
A		**Cement Sand Mortar (1:1)**	**100 m^2**	Skilled	m-day	10.0	Cement	Mt.	0.336			
				Unskilled	m-day	10.0	Sand	cu.m.	0.230			
							Water	KL	0.060			
13.20	**1300**	**Providing and flushing plaster with 3 mm thick cement mortar all complete as per Drawing and Specifications.**	**100 m^2**	Skilled	m-day	10.0	Cement	Mt.	0.518			
				Unskilled	m-day	10.0	Water	KL	0.100			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
13.21	1300	**Providing and flushing plaster with 3 mm thick lime mortar all complete as per Drawing and Specifications.**	100 m^2	Skilled	m-day	10.0	Lime	cu.m.	0.16			
				Unskilled	m-day	10.0	Water	KL	0.03			
		Remarks:										
		1. If concrete mixture is used to mix mortar where necessary, provide concrete mixture for 0.75 hr on every 100 m^2 and reduce 1 unskilled m-day.										

SECTION 14: PAINTING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
14.1	1400	Providing and applying White Washing (Lime Painting) on New Surface as per Specifications and instruction of Engineer.										
A		Single (One) Coat	100 m^2	Skilled	m-day	0.8	White lime	kg.	12.00			
				Unskilled	m-day	0.7	Gum,etc.	kg.	0.48			
B		Double (Two) Coats	100 m^2	Skilled	m-day	1.5	White lime	kg.	22.00			
				Unskilled	m-day	1.1	Gum,etc.	kg.	0.88			
C		Triple (Three) Coats	100 m^2	Skilled	m-day	3.0	White lime	kg.	32.00			
				Unskilled	m-day	2.7	Gum,etc.	kg.	1.28			
		Remarks: Add 25% unskilled labour for all types of painting works on ceiling.										
14.2	1400	Providing and applying White Washing (Lime Painting) on Old Surface as per Specifications and instruction of Engineer.	100 m^2	Skilled	m-day	0.8	White lime	kg.	10.0			
				Unskilled	m-day	0.7	Gum,etc.	kg.	0.4			
14.3	1400	Providing and applying Distemper as per Specifications and instruction of Engineer.										
A		Base / Lining (Astar) Coat	100 m^2	Skilled	m-day	2.0	Primer /Lining	Lt.	8.0			
				Unskilled	m-day	2.0						
B		Single (One) Coat	100 m^2	Skilled	m-day	2.0	Dry Distemper	kg.	6.5			
				Unskilled	m-day	2.0	powder					

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Second Coat and other additional coat**	100 m^2	Skilled Unskilled	m-day m-day	1.8 1.8	Dry Distemper powder	kg.	5.0			
14.4	1400	**Providing and applying Water Proof Cement Paint as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	100 m^2	Skilled Unskilled	m-day m-day	1.7 1.7	Water Proof Cement Paint	Kg	30.0			
B		**Two (Double) Coats**	100 m^2	Skilled Unskilled	m-day m-day	2.6 2.6	Water Proof Cement Paint	kg.	48.5			
14.5	1400	**Providing and applying ready made (prepared) enamel paint or plastic emulsion paint as per specifications and instruction of Engineer.**										
A		**Base / Lining (Astar) Coat**	100 m^2	Skilled Unskilled	m-day m-day	3.0 3.0	Primer /Lining	Lt.	8.1			
B		**Single (One) Coat**	100 m^2	Skilled Unskilled	m-day m-day	5.0 2.0	Prepared paint (Enamel or Plastic	Lt.	9.0			
C		**Second Coat**	100 m^2	Skilled Unskilled	m-day m-day	4.0 3.0	Prepared paint (Enamel or Plastic	Lt.	7.0			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Double (Two) Coats**	$100\ m^2$	Skilled Unskilled	m-day m-day	9.0 5.0	Prepared paint (Enamel or Plastic	Lt.	16.0			
14.6	1400	**Providing and applying ready made (prepared) Aluminium Paint as per specifications and instruction of Engineer.**										
A		**Base / Lining (Astar) Coat**	$100\ m^2$	Skilled Unskilled	m-day m-day	3.0 3.0	Primer /Lining	Lt.	8.1			
B		**Single (One) Coat excluding Astar coat**	$100\ m^2$	Skilled Unskilled	m-day m-day	3.75 1.88	Aluminium Paint Sand Paper (sheet)	Lt. Nr.	5.38 3.00			
C		**Double (Two) Coats excluding Astar coat**	$100\ m^2$	Skilled Unskilled	m-day m-day	7.75 3.88	Aluminium Paint Sand Paper (sheet)	Lt. Nr.	10.76 4.00			
D		**Double (Two) Coats including Astar coat**	$100\ m^2$	Skilled Unskilled	m-day m-day	10.75 6.875	Primer(lining) Aluminium Pain Sand Paper (sheet)	Lt. Lt. Nr.	8.1 10.76 4.000			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
14.7	**1400**	**Providing and applying Double Boiled Linseed Oil as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	**100 m^2**	Skilled	m-day	2.0	Linseed oil	Lt.	6.0			
				Unskilled	m-day	2.0						
B		**Second Coat and other additional coat**	**100 m^2**	Skilled	m-day	2.0	Linseed oil	Lt.	5.0			
				Unskilled	m-day	2.0						
14.8	**1400**	**Providing and applying Varnish as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	**100 m^2**	Skilled	m-day	3.0	Varnish	Lt.	6.0			
				Unskilled	m-day	2.0						
B		**Second Coat and other additional coat**	**100 m^2**	Skilled	m-day	3.0	varnish	Lt.	5.0			
				Unskilled	m-day	2.0						
14.9	**1400**	**Providing and applying Bitumen Paint as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	100 m^2	Skilled	m-day	1.5	Bitumen paint	Lt.	7			
				Unskilled	m-day	1						
B		**Second Coat and other additional coat**	**100 m^2**	Skilled	m-day	1.0	Bitumen paint	Lt.	5.0			
				Unskilled	m-day	1.0						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
14.10	**1400**	**Providing and applying Chapra (resin) Polish as per Specifications and instruction of Engineer.**										
A		**Triple (Three) Coats**	**100 m^2**	Skilled	m-day	10.0	Chapra (resin)	Kg.	2.0			
				Unskilled	m-day	5.0	Sprit	Lt.	10.0			
14.11	**1400**	**Providing and applying Red Oxide as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	**100 m^2**	Skilled	m-day	1.7	Red Oxide	Kg.	30.0			
				Unskilled	m-day	1.7						
B		**Double (Two) Coats**	**100 m^2**	Skilled	m-day	3.5	Red Oxide	Kg.	48.5			
				Unskilled	m-day	3.5						
14.12	**1400**	**Providing and applying Cement Paint over Plastered Surface as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat**	**100 m^2**	Skilled	m-day	1.7	Snowcem	Kg.	30.0			
				Unskilled	m-day	1.7						
B		**Second Coat**	**100 m^2**	Skilled	m-day	1.5	Snowcem	Kg.	20.0			
				Unskilled	m-day	1.5						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
14.13	**1400**	**Providing and applying Red Oxide Paint as per Specifications and instruction of Engineer.**										
A		**Single (One) Coat excluding Astar coat**	**100 m^2**	Skilled	m-day	4.3	Red Oxide	Lt.	7.5			
				Unskilled	m-day	4.0	Paint					
B		**Double (Two) Coats excluding Astar coat**	**100 m^2**	Skilled	m-day	6.45	Red Oxide	Lt.	12.0			
				Unskilled	m-day	6.00	Paint					
14.14	**1400**	**Providing and laying Plastic Felt as per Specifications and instruction of Engineer.**										
A		**Single (One) Layer**	**10 m^2**	Skilled	m-day	1.1	Plastic Felt	sqm.	11.00			
				Unskilled	m-day	3.5	Roofing grade bitument	Kg.	15.00			
							Fire Wood	Kg.	60.00			
							Rough River Sand	cum.	0.31			
B		**Double (Two) Layers**	**10 m^2**	Skilled	m-day	2.3	Plastic Felt	sqm.	22.00			
				Unskilled	m-day	4.6	Roofing grade bitument	Kg.	25.00			
							Fire Wood	Kg.	80.00			
							Rough River Sand	cum.	0.31			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
14.15	1400	**Providing and applying One coat Primer and Two coats Ready made (prepared) washable Distemper as per Specifications and instruction of Engineer.**	**100 m^2**	Skilled Unskilled	m-day m-day	5.8 5.8	Primer / Astar Washable Distemper	Lt. Lt.	8.00 16.00			
14.16	1400	**Providing and applying Anti-termite chemical as per Specifications and instruction of Engineer.**	**10 m^2**	Unskilled	m-day	0.5	Ready made Anti-termite chemical Water Mask	Lt. Lt. Nr	2.50 47.50 1.00	Chemical Sprayer	hr	0.25
14.17	1400	**Providing and applying plain plaster of paris on wall and ceiling all complete.**	**10 m^2**	Skilled Unskilled	m-day m-day	1.0 1.0	Plaster of Paris	kg	21.28			
14.18	1400	**Providing and applying rain seal or equivalent paint one coat all complete**	**1 m^2**	Skilled Unskilled	m-day m-day	0.162 0.540	Rain seal paint	Lt.	0.245			
		Remarks: In case of painting of wall and ceiling by using roller, labour input shall be reduced by 25% .										

SECTION 15: RIVER TRAINING AND GABION WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.1	1501	**Making gabion box with diaphragm including cutting wire, netting, etc. complete as per Drawing and Specifications.**										
A		**Mesh wire - 3.251mm (0.0615kg/m), Selvedge wire - 4.064mm (0.1057 kg/m), Hexagonal mesh 80mm x 100mm**										
I		**Box size - 2m x 1m x 1m (11 sqm)**	**Each**	Skilled	m-day	0.5	G.I. wire	Kg.	28.4			
				Unskilled	m-day	0.2	Selvedge wire	Kg.	2.96			
II		**Box size - 3m x 1m x 1m (16 sqm)**	**Each**	Skilled	m-day	0.7	G.I. wire	Kg.	41.3			
				Unskilled	m-day	0.28	Selvedge wire	Kg.	3.91			
III		**Box size - 2m x 1m x 0.5m (7.5 sqm)**	**Each**	Skilled	m-day	0.35	G.I. wire	Kg.	19.4			
				Unskilled	m-day	0.14	Selvedge wire	Kg.	2.43			
IV		**Box size - 3m x 1m x 0.5m (11 sqm)**	**Each**	Skilled	m-day	0.5	G.I. wire	Kg.	28.4			
				Unskilled	m-day	0.2	Selvedge wire	Kg.	3.28			
V		**Box size - 2m x 1m x 0.3m (6.1sqm)**	**Each**	Skilled	m-day	0.29	G.I. wire	Kg.	15.75			
				Unskilled	m-day	0.12	Selvedge wire	Kg.	2.22			
VI		**Box size - 3m x 1m x 0.3m (9sqm)**	**Each**	Skilled	m-day	0.42	G.I. wire	Kg.	23.25			
				Unskilled	m-day	0.17	Selvedge wire	Kg.	3.03			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Mesh wire - 3.251mm (0.0615kg/m), Selvedge wire - 4.064 mm (0.1057 kg/m), Hexagonal mesh 100mm x 120mm**										
I		**Box size - 2m x 1m x 1m (11 sqm)**	**Each**	Skilled	m-day	0.45	G.I. wire	Kg.	24.15			
				Unskilled	m-day	0.2	Selvedge wire	Kg.	2.96			
II		**Box size - 3m x 1m x 1m (16 sqm)**	**Each**	Skilled	m-day	0.6	G.I. wire	Kg.	35.1			
				Unskilled	m-day	0.28	Selvedge wire	Kg.	3.91			
III		**Box size - 2m x 1m x 0.5m (7.5 sqm)**	**Each**	Skilled	m-day	0.32	G.I. wire	Kg.	16.45			
				Unskilled	m-day	0.14	Selvedge wire	Kg.	2.43			
IV		**Box size - 3m x 1m x 0.5m (11 sqm)**	**Each**	Skilled	m-day	0.45	G.I. wire	Kg.	24.15			
				Unskilled	m-day	0.2	Selvedge wire	Kg.	3.28			
V		**Box size - 2m x 1m x 0.3m (6.1 sqm)**	**Each**	Skilled	m-day	0.26	G.I. wire	Kg.	13.4			
				Unskilled	m-day	0.12	Selvedge wire	Kg.	2.22			
VI		**Box size - 3m x 1m x 0.3m (9 sqm)**	**Each**	Skilled	m-day	0.37	G.I. wire	Kg.	19.75			
				Unskilled	m-day	0.17	Selvedge wire	Kg.	3.03			
15.2	1502	**Gabion construction works with diaphragm including placing in position, tying gabion box by lacing wire closing from the top. Lacing wire- 2.642 mm (0.0409kg/m)**										
I		**Box size - 2m x 1m x 1m (11 sqm)**	**Each**	Skilled	m-day	0.1	lacing wire	Kg.	1.46			
				Unskilled	m-day	0.3						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**Box size - 3m x 1m x 1m (16 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.1 0.5	lacing wire	Kg.	2.06			
III		**Box size - 2m x 1m x 0.5m (7.5 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.1 0.1	lacing wire	Kg.	1.03			
IV		**Box size - 3m x 1m x 0.5m (11 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.1 0.2	lacing wire	Kg.	1.36			
V		**Box size - 2m x 1m x 0.3m (6.1 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.02 0.1	lacing wire	Kg.	0.72			
VI		**Box size - 3m x 1m x 0.3m (9 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.08 0.1	lacing wire	Kg.	1			
15.3	1501	**Making rectangular gabion box (3mx1.5x0.8m) with two way knot including wire cutting, netting etc. complete as per Drawing, Specifications and direction of Engineer.**										
A		**Mesh size** **100mmx100mm** **Mesh wire - 3.251 mm** **Selvedged wire - 4.064 mm**	**Each**	Skilled Unskilled	m-day m-day	0.7 0.44	G.I. wire Selvedge wire	Kg. Kg.	28.61 3.74			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.4	1501	**Making rectangular gabion box (3mx1.5x0.75m) with two way knot including wire cutting, netting etc. complete as per Drawing, Specifications and direction of Engineer.**										
A		**Mesh size 150mmx150mm Mesh wire -4.064 mm**	**Each**	Skilled Unskilled	m-day m-day	0.6 0.3	G.I. wire	Kg.	28.00			
B		**Mesh size 150mmx150mm Mesh wire - 3.251mm Selvedged wire - 4.064mm**	**Each**	Skilled Unskilled	m-day m-day	0.5 0.2	G.I. wire Selvedge wire	Kg. Kg.	18 3.74			
15.5	1501	**Gabion construction works including placing in position, tying gabion box by lacing wire closing from the top. Lacing wire- 2.642 mm (0.0409kg/m)**										
I		**Box size - 3m x 1.5m x 0.8m (16.2 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.10 0.51	Lacing wire	Kg.	2.09			
II		**Box size - 3m x 1.5m x 0.75m (15.75 sqm)**	**Each**	Skilled Unskilled	m-day m-day	0.10 0.49	Lacing wire	Kg.	2.03			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.6	1501	**Providing and filling random rubble boulder/stone in gabion box of different sizes as per Drawing, Specifications and direction of Engineer.**	10 m³	Skilled	m-day	2	Boulder	cum	10			
				Unskilled	m-day	5						
15.7	1501	**Providing and filling boulder/stone in gabion boxes of different sizes including dressing, bedding, bonding all complete as per Drawing, Specifications and direction of Engineer.**	10 m³	Skilled	m-day	2	Boulder	cum	11			
				Unskilled	m-day	8						
15.8	1502	**Providing mechanically woven double twisted crates/mattress with internal diaphragm at 1m centre to centr (internal diaphgrms are not provided in box size 1.5m*1m*0.5m and 1.5m*1m*1m) including rolling, cutting and binding with lacing wire/ binding wire as per specifications**										
A		**Heavy zinc coated Hexagonal mesh, mesh type 10*12, mesh wire 3 mm, selvage wire 3.9 mm, lacing wire 2.4 mm**										
i		**Box size 1.5m*1m*0.5m**	1 No				Wire mesh	sq.m	5.5			
							Lacing wire	kg	0.68			
ii		**Box size 2m*1m*0.5m**	1 No				Wire mesh	sq.m	7.5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Lacing wire	kg	1.02			
iii		Box size 3m*1m*0.5m	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.38			
iv		Box size 4m*1m*0.5m	1 No				Wire mesh	sq.m	14			
							Lacing wire	kg	1.75			
v		Box size 1.5m*1m*1m	1 No				Wire mesh	sq.m	8			
							Lacing wire	kg	0.98			
vi		Box size 2m*1m*1m	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.48			
vii		Box size 3m*1m*1m	1 No				Wire mesh	sq.m	16			
							Lacing wire	kg	2.01			
viii		Box size 4m*1m*1m	1 No				Wire mesh	sq.m	21			
							Lacing wire	kg	2.54			
B		Heavy zinc coated Hexagonal mesh,mesh type 10 x12, mesh wire 2.7 mm, selvage wire 3.4 mm, lacing wire 2.2 mm										
i		Box size 1.5m*1m*0.5m	1 No				Wire mesh	sq.m	5.5			
							Lacing wire	kg	0.57			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Box size 2m*1m*0.5m**	1 No				Wire mesh	sq.m	7.5			
							Lacing wire	kg	0.85			
iii		**Box size 3m*1m*0.5m**	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.16			
iv		**Box size 4m*1m*0.5m**	1 No				Wire mesh	sq.m	14			
							Lacing wire	kg	1.47			
v		**Box size 1.5m*1m*1m**	1 No				Wire mesh	sq.m	8			
							Lacing wire	kg	0.82			
vi		**Box size 2m*1m*1m**	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.24			
vii		**Box size 3m*1m*1m**	1 No				Wire mesh	sq.m	16			
							Lacing wire	kg	1.69			
viii		**Box size 4m*1m*1m**	1 No				Wire mesh	sq.m	21			
							Lacing wire	kg	2.13			
C		**Heavy zinc coated Hexagonal mesh,mesh type 8 x10, mesh wire 3 mm, selvage wire 3.9 mm, lacing wire 2.4 mm**										
i		**Box size 1.5m*1m*0.5m**	1 No				Wire mesh	sq.m	5.5			
							Lacing wire	kg	0.68			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Box size 2m*1m*0.5m**	**1 No**				Wire mesh	sq.m	7.5			
							Lacing wire	kg	1.02			
iii		**Box size 3m*1m*0.5m**	**1 No**				Wire mesh	sq.m	11			
							Lacing wire	kg	1.38			
iv		**Box size 4m*1m*0.5m**	**1 No**				Wire mesh	sq.m	14			
							Lacing wire	kg	1.75			
v		**Box size 1.5m*1m*1m**	**1 No**				Wire mesh	sq.m	8			
							Lacing wire	kg	0.98			
vi		**Box size 2m*1m*1m**	**1 No**				Wire mesh	sq.m	11			
							Lacing wire	kg	1.48			
vii		**Box size 3m*1m*1m**	**1 No**				Wire mesh	sq.m	16			
							Lacing wire	kg	2.01			
viii		**Box size 4m*1m*1m**	**1 No**				Wire mesh	sq.m	21			
							Lacing wire	kg	2.54			
D		**Heavy zinc coated Hexagonal mesh,mesh type 8 x10, mesh wire 2.7 mm, selvage wire 3.4 mm, lacing wire 2.2 mm**										
i		**Box size 1.5m*1m*0.5m**	**1 No**				Wire mesh	sq.m	5.5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Lacing wire	kg	0.57			
ii		Box size 2m*1m*0.5m	1 No				Wire mesh	sq.m	7.5			
							Lacing wire	kg	0.85			
iii		Box size 3m*1m*0.5m	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.16			
iv		Box size 4m*1m*0.5m	1 No				Wire mesh	sq.m	14			
							Lacing wire	kg	1.47			
v		Box size 1.5m*1m*1m	1 No				Wire mesh	sq.m	8			
							Lacing wire	kg	0.82			
vi		Box size 2m*1m*1m	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.24			
vii		Box size 3m*1m*1m	1 No				Wire mesh	sq.m	16			
							Lacing wire	kg	1.69			
viii		Box size 4m*1m*1m	1 No				Wire mesh	sq.m	21			
							Lacing wire	kg	2.13			
E		Heavy zinc coated Hexagonal mesh,mesh type 6 x8, mesh wire 2.7 mm, selvage wire 3.4 mm, lacing wire 2.2 mm										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
i		Box size 3m*2m*0.3m	1 No				Wire mesh	sq.m	16.56			
							Lacing wire	kg	1.44			
ii		Box size 4m*2m*0.3m	1 No				Wire mesh	sq.m	21.76			
							Lacing wire	kg	1.71			
iii		Box size 5m*2m*0.3m	1 No				Wire mesh	sq.m	26.96			
							Lacing wire	kg	1.98			
iv		Box size 6m*2m*0.3m	1 No				Wire mesh	sq.m	32.16			
							Lacing wire	kg	2.25			
F		Zinc + PVC coated Hexagonal mesh, mesh type 10 x12, mesh wire 2.7mm/3.7mm (ID/OD), selvage wire 3.4mm/4.4mm (ID/OD), lacing wire 2.2mm/3.2mm (ID/OD) with PVC coating thickness nominal 0.5mm (minimum 0.38mm)										
i		Box size 1.5m*1m*0.5m	1 No				Wire mesh	sq.m	5.5			
							Lacing wire	kg	0.67			
ii		Box size 2m*1m*0.5m	1 No				Wire mesh	sq.m	7.5			
							Lacing wire	kg	1			
iii		Box size 3m*1m*0.5m	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.37			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
iv		**Box size 4m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	14 1.73			
v		**Box size 1.5m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	8 0.97			
vi		**Box size 2m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	11 1.46			
vii		**Box size 3m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	16 1.98			
viii		**Box size 4m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	21 2.51			
G		**Zinc + PVC coated Hexagonal mesh,mesh type 8 x 10, mesh wire 2.2mm/3.2mm(ID/OD), selvage wire 2.7mm/3.7mm(ID/OD), lacing wire 2.2mm/3.2mm(ID/OD) with PVC coating thickness nominal 0.5mm (minimum 0.38mm)**										
i		**Box size 1.5m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	5.5 0.67			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Box size 2m*1m*0.5m**	1 No				Wire mesh	sq.m	7.5			
							Lacing wire	kg	1			
iii		**Box size 3m*1m*0.5m**	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.37			
iv		**Box size 4m*1m*0.5m**	1 No				Wire mesh	sq.m	14			
							Lacing wire	kg	1.73			
v		**Box size 1.5m*1m*1m**	1 No				Wire mesh	sq.m	8			
							Lacing wire	kg	0.97			
vi		**Box size 2m*1m*1m**	1 No				Wire mesh	sq.m	11			
							Lacing wire	kg	1.46			
vii		**Box size 3m*1m*1m**	1 No				Wire mesh	sq.m	16			
							Lacing wire	kg	1.98			
viii		**Box size 4m*1m*1m**	1 No				Wire mesh	sq.m	21			
							Lacing wire	kg	2.51			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
H		**Zinc + PVC coated Hexagonal mesh, mesh type 10 x12, mesh wire 3mm/4mm (ID/OD) for one face facing water, and mesh wire 2.7mm/3.7mm (ID/OD) for other faces, selvage wire 3.4mm/4.4mm (ID/OD), lacing wire 2.2mm/3.2mm (ID/OD) with PVC coating thickness nominal 0.5mm (minimum 0.38mm)**										
i		**Box size 1.5m*1m*0.5m**	**1 No**				Wire mesh Lacing wire	sq.m kg	5.5 0.67			
ii		**Box size 2m*1m*0.5m**	**1 No**				Wire mesh Lacing wire	sq.m kg	7.5 1			
iii		**Box size 3m*1m*0.5m**	**1 No**				Wire mesh Lacing wire	sq.m kg	11 1.37			
iv		**Box size 4m*1m*0.5m**	**1 No**				Wire mesh Lacing wire	sq.m kg	14 1.73			
v		**Box size 1.5m*1m*1m**	**1 No**				Wire mesh Lacing wire	sq.m kg	8 0.97			
vi		**Box size 2m*1m*1m**	**1 No**				Wire mesh Lacing wire	sq.m kg	11 1.46			

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
vii		**Box size 3m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	16 1.98			
viii		**Box size 4m*1m*1m**	1 No				Wire mesh Lacing wire	sq.m kg	21 2.51			
I		**Zinc + PVC coated Hexagonal mesh, mesh type 10 x12, mesh wire 3mm/4mm (ID/OD) for one face facing water with PVC coating thickness nominal 0.5mm (minimum 0.38mm), and mesh wire 3mm for other faces, selvage wire 3.9 mm, lacing wire 2.4 mm**										
i		**Box size 1.5m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	5.5 0.68			
ii		**Box size 2m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	7.5 1.02			
iii		**Box size 3m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	11 1.38			
iv		**Box size 4m*1m*0.5m**	1 No				Wire mesh Lacing wire	sq.m kg	14 1.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
v		Box size 1.5m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	8 0.98			
vi		Box size 2m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	11 1.48			
vii		Box size 3m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	16 2.01			
viii		Box size 4m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	21 2.54			
		Remarks: 1. For Zinc+PVC coated, ID means diameter of wire with zinc coating and OD means diameter with PVC coating.										
A		Heavy zinc coated Hexagonal mesh, mesh type 10*12, mesh wire 3 mm, selvage wire 3.9 mm, lacing wire 2.4 mm										
i		Diameter 0.35m, Length 2m	1 No				Wire mesh Lacing wire	sq.m kg	2.2 0.14			
ii		Diameter 0.7m, Length 2m	1 No				Wire mesh	sq.m	4.4			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Lacing wire	kg	0.14			
B		**Zinc + PVC coated Hexagonal mesh, mesh type 10 x12, mesh wire 2.7mm/3.7mm (ID/OD), selvage wire 3.4mm/4.4mm (ID/OD), lacing wire 2.2mm/3.2mm (ID/OD) with PVC coating thickness nominal 0.5mm (minimum 0.38mm)**										
i		**Diameter 0.35m, Length 2m**	**1 No**				Wire mesh	sq.m	2.2			
							Lacing wire	kg	0.14			
ii		**Diameter 0.7m, Length 2m**	**1 No**				Wire mesh	sq.m	4.4			
							Lacing wire	kg	0.14			
15.10	1502	**Assembling mechanical woven gabion boxes/mattresses, placing in position including stretching; forming compartments; tying the sides and diaphargms with binding wire in each mesh; tying with bracing wires and tie wires; and tying down the lid complete as per specification (stone filling not included)**	**160 m²**	Skilled	m-day	2						
				Unskilled	m-day	10						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: **1. Lacing Wire/Binding Wire is Included in item no 15.8**										
15.11	1510	**Providing and laying big boulders/stones for protection works (materials within 150m lead and all lifts) not less than 40 kg each complete as per drawing and technical specifications.**										
A		**Using Mechanical Aids**	**100 m³**	Skilled Unskilled	m-day m-day	2 4	Boulder/ Stones	cum	100	Hydraulic Excavator	hr	6
B		**Manual Means**	**1 m³**	Skilled Unskilled	m-day m-day	1 3	Boulder/ Stones	cum	1			
15.12	1510	**Providing and mechanically laying boulders in launching apron on river bed for protection against scour with boulder/stones (materials within 150m lead and all lifts) weighing not less than 200 kg each complete as per drawing and technical specifications.**	**100 m³**	Skilled Unskilled	m-day m-day	2 6	Boulder/ Stones	cum	100	Crane -3T capacity	hr	12

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.13	1512	**Providing and laying concrete grade M20 dolos on river bed/slopes for protection against scour with dolos (materials within 150m lead and all lifts) weighing 6.5 tonne each complete as per drawing and technical specifications.**	**111 m³**	Skilled Unskilled	m-day m-day	3 9	Concrete Grade M20 Rate as per item no. 8.4	cum	111	Crane -10T capacity	hr	15
	Remarks	**1. Add cost of reinforcement 1.2% of the volume of concrete (add reinforcement as per drawing).** **2. Add cost of special formwork at 20% of the cost of concrete.**										
15.14	1512	**Providing and laying concrete grade M20 tetrapod on river bed/slopes for protection against scour with tetrapod (materials within 150m lead and all lifts) weighing not less 0.46 tonne and not more than 5.75 tonne each complete as per drawing and technical specifications.**	**100 m³**	Skilled Unskilled	m-day m-day	3 9	Concrete Grade M20 Rate as per item no. 8.4	cum	100	Crane -10T capacity	hr	15
		Remarks: **1. Add cost of reinforcement where volume of reinforcement is 1.2% of the volume of concrete.** **2. Add cost of special formwork at 20% of the cost of concrete.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.15	1511	**Providing and laying of apron with precast cement concrete blocks of different sizes, (cast in-situ in case of manual means) and made with nominal mix of M-15 grade cement concrete with a minimum cement content of 250 kg/cum**										
I		**Size - 0.5m x 0.5m x 0.5m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete Grade M15 Rate as per item no. 8.8	cum	100	Crane 3T	hr	6
				Unskilled	m-day	4						
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete Grade M15 Rate as per item no. 8.4	cum	1			
				Unskilled	m-day	2						
II		**Size - 0.3m x 0.3m x 0.3m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete Grade M15 Rate as per item no. 8.8	cum	100	Crane 3T	hr	6
				Unskilled	m-day	4						
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete Grade M15 Rate as per item no. 8.4	cum	1			
				Unskilled	m-day	2						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
III		**Size - 0.5m x 0.5m x 0.3m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete Grade M15 Rate as per item no. 8.8	cum	100	Crane 3T	hr	6
				Unskilled	m-day	4						
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete Grade M15 Rate as per item no. 8.4	cum	1			
				Unskilled	m-day	2						
IV		**Size - 1m x 1m x 0.5m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete Grade M15 Rate as per item no. 8.8	cum	100	Crane 3T	hr	6
				Unskilled	m-day	4						
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete Grade M15 Rate as per item no. 8.4	cum	1			
				Unskilled	m-day	2						
V		**Size - 1m x 1m x 1m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete Grade M15 Rate as per item no. 8.8	cum	100	Crane 10T	hr	6
				Unskilled	m-day	4						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete	cum	1			
				Unskilled	m-day	2	Grade M15					
							Rate as per item no. 8.4					
VI		**Size - 1.5m x 1.5m x 1m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete	cum	100	Crane 10T	hr	5
				Unskilled	m-day	4	Grade M15					
							Rate as per item no. 8.8					
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete	cum	1			
				Unskilled	m-day	2	Grade M15					
							Rate as per item no. 8.4					
VII		**Size - 2m x 2m x 1m**										
A		**Using Mechanical Aids**	**100 m³**	Skilled	m-day	2	Concrete	cum	100	Crane 15T	hr	4
				Unskilled	m-day	4	Grade M15					
							Rate as per item no. 8.8					
							Reinforcement	Kg	2			
B		**Manual Means**	**1 m³**	Skilled	m-day	0.3	Concrete	cum	1			
				Unskilled	m-day	2	Grade M15					

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Rate as per item no. 8.4					
		Remarks:										
		a) Rate of concrete shall be as per the item rate mentioned respectively										
		b) Hydraulic excavator shall be used for placing precast concrete in bed including bed preparation.										
15.16	1513	**Providing, boring and installing bored Cast in situ RCC pile of specified size and quality for river bank/toe protection works all complete as per drawing and Technical Specification.**										
A		**Pile diameter-300 mm**	**5m**	Skilled	m-day	2	Bentonite	kg	25	Piling rig (all accessories)	hr	3
				Unskilled	m-day	15	RCC Grade M20	cum	0.388	Crane 3T	hr	3
							Reinforcement	kg	76.145	Bentonite pump	hr	3
		Remarks:										
		1. Rate analysis for Providing and placing Cement Concrete and Reinforcement shall be as per section 800.										
B		**Pile diameter-500 mm**	**5m**	Skilled	m-day	2	Bentonite	kg	50	Piling rig (all accessories)	hr	4
				Unskilled	m-day	20	RCC Grade M20	cum	1.080	Crane 3T	hr	4
							Reinforcement	kg	211.95	Bentonite pump	hr	4
		Remarks:										
		1. Rate analysis for Providing and placing Cement Concrete and Reinforcement shall be as per section 800.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.17	1513	**Providing, Driving and installing Pre Cast RCC pile of specified size and quality for river bank/toe protection works all complete as per drawing and Technical Specification.**										
A		**Pile diameter -300 mm**	**25m**	Skilled	m-day	1	RCC Grade M 35	cum	1.94	Piling rig (with accessories)	hr	6
				Unskilled	m-day	5	Reinforcement	kg	378.86	Crane 10T	hr	3
							Materials Pile shoes					
							i) C.I. shoes for the pile	Kg	14.4			
							ii) M.S. clamps for shoe	Kg	6.3			
							iii) Steel helmet and cushion block on top of casing head during driving	Kg	4.5			
							iv) Casing	0.5 % of cost of concrete				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Pile diameter -500 mm**	20m	Skilled	m-day	1	RCC Grade M 35	cum	4	g rig (with access	hr	6
				Unskilled	m-day	5						
							Reinforcement	kg	841.91	Crane 10T	hr	3
							Materials Pile shoes					
							i) C.I. shoes for the pile	Kg	40			
							ii) M.S. clamps for shoe	Kg	17.5			
							iii) Steel helmet and cushion block on top of casing head during driving	Kg	12.5			
							iv) Casing	0.5 % of cost of concrete				
15.18	1510	**Providing and laying pitching on slopes laid over prepared filter media (materials within 150m lead and all lifts) complete as per drawing and techincal sepcifications.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**Stone/Boulder pitching**	**1 m³**	Skilled Unskilled	m-day m-day	1 3	Stone (not less than 40kgs each) Stone Spalls (min 25 mm size)	cum cum	1 0.2			
B		**Cement concrete blocks of size 0.3mx0.3mx0.3m cast in cement concrete of grade M15**	**1 m³**	Skilled Unskilled	m-day m-day	0.3 2	Concrete Grade M15, rate as per item no. 8.2 B(II)	cum	1.05			
15.19	1504	**Providing and laying filter materials (graded stone aggregates) underneath pitching in slopes all complete as per Drawing and technical Specifications.** **Remarks: Rate includes labour required for trimming of slope to proper profile and preparation of bed.**	**1 m³**	Skilled Unskilled	m-day m-day	1 3	Graded stone aggregate of required size	cum	1.2			
15.20	1504	**Providing and laying of Geotextile filter between pitching and embankment slopes as per Drawing, technical Specifications and direction of Engineer (overlap and wastage considered is 20%).**	**300 m²**	Skilled Unskilled	m-day m-day	3.6 9	Geotextile	sq.m.	360			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.21	1507	**Providing, laying and fixing of Geo-membrane all complete as per technical Specifications (overlap and wastage considered is 20%).**	**300 m²**	Skilled Unskilled	m-day m-day	3.6 9	Geo-membrane	sq.m.	360			
15.22	1514 1517	**Supplying, making and placing in position tree branches and Jhankhi covering overall space of about of 2.832 cum providing 3 nos. of load by filling boulder spall in empty cement bags, tying with 20 to 25 SWG annealed wire to the tree spur and anchoring the same with barbed (B.A.) wire 8 to 10 SWG to the bamboo post at least 15 m. away from the riverbank, including piling of bamboo post all complete job as per Drawing, Specifications and direction of Engineer.**	**Each**	Skilled Unskilled	m-day m-day	0.1 5.6	Tree branches Bamboo GI wire BA wire Empty cement bags Boulder spall	nos. m kg kg nos. cum	10 23 1.5 11.3 30 0.64			
		Remarks: **1)Tree branches of dia. 150mm to 200mm and 3m to 4.5m long with jhanki covering the space 2.832 m3 in volume.** **2) Bamboo 60mm to 80mm dia. 6m to 8m long** **2)GI wire 20 to 25 SWG** **3)BA wire 8 to 10 SWG**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.23	1514	**Supplying placing bamboo roll each roll of 4 nos uncleaned full bamboo 60mm to 80mm dia. 6 m. to 8 m. long at site binding properly each other in bunch with annealed wire 20 to 25 SWG at least at three places along its length, 3 nos. loads filled with boulder in empty cement bags and tying it with BA wire 8 to 10 SWG launching in river and placing in position and tying the bamboo roll at one end at least 15 m. away from river bank to bamboo post, including piling of bamboo post, all complete job as per Drawing , Specification and direction of engineer.** **Remarks:** **1) GI wire 20 to 25 SWG** **2) Bamboo 60mm to 80mm dia.** **3) BA wire 8 to 10 SWG**	**Each**	Skilled Unskilled	m-day m-day	0.1 0.56	Bamboo GI wire BA wire Empty cement bags Boulder spall	m kg kg nos. cum	30 0.5 1..13 3.00 0.106	29.75		
15.24	1515	**Providing and laying Bamboo Porcupine as per Drawing and Specifications, 30 m lead and all lifts.** **Remarks:** **1. Length of bamboo should not be less than 7m.** **2. 1 Set of Bamboo porcupine consist of 4 vertical member spaced at 1m centre to centre forming a square, 4 long diagonals and 8 short diagonals.**	**1 set**	Skilled Unskilled	m-day m-day	0.3 2	Bamboo GI wire Nails	m kg kg	70.00 1.00 1.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		3. Requirement of bamboo is calculated for the scour depth of 2.5m such that vertical member are in 4m length (2.5m below the ground and 1.5m above).										
		4. Vertical member shall be sinked to a length not less than scour depth at that location of river / stream.										
		5. Cost of sinking vertical members by jet boring if required, shall be 20% additional of the total cost (Cost of material and labour).										
15.25	**1515**	**Providing and laying concrete Porcupine of concrete grade M20 each porcupine having 6 members - 3m long and required cross section as per Drawing and Specifications, 30 m lead and all lifts.**										
		(For 10 no. of porcupines having 60 members)										
A		**Cross Section - 10cmx10cm**	**10 set**	Skilled	nos	0.5	Concrete Grade M20 rate as per item no. 8.2	cum	1.89	3T Crane (For Placing in Position)	hr	1
				Unskilled	nos	14						
							Steel Rebars (8mm Main bar, 6mm stirups)	kg	148.37			
							Nut and Bolts (16mm dia 40 cm length)	no	80.00			
							Washer	no	160.00			
							Binding Wire (10 SWG)	m	18.80			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Cross Section - 15cmx15cm**	**10 set**	Skilled Unskilled	nos nos	0.5 14	PVC Pipe (25mm dia , 80Nos.@ 15cm) Concrete Grade M20 rate as per item no. 8.2 Steel Rebars (8mm Main bar, 6mm stirups) Nut and Bolts (16mm dia 40 cm length) Washer Binding Wire (10 SWG) PVC Pipe (25mm dia , 80Nos.@15cm)	m cum kg no no m m	12.00 4.25 333.82 80.00 160.00 18.80 12.00	3T Crane (For Placing in Position)	hr	1

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.26	1515	**Providing and laying concrete Porcupine of concrete grade M15, each porcupine having 6 members - 2m long and required cross section as per Drawing and Specifications, 30 m lead and all lifts.** **(For 10 no. of porcupines having 60 members)**										
A		**Cross section - 10cm*10cm**	**10 sets**	Skilled	nos	1	Concrete Grade M15 rate as per item no. 8.2	cum	1.26	3T Crane (For Placing in Position)	hr	1
				Unskilled	nos	3						
							Steel Rebars	kg	98.91			
							Nut and Bolts (16mm dia 40 cm length)	Nr.	80.00			
							Washer	Nr.	160.00			
							Binding Wire (10 SWG)	m	18.80			
							PVC Pipe (25mm dia, 80Nos.@ 15cm)	m	12.00			
B		**Cross Section - 15cmx15cm**	**10 set**	Skilled	nos	1	Concrete Grade M20	cum	2.84	3T Crane	hr	1
				Unskilled	nos	3						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							rate as per item no. 8.2			(For Placing in Position)		
							Steel Rebars (8mm Main bar, 6mm stirups)	kg	222.55			
							Nut and Bolts (16mm dia 40 cm length)	no	80.00			
							Washer	no	160.00			
							Binding Wire (10 SWG)	m	18.80			
							PVC Pipe (25mm dia , 80Nos.@15cm)	m	12.00			
15.27	1514	**Labour for cutting 62mm to 75mm dia. Bamboo piles to size and making shoes and driving etc. complete job as per specifications and direction of engineer (20 number of piles, sunk depth = 1.525 m each, giving 30.5 m sunk depth)**	**30.5m**	Skilled Unskilled	nos nos	0.25 2.5						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.28	1514	**Supplying and making 60mm. to 80mm. dia.bamboo pile & hammering into the ground incl. cutting as per size, pointing the end, etc. all complete as per drawing and specifications.** **- Nr. of pile 8, - length of each pile 3.0 m , Depth of pile below the ground = 1.5m**	**12 m**	Skilled Unskilled	m-day m-day	0.10 0.84	Bamboo (60mm. to 80mm. Dia)	m	26.4			
		Remarks: Remaining upper portion of bamboo can be used for fabric										
15.29	1514	**Supplying and Making Bamboo Piles from well matured hard bamboos of dia 7.5cm to 9 cm as per technical specification all complete.**										
A		**Pile Length 4.20m**	**100 nos**	Skilled Unskilled	m-day m-day	2 8	Bamboo	m	462	Tools & Plants	3% of Labour cost	
B		**Pile Length 5.20m**	**100 nos**	Skilled Unskilled	m-day m-day	2 8	Bamboo	m	572	Tools & Plants	3% of Labour cost	
C		**Pile Length 6.50m**	**100 nos**	Skilled Unskilled	m-day m-day	2 9	Bamboo	m	715	Tools & Plants	3% of Labour cost	
D		**Pile Length 8m**	**100 nos**	Skilled Unskilled	m-day m-day	2 9	Bamboo	m	880	Tools & Plants	3% of Labour cost	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: **1. Length of pile depends on river discharge & location such that L=1.5+R+1.5 where L is length of pile and R is scour depth of the river for a particular discharge at particular location** **2. Length of pile L will have 1.5m length above the ground and length (R+1.5)m below the ground when used for river bank protection work.** **3. The remaining portion of Bamboo after extracting the pile length maybe used for bamboo fabric/chachri preparation works.**										
15.30	**1514**	**Bamboo Pile Driving and hammering to drive upto required depth below river bed using wooden hammer or Monkey hammer or Water jet as per the site condition and technical specification all complete**										
A		**2.75m below river bed**	**100 nos**	Skilled Unskilled	m-day m-day	1.75 30	14 gauge SWG GI Wire	kg	2	Tools and Plants (Wodden Hammer/Monkey Hammer 2 Nos)	3% of Labour cost	
B		**3.5m to 4m below river bed**	**100 nos**	Skilled Unskilled	m-day m-day	1.75 32	14 gauge SWG GI Wire	kg	2	Tools and Plants (Wodden Hammer/Monkey Hammer 2 Nos)	3% of Labour cost	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**5m below river bed**	**100 nos**	Skilled	m-day	1.8	14 gauge	kg	2	Tools and Plants (Wodden Hammer/Monkey Hammer 2 Nos)	3% of Labour cost	
				Unskilled	m-day	35	SWG GI Wire					
										5HP Pump	hr	3
D		**6m or 6.5m below river bed**	**100 nos**	Skilled	m-day	2	14 gauge	kg	2	Tools and Plants (Wodden Hammer/Monkey Hammer 2 Nos)	3% of Labour cost	
				Unskilled	m-day	40	SWG GI Wire					
										5HP Pump	hr	4
		Remarks:										
		1. Iron Cap Shall be Used for hammering.										
		2. For Pile works in 2 rows, Maximum spacing between rows shall be 1m and minimum spacing shall be 0.7m .										
		3. Incase of pile driving using water jet, cost of SWG GI wire should be excluded.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.31	1514	**Supplying and weaving Bamboo fabric/chachari from splitted bamboo (width not less than 3.5cm at beginning, strong enough to stand pressure after weaving) fixing them in bamboo piles with 7.5cm long iron nail & tying with 14 gauge SWG wire as per specification all complete.**										
A		**For Piles upto 4.2m length**	**100 m^2**	Skilled	m-day	15	Bamboo	m	340	Tools & Plants	3% of Labour cost	
				Unskilled	m-day	5	Nails	kg	3.5			
							14 Gauge SWG GI wire	kg	2.5			
B		**For Piles upto 5.2m length**	**100 m^2**	Skilled	m-day	15	Bamboo	Nos	340	Tools & Plants	3% of Labour cost	
				Unskilled	m-day	5	Nails	kg	3.5			
							14 Gauge SWG GI wire	kg	2.5			
C		**For Piles upto 6.5m length**	**100 m^2**	Skilled	m-day	15	Bamboo	Nos	340	Tools & Plants	3% of Labour cost	
				Unskilled	m-day	5	Nails	kg	3.5			
							14 Gauge SWG GI wire	kg	2.5			
D		**For Piles upto 8m length**	**100 m^2**	Skilled	m-day	15	Bamboo	Nos	340	Tools & Plants	3% of Labour cost	
				Unskilled	m-day	5	Nails	kg	3.5			
							14 Gauge SWG GI wire	kg	2.5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: **1)Fixing Iron Nail (7.5 cm long) shall be used at every alternate bamboo piles (poles).** **2) 4 pieces per bamboo ; row spacing 8.5 cm C/C**										
15.32	1515	**Supplying , Fixing and laying bamboo Porcupines , for channel closure and river bank protection works using 2m*2m bamboo poles giving box size of 1m*1m as per technical specification all complete. Boulder filled gabions (box size 3m*1m*1m, made from 3.251mm wire having 10cm*10cm rectangular mesh) to be used for providing anchorage so that porcupines maynot be removed from its position.** **(1 Set consists of 9 nos of porcupines)**	1 set	Skilled Unskilled	m-day m-day	3 18	Bamboo 9"-10" long iron bolt 10mm dia 2.032 mm wire 12mm dia cable rope Gabion Box (3m*1m*1m) Boulder D bolt (12mm - 16mm dia) Hexa	m nos kg m nos cum nos no	351 216 22.5 66 3 9 12 1	Electric Drilling	hr	9
		Remarks: **1. There shall be 4 vertical poles (2m in length) and 12 diagonal poles (8 no of 2.5m length and 4 no of 2.75m length) in each porcupine.** **2. Each 2 members will be tied by iron nut and bolts requiring 3 bolts in each joints. Total nos of bolts per porcupine will be 24.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.33	1514	**Supplying and making 60mm. to 80mm. dia. bamboo runner and fixing it to a vertical pile with nails all complete as per drawing and specifications.**	**10m.**	Skilled Unskilled	m-day m-day	0.04 0.08	Bamboo Nails	m Kg.	14 0.2			
15.34	1514	**Supplying and making bamboo fabric made by nailing bamboo pieces and fixing them in place by 75mm. nails at alternating points all complete as per drawing and specifications.**	**100 m²**	Skilled	m-day	20	Bamboo Nails	m Kg.	700 2.5			
15.35	1514	**Supplying and making two half pieces from 80mm. dia. bamboo and fixing them to vertical pole by nails all complete as per drawing and specifications.**	**100 m²**	Skilled Unskilled	m-day m-day	10 10	Bamboo Nails	m Kg.	420 2.5			
15.36	1506	**Supply of Geocell including stretching, laying and pinning Geocell pannel together using compressor run stapler and anchoring with piles at reinforcement position to achieve stable position all complete work in accordance with technical specification/requirement all complete (Lead upto 30m).**										
A		**Slope <= 40 Degree**	**100 m²**	Skilled	m-day	3.23	Geocell	sq.m.	103			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Slope > 40 Degree**	**100 m²**	Skilled	m-day	3.67	Anchor Rod(10mm dia steel rod)	kg	30.5			
							Other Item including pins, clips & hiring cost of electric air compressor etc.	(3% Cost of Geocell)				
							Geocell	sq.m.	103			
							Anchor Rod(10mm dia steel rod)	kg	30.5			
							Other Item including pins, clips & hiring cost of electric air compressor, etc.	(3% Cost of Geocell)				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.37	1506	**Supply of Geocell including stretching, laying and pinning Geocell pannel together on ground, using compressor run stapler, onto the reinforced area and extracting temporary construction piles all complete work in accordance with technical specification/requirement all complete (Lead upto 30m).**	100 m²	Skilled	m-day	2.89	Geocell	sq.m.	103			
							Other Item including pins & hiring cost of electric air compressor, etc.	(3% Cost of Geocell)				
15.38	1509	**Providing and Installation of soil nailing with semi-flexible 3- D galvanized steel mat for slope protection and erosion control**										
A		**Providing 3-D galvanized steel panels from the palette, cutting them if necessary, joining the panels to longer rows by overlapping and binding as necessary and putting on the slope, insertion of distribution bars or steel ropes , fixing with clamps and marking holes for nails or static nails (bored nails)**	40 m²	Skilled	m-day	1	3-D galvanized steel Profile	kg	138			
				Unskilled	m-day	2						
							12 mm bars (in case of T-nails)	kg	59.808			
							Clamps	nos	16			
							Binding wire loops	nos	200			
							12 mm dia. Steel rope in case of bored cement grouted nails*	kg	45.024			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Connecting elements for steel ropes for Nails *	nos	24			
		Remarks: **1)These materials are used only in connection with nails items and depend on the no of nails metal and wire cutter, safety cables, wrench, hammer, stairs, metal steps etc. T & P will be covered by Overhead.**										
B		**Providing and filling the installed 3-D galvanized steel profile with angular material of size 32-63 mm all complete as per specifications.**										
I		**Using Mechanical**										
i		**In shallow slopes (< 45 degrees slope angle)**	**150 m²**	Skilled Unskilled	m-day m-day	1 1	Angular Gravel 32-63mm	cum	7.5	Dredger Crane, loader (0.25-0.5 cum) or bucket conveyer belt	hr	6
ii		**In slopes (> 45 degrees slope angle)**	**120 m²**	Skilled Unskilled	m-day m-day	1 1	Angular Gravel 32-63mm	cum	6	Dredger Crane, loader(0.25-0.5 cum) or bucket conveyer belt	hr	6

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**Manual Means**										
i		**In shallow slopes (< 45 degrees slope angle)**	**150 m²**	Skilled Unskilled	m-day m-day	2 6	Angular Gravel 32-63mm	cum	7.5			
ii		**In slopes (> 45 degrees slope angle)**	**120 m²**	Skilled Unskilled	m-day m-day	2 7	Angular Gravel 32-63mm	cum	6			
C		**Spraying of humus (if required) on the on the top of gravel (on the top surface of 3-D profile) all complete as per specification.**										
I		**Using Mechanical Aids**										
i		**In shallow slopes (< 45 degrees slope angle)**	**150 m²**	Skilled Unskilled	m-day m-day	1 1	Humus material	cum	8.2	Humus spraying machine	hr	6
ii		**In shallow slopes (> 45 degrees slope angle)**	**120 m²**	Skilled Unskilled	m-day m-day	1 1	Humus material	cum	7.2	Humus spraying machine	hr	6
II		**Manual Means**										
i		**In shallow slopes (< 45 degrees slope angle)**	**150 m²**	Skilled Unskilled	m-day m-day	2 20	Humus material	cum	6.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**In shallow slopes (> 45 degrees slope angle)**	**120 m²**	Skilled Unskilled	m-day m-day	4 30	Humus material	cum	6			
D		**Providing and driving the equal angle L-section galvanized steel nails (size between L-32mm x 32mm x 4mm to L-40mm x 40mm x 5mm) by using handheld or pneumatic hammer (nail length between 0.6 m -3.5 m), first drilling a hole of diameter 35-43 mm (size of L-section+ 3 mm) and filling with cement mortar and then driving the nails to fix the semi-flexible 3-D galvanized steel panel on the slopes or embankments, max spacing of nails is 1.5 m.**										
I		**Driving L-nails in soft soil using small dia. pre-bored holes without using cement mortar**										
i		**In shallow slopes (< 45 degrees slope angle)**	**100m**	Skilled Unskilled	m-day m-day	3 3	Galvanized L-steel profile : 32mm x 32mm x 4mm	kgs	215	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs, temporary	20% of Labour Cost	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										scaffolding and other materials such as sand and cement admixtures accessories as necessary		
										Air compressor with pneumatic chisel attachment	hr	12
ii		**In shallow slopes (> 45 degrees slope angle)**	**100m**	Skilled Unskilled	m-day m-day	4 4	Galvanized T-steel profile : 32mm x 32mm x 4mm	kgs	215	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs, temporary scaffolding	20% of Labour Cost	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										and other materials such as sand and cement admixtures accessories as necessary		
										Air compressor with pneumatic chisel attachment	hr	12
II		**Driving L-nails in rocky soil using bigger dia. pre-bored holes using cement mortar**										
i		**In shallow slopes (< 45 degrees slope angle)**	**100m**	Skilled	m-day	6	Galvanized L-steel profile : 32mm x 32mm x 4mm	kgs	215	Bore drill bits of different diameters, extension rods, cement slurry pump, special	20% of Labour Cost	
				Unskilled	m-day	6	Cement	MT	0.25			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										hammer head for nails, handheld or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as necessary		
										Air compressor with pneumatic chisel attachment	hr	18

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**In shallow slopes (> 45 degrees slope angle)**	**100m**	Skilled	m-day	6	Galvanized T-steel profile : 32mm x 32mm x 4mm	kgs	215	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as necessary	10% of Labour Cost	
				Unskilled	m-day	6		MT	0.25			
							Cement	MT	0.25			
										Air compressor with pneumatic chisel attachment	hr	18

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
E		**Providing and driving of 28 mm dia (Threaded) steel nails by drilling holes of 90 mm dia using cement grouting for fixing of semi-flexible 3-D steel mats upto a length of 4 to 8 m on slopes**										
I		**On soft soils**	**100m**	Skilled Unskilled	m-day m-day	4 4	28 mm dia steel bar Cement	MT MT	0.483 0.8	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as necessary	25% of Labour Cost	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**On rocky soils**	**100m**	Skilled Unskilled	m-day m-day	5 5	28 mm dia steel bar Cement	MT MT	0.483 0.6	Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine) Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as necessary	hr 20% of Labour Cost	12

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	hr	12
F		**Providing and driving of 28 mm dia (Threaded) steel nails by drilling holes of 90 mm dia using cement grouting for fixing of semi-flexible 3-D steel mats upto a length > 8 m on slopes**										
1		**On soft soils**	**100m**	Skilled Unskilled	m-day m-day	6 6	28 mm dia steel bar Cement	MT MT	0.483 0.8	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld or safety cables, stairs,		25% of Labour Cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										temporary scaffolding and other materials such as sand and cement admixtures		
										Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	hr	18
II		**On rocky soils**	**100m**	Skilled	m-day	8	28 mm dia steel bar	MT	0.483	Bore drill bits of different diameters, extension rods, cement slurry pump, special hammer head for nails, handheld		20% of Labour Cost
				Unskilled	m-day	8						
							Cement	MT	0.6			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as necessary		
										Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	hr	24
		Remarks: **1)Semi-felxible 3D galvanized steel mat can be used for slope protection and launching apron in river training works.** **2) For slope protection/ launching apron, 3D galvanized steel mat can be used in layers as per design requirement.** **3) Top of the mat (in slope/launcing apron) should be covered by gabion wire of appropriate mesh (preferably 40mm x 40mm mesh size) in order to prevent the escaping of filled materials due to high river current.** **4) Cost of gabion mat shall be included in the analysis if required.**											

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.39	1516	**Providing laying and filling geobags of size 1m*0.7m (of required GSM non-woven) weight of bag 420 gm., volume of filled 0.07 cum, with locally available sandy soil including stiching in four lines by approved nylon thread with stitching machine and generators, stacking and placing after loading, unloading and carriage with help of trolly within 150m lead all complete as per Drawing, Specifications and direction of Engineer**	40 bags	Skilled	m-day	0.58	Empty Geobags	Nr.	40	Stiching Machine	day	0.33
				Unskilled	m-day	6	Sewing Thread	Rolls	2	Manual Trolly	day	1
										3KVA Generator	hr	2.67
15.40	1517	**Supply and filling of empty cement/Polypropelyne(PP) bags with local sand, stiching the bags and placing in position all complete as per Drawing, Specifications and direction of Engineer (Filling not more than 0.028m3 or 1 ft3 for cement bags and 75% of capacity for PP bags)**										
A		**Haulage upto 30m**	100 bags	Unskilled	m-day	6.5	Empty sacks	Nr.	100			
							Sweing thread (1.5mm dia cotton/parasoot thread)	roll	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Haulage upto 50m**	**100 bags**	Unskilled	m-day	8	Empty sacks	Nr.	100			
							Sweing thread (1.5mm dia cotton/parasoo t thread)	roll	1			
A		**Haulage upto 100m**	**100 bags**	Unskilled	m-day	10	Empty sacks	Nr.	100			
							Sweing thread	Kg.	0.75			
15.41	1518	**Supply and delivery of Nylon rope crates including cutting, weaving, netting etc. with**										
A		**8mm. dia. rope, box size 6m.x3mx0.8m and mesh size 20cmx20cm**	**Box**	Skilled	m-day	2	Nylon rope	Kg.	4.5			
B		**4mm. dia. rope, box size 3m.x1.05mx 1.05m and mesh size 15cmx15cm**	**Box**	Skilled	m-day	1.5	Nylon rope	Kg.	3.7			
15.42	1502 1504	**Providing and erecting Gabion Toe wall for river bank protection using machine made Gabion box with diaphragm (Box Size-4m*1m*1m, diaphragm @ 1m interval) having geotextile including filling box with GBM river bed materials, stiching geotextiles and closing gabion box with separate lacing wire as per specification all complete**										
			4m	Skilled	m-day	0.5	Gabion	sqm	42			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		(Height of Toe wall = 2m)		Unskilled	m-day	4	Geotextile	sqm	55.2			
							River Bed material	cum	8			
							Lacing Wire	kg	5.4			
15.43	1514	**Supplying , cutting and placing in place 15-25cm dia rolls of grass, branches of bamboo in between rows of piles and closing tightly by bamboo chachari at the top including tying rolls by wire all complete**	**1 m3**	Unskilled	m-day	0.5	Grass	cum	1			
							Binding wire	kg	0.25			
							Bamboo Chachari	sqm	As required			
15.44	1519	**Supplying and installation of Articulating Block fabric form concrete mattress for erosion protection and scour control as per drawing and specification all complete.**										
A		**Articulation Block fabric form concrete matress single directional cable AB300**	**100 m^2**	Skilled	m-day	4	Articulation block fabric form mattress with cable on single direction - Concrete thickness 75mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Articulation Block fabric form concrete matress single directional cable AB400**	**100 m^2**	Skilled Unskilled	m-day m-day	4 4	Terra Anchors (2T) OPC-43 grade cement Sand Articulation block fabric form mattress with cable on single direction - Concrete thickness 100 mm Terra Anchors (2T) OPC-43 grade cement Sand	Nr MT cu.m. sq.m. Nr MT cu.m.	14 4.51 5 128 14 6.04 7	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric generator set (125 KVA)	hr. hr. hr.	12.00 17.00 2.00
C		**Articulation Block fabric form concrete matress single directional cable AB600**	**100 m^2**	Skilled Unskilled	m-day m-day	4 4	Articulation block fabric form mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							with cable on single direction - Concrete thickness 150 mm			Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	9.02			
							Sand	cu.m.	11			
D		**Articulation Block fabric form concrete matress single directional cable AB800**	**100 m^2**	Skilled	m-day	4	Articulation block fabric form mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4						
							with cable on single direction - Concrete thickness 200			Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	11.96			
							Sand	cu.m.	14			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
E		**Articulation Block fabric form concrete matress single directional cable AB1000**	**100 m^2**	Skilled	m-day	4	Articulation block fabric form mattress with cable on single direction - Concrete thickness 250 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	15.28			
							Sand	cu.m.	19			
F		**Articulation Block fabric form concrete matress single directional cable AB1200**	**100 m^2**	Skilled	m-day	4	Articulation block fabric form mattress with cable on single direction - Concrete thickness 300 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							OPC-43 grade cement	MT	18.33			
							Sand	cu.m.	22			
15.45	1519	**Supplying and installation of multi-linear geocomposite drain below the concrete mattress as an integral part of the system as per drawing and specification all complete.**	**100 m^2**	Skilled Unskilled	m-day m-day	1 1	Multi-linear	sq.m.	115			
15.45	1519	**Supplying and installation of Articulating Block fabric form concrete mattress for erosion protection and scour control as per drawing and specification all complete.**										
A		**Articulation Block fabric form concrete matress bi directional cable AB300**	**100 m^2**	Skilled Unskilled	m-day m-day	4 4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 75mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric Generator set (125 KVA)	hr. hr. hr.	12.00 17.00 2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	4.51			
							Sand	cu.m.	5			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Articulation Block fabric form concrete matress bi directional cable AB400**	100 m^2	Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 100 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	6.04			
							Sand	cu.m.	7			
C		**Articulation Block fabric form concrete matress bi directional cable AB600**	100 m^2	Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 150 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	9.02			

S.N.	Ref. to SS	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Sand	cu.m.	11			
D		**Articulation Block fabric form concrete matress bi directional cable AB800**	**100 m²**	Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 200 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			
							OPC-43 grade cement	MT	11.96			
							Sand	cu.m.	14			
E		**Articulation Block fabric form concrete matress bi directional cable AB1000**	**100 m²**	Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 250 mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00
				Unskilled	m-day	4				Hydraulic excavator	hr.	17.00
										Electric generator set (125 KVA)	hr.	2.00
							Terra Anchors (2T)	Nr	14			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**Articulation Block fabric form concrete matress bi directional cable AB1200**	**100 m^2**	Skilled Unskilled	m-day m-day	4 4	OPC-43 grade cement Sand Articulation block fabric form mattress with cable on both direction - Concrete thickness 300 mm Terra Anchors (2T) OPC-43 grade cement Sand	MT cu.m. sq.m. Nr MT cu.m.	15.28 19 128 14 18.33 22	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric generator set (125 KVA)	hr. hr. hr.	12.00 17.00 2.00
15.46 A	1519	**Supplying and installation of Articulating Block fabric form concrete mattress for erosion protection and scour control as per drawing and specification all complete. Fabric form concrete matress comprising intermediate unwoven openings (for vegetation growth) EM400**	**100 m^2**	Skilled Unskilled	m-day m-day	4 4	Environmental fabric form mattress - Concrete thickness 100mm OPC-43 grade cement	sq.m. MT	128 6.04	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric generator set (125 KVA)	hr. hr. hr.	12.00 17.00 2.00

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.47	1505	**Supplying and laying high strength flexible geogrids (HSFG) as soil reinforcement / basal reinforcement as per specifications, made of high tenacity polyester core with polyethylene coating**	300 m2	Skilled Unskilled	m-day m-day	6.36 3	Sand Synthetic geogrid Water charges	cu.m. sq.m 1% of labour cost	7 300			
		Remarks: **1. Add 10 per cent of the cost of reinforcing elements (synthetic geogrids) for wastage and accessories like tie-strips, nuts and bolts and loops/lugs for joining reinforcing elements with the facia pannels, overlaps and other protective elements for synthetic geogrids and all other activities required to complete the item in all respect including transportation.**										
15.48	1521	**Supply and laying of high performing three dimensional erosion control mat made of polypropylene polymer having minimum mass per unit area 450 gms/sqm. extruded onto a mechnically woven double twisted wire hexagonal shaped wire mesh of mesh wire dia 2.7/3.7 mm (ID/OD) and having a Zn-Al5% coating in accordance with EN 10244-2 class A along with additional PVC coating and steel wire ropes of 8 mm dia woven into the mesh at a longitudinal spacing of 1 m . The renforcing hexagonal steel wire mesh has mechanical characterstics higher than the suggested from EN 10223-3.**	45 m^2	Skilled UnSkilled	m-day m-day	2.5 13	Erosion Control Mat Accessories Cost	Sqm 5% of material cost	45			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.49	1522	**Supplying of steel wire grid/mesh Geocomposite consisting of hexagonal double twisted wire mesh woven with steel wire with a diameter of 2.70 mm (EN 10223-3; EN 10218), Galmac (Zn-5%Al Alloy) coated (EN 10244 - class A), longitudinally weaved with steel cable type 6x7+ WSC, grade 1770 MPa, having a diameter of 8 mm (EN 12385-4) Galmac (Zl-5%Al Alloy) coated (EN 10244 - class A), with a spacing of 50 cm., including top and bottom support rope, lacing wire or rope required to connect the nets and all accessories such as U-clamps, thimbles, including safety, all other ancillary works, material, machinery, labour, etc. complete at easily accessible location including top and bottom, with all leads and lifts and as directed by Engineer - In - Charge.**										
		For 2.9mX40m	**116 m2**	Highly skilled Climber	m-day	1	Complete Steel Wire Grid Material	Sqm	116			
							Accessories Cost	5% of material cost				
				Skilled	m-day	1.5						
				UnSkilled	m-day	7						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.50	1523	**Providing and fixing of Self drilling anchor of 32 millimeter diameter, yield strength more than 500MPa, and yield load 230 KN, hexagonal nut, washer plate 200 x 200 x 10 millimeter size, coupler for connecting bars, and full length grouting with admixture including all ancillary works for top / bottom / cortical anchoring including all ancillary material, machinery, labour etc. complete and as directed by Engineer-in-charge.**	3 m	Highly skilled Climber	m-day	3.49	SDA 3 RM	RM	3	Rent for Drifter	LS	
							Coupler	Nos	1			
				Skilled	m-day	10	Nut	Nos	1	Rent for Compressor	LS	
				UnSkilled	m-day	8.75	Anchor Plate	Nos	1			
							Cement slurry for Grout	LS		Grouting Machine	LS	
15.51	1524	**Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 1500kJ capacity, 5m height, residual height more than 60% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.**	3 m	Highly skilled Climber	m-day	14	Rockfall barrier -1500 KJ (5m)	RM	1			
				Skilled	m-day	22	Other tool & tackles	5% of material cost				
				UnSkilled	m-day	20	Concrete M-25	Cum	0.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.52	1524	**Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 3000kJ capacity, 5m height, residual height more than 70% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.**	1 m	Highly skilled Climber	m-day	10	Rockfall barrier -3000 KJ (5m)	RM	1			
				Skilled	m-day	11	Other tool & tackles	5% of material cost				
				UnSkilled	m-day	10	Concrete M-25	Cum	0.75			
15.53	1525	**Supply and installation of Rhomboidal Wire Rope Panels of rope diameter 10mm with steel core with the intersection of joints secured by a double knot connection of 3mm wire having minimum tear capacity of 20 kN and pull apart capacity of 10 KN mesh opening 300 x 300mm size including the Top and Bottom support Rope, lacing wire or rope required to connect the panels and all accessories such as U clamps, thimbles as shown in drawings and as per**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		technical specifications etc. complete including all lead, lift and machinery and as per IRC Special Report 23 For 4.5X10 m =45 Sqm	45 m2	Highly skilled Climber	m-day	3.49	Complete Material	Sqm	45			
							Accessories Cost	5% of material cost				
				Skilled	m-day	6.5						
				UnSkilled	m-day	10.9						
15.54	1524	Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 8500kJ capacity, 7m height, residual height more than 57% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.	3 m	Highly skilled Climber	m-day	14	Rockfall barrier -8500 KJ (7m)	RM	1			
				Skilled	m-day	22	Other tool & tackles	5% of material cost				
				Unskilled	m-day	20						
							Concrete M-25	Cum	0.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.55	800	**Supplying and Laying of concrete block of required size in 1: 6 (Cement : RBM) including compaction as per specification all complete.**										
A		**Mannual means**	**1 m^3**	Skilled	m-day	0.3	Cement	MT	0.32			
				Unskilled	m-day	4	RBM	cum	1.295			
							Water	KL	0.13			
		Remarks:										
		RBM: River Bed Materials										

Note : Department of Water Resources and Irrigation does not have any intention to promote or suggest any particular commercial brand or company; however, new technologies available in market are suggested without prejudice and if may be the case of any particular commercial brand or company, equivalent product readily available in market could be used.

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.49	1522	**Supplying of steel wire grid/mesh Geocomposite consisting of hexagonal double twisted wire mesh woven with steel wire with a diameter of 2.70 mm (EN 10223-3; EN 10218), Galmac (Zn-5%Al Alloy) coated (EN 10244 - class A), longitudinally weaved with steel cable type 6x7+ WSC, grade 1770 MPa, having a diameter of 8 mm (EN 12385-4) Galmac (Zl-5%Al Alloy) coated (EN 10244 - class A), with a spacing of 50 cm., including top and bottom support rope, lacing wire or rope required to connect the nets and all accessories such as U-clamps, thimbles, including safety, all other ancillary works, material, machinery, labour, etc. complete at easily accessible location including top and bottom, with all leads and lifts and as directed by Engineer - In - Charge.**										
		For 2.9mX40m	**116 m2**	Highly skilled Climber	m-day	1	Complete Steel Wire Grid Material	Sqm	116			
							Accessories Cost	5% of material cost				
				Skilled	m-day	1.5						
				UnSkilled	m-day	7						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.50	1523	**Providing and fixing of Self drilling anchor of 32 millimeter diameter, yield strength more than 500MPa, and yield load 230 KN, hexagonal nut, washer plate 200 x 200 x 10 millimeter size, coupler for connecting bars, and full length grouting with admixture including all ancillary works for top / bottom / cortical anchoring including all ancillary material, machinery, labour etc. complete and as directed by Engineer-in-charge.**	3 m	Highly skilled	m-day	3.49	SDA 3 RM	RM	3	Rent for Drifter	LS	
				Climber			Coupler	Nos	1			
				Skilled	m-day	10	Nut	Nos	1	Rent for Compressor	LS	
				UnSkilled	m-day	8.75	Anchor Plate	Nos	1			
							Cement slurry for Grout	LS		Grouting Machine	LS	
15.51	1524	**Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 1500kJ capacity, 5m height, residual height more than 60% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.**	3 m	Highly skilled Climber	m-day	14	Rockfall barrier -1500 KJ (5m)	RM	1			
				Skilled	m-day	22	Other tool & tackles	5% of material cost				
				UnSkilled	m-day	20	Concrete M-25	Cum	0.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.52	1524	**Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 3000kJ capacity, 5m height, residual height more than 70% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.**	1 m	Highly skilled Climber	m-day	10	Rockfall barrier -3000 KJ (5m)	RM	1			
				Skilled	m-day	11	Other tool & tackles	5% of material cost				
				UnSkilled	m-day	10	Concrete M-25	Cum	0.75			
15.53	1525	**Supply and installation of Rhomboidal Wire Rope Panels of rope diameter 10mm with steel core with the intersection of joints secured by a double knot connection of 3mm wire having minimum tear capacity of 20 kN and pull apart capacity of 10 KN mesh opening 300 x 300mm size including the Top and Bottom support Rope, lacing wire or rope required to connect the panels and all accessories such as U clamps, thimbles as shown in drawings and as per**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		technical specifications etc. complete including all lead, lift and machinery and as per IRC Special Report 23 **For 4.5X10 m =45 Sqm**	**45 m2**	Highly skilled Climber	m-day	3.49	Complete Material	Sqm	45			
							Accessories Cost	5% of material cost				
				Skilled	m-day	6.5						
				UnSkilled	m-day	10.9						
15.54	1524	**Providing and fixing of ETAG certified Class A Dynamic Rockfall Barrier composed of system comprising of steel meshes and cables coated in Zn-Al 5% class A (EN 10244-2, EN 10264-2), 8500kJ capacity, 7m height, residual height more than 57% consisting of posts, anchor bolts, plate for fixing anchor bolts, base anchors, cable anchors, cables/support ropes, clamps, retention panels, etc (specifications as per clause 5.5 of IRC HRB Special Report 23) complete with post to post distance of 10m and energy dissipation by deformation of energy dissipaters, etc complete, and as per technical specifications and as directed by Engineer-in-charge.**	**3 m**	Highly skilled Climber	m-day	14	Rockfall barrier -8500 KJ (7m)	RM	1			
				Skilled	m-day	22	Other tool & tackles	5% of material cost				
				Unskilled	m-day	20						
							Concrete M-25	Cum	0.75			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
15.55	800	**Supplying and Laying of concrete block of required size in 1: 6 (Cement : RBM) including compaction as per specification all complete.**										
A		**Mannual means**	**1 m^3**	Skilled	m-day	0.3	Cement	MT	0.32			
				Unskilled	m-day	4	RBM	cum	1.295			
							Water	KL	0.13			
		Remarks: **RBM: River Bed Materials**										

Note : Department of Water Resources and Irrigation does not have any intention to promote or suggest any particular commercial brand or company; however, new technologies available in market are suggested without prejudice and if may be the case of any particular commercial brand or company, equivalent product readily available in market could be used.

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Sand	cu.m.	7			
15.47	1505	**Supplying and laying high strength flexible geogrids (HSFG) as soil reinforcement / basal reinforcement as per specifications, made of high tenacity polyester core with polyethylene coating**	300 m2	Skilled Unskilled	m-day m-day	6.36 3	Synthetic geogrid	sq.m	300			
							Water charges	1% of labour cost				
		Remarks: **1. Add 10 per cent of the cost of reinforcing elements (synthetic geogrids) for wastage and accessories like tie-strips, nuts and bolts and loops/lugs for joining reinforcing elements with the facia pannels, overlaps and other protective elements for synthetic geogrids and all other activities required to complete the item in all respect including transportation.**										
15.48	1521	**Supply and laying of high performing three dimensional erosion control mat made of polypropylene polymer having minimum mass per unit area 450 gms/sqm. extruded onto a mechnically woven double twisted wire hexagonal shaped wire mesh of mesh wire dia 2.7/3.7 mm (ID/OD) and having a Zn-Al5% coating in accordance with EN 10244-2 class A along with additional PVC coating and steel wire ropes of 8 mm dia woven into the mesh at a longitudinal spacing of 1 m . The renforcing hexagonal steel wire mesh has mechanical characterstics higher than the suggested from EN 10223-3.**	45 m^2	Skilled UnSkilled	m-day m-day	2.5 13	Erosion Control Mat	Sqm	45			
							Accessories Cost	5% of material cost				

Rate Analysis Norms

Drilling by Rotary Drilling Method

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.1		Site preparation for drilling works										
A	1600	Rig setting up and preparation of mud pit	1 well	Skilled	m-day	2.00						
				Unskilled	m-day	10.00						
B		Access road preparation — Refer to civil norms										
C		Camp setting and preparation including site clearance	1 well	Skilled	m-day	1.00						
				Unskilled	m-day	10.00						
D		Assembling, centrallizing and sinking of guide pipe (conductor of pipe) of size 22"-30" dia. to a depth of 10m	10 m	Same rate as of 16.1 (9 m/hr)								
16.2		Drilling in Soft formation (Pilot hole)										
A	1600	Drilling of pilot hole by std. bit ranging from 7 5/8" to 9 7/8" dia. For the first initial depth of 100m. With direct rotary machine in soft formation, (consists of clay, silt and sand below particle size of 4.75 mm) penetration rate is fixed at 3m. per hr.	100 m	Skilled	m-day	70.00	Bentonite	ton	1.50	Rig machine	hrs	33.33
				Unskilled	m-day	110.00	Barite	ton	0.25	Ele. Generator	hrs	25.00
							Drill bit	nos.	0.33			
							Oxygen gas	Cyl.	0.20			
							Acetelyne gas	Cyl.	0.10			
							Water	KL	50.00			

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
	1600	NOTE: * In all works, drilling rig is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig. **Working time of all manpower and machinery include idle hrs as well as sample collection, washing and rod changing with minor break down time.										
B		Drilling to a depth over and beyond 100m. for every additional 100.m depth, add to quantities of item 16.2 (A).	100m	Skilled	m-day	2.80	Bentonite	ton	0.06	Rig machine	hrs	2.00
				Unskilled	m-day	3.60	Barite	ton	0.01	Ele. Generator	hrs	2.40
							Water	KL	2.00			
		NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.2 (A) and then rate per m for every additional 100 m. from 16.2 (B), then add these two to get req rate.										
C		Add 5% of all costs from 16.2 (A) and 16.2 (B) for consumable items of mud pump										
16.3		Drilling in medium formation (Pilot Hole)										
A	1600	Drilling of pilot by std. bit ranging from 7 5/8" to 9 7/8" dia. for the first initial depth of 100 m. with drilling rig machine in medium formation (consists of gravel fine to medium) penetration rate is fixed at 2m per hour.	100m	Skilled	m-day	105.00	Bentonite	ton	1.75	Rig machine	hrs	50.00
				Unskilled	m-day	135.00	Barite	ton	0.37	Ele. Generator	hrs	37.50
							Drill bit	nos.	0.50			
							Oxygen gas	Cyl.	0.20			
							Acetelyne gas	Cyl.	0.10			
							Water	KL	58.28			
		NOTE: * In all works, drilling rig is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig. **Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time.										
B		Drilling to depth over and beyond 100m. for every additional 100m. depth add to item 16.3 (A).	100m	Skilled	m-day	4.20	Bentonite	ton	0.070	Rig machine	hrs	3.00
				Unskilled	m-day	5.40	Barite	ton	0.015	Ele. Generator	hrs	3.60
							Water	KL	2.33			

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
	1600	**NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.3 (A) and then rate per m for every additional 100 m. from 16.3(B), then add these two to get req rate.**											
C		**Add 5% of all costs from 16.3 (A) and 16.3 (B) for consumable items of mud pump.**											
16.4		**Drilling in hard formation (Pilot hole)**											
A	1600	**Drilling of pilot hole by std. bit ranging from 7 5/8" to 9 7/8" dia for the first initial depth of 100m with drilling rig machine in hard formation (consists of particle size including and above coarse gravel) Penetration rate is fixed at 1.5m per hour.**	100m	Skilled	m-day	140.00	Bentonite	ton	3.00	Rig machine	hrs	66.66	
				Unskilled	m-day	180.00	Barite	ton	0.50	Ele. Generator	hrs	50.00	
							Drill bit	nos.	1.00				
							Oxygen gas	Cyl.	0.20				
							Acetelyne gas	Cyl.	0.10				
							Water	KL	99.90				
		NOTE: * In all works, drilling rig is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig. **Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time.											
B		**Drilling to depths over and beyond 100m, for every additional 100m depth, add to quantities of item 16.4 (A).**	100m	Skilled	m-day	5.60	Bentonite	ton	0.12	Rig machine	hrs	4.00	
				Unskilled	m-day	3.20	Barite	ton	0.02	Ele. Generator	hrs	4.80	
							Water	KL	4.00				
		NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.4 (A) and then rate per m for every additional 100 m. from 16.4(B), then add these two to get req rate.											
C		**Add 5% of 16.4 A and 16.4 B for Consumable Items of mud pump**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
16.5		**Reaming of Tubewell** **Drilling in soft formation (First reaming of pilot hole)**											
A	1600	**Reaming of pilot hole by std. bit above 9 7/8" and below 13 3/4" dia. For the first initial depth of 100m with drilling rig machine in soft formation (consists of clay, silt and sand below particle size of 4.75mm) penetration rate is fixed at 9m per hr.**	100m	Skilled	m-day	35.00	Bentonite	ton	1.00	Rig machine	hrs	11.11	
				Unskilled	m-day	45.00	Barite	ton	0.25	Ele. Generator	hrs	15.00	
							Drill bit	nos.	0.20				
							Oxygen gas	Cyl.	0.10				
							Acete yne gas	Cyl.	0.05				
							Water	KL	33.30				
		Note: *In all works, drilling rig machine is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig.											
		****Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time**											
B		**Reaming of pilot hole by std. bit above 9 7/8" and below 13 3/4" dia driller to depths over and beyond 100m. For every additional 100m depth, add to quantities of item 16.5 (A).**	100m	Skilled	m-day	1.40	Bentonite	ton	0.04	Rig machine	hrs	1.00	
				Unskilled	m-day	1.80	Barite	ton	0.01	Ele. Generator	hrs	1.20	
							Water	KL	1.33				
		Note: In calculating rates for reaming to depths beyond 100m. first get rate per m. from 16.5 (A) and then rate per m for every additional 100m from 16.5 (B) then add these two to get required rate.											
C		**Add 5% of 16.5 A and 16.5 B for Consumable Items of mud pump**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
16.6		Drilling in medium formation (first reaming of pilot hole)											
A	1600	Reaming of pilot hole by std. bit above 9 7/8" and below 13 3/4" dia for the first initial depth of 100m with drilling rig machine in medium formation (consists of gravel fine to medium) penetration rate is fixed at 6m per hour.	100m	Skilled	m-day	52.50	Bentonite	ton	1.00	Rig machine	hrs	16.67	
				Unskilled	m-day	67.50	Barite	ton	0.25	Ele. Generator	hrs	22.50	
							Drill bit	nos.	0.25				
							Oxygen gas	Cyl.	0.10				
							Acetelyne gas	Cyl.	0.05				
							Water	KL	33.30				
		Note: *In all works, drilling rig machine is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig.											
		**Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time											
B		Reaming of pilot hole by std. bit above 9 7/8"and below 13 3/4" dia for drilling to depths over and beyond 100m. For every additional 100m depth, add to quantities of item 16.6 (A).	100m	Skilled	m-day	2.00	Bentonite	ton	0.04	Rig machine	hrs	1.50	
				Unskilled	m-day	2.70	Barite	ton	0.01	Ele. Generator	hrs	1.80	
							Water	KL	1.33				
		(Refer to item 16.5 (B)).											
C		Add 5% of 16.6 A and 16.6 B for Consumable Items of mud pump											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.7		**Drilling in hard formation (first reaming of pilot hole)**										
A	1600	**Reaming of pilot hole by std. bit above 9 7/8" and below 13 3/4" dia. for the first initial depth of 100m with drilling machine in hard formation (consists of particle size including and above coarse gravel.) penetration rate is fixed at 4.5m per hour.**	100m	Skilled	m-day	70.00	Bentonite	ton	1.25	Rig machine	hrs	22.22
				Unskilled	m-day	90.00	Barite	ton	0.25	Ele. Generator	hrs	30.00
							Drill bit	nos.	0.33			
							Oxygen gas	Cyl.	0.10			
							Acetelyne gas	Cyl.	0.05			
							Water	KL	41.63			
		Note: *In all works, drilling rig machine is inclusive of mud pump also, whether it be a part or a separate unit of the drilling rig.										
		****Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time**										
B		**Reaming of pilot hole by std. bit above 9 7/8"and below 13 3/4" dia for drilling to depths over and beyond 100m depth, add to quantities of item 16.7 (A).**	100m	Skilled	m-day	2.80	Bentonite	ton	0.05	Rig machine	hrs	2.00
				Unskilled	m-day	3.60	Barite	ton	0.01	Ele. Generator	hrs	2.40
							Water	KL	1.67			
		(Refer to item 16.5 (B)).										
C		**Add 5% of 16.7 A and 16.7 A for Consumable Items of mud pump.**										

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
16.8		**Drilling in soft formation (second reaming of bore hole)**											
A	1600	**Second reaming of bore hole by std. bit of 17 1/2" dia. upto depth of 100 m with drilling rig machine in soft formation consists of clay, silt and sand below particle size of 4.75 mm penetration rate is fixed at 9m per hr.**	**100m**	Skilled	m-day	35.00	Bentonite	ton	1.00	Rig machine	hrs	11.11	
				Unskilled	m-day	45.00	Barite	ton	0.25	Ele. Generator	hrs	15.00	
							Drill bit	nos.	0.13				
							Oxygen gas	Cyl.	0.10				
							Acetelyne gas	Cyl.	0.05				
							Water	KL	33.30				
		Note: *In all works, drilling rig machine is inclusive of mud pump also, weather it be a part or a separate unit of the drilling rig.											
		****Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time**											
B		**Second reaming of pilot hole by std. bit of 17 1/2" dia. for drilling to depths over and beyond 100 m, for every additional depth, add to quantities of item 16.8 (A).**	**100m**	Skilled	m-day	1.40	Bentonite	ton	0.02	Rig machine	hrs	1.00	
				Unskilled	m-day	1.80	Barite	ton	0.01	Ele. Generator	hrs	1.20	
							Water	KL	0.67				
		Note: *Same costs of 16.8 (A) and 16.8 (B) applies to third reaming by >=22" dia. std. bit for depths of upto 100m if third reaming is required.											
		****(Refer to item 16.5 (B)).**											
C		**Add 5% of 16.8 A and 16.8 B for Consumable Items of mud pump.**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
16.9		**Drilling in medium formation (Second reaming of bore hole)**											
A	1600	**Second reaming of bore hole by std. bit of 17 1/2" dia. upto depth of 100 m with drilling rig machine in medium formation (consists of gravel fine to medium) penetration rate is fixed at 6m per hr.**	100m	Skilled	m-day	52.50	Bentonite	ton	1.00	Rig machine	hrs	16.67	
				Unskilled	m-day	67.50	Barite	ton	0.25	Ele. Generator	hrs	22.50	
							Drill bit	nos.	0.167				
							Oxygen gas	Cyl.	0.10				
							Acetelyne gas	Cyl.	0.05				
							Water	KL	33.30				
		Note: *In all works, drilling rig machine is inclusive of mud pump also, weather it be a part or a separate unit of the drilling rig.											
		****Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time**											
B		**Second reaming of pilot hole by std. bit of 17 1/2" dia. for drilling to depths over and beyond 100 m, for every additional depth, add to quantities of item 16.9 (A).**	100m	Skilled	m-day	1.40	Bentonite	ton	0.04	Rig machine	hrs	1.50	
				Unskilled	m-day	1.80	Barite	ton	0.01	Ele. Generator	hrs	1.80	
							Water	KL	1.33				
		Note: *Same costs of 16.9 (A) and 16.9 (B) applies to third reaming by >=22" dia std bit for depths of upto 100m if third reaming is required.											
		****(Refer to item 16.5 (B)).**											
C		**Add 5% of 16.9 A and 16.9 B for Consumable Items of mud pump**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
16.10		**Drilling in hard formation (Second reaming of bore hole)**											
A	1600	**Second reaming of bore hole by std. bit of 17 1/2" dia upto depth of 100 m with drilling rig machine in hard formation (consists of particle size including and above coarse gravel) penetration rate is fixed at 4.5m per hr.**	100m	Skilled	m-day	70.00	Bentonite	ton	1.25	Rig machine	hrs	22.22	
				Unskilled	m-day	90.00	Barite	ton	0.25	Ele. Generator	hrs	30.00	
							Drill bit	nos.	0.25	Water truck	hrs	20.00	
							Oxygen gas	Cyl.	0.10	Cargo truck	hrs	5.00	
							Acetelyne gas	Cyl.	0.05	Pickup truck	hrs	20.00	
							Water	KL		water pump	hrs	40.00	
		Note: *In all works, drilling rig machine is inclusive of mud pump also, weather it be a part or a separate unit of the drilling rig.											
		****Working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time**											
B		**Second reaming of pilot hole by std. bit of 17 1/2" dia. for drilling to depths over and beyond 100 m, for every additional depth, add to quantities of item 16.10 (A).**	100m	Skilled	m-day	1.40	Bentonite	ton	0.05	Rig machine	hrs	2.00	
				Unskilled	m-day	1.80	Barite	ton	0.01	Ele. Generator	hrs	2.40	
							Water	KL	1.67				
		Note: *Same costs of 16.10 (A) and 16.10 (B) applies to third reaming by >=22" dia std bit for depths of upto 100m if third reaming is required.											
		****(Refer to item 16.5 (B)).**											
C		**Add 5% of 16.10 A for Consumable Items of mud pump**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.11		Reconditioning of borehole (4" dia bore hole)										
A	1600	Reconditioning of bore hole before lowering of pipe assembly of 4" dia. to a depth upto 100m and beyond.	100m	Skilled	m-day	4.00	Bentonite	ton	0.10	Rig machine	hrs	3.00
				Unskilled	m-day	4.80	Bit	nos.	0.01	Ele. Generator	hrs	1.00
							Barite	ton	0.15			
		NOTE: There is no change in rate for reconditioning of bore hole regarding depth beyond 100m										
B		Lowering of pipe assembly of 4" dia. to a depth of 100m and beyond.	100m	Skilled	m-day	6.00	4" blind pipe	m	as per design	Rig machine	hrs	8.00
				Unskilled	m-day	9.00	4" slotted pipe	m	as per design	Ele. Generator	hrs	3.00
							4" flange	nos.	as per design			
							2" nipple	nos.	as per design			
							4" gasket	set	as per design			
							Welding rod	pack	6.00			
		(Refer to item 16.5 (B)).					Oxygen gas	cyl	1.00			
							Acetelyne gas	cyl	0.50			
							Pea gravel	cum.	as per design			
		NOTE: There is no change in rate for lowering of pipe assembly regarding depth beyond 100m										
C		Add 5% of 16.11 A for Consumable Items of mud pump										

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.12		**Reconditioning of borehole (>4" dia bore hole)**											
A	1600	**Reconditioning of borehole before lowering of pipe assembly of 10"/6" dia. to a depth of 100m and beyond**	100m	Skilled	m-day	7.50	Bentonite	ton	0.50	Rig machine	hrs	6.00
				Unskilled	m-day	13.50	Bit	nos.	0.05	Ele. Generator	hrs	2.00
							Barite	ton	0.25			
							Water	KL	16.65			
		NOTE: There is no change in rate for reconditioning of bore hole regarding depth beyond 100m											
B		**Lowering of pipe assembly of 10"/6" dia to a depth of 100m and beyond.**	100m	Skilled	m-day	9.50	10" blind pipe	m	as per design	Rig machine	hrs	12.00
				Unskilled	m-day	13.50	6" blind pipe	m	as per design	Ele. Generator	hrs	6.00
							6" slotted pipe	m	as per design			
							6/10" reducer	nos.	1.00			
							10" flange	nos.	as per design			
							2" nipple	nos.	as per design			
							10" gasket	set	as per design			
							Welding rod	pack	9.00			
							Oxygen gas	cyl	1.50			
							Acetelyne gas	cyl	0.75			
							Pea gravel	cum	as per design			
		NOTE: There is no change in rate for lowering of pipe assembly regarding depth beyond 100m											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
C		Supply and packing of suitable dia. and sorted gravel for 10"/6"dia tubewell and beyond	m^3	Skilled	m-day	1.00	Pea gravel	m^3	as per design	Rig machine	hrs	6.00
				Unskilled	m-day	3.00						
D		*Add 20% extra gravel for loss during transportation and extra space occured by sidefall in the bore hole.										
		**Add 5% of 16.12 A for Consumable Items.										
E		Rate analysis formula for different types of well assembly: (16.12 A to 16.12 C)*{(screen diameter in inch)/6}.										
16.13		Well development works										
I		Well development works (Well Development by Rig Machine)										
A	1600	Well development by drilling rig machine for well size of 4" (Back washing and inner washing)	100m	Skilled	m-day	4.50	Bucket	nos.	1.00	Rig machine	hrs	6.00
				Unskilled	m-day	6.75	Liner	nos.	0.25	welding generator	hrs	1.00
							Piston Rod	nos.	0.25			
							Water	KL	33.30			
B		Well development by drilling rig machine for well size of 4" (water jetting)	100m	Skilled	m-day	3.75	Bucket	nos.	1.00	Rig machine	hrs	6.00
				Unskilled	m-day	5.25	Liner	nos.	0.25	welding generator	hrs	1.00
							Piston Roc	nos.	0.25			
							Water	KL	21.00			
C		Well development by compressor machine for well size of 4"	1 well	Skilled	m-day	19.00				Rig machine	hrs	4.00
				Unskilled	m-day	35.00				Compressor	hrs	40.00
										Generator	hrs	30.00

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
D	1600	Well development by drilling rig machine for well size of 10/6" (Back washing and inner washing)	100m	Skilled	m-day	6.00	Bucket	nos.	1.00	Rig machine	hrs	8.0
				Unskilled	m-day	9.00	Liner	nos.	0.25	welding generator	hrs	1.0
							Piston Rod	nos.	0.25			
		NOTE: There is no change in rate regarding depth beyond 100m					Water	KL	21.00			
E		Well development by drilling rig machine for well size of 10"/6" (water jetting)	100m	Skilled	m-day	5.00	Bucket	nos.	1.00	Rig machine	hrs	4.00
				Unskilled	m-day	9.00	Liner	nos.	0.25	welding generator	hrs	1.00
							Piston Rod	nos.	0.25			
							welding rod	pack	0.75			
							Sodium hexa Methaphosphate	kg	20.00			
		NOTE: There is no change rate in regarding depth beyond 100m					Water	KL	21.00			
F		Well development by bailing method for well size of 10"/6"	1 well	Skilled	m-day	7.00	Bucket	nos.	1.00	Rig machine	hr	24.00
							Liner	nos.	0.25	Generator	hr	24.00
							Piston Rod	nos.	0.25	Pickup truck	hr	7.00
		NOTE: There is no change in rate regarding depth beyond 100m					Gland Packing	set	2.00	tripod set	hr	24.00
							Water	KL	21.00			
NOTE: Add 5% of 16.13 I (A) to 16.13 I (F) for Consumable Items.												

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
II		**Well development works (Well Development by Compressor)**											
A	1600	**Well development by compressor machine for well size of 10"/6"**	**1 well**	Skilled	m-day	34.00	Water	KL	21.00	Rig machine	hrs	4.00	
				Unskilled	m-day	36.00				Compressor	hrs	72.00	
										Generator	hrs	30.00	
		NOTE: Add 5% of 16.13 II (A) for Consumable Items.											
B		**Rate analysis formula for different types of well assembly: (16.13 II A)*{(screen diameter in inch)/6}**											
III		**Well development works (Well Development by Pump)**											
A	1600	**Well development by pump for well size of 10"/6"**	**1 well**	Skilled	m-day	19.00	Gasket	set	4.00	Submersible pump set (HP)	hr	50.00	
				Unskilled	m-day	35.00	Gland Packing	set	6.00	Generator	hr	50.00	
										Discharge meter	hr	50.00	
										water Level indicator	hr	50.00	
										6" pipe T	hr	50.00	
										Tripod set	hr	50.00	
B		**Rate analysis formula for different capacity pumps of various hydraulic head: 16.13 III A*{(Submersible pump capacity in horse power)/7.5}**											

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.14		**Pump test for deep tubewell**										
A	1600	**Time draw down pump test for deep tubewell (Aquifer test)** **NOTE: Rates are inclusive of works concerning the installation and dismantle of pump and other machinery.**	1 well	Skilled	m-day	6.00	Gasket	set	4.00	submersible pump set (HP)	hr	24.00
				Unskilled	m-day	29.00	Gland Packing	set	6.00	Generator	hr	24.00
										Water table indicator	hr	24.00
										6" pipe T	hr	24.00
										Tripod set	hr	24.00
B		**Step drawdown pump test for deep tubewell**	1 well	Skilled	m-day	9.00	Gasket	set	4.00	submersible pump set (HP)	hr	24.00
				Unskilled	m-day	30.00	Gland Packing	set	6.00	Generator	hr	24.00
										Water table indicator	hr	24.00
										6" pipe T	hr	24.00
C		**Rate analysis formula for different capacity pumps of various hydraulic head: (16.14A to 16.14B)*{(total pump capacity in horse power)/7.5}**										
D		**Recovery test for deep tubewell**	1 well	Skilled	m-day	6.00				Ele. Generator	hr	6.00
				Unskilled	m-day	18.00				water table indicator	hr	16.00

Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.15		Logging of borehole										
A	1600	Logging of bore hole after drilling of pilot hole for depths of 100 m and beyond.	100m	Skilled	m-day	6.00				Logging machine set with batteries	hr	12.00
				Unskilled	m-day	8.00						
										Borehole camera set	hrs	12.00
		NOTE: The rate for electrical logging includes all necessary tools etc. and is the same for all types and depth of bore holes.								Electric generator	hrs	12.00
16.2	1600	Rate analysis formula for: Borehole videography- 16.15A*1.5 and cost of gamma gamma logging- 16.15A*2.										
16.2	1600	Report Preparation (Includes general characterstics of well, borehole logging , pump test data, analysis of acquired data, all complete.)	1 well	Skilled	m-day	2.00				Stationery Items	LS	10 % of 16.17
				Unskilled	m-day	2.00						
16.2	1600	Report preparation cost of multiple tubewells: 16.17*{1+(additional tubewells/2)}										

Drilling by Percussion Drilling Method

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.19		**Site preparation for drilling works**										
A	1600	Rig setting up and prepearation of mud pit	1 well	Skilled	m-day	2.00						
				Unskilled	m-day	10.00						
B		Camp setting and preparation including site clearance	1 well	Skilled	m-day	1.00						
				Unskilled	m-day	10.00						
C		Assembling, centrallizing and sinking of guide pipe (conductor of pipe) of size 22"-30" dia. to a depth of 10m	10 m	Same rate as of 16.1								
D		Access road preparation — Refer to civil norms										
16.20		**Drilling in Soft formation (Pilot hole)**										
A	1600	Drilling of pilot hole by std. bit ranging from 7 5/8" to 22" dia. for the first initial depth of 100 m. with drilling rig machine in medium formation (consists of clay, silt and sand below particle size of 4.75 mm) penetration rate is fixed at 1.5 m per hour.	100m	Skilled	m-day	45.00	Bentonite	ton	1.50	Rig machine	hrs	66.66
				Unskilled	m-day	84.00	Barite	ton	0.25	Ele. Generator	hrs	37.50
							Drill bit (Chisel)	nos.	0.33			
							Bailer	nos.	0.30			
							water	kl	50.00			
		NOTE: Working time of all manpower and machinery includes idle hours as well as sample collection, washing and rod changing with minor break down time										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
B	1600	**Drilling to depth over and beyond 100m. for every additional 100m. depth add to item 16.20 (A).**	100m	Skilled	m-day	4.00	Bentonite	ton	0.01	Rig machine	hrs	6.00
				Unskilled	m-day	5.40	Barite	ton	0.013	Ele. Generator	hrs	7.20
							Drill bit (Chisel)	nos.	0.013			
							Bailer	nos.	0.01			
							water	kl	0.33			
		Rate analysis formula for different size chiesel diameter: (16.20 A to 16.20 B)*{(chisel diameter in inch)/14}										
		NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.20(A) and then rate per m for every additional 100 m. from 16.20 (B), then add these two to get req rate.										
16.21		**Drilling in medium formation (Pilot Hole)**										
A	1600	**Drilling of pilot hole by std. bit ranging from 7 5/8" to 22" dia. for the first initial depth of 100 m. with drilling rig machine in medium formation (consists of fine to medium gravel) penetration rate is fixed at 1m per hour.**	100m	Skilled	m-day	65.00	Bentonite	ton	1.75	Rig machine	hrs	100.00
				Unskilled	m-day	110.00	Barite	ton	0.37	Ele. Generator	hrs	75.00
							Drill bit (Chisel)	nos.	0.50			
							Bailer	nos.	0.45			
							water	kl	58.33			
		NOTE: Working time of all manpower and machinery includes idle hours as well as sample collection, washing and rod changing with minor break down time										
B		**Drilling to depths over and beyond 100m, for every additional 100m depth, add to quantities of item 16.21 (A).**	100m	Skilled	m-day	3.00	Bentonite	ton	0.070	Rig machine	hrs	12.00
				Unskilled	m-day	3.60	Barite	ton	0.015	Ele. Generator	hrs	14.40
							Drill bit (Chisel)	nos.	0.02			
							Bailer	nos.	0.018			
							water	kl	2.33			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Rate analysis formula for different size chiesel diameter: (16.21 A to 16.21 B)*{(chisel diameter in inch)/14}										
	1600	**NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.21(A) and then rate per m for every additional 100 m. from 16.21 (B), then add these two to get req rate.**										
16.22		**Drilling in hard formation (Pilot hole)**										
A	1600	**Drilling of pilot hole by std. bit ranging from 7 5/8" to 22" dia for the first initial depth of 100m with drilling rig machine in hard formation (consists of particle size including and above coarse gravel) Penetration rate is fixed at 0.5 m per hour.**	100 m	Skilled	m-day	125.00	Bentonite	ton	3.00	Rig machine	hrs	200.00
				Unskilled	m-day	180.00	Barite	ton	0.50	Ele. Generator	hrs	150.00
							Drill bit (Chisel)	nos.	1.00			
							Bailer	nos.	0.90			
							water	kl	100.00			
B		**Drilling to a depth over and beyond 100m. for every additional 100.m depth, add to quantities of item 16.22 (A).**	100m	Skilled	m-day	4.00	Bentonite	ton	0.12	Rig machine	hrs	12.00
				Unskilled	m-day	5.00	Barite	ton	0.02	Ele. Generator	hrs	14.40
							Drill bit (Chisel)	nos.	0.04			
							Bailer	nos.	0.035			
							water	kl	4.00			
		Rate analysis formula for different size chiesel diameter: (16.22 A to 16.22 B)*{(chisel diameter in inch)/14}										
		NOTE: In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.22 (A) and then rate per m for every additional 100 m. from 16.22 (B), then add these two to get req rate.										

Drilling by Down-the-Hole (DTH) Drilling Method

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.23		**Site preparation for drilling works**										
A	1600	Rig setting up	1 well	Skilled	m-day	1.00						
				Unskilled	m-day	5.00						
B		Camp setting and preparation including site clearance	1 well	Skilled	m-day	1.00						
				Unskilled	m-day	10.00						
C		Assembling, centrallizing and sinking of guide pipe (conductor of pipe) of size 22"-30" dia. to a depth of 10m	10 m	Skilled	m-day	1.00						
				Unskilled	m-day	10.00						
D		Access Road Preparation (Refer to Civil Norms)										
16.24		**Drilling in Hard Formation**										
A	1600	Drilling of pilot hole by std. bit ranging upto 7 5/8" dia for the first initial depth of 100m with drilling rig machine in Hard Formation (Penetration rate is fixed at 3 m per hour)	100m	Skilled	m-day	25.00	Drill bit	nos.	1.00	Rig machine	hrs	33.33
				Unskilled	m-day	50.00	Oxygen gas	Cyl.	0.20	Diesel Generator	hrs	25.00
							Acetelyne gas	Cyl.	0.10	Compressor	hrs	33.33
							Welding Rod	Pkt.	5.00			
		NOTE: *working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time										
		** In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.24 (A) and then add 5% of 16.24 (A) in every additional meter and add these two to get req rate.										
		*** For increment in every addition inch of drill bit dia. add 10 % of 16.24 A										

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.25		**Drilling in Medium Formation**											
A	1600	Drilling of pilot hole by std. bit ranging upto 7 5/8" dia for the first initial depth of 100m with drilling rig machine in Medium Formation (Penetration rate is fixed at 4 m per hour)	100m	Skilled	m-day	18.00	Drill bit	nos.	0.50	Rig machine	hrs	25.00
				Unskilled	m-day	36.00	Oxygen gas	Cyl.	0.20	Diesel Generator	hrs	18.75
							Acetelyne gas	Cyl.	0.10	Compressor	hrs	25.00
							Welding Rod	Pkt.	5.00			
		NOTE:*In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.25 (A) and then add 5% of 16.25 (A) in every additional meter and add these two to get req rate (see eg. in remarks)											
		** For increment in every addition inch of bit dia. add 10 % of 16.25 A											
		***working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time											
16.26		**Drilling in Soft Formation**											
A	1600	Drilling of pilot hole by std. bit ranging upto 7 5/8" dia for the first initial depth of 100m with drilling rig machine in Soft Formation (Penetration rate is fixed at 5 m per hour)	100m	Skilled	m-day	15.00	Drill bit	nos.	0.33	Rig machine	hrs	20.00
				Unskilled	m-day	30.00	Oxygen gas	Cyl.	0.20	Diesel Generator	hrs	15.00
							Acetelyne gas	Cyl.	0.10	Compressor	hrs	20.00
							Welding Rod	Pkt.	5.00			
		NOTE: *In calculating rates for drilling to depths beyond 100m, first get rate per m from 16.26 (A) and then add 5% of 16.32 (A) in every additional meter and add these two to get req rate (see eg. in remarks)											
		** For increment in every addition inch of bit dia. add 10 % of 16.26 A											
		*** working time of all manpower and machinery includes idle hrs as well as sample collection, washing and rod changing with minor break down time											

Construction of Shallow Tubewell

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.27		**Shallow Tube well drilling works (Manually)**										
A	1600	**Site Preparation for drilling of shallow tubewell works**	1 well	Skilled	m-day	0.50						
				Unskilled	m-day	1.50						
B		**Drilling and Installation of well**										
I		**Sludge/Manual Rotary/Bogie method in soft formation (consisting of clay, silt and sand) using 2.5" dia. G.I. PIPE**										
i		**Initial 20 meter depth**										
a		**For layer testing/pilot hole**	20m	Skilled	m-day	3.00				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	18.00						
b		**Reaming of pilot hole by standard bit (hole size upto 6.5")**	20m	Skilled	m-day	2.00				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	8.00						
c		**Lowering of pipe**	20m	Skilled	m-day	1.00				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	3.00						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
ii		**For every additional 20m depth beyond initial 20m depth, add to corresponding quantities of item number [16.27-(B)-(I)-(i)]**										
a	1600	**For layer testing/pilot hole**	**20m**	Skilled	m-day	1.00				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	3.00						
b		**Reaming of pilot hole by standard bit (hole size upto 6.5")**	**20m**	Skilled	m-day	0.50				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	2.00						
c		**Lowering of pipe**	**20m**	Skilled	m-day	0.60				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	1.00						
II		**Thokuwa/Hammering Method in medium formation (consisting of alternate layer of gravel, sand and silt)**										
i	1600	**Hammering of well assembly to the depth upto 20m**	**10m**	Skilled	m-day	5.00				Drilling Tools & Plant	LS	10% of Labour Cost
				Unskilled	m-day	30.00				Pumping set	hr	6.00
C	1600	**Well development and testing by pump**	**1 well**	Skilled	m-day	0.50						
				Unskilled	m-day	2.00						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.28		**Pump test for shallow tubewell**										
A	1600	**Time drawdown pump test for shallow tubewell**	1 well	Skilled	m-day	2.20	Gasket	set	3.00	Centrifugal pump	hr	6.00
				Unskilled	m-day	4.80	Gland Packing	set	5.00	Pickup truck	hr	2.00
										Generator	hr	2.00
		NOTE: Rates are inclusive of works concerning the installlation and dismantle of pump and other machinery.								Orifice	hr	6.00
										water table indicator	hr	6.00
										4" pipe	hr	6.00
B		**Step drawdown pump test for shallow tubewell**	1 well	Skilled	m-day	2.00	Gasket	set	3.00	Centrifugal pump	hr	6.00
				Unskilled	m-day	4.80	Gland Packing	set	5.00	Pickup truck	hr	6.00
										Generator	hr	2.00
										Orifice	hr	2.00
										water table indicator	hr	6.00
										4" pipe T	hr	6.00
C		**Recovery test for shallow tubewell**	1 well	Skillec	m-day	1.50				Water table indicator	hr	3.00
				Unskilled	m-day	3.50						

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
16.29		Dugwell Construction using RCC Rings										
A	1600	Site Preparation /Camp Setting	1 well	Skilled	m-day	1.50						
				Unskilled	m-day	3.00						
B		Digging well, Lifting excavated materials and disposal all complete up to 10m lead.										
i)		Formation Type : Soft										
a		0 to 4m deep digging and lifting	1 m^3	Unskilled	m-day	1.65				Add 5% of labour for digging and lifting tools		
b		4m to 7m deep digging and lifting	1 m^3	Unskilled	m-day	2.45						
c		7m to 10m deep digging and lifting	1 m^3	Unskilled	m-day	3.90						
d		10m to 13m deep digging and lifting	1 m^3	Unskilled	m-day	6.05						
e		13m to 16m deep digging and lifting	1 m^3	Unskilled	m-day	8.85						
f		16m to 19m deep digging and lifting	1 m^3	Unskilled	m-day	12.35						
g		19m to 22m deep digging and lifting	1 m^3	Unskilled	m-day	16.50						
h		22m to 25m deep digging and lifting	1 m^3	Unskilled	m-day	21.32						
		NOTE: Add one labour for digging underwater										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
ii)	1600	**Formation Type : Medium**										
a		**0 to 4m deep digging and lifting**	**1 m^3**	Unskilled	m-day	2.55				Add 5% of labour for digging and lifting tools		
b		**4m to 7m deep digging and lifting**	**1 m^3**	Unskilled	m-day	3.50						
c		**7m to 10m deep digging and lifting**	**1 m^3**	Unskilled	m-day	4.95						
d		**10m to 13m deep digging and lifting**	**1 m^3**	Unskilled	m-day	7.10						
e		**13m to 16m deep digging and lifting**	**1 m^3**	Unskilled	m-day	9.90						
f		**16m to 19m deep digging and lifting**	**1 m^3**	Unskilled	m-day	13.40						
g		**19m to 22m deep digging and lifting**	**1 m^3**	Unskilled	m-day	17.55						
h		**22m to 25m deep digging and lifting**	**1 m^3**	Unskilled	m-day	22.40						
		NOTE: Add one labour for digging underwater										
iii)		**Formation Type : Hard**										
a		**0 to 4m deep digging and lifting**	**1 m^3**	Unskilled	m-day	3.90				Add 5% of labour for digging and lifting tools		
b		**4m to 7m deep digging and lifting**	**1 m^3**	Unskilled	m-day	4.70						
c		**7m to 10m deep digging and lifting**	**1 m^3**	Unskilled	m-day	6.15						
d		**10m to 13m deep digging and lifting**	**1 m^3**	Unskilled	m-day	8.30						
e		**13m to 16m deep digging and lifting**	**1 m^3**	Unskilled	m-day	11.10						
f		**16m to 19m deep digging and lifting**	**1 m^3**	Unskilled	m-day	14.60						
g		**19m to 22m deep digging and lifting**	**1 m^3**	Unskilled	m-day	18.75						
h		**22m to 25m deep digging and lifting**	**1 m^3**	Unskilled	m-day	23.60						
		NOTE: Add one labour for digging underwater										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
C	1600	Dewatering during digging of dugwell	1 Well	skilled	m-day	1.50				Pump 5-7 HP	hr	3.00
				Unskilled	m-day	3.00						
D		Lowering of RCC Rings	1 m	Skilled	m-day	0.15				Add 5% of labour for digging and lifting tools		
				Unskilled	m-day	0.60						
E		Recuperation Test	1 well	Skilled	m-day	1.50				Pump 5-7 HP	hr	12.00
				Unskilled	m-day	3.00						

SECTION 17: BIO-ENGINEERING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.1	1702	**Collection and preparation of seeds**										
		Collection of seeds from sources (within 1 km of the road), including separating and preparing seed for storage, and drying seed in the sun.										
A		**Grass Seeds**	**1 Kg**	Unskilled	m-day	1.50	Sealed bag	no.	1.0	Khukuri		3% of labour cost
B		**Large Shrub Seeds**	**1 Kg**	Unskilled	m-day	2.00	Sealed bag	no.	1.0	Khukuri		3% of labour cost
C		**Medium-sized Shrub Seeds (eg. Keraukose)**	**1 Kg**	Unskilled	m-day	3.00	Sealed bag	no.	1.0	Nanglo		3% of labour cost
D		**Medium-sized Shrub and tree seeds (e.g. areri, khayer, ghobre and rani salla, sisau)**	**1 Kg**	Unskilled	m-day	4.00	Sealed bag	no.	1.0	Nanglo		3% of labour cost
E		**Small Shrub and tree seeds (e.g. dhanyero, dhusun, tilka, utis)**	**1 Kg**	Unskilled	m-day	5.00	Sealed Bag	no.	1.00	Nanglo		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.2	1702	**Supply of seeds from market (if seed is available in the market).**										
A		**Grass Seeds**	1 Kg				Seed	kg	1.0			
B		**Large Shrub Seeds**	1 Kg				Seed	kg	1.0			
C		**Medium-sized Shrub Seeds (eg. Keraukose)**	1 Kg				Seed	kg	1.0			
D		**Medium-sized Shrub and tree seeds (e.g. areri, khayer, ghobre and rani salla, sisau)**	1 Kg				Seed	kg	1.0			
E		**Small Shrub and tree seeds (e.g. dhanyero, dhusun, tilka, utis)**	1 Kg				Seed	kg	1.0			
17.3	1703	**Collection of cuttings from sources (within 1 km of the road) for vegetative propogation.**										
A		**Grass clumps (e.g. amliso, kans, khar) to make slips for multiplication in the nursery.**	1000 Slips	Unskilled	m-day	1.50	Hessian Jute Grass clumps (Adequate supply)	sqm.	5.0	Kodalo		3% of labour cost

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Small bamboos (e.g. padang bans, tite nigalo bans), suitable for traditional planting. Material minimum 10 cm of rooted rhizome and 90 cm of culm.**	**1000 nos.**	Unskilled	m-day	3.00	Hessian Jute Bamboos (Adequate supply)	sqm.	10.0	Kodalo, Khukuri		3% of labour cost
C		**Hardwood cuttings (e.g. assuro, bains, kanda phul, namdi phul, saruwa, simali). Material minimum 30 cm in length and 2 cm in diameter**	**1000 nos.**	Unskilled	m-day	0.85	Hessian Jute Bushes (Adequate supply)	sqm.	5.0	Khukhuri		3% of labour cost
17.4	1704	**Nursery Operation and Management (Bed Preparation)**										
A		**Construction of seed beds for tree seedlings, including materials for beds and shades. Bed is 100 cm wide x 17 cm high and made up of: 5 cm of washed gravel, 5 cm of unsieved sweet soil, 5 cm of 1:3 mix of sieved sweet soil and washed sand, 2 cm of washed, sieved and sterilised sand.**	**5 m^2**	Skilled Unskilled	m-day m-day	1.5 2.0	Bamboo Polythene Bricks Gravel Unsieved soil	nos. sqm. nos. cum. cum.	9.00 9.00 96.00 0.25 0.10	Khanti Shovel Pick axe Screen mesh & others		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Line string	m	13.00			
							Binding wire	kg	3.00			
B		**Construction of stand out beds for tree seedlings in polypots, including materials for beds and shades. Bed is 100 cm wide x 15 cm high, with a 5 cm layer of gravel placed above the compacted ground.**	**5 m^2**	Unskilled	m-day	6.0	Bamboo	nos.	15.00	Khanti		3% of
							Bricks	nos.	96.00	Shovel		labour
							Gravel	cum.	0.25	Pick axe &		cost
							Line string	cum.	13.00	others		
							Binding wire	kg	3.00			
C		**Construction of beds for grass seeds, grass slips (i.e. vegetative propagation) and tree stool cuttings, including materials and hessian cover. Bed is 100 cm wide x 25 cm high and made up of: 5 cm of washed gravel placed above the ground, 5 cm of 1:1 mix of sieved soil and compost, and topped with 15 cm of 3:1 mix of sieved Forest topsoil and washed sand.**	**5 m^2**	Skilled	m-day	1.0	Gravel	cum.	0.38	Shovel		3% of
				Unskilled	m-day	1.5	Forest soil	cum.	1.46	Pick axe &		labour
							Compost	cum.	0.38	others		cost
							Washed sand	cum.	0.46			
							Hessian Jute	sqm.	10.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Construction of beds for propagation of bamboo culm cuttings, including materials and hessian cover. Bed is 100 cm wide x 30 cm high. The ground below the bed is dug to a depth of 30 cm. Bed is made with 10 cm unsieved soil and 20 cm sieved soil. A bund 10 cm high is formed around the edge.**	**5 m^2**	Skilled	m-day	2.0	Gravel Forest soil Compost Washed sand Hessian Jute	cum. cum. cum. cum. sqm.	0.38 1.46 0.38 6.00 25.00	Shovel Pick axe		3% of labour cost
17.5	1704	**Nursery operation and management (Seed sowing and transplanting; planting hard wood cutting)**										
A		**Tree seed sowing @ 10 gm per m^2 (medium-sized seeds) or 2 gm per m^2 (very fine seeds) into seed beds including pre-sowing seed treatment.**	**5 m^2**	Unskilled	m-day	0.04	Seed (Medium sized)	gm	50	Bowl Trowel & others		3% of labour cost
B		**Preparing potting mix and filling polypots, including all material for container seedlings. [Remarks 1 kg of 200 gauge polypots (4" x 7" laid flat) = 464 bags; 200 gauge black polythene is preferred.]**	**1000 nos.**	Unskilled	m-day	10.0	Polypot Sand Soil Compost	nos. cum. cum. cum.	1050.00 0.46 0.70 0.23	Sieve Shovel & others		3% of labour cost
C		**Direct sowing of tree seeds into polypots including seed treatment, by sowing one seed in half the pots and two seeds in the other half.**	**1000 nos.**	Unskilled	m-day	0.62	Seed Wooden peg	nos. nos.	1500.0 1.0	Sieve Shovel & others		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Pricking out young seedlings and transplanting into polypots**	**1000 nos.**	Unskilled	m-day	0.18	Wooden peg	nos.	1.0	Tray & others		3% of labour cost
E		**Pricking out tree seedlings and transplanting into beds**	**1000 nos.**	Unskilled	m-day	0.12	Wooden peg	nos.	1.0	Tray & others		3% of labour cost
F		**Transplanting grass slips into beds, from clumps. Slips are planted at 10 cm centre to centre in rows 25 cm apart.**	**1 m^2**	Unskilled	m-day	0.12	Hessian jute	sqm.	0.3	Khukuri Shovel & others		3% of labour cost
G		**Planting of hardwood cuttings of minimum 30 cm length to 20 cm depth into prepared beds. Cuttings spaced at 5 cm centre to centre in rows 20 cm apart.**	**1000 nos.**	Unskilled	m-day	1.00	Hardwood cuttings	nos.	1000	Khanti & others		3% of labour cost
17.6	1705	**Preparation of raised materials for extraction from the nursery**										
A		**Grass culm cutting production from nursery stock; single or double node (e.g. napier).**	**1000 nos.**	Unskilled	m-day	1.00	Hessian jute	sqm.	2.70	Khukhuri		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Uprooting and preparing grass slips ready for site planting from nursery seedlings**	**1000 nos.**	Unskilled	m-day	0.93	Hessian jute	sqm.	1.35	Fork Pickaxe Khukuri		3% of labour cost
C		**Uprooting and preparing grass slips ready for site planting from nursery grass clumps raised from slips by vegetative propagation.**	**1000 nos.**	Unskilled	m-day	0.63	Hessian jute	sqm.	4.20	Shovel Khanti		3% of labour cost
17.7	1705	**Compost and mulch production**										
A		**Mulch production by collection and cutting of weeds and other vegetation such as tite pati, banmara, etc. within 1 km of the road, and stacking along roadside. (thickness 7cm)**	**14 m^2**	Unskilled	m-day	1.2				Hasiya Doko		3% of labour cost
B		**Compost production by collection and cutting of weeds and other vegetation such as tite pati, banmara, etc. within 1 km of the road, including fine cutting and filling compost pit. (thickness 7cm)**	**14 m^2**	Unskilled	m-day	1.2				Hasiya Doko		3% of labour cost
C		**Turning compost once per month. (thickness 7cm)**	**14 m^2**	Unskilled	m-day	0.10				Shovel		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.8	1707	**Direct seeding on site**										
A		**Broadcasting grass seeds on slopes < 40°, seeding rate 25 gm/m^2**	**100 m^2**	Unskilled	m-day	0.17	Seed	kg	2.5			
B		**Broadcasting grass seeds on slopes < 40°, including cover with long mulch, seeding rate 25 gm/m^2**	**100 m^2**	Unskilled	m-day	5.0	Seed mulch	kg cum.	2.5 5.0			
C		**Broadcasting grass seeds on slopes < 40 - 45°, including cover with long mulch and jute netting of mesh size 300 mm x 500 mm. Seeding rate 25 gm/m^2. Operation includes pegging with suitable live pegs or hardwood cuttings (e.g. simali) @ 1 m spacing, jute net of 6.75 m x 1 m size.**	**100 m^2**	Unskilled	m-day	6.25	Seed mulch Jute Net Live Pegs	kg cum. sq.m nos.	2.5 5.0 105.0 128.0	Khukuri Mallet (wooden hammer)		3% of labour cost
D		**Sowing shrub or tree seeds on all slopes, at 25 cm intervals, including digging planting holes to 5 cm depth and covering with soil. Two seeds per planting hole.**	**100 m^2**	Unskilled	m-day	1.0	Seed	nos.	3200	Mild Steel rod of 50 cm length		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.9	1707	**Planting grass cuttings on site**										
A		**Planting single node culm cuttings of grass (e.g. napier) on fill slopes < 45° and embankment slopes in plain areas. Approximate length 15 - 20 cm, including digging planting hole 10 - 20 cm depth using a metal rod or hardwood peg.**	**100 nos.**	Unskilled	m-day	0.40	Grass cuttings Hessian jute	nos. sqm.	100 0.27	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
B		**Planting single node culm cuttings of grass (e.g. napier) on hard cut slopes < 45°. Approximate length 15 - 20 cm, including digging planting hole 10 - 20 cm depth using a metal rod or hardwood peg.**	**100 nos.**	Unskilled	m-day	0.55	Grass cuttings Hessian jute	nos. sqm.	100 0.27	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
C		**Planting single node culm cuttings of grass (e.g. napier) on hard cut slopes > 45°. Approximate length 15 - 20 cm, including digging planting hole 10 - 20 cm depth using a metal rod or hardwood peg.**	**100 nos.**	Unskilled	m-day	0.70	Grass cuttings Hessian jute	nos. sqm.	100 0.27	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
D		**Planting rooted grass slips on embankment slopes in plain areas, at 10 cm spacing within the row. The first row is 0.75 m from the edge of the pavement and subsequent rows are spaced at 1 m intervals down the embankment.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
I			1m	Unskilled	m-day	0.04	Grass Slips / no of drill cuttings	nos.	11.00	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
							Hessian jute	sqm.	0.14			
							Line String	m	1.00			
II			$1m^2$	Unskilled	m-day	0.08	Grass Slips / no of drill cuttings	nos.	22.00	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
							Hessian jute	sqm.	0.28			
							Line String	m	1.00			
E		**Planting rooted grass slips on slopes < 45°. including preparation of slips on site. Operation includes digging planting holes to a maximum of 5 cm depth with metal rod or hardwood peg, depending on nature of soil. The planting drills should be spaced 10 cm apart.**	$1\ m^2$	Unskilled	m-day	0.40	Grass Slips / no of drill cuttings	nos.	100	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
							Hessian jute	sqm.	0.27			
F		**Planting rooted grass slips on slopes 45° - 60° including preparation of slips on site. Operation includes digging planting holes to a maximum of 5 cm depth with metal rod or hardwood peg, depending on nature of soil. The planting drills should be spaced 10 cm apart.**	$1\ m^2$	Unskilled	m-day	0.50	Grass Slips / no of drill cuttings	nos.	100	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
							Hessian jute	sqm.	0.27			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
G		**Planting rooted grass slips on slopes > 60° including preparation of slips on site. Operation includes digging planting holes to a maximum of 5 cm depth with metal rod or hardwood peg, depending on nature of soil. The planting drills should be spaced 10 cm apart.**	1 m^2	Unskilled	m-day	0.60	Grass Slips / no of drill cuttings	nos.	100	Mild steel rod or hardwood peg of 50 cm length		3% of labour cost
							Hessian jute	sqm.	0.27			
17.10	1707	**Planting shrub and tree seedlings and cuttings on site**										
A		**Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, on toe of embankment slopes in plain areas, not less than 8 m from the road centre line. Pit size 30 cm diameter x 30 cm depth. Compost volume ¼ of the volume of the pit, mixed with original soil.**	10 nos.	Unskilled	m-day	0.25	Container Seedlings	nos.	10.00	Khanti		3% of labour cost
							Compost	cum.	0.05	Mallet (wooden hammer)		
							Tree guard	nos.	10.00			
							Green mulch	cum.	0.04	Doko		
B		**Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and mulching, on slopes < 30°. Pit size 30 cm diameter x 30 cm depth. Mix compost with soil and backfill into pit, to ¼ of pit volume**	10 nos.	Unskilled	m-day	0.33	Seedlings	nos.	10.00	Khanti		3% of labour cost
							Compost	cum.	0.05	Doko		
							Green mulch	cum.	0.04			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and mulching, on slopes 30°- 45°. Pit size 30 cm diameter x 30 cm depth. Mix compost with soil and backfill into pit, to ¼ of pit volume.**	**10 nos.**	Unskilled	m-day	0.40	Seedlings	nos.	10.00	Khanti		3% of labour cost
							Compost	cum.	0.05	Doko		
							Green mulch	cum.	0.04			
D		**Planting rooted tree stump cuttings and bare root seedlings, including pitting, transplanting, composting and mulching, on slopes < 30°. Pit size 10 cm diameter x 20 cm depth. Compost volume ¼ of the volume of the pit, mixed with original soil.**	**10 nos.**	Unskilled	m-day	0.17	Seedlings	nos.	10.00	Khanti		3% of labour cost
							Compost	cum.	0.03	Doko		
							Green mulch	cum.	0.04			
E		**Planting rooted tree stump cuttings and bare root seedlings, including pitting, transplanting, composting and mulching, on slopes 30° - 45°. Pit size 10 cm diameter x 20 cm depth. Compost volume ¼ of the volume of the pit, mixed with original soil.**	**10 nos.**	Unskilled	m-day	0.25	Seedlings	nos.	10.00	Khanti		3% of labour cost
							Compost	cum.	0.03	Doko		
							Green mulch	cum.	0.04			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**Planting rooted tree stump cuttings and bare root seedlings, including pitting, transplanting, composting and mulching, on slopes > 45°. Pit size 10 cm diameter x 20 cm depth. Compost volume ¼ of the volume of the pit, mixed with original soil.**	10 nos.	Unskilled	m-day	0.33	Seedlings Compost Green mulch	nos. cum. cum.	10.00 0.03 0.04	Khanti Doko		3% of labour cost
17.11	1707	**Vegetative palisade construction, brush layering and fascines**										
A		**Collection of hardwood cuttings for planting material (e.g. assuro, namdi phul, simali) from sources within 1 km of road. Material to be approx. 1 m in length and minimum 5 cm in diameter. (Applicanle if material is available)**	1000 nos.	Unskilled	m-day	0.85	Adequate supply of bushes.			Khukhuri		3% of labour cost
B		**Preparation and planting of live pegs of selected species (e.g. assuro, namdi phul, simali) of minimum 1 m length to 0.5 m depth into hard ground. Pegs spaced at 5 cm centre to centre within rows, with 5 - 20 cm between rows, and interwoven with vegetation.**	1m	Unskilled	m-day	0.17	Live Pegs	nos.	20.0	Crowbar		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Preparation and planting of live cuttings of selected species (e.g. assuro, namdi phul, simali) of minimum 1 m length to 0.5 m into soft debris. Pegs spaced at 5 cm centres within rows, with 5 - 20 cm between rows, and interwoven with vegetation.**	1m	Unskilled	m-day	0.12	Live Pegs	nos.	20.0	Crowbar		3% of labour cost
D		**Site preparation for fascine laying: earth works in excavation of trench to 20 cm depth.**	1m	Unskilled	m-day	0.06				Pick Axe Shovel Crowbar		3% of labour cost
E		**Laying of live fascines, using live hardwood cuttings of selected species (e.g. assuro, namdi phul, simali) of minimum 1 m length, placed in bundles to give 4 running metres of cuttings per metre of fascine, including backfilling of trench and careful compaction.**	1m	Unskilled	m-day	0.17	Hard Wood Cutting of at least 1m length	m	4	Khukuri Shovel		3% of labour cost
17.12 A	1708	**Jute Netting Works** **Standard Jute neetting for bare slopes and under planting with slips. Spinning raw jute from 100% jute fibre into yarn and weaving the yarn into netting. Hand spun yarn 5 to 8 mm in diameter, width of net 1.20 m, warp strands 27 nos. per 100 cm, weft strands 20 - 24 nos. per 100 cm, mesh size 30 - 40 mm square and 1.25 kg/m weight at 1.20 m**	1 m^2	Unskilled	m-day	0.36	Raw Jute	kg	1.25	Khukuri Bamboo sticks (10 nos) Weaving frame Tosro		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		widths. [Remarks. A tosro is the weaving shuttle, normally made from a split large bamboo culm.]										
B		**Wide mesh jute netting for holding mulch on slopes. Spinning raw jute from 100% jute fibre into yarn and weaving the yarn into netting. Hand spun yarn 3 to 5 mm diameter 1.20 m side and 11.2 m long. Mesh size 150 mm x 500 mm rectangular mesh and 0.25 kg/m at 1.20 m width. [Remarks. A tosro is the weaving shuttle, normally made form a split large bamboo culm.]**	1 m^2	Unskill	m-day	0.15	Raw Jute	kg	0.26	Khukuri Bamboo sticks (10 nos) Weaving frame Tosro		3% of labour cost
C		**Placing 30 - 40 mm square mesh jute netting on bare slopes (for later underplanting with grass slips), including pegging with live hardwood cuttings or split bamboo pegs and loosening tension so that the net hugs the slope throughout.**	1 m^2	Unskilled	m-day	0.15	Woven jute net Hardwood cuttings or spilt bamboo pegs	sqm. nos.	1.0 5.0	MS rod of 50 cm length Mallet (wooden hammer)		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Placing 150 x 500 mm mesh jute netting to hold mulch on slopes, including application of mulch and pegging with live hardwood cuttings or split bamboo pegs and loosening tension so that the net hugs the slope throughout.**	**1 m^2**	Unskilled	m-day	0.1	Cut mulch	cum.	0.05	MS rod of 50 cm length		
							Woven jute net	sqm.	1.00			3% of labour cost
							Hardwood cuttings or spilt bamboo	nos.	5.00	Mallet (wooden hammer)		
17.13 A	1709	**Fabrication of gabion bolster cylinders**										
		Site preparation for 30 cm diameter bolster: earth works in excavation of trench.	**1 m**	Unskilled	m-day	0.085				Pick axe Shovel		3% of labour cost
B		**Site preparation for 60 cm diameter bolster: earth works in excavation of trench.**	**1 m**	Unskilled	m-day	0.36				Pick axe Shovel		3% of labour cost
C		**Manufacture of bolster panels: 70 x 100 mm hexagonal mesh wire construction (10 SWG frame and 12 SWG mesh).**	**1 m^2**	Skilled	m-day	0.10	GI Wire	kg	2.0	Gabion frame & tools		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Construction of 30 cm bolster cylinder: placing, stretching wire mesh, filling with boulders, closing and backfilling.**	1 m	Unskilled	m-day	0.375	Boulders	cum.	0.09	Gabion Tools Doko		3% of labour cost
E		**Construction of 60 cm bolster cylinder: placing, stretching wire mesh, filling with boulders, closing and backfilling.**	1 m	Unskilled	m-day	0.75	Boulders	cum.	0.36	Gabion Tools Doko		3% of labour cost
F		**Construction of 30 cm bolster cylinder: placing, stretching wire mesh over 20 gauge black polythene sheeting, filling with boulders, closing and backfilling.**	1 m	Unskilled	m-day	0.375	Black polythene Boulders	sqm. cum.	0.95 0.09	Gabion Tools Doko		3% of labour cost
G		**Construction of 60 cm bolster cylinder: placing, stretching wire mesh over 20 gauge black polythene sheeting, filling with boulders, closing and backfilling**	1 m	Unskilled	m-day	0.75	Black polythene Boulders	sqm. cum.	1.90 0.36	Gabion Tools Doko		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
H		**Anchoring bolster: 12 mm diameter MS re-bar cut into 2 m lengths for anchorage and placed at 1 m intervals.**	**1 no.**	Unskilled	m-day	0.05	MS Rod	m	2	Sledge Hammer		3% of labour cost
I		**Providing and Laying of terram paper (geotextile). (overlap and wastage considered is 20%).**	**300 m2**	Skilled Unskilled	m-day m-day	3.6 9	Geotextile	sq.m	360			
J		**Providng and laying 60cm dia gabion bolster panels: 70*100mm hexagonal mesh wire (10 swg frame and 12 swg mesh) including Earthwork excavation filing with boulder, backfilling all complete as per Drawing and Technical Specifications**	**1 m**	Skilled Unskilled	m-day m-day	0.19 1.11	GI Wire Black Polythene Boulder	Kg sqm. cum.	4.0 1.9 0.36	Pick Axe Shovel Gabion Tools Doko		3% of labour cost
k		**Providng and laying 30cm dia gabion bolster panels: 70*100mm hexagonal mesh wire (10 swg frame and 12 swg mesh) including Earthwork excavation filing with boulder, backfilling all complete as per Drawing and Technical Specifications**	**1 m**	Skilled Unskilled	m-day m-day	0.095 0.46	GI Wire Black Polythene Boulder	Kg sqm. cum.	2 0.95 0.09	Pick Axe Shovel Gabion Tools Doko		3% of labour cost

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.14	1710	**Bamboo tree guards**										
A		**Weaving bamboo tree guards using bamboo poles as uprights: 1.60 m in height; and weaving split bamboo with the outer wall intact around the posts. Dimensions of the guard are 0.60 m diameter x 1.30 m high.**	1 no.	Unskilled	m-day	0.25	Bamboo	nos.	2.2	Khukhuri		3% of labour cost
17.15	1711	**Turfing**										
A		**Grass sodding works including sod cutting, local transporting within 10m distance, placing in position and water sprinkling (Lead upto 10m)**	1 m^2	Unskilled	m-day	0.05				Sledge Hammer		3% of labour cost
		Remarks: **1)Add cost of long distance transportation as required from available source to the work site.**										
B		**Providing and spreading manure on the grass turf**	**100 m^2**	Unskilled	m-day	0.04	Chemical Manure	kg	7.0	Sledge Hammer		3% of labour cost
C		**Turfing with sods** **Providing, furnishing and laying of the live sods of perennial turf forming grass on embankment slope, verges or other locations shown on the drawing or as directed by the engineer including preparation of ground, fetching of sods and watering.(Lead upto 10m)**	**10 m^2**	Skilled Unskilled	m-day m-day	0.12 3.000	Farm Yard Manure Cost of water	cum. KL	0.18 12.00	Tractor Trolley	hr	1.0

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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks;										
		1)Add cost of long distance transportation as required from available source to the work site.										
D		**Seeding and Mulching**										
		Providing required material, preparation of seed bed on previously laid top soil, furnishing and placing of seeds, fertilizer, mulching material, applying bituminous emulsion at the rate of 0.23 liters per sqm and laying and fixing jute/plastic netting, including watering for 3 months all as per specification	**240 m^2**	Skilled	m-day	1.0	Seeds	kg	3.60	Tractor Trolley	hr	2.0
				Unskilled	m-day	10.0	Sludge/Farm Yard Manure	Kg	172.00			
							Bitumen Emulsion	Lt	55.20			
							Jute/Plastic Netting (Open weave 2.5cm square opening)	sqm.	264.00			
							Water for 3 month	KL	84.00			
		Remarks:										
		1) In case of plastic netting, the cost of Bitumen Eulsion will not be required.										
17.16	**1711**	**Spreading of Sludge Farm Yard Manure or/and good Earth**	15 m3	Skilled	m-day	0.04						
				Unskilled	m-day	1						
		Providing and spreading of sludge farm yard manure or/and good earth in required thickness.										
		Remarks:										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		1)Add Cost of sludge, farm yard manure or/and good earth as required.										
17.17	1707	**Planting and Maintaining of Permanent Hedges**										
A		**Planting permanent hedges including digging of trenches**										
		Providing and Planting permanent hedges including digging of trenches, 60 cm wide and 45 cm deep, refilling the excavated earth mixed with farmyard manure, supplied at the rate of 4.65 cum per 100 metres and supplying and planting hedge plants at 30 cm apart	100 m	Skilled	m-day	1	Hedge plants	No	2*340			
				Unskilled	m-day	21	Manure	MT	1.86			
							Pesticide	Kg	0.25			
							Water	KL	3			
B		**Maintenance of hedge for one year**	100 m	Skilled	m-day	3	Hedge plants	No	68			
				Unskilled	m-day	30	Manure	MT	0.8			
							Pesticide	Kg	0.5			
							Water	KL	30			
17.18	1707	**Planting of Trees and their Maintenance for one Year**										
		Providing and Planting of trees by the canal service road beyond outer slope side (Avenue trees) in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge manure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year	10 Nos	Skilled	m-day	1	Sapling 2 m high 25 mm dia	Nos	10			
				Unskilled	m-day	17						
							Farm yard manure	Kg	376			
							Pesticide	Kg	0.5			
							Water	KL	12			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.19	1707	**Compensatory Afforestation** **Planting trees as compensatory afforestation at the rate of 1600 trees per hectare at a spacing of 2.5 m by clearing bush and grasses etc of the plantation area, digging holes 0.45m*0.30m*0.30m, mixing farm yard/sludge manure with soil, planting of sapling not less than 0.6m height and 5 mm dia stem at bottom, backfilling the hole and watering.**	1 ha	**Planting:**								
				Skilled	m-day	1	Sapling	Nos	1600			
				Unskilled	m-day	87	Decayed farm yard/sludge manure	MT	4.4			
				Maintenance (for one year):								
				Skilled	m-day	12	Decayed farm yard/sludge manure	MT	1.76			
				Unskilled	m-day	72						
							Pesticides for planting	kg	2.75			
							Pesticides for maintenance	kg	8			
							Cost of water	KL	33			
		Remarks: **1.Cost of fencing to be provided as per size of plot and approved design, measured and paid separately**										
17.20	1712	**Supply of material and plantation of Napier Grass/Vetiver for slope protection and erosion control of canal slope and river banks as per specification all complete**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**Land Surface Clearance (For all types of land surface)**	1 ha	Skilled Unskilled	m-day m-day	0.25 5				Tools and Plants(Shovel,Kodalo,Pick,Khukhuri,Axe)	3% of Labour Cost	
B		**Fixing Line Alignment** **Remarks: Add Travel Allowance for Skilled Manpower**	1 ha	Skilled Unskilled	m-day m-day	1 2						
C		**Excavation of pits in ordinary soil (Pit Size - 20cm*20cm*20cm @ 80cm*80cm apart, giving 15,625 nos of pits/ha)**	1 ha	Unskilled	m-day	87.5				Tools and Plants(Shovel,Kodalo,Pick,Khukhuri,Axe)	3% of Labour Cost	
D		**Excavation of pits in Gravel Mixed soil (Pit Size - 20cm*20cm*20cm @ 80cm*80cm apart, giving 15,625 nos of pits/ha)**	1 ha	Unskilled	m-day	100				Tools and Plants(Shovel,Kodalo,Pick,Khukhuri,Axe)	3% of Labour Cost	
E		**Transportation of plants (1 Labour can carry 500 sets/day in plantation area)** **Remarks: Add transportation cost from nursery to plantation area**	1 ha	Unskilled	m-day	31.25						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**Chemical Fertilizers**	1 ha	Skilled	m-day	1	Nitrogen	kg	100			
				Unskilled	m-day	2	Phosphorus	kg	50			
							Potash	kg	20			
G		**Compost (Cow dung)**	1 ha	Unskilled	m-day	5	Cow dung	MT	5			
		(Cow dung to be mixed with excavated soil /burrowed soil (125m3) and used in pits at least 100gm per pit before plantation and the remaining soil to be spreaded around the pits after plantation)										
H		**Plantation**	1ha	Skilled	m-day	1	Plants-Napier / Vetiver	Nos	17188			
				Unskilled	m-day	50						
		Remarks: Add Travel Allowance for Skilled Manpower										
I		**Watering and Watchman for Protection of Plants**	1 ha	Unskilled	m-day	240						
		(For 4 Months @ 2 labours/day)										
J		**Bamboo fencing**										
		(For protection of plantation area, where required)	100m	Skilled	m-day	6	Bamboo	Nos	41	Tools and Plants	3% of Labour Cost	
				Unskilled	m-day	15	Nails (2.5" to 3")	kg	10			
							14 gauge SWG Wire	kg	5			
	Remarks	**1. Bamboo poles shall be 2.28 m long (1.53m above ground and 0.75m below ground) at 2.44m spacing.**										
		2. Spacing of bhata fence shall be 20 cm and 4 bhatas shall be prepared from each 6.5 m bamboo.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		3. Add cost of borrowed soil in case soil is borrowed from outside.										
17.21	1711	**Plantation of different type of grass to cover exposed surface, degraded geology , etc for surface erosion control as per specification all complete**										
A		**Land Surface preparation including coverage by borrowed soil mixed with cow dung (Compost) 10cm thick**	100 m^2	Unskilled	m-day	7	Borrowed soil Compost	cum kg	10 50			
B		**Soil Surface Dressing (Plot Size 20m*5m)**	100 m^2	Unskilled	m-day	2						
C		**Fixing Line**	100 m^2	Unskilled	m-day	0.2						
D		**Mixing Grass seed with chemical fertilizer and laying**	100 m^2	Unskilled	m-day	2	Chemical Fertilizer Grass Seed	kg kg	10 1			
E		**Collection, Transporatation and plantation of local grass (Dubho,Tande Ghas,Thakailo,Simli, Bujetro,etc)** **Remarks: Add cost of watering and compost.**	100 m^2	Unskilled	m-day	4						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.22	1710	**Supplying and planting Bamboo along river bank including site selection , pit excavation(pit size- 0.45m*0.45m*0.45m @ 1.5m apart), as per specification all complete (5m*5m plot will have 16 nos of bamboos at one location)**										
A		**Excavation of Pits**	16 Nos	Unskilled	m-day	1.46						
B		**Excavation of Bamboo with roots**	16 Nos	Unskilled	m-day	3						
C		**Bamboo Plantation**	16 Nos	Unskilled	m-day	1	Bamboo Root	Nos	16			
							Compost	kg	50			
D		**Bamboo fencing (For protection of plantation area)**	100m	Skilled	m-day	6	Bamboo	Nos	41	Tools and Plants	3% of Labour Cost	
				Unskilled	m-day	15	Nails (2.5" to 3")	kg	10			
							14 gauge SWG Wire	kg	5			
E		**Watering and Watchman for Protection of Plants (For 3 Months @ 0.3 labours/day/spot)**	16 Nos	Unskilled	m-day	27						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.23	1713	**Supply of materials and making Bench Terracing (30cm wide bench in 5 rows @ 1m interval) in slope for plantation for slope stability including protection of planted area by bamboo fabric as per specification all complete**										
		(Slope Area 20m long & 5m wide)										
A		**Excavation in Slope for benching (1/2*0.3*0.45*20*5 m3)**	100 m^2	Unskilled	m-day	4.73						
B		**Pit excavation for plantation in gravel mixed soil(15625 pits in 1 ha, pit size 20cm*20cm*20cm @ 80cm*80cm apart, Volume of total excavation= 125m3)**	1 ha	Unskilled	m-day	100						
C		**Plantation including mixing soil with compost, local transportation of materials and plants in plantation area**	1 ha	Skilled	m-day	2	Plants	Nos	17188			
				Unskilled	m-day	65	Sweet Soil	cum	125			
							Compost	MT	5			
		Remarks: Add Travel Allowance for Skilled Manpower										
D		**Protection by Bamboo Fabric**										
i		**Bamboo Fabric Preparation (20 cm high fabric and 50m long)**	10 m^2	Unskilled	m-day	4.02	Bamboo	Nos	8.33	Tools and Plants	3% of labour cost	
							14 gauge SWG wire	kg	1.5			

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**Bamboo strong pegs preparation (Each Peg 0.6m long and 3.5cm wide @ 30cm centre to centre)**	10 m^2	Unskilled	m-day	2	Bamboo	Nos	5			
17.24	1710	**Tree plantation in plains with tree guard Planting containerised tree seedlings, including pitting, transplanting, composting and providing & fixing bamboo tree guards, on toe of embankment slopes in plain areas as per direction of Engineer. Pit size 60 cm diameter x 60 cm depth. Compost volume 1/8 of the volume of the pit, mixed with original soil. Plant size not less than 60 cm**	100 Nos	Unskilled	m-day	15	Containerised tree plant Compost Tree guards Green mulch	Nos Cu.m Nos Cu.m	100 2.12 100 0.4	Water Tanker 6 KL capacity	hr	0.5
17.25	1707	**Shrub Plantation in plains with tree guard Planting containerised shrub plants including pitting, transplanting, composting and providing & fixing bamboo tree guards, on toe of embankment slopes in plain areas as per direction of Engineer. Pit size 30 cm diameter x 30 cm depth. Compost volume 1/4 of the volume of the pit, mixed with original soil. Plant size not less than 45 cm**	100 Nos	Unskilled	m-day	2.5	Containerised shrub plant Compost Tree guards Green mulch	Nos Cu.m Nos Cu.m	100 0.5 100 0.4	Water Tanker 6 KL capacity	hr	0.5

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.26		**Field Visit Survey/Study for Bio -Engineering works as required**										
A		**Field Visit Works**	**1 ha**	Unskilled Skilled	m-day m-day	2 2	Rope	kg	2	T&P(Peak,etc)	3% of Labour cost	
B		**Collection of soil sample and local plants/species**	**1 ha**	Unskilled Skilled	m-day m-day	2 2				T&P(Peak,etc)	3% of Labour cost	
C		**Selection of plant/species**	**1 ha**	Skilled	m-day	2						
D		**Report preapration**	**1 ha**	Skilled Unskilled	m-day m-day	5 5						
		Remarks: **1. Add 5% of total cost of item 17.26 for transportation as required.** **2. Add 3% of total cost for stationery and office equipments required during report preparation.**										

SECTION 18: TUNNELING WORKS

Abbreviations and Definitions

TBM	:	Tunnel Boring Machine
hr/hrs	:	Hour
rm	:	Running metre/ per metre of tunnel length
CAI	:	Cerchar Abrasivity Index
m	:	Metre
m2	:	Square metre
m3	:	Cubic metre
KWh	:	Kilo Watt Hour
Nos./No.	:	Numbers
Kg	:	Kilogram
KL	:	Kilolitre
m-day	:	Man days (8 hrs working period)
ton	:	Metric ton 1000 Kg
UCS	:	Unconfined Compressive Strength
Mpa	:	Megapascal
shift	:	Division of a day in to working periods
Excavation Shift	:	10 hours period on which TBM is excavating the tunnel
Maintenance Shift	:	4 hours period on which TBM is under maintenance
Week	:	140 Hours of operation
Year	:	52 Weeks
Peagravel	:	5-10 mm size gravel used to fill the annular space between the ground and permanent segment lining
Peagravel Grouting	:	Cement based grout used to fill the pores of peagravel and surrounding opening in rocks
Preexcavation Grouting	:	Cement/ chemical based grout used for ground treatment before excavation

SECTION 18-1: USING TUNNEL BORING MACHINE (TBM)

Section - A (Project Specific)

S.N.	Ref. to SS.	Description of work
18.1		**TBM Progress Rate for Normal Case :** Normal Double Shield TBM progress rate will be found averaging the method proposed by :
i)		**Saffet Yagiz (2006) :** $ROP = 1.11+0.439\ Log\ \alpha + 0.0288\ PI - 0.216\ F_s - 0.0096\ \sigma_t - 0.00252\ \sigma_c$ Where, ROP = Rate of Penentration in m/hr α = arcsin(sin α_f - sin (α_t - α_s)) α_f = dip amount of major bedding α_t = azimuth of tunnel alignment α_s = strike of major foliation F_s = spacing of joint set PI = punching index σ_c = unconfined compressive strength of intact rock σ_t = tensile strength of intact rock
	UCS	
		After obtaining this theoretical progress rate which is reasonable for hourly penentration , this theoretical progress rate shall be reduced by 50% (Paul et. Al 2012) to find the daily advance rate.
		And,
ii)		**E. Farrokh (2020) :** ARw = Exp (3.67 - 0.000589 UCS - 0.0851 D + 0.0285 Dc + 0.0988M) x 0.9 Where,
	Peagravel Grouting	ARw = Advance Rate (m/day) D = Tunnel Diameters (m) Dc = size of disc cutter (inch) M = efficiency factor for mucking, muck cart -0, conveyor belt - 1 UCS = unconfined compressive strength of intact rock

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work
18.2		**Progress Rate of Double Shield TBM for Extraordinary Case :**
i		For squeezing condition - 30% of Normal Progress Rate
ii		For Geothermal, slabbing and rock brusting condition - 40% of Normal Progress Rate
iii		For high water ingress condition - 50% of Normal Progress Rate
iv		For fault zone condition - 30 % of Normal Progress Rate
		Remarks :
		This Norm can be used for reference purpose only for tunnel excavation by double shield tunnel boring machine . However, quantity proposewd cannot be directly used for other tunneling projects.

SECTION 18-3: USING TUNNEL BORING MACHINE (TBM)

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
18.3		**Excavation , De-mucking and Segment Lining of 5-6.5m finished diameter Tunnel by Double Shield Tunnel Boring Machine**										
1		a. Working Shift (Each Working shift is of 10 hours)	each hour	TBM Specialist/Pit Boss (highly	man- hour	1						
				Geologist (highly skilled)	man- hour	1						
				TBM Operator (highly skilled)	man- hour	1						
				Tunnel Electrician(highly skilled)	man- hour	1						
	UCS			Tunnel Foreman (highly skilled)	man- hour	2						
				Locomotive Driver (highly	man- hour	1						
				Tunnel Fitter/ Segment Erector (highly skilled)	man- hour	1						
				Equipments Mechanics (skilled)	man- hour	1						
	Peagravel			Crane Operator (skilled)	man- hour	4						
				Tunnel Labours (unskilled)	man- hour	10						
		b. Maintenance Shift (Each maintenance shift is of 4 hours)	each hour	TBM Specialist	man- hour	1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				PLC Electrician	man- hour	1						
				Senior Surveyor	man- hour	1						
				Tunnel Electrician	man- hour	1						
				TBM Mechanics	man- hour	1						
				General Mechanics	man- hour	2						
				Tunnel Labours	man- hour	8						
		c. Consumables for TBM Operation	each week				Lubrication Materials, different types of grease and sprays	kg	144			
							Gas Oil	Litre	115			
							Filters	set	112			
							Hydraulic Oil	Litre	144			
							TBM cutters	nos.	estimated fromm cutter consumption table			
							Water (7 ltr/second)	Litre	3,528 ,000			
							Sub Total A					

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		c. Consumables for TBM Operation	each week				Other Consummables includes TBM Spares, welding and cutting tools, cleaning tools,dewatering pump, disc cutter maintenance and PPE etc	13 % of the cost of other consumables (13% of Sub -total A)				
							Power	KwH	Calculated from TBM and ancillary facilities operational power requirement and actual numberof hours of operation			
		d. Plants for TBM operations	each hour							Locomotive	set	3
			each hour							Muck Cars and Grout	set	8
			each hour							Flat cars	set	3
			each hour							Manriders	set	3

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
			rm							Track	m	4
			rm							Air Pipe	m	1
			rm							Water Pipe	m	2
			rm							Cabling	m	2
			each hour							Lighting	m	1
			rm							Vent Ducting	m	1
			each hour							Booster Fan	Nos	Tunnel length (km)/3
			each hour							Small tools	set	
			each hour							Hoists	set	
			each hour							Mainn hoists	set	
			each hour							Surface Fans	set	
			each hour							Cranes	set	
			each hour							Loaders	Nos	
			each hour							Sub Total B		
			each hour							Other Surface Plants	set	5% of cost of sub total B
		c. Cost of TBM	per							TBM	set	1

Remarks :

1.Rate of manpower/hr is produced from daily rate/8hr working time.

2.Cost of TBM is estimated from table.

3.Each hour refers to number of hours of TBM operation to bore through the designed tunnel.

4.Proposed input of manpower, plant and equipment and consumables are applicable only for segmental lined tunnel to be excavated by Double Shield Tunnel Boring Machine.

SECTION 18: USING TUNNEL BORING MACHINE (TBM)

Table 1 : Cutter consumption in TBM Tunneling				
SN	Ceracher Abrasivity Index	UCS (Mpa)	Excavation Volume (m3) per	Remarks
1	≤1	Irrespective of UCS	5000	
2	2	50	4000	
		100	2000	
		150	1200	
		200	900	
		250	750	
3	3	50	750	
		100	600	
		150	300	
		200	200	
		250	150	
4	4	50	400	
		100	220	
		150	175	
		200	150	
		250	125	
5	5	150	120	
		200	90	
		250	80	
		300	70	
6	6	150	70	
		200	50	
		250	30	
		300	25	

NORMS FOR RATE ANALYSIS

Table 2 : Cost of TBM

SN	Tunnel Length	Cost 1	Cost 2	Remarks
1	upto 15km	70% of new TBM cost provided by manufacturer	20% of (cost of Human Resources +Plant and Equipments +Consumables)	for estimate purpose choose minimum of cost 1 and 2
2	15 to 30 km		15% of (cost of Human Resources +Plant and Equipments +Consumables)	for estimate purpose choose minimum of cost 1 and 2
3	more than 30 km		10% of (cost of Human Resources +Plant and Equipments +Consumables)	for estimate purpose choose minimum of cost 1 and 2

Remarks :

1. Design and cost of TBM depands uponn geology , diameter and various other factor , i.e. every TBM design is unique / tailor made. This table can't be used directly for each and every tunneling project , it can be used as reference.

2.Normally working hrs of new TBM is 15000hrs with good maintenance and quality consumables.

A TBM used for less than its working hrs in tunnel site can be reused as a whole or its parts for other site with re-engineering. Re-engineering required around 70% of new TBM cost. In table above in case of cost 1 the same is taken.

SECTION 18-4: USING TUNNEL BORING MACHINE (TBM)

Section - B (General)

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
18.4	1804	**Probing / Drilling ahead of face**											
1		Probing ahead of tunnel face for investigation, drainage,forepoling, umbrella pipe roofing, pre excavation grouting and grouting (upto 30m long 75mm dia)	1m	Unskilled	Hr	0.25	Water	kilo liter	1	Drilling Machine/ Boomer	hr	0.15	
				Driller	Hr	0.25	Grease	kg	0.5				
				Geologist	Hr	0.1	Hydraulic oil	Ltr	0.5				
				Mechanics	Hr	0.1	Drilll Rod	No	0.05	Water Pump	hr	0.15	
				Electrician	Hr	0.1	Drill Bit	No	0.05	Air Compressor	hr	0.15	
							Shank Adopter	No	0.05				
		Remarks : For TBMs with attached drilling machine omit hire charge of drilling machine											
18.5	1810	**Pea Gravel Backfilling**											
1	UCS	Pea Gravel	$1m^3$	Unskilled	m-day	0.5	Pea Gravel	m3	1	Pea gravel pump	hrs	3	
				Skilled	m-day	0.5	Grease	kg	1				
										Pump hoses and Pipes	3% of cost of Materials		
		Remarks : For TBMs with attached pea gravel pump omit hire charge of pump.											

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
18.6		**Installation of Drainage Pipe. It can be used for similar nature of construction works (e.g. Drainage pipe installation in retaining walls / Earthen Slopes etc.)**										
1		Installation of Drainage pipe roofing and fore poles (50mm and dia , 12m long)	12 m	Unskilled	hr	2	Drainage Pipes	rm	12	Drilling Machine/ Boomer	hrs	0.5
				Skilled	hr	1						
							Water	kilo liter	1			
							Grease	kg	2	Compressor	hrs	0.5
							Welding Rods	kg	1			
							Geotextiles(for drainage pipe wraping including lapping)	sqm	12			
							Hydraulic Oil	Ltr	3			
							Drill Rod	No	0.25			
							Drill Bit	No	0.5			
							Shank Adopter	No	0.25			
		Remarks : The bore hole for drainage pipe will be drilled in accordance with probe hole drilling norms.										
18.7		**Umbrella pipe roofing and forepoles installation for tunnel**										
1		Installation of Umbrella pipe roofing anf fore poles (12m long, 75mm dia thickness 4mm)	12 m	Unskilled	hr	8	Umbrella Pipes (Steel Tube)	rm	12	Drilling Machine/ Boomer	hrs	1.5
				Skilled	hr	3						
							Water	kilo liter	1	Compressor	hrs	1.5
							Grease	kg	2			
							Welding Rods	kg	2.5			
							Hydraulic oil	ltr	5			
							Drill Rod	m3	0.25			
							Drill Bit	no	1			
							Shank Adopter	no	0.25			
		Remarks : The borehole for umbrella pipe roofing / fore poling will be drilled in accordance with probe hole drilling norms.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material			Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
18.8	1810	**Pea Gravel Grouting in Annular Space/backfill grouting without Packers (grout water cement ratio 0.5:1)**											
		Pea Gravel Grouting / Backfill Grouting (Chemical Grouting or Cement)	$1m^3$	Unskilled	hr	2.5	Cement / Chemicals	ton	1.2	Grouting pump	hrs	0.5	
				Skilled	hr	0.5				Pump hoses and Pipes	3% of cost of Materials		
							Water	kilo liter	0.6				
		Remarks : The bore hole for grouting , if necessary, will be drilled in accordance with probe hole drilling norms.											
18.9	1810	**Pea Gravel Grouting in Annular Space/backfill grouting with packers (grout water cement ratio 0.5:1)**											
		Pea Gravel Grouting / Backfill Grouting (Chemical Grouting or Cement)	$1m^3$	Unskilled	hr	2.5	Cement / Chemicals	ton	1.2	Grouting pump	hrs	0.5	
				Skilled	hr	0.5				Pump hoses and Pipes	3% of cost of Materials		
							Water	kilo liter	0.6				
							Packers	nos	0.3				
		Remarks : 1)The bore hole for grouting , if necessary, will be drilled in accordance with probe hole drilling norms.											
18.10	1809	**Backfilling of Annular space of Invert Segment with cement sand mortar (M 25)**											
		Backfill cement sand mortar Grouting	$1m^3$	Unskilled	hr	2.5	Cement	ton	0.4	Grouting pump	hrs	0.5	
				Skilled	hr	0.5				Pump hoses and Pipes	3% of cost of Materials		
							Water	kilo liter	0.32				
							Sand	m3	0.91				
							Gate valves, G.I. nipp	Nos.	0.088				
							Woven Bags	Nos.	49.708				
18.11	1809	**Pre Excavation Grouting for tunnel entry/ exit / similar types of other construction works (grout water cement ratio 0.5:1)**											
		Pre Excavation grouting (chemical grouting or cement)	$1m^3$	Unskilled	hr	10	Cement / Chemicals	ton	1.2	Grouting pump	hrs	2.5	
				Skilled	hr	2.5				Pump hoses and Pipes	3% of cost of Materials		
							Water	kilo liter	0.6				
							Admixture	kg	12.5				
							Packers	nos	0.3				
		Remarks : The bore hole for pre excavation grouting will be drilled in accordance with probe hole drilling norms.											

SECTION 18-2. TUNNELING WORKS WITHOUT USING TUNNEL BORING MACHINE (TBM)

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
18.12	1804	Exacavation of Tunnel Portion in hard rock by blasting with all lead and lift, including dressing providing temporary support(steel or timber) wherever necessary, removal of spoil to dump site by truck within 1 km lead from portal face all complete as per specifications and direction of Engineer.	195 m3	Junior Formen	m-day	1	Drill steel Rod	m	316.8	Drill Jumbo	hr	6
				Sr.Foreman	m-day	1	Gelatine	kg	195	Trolley	hr	64
							Detonators	nos	96	Jack Hammer	hr	50
				Supervisor	m-day	1	Fuse Coils	nos	96	Scalling Hammer	hr	8
				Electrician	m-day	1	Other (Blasting Batteries, Galvano meter and Blasting wire ,etc.)	50% of Cost of Gelatine		Drill Excavators	hr	2
				Blaster	m-day	2				Grinder	hr	2
				Hole Cleaner	m-day	2				Convey Muckers	hr	5
				Electrician Helper	m-day	1				Battery Locomotive	hr	20
				Unskilled	m-day	12				D.8 Tractor Dozer	hr	6
				Semi Skilled	m-day	12				Ventilation Blower	hr	24
				Wiremen for Blasting	m-day	1				Truck (6m3 capacity)	hr	48
										Air Compressor	hr	11

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Note: 1. Add Machine shop charge = 40% of Machinery charge except charge of Trucks , Ventilation Blower and Air compressor. 2. Add Electric Material Charge = 10% of cost of drillling and blasting where drilling and blasting includes cost of Drill Steel Rod, Gelatine , Detonators ,Fuse coils and others. 3. Add Water Charge = 4% of cost of drillling and blasting . 4. Add Electric Charge = 2% of Grand total cost										
18.13	1806	Providing and Laying Shotcrete with steel fibers in Arch portion of tunnel all complete as per Technical Specification.										
A		Thickness upto 100mm	0.1 m3	Supervisor	hr	0.15	Cement	mt	0.045	Concrete	hr	0.15
				Foreman	hr	0.3	Sand	cum	0.11	Mixture		
				Skilled	hr	0.8	Aggregates (5-	cum	0.06		hr	0.081
				Semi	hr	0.15	10mm)			Air Compressor		
				Skilled			Silica @5% of	kg	2.25		hr	0.15
				Unskilled	hr	4.2	Cement			Transit Mixture		
				Mechanics	hr	0.3	Steel Fibers	kg	5		hr	0.5
				Electrician	hr	0.3	Accelator @	kg	0.315	Axial Flow Fan		
							0.7% of			Shotcrete	hr	0.081
							Cement			Spraying Robot		
								kg	0.45	Working	hr	0.081
							Plasticizer @			Platforms		
							1% of Cement			Others @ 5% of all costs		
B		Thickness : 100mm to 150mm	0.15m3	Supervisor	hr	0.225	Cement	mt	0.068	Concrete	hr	0.3
				Foreman	hr	0.45	Sand	cum	0.165	Mixture		

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Skilled	hr	1.2	Aggregates(5-10mm)	cum	0.09		hr	0.162
				Semi Skilled	hr	0.225				Air Compressor		
				Unskilled	hr	6.3	Silica @5% of Cement	kg	3.375		hr	0.3
				Mechanics	hr	0.45				Transit Mixture		
				Electrician	hr	0.45	Steel Fibers	kg	7.5		hr	1
							Accelator @ 0.7% of Cement	kg	0.473	Axial Flow Fan		
										Shotcrete Spraying Robot	hr	0.105
							Plasticizer @ 1% of Cement	kg	0.675	Working Platforms	hr	0.105
										Others @ 5% of all costs		
C		Thickness: 150mm to 200mm	0.2m3	Supervisor	hr	0.3	Cement	mt	0.09	Concrete Mixture	hr	0.6
				Foreman	hr	0.6	Sand	cum	0.22			
				Skilled	hr	1.6	Aggregates(5-10mm)	cum	0.12		hr	0.324
				Semi Skilled	hr	0.3				Air Compressor		
				Unskilled	hr	8.4	Silica @5% of Cement	kg	4.5		hr	0.6
				Mechanics	hr	0.6				Transit Mixture		
				Electrician	hr	0.6	Steel Fibers	kg	10		hr	2
							Accelator @ 0.7% of Cement	kg	0.63	Axial Flow Fan		
										Shotcrete Spraying Robot	hr	0.21
							Plasticizer @ 1% of Cement	kg	0.9	Working Platforms	hr	0.21
										Others @ 5% of all costs		

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
18.14	1808	Supplying, fabricating and errection of steel portal icluding steel lagging in concrete in live and grade all complete as per specifications and directon of Engineer.	1 MT				Structural steel	MT	1.025			
							Fabrication:					
							Cutting Charge	3% of Cost of Structural Steel				
							Bending of Rolled Section	6% of Cost of Structural Steel				
							Electricity Charge for Welding	8% of Cost of Structural Steel				
							Labour & Electrode Charge	10% of Cost of Structural Steel				
							Handling Charge	5% of Cost of Structural Steel				
							Temporary Fixture	8% of Cost of Structural Steel				
							Erection: transportation of material, handling and final welding at field	12% of Cost of Structural Steel				

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
18.15	1807	Drilling holes upto 38mm dia in rock including supplying and fixing 25mm dia rock bolts slorted at one end and threaded at the other and with bearing plates, bolts,nuts etc. complete including clearing holes before fixing rods as per drawing , specifications and direction of Engineer.	1m				Drill Rod	m	1		hr	0.435
							Rock bolt 25mm dia	m	1.025	Jack Hammmer		
							Bearing Plate, Nuts,etc	5% of material cost				

SECTION 19: CANAL LINING

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.1	1903	**Providing and canal lining for trapezoidal section by 150 mm. thick 1:2:4 cement concrete ratio including haulage up to 30m. and lift up to 1.5 m as per technical specifications all complete.**										
A		**By Mechanical Means**	**10 m²**	Skilled	m-day	0.3	Cement	MT	0.48	Concrete Mixer	hr	0.6
				Unskilled	m-day	3	Sand	cum	0.66	Generator	hr	0.6
							Aggregate			Concrete	hr	0.375
							20 mm	cum	0.72	Vibrator		
							10 mm	cum	0.56			
							Water	KL	0.22			
B		**By Manual Means**	**10 m²**	Skilled	m-day	1.5	Cement	MT	0.48			
				Unskilled	m-day	6	Sand	cum	0.66			
							Aggregate					
							20 mm	cum	0.72			
							10 mm	cum	0.56			
							Water	KL	0.22			
C		**By Paving Machine**	**200 m²**	Skilled	m-day	2	Cement	MT	9.60	Paver Machine	hr	2.5
				Unskilled	m-day	5	Sand	cum	13.35	Transit Mixer (4 cum capacity)		
							Aggregate			Lead upto 1km	hr	3.75
							20 mm	cum	14.4	Lead beyond	t-km	75L
							10 mm	cum	11.2	1km, L- lead in		
							Water	KL	4.32	km		

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks:										
		1. Add 10% of Paver hire charge for Other Tools, Plants and accessories										
19.2	**1903**	**Providing and canal lining for trapezoidal section by 150 mm. thick 1:1.5:3 cement concrete ratio including haulage up to 30m. and lift up to 1.5 m as per technical specifications all complete.**										
A		**By Mechanical Means**	**10 m²**	Skilled	m-day	0.3	Cement	MT	0.60	Concrete Mixer	hr	0.6
				Unskilled	m-day	3	Sand	cum	0.64	Generator	hr	0.6
							Aggregate			Concrete	hr	0.375
							20 mm	cum	0.855	Vibrator		
							10 mm	cum	0.435			
							Water	KL	0.30			
B		**By Manual Means**	**10 m²**	Skilled	m-day	1.5	Cement	MT	0.60			
				Unskilled	m-day	6	Sand	cum	0.64			
							Aggregate					
							20 mm	cum	0.855			
							10 mm	cum	0.435			
							Water	KL	0.30			
C		**By Paving Machine**	**200 m²**	Skilled	m-day	2	Cement	MT	12.00	Paver Machine	hr	2.5
				Unskilled	m-day	5	Sand	cum	12.75	Transit Mixer (4 cum capacity)		
							Aggregate			Lead upto 1km	hr	3.75

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							20 mm	cum	17.1	Lead beyond	t-km	75L
							10 mm	cum	8.7	1km, L- lead in		
							Water	KL	6.00	km		
		Remarks:										
		1. Add 10% of Paver hire charge for Other Tools, Plants and accessories										
19.3	**1903**	**Providing and canal lining for trapezoidal section by 100 mm. thick 1:1.5:3 cement concrete ratio including haulage up to 30m. and lift up to 1.5 m as per technical specifications all complete.**										
A		**By Mechanical Means**	**10 m²**	Skilled	m-day	0.3	Cement	MT	0.40	Concrete Mixer	hr	0.6
				Unskilled	m-day	3	Sand	cum	0.43	Generator	hr	0.6
							Aggregate			Concrete	hr	0.375
							20 mm	cum	0.57	Vibrator		
							10 mm	cum	0.29			
							Water	KL	0.20			
B		**By Manual Means**	**10 m²**	Skilled	m-day	1.5	Cement	MT	0.40			
				Unskilled	m-day	6	Sand	cum	0.43			
							Aggregate					
							20 mm	cum	0.57			
							10 mm	cum	0.29			
							Water	KL	0.20			
C		**By Paving Machine**	**200 m²**	Skilled	m-day	2	Cement	MT	8.00	Paver Machine	hr	2.5

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	5	Sand	cum	8.50	Transit Mixer (4 cum capacity)		
							Aggregate			Lead upto 1km	hr	3.75
							20 mm	cum	11.4	Lead beyond	t-km	75L
							10 mm	cum	5.8	1km, L- lead in		
							Water	KL	4.00	km		
		Remarks:										
		1. Add 10% of Paver hire charge for Other Tools, Plants and accessories										
19.4	**1904**	**Providing and laying average 300 mm. thick boulder pitching in cement sand mortar works including haulage up to 30 m. and lift up to 1.5 m as per technical specifications all complete.**										
A		**In 1:3 Cement Sand Mortar**	**10 m²**	Skilled	m-day	4.65	Cement	MT	0.58			
				Unskilled	m-day	13	Sand	cum	1.26			
							Stone	cum	3			
							Water	KL	0.261			
B		**In 1:4 Cement Sand Mortar**	**10 m²**	Skilled	m-day	4.65	Cement	MT	0.48			
				Unskilled	m-day	13	Sand	cum	1.35			
							Stone	cum	3			
							Water	KL	0.216			
19.5	**1905**	**Providing and laying required thickness of dry boulder pitching on filter aggregates (already laid) including haulage up to 10m. and lift up to 1.5m as per technical specifications all complete.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**In canal bed**	**1m³**	Skilled	m-day	0.70	Boulder	cum	1.1			
				Unskilled	m-day	2.12						
B		**In canal sides (slopes)**	**1m³**	Skilled	m-day	0.88	Boulder	cum	1.1			
				Unskilled	m-day	2.65						
19.6	1906	**Providing and laying 50mm. thick tiles of burnt soils (the size of each tiles 300 mm. X 150mm. X 50 mm.) in the canal bed in 1:5 cement sand mortar, filling the tile joints by the same grade of mortar, 20 mm. thick plastering on it including soaking tiles, curing, providing forms etc. as per technical specifications all complete.**	**10 m²**	Skilled	m-day	5	Tile	Nr	222			
				Unskilled	m-day	5	Cement	MT	0.155			
							Sand	cum	0.41			
							Water	KL	0.0698			
19.7	1906	**Providing and laying two layers of tiles of burnt soil (the size of each tile is 300 mm. X 150 mm. X 50 mm.) on canal sides (slopes) over sand filter; First layer is laid with 10mm thick in 1:5 cement sand mortar; Second layer is laid over the finished surface with 16mm thick 1:3 cement sand mortar, filling the joints of second layer with 1:3 cement sand mortar including soaking tiles, curing, providing forms etc. as per technical specifications all complete.**	**10 m²**	Skilled	m-day	10	Tile	Nr	444			
				Unskilled	m-day	10	Cement	MT	0.565			
							Sand	cum	1.64			
							Water	KL	0.2543			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.8	1907	**Providing and canal lining by laying one layer of slate of size 300 mm. X 300 mm. and pointing the joints by 1:3 cement sand mortar including haulage of construction materials up to 30 m. and lift 1.5m as per technical specifications all complete.**										
A		**Thickness of slate 25mm**	**10 m²**	Skilled	m-day	2	Slate	Nr	125			
				Unskilled	m-day	3	Cement	MT	0.009			
							Sand	cum	0.018			
							Water	KL	0.0041			
B		**Thickness of slate 50mm**	**10 m²**	Skilled	m-day	2.4	Slate	Nr	125			
				Unskilled	m-day	3.6	Cement	MT	0.017			
							Sand	cum	0.036			
							Water	KL	0.0077			
19.9	1907	**Providing and laying second layer of slate (size of each slate 300mm x 300mm) over 10mm thick 1:3 cement sand plaster on finished surface of first layer as in 19.6 A & B and pointing the joints with 1:3 cement sand mortar including haulage of construction materials up to 30 m. and lift 1.5m as per technical specifications all complete (Only Plaster over first layer and second layer laying works included).**										
A		**Thickness of slate 25mm**	**10 m²**	Skilled	m-day	3.5	Slate	Nr	125			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	5	Cement	MT	0.015			
							Sand	cum	0.03			
							Water	KL	0.0068			
B		**Thickness of slate 50mm**	**10 m²**	Skilled	m-day	3.9	Slate	Nr	125			
				Unskilled	m-day	5.6	Cement	MT	0.023			
							Sand	cum	0.049			
							Water	KL	0.0104			
19.10	1915	**Providing , laying and fixing plastic sheet of required thickness for canal lining works as per technical specifications all complete.**	**10 m²**	Skilled	m-day	0.1	Plastic Sheet	sqm	12			
				Unskilled	m-day	0.2						
19.11	1914	**Providing and laying PVC sheet with 30 cm thick sweet soil (cohesive clay) cover for lining works as per technical specifications all**	10 m²	Skilled	m-day	0.1	PVC Sheet	sqm	12			
				Unskilled	m-day	2.4	Sweet soil (Col	cum	3.3			
19.12	1916	**Providing , laying and fixing geomembrane for canal lining works as per technical specifications all complete.**	10 m²	Skilled	m-day	0.1	Geomembrane	sqm	12			
				Unskilled	m-day	0.2	Other Minor A	3% of material cost				
		Remarks: Add 3% of Unskilled labour cost for machinary tools										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.13	1908	**Providing and laying 20cm thick brick block in 1:4 cement sand mortar (size of brick block 50cm x 50cm) and filling the joints (2cm. wide) between the brick blocks by graded gravel filter for canal lining works including haulage up to 30m. and lift 1.5 m. as per technical specifications all complete.**	$10m^2$	Skilled Unskilled	m-day m-day	3 4.4	Bricks cement sand Graded Gravel Filter	Nr M.t. cu.m. cu.m.	1100 0.173 0.48 0.18			
19.14	1917	**Drainage arrangement in canal lining for release of pore water pressure using saftey valve, perforated UPVC pipe wrapped in geotextile and graded gravel filter as per desgin and specifications all complete.**										
A		**Providing and installation of pressure release saftey valve**	**1 no**	Skilled	m-day	0.8	Pressure relief valve Geotextiles Gravel filter	no sq.m cum	1 1.2 0.045	Miscellaneous	5% of cost of material	
B		**Providing and laying of UPVC perforated pipe 140mm dia.**	**6m**	Skilled Unskilled	m-day m-day	0.02 0.5	UPVC pipe (140mm dia.) Geotextiles	m sq.m	6 3.6	Miscellaneous	5% of cost of material	
C		**Providing and laying of UPVC perforated pipe 100mm dia.**	**6m**	Skilled Unskilled	m-day m-day	0.02 0.5	UPVC pipe (100mm dia.) Geotextiles	m sq.m	6 3	Miscellaneous	5% of cost of material	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Providing and laying of graded gravel filter**	**1 m^3**	Unskilled	m-day	1.4	Filter gravel	cum	1.1			
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
19.15	1917	**Providing and laying 300 mm, thick filter layer of 75 mm. to 6 mm. (grading 75mm at top to 6mm at bottom) stone aggregates in canal bed including haulage up to 10m. distance as per technical specifications all complete.**	**1m^3**	Skilled Unskilled	m-day m-day	0.35 0.53	Graded Filter Aggregates	cum	1			
19.16	1917	**Providing and laying 150 mm, thick filte layer of 75 mm. to 6 mm. (grading 75mm at top to 6mm at bottom) stone aggregates in canal side including haulage up to 10m. distance and lift 1.5m as per technical specifications all complete.**	**1m^3**	Skilled Unskilled	m-day m-day	0.44 0.66	Graded Filter Aggregates	cum	1			
19.17	1919	**Providing and laying 75 mm. thick layer of sand filter in canal bed and sides including sprinkling water, compaction, levelling, dressing, etc, complete haulage up to 10m. and lift upto 1.5m as per technical specifications all complete.**	**1m^3**	Unskilled	m-day	1.4	Sand	cum	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.18	1920	**Providing well graded filter aggregates of size 20 mm and down and laying 300mm thick layer underneath of canal lining for drain including haulage up to 10m and lift upto 1.5m as per technical specifications and direction of engineer all complete.**										
A		**In canal bed**	**1m³**	Skilled Unskilled	m-day m-day	0.35 0.53	Graded Filter Aggregates	cum	1			
B		**In canal sides (slopes)**	**1m³**	Skilled Unskilled	m-day m-day	0.44 0.66	Graded Filter Aggregates	cum	1			
19.19	1921	**Providing and Filling by bitumenous materials of approved quality in 10mm. wide joints in canal lining as per technical specifications all complete.**										
A		**100mm thick lining**	**30m**	Skilled Unskilled	m-day m-day	2 1	Bitumen Fuel	Kg Ltr	43.2 Approx			
B		**150 mm thick lining**	**30m**	Skilled Unskilled	m-day m-day	3 1.5	Bitumen Fuel	Kg Ltr	64.8 Approx			
19.20	1923	**Providing and fitting 150mm. dia. vertical non return valve including nutbolt, base plate.etc. all complete.**	**each**	Skilled Unskilled	m-day m-day	0.75 0.5	Valve	Nr	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.21	1923	**Providing and fitting 50mm. dia. vertical nonreturn pocket valve including nutbolt, base plate. etc. all complete.**	each	Skilled Unskilled	m-day m-day	0.5 0.5	Valve	Nr	1			
19.22	1912	**Design, Supplying and installation of fabric form concrete mattress for canal lining having intermediate filtration points for erosion protection together with multi-linear geocomposite drain below the concrete mattress as an integral part of the system as per drawing and specification.**										
A		**Fabric form concrete mattress having intermediate filtration points FP220 (thickness 55mm, Filter point centre to centre horizontal and vertical spacing 125mm)**	100 m^2	Skilled Unskilled	m-day m-day	5 5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
							Multi-linear geocomposite drain	sq.m.	115	Hydraulic excavator	hr.	17
							OPC-43 grade cement	MT	3.31	Electric generator set (125 KVA)	hr.	2
							Sand	cu.m.	4	Tipper Truck	hr.	

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Fabric form concrete mattress having intermediate filtration points FP300 (thickness 75mm, Filter point centre to centre horizontal and vertical spacing 165mm)**	**100 m^2**	Skilled	m-day	5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5						
							Multi-linear geocomposite drain	sq.m.	115	Hydraulic excavator	hr.	17
										Electric	hr.	2
							OPC-43 grade cement	MT	4.51	generator set (125 KVA)		
							Sand	cu.m.	5	Tipper Truck	hr.	1
C		**Fabric form concrete mattress having intermediate filtration points FP400 (thickness 100mm, Filter point centre to centre horizontal and vertical spacing 200mm)**	**100 m^2**	Skilled	m-day	5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5						
							Multi-linear geocomposite drain	sq.m.	115	Hydraulic excavator	hr.	17
										Electric		
							OPC-43 grade cement	MT	6.04	generator set (125 KVA)	hr.	2
							Sand	cu.m.	7	Tipper Truck	hr.	1
D		**Fabric form concrete mattress having intermediate filtration points FP600 (thickness 150mm, Filter point centre to centre horizontal and vertical spacing**	**100 m^2**	Skilled	m-day	5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5						
							Multi-linear geocomposite	sq.m.	115	Hydraulic excavator	hr.	17

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							drain			Electric generator set (125 KVA)	hr.	2
							OPC-43 grade cement	MT	9.02			
							Sand	cu.m.	11	Tipper Truck	hr.	1
E		**Fabric form concrete mattress having intermediate filtration points FP800 (thickness 200mm, Filter point centre to centre horizontal and vertical spacing 305mm)**	**100 m^2**	Skilled	m-day	5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5						
							Multi-linear geocomposite drain	sq.m.	115	Hydraulic excavator	hr.	17
										Electric generator set (125 KVA)	hr.	2
							OPC-43 grade cement	MT	11.96			
							Sand	cu.m.	4	Tipper Truck	hr.	1
F		**Fabric form concrete mattress having intermediate filtration points FP1000 (thickness 250mm, Filter point centre to centre horizontal and vertical spacing 355mm)**	**100 m^2**	Skilled	m-day	5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5						
							Multi-linear geocomposite drain	sq.m.	115	Hydraulic excavator	hr.	17
										Electric generator set (125 KVA)	hr.	2
							OPC-43 grade cement	MT	15.28			
							Sand	cu.m.	19	Tipper Truck	hr.	1

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
G		**Fabric form concrete mattress having intermediate filtration points FP1200 (thickness 300mm, Filter point centre to centre horizontal and vertical spacing 405mm)**	**100 m²**	Skilled Unskilled	m-day m-day	5 5	Fabric form concrete mattress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
							Multi-linear geoccmposite drain	sq.m.	115	Hydraulic excavator	hr.	17
							OPC-43 grade cement	MT	18.33	Electric generator set (125 KVA)	hr.	2
							Sand	cu.m.	22	Tipper Truck	hr.	1
		Remarks: **1) Filter point fabric from concrete mattress can be effectively used for erosion protection for embankment of reservoirs, channels, lakes, etc. where drawdown is expected.**										
19.23	1912	**Design, Supplying and installation of fabric form concrete mattress having uniform cross section (Manning's N value ≤ 0.021) for canal lining together with multi-linear geocomposite drain below the concrete mattress as an integral part of the system as per drawing and specification.**										
A		**Fabric form concrete matress having uniform cross section US300 (Manning's N value ≤ 0.018).**	**100 m²**	Skilled Unskilled	m-day m-day	5 5	Uniform section fabric from mattress - Concrete thickness 75mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
										Hydraulic excavator	hr.	17

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Multi-linear geocomposite drain	sq.m.	115	Electric generator set (125 KVA)	hr.	2
							OPC-43 grade cement	MT	4.5	Tipper Truck	hr.	1
							Sand	cu.m.	5			
B		**Fabric form concrete matress having uniform cross section US400 (Manning's N value ≤ 0.021).**	**100 m^2**	Skilled	m-day	5	Uniform section fabric from mattress - Concrete thickness 75mm	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5				Hydraulic excavator	hr.	17
							Multi-linear geocomposite drain	sq.m.	115	Electric generator set (125 KVA)	hr.	2
							OPC-43 grade cement	MT	6.04	Tipper Truck	hr.	1
							Sand	cu.m.	7			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
19.24	1913	**Providing, laying and fixing Concrete Canvas 11mm thick for impervious canal lining (where necessary) as per technical specification and direction of engineer all complete.**	76 m^2	Skilled Unskilled	m-day m-day	2 4	Concrete Canvas Metal J-peg Adhesive Sealent (290ml tube) Stainless steel screws Water	sq.m. Nr Tube Nr KL	95 14 3 195 5.7	Autofed screw driver Water pump Miscellaneous itemes such as saftey glasses, masks, gloves,snap off knife adhesive applicator gun etc	hr hr LS	1 1 5% of materials cost
19.25	1921	**Providing and fixing 12 mm thick compressible fiber board filler in 15 cm thick canal lining joint (expansion and contraction joints) all complete as per drawing and technical specification.**	12 m	Skilled Unskilled	m-day m-day	1 1	12 mm thick compressible fiber board	sqm	2			
19.26	1921	**Providing and filling joint sealing compound as per drawings and technical specifications with coarse sand and 6% bitumen by weight.**	1 m	Skilled Unskilled	m-day m-day	1 1	Sand Bitumen	cum cum	0.012 0.001			
19.27	1921	**Providing and fixing 10 mm thick backer rod filler (two layers) over 130 mm deep foam (1cm thick) in 15 cm thick canal lining**	12 m	Skilled Unskilled	m-day m-day	0.75 1	1 cm thick foam filler 1 cm dia. backer	m m	1.72 12			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		joint (expansion and contraction joints) all complete as per drawing and technical					rod filler					
19.28	1921	**Providing and filling high performance joint sealing compound (25 mm depth) as per drawings and technical specifications all complete.**	**12 m**	Skilled Unskilled	m-day m-day	0.5 0.5	High performance self levelleing sealent tube (266ml)	tube	13	Miscellaneous expenses including cost of applicator gun etc.	3% of cost of materials	
19.29	1916	**Supplying & laying of drainage composite for use below concrete lining of canals etc. all complete as per drawing and technical specifications**	**300 m^2**	Skilled Unskilled	m-day m-day	6.36 3	Geosynthetic Drainage Composite Water charges	sq.m 1% of labour cost	300			
		Remarks: **1. Add 10 per cent of the cost of synthetic Composits for wastage and accessories for joining sheets with the facia pannels, overlaps and other protective elements for synthetic Composits and other miscelleneus activities required to complete the item in all respect including transpotation.**										
19.30	1909	**Providing and Laying precast interlocking 1:2:4 concrete hexagonal 10cm thick blocks (side of regular hexagonal block = 20 cm) for canal lining works including pointing with 1:3 cement sand mortar as per technical specification all complete. (haulage upto 30m)**	**100 m^2**	Skilled Unskilled	m-day m-day	2 5	Precast concrete (No of block = 962) 1:3 Pointing	cu.m sq.m	10 100			
		Remarks: **1) Take basic cost of precast concrete per cubic metre as per item no. 8.8 (A) of Section 800.**										

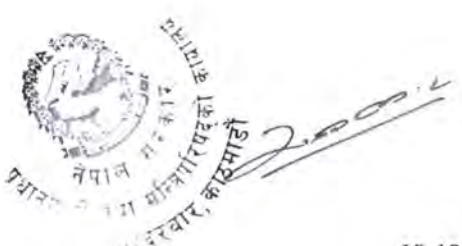
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		2) Take basic cost of pointing work per square metre as per item no. 13.14 (C) of Section 1300.										
19.31	1910	**Providing and Laying 15 cm thick soil cement canal lining for small and medium irrigation canal (discharge < 10 cumecs and velocity < 1 m/s) including watering and compaction as per technical specification all complete (haulage upto 30m).**	**100 m^2**	Skilled Unskilled	m-day m-day	3 10	Cement Sandy Soil Water	MT cu.m KL	2.3 17 0.69	Plate Compactor	hr	4
19.32	1911	**Providing and applying shotcrete concrete (1:1:2) of required thickness in canal lining as per specification all complete.**										
A		**Thickness 50 mm**	**30m^2**	Skilled Unskilled	m-day m-day	2 7.5	Cement Graded Sand Water Aggregate (5-10mm) Wire Fabric (Mesh 50mm*50mm size of 3 mm wire) Accerlator Compound	MT cu.m KL kg	0.825 58.75 1.25 117.5 60 16.5	Compressor with guniting equipment with accessories Shotcreing equipment	hr hr	6 6

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		Thickness 75 mm	$30m^2$	Skilled	m-day	2	Cement	MT	1.2375	Compressor with guniting equipment with accessories	hr	6
				Unskilled	m-day	11.25	Graded Sand	cu.m	88.125			
							Water	KL	1.875			
							Aggregate (5-10mm)		176.25	Shotcreing equipment	hr	6
							Wire Fabric (Mesh 50mm*50mm size of 3 mm wire)		60			
							Accerlator Compound	kg	24.75			
		Remarks: **1) For each item no. 19.32 A and 19.32 B above, Add 2% of cost of material for tying of welded wire fabric , consumables like nozzles, wire brush, clamping wire mesh,etc.**										

Note : Department of Water Resources and Irrigation does not have any intention to promote or suggest any particular commercial brand or company; however, new technologies available in market are suggested without prejudice and if may be the ease of any particular commercial brand or company, equivalent product readily available in market could be used.



NORMS FOR RATE ANALYSIS

SECTION 20: IRON GATE AND OTHER WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
20.1	2002	**Providing and making iron grill and fixing including clearing by sand paper, applying aluminium paint etc as per Specifications and instruction of Engineer all complete.**										
			100 kg	Skilled	m-day	1.5	steel plate	kg.	115.0			
				Unskilled	m-day	4.0						
							Nails	kg.	0.5			
							Sand paper	nos.	5.0			
							Aluminium paint	Lt	2.0			
		Remarks:										
		1. Add 10% of the cost of steel for tools and plants and welding works										
20.2	2003	**Supplying and fixing rolling shutters made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation including providing and fixing necessary 27.5 cm long wire spring and M.S. top cover of required thickness for rolling shutters all complete.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Size of Shutter = 3m*2.5m = 7.5 sq.m										
A		**80x1.25 mm M.S. laths with 1.25 mm thick top cover**	**7.5 m²**	Skilled	m-day	2.8	Rolling Shutter	sq.m	7.5			
				Unskilled	m-day	2.55						
							Top cover	m	2.5			
							27.5 cm long wire spring	No	1			
							Miscellaneous	5% of Material Cost				
							Water Charges	1% of Total Cost				
B		**80x1.20 mm M.S. laths with 1.20 mm thick top cover**	**7.5 m²**	Skilled	m-day	2.8	Rolling Shutter	sq.m	7.5			
				Unskilled	m-day	2.55						
							Top cover	m	2.5			
							27.5 cm long wire spring	No	1			
							Miscellaneous	5% of Material Cost				
							Water Charges	1% of Total Cost				
C		**80x0.9 mm M.S. laths with 0.9 mm thick top cover**	**7.5 m²**	Skilled	m-day	2.8	Rolling Shutter	sq.m	7.5			
				Unskilled	m-day	2.55						
							Top cover	m	2.5			
							27.5 cm long wire spring	No	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
							Miscellaneous	5% of Material Cost				
							Water Charges	1% of Total Cost				
20.3	2004	**Providing and fixing 1mm thick M.S. sheet for double leaf door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners and Using M.S. angels 40x40x6 mm for diagonal braces including all necessary fittings all complete.**	**145 kg**	Skilled	m-day	9.12	1mm Thick MS Sheet	MT	0.05			
				Unskilled	m-day	5	3mm Thick Gusset Plate	MT	0.0153			
							40*40*6mm Angle iron	MT	0.0936			
							Iron pintels with welded pin	No	4			
							Mild steel sheets with bolts and nuts to rest on pintels	No	4			
							Mild steel hooks	No	2			
							Locking arrangements and handles	5% of Cost of Steel				
							Rivets	7% of Cost of Steel				
							Water Charges	1% of Total Cost				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Remarks: **1. Add 5% of Cost of Steel for Miscellaneous Works including Welding,etc.** **2. Calculation Details :** **A. Weight of MS Sheet (1mm thick) with 7.85 kg/m2 = 5.76m2 * 7.85 kg/m2 *1.1 (allowing 10% wasteage) =49.738 Kg = 0.05MT** **B. Weight of Gusset Plate (3mm Thick) with 23.55 kg/m2 =((0.3*0.04 + 0.5*0.26 *(0.04+0.3))m2/no. *8 no.)+(2*22/7*0.25*0.3*0.3)m2) * 23.55 kg/m2 *1.1 (allowing 10% wasteage) = 15.31 kg** **C. Weight of Angle Iron (40*40*6 mm) with 3.5kg/m = (4*2.4 + 4*1.2+2*2.5+2*2.45)m * 3.5 kg/m *1.1 (allowing 10% wasteage) =93.56 kg = 0.0936 MT** **D. For Calculation prurpose, Double leaf door size considered is 2.4mx2.4m=5.76 m2**										
20.4	**2004**	**Providing and fixing 1mm thick M.S. sheet Double Leaf door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners and Using flats 30x6mm for diagonal braces and central cross piece including all necessary fittings all complete.**	**130 kg**	Skilled Unskilled	m-day m-day	9.12 5	1mm Thick MS Sheet 3mm Thick Gusset Plate 30*6 mm Flats 40*40*6mm Angle iron Iron pintels with welded pin Mild steel sheets with bolts and nuts to rest on pintels	MT MT MT MT No No	0.05 0.0208 0.0188 0.0554 4 4			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
							Mild steel hooks	No	2			
							Locking arrangements and handles	5% of Cost of Steel				
							Rivets	7% of Cost of Steel				
							Water Charges	1% of Total Cost				
		Remarks: **1. Add 5% of Cost of Steel for Miscellaneous Works including Welding,etc.** **2. Calculation Details :** **A. Weight of MS Sheet (1mm thick) with 7.85 kg/m2 = 5.76m2 * 7.85 kg/m2 *1.1 (allowing 10% wasteage) =49.738 Kg = 0.05MT** **B. Weight of Gusset Plate (3mm Thick) with 23.55 kg/m2 =((0.3*0.04 + 0.5*0.26 *(0.04+0.3))m2/no. *8 no.)+(2*22/7*0.25*0.3*0.3)m2+4*0.0528 m2) * 23.55 kg/m2 *1.1 (allowing 10% wasteage) = 20.78 kg =0.0208 MT** **C. Weight of Angle Iron (40*40*6 mm) with 3.5kg/m = (4*2.4 + 4*1.2)m * 3.5 kg/m *1.1 (allowing 10% wasteage) =55.44 kg = 0.0554 MT** **D. Weight of Flat (30*6mm) with 1.4kg/m = (4*2.45+2*1.2)m*1.4 kg/m*1.1 (allowing 10% wasteage) = 18.788 kg = 0.0188 MT** **E. For Calculation prurpose, Double leaf door size considered is 2.4mx2.4m=5.76 m2**									
20.5	**2005**	**Providing and fixing in position collapsible steel shutters with vertical channels (20x10x2 mm) and braced with flat iron diagonals having size (20x5 mm) with top and bottom rail of T-iron (40x40x6 mm), with 40 mm dia steel pulleys, including bolts, nuts, locking arrangement, stoppers and handles all complete.**	**3.6 m²**	Skilled	m-day	16	MS Channel	MT	0.053			
				Unskilled	m-day	8	MS Tee	MT	0.0127			
							Flat Iron	MT	0.06			
							Rivets, Fixing Hooks and Washers	10 % of Cost of Steel				
							Locking Arrange ments and Handles	3 % of Cost of Steel				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Gate Size = 2.4m * 1.5m = 3.6 sq.m					Pulley (40mm dia)	No	10			
							Water Charges	1% of				
		Remarks:										
		1. Add 5% of Cost of Steel for Miscellaneous Works.										
		2. Calculation Details :										
		A. Weight of MS Channel (20*10*2 mm) with 0.56 kg/m = 18 Nos/Side * 2 Sides * 2.4m/number * 0.56 kg/m *1.1 (allowing 10% wasteage) = 53.22 Kg = 0.053 MT										
		B. Weight of MS Tee (40*40*6 mm) with 3.5 kg/m = 1.570m (at bottom) + 1.725 m (at top) = 3.295 m *3.5kg/m *1.1 (allowing 10% wasteage)= 12.68 Kg = 0.0127 MT										
		C. Weight of Flat Iron (20*5mm) with 0.8kg/m = 4 Nos/location * 32 locations * 0.5334 m/Nos * 0.8 kg/m *1.1 (allowing 10% wasteage) = 60.08 kg = 0.06 MT										
20.6	**2006**	**Providing and Fixing built up hot finished welded type / Hot finished seamless type / Electric resistance or induction butt welded tubular (round, square or rectangular hollow tubes etc.) truss including cutting, hoisting, fixing in position, welding and bolting with special shaped washers etc. all complete.**	**119 kg**	Skilled	m-day	2.25	Tubes(50mm & 40mm dia)	MT	0.125			
				Unskilled	m-day	5.5	Welding Charge	10% of cost of Tubes				
							Water Charges	1% of Total Cost				
		Span= 8 metre , Weight = 119 Kg										
		Remarks:										
		1. Add 5% of Cost of Steel for Miscellaneous Works.										
		2. Calculation Details :										
		A. Weight of Tubes (40 &50 mm dia) with 3.61 kg/m & 5.10kg/m =((1*8+2*4.3)m * 5.10kg/m + 2(0.45+1.25+0.90+2.15)m *3.61kg/m)*1.05 (allowing 5% wasteage) = 124.90 Kg = 0.125 MT										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
20.7	2007	**Providing and fencing with GI barbed wire all complete.**	**100 m**	Skilled Unskilled	m-day m-day	0.5 1	Barbed wire Nails and hook	m kg	110 2			
20.8	2007	**Providing barbed wire fencing works with five rows and two diagonal barbed wires and column at 3m. spacing.**	**30 m**	Skilled Unskilled	m-day m-day	1 2	Salwood Barbed wire U-hooks	cu.m. m. Nr	0.19 250 77			
20.9	2007	**Providing and fixing 1.8 m high GI barbed wire fencing with 2.4m RCC M 15 grade 150 mm x 150 mm concrete post placed every 3 m center-to-center founded in M 15 grade cement concrete, 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc. complete as per Drawing and Technical Specifications.**	**30m**	Skilled Unskilled	m-day m-day	0.50 3.5	M-15 Grade concrete Steel rebars Painting Barbed wire	cu.m. kg sqm kg	0.7 101.15 12.1 40.15	Tools and plants and minor accessories		5% of cost of Barbed wire
		Remarks: Cost of excavation of foundation and foundation concrete shall be added separately as per design. Rate for these items shall be taken from respective chapter.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
20.10	2007	**Providing and fixing 1.8 meters high GI barbed wire fencing with 2.4 m angle iron posts 50 mm x 50 mm x 6 mm placed every 3 meters center to center founded in M 15 grade cement concrete, 0.6 meter below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides andend post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GIstaples, turn buckles etc. complete as per Drawing and Technical Specifications.**	**30m**	Skilled Unskilled	m-day m-day	0.4 3	Barbed wire MS angle iron 50mm x 50mm x6mm Two coat painting	kg kg sqm	40.15 152 3.9	Tools and plants and minor accessories		5% of cost of Barbed wire
		Remarks: Cost of excavation of foundation and foundation concrete shall be added separately as per design. Rate for these items shall be taken from respective chapter.										
20.11	2013	**Providing and fixing chain link fencing (10swg-GI Chain link with 25mmx25mm mesh size) chain links enclosed in angle frame (20mmx20mmx4mm and 25mmx25mmx4mm angles) using 50mm dia black pipe posts at 2 m spacing and 15cm high iron grill made of 20mmx3mm iron plate at the top of fencing including fabrication and primer painting all complete.**	**10 m2**	Skilled Unskilled	m-day m-day	7 5	50mm Post Angle (25 mm Angle (20mm x20mm x4 mm) Iron Grill (20mmx3mm) 10 SWG GI	Kg Kg Kg Kg	35.51 32.06 25.19 14.76			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
							Chain Link (25mmx25 mm mesh)	Sqm	10			
		Remarks: **1. Add 15 % of total cost for fabrication and primer painting.**										
20.12	2014	**Providing and fixing Chicken mesh fencing made of 7mm dia bar at 62 mmx62mm spacing enclosed in angle frame of 25mm x 25mmx4mm angles using 50mm dia black pipe posts at 2 metre spacing and 15cm high iron grill made of 20mmx3mm iron plate at the top of fencing including fabrication and primer painting all complete.**	**10 m2**	Skilled Unskilled	m-day m-day	7 5	50mm Post Angle (25 mm x25 mm x4 mm) 7mm dia Iron Bars Iron Grill (20 mmx 3mm)	Kg Kg Kg Kg	35.51 32.06 66.49 14.76			
		Remarks: **1. Add 15 % of total cost for fabrication and primer painting.**										
20.13	2015	**Providing and fixing spiral razor blade fencing with all accessories (posts, binding wire, clamps,nut &bolts ,etc.) all complete**	**500 m**	Skilled Unskilled	m-day m-day	1 9	Spiral Razor Blade Wire Angle post (40mmx40mm x4mm) @ 3m c/c spacing	m kg	525 403.2			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Remarks:										
		1. Add 5% of total cost for tools and plants, binding wire, clamps, nuts and bolts, etc.										
20.14	2008	**Providing, Cutting, Welding, Fitting and Fixing in Position Mild Steel Stop Log Gate Where nedded in Dam/barrage/ Undersluice/ HR-CR and Allied Works as per design, drawing and specification all complete.**	1 MT	Fabrication	30% of cost of Steel		Mild Steel (Beams, Angles, Flate etc)	MT	1.025			
				Matching, Drilling, Threading , Boring, Teeth Cutting,	20% of cost of steel		Acetylene	Cu.m	3.8			
							Oxygen	Cu.m	8.6			
							MS Electrodes	No	200			
							Gun Metal	Kg	12			
							Rubber Seal	m	2.5			
				Casting, Black smithy, Forging and Handling Jobs	40% of cost of steel		Miscellaneous Matrerial (Screw, Bolt, Paints, Black Lead,etc)	5% of Cost of Steel				
		Remarks:										
		1. Add 10% of Cost of Steel for local transportation and positioning of Stop Log Gate at Site.										
		2. Add 15 % of cost of Steel for Erection of embedded parts etc.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
20.15	2009	**Supplying, Fabrication and Fixing of vertical lift, manually operated single screw spindle small gate for small Irrigation Canals including painting as per specification all complete .**	**240 kg**	skilled	m-day	3	MS steel	kg	252			
				Unskilled	m-day	5	Gear box with handle hoist	set	1			
							Welding Including rubber seal, painting, bolt,nut,washer and other required accessories	20% of cost of steel				
20.16	2009	**Supplying, Fabrication and Fixing of vertical lift, manually operated single screw spindle gate for medium Irrigation Canals including painting as per specification all complete .**	**480 kg**	Foreman	m-day	3	MS steel	kg	505			
				Skilled	m-day	6	Flat Type	m	6			
				Semi-Skille	m-day	1.5	Rubber Seal					
				Unskilled	m-day	8.5	Screw Spindle Gear box with handle hoist	set	1			
							Welding Including bolt,nut,washer and other required accessories and painting	20% of cost of steel				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Remarks: **1. Calculation Details :** **Size of the gate considered for calculation is 2m *2m (1.8m water depth and 0.2m free board)** **A. Weight of Skin Plates (2.1m*2m*8mm) = (2.1m*2m*0.008m)*7850 kg/m3* 1.05 (allowing 5% wasteage) = 276.948 kg = 0.277 MT** **B. Weight of Horizontal MS Angle Stiffner (40*40*5mm) with weight 3.002 kg/m =3 nos*2m/no*3.002kg/m * 1.05 (allowing 5% wasteage) = 18.9126 kg =** **C. Weight of Vertical MS Plate Stiffner (2000*100*5mm) = 2nos*2m*0.1m*0.005m/no*7850kg/m3* 1.05 (allowing 5% wasteage) = 16.485 kg = 0.0165** **D. Weight of Side MS Plates(2000*70*5mm) = 2nos*2m*0.07m*0.005m/no*7850kg/m3* 1.05 (allowing 5% wasteage) = 11.54kg = 0.0115 MT** **E. Weight of Bottom MS Plates(2000*70*5mm) = 1nos*2m*0.07m*0.005m/no*7850kg/m3* 1.05 (allowing 5% wasteage) = 5.77kg = 0.006 MT** **F. Weight of Bottom Channel (ISMC 100) with weight 9.56 kg/m = 1 nos*2.2m/no*9.56kg/m*1.05 (allowing 5% wasteage)=22.0836 kg = 0.0221 MT** **G. Weight of Side Channel (ISMC 100) with weight 9.56 kg/m = 2nos*4m/no*9.56kg/m*1.05 (allowing 5% wasteage)= 80.304 kg = 0.0803 MT** **H. Weight of Spindle (50mm dia) = 3.5m*(0.05*0.05*3.142/4)m2*7850 kg/m3*1.05 (allowing 5% wasteage)= 56.65 kg = 0.0567 MT** **I. Weight of gearbox supporting beam (angle 40*40*5mm) = 2 nos.*2.6m/no.*3.002kg/m * 1.05 (allowing 5% wastage) =16 kg = 0.016 MT**										
20.17	2009 2010 2011 2012	**Supplying, Fabrication, Erection and fixing of large gates for Barrage / Undersluice / Escape / HR / CR etc** **Remarks:** **1. Unit rate of gate components and total cost of gate as a whole of such gates shall be based on the detailed design and drawings of the particular gate desired to be erected.**											

SECTION 21: PIPE AND SEWER LAYING

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
21.1	**2101**	**Providing and laying R.C.C. Hume pipe(2.5m length) and its accessories in 1:2 cement sand mortar etc. including haulage up to 100m. distance all complete.**										
A		**15 cm. dia. pipe**	**32.5 m**	Skilled	m-day	2.5	RCC pipe	m	32.5			
				Unskilled	m-day	13	Cement	MT	0.035			
							Sand	cum	0.05			
B		**20 cm. dia. pipe**	**32.5 m**	Skilled	m-day	3.5	RCC pipe	m	32.5			
				Unskilled	m-day	17	Cement	MT	0.052			
							Sand	cum	0.08			
C		**30 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	5	RCC pipe	m	32.5			
				Unskilled	m-day	19	Cement	MT	0.083			
							Sand	cum	0.13			
D		**40 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	5	RCC pipe	m	32.5			
				Unskilled	m-day	19	Cement	MT	0.083			
							Sand	cum	0.13			
E		**45/50 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	7	RCC pipe	m	32.5			
				Unskilled	m-day	26	Cement	MT	0.143			
							Sand	cum	0.22			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
F		**60 cm. dia. Pipe**	32.5 m	Skilled	m-day	8	RCC pipe	m	32.5			
				Unskilled	m-day	31	Cement	MT	0.218			
							Sand	cum	0.3			
G		**75 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	9	RCC pipe	m	32.5			
				Unskilled	m-day	36	Cement	MT	0.255			
							Sand	cum	0.35			
H		**90 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	10	RCC pipe	m	32.5			
				Unskilled	m-day	46	Cement	MT	0.29			
							Sand	cum	0.4			
I		**120/100 cm. dia. Pipe**	**32.5 m**	Skilled	m-day	11	RCC pipe	m	32.5			
				Unskilled	m-day	71	Cement	MT	0.363			
		Remarks:					Sand	cum	0.5			
		1)Cost of earth excavation and Back-filling is not included.										
		2) Add 3% of unskilled labour cost for Tools and Plants in item no 21.1										
21.2	2101	**Providing and mechanically laying R.C.C. Hume pipe (2.5m length) and its accessories in 1:2 cement sand mortar etc. including haulage up to 100m. distance all complete.**										
A		**30/40/45 cm. dia. Pipe**	**37.5 m**	Skilled	m-day	3.5	RCC pipe	m	37.5	Crane (3T)	hr	1
				Unskilled	m-day	13	Cement	MT	0.096			
							Sand	cum	0.15			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**50/60/75 cm. dia. Pipe**	**25 m**	Skilled	m-day	3.7	RCC pipe	m	25	Crane (3T)	hr	1
				Unskilled	m-day	14	Cement	MT	0.168			
							Sand	cum	0.231			
G		**90/100/120 cm. dia. Pipe**	**15 m**	Skilled	m-day	3	RCC pipe	m	32.5	Crane (3T)	hr	1
				Unskilled	m-day	19	Cement	MT	0.167			
							Sand	cum	0.23			
		Remarks:										
		1)Cost of earth excavation and Back-filling is not included.										
		2) Add 3% of unskilled labour cost for Tools and Plants in item no 21.1										
21.3	2101	**Laying HDPE Pipe-PE 80 including fitting works all complete.**										
A		**Butt welded joints**										
I		**Outer dia. 20mm and 25mm**	**1000m**	Skilled	m-day	1	Fuel (petrol)	Ltr	0.25	Generator	hr	8
				Unskilled	m-day	3				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour co	
II		**Outer dia. 32mm**	**1000m**	Skilled	m-day	1	Fuel (petrol)	Ltr	0.25	Generator	hr	8
				Unskilled	m-day	4				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour	
III		**Outer dia. 40mm and 50mm**	**1000m**	Skilled	m-day	1.5	Fuel (petrol)	Ltr	0.37	Generator	hr	8
				Unskilled	m-day	4.5				Mechanical/ Screw Jack	hr	8

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
										Other tools	2.51% of labour cost	
IV		**Outer dia. 63mm, 75mm and 90mm**	**50m**	Skilled	m-day	1	Fuel (petrol)	Ltr	0.05	Generator	hr	8
				Unskilled	m-day	3				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour cost	
V		**Outer dia. 110mm and 125mm**	**50m**	Skilled	m-day	1.5	Fuel (petrol)	Ltr	0.5	Generator	hr	8
				Unskilled	m-day	4.5				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour cost	
VI		**Outer dia. 140mm, 160mm and 180mm**	**50m**	Skilled	m-day	2	Fuel (petrol)	Ltr	1	Generator	hr	8
				Unskilled	m-day	6				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour cost	
VII		**Outer dia. 200mm, 225mm and 250 mm**	**50m**	Skilled	m-day	2.5	Fuel (petrol)	Ltr	1.5	Generator	hr	8
				Unskilled	m-day	6.5				Mechanical/ Screw Jack	hr	8
										Other tools	2.51% of labour cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Lap Joint (Length of Pipe = 5m)**										
I		**Outer dia. 280mm and 315mm**	50m	Skilled Unskilled	m-day m-day	3 7	Flange with accessories	Nos	18	Mechanical / ScrewJack Other tools	hr 2.51% of labour cost	8
II		**Outer dia. 355mm and 400mm**	50m	Skilled Unskilled	m-day m-day	3.5 7.5	Flange with accessories	Nos	18	Mechanical / ScrewJack Other tools	hr 2.51% of labour cost	8
III		**Outer dia. 450mm and 500mm**	50m	Skilled Unskilled	m-day m-day	3.5 7.5	Flange with accessories	Nos	18	Mechanical / ScrewJack Other tools	hr 2.51% of labour cost	8
IV		**Outer dia. 630mm**	50m	Skilled Unskilled	m-day m-day	4 8	Flange with accessories	Nos	18	Mechanical / ScrewJack Other tools	hr 2.51% of labour cost	8
		Remarks: **For Laying HDPE Pipe-PE 100 including fitting works all complete decrease the cost of PE 80 as follows:** **a) For Outer dia. 20mm and 25mm, by 12%** **b) For Outer dia. 32mm, by 14%**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		c) For Outer dia. 40mm and 50mm, by 15%										
		d) For Outer dia. 63mm,75mm and 90mm, by 16%										
		e) For Outer dia. 110mm and 125mm, by 16%										
		f) For Outer dia. 140mm,160mm and 180mm, by 16%										
		g) For Outer dia. 200mm, 225mm and 250mm, by 17%										
		h) For Outer dia. 280mm and 315mm, by 17%										
		i) For Outer dia. 355mm and 400mm, by 17%										
		j) For Outer dia. 450mm and 500mm, by 17%										
		k) For Outer dia. 630mm, by 17%										
21.4	**2101**	**Laying of CI pipe including transportation upto 250m all complete.**										
A		**For Titan joint**										
I		**Inner dia. 80mm (3")**	**30m**	Skilled	m-day	0.75				Tools & Plants	1%of labour cost	
				Unskilled	m-day	4.5				andother		
II		**Inner dia. 100mm (4")**	**30m**	Skilled	m-day	1				Tools & Plants	1%of labour cost	
				Unskilled	m-day	5.25				andother		
III		**Inner dia. 125mm (5")**	**30m**	Skilled	m-day	1				Tools & Plants	1%of labour cost	
				Unskilled	m-day	6				andother		
IV		**Inner dia. 150mm (6")**	**30m**	Skilled	m-day	1.25				Tools & Plants	1%of labour cost	
				Unskilled	m-day	7.5				andother		

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
IV		**Inner dia. 150mm (6")**	**30m**	Skilled Unskilled	m-day m-day	2.5 7.5	Lead Hemp/Sanpat/ Jute	kg kg	34.7 1.8	Fuel wood, lubricant, tools, plant, etc.	5%of labour cost	
V		**Inner dia. 200mm (8")**	**30m**	Skilled Unskilled	m-day m-day	3 9	Lead Hemp/Sanpat/ Jute	kg kg	52.1 2.1	Fuel wood, lubricant, tools, plant, etc.	5%of labour cost	
VI		**Inner dia. 250mm (10")**	**30m**	Skilled Unskilled	m-day m-day	4 12	Lead Hemp/Sanpat/ Jute	kg kg	63.3 3.1	Fuel wood, lubricant, tools, plant, etc.	5%of labour cost	
VI		**Inner dia. 300mm (12")**	**30m**	Skilled Unskilled	m-day m-day	5 15	Lead Hemp/Sanpat/ Jute	kg kg	73.5 4.3	Fuel wood, lubricant, tools, plant, etc.	5%of labour cost	
C		**For Flangged joint**										
I		**Inner dia. 80mm (3")**	**30m**	Skilled Unskilled	m-day m-day	1.5 4.5				Tools & Plants and other	5%of labour cost	
II		**Inner dia. 100mm (4")**	**30m**	Skilled Unskilled	m-day m-day	1.75 5.25				Tools & Plants and other	5%of labour cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
III		**Inner dia. 125mm (5")**	**30m**	Skilled Unskilled	m-day m-day	2 6				Tools & Plants and other accesssories	5%of labour cost	
IV		**Inner dia. 150mm (6")**	**30m**	Skilled Unskilled	m-day m-day	2.5 7.5				Tools & Plants and other accesssories	5%of labour cost	
V		**Inner dia. 200mm (8")**	**30m**	Skilled Unskilled	m-day m-day	3 9				Tools & Plants and other accesssories	5%of labour cost	
VI		**Inner dia. 250mm (10")**	**30m**	Skilled Unskilled	m-day m-day	4 12				Tools & Plants and other accesssories	5%of labour cost	
VI		**Inner dia. 300mm (12")**	**30m**	Skilled Unskilled	m-day m-day	5 15				Tools & Plants and other accesssories	5%of labour cost	
		Remarks: **1) Lead and jute (Hemp/Sanpat) is estimated by assuming 9 joints in 30m length. For other length of pipes, estimates shall be made accordingly.**										

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
21.5	2101	**Laying of GI pipe including transportation upto 500m all complete.**										
A		**Inner dia. 15mm and 20mm**	**30m**	Skilled Unskilled	m-day m-day	0.5 2	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	
B		**Inner dia. 25mm and 32mm**	**30m**	Skilled Unskilled	m-day m-day	0.5 3	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	
C		**Inner dia. 40mm and 50mm**	**30m**	Skilled Unskilled	m-day m-day	0.75 4	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	
D		**Inner dia. 65mm and 80mm**	**30m**	Skilled Unskilled	m-day m-day	1.25 5	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	
E		**Inner dia. 100mm**	**30m**	Skilled Unskilled	m-day m-day	1.75 6	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	
F		**Inner dia. 125mm**	**30m**	Skilled Unskilled	m-day m-day	2 7.5	Red Lead Paint, Hemp etc.	10% of labour cost		Tools & Plants and other accesssories	2.5% of labour cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: **1) For welded joint, add 2% of labour cost for respective size of pipes.** **2) For flanged joint, add the cost of the flanges required.**										
21.6	**2101**	**Laying and Jointing of Double Wall Courragated (DWC) HDPE pipe including transportation upto 250m all complete.**										
A		**Inner dia. 100mm**	**30m**	Skilled Unskilled	m-day m-day	1 1	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
B		**Inner dia. 150mm**	**30m**	Skilled Unskilled	m-day m-day	1 1	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
C		**Inner dia. 200mm**	**30m**	Skilled Unskilled	m-day m-day	1 2	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
D		**Inner dia. 250mm**	**30m**	Skilled Unskilled	m-day m-day	1 3	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices	3%of labour cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
E		**Inner dia. 300mm**	**30m**	Skilled Unskilled	m-day m-day	1 4	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
F		**Inner dia. 400mm**	**30m**	Skilled Unskilled	m-day m-day	1 6	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
G		**Inner dia. 500mm**	**30m**	Skilled Unskilled	m-day m-day	2 7	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	3%of labour cost	
H		**Inner dia. 600mm**	**30m**	Skilled Unskilled	m-day m-day	2 8	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	5%of labour cost	
I		**Inner dia. 800mm**	**30m**	Skilled Unskilled	m-day m-day	3 11	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices	5%of labour cost	

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
J		**Inner dia. 1000mm**	**30m**	Skilled Unskilled	m-day m-day	3 12	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	5%of labour cost	
K		**Inner dia. 1200mm**	**30m**	Skilled Unskilled	m-day m-day	3 12	Elastomeric Sealing ring	2% of labour cost		Tools & Plants including joining devices etc.	5%of labour cost	
21.7	2101	**G.I. Pipe fitting and fixing works all complete.**										
A		**Metal valve, meter, 15mm ferrule, Bend, elbow, union, reduser, flange, connection tap,etc for all types of fittings.**	**1 fitting**	Skilled Unskilled	m-day m-day	0.1 0.2	Fitting Red Lead Paint, Hemp etc.	No. 1% of cost of 10m length of related pipe	1			
B		**For each additional socket**	**1 fitting**	Skilled Unskilled	m-day m-day	0.1 0.2	Fitting Red Lead Paint, Hemp etc.	No. 1% of cost of 10m length of related pipe	1			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
21.8 A	2101	**C.I. Pipe fitting and fixing works all complete. Flange taper, Lead Joint flange and 15mm ferrule connection for all types of fittings.**	1 fitting	1/2 of labour cost of pipe laying of particular size as per 21.4			Red lead paint, Hemp etc. to apply in joints	1 % of the cost of 15m length of related pipe size				
B		**Lead Joint Tee for all types of fittings.**	1 fitting	1/2 of labour cost of pipe laying of particular size as per 21.4			Red lead paint, Hemp etc. to apply in joints	2 % of the cost of 15m length of related pipe size				
C		**Flanged bend, flanged elbow, lead joint elbow, for all types of fittings.**	1 fitting	1/3 of labour cost of pipe laying of particular size as per 21.4			Red lead paint, Hemp etc. to apply in joints	0.5 % of the cost of 15m length of related pipe size				
D		**Lead joint bend**	1 fitting	2/3 of labour cost of pipe laying of particular size as per 21.4			Red lead paint, Hemp etc. to apply in joints	2 % of the cost of 10m length of related pipe size				
21.9	2101	**HDPE Pipe fitting and fixing works all complete.**										
		Bend, elbow, union, reducer, flange, socket etc. for all types of fittings.	1 fitting	1/6 of labour cost of pipe laying of particular size as per 21.3								

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
21.10	2101	**Slotted pipe laying works**										
A		**Pipe of dia. 150mm**	**30 m**	Skillled	m-day	2.5						
				Semi-skilled	m-day	1.5						
				Unskilled	m-day	4						
B		**Pipe of dia. 200mm**	**30 m**	Skillled	m-day	3.25						
				Semi-skilled	m-day	2.25						
				Unskilled	m-day	5						
21.11	2101	**Laying of stoneware glazed pipe with all its accessories in 1:1 cement sand mortar joints all complete.**										
A		**Inner dia. 100mm**	**30 m**	Skillled	m-day	6	Cement	MT	0.018			
				Unskilled	m-day	8	Sand	cum	0.105			
							Jute	kg	2.05			
B		**Inner dia. 150mm**	**30 m**	Skillled	m-day	7	Cement	MT	0.03			
				Unskilled	m-day	11.5	Sand	cum	0.2			
							Jute	kg	4.75			
C		**Inner dia. 200mm**	**30 m**	Skillled	m-day	8.25	Cement	MT	0.045			
				Unskilled	m-day	13	Sand	cum	0.3			
							Jute	kg	6.6			

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
D		**Inner dia. 300mm**	**30 m**	Skillled	m-day	12	Cement	MT	0.103			
				Unskilled	m-day	19	Sand	cum	0.65			
							Jute	kg	11.7			
E		**Pipe of dia. 400mm**	**30 m**	Skillled	m-day	15	Cement	MT	0.143			
				Unskilled	m-day	22	Sand	cum	0.9			
							Jute	kg	18.35			
F		**Pipe of dia. 450mm**	**30 m**	Skillled	m-day	16	Cement	MT	0.200			
				Unskilled	m-day	23.5	Sand	cum	1.260			
							Jute	kg	25.690			
G		**Pipe of dia. 500mm**	**30 m**	Skillled	m-day	18	Cement	MT	0.280			
				Unskilled	m-day	25	Sand	cum	1.764			
							Jute	kg	35.966			
H		**Pipe of dia. 600mm**	**30 m**	Skillled	m-day	21	Cement	MT	0.392			
				Unskilled	m-day	28	Sand	cum	2.470			
							Jute	kg	50.352			
I		**Pipe of dia. 700mm**	**30 m**	Skillled	m-day	24	Cement	MT	0.549			
				Unskilled	m-day	31	Sand	cum	3.457			
							Jute	kg	70.493			
J		**Pipe of dia. 800mm**	**30 m**	Skillled	m-day	27	Cement	MT	0.769			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	34	Sand	cum	4.840			
							Jute	kg	98.691			
		Remarks:										
		1)Add watchmen and miscellanous works (approx)										
21.12	2101	**Laying and jointing of PVC-O (molecularly oriented) pipe including transportation upto 250m all complete.**										
A		**Outer diameter 90/110/125/140/160/200 mm**	**30m**	Skillled	m-day	1	Tools, Plants,					
				Unskilled	m-day	1	Rope, Lubricants/ Cement Solvent, etc.	2% of Labour Cost				
A		**Outer diameter 225/250/315/355/400 mm**	**30m**	Skillled	m-day	1	Tools, Plants,					
				Unskilled	m-day	2	Rope, Lubricants/ Cement Solvent, etc.	2% of Labour Cost				
21.13	2102	**Providing and laying weep holes in Brick works / Stone Masonry works/ Plain/ Reinforced concrete abutment, wing wall/ return wall with 75 mm dia. HDPE pipe wrapped with Geotextile in mouth(entry face) as per Drawing and Technical Specifications.**	**30 m**	Skilled	m-day	1	HDPE pipe 75	m	31.5			
				Unskilled	m-day	1	mm dia.					
							MS clamps	Nr	30			
							Cement	MT	0.02			
							Sand	cum	0.06			
							Geotextile	sqm	9			
		(Assuming Length of Weep Hole = 1m)										

SECTION 22: ROAD WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.1	2210	**Supply of Material and Making road side ditch from rubble stone masonry in cement sand mortar including haulage up to 30 m all complete.**										
A		**Cement masonry (1:3)**	**1 m³**	Skilled	m-day	1.5	Cement	MT	0.194			
				Unskilled	m-day	4.8	Sand	cu.m.	0.42			
							Stone	cu.m.	1.1			
B		**Cement masonry (1:4)**	**1 m³**	Skilled	m-day	1.5	Cement	MT	0.159			
				Unskilled	m-day	4.8	Sand	cu.m.	0.45			
							Stone	cu.m.	1.1			
C		**Cement masonry (1:6)**	**1 m³**	Skilled	m-day	1.5	Cement	MT	0.106			
				Unskilled	m-day	4.8	Sand	cu.m.	0.47			
							Stone	cu.m.	1.1			
22.2	2210	**Supply of materiral and Making road side ditch form dry rubble masonry including haulage up to 30m all complete.**	**1 m³**	Skilled	m-day	0.47	Stone	cu.m.	1.1			
				Unskilled	m-day	4.25						
22.3	2207	**Cleaning sub-grade by cutting grass including disposal up to 10m from construction site all complete**	**1 m²**	Unskilled	m-day	0.05						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Remarks: Add 3% of Unskilled labour cost for machinary tools										
22.4	2207	**Sub -grade preaparation by cutting ordinary soils including disposal upto 10m all complete**										
A		**Up to 10 cm. Depth**	**1 m²**	Unskilled	m-day	0.12						
B		**Up to 20 cm depth**	**1 m²**	Unskilled	m-day	0.18						
C		**Up to 30 cm depth**	**1 m²**	Unskilled	m-day	0.24						
		Remarks: Add 3% of Unskilled labour cost for machinary tools for item no.22.4										
22.5	2207	**Sub grade preparation by cutting GBM (Gravel Boulder Mixed) Soil including disposal upto 10 m all complete.**										
A		**Stone 20%-40% and 10cm. deep**	**1 m²**	Unskilled	m-day	0.26						
B		**Stone 40%-60% and 10cm. deep**	**1 m²**	Unskilled	m-day	0.29						
C		**Stone 20%-40% and 20cm. deep**	**1 m²**	Unskilled	m-day	0.36						
D		**Stone 40%-60% and 20cm. deep**	**1 m²**	Unskilled	m-day	0.41						
E		**Stone 20%-40% and 30cm. deep**	**1 m²**	Unskilled	m-day	0.47						
F		**Stone 40%-60% and 30cm. deep**	**1 m²**	Unskilled	m-day	0.53						
		Remarks: Add 3% of Unskilled labour cost for machinary tools for item no.22.5										

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.6	2207	**Making sub-grade by bringing approved soils from borrow pits & filling including levelling & hauling up to 10m all complete (Capping Layer).**										
A		**Up to 10 cm. high**	**100 m²**	Unskilled	m-day	11	Capping Layer	cu.m	12.5			
							Water	KL	1.5			
B		**Up to 20 cm. high**	**100 m²**	Unskilled	m-day	16	Capping Layer	cu.m	25			
							Water	KL	3			
C		**Up to 30 cm. high**	**100 m²**	Unskilled	m-day	21	Capping Layer	cu.m	37.5			
							Water	KL	4.5			
		Remarks: Add 3% of Unskilled labour cost for machinary tools for item no.22.6										
22.7	2207	**Rolling of filled soils (in 22.6 above) in layers**	**100 m³**	Unskilled	m-day	0.5				Road Roller (8-10) MT	hr.	1.67
22.8	2207	**Water sprinkling works (in 22.6 works above) including hauling upto 10m.**	**M.T.**	Unskilled	m-day	0.5						

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.9	2208	**Providing and Laying sub - base course of sand mixed gravel including loading & transporting material, levelling surface & hauling up to 10 m all complete.**										
A		**10 cm. solid depth**	**10 m²**	Unskilled	m-day	1.5	Gravel Water	cu.m. KL	1.28 0.15	Road Roller (8-10) MT	hr.	0.09
B		**12.5 cm. solid depth**	**10 m²**	Unskilled	m-day	1.7	Gravel Water	cu.m. KL	1.6 0.18	Road Roller (8-10) MT	hr.	0.11
C		**15 cm. solid depth**	**10 m²**	Unskilled	m-day	1.9	Gravel Water	cu.m. KL	1.92 0.22	Road Roller (8-10) MT	hr.	0.13
D		**20 cm. solid depth**	**10 m²**	Unskilled	m-day	2.1	Gravel Water	cu.m. KL	2.56 0.29	Road Roller (8-10) MT	hr.	0.18
E		**25 cm. solid depth**	**10 m²**	Unskilled	m-day	3	Gravel Water	cu.m. KL	3.2 0.37	Road Roller (8-10) MT	hr.	0.23
F		**30 cm. solid depth**	**10 m²**	Unskilled	m-day	3.5	Gravel Water	cu.m. KL	3.84 0.44	Road Roller (8-10) MT	hr.	0.28
G		**40 cm. solid depth**	**10 m²**	Unskilled	m-day	4.5	Gravel Water	cu.m. KL	5.12 0.59	Road Roller (8-10) MT	hr.	0.38

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.10	2208	**Providing and Laying sub-base of broken stones or required size gravel including loading & transporting materials, surface levelling & hauling up to 10 m. distance all complete**										
A		**10 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.4	Coarse Aggregate	cu.m.	1.352	Road Roller (8-10) MT	hr.	0.28
							Screening	cu.m.	0.420			
							Binding ma	cu.m.	0.10			
							Water	KL	0.40			
B		**15 cm. solid thickness**	**10 m²**	Unskilled	m-day	2.1	Coarse Aggregate	cu.m.	2.025	Road Roller (8-10) MT	hr.	0.42
							Screening	cu.m.	0.630			
							Binding ma	cu.m.	0.15			
							Water	KL	0.60			
C		**25 cm. solid thickness**	**10 m²**	Unskilled	m-day	3.2	Coarse Aggregate	cu.m.	3.375	Road Roller (8-10) MT	hr.	0.7
							Screening	cu.m.	1.050			
							Binding ma	cu.m.	0.25			
							Water	KL	1.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.11	2208	**Rolling by road roller of 8-10 M.T**										
A		**Sub-base course**	**100 m³**							Road Roller (8-10) MT	hr.	3
B		**Base course**	**100 m³**							Road Roller (8-10) MT	hr.	4
22.12	2209	**Providing and Laying base course of broken stone, sand and clay (clay bound macadam) incL. arranging stone in layers, spreading clay, compacting & hauling up to 10 m. all complete**										
A		**6 cm. solid thickness**	**10 m²**	Unskilled	m-day	1	Coarse Aggregate	cu.m.	0.794	Road Roller (8-10) MT	Hr.	0.024
							Sand	cu.m.	0.16			
							Clay	cu.m.	0.072			
							Water	KL	0.24			
B		**7.5 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.2	Coarse Aggregate	cu.m.	1	Road Roller (8-10) MT	Hr.	0.03
							Sand	cu.m.	1.2			
							Clay	cu.m.	0.09			
							Water	KL	0.30			
C		**8 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.3	Coarse Aggregate	cu.m.	1.087	Road Roller (8-10) MT	Hr.	0.032

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Sand	cu.m.	0.213			
							Clay	cu.m.	0.096			
							Water	KL	0.32			
D		**10 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.5	Coarse Aggregate	cu.m.	1.333	Road Roller (8-10) MT	Hr.	0.04
							Sand	cu.m.	0.266			
							Clay	cu.m.	0.12			
							Water	KL	0.40			
E		**12 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.8	Coarse Aggregate	cu.m.	1.6	Road Roller (8-10) MT	Hr.	0.048
							Sand	cu.m.	0.3			
							Clay	cu.m.	0.144			
							Water	KL	0.48			
F		**14 cm. solid thickness**	**10 m²**	Unskilled	m-day	2.1	Coarse Aggregate	cu.m.	1.866	Road Roller (8-10) MT	Hr.	0.056
							Sand	cu.m.	0.373			
							Clay	cu.m.	0.168			
							Water	KL	0.56			
G		**15 cm. solid thickness**	**10 m²**	Unskilled	m-day	2.3	Coarse Aggregate	cu.m.	2	Road Roller (8-10) MT	Hr.	0.06
							Sand	cu.m.	0.4			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Clay	cu.m.	0.18			
							Water	KL	0.60			
22.13	2209	**Providing , Mixing stone dust in broken stones & laying Stone dust bound macadam incl. arranging stones in layers, spreading stone dust, compacting & hauling up to 10m. distance alll complete**										
A		**6 cm. solid thickness**	**10 m²**	Unskilled	m-day	1	Coarse Aggregate	cu.m.	0.794	Road Roller (8-10) MT	Hr.	0.024
							Stone dust	cu.m.	0.16			
B		**8 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.3	Coarse Aggregate	cu.m.	1.087	Road Roller (8-10) MT	Hr.	0.032
							Stone dust	cu.m.	0.213			
C		**10 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.5	Coarse Aggregate	cu.m.	1.333	Road Roller (8-10) MT	Hr.	0.04
							Stone dust	cu.m.	0.266			
D		**12 cm. solid thickness**	**10 m²**	Unskilled	m-day	1.8	Coarse Aggregate	cu.m.	1.6	Road Roller (8-10) MT	Hr.	0.048
							Stone dust	cu.m.	0.32			
E		**14 cm. solid thickness**	**10 m²**	Unskilled	m-day	2.1	Coarse Aggregate	cu.m.	1.866	Road Roller (8-10) MT	Hr.	0.056

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Stone dust	cu.m.	0.373			
F		15 cm. solid thickness	10 m²	Unskilled	m-day	2.3	Coarse Aggregate	cu.m.	2	Road Roller (8-10) MT	Hr.	0.06
							Stone dust	cu.m.	0.4			
22.14	2209	Providing and Laying base course of 10cm solid thickness of broken stones incl. surface levelling & hauling upto 10m all complete										
A		Using 75mm broken stone	1 m²	Unskilled	m-day	0.15	Broken Stone	cu.m.	0.148	Road Roller (8-10) MT	Hr.	0.004
B		Using 50mm broken stone	1 m²	Unskilled	m-day	0.12	Broken Stone	cu.m.	0.1	Road Roller (8-10) MT	Hr.	0.003
22.15	2213	Laying wearing course of sand clay mixture on the top surface of clay bound macadam incl. surface levelling, water sprinkling & hauling up to 10m. all complete	1 m²	Unskilled	m-day	0.035						
22.16	2209	Cleaning top surface by wire brush & broom before pitching										
A		on water bound macadam	10 m²	Unskilled	m-day	0.25						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**on other road surface**	**10 m²**	Unskilled	m-day	0.2						
22.17	**2212**	**Providing and applying tack coat as per specification all complete.**										
A		**On old pitch surface**	**10 m²**	Unskilled	m-day	0.2	Bitumen	kg.	7.3	Boiler	hr	0.04
							Kerosene	ltr	approx	Sprayer	hr	0.04
							Firewood(Boiler)	kg.	3			
							Firewood(Mass	kg.	12			
							Firewood(Patch	kg.	18			
B		**On base course**	**10 m²**	Unskilled	m-day	0.2	Bitumen	kg.	12.2	Boiler	hr	0.04
							Kerosene	ltr	approx	Sprayer	hr	0.04
							Firewood(Boiler)	kg.	5			
							Firewood(Mass	kg.	20			
							Firewood(Patch	kg.	30			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.18	2212	**Providing and applying priming coat as per specification all complete.**										
A		**On old pitch surface**	10 m²	Unskilled	m-day	0.2	Bitumen	kg.	4.9	Boiler	hr	0.04
							Kerosene	ltr	approx	Sprayer	hr	0.04
							Firewood(Boiler)	kg.	2			
							Firewood(Mass	kg.	8			
							Firewood(Patch	kg.	12			
B		**On base course**	10 m²	Unskilled	m-day	0.2	Bitumen	kg.	9.75	Boiler	hr	0.04
							Kerosene	ltr	approx	Sprayer	hr	0.04
							Firewood(Boiler)	kg.	4			
							Firewood(Mass	kg.	16			
							Firewood(Patch	kg.	24			
22.19	2213	**Providing and applying one coat surface dressing including compaction as per specification all complete**	10 m²	Unskilled	m-day	0.45	Bitumen	kg.	20	Roller	hr	0.04
							Kerosene	ltr	approx	Boiler	hr	0.04
							Firewood(Boiler)	kg.	8	Sprayer	hr	0.04

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Firewood(Mass	kg.	32			
							Firewood(Patch	kg.	48			
							Aggregate 12mm	cum	0.15			
22.20	2213	**Providing and applying Two coat surface dressing including compaction as per specification all complete**	**10 m²**	Unskilled	m-day	0.8	Bitumen	kg.	34	Roller	hr	0.07
							Kerosene	ltr	approx	Boiler	hr	0.07
							Firewood(Boiler)	kg.	13	Sprayer	hr	0.07
							Firewood(Mass	kg.	52			
							Firewood(Patch	kg.	78			
							Aggregate 12mm	cum	0.18			
							Aggregate 10mm	cum	0.1			
22.21 A	2214	**Providing and applying Semigrouting work incl. compaction as per specification all 5cm. Thickness**	**10 m²**	Unskilled	m-day	1.2	Bitumen	kg.	35	Roller	hr	0.07
							Kerosene	ltr	approx	Boiler	hr	0.07
							Fuelwood For			Sprayer	hr	0.07

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Boiler	kg.	12			
							Masswork	kg.	48			
							Patchwork	kg.	72			
							Aggregate 38mm	cum	0.6			
							Aggregate 12mm	cum	0.15			
B		**10cm. Thickness**	**10 m²**	Unskilled	m-day	2.0	Bitumen	kg.	60	Roller	hr	0.07
							Kerosene	ltr	approx	Boiler	hr	0.07
							Fuelwood For			Sprayer	hr	0.07
							Boiler	kg.	18			
							Masswork	kg.	72			
							Patchwork	kg.	108			
							Aggregate 38mm	cum	1.2			
							Aggregate 12mm	cum	0.3			
22.22	2214	**Providing and applying 5cm thick full grouting works including compaction as per specification all complete**	**10 m²**	Unskilled	m-day	1.2	Bitumen	kg.	50	Roller	hr	0.07
							Kerosene	ltr	approx	Boiler	hr	0.07
							Fuelwood for			Sprayer	hr	0.07
							Boiler	kg.	20			
							Masswork	kg.	80			
							Patchwork	kg.	120			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.23	2215	**Providing and applying Seal coat including compaction as per specification all complete**	**10 m²**	Unskilled	m-day	0.45	Aggregate 38mm	cum	0.6			
							Aggregate 12mm	cum	0.15			
							Bitumen	kg.	15	Roller	hr	0.04
							Kerosene	ltr	approx	Boiler	hr	0.04
							Fuelwood for			Sprayer	hr	0.04
							Boiler	kg.	6			
							Masswork	kg.	24			
							Patchwork	kg.	36			
							Aggregate 6mm	cum	0.12			
22.24	2215	**Providing and applying Seal coat with coarse sand including compaction as per specification all complete**	**10 m²**	Unskilled	m-day	0.45	Cut-Back Bitumen	kg.	9.6	Roller	hr	0.04
							Cheese			Boiler	hr	0.04
							Kerosene	ltr	approx	Sprayer	hr	0.04
							Fuelwood for					
							Boiler	kg.	4			
							Masswork	kg.	16			
							Patchwork	kg.	24			
							Coarse Sar	cum	0.07			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.25	2218	Providing and laying 40mm. thick premix asphalt concrete including compaction as per specification all complete	10 m²	Unskilled	m-day	1	Cut-Back Bitumen	kg.	46	Roller	hr	0.11
							Cheese			Boiler	hr	0.11
										Sprayer	hr	0.11
							Kerosene	ltr	approx	Mixer	hr	0.11
							Fuelwood for					
							Boiler	kg.	18			
							Masswork	kg.	72			
							Patchwork	kg.	108			
							Coarse Sar	cum	0.19			
							Aggregate 20mm	cum	0.23			
							Aggregate 12mm	cum	0.15			
22.26	2220, 2219	Providing and Laying 20mm. thick premix carpeting including compaction as per	10 m²	Unskilled	m-day	0.9	Cut-Back	kg.	15.4	Roller	hr	0.1
							Kerosene	ltr	approx	Boiler	hr	0.1
							Fuelwood for			Sprayer	hr	0.1
							Boiler	kg.	6			
							Masswork	kg.	24			
							Patchwork	kg.	36			
							Aggregate 12mm	cu.m	0.18			
							Aggregate 10mm	cu.m	0.09			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.27	2202 2211	Providing and Edging including adjustment of line, levelling, making tench by excavating soils or pitched road, piling material (bricks/stones) in order, filling both sides of edging by soils and hand -compaction as per specification all complete.										
A		Edging (125mm. high) by edge bricks	rm	Unskilled	m-day	0.05	Brick	Nr.	5			
B		Edging (250mm. high) by flat bricks	rm	Unskilled	m-day	0.1	Brick	Nr.	17			
C		Edging by stones (100mm. Wide and 125mm deep)	rm	Unskilled	m-day	0.08	Stone	cum	0.0125			
D		Edging by stones (100mm. Wide and 250mm deep)	rm	Unskilled	m-day	0.15	Stone	cum	0.025			
22.28	2210	Earthen(Unlined) drain formation (bed width of drain less or equal to 60cm.)										
A		In ordinary soil	m	Unskilled	m-day	0.15						
B		In hard soil	m	Unskilled	m-day	0.21						
C		In common soft rock	m	Unskilled	m-day	0.68						
D		In hard rock	m	Unskilled	m-day	1.9						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
22.29	2210	**Making V-shaped drain of dry stone of thickness 15cm. to 23 cm. by erecting them in sides (top width of drain is 60cm. and depth is form 30cm. to 50 cm**	**m**	Unskilled	m-day	1	Stone	cum	Adopt qty. as per design			
22.30	2223	**Chopping & removing trees (girth between 900 mm. and 1200mm)held under bridge/culvert and blocking flow of water all complete**	**each**	Unskilled	m-day	1.6						
22.31	2224	**Construction of 3m. Wide service road parallel to canal or road by cutting humps and filling depressions etc. all complete**	**1 km**	Unskilled	m-day	13						

SECTION 23: ELECTRIC LINE AND ELECTRIFICATION WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		ELECTRICITY LINE WORKS										
23.1	2302	**Erecting steel pole for electricity line including fixing in the ground as per drawing and applying three coat lining of bitumen complete.**										
A		**Length of pole 8m (bitumen lining upto 1.5m from the bottom, depth of foundation 1.5m)**	**each**	Supervisor or Sub-engineer	m-day	0.33	Bitumen	Kg	4			
				Lineman	m-day	0.66						
				Unskilled	m-day	3.33						
B		**Length of pole 9m (bitumen lining upto 1.5m from the bottom,depth of foundation 1.5m)**	**each**	Supervisor or Sub-engineer	m-day	0.39	Bitumen	Kg	4.2			
				Lineman	m-day	0.77						
				Unskilled	m-day	3.88						
C		**Length of pole 11m (bitumen lining upto 1.8m from the bottom,depth of foundation 1.8m)**	**each**	Supervisor or Sub-engineer	m-day	0.5	Bitumen	Kg	5			
				Lineman	m-day	1						
				Unskilled	m-day	5						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		Note for Item no. 23.1 : 1. Add cost of concrete for foundation as per design and type of concrete used.										
23.2	2303	Erection of electric pole for electric line including hauling form site store up to construction site, excavation of footing (1.5m deep), making pole vertical, and placing in footing, ramming backfilling for strengthening etc. all complete.										
A		8m long wooden treated pole (dia 18cm at bottom and 12cm at top) for LT line in rural area. Wooden pole not to be used for 33KV and 11KV Circuits.	5 Poles	Skilled Unskilled	m-day m-day	3 25						
23.3	2302	Erection of electric pole (steel) for electric line up to 33 kv. incl. hauling from site store up to const. site, excavation of footing, making pole vertical, and placing in footing, concreting in footing and compacting properly for strengting etc. complete.	2 Poles	Skilled Unskilled	m-day m-day	4 25						
		Note: 1. Cost of materials (Cement, Sand, Coarse aggregate, water) for concreting in foundation required as per design and type of concrete is not included.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.4	2304	**Erection of pre-stressed concrete pole including footing excavation and fixing in ground for electric line all complete.**										
A		**Manual means**										
I		**For 8m PSC pole**	**4 Poles**	Skilled	m-day	1.5						
				Unskilled	m-day	4						
II		**For 9m PSC pole**	**4 Poles**	Skilled	m-day	2						
				Unskilled	m-day	5						
III		**For 11m PSC pole**	**4 Poles**	Skilled	m-day	2.5						
				Unskilled	m-day	6						
B		**Mechanical means**										
I		**For 8m PSC pole**	**4 Poles**	Skilled	m-day	0.3				Crane 3T	hr	2
				Unskilled	m-day	1						
II		**For 9m PSC pole**	**4 Poles**	Skilled	m-day	0.4				Crane 3T	hr	2.25
				Unskilled	m-day	1.5						
III		**For 11m PSC pole**	**4 Poles**	Skilled	m-day	0.5				Crane 3T	hr	2.5
				Unskilled	m-day	2						
		Note for Item No. 23.4:										
		1. Add cost of concrete for foundation as per design and type of concrete used.										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.5	2305	**Fixing A.C.S.R. conductor of various size given below to pole with proper tension in transmission line including transportation by labour from site store to construction site , establishing temporary station, laying conductor, giving proper tension to conductor, fixing to pole, tying them by aluminium binding wire etc, all complete.**										
A		**Fixing 1 km long, 0.075 A.C.S.R. conductor**	**each of 3 wire**	Engineer	m-day	1						
				Supervisor or Sub-engineer	m-day	3						
				Lineman	m-day	21						
				Helper	m-day	6						
				Unskilled	m-day	66						
B		**Fixing 1 km long, 0.05 A.C.S.R. conductor**	**each of 3 wire**	Engineer	m-day	1						
				Supervisor or Sub-engineer	m-day	2						
				Lineman	m-day	15						
				Helper	m-day	6						
				Unskilled	m-day	56						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Fixing 1 km long, 0.03 A.C.S.R. conductor**	**each of 3 wire**	Engineer	m-day	1						
				Supervisor or Sub-engineer	m-day	2						
				Lineman	m-day	15						
				Helper	m-day	6						
				Unskilled	m-day	51						
D		**Fixing 1 km long, 0.1 A.C.S.R. conductor**	**each of 3 wire**	Engineer	m-day	1						
				Supervisor or Sub-engineer	m-day	2						
				Lineman	m-day	15						
				Helper	m-day	6						
				Unskilled	m-day	76						
23.6	**2305**	**Fixing A.C.S.R. conductor of various size given below to pole with proper tension in distribution line including transportation by labour from site store to construction site , establishing temporary station, laying conductor, giving proper tension to conductor, fixing to pole, tying them by aluminium binding wire etc, all complete.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**Fixing 0.05 A.C.S.R. conductor 250m. long**	**each of 5 wire**	Skilled	m-day	7						
				Unskilled	m-day	35						
B		**Fixing 0.05 A.C.S.R. conductor 250m. long**	**each of 4 wire**	Skilled	m-day	5.6						
				Unskilled	m-day	28						
C		**Fixing 0.05 A.C.S.R. conductor 250m. long**	**each of 3 wire**	Skilled	m-day	4.2						
				Unskilled	m-day	21						
D		**Fixing 0.03 A.C.S.R. conductor 250m. long**	**each of 5 wire**	Skilled	m-day	5.6						
				Unskilled	m-day	28						
E		**Fixing 0.03 A.C.S.R. conductor 250m. long**	**each of 4 wire**	Skilled	m-day	4.64						
				Unskilled	m-day	22.4						
F		**Fixing 0.03 A.C.S.R. conductor 250m. long**	**each of 1 wire**	Skilled	m-day	1.16						
				Unskilled	m-day	5.6						
23.7	2306	**Fixing distribution transformer (25 KVA ,50 KVA ,100 KVA, 150 KVA and 200 KVA pole mounted) including earthing set, L.A.D.O. fuse and G.O. switch etc. all complete.**	**each**	Supervisor or Sub-engineer	m-day	1						
				Lineman	m-day	2						
				Helper	m-day	2						
				Unskilled	m-day	10						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.8	2307	**Providing and installing/constructing Standarad Stay set arrangement for stability of electric pole in overhead line construction**										
A		**For Telescopic Pole /Steel Tubular Pole**										
i		**For High Tension (HT) Transmission**	1 Set	Electrician	m-day	0.3	Stay Plate (MS 600mm*600mm*600mm)	no	1	Tools & Plants	3 % of labour cost	
				Skilled	m-day	0.3						
				Unskilled	m-day	1						
							Stay Rod 19 mm (2.44m)	no	1			
							Turn buckle	set	1			
							Stay Insulator	no	1			
							Preform Wire Commpatible for Stay Wire of Size 7/4mm	set	4			
							7/4mm SWG Stay wire	m	12			
							Bolt and Washer	set	2			
							Thimble	no	2			
							Double Eye (Twisted)	no	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
ii		**For Low Tension (LT) Distribution**	**1 Set**	Electrician	m-day	0.3	Stay Plate	no	1	Tools & Plants	3 % of labour cost	
				Skilled	m-day	0.3	(MS					
				Unskilled	m-day	1	600mm*600m					
							m*600mm)					
							Stay Rod 16					
							mm (1.8m)	no	1			
							Turn buckle	set	1			
							Stay Insulator					
								no	1			
							Preform Wire	set	4			
							Commpatible					
							for Stay Wire					
							of Size					
							7/2.6mm	m	9			
							SWG Stay					
							wire					
							Bolt and	set	2			
							Washer					
							Thimble	no	2			
							Double Eye					
							(Twisted)	no	1			
B		**For Pre Stressed Concrete Pole**										
i		**For High Tension (HT) Transmission**	**1 Set**	Electrician	m-day	0.3	Stay Plate	no	1	Tools & Plants	3 % of labour cost	
				Skilled	m-day	0.3	(MS					
				Unskilled	m-day	1	600mm*600m					

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Stay Rod 19 mm (2.44m)	no	1			
							Turn buckle	set	2			
							Stay Insulator	no	2			
							Preform Wire Commpatible for Stay Wire of Size 7/4mm	set	4			
							7/4mm SWG Stay wire	m	12			
							Eye Bolt and Washer	set	1			
							Thimble	no	2			
ii		**For Low Tension (LT) Distribution**	**1 Set**	Electrician	m-day	0.3	Stay Plate (MS 600mm*600mm*600mm)	no	1	Tools & Plants	3 % of labour cost	
				Skilled	m-day	0.3						
				Unskilled	m-day	1						
							Stay Rod 16 mm (1.8m)	no	1			
							Turn buckle	set	2			
							Stay Insulator	no	2			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Preform Wire Commpatible for Stay Wire of Size	set	4			
							7/2.6mm SWG Stay	m	9			
							Eye Bolt and Washer	set	1			
							Thimble	no	2			
		ELECTRIFICATION WORKS										
23.8	2308	**Providing and Fixing Main Switch in wooden box or in the wall as per drawing and connecting to electricity supply of single phase and three phase of following amperes, all complete.**										
A		**15-100 amperes**	**1 job**	Skilled	m-day	0.5	Main control switch	Lot	1			
				Semi-Skilled	m-day	1	Wooden box	Nr	1			
							Grips	Nr	5			
							Screws	Nr	5			
							Cement Mortar and Paint	As Reqiured				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		100-400 amperes	1 job	Skilled	m-day	1	Main control switch	Lot	1			
				Semi-Skilled	m-day	1	Wooden box	Nr	1			
							Grips	Nr	5			
							Screws	Nr	5			
							Cement Mortar and Paint	As Reqiured				
C		Above 400 amperes	1 job	Skilled	m-day	1.5	Main control switch	Lot	1			
				Semi-Skilled	m-day	3	Wooden box	Nr	1			
							Grips	Nr	5			
							Screws	Nr	5			
							Cement Mortar and Paint	As Reqiured				
23.9	2308	**Providing and Connecting Busbar Strips in metal box panel board of single or three phase according to the drawings to incoming and outgoing lines by cable shoe and also connecting ampere voltmeter, C.T. transfermer, selector switches etc. all complete of the amperes as give below.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
A		**30-100 amperes**	**1 job**	Skilled	m-day	1	Bushbar Stirpes	Lot	2 or 4			
				Semi-Skilled	m-day	2	Cable shoe	nr	10 or more			
							Other equipment	as per drawing				
							Bus Stand	as per drawing				
							Nut bolts	as per drawing				
							Flexible wire	as per drawing				
B		**100-600 amperes**	**1 job**	Skilled	m-day	1.5	Bushbar Stirpes	Lot	2 or 4			
				Semi-Skilled	m-day	3	Cable shoe	nr	10 or more			
							Other equipment	as per drawing				
							Bus Stand	as per drawing				
							Nut bolts	as per drawing				
							Flexible wire	as per drawing				
C		**above 600 amperes**	**1 job**	Skilled	m-day	2	Bushbar Stirpes	Lot	2 or 4			
				Semi-Skille	m-day	4	Cable shoe	nr	10 or more			
							Other equipment	as per drawing				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Bus Stand	as per drawing				
							Nut bolts	as per drawing				
							Flexible wire	as per drawing				
23.10	2311	**Providing and Fixing Distribution Boards according to drawings of metal box or wooden box inclusive of MCB or kitkat and connecting to electrical supply of different capacity or house type as given below, all complete.**										
A		**Upto 6 houses concealed**	**1 job**	Skilled	m-day	0.5	Box	Lot	1			
				Semi-Skilled	m-day	0.75	MCB or Kitkat	Lot	Accod. To house			
							Grip screw	Nr	6			
							Cement Mortar and Paint	As Reqiured				
B		**6 to 9 houses concealed**	**1 job**	Skilled	m-day	0.5	Box	Lot	1			
				Semi-Skilled	m-day	1	MCB or Kitkat	Lot	Accod. To house			
							Grip screw	Nr	6			
							Cement Mortar and	As Reqiured				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Upto 6 houses surface**	**1 job**	Skilled	m-day	0.5	Box	Lot	1			
				Semi-Skilled	m-day	0.5	MCB or Kitkat	Lot	Accod. To house			
							Grip screw	Nr	6			
D		**6 to 9 houses surface**	**1 job**	Skilled	m-day	0.5	Box	Lot	1			
				Semi-Skilled	m-day	0.75	MCB or Kitkat	Lot	Accod. To house			
							Grip screw	Nr	6			
23.14	2309 2310	**Providing and Fixing lighting fixtures accordin to drawings inclusive of different main switch (surface or concealed) and supplying electricity, all complete.**										
A		**Dome or wall light, hanging light, spot display, ceiling tube bulb bulk head, electrical bell,wall fan MLL chandelier upto 6 bulbs.**	**10 Nos**	Skilled	m-day	0.5	Light	Lot	1			
				Semi-Skilled	m-day	0.5	Woodenblock	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Pipe or chain	rm	0.5			
							Ceiling rose	Nr	1			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							Cemenr mortar mix and paint	As required				
							Hook	Nr	1			
B		Good quality tubelight pipe or fixing chain on ceiling, garden light, main gate light, posltop lantern, street light, chandelier light (6-10) bulbs, concealed tubelight.	10 Nos	Skilled	m-day	1	Light	Lot	1			
				Semi-Skilled	m-day	1	Woodenblock	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Pipe or chain	rm	0.5			
							Ceiling rose	Nr	1			
							Cemenr mortar mix and paint	As required				
							Hook	Nr	1			
23.15	2308	Providing and Fixing sockets according to drawings and connecting to electricity.										
A		Concealed electrical sockets	10 Nos	Skilled	m-day	1	Sockets	Lot.	1			
				Semi-Skilled	m-day	2	Box	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Cemenr mortar mix and paint	As required				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Surface electrical sockets**	**10 Nos**	Skilled	m-day	0.5	Sockets	Lot.	1			
				Semi-Skilled	m-day	1	Box	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Cemenr mortar mix and paint	As required				
C		**Conceale telephone sockets**	**10 Nos**	Skilled	m-day	1	Sockets	Lot.	1			
				Semi-Skilled	m-day	3	Box	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Cemenr mortar mix and paint	As required				
D		**Surface telephone sockets**	**10 Nos**	Skilled	m-day	0.5	Sockets	Lot.	1			
				Semi-Skilled	m-day	1	Box	Nr	1			
							Grips	Nr	4			
							Screws	Nr	4			
							Cemenr mortar mix and paint	As required				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.16	2308	**Providing and Fixing different type of Fans according to drawings and their switch as concealed or surface and supplying electricity, all complete.**										
A		**Ceiling Fan**	**1 No**	Skilled	m-day	0.5	Fan	Lot	1			
				Semi-Skilled	m-day	0.5	Ceiling rose	Nr	1			
							Wodden block	Nr	1			
							Grips and screws	As required				
							Iron Hook	Nr	1			
							Wooden Box	Nr	1			
							Wooden Frame	Nr	1			
B		**Wall Fan**	**1 No**	Skilled	m-day	0.25	Fan	Lot	1			
				Semi-Skilled	m-day	0.25	Ceiling rose	Nr	1			
							Wodden block	Nr	1			
							Grips and screws	As required				
							Iron Hook	Nr	1			
							Wooden Box	Nr	1			
							Wooden Frame	Nr	1			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
C		**Exhaust Fan**	**1 No**	Skilled	m-day	1	Fan	Lot	1			
				Semi-Skilled	m-day	1	Ceiling rose	Nr	1			
							Wodden block	Nr	1			
							Grips and screws	As required				
							Iron Hook	Nr	1			
							Wooden Box	Nr	1			
							Wooden Frame	Nr	1			
23.17	2308	**Providing and Fixing Earthing System according to drawing and connecting to electrical equipment power points or main switch all complete. (Depth of excavation pit must be greater than 1.5m)**	**1 No**	Skilled	m-day	0.2	Copper-Bonded Earth Rod (1.2-3m length & 12-20mm dia)	rod	1			
				Semi-Skilled	m-day	1.5						
				Unskilled	m-day	2						
							Copper Earthing Wire (4-16mm²)	m	12			
							Earth Bar/ Busbar (Copper)	no	1			
							Earthing Clamps (Copper)	no	3.00			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
							PVC Conduit (for wire protection)	m	15			
							Earth Pit Enclosure	no	1			
							Earth Enhancing Compound	bag	1			
		Remarks: **1. Length of Copper bonded earth rod depends on Soil Type and Ground Resistance Target. Large rod is required for dry or rocky soil and soil with lower resistance.** **2. Diameter of Copper bonded earth rod depends on Electrical load and Soil Resistivity. Thicker rod is required for high load and high soil resistance.** **3. Add 3% of cost of labour for tools and plants.** **4. Add 1 day hire charge of conduit bender if required.**										
23.18	**2310**	**Providing and fixing street lighting pole as per drawings; all complete.**										
A		**Wooden pole upto 8m (Depth of excavation 1.5m)**	**1 No**	Skilled	m-day	0.2	Pole	Lot	1			
				Semi-Skilled	m-day	0.4	Cement Concrete	As required				
				Unskilled	m-day	2	Inspection box	Nr	1			
							Varnish paint	As required				
							Nut bolts	As required				

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Steel tubular pole 8m (Depth of excavation 1.5m)**	**1 No**	Skilled	m-day	0.33	Pole	Lot	1			
				Semi-Skilled	m-day	0.66	Cement Concrete	As required				
				Unskilled	m-day	0.3	Inspection box	Nr	1			
							Varnish paint	As required				
							Nut bolts	As required				
C		**Steel tubular pole heavy gauge upto 11m (Depth of excavation 1.8m)**	**1 No**	Skilled	m-day	0.5	Pole	Lot	1			
				Semi-Skilled	m-day	1	Cement Concrete	As required				
				Unskilled	m-day	5	Inspection box	Nr	1			
							Varnish paint	As required				
							Nut bolts	As required				
23.19	2309 2310	**Surface point wiring according to drawings inclusive of stretching wire, drilling into wall or ceiling for fixing grips/skew/lee stick/ clips/ nails to a particular light via ceiling rose box and fixing and painting; all complete.**					Wire,Lee Stick,Grips, Screws, Nails,Link, Clip, Varnish Paints	As required				
A		**Light Circuit**										
I		**Short length (5m)**	**10 Points**	Skilled	m-day	1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Semi-Skilled	m-day	2						
				Unskilled	m-day	1						
II		**Medium length (6-10m)**	**10 Points**	Skilled	m-day	1						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	2						
III		**Long length (11-15m)**	**10 Points**	Skilled	m-day	1.5						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	3						
IV		**Extra long length (above 15m)**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						
B		**Power circuit or Telephone Circuit**										
I		**Short length (5m)**	**10 Points**	Skilled	m-day	1						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	2						
II		**Medium length (6-10m)**	**10 Points**	Skilled	m-day	1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Semi-Skilled	m-day	3						
				Unskilled	m-day	3						
III		**Long length (11-15m)**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						
IV		**Extra long length (above 15m)**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
23.20	**2309 2310**	**Concealed Point wiring (while constructing new house), according to Circular box drawing, placing HD polythene pipe clamps while concreting and fixing its switch hook, nails, board via ceiling rose box; all complete.**					Polyethene pipe, circular box, clamps , hooks, nails ,etc	As Required				
A		**Light Circuit**										
I		**Short Length (5m)**	**10 Points**	Skilled	m-day	1						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	2						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		Medium Length (6m	10 Points	Skilled	m-day	1.5						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	2						
III		Long Length (11m to	10 Points	Skilled	m-day	1.5						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						
IV		Extra Long Length (above 15m)	10 Points	Skilled	m-day	2						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
B		Power circuit or telephone circuit										
I		Short Length (5m)	10 Points	Skilled	m-day	1.5						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	3						
II		Medium Length (6m	10 Points	Skilled	m-day	2						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
III		**Long Length (11m to**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
IV		**Extra Long Length (above 15m)**	**10 Points**	Skilled	m-day	3						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
23.21	2309 2310	**Concealed Point wiring in the old building as per drawing: by making grooves in ceiling, walls or surface and placing HD polythene pipe by means of hook, nails and finishing with cement sand mortar mix and paint inclusive of fixing its switch via ceiling rose box; all complete.**					Polyethene pipe, circular box, clamps , hooks, nails ,etc	As Required				
							Cement sand mortar mix and paint	As Required				
A		**Light Circuit**										
I		**Short Length (5m)**	**10 Points**	Skilled	m-day	1.5						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	3						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		**Medium Length (6m**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						
III		**Long Length (11m to**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
IV		**Extra Long Length (above 15m)**	**10 Points**	Skilled	m-day	3						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
B		**Power circuit or telephone circuit**										
I		**Short Length (5m)**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	3						
				Unskilled	m-day	4						
II		**Medium Length (6m**	**10 Points**	Skilled	m-day	2						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
III		**Long Length (11m to**	**10 Points**	Skilled	m-day	3						
				Semi-Skilled	m-day	4						
				Unskilled	m-day	4						
IV		**Extra Long Length (above 15m)**	**10 Points**	Skilled	m-day	4						
				Semi-Skilled	m-day	5						
				Unskilled	m-day	5						
23.22	2308	**Power cable wiring as per drawings and connecting to electricity supply as follows:**					Cable	rm	10			
							Grip, nails, scerws, clamps etc	As per required				
A		**Simple method using clamps on the wall**										
I		**2.5 mm to 10 mm**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	0.5						
II		**16 mm to 35 mm**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	1						
III		**above 50mm sqaure**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		**Concealed wiring in brick wall as per drawing by chiselling groove in ceiling, wall or floor and supporting by clamp, nails etc. and finishing it with cement mortar mix and paint all complete.**					Cable	rm	10			
							Grip, nails, scerws, clamps etc	As per required				
I		**2.5 mm to 10 mm**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	1						
II		**16 mm to 35 mm**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	1.5						
III		**above 50mm sqaure**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	2						
C		**Excavation trench or groove(Trench depth 0.5m) according to drawings and placing cable.**					Cable	rm	10			
I		**2.5 mm to 10 mm**	**10 m**	Skilled	m-day	0.5						
				Semi-Skilled	m-day	0.5						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	1						
II		16 mm to 35 mm	10 m	Skilled	m-day	0.5						
				Semi-Skilled	m-day	0.5						
				Unskilled	m-day	1.5						
III		above 50mm sqaure	10 m	Skilled	m-day	0.5						
				Semi-Skilled	m-day	0.7						
				Unskilled	m-day	2						
23.23	2308	PVC copper wiring as per drawings, the type and methods as follows along with varnish paint all complete.										
A		Surface wiring as per drawings using grips, skew, lee stick,link, clips,nails,etc. and connecting to main switch and to relevant light and equipments.					Wire	rm	100			
							Lee stick, pipe	rm	100			
							Grips, Screws, Clamp	Nr	600			
							Clipnail	Nr	250			
I		1.5 mm to 4 mm	100 m	Skilled	m-day	0.5						
				Semi-Skilled	m-day	0.75						
				Unskilled	m-day	1.15						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
II		6 mm to 16 mm square	100 m	Skilled	m-day	0.75						
				Semi-Skilled	m-day	0.3						
				Unskilled	m-day	1.5						
III		25 mm to 35 mm square	100 m	Skilled	m-day	1						
				Semi-Skilled	m-day	1.5						
				Unskilled	m-day	2						
B		Concealed wiring using HDP polythene pipe as per drawing by chiseling grove in ceiling, wall or floor and by supporting by clamp nails etc. with connection to light switch or electrical equipement and finishing with cement mortar mix and paint all complete .					Wire	rm	100			
							Pipe	rm	100			
							Clamp,Nails	As required				
I		1.5 mm to 4 mm	100 m	Skilled	m-day	0.75						
				Semi-Skilled	m-day	1.3						
				Unskilled	m-day	1.2						
II		6 mm to 16 mm square	100 m	Skilled	m-day	1						
				Semi-Skilled	m-day	1.5						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
				Unskilled	m-day	2						
III		25 mm to 35 mm square	100 m	Skilled	m-day	1.5						
				Semi-Skilled	m-day	2						
				Unskilled	m-day	3						
IV		50mm square	100 m	Semi-Skilled	m-day	2.5						
				Unskilled	m-day	3.5						
23.24	2305	Stringing ACSR conductor to poles and fixing necessary accessories like arm, truss, insulator, etc. and connecting it to main electricity supply, all complete etc.					Conductor	km	1			
							Arm truss	lot	1			
							Insulator	lot	4			
							Nutbolt, clamps etc.	As per required				
A		0.03 sq. inch. Weasel ACSR	4x250 m	Skilled	m-day	4.64						
				Unskilled	m-day	22.4						
B		0.05 sq. inch. DOG ACSR	4x250 m	Skilled	m-day	5.6						
				Unskilled	m-day	22.8						
C		0.1 sq. inch. DOG ACSR	4x250 m	Skilled	m-day	5.6						
				Unskilled	m-day	22.8						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.25	2308	**Fixing Electrical Light Switch as per drawing either surface or concealed using box and supplying electricity, all complete.**					Switch Plate Box Nails, screws and grips	Nr. Nr. lot	10 10 40			
A		**1-5 houses surface**	**10 Nos**	Skilled Unskilled	m-day m-day	0.5 1						
B		**6-8 houses surface**	**10 Nos**	Skilled Unskilled	m-day m-day	1 2						
C		**1-5 houses concealed**	**10 Nos**	Skilled Unskilled	m-day m-day	0.5 1						
D		**6-8 houses concealed**	**10 Nos**	Skilled Unskilled	m-day m-day	1 2						
E		**Switch-dimmer surface type**	**10 Nos**	Skilled Unskilled	m-day m-day	0.5 1						
F		**Switch-dimmer concealed type**	**10 Nos**	Skilled Unskilled	m-day m-day	1 2						
		Note: **1. In Case of concealed, 10 nos of grooves shall be made for each concealed case above.**										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
23.26	2312	**Stringing of power cable all complete**										
A		**11 KVA XLPE Cable**	**100m**	Skilled Unskilled	m-day m-day	1 2	XLPE cable Cable Support Accessories Cable Joints/Terminations Insulation Tape	m unit unit roll	100 100 10 10	Cable Pulling Equipment Cable Lifting Gear Conduit Bender (if required)	hr hr hr	8 8 8
B		**ABC Cable (16 to 200 sqmm)**	**100m**	Skilled Unskilled	m-day m-day	1 2	ABC cable Cable Support Accessories Cable Joints/Terminations Insulation Tape	m unit unit roll	100 100 10 10	Cable Pulling Equipment Cable Lifting Gear Conduit Bender (if required)	hr hr hr	8 8 8

SECTION 24: SUSPENSION BRIDGE RELATED WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
24.1	2405	Fabrication										
A		Fabrication of bridge parts										
I		Suspension Bridge	1 kg	Skilled	m-day	0.061						
				Semi-Skilled	m-day	0.085						
				Unskilled	m-day	0.110						
II		Suspended bridge (Drum type)	1 kg	Skilled	m-day	0.052						
				Semi-Skilled	m-day	0.073						
				Unskilled	m-day	0.092						
III		Suspended bridge (Open type)	1 kg	Skilled	m-day	0.055						
				Semi-Skilled	m-day	0.073						
				Unskilled	m-day	0.011						
IV		Truss Bridge	1 kg	Skilled	m-day	0.05						
				Semi-Skilled	m-day	0.07						
				Unskilled	m-day	0.10						
B		Application of various types of paints on exposed surface for protection from rust										
I		Surface Preparation	1 m^2	Skilled	m-day	0.01						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
				Semi-Skilled	m-day	0.15						
II		**Applying first and second coat of paint**	**1 m^2**	Skilled	m-day	0.073						
				Semi-Skilled	m-day	0.1						
				Unskilled	m-day	0.138						
III		**Applying finishing coat of paint**	**1 m^2**	Skilled	m-day	0.085						
				Semi-Skilled	m-day	0.122						
				Unskilled	m-day	0.183						
24.2	2404 2410	**Loading, unloading and preparation works.**	**1 MT**	Supervisor	m-day	1						
				Unskilled	m-day	4						
24.3	2410	**Preparing loads for carrying them up to airport. (For every Flight)**										
A		**Loading works**	**1 MT**	Supervisor	m-day	1.5						
				Unskilled	m-day	7.5						
B		**Unloading works**	**1 MT**	Supervisor	m-day	0.5						
				Unskilled	m-day	3.0						
24.4	2411	**Establishing intermediate store on rent and hiring a watch man. (both per month basis)**	**1 month**	watchman	m-day	30						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
24.5	2411	**Camp estabmishment and bridge repair work**										
A		Establishing camp	1 m^2	Unskilled	m-day	5						
B		Repair Bridge	1 m^2	Unskilled	m-day	3						
24.6	2411	Shifting camp every month during a construction period.	1 month	Supervisor	m-day	30						
				Unskilled	m-day	120						
24.7	2412	**Temporary crossing management works**										
A		By ferry boat	1 month	Unskilled	m-day	60						
B		By constructing temporary bridge	1 m	Skilled	m-day	0.5						
				Unskilled	m-day	4.5						
C		Resonstruction of damaged temporary bridge (if required)	1 m	Unskilled	m-day	3						
D		By cable car	1 m	Unskilled	m-day	60						
24.8	2411	Collection, transportation and washing of sand required for suspension bridge related works										
A		Collection of sand and its transportation during collection	1 m^3	Unskilled	m-day	1.49						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
B		Haulage upto 10m distance	1 m^3	Unskilled	m-day	0.016						
C		Washing of sand	1 m^3	Unskilled	m-day	2						
24.9	2411	Gabion works	As per section 1500									
24.10	2411	Site clearance for suspension bridge construction including bush cutting, felling trees and disposal etc.	1 m^2	Unskilled	m-day	0.06						
24.11	2411	Foundation excavation for suspension bridge related construction works.										
A		In dry and soft soil										
I		Upto 2m deep	1 m^3	Unskilled	m-day	1.15						
II		Upto 4m deep	1 m^3	Unskilled	m-day	1.45						
III		Upto 6m deep	1 m^3	Unskilled	m-day	1.75						
IV		more than 6m deep	1 m^3	Unskilled	m-day	2.10						
B		In dry and hard soil										
I		Upto 2m deep	1 m^3	Unskilled	m-day	1.49						
II		Upto 4m deep	1 m^3	Unskilled	m-day	1.79						
III		Upto 6m deep	1 m^3	Unskilled	m-day	2.09						
IV		more than 6m deep	1 m^3	Unskilled	m-day	2.44						
C		In dry and soft rocks										
I		Upto 2m deep	1 m^3	Unskilled	m-day	2.20						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
II		Upto 4m deep	1 m^3	Unskilled	m-day	2.60						
III		Upto 6m deep	1 m^3	Unskilled	m-day	3.00						
IV		more than 6m deep	1 m^3	Unskilled	m-day	3.45						
D		In dry and hard rocks (Without blasting)										
I		Upto 2m deep	1 m^3	Unskilled	m-day	25.2						
II		Upto 4m deep	1 m^3	Unskilled	m-day	25.6						
III		Upto 6m deep	1 m^3	Unskilled	m-day	26.00						
IV		more than 6m deep	1 m^3	Unskilled	m-day	26.45						
E		In dry and hard rocks (With blasting)										
I		Upto 2m deep	1 m^3	Unskilled	m-day	4.76						
				Blaster	m-day	0.05						
II		Upto 4m deep	1 m^3	Unskilled	m-day	5.16						
				Blaster	m-day	0.05						
III		Upto 6m deep	1 m^3	Unskilled	m-day	5.76						
				Blaster	m-day	0.05						
IV		more than 6m deep	1 m^3	Unskilled	m-day	6.20						
				Blaster	m-day	0.05						
		Remarks:										
		1. Blaster is equivalent to skilled labour										

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
F		**Foundation excavation under shallow water in common soils.**										
I		Upto 2m deep	1 m^3	Unskilled	m-day	2.25						
II		Upto 4m deep	1 m^3	Unskilled	m-day	2.65						
III		Upto 6m deep	1 m^3	Unskilled	m-day	3.05						
IV		more than 6m deep	1 m^3	Unskilled	m-day	3.50						
24.12	2411	Dewatering of foundation using pump for 24 hrs .	1 Pump	Skilled	m-day	0.15						
				Semi-skilled	m-day	0.1						
		Remarks:										
		1) Number of pump used may be more than 1										
24.13	2411 800	RCC Works (1:2:4, 1:1.5:3 etc.)	As per section 800									
24.14	2411 800	Plum concrete works	As per section 800									
24.15	2411	Formwork:										
	900	Making beam and planks form available wood including felling trees cutting out to measured size, converting them to beams and planks by using available means such as axes (etc.)	1 m^3	Skilled	m-day	0.50						
				Semi-Skilled	m-day	30.0						
				Unskilled	m-day	15.0						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
		Remarks: **1. Add 3 % of unskilled labor cost for tools and plants.**										
24.16	2411 900	**Making planks for formwork**	**1 m^2**	Skilled Unskilled	m-day m-day	0.1 0.1						
24.17	2411 1300	**Cement plastering works (cement sand mortar 1:3,1:4)**	**As per section 1300**									
24.18	2405	**Installing anchorage parts, pipe and railing**	**1 MT**	Skilled Unskilled	m-day m-day	4 8						
24.19	2405 2404 2411	**Installing anchorage in rocks including drilling hole in rock and placing anchor in 1:1 cement sand mortar.**										
A		**In soft rock**	**1 m**	Semi-Skilled Unskilled	m-day m-day	0.2 0.16						
B		**In hard rock**	**1 m**	Skilled Unskilled	m-day m-day	0.225 0.225						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
24.20	800 2100	**Placing high density pipe in concrete**	1 m	Unskilled	m-day	0.1						
24.21	2411	**Tower or truss erection works**										
A		**Height of tower < 15m**	1 m	Skilled	m-day	1.5						
				Unskilled	m-day	8.0						
B		**Height of tower 15m to 25m**	1 m	Skilled	m-day	1.75						
				Unskilled	m-day	10.0						
C		**Height of tower > 25m**	1 m	Skilled	m-day	2						
				Unskilled	m-day	14						
24.22	2411 900	**Scaffolding (machan) works**	1 m	Semi-Skilled	m-day	0.5						
				Unskilled	m-day	3.0						
24.23	2412	**Installation of suspender, cross beam, wind bracing flats.**										
A		**In suspension bridge**	1 m	Semi-Skilled	m-day	1.5						
				Unskilled	m-day	2.25						
B		**In suspended bridge**	1 m	Semi-Skilled	m-day	1.1						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
				Unskilled	m-day	1.9						
24.24	2411	**Felling tree and dressing works**										
A		**Making plank and nailing works**	**1 m^3**	Skilled	m-day	0.50						
				Semi-Skilled	m-day	35.0						
				Unskilled	m-day	19.0						
B		**Applying coal tar**	**1 m^3**	Semi-Skilled	m-day	5.1						
C		**Plank rot works**	**1 m^3**	Skilled	m-day	3.3						
				Unskilled	m-day	5.8						
24.25	2409	**Placing wire mesh**	**1 m**	Semi-skilled	m-day	0.1						
				Unskilled	m-day	0.25						
24.26	2404	**Load testing works in suspension bridge and re-tightining clamp, bulldog grip and nut, etc.**	**1 m**	Semi-Skilled	m-day	0.1						
				Unskilled	m-day	0.045						
24.27	2412	**Anti-rust works**										
A		**By applying coal tar**	**1 m**	Semi-Skilled	m-day	0.015						

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.
B		By applying coal tar to non galvanized thread of suspension bridge	1 m	Semi-Skilled	m-day	0.030						
				Unskilled	m-day	0.12						
C		By applying coal tar to non galvanized thread of suspended bridge.	1 m	Semi-Skilled	m-day	0.020						
				Unskilled	m-day	0.07						
24.28	2408 2412	Repainting of steel of constructed bridge										
A		In suspension bridge	1 m^2	Semi-Skilled	m-day	0.250						
				Unskilled	m-day	0.20						
B		In suspended bridge	1 m^2	Semi-Skilled	m-day	0.220						
				Unskilled	m-day	0.19						
24.29	1707	Aforestation works of slope including planting grass, watering and clearing unwanted shrubs.	1 m^2	Semi-Skilled	m-day	0.020						
24.30	2411 2412	Construction of fencing works from grasses, leaves etc.	1 m	Unskilled	m-day	0.1						

SECTION 25: MISCELLANEOUS WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
25.1	2502	Providing and laying precast RCC railing of M 30 Grade, , center to center spacing between vertical post not to exceed 2m, leaving adequate space between vertical post for expansion, complete as per Drawings and Technical specifications. (Post 1.8m high, 60cm below the ground and 1.2m above the ground. section above ground 0.15m*0.15m and below the ground 0.35m*0.35m, RCC railing section 0.1m*0.15m, 2 rows each of 48m length) Remarks: 1) Add 5 per cent of cost of concrete for form work 2) Cost of materials for M30 PCC (4.09 cu.m) as per section 800 item no. 8.2 E shall be considered. 3) Grade of concrete may be changed based on the use of RCC railing works	48 m	Skilled Unskilled	m-day m-day	8 40	M30 cement concrete Reinforcement steel bar	cum MT	4.09 0.87			
25.2	2503	Providing and laying weep holes with dry graded stone filter material of 20mm to 40mm size in abutment and wing walls as per Drawing and Technical Specifications all complete. (Weep hole size = 0.15m*0.15m)	10 No	Unskilled	m-day	0.25	Stone Gravel Filter Geotextile	Cum sqm	1.13 1.76			
25.3	2504	Providing, Cutting, Welding, Fitting, painting and Fixing in Position Mild Steel Trash Rack in Canal Siphon, Drainage Siphon,etc as per design, drawing and specification all complete.	1 MT	Foreman Welder Unskilled	m-day m-day m-day	5 15 25	Mild Steel (Angles, Bars, etc) Oiling and Painting Miscellaneous (Welding, etc)	MT 2 % of cost of Steel 5% of Cost of Steel	1.025			

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
25.4	2504	**Providing, Cutting, Welding, Fitting, painting and Fixing in Position Mild Steel Trash Rack in Dam and Allied Works as per design, drawing and specification all complete.**	**1 MT**	Fabrication	40% of cost of Steel		Mild Steel (Beams, Angles,Flats,Plate etc)	MT	1.025			
				Staightening , Black smithy and Handling	15% of cost of steel		Acetylene	Cu.m	3.8			
							Oxygen	Cu.m	16			
							MS Electrodes	No	330			
							Oiling and Painting	2 % of cost of Steel				
		Remarks: **1. Add 10% of Cost of Steel for local transportation and positioning of Trash Rack at Site** **2. Add 15 % of cost of Steel for Erection of embedded parts and Trash Rack**										
25.5	2505	**Providing, Fixing and Fitting Rubber seal (Water Stop) of approved quality for construction and extension joints as per drawing and specification all complete**	**10m**	Labour for Overlapping and Vulcanising	10% of Material Cost		Rubber Seal	m	11			
25.6	2506	**Providing and Fixing in position 25mm thick Bituminous Board (Shalitex or Equivalent) in construction and extension joints in Dam and Its allied works as per drawing and specification all complete**	**9.3m²**	Skilled	m-day	0.25	Bituminastic Borad	m^2	10.2			
				Unskilled	m-day	0.25	Shalitex	kg				
							Primer		2.25			
25.7	2507	**Providing and Driving Steel Sheet Pile on specified alignment including Painting (2 coats of Anti corrosive Bitumen Paint) as per specification all complete**	**1MT**	Unskilled	m-day	2	Sheet Pile	MT	1.1	Sheet Pile Driving Plant	hr	2.30
							Paint	kg	12.31			

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
		(Assuming ISPS 1625U Section Pile Having weight 65.4kg per metre is driven 6.7m per hour)										
		Remarks:										
		1. Add 1.5% of Machine Cost for shifting of Piles at the place ready for driving.										
		2. Add 0.5% of Machine Cost for erecting pile machine and dismantling.										
		3. Add 0.5% of Machine Cost for depriciation of driving accessories(Track and Wooden sleeper, Fish plates , Bolts, Dug Spikes, Rails,etc).										
		4. Add 8% of Machine cost for Welding of Pipe.										
		5. Add 2% of Machine Cost for Cutting Piles										
		6. Add 0.5% of Machine Cost for Driving Holes										
		7. Add 2% of Machine Cost for Local carriage of Sheet Piles										
		8. Cost of 1m can be calculated by dividing the cost per MT by 15.29m as 1m of pile weighs 65.37kg										
		9. Similarly, the cost of 1m of other setion of sheet pile can be calculated accordingly with due consideration of its weight per metre.										
25.8	2508	Micropiling Works										
A		Bore with shell and auger or by percussion method in all soils other than rock to a designed depth below ground level all complete as per drawing and technical specification.	5m	Skilled	m-day	1	Water	KL	1	Auger/percussion drilling set	hr	8
				Unskilled	m-day	6						
B		Cement Grouting Works	1 m^3	Skilled	m-day	0.0625	Cement	ton	1	Grouting Pump	hr	0.5
				Unskilled	m-day	0.3125	Water	KL	0.35			
							Admixtures	Kg	12.5	Pump hoses and Pipes	3% of Cost of Material	
		Remarks:										
		1. Calculate the cost of designed micropile of required diameter and depth based on the above norms A and B.										
		2. Add cost of Steel Reinforcement as per design requirement.										
		3. Materials calculation is based on water cement ratio of 0.5 by volume. For other water cement ratio, materials shall be calculated accordingly.										