



Government of Nepal

Ministry of Energy, Water Resources and Irrigation

Department of Water Resources and Irrigation

RATE ANALYSIS NORMS FOR WORKS



2081

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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.

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NORMS FOR RATE ANALYSIS

SECTION 1: GENERAL

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
1.1	111	Providing and establishing 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. <i>As per Site Condition</i>	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						



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
1.4	111, 105	Relocation of services /minor infrastructures, 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						



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material			Machinery	
				Class	Unit	Quantity	Type	Unit	Type	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							



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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							Machinery	
				Labour		Construction Material		Type		Unit		Quantity
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	
1.11	114	Insurance a) Insurance of Works, Plants and Materials b) Insurance of equipments and machines c) Insurance of Workers and Staffs d) Third Party Insurance	PS PS PS PS									

Remarks: Insurance items shall be estimated as per the Guidelines of National Insurance authority, Nepal



NORMS FOR RATE ANALYSIS

SECTION 2: SITE PREPARATION

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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			



SECTION 2: SITE PREPARATION

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						Machinery	
				Labour		Construction Material		Type	Unit	Quantity	Quantity
				Class	Unit	Quantity	Type				
2.3	201	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					
		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)									
		By Mechanical Means									
2.4	201	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	
		Clearing and grubbing land including uprooting rank vegetation, 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 thickness.									

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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Quantity
A	I II	In area of light jungle (upto 15 number per 100 sqm) By Manual Means By Using Mechanical Means	1 ha 1 ha	Unskilled	M-day	200.00				Dozer	12
				Unskilled	M-day	6.00					
B	I II	In area of thorny/dense jungle (more than 15 number per 100 sqm) By Manual Means By Using Mechanical Means	1 ha 1 ha	Unskilled	M-day	300.00				Dozer	12
				Unskilled	M-day	9.00					
2.5	I II	Felling and uprooting of bamboo, clearing the area including stacking of bamboo and disposal of wastes. (Volume of excavated ditch to be measured) By Manual Means By Using Mechanical Means	100 m ³ 100 m ³	Unskilled	M-day	200.00				Excavator	6
				Unskilled	M-day	20.00					
2.6	I II	Stripping of top soil (beyond jungle area) for a minimum depth of 15 cm including disposal upto 15m outside the periphery of the area. By Manual Means By Using Mechanical Means	100 m ² 1000 m ²	Unskilled	M-day	12.00				Dozer	12
				Unskilled	M-day	2.00					



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श्रम विभाग
सिंहदरवार, काठमाडौं

SECTION 2: SITE PREPARATION

NORMS FOR RATE ANALYSIS

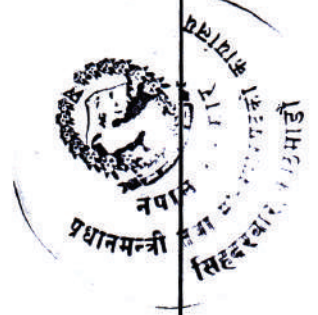
S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
2.7	201	Cutting, uprooting and disposal of grasses with light compaction, levelling and clearing the site.	100 m ²	Unskilled	M-day	2.30			
2.8	201	Surface dressing works including filling depressions, cutting humps and ground levelling (service roads etc.)	100 m ²	Unskilled	M-day	1.00			
2.9	201	Spreading top soils at the required slope	100 m ³	Unskilled	M-day	4.00			
2.10	201	Spreading top soils in slope including dressing, levelling and light compaction.	100 m ²	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, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1km.							
(i)		Lime concrete / Cement concrete							
A		Lime concrete / cement concrete M-10 and below							

SECTION 2: SITE PREPARATION



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						Machinery		
				Labour		Construction Material		Type		Unit	Quantity	Quantity
				Class	Unit	Quantity	Type	Type	Type			
I		By Manual Means	20 m ³	Skilled	M-day	1.00			Tractor-trolley	hr	6	6
B		Cement concrete M-15 and M-20	20 m ³	Unskilled	M-day	24.00			Tractor-trolley	hr	6	6
I		By Manual Means	10 m ³	Skilled	M-day	1.00			Air-compressor	hr	6	6
II		By Mechanical Means	10 m ³	Unskilled	M-day	6.00			Drilling Machine with bit and accessories	hr	6	6
									Tractor-trolley	hr	6	6
C		Prestressed/RCC grade M-20 and above	10 m ³	Technician	M-day	1.00			Tractor-trolley	hr	6	6
I		By Manual Means	10 m ³	Skilled	M-day	3.00						
II		By Mechanical Means	10 m ³	Unskilled	M-day	30.00			Air-compressor	hr	6	6
				Skilled	M-day	2.00			Drilling Machine with bit and accessories	hr	6	6
				Unskilled	M-day	10.00			Tractor-trolley	hr	6	6



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						Machinery	
				Labour		Construction Material		Type	Unit	Quantity	Quantity
				Class	Unit	Quantity	Type				
(ii)		Brick/Tile Works									
A		In lime mortar	20 m ³	Skilled Unskilled	M-day M-day	1.00 12.00		Tractor-trolley	hr	6	
B		In cement mortar	10 m ³	Skilled Unskilled	M-day M-day	1.00 10.00		Tractor-trolley	hr	6	
C		In mud mortar	20 m ³	Skilled Unskilled	M-day M-day	1.00 10.00		Tractor-trolley	hr	6	
D		Dry-brick pitching/ soling	20 m ³	Skilled Unskilled	M-day M-day	1.00 12.00		Tractor-trolley	hr	6	
(iii)		Stone masonry									
A		Rubble stone masonry in lime mortar	20 m ³	Skilled Unskilled	M-day M-day	1.00 15.00		Tractor-trolley	hr	6	
B		Rubble stone masonry in cement mortar	10 m ³	Skilled Unskilled	M-day M-day	1.00 10.00		Tractor-trolley	hr	6	
C		Rubble stone masonry in mud mortar	20 m ³	Skilled Unskilled	M-day M-day	1.00 12.00		Tractor-trolley	hr	6	
D		Dry rubble masonry	20 m ³	Skilled Unskilled	M-day M-day	1.00 10.00		Tractor-trolley	hr	6	



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						Machinery		
				Labour		Construction Material				Type	Unit	Quantity
				Class	Unit	Quantity	Type	Unit	Quantity			
E		Stone pitching/dry stone spalls	20 m ³	Skilled	M-day	1.00				Tractor-trolley	hr	6
F		Boulders laid in wire crates including opening of crates and stacking dismantled materials.	20 m ³	Unskilled	M-day	8.00				Tractor-trolley	hr	6
(iv)		Removing all types of hume pipes and stacking within a lead of 50m including earthwork and dismantling of masonry works		Skilled	M-day	1.00						
A		Upto 60cm dia.	10m	Unskilled	M-day	15.00						
B		Above 60cm to 90 cm dia.	10m	Skilled	M-day	1.00						
C		Above 90 cm dia.	10m	Unskilled	M-day	5.00						
(v)		Dismantling of barbed wire fencing/wire mesh fencing including posts, foundation concrete, back filling of pit by manual means including disposal of dismantled material with all lift and up to a lead of 1km, stacking serviceable material and unserviceable material separately.	100m	Skilled	M-day	1.00						
				Unskilled	M-day	8.00						
				Skilled	M-day	1.00						
				Unskilled	M-day	12.00						
				Skilled	M-day	2.00				Tractor-trolley	hr	6
				Unskilled	M-day	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
(vi)		Removal of telephone/electric poles and lines including excavation and dismantling of foundation concrete 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			
		Remarks: Skilled labour means electrician/lineman.							
							Tractor-tralley	hr	6



NORMS FOR RATE ANALYSIS

SECTION 3 - EARTHWORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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.							
		In soft clay and silty soil	1 m ³	Unskilled	m-day	0.70			
		Manual Means Remarks: Add 3% of Unskilled labour cost for machinery tools Using Mechanical Aids							
A	I								
			360 m ³	Skilled	m-day	1.00			
				Unskilled	m-day	3.00	Hydraulic excavator	hr	6
B	I	In hard clay and soil mixed with soft moorum, GBM soil (stones upto 30 cm).	1 m ³	Unskilled	m-day	0.80			
		Manual Means Remarks: Add 3% of Unskilled labour cost for machinery tools							
II		Using Mechanical Aids	360 m ³	Skilled	m-day	1.00			
				Unskilled	m-day	3.00	Hydraulic excavator	hr	6
C	I	In ordinary / medium rock without blasting	1 m ³	Unskilled	m-day	3.00			
		Manual Means Remarks: Add 3% of Unskilled labour cost for machinery tools							
II		Using Mechanical Aids	120 m ³	Skilled	m-day	1.00			
				Unskilled	m-day	3.00	Hydraulic excavator	hr	6



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
D		In ordinary / medium rock with drilling and blasting	1 m ³	Blaster	m-day	0.50	Gelatin	Kg	0.18			
I		Manual Means		Unskilled	m-day	2.00	Detonator	Nr.	2.00			
							Fuse wire	m	2.00			
		Remarks: Add 3% of Unskilled labour cost for machinery 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	1 m ³	Unskilled	m-day	5.00						
a		Without chiselling										
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 machinery tools										
II		Using Mechanical Aids	16 m ³	Skilled	m-day	1.00				Hydraulic excavator with	hr	6
				Unskilled	m-day	10.00				rock breaker attached		



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Qty	Unit
				Class	Unit	Qty	Type	Unit	Type		
F I		In hard rock with drilling and blasting Manual Means	1 m ³	Blaster Unskilled	m-day m-day	0.20 1.00	Gelatin Detonator Fuse wire	Kg Nr. m			
		Remarks: Add 3% of Unskilled labour cost for machinery tools									
II		Using Mechanical Aids	90 m ³	Skilled Unskilled Driller Blaster	m-day m-day m-day m-day	1.00 20.00 3.00 1.00	Gelatin Detonator Fuse wire	Kg Nr. m	Jack hammer / rock drill Air compressor Dozer	30 12 6	hr
		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 m ³ 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.									



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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
I		Using Mechanical Aids	300 m ³	Skilled	m-day	1.00				Hydraulic	hr
				Unskilled	m-day	4.00				Excavator	hr
										Tipper	hr
		<u>Remarks:</u>									
		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
				Unskilled	m-day	4.00				Tipper	hr
		<u>Remarks:</u> Incorporate additional 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					



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
3.5	I	Breaking of boulders by drilling, blasting and disposal (upto 10 m lead and 1.5 m lift) as per Drawing and Specifications.	1 m ³	Skilled UnSkilled	m-day m-day	0.05 3.35	Geltain Detonator Fuse wire	Kg Nr. m	0.15 1.00 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 UnSkilled	m-day m-day	1.00 8.00					
(ii)		Depth 3 m to 6 m	10 m ³	Skilled UnSkilled	m-day m-day	1.00 12.00					
(iii)		Depth above 6 m	10 m ³	Skilled UnSkilled	m-day m-day	2.00 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.									



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					
		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	(i)	Using Mechanical Aids 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		

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Qty	Type	Unit	Qty	Type	Unit	Qty
Remarks:											
B I (i)		Ordinary Rock (Not Requiring Blasting) Manual Means Depth upto 3 m	10 m ³	Skilled	m-day	1.00					
				UnSkilled	m-day	10.00					
				Remarks:							
II (i)		Using Mechanical Aids Depth upto 3 m	90 m ³	Skilled	m-day	1.00			Hydraulic Excavator	hr	6
				UnSkilled	m-day	3.00					
				Remarks:							
C I (i)		Hard Rock (Requiring Blasting) Manual Means Depth upto 3 m	10 m ³	Skilled Driller	m-day	1.00			Gelatin Detonator	Kg Nr.	3.50 14.00
					m-day	0.50			Air Compressor	hr	1.00
				Remarks:							

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Qty	Unit
				Class	Unit	Qty	Type	Unit	Type		
D I (i)				Blaster	m-day	0.25	Fuse wire	m	Jack hammer /	hr	3.00
				UnSkilled	m-day	12.00			Rock drill		
		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.									
		Hard Rock (Blasting prohibited) Using Mechanical Aids Depth upto 3 m	10 m ³	Skilled	m-day	1.00			Air Compressor	hr	3.00
				UnSkilled	m-day	10.00			Jack hammer /	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 conditions. 2. In case of rock, foundation beyond 3 m is not dug and hence not included.							Rock drill		
E I (i)		Marshy Soil Manual Means Depth upto 3 m	10 m ³	Skilled	m-day	1.00			Tractor-trolley for	hr	6.00
				UnSkilled	m-day	15.00			removal		
		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.									

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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Qty	Type	Unit	Qty
II		Using Mechanical Aids		Skilled	m-day	0.08			
(i)		Depth upto 3 m	10 m ³	UnSkilled	m-day	4.00		Hydraulic Excavator	0.30
								Tipper	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 disposal 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 disposal 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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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Qty	Unit
				Class	Unit	Qty	Type	Unit	Type		
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 machinery 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	
		Remarks:									
		1. Cost of earthwork excavation shall be added only in the case of available excavated earth is not sufficient for backfilling.									2.5
		2) Add 3% of unskilled labour cost for machinery tools for item 3.9 (I).									



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Qty	Construction Material		Machinery	
				Class	Unit		Type	Unit	Type	Unit
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	10 m ³	Skilled	m-day	0.20	Granular material	cum	Plate compactor / hr	2.50
				UnSkilled	m-day	5.00	Water	KL	power rammer	
A		Granular Material (Compaction by Plate compactor /Power Rammer)	10 m ³	Skilled	m-day	0.20	Sandy material	cum	Plate compactor / hr	2.50
				UnSkilled	m-day	5.00	Water	KL	power rammer	
B		Sandy Material (Compaction by Plate compactor /Power Rammer)	10 m ³	Skilled	m-day	0.20	Locally available material	cum		
				UnSkilled	m-day	5.00	Water	KL		
C		Locally available Material (Compaction by tamping rod)	10 m ³	Skilled	m-day	0.20				
				UnSkilled	m-day	5.00				
D		Locally available Material (Compaction by tamping rod without watering)	10 m ³	Skilled	m-day	0.20				
				UnSkilled	m-day	4.00				
		Remarks: Add 3% of labour cost for machinery tools for compaction by tamping rod.								



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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Qty	Unit
				Class	Unit	Qty	Type	Unit	Type		
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 machinery tools.											
3.12	309,310	<u>Embankment (Bank) Construction:</u> 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 (i)		Manual Means With Sprinkling water, using hand rammer	100 m ³	Skilled UnSkilled	m-day m-day	2.00 50.00	Water	KL		10.00	
Remarks: Add 3% of unskilled labour cost for machinery tools.											
(ii)		Without Sprinkling water, using hand rammer	100 m ³	Skilled UnSkilled	m-day m-day	1 25					
Remarks: Add 3% of unskilled labour cost for machinery tools.											



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
(iii)		With Sprinkling water, using vibratory roller	100 m ³	Skilled	m-day	2.00	Water	KL	24.00	Vibratory Roller	hr	6.00
		Using Mechanical Aids		UnSkilled	m-day	50.00						
		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).										
		Manual Means	300 m ³	Skilled	m-day	3.00	Water	KL	72.00			
				UnSkilled	m-day	150.00						
I		Remarks:										
		1) Add 3% of unskilled labour cost for machinery 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.										

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S.N.	Ref. to SS.	Description of work	Unit	Resources															
				Labour		Construction Material				Machinery									
				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 UnSkilled	m-day m-day	1.00 4.00	Water		KL	72.00	Hydraulic excavator	hr	6.00						
											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 compacting as per Drawing and Specifications all complete. (upto 50 m lead)																	
I		Using Mechanical Aids	300 m ³	Skilled UnSkilled	m-day m-day	1.00 4.00					Hydraulic excavator	hr	6.00						



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Qty	Type	Unit	Type	Qty
		Remarks: 1. If lead is more than 50m, cost of transportation of material by tipper shall be added as required.							Vibratory Roller	3.45
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 (i)		Manual Means Up to 1.5 m lift and 10 m lead	10 m3	Skilled	m-day	0.10				
		Remarks: Add 3% of unskilled labour cost for machinery tools.		Unskilled	m-day	3.60				
(ii)		Up to 1.5 m lift and 30 m lead	10 m3	Skilled	m-day	0.1				
		Remarks: Add 3% of unskilled labour cost for machinery tools.		Unskilled	m-day	5				
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		Machinery	
				Class	Unit	Qty	Type	Unit	Qty
I (i)		Manual Means Up to 1.5 m lift and 30 m lead Remarks: Add 3% of unskilled labour cost for machinery tools.	10 m3	Skilled Unskilled	m-day m-day	0.3 5			
3.17	318	Landslides clearance (including trimming and maintaining uniform slope) in various types of soils as per Drawing and Specifications.							
I (i)		Manual Means Ordinary soils Remarks: Add 3% of unskilled labour cost for machinery tools.	10 m3	Unskilled	m-day	4.20			
(ii)		Gravel and boulder mix soils Remarks: Add 3% of unskilled labour cost for machinery tools.	10 m3	Unskilled	m-day	5.30			
(iii)		Soft rocks Remarks: Add 3% of unskilled labour cost for machinery tools.	10 m3	Unskilled	m-day	8.80			
(iv)		Hard rocks Remarks: Add 4% of unskilled labour cost for machinery tools.	10 m3	Unskilled	m-day	11.00			



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

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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 A i ii	400	Collection, screening / sieving and providing sand (haulage dis. 10m).	1 m ³	Unskilled	m-day	4.5														
		Quarry output /Source capacity < 30% Manual Means																		
		Mechanical means												Unskilled	m-day	16	Excavator	hr	1.4	
B i ii		Remarks: Add 3% of labour cost for machinery tools in items i & ii.	1 m ³	Unskilled	m-day	3.25														
		Source capacity 31% - 50% Manual Means																		
		Mechanical means												Unskilled	m-day	11	Excavator	hr	1.4	
C i ii		Remarks: Add 3% of labour cost for machinery tools in items i & ii.	1 m ³	Unskilled	m-day	2.50														
		Source capacity 51% - 65% Manual Means																		
		Mechanical means												Unskilled	m-day	7	Excavator	hr	1.4	
		Remarks: Add 3% of labour cost for machinery tools in items i & ii.																		



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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 i ii		Source capacity >65% Manual Means	1 m ³	Unskilled	m-day	1.25						
		Mechanical means	15 m ³	Unskilled	m-day	2				Excavator	hr	1.4
Remarks: Add 3% of labour cost for machinery tools in items i & ii.												
E i ii		In hilly area (excavting slides in slopes) Manual Means	1 m ³	Unskilled	m-day	1.50						
		Mechanical means	15 m ³	Unskilled	m-day	3				Excavator	hr	1.4
Remarks: Add 3% of labour cost for machinery tools in items i & ii.												
F i ii		In Local Rivers Manual Means	1 m ³	Unskilled	m-day	1.5						
		Mechanical means	15 m ³	Unskilled	m-day	3				Excavator	hr	1.4
Remarks: Add 3% of labour cost for machinery tools in items i & ii.												
4.2 A i ii	400	Collection, screening /seiving and providing of gravel (haulage dis. 10m). 5mm-70mm Manual Means	1 m ³	Unskilled	m-day	2.00						
		Mechanical means	15 m ³	Unskilled	m-day	5				Excavator	hr	1.54

SECTION 4: COLLECTION AND PROVIDING OF MATERIALS



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

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
ii		Mechanical means Remarks: Add 3% of labour cost for machinery tools in items i & ii.	15 m ³	Unskilled	m-day	14			
F		70mm-100mm " Manual Means	1 m ³	Unskilled	m-day	3.0			
i		Mechanical means	15 m ³	Unskilled	m-day	9			
ii		Remarks: Add 3% of labour cost for machinery tools in items i & ii.							
4.3	400	Collection of rubble stone of required size including stacking (haulage dist.10m) Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	1.40			
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 machinery tools.							
B		Rubble stones Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	0.5			
4.5	400	Manually breaking stones (excluding collection of rubble)							



2.8 60.4

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Unit
				Class	Unit	Quantity	Type	Unit	Quantity		
A		70mm-100mm Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	1.5					
B		40mm-70mm Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	2					
C		20mm-40mm Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	3.0					
D		10mm-20mm Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	4.0					
E		5mm-10mm Remarks: Add 3% of labour cost for machinery tools.	1 m ³	Unskilled	m-day	6.0					
4.6	400	<u>Mechanically crushing stone aggregates</u> 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 Unskilled	m-day m-day	2.0 18.0	Stone / boulder	cum.	800.0	Crusher Loader	hr hr

SECTION 4: COLLECTION AND PROVIDING OF MATERIALS



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S.N.	Ref. to SS.	Description of work	Unit	Labour			Resources			Machinery		
				Class	Unit	Quantity	Construction Material		Type	Unit	Quantity	
							Type	Unit				
B		20 mm nominal size	670m ³	Skilled Unskilled	m-day m-day	2.0 18.0	Stone / boulder	cum.	800.0	Tipper	hr	18.0
C		40 mm nominal size	750m ³	Skilled Unskilled	m-day m-day	2.0 17.0	Stone / boulder	cum.	800.0	Crusher Loader	hr	18.0
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 Unskilled	m-day m-day	0.1 2.5	Gelatin D-nator F-wire	Kg nos. m	0.25 2.00 2.00	Crusher Loader Tipper	hr	6.0 20.0 20.0
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 Unskilled	m-day m-day	0.1 4.0						
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 Unskilled	m-day m-day	0.1 4.5	Gelatin D-nator F-wire	Kg nos. m	0.25 2.00 2.00			

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Type	Unit	Type	Unit		
4.10	400	Remarks: Add 3% of labour cost for machinery tools and traffic control signs. 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	
4.11	400	Remarks: Add 3% of labour cost for machinery tools and traffic control signs. 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	
4.12	400	Remarks: Add 3% of labour cost for machinery tools and traffic control signs. 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	
4.13	400	Remarks: Add 3% of labour cost for machinery tools and traffic control signs. 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	

प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय
नेपाल सरकार
सिंहदरवार, काठमाडौं

NORMS FOR RATE ANALYSIS

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



RATE ANALYSIS NORMS

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 = $1.25 \times$ 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

$$= \frac{\text{Distance/Speed of loaded truck} + \text{Distance/Speed of Unloaded truck} + \text{Loading and Unloading time}}{\text{hrs}}$$

$$= \frac{(D/S_1 + D/S_2 + 0.75)}{\text{hrs}}$$

Table 1:

Distance - D	Full time taken by Truck per Trip-T hours					
	10 kmph	15 kmph	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



RATE ANALYSIS NORMS

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	Above 5km /km		Truck Idle hr.	
1		3	4												
1	Dug Soil	1450	20	4.14 m³	5 m³	6.62 m²	9.93 m³	0.21	0.254	0.298	0.344	0.044	0.221	15	Number of bricks per cubic meter = 500
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	0.043	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	0.046	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	0.043	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	0.046	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	0.046	0.232		
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	0.046	0.232		
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	0.046	0.232		
9	Dug Stone	2400	50	3.13 m³	3.76 m³	5 m³	7.5 m³	0.221	0.267	0.313	0.37	0.046	0.232		
10	Brick	1600	30	2000 Nr	2400 Nr	3200 Nr	4800 Nr	0.221	0.267	0.313	0.37	0.046	0.232		
12	Cement, Steel			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
13	Brumen			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
14	Stone Block			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
15	GI CI Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
16	CC Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
17	HDPPE Pipe			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
18	Lime, wood			5 MT	6 MT	8 MT	12 MT	0.221	0.267	0.313	0.37	0.046	0.232		
								0.168	0.203	0.238	0.274	0.036	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 table 2. For example, assume a quantity to be transported is Q, then for a determined distance and given speed of truck read out the time required per trip from 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 transportation 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 charge 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/Mountain	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
- $$= \frac{\text{Distance/Speed of loaded Tractor} + \text{Distance/Speed of Unloaded Tractor} + \text{Loading and Unloading time}}{(D/S_1 + D/S_2 + 0.75) \text{ hrs}}$$

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



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RATE ANALYSIS NORMS

Table 2:

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

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 transported is Q, then for a determined distance and given speed of tractor read out the time required per trip from 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 transportation 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 charge 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



RATE ANALYSIS NORMS

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
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 m ³	Unskilled	m-day	0.4					
II		For every additional	1 m ³	Unskilled	m-day	0.12					
B		Pebble, gravel and aggregates									
I		First 10m haulage	1 m ³	Unskilled	m-day	0.3					
II		For every additional	1 m ³	Unskilled	m-day	0.13					
C		Rubble, block stone, dressed stone and bricks									
I		First 10m haulage	1 m ³	Unskilled	m-day	1.1					
II		For every additional	1 m ³	Unskilled	m-day	0.19					
D		Planks, logs and timber									
I		First 10m haulage	1 m ³	Unskilled	m-day	0.5					
II		For every additional	1 m ³	Unskilled	m-day	0.08					
E		Cement and lime									
I		First 10m haulage	1 m ³	Unskilled	m-day	0.5					
II		For every additional	1 m ³	Unskilled	m-day	0.13					
F		Boring tools, paint, grill, oil, iron and crippled trucks									
I		First 10m haulage	1 m ³	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	Type	Qty.
II		For every additional 10m.	1 m ³	Unskilled	m-day	0.13				
G		Iron rods required for main beam, bridge deck slab etc.								
I		First 10m haulage	1 m ³	Unskilled	m-day	1.11				
II		For every additional 10m.	1 m ³	Unskilled	m-day	0.364				
H		Water								
I		First 10m haulage	1 m ³	Unskilled	m-day	2				
II		For every additional	1 m ³	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 m ³	Unskilled	m-day	0.2				
II		For every additional	1 m ³	Unskilled	m-day	0.13				
B		Pebble, gravel and aggregates								
I		First 10m haulage	1 m ³	Unskilled	m-day	0.5				
II		For every additional	1 m ³	Unskilled	m-day	0.1				
C		Rubble, block stone, dressed stone and bricks								
I		First 10m haulage and piling	1 m ³	Unskilled	m-day	0.67				
II		For every additional 10m.	1 m ³	Unskilled	m-day	0.143				



2.50.4

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	
5.3.3	500	Note: 1) Add 3% of labour cost for tools and plants.								
		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/m ³ 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					



2.500.00

RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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	1 m ³	Unskilled	m-day	40			
A		Collection, screening and haulage of river sand	1 m ³	Unskilled	m-day	60			
B		Collection and haulage of broken stone or river bed stone	1 m ³	Unskilled	m-day	80			
C		Collection, screening and haulage of stone aggregates	1 m ³	Unskilled	m-day	120			
D		Breaking and haulage of 13mm to 19mm aggregates	1 m ³	Unskilled	m-day	20			
5.3.5	500	Haulage of river sand and pebbles all complete upto 5 km distance	1 m ³	Unskilled	m-day	40			
A		Above 5km distance	1 m ³	Unskilled	m-day				
5.3.6	500	Hauling pipe by labour (assuming 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.
x		Tenth day							
xi		Eleventh day							
xii		Twelfth day							
xiii		Thirteenth day							
xiv		Fourteenth day							
xv		Fifteenth day							
5.4	500	Hauling by mules (assuming 72 kg haulage upto 13 km per day)	1 m ³	Mules	nr	20			
5.5	500	Loading of RCC hume pipes (each pipe of 2.5m length) including lead upto 30m all complete.							
A	I	900mm/1000mm/1200mm dia. pipe By Mechanical Means	15m	Skilled Unskilled	m-day m-day	0.5 2	Tipper Truck Crane (3T)	hr hr	1 1
II		By Manual Means	15m	Skilled Unskilled	m-day m-day	0.3 3	Tipper Truck Tools and Plants Wooden Slippers	hr 3% of Labour Cost hr	4 3% of Labour Cost 4
B	I	600mm/750mm dia. pipe By Mechanical Means	25m	Skilled Unskilled	m-day m-day	0.5 2	Tipper Truck Crane (3T)	hr hr	1 1
II		By Manual Means	25m	Skilled Unskilled	m-day m-day	0.3 4	Tipper Truck Tools and Plants	hr 3% of Labour Cost	4 3% of Labour Cost



RATE ANALYSIS NORMS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Qty.	
				Class	Unit	Qty.	Type	Unit	Type		
C	I	300mm/450mm dia. pipe By Mechanical Means	37.5m	Skilled	m-day	0.5			Wooden Slippers	hr	4
	II	By Manual Means	37.5m	Unskilled	m-day	2			Tipper Truck Crane (3T)	hr	1
				Skilled	m-day	0.3			Tipper Truck	hr	1
5.6		Unloading of RCC hume pipes (each pipe of 2.5m length) including lead upto 30m all complete.		Unskilled	m-day	5			Tools and Plants	3% of Labour Cost	4
A	I	900mm/1000mm/1200mm dia. pipe By Mechanical Means	15m	Skilled	m-day	0.1			Wooden Slippers	hr	4
	II	By Manual Means	15m	Unskilled	m-day	1			Tipper Truck Crane (3T)	hr	0.5
				Skilled	m-day	0.3			Tipper Truck	hr	0.5
B	I	600mm/750mm dia. pipe By Mechanical Means	25m	Unskilled	m-day	1.5			Tools and Plants	3% of Labour Cost	3
	II	By Manual Means	25m	Skilled	m-day	0.5			Wooden Slippers	hr	3
				Unskilled	m-day	1			Tipper Truck Crane (3T)	hr	0.5
C	I	300mm/450mm dia. pipe By Mechanical Means	37.5m	Skilled	m-day	0.3			Tipper Truck	hr	0.5
	II	By Manual Means	37.5m	Unskilled	m-day	1.5			Tools and Plants	3% of Labour Cost	3
				Skilled	m-day	0.1			Wooden Slippers	hr	3
				Unskilled	m-day	1			Tipper Truck	hr	0.5
				Skilled	m-day	0.3			Crane (3T)	hr	0.5
				Unskilled	m-day	0.3			Tipper Truck	hr	3
				Skilled	m-day	0.1			Tools and Plants	3% of Labour Cost	3
				Unskilled	m-day	1			Wooden Slippers	hr	3
				Skilled	m-day	0.3			Tipper Truck	hr	0.5
				Unskilled	m-day	0.3			Crane (3T)	hr	0.5
				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	Type	Qty.
				Unskilled	m-day	1.5			Tools and Plants Wooden Slippers	3% of Labour Cost hr 3
		<u>Note:</u> 1. Wooden Slipper shall be 3 in numbers of size 250mm * 250mm * 125mm 2. Hire Charge of Wooden Slipper shall be as per market reasonable hire charge.								



NORMS FOR RATE ANALYSIS

SECTION 6: BRICKWORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Quantity
6.1	600	Brick masonry works including supplying of materials and making mortar as per drawing and specifications, haulage upto 30m.	1 m ³	Skilled Unskilled	m-day m-day	1.5 2.2	Bricks cement sand Water	Nr M.t. cu.m. KL	530 0.13 0.27 0.065		
A I		Machine made bricks 1:3 cement sand mortar									
II		1:4 cement sand mortar	1 m ³	Skilled Unskilled	m-day m-day	1.5 2.2	Bricks cement sand Water	Nr M.t. cu.m. KL	530 0.1 0.27 0.05		
III		1:5 cement sand mortar	1 m ³	Skilled Unskilled	m-day m-day	1.5 2.2	Bricks cement sand Water	Nr M.t. cu.m. KL	530 0.09 0.31 0.045		
IV		1:6 cement sand mortar	1 m ³	Skilled Unskilled	m-day m-day	1.5 2.2	Bricks cement sand Water	Nr M.t. cu.m. KL	530 0.07 0.3 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	Quantity
B I		Chimney (Bhatta) bricks 1:3 cement sand mortar	1 m ³	Skilled	m-day	1.5	Bricks	Nr	560		
				Unskilled	m-day	2.2	cement sand	M.t.	0.13		
II		1:4 cement sand mortar	1 m ³				Water	cu.m.	0.27		
								KL	0.065		
III		1:6 cement sand mortar	1 m ³	Skilled	m-day	1.5	Bricks	Nr	560		
				Unskilled	m-day	2.2	cement sand	M.t.	0.1		
IV		1:1:1 Lime surkhi sand mortar	1 m ³				Water	cu.m.	0.28		
								KL	0.05		
V		1:2 Lime surkhi mortar	1 m ³	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		
				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		
				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		
				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		



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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
VI		Mud mortar	1m ³	Skilled Unskilled	m-day m-day	1 1.7	Water Bricks Soils Water	KL Nr cu.m. KL	0.07 560 0.42 0.273		
6.2	600	Additional requirement (labour and support materials) for making support for brickwork in cement mortar									
A		For ground floor	1m ³	Unskilled	m-day	0.2	Planks, bamboo, ropes, nails, etc.		3% of labour cost		
B		For each additional storey	1m ³	Unskilled	m-day	0.7	Planks, bamboo, ropes, nails, etc.		3% of labour cost		
C		For well construction	1m ³	Unskilled	m-day	1	Planks, bamboo, ropes, nails, etc.		3% of labour cost		

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.



NORMS FOR RATE ANALYSIS

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
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 m ³	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 m ³	Skilled Unskilled	m-day m-day	5 10	Stone	cu.m.	5.5		
		Remarks: Add 1.17 man-days unskilled labour per cum of work for wall 5-10m high									
B		Mud mortar wall	5 m ³	Skilled Unskilled	m-day m-day	5 11	Stone Mud (Clay) Water	cu.m. cu.m. KL	5.5 2.00 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 m ³	Skilled Unskilled	m-day m-day	7 14	Stone Cement Sand	cu.m. Mt cu.m.	5.75 0.72 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
B		Cement Sand Mortar (1:4)	5 m ³	Skilled Unskilled	m-day m-day	7 14	Water Stone Cement Sand Water	KL cu.m. Mt cu.m. KL	0.43 5.75 0.58 1.76 0.35		
C		Cement Sand Mortar (1:6)	5 m ³	Skilled Unskilled	m-day m-day	7 14	Stone Cement Sand Water	cu.m. Mt cu.m. KL	5.75 0.42 1.89 0.25		
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 m ³	Skilled Unskilled	m-day m-day	7 20	Stone Cement Sand Water	cu.m. Mt cu.m. KL	5.75 0.72 1.65 0.43		
B		Add 5% of cost of labour and materials for scaffolding									
		Cement Sand Mortar (1:4)	5 m ³	Skilled Unskilled	m-day m-day	7 20	Stone Cement Sand	cu.m. Mt cu.m.	5.75 0.58 1.76		

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.



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
C		Add 5% of cost of labour and materials for scaffolding					Water	KL	0.35		
		Cement Sand Mortar (1:6)	5 m ³	Skilled Unskilled	m-day m-day	7 20	Stone Cement Sand Water	cu.m. Mt cu.m. KL	5.75 0.42 1.89 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 m ³	Skilled Unskilled	m-day m-day	8 22	Stone (sorted) Cement Sand Water	cu.m. Mt cu.m. KL	5.75 0.72 1.65 0.43		
		Add 5% of cost of labour and materials for scaffolding									
B		Cement Sand Mortar (1:4)	5 m ³	Skilled Unskilled	m-day m-day	8 22	Stone (sorted) Cement Sand Water	cu.m. Mt cu.m. KL	5.75 0.58 1.76 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
C		Add 5% of cost of labour and materials for scaffolding	5 m ³								
		Cement Sand Mortar (1:6)		Skilled	m-day	8	Stone (sorted)	cu.m.	5.75		
				Unskilled	m-day	22	Cement	Mt	0.42		
							Sand	cu.m.	1.89		
7.6		Add 5% of cost of labour and materials for scaffolding					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. 7.5.									
		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 m ³	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		
B		Add 5% of cost of labour and materials for scaffolding	1 m ³								
		Cement Sand Mortar (1:4)		Skilled	m-day	2	Stone	cu.m.	1.1		
				Unskilled	m-day	5.4	Cement	Mt	0.159		
							Sand	cu.m.	0.45		
		Add 5% of cost of labour and materials for scaffolding					Water	KL	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
C		Cement Sand Mortar (1:6)	1 m ³	Skilled	m-day	2	Stone	cu.m.	1.1		
				Unskilled	m-day	5.4	Cement	Mt	0.106		
		Add 5% of cost of labour and materials for scaffolding					Sand	cu.m.	0.47		
							Water	KL	0.06		
		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 m ³	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 m ³	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		



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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	
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 Unskilled	m-day m-day	1.1 1.8	5cm thick Concrete mesh	sq.m.	10.50	
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.					Cement Sand Water	Mt cu.m. KL	0.121 0.431 0.100	
A		Cement Sand Mortar (1:4) Hollow blocks (200mm*200mm*150mm)	10 m ²	Skilled Unskilled	m-day m-day	2.5 2.5	Hollow blocks Cement Sand Water	nos. Mt cu.m. KL	190.00 0.14 0.44 0.120	
B		Cement Sand Mortar (1:6) Hollow blocks (200mm*200mm*150mm)	10 m ²	Skilled Unskilled	m-day m-day	2.5 2.5	Hollow blocks Cement Sand Water	nos. Mt cu.m. KL	190.00 0.10 0.42 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	
B		AAC blocks (600mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.024				
							Sand	cu.m.	0.067				
							Water	KL	0.012				
		Cement Sand Mortar (1:6)	1 m ³	Skilled	m-day	2	AAC blocks	nos.	39.00				
7.12	702, 703, 710	AAC blocks (600mm*200mm*200mm)		Unskilled	m-day	2	Cement	Mt	0.017				
							Sand	cu.m.	0.072				
							Water	KL	0.008				
			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 masonry works items.											



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SECTION 8 - CEMENT CONCRETE WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Unit	Quantity
				Class	Unit	Quantity	Type	Unit	Type		
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.	10 m ³	Skilled	m-day	3	Cement	Mt.	Concrete Mixer	hr	6
A		60% M 15 Concrete and 40% Boulder / Stones		Unskilled	m-day	30	Aggregate 20-40 mm	cu.m.	Concrete Vibrator	hr	6
I		Using Mechanical Aids					10-20 mm	cu.m.			
							5-10 mm	cu.m.			
							Course Sand	cu.m.			
							Boulder/				
							Stones	cu.m.			
							Water	KL			
II		Manual Means	1 m ³	Skilled	m-day	1	Cement	Mt.			
				Unskilled	m-day	4	Aggregate 20-40 mm	cu.m.			
							10-20 mm	cu.m.			
							5-10 mm	cu.m.			
							Course Sand	cu.m.			
							Boulder/Stone	cu.m.			
							Water	KL			



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NORMS FOR RATE ANALYSIS

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 I		70% M 15 Concrete and 30% Boulder / Stones Using Mechanical Aids	10 m ³	Skilled Unskilled	m-day m-day	4 30	Cement Aggregate 20-40 mm 10-20 mm 5-10 mm Course Sand Boulder/ Stones Water	Mt. cu.m. cu.m. cu.m. cu.m. cu.m.	1.950 4.000 1.800 0.800 3.450 3.300	Concrete Mixer Concrete Vibrator	hr hr	6 6
II		Manual Means	1 m ³	Skilled Unskilled	m-day m-day	1 4	Cement Aggregate 20-40 mm 10-20 mm 5-10 mm Course Sand Boulder/ Stones Water	Mt. cu.m. cu.m. cu.m. cu.m. cu.m.	0.214 0.398 0.180 0.082 0.345 0.330			
C I		60% M 10 Concrete and 40% Boulder / Stones Using Mechanical Aids	10 m ³	Skilled Unskilled	m-day m-day	3 30	Cement Aggregate 20 mm	Mt. cu.m.	1.200 4.230	Concrete Mixer Concrete Vibrator	hr hr	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	Quantity
II		Manual Means	1 m ³	Skilled Unskilled	m-day m-day	1 4	10 mm	cu.m.	1.410				
							Course Sand	cu.m.	2.820				
							Boulder/ Stones	cu.m.	4.400				
							Water	KL	0.600				
							Cement	Mt.	0.130				
							Aggregate 20 mm	cu.m.	0.423				
D I	70% M 10 Concrete and 30% Boulder / Stones Using Mechanical Aids		10 m ³	Skilled Unskilled	m-day m-day	3 30	10 mm	cu.m.	0.141				
							Course Sand	cu.m.	0.282				
							Boulder/ Stones	cu.m.	0.440				
							Water	KL	0.065				
							Cement	Mt.	1.500	Concrete Mixer	hr	6	
							Aggregate 20 mm	cu.m.	4.900	Concrete Vibrator	hr	6	
II		Manual Means	1 m ³	Skilled	m-day	1	10 mm	cu.m.	1.700				
							Course Sand	cu.m.	3.300				
							Boulder/ Stones	cu.m.	3.300				
							Water	KL	0.750				
							Cement	Mt.	0.160				
							Aggregate 20 mm	cu.m.	0.160				

NORMS FOR RATE ANALYSIS

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	
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.		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				
A		PCC : Grade M 10	1 m ³	Skilled	m-day	0.13	Cement	Mt.	0.230	Concrete Mixer Generator	hr	0.4	
I		Using Mechanical Aids		Unskilled	m-day	1.4	Aggregate 40mm	cu.m.	0.650			0.4	
							20mm	cu.m.	0.240	Concrete Vibrator	hr	0.25	
							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	1 m ³	Skilled	m-day	0.2	Cement	Mt.	0.275	Concrete Mixer Generator	hr	0.4	
I		Using Mechanical Aids		Unskilled	m-day		Aggregate 40mm	cu.m.	0.540	Concrete Vibrator	hr	0.4	
												0.25	

Remarks: In case of manual mixed, add 50% of Labour component and reduce equipment

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material				Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Quantity	Type	Unit	Quantity
							20mm 10 mm Course Sand Water	cu.m. cu.m. cu.m. KL	0.270 0.090 0.450 0.130				
Remarks: In case of manual mixed, add 50% of Labour component and reduce equipment													
C I		PCC for RCC : Grade M 20 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	3 30	Cement	Mt.	5.210		Concrete Mixer Generator	hr	6
							Aggregate 20mm	cu.m.	8.100			hr	6
							10 mm	cu.m.	5.400		Concrete Vibrator	hr	1.5
							Course Sand	cu.m.	6.750				
D I		PCC for RCC : Grade M 25 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	3 30	Water	KL	2.500				
							Cement	Mt.	6.050		Concrete Mixer Generator	hr	6
							Aggregate 20mm	cu.m.	8.100			hr	6
							10 mm	cu.m.	5.400		Concrete Vibrator	hr	1.5
E I		PCC for RCC : Grade M 30 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	3 30	Course Sand	cu.m.	6.750				
							Water	KL	3.000				
							Admixture	Kg	24.2				
							Cement	Mt.	6.100		Concrete Mixer	hr	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	Quantity
F I		PCC for RCC : Grade M 35 Using Mechanical Aids	15 m ³	Unskilled	m-day	30	Aggregate 20mm 10 mm Course Sand Water Admixture	cu.m. cu.m. cu.m. KL Kg	8.100 5.400 6.750 3.000 24.4	Generator Concrete Vibrator	hr hr	6 1.5	
				Skilled	m-day	3	Cement	Mt.	6.330	Concrete Mixer	hr	6	
				Unskilled	m-day	30	Aggregate 20mm 10 mm Course Sand Water Admixture	cu.m. cu.m. cu.m. KL Kg	8.100 5.400 6.750 3.000 25.32	Generator Concrete Vibrator	hr hr	6 1.5	
				<u>Remarks:</u>									
				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 separately 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

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 I		PCC : Grade M 10 Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.13 1.4	Cement	Mt.	0.220	Concrete Mixer	hr	0.4
							Aggregate	cu.m.	0.650	Generator	hr	0.4
							40mm	cu.m.	0.240	Concrete Vibrator	hr	0.25
B I		PCC : Grade M 15 Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.2 2	Cement	Mt.	0.320	Concrete Mixer	hr	0.4
							Aggregate	cu.m.	0.520	Generator	hr	0.4
							40mm	cu.m.	0.220	Concrete Vibrator	hr	0.25
8.4	800	Providing and laying concrete in super structures, columns, deck slabs, beams as per Drawing and Specifications, haulage upto 30m.					20mm	cu.m.	0.110			
							sand	cu.m.	0.445			
							Water	KL	0.130			
A I		PCC for RCC : Grade M 15 Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.5 3.5	Cement	Mt.	0.320	Concrete Mixer	hr	0.4
							Aggregate	cu.m.	0.520	Generator	hr	0.4
							40mm	cu.m.	0.220	Concrete Vibrator	hr	0.25

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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	Quantity
B I		PCC for RCC : Grade M 20 Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.5 3.5	Course Sand	cu.m.	0.445	Concrete Mixer Generator	hr	0.4	0.4
							Water	KL	0.130				
							Cement	Mt.	0.400				
							Aggregate 20mm 10mm	cu.m. cu.m.	0.570 0.290				
C I		PCC for RCC : Grade M 25 Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.5 3.5	Course Sand	cu.m.	0.425	Concrete Mixer Generator	hr	0.4	0.4
							Water	KL	0.200				
							Cement	Mt.	0.610				
							Aggregate 20mm 10mm	cu.m. cu.m.	0.640 0.210				
D I		PCC for RCC : Grade M 30 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	3 32	Course Sand	cu.m.	0.425	Concrete Mixer Generator	hr	6	6
							Water	KL	0.300				
							Admixture	Kg	2.44				
							Cement	Mt.	6.100				
				Skilled Unskilled	m-day m-day	3 32	Aggregate 20mm 10mm	cu.m. cu.m.	8.100 5.400	Concrete Mixer Generator	hr	6	1.5



NORMS FOR RATE ANALYSIS

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			



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	Quantity
F I	PCC for RCC/PSC : Grade M 40 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	4 33	Cement Aggregate 20mm 10mm Course Sand Water Admixture	Mt. cu.m. cu.m. cu.m. KL Kg	6.450 8.100 5.400 6.750 3.000 25.8	Concrete Mixer Generator Concrete Vibrator	hr hr hr	6 6 1.5		
G I	PCC for RCC/PSC : Grade M 45 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	4 33	Cement Aggregate 20mm 10mm Course Sand Water Admixture	Mt. cu.m. cu.m. cu.m. KL Kg	6.975 8.100 5.400 6.750 3.000 27.9	Concrete Mixer Generator Concrete Vibrator	hr hr hr	6 6 1.5		

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.

Remarks:

- 1) For height upto 5m, add @ 20% on cost of concrete i.e. cost of materials, labours and equipments for formwork and staging.



NORMS FOR RATE ANALYSIS

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) 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 I		PCC for RCC/PSC : Grade M 50 Using Mechanical Aids	15 m ³	Skilled Unskilled	m-day m-day	5 30	Cement Aggregate 20mm 10mm Course Sand Water Admixture	Mt. cu.m. cu.m. cu.m. KL Kg	7.350 8.100 5.400 6.750 3.000 29.4	Concrete Mixer Generator Concrete Vibrator	hr hr hr	6 6 1.5	
		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.	120 m ³	Skilled Unskilled	m-day m-day	4 18	Cement Aggregate	Mt.	38.400	Batching Plant Generator	hr hr	6 6	
A		PCC : Grade M 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	Quantity
B	PCC : Grade M 20	120 m ³	Skilled Unskilled	m-day m-day	4 18		40mm	cu.m.	62.400	Loader	hr	6	6
							20mm	cu.m.	26.400	Transit Mixer	hr	15	15
							10mm	cu.m.	13.200	Lead upto 1km	t-km	300L	300L
							Course Sand	cu.m.	53.400	Lead beyond 1 km,			
							Water	KL	15.600	L- lead in km			
							Admixtures	Kg	153.600	Concrete Pump	hr.	6	6
										Concrete Vibrator	hr	30	30
							Cement	Mt.	41.660	Batching Plant	hr	6	6
							Aggregate	cu.m.	64.800	Generator	hr	6	6
							20mm	cu.m.	43.200	Loader	hr	6	6
C	PCC : Grade M 25	120 m ³	Skilled Unskilled	m-day m-day	4 18		10mm	cu.m.	54.000	Transit Mixer	hr	15	15
							Course Sand	cu.m.	24.000	Lead upto 1km	t-km	300L	300L
							Water	KL	166.640	Lead beyond 1km,			
							Admixtures	Kg		L- lead in km			
										Concrete Pump	hr.	6	6
										Concrete Vibrator	hr	30	30
							Cement	Mt.	48.380	Batching Plant	hr	6	6
							Aggregate	cu.m.	64.800	Generator	hr	6	6
							20mm	cu.m.	43.200	Loader	hr	6	6
							10mm	cu.m.	54.000	Transit Mixer	hr	15	15

SECTION 8: CEMENT CONCRETE WORKS

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
D	PCC : Grade M 30		120 m ³				Water	KL	27.000
							Admixtures	Kg	193.520
E	PCC : Grade M 35		120 m ³						

NORMS FOR RATE ANALYSIS

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	hr	1.5	
		Remarks:								Steel Bar Bending M/c	hr	2.5	

SECTION 8: CEMENT CONCRETE WORKS

NORMS FOR RATE ANALYSIS

NORMS FOR RATE ANALYSIS													
S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Quantity	Construction Material			Machinery			
				Class	Unit		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 Unskilled	m-day m-day	0.5 3.5	Cement Sand Aggrts 40mm 20mm 10mm Water	MT cu.m. cu.m. cu.m. cu.m. KL	0.320 0.445 0.520 0.220 0.110 0.160	Concrete Mixer Generator Concrete Vibrator	hr hr hr	0.4 0.4 0.25	
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 Unskilled	m-day m-day	7.5 7.5	Water Proofing material	Ltr	112.980				



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SECTION 8: CEMENT CONCRETE WORKS

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Unit
				Class	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 Unskilled	m-day m-day	1 1	Asphalt Coal	Kg Kg	10.000 2.000		
8.11	800	<u>Underwater Concreting</u> 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). Using Mechanical Aids	1 m ³	Skilled Unskilled	m-day m-day	0.2 2	Cement Aggregate 20mm 10 mm Course Sand Fine sand Water Admixtures	Mt. cu.m. cu.m. cu.m. cu.m. KL kg	0.407 0.540 0.360 0.383 0.067 0.183 4.067	Concrete Mixer Generator	hr hr
I		Remarks: 1) Add 10% of cost of cement for Concrete pouring tools and arrangement.									



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NORMS FOR RATE ANALYSIS

SECTION 9: FORM WORKS

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 Struts, ballies, etc Nails, spikes, etc.	cum cum kg	0.42 0.18 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 stiffeners MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	kg m nos. nos.	495 36 21 178						
		<u>Remarks:</u> 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.													



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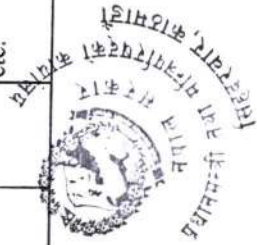
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
9.2	903, 905	5. MS sheets, angle stiffners, clamps and nut and bolts - 40 times usage.	10 m ²							
		6. MS pipes - 60 times usage.								
		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	i	Using timber (soft wood/ Ku- Kath) 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



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
iv	B	Height above 9m Using Plywood 9mm thick Height upto 3m	10 m ²	Unskilled	m-day	3.1	Struts, ballies, etc	cum	0.45		
							Nails, spikes, etc.	kg	4.00		
				Increase the rate by 10% for every additional meter height to the rate for previous height							
ii		Height above 3m to 6m	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		
iii		Height above 6m to 9m	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		
				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		



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
iv		Height above 9m		Increase the rate by 10% for every additional meter height to the rate for previous height							
C	i	Using steel (14 gauge) & angles stiffeners (35mm*35mm*5 mm) Height upto 3m	10 m ²	Skilled	m-day	1.6	MS sheet & angle stiffeners	kg	495		
				Unskilled	m-day	2.2	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.	70 40 178		
ii		Height above 3m to 6m	10 m ²	Skilled	m-day	1.9	MS sheet & angle stiffeners	kg	495		
				Unskilled	m-day	2.8	MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.	88 50 178		
iii		Height above 6m to 9m	10 m ²	Skilled	m-day	2.3	MS sheet & angle stiffeners	kg	495		
				Unskilled	m-day	4.0					



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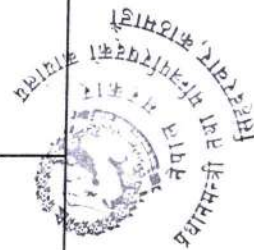
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit
iv		Height above 9m 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.	Increase the rate by 10% for every additional meter height to the rate for previous height				MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.	112 64 178		
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								



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
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								



NORMS FOR RATE ANALYSIS

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



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
iv		Height above 9m					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.								
9.4	903	Providing, preparing and installing Form								
	905	Work for columns (Circular section) including necessary supports and removing after completion all complete as per Specifications and direction of Engineer.								
A		Using Plywood 9mm thick								
i		Height upto 3m	10 m ²	Skilled	m-day	3.6	Plywood	sqm		11.00
				Unskilled	m-day	3.3	Timber	cum		0.75
							Nails, spikes, etc.	kg		5.00



NORMS FOR RATE ANALYSIS

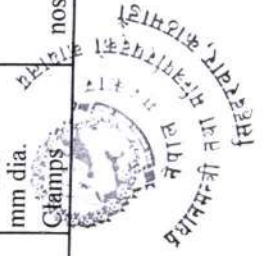
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
ii		Height above 3m to 6m	10 m ²	Skilled Unskilled	m-day m-day	4.2 4.2	Plywood Timber Nails, spikes, etc.	sqm cum kg		11.00 1.00 6.50	
iii		Height above 6m to 9m	10 m ²	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 m ²	Skilled Unskilled	m-day m-day	2.4 3.3	MS sheet & angle stiffeners	kg		495	
							MS pipes 40 mm dia. Clamps Nuts & bolts 6 mm dia	m nos. nos.		135 77 178	
ii		Height above 3m to 6m	10 m ²	Skilled Unskilled	m-day m-day	2.9 4.2	MS sheet & angle stiffeners	kg		495	



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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
9.5	A	903 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. Using timber (soft wood - Jamun or	10 m ²	Skilled	m-day	1.8	38 mm thick planks	cum			
				Unskilled	m-day	2.5	Rafters, beam, battens, strut etc.	cum			
							Nails, spikes, etc.	kg			
B		Using Plywood 12mm thick	10 m ²	Skilled	m-day	1.5	Plywood	sqm			
				Unskilled	m-day	2.50	Rafters, beam, battens, strut etc.				
							Nails, spikes, etc.	cum			
C		Using steel (14 gauge) & angles stiffeners	10 m ²	Skilled	m-day	1.25	MS sheet & angle stiffeners	kg			
				Unskilled	m-day	2.5					
							MS pipes 40 mm dia.	m			
							Clamps	nos.			



NORMS FOR RATE ANALYSIS

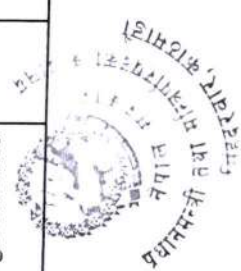
S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery				
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity	
		<u>Remarks:</u> 1. Salvage value of planks and plywood 25% of their respective original value. 2. Salvage value of MS sheets 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.					Nuts & bolts 6 mm dia	nos.	178				
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 Unskilled	m-day m-day	4 6.0	38 mm thick planks Rafters, beam,battens, strut etc. Nails, spikes, etc.	cum cum kg	0.42 0.30 2.50				

NORMS FOR RATE ANALYSIS

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

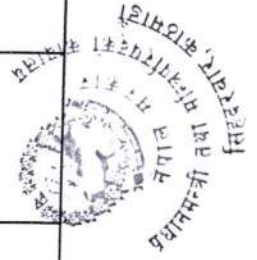
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S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery			Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type	Unit	Type		
iii		Depth of beam upto 0.8 m to 1.2 m	10 m ²	Unskilled	m-day	3.2	Rafters,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



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
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. 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	11 0.30			
B		Using steel (14 gauge) & angles stiffeners	10 m ²	Skilled Unskilled	m-day m-day	2.5 3.0	MS sheet & angle stiffeners 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.										



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
9.8	903 905	5. MS sheets, angle stiffeners, clamps and nut and bolts - 40 times usage.	10 m ²								
		6. MS pipes - 60 times usage.									
		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 stiffeners	kg	495		
				Unskilled	m-day	2.0					
							MS pipes 40 mm dia.	m	32		
							Clamps	nos.	18		
							Nuts & bolts 6 mm dia	nos.	178		



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
II		Circular section									
A		Using Plywood 9mm thick	10 m ²	Skilled Unskilled	m-day m-day	3 2.5	Plywood Rafters, beam,battens, strut etc. Nails, spikes, etc.	cum cum kg		11 0.20 3.00	
B		Using steel (14 gauge) & angles stiffeners	10 m ²	Skilled Unskilled	m-day m-day	2.5 2.0	MS sheet & angle stiffeners	kg		495	
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 stiffeners, clamps and nut and bolts - 40 times usage.									
		6. MS pipes - 60 times usage.									

NORMS FOR RATE ANALYSIS

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

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
ii		Height above 3m to 6m	10 m ²	Skilled	m-day	14	Clamps	nos.	171.00
				Unskilled	m-day	25.0	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
iv		Height above 9m	Increase the rate by 10% for every additional meter height to the rate for previous height	Skilled	m-day	20	MS pipes 40 mm dia.	m	980.00
				Unskilled	m-day	40.0	Clamps	nos.	560.00
		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							

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Quantity
				Class	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		



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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
ii		Height above 2m to 4m	10 m ²	Skilled	m-day	8	MS pipes 40 mm dia.	m	42.00		
				Unskilled	m-day	14.0	Clamps Nuts & bolts 6 mm dia	nos. nos.	24.00 178.00		
iii		Height above 4m to 6m	10 m ²	Skilled	m-day	12	MS pipes 40 mm dia.	m	570.00		
				Unskilled	m-day	20.0	Clamps Nuts & bolts 6 mm dia	nos. nos.	325.00 178.00		
iv		Height above 6m		Increase the rate by 10% for every additional meter height to the rate for previous height							
9.10	903	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									



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



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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) 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) 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				

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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
III		Steeped Surface (Non- Load bearing)	10 m ²	Unskilled	m-day	4.200				
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)		Skilled	m-day	2.400				
				Unskilled	m-day	3.600				
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)								

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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
I		Horizontal keyway	10 m ²	Skilled Unskilled	m-day m-day	0.400 0.600					
II		Vertical keyway	10 m ²	Skilled Unskilled	m-day m-day	0.750 1.130					
III		Sloped/Slanted keyway	10 m ²	Skilled Unskilled	m-day m-day	1.200 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 Unskilled	m-day m-day	0.250 0.250	Planks Walling and Struts	sq.m Cum	33.33 2.03		
B		Depth 1.5m to 3m	100 m ²	Skilled Unskilled	m-day m-day	0.500 1.000	Planks Walling and Struts	sq.m Cum	33.33 2.03		
C		Depth above 3m	100 m ²	Skilled Unskilled	m-day m-day	1.000 1.750	Planks Walling and Struts	sq.m Cum	33.33 2.03		



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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 m ²	Skilled Unskilled	m-day m-day	0.250 0.250	Planks Walling and Struts	sq.m Cum	33.33 1.65
B		Depth 1.5m to 3m	100 m ²	Skilled Unskilled	m-day m-day	0.500 1.000	Planks Walling and Struts	sq.m Cum	33.33 1.65
C		Depth above 3m	100 m ²	Skilled Unskilled	m-day m-day	1.000 1.750	Planks Walling and Struts	sq.m Cum	33.33 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 m ²	Skilled	m-day	0.500	Planks	sq.m	100.00

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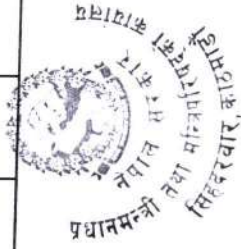
S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
B		Depth 1.5m to 3m	100 m ²	Unskilled	m-day	1.000	Walling and Struts	Cum		1.36
				Skilled	m-day	1.000	Planks	sq.m		100.00
C		Depth above 3m	100 m ²	Unskilled	m-day	2.000	Walling and Struts	Cum		1.36
				Skilled	m-day	1.500	Planks	sq.m		100.00
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. (Using timber (soft wood - Jamun or equivalent))	10 m ²	Unskilled	m-day	2.600	Walling and Struts	Cum		1.36
				Skilled	m-day	1.5	38 mm thick	cum		0.42
		Remarks: 1. Salvage value of planks 25% of its original value. 2. Timber/Planks - 8 times usage		Unskilled	m-day	4.0	Struts, ballies, etc	cum		0.18
				Skilled	m-day		Nails, spikes, etc.	kg		1.00
		Remarks: 1. Salvage value of planks 5% of its original value. 2. Timber/Planks - 3 times usage		Unskilled	m-day					
				Skilled	m-day					



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SECTION 10: ROOFING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
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	



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

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
10.9	1000	Remarks: Diameter of a bundle khar is 15cm 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.	

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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
10.14	1000	Making 25mm. salwood eaves-board and fittings all complete.	10m ²	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 ceiling including making wooden frame, fixing in position with necessary stainless steel crews, nails, etc. and fixing plywood all complete as per specification.	9 m ²	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	(Wooden main rafter and cross battren =6no*3300mm*50mm*125mm+6nos*3000mm								
		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 m ²	Skilled Unskilled	m-day m-day	23 2.3	Sal wood timber Plywood 3mm	cu.m. sq.m.		0.45 37.5
							Beads Nails	m kg		30 0.3

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



NORMS FOR RATE ANALYSIS

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	Type	Quantity
11.1 A	1100	Providing and Making sal wood frame for door and fixing all complete. Door size - 900mm x 2100mm Frame wood size - 100mm x 75mm	each	Skilled	m-day	1.50	Salwood	cu.m.		0.044
				Unskilled	m-day	0.15	Holdfast 250mm Screw	No.		4
B		Providing and Making sal wood frame (For Doors and Windows) and fixing all complete.	1m ³	Skilled	m-day	34.0	Salwood	cu.m.		1.1
				Unskilled	m-day	3.40	Holdfast 250mm Screw	No.		92
11.2	1100	Providing and Making shutter in 38mm. thick sal wood frame all complete (shutter size 1.07m x 1.982m).	each	Skilled	m-day	10	Salwood	cu.m.		0.084
				Unskilled	m-day	1	100mm Hinge	No.		6
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	150mm Bolts	No.		1
							300 mm Bolts	No.		1
							250mm	No.		1
							Locking set	No.		1
							Handles	No.		2
							Screws	No.		76
							Salwood	cu.m.		0.049
							Glass 3/4/5.5/6mm	Sq.m.		1.085
							75mm Hinges	No.		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
11.4 A	1100	Providing and Making and fixing flush shutter in 38mm. thick sal wood frame with shutter size 1.092m x 2.058m. 3mm thick commerical plywood on bothside	each				100mm Bolts	No.	4		
							Handles	No.	2		
							Screws	No.	112		
B		3mm thick teek 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	No.	3		
							100mm	No.	2		
							Bolts 150mm	No.	1		
							Mortise Lock	No.	46		
							Screws	No.	46		
				Skilled	m-day	7	Salwood	cu.m.	0.0346		
				Unskilled	m-day	0.7	Teek plywood	Sq.m.	4.65		
							Hinges	No.	3		
							100mm	No.	2		
							Bolts 150mm	No.	1		
							Mortise Lock	No.	46		
							Screws	No.	46		



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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery			Quantity	Unit
C		18 gauge G.I. plain sheet on both sides	each	Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit		
				Skilled	m-day	7	Salwood	cu.m.	0.0346				
D		24 gauge mosquito proof G.I. wire mesh	each	Unskilled	m-day	0.7	G.I. Plain Sheet	Sq.m.	4.65				
							Hinges	No.	3				
							100mm	No.	2				
							Bolts 150mm	No.	1				
							Mortise Lock	No.	46				
							Screws	No.	1				
							Handle	No.	0.026				
				Skilled	m-day	5	Salwood	cu.m.	2.13				
				Unskilled	m-day	0.5	G.I. wire mesh	Sq.m.	3				
							Hinges	No.	2				
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				100mm	No.	2				
							Bolts 150mm	No.	2				
							Handle	No.	1				
							Spring	No.	46				
							Screw	No.	1.00				
				Skilled	m-day	0.06	Glass 3/4 /5.5	Sq.m.	4.05				
				Unskilled	m-day	0.006	/6 mm	m	0.10				
							Timber beads	kg					
							Nails						

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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	Quantity
11.6	1100	Providing and Fixing 3mm. commercial plywood in frame using timber beads (listi) all complete.	1m ²	Skilled Unskilled	m-day m-day	0.06 0.006	Plywood 3mm Timber beads Nails	Sq.m. m kg	1.05 4.05 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 Unskilled	m-day m-day	20 20	Steel rods	MT	1.05				
11.8	1100	Making and fixing flush shutter in 38mm x 100mm sal wood frame using 8mm thick commercial plywood and 4mm thick teak plywood lamination on one side all complete.	2.245 m ²	Skilled Unskilled	m-day m-day	9.00 0.90	Salwood Commercial Plywood Teak plywood Timber beads Gum Hinges 100mm Bolts 150mm Mortise Lock Screws	cu.m. Sq.m. Sq.m. m kg No. No. No. No.	0.0346 1.9 1.9 7.43 0.25 3 2 1 46				



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S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery			Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit		
11.9	1100	Making and fixing flush shutter in 38mm x 100mm sal wood frame using 8mm thick commercial plywood and 4mm thick teak 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				
							Teak 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 teak 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				
							Teak 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				



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 Unskilled	m-day m-day	0.06 0.01	Sunmica/ formica Mobical Nails	Sq.m. kg kg	1.05 0.25 0.1				
11.12	1100	Making and fixing aluminium sliding window frame, glass and other fittings all complete.	1.49 m ²	Skilled Unskilled	m-day m-day	5.33 5.33	Aluminium PVC plug Aluminium screw Rubber beading 4mm thick glass	kg No. No. m	8.53 8 30 9.75				
11.13	1100	Making and fixing openable aluminium window frame, glass and other fittings all complete.	2.23 m ²	Skilled Unskilled	m-day m-day	8.00 8.00	Aluminium PVC plug Aluminium screw Rubber beading 4mm thick glass	kg No. No. m	13.44 15 60 10.97				

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



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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
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. Using 3mm commercial plywood shutter	each			4mm glass Prelaminated board	sq.m.	0.92			
						Automatic closer	m	1.07			
						Handle with lock	No.	1			
							No.	2			
A			each	Skilled	23	Sal wood timber	cu.m.	0.35			
				Unskilled	2.3	Plywood 3mm	sq.m.	75			
						Beads	m	55			
						Nails	kg	0.5			
B		Using 12mm. hardboard	each	Skilled	23	Sal wood timber	cu.m.	0.35			
				Unskilled	2.3	Hardboard 12mm	sq.m.	75			
						Beads	m	55			
						Nails	kg	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	Type	Quantity
C		Using 19mm salwood planks	each	Skilled Unskilled	m-day m-day	30 3	Sal wood timber Beads Nails	cu.m. m kg		
11.17	1100	Sawing timber logs including loading, unloading, sawing, hauling and piling all complete.						1.767 55 0.5		
A		Dry timber sawing	1 m ²	Skilled Unskilled	m-day m-day	0.5 0.166				
B		Wet timber sawing	1 m ²	Skilled Unskilled	m-day m-day	0.625 0.208				
11.18	1100	Making 3 to 4m long round or square column by stripping sawed logs by axe/cutter and smoothing by jack plain including boring holes all complete.								
A		By Manual Means	No.	Skilled Unskilled	m-day m-day	1.785 0.595				
B		By Mechanical Means	No.	Skilled Unskilled	m-day m-day	0.5355 0.1785			Electric Jack Electric Cutter	hr hr

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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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. By Manual Means	No.	Skilled	m-day	3				
A				Unskilled	m-day	1				
B		By Mechanical Means	No.	Skilled	m-day	0.9			Electric Jack	hr
				Unskilled	m-day	0.3			Electric Cutter	hr
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				0.5
				Unskilled	m-day	4				0.75
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 rectangular shaped timber from 4 to 5m long timber log by axe/cutter all complete. By Manual Means	No.	Skilled	m-day	0.975				
A				Unskilled	m-day	0.325				
B		By Mechanical Means	No.	Skilled	m-day	0.2925			Electric Cutter	hr
				Unskilled	m-day	0.0975				1



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

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Quantity
				Class	Unit	Quantity	Type	Unit	Type		
B I		Truss Structure Height upto 4m	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber
II		<u>Remarks:</u> 1) Add 20% of labour, materials and equipment cost for formworks and staging works if required.	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber
III		Height 4m to 6m	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber
		<u>Remarks:</u> 1) Add 25% of labour, materials and equipment cost for form works and staging works if required.	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber
		Height above 6m	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber
		<u>Remarks:</u> 1) Add 30% of labour, materials and equipment cost for form works and staging works if required.	1m ³	Skilled	m-day	13	Sal wood	cum	Tools and Plants	1.1	1% of
				Unskilled	m-day	20	Hardwares and Other Consumables	LS		5% of timber cost	timber



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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	No.	Skilled	m-day					
i.		hydraulic	No.	Skilled	m-day	0.25				
ii.		Spring	No.	Skilled	m-day	0.1				
K.		Beads	m.	Skilled	m-day	0.033				

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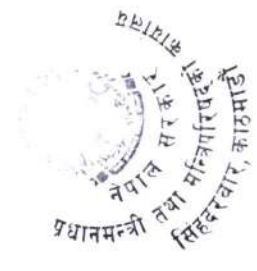
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SECTION 12 : FLOORING WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type
12.1 A	1200	Providing and casting 1:2:4 concrete for floor incl. finishing by cement rubbing as per specification all complete. Floor thickness 25mm.	10m ²	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.	10m ²	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.	10m ²	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.	10m ²	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	

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S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material		Machinery		Type	Unit	Quantity	Quantity
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity	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 Unskilled	m-day m-day	2.5 16	Cement Sand Aggregates 12.5 mm White cement 3mm Marble chips Oxalic acid Wax polish Tarpentine Carborandum	M.T. cu.m. cu.m. M.T. cu.m. kg. kg. Ltr.	0.065 0.088 0.176 0.061 0.061 0.365 0.118 0.538 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 Unskilled	m-day m-day	3.5 36	Cement Sand White cement Marble chips 3mm Oxalic Acid Wax polish Tarpentine Carborandum	M.T. cu.m. M.T. cu.m. kg. kg. Ltr.	0.121 0.165 0.069 0.047 0.34 0.118 0.5 Approx.				

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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	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 Unskilled	m-day m-day	3.5 36	Cement Sand White cement Marble chips 3mm Oxalic Acid Wax polish Tarpentine Carborandum	M.T. cu.m. M.T. cu.m. kg. kg. Ltr.	0.089 0.122 0.089 0.061 0.37 0.118 0.538 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.	10m ²	Skilled Unskilled	m-day m-day	2 26.1	T-tiles 20mm Cement Sand Oxalic Acid powder Wax polish Tarpentine Carborandum	sq.m. M.T. cu.m. kg. kg. Ltr.	11 0.081 0.22 0.37 0.118 0.538 Approx.				
A		Manual means											
B		Using Mechanical Aids (For Rubbing)	10m ²	Skilled Unskilled	m-day m-day	2 12.6	T-tiles 20mm Cement	sq.m. M.T.	11 0.081	Rub Machine	hr		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
12.6	1200	Providing and Laying 15mm thick marble (450mm X 450mm) on 20mm thick lime surkhi mortar incl. rubbing and polishing all complete. Manual Means	10m ²	Skilled Unskilled	m-day m-day	2 21.5	Sand	cu.m.	0.22	
							Oxalic Acid powder	kg.	0.37	
							Wax polish	kg.	0.118	
							Tarpetine	Ltr.	0.538	
							Carborandum		Approx	
							Marble 15 mm	sq.m.	11	
							Surkhi	cu.m.	0.183	
							Lime	cu.m.	0.091	
							Oxalic Acid	kg.	0.37	
							Wax polish	kg.	0.118	
B		Using Mechanical Aids (For Rubbing only)	10m ²	Skilled Unskilled	m-day m-day	2 8	Tarpetine	Ltr.	0.538	Rub machine
							Carborandum		Approx.	
							Marble 15mm	sq.m.	11	
							Surkhi	cu.m.	0.183	
							Lime	cu.m.	0.091	
							Oxalic Acid	kg.	0.37	
							Wax polish	kg.	0.118	
							Tarpetine	Ltr.	0.538	
							Carborandum		Approx.	
							Marble 15mm	sq.m.	11	
							Surkhi	cu.m.	0.183	
							Lime	cu.m.	0.091	
							Oxalic Acid	kg.	0.37	
							Wax polish	kg.	0.118	
							Tarpetine	Ltr.	0.538	



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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	Quantity
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 Unskilled	m-day m-day	1 3	P.G tiles Cement Sand White cement	sq.m. M.T. cu.m. kg	11 0.056 0.152 3.228		
12.8	1200	Providing and laying flagstone in 1:4 cement sand mortar all complete.	10m ²	Skilled Unskilled	m-day m-day	2 4.5	F-stone 50mm	sq.m.	11		
A		50mm thick flagstone									
B		37.5mm thick flagstone	10m ²	Skilled Unskilled	m-day m-day	2 4.5	Cement Sand	Mt. cu.m.	0.063 0.171		
12.9	1200	Providing and Laying Flagstone (upto thickness 50mm) on sand all complete.	10m ²	Skilled Unskilled	m-day m-day	1 3	Stone 37.5mm Cement Sand	sq.m. M.T. cu.m.	11.00 0.06 0.165		
12.10	1200	Providing and Laying 25mm thick flat stone in 1:4 cement sand mortar all complete.	10m ²	Skilled Unskilled	m-day m-day	1.5 4.5	Stone 25 mm Cement Sand	sq.m. M.T. cu.m.	11 0.056 0.152		



NORMS FOR RATE ANALYSIS

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



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Type	Unit		
C	1200	Dry stone laying(10 cm thick)	10m ²	Unskilled	m-day	3.25	Sand		cu.m.	0.71	
				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. By sand	10m ²	Skilled	m-day	6.5	Sand		cu.m.	11	
				Skilled	m-day	10	Brick bats		cu.m.	11	
				Skilled	m-day	1	Cement		kg	53.2	
12.19	1200	Providing and laying 3mm thick fine cement rubbing (Punning) works.	10m ²	Unskilled	m-day	1					



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery			Quantity	
				Class	Unit	Quantity	Type	Unit	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 Unskilled	m-day m-day	6.5 0.65	Sal wood Nails	cu.m. kgs			0.421 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 Unskilled	m-day m-day	2 21.5	16mm Granite	sq.m.			11		
							Cement	M.T.			0.13		
							Sand	cu.m.			0.183		
							Oxalic Acid powder	kg.			0.37		
							Wax polish	kg.			0.118		
							Tarpetine	Ltr.			0.538		
							Carborandum				Approx		
12.22	1200	Providing and laying heavy duty interlocking concrete block on 50mm thick crusher stone dust all complete.	10m ²	Skilled Unskilled	m-day m-day	1 10	Interlocking block	sq.m			11		
A		50mm thick Block					Crusher Stone	cu.m			0.55		
							Dust						
B		60mm thick block	10m ²	Skilled Unskilled	m-day m-day	1 11	Interlocking block	sq.m			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
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	Crusher Stone Dust	cu.m	0.55	
12.24	1200	Providing 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	Clay Tiles Cement Sand	sq.m MT cu.m	11 0.056 0.152	
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	Cement Tile Cement Sand	sq.m MT Cu.m	11 0.081 0.22	
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	Glazed Tile Cement Sand Epoxy Grout Pigment	sq.m MT Cu.m	11 0.13 0.29 Approx	
							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
12.27	1200	Providing and Laying 10mm thick Vetrified tiles in 1:6 Cement sand Mortar all complete.	10m ²	Skilled Unskilled	m-day m-day	13 4.5	Vetrified Tile Cement Sand Epoxy Grout Pigment	sq.m MT Cu.m	11 0.15 0.5 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 Unskilled	m-day m-day	6.5 6.5	Anti Acid /Alkali Tile Cement Sand Anti Chemical Cement	Nos MT Cu.m Bag	120 0.18 0.52 0.66	
12.29	1200	Providing and Laying PVC tiles in Rubber Based Adhesives and Rolling all complete.	10m ²	Skilled Unskilled	m-day m-day	1.5 1.5	PVC Tiles Adhesives	sq.m Kg	11 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 Unskilled	m-day m-day	2 21.5	Marble 15 mm Cement Sand Oxalic Acid Wax polish Turpentine Carborandum	sq.m. MT cu.m. kg. kg. Ltr.	11 0.13 0.183 0.37 0.118 0.538 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	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 Unskilled	m-day m-day	14 12	Marble 15 mm Cement Sand Oxalic Acid Wax polish Tarpentine Carborandum	sq.m. MT cu.m. kg. kg. Ltr.	11 0.063 0.128 0.128 0.118 0.538 Approx.				
12.32	1200	Labour requirement For Marble nosing in stair steps	10m	Skilled Unskilled	m-day m-day	2.5 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 Unskilled	m-day m-day	6.5 0.65	Ready made Parquet Fevicol (Glue)	sq.m kg	10 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 Unskilled	m-day m-day	0.15 0.1	Non Glaze Tile Cement Sand Epoxy Grout Pigment	sq.m MT Cu.m	0.11 0.001 0.003 Approx				



NORMS FOR RATE ANALYSIS

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
13.1	1300	<u>Plastering Works:</u> Providing and plastering with 12.5 mm thick cement sand mortar on brick masonry works all complete as per Drawing and 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	
A							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	
C		Cement Sand Mortar (1:4)	100 m ²				Water	KL	0.120	
D		Cement Sand Mortar (1:6)	100 m ²	Skilled	m-day	12	Cement	Mt.	0.538	
				Unskilled	m-day	16	Sand	cu.m.	1.460	
							Water	KL	0.100	
							Cement	Mt.	0.382	
							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
13.2	A	Providing and plastering with 12.5 mm thick cement sand mortar on ceiling works all complete as per Drawing and Specifications. 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	A	Providing and plastering with 12.5 mm thick cement, lime and sand mortar on brick masonry works all complete as per Drawing and Specifications. 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	
B		Cement, Lime and Sand Mortar (1:2:12)	100 m ²				Water	KL	0.123	
				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
13.4	1300	Providing and plastering with lime surkhi mortar (1:2) on brick masonry works all complete as per Drawing and Specifications. Lime Surkhi Mortar 12.5mm thick	100 m ²	Skilled Unskilled	m-day m-day	12 16	Sand	cu.m.	1.46		
							Water	KL	0.094		
							Lime	cu.m.	0.61		
B		Lime Surkhi Mortar 20mm thick	100 m ²	Skilled Unskilled	m-day m-day	14 19	Surkhi	cu.m.	1.22		
							Water	KL	0.12		
							Lime	cu.m.	0.92		
13.5	1300	Providing and plastering with 20 mm thick cement sand mortar on brick masonry works all complete as per Drawing and Cement Sand Mortar (1:3)	100 m ²	Skilled Unskilled	m-day m-day	14 19	Surkhi	cu.m.	1.83		
							Water	KL	0.18		
							Cement	Mt.	0.96		
A		Cement Sand Mortar (1:4)	100 m ²	Skilled Unskilled	m-day m-day	14 19	Sand	cu.m.	1.95		
							Water	KL	0.20		
							Cement	Mt.	0.81		
B							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
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	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	Kg	10.64		
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
13.14	1300	Pointing Works: Providing and flush pointing in brick masonry works all complete as per Drawing and Specifications.	100 m ²	Skilled Unskilled	m-day m-day	10.5 12.0	Cement Sand Water	Mt. cu.m. KL	0.316 0.220 0.060	
A		Cement Sand Mortar (1:1)								
B		Cement Sand Mortar (1:2)	100 m ²	Skilled Unskilled	m-day m-day	10.5 12	Cement Sand Water	Mt. cu.m. KL	0.21 0.29 0.04	
C		Cement Sand Mortar (1:3)	100 m ²	Skilled Unskilled	m-day m-day	10.5 12	Cement Sand Water	Mt. cu.m. KL	0.155 0.320 0.030	
D		Cement, Lime and Sand Mortar (1:1:3)	100 m ²	Skilled Unskilled	m-day m-day	10.5 12	Cement Lime Sand Water	Mt. cu.m. cu.m. KL	0.125 0.085 0.255 0.040	
E		Lime Surkhi Mortar (1:1)	100 m ²	Skilled Unskilled	m-day m-day	10.5 12	Lime Surkhi Water	cu.m. cu.m. KL	0.22 0.22 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 m ²	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 Cement Sand Mortar (1:1)	100 m ²	Skilled	m-day	10.0	Cement	Mt.	0.612				
A				Unskilled	m-day	14.0	Sand	cu.m.	0.430				
							Water	KL	0.100				
B		Cement Sand Mortar (1:2)	100 m ²	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 m ²	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 Cement Sand Mortar (1:3)	100 m ²	Skilled	m-day	8.0	Cement	Mt.	0.11				
A				Unskilled	m-day	10.0	Sand	cu.m.	0.20				
							Water	KL	0.02				

प्रधानमन्त्री तथा मन्त्रिपरिषद्को कार्यालय
नेपाल सरकार
सिंहदरवार, काठमाडौं

2.2.2.2

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
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.	100 m ²	Skilled	m-day	5	Cement	Mt.	0.042	
A		Cement Sand Mortar (1:3)		Unskilled	m-day	5.0	Sand	cu.m.	0.030	
13.18	1300	Providing and pointing with cement sand mortar on Teliya brick (special brick) pavement works all complete as per Drawing and Specifications.	100 m ²	Skilled	m-day	10.0	Cement	Mt.	0.15	
A		Cement Sand Mortar (1:1)		Unskilled	m-day	10.0	Sand	cu.m.	0.10	
13.19	1300	Providing and flushing plaster with 3 mm thick cement sand mortar all complete as per Drawing and Specifications.	100 m ²	Skilled	m-day	10.0	Water	KL	0.03	
A		Cement Sand Mortar (1:1)		Unskilled	m-day	10.0	Cement	Mt.	0.336	
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	Sand	cu.m.	0.230	
				Unskilled	m-day	10.0	Water	KL	0.060	
				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	Unit
13.21	1300	Providing and flushing plaster with 3 mm thick lime mortar all complete as per Drawing and Specifications.	100 m ²	Skilled Unskilled	m-day m-day	10.0 10.0	Lime Water	cu.m. KL	0.16 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.						



NORMS FOR RATE ANALYSIS

SECTION 14: PAINTING WORKS

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. Single (One) Coat	100 m ²	Skilled	m-day	0.8	White lime	kg.	12.00				
A				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				
C				Unskilled	m-day	1.1	Gum,etc.	kg.	0.88				
		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				
14.3				Unskilled	m-day	0.7	Gum,etc.	kg.	0.4				
A	1400	Providing and applying Distemper as per Specifications and instruction of Engineer. Base / Lining (Astar) Coat	100 m ²	Skilled	m-day	2.0	Primer /Lining	Lt.	8.0				
B				Unskilled	m-day	2.0							
		Single (One) Coat	100 m ²	Skilled	m-day	2.0	Dry Distemper	kg.	6.5				
				Unskilled	m-day	2.0	powder						

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

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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 Pair Sand Paper (sheet)	Lt. Lt. Nr.	8.1 10.76 4.000



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
14.7 A	1400	Providing and applying Double Boiled Linseed Oil as per Specifications and instruction of Engineer. 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 A	1400	Providing and applying Varnish as per Specifications and instruction of Engineer. 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 A	1400	Providing and applying Bitumen Paint as per Specifications and instruction of Engineer. 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				

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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	Quantity
14.10	A	Providing and applying Chapra (resin) Polish as per Specifications and instruction of Engineer. Triple (Three) Coats	100 m ²	Skilled Unskilled	m-day m-day	10.0 5.0	Chapra (resin) Sprit	Kg. Lt.	2.0 10.0		
14.11	A	Providing and applying Red Oxide as per Specifications and instruction of Engineer. Single (One) Coat	100 m ²	Skilled Unskilled	m-day m-day	1.7 1.7	Red Oxide	Kg.	30.0		
	B	Double (Two) Coats	100 m ²	Skilled Unskilled	m-day m-day	3.5 3.5	Red Oxide	Kg.	48.5		
14.12	A	Providing and applying Cement Paint over Plastered Surface as per Specifications and instruction of Engineer. Single (One) Coat	100 m ²	Skilled Unskilled	m-day m-day	1.7 1.7	Snowcem	Kg.	30.0		
	B	Second Coat	100 m ²	Skilled Unskilled	m-day m-day	1.5 1.5	Snowcem	Kg.	20.0		

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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
14.13 A	1400	Providing and applying Red Oxide Paint as per Specifications and instruction of Engineer. Single (One) Coat excluding Astar coat	100 m ²	Skilled	m-day	4.3	Red Oxide Paint	Lt.	7.5	
				Unskilled	m-day	4.0				
B	1400	Double (Two) Coats excluding Astar coat	100 m ²	Skilled	m-day	6.45	Red Oxide Paint	Lt.	12.0	
				Unskilled	m-day	6.00				
14.14 A	1400	Providing and laying Plastic Felt as per Specifications and instruction of Engineer. Single (One) Layer	10 m ²	Skilled	m-day	1.1	Plastic Felt	sqm.	11.00	
				Unskilled	m-day	3.5				
B	1400	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.	60.00	
							Rough River Sand	cum.	0.31	
							Plastic Felt	sqm.	22.00	
							Roofing grade bitument	Kg.	25.00	
							Fire Wood	Kg.	80.00	
							Rough River Sand	cum.	0.31	

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Quantity
				Class	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	Lt.	2.50	Chemical Sprayer	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	Lt. Nr	47.50 1.00		
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%.											

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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
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
II		Box size - 3m x 1m x 1m (16 sqm)	Each	Unskilled	m-day	0.2	Selvedge wire	Kg.	2.96
III		Box size - 2m x 1m x 0.5m (7.5 sqm)	Each	Skilled	m-day	0.7	G.I. wire	Kg.	41.3
IV		Box size - 3m x 1m x 0.5m (11 sqm)	Each	Unskilled	m-day	0.28	Selvedge wire	Kg.	3.91
V		Box size - 2m x 1m x 0.3m (6.1sqm)	Each	Skilled	m-day	0.35	G.I. wire	Kg.	19.4
VI		Box size - 3m x 1m x 0.3m (9sqm)	Each	Unskilled	m-day	0.14	Selvedge wire	Kg.	2.43
				Skilled	m-day	0.5	G.I. wire	Kg.	28.4
				Unskilled	m-day	0.2	Selvedge wire	Kg.	3.28
				Skilled	m-day	0.29	G.I. wire	Kg.	15.75
				Unskilled	m-day	0.12	Selvedge wire	Kg.	2.22
				Skilled	m-day	0.42	G.I. wire	Kg.	23.25
				Unskilled	m-day	0.17	Selvedge wire	Kg.	3.03

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

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Quantity
				Class	Unit	Quantity	Type	Unit	Type		
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 Seldvedge wire - 4.064 mm	Each	Skilled Unskilled	m-day m-day	0.7 0.44	G.I. wire Seldvedge wire	Kg. Kg.		28.61 3.74	



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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Type	Unit		
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.	Each	Skilled	m-day	0.6	G.I. wire		Kg.	28.00	
A		Mesh size 150mmx150mm Mesh wire -4.064 mm		Unskilled		0.3					
B		Mesh size 150mmx150mm Mesh wire - 3.251mm Selvedged wire - 4.064mm	Each	Skilled	m-day	0.5	G.I. wire		Kg.	18	
				Unskilled	m-day	0.2	Selvedge wire		Kg.	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)	Each	Skilled	m-day	0.10	Lacing wire		Kg.	2.09	
I		Box size - 3m x 1.5m x 0.8m (16.2 sqm)		Unskilled		0.51					
II		Box size - 3m x 1.5m x 0.75m (15.75 sqm)	Each	Skilled	m-day	0.10	Lacing wire		Kg.	2.03	
				Unskilled	m-day	0.49					

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Type	Unit	Type	Unit		
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 m ³	Skilled Unskilled	m-day m-day	Boulder	cum			10	
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 m ³	Skilled Unskilled	m-day m-day	Boulder	cum			11	
15.8	1502	Providing mechanically woven double twisted crates/mattress with internal diaphragm at 1m centre to centre (internal diaphragms 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, selvaige 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	sq.m			7.5	

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

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
ii		Box size 2m*1m*0.5m	1 No				Wire mesh Lacing wire	sq.m kg	7.5 0.85
iii		Box size 3m*1m*0.5m	1 No				Wire mesh Lacing wire	sq.m kg	11 1.16
iv		Box size 4m*1m*0.5m	1 No				Wire mesh Lacing wire	sq.m kg	14 1.47
v		Box size 1.5m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	8 0.82
vi		Box size 2m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	11 1.24
vii		Box size 3m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	16 1.69
viii		Box size 4m*1m*1m	1 No				Wire mesh Lacing wire	sq.m kg	21 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 Lacing wire	sq.m kg	5.5 0.68

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

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

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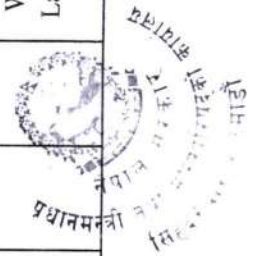
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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
i		Box size 3m*2m*0.3m	1 No				Wire mesh	sq.m		16.56
ii		Box size 4m*2m*0.3m	1 No				Lacing wire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

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2.9.80.4

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
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, selvaqe 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
ii		Box size 2m*1m*0.5m	1 No				Lacing wire	kg	0.67
iii		Box size 3m*1m*0.5m	1 No				Wire mesh	sq.m	7.5
iv		Box size 4m*1m*0.5m	1 No				Lacing wire	kg	1
v		Box size 1.5m*1m*1m	1 No				Wire mesh	sq.m	11
vi		Box size 2m*1m*1m	1 No				Lacing wire	kg	1.37
							Wire mesh	sq.m	14
							Lacing wire	kg	1.73
							Wire mesh	sq.m	8
							Lacing wire	kg	0.97
							Wire mesh	sq.m	11
							Lacing wire	kg	1.46

प्रधानमंत्री
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तथा मंत्रिपरिषद् के
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2.5.6.1.4

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
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	Quantity	Type	Unit	Type	Quantity
v		Box size 1.5m*1m*1m	1 No			Wire mesh	sq.m		8
vi		Box size 2m*1m*1m	1 No			Lacing wire	kg		0.98
vii		Box size 3m*1m*1m	1 No			Wire mesh	sq.m		11
viii		Box size 4m*1m*1m	1 No			Lacing wire	kg		1.48
						Wire mesh	sq.m		16
						Lacing wire	kg		2.01
						Wire mesh	sq.m		21
						Lacing wire	kg		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	sq.m		2.2
						Lacing wire	kg		0.14
ii		Diameter 0.7m, Length 2m	1 No			Wire mesh	sq.m		4.4

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Quantity	Type	Unit	Type	Quantity
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)				Lacing wire	kg		0.14
i		Diameter 0.35m, Length 2m	1 No			Wire mesh	sq.m		2.2
ii		Diameter 0.7m, Length 2m	1 No			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 diaphragms 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 m ²	Skilled Unskilled	2 10	Wire mesh Lacing wire	sq.m kg		4.4 0.14



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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	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 m ³	Skilled	m-day	2	Boulder/ Stones	cum	Hydraulic Excavator	hr	6
				Unskilled	m-day	4					
B		Manual Means	1 m ³	Skilled	m-day	1	Boulder/ Stones	cum			
				Unskilled	m-day	3					
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 m ³	Skilled	m-day	2	Boulder/ Stones	cum	Crane -3T capacity	hr	12
				Unskilled	m-day	6					

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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
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 m ³	Skilled Unskilled	m-day m-day	3 9	Concrete Grade M20 Rate as per item no. 8.4	cum	111	Crane -10T capacity	hr
		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 m ³	Skilled Unskilled	m-day m-day	3 9	Concrete Grade M20 Rate as per item no. 8.4	cum	100	Crane -10T capacity	hr
		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.									

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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	Quantity
15.15 I A	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 Size - 0.5m x 0.5m x 0.5m Using Mechanical Aids	100 m ³	Skilled	m-day	2	Concrete Grade M15	cum	100	Crane 3T	6
				Unskilled	m-day	4	Rate as per item no. 8.8				
B		Manual Means	1 m ³	Skilled	m-day	0.3	Reinforcement Concrete	Kg	2		
				Unskilled	m-day	2	Grade M15	cum	1		
II A		Size - 0.3m x 0.3m x 0.3m Using Mechanical Aids	100 m ³	Skilled	m-day	2	Concrete Grade M15	cum	100	Crane 3T	6
				Unskilled	m-day	4	Rate as per item no. 8.8				
B		Manual Means	1 m ³	Skilled	m-day	0.3	Reinforcement Concrete	Kg	2		
				Unskilled	m-day	2	Grade M15	cum	1		

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



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नयाँ बानेश्वर, काठमाडौं

NORMS FOR RATE ANALYSIS

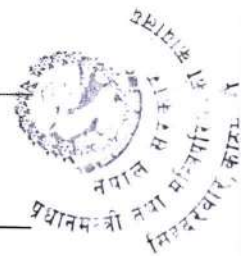
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Type	Unit	Quantity
B		Manual Means	1 m ³	Skilled	m-day	0.3	Reinforcement	Kg			
				Unskilled	m-day	2	Concrete Grade M15	cum			
VI	A	Size - 1.5m x 1.5m x 1m Using Mechanical Aids	100 m ³	Skilled	m-day	2	Concrete Grade M15	cum	Crane 10T	hr	5
				Unskilled	m-day	4	Rate as per item no. 8.4				
B		Manual Means	1 m ³	Skilled	m-day	0.3	Reinforcement	Kg			
				Unskilled	m-day	2	Concrete Grade M15	cum			
VII	A	Size - 2m x 2m x 1m Using Mechanical Aids	100 m ³	Skilled	m-day	2	Concrete Grade M15	cum	Crane 15T	hr	4
				Unskilled	m-day	4	Rate as per item no. 8.4				
B		Manual Means	1 m ³	Skilled	m-day	0.3	Reinforcement	Kg			
				Unskilled	m-day	2	Concrete Grade M15	cum			



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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			
15.16	A	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.	5m	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.			Rate as per item no. 8.4								
	B	Pile diameter-300 mm	5m	Remarks: 1. Rate analysis for Providing and placing Cement Concrete and Reinforcement shall be as per section 800.		Skilled Unskilled	m-day m-day	2 15	Bentonite RCC Grade M20 Reinforcement	kg cum kg	25 0.388 76.145	Piling rig (all accessories) Crane 3T Bentonite pump	hr hr hr	3 3 3	
	B	Pile diameter-500 mm	5m	Remarks: 1. Rate analysis for Providing and placing Cement Concrete and Reinforcement shall be as per section 800.		Skilled Unskilled	m-day m-day	2 20	Bentonite RCC Grade M20 Reinforcement	kg cum kg	50 1.080 211.95	Piling rig (all accessories) Crane 3T Bentonite pump	hr hr hr	4 4 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
15.17	A	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.	25m	Skilled	m-day	1	RCC Grade M 35	cum	1.94
				Unskilled	m-day	5	Reinforcement	kg	378.86
				Materials Pile shoes					
				i) C.I. shoes for the pile					
				ii) M.S. clamps for shoe					
				iii) Steel he met and cushion block on top of casing head during driving					
				iv) Casing					
				0.5 % of cost of concrete					



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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	
B		Pile diameter -500 mm	20m	Skilled	m-day	1	RCC Grade M 35	cum	4	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						
							iii) Steel helmet and cushion block on top of casing head during driving	Kg	17.5				
							iv) Casing	Kg	12.5				
								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 technical sepcifications.											



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
A		Stone/Boulder pitching	1 m ³	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 m ³	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.	1 m ³	Skilled Unskilled	m-day m-day	1 3	Graded stone aggregate of required size	cum		1.2	
Remarks: Rate includes labour required for trimming of slope to proper profile and preparation of bed.											
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 m ²	Skilled Unskilled	m-day m-day	3.6 9	Geotextile	sq.m.		360	



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
15.21	1507	Providing, laying and fixing of Geo-membrane all complete as per technical Specifications (overlap and wastage considered is 20%).	300 m ²	Skilled Unskilled	m-day m-day	3.6 9	Geo-membrane	sq.m.		360
15.22	1514	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	m-day	0.1	Tree branches	nos.		10
	1517			Unskilled	m-day	5.6	Bamboo	m		23
							GI wire	kg		1.5
							BA wire	kg		11.3
							Empty cement bags	nos.		30
							Boulder spall	cum		0.64
		Remarks: 1) Tree branches of dia. 150mm to 200mm and 3m to 4.5m long with jhanki covering the space 2.832 m ³ 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								



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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
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.	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		
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		



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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Type	Unit	Type	Unit		
		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 sunk 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.									
A		(For 10 no. of porcupines having 60 members)									
		Cross Section - 10cmx10cm	10 set	Skilled Unskilled	nos nos	0.5 14	cum	3T Crane (For Placing in Position)	hr	1	
							kg				
							no				
							no				
							m				



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
B		Cross Section - 15cmx15cm	10 set				PVC Pipe (25mm dia, 80Nos.@ 15cm)	m		12.00
							Concrete Grade M20 rate as per item no. 8.2	cum	3T Crane (For Placing in Position)	4.25
				Skilled	nos	0.5	Steel Rebars (8mm Main bar, 6mm stirrups)	kg		333.82
				Unskilled	nos	14	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



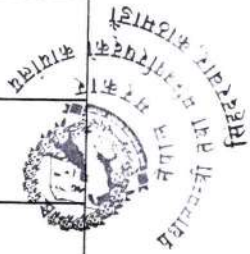
NORMS FOR RATE ANALYSIS

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



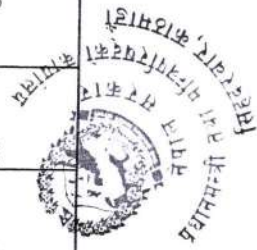
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material			Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity	Type
							rate as per item no. 8.2			(For Placing in Position)
							Steel Rebars (8mm Main bar, 6mm stirrups)	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
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 Remarks: Remaining upper portion of bamboo can be used for fabric	12 m	Skilled Unskilled	m-day m-day	0.10 0.84	Bamboo (60mm. to 80mm. Dia)	m	26.4		
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
		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 may be 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 Unskilled	m-day m-day	1.8 35	14 gauge SWG GI Wire	kg	2	Tools and Plants (Wodden Hammer/Monke y Hammer 2 Nos) 5HP Pump	3% of Labour cost hr	3	
D		6m or 6.5m below river bed	100 nos	Skilled Unskilled	m-day m-day	2 40	14 gauge SWG GI Wire	kg	2	Tools and Plants (Wodden Hammer/Monke y Hammer 2 Nos) 5HP Pump	3% of Labour cost 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
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	kg	2.5		
							SWG GI wire				
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	kg	2.5		
							SWG GI wire				
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	kg	2.5		
							SWG GI wire				
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	kg	2.5		
							SWG GI wire				



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Type	Quantity	
15.32	1515	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 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 3.25mm 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) 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.	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	Electric Drilling	hr	9



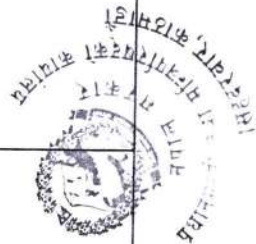
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
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 m ²	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 m ²	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 m ²	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
B		Slope > 40 Degree	100 m ²	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	Type	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 m ²	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	40 m ²	Skilled	m-day	1	3-D galvanized steel Profile	kg		138
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)		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	Type		
							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 m ²	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
ii		In slopes (> 45 degrees slope angle)	120 m ²	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



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Unit	Quantity
				Class	Unit	Quantity	Type	Unit	Type	Unit	Quantity
II	i	Manual Means In shallow slopes (< 45 degrees slope angle)	150 m ²	Skilled	m-day	2	Angular Gravel 32-63mm	cum			7.5
				Unskilled	m-day	6					
ii		In slopes (> 45 degrees slope angle)	120 m ²	Skilled	m-day	2	Angular Gravel 32-63mm	cum			6
				Unskilled	m-day	7					
I	i	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. Using Mechanical Aids In shallow slopes (< 45 degrees slope angle)	150 m ²	Skilled	m-day	1	Humus material	cum	Humus spraying machine	hr	8.2
				Unskilled	m-day	1					
ii		In shallow slopes (> 45 degrees slope angle)	120 m ²	Skilled	m-day	1	Humus material	cum	Humus spraying machine	hr	7.2
				Unskilled	m-day	1					
II	i	Manual Means In shallow slopes (< 45 degrees slope angle)	150 m ²	Skilled	m-day	2	Humus material	cum			6.75
				Unskilled	m-day	20					



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
ii		In shallow slopes (> 45 degrees slope angle)	120 m ²	Skilled	m-day	4				
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.		Unskilled	m-day	30	Humus material	cum		6
I		Driving L-nails in soft soil using small dia. pre-bored holes without using cement mortar		Skilled	m-day	3	Galvanized L-steel profile : 32mm x 32mm x 4mm	kgs		215
i		In shallow slopes (< 45 degrees slope angle)	100m	Unskilled	m-day	3			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



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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
ii		In shallow slopes (> 45 degrees slope angle)	100m	Skilled	m-day	4	Galvanized T-steel profile : 32mm x 32mm x 4mm	kgs	215
				Unskilled	m-day	4			
							scaffolding and other materials such as sand and cement admixtures accessories as necessary		
							Air compressor with pneumatic chisel attachment	hr	12
							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	

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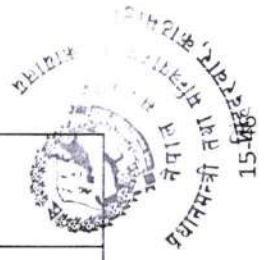
S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
							hammer head for nails, handheld or safety cables, stairs, temporary scaffolding and other materials such as sand and cement admixtures accessories as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



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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour		Construction Material		Machinery		Quantity		
				Class	Unit	Quantity	Type	Unit	Type			
ii		In shallow slopes (> 45 degrees slope angle)	100m	Skilled Unskilled	m-day m-day	6 6	Galvanized T-steel profile : 32mm x 32mm x 4mm Cement	kgs MT MT	215 0.25 0.25	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	18
										Air compressor with pneumatic chisel attachment	hr	



 नमो भगवते वासुदेवाय

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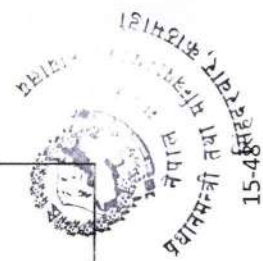
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit
E		Providing and driving of 28 mm dia (Threaded) steel nails by drilling holes of 90 mm dia using cement grouting for fixing of semi-flexible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



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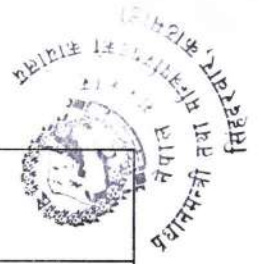
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour		Construction Material		Machinery				
				Class	Unit	Quantity	Type	Unit	Quantity			
II		On rocky soils	100m	Skilled	m-day	5	23 mm dia steel bar	MT	Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	hr	12	
				Unskilled	m-day	5						0.483
												0.6
							Cement	MT	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			
									20% of Labour Cost			



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		Quantity
				Class	Unit	Quantity	Type	Unit	Type	
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	100m						Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	12
I		On soft soils		Skilled	m-day	6	28 mm dia steel bar	MT	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
				Unskilled	m-day	6	Cement	MT		



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
II		On rocky soils	100m						temporary scaffolding and other materials such as sand and cement admixtures	
									Air compressor with pneumatic chisel attachment / excavator mounted Boring Lafitte (horizontal drilling machine)	18
				Skilled	m-day	8	28 mm dia steel bar	MT	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		



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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 stitching in four lines by approved nylon thread with stitching machine and generators, stacking and placing after loading, unloading and carriage with help of trolley within 150m lead all complete as per Drawing, Specifications and direction of Engineer	40 bags	Skilled	m-day	0.58	Empty Geobags	Nr.	Stitching Machine	0.33
15.40	1517	Supply and filling of empty cement/Polypropylene(PP) bags with local sand, stitching 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)		Unskilled	m-day	6	Sewing Thread	Rolls	Manual Trolley 3KVA Generator	1 2.67
A		Haulage upto 30m	100 bags	Unskilled	m-day	6.5	Empty sacks Sweing thread (1.5mm dia cotton/parasoot thread)	Nr. roll		100 1

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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/parasoot thread)	roll	1
A		Haulage upto 100m	100 bags	Unskilled	m-day	10	Empty sacks	Nr.	100
15.41	1518	Supply and delivery of Nylon rope crates including cutting, weaving, netting etc. with 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



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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	Type	Quantity
		(Height of Toe wall = 2m)		Unskilled	m-day	4	Geotextile River Bed material Lacing Wire	sqm cum kg		
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 Binding wire Bamboo Chachari	cum kg As required sqm		
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.		Skilled Unskilled	m-day m-day	4 4	Articulation block fabric form mattress with cable on single direction - Concrete thickness 75mm	sq.m.	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric generator set (125 KVA)	12.00 17.00 2.00



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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		Articulation Block fabric form concrete matress single directional cable AB400	100 m ²				Terra Anchors (2T)	Nr	14					
							OPC-43 grade cement	MT	4.51					
							Sand	cu.m.	5					
				Skilled	m-day	4	Articulation block fabric form matress with cable on single 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
C		Articulation Block fabric form concrete matress single directional cable AB600	100 m ²				Terra Anchors (2T)	Nr	14					
							OPC-43 grade cement	MT	6.04					
							Sand	cu.m.	7					
				Skilled	m-day	4	Articulation block fabric form matress	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.	12.00		
				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
D		Articulation Block fabric form concrete mattress single directional cable AB800	100 m ²				with cable on single direction - Concrete thickness 150 mm			Hydraulic excavator	hr.
							Terra Anchors (2T)	Nr	14	Electric generator set (125 KVA)	hr.
							OPC-43 grade cement	MT	9.02		
							Sand	cu.m.	11		
				Skilled	m-day	4	Articulation block fabric	sq.m.	128	Concrete Pump (30 to 45 cum capacity)	hr.
				Unskilled	m-day	4	with cable on single direction - Concrete thickness 200			Hydraulic excavator	hr.
							Terra Anchors (2T)	Nr	14	Electric generator set (125 KVA)	hr.
							OPC-43 grade cement	MT	11.96		
							Sand	cu.m.	14		

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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	Type	Quantity
E		Articulation Block fabric form concrete mattress 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.	Concrete Pump (30 to 45 cum capacity)	128
				Unskilled	m-day	4	Terra Anchors (2T)	Nr	Hydraulic excavator	14
							OPC-43 grade cement	MT	Electric generator set (125 KVA)	15.28
F		Articulation Block fabric form concrete mattress single directional cable AB1200	100 m ²				Sand	cu.m.		19
				Skilled	m-day	4	Articulation block fabric form mattress with cable on single direction - Concrete thickness 300 mm	sq.m.	Concrete Pump (30 to 45 cum capacity)	128
				Unskilled	m-day	4	Terra Anchors (2T)	Nr	Hydraulic excavator	14
									Electric generator set (125 KVA)	17.00
										2.00



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 15-57

NORMS FOR RATE ANALYSIS

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



NORMS FOR RATE ANALYSIS

Sl. No.	Ref. to Spec.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
D		Articulation Block fabric form concrete mattress bi directional cable AB800	100 m ²	Skilled	m-day	4	Sand	cu.m.	Concrete Pump (30 to 45 cum capacity)	11	12.00
				Unskilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 200 mm	sq.m.	Hydraulic excavator	128	17.00
							Terra Anchors (2T)	Nr	Electric generator set (125 KVA)	14	2.00
E		Articulation Block fabric form concrete mattress bi directional cable AB1000	100 m ²				OPC-43 grade cement	MT		11.96	
							Sand	cu.m.	Concrete Pump (30 to 45 cum capacity)	14	12.00
				Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction - Concrete thickness 250 mm	sq.m.	Hydraulic excavator	128	17.00
				Unskilled	m-day	4	Terra Anchors (2T)	Nr	Electric generator set (125 KVA)	14	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	Type	Quantity
F		Articulation Block fabric form concrete mattress bi directional cable AB1200	100 m ²				OPC-43 grade cement	MT		15.28
							Sand	cu.m.		19
				Skilled	m-day	4	Articulation block fabric form mattress with cable on both direction -	sq.m.	Concrete Pump (30 to 45 cum capacity)	128
15.46	A	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 mattress comprising intermediate unwoven openings (for vegetation growth) EM400	100 m ²	Unskilled	m-day	4	Concrete thickness 300 mm		Hydraulic excavator	17.00
							Terra Anchors (2T)	Nr	Electric generator set (125 KVA)	2.00
							OPC-43 grade cement	MT		
							Sand	cu.m.		
							Environmental fabric form mattress -	sq.m.	Concrete Pump (30 to 45 cum capacity)	128
				Skilled	m-day	4	Concrete thickness 100mm		Hydraulic excavator	17.00
				Unskilled	m-day	4	OPC-43 grade cement	MT	Electric generator set (125 KVA)	2.00


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 15-61

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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 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 fascia pannels, overlaps and other protective elements for synthetic geogrids and all other activities required to complete the item in all respect including transportation.	300 m ²	Skilled Unskilled	m-day m-day	6.36 3	Sand Synthetic geogrid Water charges	cu.m. sq.m 1% of labour cost	7 300
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 mechanically 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 reinforcing hexagonal steel wire mesh has mechanical characteristics 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

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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	Type		
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 Accessories Cost	Sqm	116	5% of material cost	
				Skilled UnSkilled	m-day m-day	1.5 7					



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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
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 Coupler	RM	3
				Skilled	m-day	10	Nut	Nos	1
				UnSkilled	m-day	8.75	Anchor Plate	Nos	1
							Cement slurry for Grout	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), 1500kl 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	Type	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								

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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	Quantity
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.	45 m ²	Highly skilled Climber	m-day	3.49	Complete Material	Sqm	45		
				Skilled UnSkilled	m-day m-day	6.5 10.9	Accessories Cost	5% of material cost			
				Highly skilled Climber	m-day	14	Rockfall barrier -8500 KJ (7m)	RM	1		
				Skilled Unskilled	m-day m-day	22 20	Other tool & tackles	5% of material cost			
							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	Type	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.	1 m ³							
A		Manual means		Skilled	m-day	0.3	Cement	MT		
				Unskilled	m-day	4	RBM	cum		
		Remarks: RBM: River Bed Materials					Water	KL		

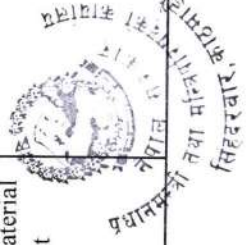
Note : Department of Water Resources and Irrigation does not have any intention to promote or suggest any particular commercial brand or company; however, new technologies available in market are suggested without prejudice and if may be the case of any particular commercial brand or company, equivalent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



 नेपाल सरकार
 जल संसाधन विभाग
 प्रधानमन्त्री तथा
 सिद्धार्थनगर

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
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 Accessories Cost	Sqm	116	5% of material cost	
				Skilled UnSkilled	m-day m-day	1.5 7					



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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 Coupler	RM	Rent for Drifter	3
				Skilled	m-day	10	Nut	Nos	Rent for Compressor	1
				UnSkilled	m-day	8.75	Anchor Plate	Nos	Grouting Machine	1
							Cement slurry for Grout	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



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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	Type	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
15.54	1524	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
				Skilled UnSkilled	m-day m-day	6.5 10.9	Accessories Cost	5% of material cost	
				Highly skilled Climber	m-day	14	Rockfall barrier -8500 KJ (7m)	RM	1
				Skilled Unskilled	m-day m-day	22 20	Other tool & tackles	5% of material cost	
							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.	1 m ³										
A		Manual means		Skilled	m-day	0.3	Cement	MT	0.32				
				Unskilled	m-day	4	RBM	cum	1.295				
		Remarks: RBM: River Bed Materials				Water	KL	0.13					

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
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 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 fascia pannels, overlaps and other protective elements for synthetic geogrids and all other activities required to complete the item in all respect including transportation.	300 m ²	Skilled Unskilled	m-day m-day	6.36 3	Sand Synthetic geogrid Water charges	cu.m. sq.m 1% of labour cost	7 300	
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 mechanically 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 reinforcing hexagonal steel wire mesh has mechanical characteristics 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	



Rate Analysis Norms

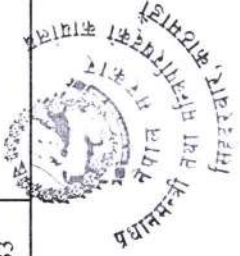
Drilling by Rotary Drilling Method

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit
16.1		Site preparation for drilling works									
A	1600	Rig setting up and preparation of mud pit	1 well	Skilled	m-day	2.00					
B		Access road preparation		Unskilled	m-day	10.00					
C		Camp setting and preparation including site clearance	1 well	Skilled	m-day	1.00					
D		Assembling, centralizing and sinking of guide pipe (conductor of pipe) of size 22"-30" dia. to a depth of 10m	10 m	Unskilled	m-day	10.00					
				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
				Unskilled	m-day	110.00	Barite	ton	0.25	Ele. Generator	hrs
							Drill bit	nos.	0.33		
							Oxygen gas	Cyl.	0.20		
							Acetylene 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		Qty.	Unit	
				Class	Unit	Qty.	Type	Unit	Type			
		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	1600	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													
<u>Drilling in hard formation (Pilot hole)</u>													
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				
							Acetylene 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	5.50	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.
Reaming of Tubewell												
16.5		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			
							Acetyne 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.														
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). (Refer to item 16.5 (B)).	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					
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		Qty.	Unit	
				Class	Unit	Qty.	Type	Unit	Type			
16.7		Drilling in hard formation (first reaming of pilot hole)										
A		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			
	1600	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			
C		(Refer to item 16.5 (B)).										
		Add 5% of 16.7 A and 16.7 A for Consumable Items of mud pump.										



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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					
							Acetylene gas	Cyl.	0.05					
							Water	KL	33.30					
<u>Note:</u> * 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					
<u>Note:</u> *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		Qty.	Unit	
				Class	Unit	Qty.	Type	Unit	Type			
16.9		Drilling in medium formation (Second reaming of bore hole)										
A		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			
<u>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.</u>												
**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			
<u>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.</u>												
**(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		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
<u>Note:</u> *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	1600	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			
<u>Note:</u> *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										
							Oxygen gas	cyl	1.00										
C		(Refer to item 16.5 (B)).					Acetylene 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															
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		Unit	Qty.						
				Class	Unit	Qty.	Type	Unit	Type								
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	1600	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									
						Acetylene 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 occurred by sidefall in the bore hole.											
E		**Add 5% of 16.12 A for Consumable Items.											
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		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	1600	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		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			
		<u>NOTE:</u> There is no change in rate regarding depth beyond 100m						Water	KL	21.00		
E	1600	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		
F		<u>NOTE:</u> There is no change rate in regarding depth beyond 100m	1 well				Sodium hexa Methaphosphate	kg	20.00			
							Water	KL	21.00			
				Skilled	m-day	7.00	Bucket	nos.	1.00	Rig machine	hr	24.00
		<u>NOTE:</u> There is no change in rate regarding depth beyond 100m						Liner	nos.	0.25	Generator	hr
							Piston Rod	nos.	0.25	Pickup truck	hr	7.00
							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	
B	Rate analysis formula for different capacity pumps of various hydraulic head: 16.13 III A*{(Submersible pump capacity in horse power)/7.5}											



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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		<u>Pump test for deep tubewell</u>												
A		Time draw down pump test for deep tubewell (Aquifer test) <u>NOTE:</u> 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	1600	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			
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		Type	Unit		
				Class	Unit	Qty.	Type	Unit	Qty.				
16.15		<u>Logging of borehole</u>											
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		
								Electric generator	hrs	12.00			
		<u>NOTE:</u> The rate for electrical logging includes all necessary tools etc. and is the same for all types and depth of bore holes.											
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 characteristics 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)}											



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Rate Analysis Norms

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
16.19		<u>Site preparation for drilling works</u>									
A	1600	Rig setting up and prepeparation of mud pit	1 well	Skilled	m-day	2.00					
B		Camp setting and preparation including site clearance	1 well	Unskilled	m-day	10.00					
C		Assembling, centralizing 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					
D		Access road preparation		Unskilled	m-day	10.00					
		Refer to civil norms		Same rate as of 16.1							
16.20		<u>Drilling in Soft formation (Pilot hole)</u>									
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	Ber-tonite	ton	1.50	Rig machine	hrs
				Unskilled	m-day	84.00	Barite	ton	0.25	Ele. Generator	hrs
							Dri.1 bit (Chisel)	nos.	0.33		
							Bailer	nos.	0.30		
							water	kl	50.00		
		<u>NOTE:</u> Working time of all manpower and machinery includes idle hours as well as sample collection, washing and rod changing with minor break down time									



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.	
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		<u>Drilling in medium formation (Pilot Hole)</u>											
A		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				
1600		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				



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.	
				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		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					
B	1600	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.									



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Rate Analysis Norms

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
16.23		Site preparation for drilling works									
A		Rig setting up	1 well	Skilled	m-day	1.00					
B		Camp setting and preparation including site clearance	1 well	Unskilled	m-day	5.00					
				Skilled	m-day	1.00					
				Unskilled	m-day	10.00					
C	1600	Assembling, centralizing 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					
D		Access Road Preparation (Refer to Civil Norms)		Unskilled	m-day	10.00					
16.24		Drilling in Hard Formation									
		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
				Unskilled	m-day	50.00	Oxygen gas	Cyl.	0.20	Diesel Generator	hrs
							Acetylene gas	Cyl.	0.10	Compressor	hrs
							Welding Rod	Pkt.	5.00		
A	1600	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									



Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type
16.25		Drilling in Medium Formation								
		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
				Unskilled	m-day	36.00	Oxygen gas	Cyl.	0.20	Diesel Generator
							Acetelyne gas	Cyl.	0.10	Compressor
							Welding Rod	Pkt.	5.00	
A	1600	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								
		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
				Unskilled	m-day	30.00	Oxygen gas	Cyl.	0.20	Diesel Generator
							Acetelyne gas	Cyl.	0.10	Compressor
							Welding Rod	Pkt.	5.00	
A	1600	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								



Rate Analysis Norms

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
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					
B				Unskilled	m-day	1.50					
I		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									
a		Initial 20 meter depth	20m	Skilled	m-day	3.00				Drilling Tools & Plant	LS
		For layer testing/pilot hole		Unskilled	m-day	18.00					10% of Labour Cost
b		Reaming of pilot hole by standard bit (hole size upto 6.5")	20m	Skilled	m-day	2.00				Drilling Tools & Plant	LS
				Unskilled	m-day	8.00					10% of Labour Cost
c		Lowering of pipe	20m	Skilled	m-day	1.00				Drilling Tools & Plant	LS
				Unskilled	m-day	3.00					10% of Labour Cost



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 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	
b		Reaming of pilot hole by standard bit (hole size upto 6.5")	20m	Unskilled	m-day	3.00							
				Skilled	m-day	0.50				Drilling Tools & Plant	LS	10% of Labour Cost	
c		Lowering of pipe	20m	Unskilled	m-day	2.00							
				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							



Rate Analysis Norms

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material			Machinery			Qty.	Qty.
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit		
16.28		<u>Pump test for shallow tubewell</u>											
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	6.00
				Unskilled	m-day	4.80	Gland Packing	set	5.00	Pickup truck	hr	2.00	2.00
										Generator	hr	2.00	2.00
										Orifice	hr	6.00	6.00
										water table indicator	hr	6.00	6.00
										4" pipe	hr	6.00	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	6.00
				Unskilled	m-day	4.80	Gland Packing	set	5.00	Pickup truck	hr	6.00	6.00
										Generator	hr	2.00	2.00
										Orifice	hr	2.00	2.00
										water table indicator	hr	6.00	6.00
										4" pipe T	hr	6.00	6.00
C		Recovery test for shallow tubewell	1 well	Skilled	m-day	1.50				Water table indicator	hr	3.00	3.00
				Unskilled	m-day	3.50							



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.							
16.29		Dugwell Construction using RCC Rings																	
A		Site Preparation /Camp Setting	1 well	Skilled	m-day	1.50													
B		Digging well, Lifting excavated materials and disposal all complete up to 10m lead.		Unskilled	m-day	3.00													
i)		Formation Type : Soft																	
a	1600	0 to 4m deep digging and lifting	1 m ³	Unskilled	m-day	1.65													
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																	



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
ii)		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)	1600	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									

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour			Construction Material			Machinery	
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit
C		Dewatering during digging of dugwell	1 Well	skilled	m-day	1.50				Pump 5-7 HP	hr
				Unskilled	m-day	3.00					
D	1600	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
				Unskilled	m-day	3.00					



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SECTION 17: BIO-ENGINEERING WORKS

S.N.	Ref. to SS.	Description of work	Resources						
			Unit	Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
17.1	1702	<u>Collection and preparation of seeds</u> 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
B		Large Shrub Seeds	1 Kg	Unskilled	m-day	2.00	Sealed bag	no.	1.0 Khukuri
C		Medium-sized Shrub Seeds (eg. Keraukose)	1 Kg	Unskilled	m-day	3.00	Sealed bag	no.	1.0 Nanglo
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
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
									3% of labour cost
									3% of labour cost
									3% of labour cost
									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
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. Kerakose)	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 propagation.							
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	Resources						
			Labour		Construction Material		Machinery		Quantity
			Class	Unit	Quantity	Type	Unit	Type	
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.	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	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)	Skilled Unskilled	m-day m-day	1.5 2.0	Bamboo Polythene Bricks Gravel	nos. sqm. nos. cum.	9.00 Khanti 9.00 Shovel 96.00 Pick axe 0.25	3% of labour cost
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.				Unsieved soil	cum.	Screen mesh & others	

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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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	cum.	0.38 Shovel
							Forest soil	cum.	1.46 Pick axe
							Compost	cum.	0.38
							Washed sand	cum.	6.00
							Hessian Jute	sqm.	25.00
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
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	nos.	Trowel & others
							Sand	cum.	1050.00 Sieve
							Soil	cum.	0.46 Shovel & others
							Compost	cum.	0.70
									0.23
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	nos.	1500.0 Sieve
							Wooden peg	nos.	1.0 Shovel & others

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S.N.	Ref. to SS.	Description of work	Resources						
			Unit	Labour		Construction Material		Machinery	
				Class	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
E		Pricking out tree seedlings and transplanting into beds	1000 nos.	Unskilled	m-day	0.12	Wooden peg	nos.	1.0
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
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
17.6	1705	Preparation of raised materials for extraction from the nursery		Unskilled	m-day	1.00	Hessian jute	sqm.	2.70
A		Grass culm cutting production from nursery stock; single or double node (e.g. napier).		Unskilled	m-day	1.00	Hessian jute	sqm.	2.70

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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Unit
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
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.		Pickaxe Khukuri
17.7	1705	Compost and mulch production	14 m ²	Unskilled	m-day	1.2				
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)		Unskilled	m-day					Hasiya Doko
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
C		Turning compost once per month. (thickness 7cm)	14 m ²	Unskilled	m-day	0.10				Shovel

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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	Unit
17.8 A	1707	Direct seeding on site Broadcasting grass seeds on slopes < 40°, seeding rate 25 gm/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	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.	Unskilled	m-day	6.25	Seed mulch Jute Net Live Pegs	kg cum. sq.m nos.	2.5 5.0 105.0 128.0	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.	Unskilled	m-day	1.0	Seed	nos.	3200	3% of labour cost

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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources				Machinery				
				Labour		Construction Material						
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
17.9 A	1707	Planting grass cuttings on site	100 nos.	Unskilled	m-day	0.40	Grass cuttings nos. Hessian jute sqm.	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 nos. Hessian jute sqm.	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 nos. Hessian jute sqm.	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.										



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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material			Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity	Unit
I			1 m	Unskilled	m-day	0.04	Grass Slips / no of drill cuttings	nos.	11.00	Mild steel rod or hardwood peg of 50 cm length
II			1 m ²	Unskilled	m-day	0.08	Hessian jute Line String	sqm. m	0.14 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.	22.00 0.28 1.00	Mild steel rod or hardwood peg of 50 cm length
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	Hessian jute	sqm.	100 0.27	Mild steel rod or hardwood peg of 50 cm length

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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
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.	Mild steel rod or hardwood peg of 50 cm length	3% of labour cost
							Hessian jute	sqm.		
17.10		Planting shrub and tree seedlings and cuttings on site	10 nos.	Unskilled	m-day	0.25	Container Seedlings	nos.	Khanti	
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	Compost	cum.	Mallet (wooden hammer)	3% of labour cost
							Tree guard	nos.		
							Green mulch	cum.	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.	Khanti	3% of labour cost
							Compost	cum.	Doko	
							Green mulch	cum.		

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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	
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 Compost Green mulch	nos. cum. cum.	10.00 0.05 0.04	Khanti Doko		3% of labour cost
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 Compost Green mulch	nos. cum. cum.	10.00 0.03 0.04	Khanti Doko		3% of labour cost
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 Compost Green mulch	nos. cum. cum.	10.00 0.03 0.04	Khanti Doko		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
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
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. (Applicable if material is available)	1000 nos.	Unskilled	m-day	0.85	Adequate supply of bushes.		Khukhuri
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
									3% of labour cost
									3% of labour cost



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सिंहदरवार, काठमाडौं

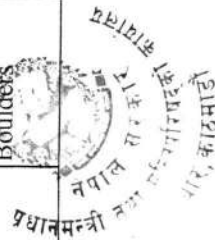
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Resources						Machinery		
			Unit	Labour		Construction Material		Material		Unit	Quantity
				Class	Unit	Quantity	Type	Unit	Quantity	Type	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	3% of labour cost
							Woven jute net	sqm.	1.00		
							Hardwood cuttings or split 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	Wire	kg	2.0	Gabion frame & tools	3% of labour cost

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योजना

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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	3% of labour cost
			Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	
D		Construction of 30 cm bolster cylinder: placing, stretching wire mesh, filling with boulders, closing and backfilling.	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.	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.	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	Unskilled	m-day	0.75	Black polythene Boulders	sqm. cum.	1.90 0.36	Gabion Tools Doko		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	
17.14 A	1710	Bamboo tree guards 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 A	1711	Turfing 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:												
B		1)Add cost of long distance transportation as required from available source to the work site.										
		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	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
		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)										

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S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour		Construction Material		Machinery				
				Class	Unit	Quantity	Type	Unit	Quantity			
D		Remarks; 1)Add cost of long distance transportation as required from available source to the work site. 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 Unskilled	m-day m-day	1.0 10.0	Seeds Sludge/Farm Yard Manure	kg Kg	3.60 172.00	Tractor Trolley	hr	2.0
17.16	1711	Remarks: 1) In case of plastic netting, the cost of Bitumen Eulsion will not be required. Spreading of Sludge Farm Yard Manure or/and good Earth Providing and spreading of sludge farm yard manure or/and good earth in required thickness. Remarks:	15 m3	Skilled Unskilled	m-day m-day	0.04 1	Bitumen Emulsion Jute/Plastic Netting (Open weave 2.5cm square opening) Water for 3 month	Lt sqm. KL	55.20 264.00 84.00			



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
			Class	Unit	Quantity	Type	Unit	Quantity	Unit
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 Unskilled m-day	1 87	Sapling Decayed farm yard/sludge manure	Nos MT	1600 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 Pesticides for maintenance Cost of water	kg kg KL	2.75 8 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							



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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			
B		Fixing Line Alignment	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			
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			
E		Transportation of plants (1 Labour can carry 500 sets/day in plantation area)	1 ha	Unskilled	m-day	31.25			

Remarks: Add transportation cost from nursery to plantation area



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	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) (Cow dung to be mixed with excavated soil /burrowed soil (125m ³) and used in pits at least 100gm per pit before plantation and the remaining soil to be spreaded around the pits after plantation)	1 ha	Unskilled	m-day	5	Cow dung	MT	5
H		Plantation	1ha	Skilled	m-day	1	Plants-Napier	Nos	17188
				Unskilled	m-day	50	/ Vetiver		
		Remarks: Add Travel Allowance for Skilled Manpower							
I		Watering and Watchman for Protection of Plants (For 4 Months @ 2 labours/day)	1 ha	Unskilled	m-day	240			
J		Bamboo fencing (For protection of plantation area, where required)	100m	Skilled	m-day	6	Bamboo	Nos	41
				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.						Tools and Plants	
								3% of Labour Cost	



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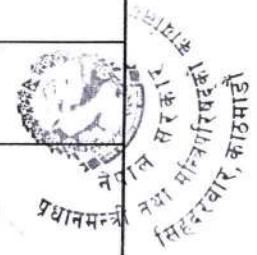
S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
			Class	Unit	Quantity	Type	Unit	Quantity	Unit
		3. Add cost of borrowed soil in case soil is borrowed from outside.							
17.21	1711	Plantation of different type of grass to cover exposed surface, 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 cum Compost	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	10	
E		Collection, Transportation and plantation of local grass (Dubho, Tande Ghas, Thakailo, Simli, Bujetro, etc)	100 m ²	Unskilled	m-day	4	Grass Seed	1	
		Remarks: Add cost of watering and compost.							



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S.N.	Ref. to SS.	Description of work	Resources						
			Labour		Construction Material		Machinery		
			Class	Unit	Quantity	Type	Unit	Quantity	Unit
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	Unskilled	m-day	1.46				
B		Excavation of Bamboo with roots	Unskilled	m-day	3				
C		Bamboo Plantation	Unskilled	m-day	1	Bar-boo Root	Nos	16	
D		Bamboo fencing (For protection of plantation area)	Skilled	m-day	6	Compost	kg	50	
			Unskilled	m-day	15	Bamboo Nails (2.5" to 3")	Nos	41	3% of Labour Cost
					14 gauge SWG Wire	kg	kg	10	
E		Watering and Watchman for Protection of Plants (For 3 Months @ 0.3 labours/day/spot)	Unskilled	m-day	27			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
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) Excavation in Slope for benching (1/2*0.3*0.45*20*5 m3)	100 m ²	Unskilled	m-day	4.73			
A									
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 Remarks: Add Travel Allowance for Skilled Manpower	1 ha	Skilled Unskilled	m-day m-day	2 65	Plants Sweet Soil Compost	Nos cum MT	17188 125 5
D	i	Protection by Bamboo Fabric Bamboo Fabric Preparation (20 cm high fabric and 50m long)	10 m ²	Unskilled	m-day	4.02	Bamboo 14 gauge SWG wire	Nos kg	8.33 1.5
								Tools and Plants	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	Unit	Quantity	
ii		Bamboo strong pegs preparation (Each Peg 0.6m long and 3.5cm wide @ 30cm centre to centre)	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	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	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



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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
17.26		Field Visit Survey/Study for Bio -Engineering works as required	1 ha	Unskilled	m-day	2	Rope	kg	2	T&P(Peak,etc)	3% of Labour cost
A		Field Visit Works		Skilled	m-day	2					
B		Collection of soil sample and local plants/species	1 ha	Unskilled	m-day	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	m-day	5					
		Unskilled			m-day	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.									



2.9.2.4

NORMS FOR RATE ANALYSIS

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
m ²	:	Square metre
m ³	:	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



NORMS FOR RATE ANALYSIS

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 : Saffet Yagiz (2006) : $ROP = 1.11 + 0.439 \log a + 0.0288 PI - 0.216 F_s - 0.0096 \sigma_1 - 0.00252 \sigma_c$ Where, ROP = Rate of Penetration in m/hr $a = \arcsin(\sin \alpha_t \cdot \sin (\alpha_t - \alpha_s))$ α_t = dip amount of major bedding α_s = 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_1 = tensile strength of intact rock After obtaining this theoretical progress rate which is reasonable for hourly penetration , this theoretical progress rate shall be reduced by 50% (Paul et. Al 2012) to find the daily advance rate. And, E. Farrokh (2020) : $ARw = \exp (3.67 - 0.000589 UCS - 0.0851 D + 0.0285 Dc + 0.0988M) \times 0.9$ 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
ii)	UCS	



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S.N.	Ref. to SS.	Description of work
18.2		Progress Rate of Double Shield TBM for Extraordinary Case : For squeezing condition - 30% of Normal Progress Rate For Geothermal, slabbing and rock brusting condition - 40% of Normal Progress Rate For high water ingress condition - 50% of Normal Progress Rate 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.



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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
18.3 1	UCS	Excavation , De-mucking and Segment Lining of 5-6.5m finished diameter Tunnel by Double Shield Tunnel Boring Machine a. Working Shift (Each Working shift is of 10 hours)	each hour	TBM	man- hour	1				
				Specialist/Pit Boss (highly skilled)	man- hour	1				
				Geologist (highly skilled)	man- hour	1				
				TBM Operator (highly skilled)	man- hour	1				
				Tunnel Electrician (highly skilled)	man- hour	1				
				Tunnel Foreman (highly skilled)	man- hour	2				
				Locomotive Driver (highly skilled)	man- hour	1				
				Tunnel Fitter/Segment Erector (highly skilled)	man- hour	1				
				Equipments Mechanics (skilled)	man- hour	1				
				Crane Operator (skilled)	man- hour	4				
				Tunnel Labours (unskilled)	man- hour	10				
				TBM Specialist	man- hour	1				
	Peagravel	b. Maintenance Shift (Each maintenance shift is of 4 hours)	each hour							



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
			rm					Track	m
			rm					Air Pipe	m
			rm					Water Pipe	m
			rm					Cabling	m
			each hour					Lighting	m
			rm					Vent Ducting	m
			each hour					Booster Fan	Nos
			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	set
								Plants	
			per					TBM	set
		c. Cost of TBM							

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.



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SECTION 18: USING TUNNEL BORING MACHINE (TBM)

Table 1 : Cutter consumption in TBM Tunneling			
SN	Ceracher Abrasivity Index	UCS (Mpa) Irrespective of UCS	Excavation Volume (m3) per
1	≤1	50	5000
2	2	100	4000
		150	2000
		200	1200
		250	900
3	3	50	750
		100	600
		150	300
		200	200
4	4	250	150
		50	400
		100	220
		150	175
5	5	200	150
		250	125
		150	120
		200	90
6	6	250	80
		300	70
		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 depends upon 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	1m	Unskilled Driller	Hr		0.25	Water	kilo liter	1	Drilling Machine/Boomer	hr	0.15	
1		Probing ahead of tunnel face for investigation, drainage,forepoling, umbrella pipe roofing, pre excavation grouting and grouting (upto 30m long 75mm dia)			Hr		0.25	Grease	kg	0.5				
					Hr		0.1	Hydraulic oil	Ltr	0.5				
					Hr		0.1	Drill Rod	No	0.05				
					Electrician	Hr		0.1	Drill Bit	No				0.05
									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	hrs	3	
				Skilled	m-day		0.5	Grease	kg	1	pump			
											Pump hoses and Pipes	3% of cost of Materials		
Remarks : For TBMs with attached pea gravel pump omit hire charge of pump.														

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S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material				Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	Qty.
18.6	1	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.)											
		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	Boomer	hrs		
							Grease	kg	2	Compressor	hrs		0.5
							Welding Rods	kg	1				
							Geotextiles(for drainage pipe wrapping 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	1	Umbrella pipe roofing and forepoles installation for tunnel											
		Installation of Umbrella pipe roofing and 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.											

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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) (Chemical Grouting or Cement)	1m ³	Unskilled Skilled	hr hr	2.5 0.5	Cement / Chemicals Water	ton kilo liter	1.2 0.6	Grouting pump Pump hoses and Pipes	hrs 3% of cost of Materials
		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) (Chemical Grouting or Cement)	1m ³	Unskilled Skilled	hr hr	2.5 0.5	Cement / Chemicals Water Packers	ton kilo liter nos	1.2 0.6 0.3	Grouting pump Pump hoses and Pipes	hrs 3% of cost of Materials
18.10	1809	Remarks : 1) The bore hole for grouting, if necessary, will be drilled in accordance with probe hole drilling norms. Backfilling of Annular space of Invert Segment with cement sand mortar (M 25)									
		Backfill cement sand mortar Grouting	1m ³	Unskilled Skilled	hr hr	2.5 0.5	Cement Water Sand Gate valves, G.I. nipp Woven Bags	ton kilo liter m ³ Nos. Nos.	0.4 0.32 0.91 0.088 49.708	Grouting pump Pump hoses and Pipes	hrs 3% of cost of Materials
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 Skilled	hr hr	10 2.5	Cement / Chemicals Water Admixture Packers	ton kilo liter kg nos	1.2 0.6 12.5 0.3	Grouting pump Pump hoses and Pipes	hrs 3% of cost of Materials
		Remarks : The bore hole for pre excavation grouting will be drilled in accordance with probe hole drilling norms.									



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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		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
18.12	1804	Excavation 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 Foreman	m-day	1	Drill steel Rod	m	Drill Jumbo	hr	6
				Sr. Foreman	m-day	1	Gelatine	kg	Trolley	hr	64
					m-day	1	Detonators	nos	Jack Hammer	hr	50
				Supervisor	m-day	1	Fuse Coils	nos	Scalling Hammer	hr	8
				Electrician	m-day	1	Other (		Drill Excavators	hr	2
				Blaster	m-day	2	Blasting Batteries,		Grinder	hr	2
				Hole Cleaner	m-day	2	Galvano meter and Blasting wire ,etc.)		Convey Muckers	hr	5
				Electrician Helper	m-day	1			Battery	hr	20
				Unskilled	m-day	12			Locomotive	hr	6
				Semi Skilled	m-day	12			D.8 Tractor	hr	
				Wiremen for Blasting	m-day	1			Dozer	hr	
									Ventilation Blower	hr	24
									Truck (6m3 capacity)	hr	48
									Air Compressor	hr	11



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S.N.	Ref. to SS.	Description of work	Unit	Resources													
				Labour		Construction Material		Machinery		Type	Unit	Quantity					
				Class	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 drilling 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 drilling 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. Thickness upto 100mm	0.1 m3	Supervisor Foreman Skilled Semi Skilled Unskilled Mechanics Electrician	hr hr hr hr hr hr hr hr	0.15 0.3 0.8 0.15 4.2 0.3 0.3	Cement Sand Aggregates (5- 10mm) Silica @5% of Cement Steel Fibers Accelerator @ 0.7% of Cement Plasticizer @ 1% of Cement	mt cum cum cum kg kg kg kg	0.045 0.11 0.06 2.25 5 0.315 0.45	Concrete Mixture Air Compressor Transit Mixture Axial Flow Fan Shotcrete Spraying Robot Working Platforms Others @ 5% of all costs	hr hr hr hr hr hr hr hr	0.15 0.081 0.15 0.5 0.081 0.081					
B		Thickness : 100mm to 150mm	0.15m3	Supervisor Foreman	hr hr	0.225 0.45	Cement Sand	mt cum	0.068 0.165	Concrete Mixture	hr	0.3					



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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
C		Thickness: 150mm to 200mm	0.2m ³	Skilled	hr	1.2	Aggregates(5-10mm)	cum	0.09		Air Compressor	hr	0.162
				Semi Skilled	hr	0.225	Silica @5% of Cement	kg	3.375		Transit Mixture	hr	0.3
				Unskilled	hr	6.3	Cement	kg	7.5		Axial Flow Fan	hr	1
				Mechanics	hr	0.45	Steel Fibers	kg	0.473		Shotcrete	hr	0.105
				Electrician	hr	0.45	Accelerator @ 0.7% of Cement	kg	0.675		Spraying Robot	hr	
							Plasticizer @ 1% of Cement	kg			Working Platforms	hr	0.105
											Others @ 5% of all costs		
				Supervisor	hr	0.3	Cement	mt	0.09		Concrete Mixture	hr	0.6
				Foreman	hr	0.6	Sand	cum	0.22				
				Skilled	hr	1.5	Aggregates(5-10mm)	cum	0.12		Air Compressor	hr	0.324
				Semi Skilled	hr	0.3	Silica @5% of Cement	kg	4.5		Transit Mixture	hr	0.6
				Unskilled	hr	8.4	Cement	kg	10		Axial Flow Fan	hr	2
				Mechanics	hr	0.6	Steel Fibers	kg	0.63		Shotcrete	hr	0.21
				Electrician	hr	0.6	Accelerator @ 0.7% of Cement	kg	0.9		Spraying Robot	hr	
							Cement	kg			Working Platforms	hr	0.21
							Plasticizer @ 1% of Cement	kg			Others @ 5% of all costs		



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



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S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
18.15	1807	Drilling holes upto 38mm dia in rock including supplying and fixing 25mm dia rock bolts slotted 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 Rock bolt 25mm dia	m m	1 1.025
							Bearing Plate, Nuts,etc	5% of material cost	
							Jack Hammer	hr	0.435



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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. By Mechanical Means	10 m ²	Skilled Unskilled	m-day m-day	0.3 3	Cement Sand Aggregate 20 mm 10 mm Water	MT cum cum cum KL	0.48 0.66 0.72 0.56 0.22	Concrete Mixer Generator Concrete Vibrator	hr hr hr	0.6 0.6 0.375
B		By Manual Means	10 m ²	Skilled Unskilled	m-day m-day	1.5 6	Cement Sand Aggregate 20 mm 10 mm Water	MT cum cum cum KL	0.48 0.66 0.72 0.56 0.22			
C		By Paving Machine	200 m ²	Skilled Unskilled	m-day m-day	2 5	Cement Sand Aggregate 20 mm 10 mm Water	MT cum cum KL	9.60 13.35 14.4 11.2 4.32	Paver Machine Transit Mixer (4 cum capacity) Lead upto 1km Lead beyond 1km, L- lead in km	hr	2.5 3.75 75L

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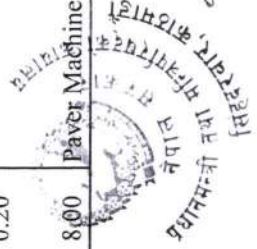
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Type		
		Remarks:									
		1. Add 10% of Paver hire charge for Other Tools, Plants and accessories									
19.2	1903	Providing and canal lining for trapezoidal 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 m ²	Skilled	m-day	0.3	Cement	MT	Concrete Mixer	hr	0.6
				Unskilled	m-day	3	Sand	cum	Generator	hr	0.6
							Aggregate	cum	Concrete	hr	0.375
							20 mm		Vibrator		
							10 mm				
							Water	KL			
B		By Manual Means	10 m ²	Skilled	m-day	1.5	Cement	MT			
				Unskilled	m-day	6	Sand	cum			
							Aggregate				
							20 mm	cum			
							10 mm	cum			
							Water	KL			
C		By Paving Machine	200 m ²	Skilled	m-day	2	Cement	MT	Paver Machine	hr	2.5
				Unskilled	m-day	5	Sand	cum	Transit Mixer (4 cum capacity)		
							Aggregate		Lead upto 1km	hr	3.75



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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	Quantity
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.	10 m ²	Remarks: 1. Add 10% of Paver hire charge for Other Tools, Plants and accessories			20 mm 10 mm Water	cum cum KL	17.1 8.7 6.00	Lead beyond 1km, L- lead in km	t-km	75L	
A		By Mechanical Means	10 m ²	Skilled Unskilled	m-day m-day	0.3 3	Cement Sand Aggregate 20 mm 10 mm Water	MT cum cum cum KL	0.40 0.43 0.57 0.29 0.20	Concrete Mixer Generator Concrete Vibrator	hr hr hr	0.6 0.6 0.375	
B		By Manual Means	10 m ²	Skilled Unskilled	m-day m-day	1.5 6	Cement Sand Aggregate 20 mm 10 mm Water	MT cum cum cum KL	0.40 0.43 0.57 0.29 0.20				
C		By Paving Machine	200 m ²	Skilled	m-day	2	Cement	MT	8.00	Paver Machine	hr	2.5	



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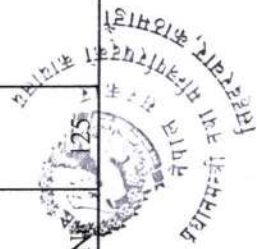
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S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		Quantity
				Class	Unit	Quantity	Type	Unit	Type	
A		In canal bed	1 m ³	Skilled Unskilled	m-day m-day	0.70 2.12	Boulder	cum		1.1
B		In canal sides (slopes)	1 m ³	Skilled Unskilled	m-day m-day	0.88 2.65	Boulder	cum		1.1
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 m ²	Skilled Unskilled	m-day m-day	5 5	Tile Cement Sand Water	Nr MT cum KL		222 0.155 0.41 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 m ²	Skilled Unskilled	m-day m-day	10 10	Tile Cement Sand Water	Nr MT cum KL		444 0.565 1.64 0.2543

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NORMS FOR RATE ANALYSIS

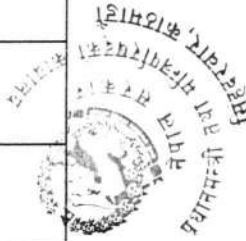
S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Quantity	Type	Unit	Quantity
19.8	1907	Providing and canal lining by laying one layer of slate of size 300 mm. X 300 mm. and pointing the joints by 1:3 cement sand mortar including haulage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



 19-6

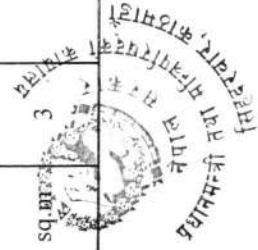
NORMS FOR RATE ANALYSIS

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 of slate 50mm	10 m ²	Unskilled	m-day	5	Cement	MT	0.015				
							Sand	cum	0.03				
							Water	KL	0.0068				
19.10	1915	Providing , laying and fixing plastic sheet of required thickness for canal lining works as per technical specifications all complete.	10 m ²	Skilled	m-day	3.9	Slate	Nr	125				
				Unskilled	m-day	5.6	Cement	MT	0.023				
							Sand	cum	0.049				
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 m ²				Water	KL	0.0104				
				Skilled	m-day	0.1	Plastic Sheet	sqm	12				
				Unskilled	m-day	0.2							
19.12	1916	Providing , laying and fixing geomembrane for canal lining works as per technical specifications all complete. Remarks: Add 3% of Unskilled labour cost for machinery tools	10 m ²	Skilled	m-day	0.1	PVC Sheet	sqm	12				
				Unskilled	m-day	2.4	Sweet soil (Col	cum	3.3				
							Geomembrane	sqm	12				
						0.2	Other Minor A	3% of material cost					



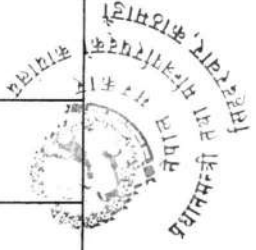
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type		
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 safety valve, perforated UPVC pipe wrapped in geotextile and graded gravel filter as per design and specifications all complete.									
A		Providing and installation of pressure release safety valve	1 no	Skilled	m-day	0.8	Pressure relief valve	no	Miscellaneous	1	5% of cost of material
							Geotextiles	sq.m		1.2	
							Gravel filter	cum		0.045	
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	Miscellaneous	6 3.6	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	Miscellaneous	6 3	5% of cost of material



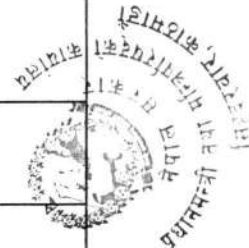
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
D		Providing and laying of graded gravel filter	1 m ³	Unskilled	m-day	1.4	Filter gravel	cum		
19.15	1917	Remarks: Add 3% of Unskilled labour cost for machinery tools 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 filter 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	Type	Quantity
19.18		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	1m ³	Skilled	m-day	0.35	Graded Filter	cum		1
B		In canal sides (slopes)	1m ³	Unskilled	m-day	0.53	Aggregates			
19.19		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	m-day	2	Bitumen	Kg		43.2
B		150 mm thick lining	30m	Unskilled	m-day	1	Fuel	Ltr		Approx
19.20		Providing and fitting 150mm. dia. vertical non return valve including nutbolt, base plate.etc. all complete.								
A			each	Skilled	m-day	0.75	Bitumen	Kg		64.8
B				Unskilled	m-day	0.5	Fuel	Ltr		Approx
19.23							Valve	Nr		1



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	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	m-day	5	Fabric form concrete mattress	sq.m.	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5	Multi-linear geocomposite drain	sq.m.	Hydraulic excavator	hr.	17
							OPC-43 grade cement	MT	Electric generator set (125 KVA)	hr.	2
							Sand	cu.m.	Tipper Truck	hr.	1

NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
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	sq.m.	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Unskilled	m-day	5	concrete mattress	sq.m.	Hydraulic excavator	hr.	17
							Multi-linear geocomposite drain	MT	Electric generator set (125 KVA)	hr.	2
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				OPC-43 grade cement	cu.m.	Tipper Truck	hr.	1
							Sand	sq.m.	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Skilled	m-day	5	Fabric form	sq.m.	Hydraulic excavator	hr.	17
D		Fabric form concrete mattress having intermediate filtration points FP600 (thickness 150mm, Filter point centre to centre horizontal and vertical spacing 200mm)	100 m ²	Unskilled	m-day	5	concrete mattress	sq.m.	Electric generator set (125 KVA)	hr.	2
							Multi-linear geocomposite drain	MT	Tipper Truck	hr.	1
							OPC-43 grade cement	cu.m.	Concrete Pump (30 to 45 cum capacity)	hr.	12
D		Fabric form concrete mattress having intermediate filtration points FP600 (thickness 150mm, Filter point centre to centre horizontal and vertical spacing 200mm)	100 m ²				Sand	sq.m.	Hydraulic excavator	hr.	17
							Multi-linear geocomposite	sq.m.			
				Skilled	m-day	5	Fabric form	sq.m.	Concrete Pump (30 to 45 cum capacity)	hr.	12
D		Fabric form concrete mattress having intermediate filtration points FP600 (thickness 150mm, Filter point centre to centre horizontal and vertical spacing 200mm)	100 m ²	Unskilled	m-day	5	concrete mattress	sq.m.	Hydraulic excavator	hr.	17
							Multi-linear geocomposite	sq.m.			
							Multi-linear geocomposite	sq.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
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			drain	Electric generator set (125 KVA)	hr.	2
						OPC-43 grade cement	Tipper Truck	hr.	1
						Sand	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Skilled	m-day	Fabric form concrete mattress	Hydraulic excavator	hr.	17
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	Unskilled	m-day	Multi-linear geocomposite drain	Electric generator set (125 KVA)	hr.	2
						OPC-43 grade cement	Tipper Truck	hr.	1
						Sand	Concrete Pump (30 to 45 cum capacity)	hr.	12
				Skilled	m-day	Fabric form concrete mattress	Hydraulic excavator	hr.	17
				Unskilled	m-day	Multi-linear geocomposite drain	Electric generator set (125 KVA)	hr.	2
						OPC-43 grade cement	Tipper Truck	hr.	1
						Sand	Concrete Pump (30 to 45 cum capacity)	hr.	12
							Hydraulic excavator	hr.	17
						OPC-43 grade cement	Electric generator set (125 KVA)	hr.	2
						Sand	Tipper Truck	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	
G		Fabric form concrete mattress having intermediate filtration points FP1200 (thickness 300mm, Filter point centre to centre horizontal and vertical spacing 405mm)	100 m ²	Skilled Unskilled	m-day m-day	5 5	Fabric form concrete mattress Multi-linear geocomposite drain OPC-43 grade cement Sand	sq.m. sq.m. MT cu.m.	128 115 18.33 22	Concrete Pump (30 to 45 cum capacity) Hydraulic excavator Electric generator set (125 KVA) Tipper Truck	hr. hr. hr. hr.	12 17 2 1	
<u>Remarks:</u>													
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 mattress having uniform cross section US300 (Manning's N value ≤ 0.018).	100 m ²	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) Hydraulic excavator	hr. hr.	12 17	



NORMS FOR RATE ANALYSIS

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



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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	5% of materials cost
				Class	Unit	Quantity	Type	Unit	Type	Unit	
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 Sealant (290ml tube)	sq.m. Nr Tube	Autofed screw driver Water pump Miscellaneous items such as safety glasses, masks, gloves, snap off knife adhesive applicator gun etc	hr hr	1 1
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			
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			
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			



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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
19.28	1921	joint (expansion and contraction joints) all complete as per drawing and technical	12 m	Skilled Unskilled	m-day m-day	0.5 0.5	rod filler High performance self levelling sealant tube (266ml)	tube	13
19.29	1916	Providing and filling high performance joint sealing compound (25 mm depth) as per drawings and technical specifications all complete.							
									3% of cost of materials
									Miscellaneous expenses including cost of applicator gun etc.
19.30	1909	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	300
									1% of labour cost
Remarks:									
1. Add 10 per cent of the cost of synthetic Composites for wastage and accessories for joining sheets with the fascia pannels, overlaps and other protective elements for synthetic Composites and other miscellaneous activities required to complete the item in all respect including transportation.									
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		Quantity	Unit	Quantity	Unit
				Class	Unit	Quantity	Type	Unit	Type				
19.31	1910	2) Take basic cost of pointing work per square metre as per item no. 13.14 (C) of Section 1300. 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. 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 kg	0.825 58.75 1.25 117.5 60 16.5	Compressor with guniting equipment with accessories Shotcreing equipment	hr	6 6	
A													



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour		Construction Material		Machinery		Quantity	Unit	
				Class	Unit	Quantity	Type	Unit	Quantity			Type
B		Thickness 75 mm	30m ²	Skilled Unskilled	m-day m-day	2 11.25	Cement Graded Sand	MT cu.m	1.2375 88.125	Compressor with guniting equipment with accessories	hr	6
							Water Aggregate (5- 10mm) Wire Fabric (Mesh 50mm*50mm size of 3 mm wire) Accerlator Compound	KL 60 kg	1.875 176.25 24.75	Shotcreing equipment	hr	6
				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 case 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.
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 Unskilled	m-day m-day	1.5 4.0	steel plate Nails Sand paper Aluminium paint	kg. kg. nos. Lt	115.0 0.5 5.0 2.0
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.							

Remarks:

1. Add 10% of the cost of steel for tools and plants and welding works



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material				Machinery		Qty.	
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit		
A		Size of Shutter = $3\text{m} \times 2.5\text{m} = 7.5 \text{ sq.m}$ 80x1.25 mm M.S. laths with 1.25 mm thick top cover	7.5 m ²	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				
B		80x1.20 mm M.S. laths with 1.20 mm thick top cover	7.5 m ²				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 m ²	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					



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 Tamil Nadu Legislative Assembly

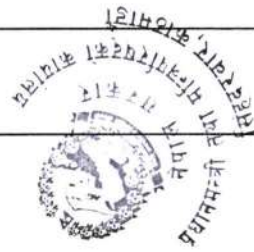
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour			Construction Material				Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
20.3	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				Miscellaneous	5% of Material Cost					
							Water Charges	1% of Total Cost					
				Skilled	m-day	9.12	1mm Thick	MT	0.05				
				Unskilled	m-day	5	MS Sheet	MT	0.0153				
							3mm Thick						
							Gusset Plate						
							40*40*6mm	MT	0.0936				
							Angle iron						
							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						
							Rivets						
							Water Charges						



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Qty.	Type	Unit	Type	Unit	Qty.
		<u>Remarks:</u> 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% wastage) =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% wastage) = 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% wastage) =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		Type	Unit	Qty.				
				Class	Unit	Qty.	Type	Unit	Qty.							
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 m ²	Skilled	m-day	16	MS Channel	MT	0.053	No	2	5% of Cost of Steel	7% of Cost of Steel	1% of Total Cost		
				Unskilled	m-day	8	MS Tee	MT	0.0127						10 % of Cost of Steel	
							Flat Iron	MT	0.06							Steel
							Rivets, Fixing Hooks and Washers									
							Arrange ments and Handles								Steel	
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/m ² = 5.76m ² * 7.85 kg/m ² * 1.1 (allowing 10% wastage) =49.738 Kg = 0.05MT B. Weight of Gusset Plate (3mm Thick) with 23.55 kg/m ² =((0.3*0.04 + 0.5*0.26 *(0.04+0.3))m ² /no. *8 no.)+(2*22/7*0.25*0.3*0.3)m ² +4*0.0528 m ²) * 23.55 kg/m ² *1.1 (allowing 10% wastage) = 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% wastage) =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% wastage) = 18.788 kg = 0.0188 MT E. For Calculation prurpose, Double leaf door size considered is 2.4mx2.4m=5.76 m ²																



2005

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
		Gate Size = 2.4m * 1.5m = 3.6 sq.m					Pulley (40mm dia) Water Charges	No 1% of	10	
		<u>Remarks:</u> 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% wastage) = 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% wastage)= 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% wastage) = 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. Span= 8 metre , Weight = 119 Kg	119 kg	Skilled	m-day	2.25	Tubes(50mm & 40mm dia) Welding Charge Water Charges	MT 10% of cost of Tubes 1% of Total Cost	0.125	
		<u>Remarks:</u> 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% wastage) = 124.90 Kg = 0.125 MT								



NORMS FOR RATE ANALYSIS

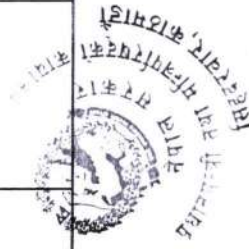
S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material		Machinery					
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit	Qty.	
20.7	2007	Providing and fencing with GI barbed wire all complete.	100 m	Skilled Unskilled	m-day m-day	0.5 1	Barbed wire Nails and hook	m kg	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.													



2.55

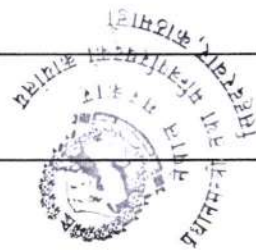
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			Qty.
				Class	Unit	Qty.	Type	Unit	Qty.	Type	
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 and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with G1staples, 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.
		Remarks: 1. Add 15 % of total cost for fabrication and primer painting.					Chain Link (25mmx25 mm mesh)	Sqm	10
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 m ²	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.					Spiral Razor Blade Wire Angle post (40mmx40mm x4mm) @ 3m c/c spacing	m kg	525 403.2
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			



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NORMS FOR RATE ANALYSIS

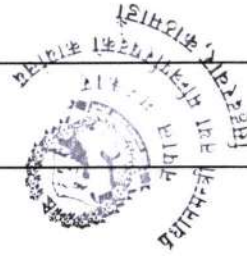
S.N.	Ref. to SS.	Description of work	Unit	Resources					
				Labour		Construction Material		Machinery	
				Class	Unit	Qty.	Type	Unit	Qty.
		Remarks: 1. Add 5% of total cost for tools and plants, binding wire, clamps, nuts and bolts, etc. Providing, Cutting, Welding, Fitting and Fixing in Position Mild Steel Stop Log Gate Where needed 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 Oxygen MS Electrodes	Cu.m Cu.m No	3.8 8.6 200
				Casting, Black smithy, Forging and Handling Jobs		40% of cost of steel	Gun Metal Rubber Seal Miscellaneous Matrerial (Screw, Bolt, Paints, Black Lead,etc)	Kg m 5% of Cost of Steel	12 2.5
		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.							



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NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			Qty.
				Class	Unit	Qty.	Type	Unit	Type	Unit	
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 Unskilled	m-day m-day	3 5	MS steel Gear box with handle hoist Welding Including rubber seal, painting, bolt,nut, washe r and other required accessories	kg set			252 1
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 Skilled Semi-Skilled Unskilled	m-day m-day m-day m-day	3 6 1.5 8.5	MS steel Flat Type Rubber Seal Screw Spindle Gear box with handle hoist Welding Including bolt,nut,washe r and other required accessories and painting	kg m set			505 6 1
								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	Type	Unit	Qty.		
		Remarks: I. 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/m ³ * 1.05 (allowing 5% wastage) = 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% wastage) = 18.9126 kg = C. Weight of Vertical MS Plate Stiffner (2000*100*5mm) = 2nos*2m*0.1m*0.005m/no*7850kg/m ³ * 1.05 (allowing 5% wastage) = 16.485 kg = 0.0165 D. Weight of Side MS Plates(2000*70*5mm) = 2nos*2m*0.07m*0.005m/no*7850kg/m ³ * 1.05 (allowing 5% wastage) = 11.54kg = 0.0115 MT E. Weight of Bottom MS Plates(2000*70*5mm) = 1nos*2m*0.07m*0.005m/no*7850kg/m ³ * 1.05 (allowing 5% wastage) = 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% wastage)=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% wastage)= 80.304 kg = 0.0803 MT H. Weight of Spindle (50mm dia) = 3.5m*(0.05*0.05*3.142/4)m ² *7850 kg/m ³ *1.05 (allowing 5% wastage)= 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.											



2009.12

NORMS FOR RATE ANALYSIS

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
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.	32.5 m	Skilled	m-day	2.5	RCC pipe	m	32.5		
A		15 cm. dia. pipe		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		



200.0

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	
F		60 cm. dia. Pipe	32.5 m	Skilled Unskilled	m-day m-day	8 31	RCC pipe Cement Sand	m MT cum	32.5 0.218 0.3				
G		75 cm. dia. Pipe	32.5 m	Skilled Unskilled	m-day m-day	9 36	RCC pipe Cement Sand	m MT cum	32.5 0.255 0.35				
H		90 cm. dia. Pipe	32.5 m	Skilled Unskilled	m-day m-day	10 46	RCC pipe Cement Sand	m MT cum	32.5 0.29 0.4				
I		120/100 cm. dia. Pipe	32.5 m	Skilled Unskilled	m-day m-day	11 71	RCC pipe Cement Sand	m MT cum	32.5 0.363 0.5				
<u>Remarks:</u> 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 Unskilled	m-day m-day	3.5 13	RCC pipe Cement Sand	m MT cum	37.5 0.096 0.15	Crane (3T)	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
B		50/60/75 cm. dia. Pipe	25 m	Skilled Unskilled	m-day m-day	3.7 14	RCC pipe Cement Sand	m MT cum	25 0.168 0.231	Crane (3T)	hr	1
G		90/100/120 cm. dia. Pipe	15 m	Skilled Unskilled	m-day m-day	3 19	RCC pipe Cement Sand	m MT cum	32.5 0.167 0.23	Crane (3T)	hr	1
21.3	2101	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 Laying HDPE Pipe-PE 80 including fitting works all complete.										
A		Butt welded joints		Skilled Unskilled	m-day m-day	1 3	Fuel (petrol)	Ltr	0.25	Generator Mechanical/ Screw Jack Other tools	hr hr	8 8
I		Outer dia. 20mm and 25mm	1000m								2.51% of labour cost	
II		Outer dia. 32mm	1000m	Skilled Unskilled	m-day m-day	1 4	Fuel (petrol)	Ltr	0.25	Generator Mechanical/ Screw Jack Other tools	hr hr	8 8
III		Outer dia. 40mm and 50mm	1000m	Skilled Unskilled	m-day m-day	1.5 4.5	Fuel (petrol)	Ltr	0.37	Generator Mechanical/ Screw Jack	hr hr	8 8



NORMS FOR RATE ANALYSIS

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



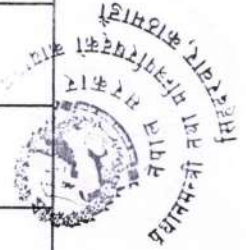
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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	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	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	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	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%								



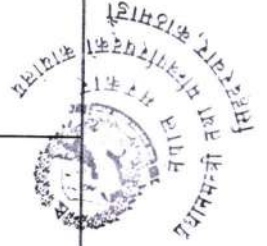
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Type		
		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. For Titan joint Inner dia. 80mm (3")	30m	Skilled Unskilled	m-day m-day	0.75 4.5				Tools & Plants and other	1% of labour cost
A											
I											
II		Inner dia. 100mm (4")	30m	Skilled Unskilled	m-day m-day	1 5.25				Tools & Plants and other	1% of labour cost
III		Inner dia. 125mm (5")	30m	Skilled Unskilled	m-day m-day	1 6				Tools & Plants and other	1% of labour cost
IV		Inner dia. 150mm (6")	30m	Skilled Unskilled	m-day m-day	1.25 7.5				Tools & Plants and other	1% of labour cost



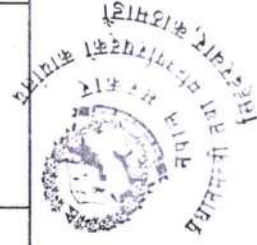
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit
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 I		For Flanged joint 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



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S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Quantity
				Class	Unit	Quantity	Type	Unit	Quantity		
III		Inner dia. 125mm (5")	30m	Skilled Unskilled	m-day m-day	2 6				Tools & Plants and other accessories	5% of labour cost
IV		Inner dia. 150mm (6")	30m	Skilled Unskilled	m-day m-day	2.5 7.5				Tools & Plants and other accessories	5% of labour cost
V		Inner dia. 200mm (8")	30m	Skilled Unskilled	m-day m-day	3 9				Tools & Plants and other accessories	5% of labour cost
VI		Inner dia. 250mm (10")	30m	Skilled Unskilled	m-day m-day	4 12				Tools & Plants and other accessories	5% of labour cost
VI		Inner dia. 300mm (12")	30m	Skilled Unskilled	m-day m-day	5 15				Tools & Plants and other accessories	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.									



NORMS FOR RATE ANALYSIS

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



21-10

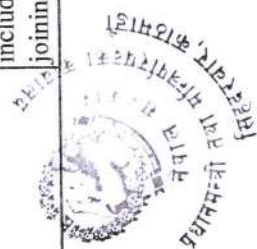
NORMS FOR RATE ANALYSIS

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) 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 Corrugated (DWC) HDPE pipe including transportation upto 250m all complete. 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							



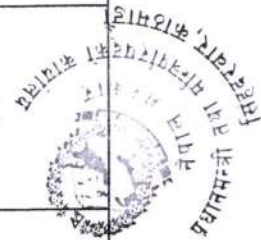
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Type	Quantity
				Class	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



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
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.
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.
21.7	2101	G.I. Pipe fitting and fixing works all complete.								
A		Metal valve, meter, 15mm ferrule, Bend, elbow, union, reducer, 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	



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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					



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
21.10 A	2101	Slotted pipe laying works Pipe of dia. 150mm	30 m	Skilled Semi-skilled Unskilled	m-day m-day m-day	2.5 1.5 4				
B		Pipe of dia. 200mm	30 m	Skilled Semi-skilled Unskilled	m-day m-day m-day	3.25 2.25 5				
21.11 A	2101	Laying of stoneware glazed pipe with all its accessories in 1:1 cement sand mortar joints all complete. Inner dia. 100mm	30 m	Skilled Unskilled	m-day m-day	6 8	Cement Sand Jute	MT cum kg		0.018 0.105 2.05
B		Inner dia. 150mm	30 m	Skilled Unskilled	m-day m-day	7 11.5	Cement Sand Jute	MT cum kg		0.03 0.2 4.75
C		Inner dia. 200mm	30 m	Skilled Unskilled	m-day m-day	8.25 13	Cement Sand Jute	MT cum kg		0.045 0.3 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	
D		Inner dia. 300mm	30 m	Skilled Unskilled	m-day m-day	12 19	Cement Sand Jute	MT cum kg	0.103 0.65 11.7				
E		Pipe of dia. 400mm	30 m	Skilled Unskilled	m-day m-day	15 22	Cement Sand Jute	MT cum kg	0.143 0.9 18.35				
F		Pipe of dia. 450mm	30 m	Skilled Unskilled	m-day m-day	16 23.5	Cement Sand Jute	MT cum kg	0.200 1.260 25.690				
G		Pipe of dia. 500mm	30 m	Skilled Unskilled	m-day m-day	18 25	Cement Sand Jute	MT cum kg	0.280 1.764 35.966				
H		Pipe of dia. 600mm	30 m	Skilled Unskilled	m-day m-day	21 28	Cement Sand Jute	MT cum kg	0.392 2.470 50.352				
I		Pipe of dia. 700mm	30 m	Skilled Unskilled	m-day m-day	24 31	Cement Sand Jute	MT cum kg	0.549 3.457 70.493				
J		Pipe of dia. 800mm	30 m	Skilled	m-day	27	Cement	MT	0.769				



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
21.12	2101	Remarks: 1) Add watchmen and miscellaneous works (approx) Laying and jointing of PVC-O (molecularly oriented) pipe including transportation upto 250m all complete.	30m	Unskilled	m-day	34	Sand	cum	4.840		
							Jute	kg	98.691		
A		Outer diameter 90/110/125/140/160/200 mm	30m	Skilled	m-day	1	Tools, Plants, Rope,				
				Unskilled	m-day	1	Lubricants/ Cement Solvent, etc.		2% of Labour Cost		
A		Outer diameter 225/250/315/355/400 mm	30m	Skilled	m-day	1	Tools, Plants, Rope,				
				Unskilled	m-day	2	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. (Assuming Length of Weep Hole = 1m)	30 m	Skilled	m-day	1	HDPE pipe 75 mm dia.	m	31.5		
				Unskilled	m-day	1	MS clamps	Nr	30		
							Cement	MT	0.02		
							Sand	cum	0.06		
							Geotextile	sqm	9		



NORMS FOR RATE ANALYSIS

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	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. Cement masonry (1:3)	1 m ³	Skilled Unskilled	m-day m-day	1.5 4.8	Cement Sand Stone	MT cu.m. cu.m.	0.194 0.42 1.1		
A											
B		Cement masonry (1:4)	1 m ³	Skilled Unskilled	m-day m-day	1.5 4.8	Cement Sand Stone	MT cu.m. cu.m.	0.159 0.45 1.1		
C		Cement masonry (1:6)	1 m ³	Skilled Unskilled	m-day m-day	1.5 4.8	Cement Sand Stone	MT cu.m. cu.m.	0.106 0.47 1.1		
22.2	2210	Supply of material and Making road side ditch form dry rubble masonry including haulage up to 30m all complete.	1 m ³	Skilled Unskilled	m-day m-day	0.47 4.25	Stone	cu.m.	1.1		
22.3	2207	Cleaning sub-grade by cutting grass including disposal up to 10m from construction site all complete	1 m ²	Unskilled	m-day	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
22.4	2207	Remarks: Add 3% of Unskilled labour cost for machinery tools							
A		Sub-grade preparation by cutting ordinary soils including disposal upto 10m all complete							
B		Up to 10 cm. Depth	1 m ²	Unskilled	m-day	0.12			
C		Up to 20 cm depth	1 m ²	Unskilled	m-day	0.18			
		Up to 30 cm depth	1 m ²	Unskilled	m-day	0.24			
22.5	2207	Remarks: Add 3% of Unskilled labour cost for machinery tools for item no.22.4							
A		Sub grade preparation by cutting GBM (Gravel Boulder Mixed) Soil including disposal upto 10 m all complete.							
B		Stone 20%-40% and 10cm. deep	1 m ²	Unskilled	m-day	0.26			
C		Stone 40%-60% and 10cm. deep	1 m ²	Unskilled	m-day	0.29			
D		Stone 20%-40% and 20cm. deep	1 m ²	Unskilled	m-day	0.36			
E		Stone 40%-60% and 20cm. deep	1 m ²	Unskilled	m-day	0.41			
F		Stone 20%-40% and 30cm. deep	1 m ²	Unskilled	m-day	0.47			
		Stone 40%-60% and 30cm. deep	1 m ²	Unskilled	m-day	0.53			
		Remarks: Add 3% of Unskilled labour cost for machinery tools for item no.22.5							



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			Quantity
				Class	Unit	Quantity	Type	Unit	Type	Unit	
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 m ²	Unskilled	m-day	11	Capping Layer	cu.m			12.5
							Water	KL			1.5
B		Up to 20 cm. high	100 m ²	Unskilled	m-day	16	Capping Layer	cu.m			25
							Water	KL			3
C		Up to 30 cm. high	100 m ²	Unskilled	m-day	21	Capping Layer	cu.m			37.5
							Water	KL			4.5
Remarks: Add 3% of Unskilled labour cost for machinery tools for item no.22.6											
22.7	2207	Rolling of filled soils (in 22.6 above) in layers	100 m ³	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					



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			
				Class	Unit	Quantity	Type	Unit	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 m ²	Unskilled	m-day	1.5	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.09
B		12.5 cm. solid depth	10 m ²	Unskilled	m-day	1.7	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.11
C		15 cm. solid depth	10 m ²	Unskilled	m-day	1.9	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.13
D		20 cm. solid depth	10 m ²	Unskilled	m-day	2.1	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.18
E		25 cm. solid depth	10 m ²	Unskilled	m-day	3	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.23
F		30 cm. solid depth	10 m ²	Unskilled	m-day	3.5	Gravel Water	cu.m. KL	Road Roller (8-10) MT	hr.	0.28
G		40 cm. solid depth	10 m ²	Unskilled	m-day	4.5	Gravel Water	cu.m. KL	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	Type	Quantity
22.10	A	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 10 cm. solid thickness	10 m ²	Unskilled	m-day	1.4	Coarse Aggregate	cu.m.	Road Roller (8-10) MT	1.352
							Screening material			
							Binding material			
							Water			
B		15 cm. solid thickness	10 m ²	Unskilled	m-day	2.1	Coarse Aggregate	cu.m.	Road Roller (8-10) MT	2.025
							Screening material			
							Binding material			
							Water			
C		25 cm. solid thickness	10 m ²	Unskilled	m-day	3.2	Coarse Aggregate	cu.m.	Road Roller (8-10) MT	3.375
							Screening material			
							Binding material			
							Water			



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material			Machinery	
				Class	Unit	Quantity	Type	Unit	Type	Quantity
22.11 A	2208	Rolling by road roller of 8-10 M.T Sub-base course	100 m ³						Road Roller (8-10) MT	3
B		Base course	100 m ³						Road Roller (8-10) MT	4
22.12 A	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 6 cm. solid thickness	10 m ²	Unskilled	m-day	1	Coarse Aggregate Sand Clay Water	cu.m. cu.m. cu.m. KL	Road Roller (8-10) MT	0.024
B		7.5 cm. solid thickness	10 m ²	Unskilled	m-day	1.2	Coarse Aggregate Sand Clay Water	cu.m. cu.m. cu.m. KL	Road Roller (8-10) MT	0.03
C		8 cm. solid thickness	10 m ²	Unskilled	m-day	1.3	Coarse Aggregate	cu.m.	Road Roller (8-10) MT	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	Quantity
D		10 cm. solid thickness	10 m ²	Unskilled	m-day	1.5	Sand Clay Water Coarse Aggregate	cu.m. cu.m. KL cu.m.	0.213 0.096 0.32 1.333	Road Roller (8-10) MT	Hr.	0.04	
E		12 cm. solid thickness	10 m ²	Unskilled	m-day	1.8	Sand Clay Water Coarse Aggregate	cu.m. cu.m. KL cu.m.	1.6 0.3 0.144 0.48	Road Roller (8-10) MT	Hr.	0.048	
F		14 cm. solid thickness	10 m ²	Unskilled	m-day	2.1	Sand Clay Water Coarse Aggregate	cu.m. cu.m. KL cu.m.	1.866 0.373 0.168 0.56	Road Roller (8-10) MT	Hr.	0.056	
G		15 cm. solid thickness	10 m ²	Unskilled	m-day	2.3	Sand Clay Water Coarse Aggregate	cu.m. cu.m. KL cu.m.	2 0.4	Road Roller (8-10) MT	Hr.	0.06	



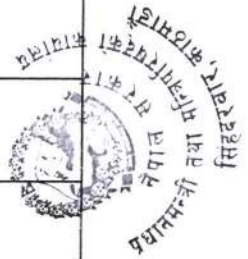
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources																							
				Labour		Construction Material		Machinery																			
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity															
22.13	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 all complete	10 m ²	Unskilled	m-day	1	Clay Water	cu.m. KL	0.18 0.60	Road Roller (8-10) MT	Hr.	0.024															
A	6 cm. solid thickness												0.794	cu.m.	0.16	Hr.	0.032										
B	8 cm. solid thickness																	1.087	cu.m.	0.213	Hr.	0.04					
C	10 cm. solid thickness																						1.333	cu.m.	0.266	Hr.	0.048
D	12 cm. solid thickness																										
E	14 cm. solid thickness	1.866	cu.m.	Road Roller (8-10) MT	Hr.	0.056																					



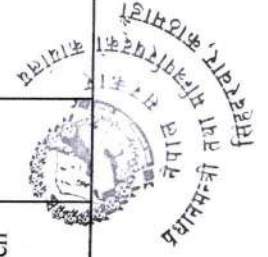
NORMS FOR RATE ANALYSIS

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



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery			Quantity
				Class	Unit	Quantity	Type	Unit	Type	Unit	
B		on other road surface	10 m ²	Unskilled	m-day	0.2					
22.17	2212	Providing and applying tack coat as per specification all complete.									
A		On old pitch surface	10 m ²	Unskilled	m-day	0.2	Bitumen	kg.	Boiler	hr	0.04
							Kerosene	ltr	Sprayer	hr	0.04
							Firewood(Boiler)	kg.			
							Firewood(Mass)	kg.			
							Firewood(Patch)	kg.			
B		On base course	10 m ²	Unskilled	m-day	0.2	Bitumen	kg.	Boiler	hr	0.04
							Kerosene	ltr	Sprayer	hr	0.04
							Firewood(Boiler)	kg.			
							Firewood(Mass)	kg.			
							Firewood(Patch)	kg.			



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
22.18 A		Providing and applying priming coat as per specification all complete. On old pitch surface	10 m ²	Unskilled	m-day	0.2	Bitumen	kg.	Boiler	0.04
							Kerosene	ltr	Sprayer	0.04
							Firewood(Boiler)	kg.		
							Firewood(Mass)	kg.		
							Firewood(Patch)	kg.		
B		On base course	10 m ²	Unskilled	m-day	0.2	Bitumen	kg.	Boiler	0.04
							Kerosene	ltr	Sprayer	0.04
							Firewood(Boiler)	kg.		
							Firewood(Mass)	kg.		
							Firewood(Patch)	kg.		
22.19	2213	Providing and applying one coat surface dressing including compaction as per specification all complete	10 m ²	Unskilled	m-day	0.45	Bitumen	kg.	Roller	0.04
							Kerosene	ltr	Boiler	0.04
							Firewood(Boiler)	kg.	Sprayer	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
22.20	2213	Providing and applying Two coat surface dressing including compaction as per specification all complete	10 m ²	Unskilled	m-day	0.8	Firewood(Mass	kg.	32		
							Firewood(Patch	kg.	48		
							Aggregate 12mm	cum	0.15		
							Bitumen	kg.	34	Roller	hr
22.21	2214	Providing and applying Semigrouting work incl. compaction as per specification all 5cm. Thickness	10 m ²	Unskilled	m-day	1.2	Kerosene	ltr	approx	Boiler	hr
							Firewood(Boiler)	kg.	13	Sprayer	hr
							Firewood(Mass	kg.	52		
							Firewood(Patch	kg.	78		
A							Aggregate 12mm	cum	0.18		
							Aggregate 10mm	cum	0.1		
							Bitumen	kg.	35	Roller	hr
							Kerosene	ltr	approx	Boiler	hr
							Fuelwood For			Sprayer	hr



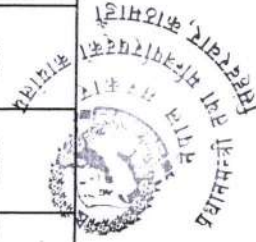
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources								
				Labour			Construction Material			Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type	Unit	Quantity
B		10cm. Thickness	10 m ²	Unskilled	m-day	2.0	Boiler	kg.	12			
							Masswork	kg.	48			
							Patchwork	kg.	72			
							Aggregate 38mm	cum	0.6			
							Aggregate 12mm	cum	0.15			
							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			
22.22	2214	Providing and applying 5cm thick full grouting works including compaction as per specification all complete	10 m ²	Unskilled	m-day	1.2	Patchwork	kg.	108			
							Aggregate 38mm	cum	1.2			
							Aggregate 12mm	cum	0.3			
							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 m ²	Unskilled	m-day	0.45	Aggregate 38mm	cum	0.6								
							Aggregate 12mm	cum	0.15								
							Bitumen	kg.	15								0.04
							Kerosene	ltr	approx								0.04
							Fuelwood for Boiler	kg.	6								0.04
							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 m ²	Unskilled	m-day	0.45	Cut-Back Bitumen Cheese	kg.	9.6								0.04
							Kerosene	ltr	approx								0.04
							Fuelwood for Boiler	kg.	4								0.04
							Masswork	kg.	16								
							Patchwork	kg.	24								
							Coarse Sand	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	Quantity
22.25	2218	Providing and laying 40mm. thick premix asphalt concrete including compaction as per specification all complete	10 m ²	Unskilled	m-day	1	Cut-Back Bitumen Cheese	kg.	46	Roller	hr	0.11	0.11
							Kerosene	ltr	approx	Sprayer	hr	0.11	0.11
							Fuelwood for			Mixer	hr	0.11	0.11
							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 m ²	Unskilled	m-day	0.9	Cut-Back Kerosene	kg.	15.4	Roller	hr	0.1	0.1
							Fuelwood for	ltr	approx	Boiler	hr	0.1	0.1
							Boiler	kg.	6	Sprayer	hr	0.1	0.1
							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			Quantity
				Class	Unit	Quantity	Type	Unit	Type	Unit	
22.27	2202 2211	Providing and Edging including adjustment of line, levelling, making trench 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					



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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	Type	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				



NORMS FOR RATE ANALYSIS

SECTION 23: ELECTRIC LINE AND ELECTRIFICATION WORKS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
23.1 A	2302	Erecting steel pole for electricity line including fixing in the ground as per drawing and applying three coat lining of bitumen complete. 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					
				Supervisor or Sub-engineer	m-day	0.39	Bitumen	Kg		4.2	
B		Length of pole 9m (bitumen lining upto 1.5m from the bottom, depth of foundation 1.5m)	each	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					



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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
		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	m-day	3			
				Unskilled	m-day	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 strengthening etc. complete.	2 Poles	Skilled	m-day	4			
				Unskilled	m-day	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.							



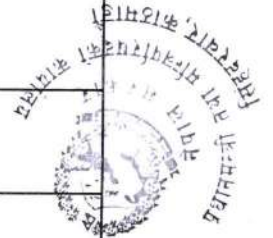
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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	2
				Unskilled	m-day	1				
II		For 9m PSC pole	4 Poles	Skilled	m-day	0.4			Crane 3T	2.25
				Unskilled	m-day	1.5				
III		For 11m PSC pole	4 Poles	Skilled	m-day	0.5			Crane 3T	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.								



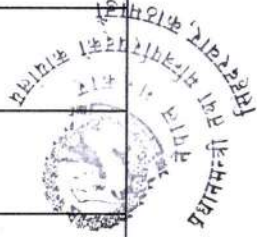
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	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.	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		Quantity	
				Class	Unit	Quantity	Type	Unit	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
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					
				Linemans	m-day	2					
				Helper	m-day	2					
				Unskilled	m-day	10					



NORMS FOR RATE ANALYSIS

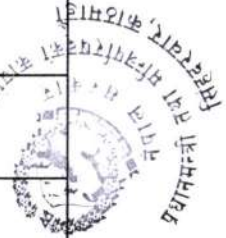
S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Quantity	Type
23.8	A	Providing and installing/constructing Standard Stay set arrangement for stability of electric pole in overhead line construction For Telescopic Pole /Steel Tubular Pole For High Tension (HT) Transmission	1 Set	Electrician	m-day	0.3	Stay Plate	no	1	Tools & Plants
				Skilled	m-day	0.3	(MS			
				Unskilled	m-day	1	600mm*600mm m*600mm)			
							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	m	12	
							Stay wire			
							Bolt and Washer	set	2	
							Thimble	no	2	
							Double Eye (Twisted)	no	1	



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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	
ii		For Low Tension (LT) Distribution	1 Set	Electrician Skilled Unskilled	m-day m-day m-day	0.3 0.3 1	Stay Plate (MS 600mm*600mm m*600mm) Stay Rod 16 mm (1.8m) Turn buckle Stay Insulator Preform Wire Compatible for Stay Wire of Size 7/2.6mm SWG Stay wire Bolt and Washer Thimble Double Eye (Twisted)	no no set no set m set no no	1 1 1 1 4 9 2 2 1	Tools & Plants	3 % of labour cost		
B i		For Pre Stressed Concrete Pole For High Tension (HT) Transmission	1 Set	Electrician Skilled Unskilled	m-day m-day m-day	0.3 0.3 1	Stay Plate (MS 600mm*600mm)	no	1	Tools & Plants	3 % of labour cost		



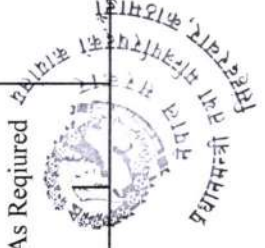
NORMS FOR RATE ANALYSIS

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



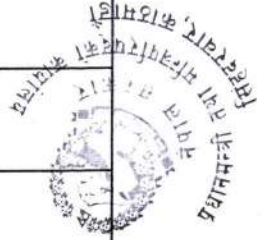
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	Quantity
				Class	Unit	Quantity	Type	Unit	Type		
23.8	2308	<u>ELECTRIFICATION WORKS</u> 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. 15-100 amperes	1 job	Skilled Semi-Skilled	m-day	0.5	Preform Wire	set		4	
							Compatible for Stay Wire of Size				
							7/2.6mm SWG Stay	m		9	
							Eye Bolt and Washer	set		1	
							Thimble	no		2	
A					m-day	1	Main control switch	Lot		1	
							Wooden box	Nr		1	
							Grips	Nr		5	
							Screws	Nr		5	
							Cement Mortar 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
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	As Required		
C		Above 400 amperes	1 job				Mortar and Paint	As Required		
				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	
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. transformer, selector switches etc. all complete of the amperes as give below.					Cement	As Required		
							Mortar 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	Quantity
A		30-100 amperes	1 job	Skilled	m-day	1	Bushbar	Lot	2 or 4				
				Semi-Skilled	m-day	2	Stirpes	nr	10 or more				
							Cable shoe	as per drawing					
							Other equipment	as per drawing					
B		100-600 amperes	1 job	Skilled	m-day	1.5	Bus Stand	as per drawing					
				Semi-Skilled	m-day	3	Nut bolts	as per drawing					
							Flexible wire	as per drawing					
C		above 600 amperes	1 job	Skilled	m-day	2	Bushbar	Lot	2 or 4				
				Semi-Skilled	m-day	4	Stirpes	nr	10 or more				
							Cable shoe	as per drawing					
							Other equipment	as per drawing					

23-ELECTRIC LINE AND ELECTRIFICATION WORKS

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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
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.	1 job	Skilled Semi-Skilled	m-day	0.5	Bus Stand	as per drawing	1	Accod. To house	6
							Nut bolts	as per drawing			
							Flexible wire	as per drawing			
A		Upto 6 houses concealed	1 job	Skilled Semi-Skilled	m-day	0.75	Box	Lot	1	Accod. To house	6
							MCB or Kitkat	Lot			
							Grip screw Cement Mortar and Paint	Nr			
B		6 to 9 houses concealed	1 job	Skilled Semi-Skilled	m-day	0.5	Box	Lot	1	Accod. To house	6
							MCB or Kitkat	Lot			
							Grip screw Cement Mortar and	Nr			



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
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 according 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	mm	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
B		Good quality tubelight pipe or fixing chain on ceiling, garden light, main gate light, posttop lantern, street light, chandelier light (6-10) bulbs, concealed tubelight.	10 Nos	Skilled Semi-Skilled	m-day m-day	1 1	Cemenr mortar mix and paint	As required	As required	
							Hook	Nr	1	
							Light	Lot	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	As required	
							Hook	Nr	1	
23.15	A	Providing and Fixing sockets according to drawings and connecting to electricity.	10 Nos	Skilled Semi-Skilled	m-day m-day	1 2	Sockets	Lot.	1	
							Box	Nr	1	
		Concealed electrical sockets					Grips	Nr	4	
							Screws	Nr	4	
							Cemenr mortar mix and paint	As required	As required	



NORMS FOR RATE ANALYSIS

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



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
23.16 A		Providing and Fixing different type of Fans according to drawings and their switch as concealed or surface and supplying electricity, all complete. 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		
B		Wall Fan	1 No				Iron Hook	Nr	1	
							Wooden Box	Nr	1	
							Wooden Frame	Nr	1	
							Fan	Lot	1	
				Skilled	m-day	0.25	Ceiling rose	Nr	1	
				Semi-Skilled	m-day	0.25	Wodden block	Nr	1	
							Grips and screws	As required		
							Iron Hook	Nr	1	
							Wooden Box	Nr	1	
							Wooden Frame	Nr	1	



 23-17

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	
C		Exhaust Fan	1 No	Skilled Semi-Skilled Skilled	m-day m-day	1 1	Fan Ceiling rose Wodden block	Lot Nr Nr	1 1 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 Semi-Skilled Unskilled	m-day m-day m-day	0.2 1.5 2	Copper-Bonded Earth Rod (1.2-3m length & 12-20mm dia) Copper Earthing Wire (4-16mm ²)	rod m	1 12				
							Earth Bar/Busbar (Copper) Earthing Clamps (Copper)	no	1				
								no	3.00				

23-ELECTRIC LINE AND ELECTRIFICATION WORKS

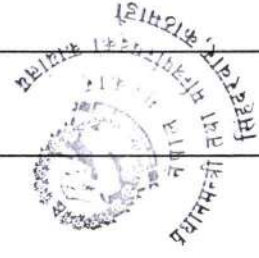
23-18

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
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	As required			
				Unskilled	m-day	0.3	Concrete				
							Inspection box	Nr	1		
C		Steel tubular pole heavy gauge upto 11m (Depth of excavation 1.8m)	1 No	Skilled	m-day	0.5	Varnish paint	As required			
				Semi-Skilled	m-day	1	Nut bolts	As required			
				Unskilled	m-day	5	Pole	Lot	1		
							Cement	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.	10 Points				Concrete				
							Inspection box	Nr	1		
							Varnish paint	As required			
							Nut bolts	As required			
A I		Light Circuit Short length (5m)					Wire, Lee				
							Stick, Grips,	As required			
							Screws,				
							Nails, Link,				

NORMS FOR RATE ANALYSIS

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



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NORMS FOR RATE ANALYSIS

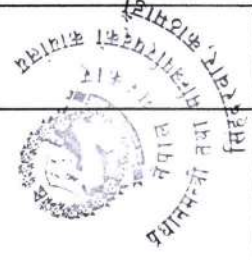
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
III		Long length (11-15m)	10 Points	Semi-Skilled	m-day	3					
				Unskilled	m-day	3					
				Skilled	m-day	2					
				Semi-Skilled	m-day	3					
IV		Extra long length (above 15m)	10 Points	Unskilled	m-day	4					
				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.					Polythene pipe, circular box, clamps, hooks, nails, etc	As Required			
A I		Light Circuit Short Length (5m)	10 Points	Skilled	m-day	1					
				Semi-Skilled	m-day	3					
				Skilled	m-day	2					
				Unskilled	m-day						



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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	Type	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	10 Points	Skilled	m-day	1.5				
I		Short Length (5m)		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	Type	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	10 Points	Skilled	m-day	1.5				
I		Short Length (5m)		Semi-Skilled	m-day	3				
				Unskilled	m-day	3				



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NORMS FOR RATE ANALYSIS

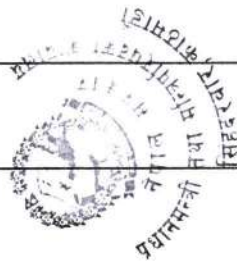
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type	Unit	Quantity
II		Medium Length (6m)	10 Points	Skilled	m-day	2					
				Semi-Skilled	m-day	3					
				Unskilled	m-day	4					
III		Long Length (11m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



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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	Type	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	mm		10
							Grip, nails, screws, clamps etc	As per required		
A		Simple method using clamps on the wall	10 m	Skilled	m-day	0.5				
I		2.5 mm to 10 mm		Semi-Skilled	m-day	0.5				
				Skilled	m-day	0.5				
II		16 mm to 35 mm	10 m	Skilled	m-day	1				
				Semi-Skilled	m-day	0.5				
				Skilled	m-day	1				
III		above 50mm square	10 m	Skilled	m-day	0.5				
				Semi-Skilled	m-day	1				
				Skilled	m-day	1				



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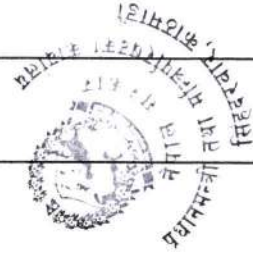
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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
I		2.5 mm to 10 mm	10 m	Skilled	m-day	0.5	Grip, nails, screws, clamps etc	As per required		
II		16 mm to 35 mm	10 m	Semi-Skilled	m-day	1				
III		above 50mm square	10 m	Skilled	m-day	0.5				
C		Excavation trench or groove(Trench depth 0.5m) according to drawings and placing cable.		Semi-Skilled	m-day	1.5				
I		2.5 mm to 10 mm	10 m	Skilled	m-day	0.5	Cable	rm		10
				Semi-Skilled	m-day	2				
				Skilled	m-day	0.5				
				Semi-Skilled	m-day	0.5				



NORMS FOR RATE ANALYSIS

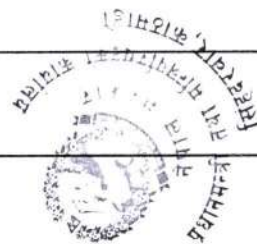
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
II		16 mm to 35 mm	10 m	Unskilled	m-day	1					
				Skilled	m-day	0.5					
				Semi-Skilled	m-day	0.5					
				Unskilled	m-day	1.5					
III		above 50mm square	10 m	Skilled	m-day	0.5					
				Semi-Skilled	m-day	0.7					
				Unskilled	m-day	2					
23.23 A		PVC copper wiring as per drawings, the type and methods as follows along with varnish paint all complete. 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					



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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	Unit
II		6 mm to 16 mm square	100 m	Skilled Semi-Skilled Unskilled	m-day	0.75 0.3 1.5				
III		25 mm to 35 mm square	100 m	Skilled Semi-Skilled Unskilled	m-day	1 1.5 2				
B		Concealed wiring using HDP polythene pipe as per drawing by chiseling groove in ceiling, wall or floor and by supporting by clamp nails etc. with connection to light switch or electrical equipment and finishing with cement mortar mix and paint all complete .					Wire Pipe Clamp,Nails	rm rm As required		
I		1.5 mm to 4 mm	100 m	Skilled Semi-Skilled Unskilled	m-day	0.75 1.3 1.2				
II		6 mm to 16 mm square	100 m	Skilled Semi-Skilled	m-day	1 1.5				



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NORMS FOR RATE ANALYSIS

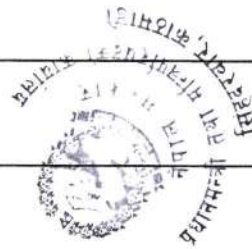
S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	Quantity
III		25 mm to 35 mm square	100 m	Unskilled	m-day	2				
				Skilled	m-day	1.5				
				Semi-Skilled	m-day	2				
				Unskilled	m-day	3				
IV		50mm square	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				



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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	Type	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.								



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NORMS FOR RATE ANALYSIS

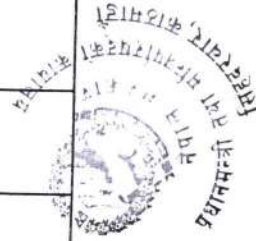
S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material		Machinery		Quantity	
				Class	Unit	Quantity	Type	Unit	Type		
23.26 A	2312	Stringing of power cable all complete 11 KVA XLPE Cable	100m	Skilled	m-day	1	XLPE cable	m	Cable Pulling Equipment	100	8
				Unskilled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



NORMS FOR RATE ANALYSIS

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	Type	Qty.
24.1	2405	Fabrication of bridge parts Suspension Bridge	1 kg	Skilled Semi-Skilled Unskilled	m-day	0.061 0.085 0.110				
II		Suspended bridge (Drum type)	1 kg	Skilled Semi-Skilled Unskilled	m-day	0.052 0.073 0.092				
III		Suspended bridge (Open type)	1 kg	Skilled Semi-Skilled Unskilled	m-day	0.055 0.073 0.011				
IV		Truss Bridge	1 kg	Skilled Semi-Skilled Unskilled	m-day	0.05 0.07 0.10				
B		Application of various types of paints on exposed surface for protection from rust	1 m ²	Skilled	m-day	0.01				
I		Surface Preparation								



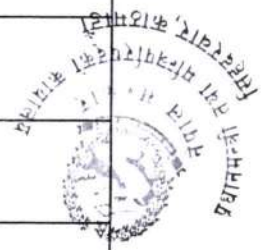
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material			Machinery	
				Class	Unit	Qty.	Type	Unit	Type	Qty.
II		Applying first and second coat of paint	1 m ²	Semi-Skilled	m-day	0.15				
				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				



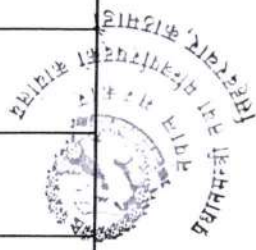
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources									
				Labour		Construction Material		Machinery					
				Class	Unit	Qty.	Type	Unit	Type	Unit	Qty.		
24.5	2411	Camp establishment 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	1 month	Unskilled	m-day	60							
A		By ferry boat											
B		By constructing temporary bridge	1 m	Skilled	m-day	0.5							
				Unskilled	m-day	4.5							
C		Reconstruction 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	Type	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	Type	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 Blaster	m-day	4.76				
					m-day	0.05				
II		Upto 4m deep	1 m ³	Unskilled Blaster	m-day	5.16				
					m-day	0.05				
III		Upto 6m deep	1 m ³	Unskilled Blaster	m-day	5.76				
					m-day	0.05				
IV		more than 6m deep	1 m ³	Unskilled Blaster	m-day	6.20				
					m-day	0.05				
		Remarks:								
		1. Blaster is equivalent to skilled labour								



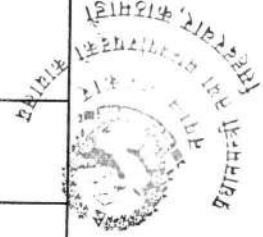
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Qty.	Type	Unit	Type	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				
		Remarks:		Semi-skilled	m-day	0.1				
		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 900	Formwork:								
		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	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					



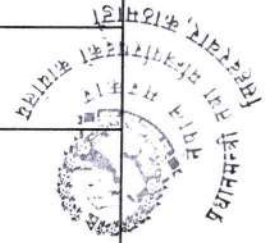
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Qty.	Type	Unit	Type	Qty.
24.20	800 2100	Placing high density pipe in concrete	1 m	Unskilled	m-day	0.1				
24.21 A	2411	Tower or truss erection works 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 A	2412	Installation of suspender, cross beam, wind bracing flats. 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				



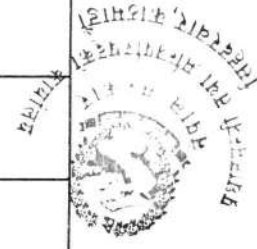
NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources							
				Labour		Construction Material			Machinery		
				Class	Unit	Qty.	Type	Unit	Qty.	Type	Unit Qty.
24.24 A	2411	Felling tree and dressing works Making plank and nailing works	1 m ³	Unskilled	m-day	1.9					
B		Applying coal tar	1 m ³	Skilled	m-day	0.50					
				Semi-Skilled	m-day	35.0					
C		Plank rot works	1 m ³	Unskilled	m-day	19.0					
				Semi-Skilled	m-day	5.1					
24.25	2409	Placing wire mesh	1 m	Skilled	m-day	3.3					
				Unskilled	m-day	5.8					
24.26	2404	Load testing works in suspension bridge and re-tightening clamp, bulldog grip and nut, etc.	1 m	Semi-skilled	m-day	0.1					
				Unskilled	m-day	0.25					
24.27 A	2412	Anti-rust works By applying coal tar	1 m	Semi-Skilled	m-day	0.1					
				Unskilled	m-day	0.045					
				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	Type	Qty.
B		By applying coal tar to non galvanized thread of suspension bridge	1 m	Semi-Skilled	m-day	0.030				
C		By applying coal tar to non galvanized thread of suspended bridge.	1 m	Unskilled	m-day	0.12				
24.28		Repainting of steel of constructed bridge		Semi-Skilled	m-day	0.020				
A	2408 2412	In suspension bridge	1 m ²	Unskilled	m-day	0.07				
B		In suspended bridge	1 m ²	Semi-Skilled	m-day	0.250				
24.29		Aforestation works of slope including planting grass, watering and clearing unwanted shrubs.	1 m ²	Unskilled	m-day	0.20				
24.30	1707	Construction of fencing works from grasses, leaves etc.	1 m	Semi-Skilled	m-day	0.220				
	2411 2412			Unskilled	m-day	0.19				
				Semi-Skilled	m-day	0.020				
				Unskilled	m-day	0.1				



NORMS FOR RATE ANALYSIS

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
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 2 % of cost of Steel 5% of Cost of Steel		



NORMS FOR RATE ANALYSIS

S.N.	Ref. to SS.	Description of work	Unit	Resources						
				Labour		Construction Material		Machinery		
				Class	Unit	Quantity	Type	Unit	Type	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 Straightening , Black smithy and Handling	40% of cost of Steel	1.025	Mild Steel (Beams, Angles, Flats, Plate etc)	MT		
					15% of cost of steel	3.8	Acetylene Oxygen	Cu.m		
						16	MS Electrodes	Cu.m		
						330		No		
							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	11	Rubber Seal	m		
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	9.3m ²	Skilled Unskilled	m-day m-day	0.25 0.25	Bituminastic Borad Shalitex Primer	m ² kg		
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 Paint	MT kg	Sheet Pile Driving Plant	2.30 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		
25.8 A	2508	(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 depreciation 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												
25.8 B	2509	9. Similarly, the cost of 1m of other section of sheet pile can be calculated accordingly with due consideration of its weight per metre.												
		<u>Micropiling Works</u>												
		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 Unskilled	m-day m-day	1 6	Water	KL	1	Auger/percussion n drilling set	hr	8		
		Cement Grouting Works	1 m ³	Skilled Unskilled	m-day m-day	0.0625 0.3125	Cement Water Admixtures	ton KL Kg	1 0.35 12.5	Grouting Pump Pump hoses and Pipes	hr	0.5 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.												

