



**GOVERNMENT OF WEST BENGAL
PUBLIC WORKS (ROADS) DIRECTORATE
NATIONAL HIGHWAY WING**



**SCHEDULE OF RATES
2019-20
ROAD & BRIDGE WORKS
1 JUNE 2019**



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1 JUNE 2019

Office of the
Superintending Engineer
N.H. Planning & Design Circle
Khadya Bhaban
Kolkata-700 087

FOREWORD

The National Highway Planning & Design Circle has been publishing since a long time back the Schedule of Rates for different works of National Highways entrusted with the State PWD, Government of West Bengal by the Ministry of Road Transport & Highways (erstwhile MOST), Government of India.

The 6th edition of the SOR was published on 1st July, 2011 in printed form for the very last time. This remained operative upto 9th April, 2014 till publication of its 7th edition in e-mode (uploaded in the PWD website) w.e.f. 10th July, 2014 for the very first time. The 8th edition of the SOR was published w.e.f. 16th April, 2015 as per the directive of the then Principal Secretary to Government of West Bengal, PWD to the effect of updating of the SOR in each year. The 5th revision of the Specifications for Road and Bridge Works published in August, 2013 by MORTH had also necessitated for updating of the SOR in the year 2015-16. Since 1st July, 2017, the implementation of GST, has obviously demanded a change in SOR.

It has been gathered, that, the Ministry of Road Transport & Highways, Government of India has also engaged a consultant for revision of the Standard Data Book for Analysis of Rates (1st revision, 2003). Once that comes out, it would be of great help as due to want of that, state PWD has updated the hire charges of T&P Machineries on the basis of WPI and the data collected by the field officers, over the years.

Based on the input received from various reputed manufacturing houses / organisations, related authorities and field officers of NH Wing, the 9th edition of the SOR has been compiled by the officers of NH Planning & Design Circle following Specifications for Road and Bridge Works (5th revision, 2013) & Standard Data Book for Analysis of Rates (1st revision, 2003) as well as GST rules.

All users of this SOR are requested to feel free in suggesting anything for up gradation of the documents in future.

Date: 30 May 2019

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PREFACE

The Schedule of Rates for NH Works in the state of West Bengal was revised for 8th times, being the last one in the year 2015 for conforming it to the 5th revision of the Specifications for Road & Bridge Works (published in August, 2013) as well as the Standard Data Book for Analysis of Rates (1st Revision in June, 2003). Due to non-requisition of any modification of the prevailing SOR to the concerned authority, the same is still in operation.

Since 1st July, 2017, the implementation of GST, had obviously demanded a change in SOR, but, non-reflection of necessity of revision of the same through different bidding rates obtained all over the state of West Bengal, it was not updated. But, recently, it has been reported that for two/three ROB projects, quoted rates are far more than the sanctioned amount. Though that could be owing to different reasons altogether but, it has been decided by the competent authority of state PWD as well as the Ministry to have a general revision of the Schedule of Rates for accommodating the fluctuations in cost of Materials, Tools & Plants during the past periods vis-à-vis the significant change in tax-regime in India with the introduction of GST.

The basic cost of all materials has been established, on the basis of the input received from various reputed manufacturing houses / organisations, related authorities and field officers of NH Wing. State PWD has updated the hire charges of T&P Machineries on the basis of WPI and the data collected by the field officers, over the years.

It has been gathered, that, the Ministry of Road Transport & Highways, Government of India has also engaged a consultant viz., Lea Associates South Asia Pvt. Limited for 2nd revision of the Standard Data Book for Analysis of Rates (1st revision, 2003). Once that comes out, it would be of great help for updating the rates established by the state PWD.

As such the 9th edition of the NH Schedule of Rates has been compiled by the officers of NH Planning & Design Circle following Specifications for Road and Bridge Works (5th revision, 2013) & Standard Data Book for Analysis of Rates (1st revision, 2003) as well as GST rules.

The draft proposal of the 9th edition of the SOR was placed by the Superintending Engineer, NH Planning & Design Circle & Member Secretary and Convener, before the NH Schedule Review Committee on 6th, 7th & 8th, 13th, 14th, 19th & 21st May, 2019. All the valued comments/suggestions of the committee members were incorporated and finally the committee approved the draft proposal on the 29th May, 2019 and resolved to publish the same as SOR for 2019-20 w.e.f. 1st June, 2019.

The uphill task of compilation of all the data collected from the renowned manufacturing houses, construction agencies, and construction officers of NH Wing was not simply possible, without the active help of Executive Engineers, Assistant Engineers attached with this Planning & Design Circle as well as the Engineer officers attached with o/o the Chief Engineer (National Highways). A special mention regarding the contribution of the Junior Engineers attached with the Planning & Design Circle as well as the NH Circle-I in preparation of the SOR 2019-20 must be made.

Date: 30 May 2019

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ABBREVIATIONS

Abbreviation of unit wherever occurring in the 'Schedule of Rates' are as under

LENGTH

Millimetre	mm
Centimetre	cm
Metre	m
Kilometre	km
Running metre	RM

AREA

Square Millimetre	sq mm / mm ²
Square Centimetre	sq cm / cm ²
Square Metre	sqm / m ²
Acre	a
Hectare	ha
Square Kilometre	sqkm / Km ²

VOLUME

Cubic Millimetre	cu mm / mm ³
Cubic Centimetre	cu cm / cm ³
Cubic Metre	cum / m ³

CAPACITY

Millilitre	ml
Litre	l / LT

WEIGHT

Milligram	mg
Gram	gm
Quintal	q
Kilogram	Kg
Tonne	t
Ton	T

MISCELLANEOUS

Ministry of Road Transport & Highways	MORT&H
Indian Standard	IS
National Highway	NH
Standard Data Book	SDB

Public Works (Roads) Department	PW(R)D
Tools & Plants	T & P
Cast Iron	CI
Indian Road Congress	IRC
Reinforced Cement Concrete	R.C.C. / RCC
For example , e.g.	
Plain Cement Concrete	P.C.C. /PCC
Ground Level	GL
Mean Sea Level	MSL
Mild Steel	MS
Diameter	Dia.
Bituminous Concrete	BC
Rupees	₹
Front End Loader	FE Loader
Minimum	Min.
Maximum	Max.
Road Roller	RR
Number	No.
Lead in km	L
Tonne Kilometer	t.km.
Ditto	- do -/ do
Kilolitre	KL
Hour	Hr / hr
That is	i.e. / ie
Et cetera	etc. / Etc.
Degree Centigrade	°C
Column	Col.
Serial No.	Sl. No. / Sl.
Water Bound Macadam	WBM
Wet Mix Macadam	WMM
Bituminous Macadam	BM
Optimum Moisture Content	OMC
Hot Mix Plant	HMP
West Bengal	WB
Schedule of Rates	SOR
Goods and Service Tax	GST

N.B. The above abbreviations signify both singular as well as plural number.

GENERAL FEATURES

1. Back Ground

The National Highway Wing has been publishing since a long time back the Schedule of Rates for different works of National Highways entrusted with the state PWD, Government of West Bengal by the Ministry of Road Transport & Highways (erstwhile MOST), Government of India.

The 6th edition of the SOR was published on 1st July, 2011 in printed form for the very last time. This remained operative upto 9th April, 2014 till publication of its 7th edition in e-mode (uploaded in the PWD website) w.r.t. 10th July, 2014 for the very first time. The 8th edition of the SOR was published w.e.f. 16th April, 2015 as per the directive of the then Principal Secretary to Government of West Bengal, PWD to the effect of updating of the SOR in each year. The 5th revision of the Specifications for Road and Bridge Works published in August, 2013 by MORTH has also necessitated for updating of the SOR in the year 2015-16.

Since 1st July, 2017, the implementation of GST, has necessitated a change in the SOR, but, non-reflection of necessity of revision of the same through different bidding rates obtained all over the state of West Bengal, it was not updated.

It has been gathered, that, the Ministry of Road Transport & Highways, Government of India has also engaged a consultant for revision of the Standard Data Book for Analysis of Rates (1st revision, 2003). Once that comes out, this SOR would demand a further revision, but, pending that, state PWD has updated the hire charges of T&P Machineries on the basis of WPI and the data collected by the field officers, over the year

2. Scope

The schedule covers both original works, repair and rehabilitation works including carriage of materials for National Highway within the jurisdiction of West Bengal.

3. Validity

This Schedule of Rates for NH works 2019-20 will come into force from 01 June 2019 superseding the Schedule of Rates for NH works: 2015-16, effective from 16th March 2015, along with its all addenda & corrigenda, without prejudice to the standing contracts of works. This schedule would subject to thorough revision once again to become compatible with the STANDARD DATA BOOK FOR ANALYSIS OF RATES, which is under revision by the consultant viz., Lea Associates South Asia Pvt. Ltd. engaged by the Ministry of Road Transport & Highways.

4. Specification

Nomenclature of items of work is brief, indicative and have been linked to the related sections of SPECIFICATION FOR ROAD AND BRIDGE WORKS (5TH REVISION)-2013 of the Ministry of Road Transport & Highways, Government of India. It is recommended that provisions of the publication SPECIFICATION FOR ROAD AND BRIDGE WORKS (5TH REVISION)-2013 shall form part of contract of works.

5. Abbreviations

Abbreviations of units as prescribed in STANDARD DATA BOOK FOR ANALYSIS OF RATES (1st Revision 2003) of MOST have been adopted. Requisite listing has been included in this Publication.

6. New Item

For any item not covered by the Schedule, if absolutely necessary on a work, the concerned Superintending Engineer will approve the rate with intimation to this office for records and reference. However; this revision have considered a good number of new items of work like Structural Steel works, Road Furniture items, White Topping etc.

7. Methodology

- I) With the introduction of GST, the Methodology of Analysis of Rates as obtained in STANDARD DATA BOOK FOR ANALYSIS OF RATES (1st Revision 2003) of MOST has been changed and now the rates shall include a) Labour, T & P and Machinery ;
b) materials without GST; c) overhead charges ; d) contractor's profit ;
e) labour welfare cess.
- II) To arrive for a particular item the estimator has to consider the involvement of different components as applicable. These are a) Labour , T & P and Machinery ; b) materials without GST ; c) Overhead charges ; d) Contractor's profit ;
e) Building and other construction workers' Welfare Cess .

NOTE: Overhead charges (c) @ 8/10 % on (a + b) [For overhead charges refer 9(II) of this chapter] Contractor's profit (d) @10 % on (a + b + c)

Labour welfare cess (e) @ 1% on (a+b+c+d) shall be considered

Therefore rate = (a + b + c + d + e)/ unit

- III) ***The overhead charges for road and bridge works include the following elements:***
- 1) Site accommodation, setting of plan, access road, water supply, electricity and general site arrangements.
 - 2) Office furniture, equipment and communications.
 - 3) Expenditure on a) Corporate office of Contractor, b) Site supervision, c) Documentation and as-built drawings.
 - 4) Mobilization/ demobilization of resources.
 - 5) Labour camps with minimum amenities and transportation to work site.
 - 6) Light vehicles for site supervision including administrative and managerial requirements.
 - 7) Laboratory equipment and quality control including field and laboratory testing.
 - 8) Minor T & P and survey instruments and setting out works including verification of line, dimensions, trial pits and bore holes, where requires.
 - 9) Watch and ward.
 - 10) Traffic arrangement & management / Road safety during construction.
 - 11) Expenditure on safeguarding environment.
 - 12) Sundries.
 - 13) Financing expenditure.
 - 14) Work insurance/ compensation.

Contractor's profit @ 10% over all cost to be added uniformly.

- IV) The cost of materials shall include a) Materials (basic cost without GST),
b) carriage, c) loading & unloading etc.
- V) Labour rates are depicted in Annexure.
- VI) Provision for Mate/ Supervisor intended for supervision of work and taking attendance of labourer has been included.
- VII) The source of all materials to be used on the project must be tested and expressly approved by the Engineer. Rates appearing in this schedule of rates have been worked out generally on the basis of current market rates received through different NH Circles for materials. As regards labour rates, those adopted in this schedule are **latest as laid down by Labour Department, Government of West Bengal.**

No advantage may be taken by any one, of any obvious error or of omission in this schedule, and in respect of error or omission, the decision of Superintending Engineer in whose Circle the work is being done shall be final and binding on all.

Description of items may be felt in brief. Relevant clauses of MORTH's Specifications (5th revision) may be referred for detailed specifications.

The Schedule of rates is for Department use only. It cannot be produced in court of law as reference/ authority and thus is a privileged document.

The quantities taken as output of the item in the rate analysis as the compacted quantities.

8. General Conditions

- I) (Item No - Part - of Standard Data Book for Analysis of Rates, MOST, Roads Wing, 2003) - Written below the description **should not be written in tender.**
- II) The quantities appeared in Chapter A are inclusive of normal wastages.
- III) The quantities appeared in Chapter A are approximate and based on MOST's Specifications but are intended only for analysis of rates of the related item. For actual execution in case of sub- base, base, bituminous material, cement concrete (**design mix**), etc. **mix shall have to be designed and actual consumption shall be recorded** accordingly rather than the estimated proportion.
- IV) The agency is liable for obtaining **approval of design on mix from the Engineer-in-Charge/Authority/Department** before execution of work.
- V) The Data given in Chapter A and Column 2 of item description shall not be included in tender document/ priced schedule of items of work/ bill of quantity to avoid post contract complications that result in time and cost over run.
- VI) **Material testing is required to be conducted** at the desired levels of frequency as prescribed in the relevant specifications and is binding.
- VII) The contractor shall carry out the work on highway creating the least interference to the flow of traffic to the satisfaction of the Department. All works involving improvement to the existing highway, **the contractor is liable for maintaining a passage**, as per directive of the Engineer in charge, for traffic **either along a part of the existing carriageway** under improvement, **or along a temporary diversion** constructed close to the highway.

The contractor is also liable for maintaining barricades, lights and flagman, as would be necessary for maintaining safety at peripherals of construction area and/or as directed by the Engineer-in-Charge.

9. For road works

- I) The description of items is given briefly and linked with a relevant clause of the MORT&H Specifications for roads and bridge works, which **may be referred for detailed description, provisions, and interpretations.**
- II) Due to mechanization of construction work, rate analysis for various items have been prepared using mechanical means. However, manual means have also been provided for certain cases, where areas may be inaccessible for machines or quantum of work may not be large enough to justify use of machines.

- III) For purpose of calculation of overhead charges the projects are categorized into two types as under and overhead charges, provided as indicated against each.

Category 1: Cost up to ₹50 crore : 10%

Category 2: Cost above ₹50 crore : 08%

- IV) **A Dozer is proposed for excavation** where cutting and filling for the roadway is **within 100 m. For longer leads, a combination of hydraulic excavator and tipper** is proposed.
- V) **Quantities of materials given in the rate analysis are approximate** for the purpose of estimating and include normal wastages. Actual consumption would have to be on mix design.
- VI) **Output of plant/equipment** is considered for the compacted quantities.
- VII) **Arrangement for traffic during construction shall be as per clause 112 of MORT&H specifications for Road and Bridge Works. Road safety during construction should be as per IRC:SP:55.**
- VIII) **Contractor will make his own arrangements for borrowing earth. However Compensation for earth taken from private land has been included in the Rate analysis for construction of embankment with borrowed earth .**
- IX) **The contractor shall arrange to provide and maintain an adequate equipped Field laboratory as per clause 121.**
- X) **10 (ten) percent extra cement** may be provided for **concreting under water**, wherever required .
- XI) **Grade of cement may be adopted as per mix design.** Quantities of cement in various grades of cement concrete for structural concrete as per section 1700 of the specification (5th revision) for bridges have been taken as per IRC:112-2011 & for PQC as per IRC-44 .
- XII) **The coarse and fine aggregates shall conform to IS:383. Modified bitumen from refinery sources or blended at approved central plant or made by appropriate mobile blending plant with site testing facility shall be used for road works. Blending at site by simple stirrers is not permitted .**

10. Bridge Works.

- I) For the purpose of calculation of overhead charges, the bridge projects may be categorized into three basic types depending upon width of carriageway, length of bridge and present cost .

Category 1: Major bridges including state-of the-art bridges and stand alone minor bridges : **25%**

Category 2 : Minor bridges included in the road packages : **20%**

Category 3: Rehabilitation of bridges : **30 %**

- II) **Bridge bearing and expansion joints are readymade items commercially produced by specialized firms and in certain cases using imported technology and parts. The rates of these items are to be obtained directly from different manufacturers approved by the Ministry and shall be adopted after comparison.**

- III) **Normal method of curing has been covered** in the schedule. Rates of **steam curing has been included** in the analysis of **pre cast concrete PSC beams**.
- IV) Since the testing of materials and finished items of work is covered under overhead charges, the cost of such tests shall be deemed to be inclusive in the rate for related item and no separate payment is due to the contractors. If the contractor intends to get the requisite tests carried out by an agency that agency is required to be acceptable to the Department and the contractor shall remain liable for bearing such cost of testing.
- V) For innovative type of structures like cable stayed bridges, suspension bridges, arch bridges, bow string girder bridges, erected by innovative techniques where erection stage is as important as the construction of bridge components in terms of input of machinery, manpower and materials, special analysis is called for the items may not cover all components of bridge projects for all situations. There may be specialized items for specific cases, which need to be analyzed keeping in view the basic approach.

11. Guide Bund

The items for the guide bund are excavation, embankment and protection works. The rates may be taken from the respective chapters.

In case bridge construction works are to be done on wide and deep water channels in major rivers or in sea creeks etc., provision of floating barges etc. for taking the construction materials and equipments inside water shall also be made separately.

Analysis for sinking of wells covers diameter from 6m to 12 m and twin D type of size 12m x 6m. For other shapes like rectangular or any other size, the rates of sinking may be worked out on pro-rata basis.

The lift for casting of concrete in well steining may be 2 to 2.5m restricting the free fall of concrete to 1.5m and concreting layer to 450mm.

12. Load test on piles

Load testing of piles is incidental to work and is not required to be included in BOQ of contract, but, the same is required to be added in the estimate to assess cost of work.

13. New features/items

- I) Although the Standard Data Book for Analysis of Rates prescribes the unit of **carriage of different construction materials for variable leads as Tonne-Kilometre**, the NH SOR of West Bengal upto now was adopting the unit for carriage as M3/MT/Nos etc. **In this edition the unit for carriage has duly been modified as per the MORTH's Standard Data Book for Analysis of Rates.**
- II) Although the Standard Data Book for Analysis of Rates prescribes the unit of **supply, fitting, fixing of metallic bearing of Bridge structures as Tonne-Capacity**, the NH SOR of West Bengal upto now was adopting the unit for the same as KG/Tonne etc., but without any clarity regarding the fact whether it relates to the self weight of the Bearing system or its load carrying capacity. **In this edition the unit for different type of metallic bearings (Design vertical load carrying capacity in Metric Tonne) has duly been modified as per the MORTH's Standard Data Book for Analysis of Rates. In the contract BOQ this unit may be in Nos also for better appreciation.**

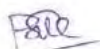
- III) The Standard Data Book for Analysis of Rates prescribes for extra provision in cost of manpower and usage rates of machine for hilly areas having height more than as high as 2100 Mtr Recently Chief Engineer(NH) received one representation from the Construction wing for rationalisation of the cost of carriage of construction materials, boulder in specific in areas of Kalimpong District along NH-10 beyond CORRORATION BRIDGE (RL= 203M),as it has been emerged out of many tenders The Schedule Committee has looked into the matter with great concern and finally approved to allow an extra provision of 35% over the cost of carriage in plain terrain for hilly terrain having an elevation more than 205 Mtr
- IV) **With the publication of 5th revision of MORTH's specification in the year 2013**, the narration of different items mentioned in the the Standard Data Book for Analysis of Rates required to be modified. A modified narration were also adopted in the past edition of the SOR published in the year 2014-15 & 2015-16.In this edition a thorough review has been done for making the narrations quite clear and have duly been modified as & when found necessary.
- V) **The cost of different grades of bitumen has been made fully dynamic** in order to consider the effect of market fluctuations time to time needing no further intervention of the schedule review committee.Even **the cost of Industrial Grade Bitumen for Mastic Asphalt work,Polymer Modified Bitumen,special category of Cut-Back Bitumen for maintenance Work,Bitumen emulsion for prime coat & tack coat have also been made dynamic** by its standardisation through quotations obtained from different producers mainly of Eastern India.
- VI) **Since its 1st revision of the Standard Data Book for Analysis of Rates in the year 2003**, the **hire charges of Plant & Machineries** has not been revised. The state PWD is updating the same in due accordance to the WPI published by the RBI time to time.In this occassion also the hire charges of Plant & Machineries **have been updated as per the present WPI** excluding any tax.
- VII) **Three (3) nos new items have been included under Chapter-17 (miscellaneous) of the SOR**, which are namely; **1. BC using Hot -In-Place Reclying method of construction----**very effective for optimisation in usage of mineral aggregates as well as Bitumen for road maintenance. **2. Stone Matrix Asphalt---**very useful for wearing course of heavily trafficked roads. **3. Micro-surfacing -----**highly cost-effective in periodical maintenance of road surfaces without having any structural distress of hard-crust. **Some more new items are in the pipe line and would be published as addenda to this SOR within a very short period.**

14. Procedure for preparation of Project Cost Estimate

The mode of preparation of project cost estimate has been changed a lot with the change in mode of construction from SBD to EPC for quite some time past.With the introduction of Goods & Service Tax system the procedure has changed once more. Recently **the Ministry of Road Transport & Highways has issued one circular no. Secy/RTH/Circular/005 dated-9.03.2019** pertaining to the procedure for calculation of cost estimates and provision of contingencies/centages.One sample abstract sheet in order to prepare project cost estimate is appended below:-

Sample Abstract Sheet to Prepare Project Cost Estimate (upto ₹ 300 crore projects)		
GENERAL ABSTRACT OF COST		
Sl. No.	Description	Amount (₹)
1	Designed LengthKm.
2	Construction Periodmonths.
Civil Construction Cost Estimates		
i)	Civil Construction Cost (Road Portion)	
ii)	Civil Construction Cost (Structures)	
A.	Total Estimated Civil Construction Cost	
Pre-Construction Activities		
i)	Land Acquisition Cost	
ii)	Utility Shifting	
iii)	Tree felling/ Forest Diversion	
B.	Total Pre-Construction Estimates	
i)	GST @ 12% on 'A' above	
ii)	Contingencies @ 2.8% on 'A'	
iii)	Agency Charges 3% on 'A'.	
iv)	Supervision Charges 3% on 'A'.	
v)	Price Escalation @ 5% of 'A' above as per phasing of the Project execution only for the period beyond one year of the Bid submission date.	
vi)	Maintenance during Construction/ Defect Liability Period (Calculate as per rates prescribed in the latest document on EPC Contracts)	
C.	Total Provision for GST/ Contingencies and Centages.	
D.	Total Sanctioned Cost of the Project (A+B+C).	

Above format shall strictly be followed during preparation of cost estimates for all EPC projects unless any modification is suggested by MORTH.



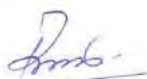
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CHAPTER - A

APPROXIMATE MATERIAL REQUIREMENT FOR DIFFERENT ITEMS OF WORKS

CHAPTER - A

APPROXIMATE MATERIAL REQUIREMENT FOR DIFFERENT ITEMS OF WORKS

Items & Materials

(Cost of water need not to be added with the item rate)

3.5 Excavation in hard rock (requiring blasting)

(Material cost need not to be added with the item rate)

- i. Gelatine 80% = 0.350 kg per Cum.
- ii. Electric detonators = 1.40 nos. /Cum.

3.9 Excavation in hard rock (controlled blasting)

(Material cost need not to be added with the item rate)

- i. Gelatine 80% = 0.350 kg per Cum.
- ii. Electric detonators = 5.60 nos. /Cum.

3.12 Pre-splitting of rock excavation slopes

(Material cost need not to be added with the item rate)

- i. Gelatine 80% = 0.350 kg per Cum.
- ii. Electric detonators = 5.60 nos. /Cum.

3.13 Excavation for structure (Hard Rock)

(Material cost need not to be added with the item rate)

- i. Gelatine 80% = 0.350 kg per Cum.
- ii. Electric detonators = 1.40 nos. /Cum.

3.23 Seeding and Mulching

- i. Bitumen Emulsion = 0.23 Litre per sqm.

3.27 Subsurface drains with perforated pipe

- 1) Perforated pipe of cement concrete internal dia. 100mm.=1m
(For Sl. No. 1, Material cost already included in the analysis & need not to be added with the item rate)

- 2) Grading of Crushed stone/Gravel /Sand materials per metre as per table 300-3, 5th Revision of MoRT&H's specification, 2013:

For Grade-I

Size of materials	Qty. (m ³)
5.6 mm	0.010
2.8 mm	0.011
1.4 mm	0.034
710 micron	0.048
355 micron	0.073
180 micron	0.043
90 micron	0.022

Items & Materials

For Grade-II

Size of materials	Qty. (m ³)
22.4 mm	0.006
11.2 mm	0.056
5.6 mm	0.079
2.8 mm	0.032
710 micron	0.037
355 micron	0.016
90 micron	0.013

For Grade-III

Size of materials	Qty. (m ³)
22.4 mm	0.047
11.2 mm	0.094
5.6 mm	0.053
2.8 mm	0.031
1.4 mm	0.006
90 micron	0.006

3.28 Aggregate Subsurface drains

- 1) Grading of Crushed stone/Gravel materials per metre as per table 300-4 :

For Type-A

Size of materials	Qty. (m ³)
10.0 mm	0.037
5.6 mm	0.027
600 micron	0.035
150 micron	0.029
75 micron	0.007

For Type-B

Size of materials	Qty. (m ³)
37.5 mm	0.010
20.0 mm	0.111
10.0 mm	0.014

3.29 Underground drain at edge of pavement.

- i. Consumption of materials as per Sl. No. 12.8 for RCC (M-20 Grade) Concrete by Mechanical means as per sl. no. 12.8
- ii. HYSD Reinforcement = 0.039 MT per Cum.

3.34 Excavation in hilly areas in hard rock

(Material cost already included in the analysis & need not to be added with the item rate)

- i. Gelatine 80% = 0.206 kg per Cum.
- ii. Electric detonators = 0.82 nos. /Cum.

[Conform to the MoRTH's Specification for Road & Bridge Works (5th Revision) - 2013]

Items & Materials

4.1 Graded Crushed stone/gravel & sand mixture per cum for sub base:

For Grading-I

Size of materials	Qty. (m ³)
53 mm	0.13
26.5 mm	0.22
10.0 mm	0.29
5.6 mm	0.13
2.36 mm	0.13
0.425 mm	0.22
0.075 mm	0.16

For Grading-V

Size of materials	Qty. (m ³)
53.0 mm	0.13
26.5 mm	0.22
10.0 mm	0.29
5.6 mm	0.19
2.36 mm	0.26
0.85 mm	0.12
0.425 mm	0.08

For Grading-II

Size of materials	Qty. (m ³)
26.5 mm	0.19
10.0 mm	0.26
5.6 mm	0.16
2.36 mm	0.16
0.425 mm	0.35
0.075 mm	0.16

For Grading-VI

Size of materials	Qty. (m ³)
26.5 mm	0.16
10.0 mm	0.29
5.6 mm	0.29
2.36 mm	0.32
0.425 mm	0.17
0.075 mm	0.05

For Grading-III

Size of materials	Qty. (m ³)
26.5 mm	0.48
5.6 mm	0.54
0.075 mm	0.26

For Grading-IV

Size of materials	Qty. (m ³)
26.5 mm	0.45
5.6 mm	0.51
0.075 mm	0.32

Note: Quantities are only for estimation, grading I/II/ III / IV /V/VI as required shall conform to Table 400-1 of MoRT&H's Specification for Road & Bridge Works (5th Revision) - 2013.

4.2 Graded Crushed stone/gravel & sand mixture per cum for sub base:

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Items & Materials

4.3 Lime stabilization for improving sub grade

- i. Lime at site = 50 Kg per m³.
- ii. Water = 0.240 KL per m³.

4.4 Lime treated Soil for Sub-Base

- i. Lime at site = 50 Kg per m³.
- ii. Water = 0.240 KL per m³.

4.5 Cement treated Soil Sub-Base / Base

- i. Cement at site = 70 Kg per m³.
- ii. Water = 0.240 KL per m³. (*Cost of water need not to be added with the item rate*)

4.6 Per cum of Cement treated crushed rock or combination

For Sub-base/base course

- i. Cement = 0.08 t
- ii. Graded crushed stone/gravels, sand mixture per cum.

Size of materials	Qty. (m ³)
Stone metal 37.5mm	0.03
Stone chips 20.0 mm	0.32
Stone chips 10.0 mm	0.06
Stone chips 5.6 mm	0.06

Size of materials	Qty. (m ³)
Sand 600 micron	0.33
Sand 300 micron	0.18
Sand 75 micron	0.29

Note: Quantities are only for estimation, Materials as required shall conform to Table 400-4 of MoRT&H's Specification for Road & Bridge Works (5th Revision) - 2013.

4.8 Inverted Choke.

- i. Screening type 'B' or coarse sand = 1.20 cum per cum
- ii. Water = 0.18 KL per cum. (*Cost of water need not to be added with the item rate*)

Items & Materials

4.9 Per cum. of Water Bound Macadam (Reference table No. 400-9, 400-10 & 400-11)

A. Crushed Stone aggregates

Size of crushed stone aggregates	Grading-1 (75 mm compacted thickness) in cum.	Grading-2 (75 mm compacted thickness) in cum.
63 mm	0.07	-
53 mm	0.59	0.03
45 mm	0.56	0.26
22.4 mm	0.10	0.96
11.2 mm	-	0.07

B. Stone screening (in loose Qty./m³)

Size of crushed stone aggregates	Grading-1 (75 mm compacted thickness) in cum.	Grading-2 (75 mm compacted thickness) in cum.
Type-A		
13.2 mm	--	--
11.2 mm	--	--
5.6 mm	0.13	--
180 micron	0.05	--
Type-B		
11.2 mm	--	--
10.0 mm	0.03	0.03
5.6 mm	0.08	0.08
180 micron	0.17	0.16
Crushable Type materials such as moorum or gravel	0.31	0.31

C. Binding materials (in loose Qty./m³)

Size of crushed stone aggregates	Grading-1 (75 mm compacted thickness) in cum.	Grading-2 (75 mm compacted thickness) in cum.
2.36 to 75 micron	0.08	0.08

Note: Quantities are only for estimation. For execution grading shall conform to table 400-9, 400-10 & 400-11 of MoRT&H's Specification for Road & Bridge Works (5th Revision) - 2013.

Items & Materials

4.12 Per Cum of Wet Mix Macadam

Size of materials	Qty. (m ³)
Stone metal 45 mm	0.03
Stone chips 22.4 mm	0.36
Stone chips 11.2 mm	0.26
Stone chips 5.6 mm	0.23
Stone Dust	0.43

Water = 0.08KL per m³ (Cost of water need not to be added with the item rate).

Note: Quantities are only for estimation, For execution grading shall conform to the grading given in **Table 2 of IRC:109-2015**.

IS Sieve Designation	53.00 mm	45.00 mm	22.40 mm	11.20 mm	4.75 mm	2.36 mm	600* micron	75* micron
Percent by Weight Passing Sieve	100	95-100	60-80	40-60	25-40	15.30	6-18	4-8

*The fraction passing the 75 micron sieve shall not be greater than two-thirds of the fraction passing the 600 micron sieve.

The grading of the WMM shall be within and approximately parallel to the grading envelope. The grading within the limit set forth in **Table 2 of IRC:109-2015** shall be graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or the vice versa. The grading can be produced by crushing rock and may be an all-in product, usually termed a 'crusher-run'. If it is unable to achieve the required grading directly and continuously from crushing, screen the material into at least four fractions and reconstitute the material to conform to the Specifications by mixing it together in a pug mill.

Material finer than 425 micron shall have Plasticity Index (PI) not exceeding 6. For determination of laboratory MDD/OMC, for sample having aggregate passing through 37.5 mm sieve bigger size mould of volume 2250 cc as specified in IS:2720, (Part VIII) shall be used.

4.16 Per cum of Granular sub base for footpath & separator

A. For Granular Sub-base layer: Table - 400 -1 may be followed as per Sl. No. 4.1 (applicable Grade of GSB to be used)

For Grading-I

Size of materials	Qty. (m ³)
53 mm	0.13
26.5 mm	0.22
10.0 mm	0.29
5.6 mm	0.13

Size of materials	Qty. (m ³)
2.36 mm	0.13
0.425 mm	0.22
0.075 mm	0.16

Items & Materials

For Grading-II

Size of materials	Qty. (m ³)
26.5 mm	0.19
10.0 mm	0.26
5.6 mm	0.16
2.36 mm	0.16

Size of materials	Qty. (m ³)
0.425 mm	0.35
0.075 mm	0.16

B. Cement conc. Grade M15: 0.025 cum/sq.m. as per Sl. No. 12.8

C. Cement Plaster 1:3

i. Sand = 0.013 cum/sq.m.

ii. Cement = 6.1 kg/sq.m.

Note: Quantities are only for estimation, For execution grading shall conform to Table 400-1 of MoRT&H's Specification for Road & Bridge Works (5th Revision) - 2013.

4.17 Per cum for Crusher run Macadam base:

For 53 mm maximum size of aggregate

Size of materials	Qty. (m ³)
Stone metal 45 mm	0.09
Stone chips 22.4 mm	0.34
Stone chips 5.6 mm	0.43
Stone chips 710 micron	0.23
Stone chips 90 micron	0.23

For 37.5 mm maximum size of aggregate

Size of materials	Qty. (m ³)
Stone metal 22.4 mm	0.07
Stone chips 5.6 mm	0.66
Stone chips 710 micron	0.33
Stone chips 90 micron	0.26

Note: Quantities are only for estimation, For execution grading shall conform to Table 400-14 of MoRT&H's Specification for Road & Bridge Works (5th Revision) - 2013.

4.18 Lime (i.e. Lime stone, chemically known as CaCO₃) fly ash stabilized soil sub base:

(Only compensation for earth is included)

Out put: 480 Cu.m. (720 ton, Density 1.50 ton / Cum.)

Lime + Fly ash @ 20% of 720 ton = 144 ton

Lime: Fly ash ratio = 4 : 16

So, Lime = 29 ton, Fly ash = 115 ton

Soil = 576 ton i.e. = (576 / 1.6) Cum = 360 Cum.

So for 1 Cum. compacted work, Lime = 0.06042 ton = 60.42 Kg

So for 1 Cum. compacted work, Fly ash = 0.23958 ton = 239.6 Kg

So for 1 Cum. compacted work, Soil = 0.75 Cum.

Items & materials

5.1 Per square meter Prime Coat

Cationic Bitumen Emulsion SS-1 (Inverted Emulsion), Grade confirming to IS : 8887 or Medium curing Cut back Bitumen confirming to IS : 217.

i) On WMM/WBM surface = 0.70 to 1.0 kg /per sqm.

ii) On Stabilized soil base/Crusher Run Macadam = 0.90 to 1.2 kg per sqm.

Water = 1.17 L per sq.m.

5.2 Per square meter Tack Coat

Cationic Bitumen Emulsion RS-1 complying with IS:8887 or suitable low viscosity paving bitumen of VG 10 Grade conforming to IS :73.The use of Cut back Bitumen RC: 70, as per IS: 217 shall be restricted only for sites at sub zero temperatures and emergency purposes.

i) On Bituminous Surface = 0.20 to 0.30 kg /per sqm.

ii) On Granular surface treated with primer = 0.25 to 0.30 kg per sqm.

ii) On Cement Concrete Pavement = 0.30 to 0.35 kg per sqm.

5.3 Per cum of Bituminous Macadam

Size of crushed stone aggregates	Grading-1 40 mm nominal max ^m aggregate size 80 - 100 mm (Layer thickness) cum.	Grading-2 19 mm nominal max ^m aggregate size 50 -75 mm (Layer thickness) cum.
37.5 mm	0.07	-
26.5 mm	0.11	-
20 mm	-	0.07
13.2 mm	0.56	0.33
5.6 mm	0.43	0.65
2.36 mm	0.09	0.21
300 micron	0.08	0.08
75 micron	0.08	0.08
Bitumen content (%) by mass of total mix	3.30%	3.40%
Bitumen content by mass	73 Kg	75 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-7 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013.

Items & materials

5.6 Per cum of Dense Graded Bituminous Macadam

Size of crushed stone aggregates	Grading-1 37.5 mm nominal max ^m aggregate size 80 - 100 mm (Layer thickness) cum.	Grading-2 26.5 mm nominal max ^m aggregate size 50 -75 mm (Layer thickness) cum.
37.5 mm	0.04	-
26.5 mm	0.28	0.07
20 mm	-	0.17
13.2 mm	0.19	0.22
5.6 mm	0.27	0.32
2.36 mm	0.16	0.16
300 micron	0.30	0.30
75 micron	0.20	0.20
Bitumen content (%) by mass of total mix	4% (min.)	4.5% (min.)
Bitumen content by mass	92 Kg (Min)	104 Kg (Min)
Filler(2 %) of wt of Aggregates (Cement /lime* / Rock dust)	45 Kg	45 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-10 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

* Lime as a filler material should be Hydrated Lime [i.e chemically known as Ca(OH)₂]

5.8 Per cum of Bituminous Concrete

Size of crushed stone aggregates	Grading -1 19 mm nominal max ^m aggregate size (layer thickness 50mm) Cum	Grading - 2 13.2 mm nominal max ^m aggregate size (layer thickness 30-40mm) Cum
20mm	0.07	-
13.2mm	0.38	0.07
10mm	0.10	0.24
5.6mm	0.25	0.25
2.36mm	0.13	0.18
1.18mm	0.13	0.13
600 micron	0.09	0.13
300 micron	0.09	0.13
150 micron	0.09	0.10
75 micron	0.13	0.23
Bitumen content (%) by mass of total mix	5.20 % (min.)	5.40 % (min.)
Bitumen content by mass	123 Kg (Min)	127 Kg (Min)
Filer(2 % by total weight of aggregate)(Cement /lime* / Rock dust)	45 kg	45 kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-17 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

* Lime as a filler material should be Hydrated Lime [i.e chemically known as Ca(OH)₂]

Items & materials

5.9 Per sqm. of Surface dressing

Size of crushed stone aggregates	Case-I. 19 mm nominal max ^m aggregate size cum per sqm.	Case-II. 13 mm nominal max ^m aggregate size cum per sqm.
20 mm	0.0011	-
13.2 mm	0.0109	0.0007
10.0 mm	0.0025	0.0073
5.6 mm	-	0.0017
2.36 mm	0.0004	0.00025
75 micron	0.00015	0.00013
Bitumen	1.20 Kg	1.00 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-21 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

5.10 Per sqm. of Open Graded Premix Surfacing

Size of crushed stone aggregates	Case-I Using Viscosity grade Bitumen cum per sqm.	Case-II Using Cationic Bitumen Emulsion cum per sqm.
13.2 mm	0.018	0.018
11.2 mm	0.009	0.009
Bitumen	1.46 Kg	2.153 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-23 & 500-24 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

5.11 Per sqm. of Close-Graded Premix Surfacing / Mix Seal Surfacing

Size of crushed stone aggregates	Type - A (Rainfall more than 150cm/year) Using Viscosity grade Bitumen 20 mm thickness cum per sqm.	Type - B (Rainfall less than 150cm/year) Using Penetration grade Bitumen 20 mm thickness cum per sqm.
13.2 mm	-	-
11.2 mm	-	0.0016
5.6 mm	0.0081	0.0142
2.8 mm	0.0119	0.0072
90 micron	0.007	0.004
Bitumen	2.20 Kg	1.90 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-19 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

Items & materials

5.12 Per sqm. of Seal Coat

Size of crushed stone aggregates	Liquid Seal Coat Type -A cum per sqm.	Premixed Seal Coat Type -B cum per sqm.
5.6 mm nominal size	0.009	-
2.36 mm to 90 micron	-	0.006
Bitumen (Viscosity Grade)	0.98 Kg	0.68 Kg

Size of crushed stone aggregates	Liquid Seal Coat Type -A cum per sqm.	Premixed Seal Coat Type -B cum per sqm.
5.6 mm nominal size	0.009	-
2.36 mm to 90 micron	-	0.006
Bitumen (Emulsion)	1.5 Kg	1.05Kg

Note: Quantities are only for estimation. For execution grading shall conform to cl. 511.2.2 & 511.2.3 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

5.14 Per sqm. of 25 mm thick Mastic Asphalt

Materials Requirement

- (i) Bitumen 85/25 to be used in normal climatic regions and VG 40 to be used in cold climatic regions (temperature less than 10°C) = 5.714 kg/sqm
- (ii) Fine aggregate passing 2.36 mm sieve and retained 0.075 mm sieve = 0.011 Cum./sqm.

(iii) Lime stone dust with calcium content not less than 80 % by weight and @ 17.92 % by wt.of mix = 10.29 Kg per Sq.m.

(iv) Coarse aggregate 5.6 mm to 13.2 mm @ 40 % by wt. of mix = 0.0157 Cum. per Sqm.

(v) Pre-coated stone chips of 13.2 mm nominal size for skid resistance = 0.00057 Cum. per Sqm.

(vi) Bitumen for coating of chips @ 2% by wt. = 0.014 Kg per Sqm.

Note: 1) Quantities are only for estimation. For execution grading shall conform to table 500-39, 500-40, 500-41 & 500-42 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

2) This rate analysis is based on design made by CRRI for a specific case and is meant for estimating purposes only. Actual design is required to be done for each case.

5.15 Per sqm. of Slurry Seal Coat

Materials Requirement	Case-I. 2-3 mm thickness	Case-II. 4-6 mm thickness	Case-III. 6-8 mm thickness
(i) Cationic Emulsion (SS2) as Residual Binder	0.72 Kg per sqm.	1.21 Kg per sqm.	1.39 Kg per sqm.
(ii) Crushed stone Aggregate	Fine aggregate passing 2.36 mm and below = 0.0031 Cum.per sqm.	Fine aggregate 5.6 mm - 5% and 2.36mm & below -	Fine aggregate 5.6 mm-(20%) & 2.36 and below(80%) = 0.0091 Cum /m2
(iii) Ordinary Portland Cement as Filler @ 2% of total mix	0.11 Kg. per Sqm.	0.22 Kg. per Sqm.	0.31 Kg per sqm.
(iv) Water	0.60 lit. per Sqm.	0.75 lit. per Sqm.	0.85 lit. per Sqm.

Note: Quantities are only for estimation. For execution grading shall conform to table 500-25 of MORT&H's specification for Road & Bridge Works (5th Revision)- 2013

Items & materials

5.16 Per cum. of Recycling of Bituminous pavement with central Recycling Plant

Considering percentage of mix requiring fresh aggregate = 70 % = 1.0304 cum.

- i) 37.5mm to 26.5 mm @ 23 % of 1.0304 Cu.m = 0.237 Cu.m. / Cu.m. Compacted vol.
- ii) 26.5mm to 10 mm @ 15 % of 1.0304 Cu.m. = 0.155 Cu.m. / Cu.m. Compacted vol.
- iii) 10mm to 5.6 mm @ 20 % of 1.0304 Cu.m. = 0.206 Cu.m. / Cu.m. Compacted vol.
- iv) Below 5.6mm @ 40 % of 1.0304 cum. = 0.412 Cu.m. / Cu.m. Compacted vol.
- v) Filler : Cement @ 2 % of 2.30 tonne = 46.00 Kg. / Cu.m. Compacted vol.
- vi) Bitumen = 81.00 Kg / Cu.m. of Compacted vol.

5.17 Per sqm of Fog Spray

A Cationic Bitumen Emulsion Grade SS-1 complying with requirements IS :8887 @ 0.75 Kg per Sqm.

B Note : In case it decided by the Engineer to blind the Fog Spray the following may be added in excess with A

- i) Crushed stone grit 2.36 mm size @ 3.75 Kg per Sqm.
- ii) Cationic Bitumen Emulsion for pre coating grit @ 2% = 0.075 kg per Sqm.

5.18 Per cum. Of Bituminous Cold mix (including gravel emulsion)

Size of crushed stone aggregates	Case-I Using cationic Bitumen emulsion & 13.2 mm nominal maximum size aggregate / cum	Case-II Using cationic bitumen Emulsion and 26.5 mm nominal maximum size aggregate / cum	Case-III Using Cutback Bitumen and 13.2 mm nominal maximum size	Case-IV Using Cutback Bitumen and 26.5 mm nominal maximum size aggregate / cum
26.5 mm	-	0.066	-	0.068
20 mm	-	-	-	-
13.2 mm	0.066	0.356	0.068	0.367
5.6 mm	0.494	0.316	0.510	0.327
2.36 mm	0.23	0.158	0.238	0.163
300 micron	0.362	0.277	0.374	0.286
75 micron	0.165	0.145	0.17	0.15
Bitumen Emulsion or Cutback	175.61 Kg	175.61 Kg	109.76 Kg	109.76 Kg
*Lime as filler	43.9 Kg	43.9 Kg	43.9 Kg	43.9 Kg

Note: Quantities are only for estimation. For execution grading shall conform to table 500-44 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

* Lime as a filler material should be Hydrated Lime [i.e chemically known as Ca(OH)_2]

5.19 Per cum of Sand Asphalt Base course

- i) Sand of size 4.75 mm to 75 micron = 1.38 cum per cum
- ii) Cement, Lime [Ca(OH)_2] or Rock dust as filler @ 2 % of total mix = 43.90 Kg per cum.
- iii) Bitumen @ 5 % = 109.76 Kg per cum

Note: Quantities are only for estimation. For execution grading shall conform to table 500-14 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

Items & materials

5.21 Crack Prevention Courses (materials requirement)

Crack Width	Binder in kg/sqm	Stone Aggregates (cum/sqm)	Remarks
< 6mm	1.1	5.6mm - 0.01	NIL
6mm to 9mm	1.3	<u>For First coat</u> 5.6mm - 0.006 & 11.2mm - 0.006	<u>For Second coat</u> (if used) apply binder @0.9 kg/sqm & 5.6mm chips @0.01 cum/sqm
>9mm & cracked area >50%	1.5	11.2mm - 0.012	DO

Note: Quantities are only for estimation. For execution grading shall conform to table 500-43 and clause no 517 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

Case IV Bitumen Impregnated Geo Textile

i) Bitumen VG-10 = 1.00 kg / Sq.m. area

ii) Geo Textile including 10 % for overlap = 1.10 Sqm./ Sq.m. area

5.22 Per cum of Recipe Cold Mixes

Size of crushed stone aggregates	Case-I 75 mm thickness cum	Case-II 40 mm thickness cum	Case-III 25 mm thickness cum
37.5 mm	0.0724	-	-
26.5 mm	0.326	-	-
20 mm	-	-	-
13.2 mm	0.3984	0.07	-
10 mm	-	0.42	-
5.6 mm	0.2898	0.42	-
3.35 mm (same Rate of 5.6 mm size)	0.1449	0.21	-
2.36 mm	-	-	0.1646
600 micron	-	-	0.5927
300 micron	0.2173	-	-
150 micron	-	-	0.3293
75 micron	-	0.28	0.2305
Slow/Medium setting Bitumen Emulsion	98.78 Kg	153.66 Kg	186.60 Kg
water	29.27 lit	29.27 lit	29.27 lit

Note: Quantities are only for estimation. For execution grading shall conform to table 500-47 and clause no 518 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

Items & materials

6.1 Per cum of Dry Lean Cement Concrete

Coarse Aggregate : 26.5 mm & 11.2 mm nominal aggregate size graded stone chips @ 0.9 Cu.m. / Cu.m. of Compacted vol.

Fine Aggregate : Coarse Sand: @ 0.45 Cu.m. / Cu.m. of Compacted vol.

Cement: @ 150 kg / Cu.m. of Compacted vol.

Water: @ 106.67 lit. / Cu.m. of Compacted vol.

Note: 1) Quantities are only for estimation. For execution grading shall conform to table 600-1 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013 & also IRC:SP:49

2) Fly-ash upto 20% by wt. of cementitious material to be used in replace of OPC cement upto 30% as per 601.2.3 of MORT&H's specification for Road & Bridge Works(5thRevision) - 2013 & also IRC:SP:49

6.2 Per cum of Cement Concrete pavement

Coarse Aggregate : 26.5 mm & 11.2 mm nominal size(conforming to clause 602.2.6.4 of MORT&H' s specification) graded stone chips @ 0.9 cum / cum. of Compacted vol.

Fine Aggregate : Coarse Sand (conforming to clause 602.2.6.3 & 602.2.6.4 of MORT&H' s specification): @ 0.45 cum / cum of Compacted vol.

Cement: 43 Grade @ 360 kg / Cu.m. of Compacted vol.

Mild Steel :32 mm dia Dowel bars of Grade-I conforming to IS:432 @ 9.0 kg/Cu.m. of

HYSD Steel :12 mm dia Tie bars as per IS:1786 @ 1.11 kg / Cu.m. of Compacted vol.

Separation membrane of Impermeable Plastic sheeting 150 micron thick as per IRC:15 =3.50 Sq.m. / Cu.m. of Compacted vol.

Pre molded Joint Filler 25 mm thick for Expansion joint = 0.016 Sq.m. / Cu.m. of Compacted vol.

Joint Sealant = 0.833 Kg / Cu.m. of Compacted vol.

Sealant Primer = 0.110 Kg / Cu.m. of Compacted vol.

Plastic sheath 0.5 mm thick for Dowel bars =0.044 Sq.m. / Cu.m. of Compacted vol.

Curing Compound :1.76 lit. / Cu.m. of Compacted vol.

Super Plasticizer Admixture is Marked as per IS: 9103 - 1999 @ 0.5 % by wt. of Cement = 1.97 kg / cum of Compacted vol.

Water: @ 205.71 lit. / Cu.m. of Compacted vol.

Note: 1) Add 1% of material for cost of miscellaneous materials.

2) Quantities are only for estimation. For execution grading shall conforming to table 600-3 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

3) Fly-ash upto 20% by wt. of cementitious material to be used in replace of OPC, such that OPC content shall not be less than 310 kg /cu.m. as per 602.3.2 of MORT&H specification for Road & Bridge Works (5th Rev) 2013

6.3 ITEM DELETED

6.5 Per cum of construction of Base / Sub-base of pavement with Lean Concrete- Flyash

Coarse Aggregate : 40 mm nominal size graded stone chips conforming to Table 2 IRC: 74-1979 @ 0.9 cum / cum of compacted vol.

Fine Aggregate : Coarse Sand: @ 0.25 Cu.m. / Cu.m. of Compacted vol.

: Fly Ash Conforming to IS 3812 (Part II) :@ 0.20 Cum/cum of compacted vol.

Cement: 43 Grade @ 150 kg / cum of compacted vol.

Water: @ 106.67 lit. / cum of compacted vol.

6.6 Per cum of Cement - Flyash Concrete Pavement

Coarse Aggregate : 26.5 mm & 13.2 mm nominal size graded stone chips @ 0.9 cum / cum of compacted vol.

Fine Aggregate : Coarse Sand as per IS 383 Conforming to clause 602.2.4 : @ 0.4048 cum / cum of compacted vol.

: Fly Ash Conforming to IS 3812 (Part II) : @ 0.104 tonne / cum. of compacted vol.

Cement: 43 Grade @ 340 kg / Cu.m. of Compacted vol.

Steel :32 mm dia MS Dowel bars of Grade S 240 @ 9.0 kg / Cu.m. of Compacted vol.

Steel :16 mm dia Deformed steel Tie bars of Grade S 415 @ 1.11 kg / cum of compacted vol.

Separation membrane of Impermeable Plastic sheeting 125 micron thick =3.50 Sq.m. / cum of compacted vol.

Pre molded Joint Filler 25 mm thick for Expansion joint = 0.016 Sq.m. / cum of compacted vol.

Joint Sealant = 0.833 Kg / cum of Compacted vol.

Sealant Primer = 0.110 Kg / cum of Compacted vol.

Plastic sheath 1.25 mm thick for Dowel bars =0.044 Sq.m. / cum of Compacted vol.

Curing Compound :1.76 lit. / cum. of Compacted vol.

Super Plasticizer Admixture IS Marked as per 9103 - 1999 @ 0.5 % by wt. of Cement = 1.97 kg / cum of Compacted vol.

Water: @ 205.71 lit. / cum. of Compacted vol.

NOTE: General requirement of Cement = 400 kg per Cu.m. of Compacted vol.

15 % of Cement is to be replaced by Flyash = 60 kg per Cu.m. of Compacted vol.

Items & materials

Balance Cement = 85 % of total requirement = 340 kg per Cu.m. of Compacted vol. General requirement of Coarse sand = 0.45 Cu.m. per Cu.m. of Compacted vol. = ,10 % to be replaced by Flyash = 0.045 Cu.m. = 44.0 kg per Cu.m. of Compacted vol. Balance sand = 0.45 X 0.90 = 0.405 Cu.m. per Cu.m. of Compacted vol.

Total Flyash = 60.00 kg + 44.00 kg = 104.00 kg = 0.104 tonne

7.1 Per running metre of sub-surface drain with geotextile

Materials requirement

- (i) Geonets = 1.00 Sqm. Per Running metre length.
- (ii) Geomembrane = 1.00 Sqm. Per Running metre length.
- (ii) Geotextile = 2.00 Sqm. Per Running metre length.

7.2 Per running metre of narrow filter sub-surface drain

Materials requirement

- (i) Perforated geosynthetic pipe 150 mm dia. = 1.0m. /RM length.
- (ii) Geotextile filter fabric = 1.25 Sqm. Per Running metre length.

7.3 Per sqm of laying Paving Fabric beneath a pavement overlay

Materials requirement

- (i) Paving Fabric = 1.05 Sqm. Per Sqm. Complete item
- (ii) Paving bitumen 80 / 100 = 1.00 kg per Sqm complete item

7.5 Reinforced Earth structures

7.5(i) Per metre assembling, joining, and laying of reinforcing elements

A Reinforcement strips 60 mm wide and 5 mm thick as per clause 3102

- 1 Galvanised carbon steel strips 1 m / m

OR

- 2 Copper strips 1 m / m

OR

- 3 Aluminium strips 1 m / m

OR

- 4 Stainless steel strips 1 m / m

OR

- 5 Glass reinforced Polymer/Fibre reinforced polymer/Polymeric strips 1m /m.

B Synthetic Geo grids as per clause 3102.8 and approved design and specifications I Sq.m. / Sq.m.

Note Add 10 per cent of the cost of reinforcing strip towards accessories like tie-strips, nuts and bolts and loops/lugs for joining reinforcing elements with the fascia pannels, overlaps, heat bonding or extension.

7.5(ii) Per sqm of fencing elements of RCC

- (i) Pre cast R.C.C. M - 35 Facing Element of size as per design and 18 cm thick = 0.18 Cu.m. / Sq.m.as per Sl.No.12.8.
- (ii) HYSD Steel @ 5 kg / Sq.m.as per Sl. No. 13.6

Items & materials

8.1 Per metre length of cast in situ Cement Concrete M-20 Kerb

A Materials required

- i) Crushed stone aggregate 20 mm nominal aggregate size = 0.061 Cu.m. / m length.
- ii) Coarse sand = 0.030 Cu.m. / m length.
- iii) Cement = 15.83 kg / m length.
- iv) Water = 83.33 lit. / m length.

B Materials required

- i) Crushed stone aggregate 20 mm nominal size = 0.061 Cu.m. / m length.
- ii) Coarse sand = 0.030 Cu.m. / m length.
- iii) Cement = 15.83 kg / m length.
- iv) Water = 83.33 lit. / m length.

8.2 Per metre length of cast in situ Cement Concrete M-20 Kerb with channel

A Materials required

- i) Crushed stone aggregate 20 mm nominal size = 0.122 Cu.m. / m length.
- ii) Coarse sand = 0.061 Cu.m. / m length.
- iii) Cement = 30.03 kg / m length.
- iv) Water = 120 lit. / m length.

B Materials required

- i) Crushed stone aggregate 20 mm nominal size = 0.122 Cu.m. / m length.
- ii) Coarse sand = 0.061 Cu.m. / m length.
- iii) Cement = 30.03 kg / m length.
- iv) Water = 0.12 KL / m length.

8.3 Printing new Letters and figures of any shade per letter of 1 cm height

- i) Hindi (Matras, Commas and the like not to be measured and paid and half letters shall be counted as half)

Paint = 0.00044 lit. / letters of 1.0 cm height.

- ii) English & Roman :Hyphens and the like not to be measured and paid.
Paint = 0.0003 lit. / letters of 1.0 cm height.

8.4 Per number of Retro- reflectorised Traffic Signs

Materials requirement:

Part I : Consolidated Items

- i) Excavation of Foundation = 0.216 Cu.m. for each sign board.
- ii) Cement Concrete M -15 Grade 0.12 Cu.m. for each sign board as per SL. No. 12.8.
- iii) Painting angle iron post 2 (two) coats = 0.43 m² for each sign board.

Part II : Materials component of Retro - reflective Sign Board

- i) MS Angle Iron 75 x 75 x 5 mm = 19.00 kg for each sign board.
- ii) aluminium sheeting fixed with encapsulated lens type reflective sheeting of size including lettering & signs as applicable.

Contd...

Items & materials

a) 90 cm Equilateral triangle 0.35 Sq.m.

OR

b) 60 cm Equilateral triangle 0.156 Sq.m.

OR

c) 60 cm Circular 0.283 Sq.m.

OR

d) 80 cm x 60 cm Rectangular 0.48 Sq.m.

OR

e) 60 cm x 45 cm Rectangular 0.27 Sq.m.

OR

f) 60 cm x 60 cm Square 0.36 Sq.m.

OR

g) 90 cm high Octagonal 0.672 Sq.m.

Note: Add 2 % cost of Angle Iron towards cost of drilling holes, nuts, bolts etc.

8.5 Per number of Direction and place identification signs with size up to 0.90 sqm size Board

Materials requirement:

Part I : Consolidated Items

- i) Excavation of Foundation = 0.216 Cu.m. for each 0.9 Sq.m.sign board.
- ii) Cement Concrete M - 15 Grade 0.12 Cu.m. for each 0.9 Sq.m. sign board as per Sl. No. 12.8.
- iii) Painting angle iron post 2 (two) coats = 0.43 Sq.m. for each 0.9 Sq.m. sign board.

Materials requirement for sign boards

- i) MS angle Iron 75 x 75 x 6 mm, 2.85 m long = 19.00 kg for each 0.9 Sq.m. sign board.
- ii) Aluminium sheeting fixed with encapsulated lens type reflective sheeting of size = 0.90 Sq.m. for each sign board.

Note: Add 2 % cost of materials towards cost of drilling holes, nuts, bolts, fabrication etc.

8.6 Per number of Direction and place identification signs with size more than 0.90 sqm size Board

Materials requirement:

Part I : Consolidated Items

- i) Excavation of Foundation = 0.43 Cu.m. for each 1.5 Sq.m. sign board.
- ii) Cement Concrete M - 15 Grade 0.24 Cu.m. for each 1.5 Sq.m sign board as per Sl. No. 12.8.
- iii) Painting angle iron post 2 (two) coats = 0.86 Sq.m for each 1.5 Sq.m sign board.

Materials requirement for sign boards

- i) MS angle Iron 75 x 75 x 6 mm, 2.85 m long 2 (two) nos. = 38.00 kg for each 1.5 Sq.m. sign board.
- ii) Aluminium sheeting fixed with encapsulated lens type reflective sheeting of size = 1.50 Sq.m. for each 1.5 Sq.m. sign board.

Note: Add 2 % cost of materials towards cost of drilling holes, nuts, bolts, fabrication etc.

Items & materials

8.7 Over head signs

A Truss and Vertical Support

Materials requirement:

- i) Aluminium Alloy / Galvanised steel including 5% wastage = 1.05 tonne / tonne.

Note: i) Add 1 % on cost of materials towards cost of nuts, bolts, drilling holes, welding consumables.

- ii) Add 15 % on cost of materials for Fabrication of Truss as approved design.

B Aluminium Alloy Plate For Over Head Signs

Materials requirement:

- i) Aluminium Alloy Plate 2 mm thick, fixed with high intensity grade sheeting vide clause 801.3 = 1.00 Sq.m.

Note: i) The cost of Excavation of Foundation and Concrete for fixing of vertical support system to be worked out as per approved drawing and design and to be included in the estimate.

- ii) Lettering and Arrow marks on sign boards to be provided separately as per actual requirements. Rate of these items have been included separately in this Chapter.

8.8 Per sqm of painting two coats on new concrete surfaces

Materials requirement:

- i) Paint conforming to clause 803.3. = 0.15 Litre per Sqm.

8.9 Per sqm of painting two coats on steel surfaces

Materials requirement:

- i) Paint ready mixed of approved brand.= 0.125 Litre per Sqm.

8.10 Per sqm of painting two coats on wood surfaces

Materials requirement:

- i) Paint ready mixed of approved brand.= 0.15 Litre per Sqm.

8.11 Per sqm of Painting line, dashes, arrows, etc. on road in two coats on new work

- i) Over 10 cm in Width.

Materials requirement:

- i) Road marking paint as per IS: 164.= 0.148 Litre per Sqm.

- ii) Up to 10 cm in Width.

Materials requirement:

- i) Road marking paint as per IS: 164.= 0.148 Litre per Sqm.

8.12 Per sqm of Painting line, dashes, arrows, etc. on road in two coats on old work

- i) Over 10 cm in Width.

Materials requirement:

- i) Road marking paint as per IS: 164.= 0.09 Litre per Sqm.

- ii) Up to 10 cm in Width.

Materials requirement:

- i) Road marking paint as per IS: 164.= 0.09 Litre per Sqm.

8.13 Per sqm of road marking with hot applied thermoplastic compound with reflecting glass beads on bituminous surface

Hot applied thermoplastic compound = 2.5 Litre per Sqm.

Reflectorising glass beads = 0.25 Kg per Sqm.

Items & materials

8.14 Kilometre Stone (As per IRC 8-1980, clause no 805, 5th revision of Mort&h's specification 2013)

i) Per number of 5 th K. M. Stone (precast)

Materials requirement: Per number

- a) M 15 grade concrete = 0.39167 Cum
- b) Steel Reinforcement = @ 3.68 Kg per No.
- c) Excavation for foundn. in soil = 0.28 m³
- d) Painting two Coats on concrete surface = 1.642 Sqm
- e) Lettering = 300 per cm per letter

Materials requirement:	Qty(cum)
i) 40mm nominal aggregate size	0.21
ii) 20 mm nominal aggregate size	0.10
iii) 10 mm nominal aggregate size	0.04
iv) Coarse sand	0.18
v) Cement a) using concrete mixer	107.84Kg

i) Per number of Ordinary K. M. Stone (precast)

Materials requirement: Per number

- a) M 15 grade concrete = 0.2693 Cum
- b) Steel Reinforcement = 1.9 Kg
- c) Excavation for foundn. in soil = 0.20 Cum
- d) Painting two Coats on concrete surface = 0.815 Sqm
- e) Lettering = 120 per cm per letter

Materials requirement:	Qty(cum)
i) 40mm nominal aggregate size	0.14
ii) 20 mm nominal aggregate size	0.07
iii) 10 mm nominal aggregate size	0.03
iv) Coarse sand	0.12
v) Cement a) using concrete mixer	74.15Kg

i) Per number of Hectometre Stone (precast)

Materials requirement: Per number

- a) M 15 grade concrete = 0.048 Cum
- b) Steel Reinforcement = 2 Kg per No.
- c) Excavation for foundn. in soil = 0.042 m³
- d) Painting two Coats on concrete surface = 0.19 Sqm
- e) Lettering = 10 per cm per letter

Materials requirement:	Qty(cum)
i) 40mm nominal aggregate size	0.02
ii) 20 mm nominal aggregate size	0.01
iii) 10 mm nominal aggregate size	0.01
iv) Coarse sand	0.02
v) Cement a) using concrete mixer	13.22Kg

8.15 Per number of road delineators

Materials requirement:

Cost of approved type of delineator from ISI certified firm as per the standard drawing given in IRC: 79 = 1 No. for each

8.16 Per number of Boundary pillar

Materials requirement: Per number

- a) M 15 grade concrete = 0.022 Cum
- b) Steel Reinforcement = 1.4 Kg
- c) Excavation for foundn. in soil = 0.19 m³
- d) Lettering = 40 per cm per letter
- e) Stone Spalls = 0.21 Cum. for each.

Materials requirement:	Qty(cum)
i) 40mm nominal aggregate size	0.01
ii) 20 mm nominal aggregate size	0.005
iii) 10 mm nominal aggregate size	0.005
iv) Coarse sand	0.01
v) Cement a) using concrete mixer	6.06Kg

8.17 Per metre length of GI barbed wire fencing 1.2 m high

Materials requirement:

- i) Barbed wire = 11.17m length @ 9.38 kg/100 m = 1.05 kg per m.
- ii) 50mm dia. Medium wt. G.I. Pipe = 0.767 m. length @ 5.10 kg per m = 3.91 kg per m.

Note: Add 2% of the cost of above materials for staple binding wire, drilling holes etc.

iii) Applying two coats of painting on exposed surface of G.I. Pipe posts = 0.241 Sqm per m.

Items & materials

8.18 Per metre length of GI barbed wire fencing 1.8 m high

Materials requirement: Clause no 808, 5th revision of Mort&h's specification 2013

- i) Barbed wire = 14.267 m length @ 9.38 kg/100 m = 1.34 kg per m.
- ii) 50mm dia. Medium wt. G.I. Pipe = 1.127 m. length @ 5.10 kg per m = 5.75 kg per m.

Note: Add 2% of the cost of above materials for staple binding wire, drilling holes etc.

- iii) Applying two coats of painting on exposed surface of 50 dia G.I. Pipe posts = 0.354 Sqm per m.

8.19 Per metre Fencing with welded steel wire fabric 75 mm X 50 mm

Materials requirement:

- i) 50mm dia medium wt. G.I. pipe posts @ 5.15 kg/m = 0.79 m
- ii) Runner flat 50X5 mm = 0.867kg / m.
- iii) Welded steel wire fabric 75X 50 mm @ 4.0 kg per Sqm. = 1.26 sqm. = 5.04 kg per m.

OR

Welded steel wire fabric 75 X 25 mm mesh @ 7.75 kg per Sqm. = 1.26 Sqm /m. = 9.765 kg per m.

- iv) Painting two coats including priming = 0.248 sqm./m.

Note: Add 2.5 % of cost of materials for drilling hole in angles flats splitting angle at bottom, nut and bolts and welded consumables

8.20 Per metre of tubular steel steel railing on medium weight channel (ISMC series) 100mmX 50mm

Materials requirement:

- i) Excavation of foundation(6 nos) = 0.1296 Cum.per m.
- ii) Foundation concrete M 15 Grade PCC = 0.0648 Cum. Per m. as per SL. No. 12.8.
- iii) Painting of pipe = 0.471 Sqm. Per m.
- iv) Painting of channel section = 0.216 Sqm. Per m.
- v) Steel pipe 50 mm external dia as per IS 1239 = 3.00 m. per m.
- vi) Medium weight steel channel (ISMC series) = 1.08 m. /m. @ 9.2 kg per m. = 9.936 kg per m.

8.21 Per metre of tubular steel steel railing on precast RCC posts, 1.2m high above ground level

Materials requirement:

- i) Excavation of foundation = 0.1296 Cum.per m.
- ii) Foundation concrete M-15 Grade PCC = 0.0648 Cum. Per m as per sl. no. 12.8
- iii) RCC M 20 for precast post 1.8 m each = 0.032 Cum Per m as per SL. No. 14.1
- iv) Painting of pipe = 0.471 Sqm. Per m as per SL. No.8.9.
- v) Steel pipe 50 mm external dia as per IS 1239 = 3.00 m. per m.
- vi) Medium weight steel channel (ISMC series) = 1.08 m. /m. @ 9.2 kg per m. = 9.936 kg per m.
- vii) HYSD steel reinforcement. = 0.030 tonne per RM.

Items & materials

8.22 Per metre of RCC crash barrier

Materials requirement:

- i) RCC M 40 grade concrete = 0.30 cum per m as per sl. no. 14.1
- ii) HYSD steel reinforcement including dowel bars = 0.028 tonne per m.
- iii) Pre-molded asphalt filler board = 0.032 Sqm per m.

8.23 Per metre of metal beam crash barrier

A) Type - A "W" metal beam crash barrier

Materials requirement:

- i) Corrugated sheet, 3 mm thick, "w" beam section railing, 4.5 m in length = 9.158 kg per m.
- ii) Channel posts 150 X 75 X 5 mm 1.8 m. long 3 nos @ 16.4 kg per m = 19.68 kg per m.
- iii) Spacer 150 X 75 X 5 mm channel .33 m. long 3 nos @ 16.4 kg per m. = 3.608 kg per m.
- iv) Nuts and bolts = 4.44 kg per m.

Note: Add 25 % of cost of materials for fabrication nuts bolts & washer etc.

B) Type - B "Thrie" metal beam crash barrier

Materials requirement:

- i) Corrugated sheet, 3 mm thick, "Thrie" beam section railing = 16.209 kg per m.
- ii) Channel posts 150 X 75 X 5 mm 2 m. long, 3 nos @ 16.4 kg per m = 21.89 kg per m.
- iii) Spacer 150 X 75 X 5 mm channel 0.546 m. long, 3 nos @ 16.4 kg per m. = 5.9696 kg per m.
- iv) Nuts and bolts = 6.67 kg per m.

Note: Add 15 % of cost of materials for fabrication nuts bolts and washer etc.

8.24 Road traffic signals Electrically operated

Note: Since it is a readymade item commercially produced and erected by Specialized firm in the electrical and electronics field, rate may be taken based on market rate enquiry from firms specialized in this field and ISI certified for the approved design and drawings.

8.25 Per metre of Flexible crash barrier, wire rope safety barrier

Materials requirement:

- i) RS Joist 100 X 75 mm - 16.5 m @ 11.5 kg per m. = 12.65 kg per m.
- ii) Strut two Nos for terminal posts 2m. long each = 3.067 Kg per m.
- iii) tie two nos of 8 mm steel plate 1.5 sqm. Each for terminal posts = 12.56 kg/ m.
- iv) Steel wire rope 40 mm, including 7.50 % extra for fixing at ends = 4.3 m. @ 1 kg per m. = 4.33 kg per m.
- v) Applying two coats of painting on exposed surface = 1.1 sqm./m.

Items & materials

8.26 Per metre of anti -glare devices in median

B. Anti- glare screen with

- i) 25 mm steel pipe =16 m.per m.
- ii) MS sheet for 600 X 300 X 3 mm rectangular vane one No @ 24 kg per Sqm. = 4.32 kg per m.
- iii) MS Sheet for 250 mm dia circular vane, 3 mm thick, 4 Nos. @ 24 kg per Sqm. =4.80 kg per m.

Add 5 % cost of above materials for fabrication, welding, bending, nuts, bolts, etc.

- iv) Painting two coats on exposed surface = 1.83 Sqm. Per m.

C. Anti-glare screen with rectangular vane of MS sheet

- i) Angle iron post 50 X 50 x 6 mm =1.567 m. = 7.05 kg per m.
- ii) MS sheet 3 mm thick @ 24 kg per Sqm. = 6.00 kg per m.

Add 5 % cost of above materials for fabrication, welding, bending, nuts, bolts, etc.

- iii) Applying two coats of painting on exposed surface =0.57 sqm./m

8.27 Street Lighting (for each)

A. For fixing in median

Materials requirement:

- i) steel circular hollow pipe of standard specification for street lighting to mount light at 9 m. height above the road level =1 no for each
 - ii) Sodium vapour lamp- 250 watt = 1 no for each
- Add 5% of cost of materials for holder, electric cable, insulation, ladder, scaffolding etc.

- iii) Providing two coats of aluminium paint over steel circular hollow pipe with overhang on both side= 5.75 Sqm. For each

B. For fixing in footpath

Materials requirement:

- i) steel circular hollow pipe of standard specification for street lighting to mount light at 9 m. height above the road level =1 no for each
 - ii) Sodium vapour lamp- 250 watt = 1 no for each
- Add 5% of cost of materials for holder, electric cable, insulation, ladder, scaffolding etc.

- iii) Providing two coats of aluminium paint over steel circular hollow pipe with overhang on both side= 4.63 Sqm. For each

8.28 Lighting on bridge (for each)

Materials requirement:

- i) steel circular hollow pipe of standard specification for street lighting to mount light at 5 m. height above deck level =1 no for each
 - ii) Sodium vapour lamp-70 watt = 1 no for each
- Add 1% of cost of materials for holder, electric cable, insulation, ladder, scaffolding etc.

- iii) Providing two coats of aluminium paint over steel circular hollow pipe with overhang on both side=2.76 Sqm. For each

Items & materials

8.29 Per metre length of cable duct across the road

Case - I Single row for one utility service

Materials requirement:

- i) Random rubble masonry / Brick masonry in cement mortar 1 : 6 for head wall both side = 0.118 cum. Per m as per Sl. No. 12.7
- ii) RCC pipe 300 mm dia = 1 m/m.
- iii) Granular soil with PI less than 6 for bedding and side of pipe = 0.36 Cum. Per m.
- iv) Collar for joint for 300 mm dia = 0.45 nos. per m.
- v) Cement mortar 1 :2 for joints = 0.001 Cum. Per m. as per Sl. No. 12.6.

CASE - II Double row for two utility services

Materials requirement:

- i) Random rubble masonry / Brick masonry in cement mortar 1 : 6 for head wall both side = 0.1685 cum. Per m as per Sl. No. 12.7
- ii) RCC pipe 300 mm dia = 2 m per m
- iii) Granular soil with PI less than 6 for bedding and side of pipe = 0.72 cum per m.
- iv) Collar for joint for 300 mm dia = 0.90 nos. per m.
- v) Cement mortar 1 :2 for joints = 0.002 Cum. Per m.as per Sl. No. 12.6.

CASE -III Triple row for three utility services

Materials requirement:

- i) Random rubble masonry / Brick masonry in cement mortar 1 : 6 for head wall both side = 0.219 cum. Per m as per Sl. No. 12.7
- ii) RCC pipe 300 mm dia = 3 m.
- iii) Granular soil with PI less than 6 for bedding and side of pipe = 1.08 Cum. Per m.
- iv) Collar for joint for 300 mm dia =1.35 nos. per m.
- v) Cement mortar 1 :2 for joints = 0.003 Cum. Per m.as per Sl. No. 12.6.

8.33 Per tonne of Gantry mounted variable message sign board

i) Gantry support system

Materials requirement:

Alluminium alloy / Galvanised steel including 5 % wastage = 1.05 tonne per tonne

Note: Add 15 % of the cost of materials for fabrication and erection

Add 1 % of the cost of materials for nuts bolts and welding

Items & materials

8.34 Per sqm of traffic impact attenuators at abutments and piers

A. With scrap tyres

- i) scrap tyres of size 900 X 20 = 4 Nos. per sqm.
- ii) 20 mm steel wire rope = 7.5 kg per Sqm.

Note: Add 1 % of the cost of wire rope for clamps etc.

B. Using plastic / steel barrel, filled with sand

- i) Plastic Barrel Or Steel barrel = 2.50 Nos per Sqm.
- ii) sand = 0.4 Cum per Sqm.
- iii) 20 mm Steel wire rope = 0.75 kg per Sqm.

Note: Add 1 % of the cost of wire rope for clamps etc.

C. With hi-dro cell sandwich (patented)

Materials requirement:

- i) Plastic tubes 50 cm dia, 1.2 m high = 4 Nos. per Sqm.
- ii) Water = 1.20 KL per Sqm.
- iii) 20 mm Steel wire rope = 10.00 kg per Sqm.

Note: Add 1 % of the cost of materials for nuts bolts and welding

8.35 Per number road markers / Road stud with lens reflector

Materials requirement:

- i) Aluminium studs 100 mm X 100 mm Fitted with lens reflector = 1 No. per No.

Note: Add 10 % of the cost of materials for fixing and installation.

8.36 Per metre length of Traffic cone

Materials requirement:

- i) traffic Cones with 150 mm reflective sleeve = 1 No per m.

8.39 Policeman umbrella (for each)

- i) E/w, cement concrete/ brick work/ stone masonry rates from chapter 3 & 13
- ii) Steel pipe 100 mm dia 3.50 m for each
- iii) Steel pipe 25 mm dia 10.00 m for each
- iv) CGI Sheet = 8 kg for each

Note: Add 25 % of cost of materials for fabrication [it No. ii) to iv)]

8.43 Portable barricade in construction zone (for each)

Materials requirement:

- i) Angle iron 45 X 45X 5 mm = 25 kg for each
- ii) MS Sheet 300 mm wide, 2.5 m long and 2.6 mm thick = 15 kg each
- iii) Paint = 0.5 litre for each

Note : Add 2 % of cost of steel for welding consumable, nuts, and bolts and drilling holes.

Items & materials

8.44 Permanent type barricade in construction zone (for each)

A. With steel components

Materials requirement:

- i) Angle iron 50 X 50 X 5 mm, 2M long ,2nos =15.00 kg for each
- ii) MS Sheet 12 SWG, 3 Nos of 200 mm width and 4 m length=50 kg for each
- iii) Paint =1.00 litre for each

Note : Add 1 % of cost of steel for welding consumable, nuts, and bolts and drilling holes.

B. With wooden components

Timber = 0.18 Cum. For each

Note : Add 1 % of cost of timber for nuts, and bolts, nails etc.

C. With brick

- i) Brick = 1800.00 nos for each
- ii) Cement = 22 kg for each
- iii) Sand = 0.09 Cum for each
- iv) Paint =1.25 litre for each

8.45 Drum delineator in construction zone (for each)

Materials requirement:

- i) Steel drum 300 mm dia 1.2 m high / empty bitumen drum = 1 no for each
- ii) Paint = 0.5 litre

8.46 Flag man (for each)

Materials requirement:

- i) Flag of red colour cloth 600 mm X 600 mm = 1No for each
- ii) Wooden staff for fastening of flag 25 mm dia and 1 m long = 1 No for each

Items & materials

9.1 Per cum of PCC 1:3:6 in foundation

- i) 40 mm nominal size Aggregate = 0.92 Cum. Per Cum.
- ii) Sand at site = 0.46 Cum per Cum.
- iii) Cement at site = 220 kg per Cum.
- iv) Water = 1.2 KL per Cum.

9.2 Per metre of laying RCC pipe NP4 / prestressed concrete pipe on first class bedding in single row

A. 1000 mm dia.

Materials requirement:

- i) Sand at site = 0.0056 Cum. Per m.
- ii) Cement at site = 4 kg per m.
- iii) Granular material passing 5.6 mm sieve for bedding = 0.36 cum per m.

B. 1200 mm dia.

Materials requirement:

- i) Sand at site = 0.0072 Cum. Per m.
- ii) Cement at site = 5.6 kg per m.
- iii) Granular material passing 5.6 mm sieve for class bedding = 0.4 Cum. Per m.

9.3 Per metre of laying RCC pipe NP4 / prestressed concrete pipe on first

A. 1000 mm dia.

Materials requirement:

- i) Sand at site = 0.0112 Cum. Per m.
- ii) Cement at site = 8 kg per m.
- iv) Granular material passing 5.6 mm sieve for bedding = 1.00 Cum per m.

B. 1200 mm dia.

Materials requirement:

- i) Sand at site = 0.0144 Cum. Per m.
- ii) Cement at site = 11.2 kg per m.
- iv) Granular material passing 5.6 mm sieve for bedding = 1.10 Cum per m.

10.4 Per sqm filling potholes and patch repairing with open graded premix surfacing, 20 mm

Materials requirement:

- i) Crushed Stone aggregate 13.2 mm nominal size = 0.018 Cum. Per Sqm.
- ii) Crushed Stone aggregate 11.2 mm nominal size = 0.009 Cum. Per Sqm.
- iii) Bitumen VG30 = 1.46 kg per Sqm.
- iv) Bitumen emulsion for tack coat including vertical side of pot holes = 0.24 kg per Sqm.

Items & materials

10.5 Per sqm filling pot-holes and patch repairing with Bituminous concrete

Size of crushed stone aggregates	Grading - I 19mm nominal size (layer thickness 50mm)	Grading - II 13mm nominal size (layer thickness 40mm)
20mm	0.004	-
13.2mm	0.021	0.006
11.2mm	0.009	0.011
5.6mm	0.005	0.016
2.8mm & below	0.032	0.024
75 micron		
Add 5% for wastage	0	0
Bitumen emulsion for tack cost	0.24 Kg	0.24 Kg
Filler	2.2 Kg	1.76 Kg
Bitumen	5.5 Kg	4.6 Kg

10.6 Per metre length of Crack filling

Materials requirement:

i) Slow curing bitumen emulsion = 0.066 kg per m.

ii) Stone Crusher Dust = 0.00004 Cum. Per m.

Stone Crusher dust finer than 2.36 mm with not more than 10% passing the 0.075mm s

10.7 Per sqm of Dusting

Materials requirement:

Stone Crusher dust finer than 2.36 mm with not more than 10 % passing the 0.075mm sieve

Rate of application of Stone Dust @2.5kg/sqm

10.8B Crack prevention courses

Materials requirement:

Crack Width	Binder in kg/sqm	Stone Aggregates (cum/sqm)	Remarks
Upto 3mm	0.9	5.6mm - 0.01	NIL
< 6mm	1.1	5.6mm - 0.011	Crack Width
6mm to 9mm	1.3	5.6mm - 0.006 & 11.2mm - 0.006	For Second coat(if used) apply binder @0.9 kg/sqm & 5.6mm chips @0.01 cum/sqm
>9mm & cracked area >50%	1.5	11.2mm - 0.012	DO

Items & materials

Bitumen Impregnated Geo-Textile

Materials requirement:

Bitumen (VG 30)@1.05kg/sqm

10.8C Slurry Seal

Materials requirement:

	Case I	Case II	Case III
	2-3 mm	4-6 mm	6-8 mm
i) C.B.E	0.72 kg/sqm	1.21 kg/sqm	1.39 kg/sqm
ii) F.A	.0031 cum/sqm (2.36 mm & below)	.00638 cum/sqm (5.6 mm- 5% ,2.36 & below - 95%)	.0091 cum/sqm (5.6 mm- 20% ,2.36 & below -80%)
iii) Filler(OPC)	0.11 kg/sqm	0.22kg/sqm	0.31 kg/sqm

10.9 Per metre repair of joint grooves with epoxy mortar

Materials requirement:

i) Epoxy primer = 0.25 kg per m.

ii) Epoxy compound with accessories for preparing epoxy mortar = 1.00 kg per m.

10.10 Per metre repair of old joints sealant

Materials requirement:

i) Primer = 0.025 kg per m.

ii) Sealant = 0.10 kg per m.

10.13 Per cum of land slide clearance in hard rock requiring blasting

Materials requirement:

i) Gelatine stick = 0.175 kg per Cum.

ii) Electric Detonators @ 1 detonator per 2 gelatine stick = 0.7 No per Cum.

11.2 Per sqm of grassing with "doob" grass

i) In rows 15 cm apart in either direction

Materials requirement:

"Doob" grass = 1.00 kg per Sqm.

ii) in rows 7.5 cm apart in either direction

Materials requirement:

"Doob" grass = 2.00 kg per Sqm.

11.3 Per sqm of Marking lawns including ploughing and dragging with "swaga" breaking of clods

i) Supply of farm yard manure at site of work = 0.0018 Cum. Per Sqm.

ii) Fine grass = 1.00 kg per Sqm.

Items & materials

11.4 Per sqm of maintenance of lawns or turfing slope

Materials requirement:

Water = 0.90 KL per Sqm.

11.5 Per sqm of turfing lawns with fine grassing including ploughing and dressing

Materials requirement:

i) Supply of farm yard manure at site of work = 0.006 Cum. Per Sqm.

ii) Fine grass = 1.00 kg per sqm.

11.6 Per sqm of maintenance of lawns with fine grassing for the first year

Materials requirement:

Water = 0.60 KL per Sqm.

11.7 Planting and maintaining of permanent hedges

A. Per metre length of Planting permanent hedges including digging of trenches.

Materials requirement:

i) Hedges plants 2 rows at 30 cm apart= 6.80 Nos. Per m.

ii) Supply of farm yard manure at site of work = 0.0467 Cum. Per m.

iv) water = 0.03 KL per m.

B. Per metre length of Maintenance of hedge for one year

Materials requirement:

i) Supply of farm yard manure at site of work = 0.02 Cum. Per m.

ii) Pesticide = 0.005 kg per m.

iii) water = 0.3 KL per m.

iv) Hedge plants (for replacement due to casualty) @ 10% = 0.68 nos. per m.

11.8 Planting and maintaining of flowering plants and shrubs

A. Per metre length of Planting flowering plants and shrubs in central verge.

Considering width of the verge is 3.00 m & above

Materials requirement:

i) plant = 0.2 No per m.

ii) Shrub = 0.8 No per m.

iii) Manure sludge or farm yard manure = 0.0634 Cum per m.

iv) Pesticide = 0.5 g per m

v) Water = 0.036KL per m.

Items & materials

B. Per metre length of Maintenance of flowering plant and shrubs in central verge for one year

Materials requirement:

- i) Manure sludge/farmyard manure at site = 0.01 cum/m
- ii) plant = 0.02 No per m. (for replacement due to casualty)
- iii) Shrub = 0.08 No per m. (for replacement due to casualty)
- iv) Manure sludge or farm yard manure = 0.01 Cum per m.
- v) Pesticide = 1.5 g per m
- vi) Water = 0.18 KL per m.

11.9 Planting of trees and there maintenance for one year (for each)

Materials requirement:

- i) Sapling 2 m high 25 mm dia = 1 No for each plant
- ii) Farmyard manure = 0.094 Cum. For each plant
- iii) Pesticide = 50 g for each plant
- iv) Water = 1.2 KL for each plant

11.11 Per cum of supply at site well decayed farmyard manure

Materials requirement:

The rate is inclusive of cost of well decayed farmyard manure duly screened, carriage, loading, unloading, and stacking at site..

11.12 Per quintal supply at site of work / store de-oiled neem cake

Materials requirement:

The rate is inclusive of Cost, carriage, loading, unloading and stacking at site.

11.13 Per Cum of supplying sludge

Materials requirement:

Cost of sludge, including carriage, loading, unloading and stacking at site

11.14 Half brick circular tree guard, in 2nd class bricks, internal dia. 1.25 m and height 1.2 m above ground and 0.20 m below ground (For each

Materials requirement:

- i) Brick 2nd class including carriage = 230.00 Nos for each tree guard
- ii) Cement mortar (1:6) = 0.025 Cum. For each tree guard as per Sl. No. 12.6.

11.15 Per metre length of edging with 2nd class bricks, laid dry legthwise

Materials requirement:

- i) Brick 2nd class including carriage = 5.00 Nos per m.

Items & materials

11.16 Making tree guard 53 cm dia. And 1.3 m high as per design from empty bitumen drum (for each tree guard)

Materials requirement:

- i) Empty bitumen drum = 1 No for each tree guard
- ii) MS Sheet 50 X 0.5 mm = 0.65 Kg for each tree guard
- iii) Rivets 6 mm dia and 10 mm in length = 22 Nos for each tree guard

11.17 Making tree guard 53 cm dia. And 2 m high as per design from empty bitumen drum (for each tree guard)

Materials requirement:

- i) Empty bitumen drum = 1.50 Nos for each tree guard
- ii) MS Sheet 50 X 0.5 mm = 0.65 Kg for each tree guard
- iii) Rivets 6 mm dia and 10 mm in length = 50 Nos for each tree guard
- iv) MS plate 30x3 mm = 1.3 kg for each tree guard

11.18 Per sqm of wrought iron and mild steel welded work

Materials Requirement :

- i) Angle, trees, channels etc. = 1.05 Quintal per Quintal
- ii) the cost of scrap = 0.05 Quintal per Quintal

Note: 5% cost of materials for welding rods and other welding accessories is included

11.19 Tree guard with MS iron (for each tree guard)

Materials requirements:

- i) MS iron 25x6 MM =19.20 kg for each tree guard
 - ii) MS iron 25x3 MM =9.60 kg for each tree guard
- Painting =1.770 Sqm as per Sl. No. 8.9.

11.20 Tree guard with MS angle iron and steel wire (for each tree guard)

Materials requirement:

- i) MS angle iron 30x30x3 mm =13.50 kg for each tree guard
 - ii) MS iron 25x3 MM =18.00 kg for each tree guard
 - iii) Steel wire 3 mm dia =6kg for each tree guard
- Painting=1.50 sqm as per Sl. No.8.9.

11.21 Per hectare of compensatory afforestation

Materials requirement:

- i) Sapling 1 to 1.5 m high 2 cm dia stem =290 Nos per hectare
10% of sapling = 29 nos per hectare = 290+29=319nos. Sapling
- ii) Decayed farmyard / sludge manure (planting) = 60.90 Cum.Per hectare
DO for maintenance = 4.00 Cum Per hectare
- iii) Pesticide for planting =0.50 kg per

Items & materials

DO for maintenance = 1.50 Cum Per hectare

iv) Water =18 Kl per hectare

12.1 Per cum of Excavation for structure

III. Hard rock requiring blasting

Manual means

Materials requirement:

i) Blasting materials = 0.35 kg. / cum

ii) Electric detonator = 1.4 nos. / cum

12.2 Per cum of filling annular space around footing in rock

Materials requirement:

Lean cement concrete M15 Nominal mix =1 cum / cum

NOTE: Rate may be taken as per Sl. No. 12.8 A

12.3 Per cum of Sand filling in Foundation trenches as per drawing and technical specifications

Materials requirement:

Sand =1.20 cum / cum.

12.4 Per cum of PCC 1:3:6 in foundation

Materials requirement:

i) 40 mm nominal aggregate size =0.60 cum / cum

ii) 20 mm nominal aggregate size =0.30 cum / cum

iii) Coarse sand =0.45 cum / cum

iv) Cement =230.00 kg./ cum

v) Water =1.20 Kl. / cum

12.5 Per cum of brick masonry work in cement mortar 1:3 in foundation complete excluding pointing

Materials requirement:

i) Bricks 1st class =500 nos per Cum.

ii) Cement mortar 1:3 = 0.24 Cum per Cum.as per Sl. No.12.6.

Items & materials

12.6 Per cum of cement mortar 1:3

Materials requirement: per cum of mortar

Grade of mortar	Cement (tonne)	Sand (cum)
1:2	0.67	0.93
1:3	0.51	1.05
1:4	0.4	1.12
1:6	0.29	1.34

12.7 Per cum stone masonry work in cement mortar 1:3 in foundation complete as per drawing and technical specifications

A. Square Rubble Coursed Rubble Masonry (first sort)

Materials requirement:

- i) Stone =1.1 Cum. Per Cum.
- ii) Through and Bond Stone =7 nos per Cum.
- iii) cement mortar 1:3 =0.30 Cum. Per Cum as per Sl. No. 12.6.

B: Random Rubble Masonry(coursed / uncoursed)

Materials requirement:

- i) Stone =1.1 Cum. Per Cum.
- ii) Through and Bond Stone =7 nos per Cum.
- iii) cement mortar 1:3 =0.31 Cum. Per Cum as per Sl. No. 12.6.

12.8 Per cum of Plain / Reinforced cement concrete in open foundation complete as per drawing and technical specifications

Materials requirement:	A	B	C	D	E
	PCC grade M-15 (cum)	PCC grade M-20 (cum)	RCC grade M-20 (cum)	PCC grade M-25 (cum)	RCC grade M-25 (cum)
i) 40mm nominal aggregate size	0.54	0.36	-	0.36	-
ii) 20 mm nominal aggregate size	0.27	0.36	0.54	0.36	0.54
iii) 10 mm nominal aggregate size	0.09	0.18	0.36	0.18	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
v) Cement a) using concrete mixer	275.33 Kg	344 Kg	347.33 Kg	399.33 Kg	403.33 Kg
b) Using Batching plant	-	-	347.2 Kg	399.60 Kg	403.17 Kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL

Items & materials

	F	G	H
Materials requirement:	PCC grade M-30(cum)	RCC grade M-30 (cum)	RCC grade M-35 (cum)
i) 40mm nominal aggregate size	0.36	-	-
ii) 20 mm nominal aggregate size	0.36	0.54	0.54
iii) 10 mm nominal aggregate size	0.18	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45
v) Cement a) using concrete mixer	405.33 Kg	406.67 Kg	422.00 Kg
b) Using Batching plant	405 Kg	406.67 Kg	422.00 Kg
v) Water	1.20 KL	1.20 KL	1.20 KL

12.9 Providing and constructing Temporary island 16m dia. For construction of well foundation for 8.00m dia well (for each well)

A. Assuming depth of water 1.0m. And height of island = 1.25 m.

Materials requirement:

- i) Compacted Earth = 251.20 cum for each Well
- ii) Sand bags = 750.00 nos. for each Well

B. Assuming depth of water 4.0m. And height of island = 4.50 m.

Materials requirement:

- i) Compacted Earth = 904.32 cum for each Well
- ii) Sand bags = 6000.00 nos. for each Well
- iii) Wooden Ballies 8" and 9 m. long = 95 Nos. for each well
- iv) Wooden Ballies 2" dia for bracing = 190 Rm.

C. Providing and constructing one span service road to reach island location from one pier to another pier location

Assuming span length up to 30 m. width of service Road 10m and depth of water 1.00 m.

Materials requirement:

- i) Compacted Earth = 15.00 cum per m.
- ii) Sand bags = 10.00 nos. per m.

12.10 Per MT of Providing and laying cutting edge of mild steel weighing 40 kg per m for well foundation complete as per drawing and technical specifications

Materials requirement:

- i) Structural steel in plates, angle, etc. = 1.05 MT. per MT
- ii) Nuts and Bolts = 20 kg per MT.

Items & materials

12.11 Per cum

A. Well Curb

- i) RCC Grade M-20, (*Materials requirement: Same as for 12.8 C*)
- ii) RCC Grade M-25 (*Materials requirement: Same as for 12.8 E*)
- iii) RCC Grade M-35 (*Materials requirement: Same as for 12.8 H*)

B. Well Steining

- i) RCC Grade M-15 (*Materials requirement: Same as for 12.8 A*)
- ii) RCC Grade M-20 (*Materials requirement: Same as for 12.8 B*)
- iii) RCC Grade M-20 (*Materials requirement: Same as for 12.8 C*)
- iv) RCC Grade M-25 (*Materials requirement: Same as for 12.8 D*)
- v) RCC Grade M-25 (*Materials requirement: Same as for 12.8 E*)
- vi) RCC Grade M-30 (*Materials requirement: Same as for 12.8 F*)
- vii) RCC Grade M-30 (*Materials requirement: Same as for 12.8 G*)
- viii) RCC Grade M-35 (*Materials requirement: Same as for 12.8 H*)
- ix) RCC Grade M-40

Using Batching plant, Transit mixer and Concrete pump

Materials requirement:

- i) 20 mm nominal aggregate size = 0.54cum / cum.
- ii) 10 mm nominal aggregate size = 0.36 cum / cum
- iii) Coarse sand = 0.45 cum / cum.
- iv) Cement = 430.00 kg. / cum.
- v) Water=1.20 KL/ m³

Items & materials

C. Bottom plug (10 % extra cement to be added where underwater concreting is involved.)

Materials requirement:	Case-I PCC grade M-20 Using concrete mixture (cum)	Case-II PCC grade M-20 Using Batching plant (cum)	Case-I PCC grade M-25 Using concrete mixture (cum)	Case-II PCC grade M-25 Using Batching plant (cum)	Case-I PCC grade M-30 Using concrete mixture (cum)
i) 40 mm nominal aggregate size	0.36	-	0.36	-	0.36
ii) 20 mm nominal aggregate size	0.36	0.54	0.36	0.54	0.36
iii) 10 mm nominal aggregate size	0.18	0.36	0.18	0.36	0.18
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
iv) Cement using concrete mixture	370.0 kg	370 kg	399.0 kg	399.00 kg	405.33 kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL
vi) admixture	1.24 kg	1.24 kg	1.44 kg	1.44 kg	1.44 kg

Materials requirement:	Case-II PCC grade M-30 Using Batching plant (cum)	Case-I PCC grade M-35 Using concrete mixture (cum)	Case-II PCC grade M-35 Using Batching plant (cum)
i) 40 mm nominal aggregate size	-	0.36	-
ii) 20 mm nominal aggregate size	0.54	0.36	0.54
iii) 10 mm nominal aggregate size	0.36	0.18	0.36
iv) Coarse sand	0.45	0.45	0.45
v) Cement using concrete mixture	405.33 kg	419.33 kg	419.00 kg
vi) Water	1.20 KL	1.20 KL	1.20 KL
vii) admixture	1.44 kg	1.44 kg	1.44 kg

Items & materials

D. Intermediate Plug

- i) PCC Grade M-20 Same as in bottom plug concrete.
- ii) PCC Grade M-25 Same as in bottom plug concrete.
- iii) PCC Grade M-30 Same as in bottom plug concrete.

E. Top Plug

- i) PCC Grade M-15 Same as item no. 12.8 (A)
- ii) PCC Grade M-20 Same as item no. 12.8 (B)
- iii) PCC Grade M-25 Same as item no. 12.8 (D)
- iv) PCC Grade M-30 Same as item no. 12.8 (F)

F. Well Cap

Materials requirement:	Case-I RCC grade M-20 Using concrete mixture (cum)	Case-II RCC grade M-20 Using Batching plant (cum)	Case-I RCC grade M-25 Using concrete mixture (cum)	Case-II RCC grade M-25 Using Batching plant (cum)	Case-I RCC grade M-30 Using concrete mixture (cum)
i) 40 mm nominal aggregate size	-	-	-	-	-
ii) 20 mm nominal aggregate size	0.54	0.54	0.54	0.54	0.54
iii) 10 mm nominal aggregate size	0.36	0.36	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
iv) Cement using concrete mixture	341.33 kg	341 kg	403.33 kg	403.33 kg	406.67 kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL

Items & materials

Materials requirement:	Case-II RCC grade M-30 Using Batching plant (cum)	Case-I RCC grade M-35 Using concrete mixture (cum)	Case-II RCC grade M-35 Using Batching plant (cum)	RCC grade M-40 Using Batching plant (cum)
i) 40 mm nominal aggregate size	-	-	-	-
ii) 20 mm nominal aggregate size	0.54	0.54	0.54	0.54
iii) 10 mm down aggregate size	0.36	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45
iv) Cement using concrete mixture	406.58 kg	422.00 kg	422.00 kg	435.00 kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL
vi) Admixture	-	-	-	1.72 kg

12.12 Per metre sinking of 6m external dia. Well other than pneumatic.

D. Hard rock (6 m dia. Well)

Depth in hard rock strata up to 4.0 m

Materials requirement:

- i) Gelatine 80 % = 4.00 kg per m.
- ii) Electric detonators = 18.00 nos. / m.

12.13 Per metre sinking of 7m external dia. Well other than pneumatic.

D. Hard rock (7 m dia. Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 7.00 kg per m.
- ii) Electric detonators = 30.00 nos. / m.

12.14 Per metre sinking of 8m external dia. Well other than pneumatic.

D. Hard rock (8 m dia. Well)

Depth in hard rock strata up to 3.0 m

Items & materials

Materials requirement:

- i) Gelatine 80 % = 8.00 kg per m.
- ii) Electric detonators = 32.00 nos. / m.

12.15 Per metre sinking of 9m external dia. Well other than pneumatic.

D. Hard rock (9 m dia. Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 10.00 kg per m.
- ii) Electric detonators = 40.00 nos. / m.

12.16 Per metre sinking of 10m external dia. Well other than pneumatic.

D. Hard rock (10 m dia. Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 11.00 kg per m.
- ii) Electric detonators = 44.00 nos. / m.

12.17 Per metre sinking of 11m external dia. Well other than pneumatic.

D. Hard rock (11 m dia. Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 12.00 kg per m.
- ii) Electric detonators = 48.00 nos. / m.

12.18 Per metre sinking of 12m external dia. Well other than pneumatic.

D. Hard rock (12 m dia. Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 14.00 kg per m.
- ii) Electric detonators = 56.00 nos. / m.

Items & materials

12.19 Per metre sinking of twin D type well other than Is reckoned from bed level

Hard rock (Twin D type Well)

Depth in hard rock strata up to 3.0 m

Materials requirement:

- i) Gelatine 80 % = 10.00 kg per m.
- ii) Electric detonators = 40.00 nos. / m.

12.20 Per cum of pneumatic sinking of well Clause 1207.6 of MORT&H specifications

Materials requirement:

- a) RCC Grade M-35 corbel provided for supporting of equipment

Rate may be adopted vide It. No. 12.8(H) = 1.60 Cum per Cum.

HYSD bar reinforcement in corbel = 0.096 MT / cum

- b) Blasting materials

- i) Gelatine 80 % = 0.300 kg per Cum.

- ii) Electric detonators = 1.20 nos. / Cum.

12.21 Per cum of sand filling in well complete as per drawing and technical specifications

Sand = 1.20 cum / cum.

12.22 Per MT of providing steel liner 10 mm thick for curbs and 6 mm thick for steining of wells ... as per detailed drawing

Materials requirement:

Structural Steel including 5 % wastage = 1.05 MT / MT.

12.23 Per metre bored cast-in-situ M-35 grade RCC pile excluding reinforcement Lead and lifts up to 1000 m

Pile Dia = 1000 mm.

Materials requirement:

Concrete Grade M - 35 = 0.786 Cum per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

12.24 Per metre bored cast-in-situ M-35 grade RCC pile excluding reinforcement Lead and lifts up to 1000 m

Pile Dia = 1000 mm.

Materials requirement:

Concrete Grade M - 35 = 0.786 Cum per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

12.25 Per metre bored cast-in-situ M-35 grade RCC pile excluding reinforcement Lead and lifts up to 1000 m

Pile Dia = 1200 mm.

Items & materials

Materials requirement:

Concrete Grade M - 35 = 1.13 Cum per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

12.26 Per metre of driven cast-in-place vertical M-35 grade RCC pile

Pile Dia = 750 mm.

Materials requirement:

a) RCC Grade M-35 = 0.4415 Cum.per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

b) Pile shoes

i) CI shoe for the pile = 160 kg for each pile

ii) MS clamp for shoe per 15 m length of pile = 35 kg

iii) Steel helmet and cushion block =50 kg for each pile

12.27 Per metre of driven cast-in-place vertical M-35 grade RCC pile

Pile Dia. = 1000 mm.

Materials requirement:

a) RCC Grade M-35 = 0.785 Cum.per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

b) Pile shoes

i) CI shoe for the pile = 160 kg for each pile

ii) MS clamp for shoe per 15 m length of pile = 35 kg

iii) Steel helmet and cushion block =50 kg for each pile

12.28 Per metre of driven cast-in-place vertical M-35 grade RCC pile

Pile Dia. = 1200 mm.

Materials requirement:

a) RCC Grade M-35 = 1.1305 Cum.per m.

Rate may be adopted same for bottom plug vide It. No .12.11(C)

b) Pile shoes

i) CI shoe for the pile = 160 kg for each pile

ii) MS clamp for shoe per 15 m length of pile = 35 kg

iii) Steel helmet and cushion block =50 kg for each pile

Where steel lining require the quantity of the same to be taken as per design.

Items & materials

12.30 Per metre of driven cast-in-place vertical M-35 grade RCC pile excluding reinforcement complete as per drawing and technical specifications

Pile Dia. = 750 mm.

Materials requirement:

- a) RCC Grade M-35 = 0.4416 Cum.per m.
Rate may be adopted same for bottom plug vide It. No .12.11(F)
- b) Pile shoes
 - i) CI shoe for the pile = 160 kg for each pile
 - ii) MS clamp for shoe. = 70 kg for each pile
 - iii) Steel helmet and cushion block =40 kg for each pile

12.31 Per metre of driven cast-in-place vertical M-35 grade RCC pile excluding reinforcement complete as per drawing and technical specifications

Pile Dia. = 1000 mm.

Materials requirement:

- a) RCC Grade M-35 = 0.785 Cum.per m.
Rate may be adopted same for bottom plug vide It. No .12.11(F)
- b) Pile shoes
 - i) CI shoe for the pile = 160 kg for each pile
 - ii) MS clamp for shoe. = 70 kg for each pile
 - iii) Steel helmet and cushion block =40 kg for each pile

12.34 Per metre of driven cast-in-place vertical M-35 grade RCC pile excluding reinforcement complete as per drawing and technical specifications

SIZE OF PILE = 750 mm X 750 mm

Materials requirement:

- a) RCC Grade M-35 = 0.5625 Cum.per m.
Rate may be adopted same for bottom plug vide It. No .12.11(F)
- b) Pile shoes
 - i) CI shoe for the pile = 160 kg for each pile
 - ii) MS clamp for shoe. = 70 kg for each pile
 - iii) Steel helmet and cushion block =30 kg for each pile

Items & materials

12.35 Per metre of driven vertical steel piles complete as per drawing and technical specifications

SECTION OF PILE = H SECTION STEEL COLUMN 400 X 250 mm (ISHB Series)

Materials requirement:

a) Structural steel including 5 % wastage = 86.286 kg per m.

12.36 Per metre of driven vertical steel piles complete as per drawing and technical specifications

SECTION OF PILE = H SECTION STEEL COLUMN 400 X 250 mm (ISHB Series)

Materials requirement:

a) Structural steel including 5 % wastage = 97.167 kg per m.

12.37 Pile load test on single vertical pile in accordance with IS: 2911 (part-IV)

Note: Although this item is incidental to work and is not required to be included in BOQ of contract, the same is required to be added in the estimate to assess cost of work.

12.38 Per cum of cement concrete for reinforced concrete in pile cap complete as per drawing and technical specifications

Materials requirement:	Case-I RCC grade M-20 Using concrete mixture (cum)	Case-II RCC grade M-20 Using Batching plant (cum)	Case-I RCC grade M-25 Using concrete mixture (cum)	Case-II RCC grade M-25 Using Batching plant (cum)	Case-I RCC grade M-30 Using concrete mixture (cum)
i) 40 mm nominal aggregate size	-	-	-	-	-
ii) 20 mm nominal aggregate size	0.54	0.54	0.54	0.54	0.54
iii) 10 mm nominal aggregate size	0.36	0.36	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
v) Cement using concrete mixture	341.33 kg	341.33 kg	399.33 kg	399.33 kg	406.67 kg
vi) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL

Items & materials

Materials requirement:	Case-II RCC grade M-30 Using Batching plant (cum)	Case-I RCC grade M-35 Using concrete mixer (cum)	Case-II RCC grade M-35 Using Batching plant (cum)
i) 40 mm nominal aggregate size	-	-	-
ii) 20 mm nominal aggregate size	0.54	0.54	0.54
iii) 10 mm nominal aggregate size	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45
iv) Cement using concrete mixer	406.67 kg	422.00 kg	422.00 kg
v) Water	1.20 KL	1.20 KL	1.20 KL

12.39 Per cum leveling course for pile cap, P.C.C (M15)

Materials requirement:

i) 40 mm nominal aggregate size =	0.54 Cum. Per Cum.
ii) 20 mm nominal aggregate size =	0.27 cum / cum.
iii) 10 mm nominal aggregate size =	0.09 cum / cum.
iv) Coarse sand =	0.45 cum / cum.
iv) Cement =	275.333 kg./ cum.
v) Water =	1.20 KL / cum.

12.40 Per MT of supplying fitting and placing uncoated HYSD bar reinforcement in foundation complete as per drawing and technical specifications

Materials requirement:

- i) HYSD bar including 5 % overlap and wastage = 1.05 MT. per MT.
- ii) Binding wire = 6 kg per MT.

12.41 Per MT of supplying fitting and placing uncoated MS bar reinforcement in foundation complete as per drawing and technical specifications

Materials requirement:

- i) MS bar including 5 % overlap and wastage = 1.05 MT. per MT.
- ii) Binding wire = 6 kg per MT.

Items & Materials

13.1 Per cum brick masonry work in 1:3 cement mortar in substructure excluding pointing and plastering, as per drawing and technical specifications

Materials requirement:

- i) Brick 1st class = 500.00 Nos per Cum.
- ii) Cement mortar 1:3 (Rate as per Lt. No. 12.6) = 0.24 Cum. Per Cum.

13.2 Per sqm of pointing with cement mortar (1:3) on brick work in substructure as per technical specifications

Materials requirement:

- i) Cement mortar 1:3 (Rate as per Lt. No. 12.6) = 0.003 Cum. Per Sqm.

13.3 Per sqm of plastering with cement mortar (1:3) on brick work in substructure as per technical specification

Materials requirement:

- i) Cement mortar 1:3 (Rate as per Lt. No. 12.6) = 0.0144 Cum. Per Sqm.

13.4 Per cum of stone masonry work in cement mortar 1:3 for substructure complete as per drawing and technical specifications

Materials requirement:	A. Random rubble masonry (coursed or	B. Coursed rubble masonry (first sort) cum.	C. Ashlar masonry (first sort) cum.
i) Stone	1.00 cum	1.10 cum	1.11 cum
ii) Through and bond stone (size - 0.24 m X 0.24 m. X 0.39 m.)	7 Nos	7 Nos	7 Nos
iii) Cement mortar 1:3 (Rate as per Lt. No. 12.6)	0.33 cum	0.30 cum	0.33 cum

13.5 Per cum of plain / reinforced cement concrete in substructure complete as per drawing and technical specifications

- a) PCC Grade M- 15 Same as item No 12.8.
- b) PCC Grade M- 20 Same as item No 12.8.
- c) PCC Grade M- 25 Same as item No 12.8 .
- d) PCC Grade M- 30 Same as item No 12.8.
- e) RCC Grade M- 20 Same as item No 12.8 .
- f) RCC Grade M- 25 Same as item No 12.8.
- g) RCC Grade M- 30 Same as item No 12.8.
- h) RCC Grade M- 35 Same as item No 12.8.

13.6 Per MT of supplying fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and technical specifications

Materials requirement:

- i) HYSD bars including 5 % overlap and wastage = 1.05 MT. per MT.
- ii) Binding wire = 6 kg per MT.

Items & Materials

13.7 Per MT of supplying fitting and placing Mild steel bar reinforcement in sub-structure complete as per drawing and technical specifications

Materials requirement:

- i) MS bars including 5 % overlap and wastage = 1.05 MT. per MT.
- ii) Binding wire = 6 kg per MT.

13.8 Providing weep holes in brick masonry / plain / reinforced concrete abutment, wing wall / return wall with 100 mm dia AC pipe..... as per drawing and technical specifications

Materials requirement:

- i) AC/PVC/HDPE pipe 100 mm dia. (including wastage @ 5 %) = 1.05 m. for each hole
Average length of weep hole is taken as one m. for the purpose of estimating.
- ii) MS Clamp = 1 no for each hole
- iii) Collor = 0.33 nos for each hole
Cement mortar 1:3 rate as in Item No. 12.6 = 0.00167 Cum. for each hole.

13.9 Per cum back filling behind abutment, wing wall and return wall complete as per drawing and technical specifications

A. Granular material

Materials requirement:

Granular material = 1.20 cum per cum

B. Sandy material

Materials requirement:

Sand = 1.20 cum per cum.

Ref. Cl. 710.1.4 : IRC 78

Soil group according to IS 1498-1970	Visual description	Max. dry density range kg/ m ³ *	Optimum moisture content range percent	Anticipated embankment performance
GW, GP, GM, SW, HP	Granular materials	1850-2280	7-15	Good to Excellent
SP	Sand	1760-1850	19-25	Fair to Good

13.10 Per cum of providing and laying filter media with granular materials / crushed stone aggregates as per drawing and technical specifications

Materials requirement:

Filter media of stone aggregate conforming to clause 2504.2.2 of MORT&H specifications = 1.20 cum per cum.

13.11 Supplying, fitting and fixing in position true to line and level cast steel rocker bearingtechnical specifications (for each)

Considering a 250 tonne capacity bearing for this analysis

Cost of rocker bearing assembly of 250 tonne design load capacity duly painted with all its components as per drawing and specification = 1 No

13.12 Supplying, fitting and fixing in position true to line and level Forged steel roller bearingas per drawing and technical specifications (for each)

Considering a 250 tonne capacity bearing for this analysis

Cost of Forged steel roller bearing of 250 tonne design load capacity duly painted with all its components as per drawing and specification = 1 No

Items & Materials

13.13 Supplying, fitting and fixing as per drawing and technical specifications and BS: 5400, section 9.1 & 9.2 (for PTFE) and clause 2004 of MORT&H specifications (for each)

Considering a 80 tonne capacity bearing for this analysis

Cost of PTFE bearing assembly of 80 tonne design load capacity duly painted with

13.14 Supplying, fitting and fixing in position true to line and level elastomeric bearing as per drawing and technical specifications (for each)

Considering an elastomeric bearing of size 500 X 400 X 96 mm for this analysis

Overall Volume = 19200 cc.

Volume of 6 nos. 488 X388 x 4 mm size reinforcing steel plates = 4545 cc.

Hence, volume of elastometer = 14655 cc.

Materials requirement:

Elastomeric bearing assembly consisting of 7 internal layers of elastomeric bonded to 6 nos. internal reinforcing steel laminates by the process of vulcanization, complete with all components as per drawing and technical specifications.=1 No.

13.15 Supplying, fitting and fixing in position true to linetechnical specifications (for each)

Considering a 80 tonne capacity bearing for this analysis

Cost of Sliding plate bearing assembly of 80 tonne design load capacity duly painted with all its components as per drawing and specification = 1 No

13.16 Supplying, fitting and fixing in position true to line and level POT- PTFE bearing As per approved technical specifications (for each)

Considering a Pot bearing assembly of 250 tonne capacity for this analysis

Cost of pot type bearing assembly consisting of As per clause 2006 and complete as per drawings and technical specifications = 1 No

14.1 Per cum of furnishing and placing reinforced / pretressed cement concrete in superstructure as per drawing and technical specifications

Materials requirement:	Case-I RCC grade M-20 Using concrete mixture (cum)	Case-II RCC grade M-20 Using Batching plant (cum)	Case-I RCC grade M-25 Using concrete mixture (cum)	Case-II RCC grade M-25 Using Batching plant (cum)	Case-I RCC grade M-30 Using concrete mixture (cum)
i) 40mm nominal chips	-	-	-	-	-
ii) 20 mm nominal chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm nominal chips	0.36	0.36	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
iv) Cement using concrete mixture	341.333 Kg	341.00 Kg	399.333 Kg	399.583 Kg	406.667 Kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL

Items & Materials

Materials requirement:	Case-II RCC grade M-30 Using Batching plant (cum)	Case-I RCC / PSC grade M-35 Using concrete mixer (cum)	Case-II RCC / PSC grade M-35 Using Batching plant (cum)	Case-I PSC grade M-40 Using concrete mixer (cum)	Case-II PSC grade M-40 Using Batching plant (cum)
i) 40mm nominal chips	-	-	-	-	-
ii) 20 mm nominal chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm nominal chips	0.36	0.36	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45	0.45	0.45
iv) Cement using concrete mixture	406.58 Kg	422.00 Kg	422.00 Kg	430.00 Kg	430.00 Kg
v) Water	1.20 KL	1.20 KL	1.20 KL	1.20 KL	1.20 KL
vi) admixture	-	-	-	1.72 Kg	1.72 Kg

Materials requirement:	Case-II PSC grade M-45 Using Batching plant (cum)	Case-II PSC grade M-50 Using Batching plant (cum)	Case-II PSC grade M-55 Using Batching plant (cum)
i) 40mm nominal chips	-	-	-
ii) 20 mm down	0.54	0.54	0.54
iii) 10 mm down	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45
iv) Cement using	465.00 Kg	490.00 Kg	529.167 Kg
v) Water	1.20 KL	1.20 KL	1.20 KL
vi) admixture	1.86 Kg	1.96 Kg	2.12 Kg

14.2 Per MT of supplying fitting and placing HYSD bar reinforcement in superstructure complete as per drawing and technical specifications

Materials requirement:

- i) HYSD bars including 5 % overlap and wastage = 1.05 MT. per MT.
- ii) Binding wire = 8 kg per MT.

14.3 Per MT of supplying fitting and placing High tensile steel wires / strands including all accessories for stressing operations and grouting complete as per drawing and technical specifications

Materials requirement:

- i) HT strand @ 9.42 kg per m. including 2 % wastage and extra length for jacking = 1.02 MT. per MT.
- ii) Sheathing duct ID 66 mm along with 5 % extra length = 111.41 m. per MT.
- iii) Tube anchorage set complete with bearing plate, permanent wedges, etc = 5.31 nos
- iv) Cement for grouting including 3 % wastage @ 3 kg per m. = 331.565 kg per MT.

14.4 Per cum of providing and laying cement concrete wearing coat M-30 grade including reinforcement complete as per drawing and technical specifications

Materials requirement:

- i) Cement concrete grade M-30 = 1.00 Cum. Per Cum.
(refer relevant Item of concrete in Item No. 14.1)
- ii) HYSD Bar reinforcement = 75 kg per Cum. (As per Item No. 14.2)

Items & Materials

14.5 Per sqm of providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab All complete as per clause 515.

Materials requirement:

- i) Bitumen grade 85 /25 or 30 /40 = 2.815 kg per Sqm.
- ii) Crusher stone dust = 0.00538 Cum. Per Sqm.
- iii) lime stone dust filler with calcium carbonate content not less than 80 % = 4.968 kg per Sqm.
- iv) coarse aggregate 3.35 mm to 9.5 mm = 0.00759 Cum. Per Sqm.
- v) precoated stone chips of 13.2 mm size for skid resistance = 0.000497 Cum per Sqm.
- vi) Bitumen for coating of chips = 0.0145 kg per Sqm.

14.6 Per RM construction of precast RCC railing of M-30 grade As per drawing and technical specifications

Materials requirement:

- i) RCC M - 30 grade concrete = 0.0853 Cum. Per RM. ((As per Item No. 14.1)
- ii) HYSD bar reinforcement = 18.02 kg per RM. ((As per Item no 14.2)

14.7 Per RM construction of RCC railing of M-30 grade in-citu As per drawing and technical specifications

Materials requirement:

- i) RCC M - 30 grade concrete = 0.0853 Cum. Per RM. (As per Item No. 14.1)
- ii) HYSD bar reinforcement = 18.02 kg per RM. (As per Item no 14.2)

14.8 Per RM of providing and fixing Mild steel railing complete as per drawing and technical specifications

Materials requirement:

- i) ISMC 100 = 29.46 kg. Per RM.
- ii) MS Flat = 10.12 kg Per RM.
- iii) MS Bars = 1.80 kg Per RM.
- iv) MS Bolts, Nuts and Washers = 1.50 kg Per RM.

14.9 Drainage spouts complete as per drawing and technical specifications (for each)

Materials requirement:

- i) Corrosion resistant structural steel = 4.0 kg for each
- ii) GI Pipe 100 mm dia = 6.00 m for each
- iii) GI Bolt 10 mm dia = 6 Nos. for each
- iv) Galvanised MS Flat Clamp = 2 Nos. for each

14.10 Per cum of PCC M - 15 Grade leveling course below approach slab complete as per drawings and technical specifications

Materials requirement:

Concrete rate as per item No. 12.8 = 1.00 cum per cum.

14.11

Per cum of Reinforced Cement Concrete approach slab including reinforcement and formwork complete as per drawing and technical specifications

Materials requirement:

- i) Cement concrete grade M-30 = 1.00 Cum. Per Cum.
Refer relevant item of Concrete in item no. 12.8 .
- ii) HYSD Bar Reinforcement = 50.00 kg per cum
As per item no. 14.2

Items & Materials

14.12 Per MT providing anti corrosive treatment to HYSD reinforcement with Fusion Bonded Epoxy Coating (FBEC)

Materials requirement:

FBEC = 1.00 MT per MT

Rate to be taken as per prevailing market rates

14.13 Per cum Precast Pretensioned Girders

Materials requirement:

- i) Cement = 0.47 MT per Cum
 - ii) Coarse sand = 0.45 cum per cum
 - iii) 20 mm Aggregate = 0.54 cum per cum
 - iv) 10 mm Aggregate = 0.36 cum per cum
 - v) Admixture = 1.88 kg per cum
 - vi) HYSD Steel 100 kg per cum
- HT Strand with 5 % as wastage = 60 kg per Cum.
LDO for steam curing = 37 Litre per Cum.

14.14 Per RM providing and fixing helical pipes in voided concrete slabs

Materials requirement:

- i) Helical pipes 600 mm diameter = 1 RM per RM.
- ii) Tie rods 20 mm dia. = 1 no per RM.

14.15 Crash Barrier

Included in Chapter - 8.

14.16 Per sqm painting on concrete surface

Materials requirement:

Water based paint of approved quality for cement concrete surface = 0.5 litre per Sqm.

14.17 Per RM Burried joint

Materials requirement:

Galvanised MS plate 200 mm wide, 12 mm thick @ 94.20 kg/ sqm. Including 5 % wastage = 19.79 kg per RM.

14.18 Per RM of filler joint

- (i) Providing and fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawing and technical specifications.

Materials requirement:

Copper plate -1 m long X 250 mm wide

Area = 0.25 Sqm.

Weight = 0.25 X .002 X 8900 = 4.45 Kg

Wastage @ 2.5 % = 4.45 X .025 = 0.11125 Kg

Total weight =4.56 kg per RM.

- (ii) Providing and fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing and technical specifications.

Materials requirement:

20 mm thick compressible fibre board 1 m long X 25 cm. deep = 0.25 Sqm.

- (iii) Providing and fixing in position 20 mm thick pre -moulded joint filler in expansion joint for fixed ends of simply supported spans not exceeding 10 m to cater for a horizontal movement up to 20 mm, covered with sealant complete as per drawing and technical specification.

Materials requirement:

Premoulded joint filler, 1 m long, 20 mm thick and 300 mm deep =0.30 sqm per RM

Items & Materials

- (iv) Providing and filling joint sealing compound as per drawings and technical specification with coarse sand and 6 % bitumen by weight.

Materials requirement:

Sand = 1 m X 0.1m X 0.01 m = 0.001 cum.per RM.

Bitumen =0.083 kg per RM

14.19 Per RM of asphaltic plug joint

Materials requirement:

- i) Crushed stone aggregate 12.5 mm nominal size = 0.0625 Cum per RM.
- ii) Polymer modified Bitumen =6.458 kg per RM.
- iii) Galvanised steel plate 200 mm wide, 6 mm thick and 2 m long = 9.417 Kg per RM.

14.20 Per RM of Elastomeric slab seal expansion joint

Materials requirement:

Supply of elastomeric slab seal expansion joint assembly manufactured by using chloroprene, elastomeric for elastomeric slab unit conforming to clause 915.1 of IRC - 83 (part-II) complete as per approved drawings and standard specifications conforming to clause 2606 of MORT&H specifications = 1m per RM.

14.21 Per RM compression seal joint

Materials requirement:

- i) Galvanised angle sections 100 mm X 100 mm of 12 mm thickness weldable structural steel as per IS: 2062, 2 nos of 1 m length each @ 17.70 kg per m and 5 % wastage = 37.17 kg per m.
- ii) Preformed continuous chloroprene elastomeric or closed cell foam sealing element with high tear strength, vulcanized in a single operation for the full length of a joint to ensure water tightness = 1m per RM

14.22 Per RM strip seal expansion joint

Materials requirement:

Supply of Complete assembly of Strip seal expansion joint comprising of edge beams, anchorage, strip seal element and complete accessories as per approved specifications and drawings = 1 m per RM

14.23 Per RM Modular strip / Box seal joint (horizontal movement beyond 70 mm and up to 140 mm)

Supply of a modular strip / box seal joint assembly comprising of edge beams, central beams, 2 modules chloroprene seal, anchorage elements, support and control system, all steel sections procted against corrosion and installed by the manufacturer or his authorized representative = 1 m per RM.

14.24 Per RM Modular strip / Box seal joint (horizontal movement beyond 140 mm and up to 210 mm)

Materials requirement:

Supply of a modular strip / box seal joint assembly containing 3 modules / cells and comprising of edge beams, two central beams, chloroprene seal, anchorage elements, support and control system, all steel sections procted against corrosion and installed by the manufacturer or his authorized representative = 1 m per RM.

Items & Materials

15.1 Per cum of providing and laying boulders apron on river bed for protection

A. Boulder laid dry without wire crates

Materials requirement:

- i) Stone = 1 cum per cum.
- ii) Stone spalls = 0.20 cum per cum.

15.2 Per cum boulder apron laid in wire crates

Materials requirement:

- i) 4 mm GI Wire crates woven in mesh size of 100 mm X 100 mm = 3.91 sqm per cum
- ii) Stone = 1 cum per cum.
- iii) Stone spalls = 0.20 cum per cum

15.3 Per cum cement concrete blocks (size 0.5 X 0.5 X 0.5 m)

Materials requirement:

Concrete Grade M 15 = 1 cum per cum As per Item no. 12.8.

15.4 Per cum of providing and laying pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and technical specifications

A Stone Boulder

Materials requirement:

- i) Stone weighing not less than 40 kg = 1 cum per cum
- ii) Stone spalls of minimum 25 mm size = 0.20 cum per cum.

B Cement concrete blocks (size 0.3 X 0.3 X 0.3 M)

Materials requirement:

Concrete Grade M 15 = 1 cum per cum

As per Item no. 12.8 .

15.5 Per cum providing and laying filter materials underneath pitching in slopes complete as per drawing and technical specifications

Materials requirement:

Graded stone aggregate of required size = 1.20 cum per cum

15.6 Per sqm of Geotextile filter

Materials requirement:

Permeable synthetic Geotextile including 5 % for overlap and wastage = 1.05 sqm per sqm

15.8 Per cum providing and laying flooring complete as per drawing and technical specifications

A Rubble stone laid in cement mortar 1 : 3

Materials requirement:

- i) Cement mortar 1 : 3 = 0.33 cum per cum
As per Item no. 12.6
- ii) Cement concrete M-15 nominal mix vide Item no. 12.8 = 1 cum per cum
- iii) Stone = 1 cum per cum
- iv) Stone spalls = 0.20 cum per cum

B Cement concrete blocks Grade M-15

Materials requirement:

- i) Concrete Grade M 15 block = 1 cum per cum
As per Item no. 12.8.
- ii) Cement concrete bedding M-15 nominal mix = 1 cum per cum

15.9 Per cum Dry rubble flooring

Materials requirement:

- i) Stone = 1 cum per cum.
- ii) Stone spalls = 0.20 cum per cum.

Items & materials

15.10 Per cum curtain wall complete as per drawing and technical specifications laid over

A. Stone masonry in cement mortar 1 : 3

Materials requirement:

Coursed rubble masonry (1st Sort) = 1 cum per cum

As per Item no. 12.7 (A).

B. Cement concrete Grade M-15

Materials requirement:

PCC Grade M-15 = 1 cum per cum

As per Item no 12.8.

15.11 Per cum construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall

Materials requirement:

i) Stone = 1 cum per cum.

ii) Stone spalls = 0.20 cum per cum.

15.12 Per cum gabion structure for retaining earth

Materials requirement:

i) Galvanized steel wire crates of mesh size 100 mm X 100 mm woven with 4 mm dia GI wire in rolls of required size = 4.84 sqm per cum

ii) Stone boulder with least dimension 200 mm = 1 cum per cum

iii) Stone spalls of size 25 mm = 0.20 cum per cum

15.13 Per cum of gabion structure for erosion control, river training works and protection works

Materials requirement:

i) Stone boulder with least dimension 200 mm = 1 cum per cum

ii) Stone spalls of size 25 mm = 0.20 cum per cum

iii) Galvanized steel wire crates of mesh size 100 mm X 100 mm woven with 4 mm dia GI wire in rolls of required size = 10.833 sqm per cum

16.3 Per sqm of Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy complete as per technical specification, assuming thickness 25 mm

Materials requirement:

i) Cement = 16 kg per sqm.

ii) Graded sand = 0.04 cum per sqm.

iii) Wire mesh 50 mm X 50 mm size of 3 mm wire = 2 kg per sqm.

iv) Epoxy = 0.67 kg per sqm.

v) Accelerator compound for guiniting @ 4 % of weight of cement = 0.64 kg per sqm.

16.4 Providing and inserting nipples with approved fixing compound after drilling holes With cement / epoxy (for each)

Materials requirement:

i) Nipples 1 no. for each

16.5 Per Kg of sealing cracks / porous concrete by injection process through nipples / grouting complete as per technical specification

A Cement grout

Materials requirement:

i) Cement including 10 % wastage = 1.10 kg per kg

B Cement mortar (1 : 1) grouting

Materials requirement:

i) Cement including 10 % wastage = 0.55 kg per kg

ii) Sand including 10 % wastage = 0.55 kg per kg

Items & materials

- 16.6 Per sqm of 25 mm thick patching of damaged concrete surface with polymer concrete and curing compounds, initiator and promoter available in present foundations of manufacturer and approved by the Engineer**

- 16.6 Patching of damaged concrete surface.....approved by the Engineer**

Materials requirement:

Pre-packed polymer concrete based on epoxy system complete with curing compound, initiator and promoter including 5 % wastage = 31.50 kg per sqm (25 mm thickness)

- 16.7 Per Kg of sealing cracks / porous concrete with epoxy grout by injection process through nipples complete as per clause 2803.1**

Materials requirement:

Epoxy including 10 % wastage = 1.10 kg per kg

- 16.8 Per sqm of applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement complete as per technical specifications**

Materials requirement:

i) Epoxy Resin - Hardener Mix for Prime coat = 0.25 Kg. per Sqm.

ii) Epoxy mortar = 0.22 Kg. per Sqm.

iii) Epoxy Resin - Hardener Mix for Seal coat = 0.20 Kg. per Sqm.

- 16.9 Per sqm of defective concrete, cleaning the surface thoroughly as per clause 2807.1 and workmanship conforming to clause 2807.6**

Materials requirement:

Considering 40 mm average thickness

i) Cement = 12 kg per sqm.

ii) Sand = 0.015 Cum per Sqm.

iii) Coarse aggregate of size 4.75 mm = 0.015 Cum per Sqm.

iv) Quick setting compound = 0.25 Kg. per Sqm.

v) Water = 0.01 KL per Sqm.

- 16.10 Per sqm applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete**

Materials requirement:

Assuming thickness 10 mm

i) Acrylic polymer bonding coat = 0.14 litre per Sqm.

ii) Pre-packed cement based polymer mortar of strength 45 Mpa at 28 days = 1.2 kg. per sqm.

- 16.11 Per sqm of epoxy bonding of new concrete to old concrete**

Materials requirement:

Epoxy resin with pot life not less than 60 to 90 minutes and satisfying testing as per clause 2803.9 = 0.80Kg. Per Sqm.

Items & materials

16.12

Per MT providing external prestressing with tensile steel wire / strand including drilling for passage of prestressing steel, all accessories for stressing operation and grouting complete as per drawing and technical specifications

Materials requirement:

Span assume = up to 25 m

- i) HTS Strand including 5 % wastage and extra length for jacking = 1.05 MT per MT
- ii) HDPE Pipes 75 mm dia including 5 % wastage = 112 RM per MT
- iii) Cement for grouting = 400 kg per MT
- iv) Tube anchorage set complete with bearing plate, permanent wedges, etc. = 8 nos. per MT
- v) Epoxy = 6.00 kg per MT
- vi) MS Plate for deviator (where deviator blocks are not provided) = 2.10 MT per MT

16.13 Per MT providing external prestressing with high tensile steel wires / strands including drilling for passage of prestressing steel, all accessories for stressing operation and grouting complete as per drawing and technical specifications

Materials requirement:

Span : above 25 but less than 50 m

- i) HTS Strand including 5 % wastage and extra length for jacking = 1.05 MT per MT
- ii) HDPE Pipes 90 mm dia including 5 % wastage = 72.26 RM per MT
- iii) Cement grouting = 325.80 kg per MT
- iv) Tube anchorage set complete with bearing plate, permanent wedges, etc. = 2.58 nos.
- v) Epoxy = 3.23 kg per MT
- vi) MS Plate for deviator (where deviator blocks are not provided) = 2.26 MT per MT

16.14 Per MT providing external prestressing with high tensile steel wires / strands including drilling for passage of prestressing steel, all accessories for stressing operation and grouting complete as per drawing and technical specifications

Materials requirement:

Span assume = above 50 m

- i) HTS Strand incl. 5% wastage & extra length for jacking = 1.05 MT/MT
- ii) HDPE Pipes 90 mm dia including 5 % wastage = 72.41 RM per MT
- iii) Cement grouting = 327.59 kg per MT
- iv) Tube anchorage set complete with bearing plate, permanent wedges, etc. = 1.293 nos.
- v) Epoxy = 1.51 kg per MT
- vi) MS Plate for deviator (where deviator blocks are not provided) = 2.16 MT per MT

16.15 Replacement of bearing complete as per technical specfn. (for each)

Materials requirement:

Replacement of bearing cost = 1 no for each

16.16 Rectification of bearing as per technical specifications (for each)

Materials requirement:

Cost of parts of bearing = 1 no for each

Items & materials

16.17 Per RM of replacement of expansion joints complete as per drawings

Materials requirement:

- i) Epoxy for Bonding new conc. to old conc. @ 0.8 Kg/sqm. = 0.8 kg /RM.
- ii) Concrete M- 30 = 0.3 cum. Per RM as per Sl.No.14.1

16.18 Per RM Replacement of damaged concreting railing

Note: The rate for the provision of new railing may be adopted from chapter on superstructure.

16.19 Per RM Replacement of crash barrier

Note: The rate for the construction of new crash barrier may be adopted from chapter 8 on Traffic and Transportation

16.21 Per RM of repairing of crash barrier

Materials requirement:

M- 30 Grade concrete = 0.03 Cum. Per RM as per Sl.No.14.1

This may be priced based on the rate given in chapter on superstructure.

16.22 Per RM repair of RCC railing

Materials requirement:

M- 30 Grade concrete = 0.01 Cum. Per RM.

As per items 14.1

HYSR reinforcement = 0.0013 MT per RM

As per items 14.2

16.23 Per RM of repairing of steel railing

Materials requirement:

- i) Mild steel ISMC series = 2.90 kg per RM.
- ii) Flat iron = 1.00 kg per RM.
- iii) MS bolts and nuts = 0.1 kg per RM.

Items & materials

Item No. 17.7 Plum concrete:

PLUM CONCRETE (1:3:6)	Quantity
Materials requirement per Cum :	
225 mm to 150 mm stone boulder	0.6 cum
40 mm down single	0.24 cum
20 mm down bazri	0.12 cum
Coarse Sand	0.18 cum
Cement 53 grade in MT (considering 5% wastage)	0.092 M.T

Item No. 17.13 Stone Matrix Asphalt (SMA):

Size of crushed stone aggregates	17.13(i)	17.13(ii)
	Grading - I 13 mm SMA with layer thickness 40-50mm. Cum	Grading - II 19 mm SMA with layer thickness 45-75mm. Cum
20 mm	0	0.07
13.2mm	0.07	0.52
10 mm	0.45	0.21
5.6mm	0.54	0.26
Stone dust	0.33	0.33
Bitumen content (%) by mass of total mix	5.80 % (min.)	5.80 % (min.)
Filler Cement /lime / Rock dust	64.034 kg	63.27 kg
Note: Quantities are only for estimation. For execution grading shall conform to table 500-37 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013		

Items & materials

Item No. 17.14 Micro Surfacing:

Materials Requirement	17.14(i)	17.14(ii)
	Type-II 4-6 mm thickness	Type-III 6-8 mm thickness
(i) Polymer modified emulsion for Micro Surfacing	1.254 Kg per sqm.	1.686 Kg per sqm.
(ii) Crushed stone Aggregate		
5.6mm stone metal	0.07 cum/sqm	0.28 cum/sqm
Stone grit	0.52 cum/sqm	0.57cum/sqm
Stone dust	0.80cum/sqm	0.54 cum/sqm
Ordinary Portland Cement	0.12 Kg. per Sqm.	0.171 Kg per sqm.

Note: Quantities are only for estimation. For execution grading shall conform to table 500-34 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

Items & materials

Table: VISCOSITY GRADE (VG) BITUMEN SPECIFICATION AS PER IS 73:2013

Table 1 Requirements for Paving Bitumen
(Clause 6.2)

Sl No.	Characteristics	Paving Grades				Method of Test, Ref to
		VG10	VG20	VG30	VG40	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Penetration at 25°C, 100 g, 5 s, 0.1 mm, Min	80	60	45	35	IS 1203
ii)	Absolute viscosity at 60°C, Poises	800-1200	1600-2400	2400-3600	3200-4800	IS 1206 (Part 2)
iii)	Kinematic viscosity at 135°C, cSt, Min	250	300	350	400	IS 1206 (Part 3)
iv)	Flash point (Cleveland open cup), °C, Min	220	220	220	220	IS 1448 [P : 69]
v)	Solubility in trichloroethylene, percent, Min	99	99	99	99	IS 1216
vi)	Softening point (R&B), °C, Min	40	45	47	50	IS 1205
vii)	Tests on residue from rolling thin film oven test:					
	a) Viscosity ratio at 60°C, Max	4	4	4	4	IS 1206 (Part 2)
	b) Ductility at 25°C, cm, Min	75	50	40	25	IS 1208

SHRINKAGE FACTOR OF DIFFERENT MATERIALS

The following table relates to bulkage/Shrinkage of coarse & fine aggregate for calculation of loose net volume if the material measured in stacks (Reference to MoRT&H's specification, 5th Revision Table 500-50).

Sl No.	Standard Size of Aggregates	Percentage Reduction in volume computed by stack measurements to arrive at the volume to be paid for
1.0	75 mm and 63 mm	12.5
2.0	53 mm	11.0
3.0	45 mm to 26.5 mm	10.0
4.0	22.4 mm to 5.6 mm	5.0
5.0	Fine aggregate	5.0

CHAPTER - 1

**LOADING, UNLOADING, STACKING AND
CARRIAGE OF DIFFERENT MATERIALS**

CHAPTER-1
CARRIAGE OF MATERIALS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.1	a) Loading and Unloading of brick bats/Stone Boulder/Stone metal/ stone chips/slag materials/shringles/ river bed materials/Sand/ Kanker/ Moorum/Surki/ Cinder and similar granular material.	cum	125.00	Note - Unloading will be by tipping.
	b) Loading and Unloading of bricks/ stone sets	1000 Nos.	238.00	
1.2	Loading and Unloading of Boulders by Manual Means	cum	204.00	Note - Unloading will be by tipping.
1.3	Loading and Unloading of Cement and lime in bags, tar or bitumen, Steel materials, timbers and similar material Manual Means and Stacking.	tonne	169.00	
1.4	Cost of Haulage Excluding Loading and Unloading Haulage of materials by tipper excluding cost of loading, unloading and stacking.			
a)	Carriage for Sand. (i) Surfaced Road (ii) Unsurfaced Graveled Road (iii) Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.		t.km	cu.km
			7.00	12.08
			8.40	14.49
			17.00	29.33
b)	Carriage for Moorum, Surki, Cinder and similar granular materials (i) Surfaced Road (ii) Unsurfaced Graveled Road (iii) Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.		t.km	cu.km
			7.00	5.04
			8.40	6.05
			17.00	12.24
c)	Carriage for Brick bat ,Boulders, stone metal/chips, Gravels, Slag metals, Shingles, River bed materials. (i) Surfaced Road (ii) Unsurfaced Graveled Road (iii) Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.		t.km	cu.km
			7.00	11.10
			8.40	13.31
			17.00	26.95

CHAPTER-1
CARRIAGE OF MATERIALS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
d)	Carriage for cement/lime (in bags),tar or bitumen, Steel materials, timber and similar materials. (i)Surfaced Road (ii)Unsurfaced Graveled Road (iii)Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.	t.km	7.00 8.40 17.00	
e)	Carriage for bricks. (i)Surfaced Road (ii)Unsurfaced Graveled Road (iii)Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.	1000 nos/km	23.33 28.00 56.66	
1.5	Hand Broken Stone Aggregates 63 mm Nominal Size Supply of quarried stone, hand breaking into coarse aggregate 63 mm nominal size (passing 80 mm and retained on 50 mm sieve) and stacking as directed	cum	532.00	
1.6	Crushing of Stone Aggregates 13.2 mm Nominal Size. Crushing of stone boulders of 150 mm size in an integrated stone crushing unit of 200 tonnes per hour capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates of 13.2 mm nominal size. Note : 1. 800 cum of stone boulders are needed to get 600 cum of stone chips of size 13.2 mm. 2. 95 per cent of above cost will be attributed to the production of 600 cum of stone chips of 13.2 mm size and balance 5 per cent to the production of stone dust which comes out as a by-product. 3. The integrated stone crusher includes primary and secondary crushing units.	cum	77.00	

CHAPTER-1
CARRIAGE OF MATERIALS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.7	Crushing of Stone Aggregates 20 mm Nominal Size Crushing of stone boulders of 150 mm size in an integrated stone crushing unit of 200 tonnes per hour capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates of 20 mm nominal size. <i>Note : 1. 800 cum of stone boulders are needed to get 600 cum of stone chips of size 20 and 40 mm.</i> 2. 90 per cent of above cost will be attributed to the production of 670 cum of stone aggregates of 20mm size and balance 10 per cent will be for smaller size aggregates and stone dust which comes out as a by-product. 3. The integrated stone crusher includes primary and secondary crushing units.	cum	65.00	
1.8	Crushing of Stone Aggregates 40 mm Nominal Size Crushing of stone boulders of 150 mm size in an integrated stone crushing unit of 200 tonnes per hour capacity comprising of <i>Note: 1. 800 cum of stone boulders are needed to get 600 cum of stone chips of size 13.2 mm.</i> 2. 85 per cent of above cost will be attributed to the production of 750 cum of stone aggregates of 40mm size and balance 15 per cent will be for smaller size aggregates and stone dust which comes out as a by-product. 3. The integrated stone crusher includes primary and secondary crushing units.	cum	55.00	

Notes:

- ¹ For carriage in Hill areas having altitude 460 ft and more, above MSL : 35% extra over the corresponding rates as above.
- ² The above rates are excluding all charges ,Royalty ,contractors profit and GST.

CHAPTER - 2

SITE CLEARANCE

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Cutting of Trees, including cutting of Trunks, Branches and Removal Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression/pit. (Reference to MORT&H's specification clause 201)			Complete Rate
	i)Girth from 300 mm to 600 mm	Each	246.40	
	ii)Girth from 600 mm to 900 mm	Each	438.70	
	iii)Girth from 900 mm to 1800 mm	Each	862.40	
	iv)Girth above 1800 mm	Each	1648.20	
2	Clearing Grass and Removal of Rubbish : By Manual Means Clearing grass and removal of rubbish up to a distance of 50 metres outside the periphery of the area. (Reference to MoRT&H's specification clause 201)	Hectare	17730.00	Complete Rate
3	Clearing and Grubbing Road Land Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness. (Reference to MoRT&H's specification clause 201)			

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3(I)	By Manual Means			Complete Rate
3(I)(A)	In area of light jungle	Hectare	53573.00	
3(I)(B)	In area of thorny jungle	Hectare	71686.00	
3(II)	By Mechanical Means			
3(II)(A)	In area of light jungle	Hectare	41431.40	
3(II)(B)	In area of thorny jungle	Hectare	50258.10	
4	Dismantling of Structures Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1000 metres (Reference to MORT&H's specification clause 202)			Complete Rate
4(i)	Lime /Cement Concrete			
4(i)I	By Manual Means			
4(i)I.A	Lime Concrete, cement concrete grade M-10 and below	cum	366.40	
4(i)I.B	Cement Concrete Grade M-15 & M-20	cum	437.30	
4(i)I.C	Prestressed / Reinforced cement concrete grade M-20 & above	cum	1166.90	
4(i)II	By Mechanical Means			
4(i)II.A	Cement Concrete Grade M-15 & M-20	cum	410.30	

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(i)II.B	Prestressed / reinforced cement concrete grade M-20 & above	cum	719.90	Complete Rate
4(ii)	Dismantling Brick / Tile work			
4(ii)A	In lime mortar	cum	224.60	
4(ii)B	In cement mortar	cum	295.50	
4(ii)C	In mud mortar	cum	196.20	
4(ii)D	Dry brick pitching or brick soling	cum	182.00	
4(iii)	Dismantling Stone Masonry			
4(iii)A	Rubble stone masonry in lime mortar.	cum	252.90	
4(iii)B	Rubble stone masonry in cement mortar.	cum	295.50	
4(iii)C	Rubble Stone Masonry in mud mortar.	cum	224.60	
4(iii)D	Dry rubble masonry	cum	210.40	
4(iii)E	Dismantling stone pitching/ dry stone spalls.	cum	196.20	
4(iii)F	Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials.	cum	224.60	
4(iv)	Wood Work wrought framed and fixed in frames of trusses upto a height of 5 m above plinth level.	cum	549.00	
4(v)	Steel Work in all types of sections upto a height of 5 m above plinth level excluding cutting of rivet.			
4(v)A	Including dismembering	tonne	1441.80	

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(v)B	Excluding dismembering.	tonne	1169.30	Complete Rate
4(v)C	Extra over item No(v)A and (v)B for cutting rivets.	each	10.50	
4(vi)	Scraping of Bricks Dismantled from Brick Work including Stacking.			
4(vi)A	In lime/Cement mortar	1000 Nos.	1241.10	
4(vi)B	In mud mortar	1000 Nos.	443.30	
4(vii)	Scraping of Stone from Dismantled Stone Masonry			
4(vii)A	In cement and lime mortar	cum	501.10	
4(vii)B	In Mud mortar	cum	104.10	
4(viii)	Scarping Plaster in Lime or Cement Mortar from Brick/ Stone Masonry	sqm	15.40	
4(ix)	Removing all types of Hume Pipes and Stacking within a lead of 1000 metres including Earthwork and Dismantling of Masonry Works.			
4(ix)A	Up to 600 mm dia	m	183.50	
4(ix)B	Above 600 mm to 900 mm dia	m	250.60	
4(ix)C	Above 900 mm	m	427.90	
Note	1. The excavation of earth, dismantling of stone masonry work in head walls and protection works is not included which is to be measured and paid separately. 2. Credit for retrieved stone from masonry work may be taken as per actual availability. 3. For dismantling of structures, which remain submerged in water, the cost may be enhanced by 50 per cent.			

CHAPTER - 2
SITE CLEARANCE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	Dismantling of Flexible Pavements Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately (Reference to MoRT&H's specification clause 202)			
5(I)	By Manual Means			
5(I)A	Bituminous courses	cum	677.40	
5(I)B	Granular courses	cum	481.00	
5(II)	By Mechanical Means			
5(II)A	Bituminous course	cum	256.00	
6	Dismantling of Cement Concrete Pavement Dismantling of cement concrete pavement by mechanical means using pneumatic tools, breaking to pieces not exceeding 0.02 cum in volume and stock piling at designated locations and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately (Reference to MoRT&H's specification clause 202)	cum	1169.00	Complete Rate
Note	<i>The above analysis is for removal of complete pavement. In case full depth repair work is required to be done after dismantling, provision of a concrete cutting and sawing machine may be added for 0.25 hours i.e. ₹ 80.50 only.</i>			

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7	Dismantling of Guard Rails Dismantling guard rails by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metres, stacking serviceable materials & unserviceable materials separately and back filling the trenches & pits (Reference to MoRT&H's Specification clause 202).	R M	72.30	Complete Rate
8	Dismantling of Kerb Stone Dismantling kerb stone by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metre (Reference to MORT&H's specification clause 202).	R M	13.45	Complete Rate
9	Dismantling of Kerb Stone Channel Dismantling kerb stone channel by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metre (Reference to MoRT&H's specification clause 202).	R M	20.20	Complete Rate
10	Dismantling of Kilometre Stone Dismantling of kilometre stone including cutting of earth, foundation and disposal of dismantled material with all lifts and lead upto 1000 m and back filling of trenches & pit (Reference to MoRT&H's Specification clause 202).			
10A	5th KM stone	Each	439.90	Complete Rate
10B	Ordinary KM Stone	Each	215.60	Complete Rate
10C	Hectometre Stone	Each	43.10	Complete Rate

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11	Dismantling of Fencing Dismantling of barbed wire fencing/ wire mesh fencing including posts, foundation concrete, back filling of trenches & pit by manual means including disposal of dismantled material with all lifts and up to a lead of 1000 metres, stacking serviceable material and unserviceable material separately (Reference to MoRT&H's specification clause 202).	R M	48.80	Complete Rate
12	Dismantling of CI Water Pipe Line Dismantling of CI water pipe line 600 mm dia including disposal with all lifts and lead upto 1000 metres and stacking of serviceable material and unserviceable material separately under supervision of concerned department (Reference to MORT&H's specification clause 202).	R M	118.26	Complete Rate
Note	<i>The rate analysis does not include any excavation in earth or dismantling of masonry works which are to be measured and paid separately.</i>			
13	Removal of Cement Concrete Pipe of Sewer Gutter Removal of Cement Concrete Pipe of Sewer Gutter 1500mm dia under the supervision of concerned Department including disposal with all lifts and upto a lead of 1000m and stacking of serviceable, unserviceable material separately and backfilling the trenches & pits but excluding earth excavation and dismantling of masonry works (Reference to MoRT&H's specification clause:202).	R M	154.40	Complete Rate

CHAPTER - 2
SITE CLEARANCE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>The rate analysis does not include any excavation in earth or dismantling of masonry works which are to be measured and paid separately.</i>			
14	Removal of Telephone / Electric Poles and Lines Removal of telephone / Electric poles including excavation and dismantling of foundation concrete and lines under the supervision of concerned Department, disposal with all lifts and up to a lead of 1000 metres and stacking the serviceable, unserviceable material separately and backfilling the trenches & pits (Reference to MoRT&H's specification clause 202).	Each	167.80	Complete Rate

CHAPTER - 3

EARTHWORK, EROSION CONTROL AND DRAINAGES

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Excavation in Soil by Manual Means Excavation for roadway in soil using manual means including loading in truck for carrying of cut earth to embankment site with all lifts and lead upto 1000 metres (Reference to MoRT&H's specification clause 301). Note <i>In case there is a situation where the cross-section is of cut and fill and cut earth is required to be used in embankment in the immediate vicinity, the item of carriage in the truck (i.e. ₹40.90) shall be omitted.</i>	cum	173.90	Complete Rate (Including material cost)
2	Excavation in Ordinary Rock by Manual Means Excavation in ordinary rock using manual means including loading in a truck and carrying of excavated material to embankment site with in all lifts and leads up to 1000 metres (Reference to MoRT&H's specification clause 301) Note <i>In case there is a situation where the cross-section is of cut and fill and cut earth is required to be used in embankment in the immediate vicinity, the item of carriage in the truck (i.e. ₹ 40.90) shall be omitted.</i>	cum	247.80	Complete Rate (Including material cost)
3	Excavation in Soil with Dozer with lead up to 100 metres Excavation for road way in soil by mechanical means including cutting and pushing the earth to site of embankment up to a distance of 100 metres (average lead 50 metres), (Contd...)	cum	136.00	Complete Rate (Including material cost)

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	including trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301).			
4	Excavation in Ordinary Rock with Dozer with lead up to 100 metres Excavation for roadway in ordinary rock by deploying a dozer, 80 HP including cutting and pushing the cut earth to site of embankment up to a distance of 100 metres (average lead 50 metres), trimming bottom and side slopes in accordance with the requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301).	cum	230.00	Complete Rate (including cost of materials) for item No. from 4 to 6
5	Excavation in Hard Rock (requiring blasting) with disposal upto 1000 metres Excavation for roadway in hard rock (requiring blasting) by drilling, blasting and breaking, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections, loading and disposal of cut road within all lifts and leads upto 1000 metres (Reference to MoRT&H's specification clause 301& 302). Note 1. The quality and availability of rock shall be checked before affording credit. 2. In case some rock is issued to the contractor at site, the item of carriage shall be reduced/restricted to that extent.	cum	294.00	

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	<p>Excavation in Soil using Hydraulic Excavator CK 90 and Tippers with Disposal upto 1000 metres.</p> <p>Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m (Reference to MoRT&H's specification clause 301).</p>	cum	70.00	
7	<p>Excavation in Ordinary Rock using Hydraulic Excavator CK-90 and Tippers with Disposal upto 1000 metres.</p> <p>Excavation for roadway in ordinary rock with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, transporting to embankment site within all lifts and lead upto 1000 m, trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301).</p>	cum	83.90	<i>Complete Rate (Including material cost)</i>

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Excavation in Hard Rock (blasting prohibited) Excavation for roadway in hard rock (blasting prohibited) with rock breakers including breaking rock, loading in tippers and disposal within all lifts and lead upto 1000 metres, trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301). Note 1. <i>The quality and availability of rock shall be checked before affording credit.</i> 2. <i>Credit is considered for 50 per cent of quantity of work.</i> 3. <i>Being small quantity, manual loading will be economical in this case and has been provided accordingly.</i> 4. <i>In case some rock is issued to contractor at site, the item of carriage shall be omitted to the extent of quantity issued to the contractor.</i>			
8A	Mechanised Method	cum	511.30	<i>Complete Rate (Including material cost)</i>
8B	Manual Method	cum	1252.00	<i>Complete Rate (Including material cost)</i>

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9	<p>Excavation in Hard Rock (controlled blasting) with disposal upto 1000 metres</p> <p>Excavation for roadway in hard rock with controlled blasting by drilling, blasting and breaking, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections, loading and disposal of cut road within all lifts and leads upto 1000 metres (Reference to MoRT&H's specification clause 301).</p>	cum	313.20	Complete Rate (Including material cost)
Note	<p>1. Credit is considered for 50 per cent of quantity of blistered rock, if found suitable for construction.</p> <p>2. In case some rock is issued to the contractor at site, the item of carriage shall be reduced to that extent.</p>			
10	<p>Excavation in Marshy Soil</p> <p>Excavation for roadway in marshy soil with hydraulic excavator 0.9 cum bucket capacity including cutting and loading in tippers and disposal within all lifts and lead upto 1000 metres, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301).</p>	cum	76.10	Complete Rate (Including material cost)
11	<p>Removal of Unserviceable Soil with Disposal upto 1000 metres</p> <p>Removal of unserviceable soil including excavation, loading and disposal upto 1000 metres lead but excluding replacement by suitable soil which shall be paid separately as per clause 305 (Reference to MoRT&H's specification clause 301).</p>	cum	71.00	Complete Rate (Including material cost)

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>This item does not include replacement of unsuitable soil by suitable soil. Replacement, where required, is to be provided and paid separately under clause 305.</i>			
12	Pre-splitting of Rock Excavation Slopes Carrying out excavation in hard rock to achieve a specified slope of the rock face by controlled use of explosives and blasting accessories in properly aligned and spaced drill holes, collection of the excavated rock by a 80 HP dozer, loading in tipper by a front end loader and disposing of the material with all lifts and lead upto 1000 m, all as specified in clause No. 303 (Reference to MoRT&H's specification clause 303).	sqm	112.10	Complete Rate (Including material cost)
13	Excavation for Structures Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work (Reference to MoRT&H's specification clause 304).			
13(i) 13(i)A	Ordinary soil Manual Means (Depth upto 3 m)	cum	283.70	Complete Rate (Including material cost)

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Cost of dewatering may be added where required upto 10 per cent of labour cost i.e. ₹ 28.40 for assessment for dewatering shall be made as per site conditions.			
13(i)B	Mechanical Means (Depth upto 3 m)	cum	37.00	Complete Rate (Including material cost)
Note	Cost of dewatering upto 5 per cent of cost of labour and machineries i.e. of column 4 may be added, where required. Assessment of dewatering shall be made as per site conditions.			
13(ii)	Ordinary Rock (not requiring blasting)			
13(ii)A	Manual Means (Depth upto 3 m)	cum	354.60	Complete Rate (Including material cost)
Note	Cost of dewatering upto 10 per cent of labour cost ; i.e. ₹ 35.50 may be added, where required. Assessment for dewatering shall be made as per site conditions.			
13(ii)B	Mechanical Means	cum	48.10	Complete Rate (Including material cost)
Note	1. Cost of dewatering upto 5 per cent of labour and machineries i.e. of column 4 may be added, where required. Assessment for dewatering shall be made as per site conditions.			
13(iii)	Hard Rock (requiring blasting)			
13(iii)A	Manual Means	cum	544.40	Complete Rate (Including material cost)
Note	Cost of dewatering @ 10 per cent of labour cost ; i.e. ₹ 47.00 may be added, where required. Assessment for dewatering shall be made as per site conditions.			

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13(iv) 13(iv)A Note	Hard Rock (blasting prohibited) Mechanical Means 1. Cost of dewatering upto 5 per cent of labour and machineries i.e. of column 4 may be added, where required 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.	cum	512.30	Complete Rate (Including material cost)
13(v) 13(v)A Note	Marshy soil Manual means (upto 3 m depth) 1. Cost of dewatering @ 30 per cent of labour cost i.e. ₹ 103.68 , may be added, where required. Assessment for dewatering shall be made as per site conditions. 2. Shoring & strutting 20 per cent of labour cost i.e. ₹ 69.12, where required may be added.	cum	575.90	cost of selected earth for refilling is included.
13(v)B Note	Mechanical Means 1. Cost of dewatering @ 20 per cent of labour & machineries i.e. ₹23.90 may be added, where required. 2. Shoring & strutting @ 10 per cent of labour & machineries i.e. ₹11.95, where required may be added. 3. It is assumed that Marshy Soil will be available upto 3 m depth only.	cum	259.00	cost of selected earth for refilling is included.
14	Scarifying Existing Granular Surface to a Depth of 50 mm by Manual Means Scarifying the existing granular road surface to a depth of 50 mm and disposal of scarified material within all lifts and leads upto 1000 metres	sqm	24.10	Material cost Nil [In case material is to be reused at site, transportation cost catered above for disposal shall be deleted]

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	(Reference to MoRT&H's specification clause 305.4.3).			
15	Scarifying Existing Bituminous Surface to a depth of 50 mm by Mechanical Means Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material within all lifts and lead upto 1000 metres (Reference to MoRT&H's specification clause 305.4.3).	sqm	5.70	Complete Rate (Including material cost)
16	Construction of Embankment with Material obtained from Borrow pits Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-2 & 300-1 .The size course material in the mix of earth ordinarily shall not be exceed 75mm.(Reference to MoRT&H's specification clause 305). Note <i>Compensation for earth will vary from place to place and will have to be assessed realistically as per particular ground situation. In case earth is available from Govt. land, compensation for earth i.e. ₹ 43.00/m3 to be deducted from the Rate in Col. 4. The position is required to be clearly stated in the cost estimate.</i>	cum	180.60	Cost of compensation for Earth material & its carriage from private land at 5km distance have been included in the rate.
17	Construction of Embankment with Material Deposited from Roadway Cutting Construction of embankment with approved materials deposited at (Contd..)	cum	86.40	Material Cost Nil <i>In case the earth cutting is done by dozer and pushed for filling in the embankment, the input of dozer in the cost</i>

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300-2 & 300-1. The size course material in the mix of earth ordinarily shall not be exceed 75mm. (Reference to MoRT&H's specification clause 305).</p> <p><i>In case the earth cutting is done by dozer and pushed for filling in the embankment, the input of dozer in the cost of embankment i.e. ₹ 39.63/m³ shall be deducted from the Rate (Col. 4) as the same is already provided in the cost of excavation. However, if the earth is dumped by tippers from roadway cutting, the input of dozer for spreading is required to be provided.</i></p>			<p><i>of embankment i.e. ₹ 39.63/m³ shall be deducted from the Rate (Col. 4) as the same is already provided in the cost of excavation. However, if the earth is dumped by tippers from roadway cutting, the input of dozer for spreading is required to be provided</i></p>
18	<p>Construction of Subgrade and Earthen Shoulders</p> <p>Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2 (Reference to MoRT&H's specification clause 305).</p>	cum	212.70	<p><i>Cost of compensation for Earth material & its carriage from private land at 5km distance have been included in the rate.</i></p> <p><i>[vide note col. of item no. 16 also]</i></p>

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
19	Compacting Original Ground			
Case-I	Compacting original ground supporting sub-grade Loosening of the ground upto a level of 500 mm below the sub-grade level, watered, graded and compacted in layers to meet requirement of table 300-2 & 300-1 for sub-grade construction (Reference to MoRT&H's specification clause 305.3.4).	cum	57.70	Complete Rate (Including material cost)
Case-II	Compacting original ground supporting embankment Loosening, leveling and Compacting original ground supporting embankment to facilitate placement of first layer of embankment, scarified to a depth of 150 mm, mixed with water at OMC and then compacted by rolling so as to achieve minimum dry density as given in Table 300-2 & 300-1 for embankment construction. (Reference to MoRT&H's specification clause 305.3.4).	cum	29.60	Complete Rate (Including material cost)
20	Stripping and Storing Top Soil Stripping, storing of top soil by road side at 15 m interval and re-application on embankment slopes, cut slopes and other areas in localities where the available embankment material is not conducive to plant growth (Reference to MoRT&H's specification clause 305).	cum	216.90	Complete Rate (Including material cost)

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
21	Stripping, Storing and Re-laying Top Soil from Borrow Areas in Agriculture Fields.	cum	81.60	<i>Complete Rate (Including material cost)</i>
	Stripping of top soil from borrow areas located in agriculture fields, storing at a suitable place, spreading and re-laying after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels and satisfaction of the farmer.			
22	Turfing with Sods Furnishing and laying of the live sods of (thickness 50-80mm) 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 (Reference to MoRT&H's specification clause 307).	sqm	30.40	<i>Material cost i.e. Cost of farm yard manure considered in this item .</i>
23	Seeding and Mulching 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 litres per sqm and laying and fixing jute netting (with 25mm sqr opening) including watering for 3 months all as per clause 308 (Reference to MoRT&H's specification clause 308).	sqm	97.00	<i>All materials cost except Bitumen Emulsion included in the analysis. Bitumen Emulsion consumption as per Chapter-A, Item No. 3.23 to be added with this rate.</i>

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
24	Surface Drains in Soil Construction of unlined surface drains of average cross sectional area 0.40 sqm in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of 50 metres (average lead 25 metres) (Reference to MoRT&H's specification clause 309).			
24A	Mechanical means	Mtr.	54.30	<i>Complete Rate (Including material cost)</i>
24B	Manual Means	Mtr.	70.90	<i>Complete Rate (Including material cost)</i>
Note	<i>Where lining of drain is provided, quantity shall be worked out based on approved design and drawing and priced on rate of cement concrete of approved grade or stone/brick masonry as the case may be.</i>			
25	Surface Drains in Ordinary Rock Construction of unlined surface drain of average cross sectional area 0.4 sqm in ordinary rock to specified lines, grades, levels and dimensions as per approved design and to the requirement of clauses 301 to 309. Excavated material to be used in embankment at site (Reference to MoRT&H's specification clause 309).			
25A	Mechanical Means	Mtr.	110.00	<i>Complete Rate (Including material cost)</i>
25B	Manual Means	Mtr.	106.40	<i>Complete Rate (Including material cost)</i>

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
26	Surface Drains in Hard Rock Rate per metre may be worked out based on quantity of hard rock as per design. For rate of hard rock cutting, refer relevant item in this chapter (Reference to MoRT&H's specification clause 309).			
27	Sub-Surface Drains with Perforated Pipe Construction of subsurface drain with perforated pipe of 100 mm internal diameter of metal/ asbestos cement/ cement concrete/PVC, closely jointed, perforations ranging from 3 mm to 6 mm depending upon size of material surrounding the pipe, with 150 mm bedding below the pipe and 300 mm cushion above the pipe, cross section of excavation 450 x 550 mm. Excavated material to be utilised in roadway at site The Grading of backfilling material shall be provided as per table 300-3 . (Reference to MoRT&H's specification clause 309 & 309.3.2.2).(Reference to MoRT&H's specification clause 309).	Mtr.	175.30	<i>Only cost of crushed stone aggregates / gravel /sand materials as per chapter-A, Sl. No.3.27 to be added.</i>
<i>Note</i>	<i>Type of pipe may be modified depending upon provision in design.</i>			

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
28	Aggregate Sub-Surface Drains Construction of aggregate sub surface drain 300 mm x 450 mm with aggregates conforming to table 300-4, excavated material to be utilised in roadway (Reference to MoRT&H's specification clause 309).	Mtr.	48.50	<i>Cost of Crushed stone aggregate / gravel materials as per chapter - A Sl. No. 3.28 to be added.</i>
29	Underground Drain at Edge of Construction of an underground drain 1 m x 1 m (inside dimensions) lined with R.C.C. (M-20) , 20 cm thick wall and covered with RCC (M-20) slab, 10 cm in thickness on urban roads (Reference to MoRT&H's specification clause 309).	RM	308.40	<i>Material cost as per chapter - A Sl. No.3.29. to be added.</i>
30	Preparation and Surface Treatment of Formation. Preparation and surface treatment of formation by removing mud and slurry, watering to the extent needed to maintain the desired moisture content, trimming to the required line, grade, profile and rolling with 8-10 tonne smooth wheeled roller, complete as per clause 310 (Reference to MoRT&H's specification clause 310).	sqm	1.70	<i>Complete Rate (Including material cost)</i>
31	Construction of Rock fill Embankment Construction of rock fill embankment with broken hard rock fragments of size not exceeding 300 mm laid in layers not exceeding 500 mm thick including filling of surface voids with stone spalls, blinding top layer with granular material, rolled with vibratory road roller, all complete as per clause 313 (Reference to MoRT&H's specification clause 313).	cum	52.80	<i>Complete Rate (Including material cost)</i>

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>It is assumed that rock is available locally at site from roadway cutting.</i>			
32	EARTH WORK ON HILL ROAD Excavation in Hill Area in Soil by Mechanical Means Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres (Reference to MoRT&H's specification clause 301). Note <i>In case the land on the valley side is barren and there is no objection for disposing of excavated earth on the valley side, the provision of front end loader and tipper ; i.e. ₹ 52.38 shall be deducted as excavated earth shall be disposed off on the valley side.</i>	cum	171.20	Complete Rate (Including material cost)
33	Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting. Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres (Reference to MoRT&H's specification clause 301). Note <i>In case the land on the valley side is barren and there is no objection for disposing of excavated earth on the valley side, the provision of front end loader and tipper ; i.e. ₹ 68.76 shall be deducted as excavated earth can be disposed off on the valley side.</i>	cum	242.40	Complete Rate (Including material cost)

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EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
34	<p>Excavation in Hilly Areas in Hard Rock Requiring Blasting</p> <p>Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres (Reference to MoRT&H's specification clause 301).</p> <p>Note 1. In case the land on the valley side is barren and there is no objection for disposing of excavated earth on the valley side, the provision of front end loader and tipper (i.e. ₹ 68.76) shall be deducted as excavated earth can be disposed off on the valley side.</p>	cum	285.90	Complete Rate (Including material cost)
35	<p>Work in Urban Roads</p> <p>The cost of earth work in urban roads inhabited area will be comparatively higher due to following reasons:</p> <p>a) There is mixed traffic on urban roads like slow moving hand and animal driven carts, rickshaws, cycles, two/ three wheeler apart from the usual vehicular traffic resulting into traffic jams. This causes loss of working time which may be in the range of 10 - 15 per cent.</p> <p>b) There is considerable disruption of traffic adversely affecting the efficiency of the working parties including machines due to congestion caused by pedestrian traffic, local road side vendors, parking of vehicles by the road side, encroachments by the (Contd..)</p>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p>shopkeepers and local shops who make use of the berms of the road in front of these shops and unauthorised conversion of road berms into mini local market The output of manpower and machines is substantially reduced due to factors mentioned above.</p> <p>c) Cost of living in urban areas is comparatively more resulting into higher wages.</p> <p>d) At times, work is executed during night time due to heavy traffic during day time. This involves extra expenditure by way of making arrangement for lighting and special transport for working parties due to odd hour. In the light of above, the authorities engaged in preparing the cost estimates may exercise their judgment and cater for the additional cost to the extent of 2 to 3 per cent, keeping in view the severity of factors mentioned above. Supporting details for the extra cost based on the actual site conditions in specific cases will have to give in justification.</p>			
36	<p>Embankment Construction with Flyash/Pond ash available from coal or lignite burning Thermal Plants as waste material.</p> <p>Construction of embankment with Flyash conforming to table 1 of IRC: SP: 58 - 2001 obtained from coal or lignite burning thermal power stations as waste material, spread and compacted in layer of 200mm thickness each at OMC, all as specified in IRC: SP: 58-2001 and as per approved plans (Suggestive)</p>	cum	127.50	<p><i>If flyash is not available as free of cost, the cost of flyash shall be added. Carriage cost of fly-ash from a distance 5km is included AND SUBJECT TO modification according to actual distance of carriage.</i></p>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>1. As flyash is available free of cost as waste material from Thermal Plants, cost of material has not been added.</p> <p>2. The earth cover on sides and intermediate layers of earth sandwiching the flyash have not been included in this analysis. The same are required to be provided as per approved design and priced separately as embankment construction.</p>			

CHAPTER - 4

SUB-BASES, BASES (NON BITUMINOUS) AND SHOULDERS

CHAPTER - 4
SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Granular Sub-Base with Graded Material (Table:- 400-1)			Cost of materials to be added.
1A	Plant Mix Method Construction of granular sub-base by providing graded material such as natural sand/crushed gravel/crushed stone/combination depending upon the required grading spreading in uniform layers with motor grader on prepared surface, mixing by appropriate mechanical mixture (with controlled addition of water), and compacting with vibratory roller to achieve at least 98% of the maximum dry density for the material determined as per IS:2720 (Part 8), complete as per clause 401			Consumption of materials to be followed as per Ch. A.,Sl.No. 4.1
1A(i)	Rate per cum for grading-I Material	cum	268.60	
1A(ii)	Rate per cum for grading-II Material	cum	268.60	
1A(iii)	Rate per cum for grading-III Material	cum	268.60	
1A(iv)	Rate per cum for grading-IV Material	cum	268.60	
1A(v)	Rate per cum for grading-V Material	cum	268.60	
1A(vi)	Rate per cum for grading-VI Material	cum	268.60	
Note	For two layer GSB grading III and IV shall preferably be used in drainage layer or upper subbase layer. The gradations I, II, V, VI are recommended for filter/ separation layer. For single drainage cum filter layer GSB (when thickness< 200mm) grading V & VI shall be used for drainage-cum-filter layer. (As per CL.7.2.1 of IRC:37-2018)			

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1B	By Mix in Place Method Construction of granular sub-base by providing graded materials such as natural sand/crushed gravel/crushed stone/combination depending upon the required grading , spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator and compacting with vibratory roller to achieve at least 98% of the maximum dry density for the material determined as per IS:2720 (Part 8), complete as per clause 401 desired density, complete as per clause 401			<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 4.1</i>
1B(i)	Rate per cum for grading-I Material	cum	120.00	
1B(ii)	Rate per cum for grading-II Material	cum	120.00	
1B(iii)	Rate per cum for grading-III Material	cum	120.00	
1B(iv)	Rate per cum for grading-IV Material	cum	120.00	
1B(v)	Rate per cum for grading-V Material	cum	120.00	
1B(vi)	Rate per cum for grading-VI Material	cum	120.00	
Note	<i>For two layer GSB grading III and IV shall preferably be used in drainage layer or upper subbase layer. The gradations I, II, V, VI are recommended for filter/ separation layer. For single drainage cum filter layer GSB (when thickness< 200mm) grading V & VI shall be used for drainage-cum-filter layer. (As per CL.7.2.1 of IRC:37-2018)</i>			

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
2	<p>Granular Sub-Base with Graded Material (Table:- 400-1)</p> <p>Construction of granular sub-base by providing graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401 (Reference to MoRT&H's specification 401).</p>			ITEM DELETED
2.(i)	Rate per cum for grading-III Material			
2.(ii)	Rate per cum for grading-IV Material			
Note	<i>Any one of the above grading for material may be adopted as per design. Grading III & IV shall preferably be used in lower sub-base layer.</i>			
3	<p>Lime Stabilisation for Improving Sub-grade</p> <p>Laying and spreading available soil in the sub-grade on a prepared surface, pulverising, mixing the spread soil in place with rotavator for mechanical means with 3 per cent slaked lime having minimum content of 70 per cent of CaO, grading with motor grader and compacting with the road roller at OMC to the desired density to form a layer of improved sub grade (Reference to MoRT&H's specification 402).</p>			<p><i>Cost of materials to be added.</i></p> <p><i>Consumption of materials to be followed as per Ch. A.,Sl.No.4.3</i></p>
3A	By Mechanical Means	cum	122.40	
3B	By Manual Means	cum	135.80	

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4	Lime Treated Soil for Sub- Base Providing, laying and spreading soil on a prepared sub grade, pulverising, mixing the spread soil in place with rotavator with 3 per cent slaked lime with minimum content of 70 per cent of CaO, grading with motor grader and compacting with the road roller at OMC corresponding to IS:2720(Part 8) not more than 2 % above it to achieve at least 98 per cent of the max dry density to form a layer of sub base (Reference to MoRT&H's specification 402).	cum	193.60	<i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.4</i>
5	Cement Treated Soil Sub Base/ Base Providing, laying and spreading soil on a prepared sub grade, pulverising, adding the designed quantity of cement (The quantity of cement shall be more than 2% by weight of cement-soil mix) to the spread soil, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base (Reference to MoRT&H's specification 403). Note: <i>Cost of Cement to be added/ Qty in consumption table</i>	cum	193.60	<i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.5</i>

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	Cement Treated Crushed Rock or combination as per clause 403.2 and table 400-4 in Sub base/ Base Providing, laying and spreading Material on a prepared sub grade, adding the designed quantity of cement (The quantity of cement shall be more than 2% by weight of cement rock mix)to the spread Material, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base (Reference to MoRT&H's specification 403).			<i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.6</i>
6(i)	For Sub-Base course/base course	cum	133.40	
7	Making 50 mm x 50 mm Furrows Making 50 mm x 50 mm furrows, 25mm/ 50mm deep, 450 to the center line of the road and at one metre interval in the existing thin bituminous wearing coarse including sweeping and disposal of excavated material within 1000 metres lead (Reference to MoRT&H's specification 404.3.1, 4th Revision).			ITEM DELETED
7(i)	25mm deep furrow cutting			
7(ii)	50mm deep furrow cutting			
8	Inverted Choke Construction of inverted choke by providing, laying, spreading and compacting screening B type/ coarse sand of specified grade in uniform layer on a prepared surface with motor grader and compacting with power roller etc (Reference to MoRT&H's specification 404.3.2).	cum	72.90	<i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.8</i>

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9	Water Bound Macadam Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with 3 wheeled steel/ vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/ binding Materials to fill up the interstices of coarse aggregate, watering and compacting to the required density (Reference to MoRT&H's specification 404).			<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 4.9</i>
9A	By Manual Means			
9A(i)	Grading-1(Table 400-9)			
9A (i)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	314.20	
9A (i)(b)	Using Screening (Table 400-10) Type-A (13.2 mm aggregate)	cum	314.20	
9A (i)(c)	Using Screening (Table 400-10) Type-B (11.2 mm aggregate)	cum	314.20	
9A(ii)	Grading-2 (Table 400-9)			
9A(ii) (a)	Using Screening Crushable type such as Moorum or Gravel	cum	314.20	

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9A (ii)(b)	Using Screening (Table 400-10) Type-B (11.2 mm aggregate)	cum	314.20	<p><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 4.9</i></p>
9B	By Mechanical Means:			
9B(i)	Grading-1 (Table 400-9)			
9B (i)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	133.70	
9B (i)(b)	Using Screening (Table 400-10) Type-A (13.2 mm aggregate)	cum	133.70	
9B (i)(b)	Using Screening (Table 400-10) Type-B (11.2 mm aggregate)	cum	133.70	
9B(ii)	Grading-2(Table 400-9)			
9B (ii)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	133.70	
9B (ii)(b)	Using Screening(Table 400-10) Type-B (11.2 mm aggregate)	cum	133.70	
Note	<p><i>As three wheeled smooth rollers are also very commonly used, the same may be provided as an alternative of vibratory roller.</i></p>			

CHAPTER - 4
SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	<p>Crushed Cement Concrete Sub-base / Base</p> <p>Breaking and crushing of material obtained by breaking damaged cement concrete slabs to size range not exceeding 75 mm as specified in table 400-9 transporting the aggregates obtained from breaking of cement concrete slabs at a lead of L km., laying and compacting the same as sub base/ base course, constructed as WBM to clause 404 except the use of screening or binding Material (Reference to MoRT&H's specification 405).</p> <p>Note 1. It is assumed that dismantling of concrete slab/pavement has been considered separately. Hence same is not added in this analysis. Only labour for crushing the dismantled slab into aggregate has been added. Carriage from stock pile to work site has been provided.</p> <p>2. In case of breaking of slabs is done locally without involvement of transportation, the provision of tipper, front end loader and loading/unloading charges (i.e. ₹ 50.80) may be deducted.</p>	cum	242.60	<i>Refer note in column 2.</i>
11	<p>Penetration Coat Over Top Layer of Crushed Cement Concrete Base</p> <p>Spraying of bitumen over cleaned dry surface of crushed cement concrete base at the rate of 25 kg per 10 sqm by a bitumen pressure distributor, spreading of key aggregates at the rate of 0.13 cum per 10 sqm by a mechanical gritter and rolling the surface as per clause 506.3.8 (Reference to MoRT&H's specification 405.2, 4th Revision).</p>			ITEM DELETED

CHAPTER - 4
SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate conforming to the grading of table 400 13 revised vide table 2 of IRC : 109 (2015) to wet mix macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density .The thickness of a single compacted layer shall not be less than 75 mm.(Reference to MoRT&H's specification 406.	cum	236.70	<p style="text-align: center;"><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 4.12</i></p>
Note	1. As three wheeled smooth steel rollers are commonly in use, the same has been provided as an alternative which can be used if the thickness of individual layer does not exceed 100 mm .			
13	Construction of Median and Island with Soil Taken from Roadway Cutting/ excavation nearby Construction of Median and Island above road level with approved material deposited at site from roadway cutting and excavation for drain and foundation of other structures, spread, graded and compacted as per clause 408 (Reference to MoRT&H's specification 408).	cum	166.10	<p style="text-align: center;"><i>Complete Rate</i></p>

CHAPTER - 4
SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>This analysis provides for median and island with earthen top. In case the surface is required to be turfed or planted with shrubs, the same is required to be provided separately as per analysis given in the chapter on horticulture. In case granular fill is required to be paved, quantities of paving are required to be calculated as per approved design and provided separately.</i>			
14	Construction of Median and Island with Soil Taken from Borrow Areas Construction of median and Island above road level with approved material brought from borrow pits, spread, sloped and compacted as per clause 408 (Reference to MoRT&H's specification 408). Note <i>This analysis provides for median and island with earthen top. In case the surface is required to be turfed or planted with shrubs, the same is required to be provided separately as per analysis given in the chapter on horticulture. In case surface finish is of hard type, the same may be provided separately as per approved design.</i>	cum	206.30	Complete Rate
15	Construction of Shoulders A. Earthen Shoulders The rate as applicable for Sub-grade construction may be adopted. B. Hard Shoulders Rate as applicable for sub-base and or base may be adopted as per approved design.			Refer Note in coloumn-2

CHAPTER - 4
SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	C. Paved shoulders The rate may be adopted as applicable for different layers of pavement depending upon approved design of paved shoulders.			
16	Footpaths and Separators Construction of footpath/separator by providing a 150 mm compacted granular sub base as per clause 401 and 25 mm thick cement concrete grade M15, over laid with pre-cast concrete tiles of grade not less than M-30 in cement mortar 1:3 including provision of all drainage arrangements but excluding kerb channel (Reference to MoRT&H's specification 410).	sqm	465.10	<i>Cost of precast cement concrete tiles & RCC pipes are included in this rate. Cost of other Materials to be added as per Sl. No. 4.16 of Chapter - A.</i>
17	Crusher Run Macadam Base Providing crushed stone aggregate conforming to table 400-14, depositing on a prepared surface by hauling vehicles, spreading and mixing with a motor grader, watering and compacting with a vibratory roller to clause 407 to form a layer of sub-base/Base (Reference to MoRT&H's specification 407).			<i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.17</i>
Note	Any one of the aggregate grading may be adopted			
17A	By Mix in Place Method			
17A(i)	For 53 mm maximum size	cum	104.80	
17A(ii)	For 37.5 mm maximum size	cum	104.80	
17B	By Mixing Plant :			
17B(i)	For 53 mm maximum size	cum	259.70	
17B(ii)	For 37.5 mm maximum size	cum	259.70	

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SUB-BASES, BASES(NON-BITUMINOUS) AND SHOULDERS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18	<p>Lime, Flyash Stabilised Soil Sub-Base</p> <p>Construction of Sub-base using lime - Flyash admixture with granular soil, free from organic matter/ deleterious material or clayey silts and low plasticity clays having PI between 5 and 20 and liquid limit less than 25 and commercial dry lime, slaked at site or pre-slaked with CaO content not less than 50 per cent, Flyash to conform to gradation as per clause 4.3 of IRC: 88-1984, lime + Flyash content ranging between 10 to 30 per cent, the minimum un-confined compressive strength and CBR value after 28 days curing and 4 days soaking to be 7.5kg/sq, cm and 25 per cent respectively, all as specified in IRC: 88-1984.</p>	cum	173.90	<p><i>Cost of materials to be added.</i></p> <p><i>Consumption of materials to be followed as per Ch. A.,Sl.No. 4.18 .Only compensation for earth included</i></p>
Note	<p>1. Compensation for earth will vary from place to place and will have to be assessed realistically as per particular ground situation. In case earth is available from Govt. land, compensation for earth i.e. ₹ 43.00 per cum. will be deducted from complete rate.The position is required to be clearly stated in the cost estimate.</p> <p>2. Cost of Flyash has not been considered as same will be available free of cost. Only carriage of Flyash has been provided. However, if the same not available freely, then the cost of Flyash is to be added.</p> <p>3. Lime + Flyash has been taken as 20 per cent of total mass and ratio of lime and Flyash as 1:4 for estimating purposes. Total quantities will be as per approved design.</p>			

CHAPTER - 5

BASES AND SURFACE COURSES (BITUMINOUS)

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Prime Coat			
(A)	Providing and applying primer coat with cationic bitumen emulsion SS1 grade conforming to IS:8887 on prepared porous granular surface including clearing of road surface and spraying primer using mechanical means (Reference to MORT&H's specification clause 502).			
i)	On WMM/WBM surface @ 0.70-1.0kg /sqm.	sqm	1.60	<p><i>Cost of materials to be added.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 5.1.</i></p> <p><i>The approved rate of cut back bitumen is to be added.</i></p>
ii)	On stabilized soil bases / Crusher Run Macadam surface @ 0.90-1.2kg /sqm.	sqm.	1.60	
(B)	Providing and applying primer coat with medium curing cutback bitumen conforming to IS:217 on prepared porous granular surface including clearing of road surface and spraying primer using mechanical means (Reference to MORT&H's specification clause 502).			
i)	On WMM/WBM surface-MC30 @ 0.60-0.9kg /sqm.	sqm	1.60	
ii)	On stabilized soil bases / Crusher Run Macadam surface-MC70 @ 0.90-1.2kg /sqm.	sqm.	1.60	

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
2	Tack Coat	sqm		
(A)	Providing and applying tack coat with Cationic bitumen emulsion (RS1) complying with IS:8887 using emulsion pressure distributor on the prepared bituminous/granular /cement concrete pavement surface cleaned with mechanical broom and high pressure air jet (Reference to MORT&H's specification clause 503).			<p><i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A., Sl.No. 5.2.</i></p>
i)	i)On bituminous surface @ 0.20kg-0.3kg /sqm.	sqm.	1.40	
ii)	ii)On Granular surface treated with primer @ 0.25kg-0.30 /sqm.	sqm.	1.40	
iii)	iii)On Cement Concrete Pavement surface @ 0.30kg-0.35 /sqm.	sqm.	1.40	
(B)	Providing and applying tack coat with paving bitumen of VG-10 grade conforming to IS:73 using emulsion pressure distributor on the prepared bituminous/granular /cement concrete pavement surface cleaned with mechanical broom and high pressure air jet (Reference to MORT&H's specification clause 503).			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
i)	i)On bituminous surface @ 0.20kg-0.3kg /sqm.	sqm.	1.40	
ii)	ii)On Granular surface treated with primer @ 0.25kg-0.30 /sqm.	sqm.	1.40	
iii)	iii)On Cement Concrete Pavement surface @ 0.30kg-0.35 /sqm.	sqm.	1.40	
3	Bituminous Macadam Providing and laying bituminous macadam with 100-120 TPH hot mix plant using crushed aggregates of specified grading premixed with approved bituminous binder @ 3.3% (min) for Grading -1 and 3.4% (min) for Grading -2 by weight of total mix , transported to site, laid over a previously prepared base with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction (Reference to MORT&H's specification clause 504).			<i>Cost of materials to be added . Consumption of materials [for the items for Sl. No.3(i) & 3(ii)] to be followed as per Ch. A., Sl.No. 5.3</i>
3(i)	for Grading I (40 mm nominal maximum aggregate size) Layer Thickness 80-100mm	cum	1049.70	
3(ii)	for Grading II (19 mm nominal maximum aggregate size) Layer Thickness 50-75mm	cum	1049.70	
Note	1. Labour and other arrangements for traffic control, during construction as per IRC:SP:55.watch and ward and other miscellaneous duties at site including sundries have been included in administrative overheads of the contractor.			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	2. In case BM is laid over freshly laid tack coat, provision of Mechanical broom and 2 mazdoors for the same (i.e. ₹6.89per cum) shall be deleted as the same has been included in the cost of tack coat.			
4	Bituminous Penetration Macadam Construction of penetration macadam over prepared Base by providing a layer of compacted crushed coarse aggregate using chips spreader with alternate applications of bituminous binder and key aggregates and rolling with a smooth wheeled steel roller 8-10 tonne capacity to achieve the desired degree of compaction (Reference to MORT&H's specification clause 505).			ITEM DELETED
4A	50 mm thick			
4B	75 mm thick			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	Built-up-Spray Grout Providing, laying and rolling of built-up-spray grout layer over prepared base consisting of a two layer composite construction of compacted crushed coarse aggregates using motor grader for aggregates. key stone chips spreader may be used with application of bituminous binder after each layer, and with key aggregates placed on top of the second layer to serve as a Base conforming to the line, grades and cross-section specified, the compacted layer thickness being 75 mm (Reference to MORT&H's specification clause 506).			ITEM DELETED
6	Dense Graded Bituminous Macadam Providing and laying dense graded bituminous macadam with 100-120 TPH batch type HMP using crushed aggregates of specified grading, premixed with bituminous binder of approved grade @ 4.0% (min) for Grading -1 and 4.5% (min) for Grading -2 by weight of total mix and filler(Cement /hydrated lime / Rock dust) as per table 500-10 and mix design done as per table 500-11and job mix formula as per clause 505.3.3 transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required (Contd..)			Cost of materials to be added . Consumption of materials [for the items from Sl. No.5.6(i)& 5.6(ii)] to be followed as per Ch. A., 5.6(i)& 5.6(ii)

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	grade, level and alignment, rolling with smooth wheeled, vibratory tandem roller and with pneumatic tyre roller of 12 to 15 tonne weight with a pressure at least 0.56 MPa as directed by E-I-C, and to achieve the desired compaction as per MORT&H specification clause No. 505.3.5 complete in all respects (Reference to MORT&H's specification clause 505).			
6(i)	For Grading 1 (37.5 mm nominal maximum aggregate size) Layer Thickness 75-100mm	cum	896.00	<i>Cost of materials to be added . Consumption of materials [for the items from Sl. No.5.6(i)& 5.6(ii)] to be followed as per Ch. A., 5.6(i)& 5.6(ii)</i>
6(ii)	For Grading 2 (26.5 mm nominal maximum aggregate size) Layer Thickness 50-75mm	cum	896.00	
Note	The minimum bitumen content has been specified according to which estimate should be done. Actual bitumen content as per approved mix design, if more than the minimum,extra bitumen is not payable. While quoting rate the contractor is supposed to take this, into account.			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7	Semi - Dense Bituminous Concrete Providing and laying semi dense bituminous concrete with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5 per cent of mix and filler(Cement /lime / Rock dust), transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRTH specification clause No. 508 complete in all respects (Reference to MORT&H's specification clause 508).			ITEM DELETED
7(i)	for Grading I (13 mm nominal			
7(ii)	for Grading II (10 mm nominal size)			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Bituminous Concrete Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder of approved grade@ 5.2% (min) for Gr.-1 & @ 5.4% (min) for Gr.-2 , as per table 500-17, and mix design done as per table 500-10 and job mix formula as per cl. 505.3.3 and filler(Cement /hydrated lime / Rock dust), transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory tandem roller and with pneumatic tyre roller of 12 to 15 tonne weight with a pressure at least 0.56 MPa as directed by E-I-C to achieve the desired compaction as per clause no 507.3.5 complete in all respects ref. to MORTH specification clause No.507.			
8(i)	for Grading-1 (19 mm nominal maximum aggregate size), Layer thickness: 50mm	cum	914.80	Material cost to be added. Consumption of materials <i>[for the items from Sl. No.5.8(i)& 5.8(ii)] to be followed as per Ch. A., 5.8(i)& 5.8(ii)</i>
8(ii)	for Grading-2 (13.2 mm nominal maximum aggregate size), Layer thickness:30-40mm	cum	914.80	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>The minimum bitumen content has been specified according to which estimate should be done. Actual bitumen content as per approved mix design, if more than the minimum, extra bitumen is not payable. While quoting rate the contractor is supposed to take this, into account.</i>			
9	Surface Dressing Providing and laying surface dressing as wearing course in single coat using approved crushed stone aggregates of specified size on a layer of bituminous binder of approved grade laid on prepared surface and rolling in accordance with clause 501.6 and 501.7 of MORT&H's specification (Reference to MORT&H's specification clause 509).			Material cost to be added. Consumption of materials to be followed as per chapter - A , Sl. No.5.9
Case -I	19 mm nominal chipping size	sqm	5.40	
Case - II	13 mm nominal size chipping	sqm	6.00	

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>1. Where the proposed aggregate fails to pass the stripping test, an approved adhesion agent may be added to the binder as per clause 509.2.4. Alternatively, chips may be pre-coated as per clause 509.2.2</p> <p>2. Input for the second coat, where required, will be the same as per the 1st coat mentioned above.</p>			
10	<p>Open - Graded Premix Surfacing Providing, laying and rolling of open - graded premix surfacing of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using viscosity grade bitumen of approved grade to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled tandem or other approved type roller 8-10 tonne capacity, finished to required level and grades (Reference to MORT&H's specification clause 510).</p>			
10(i)	<p>Case - I: Mechanical method using approved grade Bitumen and HMP of appropriate capacity not less than 75 tonnes/hour .</p>	sqm	20.30	
Note	<p>If a premix sand seal coat of 'B' type is proposed, the same is required to be provided over the open graded premix carpet immediately on the same day. As the same HMP and other</p> <p style="text-align: right;">(Contd..)</p>			<p><i>Material cost to be added. Consumption of materials to be followed as per chapter - A , Sl. No.5.10 (i)</i></p>

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10(ii)	<p>machines will be used for laying of premix sand seal coat, out of 6 effective working hours, 4.00 hours may be utilised for laying of premix carpet and balance 2.00 hours for the seal coat. The rate for the premix sand seal coat under clause 511 (case II) has been worked out accordingly by utilising the HMP for 2.00 hours for the purpose of seal coat. In case type 'A' seal coat is proposed, HMP can be worked for six hours for the premix carpet as type 'A' seal coat does not require the use of HMP.</p> <p>Case - II: Open-Graded Premix Surfacing using cationic Bitumen Emulsion</p>	sqm	14.20	Material cost to be added. Consumption of materials to be followed as per chapter - A , Sl. No.5.10 (ii)
11	<p>Close Graded Premix Surfacing/Mixed Seal Surfacing (Reference to MORT&H's specification clause 508).</p> <p>Case I Mechanical means using HMP of appropriate capacity not less than 75 tonnes/hour.</p> <p>Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.09 mm (Type-A) or 13.2 mm to 0.09 mm (Type-B) aggregates using viscosity grade bitumen of suitable approved grade to the required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a Smooth wheeled roller 8-10 tonne capacity, and finishing to required level and grade.</p>			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
i)	Type - A. (rainfall more than 150cm/year)	sqm	20.00	Material cost to be added. Consumption of materials to be followed as per chapter - A , Sl. No.5.11 (i) & 5.11 (ii)
ii)	Type - B (rainfall less than 150cm/year)	sqm	20.00	
12	Seal Coat			
	Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using. Type A and B seal coats (Reference to MORT&H's specification clause 511)			
12(i)	Case - I : Type A (Stone chips 6.7mm size) Providing and laying of liquid seal coat with HMP using approved crushed stone chipping and viscosity grade paving bitumen of suitable approved grade.	sqm	4.10	Material cost to be added. Consumption of materials to be followed as per chapter - A , Sl. No.5.12
12(ii)	Case - II : Type B Providing and laying of premix sand seal coat with HMP using approved crushed stone chipping and viscosity grade paving bitumen of suitable approved grade.	sqm	6.7	
12(iii)	Case - III : Type A (Stone chips 6.7mm size) Providing and laying of liquid seal coat bitumen emulsion of suitable approved grade.	sqm	4.10	Material cost to be added. Consumption of materials as per chapter - A , Sl. No.5.12
12(iv)	Case - IV : Type B Providing and laying of premix sand seal coat with bitumen emulsion of suitable approved grade.	sqm	6.70	

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13	Supply of Stone Aggregates for Pavement Courses Supply of stone aggregates from approved sources conforming to the physical requirement, specified in the respective specified clauses, including royalties, fees rents, collection, transportation, stacking and testing and measured in cum as per clause 520.5 (Reference to MORT&H's specification clause 520).			<i>The cost of stone aggregates to be used for different items are incorporated in the Tables attached to this Schedule of rates from different sources.</i>
14	Mastic Asphalt Providing and laying 25 mm thick mastic asphalt wearing course with approved grade bitumen meeting the requirements given in table 500 39, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine-grained hard stone chipping of 13.2 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 100°C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 516 (Reference to MORT&H's specification clause 516 along with IRC:107).	sqm	174.00	<i>Material cost to be added. Consumption of materials to be followed as per chapter - A Sl. No.5.14</i>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>1. The rates for 50 mm & 40 mm thick layers may be worked out on pro-rata basis.</p> <p>2. Where tack coat is required to be provided before laying mastic asphalt, the same is required to be measured and paid separately.</p>			
15	<p>Slurry Seal</p> <p>Providing and laying slurry seal consisting of a mixture of fine aggregates, Ordinary Portland cement filler, Slow setting (SS2) cationic bituminous emulsion and water on a road surface including cleaning of surface, mixing of slurry seal in a suitable mobile plant, laying and compacting to provide even riding surface (Reference to MORT&H's specification clause 512 along with IRC:SP:81 and IRC:SP:100).</p>			<p>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.15</p>
15(i)	Type - I : 2-3 mm thickness	sqm	1.40	
15(ii)	Type -II : 4-6 mm thickness	sqm	2.00	
15(iii)	Type -III : 6-8 mm thickness	sqm	2.30	
Note	<p>1. Tack coat, if required to be provided, before laying slurry seal may be measured and paid separately</p>			
16	<p>Recycling of Bituminous Pavement with Central Recycling Plant</p> <p>Recycling of existing bituminous pavement by cold milling upto the specified depth and upgrading the pavement by hot in plant recycling using fresh aggregates and binder of approved grade along with Reclaimed Asphalt Pavement (RAP) (Contd..)</p>	cum	985.10	<p>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.16</p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	** material upto the extent of 30% as per approved designed mix, laid by sensor paver and compacted by suitable roller to desired compaction level as per clause 519 and IRC: 120 (2015).			
17	Fog Spray Providing and applying low viscosity bitumen emulsion (SS1) for sealing cracks less than 3 mm wide or incipient fretting or disintegration in an existing bituminous surfacing (Reference to MORT&H's specification clause 513).			Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.17
i)	Without aggregate	sqm	1.20	
ii)	With Precoated aggregate	sqm	1.30	
18	Bituminous Cold Mix Providing, laying and rolling of bituminous cold mix on prepared base consisting of a mixture of unheated mineral aggregate and emulsified or cutback bitumen, including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finishing to specified grades and levels (Reference to MORT&H's specification clause 518).			Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.18
18(i)	Using bitumen emulsion and 9.5 mm or 13.2 mm nominal maximum size aggregate	cum	324.10	

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	1.Density of aggregates has been assumed 1.5 gms/cc			
18(ii)	Using bitumen emulsion and 19 mm nominal maximum size aggregate Note 1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.	cum	324.10	Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.18
18(iii)	Using cutback bitumen and 9.5 mm or 13.2 mm nominal maximum size aggregate Note 1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.	cum	324.10	
18(iv)	Using cutback bitumen and 19 mm nominal maximum size aggregate Note 1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.	cum	324.10	
19	Sand Asphalt Base Course Providing, laying and rolling sand-asphalt base course composed of sand, mineral filler and bituminous binder of approved grade on a prepared sub-grade or sub-base to the lines, levels, grades and cross sections as per the drawings including mixing in a plant of suitable type and capacity, transporting, laying,	cum	744.10	Material cost to be added . Consumption of materials is to be followed as per chapter - A Sl. No.5.19

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	compacting and finishing (Reference to MORT&H's specification clause 506). <i>Tack coat will be measured and paid separately</i>			
20	<p>Modified Binder</p> <p>Supply of modified binder produced by mixing bitumen with modifier such as natural rubber or crumb rubber or any other polymer found compatible with bitumen and which allows properties given in IRC:SP: 53 blending of modifier with bitumen to be done either at the refinery or at central unit with all facilities by proper industrial process, is essential.</p> <p>The use of modified binder is expected to result in an extended service life of bituminous pavements subject to heavy traffic loads in extreme climatic conditions, thus justifying the entire cost of adding modifiers/fibres. Other advantages include lower temperature susceptibility, higher resistance to aging, higher fatigue life, higher resistance to cracking and</p>	tonne		<p><i>The cost of different types of modified Bitumen to be used for different items may be applied either from i) the Annexure attached to this Schedule of rates from different sources or market rate , if available from IOCL</i></p>

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p>better adhesion between aggregates and binder. Detailed information and inductive dose level on the use of polymer modified binder is available in IRC : SP-53 / 2002. A number of proprietary products are now available in the market. For such proprietary products, test reports and cost effectiveness should be the basis for their selection in road works.</p> <p>**The modifier, in the required quantity shall be blended at ** the refinery or at central unit with all facilities by proper industrial process, is essential. If supplied in drums it shall be agitated in melted condition with suitable device for achieving homogeneity .Proposals to use glass fibre, polypropylene fibres or any other similar material in a bituminous mixture should be substantiated, complete with all details including test results, manufacturer's recommendations for addition or means of incorporating the fibres, homogeneously, without segregation, into the mixture.</p> <p>Before agreeing to the use of a fibre, it should have been proved to be satisfactory in use under circumstances, similar to the work, elsewhere or it would have undergone appropriate performance trials. Documented evidence of use and trials of the fibre, in any country having</p>			

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>conditions similar to Indian will be acceptable.where information on use of trials is inadequate or lacking, trials may be required to be under taken before agreeing to the use of the fiber.</p> <p>1. The modified binder is usually manufactured by specialised firms as a proprietary product. The rate for this product is required to be ascertained from the market.</p> <p>2.The specifications for various item of road works using polymer/rubber modified bitumens are same as those for penetration grade bitumen except those for any special conditions which the manufacturer may indicate.</p> <p>3.The other controls during mixing, laying shall be same as specified in IRC - 14, 29, 94 and 95 for open graded premix carpet, bituminous concrete, DBM and SDBC respectively</p> <p>4.The temperature of mixing and rolling will be slightly higher than conventional bituminous mixes as indicated in Table 8 of IRC: SP: 53 - 2002</p>			
21	Crack Prevention Courses (Reference to MORT&H's specification clause 517).			
21(i)	<p>Stress absorbing membrane (SAM) crack width less than 6 mm</p> <p>Providing and laying of a stress absorbing membrane over a cracked road surface with crack width below 6 mm after cleaning with a mechanical broom, using modified binder complying with</p>	sqm	3.20	<p><i>Material cost to be added. Consumption of materials is to be followed as per chapter - A</i></p> <p><i>Sl. No.5.21 except the cost of Geotextile</i></p>

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
21(ii)	<p>IS:15462 & IRC: SP 53, sprayed at the rate of 9 kg per 10 sqm and spreading 5.6 mm crushed stone aggregates @ 0.11 cum per 10 sqm with hydraulic chip spreader, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 517.</p> <p>Stress absorbing membrane (SAM) with crack width 6 mm to 9 mm</p> <p>Providing and laying of a stress absorbing membrane over a cracked road surface, with crack width 6 to 9 mm after cleaning with a mechanical broom, using modified binder sprayed at the rate of 11 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 517.</p>	sqm	3.20	
21(iii)	<p>Stress absorbing membrane (SAM) crack width above 9 mm and cracked area above 50 per cent</p> <p>Providing and laying a single coat of a stress absorbing membrane over a cracked road surface, with crack width above 9 mm and cracked area above 50 per cent after cleaning with a mechanical broom, using modified binder sprayed at the rate of 15 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 517.</p>	sqm	3.30	<p>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.5.21 except the cost of Geotextile</p>

CHAPTER - 5

BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>In case 2nd coat is also required to be provided, material provided for the 2nd coat shall be as per table 500-47.</i>			
21(iv)	Case - IV : Bitumen impregnated geotextile Providing and laying a non-woven heat set geotextile layer after cleaning the road surface, geotextile conforming to requirements of clause 708.2.1, laid over a tack coat with 1.00 kg per sqm of paving grade bitumen VG-10 and constructed to the requirement of clause 708.3.4	sqm	78.20	
22	Recipe Cold Mix Providing and laying of premix of crushed stone aggregates and slow/medium setting bitumen emulsion conforming to IS:8887 which is laid immediately after mixing and while the emulsion is still substantially in an unbroken state, mixed in a batch type cold mixing plant, laid over prepared surface, by paver finisher, rolled with a pneumatic tyred roller initially and finished with a smooth steel wheel roller, all as per clause 518.3 (Reference to MORT&H's specification clause 518.3).			<i>Material cost to be added</i> <i>Consumption of materials is to be followed as per chapter - A , Sl. No.5.22</i>
22(i)	75 mm thickness	cum	315.50	
22(ii)	40 mm thickness	cum	315.50	
22(iii)	25 mm thickness	cum	315.50	

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p><i>(Case i to iii)</i></p> <p><i>1. These mixes are considered suitable for minor repair work and temporary road surface improvement.</i></p> <p><i>2. In case concrete mixtures are required to be used for mixing, a number of these will be needed to match the capacity of road rollers.</i></p> <p><i>3. Tack coat, where provided, will be measured and paid separately.</i></p>			

CHAPTER - 6

CEMENT CONCRETE PAVEMENT

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Dry Lean Cement Concrete Sub- base Construction of <i>zero slump</i> dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate as per approved design mixed, aggregate cement ratio not to exceed 14:1 where OPC is used and 12:1 where PSC or PPC is used, aggregate gradation after blending to be as per table 600-1, cement content as per clause 601.2.2, cementitious material content not to be less than 140 kg/cum with use of mineral admixture if used to be as per clause. 3.4 of IRC:SP:49 (2014) optimum moisture content to be determined during trial length construction, concrete strength not to be less than 7 Mpa at 7 days as per Cl.4.1 of IRC:SP:49(2014), mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roller, finishing and curing (Reference to MORT&H's specification 601 along with IRC:SP:49).	cum	202.00	Material cost to be added. Consumption of materials is to be followed as per chapter - A, Sl. No.6.1
Note	1) PPC or PSC may be used as per clause 601.2.2 MORT&H's specification. 2) The quantities for cement, coarse aggregate and fine aggregate are for estimating only. The exact quantities will be as per mixed design. The extra quantities of any material, if more than quantities considered in estimate are not payable. While quoting the rate, the contractor is supposed to take this into account.			

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
2	<p>Cement Concrete Pavement</p> <p>Construction of un-reinforced, dowel jointed, plain cement concrete pavement of specified grade with characteristic flexural strength of concrete not less than 4.5 MPa over a prepared sub base <i>as per clause 602 of MORT&H's specification 2013 and cement content as per clause 602.3.2 , coarse and fine aggregate conforming to IS 383, using fine and coarse aggregates of approved variety combined gradation as per Table 600-3 of MORTH specification 2013,</i> maximum size of coarse aggregate not exceeding 31.5 mm, mixed in a batch mix plant with weigh batching facility as per approved mix design done as per IRC:44, transported to site, laid with a slip form paver <i>with electronic sensor</i> , spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant as per IRC:57, debonding strip, dowel bar, tie bar, admixtures as approved, tinning, texturing, curing, finishing to lines and grades as per drawing (Reference to MORT&H's specification 602 along with IRC 15).</p>	cum	1084.70	<p><i>Material cost to be added for Stone aggregate, Sand, Cement and steel for dowel bar and tie bar only. Consumption of materials is to be followed as per chapter - A Sl. No.6.2</i></p>
Note	<p>1 . PPC or PSC may be used as per clause 602.2.2 MORT&H's specification</p> <p>2. The quantities for cement, coarse aggregate and fine aggregates are for estimating only .The exact quantities will be as per mix design. The extra quantities of any material, if more than quantities considered in estimate are not payable. While quoting the rate, the contractor is supposed to take this into account.</p>			

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3	Rolled Cement Concrete Base Construction of rolled cement concrete base course with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm with minimum, aggregate cement ratio 15:1 and minimum cement content of 200 kg/cum, aggregate gradation to be as per table 600-4 after blending, mixing in batching plant at optimum moisture content, transporting to site, laying with a paver with electronic sensor, compacting with 8-10 tonnes smooth wheeled vibratory roller to achieve, the designed flexural strength, finishing and curing (Reference to MORT&H's specification 603).			ITEM DELETED
4	Transition Section between Rigid and Flexible Pavement Due to change in the properties of materials and type of construction, a gradual changeover from rigid pavement to flexible pavement as per IRC: 15 is desirable to avoid any damage at the butting joint. After provision of an expansion joint in the cement concrete slab, the thickness of slab should be tapered to 10 cm over a length of 3 m towards the flexible pavement. The deficiency of thickness caused due to tapering of the slab should be made up by the asphaltic layers (Reference to MORT&H's specification 602.9.8 & 602.9.9). The quantities of items should be worked out based on the approved design and drawings and priced as per rates given under respective clauses for cement concrete and asphaltic work.			Rate to be analysed as per drawing & Technical specification.

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	<p>Construction of Base/Sub-Base of Pavement with Lean Concrete - Flyash.</p> <p>Construction of Base/sub-base using cement, sand, fly ash and coarse aggregates proportioned as per table 4 of IRC: 74/1979 and with water content ratio, slump and compressive strength as defined in the said table, mix prepared in a batching and mixing plant and compacted with a vibratory roller 8-10 tonnes capacity within the time limit laid down vide clause 7.6.3 of IRC: 74-1979, construction joints properly formed at the end of day's work, cured for 14 days, all as specified in IRC: 74-1979 and as per approved plans.</p>	cum	202.00	<p><i>Material cost to be added. Consumption of materials is to be followed as per chapter - A</i></p> <p><i>Sl. No.6.5 except the cost of Flyash (carriage cost of Flyash to be included.</i></p>
Note	<p>1. Depending upon approved designs, crushed stone aggregates of nominal size 20mm can also be used as per gradation given in table 2 of IRC: 74-1979.</p> <p>2. The ratio of specific gravities of fly ash and sand has been assumed to be 0.827.</p> <p>3. The quantities of materials given in the analyses are for estimating purposes. Actual quantities shall be as per job mix formula.</p> <p>4. Construction procedure as laid down in clause, of IRC: 74-1979 shall be followed.</p>			

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	Cement - Flyash Concrete Pavement. Construction un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, replacing cement by fly ash to the extent of 15 per cent and sand by 10 per cent, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing.	cum	1084.70	<i>Material cost to be added for Stone aggregate, Sand, Cement and steel only.</i> <i>Consumption of materials is to be followed as per chapter - A</i> <i>Sl. No.6.6</i>
Note: IRC: 68-1976 may be referred for guidelines on the design of cement-fly ash concrete for rigid pavement construction.				

CHAPTER - 7

GEOSYNTHETICS AND REINFORCED EARTH

CHAPTER - 7
GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Sub-Surface Drain with Geotextiles Construction of sub surface drain 200 mm dia using geotextiles treated with carbon black with physical properties as given in clause 702.2 formed in to a stable network and a planar geocomposite structure, joints wrapped with geotextile to prevent ingress of soil, all as per clause 702.3.1 and approved drawings including excavation and backfilling (Reference to MORT&H's specification 702).	RM	766.10	Complete Rate
2	Narrow Filter Sub-Surface Drain Construction of a narrow filter sub-surface drain consisting of porous or perforated pipe laid in narrow trench surrounded by a geotextile filter fabric, with a minimum of 450 mm overlap of fabric and installed as per clause 704.3.1 and 309.3.5 including excavation and backfilling (Reference to MORT&H's specification 704.2.1).	RM	600.90	Complete Rate
3	Laying Paving Fabric Beneath a Pavement Overlay Providing and laying paving fabric with physical requirements as per table 700-16 over a tack coat of paving grade Bitumen of VG-10, laid at the rate of 1 kg per sqm over thoroughly cleaned and repaired surface to provide a water resistant membrane and crack retarding (Contd...)	Sqm	98.70	<i>Consumption of materials to be followed as per Ch. A., Sl.No. 7.3.</i> <i>The cost of all materials have been included excluding bitumen.</i>

CHAPTER - 7
GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	layer. Paving fabric to be free of wrinkling and folding and to be laid before cooling of tack coat, brooming and rolling of surface with pneumatic roller to maximise paving fabric contact with pavement surface (Reference to MORT&H's specification 708).			
4	Laying Boulder Apron in Crates of Synthetic Geogrids			<i>DELETED</i>
5	<p>Reinforced Earth Structures (Reference to MORT&H's specification 3100).</p> <p>Reinforced earth Structures have four main components as under:</p> <p>a) Excavation for foundation, foundation concrete and cement concrete grooved seating in the foundation for facing elements (facia material).</p> <p>b) Facia material and its placement.</p> <p>c) Assembling, joining with facing elements and laying of the reinforcing elements.</p> <p>d) Earth fill with granular material which is to be retained by the wall.</p> <p>Each component is analysed separately as under: <i>considering Average height of wall = 8 m.</i></p> <p>5(i) Assembling, joining and laying of reinforcing elements (Reference to MORT&H's specification 3103).</p> <p>5(i)A With reinforcing element of steel / Aluminium strips / polymeric strips.</p>			
Type 1	1. Galvanised carbon steel strips	RM	7.50	<i>Cost of material to be added for all Type of materials.</i>
Type 2	2. Copper Strips	RM	7.50	
Type 3	3. Aluminium Strips	RM	7.50	
Type 4	4. Stainless steel strips	RM	7.50	
Type 5	5. Glass reinforced polymer / fibre reinforced polymer / polymeric strips	RM	7.50	

CHAPTER - 7
GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5(i)B	With reinforcing elements of synthetic geogrids	Sqm	2609.20	<p style="text-align: center;">Complete Rate</p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 7.5(ii). The cost of all materials have been included excluding the cost of sand, cement and stone materials & reinforcement.</i></p>
5(ii)	Facing elements of RCC (Reference to MORT&H's specification 3105).	Sqm	169.40	
Note	<p>1. The specification and construction details to be adopted shall be as per section 3100 of MoRTH Specification.</p> <p>2. Drainage arrangement shall be made as per approved design and drawings.</p> <p>3. The quantity of filler media shall be calculated as per approved design and specifications and shall be priced separately. The rate for same to be adopted from chapter 15.</p> <p>4. Excavation for foundation including foundation concrete and groove in the foundation for seating of bottom most fascia panel and capping beam to be calculated as per design and priced separately. The rates for excavation and foundation concrete shall be taken from the chapter 12 & 13 in bridge section.</p> <p>5. The earth fill to be retained is not included in this analysis. The same is to be worked out and provided separately complete as per clause 305.</p> <p>6. For compaction of Earthwork, attention is invited to clause 3106.5 of MoRTH Specification.</p> <p>7. Length of reinforcing strips will vary with the height of wall and will be as per approved design and drawings.</p>			

CHAPTER - 7
GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p>8. The type of reinforcing elements to be adopted shall be as per approved design and specifications.</p> <p>9. The market rate for supply of reinforcing elements and their accessories are to be ascertained from reputed firms in the field of earth reinforcement.</p> <p>10. The earth fill material shall be clean, free draining, granular with high friction and low cohesion, non-corrosive, coarse grained with not 10 per cent of particles passing 75 micron sieve, free of any deleterious matter, chlorides, salts, acids, alkalies, mineral oil, fungus and microbes and shall be of specified PH value.</p> <p>11. Capping beam is to be priced separately as per approved design. The rate for cement concrete shall be taken from the chapter of sub-structure in bridge section.</p> <p>12. The cost of reinforced earth retaining wall shall include following:</p> <p>(i) Excavation for foundation including backfilling.</p> <p>(ii) Foundation concrete as per approved design.</p> <p>(iii) Cost of facial pannels and their erection .</p> <p>(iv) Cost of reinforcing elements including their fixing and joining with the facial pannels.</p> <p>(v) Drainage arrangement including filter media as per approved design and drawings.</p> <p>13. The compacted earth filling to be retained shall form part of embankment.</p>			

CHAPTER - 8

TRAFFIC SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

CHAPTER - 8
TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Cast in Situ Cement Concrete M20 Kerb : Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-15 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 409 (Reference to MORT&H's specification 409).			<i>Cost of Material to be added.</i> <i>Consumption of materials is to be followed as per chapter - A , Sl. No 8.1.</i>
1A	Using Concrete Mixer	RM	41.90	
1B	Using Concrete Batching and Mixing Plant	RM	42.30	
2	Cast in Situ Cement Concrete M 20 Kerb with Channel :- Construction of cement concrete kerb with channel with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M15 grade foundation 150 mm thick, kerb channel 300 mm wide, 50 mm thick in PCCM20 grade, sloped towards the kerb, kerb stone with channel laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 409 (Reference to MORT&H's specification 409).			<i>Cost of Material to be added.</i> <i>Consumption of materials is to be followed as per chapter - A , Sl. No 8.2.</i>
2A	Using Concrete Mixer	RM	56.30	
2B	Using Concrete Batching and Mixing Plant	RM	59.90	

CHAPTER - 8
TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3	<p>Printing New Letter and Figures of any Shade for English/Local/Regional Language may be used.</p> <p>Printing new letter and figures of any shade with synthetic enamel paint black or any other approved colour to give an even shade (Reference to MORT&H's specification 801).</p>			Complete Rate (including material cost)
3(i)	<p>Hindi/Local (Matras commas and the like not to be measured and paid for Half letter shall be counted as half)</p> <p><i>Details for 100 letters of 16 cm height i.e. 1600 cm</i></p>	per cm height per letter	0.90	
3(ii)	<p>English and Roman:</p> <p>Hyphens and the like not to be measured and paid for</p> <p><i>Detail for 100 letters of 16 cm height. i.e. 1600 cm</i></p>	per cm height per letter	0.50	
4	<p>Retro-Reflectorised Traffic Signs:</p> <p>Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC :67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 1.5 mm thick, when signs with maximum side dimensions do not exceed 600mm, or with aluminium sheeting 2.0mm thick when signs with maximum side dimensions exceeds 600mm, supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing (Reference to MORT&H's specification 801).</p>			

CHAPTER - 8
TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(i)	90 cm equilateral triangle	Each	4024.90	<i>Cost of all material included. Only the cost of material for M-15 grade conc. to be added as per chap. A Sl No..8.4.</i>
	or			
4(ii)	60 cm equilateral triangle	Each	2481.00	
	or			
4(iii)	60 cm circular	Each	3491.70	
	or			
4(iv)	80 cm x 60 cm rectangular	Each	5059.40	
	or			
4(v)	60 cm x 45 cm rectangular	Each	3388.20	
	or			
4(vi)	60 cm x 60 cm square	Each	4104.50	
	or			
4(vii)	90 cm high octagon	Each	6587.40	
Note 1.Any one area of aluminium sheeting given at (i) to (vii) may be adopted as per site requirement and in accordance with IRC : 67 2. The depth of foundation and quantity of cement concrete in the foundation are indicative. These may be increased for areas having higher wind velocities like in coastal areas. This is applicable to all road signs and directions boards.				
5	Direction and Place Identification Signs upto 0.9 sqm Size Board :- Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing (Reference to MORT&H's specification 801).	sqm	9322.50	<i>Cost of all material included. Only the cost of material for M-15 grade conc. to be added as per chap. A Sl No..8.5.</i>

CHAPTER - 8
TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been analysed separately			
6	Direction and Place Identification Signs with size more than 0.9 sqm size Board. Providing and erecting direction and place identification retro-reflectorised sign as per IRC :67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing (Reference to MORT&H's specification 801).	sqm	15935.90	Cost of all material included. Only the cost of material for M-15 grade conc. to be added as per chap. A Sl No..8.6.
Note	Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been analysed separately			
7	Overhead Signs Providing and erecting overhead signs with a corrosion resistant 2mm thick aluminium alloy sheet reflectorised with high intensity retro-reflective sheeting of encapsulated lens type with vertical and lateral clearance given in clause 802.2 and 802.3 and installed as per clause 802.6 over a designed support system of aluminium alloy or galvanised steel trestles and trusses of sections and type as per structural design requirements and approved plans (Reference to MORT&H's specification 802).			Complete Rate

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7A	Truss and Vertical Support	tonne	56941.50	Complete Rate
7B	Aluminium Alloy Plate for Over Head Sign	sqm	337.60	
Note	<p>1. The cost of excavation and foundation concrete for fixing of vertical support system to be worked out separately as per the approved drawing/design and to be included in the estimate.</p> <p>2. Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been included separately in this chapter.</p>			
8	Painting Two Coats on New Concrete Surfaces Painting two coats, after filling the surface & applying a sealing primer, with synthetic enamel paint in all shades on new plastered concrete surfaces as per MORT&H's specification 803.6.2.(Reference to MORT&H's specification 803).	sqm	58.40	Complete Rate
9	Painting on Steel Surfaces :- Providing and applying two coats of ready mix paint of approved brand on steel surface after through cleaning of surface to give an even shade (Reference to MORT&H's specification 803).	sqm	52.10	
10	Painting on Wood Surfaces Providing and applying two coats of ready mix paint of approved brand on wood surface after thorough cleaning of surface to give an even shade (Reference to MORT&H's specification 803).	sqm	56.80	

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11	Painting Lines, Dashes, Arrows etc on Roads in Two Coats on New Work Painting lines, dashes, arrows etc on roads in two coats on new work with ready mixed road marking paint conforming to IS:164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control (Reference to MORT&H's specification 803).			Complete Rate
11(i)	Over 10 cm in width	sqm	104.20	
11(ii)	Up to 10 cm in width	sqm	87.50	
12	Painting Lines, Dashes, Arrows etc on Roads in Two Coats on Old Work Painting lines, dashes, arrows etc on roads in two coats on old work with ready mixed road marking paint conforming to IS: 164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control (Reference to MORT&H's specification 803).			
12(i)	Over 10 cm in width	sqm	72.00	
12(ii)	Up to 10 cm in width	sqm	78.30	
13	Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass Beads on Bituminous Surface Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes (Reference to MORT&H's specification 803).	sqm	509.60	

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	1. A sealing primer may be applied in advance on cement concrete pavement to ensure proper bonding. Any laitance and/or curing compound to be removed where paint is required to be applied on concrete surface.			
14	Road Distance Indicator Reinforced cement concrete M15 grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc (Reference to MORT&H's specification 805).			Cost of all material included. Only the cost of material for M-15 grade conc. and HYSD steel (without binding wire)to be added as per chap. A Sl No.8.14.
14(i)	5th kilometre stone (precast)	Nos.	1459.10	
14(ii)	Ordinary kilometer stone (precast)	Nos.	777.70	
14(iii)	Hectometer stone (precast)	Nos.	242.20	
15	Road Delineators :- Supplying and installation of delineators (road way indicators, hazard markers, object markers), 80 100 cm high above ground level, painted black and white in 15 cm wide strips, fitted with 80 x 100 mm rectangular or 75 mm dia circular reflectorised panels at the top, buried or pressed into the ground and conforming to IRC-79 and the drawings (Reference to MORT&H's specification 806).	Each	718.00	Complete Rate
Note	In case of soft ground, a proper foundation may be provided as per approved design. In case foundation is required to be provided, the items of excavation and foundation concrete are required to be measured and paid separately.			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16	Boundary pillar : Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but excluding painting (Reference to MORT&H's specification 807). Note <i>In case of soft ground, a proper foundation may be provided as per approved design. In case foundation is required to be provided, the items of excavation and foundation concrete are required to be measured and paid separately.</i>	Each	586.30	<i>Complete rate excluding the cost of material for M-15 grade conc. and HYSD steel (without binding wire) to be added as per chap. A Sl No.8.16.</i>
17	G.I Barbed Wire Fencing 1.2 Metre High : Providing and fixing 1.2 metres high GI barbed wire fencing with 1.8 m 50mm dia. G.I. pipe post conforming to IS: 1239 placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre below ground level, every 15th post, last but one end post and corner post shall be struttred 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 clause 808 (Reference to MORT&H's specification 808). Note <i>Cost of excavation for foundation and foundation concrete to be added separately in the cost estimate as per approved design.</i>	RM	234.00	<i>Complete Rate (except as mentioned in the note below item)</i>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18	G.I Barbed Wire Fencing 1.8 Metre High : Providing and fixing 1.8 metres high GI barbed wire fencing with 2.4 m, 50 mm dia G.I. pipe post placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre 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 12 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per clause 808 (Reference to MORT&H's specification 808).	RM	386.60	Complete Rate <i>(except as mentioned in the note below item)</i>
Note	<i>Cost of excavation for foundation and foundation concrete to be added separately in the cost estimate as per approved design.</i>			
19	Fencing With Welded Steel Wire Fabric 75 mm x 50 mm Providing 1.20 metre high fencing with 50mm dia G.I. pipe post placed at 3 metre center to center with 0.40 metre embedded in M15 grade cement concrete, corner, end and every 10th post to be strutted, provided with welded steel wire fabric of 75 mm x 50 mm mesh or 75 mm x 25 mm mesh and fixed to iron posts by flat iron 50 x 5 mm and bolts etc. complete in all respects (Suggestive).	RM	527.30	Complete Rate <i>(except as mentioned in the note below item)</i>
Note	<i>i) Adopt any one type of welded steel wire fabric 75 x 50 mm or 75 x 25 mm as per approved design.</i> <i>ii) The item of excavation and cement concrete in foundation shall be measured and paid separately</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
20	Tubular Steel Railing on Medium Weight Steel Channel (ISMC series) 100 mm x 50 mm Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50 mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings (Reference to MORT&H's specification 809).	RM	1310.30	<i>Complete rate excluding the cost of material for M-15 grade conc. and HYSD steel (without binding wire) to be added as per chap. A Sl No.8.20.</i>
21	Tubular Steel Railing on Precast RCC Posts, 1.2 m High Above Ground Level : Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M20 grade RCC vertical posts 1.8 metres high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 metres centre to, complete as per approved drawing (Reference to MORT&H's specification 809).	RM	818.20	<i>Complete rate excluding the cost of material for M-15 grade conc, RCC M-20 & HYSD Steel reinforcement to be added as per chapter A Sl.No. 8.21</i>
22	Reinforced Cement Concrete Crash Barrier : Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-40 grade concrete with HYSD reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, all as specified (Reference to MORT&H's specification 811).	RM	228.40	<i>Complete rate excluding the cost of material for RCC M-40 & HYSD steel reinforcement to be added as per chapter A Sl.No. 8.22</i>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>i) Excavation and backfilling are incidental to work and not to be measured separately.</i>			
23	Metal Beam Crash Barrier (Reference to MORT&H's specification 811).			
23A	Type - A, "W" : Metal Beam Crash Barrier Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long complete as per clause 811	RM	2530.70	Complete Rate
23B	Type - B, "THRIE" : Metal Beam Crash Barrier Providing and erecting a "Thrie" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 85 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 2 m high with 1.15 m below ground level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a space of channel section 150 x 75 x 5 mm, 546 mm long complete as per clause 811	RM	3106.00	Complete Rate

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>In the case of median crash barrier, 'W' metal beam or thrie beam section should be provided on both sides of the vertical posts fixed in the median. Extra provision for metal beam railing and spacer is required to be made when fixed in the median depending on approved design.</i>			
24	Road Traffic Signals electrically operated (Reference to MORT&H's specification 812).			As per market Rate.
Note	<i>Since it is a ready made item commercially produced and erected by specialised firm in the electrical and electronic field, rate may be taken based on market enquiry from firms specialised in this field and ISI certified for the approved design and drawing.</i>			
25	Flexible Crash Barrier, Wire Rope Safety Barrier : Providing and erecting a wire rope safety barrier with vertical posts of medium weight RS Joist (ISMB series) 100 mm x 75 mm (11.50 kg/m), 1.50 m long 0.85 m above ground and 0.65 m below ground level, split at the bottom for better grip, embedded in M 15 grade cement concrete 450 x 450 x 450 mm, 1.50 m center to center and with 4 horizontal steel wire rope 40 mm dia and anchored at terminal posts 15 m apart. Terminal post to be embedded in M 15 grade cement concrete foundation 2400 x 450 x 900 mm (depth), strengthened by a strut of RS joist 100 x 75 mm, 2 m long at 45° inclination and a tie 100 x 8 mm, 1.50 m long at the bottom, all embedded in foundation concrete as per approved design and drawing, rate excluding excavation and cement concrete as per MORT&H's specification 811.4	RM	2781.40	Complete Rate

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>The items of excavations and cement concrete works will be measured and included separately as per the approved designs and drawings.</i>			
26	Anti-Glare Devices in Median.			
26A	Plantation Plantation of shrubs and plants of approved species in the median. apart from cutting off glare from vehicle coming from opposite direction, these plants provide a pleasant environment and are eco-friendly. The rate for this item is available in the chapter 11 on horticulture.	RM		<i>ITEM DELETED</i>
26B	Anti-glare screen with 25 mm steel pipe framework fixed with circular and rectangular vans Providing and erecting an anti - glare screen with 25 mm dia vertical pipes fabricated and framed in the form of panels of one metre length and 1.75 metre height fixed with circular vane 250 mm dia at top and rectangular vane 600 x 300 mm at the middle, made out of steel sheet of 3 mm thickness, end vertical pipes of the panel made larger for embedding in foundation concrete, applying 2 coats of paint on all exposed surfaces, all as per approved design and drawings.	RM	2676.90	Complete Rate
Note	<i>The items of excavation and cement concrete as per approved design to be measured and paid separately</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
26C	Anti-glare screen with rectangular vane of MS sheet Providing and erecting anti - glare screen with rectangular vanes of size 750 x 500 mm made from MS sheet, 3 mm thick and fixed on MS angle 50 x 50 x 6 mm at an angle of 45° to the direction of flow of traffic, 1.5 m center to center, top edge of the screen 1.75 m above ground level, vertical post firmly embedded in M-15 cement concrete foundation 0.60 m below ground level, applying 2 coats of paint on exposed faces, all complete as per approved design and drawings	RM	769.70	Complete Rate
Note	The items of excavation and cement concrete as per approved design to be measured and paid separately. Rate of painting has been analysed separately in this chapter.			
27	Street Lighting : Providing and erecting street light mounted on a steel circular hollow pole of standard specifications for street lighting, 9 m high spaced 40 m apart, 1.8 m overhang on both sides if fixed in the median and on one side if fixed on the footpath, fitted with sodium vapour lamp and fixed firmly in concrete foundation.			
27(i)	For Fixing in Median	Each	6636.40	Complete rate excluding the cost of sodium vapour lamp to be added as per chapter A Sl.No. 8.27
27(ii)	For fixing in Footpath	Each	6580.40	
Note	The items of excavation and cement concrete foundation will be measured and included separately in the estimate as per approved design and drawing. The rate for painting has been included in this chapter.			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
28	Lighting on Bridges : Providing and fixing lighting on bridges, mounted on steel hollow circular poles of standard specifications, 5 m high fixed on parapets with cement concrete, 20 m apart and fitted with sodium vapour lamp.	Each	6193.20	<i>Complete rate excluding the cost of sodium vapour lamp to be added as per chapter A Sl.No. 8.28</i>
Note	The items of cement concrete to be measured and paid separately as per approved design. The rate for painting has already been included in this chapter.			
29	Cable Duct Across the Road : Providing and laying of a reinforced cement concrete pipe duct, 300 mm dia, across the road (new construction), extending from drain to drain in cuts and toe of slope to toe of slope in fills, constructing head walls at both ends, providing a minimum fill of granular material over top and sides of RCC pipe as per IRC:98-1997, bedded on a 0.3 m thick layer of granular material free of rock pieces, outer to outer distance of pipe at least half dia of pipe subject to minimum 450 mm in case of double and triple row ducts, joints to be made leak proof, invert level of duct to be above higher than ground level to prevent entry of water and dirt, all as per IRC: 98 - 1997 and approved drawings .			<i>Complete rate excluding the cost of Cement mortar for Rubble masonry & granular soil to be added as per chapter A Sl.No. 8.29</i>
29(i)	Single row for one utility service	RM	1122.60	
29(ii)	Double row for two utility services	RM	2150.60	
29(iii)	Triple Row for three utility services	RM	3198.90	
Note	1. Inspection chamber at both ends is the responsibility of the agency who is laying the duct. Hence not included.			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
30	Highway Patrolling and Traffic Aid Post It is proposed to locate one Traffic Aid Post every 50-60 km of the highway. The organisation and financial aspect are required to be finalised in consultation with administrative and traffic authorities .			
31	Items Related to Underpass/ Subway/ Overhead Bridge/ Overhead Foot Bridge The items involved for underpass/ subway/ overhead bridge/ overhead foot bridge are earthwork, plain cement concrete, plastering, painting, information sign etc. The rates for these items are available in respective chapters which can be adopted for the quantities derived from the approved designs and drawings.			
32	Traffic Control System and Communication System Providing a traffic control centre and communication system including telecommunication facilities and related accessories, CCTV, radar, vehicle detection camera, central computer system These are specialised item of telecommunication system and are the commercial products. The designer is required to contact the manufacturers to ascertain market prices. In case of civil works required to be executed for these installations, pricing may be done as per rates in relevant chapters for quantities derived as per approved design and drawing. (Contd...)			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	As regards the locations where such devices are required to be installed, the traffic control authority should be consulted to finalise the location.			
33	Gantry Mounted Variable Message Sign Board Providing and erecting gantry mounted variable message sign board electronically operated capable of flashing the desired message over a designed support system of aluminium alloy or galvanised steel, erected as per approved design and drawings and with lateral clearance as per clause 802.3.			
33(i)	Gantry Support System	tonne	54533.80	Complete Rate
33(ii)	Message Display	Each		
Note:	<i>Message display board 6 sqm electronically operated with complete electronic fitments for flashing the pre-determined messages.</i> <i>This is a specilised commercial product and the lump sum rate including erection at site is required to be ascertained from the market and including in the rate analysis. The size of the board will vary depending upon specific location.</i> <i>The rate for the gantry mounted variable sign would be the addition of cost of gantry support system as per approved design determined at (i) above and the cost of message display board ascertained from the market at (ii) above</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
34	Traffic Impact Attenuators at Abutments and Piers			<i>ITEM DELETED</i>
34A	With Scrap Tyres Provision and installation of traffic attenuators at abutment/pier of flyovers bridges using scrap tyres of size 100 x 20 retrieved from trucks laid in 2 rows and 4 tiers, one above the other and tied with 20 mm wire rope as per approved design and drawings.	sqm	2460.20	Complete Rate
34B	Using Plastic/Steel Barrel, Filled with Sand Provision and installation of traffic impact attenuator at abutment/pier of flyovers bridges using plastic/steel barrels 0.60 m dia and 1.0 m in height, filled with sand in three rows and tied with 20 mm steel wire rope as per approved design and drawings	sqm	772.30	Cost of sand to be added as per ch.A sl.no.8.34
34C	With HI - DRO cell Sandwich (Patented) (In this patented HI - DRO cell system, water gets discharged from plastic tubes on impact over a pre-determined time, thus absorbing the energy) Providing and installing a patented HI - DRO cell system as a traffic impact attenuators, using plastic tubes 50 cm dia, 1.2 m in height, 25 mm opening at the top, placed in three rows, filled with water and tied with a 20 mm steel wire rope	sqm	3023.20	Complete Rate

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
35	Road Markers/Road Stud with Lense Reflector Providing and fixing of road stud 100x 100 mm, die-cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973.	Nos.	627.50	Complete Rate
36	Traffic Cone Provision of red fluorescent with white reflective sleeve traffic cone made of low density polyethylene (LDPE) material with a square base of 390 x 390 x 35 mm and a height of 770 mm, 4 kg in weight, placed at 1.5 m interval, all as per BS 873.	RM	633.20	Complete Rate
37 37A	Roadside Amenities Rest areas Providing plainly furnished accommodation for rest rooms, dormitories, restaurants, stalls, shops, petrol pump, telephone booth, first aid room, traffic aid post, police assistance booth, including electricity, toilet and sewerage system Pricing may be done based on current plinth area rates approved by PWD/CPWD/MES for a particular zone. Area is required to be assessed for specific location as per actual site conditions.			Rate to be analysed as per drawing & Technical specification.
37B	Parking areas and bus laybys for trucks, buses and light vehicles Pricing of parking areas may be done for the quantities of various items based on the approved dimensions and pavement design for a particular terrain and soil. Rates for items may be from respective chapters			Rate to be analysed as per drawing & Technical specification.

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
37C	Lawn Providing a lawn planted with grass and its maintenance Pricing of lawn may be done as per rates given in the chapter on horticulture for the quantities as per approved dimensions in the drawings			<i>Rate to be analysed as per drawing & Technical specification.</i>
38	Rumble Strips Provision of 15 No.s rumble strips covered with premix bituminous carpet, 15-20 mm high at center, 250 mm wide placed at 1 m center to center at approved locations to control speed, marked with white strips of road marking paint.	sqm		<i>Rate to be analysed as per drawing & Technical specification.</i>
39	Policeman Umbrella Provision of a 2 m high (floor to roof) umbrella for traffic policeman at road crossings, where necessary, installed on a raised platform, built on a central support of a steel pipe 100 mm dia, roof made of 25 mm dia steel pipe to provide covered area of 3 sqm, roofed with CGI sheets, all steel parts to be given 2 coats of paint.	Each		<i>Rate to be analysed as per drawing & Technical specification.</i>
40	High Mast Pole Lighting at Interchanges and Flyovers Providing and erecting a high mast pole lighting with 30 m high hot dip galvanised mast designed to withstand forces exerted with wind speeds of 180 km per hour with 3 seconds gust, as per IS:875 (Part 3) - 1978, fitted with a base flange, door at the base of mast with heavy duty internal lock, lantern carriage, suitable winching arrangement for safe working load of 750 kg and high powered electrically driven power tools for raising and lowering of lantern carriage, (Contd...)			<i>Rate to be analysed as per drawing & Technical specification.</i>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	flexible 8 core electric cable, lightning conductor earthing terminal, and fixing 2 No.s aviation obstruction lights on top of the mast, all complete as per approved design and drawings <i>This is a specialised work and is generally done by firms who specialise in such jobs. The detailed designs and estimates are submitted by the firms along with their tender for checks by the Department. The cost of this work is required to be worked out based on approved design, drawings and estimate of the lowest tender. A separate contract for this work is concluded as the contractors for road and bridge works generally do not undertake such jobs.</i>			
41	Toll Plaza The construction, operation and maintenance of Toll Plaza can be broken into separate items of work as under based on the approved design and drawings:- a) Provision of toll collection service lane to separate different categories of vehicles for purpose of toll collection. This involves considerable increase in carriage way width b) Provision of 2.5 m wide separators for different toll collection service lanes for safety c) Toll booths with integrated roof cover d) Barrier gates for individual lanes e) Provision of building to provide facility to toll plaza personnel	Each		Rate to be analysed as per drawing & Technical specification.

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	f) Toll plaza office equipment and furniture g) Water supply, electricity, sanitation, septic-tank system and drainage h) Telephone, intercoms, wireless communication system i) High mast lighting j) Pavement marking k) Overhead signs l) Fixed message signs (Advance) m) Variable message signs n) Traffic cones and pylons o) First aid post p) Traffic aid post and security The quantities for the above mentioned items may be calculated from the approved design and drawings and their rates adopted from respective chapters			
42	Safety Devices and Signs in Construction Zones Provision and fixing of traffic signs for limited period at suitable locations in construction zone comprising of warning zone, approach transition zone, working zone and terminal transition zone with a minimum distance of 60 cm from the edge of the kerb in case of kerbed roads and 2 to 3 m from the edge of the carriageway in case of un-kerbed roads, the bottom edge of the lowest sign plate to be not less than 2 m above the road level, fixed on 60 mm x 60 mm x 6 mm angle iron post, founded and installed as per approved design and drawings, removed and disposed of after completion of construction work, all as per IRC:SP:55-2001	Each		<i>Rate to be analysed as per drawing & Technical specification.</i>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
43	Portable Barricade in Construction Zone Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 450, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001.	Each	2547.20	Complete Rate
44	Permanent Type Barricade in Construction Zone			
44A	With steel components Construction of a permanent type barricade made of steel components, 1.5 m high from road level, fitted with 3 horizontal rails 200 mm wide and 4 m long on 50 x 50 x 5 mm angle iron vertical support, painted with yellow and white strips, 150 mm in width at an angle of 450, complete as per IRC:SP:55-2001	Each	4025.80	Complete Rate
44B	With wooden components Construction of a permanent type barricade made of wooden components, 1.5 m high from road level, fitted with 3 horizontal planks 200 mm wide and 3.66 m long on 100 x 100mm wooden vertical post, painted with yellow and white strips, 150 mm in width at an angle of 450, complete as per IRC:SP:55-2001	Each	10978.50	Complete Rate
44C	With bricks Construction of a permanent type barricade made with brick work in mud mortar, 1.5 m high, 4 m long, 600 mm thick, plastered with cement mortar 1:6, painted with yellow and white strips	Each	2631.10	Cost of cement, sand and bricks to be added as per chapter A Sl. No.8.44.

CHAPTER - 8
TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
45	Drum Delineator in Construction Zone Provision of metal drum/empty bitumen drum delineator, 300 mm in diameter, 800 mm high, filled with earth for stability, painted in circumferential strips of alternate black and white 100 mm wide fitted with reflectors 3 Nos of 7.5 cm dia, all as per IRC:SP:55-2001 .	Each	475.80	Complete Rate
46	Flagman Positioning of a smart flagman with a yellow vest and a yellow cap and a red flag 600 x 600 mm securely fastened to a staff 1 m in length for guiding the traffic .	Each	437.60	Complete Rate

CHAPTER - 9

PIPE CULVERTS

CHAPTER - 9
PIPE CULVERTS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	PCC 1:3:6 in Foundation Plain cement concrete of 1:3:6 nominal mix with crushed stone aggregate 40 mm nominal maximum size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days as per the requirements of MORT&H's specification 1704.3.	cum	781.40	<i>Consumption of materials as per Ch. A., Sl.No. 9.1. Cost of material to be added.</i>
2	Laying Reinforced Cement Concrete Pipe NP4 / Prestressed Concrete Pipe on First Class Bedding in Single Row . Laying Reinforced cement concrete pipe NP4/prestressed concrete pipe for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per the requirements of MORT&H's specification 2900.			<i>Consumption of materials as per Ch. A., Sl.No. 9.2. Cost of material to be added excluding the cost of NP4 pipe.</i> <i>1. In case of cement cradle bedding, quantity of PCC M15 is to be calculated as per design and priced separately and added .</i> <i>2. The rates in column 4 does not include excavation, cement /masonry works in head walls, backfilling, protection works and parapet walls. The same are to be calculated as per approved design and drawings and priced separately on rates available under respective sections</i>
2A	1000 mm dia	Mtr.	6428.70	
2B	1200 mm dia	Mtr.	7572.70	
3	Laying Reinforced Cement Concrete Pipe NP4 / Prestressed Concrete Pipe on First Class Bedding in Double Row . Laying Reinforced cement concrete pipe NP4 / prestressed concrete pipe for culverts on first class bedding of granular material in double row including fixing collar with			<i>Consumption of materials as per Ch. A., Sl.No. 9.3. Cost of material to be added excluding the cost of NP4 pipe</i> <i>1. In case of cement cradle bedding, quantity of PCC M15 is to be calculated as per design and priced separately and added .</i>

CHAPTER - 9

PIPE CULVERTS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3A	1000 mm dia	Mtr.	12857.50	<p><i>2. The rates in column 4 does not include excavation, cement /masonry works in head walls, backfilling, protection works and parapet walls. The same are to be calculated as per approved design and drawings and priced separately on rates available under respective sections</i></p>
3B	1200 mm dia	Mtr.	15145.00	

CHAPTER - 10

MAINTENANCE OF ROADS

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Restoration of Rain Cuts Restoration of rain cuts with soil, moorum, gravel or a mixture of these, clearing the loose soil, benching for 300 mm width and extending continuously for a sufficient length and height of benches shall be in the range of 150-300mm. Fresh material shall be deposited in layers not exceeding 250 mm and compacting with plate compactor or power rammers or by suitable implements handled manually to restore the original alignment, levels and slopes as per the requirement of MORT&H's specification 3002.	cum	115.00	Material cost nil
2	Maintenance of Earthen Shoulder (filling with fresh soil) Making up irregularities/loss of material on shoulder to the design level by adding fresh approved soil and compacting it with appropriate equipment as per the requirement of MORT&H's specification 3003.	sqm	39.10	Material cost nil
3	Maintenance of Earth Shoulder (stripping excess soil) Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor as per the requirement of MORT&H's specification 3003.	sqm	14.00	Material cost nil
Note	The earth stripped from earthen shoulders to be dumped on the side slopes locally for disposal.			
4	Filling Pot-holes and Patch Repairs with open-Graded Premix surfacing, 20mm. (Contd...)	sqm	23.20	Cost of material to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 10.4.

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	Removal of all failed material,in the pavement courses and if necessary below the pavement,until the root causes of the failure is removed, the trimming of completed excavation to provide firm vertical faces; specified for the pavement layer; application of tack coat conforming to cl. 503 of MORT&H's specification ,on to the sides and base of excavation prior to placing hot bituminous material as per clause 510 and the compaction,trimming and finishing of the surfaces of all patches to form a smooth continuous surface, level with the surrounding road as per the requirement of clause 3004.2 of MORT&H's specification .			
5	Filling Pot-holes and Patch Repairs with Bituminous concrete, 40mm. Removal of all failed material,in the pavement courses and if necessary below the pavement,until the root causes of the failure is removed, the trimming of completed excavation to provide firm vertical faces; specified for the pavement layer; application of tack coat conforming to cl. 503 of MORT&H's specification ,on to the sides and base of excavation prior to back filling the pot holes with hot bituminous material as per clause 504 and the compaction,trimming and finishing of the surfaces of all patches to form a smooth continuous surface, level with the surrounding road as per the requirement of clause 3004.2 of MORT&H's specification			<i>Cost of material to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 10.5.</i>
5(i)	for grading I Material	sqm	39.10	
5(ii)	for grading II Material	sqm	39.10	

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	Crack Filling Filling of crack using slow - curing bitumen emulsion and applying crusher dust or other fine material or a suitable premix acceptable to the Engineer-in-Charge, in case crack are wider than 3mm as per the requirement of MORT&H's specification 3004.3.3).	RM	0.70	<i>Cost of material to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 10.6.</i>
7	Dusting Applying crusher dust or other fine graded material approved by the Engineer-in-Charge to areas of road where bleeding of excess bitumen is occurring as per requirement of MORT&H's specification 3004.4.	sqm	0.20	<i>Cost of material to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 10.7.</i>
8A	Fog Seal This work shall conform to the requirements of cl. 513 of these specifications and shall consist of an application of Emulsified bitumen, without any aggregate cover for sealing fine hair-cracks or for rejuvenating oxidised bituminous surfaces. Areas having cracks with less than 3mm width shall be considered for this treatment, unless otherwise instructed by the Engineer-in-Charge (Reference to MORT&H's specification 3004.3.2).	sqm	1.30	<i>Cost of material to be added as per Ch. A., Sl.No. 5.17</i>
8B	Crack Prevention courses			
8B(i)	Stress Absorbing Membrane (SAM) crack width less than 3 mm	sqm	3.30	<i>Cost of material to be added except cost of Geotextile (where required). Consumption of materials to be followed as per Ch. A., Sl.No. 10.8B</i>
8B(ii)	Stress Absorbing Membrane (SAM) crack width less than 6 mm			
8B(iii)	Stress Absorbing Membrane (SAM) with crack width 6 mm to 9 mm	sqm	3.30	
8B(iv)	Stress Absorbing Membrane (SAM) crack width above 9 mm and	sqm	3.30	
8B(v)	cracked area above 50 per cent Bitumen Impregnated Geotextile	sqm	78.20	

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8C	Slurry Seal This work shall conform to the requirements of cl. 512 of these specifications and shall consist of design and laying a mixture of mineral aggregate slow setting cationic bitumen emulsion ,water and additives, if needed, propotioned, mixed and uniformly spread over a previously prepared surface.The finally laid slurry seal shall have a homogenous mat. adhere firmly to the prepared surface and provide friction resistance surface texture throughout its surface life (Reference to MORT&H's specification 3004.5).			<i>Cost of material to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 10.8C.</i>
8C(i)	TYPE-III (CVPD<1500) 6mm to 8 mm thickness	sqm	2.20	
8C(ii)	TYPE-II (CVPD<450) 4mm to 6 mm	sqm	1.39	
8C(iii)	TYPE-I 2mm to 3 mm	sqm	1.20	
8D	Surface Dressing			<i>Cost of material to be added as per Ch. A., Sl.No. 5.9.</i>
8D(i)	19 mm nominal size chipping	sqm	5.40	
8D(ii)	13 mm nominal size chipping	sqm	6.00	
Note	The above mentioned items have already been included in chapter 5.			
9	Repair of Joint Grooves with Epoxy Mortar or Epoxy Concrete This work shall consist of repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in concrete pavements using epoxy mortar or epoxy concrete as per the requirement of MORT&H's specification cl. 3005.1.	RM	633.20	Complete Rate
Note	The constituents of epoxy mortar/ epoxy concrete will be as per the instruction and manual of the manufacture.			

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	Removal & Repair of old Joints The repair of sealant of contraction, longitudinal or expansion joints in concrete pavement shall include removal of the existing sealant and resealing the joint with fresh sealant material as per the requirement of MORT&H's specification cl. 3005.2.	RM	69.00	Complete Rate
11	Hill Side Drain Clearance Removal of earth from the choked hill side drain and disposing it on the valley side manually as per the requirement of MORT&H's specification cl.3000.	RM	40.10	Complete Rate
12	Landslide Clearance in soil Clearance of land slides in soil and ordinary rock by a bull-dozer D 80 A-12, 180 HP and disposal of the same on the valley side as per the requirement of MORT&H's specification 3000. Note <i>Slide clearance involves pushing of loose earth slid on the road surface from hill face on the valley side. Since no cutting of original ground is involved, the output of dozer has been taken as 60 cum per hour for soil, ordinary rock and blasted hard rock. However, if there are objection to disposing of earth on valley side, additional resources for its disposal shall be considered as per site conditions.</i>	cum	69.70	Complete Rate
13	Landslide Clearance in Hard Rock Requiring Blasting	cum	103.50	Complete Rate

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	Clearing of land slide in hard rock requiring blasting for 50 per cent of the boulders and disposal of the same on the valley side as per the requirement of MORT&H's specification 3000. Note <i>Credit for the rock if found acceptable as construction material shall be afforded</i>			
14	Snow Clearance on Roads with Dozer Snow clearance from road surface by a bull- dozer 165 HP and disposing it on the valley side as per the requirement of MORT&H's specification 3000. Note <i>Labour provided will not be cutting the snow. They will be guiding the dozer operator on the alignment of the road as entire surface gets covered with snow and the edges of the road are not visible and for changing the blade angle. Also they will keep a watch on the hill side for any eventuality of avalanches, slide etc..</i>	cum	4.80	Complete Rate
15	Snow Clearance on Roads with Snow Blowers Snow clearance from road surface by a snow blower and disposing on the valley side as per the requirement of MORT&H's specification 3000.	cum	3.60	Complete Rate

CHAPTER - 11

HORTICULTURE

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Spreading of Sludge Farm Yard Manure or/and good Earth Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm yard manure or/and good earth to be paid for separately) (Reference to MORT&H's specification 308.3.2).	cum	23.60	Complete Rate
2	Grassing with 'Doobs' Grass Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed (Reference to MORT&H's specification 307).			Complete Rate
2(i)	In rows 15 cm apart in either direction	sqm	59.20	
2(ii)	In rows 7.5 cm apart in either direction	sqm	111.80	
3	Making Lawns including Ploughing and Dragging with 'Swagha' Breaking of Clod Making lawns including ploughing and breaking of clod, removal of rubbish, dressing and supplying doobs grass roots and planting at 15 cm apart, including supplying and spreading of farm yard manure at rate of 0.18 cum per 100 sqm (Reference to MORT&H's specification 307).	sqm	79.10	Complete Rate
4	Maintenance of Lawns or Turfing of Slopes Maintenance of lawns or Turfing of slopes (rough grassing) for a period of one year including watering etc (Reference to MORT&H's specification 307).	sqm	120.00	Complete Rate
5	Turfing Lawns with Fine Grassing including Ploughing, Dressing (Contd...)	sqm	94.00	Complete Rate

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	Turfing lawns with fine grassing including ploughing, dressing including breaking of clods, removal of rubbish, dressing and supplying doobs grass roots at 10 cm apart, including supplying and spreading of farm yard manure at rate of 0.6 cum per 100 sqm (Reference to MORT&H's specification 307).			
6	Maintenance of Lawns with Fine Grassing for the First Year Maintenance of lawns with fine grassing for the first year including watering etc (Reference to MORT&H's specification 307).	sqm	148.70	Complete Rate
7	Planting and Maintaining of Permanent Hedges (Reference to MORT&H's specification 307).			
7(a)	Planting permanent hedges including digging of trenches Planting permanent hedges including digging of trenches, 60 cm wide and 45 cm deep, refilling the excavated earth mixed with farmyard manure, supplied at the rate of 4.65 cum per 100 metres and supplying and planting hedge plants at 30 cm apart .	RM	233.80	Complete Rate
7(b)	Maintenance of hedge for one year	RM	212.90	Complete Rate
8	Planting and Maintaining of Flowering Plants and Shrubs (Reference to MORT&H's specification 307).			
8(a)	Planting flowering plants and shrubs in central verge	km	180933.00	Complete Rate
8(b)	Maintenance of flowering plants and shrubs in central verge for one year	km	232773.00	

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9	Planting of Trees and their Maintenance for one Year Planting of trees by the road side (Avenue trees) in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge manure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year (Reference to MORT&H's specification 307).	Each	1108.00	Complete Rate
10	Renovation Lawns including, Weeding, Forking the Ground, Top Dressing with Forked Soil Renovation lawns including, weeding, forking the ground, top dressing with forked soil, watering and maintenance the lawns, for 30 days or more, till the grass forms a thick lawn, free from weeds, and fit for moving and disposal of rubbish as directed, including supplying good earth, if needed but excluding the cost of well decayed farm yard manure (Reference to MORT&H's specification 308).	sqm	13.50	Complete Rate
11	Supply at Site Well Decayed Farm Yard Manure Supply at site of work well decayed farm yard manure, from any available source, approved by the engineer in charge including screening and stacking (Reference to MORT&H's specification 308.2).	cum	2490.00	Complete Rate
12	Supply at Site of Work/ Store-Deoiled Neem Cake Supply at site of work/ store-deoiled neem cake duly packed in used gunny bags	Quin- tal		As per market Rate
13	Supplying Sludge Supplying sludge duly stacked at site/ store	cum		As per market Rate

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14	<p>Half Brick Circular Tree Guard, in 2nd Class Brick, internal diameter 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground</p> <p>Half brick circular tree guard, in 2nd class brick, internal diameter 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground, bottom two courses laid dry, and top three courses in cement mortar 1:6 (1 cement 6 sand) and the intermediate courses being in dry honey comb masonry, as per design complete.</p>	Each	245.90	<i>Cost of Material to be added as per Ch. A., Sl.No. 11.14.</i>
15	<p>Edging with 2nd Class Bricks, Laid Dry Lengthwise</p> <p>Edging with 2nd class bricks, laid dry lengthwise, including excavation, refilling, consolidation, with a hand packing and spreading nearly surplus earth within a lead of 50 metres.</p>	Mtr.	3.80	<i>Cost of Material to be added as per Ch. A., Sl.No. 11.15.</i>
16	<p>Making Tree Guard 53 cm dia and 1.3 m High as per Design from Empty Bitumen Drums</p> <p>Making tree guard 53 cm dia and 1.3 m high as per design from empty bitumen drum, slit suitably to permit sun and air, (supplied by the department at stock issue rate) including providing and fixing 2 No.s MS sheet rings 50 x 0.5 mm with rivets, complete in all respect.</p>	Each	509.00	<i>Complete Rate</i>

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
17	Making Tree Guard 53 cm dia and 2 Metre High as per Design from Empty Bitumen Drums Making tree guard 53 cm dia and 2 metres high as per design from empty bitumen drums, slit suitably to permit sun and air, (supplied by the department at stock issue rate) including providing and fixing four legs 40 cm long of 30 x 3 mm MS riveted to tree guard and providing and fixing 2 No.s MS sheet rings 50 x 0.5 mm with rivets complete in all respects.	Each	979.70	Complete Rate
18	Wrought Iron and Mild Steel Welded Work Wrought iron and mild steel welded work (using angles, square bars, tees and channel grills, grating frames, gates and tree guards of any size and design etc. including cost of screens and welding rods or bolts and nuts complete fixed in position but without the cost of excavation and concrete for fixing which will be paid separately.	Quin- tal	7593.50	Complete Rate
19	Tree Guard with MS Iron Providing and fixing MS iron tree guard 60 cm dia and 2 metre high above ground level formed of 4 No.s (25 x 6 mm) and 8 No.s (25 x 3 mm) vertical MS riveted to 3 No.s (25 x 6 mm) iron rings in two halves, bolted together with 8 mm dia and 30 mm long bolts including painting two coats with paint of approved brand over a coat of priming, complete in all respects.	Each	1796.00	Complete Rate
Note	1. The items of excavation and concreting to be measured and paid separately as per design . 2 . Rate of painting may be adopted from the chapter as Traffic signs.			

CHAPTER - 11

HORTICULTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
20	Tree Guard with MS Angle Iron and Steel Wire Providing and fixing tree guard 0.60 metre square, 2.00 metre high fabricated with MS angle iron 30 x 30 x 3 mm, MS iron 25 x 3 mm and steel wire 3 mm dia welded and fabricated as per design in two halves bolted together.	Each	2397.00	Complete Rate
21	Compensatory Afforestation Planting trees as compensatory afforestation at the rate of 290 trees per hectare at a spacing of 6 m by grubbing and leveling the ground upto a depth of 150 mm, digging holes 0.9 m dia, 1 m deep, mixing farm yard/sludge manure with soil, planting of sapling 2 m high with 25 cm dia stem, backfilling the hole and watering including maintenance for 1(one) year by watering, manuring and replacing dead plant with new one.	Hec-tare	239224.00	Complete Rate

CHAPTER - 12

FOUNDATION

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Excavation for Structures Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material (Reference to MORT&H's specification 304).			
1(I)	Ordinary soil			
1(I)A	Manual Means			
1(I)A(i)	Depth upto 3 m	cum	124.10	
Note	<p>1. Cost of dewatering may be added where required upto 10 per cent of cost of labour i.e. ₹12.10/- per cum. Assessment for dewatering shall be made as per site conditions.</p> <p>2. The excavated earth can be used partially for backfilling of foundation pit and partly for road work except for marshy soil. Hence cost of disposal has not been added except for marshy soil. This remark is common to all cases of item 1 excluding marshy soil.</p> <p>3. The cost of shoring and shuttering, where needed, may be added @ 1 per cent on cost of excavation for open foundation.</p>			
1(I)A(ii)	Depth 3 m to 6 m	cum	159.60	
Note	Cost of dewatering may be added where required upto 15 per cent of cost of labour i.e. ₹15.55/- per cum. Assessment for dewatering shall be done as per actual ground conditions.			
				Complete Rate

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1(I)A(iii) Note	Depth above 6 m <i>Cost of dewatering may be added where required upto 20 per cent of labour cost i.e. ₹41.48/- per cum. Assessment for dewatering shall be made as per site conditions.</i>	cum	212.80	Complete Rate
1(I)B 1(I) B(i) Note	Mechanical Means Depth upto 3 m <i>Cost of dewatering upto 5 per cent of cost as mentioned in column - 4 may be added, where required. Assessment for dewatering shall be made as per site conditions..</i>	cum	46.20	
1(I) B(ii) Note	Depth 3 m to 6 m <i>Cost of dewatering upto 7.5 per cent of cost as mentioned in column - 4 may be added, where required. Assessment for dewatering shall be made as per site conditions..</i>	cum	52.90	
1(I) B(iii) Note	Depth above 6m <i>1. Cost of dewatering upto 10 per cent of cost as mentioned in column - 4 may be added, where required. Assessment for dewatering shall be made as per site conditions.</i> <i>2. Labour provided for excavation by mechanical means includes that required for trimming of bottom and side slopes.</i>	cum	65.60	
1(II) 1(II)A 1(II) A(i) Note	Ordinary Rock (not requiring blasting) Manual Means Depth upto 3 m <i>Cost of dewatering upto 10 per cent of labour cost i.e. ₹17.28/- per cum may be added, where required. Assessment for dewatering shall be made as per site conditions..</i>	cum	177.30	

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1(II)B Note	Mechanical Means 1. Cost of dewatering upto 10 per cent of cost as mentioned in column - 4 may be added, where required Assessment for dewatering shall be made as per site conditions.	cum	57.70	Complete Rate
1(III) 1(III)A Note	Hard Rock (requiring blasting) Manual Means Cost of dewatering @ 10 per cent of cost as mentioned in column - 4 may be added, where required Assessment for dewatering shall be made as per site conditions.	cum	391.30	Material cost to be added as per Ch. A, Sl.No. 12.1
1(IV) 1(IV)A Note	Hard Rock (blasting prohibited) Mechanical Means 1. Cost of dewatering upto 10 per cent of cost as mentioned in column - 4, may be added, where required Assessment for dewatering shall be made as per site conditions. 2. In case of rock, foundation beyond 3m is not dug and hence not included.	cum	378.30	Complete Rate
1(V) 1(V)A Note	Marshy Soil Manual means 1. Cost of dewatering @ 30 per cent of labour cost i.e. ₹112.68/-, may be added, where required Assessment for dewatering shall be made as per site conditions. 2. Shoring & strutting 15 per cent of labour cost i.e. ₹56.34/-, where required may be added. 3. It is assumed that Marshy Soil will be available upto 3 m depth only. For deeper excavation below 3 m depth, refer analysis in item 1(i) to 1(iv) for ordinary soil.	cum	487.90	

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1(V)B Note	Mechanical Means 1. Cost of dewatering @ 20 per cent of cost as mentioned in column -4, may be added, where required. 2. Shoring & strutting @ 10 per cent of cost as mentioned in column -4, where required may be added. 3. It is assumed that Marshy Soil will be available upto 3 m depth only. For deeper excavation below 3 m depth, refer analysis in item 1(i) to 1(iv) for ordinary soil.	cum	146.20	Complete Rate
1(VI)	Back Filling in Marshy Foundation Pits	cum	320.50	
2	Filling Annular Space Around Footing in Rock with M15 grade P.C.C (Reference to MORT&H's specification 304).	cum	839.30	Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 12.8A.
3	Sand Filling in Foundation Trenches with good local sand free from earth not exceeding 150 mm compacted thickness including inundating each layer by profuse water and pocking and ramming layer by layer. Quality of sand is to be approved by the Engineer-in-charge.(Reference to MORT&H's specification 304).	cum	104.10	Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 12.3.
4	PCC 1:3:6 in Foundation Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days (Reference to MORT&H's specification 2100). Note Vibrator is a part of minor T & P which is already included in overhead charges of the contractor.	cum	743.20	Cost of materials to be added. Consumption of materials to be followed as per Ch. A.,Sl.No. 12.4.

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	Brick masonry work with 1st class full size bricks except when necessary to complete the bond in cement mortar 1:3 in foundation complete, including thoroughly soaking the bricks in a tank filled with water for a minimum period of one hour prior to being laid, protecting the green structure from rain by suitable covering and with a minimum Seven days curing etc., but excluding pointing and plastering, as per drawing and Technical Specifications.(Reference to MORT&H's specifications 1300 & 2200).	cum	1010.40	<i>Cost of materials to be added. Consumption of materials to be followed as as per Ch. A., Sl.No. 12.5.</i>
6A	Cement Mortar 1:3 (1 cement : 3 sand) (Sub Analysis)	cum	323.80	
6B	Cement Mortar1:2 (1cement :2 sand) (Sub Analysis)	cum	323.80	
6C	Cement Mortar1:4 (1cement :4 sand) (Sub Analysis)	cum	323.80	
6D	Cement Mortar1:6 (1cement :6 sand) (Sub Analysis)	cum	323.80	
7	Stone masonry work in cement mortar 1:3 for foundation complete all including curing, sufficiently wetted before its laying etc. as per drawing and Technical Specifications (Reference to MORT&H's specifications 1400 & 2200)			<i>Cost of material to be added Consumption of materials to be followed as per Ch. A , Sl.No. 12.6 & 12.7.</i>
7A	Square Rubble Coursed Rubble Masonry (first sort) (Reference to MORT&H's specification 1405.1.3).	cum	1420.40	
7B	Random Rubble Masonry (Reference to MORT&H's specification 1405.1.3).	cum	1291.30	
Note	The labour already considered in cement mortar has been taken into account while proposing labour for masonry works.			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Plain/Reinforced cement concrete in open foundation complete all including vibrating and compacting, finishing, curing, sampling, testing etc. as per drawing and Technical Specifications (Reference to MORT&H's specifications 1500, 1700 & 2200).			
8A	PCC Grade M15	cum	872.80	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.8.
Note	1) Add 4% extra cost as formwork over cost of material 2) Needle Vibrator is an item of minor T & P which is already included in overhead charges. Hence not added in rate analysis of cement concrete works.			
8B	PCC Grade M20	cum	832.10	
Note	Add 4% extra cost as formwork over cost of material			
8C	RCC Grade M20			
Case I	Using Concrete Mixer	cum	832.10	
Note	Add 4% extra cost as formwork over cost of material			
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	511.40	
Note	Add 4% extra cost as formwork over cost of material			
8D	PCC Grade M25			
Case I	Using Concrete Mixer	cum	830.10	
Note	Add 3.75% extra cost as formwork over cost of material			
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	510.10	
Note	Add 3.75% extra cost as formwork over cost of material			
8E	RCC Grade M25			
Case I	Using Concrete Mixer	cum	830.10	
Note	Add 3.75% extra cost as formwork over cost of material.			
	(Contd...)			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	510.10	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.8.
Note	Add 3.75% extra cost as formwork over cost of material			
8F	PCC Grade M30			
Case I	Using Concrete Mixer	cum	828.10	
Note	Add 3.5% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	508.90	
Note	Add 3.5% extra cost as formwork over cost of material			
8G	RCC Grade M30			
Case I	Using Concrete Mixer	cum	828.10	
Note	Add 3.5% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	508.90	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.8.
Note	Add 3.5% extra cost as formwork over cost of material			
8H	RCC Grade M35			
Case I	Using Concrete Mixer	cum	824.10	
Note	Add 3.0% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	506.50	
Note	1. Add 3.0% extra cost as formwork over cost of material 2. Where ever concrete is carried out using batching plant, transit mixer, concrete pump, Admixtures @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.			
9	WELL FOUNDATION Providing and Constructing Temporary Island 16 m diameter for Construction of Well Foundation for 8m dia. Well (Reference to MORT&H's specification 1200).			Complete Rate

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9A	Assuming depth of water 1.0 m and height of island to be 1.25 m.	1 No.	54807.90	Complete Rate
Note	<i>It is assumed that earth will be available within the working space of crane with grab bucket.</i>			
9B	Assuming depth of water 4.0 m and height of island 4.5 m.	1 No.	338669.30	
Note	<i>For other well diameters rate can be worked out on the basis of cross-sectional area of well. The diameter of the island shall be in the conformity with clause 1203.2 of MORT&H specifications.</i>			
9C	Providing and constructing one span service road to reach island location from one pier location to another pier location	RM	2835.80	
10	Providing and Laying Cutting Edge of Mild Steel weighing 40 kg per metre for Well Foundation complete as per Drawing and Technical Specification (Reference to MORT&H's specifications 1200 & 1900).	MT	73076.30	Complete Rate
11	Plain/Reinforced cement concrete in well foundation complete all including vibrating and compacting, finishing, curing, sampling, testing etc as per drawing and Technical Specifications (Reference to MORT&H's specifications 1200, 1500 & 1700).			<i>Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .</i>
11A 11A(i) Note	Well curb RCC M20 Grade <i>Add 20.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	961.20	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	590.20	<i>Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .</i>
11A(ii)	RCC M25 Grade			
Note	Add 20.0% extra cost as formwork over cost of material except the cost of admixture if applicable.			
Case I	Using Concrete Mixer	cum	961.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	590.20	
11A (iii)	RCC M35 Grade			
Note	Add 20.0% extra cost as formwork over cost of material except the cost of admixture if applicable.			
Case I	Using Concrete Mixer	cum	961.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	590.40	
Note.	If curb concrete is carried out within steel liner, cost of formwork shall be excluded for all items under 11A.			
11B	Well steining			
11B(i)	PCC M15 Grade			
Note	Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.			
Case I	Using Concrete Mixer	cum	924.00	
11B(ii)	PCC M20 Grade			
Note	Add 10.0% extra cost as formwork over cost of materia except the cost of admixture if applicable			
Case I	Using Concrete Mixer	cum	881.10	
11B(iii)	RCC M20 Grade			
Note	Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11B(iv)	PCC M25 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
11B(v)	RCC M25 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	
11B(vi)	PCC M30 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
11 B(vii)	RCC M30 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
11 B (viii)	RCC M35 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
11B (ix)	RCC M40 Grade	cum	758.00	
Note	<i>Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			

Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11C	Bottom Plug Concrete to be placed using tremie pipe Note 10% extra cement to be added where under water concreting is involved .			
11C (i)	PCC Grade M20 Note Add 5.0% extra cost over cost of material except the cost of admixture if applicable towards cost of forming sump, protective bunds, chisling & making arrangement for under water concreting with tremie pipe			
Case I	Using Concrete Mixer	cum	1168.20	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	645.10	
11C (ii)	PCC Grade M25 Note Add 5.0% extra cost over cost of material except the cost of admixture if applicable towards cost of forming sump, protective bunds, chisling & making arrangement for under water concreting with tremie pipe			Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .
Case I	Using Concrete Mixer	cum	1192.30	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	669.20	
11C (iii)	PCC Grade M30 Note Add 5.0% extra cost over cost of material except the cost of admixture if applicable towards cost of forming sump, protective bunds, chisling & making arrangement for under water concreting with tremie pipe			
Case I	Using Concrete Mixer	cum	1192.30	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	669.20	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11C(iv)	PCC Grade M35			
Note	<i>Add 5.0% extra cost over cost of material except the cost of admixture if applicable towards cost of forming sump, protective bunds, chislling & making arrangement for under water concreting with tremie pipe</i>			
Case I	Using Concrete Mixer	cum	1192.30	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	669.20	
11D	Intermediate plug			
11D(i)	Grade M20 PCC			
Case I	Using Concrete Mixer	cum	1135.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	635.00	
11D(ii)	Grade M25 PCC			
Case I	Using Concrete Mixer	cum	1158.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	658.00	
11D(iii)	Grade M30 PCC			
Case I	Using Concrete Mixer	cum	1158.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	658.00	
11E	Top plug			
11E(i)	Grade M15 PCC			
Case I	Using Concrete Mixer	cum	840.00	
11E (ii)	Grade M20 PCC			
Case I	Using Concrete Mixer	cum	801.00	
11E (iii)	Grade M25 PCC			
Case I	Using Concrete Mixer	cum	801.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	492.00	

Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11E (iii)	Grade M25 PCC			
Case I	Using Concrete Mixer	cum	801.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	492.00	
11E (iv)	Grade M30 PCC			
Case I	Using Concrete Mixer	cum	801.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	492.00	
11F	Well cap			
11F(i)	RCC Grade M20			
Note	<i>Add 4.0% extra cost as formwork over cost of material except the cost of admixture if applicable</i>			
Case I	Using Concrete Mixer	cum	832.10	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	511.40	
Note	<i>Where ever concrete is carried out using batching plant, transit mixer, concrete pump, Admixtures @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.</i>			
11F (ii)	RCC Grade M25			
Case I	Using Concrete Mixer	cum	830.10	
Note	<i>Add 3.75% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	510.10	
Note	<i>Add 4.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
11F(iii)	RCC Grade M30			
Note	<i>Add 3.5% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	828.10	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	508.90	

Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11F(iv) Note	RCC Grade M35 <i>Add 3.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			<i>Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., Sl.No. 12.11 .</i>
Case I	Using Concrete Mixer	cum	824.10	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	506.50	
Note	<i>Where ever concrete is carried out using batching plant, transit mixer, concrete pump, Admixtures @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.</i>			
11F(v) Note	RCC M40 Grade <i>Add 3.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
	Using Batching Plant, Transit Mixer and Concrete Pump	cum	709.80	
12	Sinking of 6 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification Section 1208).			<i>Complete Rate</i>
12A	Sandy Soil			
12A (i)	Depth below bed level upto 3.0 m	RM	4059.60	
12A (ii)	Beyond 3m upto 10m depth	RM	5791.70	
12A (iii)	Beyond 10m upto 20m	RM	6081.00	
Note	<i>Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12A (iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	10140.00	Complete Rate
12A (v) Note	Beyond 30m upto 40 m 1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	21388.00	
12B 12B (i)	Clayey Soil (6m dia. Well) Depth below bed level upto 3.0 m	RM	5800.00	
12B (ii)	Beyond 3m upto 10m depth	RM	12731.00	
12B (iii) Note	Beyond 10 m upto 20 m 1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add for dewatering @ 5 per cent of cost, if required.	RM	13368.00	
12B (iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add 5 per cent of cost for dewatering of the cost, if required	RM	22294.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12B (v) Note	Beyond 30m upto 40 m <i>1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i> <i>2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i> <i>3) Add for dewatering @ 5 per cent of cost, if required.</i>	RM	47015.00	Complete Rate
12C Note	Soft Rock (6m dia well) <i>Add for dewatering @ 5 per cent of cost, if required.</i>	RM	17522.00	
12D Note	Hard Rock (6m dia well) For depth in soft rock strata upto 3m <i>Add for dewatering @ 5 per cent of cost of labour & machinery i.e. ₹830.00/- per RM, if required.</i>	RM	18970.00	
13	Sinking of 7 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification Section 1208).			
13A 13A(i)	Sandy Soil Depth below bed level upto 3.0 m	RM	6150.00	Complete Rate
13A(ii)	Beyond 3m upto 10m depth	RM	8241.00	
13A(iii)	Beyond 10m upto 20m	RM	8653.00	
Note	<i>1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13A(iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	14431.00	Complete Rate
13A(v) Note	Beyond 30m upto 40 m 1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	30434.00	
13B	Clayey Soil (7m dia. Well)			
13B(i)	Depth below bed level upto 3.0 m	RM	8241.00	
13B(ii)	Beyond 3m upto 10m depth	RM	11872.00	
13B(iii) Note	Beyond 10 m upto 20 m 1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add for dewatering @ 5 per cent of cost, if required.	RM	12466.00	
13B(iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add 5 per cent of cost for dewatering of the cost, if required	RM	20789.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13B(v) Note	Beyond 30m upto 40 m <i>1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter.</i>	RM	43843.00	Complete Rate
	<i>2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i>			
	<i>3) Add for dewatering @ 5 per cent of cost, if required.</i>			
13C	Soft Rock (7m dia well) For depth in soft rock strata upto 3m	RM	14800.00	
Note	<i>Add for dewatering @ 5 per cent of cost of col. 4, if required.</i>			
13D	Hard Rock (7m dia well) For depth in soft rock strata upto 3m	RM	21395.00	
Note	<i>Add for dewatering @ 5 per cent of cost of labour & machinery i.e. ₹922.00/- per RM, if required.</i>			
14	Sinking of 8 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification Section 1208).			Complete Rate
14A	Sandy Soil			
14A(i)	Depth below bed level upto 3.0 m	RM	7524.00	
14A(ii)	Beyond 3m upto 10m depth	RM	9303.00	
14A(iii)	Beyond 10m upto 20m	RM	9768.00	
Note	<i>Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14A(iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter. 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	16288.00	Complete Rate
14A(v) Note	Beyond 30m upto 40 m 1) Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter. 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	34352.00	
14B	Clayey Soil (8m dia. Well)			
14B(i)	Depth from bed level upto 3.0 M	RM	10078.00	
14B(ii)	Beyond 3m upto 10m depth	RM	13416.00	
14B(iii) Note	Beyond 10 m upto 20 m 1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add for dewatering @ 5 per cent of cost, if required.	RM	14087.00	
14B(iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter. 2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add 5 per cent of cost for dewatering of the cost, if required.	RM	23493.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14B(v) Note	Beyond 30m upto 40 m <i>1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i>	RM	49545.00	Complete Rate
14C	Soft Rock (8m dia well) For depth in soft rock strata upto 3m Note <i>Add for dewatering @ 5 per cent of cost, if required.</i>	RM	16427.00	
14D	Hard Rock (8m dia well) For depth in soft rock strata upto 3m Note <i>Add for dewatering @ 5 per cent of cost of labour & machinery i.e. ₹922.27/- per RM, if required.</i>	RM	21528.00	
15	Sinking of 9 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification Section 1208).			
15A	Sandy Soil			Complete Rate
15A(i)	Depth below bed level upto 3.0 m	RM	7620.00	
15A(ii)	Beyond 3m upto 10m depth	RM	10213.00	
15A(iii)	Beyond 10m upto 20m Note <i>Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i>	RM	10723.00	
15A(iv)	Beyond 20m upto 30 m	RM	17882.63	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
15A(v)	Beyond 30m upto 40 m	RM	37713.50	
Note	1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
15B	Clayey Soil (9m dia. Well)			
15B (i)	Depth below bed level upto 3.0 m	RM	10638.00	
15B (ii)	Beyond 3m upto 10m depth	RM	14467.00	
15B (iii)	Beyond 10 m upto 20 m	RM	15190.00	
Note	1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add for dewatering @ 5 per cent of cost, if required.			
15B (iv)	Beyond 20m upto 30 m	RM	25332.00	
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
	3) Add 5 per cent of cost for dewatering of the cost, if required			
15B (v)	Beyond 30m upto 40 m	RM	53424.00	
Note	1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter (Contd...)			
				Complete Rate

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
15C	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add for dewatering @ 5 per cent of cost, if required. Soft Rock (9m dia well) For depth in soft rock strata upto 3m	RM	20579.00	Complete Rate
Note	Add for dewatering @ 5 per cent of cost, if required.			
15D	Hard Rock (9m dia well) For depth in soft rock strata upto 3m	RM	24210.00	
Note	Add for dewatering @ 5 per cent of cost of labour & machinery i.e. ₹1035/- per RM, if required.			
16	Sinking of 10 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification 1208).			Complete Rate
16A	Sandy Soil			
16A (i)	Depth below bed level upto 3.0 m	RM	9151.00	
16A (ii)	Beyond 3m upto 10m depth	RM	10796.00	
16A (iii)	Beyond 10m upto 20m	RM	11335.00	
Note	Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
16A (iv)	Beyond 20m upto 30 m	RM	18904.00	
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16A (v) Note	Beyond 30m upto 40 m <i>1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i> <i>2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i>	RM	39865.00	Complete Rate
16B 16B (i)	Clayey Soil (10m dia. Well) Depth below bed level upto 3.0 m	RM	11695.00	
16B (ii)	Beyond 3m upto 10m depth	RM	14318.00	
16B (iii) Note	Beyond 10 m upto 20 m <i>1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i> <i>2) Add for dewatering @ 5 per cent of cost, if required.</i>	RM	15033.00	
16B (iv) Note	Beyond 20m upto 30 m <i>1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i> <i>2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i> <i>3) Add 5 per cent of cost for dewatering of the cost, if required</i>	RM	25071.00	
16B (v) Note	Beyond 30m upto 40 m <i>1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter</i> <i>2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i> <i>3) Add for dewatering @ 5 per cent of cost, if required.</i>	RM	52872.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16C	Soft Rock (10m dia well) For depth in soft rock strata upto 3m Note Add for dewatering @ 5 per cent of cost, if required.	RM	20984.00	Complete Rate
16D	Hard Rock (10m dia well) For depth in soft rock strata upto 3m Note Add for dewatering @ 5 per cent of cost of machinery i.e. ₹631.30/- per RM, if required.	RM	28252.00	
17	Sinking of 11 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification 1208).			
17A	Sandy Soil			Complete Rate
17A (i)	Depth from bed level upto 3.0 m	RM	21059.00	
17A (ii)	Beyond 3m upto 10m depth	RM	23936.00	
17A (iii)	Beyond 10m upto 20m Note Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter	RM	25133.00	
17A (iv)	Beyond 20m upto 30 m Note 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.	RM	41916.00	
17A (v)	Beyond 30m upto 40 m Note 1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter (Contd...)	RM	88400.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
17B	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			Complete Rate
	Clayey Soil (11 m dia. Well)			
	17B (i) Depth from bed level upto 3.0 m	RM	19527.00	
	17B (ii) Beyond 3m upto 10m depth	RM	29530.00	
	17B (iii) Beyond 10 m upto 20 m	RM	31007.00	
	Note 1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add for dewatering @ 5 per cent of cost, if required.			
	17B (iv) Beyond 20m upto 30 m	RM	51711.00	
	Note 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
17C	3) Add 5 per cent of cost for dewatering of the cost, if required			Complete Rate
	17B (v) Beyond 30m upto 40 m	RM	109055.00	
	Note 1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
	3) Add for dewatering @ 5 per cent of cost, if required.			
	Soft Rock (11m dia well)			
	For depth in soft rock strata upto 3m	RM	47029.00	
	Note Add for dewatering @ 5 per cent of cost, if required.			
	17D Hard Rock (11m dia well)			
	For depth in soft rock strata upto 3m	RM	63255.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Add for dewatering @ 5 per cent of cost of machinery i.e. ₹741.95/- per RM, if required.			
18	Sinking of 12 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification 1208).			Complete Rate
18A	Sandy Soil			
18A (i)	Depth below bed level upto 3.0 m	RM	43486.00	
18A (ii)	Beyond 3m upto 10m depth	RM	49190.00	
18A (iii)	Beyond 10m upto 20m	RM	51650.00	
Note	Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter.			
18A (iv)	Beyond 20m upto 30 m	RM	86136.00	
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter. 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
18A(v)	Beyond 30m upto 40 m	RM	181660.00	
Note	1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
18B	Clayey Soil (12 m dia. Well)			
18B (i)	Depth below bed level upto 3.0 m	RM	47836.00	
18B (ii)	Beyond 3m upto 10m depth	RM	73939.00	
18B (iii)	Beyond 10 m upto 20 m	RM	77636.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter.			
	2) Add for dewatering @ 5 per cent of cost, if required.			
18B (iv)	Beyond 20m upto 30 m	RM	129472.00	
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
	2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
	3) Add 5 per cent of cost for dewatering of the cost, if required			
18B (v)	Beyond 30m upto 40 m	RM	273052.00	Complete Rate
Note	1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter.			
	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
	3) Add for dewatering @ 5 per cent of cost, if required.			
18C	Soft Rock (12m dia well) For depth in soft rock strata upto 3m	RM	110298.00	
Note	Add for dewatering @ 5 per cent of cost, if required.			
18D	Hard Rock (12m dia well) Depth in hard rock strata upto 3 m	RM	142799.00	
Note	Add for dewatering @ 5 per cent of cost, if required.			
19	Sinking of Twin D Type well (overall length=12m & overall width= 06 m) (other than pneumatic method of sinking) through all types of strata namely (Contd...)			Complete Rate

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level (Reference to MORT&H's specification 1208).			
19A	Sandy Soil			
19A(i)	Depth from bed level upto 3.0 m	RM	9860.00	
19A(ii)	Beyond 3m upto 10m depth	RM	10699.00	
19A(iii)	Beyond 10m upto 20m	RM	11234.00	
Note	Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter			
19A(iv)	Beyond 20m upto 30 m	RM	18735.00	
Note	1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
19A(v)	Beyond 30m upto 40 m	RM	39513.00	
Note	1) Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.			
19B	Clayey Soil (Twin D Type Well)			
19B(i)	Depth below bed level upto 3.0 m	RM	11556.00	
19B(ii)	Beyond 3m upto 10m depth	RM	15882.00	
19B(iii)	Beyond 10 m upto 20 m	RM	16676.00	
Note	1) Rate is provided for 11m depth. Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add for dewatering @ 5 per cent of cost, if required.			
				Complete Rate

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
19B(iv) Note	Beyond 20m upto 30 m 1) Rate is provided for 21m depth. Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add 5 per cent of cost for dewatering of the cost, if required	RM	27810.00	Complete Rate
19B(v) Note	Beyond 30m upto 40 m 1)Rate is provided for 31m depth. Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour. 3) Add for dewatering @ 5 per cent of cost, if required.	RM	58649.00	
19C Note	Soft Rock (Twin D Type Well) For depth in soft rock strata upto 3m Add for dewatering @ 5 per cent of cost, if required.	RM	23873.00	
19D Note	Hard Rock (Twin D Type Well) For depth in soft rock strata upto 3m Add for dewatering @ 5 per cent of cost of labour & machinery i.e. ₹1302.60/- per RM, if required.	RM	30398.00	
20	Pneumatic sinking of wells with equipment of approved design, drawing and specifications worked by competent and trained personnel and comprising of compression and decompression chambers, reducers, two air locks separately for men and plant & materials, arrangement for supply of fresh air to working chambers, check valves, exhaust valves, (Contd...)	cum	62883.10	
				Cost of materials to be added except the cost of admixture. Consumption of materials to be followed as per Ch. A., Sl.No. 12.20.

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	shafts made from steel plates of riveted construction not less than 6 mm thick to withstand an air pressure of 0.50 MPa, controlled blasting of hard rock where required, staircases and 1 m wide landing platforms with railing, arrangement for compression and decompression, electric lighting of 50 V maximum, proper rooms for rest and medical examinations and compliance with safety precautions as per IS:4138, all as per clause 1207.6 of MoRT&H Specifications (Reference to MoRT&H's specification 1208).			
	<p>Using batching plant</p> <p>1. The cost of induction, deinduction and erection of equipment shall be divided by the total quantity of pneumatic sinking for all the wells of a particular bridge to arrive at the per cum rate on account of this item.</p> <p>2. In case pneumatic sinking is involved on a dry bed, the provision of barge and boat i.e. ₹50/- may be deducted.</p> <p>3. The necessity and dimensions of the corbel will be as per actual ground conditions.</p> <p>4. Small equipments like welding sets, pumps, vibrators, pneumatic tools, portable lamps, fire extinguishers, hose pipes etc., have not been included as the same are covered as items of minor T&P under overhead charges.</p> <p>5. Depth of sinking shall be restricted to 30 m.</p>			<p><i>Cost of materials to be added except the cost of admixture. Consumption of materials to be followed as per Ch. A., Sl.No. 12.20.</i></p>
21	Sand Filling in Wells in layers with Sand free from earth, clay clods, roots, boulders, shingles etc and (Contd...)	cum	104.10	<p><i>Cost of materials to be added . Consumption of materials</i></p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	compacted by inundation with water and should be commenced after seven days after laying of bottom plug.complete as per Drawing and Technical Specifications (Reference to MORT&H's specification 1210).			<i>to be followed as per Ch. A., Sl.No. 12.21.</i>
22	Providing Steel Liner 10 mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing (Reference to MORT&H's specifications 1204 & 1900).	1 MT	66575.90	Complete Rate
23	<p>Bored cast-in-situ M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 750mm Using batching plant</p> <p>Note Add 5% of cost of material except the cost of admixture towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p>	RM	2765.50	<p><i>Cost of materials to be added except the cost of admixture . Consumption of materials to be followed as per Ch. A., Sl.No. 12.23.</i></p>
24	<p>Bored cast-in-situ M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m (Reference to MORT&H's specifications 1100, 1600 & 1700).</p> <p>Pile diameter = 1000mm Using batching plant</p> <p>Note Add 5% of cost of material except the cost of admixture towards cost of forming sump, (Contd...).</p>	RM	4267.70	<p><i>Cost of materials to be added except the cost of admixture. Consumption of materials to be followed as per Ch. A., Sl.No. 12.24.</i></p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p><i>protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</i></p> <p><i>In case permanent steel liner is considered in the design, the same may be included in the rate analysis.</i></p>			
25	<p>Bored cast-in-situ M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000 m (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 1200mm Using batching plant</p> <p>Note <i>Add 5% of cost of material except the cost of admixture towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</i></p> <p><i>In case permanent steel liner is considered in the design, the same may be included in the rate analysis.</i></p>	RM	4927.90	<p><i>Cost of materials to be added except the cost of admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.25.</i></p>
26	<p>Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 750mm Using batching plant</p> <p>Note <i>1) Add 5% of cost of material except the cost of MS clamp, steel helmet & cushion block and admixture towards cost of forming sump, protective bunds, (Contd...)</i></p>	RM	1737.60	<p><i>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.26.</i></p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
27	<p><i>chiselling and making arrangements for under water concreting with tremie pipe.</i></p> <p><i>2) In case steel lining is included in the design for driven cast-in-situ pile and is planned to be retained, the same may be included in the rate analysis. In case the temporary steel casing used during casting is planned to be removed, an additional cost @ 0.50 per cent for cost materials of concrete.</i></p> <p>Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 1000mm</p> <p>Using batching plant</p> <p>Note <i>1) Add 5% of cost of material except the cost of MS clamp, steel helmet & cushion block and admixture towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe..</i></p> <p><i>2) In case steel lining is included in the design for driven cast-in-situ pile and is planned to be retained, the same may be included in the rate analysis. In case the temporary steel casing used during casting is planned to be removed, an additional cost @ 0.50 per cent for cost materials of concrete.</i></p>	RM	2433.70	<p><i>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.27.</i></p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
28	<p>Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specification 1100 & 1700).</p> <p>Pile diameter = 1200mm Using batching plant</p> <p>Note 1) Add 5% of cost of material except the cost of MS clamp, steel helmet & cushion block and admixture towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p> <p>2) In case steel lining is included in the design for driven cast-in-situ pile and is planned to be retained, the same may be included in the rate analysis. In case the temporary steel casing used during casting is planned to be removed, an additional cost @ 0.50 per cent for cost materials of concrete.</p>	RM	3624.40	<p><i>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.28.</i></p>
29	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 500mm Using batching plant</p> <p>Note 1) Add 5% of cost of material except the cost of MS clamp and steel helmet & cushion block towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe..</p>	RM		ITEM DELETED

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	2) Add 1 per cent of cost of material except the cost of MS clamp and steel helmet & cushion block towards carriage of piles from casting yard to work site and stacking, and other imponderables during installation.			
30	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 750mm</p> <p>Using batching plant</p> <p>Note 1) Add 5% of cost of material except the cost of MS clamp and steel helmet & cushion block towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p> <p>2) Add 1 per cent of cost of material except the cost of MS clamp and steel helmet & cushion block towards carriage of piles from casting yard to work site and stacking, and other imponderables during installation.</p>	RM	1107.90	<p><i>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.30.</i></p>
31	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Pile diameter = 1000mm</p> <p>Using batching plant</p>	RM	1584.30	<p>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</p> <p>Consumption of materials to be followed as per Ch. A., Sl.No. 12.31.</p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>1) Add 5% of cost of material except the cost of MS clamp and steel helmet & cushion block towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p> <p>2) Add 1 per cent of cost of material except the cost of MS clamp and steel helmet & cushion block towards carriage of piles from casting yard to work site and stacking, and other imponderables during installation.</p>			
32	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Size of Pile = 300mm x 300mm Using batching plant</p> <p>Note 1) Add 5% of cost of material except the cost of MS clamp and steel helmet & cushion block towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p> <p>2) Add 1 per cent of cost of material except the cost of MS clamp and steel helmet & cushion block towards carriage of piles from casting yard to work site and stacking, and other imponderables during installation.</p>			<i>ITEM DELETED</i>
33	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Size of Pile = 500mm x 500mm</p>			<i>ITEM DELETED</i>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
34	<p>Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1700).</p> <p>Size of Pile = 750mm x 750mm</p> <p>Using batching plant</p> <p>Note 1) Add 5% of cost of material except the cost of MS clamp and steel helmet & cushion block towards cost of forming sump, protective bunds, chiselling and making arrangements for under water concreting with tremie pipe.</p> <p>2) Add 1 per cent of cost of material except the cost of MS clamp and steel helmet & cushion block towards carriage of piles from casting yard to work site and stacking, and other imponderables during installation.</p>	RM	1297.40	<p><i>Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture.</i></p> <p><i>Consumption of materials to be followed as per Ch. A., Sl.No. 12.34.</i></p>
35	<p>Driven Vertical Steel Piles complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1900).</p> <p>Section of the pile = H-section steel column 400mm x 250mm (ISHB series)</p>	RM	4754.30	Complete Rate
36	<p>Driven Vertical Steel Piles complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1900).</p> <p>Section of the pile = H-section steel column 450mm x 250mm (ISHB series)</p>	RM	5372.00	Complete Rate
37	Pile Load Test on single Vertical Pile in accordance with IS:2911(Part-4) (Reference to MORT&H's specification 1113).			<p>Complete Rate</p> <p><i>Not to be included in BOQ</i></p>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	a) Initial and routine load test	MT	464.06	
	b) Lateral load test	MT	7734.38	
Although, this item is incidental to work and is not required to be included in BOQ of contract, the same is required to be added in the estimate to assess cost of work.				
38	Reinforced cement concrete in Pile cap complete all including vibrating and compacting, finishing, curing, sampling, testing etc. as per drawing and Technical Specifications (Reference to MORT&H's specifications 1114, 1500 & 1700).			Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.38.
38A	RCC Grade M20			
38A(i)	Using Concrete Mixer	cum	852.80	
38A(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	552.40	
Note	Add 4.0% extra cost as formwork over cost of material			
38B	RCC Grade M25			
38B(i)	Using Concrete Mixer	cum	852.80	
38B(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	561.40	
Note	Add 4.0% extra cost as formwork over cost of material			
38C	RCC Grade M30			
38C(i)	Using Concrete Mixer	cum	852.80	
38C(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	552.40	
Note	Add 4.0% extra cost as formwork over cost of material			
38D	RCC Grade M35			
38D(i)	Using Concrete Mixer	cum	852.80	
38D(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	561.40	
Note	Add 4.0% extra cost as formwork over cost of material			

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FOUNDATION

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
39	Levelling Course for Pile cap Providing and laying of PCC M15 levelling course 100mm thick below the pile cap (Reference to MORT&H's specifications 1114 & 1700).	cum	796.40	<i>Cost of materials excluding binding wire to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.39.</i>
40	Supplying, binding, fixing etc. including initial straightening, cutting to requisite length, hooking and bending to correct shape, placing in proper position of uncoated HYSD reinforcement bar in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1600 & 2200).	MT	3518.00	<i>Cost of materials excluding binding wire to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.40.</i>
41	Supplying, binding, fixing etc. including initial straightening , cutting to requisite length, hooking and bending to correct shape, placing in proper position of uncoated mild steel reinforcement bar in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1600 & 2200).	MT	3809.50	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.41.</i>

CHAPTER - 13

SUB STRUCTURE

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SUBSTRUCTURE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	<p>Brick masonry work with 1st class full size bricks except when necessary to complete the bond in cement mortar 1:3 in sub-structure complete, including thoroughly soaking the bricks in a tank filled with water for a minimum period of one hour prior to being laid, protecting the green structure from rain by suitable covering and with a minimum Seven days curing etc., but excluding pointing and plastering, as per drawing and Technical Specifications.(Reference to MORT&H's specifications 1300 & 2200)..</p> <p>Note <i>Add 5% extra cost over material as scaffolding.</i></p>	cum	758.20	<p><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.1.</i></p>
2	<p>Pointing with cement mortar (1:3) on brick work including raking out joints in substructure as per Technical Specifications (Reference to MORT&H's specifications 1300 & 2200).</p> <p>Note <i>Scaffolding is already included in item 1 .1. If this is executed seperately then add for scaffolding @ 5 per cent of cost of material and labour</i></p>	10 sqm	415.30	<p><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.2.</i></p>

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SUBSTRUCTURE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3	Plastering with cement mortar (1:3) on brick work in sub-structure complete all including raking out joints curing, etc as per Technical Specifications (Reference to MORT&H's specifications 1300 & 2200).	10 sqm	452.30	<p><i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A , Sl.No. 13.3.</i></p>
Note	<p>1.Scaffolding is already included in item 1 .1. If this is executed</p> <p>2.The number of masons and Mazdoors already catered in the cement mortar have been taken into account while providing these categories in brick masonry, pointing and plastering.</p>			
4	Stone masonry work in cement mortar 1:3 for substructure complete all including curing, sufficiently wetted before its laying etc. as per drawing and Technical Specifications (Reference to MORT&H's specifications 1400 & 2200).			<p><i>Cost of materials to be added.</i> <i>Consumption of materials to be followed as per Ch. A , Sl.No. 13.4.</i></p>
4A	Random Rubble Masonry	cum	1139.30	
4B	Coursed rubble masonry (first sort)	cum	1379.70	

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Serial No	Item	Unit	Rate	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4C Note	Ashlar masonry (first sort) 1) Add 5% extra cost over material as scaffolding. 2) The labour already considered in the cement mortar have been taken into account while providing these categories in the stone masonry works.	cum	2241.70	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.4.C</i>
5	Plain/Reinforced cement concrete in sub-structure complete all including vibrating and compacting, finishing, curing, sampling, testing etc. by mechanically mixed as per drawing and Technical Specifications (Reference to MORT&H's specifications 1500, 1700 & 2200).			
5A Note	PCC Grade M15 Height upto 5m Add 10% extra cost as formwork over cost of material.	cum	924.00	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.</i>
5B Note	PCC Grade M20 Height upto 5m Add 10% extra cost as formwork over cost of material.	cum	881.10	
5C 5C(p) Note	PCC Grade M25 Height upto 5m Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	

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SUBSTRUCTURE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5C(q)	Height 5m to 10m			Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.
Note	1) Add 2 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 12% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	913.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	560.90	
5C(r)	Height above 10m			
Note	1) Add 4 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 15% extra cost as formwork over cost of material			
Case I	Using concrete Mixer	cum	953.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	585.50	
5D	PCC Grade M30			
5D(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
5D(q)	Height 5m to 10m			
Note	1) Add 2 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 12% extra cost as formwork over cost of material.			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using concrete Mixer	cum	913.10	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.</i>
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	560.90	
5D(r)	Height above 10m			
Note	1) Add 4 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 15% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	953.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	585.50	
5E	RCC Grade M20			
5E(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	
5E(q)	Height 5m to 10m			
Note	1) Add 2 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 12% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	913.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	561.00	

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SUBSTRUCTURE

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5E(r)	Height above 10m			<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.</i>
Note	1) Add 4 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 15% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	953.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	585.20	
5F	RCC Grade M25			
5F(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	
5F(q)	Height 5m to 10m			
Note	1) Add 1.8 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 11.8% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	909.90	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	559.00	
5F(r)	Height above 10m			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	1) Add 4 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 15% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	953.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	585.20	
5G	RCC Grade M30			
5G(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.00	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.</i>
5G(q)	Height 5m to 10m			
Note	1) Add 1.6 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 11.5% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	905.90	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	556.50	
5G(r)	Height above 10m			
Note	1) Add 3.5 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 14% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	941.20	

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	578.10	<p><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.5.</i></p>
5H	RCC Grade M35			
5H(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	881.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	541.20	
5H(q)	Height 5m to 10m			
Note	1) Add 1.4 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 11% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	900.30	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	553.00	
5H(r)	Height above 10m			
Note	1) Add 3 per cent extra cost of material excluding form work to cater for extra lift. 2) Add 13% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	929.20	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	570.70	
Note	a) Ramps/Stairs: Extra expenditure on structures which are more than 5 m high @ 2 per cent of cost for height upto 10 m and 4 per cent for heights above 10 m will be involved for approaching the work spot by providing higher ramp/stair case for use by the working parties.			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<i>b) The above mentioned percentages have been suitably modified for different categories as cost for various categories varies, whereas effort for access for same height will be similar. As the cost of richer concrete is comparatively more, the percentage to be added has been reduced to maintain the same cost for extra efforts.</i>			
6	Supplying, binding, fixing etc. including initial straightening, cutting to requisite length, hooking and bending to correct shape, placing in proper position of uncoated HYSD reinforcement bar in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1600 & 2200).	MT	3602.00	<i>Cost of materials to be added except cost of binding wire. Consumption of materials to be followed as per Ch. A , Sl.No. 13.6.</i>
7	Supplying, binding, fixing etc. including initial straightening , cutting to requisite length, hooking and bending to correct shape, placing in proper position of uncoated mild steel reinforcement bar in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1600 & 2200).	MT	3019.20	<i>Cost of materials to be added except cost of binding wire. Consumption of materials to be followed as per Ch. A , Sl.No. 13.7.</i>

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC/PVC/HDPC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 2706 & 2200).	Nos.	116.50	<p><i>Cost of materials to be added except cost of MS clamp, AC pipe and collar. Consumption of materials to be followed as per Ch. A , Sl.No. 13.8.</i></p>
Note	<p>1. In case of stone masonry, the size of the weep hole shall be 150 mm x 80 mm or circular with 150 mm diameter.</p> <p>2. For structure in stone masonry, the weep holes shall be deemed to be included in the item of stone masonry work and shall not be paid separately.</p>			
9	Back filling behind abutment, wing wall and return wall complete including sprinkling water and thoroughly compacted with plate compactor/power rammer in layers not exceeding 150mm compacted thickness as per drawing and Technical Specification (710.1.4 of IRC:78 & MoRTH's specification 2200)			<p><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.9.</i></p>
9A	Granular material	cum	283.80	
9B	Sandy material	cum	284.40	

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRT&H specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification (710.1.4 of IRC:78 & 2200).	cum	293.60	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A , Sl.No. 13.10.</i>
11	Supplying, fitting and fixing in position true to line and level cast steel rocker bearing conforming to IRC: 83(Pt.-1) section IX and clause 2003 of MoRT&H specifications complete including all accessories as per drawing and Technical Specifications (Reference to MoRT&H's specifications 2000, 1000 & 2200).	Tonne Capacity	1446.30	<i>Complete Rate (including cost of materials)</i>
Note	<i>Rate including of cost of foundation anchorage bolts, lifting arrangements, grease and other consumables.</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12	Supplying, fitting and fixing in position true to line and level forged steel roller bearing conforming to IRC: 83(Pt.-1) section IX and clause 2003 of MoRT&H specifications complete including all accessories as per drawing and Technical Specifications (Reference to MORT&H's specifications 2000, 1000 & 2200).	Tonne Capacity	2478.00	<i>Complete Rate (including cost of materials)</i>
Note	<i>Rate including of cost of foundation anchorage bolts, lifting arrangements, grease and other consumables.</i>			
13	Supplying, fitting and fixing in position true to line and level sliding plate bearing with PTFE surface sliding on stainless steel complete including all accessories as per drawing and Technical Specifications and BS: 5400, section 9.1 & 9.2 (for PTFE) and clause 2004 of MoRT&H Specifications (Reference to MORT&H's specifications 2000 & 2200).	Tonne Capacity	351.00	<i>Complete Rate (including cost of materials)</i>
Note	<i>Rate including of cost of foundation anchorage bolts, consumables.</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14	Supplying, fitting and fixing in position true to line and level elastomeric bearing conforming to IRC: 83 (Part-II) section IX and clause 2005 of MoRT&H specifications complete including all accessories as per drawing and Technical Specifications (Reference to MORT&H's specifications 2000 & 2200).	cu cm	1.00	<i>Complete Rate (including cost of materials)</i>
Note	<i>Rate including of cost of foundation anchorage bolts, consumables.</i>			
15	Supplying, fitting and fixing in position true to line and level sliding plate bearing with stainless steel plate sliding on stainless steel plate with mild steel matrix complete including all accessories as per drawing and Technical Specifications (Reference to MORTH's Specifications 2000 & 2200)	Tonne Capacity	510.00	<i>Rate is inclusive of cost of material</i>
Note	<i>Rate including of cost of foundation anchorage bolts, consumables.</i>			

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16	Supplying, fitting and fixing in position true to line and level POT-PTFE bearing consisting of a metal piston supported by a disc or unreinforced elastomer confined within a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel mating surface, complete assembly to be of cast steel/fabricated structural steel, metal and elastomer elements to be as per IRC: 83 part-I & II respectively and other parts conforming to BS: 5400, section 9.1 & 9.2 and clause 2006 of MoRTH Specifications complete as per drawing and approved Technical Specifications (Reference to MORT&H's specifications 2000 & 2200).	Tonne Capacity	398.00	<i>Complete Rate (including cost of materials)</i>
Note	Rate including of cost of foundation anchorage bolts, consumables.			

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SUPER STRUCTURE

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SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Furnishing and Placing Reinforced/ Prestressed cement concrete in super- structure all including vibrating and compacting, finishing, curing, sampling, testing etc. by mechanically mixed as per clause 1719 of MoRTH but excluding the cost of materials as per drawing and Technical Specification (Reference to MORT&H's specifications 1500, 1600,1700 & 1800).			
1A	RCC Grade M20			
Case I	Using Concrete Mixer			
1.A.I(i)	For solid slab super-structure			
1.A.I(i)(a)	Height upto 5m	cum	960.00	Cost of materials to be added . Consumption of materials [for the items from Sl. No.1.A.I(i)(a) to 1.A.II(i)(a)] to be followed as per Ch. A., Sl.No. 14.1.
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			
1.A.I (i)(b)	Height 5m to 10m	cum	1000.10	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.A.I(i)(c)	Height above 10m	cum	1040.10	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.A.I(ii)	For T-beam & slab			
1.A.I(ii)(a)	Height upto 5m	cum	1000.10	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.A.I(ii)(b)	Height 5m to 10m	cum	1040.10	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.A.I(ii)(c)	Height above 10m	cum	1080.10	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump			
1.A.II(i)	For solid slab super-structure			
1.A.II(i)(a)	Height upto 5m	cum	590.10	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.A.II(i) (b) Note:	Height 5m to 10m <i>For formwork and staging component add 25 per cent of the material cost.</i>	cum	614.60	Cost of materials to be added . Consumption of materials [for the items from Sl. No.1.A.II(ii)(b) to 1.B.I(ii)(a)] to be followed as per Ch. A., Sl.No. 14.1.
1.A.II(i) (c) Note:	Height above 10m <i>For formwork and staging component add 30 per cent of the material cost.</i>	cum	639.20	
1.A.II(ii) 1.A.II(ii)(a) Note:	For T-beam & slab Height upto 5m <i>For formwork and staging component add 25 per cent of the material cost.</i>	cum	614.60	
1.A.II(ii)(b) Note:	Height 5m to 10m <i>For formwork and staging component add 30 per cent of the material cost.</i>	cum	639.20	
1.A.II(ii)(c) Note:	Height above 10m <i>For formwork and staging component add 35 per cent of the material cost.</i>	cum	663.80	
1B	RCC Grade M25			
Case I	Using Concrete Mixer			
1.B.I(i) 1.B.I(i)(a) Note:	For solid slab super-structure Height upto 5m <i>For formwork and staging component add 20 per cent of the material cost.</i>	cum	960.00	
1.B.I(i) (b) Note:	Height 5m to 10m <i>For formwork and staging component add 25 per cent of the material cost.</i>	cum	1000.10	
1.B.I(i) (c) Note:	Height above 10m <i>For formwork and staging component add 30 per cent of the material cost.</i>	cum	1040.10	
1.B.I(ii) 1.B.I(ii) (a) Note:	For T-beam & slab Height upto 5m <i>For formwork and staging component add 25 per cent of the material cost.</i>	cum	1000.10	

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.B.I(ii) (b)	Height 5m to 10m	cum	1040.10	Cost of materials to be added . Consumption of materials [for the items from Sl. No.1.B.I(ii)(b) to 1.C.I(i) (a)] to be followed as per Ch. A., Sl.No. 14.1.
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.B.I(ii) (c)	Height above 10m	cum	1080.10	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump			
1.B.II(i)	For solid slab super-structure			
1.B.II(i) (a)	Height upto 5m	cum	590.10	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			
1.B.II(i)(b)	Height 5m to 10m	cum	614.60	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.B.II(i)(c)	Height above 10m	cum	639.20	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.B.II(ii)	For T-beam & slab			
1.B.II(ii)(a)	Height upto 5m	cum	614.60	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.B.II(ii)(b)	Height 5m to 10m	cum	639.20	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.B.II(ii)(c)	Height above 10m	cum	663.80	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
1C	RCC Grade M 30			
Case I	Using Concrete Mixer			
1.C.I(i)	For solid slab super-structure			
1.C.I(i)(a)	Height upto 5m	cum	988.50	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.C.I(i)(b)	Height 5m to 10m	cum	1029.70	Cost of materials to be added . Consumption of materials [for the items from Sl. No.1.C.I(ii)(b) to 1.C.II(ii)(b)] to be followed as per Ch. A., Sl.No. 14.1.
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.C.I(i)(c)	Height above 10m	cum	1071.00	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.C.I(ii)	For T-beam & slab			
1.C.I(ii)(a)	Height upto 5m	cum	1029.70	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.C.I(ii)(b)	Height 5m to 10m	cum	1071.00	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.C.I(ii)(c)	Height above 10m	cum	1112.00	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump.			
1.C.II(i)	For solid slab super-structure			
1.C.II(i)(a)	Height upto 5m	cum	593.60	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			
1.C.II(i)(b)	Height 5m to 10m	cum	618.00	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.C.II(i)(c)	Height above 10m	cum	643.10	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.C.II(ii)	For T-beam & slab			
1.C.II(ii)(a)	Height upto 5m	cum	618.00	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.C.II(ii)(b)	Height 5m to 10m	cum	643.10	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.C.II(ii)(c)	Height above 10m	cum	667.80	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
1D	RCC/PSC Grade M35			
Case I	Using Concrete Mixer.			
1.D.I(i)	For solid slab super-structure			
1.D.I(i)(a)	Height upto 5m	cum	972.00	
Note:	<i>For formwork and staging component add 18 per cent of the material cost.</i>			
1.D.I(i)(b)	Height 5m to 10m	cum	1013.20	
Note:	<i>For formwork and staging component add 23 per cent of the material cost.</i>			
1.D.I(i)(c)	Height above 10m	cum	1054.40	
Note:	<i>For formwork and staging component add 28 per cent of the material cost.</i>			
1.D.I(ii)	For T-beam & slab			
1.D.I(ii)(a)	Height upto 5m	cum	1013.20	
Note:	<i>For formwork and staging component add 23 per cent of the material cost.</i>			
1.D.I(ii)(b)	Height 5m to 10m	cum	1054.40	
Note:	<i>For formwork and staging component add 28 per cent of the material cost.</i>			
1.D.I(ii)(c)	Height above 10m	cum	1095.60	
Note:	<i>For formwork and staging component add 33 per cent of the material cost.</i>			
1.D.I(iii)	For box girder and balanced cantilever			
1.D.I(iii)(a)	Height upto 5m	cum	1136.80	
Note:	<i>For formwork and staging component add 38 per cent of the material cost.</i>			

*Cost of materials to be added .
Consumption of materials
[for the items from Sl.
No.1.C.II(ii)(c) to
1.D.I(iii)(a)]
to be followed as per
Ch. A., Sl.No. 14.1.*

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.D.I(iii)(b)	Height 5m to 10m	cum	1219.10	Cost of materials to be added. Consumption of materials [for the items from Sl. No.1.D.I (iii) (b) to 1.D.II (iii)(b)] to be followed as per Ch. A., Sl.No. 14.1.
Note:	<i>For formwork and staging component add 48 per cent of the material cost.</i>			
1.D.I(iii)(c)	Height above 10m	cum	1301.50	
Note:	<i>For formwork and staging component add 58 per cent of the material cost.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump			
1.D.II(i)	For solid slab super-structure			
1.D.II(i)(a)	Height upto 5m	cum	583.70	
Note:	<i>For formwork and staging component add 18 per cent of the material cost.</i>			
1.D.II(i)(b)	Height 5m to 10m	cum	608.40	
Note:	<i>For formwork and staging component add 23 per cent of the material cost.</i>			
1.D.II(i)(c)	Height above 10m	cum	633.20	
Note:	<i>For formwork and staging component add 28 per cent of the material cost.</i>			
1.D.II(ii)	For T-beam & slab			
1.D.II(ii)(a)	Height upto 5m	cum	608.40	
Note:	<i>For formwork and staging component add 23 per cent of the material cost.</i>			
1.D.II(ii)(b)	Height 5m to 10m	cum	633.20	
Note:	<i>For formwork and staging component add 28 per cent of the material cost.</i>			
1.D.II(ii) (C)	Height above 10m	cum	657.90	
Note:	<i>For formwork and staging component add 33 per cent of the material cost.</i>			
1.D.II(iii)	For box girder and balanced cantilever			
1.D.II(iii)(a)	Height upto 5m	cum	683.00	
Note:	<i>For formwork and staging component add 38 per cent of the material cost.</i>			
1.D.II(iii)(b)	Height 5m to 10m	cum	732.10	
Note:	<i>For formwork and staging component add 48 per cent of the material cost.</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.D.II(iii)(c)	Height above 10m	cum	781.60	<p><i>Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1.D.II(iii)(c) to.E.I(ii)(c)] to be followed as per Ch. A., Sl.No. 14.1.</i></p>
Note:	<i>For formwork and staging component add 58 per cent of the material cost.</i>			
1E	PSC Grade M-40			
Case I	Using concrete mixer.			
1.E.I(i)	For solid slab super-structure			
1.E.I(i)(a)	Height upto 5m	cum	1272.50	
Note:	<i>For formwork and staging component add 20 per cent of the material cost except the cost of Admixture.</i>			
1.E.I(i)(b)	Height 5m to 10m	cum	1325.50	
Note:	<i>For formwork and staging component add 25 per cent of the material cost except the cost of Admixture.</i>			
1.E.I(i)(c)	Height above 10m	cum	1378.50	
Note:	<i>For formwork and staging component add 30 per cent of the material cost except the cost of Admixture.</i>			
1.E.I(ii)	For T-beam & slab			
1.E.I(ii)(a)	Height upto 5m	cum	1325.50	
Note:	<i>For formwork and staging component add 25 per cent of the material cost except the cost of Admixture.</i>			
1.E.I(ii)(b)	Height 5m to 10m	cum	1378.50	
Note:	<i>For formwork and staging component add 30 per cent of the material cost except the cost of Admixture.</i>			
1.E.I(ii)(c)	Height above 10m	cum	1431.50	
Note:	<i>For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.</i>			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.E.II(i)	For solid/voided slab superstructure			
1.E.II(i)(a)	Height upto 5m	cum	822.80	
Note:	<i>For formwork and staging component add 18 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(i)(b)	Height 5m to 10m	cum	857.70	
Note:	<i>For formwork and staging component add 23 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(i)(c)	Height above 10m	cum	892.60	
Note:	<i>For formwork and staging component add 28 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(ii)	For T-beam & slab including launching of precast girder by launching truss upto 40m span.			
1.E.II(ii)(a)	Height upto 5m	cum	857.70	
Note:	<i>For formwork and staging component add 23 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(ii)(b)	Height 5m to 10m	cum	892.60	
Note:	<i>For formwork and staging component add 28 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(ii)(c)	Height above 10m	cum	927.40	
Note:	<i>For formwork and staging component add 33 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(iii)	For cast-in-situ box girder, segment construction and balanced cantilever			
1.E.II(iii)(a)	Height upto 5m	cum	962.30	

*Cost of materials to be added , except the cost of Admixture.
Consumption of materials [for the items from Sl. No.1.E.II(i)(a) to 1.E.II(iii)(a)] to be followed as per Ch. A., Sl.No. 14.1.*

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note:	<i>For formwork and staging component add 38 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(iii)(b)	Height 5m to 10m	cum	1032.00	
Note:	<i>For formwork and staging component add 48 per cent of the material cost except the cost of Admixture.</i>			
1.E.II(iii)(c)	Height above 10m	cum	1102.00	
Note:	<i>For formwork and staging component add 58 per cent of the material cost except the cost of Admixture.</i>			
1F	PSC Grade M-45			
1F(i)	For solid/voided slab superstructure			
1F(i)(a)	Height upto 5m	cum	828.00	Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1.E II(iii)(b) to 1.F.(ii)(b)] to be followed as per Ch. A., Sl.No. 14.1.
Note:	<i>For formwork and staging component add 16 per cent of the material cost except the cost of Admixture.</i>			
1F(i)(b)	Height 5m to 10m	cum	863.20	
Note:	<i>For formwork and staging component add 21 per cent of the material cost except the cost of Admixture.</i>			
1F(i)(c)	Height above 10m	cum	898.90	
Note:	<i>For formwork and staging component add 26 per cent of the material cost except the cost of Admixture.</i>			
1F(ii)	For T-beam & slab including launching of precast girders by launching truss upto 40 m span			
1F(ii)(a)	Height upto 5m	cum	863.20	
Note:	<i>For formwork and staging component add 21 per cent of the material cost except the cost of Admixture.</i>			
1F(ii)(b)	Height 5m to 10m	cum	898.90	
Note:	<i>For formwork and staging component add 26 per cent of the material cost except the cost of Admixture.</i>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1F(ii)(c)	Height above 10m Note: <i>For formwork and staging component add 31 per cent of the material cost except the cost of Admixture.</i>	cum	934.60	Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1F(ii)(c) to 1(G)(i)(b)]
1F(iii)	For cast-in-situ box girder, segmental construction and balanced cantilever			
1F(iii)(a)	Height upto 5m Note: <i>For formwork and staging component add 36 per cent of the material cost except the cost of Admixture.</i>	cum	970.30	
1F(iii)(b)	Height 5m to 10m Note: <i>For formwork and staging component add 46 per cent of the material cost except the cost of Admixture.</i>	cum	1041.60	
1F(iii)(c)	Height above 10m Note: <i>For formwork and staging component add 56 per cent of the material cost except the cost of Admixture.</i>	cum	1112.90	
1(G)	PSC Grade M-50			
1(G)(i)	For cast-in-situ box girder, segmental construction and balanced cantilever			
1(G)(i)(a)	Height upto 5m Note: <i>For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.</i>	cum	978.60	
1(G)(i)(b)	Height 5m to 10m Note: <i>For formwork and staging component add 45 per cent of the material cost except the cost of Admixture.</i>	cum	1051.00	

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1(G)(i)(c) Note:	Height above 10m <i>For formwork and staging component add 55 per cent of the material cost except the cost of Admixture.</i>	cum	1123.60	Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1G(i)(c) to 1(H)(i)(c)]
1(H) 1(H)(i)	PSC Grade M- 55 For cast-in-situ box girder, segmental construction and balanced cantilever			
1(H)(i)(a) Note:	Height upto 5m <i>For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.</i>	cum	1003.00	
1(H)(i)(b) Note:	Height 5m to 10m <i>For formwork and staging component add 45 per cent of the material cost except the cost of Admixture.</i>	cum	1077.30	
1(H)(i)(c) Note:	Height above 10m <i>For formwork and staging component add 55 per cent of the material cost except the cost of Admixture.</i>	cum	1152.00	
Note	<p>1.Where ever concrete is carried out using batching plant, transit mixer, concrete pump, admixtures conforming IS: 9103 @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.</p> <p>2. Cement provided for various components of the super structure is for estimating purpose only. Actual quantity of cement will be as per approved mix design. Similarly, the provision for coarse and fine aggregates is for estimating purpose and the exact quantity shall be as per the mix design.</p>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	3. The items like needle and surface vibrators are part of minor T & P which is already covered under the overhead charges. As such these items have not been added separately in the rate analysis.			
2	Supplying, binding, fixing etc. including initial straightening, cutting to requisite length, hooking and bending to correct shape, placing in proper position of uncoated HYSD reinforcement bar in super-structure complete as per drawing and technical specifications (Reference to MORT&H's specification 1600) .	MT	4719.00	<i>Cost of materials except binding wire to be added. Consumption of materials as per Ch. A., Sl.No. 14.2.</i>
3	High tensile steel wires/strands including all accessories for stressing, stressing operations and grouting and making ensure all safety measure to be considered during operation as per MoRTH's cl. 1812 complete as per drawing and Technical Specifications (Reference to MORT&H's specification 1800) .	MT	11927.00	<i>Cost of materials to be added. Consumption of materials as per Ch. A., Sl.No. 14.3</i>
Note	1) Add 0.50 % cost of material for Spacers, Insulation tape and miscellaneous items			
4	Providing and laying Cement concrete wearing coat M-30 grade complete all including vibrating and compacting, finishing, curing, sampling, testing etc as per clause 1719 of MoRTH including reinforcement complete as per drawing and Technical Specifications (Reference to MORT&H's specification 2702.2).	cum	895.10	<i>Cost of materials except binding wire to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.4.</i>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	<p><u>Mastic Asphalt</u></p> <p>Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab excluding prime coat with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 9.5 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces not less than 100 deg. C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 516 (Reference to MORT&H's specifications 516 & 2702).</p>	sqm		DELETED
Note	<p>1.The rates for 6 mm or any other thickness may be worked out on pro-rata basis.</p> <p>2. Where tack coat is required to be provided before laying mastic asphalt, the same is required to be measured and paid separately.</p> <p>3.The quantities of binder, filler and aggregates are for estimating purpose. Exact quantities shall be as per mix design.</p> <p>4.This rate analysis is based on design made by CRRRI for a specific case and is meant for estimating purposes only. Actual design is required to be done for each case.</p> <p>5.The quantity of bitumen works out 17 per cent of the mastic asphalt blocks without aggregates and falls within the standards laid down by MoRT&H Specifications.</p>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	<p>Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolerance of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, with a minimum 10 days curing complete as per approved drawings and technical specifications (Reference to MORT&H's specifications 2703, 1500, 1600 & 1700).</p>	RM	135.80	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.6.</i>
Note	<p>1) Add 5% of cost of material of concrete for formwork for casting in casting yard.</p> <p>2) Add 5% of cost of total material for handling & fixing of precast panels in positions.</p> <p>3) Quantity of materials have been adopted from Standard plans of MORT&H vide drawing no. SD/202</p>			
7	<p>Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolerance of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, complete as per approved drawings and technical specifications (Reference to MORT&H's specifications 2703, 1500, 1600 & 1700).</p>	RM	132.30	<i>Cost of materials to be added. Consumption of materials as per Ch. A., Sl.No. 14.7.</i>
Note	<p>1) Add 12% of cost of material of concrete for formwork.</p> <p>2) Quantity of materials have been adopted from Standard plans of MORT&H vide drawing no. SD/202</p>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Providing, fitting and fixing mild steel railing with one shop coat with red oxide primer and three coats of synthetic enamel paint and consumables to safeguard against weathering and corrosion complete as per drawing and Technical Specification (Reference to MORT&H's specifications 2703.2 & 1900).	RM	2603.00	Complete Rate (including cost of materials)
9	<p>Drainage Spouts not less than 100 mm dia of corrosive resistance material ,spacing not exceeding 10 m. complete as per drawing and Technical specification (Reference to MORT&H's specification 2705).</p> <p>Note</p> <p>1. In case of viaducts in urban areas, the drainage spouts should be connected with suitably located pipelines to discharge the surface run-off to drains provided at ground level.</p> <p>2. In case of bridges, sufficient length of G.I Pipe shall be provided to ensure that there is no splashing of water from the drainage spout on the structure.</p> <p>3. Add @ 5 per cent of cost of corrosion resistant structural steel for electrodes, cutting gas, sealant, anti-corrosive bituminous paint, mild steel grating etc.</p>	No.	761.00	Cost of corrosion resistant structural steel to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.9.
10	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification (Reference to MORT&H's specifications 2700).	cum	840.00	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.10.

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Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11	Reinforced cement concrete approach slab including reinforcement and formwork, curing complete as per drawing and Technical specification (Reference to MORT&H's specifications 1500, 1600, 1700 & 2704).	cum	738.00	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.11.</i>
Note:	Using batching plant 1) For formwork component add 2 per cent of the material cost. 2) The grade of reinforced cement concrete shall be adopted as M30 .			
12	HYSD reinforcement with Fusion Bonded Epoxy Coating (FBEC) (Reference to MORT&H's specification 1600 and cl. 1010.3.2.of section 1000 of MoRTH).1600).	MT		<i>To be taken as per the prevailing market rates.</i>
Note	Contractors generally do not have expertise for this item . The job is therefore, got done from specialized firms who have the expertise in the field of construction chemicals. The prevailing rate in the market is required to be ascertained from the market and added in the cost estimate. Detailed guidelines in this regard have been issued by MoRTH vide their circular no. RW/NH-34041/44/91-S&R dated 21.3.2000.			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13	Precast - pretensioned Girders Providing, precasting, transportation and placing in position precast pretensioned concrete girders as per drawing and technical specifications (Reference to MORT&H's specifications 1800 & 2300). Grade of concrete M40 Note: 1) For formwork and staging component 2) Add 1% as consumable over the cost of materials except the cost of admixture & HT strand.	cum	8655.00	<i>Cost of materials except admixtures & HT Strand to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.13.</i>
14	Providing and fixing Helical pipes in voided concrete slabs (Reference to MORT&H's specifications 1700 & 1800). Note: Including cost of materials for sealing joints etc.	RM	1337.00	<i>Complete rate. Consumption of materials to be followed as per Ch. A., Sl.No. 14.14.</i>
15	Crash Barriers Note: The rate analysis for rigid crash barrier in reinforced cement concrete, semi-rigid crash barrier with metal beam and flexible crash barrier with wire ropes have been made and included in chapter-8 on Traffic and Transportation (Reference to MORT&H's specification 800).			
16	<u>Painting on concrete surface</u> Providing and applying 2 coats of water based cement paint to unplastered concrete surface after cleaning the surface of dirt, dust, oil, grease, efflorescence and applying paint @ of 1 litre for 2 sqm (Reference to MORT&H's specification 800).	sqm	35.00	Complete Rate .(including materials)

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc	
1	2	3	4	5
17	<u>Burried Joint</u> Providing and laying a burried expansion joint, expansion gap being 20 mm, covered with 12 mm thick, 200 mm wide galvanised weldable structural steel plate as per IS: 2062, placed symmetrical to centre line of the joint, resting freely over the top surface of the deck concrete, welding of 8 mm dia. 100 mm long galvanised nails spaced 300 mm c/c along the centre line of the plate, all as specified in clause 2604 (Reference to MORT&H's specification 2604). Note 1) Add 1% of cost of steel plate for cutting, welding consumables & galvanised nails. 2) Guidelines laid down vide the MoRT&H circular No. RW/NH-34059/1/96-S&R dated 30.11.2000 and subsequent corrigendum dated 25.01.2001 may be referred for expansion joints.	RM	886.00	<i>Complete Rate .</i>
18	Filler joint (Reference to MORT&H's specification 2604).			
18(i)	Providing & fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawing & Technical Specification.	RM	3135.00	<i>Complete Rate</i>
18(ii)	Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing & Technical Specification.	RM	206.00	<i>Complete Rate</i>
18(iii)	Providing and fixing in position 20 mm thick premoulded joint filler in expansion joint for fixed ends of simply supported spans not exceeding 10 m to cater for a horizontal movement upto 20 mm, covered with sealant complete as per drawing and technical specifications.	RM	159.00	<i>Complete Rate</i>

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18(iv)	Providing and filling joint sealing compound as per drawings and technical specifications with coarse sand and 6 per cent bitumen by weight	RM	18.00	<i>Cost of materials to be added. Consumption of material to be followed as per Ch. A., Sl.No. 14.18.(iv)</i>
Note	<i>For arriving at the final rate of filler joints per metre length & per cm depth of joint filling compound, the rates at Sr. no. i, ii, iii & iv shall be added.</i>			
19	Asphaltic Plug joint Providing and laying of asphaltic plug joint to provide for horizontal movement of 25 mm and vertical movement of 2 mm, depth of joint varying from 75 mm to 100 mm, width varying from 500 mm to 750 mm (in traffic direction), covered with a closure plate of 200mm x 6mm of weldable structural steel conforming to IS: 2062, asphaltic plug to consist of polymer modified bitumen binder, carefully selected single size aggregate of 12.5 mm nominal size and a heat resistant foam caulking/backer rod, all as per approved drawings and specifications (Reference to MORT&H's specification 2608).	RM	529.00	<i>Cost of materials to be added except the cost of galvanised structural steel plate. Consumption of materials to be followed as per Ch. A., Sl.No. 14.19</i>
Note	<p>Continuation of Asphaltic Plug joint:</p> <p>1) Add 1% of cost of material except Galvanised structural steel plate for welding & foam caulking / backer rod & other incidental.</p> <p>2) The nominal size of aggregates shall be 12.5 mm for depth of joint upto 75 mm and 20 mm for joints of depth more than 75 mm.</p>			

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Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
20	<u>Elastomeric Slab Seal Expansion Joint:</u> Providing and laying of an elastomeric slab seal expansion joint, catering to right or skew (less than 20 deg., moderately curved with maximum horizontal movement upto 50 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation and clause 2605 of MoRT&H specifications for road & bridge works :- (a) For movement up to ± 10 mm - Type : m20 (b) For movement up to ± 16 mm - Type : m32 (c) For movement up to ± 25 mm - Type : m50 (d) For movement up to ± 40 mm - Type : m80			
		RM	17260.00	<i>Complete Rate</i>
		RM	20201.00	
		RM	28394.00	
21	<u>Compression Seal Joint :</u> Providing and laying of compression seal joint consisting of steel armoured nosing at two edges of the joint gap suitably anchored to the deck concrete and a preformed chloroprene elastomer or closed cell foam joint sealer compressed and fixed into the joint gap with special adhesive binder to cater for a horizontal movement upto 40 mm and vertical movement of 3 mm (Reference to MORT&H's specification 2609).			
		RM	40998.00	<i>Complete Rate</i>
		RM	1903.00	

CHAPTER - 14
SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</p> <p>2. The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</p> <p>3. The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</p>			
22	<p><u>Strip Seal Expansion Joint</u></p> <p>Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 80 mm manufactured by MORT&H ,GOI Approved/Empanelled manufacturer and complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation (Reference to MORT&H's specification 2606).</p>	RM	7390.00	Complete Rate
Note	<p>1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</p> <p>2. The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</p>			

CHAPTER - 14
SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1 23	<p style="text-align: center;">2</p> <p><u>Modular Strip / Box Seal Joint</u></p> <p>Providing and laying of a modular strip seal expansion joint catering to maximum horizontal movement beyond 80 mm and upto 160 mm manufactured by MORT&H ,GOI Approved/Empanelled manufacturer and complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation (Reference to MORT&H's specification 2607).</p>	3 RM	4 106427.00	5 <i>Complete Rate</i>
Note	<p>1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</p> <p>2. The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</p> <p>3. The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</p>			

CHAPTER - 14

SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
24	Modular Strip / Box Seal Joint Providing and laying of a modular strip box seal expansion joint catering to a horizontal movement beyond 160mm and upto 240mm, manufactured by MORT&H, GOI Approved/Empanelled manufacturer and complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation (Reference to MORT&H's specification 2607).	RM	170267.00	Complete Rate
Note	1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer. 2. The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck. 3. The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.			

CHAPTER - 15

RIVER TRAINING AND PROTECTION WORKS

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	<p>Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 40 kg each template cross wall in dry wall masonry shall be built about a meter thick & to the full height of the specified thickness of apron at 30 mt. interval complete as per drawing and Technical specification (Reference to MORT&H's specification 2503).</p>			<p><i>Material cost to be added. Consumption of materials is to be followed as per chapter - A, Sl. No.15.1</i></p>
1A	Boulder Laid Dry Without Wire Crates.	cum	421.10	
Note	Nominal excavation required for preparation of bed has been taken into account while making provision for labour.			
2	<p>Boulder Apron Laid in Wire Crates</p> <p>Providing and laying of boulder apron laid in wire crates made with 4mm dia wire dia not less than 4mm GI wire conforming to IS: 280 & IS:4826 in 100mm x 100mm mesh Mesh size not more than 150mm (weaved diagonally) including 10 per cent extra for laps and joints laid with stone boulders weighing not less than 40 kg each (Tensile strength 300-450mpa, size of wire crates 3.0mx1.50mx1.25 m) (Reference to MORT&H's specification 2503).</p>	cum	1992.80	<p><i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.2</i></p>

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>Readymade woven wire crate rolls have been considered in the rate analysis. In case readymade rolls are not available, GI wire 4mm dia. @ 32 kg per 10 sqm may be provided. In that case 2 per cent of the cost of GI wire may be added for weaving the wire crates.</i>			
3	Cement Concrete Blocks (size 0.5 x 0.5 x 0.5 m) Providing and laying of apron with cement concrete blocks of size 0.5x0.5x0.5 m cast in-situ and made with nominal mix of M-15 grade cement concrete with a minimum cement content of 250 kg/cum as per IRC: 21-2000 (Reference to MORT&H's specification 2503).	cum	890.50	Material cost to be added. Consumption of materials is to be followed as per chapter - A, Sl. No.15.3
Note	<i>Add 2% over cost of material as excavation for preparation of bed, nominal surface reinforcement & filling of granular material in recesses between blocks.</i>			
4	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications (Reference to MORT&H's specification 2504).			
4A	Stone/Boulder	cum	421.10	Material cost to be added. Consumption of materials is to be followed as per chapter - A, Sl. No.15.4A
4B	Cement Concrete Blocks of size 0.3x0.3 x0.3 m cast in cement concrete of Grade M15	cum	890.50	Material cost to be added. Consumption of materials is to be followed as per chapter - A, Sl. No.15.4B

CHAPTER - 15

RIVER TRAINING & PROTECTION WORKS

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>Add 2% over cost of material as nominal surface reinforcement & filling of granular material in recesses between blocks.</i>			
5	Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification Gradation of filter , Thickness of filter 200/300 mm (Reference to MORT&H's specification 2504).	cum	459.50	<i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.5</i>
6	Geotextile Filter Laying of a geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching/cement concrete blocks as well as to allow free movement of water without creating any uplift head on the pitching. (Reference to MORT&H's specifications 700 & 2504).	sqm	2613.20	<i>Complete Rate (including cost of materials)</i>
7	Toe - protection A toe wall (provided at the junction of slope pitching and launching apron of a guid bund)for toe protection can either be in dry rubble masonry in case of dry rubble pitching or pitching with stones in wire crates or it can be in PCC M15 nominal mix if cement concert block have been used for pitching . Rates for toe wall can be adopted from respective clauses depending upon approved design. The rate for excavation for foundation, dry rubble masonry and PCC M15 have been analysed and given in respective chapters (Reference to MORT&H's specification 2504.4).	cum		

CHAPTER - 15

RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Providing and laying Flooring shall consist 150 mm thick complete as per drawing and Technical specifications laid over cement concrete bedding (Reference to MORT&H's specification 2505).			
8A	Rubble stone laid in cement mortar 1:3	cum	1148.00	<i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.8A</i>
Note	Add 1 % of cost over material to account for excavation for preparation of bed			
8B	Cement Concrete blocks Grade M15	cum	1172.70	<i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.8B</i>
Note	Add 1 % of cost over material to account for excavation for preparation of bed			
9	Dry Rubble Flooring Construction of dry rubble flooring (shall be laid closely on the prepared base in one or more layers with appropriate bond) at cross drainage works for relatively less important works (Reference to MORT&H's specification 2506).	cum	791.30	<i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.9</i>
10	Curtain wall (Rigid flooring enclosed by curtain wall with min depth below floor level of 2 m on u/s side and 2.50 m on d/s side) complete as per drawing and Technical specification (Reference to MORT&H's specification 2507.1).			<i>Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.10A</i>
10A	Stone masonry in cement mortar (1:3) Coursed rubble masonry (1st sort)	cum	1420.00	

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10B Note	Cement concrete Grade M15 <i>Other items like excavation for foundation, filling behind wall, filter media, weep holes etc. shall be added separately as per approved design.</i>	cum	873.00	Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.10B
11 Note	Flexible Apron : (Shall be provided beyond curtain walls for a min distance of 3m on u/s and 6m on d/s side) Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall (Reference to MORT&H's specification 2507.2). <i>Add 1 % of cost over material to trimming & preparation of bed.</i>	cum	473.40	Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.11
12	Gabian Structure for Retaining Earth Providing and construction of a gabian structure for retaining earth with segments of wire crates of size 7 m x 3 m x 0.6 m (7.50m x 3.0m x0.6m) each divided into 1.5 m compartments by cross netting, made from 4 mm galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa (tensile strength 300-450 Mpa) conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be tied with 4 mm galvanised steel wire (Reference to MORT&H's specification 2503.3).	cum	2303.60	Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.12

CHAPTER - 15

RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Readymade woven wire crate rolls have been considered in the rate analysis. In case readymade rolls are not available, GI wire 4mm dia. @ 32 kg per 10 sqm may be provided. In that case 2 per cent of the cost of GI wire may be added for weaving the wire crates.			
13	Gabian Structure for Erosion Control, River Training Works and Protection works Providing and constructing gabian structures for erosion control, river training works and protection works with wire crates of size 2 m x 1 m x 0.3 m each divided into 1m compartments by cross netting, made from 4 mm Annealed galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 mm x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be securely tied with 4 mm galvanised steel wire (Reference to MORT&H's specification 2503.3).	cum	4908.50	Material cost to be added. Consumption of materials is to be followed as per chapter - A Sl. No.15.13
Note	Ready made woven wire crate rolls have been considered in the rate analysis. In case readymade rolls are not available, GI wire 4mm dia. @ 32 kg per 10 sqm may be provided. In that case 2 per cent of the cost of GI wire may be added for weaving the wire crates.			

CHAPTER - 16

REPAIR AND REHABILITATION

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Removal of existing cement concrete wearing coat including its disposal complete (Deck slab width 400mm should be removed on either side for placing anchor rod, bolt for new expansion joints) as per Technical Specification without causing any detrimental effect to any part of the bridge structure and removal of dismantled material with all lifts and lead upto 1000 m (Reference to MORT&H's specification 2811). Thickness 75 mm	Sq m	90.40	<i>Complete Rate (including material cost)</i>
2	Removal of existing asphaltic wearing coat comprising of 50 mm thick asphaltic concert laid over 12 mm thick mastic asphalt including disposal with all lift and lead upto 1000 m (Reference to MORT&H's specification 2811).	Sq m	67.00	<i>Complete Rate (including material cost)</i>
3	Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy complete as per Technical Specification (Reference to MORT&H's specification 2807).	Sq m	608.00	<i>Cost of material to be added as per Ch. A., Sl.No. 16.3 , except the cost of wire mesh & Accelerator & epoxy compound.</i>
Note	Add 2% of cost of materials(except the cost of wire mesh & Accelerator compound) for miscellaneous consumables, like nozzles, wire brush, cotton waste etc.			

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4	Providing and inserting nipples with approved fixing compound after drilling holes for grouting as per Technical Specifications including subsequent cutting/removal and sealing of the hole as necessary of nipples after completion of grouting with Cement/Epoxy (Reference to MORT&H's specification 2800).	Each	125.00	Complete Rate (including material cost)
Note	Add 15% cost of material for cement, fixing compound and consumables .			
5	Sealing of cracks/porous concrete (within the limits of practical pressure 100kpa -400kpa until refusal) by injection process through nipples/Grouting complete as per Technical Specification (Reference to MORT&H's specification 2806).			Cost of materials to be added as per Ch. A ,Sl.No. 16.5
Note	Add 20% cost over cement as admixture (Anti shrinkage compound).			
5A	Cement Grout	Kg	193.80	
5B	Cement Mortar (1:1) Grouting	Kg	193.80	
6	Patching of damaged concrete surface with polymer concrete and curing compounds, initiator and promoter, available in present formulations, to be applied as per instructions of manufacturer and as approved by the Engineer (Reference to MORT&H's specification 2800).			Complete Rate (including material cost)
	Thickness of patching = 25mm	Sqm	1257.10	

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>This item is a proprietary item available in market as pre-packed polymer concrete and is required to be applied as per instructions of the manufacturer.</i>			
7	Sealing of crack / porous concrete with Epoxy Grout by injection through nipples complete as per clause 2803.1 (Reference to MORT&H's specification 2803).	Kg	734.00	Complete Rate (including material cost)
8	Applying epoxy mortar over leached, honey combed and spalled concrete surface (@ 20-24 kg of Epoxy mortar/sqm) and exposed steel reinforcement complete as per Technical Specification (Reference to MORT&H's specification 2804). Thickness of epoxy mortar = 10mm	Sq m	472.00	Complete Rate (including material cost)
9	Removal of defective concrete, cleaning the surface thoroughly, applying the shotcrete mixture mechanically with compressed air under pressure, comprising of cement, sand, coarse aggregates, water and quick setting compound in the proportion as per clause 2807.1., sand and coarse aggregates conforming to IS: 383 and table 1 of IS: 9012 respectively, water cement ratio ranging from 0.35 to 0.50, density of gunite not less than 2000 kg/cum, strength not less than 25 Mpa and workmanship conforming to clause 2807.6 (Reference to MORT&H's specification 2807). Average thickness of shotcrete mixture 25mm to 40mm	Sq m	129.70	Cost of materials to be added as per Ch. A., Sl.No. 16.9, except the cost of quick setting compound .

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	Applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete (@ 21-22 kg polymer mortar/sqm)(Reference to MORT&H's specification 2800) . (ADMIXTURE SHOULD BE ADDED AS PER MANUFACTURER'S SPECIFICATION) Thickness of mortar = 10mm	Sqm	101.10	<i>Complete Rate (including material cost)</i>
11	Epoxy bonding of new concrete to old concrete (crack/spalling shall be sealed with epoxy injection/grouting coating of epoxy resin @ 0.80kg /sqm should be applied)(Reference to MORT&H's specification 2805).	Sqm	538.90	<i>Complete Rate (including material cost)</i>
12	Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification (Reference to MORT&H's specification 2812). Span : upto 25 m	MT	254667.00	<i>Cost of material to be added as per Ch. A., Sl.No. 16.12 , except HTS Strand, HDPE pipes, MS plates & epoxy compound.</i>
Note	Add 20% cost of material for other materials like lead sheet, sleeves, deviator, fixtures etc.; except HTS strands, HDPE pipes & MS plates			

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13	<p>Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification (Reference to MORT&H's specification 2812).</p> <p>Span : above 25 but less than 50 m</p> <p>Note Add 20% cost of material except HTS strands, HDPE pipes & MS plates for other materials like lead sheet, sleeves, deviator, fixtures etc.</p>	MT	254395.00	<p><i>Cost of material to be added as per Ch. A., Sl.No. 16.13 , except HTS Strand, HDPE pipes, MS plates & epoxy compound.</i></p>
14	<p>Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification (Reference to MORT&H's specification 2812).</p> <p>Span : above 50 m</p> <p>Note Add 20% cost of material except HTS strands, HDPE pipes & MS plates for other materials like lead sheet, sleeves, deviator, fixtures etc.</p>	MT	234052.00	<p><i>Cost of material to be added as per Ch. A., Sl.No. 16.14 , except HTS Strand, HDPE pipes, MS plates & epoxy compound.</i></p>
15	<p>Replacement of Bearings complete as per Technical Specification (Reference to MORT&H's specification 2810).</p> <p>Note The work entails replacement of all the bearings on one side of the span.</p>	No	2028.00	<p><i>Time required and lifting capacity of Jack is case specific, it depend upon the hire charges of jack of suitable lifting capacity for replacement of each bearing. Hire charges of Jack and cost of bearing is to be added.</i></p>

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16	Rectification of Bearings as per Technical Specifications (Reference to MORT&H's specification 2810).	No	1978.00	
Note	<i>The rectification of 3 bearings included in this analysis are on the same side of the span.</i>			<i>Time required and lifting capacity of Jack is case specific. It depends upon the hire charges of jack of suitable lifting capacity for rectification of each bearing. Cost of parts (to be replaced) to be added before applying overhead charges and contractors profit.</i>
17	Replacement of Expansion Joints complete as per drawings	RM	753.80	
Note	<i>The rate for the installation of new expansion joints may be taken from the chapter on superstructure. Broken concrete will have to be replaced which has been included in this analysis.</i>			<i>Cost of materials except epoxy compound to be added, as per Ch. A., Sl.No. 16.17.</i>
18	Dismantling and removing of Damaged Concrete Railing.	RM	215.60	
Note	<i>The rate for the provision of new railing may be adopted from the chapter on superstructure.</i>			<i>Complete Rate (including material cost)</i>
19	Dismantling and removing of Crash Barrier.	RM	392.90	
Note	<i>The rate for the construction of new crash barrier may be adopted from chapter 8 on Traffic and Transportation.</i>			<i>Complete Rate (including material cost)</i>

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
20	Dismantling and removing of Damaged Mild Steel Railing	RM	180.10	<i>Complete Rate (including material cost)</i>
21	Repair of Crash Barrier Repair of concrete crash barrier with cement concert of M-30 grade by cutting and trimming the damaged portion to a regular shape, cleaning the area to be repaired thoroughly, applying cement concert after erection of proper form work.	RM	53.30	<i>Cost of materials to be added , as per Ch. A., Sl.No. 16.21.</i>
22	Repair of RCC Railing Carrying out repair of RCC M30 railing to bring it to the original shape.	RM	20.10	<i>Cost of materials to be added , as per Ch. A., Sl.No. 16.22.</i>
23	Repair of Steel Railing Repair of steel railing to bring it to the original shape It is assumed that the damage to the steel railing is to the extent of 10 per cent .	RM	228.80	<i>Complete Rate (including material cost)</i>

CHAPTER - 17

MISCELLANEOUS

CHAPTER - 17
MISCELLANEOUS

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Repairing Pot-holes with Bituminous Macadam (Grading - I, for compacted thickness of 80mm to 100mm) Filling Pot Holes with Bituminous Macadam using Mobile Hot Mix plant (6-10 TPH) with approved crushed aggregates of specified grading premixed with bituminous binder @3.3% by wt. of the total mix, transported to site and laid in the pot hole prepared before hand by cutting the edges to get a firm vertical face and by removing all the failed and loose materials including dust and applying tack coat evenly on the sides and on the surface as per specification, rolling the filled depression with 8 10 tonne smooth wheeled roller to achieve the desired compaction, including the cost and carriage of stone aggregates and bitumen, hire charges of machinery and equipment, cost of fuel and lubricants and wages of all operational staff, quality control except the cost of tack coat complete as per direction of Engineer-in-charge. Payment to be made on the basis of the loose net volume of the stone aggregates used in the work.	cum	1111.12	<i>Material cost to be added as per Chapter A, Sl. No. 5.3 after dividing quantities of each of the materials by a factor of 1.42. For cost of tack coat refer Item No. 2 of Chapter-5 (to be added seperately)</i>
2	Repairing Pot-holes with Bituminous Macadam (Grading - II, for compacted thickness of upto 75mm) Filling Pot Holes with Bituminous Macadam using Mobile Hot Mix plant (6-10 TPH) with approved crushed aggregates of specified grading premixed with bituminous binder @3.4% by wt. of the total mix, transported to site and laid in the pot hole prepared before hand by cutting the edges to get a firm vertical face and by removing all the failed and loose materials including dust and applying tack coat evenly on the sides and on the surface as per specification, rolling the filled depression (Contd.)	cum	1111.12	<i>Material cost to be added as per Chapter A, Sl. No. 5.3 after dividing quantities of each of the materials by a factor of 1.42. For cost of tack coat refer Item No. 2 of Chapter-5 (to be added seperately)</i>

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	with 8-10 tonne smooth wheeled roller to achieve the desired compaction, including the cost and carriage of stone aggregates and bitumen, hire charges of machinery and equipment, cost of fuel and lubricants and wages of all operational staff, quality control except the cost of tack coat complete as per direction of Engineer-in-charge. Payment to be made on the basis of the loose net volume of the stone aggregates used in the work.			
3	Supplying & fixing of Aluminium Flexible Prismatic Sheeting (AFP) consisting of non metallic prismatic lenses that are formed in a transparent , synthetic resin; sealed and backed with a conformable aluminium foil backing with an aggressive pressure sensitive adhesive and with an easily removable liner. This flexible prismatic reflective sheeting used in the product specified herein should be of yellow colour and have minimum values of retro reflection coefficient, which shall conform to Type VI of ASTM D4956-09.. After application of the flexible prismatic sheeting to required application areas, all the edges of the flexible prismatic sheeting should be sealed with two part epoxy based structural adhesives with epoxy having viscosity of 8000-14000 mPa.s when measured as per ISO 12058, which should show extreme resistance to peel off. The contractor will have to provide a test certificate from a reputable national/international laboratory conforming the above specifications.	sqm	5935.74	
4	Labour for mixing stable anti- stripping agent of approved quality conforming to Table -A 5 - 1 of Appendix-5 of specification for Road & Bridge Works of MORT&H(Rev-4) to the binder @ 0.5% to 1% by weight of binder (depending up on size & stripping value of the aggregates) and allowing 15 to 30 minutes of circulation or stirring in the hot bitumen tank to ensure a homogeneous mix of binder and anti- stripping agent for different bituminous works as per (Contd...)	Kg	5.55	Material cost to be added as per chapter - A , Sl. No.17.4

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	Technical Specifications in given n Appendix - 5 of specification for Road & Bridge Works of MoRT&H (Rev-5) and direction of Engineer-in-Charge complete			
5	Supplying & fixing of Hazard Markers of size : 30cm X 90 cm as per IRC :79-1981 (The above is inclusive of vertical post)	Each	3600.00	Complete Rate
6	Supplying & fixing of Raised Pavement Markers/Road Studs/Cats Eye made of polycarbonate moulded body and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face which shall support a load of 13635 kg tested in accordance to ASTM D 4280 Type H and complying to Specifications of Category A of MoR&TH Circular No. RW/NH/33023/10-97 - DO III Dt. 11.06.1997 & MoRT&H's specification for Road & Bridge Works (Fifth Rev.). Marker height shall not be less than 10 mm and shall not exceed 20 mm, width shall not exceed 130mm and with minimum reflective area of 13 sqcm on each side and slope to the base shall be 35 ± 5 degree. Fixing will be without nails but by using epoxy resin based adhesive as per manufacturer's recommendation including site clearance etc and complete as directed by the Engineer in Charge. The contractor will have to provide a test certificate from a reputable national/international laboratory conforming the above specifications.	Each	180.00	Complete Rate

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7	PLUM CONCRETE (1:3:6) Plain cement concrete of nominal mix (1:3:6) with coarse aggregate of which stone boulder of size 225 mm to 150mm of 60% of total dry volume to be placed in position as directed by Eng-in charge ,67% - 40 mm down single &33% 20 mm down bazri , Coarse Sand ,Cement (53 grade) mechanically mixed in 1:3:6 of rest volume and placed in position and compacted by any means as directed including cost of shuttering .	Cum	591.70	<i>Material cost to be added as per chapter - A , Sl. No.17.7</i>
8	Bituminous Macadam Providing and laying bituminous macadam using crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction (Reference to MORT&H's specification clause 504).			
8a	With Continuous Type HMP (60-90 TPH) (i) for Grading 1 (40 mm nominal size) (ii) for Grading 2 (19 mm nominal size)	cum cum	1044.20 1044.20	
8b	With Continuous Type HMP (40-60 TPH) (i) for Grading 1 (40 mm nominal size) (ii) for Grading 2 (19 mm nominal size) 1.Quantity of Bitumen has been taken for analysis purpose. The actual quantity will depend upon job mix formula. 2. Labour for traffic control, watch and ward and other miscellaneous duties at site including sundries have been included in administrative overheads of the contractor. 3. In case BM is laid over freshly laid tack coat, provision of Mechanical broom and 2 mazdoors for the same (i.e. ₹2.97 per cum) shall be deducted as the same has been included in the cost of tack coat.	cum cum	1041.90 1041.90	<i>This is as per MoRT&H No. RW- 24011/02/2014-Mech Dated 11.12.2015</i> <i>Cost of materials to be added .</i> <i>Consumption of materials to be followed as per Ch. A., Sl.No. 5.3</i> <i>This item is to be used after getting prior approval of the concerned S.E.</i>

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9	Dense Graded Bituminous Macadam Providing and laying dense graded bituminous macadam using crushed aggregates of specified grading, premixed with bituminous binder @ 4.0% (min.) for Grading 1 & 4.5% (min.) for Grading 2 by weight of total mix and filler(Cement /lime / Rock dust), transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORT&H specification clause No. 505.4 complete in all respects (Reference to MORT&H's specification clause 505).			<p><i>This is as per MoRT&H No. RW- 24011/02/2014-Mech Dated 11.12.2015</i> <i>Material cost to be added.</i> <i>Consumption of materials to be followed as per - Ch. A., Sl. No.5.6</i> <i>This item is to be used after getting prior approval of the concerned S.E.</i></p>
9a	With Continuous Type HMP(60-90 TPH)			
(i)	for Grading 1 (37.5 mm nominal size)	cum	1128.50	
(ii)	for Grading 2 (26.5 mm nominal size)	cum	1128.50	
9b	With Continuous Type HMP (40-60 TPH)			
(i)	for Grading 1 (37.5 mm nominal size)	cum	1243.50	
(ii)	for Grading 2 (26.5 mm nominal size)	cum	1243.50	
10	Bituminous Concrete Providing and laying bituminous concrete using crushed aggregates of specified grading, premixed with bituminous binder @ 5.2% (min.) for Gr.-1(19mm agg size) & @ 5.4% (min.) for Gr.- 2 (13.2mm agg size), as per table 500-17, of mix and filler(Cement /lime / Rock dust), transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No.507complete in all respects (Reference to MORT&H's specification clause 507).			<p><i>This is as per MoRT&H No. RW- 24011/02/2014-Mech Dated 11.12.2015</i> <i>Material cost to be added.</i> <i>Consumption of materials to be followed as per - Ch. A., Sl. No.5.8</i> <i>This item is to be used after getting prior approval of the concerned S.E.</i></p>
10a	With Continuous Type HMP (60-90 TPH)			
(i)	for Grading 1 (19 mm nominal size)	cum	1276.60	
(ii)	for Grading 2 (13.2 mm nominal size)	cum	1276.60	
10b	With Continuous Type HMP (40-60 TPH)			
(i)	for Grading I (19 mm nominal size)	cum	1597.60	
(ii)	for Grading 2 (13.2 mm nominal size)	cum	1597.60	

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11	Cold Milling Cold Milling of Bituminous Pavement surface upto the required depth by mechanical means using milling machine, without disturbing the under lying layers, to proper line and level, cleaning the surface properly after milling and removing the loose materials, stacking the milled materials for re-use, necessary guarding, barricading & lighting, including hire charges of machinery, cost of fuel and labour and other incidental charges all complete and as per direction of Engineer-in-Charge.			Complete Rate
a)	For depth upto 100mm	sqm	34.38	
b)	For depth 100mm to 150mm	sqm	50.00	
12	Laying Bituminous Concrete up to 50mm thickness with Hot In-Place Recycling Technology Technology with 60% recycled and 40% fresh material with a range of +10% /-10 % as per IRC 120 and MoRTH's specification (5th rev.) clause 519 using Hot Milling machine, hot mix plant, paver finisher. tandem vibratory roller without disturbing the underlying layer to proper line and level, necessary guarding, barricading & lighting, including supply of required Rejuvenating oil as per approved design mix after necessary structural evaluation of the existing pavement, cost of fuel and labour and other incidental charges all complete and as per direction of Engineer-in-Charge.	cum	4657.01	<i>Quantity of fresh material to be mixed will depend upon the approved mix design based on site condition. For estimation purpose the material cost to be added based on Chapter A Sl. No. 5.8(Gr-1) and 5.8(Gr-2) with a VG-10 Bitumen Percentage of 7% (min) in place of 5.2%(min) and 5.4%(min) respectively of the said table. A multiplying factor based on percentage of fresh material to total required volume is to be applied on the entire table.</i>

**CHAPTER - 17
MISCELLANEOUS**

Serial No.	Item	Unit	Rate (₹)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13	Stone Matrix Asphalt Providing and laying Stone Matrix Asphalt with Hot Mix Plant meeting the requirement as per table 500-37 of MoRT&H by using coarse aggregates, fine aggregates, mineral filler, Pelletized cellulose fiber and bituminous binder of required specification including screening, cleaning of chips and preparing a uniform and homogeneous mix and transporting the Hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per clause 515 of specifications for Roads & Bridge works of MoRTH's (5th Revision) complete in all respects.			<i>Cost of materials to be added .</i> <i>Consumption of materials [for the items from Sl. No.17.13(i)& 17.13(ii)] to be followed as per Ch. A., 17.13(i)& 17.13(ii)</i>
	i) 13 mm SMA with layer thickness 40-50mm (Surface Course)	cum	1668.30	
	ii) 19 mm SMA with layer thickness 45-75mm (Binder or Intermediate Course)	cum	1655.60	
14	Micro Surfacing Providing and laying Micro Surfacing with Micro Paver Equipment (mounted on Truck), meeting the requirement as per table 500-34 of MoRT&H by using coarse aggregate mineral filler and modified bitumen emulsion of required specification including screening, cleaning of chips and preparing a uniform and homogeneous mix and laying the mix with a Micro Surfacing Paver finisher as per clause 514 of MoRT&H (5th Revision).			<i>Cost of materials to be added .</i> <i>Consumption of materials [for the items from Sl. No.17.14(i)& 17.14(ii)] to be followed as per Ch. A., 17.14(i)& 17.14(ii)</i>
	i) Type - II (4-6 mm thickness)	sqm	13.00	
	ii) Type - III (6 to 8 mm thickness)	sqm	13.00	

TABLES

COST OF DIFFERENT MATERIALS - Sand, Bricks etc.

TABLE - I (PART-A)

Serial No.	Grades of Sand	Kolkata/ 24 Parganas (N&S)	Howrah, Hooghly, Nadia, Murshidabad, Malda, N&S Dinajpur	Burdwan,E& W Midnapore,Bankura, Purulia, Birbhum, Coochbehar*, Jalpaiguri*, Alipurduar*, Darjeeling Plains*	Darjeeling Hill Area	Remarks
a)	Coarse sand (at site)	₹1430	₹1114	₹798	₹1655	The rates of Sand & River Bed Materials are in per m³ of loose net volume (i.e. after deduction for shrinkage)
b)	Medium sand (at site)	₹1180	₹867	₹625	₹1547	
c)	Fine Sand (at site)	₹990	₹680	₹595	₹1370	
d)	River Bed Materials (at site)	-	-	₹774 (The rate of River Bed Materials is applicable for * marked Districts)	₹1600	

TABLE - I (PART-B)

Serial No.	Description of Items	Unit	For all Districts of South Bengal including Jalpaiguri and Darjeeling plains	Darjeeling Hill Area	Remarks
1	Murum (at quarry)	m ³	₹ 120		The above rates (except lime(SL No.-4) and bricks (SL No.-6)) are for volume in stack after deduction for shrinkage (i.e. loose net volume).Material cost = cost at source + carriage cost + cost for loading & unloading and stacked at site
2	Cinder (at source)	m ³	₹ 280		
3	Lime (at site)	Tonne	₹ 7500		
4	Surki (at site)	m ³	₹ 710		
5	Bricks, Bats, Jhama Khoa etc.				
	(a) First Class Bricks (Kiln Burnt) (at source / brick field)	1000 Nos	₹ 7700	₹ 10000	
	(b) First Class Picket Bricks (Kiln Burnt) (at source / brick field)	1000 Nos	₹ 7600	₹ 9810	
	(c) First Class bats (Kiln Burnt) (at source)	m ³	₹ 1162	₹ 2219	
	(d) Jhama Khoa (40-63 mm) (at source)	m ³	₹ 1667		
7	Laterite Boulder				
	(a) Size above 250 mm	m ³	₹ 260.00		
	(b) Size above 150 mm to 250 mm	m ³	₹ 292		

Note : The above rates are exclusive of contractor's profit & GST.

TABLE - II

SUPPLY OF LOCAL STONE MATERIALS (GRAVELS)

Unit: cum

Cost in ₹

Sl No.	Item	Name of Quarry	40 mm (in ₹)	26.5mm (in ₹)	20 mm (in ₹)	10 mm (in ₹)
1	Approved quality double washed gravel completely free from weathered and dead materials (at sources)	a) Damodarpur in the District of Bankura	508	561	561	523
		b) Dhalbhumgarh	860	950	931	912
		c) Kamalpur in the district of Burdwan (Near Durgapur Steel Town)	860	950	931	912

N.B 1. The above rates excluding Contractor's Profit and GST.

2. The above rates for volume in stack after deduction for shrinkage (i.e. loose net volume).

CARRIAGE DETAILS

Name of Quarry	Distance of Quarry	
	From Place	Over Pucca road
Damodarpur, Bankura	Bankura Town	6 km
Dhalbhumgarh	NH-6 junction at Kharagpur	104 km
Kamalpur, Burdwan	Durgapur Steel Town More on G.T. road	4 km

TABLE -III
SUPPLY OF STONE MATERIALS
NORTH BENGAL

Local hard stone materials delivered and stacked within a lead of 150 metres from the source :

Unit: Cu.M.

Cost in ₹

Stone Boulders		Shingles		Bazree			Grits	Stone metal						Crusher broken			
Above 225 mm	225 mm to 150 mm	63 mm size	40 mm / 37.5 mm size	20 mm / 22.4 mm size	13.2 mm size	10 mm / 11.2 mm size	5.6 mm size	75 mm size	63 mm size	53 mm size	45 mm size	40mm / 37.5 mm size	26.5 mm size	20mm/ 22.4 mm size	13.2 mm size	10 mm / 11.2 mm size	5.6 mm size
292.00	271.00	206.00	238.00	325.00	357.00	325.00	249.00	395.00	400.00	595.00	400.00	595.00	595.00	660.00	671.00	671.00	379.00
														Stone Dust : ₹ 225.00			

CARRIAGE DETAILS

Remarks : 1. The above Rates include royalty and also include allowance for sinkage or shrinkage but excluding GST and Contractor's profit.

2. Carriage cost at worksite to be added.
3. The above rates are for volume in stack after deduction for shrinkage (i.e. loose net volume).

Name of Quarry	Distance of Quarry			
	From Place	Pucca	Kutchra	River
Dhudia	69 kmp of NH 55	17 km		6 km
Jaldahka River	115 kmp of NH 31 C			6 km
Upper Basra River	a) 182 kmp of NH 31 C	24 km	6 km	
	b) 743 kmp of NH 31 D	24 km	6 km	
Bhutanghat River	226 kmp of NH 31 C	37 km		6 km
Balason River Bed	570 kmp of NH 31			6 km
Pagli River Bed	718 kmp of NH 31	6 km		6 km
Silbari River bed	718 kmp of NH 31	10 km		6 km
Kaljani River Bed	202 kmp of NH 31 C		4 km	

TABLE-IV
SUPPLY OF STONE MATERIALS
SOUTH BENGAL
COST OF STONE AGGREGATES AT QUARRY SITE :

Unit: Cum

Cost in ₹

Item	Above 225 mm	225 mm to 150 mm	150 mm to 75mm m	63 mm	53 mm	45 mm	40 mm / 37.5 mm	Crusher Broken					Stone dust 2.8mm to 75 micron
								26.5 mm	20mm/2 2.4 mm	13.20m m	10mm/1 1.2 mm	5.6 mm	
1. Approved Quality Local hard black stone (trap) materials delivered and stacked within a lead of 50 m from the quarry site													
a) Rampurhat/Panchami	626.00	678.00	738.00	805.00	850.00	865.00	895.00	984.00	1014.00	1029.00	373.00	313.00	112.00

Name of Quarry	Distance of Quarry	
	From Place	Pucca
Rampurhat	Rampurhat	14 km
	Moregram	50 km
	Panagarh	129 km
Panchami	Panchami More on Suri Rampurhat	12 km
	Moregram NH 34 Jn.	81 km
	Panagarh (NH 2 - 513 kmp)	98 km

N.B : Remarks : 1. The above Rates include royalty and also include allowance for sinkage or shrinkage but excluding GST and Contractor's profit.

2. Carriage cost at worksite to be added.

3. The above rates are for volume in stack after deduction for shrinkage (i.e. loose net volume).

TABLE - V
COST OF STONE AGGREGATES AT QUARRY SITES (PAKUR)

Unit: Cum

Cost in ₹

<i>Cost of different varieties Pakur stone materials (₹)</i>													
30/45 kg boulder	225mm to 150 mm boulder	75mm ballast all black	63mm ballast all black	53mm ballast all black	45mm ballast all black	40mm/ 37.5mm stone metal all black	26.5mm machine made chips	20mm /22.4mm machine made chips	13.2mm machine made chips	10mm / 11.2mm machine made chips	5.6mm machine made chips	Stone dust 2.8mm to 75 micron	Stone 250mmX 125mmX 100mm per 100 Nos.
750.00	700.00	700.00	900.00	970.00	970.00	1030.00	990.00	1080.00	1100.00	750.00	420.00	400.00	810.00

N.B. 1. The above rates are excluding contractor's profit and GST.

2. The above rates are for volume in stack after deduction for shrinkage (i.e. loose net volume).

3. Pakur Quarry is 20 km away on pucca road from the 279 kmp of NH 34.

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TABLE - VI

Cost of Pakur stone materials of different sizes at different Railway Stack Yards

Unit : Cum

Cost in ₹

Sl. No.	Rly Stack yard	30/40 kg Boulder	225 mm to 150mm boulder	75 mm ballast all black	63 mm ballast all black	53 mm ballast all black	45 mm ballast all black	37.5mm /40mm ballast all black	26.5 mm machine made chips	20 mm /22.4 mm machine made chips	13.2 mm machine made chips	10 mm/ 11.2mm machine made chips	5.6 mm machine made chips	Stone dust 2.8 mm to 75 µ	Stone 250mmX 125mmX 100mm per 100 Nos.
1	Alipurduar	2011.00	2011.00	1961.00	2161.00	2231.00	2231.00	2291.00	2251.00	2341.00	2361.00	2011.00	1681.00	1661.00	2071.00
2	Andal	1307.00	1307.00	1257.00	1457.00	1527.00	1527.00	1587.00	1547.00	1637.00	1657.00	1307.00	977.00	957.00	1367.00
3	Asansol	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1433.00
4	Barasat	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1624.00
5	Belghoria	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1624.00
6	Berhampore court	1882.00	1882.00	1832.00	2032.00	2102.00	2102.00	2162.00	2122.00	2212.00	2232.00	1882.00	1552.00	1532.00	1942.00
7	Bally	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
8	Burdwan Jn.	1307.00	1307.00	1257.00	1457.00	1527.00	1527.00	1587.00	1547.00	1637.00	1657.00	1307.00	977.00	957.00	1227.00
9	Barakar	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1277.00
10	Bauria	1629.00	1629.00	1579.00	1779.00	1849.00	1849.00	1909.00	1869.00	1959.00	1979.00	1629.00	1299.00	1279.00	1469.00
11	Chitpur	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
12	Coochbehar	2011.00	2011.00	1961.00	2161.00	2231.00	2231.00	2291.00	2251.00	2341.00	2361.00	2011.00	1681.00	1661.00	1755.00
13	Dumdum Cant.	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
14	Dalkhola	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1277.00
15	Dankuni	1499.00	1499.00	1449.00	1649.00	1719.00	1719.00	1779.00	1739.00	1829.00	1849.00	1499.00	1169.00	1149.00	1371.00
16	Dhulian Ganga	1076.00	1076.00	1026.00	1226.00	1296.00	1296.00	1356.00	1316.00	1406.00	1426.00	1076.00	746.00	726.00	1054.00
17	Durgapur	1307.00	1307.00	1257.00	1457.00	1527.00	1527.00	1587.00	1547.00	1637.00	1657.00	1307.00	977.00	957.00	1227.30

Cost of Pakur stone materials of different sizes at dfferent Railway Stack Yards

Unit : Cum

Cost in ₹

Sl. No.	Rly Stack yard	30/40 kg Boulder	225 mm to 150mm boulder	75 mm ballast all black	63 mm ballast all black	53 mm ballast all black	45 mm ballast all black	37.5mm /40mm ballast all black	26.5 mm machine made chips	20 mm /22.4 mm machine made chips	13.2 mm machine made chips	10 mm/ 11.2mm machine made chips	5.6 mm machine made chips	Stone dust 2.8 mm to 75 μ	Stone 250mmX 125mmX 100mm per 100 Nos.
18	Falakata	1882.00	1882.00	1832.00	2032.00	2102.00	2102.00	2162.00	2122.00	2212.00	2232.00	1882.00	1552.00	1532.00	1659.00
19	Garbeta	1754.00	1754.00	1704.00	1904.00	1974.00	1974.00	2034.00	1994.00	2084.00	2104.00	1754.00	1424.00	1404.00	1563.00
20	Habra	1629.00	1629.00	1579.00	1779.00	1849.00	1849.00	1909.00	1869.00	1959.00	1979.00	1629.00	1299.00	1279.00	1469.00
21	Haldia	1882.00	1882.00	1832.00	2032.00	2102.00	2102.00	2162.00	2122.00	2212.00	2232.00	1882.00	1552.00	1532.00	1659.00
22	Harishchandrapur	1157.00	1157.00	1107.00	1307.00	1377.00	1377.00	1437.00	1397.00	1487.00	1507.00	1157.00	827.00	807.00	1115.00
23	Jhargram	1947.00	1947.00	1897.00	2097.00	2167.00	2167.00	2227.00	2187.00	2277.00	2297.00	1947.00	1617.00	1597.00	1707.00
24	Kankinara	1499.00	1499.00	1449.00	1649.00	1719.00	1719.00	1779.00	1739.00	1829.00	1849.00	1499.00	1169.00	1149.00	1371.00
25	Kalyani	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
26	Kalaikunda	1882.00	1882.00	1832.00	2032.00	2102.00	2102.00	2162.00	2122.00	2212.00	2232.00	1882.00	1552.00	1532.00	1659.00
27	Krishnanagar	1690.00	1690.00	1640.00	1840.00	1910.00	1910.00	1970.00	1930.00	2020.00	2040.00	1690.00	1360.00	1340.00	1515.00
28	Kharagpur Jn.	1817.00	1817.00	1767.00	1967.00	2037.00	2037.00	2097.00	2057.00	2147.00	2167.00	1817.00	1487.00	1467.00	1610.00
29	Mogra	1499.00	1499.00	1449.00	1649.00	1719.00	1719.00	1779.00	1739.00	1829.00	1849.00	1499.00	1169.00	1149.00	1371.00
30	Memari	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1277.00
31	Malda Town	1076.00	1076.00	1026.00	1226.00	1296.00	1296.00	1356.00	1316.00	1406.00	1426.00	1076.00	746.00	726.00	1054.00
32	Midnapur	1882.00	1882.00	1832.00	2032.00	2102.00	2102.00	2162.00	2122.00	2212.00	2232.00	1882.00	1552.00	1532.00	1659.00
33	Naihati	1499.00	1499.00	1449.00	1649.00	1719.00	1719.00	1779.00	1739.00	1829.00	1849.00	1499.00	1169.00	1149.00	1371.00
34	Nimtita	1157.00	1157.00	1107.00	1307.00	1377.00	1377.00	1437.00	1397.00	1487.00	1507.00	1157.00	827.00	807.00	1115.00
35	New Farakka	1076.00	1076.00	1026.00	1226.00	1296.00	1296.00	1356.00	1316.00	1406.00	1426.00	1076.00	746.00	726.00	1054.00

Cost of Pakur stone materials of different sizes at dfferent Railway Stack Yards

Unit : Cum

Cost in ₹

Sl. No.	Rly Stack yard	30/40 kg Boulder	225 mm to 150mm boulder	75 mm ballast all black	63 mm ballast all black	53 mm ballast all black	45 mm ballast all black	37.5mm /40mm ballast all black	26.5 mm machine made chips	20 mm /22.4 mm machine made chips	13.2 mm machine made chips	10 mm/ 11.2mm machine made chips	5.6 mm machine made chips	Stone dust 2.8 mm to 75 μ	Stone 250mmX 125mmX 100mm per 100 Nos.
36	New Jalpaiguri	1690.00	1690.00	1640.00	1840.00	1910.00	1910.00	1970.00	1930.00	2020.00	2040.00	1690.00	1360.00	1340.00	1514.50
37	Purulia	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
38	Panagarh	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1276.80
39	Raiganj	1373.00	1373.00	1323.00	1523.00	1593.00	1593.00	1653.00	1613.00	1703.00	1723.00	1373.00	1043.00	1023.00	1276.80
40	Raniganj	1307.00	1307.00	1257.00	1457.00	1527.00	1527.00	1587.00	1547.00	1637.00	1657.00	1307.00	977.00	957.00	1227.30
41	Raninagar	1754.00	1754.00	1704.00	1904.00	1974.00	1974.00	2034.00	1994.00	2084.00	2104.00	1754.00	1424.00	1404.00	1562.50
42	Salimar	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
43	Sainthia	1076.00	1076.00	1026.00	1226.00	1296.00	1296.00	1356.00	1316.00	1406.00	1426.00	1076.00	746.00	726.00	1054.00
44	Sankrail	1564.00	1564.00	1514.00	1714.00	1784.00	1784.00	1844.00	1804.00	1894.00	1914.00	1564.00	1234.00	1214.00	1420.00
45	Siliguri	1690.00	1690.00	1640.00	1840.00	1910.00	1910.00	1970.00	1930.00	2020.00	2040.00	1690.00	1360.00	1340.00	1514.50
46	Uluberia	1629.00	1629.00	1579.00	1779.00	1849.00	1849.00	1909.00	1869.00	1959.00	1979.00	1629.00	1299.00	1279.00	1468.80

- N.B. 1. The above rates include royalty, but exclude GST & Contractor's profit.
 2. The above rates are for volume in stack after deduction for shrinkage (i.e. loose net volume).

ANNEXURE

Annexure-I
Cost of different materials - Cement, Steel etc.

Item No.	Description			Rate per M.T.	Remarks	
1 a)	Cement: For all items except items under Chapter 6					
	OPC	43 Grade	This rates are exclusive of GST, and contractor's profit i.e cost at site per M.T	₹ 5,873.00		
		53 Grade		₹ 6,056.00		
	PPC	—		₹ 5,873.00		
	PSC	—		₹ 5,873.00		
1 b)	COMPOSITE CEMENT: Confirming IS:16415:2015			₹ 5,893.00		
Composite Cement (New)						
	Steel materials					
2(A)	Mild Steel rods/Tor Steel rods/HYSD bars/TMT bar This rates are excluding GST, Contractor's Profit and Transport Charges per M.T.			₹ 49,730.00		
2(B)	High Tensile Steel					
	a)			BASIC RATE		
	ii) 15.2 mm Ancarite Wedge(No.)		19 T 15 Anchorage			₹ 40.00
	iii) 19 T 15 Tube Unit (No.)					₹ 1,880.00
						₹ 3,641.00
	b)					
	i) 12 T 13 Bearing Plate (No.)		12 T 13 Anchorage			₹ 392.00
	ii) 1/2 " Ancarite Wedge (No.)					₹ 30.00
	iii) 12 T 13 Tube Unit (No.)					₹ 626.00
						₹ 1,048.00
	c)					
	i) 15.2 mm LRPC Strand(MT)		19 T 15 Anchorage			₹ 74,000.00
	ii) 12.7 mm LRPC Strand(MT)		12 T 13 Anchorage			₹ 74,000.00
	iii) 75 x 0.4 GI Sheething (Rmt)		12 T 13 Anchorage			₹ 92.00
	iv) 90 x 0.5 GI Sheething (Rmt)		19 T 15 Anchorage			₹ 139.00
2(C)	Structural Steel (MS)					
	a) Plate		This rates are excluding GST, Contractor's Profit and Transport Charges per M.T.	₹ 49,205.00		
	b) i) R.S Joist (Light sec.)			₹ 47,405.00		
	ii) R.S Joist (Medium sec.)			₹ 47,405.00		
	c) Angles, channel, flats etc			₹ 48,545.00		
	d) Unequal angles			₹ 52,145.00		
	e) Nuts & bolts, Rivets,etc			₹ 56,885.00		

ANNEXURE - 1A
COST OF BITUMEN AT SOURCE

Sl. No.	Product		UNIT	Basic Price			Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				GRADE			* - The rate of various types & grades of Bitumen and Bituminous compound is to be arrived at, by taking the first published rate of the IOCL of that quarter of that financial year in which the project estimate is being framed.
				VG-10	VG-30	VG-40	
1	BITUMEN (BULK)	at HALDIA	MT	*	*	*	
2	BITUMEN (PACKED)	at HALDIA	MT	*	*		
3	BITUMEN EMULSION (BULK)	at HALDIA		GRADE (SETTING TIME)			
			RS	MS	SS-1/SS-2		
		MT		*			
4	BITUMEN EMULSION (PACKED)	at nearest Rly stack yard in North Bengal	MT	Rates of IOCL Chennai as per remark + ₹3500/-		Rates of IOCL Chennai as per remark + ₹3500/-	
5	BITUMEN EMULSION (PACKED)	at nearest Rly stack yard in South Bengal	MT	Rates of IOCL Chennai as per remark + ₹3000/-		Rates of IOCL Chennai as per remark + ₹3000/-	
6	CRMB - BULK			GRADE			
				CRMB-55	CRMB-60		
		at HALDIA	MT	*	*		
7	CRMB - PACKED	at HALDIA	MT	*	*		
8	PMB-40E (BULK)	at KOLKATA	MT	Rates of VG-30 (Bulk) of IOCL Haldia as per remark + ₹10,500/-			
9	MC 800 -(BULK)	at KOLKATA	MT	Rates of VG-30 (Bulk) of IOCL Haldia as per remark + ₹20000/-			
10	INDUSTRIAL GRADE BITUMEN as per IS: 702 (Packed)	at KOLKATA	MT	Rates of VG-30 (Bulk) of IOCL Haldia as per remark + ₹7000/-			
11	Polymer Modified Emulsion (BULK) for micro sufacing	at KOLKATA	MT	Rates of VG-10 (Bulk) of IOCL Haldia as per remark + ₹9200/-			

Note:

The above rates are excluding GST and contractor's profit. Loading & unloading charges carriage cost to be added

ANNEXURE - 1B
COST OF ANTI STRIPPING AGENT AT SOURCE

Sl. No.	Product	UNIT	Market Price	Remarks
1	Anti stripping Agent	Kg	₹341.00	NOTHING extra TO BE ADDED (loading, unloading & carriage cost included)

ANNEXURE - II
DAILY LABOUR WAGES CHART

Unit : Per day

A Unskilled labour	: ₹	308.00
a. Majdoor (Male/ Female)		
B Semiskilled	: ₹	339.00
a. Mazdoor/Dresser (Semi Skilled)		
b. Mali		
C Skilled	: ₹	373.00
a. Blacksmith (II nd class)		
b. Mason (II nd class)		
c. Mazdoor/Dresser/Sinker (Skilled)		
D Highly Skilled	: ₹	410.00
a. Blacksmith (Ist class)/ Welder(Ist class)/ Plumber(Ist class)/ Electrician(Ist class)		
b. Blaster (Stone cutter)		
c. Carpenter (Class I)		
d. Driller (Jumper)		
e. Operator(grouting) (Ist class)		
f. Painter (Ist class)		
g. Chiseller (Head Mazdoor)		
h. Fitter (Ist class)		
i. Mason (Ist class)		
E Specially trained personnel		
a. Mate / Supervisor	: ₹	1165.00
b. Engineer/Doctor	: ₹	1800.00
c. Diver	: ₹	2319.00
d. Para medical personnel	: ₹	1263.00

Note : *The above rates of labour are exclusive of contractors profit that would be admissible to the contractor but contractual percentage will not be applicable on the above notes.*

ANNEXURE - III

Illustrations showing the rate analysis of different items.

Basic Inputs:

Pakur stone materials of different sizes are chosen for the work. Nearest Railway Stack Yard from the work site is Burdwan Jn. Distance of work site from Burdwan Jn. is 15 KM

Distance of work site from Haldia Refinery is 209 KM

Date of Estimate: 01.06.2019

1. COST OF STONE AGGREGATES :

NOTE : Cost of Materials at Nearest Railway Stack Yard and cost of its carriage upto site have been considered from rates given in Schedule of Rates for N.H. Works (Roads & Bridges), 2019-2020 (w.e.f 01st June 2019).

Distance from Burdwan Jn. Railway Stackyard to worksite 15 Km.

Lead by road = 15 Km.

COST OF ROAD CARRIAGE : (Plain Area) Unit : cum.

From Km.	To Km.	Rate @ (₹)	Distance (Km.)	Amount (₹)	REMARKS
0	15	11.10	15	166.50	For Carriage cost analysis refer Chapter-I, Page -68, of N.H. Schedule of Rates, 2019-2020 (w.e.f 1st June' 2019).
Total carriage cost = ₹				166.50	per cum.

Carriage cost = ₹ 166.50per cum.

COST OF PAKUR VARIETY STONE AGGREGATE. AT PROJECT SITE :

ITEM	SIZE	Cost of Pakur variety material at Burdwan Jn. Rly Yard per cu.m.	LOADING & Unloading	CARRIAGE Cost	TOTAL Cost	REMARKS
	(mm)	(₹)	(₹)	(₹)	(₹)	1) For Cost of Pakur variety material at Burdwan Jn. Rly Yard. refer Table-VI, page-280 of N.H. Schedule of Rates,2019-2020 (w.e.f 1st June ' 2019). This rate excludes 10% contractor's profit. 2) For loading/unloading cost refer Chapter-I, Page- 68 of N.H. Schedule of Rates,,2019-2020 (w.e.f 1st June '2019) 3) Material costs are in loose net volume
Ballast	75	1257	125	166.50	1548.5	
Ballast	63	1457	125	166.50	1748.5	
Ballast	53	1527	125	166.50	1818.5	
Ballast	45	1527	125	166.50	1818.5	
Ballast	40	1587	125	166.50	1878.5	
Ballast	37.5	1587	125	166.50	1878.5	
Chips	26.5	1547	125	166.50	1838.5	
Chips	20/22.4	1637	125	166.50	1928.5	
Chips	13.2	1657	125	166.50	1948.5	
Chips	10/11.2	1307	125	166.50	1598.5	
Chips	5.6	977	125	166.50	1268.5	
Dust	-	957	125	166.50	1248.5	

2. COST OF VG- 30 BULK BITUMEN AT SITE

Source of material :- Haldia Refinery

Lead from Haldia Refinery to worksite = 209 Km.

COST OF ROAD CARRIAGE : (Plain Area) Unit : tn

From Km.	To Km.	Rate @ (₹)	Distance (Km.)	Amount (₹)	REMARKS
0	209	7	209	1463.00	For Carriage cost analysis refer Chapter-I, Page-69, of N.H. Schedule of Rates, 2019-2020 (w.e.f 1st June' 2019).
Total carriage cost = ₹				1463.00	per tonne

Carriage cost = ₹ 1463 per tonne

Cost of Bitumen at Source (Excluding all Taxes)	₹ 28,620.00
Loading and unloading	₹ 169.00
Carriage Cost	₹ 1,463.00
Cost of Bitumen at worksite	₹ 30,252.00

Note : - i) The rate of Bitumen is excluding all taxes and GST.

ii) Bitumen Price (VG -30 Bulk at source) is the first published rate of I.O.C of that quarter of the financial year in which the project estimate is framed. For this instance, rate published by IOC on 1st April '2019 is considered as the estimate is framed on 01.06.2019, i.e. on the 1st quarter of the financial year 2019-2020

3. COST OF HYSD/MS BARS :

Supply of HYSD reinforcement bars shall be from Market at Burdwan

Total Lead from Site 15 km

COST OF ROAD CARRIAGE : (Plain Area) Unit : tonne

From Km.	To Km.	Rate @ (₹)	Distance (Km.)	Amount (₹)	REMARKS
0	15	7	15	105.00	For Carriage cost analysis refer Chapter-I, Page-69, of N.H. Schedule of Rates, 2019-2020 (w.e.f 1st June '2019)..
Total carriage cost = ₹				105.00	per tonne

Carriage cost = ₹ 105.00 per tonne

COST OF STEEL AT PROJECT SITE :

ITEM	UNIT	BASIC COST	LOADING & UNLOADING	CARRIAGE COST	TOTAL COST	REMARKS
		(₹)	(₹)	(₹)	(₹)	Refer values in Annexure - I, page 283 of N.H. Schedule of Rates 2019-2020 (w.e.f 1st June' 2019)..
Steel Rods	tonne	49730	169.00	105.00	50004.00	

4. Illustration for analysis of rate for Dense Bituminous Macadam with 100-120 TPH...

(Ref. Sr. No. 6(ii) of Chapter - 5, Page - 114 of N.H. Schedule of Rates, 2019-2020 (w.e.f 01st June '2019))

Grading - II (For Burdwan District)

Unit : cu.m.

A. Labour, T & P, Machinery etc.

896.00

B. Materials

5598.85

ITEM	UNIT	SIZE (mm)	Quantity	Rate	TOTAL COST	REMARKS
				(₹)	(₹)	
Stonechips	cu.m.	37.5	0	1878.50	0.00	
Stonechips	cu.m.	26.5	0.07	1838.50	128.70	
Stonechips	cu.m.	20.0	0.17	1928.50	327.85	
Stonechips	cu.m.	13.2	0.22	1948.50	428.67	
Stonechips	cu.m.	5.6	0.32	1268.50	405.92	
Dust	cu.m.	2.8-0.075	0.66	1248.50	824.01	
Bitumen	kg	VG -30	104.00	30.25	3146.21	
filler (hydrated lime) 2% of wt of aggregate	kg		45.00	7.50	337.50	
Material Cost					5598.85	

(A+B) ₹

6494.85

C. Cost of formwork/scaffolding etc. @	0%	of B	₹	0.00
		Cost of (A+B+C)	₹	6494.85
D. Add overhead charges @	10%	of (A+B+C)	₹	649.48
E. Add contractor's profit @	10%	of (A+B+C+D)	₹	714.43
		TOTAL COST (A+B+C+D+E)	₹	7858.77
F. Add Labour welfare cess	@ 1%	of (A+B+C+D+E)	₹	78.59
		ITEM RATE	₹	7937.35

5. Illustration for analysis of rate for R.C.C M25 grade using batch mix plant....

(Ref. Sr. No. 8 E case II of Chapter - 12, Page -185 of N.H. Schedule of Rates, 2019-2020 (w.e.f 01st June ' 2019)

(For Burdwan District)

Unit : cu.m.

A. Labour, T & P, Machinery etc.	510.10
B. Materials	4343.77

ITEM	UNIT	SIZE (mm)	Quantity	Rate	TOTAL COST	REMARKS
				(₹)	(₹)	
Stonechips	cu.m.	20mm	0.54	1928.50	1041.39	
Stonechips	cu.m.	10mm	0.36	1598.50	575.46	
Coarse sand	cu.m.	coarse	0.45	798.00	359.10	
Cement	kg	43 Grade	403.17	5.873	2367.82	
Material Cost					4343.77	

(A+B) ₹ 4853.87

C. Cost of formwork/scaffolding etc. @	3.75%	of B	₹	162.89
		Cost of (A+B+C)	₹	5016.76
D. Add overhead charges @	25%	of (A+B+C)	₹	1254.19
E. Add contractor's profit @	10%	of (A+B+C+D)	₹	627.09
		TOTAL COST (A+B+C+D+E)	₹	6898.04
F. Add Labour welfare cess	@ 1%	of (A+B+C+D+E)	₹	68.98
		ITEM RATE	₹	6967.02

6. Illustration for analysis of rate for Supplying fitting and placing un-coated HYSD bar Reinforcement....

(Ref. Sr. No. 40 of Chapter - 12, Page - 217 of N.H. Schedule of Rates, 2019-2020 (w.e.f 01st June' 2019)

(For Burdwan District)

Unit : Tonne

A. Labour, T & P, Machinery etc.	3518.00
B. Materials	52504.20

ITEM	UNIT	Quantity	Rate	TOTAL COST	REMARKS
			(₹)	(₹)	
HYSD Bar	kg	1050.00	50.004	52504.20	
Binding Wire	kg	6.00	0.00	0.00	
Material Cost				52504.20	

(A+B) ₹ 56022.20

C. Cost of formwork/scaffolding etc. @	0%	of B	₹	0.00
		Cost of (A+B+C)	₹	56022.20
D. Add overhead charges @	25%	of (A+B+C)	₹	14005.55
E. Add contractor's profit @	10%	of (A+B+C+D)	₹	7002.78
		TOTAL COST (A+B+C+D+E)	₹	77030.53
F. Add Labour welfare cess	@ 1%	of (A+B+C+D+E)	₹	770.31
		ITEM RATE	₹	77800.83

GOVERNMENT OF WEST BENGAL
PUBLIC WORKS (ROADS) DIRECTORATE
NATIONAL HIGHWAY WING

SCHEDULE OF RATES (ROAD & BRIDGE WORKS) 2019 - 20
National Highway Wing, P.W (Roads) Directorate, Govt. of West Bengal