



सत्यमेव जयते

GOVERNMENT OF WEST BENGAL

PUBLIC WORKS (ROADS) DEPARTMENT

NATIONAL HIGHWAY WING



SCHEDULE OF RATES

ROAD & BRIDGE WORKS

2015-2016

Effective from 16th April 2015



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

SCHEDULE OF RATES
(with effect from 16th April 2015)

National Highway Works
(ROAD & BRIDGE)
2015 - 2016

Office of the

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

Foreword

The National Highway Planning & Design Circle published the 7th edition of Schedule of National Highway works for the year 2014-15 in West Bengal in July, 2014 that came into effect from 10th July, 2014, Which was very first occasion in the history of the NH wing of P.W.(R)Department, Govt. of West Bengal to issue the SOR in public domain free of cost in the Web. Thereafter getting a number of good suggestions from various levels of field engineers, vis-à-vis the resolution emerged out during the course of different monthly review meetings of the NH works under the chairmanship of the Principal Secretary, P.W.D & PWRD, Govt. of West Bengal, annual revision of SOR was of absolute necessity.

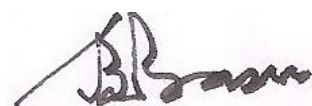
Based on the input received from various reputed manufacturing houses/organizations, related authorities, the updating of SOR has been compiled by the officers of N.H. Planning & Design Circle. Standard Data Book for analysis of rates (1st revision, 2003 of MOST) has been followed in framing up of item of works and analysis of rates. Specifications for Road & Bridge Works (5th revision, August 2013) have been strictly followed.

This Eighth publication will come into effect from 16.04.2015 onwards.

For any item not covered by the schedule, if that item is absolutely necessary on a work the concerned Superintending Engineer has to approve the rate with intimation to Superintending Engineer, N.H. Planning & Design Circle for record & reference. It is expected that, field Engineers will continue to send feed-backs regarding their experiences in handling the Present Schedule of Rates for NH works 2015-16 with suggestions and updated data for further revision in future.

The NH wing of P.W. (Roads) Department is thankful to the officers of N.H. Planning & Design Circle, who have updated the Schedule of Rates, for their sincere efforts in collection of input and the Computation work in the shortest possible time.

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PREFACE

The Schedule of Rates for National Highway works was last revised in 2014 and was based on Standard Data Book for Analysis of Rates (1st revision, June 2003) and Specification for Road & Bridge Works (5th revision, August 2013). Ministry of Road Transport and Highways published 5th revision for specifications in the year 2013. Due to increase in prices of different materials along with the increase in wages of labour, Hire charges of machinery etc., the revision of the Schedule of Rates for the year 2015-2016 has become necessary.

Standard Data Book (1st revision, June 2003) and Specification for Road & Bridge Works (5th revision, August 2013), should always be referred to in actual execution of any item, irrespective of any incompleteness in the nomenclature of the items of work as has appeared in this publication. In Chapter A, approximate materials requirement for different items of works have been provided, where the quantities are only for estimation purpose. For execution, grading/ mixing to be designed and that should conform to the relevant tables of MORTH's Specification.

Although all care has been taken to update the Schedule of Rates, there may be undetected errors and the scope for its further improvement. The field Engineers and the users may feel free to point out any error or give suggestions for further improvement.

In case of errors and omission which is not unlikely, the decision of the concerned Superintending Engineer shall be final and binding on all within the ambit of control. Care has been taken to publish the issue error free and easy to access via official website of P.W.D., Government of West Bengal <http://www.pwdwb.in>

I take this opportunity, to sincerely thank all those people, within and outside the Department and other individuals whose concerted and untiring effort made this publication a stupendous achievement.

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The 27th Day of March, 2015


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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 / mm²

Square Centimetre sq cm / cm²

Square Metre sqm / m²

Acre a

Hectare ha

Square Kilometre sqkm / Km²

VOLUME

Cubic Millimetre cu mm / mm³

Cubic Centimetre cu cm / cm³

Cubic Metre cum / m³

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

Tools & Plants

Cast Iron

Indian Road Congress

Reinforced Cement Concrete

For example, e.g.

Plain Cement Concrete

Ground Level

Mean Sea Level

Mild Steel

Diameter

Bituminous Concrete

Rupees

Front End Loader

Minimum

Maximum

Road Roller

Number

Lead in km

Tonne Kilometer

Ditto

Kilolitre

Hour

That is

Et cetera

Degree Centigrade

Column

Serial No.

Water Bound Macadam

Wet Mix Macadam

Bituminous Macadam

Optimum Moisture Content

Hot Mix Plant

West Bengal

Schedule of Rates

PW(R)D

T & P

CI

IRC

R.C.C. / RCC

P.C.C. / PCC

GL

MSL

MS

Dia.

BC

Rs.

FE Loader

Min.

Max.

RR

No.

L

t.km.

- do - / do

KL

Hr / hr

i.e. / ie

etc. / Etc.

°C

Col.

Sl. No. / Sl.

WBM

WMM

BM

OMC

HMP

WB

SOR

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

GENERAL FEATURES**1. Back Ground**

The schedule of rates for NH works was prepared on the basis of STANDARD DATA BOOK FOR ANALYSIS OF RATES “1994” PUBLISHED BY THE MINISTRY OF SURFACE TRANSPORT (ROADS) WING, GOVERNMENT OF INDIA AND IN PURSUANCE OF CHIEF ENGINEER, NATIONAL HIGHWAYS, P.W. (ROADS) DEPARTMENT. Accordingly, the first edition of the schedule appeared in 1997-98. Thereafter subsequent revisions are being made to fulfill the necessity. As such any issue to be sorted out must be settled within the ambit of standard data book and specification of roads and bridges of Ministry of Surface Transport.

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 2015-16 will come into force from 16.04.2015 superseding the Schedule of Rates for NH works: 2014-15, effective from 10.07.2014 without prejudice to the standing contracts of works.

4. Specification

Nomenclature of items of work is brief, indicative and has been linked to the related sections of SPECIFICATION FOR ROAD AND BRIDGE WORKS (5TH REVISION)-2013 of the Ministry of Surface Transport (Roads Wing), Government of India. It is recommended that provisions of the publication SPECIFICATION FOR ROAD AND BRIDGE WORKS (5TH REVISION)-2013 should form a 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.

7. Methodology

- I) Methodology of Analysis of Rates as obtained in STANDARD DATA BOOK FOR ANALYSIS OF RATES (1st Revision 2003) of MOST has been adopted. The rates include a) Labour, T & P and Machinery ; b) material ; c) overhead charges ; d) contractor's profit ; e) 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) material ; c) Overhead charges ; d) Contractor's profit ; e) Building and other construction workers' Welfare Cess .

Overhead charges (c) @__% on (a + b) [For overhead charges refer 9(II) of this chapter]

Contractor's profit (d) @10 % on (a + b + c)

Cess (e) @ 1 (one) % on (a + b+c+d)

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,
- 9) Watch and ward.
- 10) Traffic arrangement/ management during construction.
- 11) Expenditure on safeguarding environment.
- 12) Sundries.
- 13) Financing expenditure.
- 14) Sales/ turnover tax.
- 15) Work insurance/ compensation.

Note: Vat on materials are not covered under this overhead charges and to be added during analysis of rate when it is specifically stated

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

- IV) The cost of materials includes a) Materials (basic cost), b) carriage, c) loading & unloading etc.
- V) Labour rates are given 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 NH Circles for materials. As regards labour rates, those adopted in this schedule are 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) Specifications may be referred for detailed specifications.

(Contd...)

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 been 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 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/ price 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 of 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 liable for maintaining barricades, lights and flagman, as necessary 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 analyses 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.

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 Rs.50 crore :10%

Category 2: Cost above Rs.50 crore : 8%

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.

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.

Output of plant/equipment is considered for the compacted quantities.

Arrangement for traffic during construction shall be as per clause 112 of MORT&H specifications for Road and Bridge Works .

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 .

The contractor shall arrange to provide and maintain an adequate equipped Field laboratory as per clause 121.

10 (ten) percent extra cement may be provided for concreting under water, where required .

Grade of cement may be adopted as per mix design. Quantities of cement in various grades of cement concrete have been taken as per IRC:112-2011 .

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.

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 minor bridges : 25%

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

Category 3: Rehabilitation of bridges : 30 %

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.

Normal method of curing has been covered in the schedule. Analysis of steam curing has been included in the analysis of pre cast concrete PSC beams.

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.

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.

Guide Bund

The item 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.



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The 27th Day of March, 2015

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

Size of materials	Qty. (m ³)
355 micron	0.073
180 micron	0.043
90 micron	0.022

(Contd...)

Items & MaterialsFor 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

Size of materials	Qty. (m ³)
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

Size of materials	Qty. (m ³)
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

Size of materials	Qty. (m ³)
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:**
(Grading V & VI shall be used as a Sub-base cum Drainage layer)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

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

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

Size of materials	Qty. (m ³)
2.36 mm	0.26
0.85 mm	0.12
0.425 mm	0.08

For Grading- VI

Size of materials	Qty. (m ³)
26.5 mm	0.16
10.0 mm	0.29
5.6 mm	0.29

Size of materials	Qty. (m ³)
2.36 mm	0.32
0.425 mm	0.17
0.075 mm	0.05

Note: Quantities are only for estimation, grading I/II/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:
(For Grading III & IV shall preferably be used in lower sub-base layer)

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 III / IV as required shall conform to Table 400-1 of MoRT&H's Specification for Road & Bridge Works (5th Revision) – 2013.

Items & Materials

4.3 Lime stabilization for improving sub grade

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

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

4.4 Lime treated Soil for Sub-Base

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

- 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 Table 400-13 of MoRT&H's specification for Road & Bridge Works (5th Revision) – 2013.

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

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)
-------------------	------------------------

NH PW (ROADS) Dte ; WB**GENERAL**

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

Size of materials	Qty. (m3)
Stone chips 90 micron	0.23

(Contd...)

Items & Materials**For 37.5 mm maximum size of aggregate**

Size of materials	Qty. (m3)
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 flyash stabilized soil sub base:

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

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

Lime + Flyash @ 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**

Bitumen Emulsion

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

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

Water = 1.17 L per sq.m.

5.2 Per square meter Tack Coat

Bitumen Emulsion

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

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

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

5.3 Per cum of Bituminous Macadam

Size of crushed stone aggregates	Grading-1 40 mm nominal size 80 - 100 mm (Layer thickness) cum.	Grading-2 19 mm nominal 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 size (Layer thickness 75 - 100 mm) cum.	Grading-2 26.5 mm nominal size (Layer thickness 50 -75 mm) 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)
Filer(2 %)(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

5.8 Per cum of Bituminous Concrete

Size of crushed stone aggregates	Grading -1 19 mm nominal size (layer thickness 50mm) Cum	Grading - 2 13.2 mm nominal 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

5.9 Per sqm. of Surface dressing

Size of crushed stone aggregates	Case-I. 19 mm nominal size cum per sqm.	Case-II. 13 mm nominal 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 Penetration 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 Using Penetration grade Bitumen 20 mm thickness cum per sqm.	Type - B 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	0.98 Kg	0.68 Kg

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 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 -95%= 0.00638 Cum.per sqm.	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 @ 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 size aggregate/ cum	Case-II. Using cationic bitumen Emulsion and 26.5 mm nominal size aggregate / cum	Case-III. Using Cutback Bitumen and 13.2 mm nominal size aggregate / cum	Case-IV. Using Cutback Bitumen and 26.5 mm nominal size aggregate
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

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 or Rock dust as filler @ 2 % = 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

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	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

Note: Quantities are only for estimation. For execution grading shall conform to table 500-43 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

CASE IV Bitumen Impregnated Geo Textile

- i) Paving Grade Bitumen 80/100 = 1.05 kg / Sq.m. area
- ii) Geo Textile including 10 % for overlap = 1.10 Sq.m./ Sq.m. area

5.22 Per cum of Recipe Cold Mixes

Size of crushed stone aggregates	Case-I. 75 mm thick-ness 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	0.4347	0.63	-
2.36 mm	-	-	0.1646
600 micron	-	-	0.5927
300 micron	0.2173	-	-
150 micron	-	-	0.3293
75 micron	-	0.28	0.2305
Bitumen Emulsion or Cutback	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 of MORT&H's specification for Road & Bridge Works (5th Revision) - 2013

6.1 Per cum of Dry Lean Cement Concrete

Coarse Aggregate : 26.5 mm & 11.2 mm nominal 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

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 (5th Revision) - 2013

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.

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 / Cu.m. of Compacted vol.

Separation membrane of Impermeable Plastic sheeting 125 micron thick = 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 1.25 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 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 moulded 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.

(Contd.)

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 = $0.45 \times 0.90 = 0.405$ 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 facing 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 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

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. / letter of 1.0 cm height.
- ii) English & Roman :Hyphens and the like not to be measured and paid.
Paint = 0.0003 lit. / letter 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.
- a) 90 cm Equilateral triangle 0.35 Sq.m.

(Contd.)

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
- 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

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

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 down chips	0.21
ii) 20 mm down chips	0.10
iii) 10 mm down chips	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 down chips	0.14
ii) 20 mm down chips	0.07
iii) 10 mm down chips	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 down chips	0.02
ii) 20 mm down chips	0.01
iii) 10 mm down chips	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 down chips	0.01
ii) 20 mm down chips	0.005
iii) 10 mm down chips	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) M.S. angle iron 40mmX40mmX6mm, 23m in length @ 3.5 kg/m = 2.68 kg

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 angle iron posts = 0.07 Sqm per m.

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

Materials requirement:

- i) Barbed wire = 14.267 m length @ 9.38 kg/100 m = 1.34 kg per m.
- ii) M.S. angle iron 50mmX50mmX6mm, 33.80m in length @ 4.5 kg/m = 5.07 kg

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 angle iron posts = 0.13Sqm 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.

8.22 Per metre of RCC crash barrier

Materials requirement:

- i) RCC M 25 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-moulded 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 = 4.33 kg per m.
- v) Applying two coats of painting on exposed surface = 1.1 sqm./m.

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

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

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

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, field 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

Shrinkage Factor

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
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

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 bedding = 0.4 Cum. Per m.

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

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 coat	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 fillingMaterials requirements:

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 sieve

10.7 Per sqm of DustingMaterials 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 coursesMaterials 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

(Contd..)

Bitumen Impregnated Geo-TextileMaterials requirement:

Bitumen (VG 30)@1.05kg/sqm

10.8C Slurry SealMaterials 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	0.11 kg/sqm	0.22kg/sqm	0.31 kg/sqm

10.9 Per metre repair of joint grooves with epoxy mortarMaterials 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 sealantMaterials 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 blastingMaterials 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 directionMaterials 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 dressingMaterials 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 yearMaterials 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 yearMaterials 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.

(Contd...)

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) Pesticide = 1.5 g per m
- v) 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 manureMaterials 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 cakeMaterials requirement:

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

11.13 Per Cum of supplying sludgeMaterials 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 eachMaterials 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 lengthwiseMaterials 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 workMaterials RequirementRequirement:

- 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 afforestationMaterials 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 (for planting = 60.90 cum.per hectare)
- iii) Decayed farmyard / sludge manure (for maintenance= 4.00 cum.per hectare)
- iv) Pesticide for planting =0.50 kg per hectare

(Contd...)

Items & materials

- v) Pesticide for maintenance = 1.50 kg per hectare
- vi) 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 down chips =0.60 cum / cum
- ii) 20 mm down chips =0.30 cum / cum
- iii) Coarse sand =0.45 cum / cum
- iv) Cement =230.00 kg./ 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***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 down chips	0.54	0.36	-	0.36	-
ii) 20 mm down chips	0.27	0.36	0.54	0.36	0.54
iii) 10 mm down chips	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	-	-	-	-	-

(Contd...)

Materials requirement:	F	G	H
	PCC grade M-30(cum)	RCC grade M-30 (cum)	RCC grade M-35 (cum)
i) 40mm down chips	0.36	-	-
ii) 20 mm down chips	0.36	0.54	0.54
iii) 10 mm down chips	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
vi) Water	-	-	-

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 REQUIREMENTS:
(Same as for 12.8 C)
- ii) RCC Grade M-25
MATERIALS REQUIREMENTS:
(Same as for 12.8 E)
- iii) RCC Grade M-35
MATERIALS REQUIREMENTS:
(Same as for 12.8 H)

B. Well Steining

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

Using Batching plant, Transit mixer and Concrete pump**MATERIALS REQUIREMENTS:**

- i) 20 mm down chips = 0.54cum / cum.
- ii) 10 mm down chips = 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 down chips	0.36	-	0.36	-	0.36
ii) 20 mm down chips	0.36	0.54	0.36	0.54	0.36
iii) 10 mm down chips	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	-	-	-	-	-
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 down	-		0.36		-
ii) 20 mm	0.54		0.36		0.54
iii) 10 mm	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	-		-		-
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 down chips	-	-	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm down chips	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 kg	403.33 kg	403.33 kg	406.67 kg
vi) Water	-	-	-	-	-

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 down chips	-	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54	0.54
iii) 10 mm down chips	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	-	-	-	-
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

(Contd...)

Items & materialsMaterials 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 specificationsMaterials 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 drawingMaterials 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 = 0.785 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 = 1.13 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.

(Contd...)

Items & materialsMaterials 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 down chips	-	-	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm down chips	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	-	-	-	-	-

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 down chips	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54
iii) 10 mm down chips	0.36	0.36	0.36
iv) Coarse sand	0.45	0.45	0.45
v) Cement using concrete mixer	406.67 kg	422.00 kg	422.00 kg
vi) Water	-	-	-

12.39 Per cum levelling course for pile cap, P.C.C (M15)Materials requirement:

i) 40 mm down chips =	0.54 Cum. Per Cum.
ii) 20 mm down chips =	0.27 cum / cum.
iii) 10 mm down chips=	0.09 cum / cum.
iv) Coarse sand =	0.45 cum / cum.
v) Cement =	275.333 kg./ cum.
vi) Water =	-

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

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

Items & materials

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 It. 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 It. 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 It. 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)	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 It. 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

(Contd...)

Items & Materials

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.

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 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 for AC pipe (average) = 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.

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

Items & Materials

- 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

- 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

- 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 Cum.

Hence, volume of elastometer = 14655 Cum.

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	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 down chips	-	-	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm down 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 down chips	-	-	-	-	-
ii) 20 mm down chips	0.54	0.54	0.54	0.54	0.54
iii) 10 mm down 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 down chips	-	-	-
ii) 20 mm	0.54	0.54	0.54
iii) 10 mm	0.36	0.36	0.36
iv) Coarse	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

Items & Materials**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)

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.

(Contd..)

Items & Materials

(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

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

(Contd..)

Items & Materials

- 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
Materials requirement:
Copper plate -1 m long X 250 mm wide
Area = 0.25 Sqm.
Weight = $0.25 \times .002 \times 8900 = 4.45$ Kg
Wastage @ 2.5 % = $4.45 \times .025 = 0.11125$ 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 mmthick compressible fibre board 1 m long X 25 cm. deep
- (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
- (iv) Providing and filling joint sealing compound as per drawings and
Materials requirement:
i) sand = $1 \text{ m} \times 0.1 \text{ m} \times 0.01 \text{ m} = 0.001$ cum.per RM.
ii) Bitumen = 0.083 kg per RM

Items & Materials**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.

Materials requirement:

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*****Items & materials****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
- 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

- iii) Stone = 1 cum per cum

- iv) Stone spalls = 0.20 cum per cum

(Contd...)

Items & materials**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.

15.10 Per cum curtain wall complete as per drawing and technical**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 guniting @ 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

- 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

- 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.

(Contd...)

Items & materials

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.

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*

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

Items & materials

- 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

- 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

HYSD 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	0.092 M.T
(considering 5% wastage)	

Different Grades of Bitumen marketed by Indian Oil :

VG-10 BITUMEN: VG-10 is widely used in spraying applications such as surface-dressing and paving in very cold climate in lieu of old 80/100 Penetration grade. It is also used to manufacture Bitumen Emulsion and Modified Bitumen products.

VG-20 BITUMEN: VG-20 is used for paving in cold climate & high altitude regions.

VG-30 BITUMEN: VG-30 is primarily used to construct extra heavy duty Bitumen pavements that need to endure substantial traffic loads. It can be used in lieu of 60/70 Penetration grade.

VG-40 BITUMEN: VG-40 is used in highly stressed areas such as intersections, near toll booths and truck parking lots in lieu of old 30/40 Penetration grade. Due to its higher viscosity, stiffer Bitumen mixes can be produced to improve resistance to shoving and other problems associated with higher temperature and heavy traffic loads.

Table: VISCOSITY GRADE (VG) BITUMEN SPECIFICATION AS PER IS 73:2006

Characteristics	VG-10	VG-20	VG-30	VG-40
Absolute Viscosity, 60°C, poises, min	800	1600	2400	3200
Kinematic Viscosity, 135°C, CST, min	250	300	350	400
Flash point, °C, min	220	220	220	220
Solubility in trichloroethylene, %, min	99.0	99.0	99.0	99.0
Penetration at 25°C	80-100	60-80	50-70	40-60
Softening point, °C, min	40	45	47	50
Tests on residue from thin film over test / RTFOT:				
i. Viscosity ratio at 60°C, max	4.0	4.0	4.0	4.0
ii. Ductility at 25°C, cm, min, after thin film over test	75	50	40	25

CHAPTER -1

LOADING, UNLOADING, STACKING AND
CARRIAGE OF DIFFERENT MATERIALS

CHAPTER-1

LOADING, UNLOADING, STACKING & CARRIAGE OF DIFFERENT MATERIALS BY ROAD TRANSPORT OVER PUCCA ROAD

Cost in Rs. for all rates.

Sl. No.	Description of Item	Unit	Loading into Trucks & Unloading at destination	Upto 1 km	Upto 2 km	Upto 3 km	Upto 4 km	Upto 5 km	For 6 to 10 km, Rate/km	For 11 to 20 km, Rate/km	For 21 to 50 km, Rate/km	For 51 to 100 km, Rate/km	For more than 100 km, Rate/km
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1(a)	Sand, Moorum, Lime, Surki, Cinder and similar granular materials	Cum	102.00	115.50	127.90	140.40	152.80	165.30	10.70	9.70	9.00	8.00	7.50
1(b)	Brick-bats, Boulders, Stone metal/ chips, Gravels, Slag metals, Shingles, River bed materials												
2	Cement (in bags), tar or bitumen, Steel materials, timber and similar materials	M.T.	161.00	77.00	85.30	93.60	101.90	110.20	7.20	6.50	6.00	5.30	5.00
3	Heavy Steel Section (RSJ above 460 X 150 mm) & Structural Steel bars having length more than 7.50m	M.T.	225.27	77.00	85.30	93.60	101.90	110.20	7.20	6.50	6.00	5.30	5.00
4	Bricks	1000 Nos.	194.50	277.10	307.00	336.90	366.80	396.70	25.80	23.30	21.70	19.10	18.00
5	Stone Sets	1000 Nos.	291.80	415.70	460.50	505.40	550.20	595.10	38.70	35.00	32.60	28.70	27.00

Note: 1. For carriage on Unsurfaced Gravelled road: 20% extra over the corresponding rates as above.

2. For carriage on Kutch road and river bed: 30% extra over the corresponding rates as above.

3. For carriage in hill areas having altitude 460m and more above MSL: 70% extra over the corresponding rates as above.

4. The above Rates includes all charges, royalty etc. but exclude Overhead charges & Contractor's profit.

CHAPTER -2

SITE CLEARANCE

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (Rs.)	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)			
	i) Girth from 300 mm to 600 mm	Each	218.60	Material cost of item No.1 : Nil
	ii) Girth from 600 mm to 900 mm	Each	396.70	
	iii) Girth from 900 mm to 1800 mm	Each	768.50	
	iv) Girth above 1800 mm	Each	1459.00	
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	15312.00	Material cost of item No.2 : Nil
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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3(I)	By Manual Means			Material cost of item No. 3 : Nil
3(I)(A)	In area of light jungle	Hectare	46326.00	
3(I)(B)	In area of thorny jungle	Hectare	62028.00	
3(II)	By Mechanical Means			
3(II)(A)	In area of light jungle	Hectare	41915.00	
3(II)(B)	In area of thorny jungle	Hectare	50782.40	
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)			Material cost of item No. 4 : Nil
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	329.20	
4(i)I.B	Cement Concrete Grade M-15 & M-20	cum	390.50	
4(i)I.C	Prestressed / Reinforced cement concrete grade M-20 & above	cum	1020.60	
4(i)II	By Mechanical Means			
4(i)II.A	Cement Concrete Grade M-15 & M-20	cum	394.70	

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(i)IL.B	Prestressed / reinforced cement concrete grade M-20 & above	cum	675.50	Material cost of item No.4 : Nil
4(ii)	Dismantling Brick / Tile work			
4(ii)A	In lime mortar	cum	206.70	
4(ii)B	In cement mortar	cum	268.00	
4(ii)C	In mud mortar	cum	182.20	
4(ii)D	Dry brick pitching or brick soling	cum	170.00	
4(iii)	Dismantling Stone Masonry			
4(iii)A	Rubble stone masonry in lime mortar.	cum	231.20	
4(iii)B	Rubble stone masonry in cement mortar.	cum	268.00	
4(iii)C	Rubble Stone Masonry in mud mortar.	cum	206.70	
4(iii)D	Dry rubble masonry	cum	194.50	
4(iii)E	Dismantling stone pitching/ dry stone spalls.	cum	182.20	
4(iii)F	Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials.	cum	206.70	
4(iv)	Wood Work wrought framed and fixed in frames of trusses upto a height of 5 m above plinth level.	cum	486.90	
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	1255.10	

CHAPTER - 2
SITE CLEARANCE

SITE CLEARANCE				
Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(v)B	Excluding dismembering.	tonne	1023.00	Material cost of item No.4 : Nil
4(v)C	Extra over item No(v)A and (v)B for cutting rivets.	each	9.10	
4(vi)	Scraping of Bricks Dismantled from Brick Work including Stacking.			
4(vi)A	In lime/Cement mortar	1000 Nos.	1071.80	
4(vi)B	In mud mortar	1000 Nos.	382.80	
4(vii)	Scraping of Stone from Dismantled Stone Masonry			
4(vii)A	In cement and lime mortar	cum	432.90	
4(vii)B	In Mud mortar	cum	89.80	
4(viii)	Scarping Plaster in Lime or Cement Mortar from Brick/ Stone Masonry	sqm	13.50	
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	158.40	
4(ix)B	Above 600 mm to 900 mm dia	m	216.40	
4(ix)C	Above 900 mm	m	369.60	
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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5	Dismantling of Flexible Pavements			Material cost of item Nos. 5 & 6 : Nil
	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	607.60	
5(I)B	Granular courses	cum	434.90	
5(II)	By Mechanical Means			
5(II)A	Bituminous course	cum	245.00	
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	1134.00	
Note	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. Rs. 80.50 only.			

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (Rs.)	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	65.40	Material cost Nil
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	12.81	Material cost Nil
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	19.20	Material cost Nil
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	391.30	Material cost Nil
10B	Ordinary KM Stone	Each	192.10	Material cost Nil
10C	Hectometre Stone	Each	38.40	Material cost Nil

CHAPTER - 2
SITE CLEARANCE

Serial No.	Item	Unit	Rate (Rs.)	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	42.40	Material cost Nil
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). Note The rate analysis does not include any excavation in earth or dismantling of masonry works which are to be measured and paid separately.	R M	107.70	Material cost Nil
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). (Contd...)	R M	143.50	Material cost Nil

CHAPTER - 2
SITE CLEARANCE

Serial No	Item	Unit	Rate (Rs.)	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	147.90	<i>Material cost Nil</i>

CHAPTER -3

EARTH WORK, EROSION CONTROL AND
DRAINAGES

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	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. Rs.40.90) shall be omitted.</i>	cum	156.50	Material cost Nil
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. Rs. 40.90) shall be omitted.</i>	cum	220.30	Material cost Nil
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), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections (Reference to MoRT&H's specification clause 301).	cum	137.70	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	232.40	Material cost of item No. from 4 to 6 : Nil
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).	cum	284.90	
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.			
6	Excavation in Soil using Hydraulic Excavator CK 90 and Tippers with Disposal upto 1000 metres. 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).	cum	52.20	

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7	Excavation in Ordinary Rock using Hydraulic Excavator CK-90 and Tippers with Disposal upto 1000 metres. 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).	cum	65.60	Material cost Nil
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 <ol style="list-style-type: none"> <i>The quality and availability of rock shall be checked before affording credit.</i> <i>Credit is considered for 50 per cent of quantity of work.</i> <i>Being small quantity, manual loading will be economical in this case and has been provided accordingly.</i> <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> 			

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8A	Mechanised Method	cum	428.70	Material cost Nil
8B	Manual Method	cum	1033.00	Material cost Nil
9	Excavation in Hard Rock (controlled blasting) with disposal upto 1000 metres 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). Note 1. Credit is considered for 50 per cent of quantity of blistered rock, if found suitable for construction. 2. In case some rock is issued to the contractor at site, the item of carriage shall be reduced to that extent.	cum	328.50	Material cost Nil
10	Excavation in Marshy Soil 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).	cum	57.80	Material cost Nil
11	Removal of Unserviceable Soil with Disposal upto 1000 metres 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). Note This item does not include replacement of unsuitable soil by suitable soil. (Contd...)	cum	52.80	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<i>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	121.10	Material cost Nil
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 Note	Ordinary soil Manual Means (Depth upto 3 m) <i>Cost of dewatering may be added where required upto 10 per cent of labour cost i.e. Rs. 24.50 for assessment for dewatering shall be made as per site conditions.</i>	cum	245.00	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13(i)B	Mechanical Means (Depth upto 3 m)	cum	36.20	Material cost Nil
Note	<i>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.</i>			
13(ii)	Ordinary Rock (not requiring blasting)			
13(ii)A	Manual Means (Depth upto 3 m)	cum	306.20	Material cost Nil
Note	<i>Cost of dewatering upto 10 per cent of labour cost ; i.e. Rs. 30.60 may be added, where required. Assessment for dewatering shall be made as per site conditions.</i>			
13(ii)B	Mechanical Means	cum	47.40	Material cost Nil
Note	<i>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.</i>			
13(iii)	Hard Rock (requiring blasting)			
13(iii) A	Manual Means	cum	493.80	Material cost Nil
Note	<i>Cost of dewatering @ 10 per cent of labour cost ; i.e. Rs. 38.50 may be added, where required. Assessment for dewatering shall be made as per site conditions.</i>			
13(iv)	Hard Rock (blasting prohibited)			
13(iv) A	Mechanical Means	cum	494.10	Material cost Nil
Note	<i>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. (Contd...)</i>			

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13(v)	2. In case of rock, foundation beyond 3 m is not dug and hence not included. Marshy soil			
13(v)A	Manual means (upto 3 m depth)	cum	531.40	Material cost included.
Note	1. Cost of dewatering @ 30 per cent of labour cost i.e. Rs. 92.00 , 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. Rs. 61.25, where required may be added.			
13(v)B	Mechanical Means	cum	233.50	Material cost included.
Note	1. Cost of dewatering @ 20 per cent of labour & machineries i.e. Rs.22.50 may be added, where required. 2. Shoring & strutting @ 10 per cent of labour & machineries i.e. Rs.11.25, where required may be added. 3. It is assumed that Marshy Soil will be available upto 3 m depth only.			
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 (Reference to MoRT&H's specification clause 305.4.3).	sqm	21.80	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	4.70	Material cost Nil
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 (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. Rs. 238.00/m³ to be deducted from the Rate in Col. 4. The position is required to be clearly stated in the cost estimate.</i>	cum	381.00	Material cost Nil (carriage cost included & compensation for earth for taking from private land : considered)
17	Construction of Embankment with Material Deposited from Roadway Cutting Construction of embankment with approved materials deposited at site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300-2 (Reference to MoRT&H's specification clause 305). (Contd...)	cum	87.70	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<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. Rs. 19.80/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>			
18	Construction of Subgrade and Earthen Shoulders 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).	cum	413.50	Material cost Nil (carriage cost included & compensation for earth for taking from private land : considered)
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 for sub-grade construction (Reference to MoRT&H's specification clause 305.3.4).	cum	58.40	Material cost Nil
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 for embankment construction. (Reference to MoRT&H's specification clause 305.3.4).	cum	29.90	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	193.40	Material cost Nil
21	Stripping, Storing and Re-laying Top Soil from Borrow Areas in Agriculture Fields. 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.	cum	82.60	Material cost Nil
22	Turfing with Sods Furnishing and laying of the live sods of perennial turf forming grass on embankment slope, verges or other locations shown on the drawing or as directed by the engineer including preparation of ground, fetching of sods and watering (Reference to MoRT&H's specification clause 307).	sqm	29.50	Material cost included. Cost of farm yard manure considered in this item .
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, including watering for 3 months all as per clause 308 (Reference to MoRT&H's specification clause 308).	sqm	121.20	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.

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	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 24B Manual Means 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>	Mtr. Mtr.	53.90 61.20	Material cost Nil Material cost Nil
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 25B Manual Means	Mtr. Mtr.	109.10 91.90	Material cost Nil Material cost Nil
26	Surface Drains in Hard Rock Rate per metre may be worked out based on quantity of hard rock as per design. (Contd....)			

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	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 (Reference to MoRT&H's specification clause 309). Note <i>Type of pipe may be modified depending upon provision in design.</i>	Mtr.	171.10	Only cost of crushed stone aggregates / gravel /sand materials as per chapter-A, Sl. No.3.27 to be added.
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.	41.80	Cost of Crushed stone aggregate / gravel materials as per chapter - A Sl. No. 3.28 to be added.
29	Underground Drain at Edge of Pavement 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	306.00	Material cost as per chapter - A Sl. No.3.29. to be added.

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	Material cost Nil
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). Note <i>It is assumed that rock is available locally at site from roadway cutting.</i>	cum	52.90	Material cost Nil
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 (Contd...)</i>	cum	153.40	Material cost Nil

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<i>end loader and tipper ; i.e. Rs. 53.30 shall be deducted as excavated earth shall be disposed off on the valley side.</i>			
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. Rs. 68.70 shall be deducted as excavated earth can be disposed off on the valley side.</i>	cum	226.60	Material cost Nil
34	Excavation in Hilly Areas in Hard Rock Requiring Blasting 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). Note <i>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.Rs. 68.70) shall be deducted as excavated earth can be disposed off on the valley side.</i>	cum	277.60	Complete Rate

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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 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 (Contd...)</p>			

CHAPTER - 3
EARTHWORK, EROSION CONTROL AND DRAINAGES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	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.			
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> <p>Note 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>	cum	128.80	<i>If flyash is not available as free of cost, the cost of flyash may be added. (carriage cost included)</i>

CHAPTER -4

SUB-BASES, BASES (NON BITUMINOUS) AND
SHOULDERS

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

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Granular Sub-Base with Graded Material (Table:- 400-1)			Material cost to be added for the item Nos. from 1 to 2, as per chapter - A , Sl. No.4(4.1 & 4.2)
1A	Plant Mix Method			
1A(i)	Rate per cum for grading-I Material	cum	270.00	
1A(ii)	Rate per cum for grading-II Material	cum	270.00	
1A(iii)	Rate per cum for grading-V Material	cum	270.00	
1A(iv)	Rate per cum for grading-VI Material	cum	270.00	
	<i>Any one of the above grading for material may be adopted as per design. Grading V & VI shall be used for sub-base cum drainage layer.</i>			
1B	By Mix in Place Method			
	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			
1B(i)	Rate per cum for grading-I Material	cum	119.80	
1B(ii)	Rate per cum for grading-II Material	cum	119.80	
1B(iii)	Rate per cum for grading-V Material	cum	119.80	
1B(iv)	Rate per cum for grading-VI Material	cum	119.80	
Note	<i>Any one of the above grading for material may be adopted as per design. Grading V & VI shall be used for sub-base cum drainage layer.</i>			
2	Granular Sub-Base with Graded Material (Table:- 400- 1)			
	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).			

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
2(i)	Rate per cum for grading-III Material	cum	101.60	<p style="text-align: center;">Material cost to be added except cost of lime if required for the item Nos. from 2 to 5, as per chapter - A , Sl. No.4(4.2 to 4.5)</p>
2(ii)	Rate per cum for grading-IV Material	cum	101.60	
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	Lime Stabilisation for Improving Sub-grade Laying and spreading available soil in the sub-grade on a prepared surface, pulverising, mixing the spread soil in place with rotavator 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).			
3A	By Mechanical Means	cum	470.30	
3B	By Manual Means	cum	478.00	
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 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	541.60	
5	Cement Treated Soil Sub Base/ Base (Contd...)	cum	194.20	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p>Providing, laying and spreading soil on a prepared sub grade, pulverising, adding the designed quantity of cement 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).</p> <p>Note: <i>Cost of Cement to be added/ Qty in consumption table</i></p>			
6	<p>Cement Treated Crushed Rock or combination as per clause 403.2 and table 400-4 in Sub base/ Base</p> <p>Providing, laying and spreading Material on a prepared sub grade, adding the designed quantity of cement 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).</p>			Materials cost to be added as per chapter-A Sl. No. 4.6
6(i)	For Sub-Base course/base course	cum	133.40	
7	<p>Making 50 mm x 50 mm Furrows</p> <p>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).</p>			ITEM DELETED

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7(i)	25mm deep furrow cutting			ITEM DELETED
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	72.10	Materials cost to be added as per chapter - A , Sl. No. 4.8
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).			Materials cost to be added as per chapter-A, Sl. No. 4.9
9A	By Manual Means			
9A(i)	Grading-1			
9A(i)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	281.40	
9A(i)(b)	Using Screening Type-A (13.2 mm aggregate)	cum	281.40	
9A(i)(c)	Using Screening Type-B (11.2 mm aggregate)	cum	281.40	
9A(ii)	Grading-2			
9A(ii)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	281.40	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9A (ii)(b)	Using Screening Type-B (11.2 mm aggregate)	cum	281.40	Materials cost to be added as per chapter - A , Sl. No. 4.9
9B	By Mechanical Means:			
9B(i)	Grading-1			
9B (i)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	133.40	
9B (i)(b)	Using Screening Type-A (13.2 mm aggregate)	cum	133.40	
9B (i)(b)	Using Screening Type-B (11.2 mm aggregate)	cum	133.40	
9B(ii)	Grading-2			
9B (ii)(a)	Using Screening Crushable type such as Moorum or Gravel	cum	133.40	
9B (ii)(b)	Using Screening Type-B (11.2 mm aggregate)	cum	133.40	
Note	As three wheeled smooth rollers are also very commonly used, the same may be provided as an alternative of vibratory roller.			

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	Crushed Cement Concrete Sub-base / Base 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). 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. 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. Rs. 50.80) may be deducted.	cum	230.40	Refer note in column 2.
11	Penetration Coat Over Top Layer of Crushed Cement Concrete Base 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).			ITEM DELETED

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12	Wet Mix Macadam Providing, laying, spreading and compacting graded stone aggregate 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 (Reference to MoRT&H's specification 406). 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 .	cum	237.10	Materials cost to be added as per chapter - A , Sl. No. 4.12
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). Note 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.	cum	153.60	Material cost nil

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	199.00	Material cost Nil
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. C. Paved shoulders The rate may be adopted as applicable for different layers of pavement depending upon approved design of paved shoulders.			Refer Note in coloumn-2
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 in cement mortar 1:3 including provision of all drainage arrangements but excluding kerb channel (Reference to MoRT&H's specification 410).	sqm	485.10	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.

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
17	Crusher Run Macadam Base Providing crushed stone aggregate, 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).			Material cost to be added as per chapter-A, Sl. No. 4.17
Note	<i>Any one of the aggregate grading may be adopted</i>			
17A	By Mix in Place Method			
17A(i)	For 53 mm maximum size	cum	104.70	
17A(ii)	For 37.5 mm maximum size	cum	104.70	
17B	By Mixing Plant :			
17B(i)	For 53 mm maximum size	cum	261.80	
17B(ii)	For 37.5 mm maximum size	cum	261.80	

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

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18	Lime, Flyash Stabilised Soil Sub-Base 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.	cum	721.40	Complete Rate & Compensation for earth included
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. Rs. 178.50 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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Prime Coat Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer using mechanical means (Reference to MORT&H's specification clause 502). i) On WMM/WBM surface @ 0.70kg /sqm. ii) On stabilized soil bases / Crusher Run Macadam surface @ 0.90kg /sqm. Note <i>Bitumen primer has been provided as per table 500-3. Payment shall be made with adjustment, plus or minus, for the variation between this quantity and the actual quantity approved by the Engineer after the preliminary trials referred to in clause No. 502.4.3.</i>	 sqm sqm.	 1.60 1.60	For consumption of material, refer note of column - 2. Material cost to be added as per chapter - A, Sl. No.5.1
2	Tack Coat Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor on the prepared bituminous/granular /cement concrete pavement surface cleaned with mechanical broom (Reference to MORT&H's specification clause 503). i) i)On bituminous surface @ 0.20kg /sqm. ii) ii)On Granular surface treated with primer @ 0.25kg /sqm. iii) iii)On Cement Concrete Pavement surface @ 0.30kg /sqm. Note <i>1. Bitumen emulsion has been provided table 500-5. Payment shall be made with adjustment, plus or minus, for the variation between this quantity and actual quantity approved by the Engineer after preliminary trials referred to in clause No. 503.4.3</i>	sqm sqm. sqm. sqm.	 1.40 1.40 1.40	

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3	Bituminous Macadam Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average output of 75 tonnes per hour 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).			Cost of materials to be added . Consumption of materials [for the items from Sl. No.3(i) to 4A] to be followed as per Ch. A., Sl.No. 5.3 & 5.4
3(i)	for Grading I (40 mm nominal size)	cum	1061.20	
3(ii)	for Grading II (19 mm nominal size)	cum	1061.20	
Note	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. Rs.2.97 per 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 (Contd...)			ITEM DELETED

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4A	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). 50 mm thick			ITEM DELETED
4B	75 mm thick			
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 producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ (Contd...)			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6(i)	4.0% (min) for Grading -1 and 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). For Grading 1 (37.5 mm nominal size)	cum	1197.10	<i>Cost of materials to be added except cost of lime . 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 size)	cum	1197.10	
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). 7(i) for Grading I (13 mm nominal size) 7(ii) for Grading II (10 mm nominal size)			ITEM DELETED

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	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 producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder@ 5.2% (min) for Gr.-1 (19mm aggregate size) & @ 5.4% (min) for Gr.-2 (13.2mm aggregate 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).			
8(i)	for Grading-1 (19 mm nominal size)	cum	1222.10	<i>Material cost to be added except cost of lime as per chapter - A , Sl. No.5.8(i) & 5.8(ii)</i>
8(ii)	for Grading-2 (13.2 mm nominal size)	cum	1222.10	
9	Surface Dressing Providing and laying surface dressing as wearing course in single coat using crushed stone aggregates of specified size on a layer of bituminous binder laid on prepared surface and rolling with 8-10 tonne smooth wheeled steel roller (Reference to MORT&H's specification clause 509).			
Case -I	19 mm nominal chipping size	sqm	5.18	<i>Material cost to be added as per chapter - A , Sl. No.5.9</i>
Case - II	13 mm nominal size chipping	sqm	5.88	

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	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 2. Input for the second coat, where required, will be the same as per the 1st coat mentioned above			
10	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 penetration grade bitumen or cut-back or emulsion 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 roller 8-10 tonne capacity, finished to required level and grades (Reference to MORT&H's specification clause 510).	sqm	20.50	Material cost to be added as per chapter - A , Sl. No.5.10
10(i)	Case - I: Mechanical method using Penetration grade Bitumen and HMP of appropriate capacity not less than 75 tonnes/hour .			
Note	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 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. (Contd...)			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10(ii)	<p>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	13.20	<i>Material cost to be added as per chapter - A ,Sl. No.5.10(ii)</i>
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. 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 penetration grade bitumen 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>			
i)	Type - A.	sqm	20.00	<i>Material cost to be added as per chapter - A,Sl. No.5.11(i)&5.11(ii)</i>
ii)	Type - B	sqm	20.00	
12	<p>Seal Coat</p> <p>Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using. (Contd...)</p>			

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12(i)	Type A and B seal coats (Reference to MORT&H's specification clause 511) Case - I : Type A	sqm	4.00	Material cost to be added as per chapter - A , Sl. No.5.12
12(ii)	Case - II : Type B Providing and laying of premix sand seal coat with HMP of appropriate capacity not less than 75 tonnes/ hours using crushed stone chipping and penetration bitumen of suitable grade.	sqm	7.00	
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).			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.
14	Mastic Asphalt Providing and laying 25 mm thick mastic asphalt wearing course with paving 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 (contd...)	sqm	228.00	Material cost to be added except cost of lime as per chapter - A Sl. No.5.14

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BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>mastic surface, all complete as per clause 516 (Reference to MORT&H's specification clause 516).</p> <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, Portland cement filler, 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).</p>			<p>Material cost to be added except cost of Port land Cement(Filler materials) as per chapter - A, Sl. No.5.15</p>
15(i)	Type - I : 2-3 mm thickness	sqm	2.10	
15(ii)	Type - II : 4-6 mm thickness	sqm	4.00	
15(iii)	Type - III : 6-8 mm thickness	sqm	4.20	
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 pavement by cold milling of existing bituminous layers, planning the surface after cold milling, reclaiming excavated material to the extent of 60 per cent of the required quantity, hauling and stock piling **</p>	cum	933.10	<p>Material cost to be added as per chapter - A Sl. No.5.16</p>

CHAPTER - 5

BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	** the reclaimed material near the central recycling plant after carrying out necessary checks and evaluation, adding fresh material including rejuvenators as required, mixing in a hot mix plant, transporting and laying at site and compacting to the required grade, level and thickness, all as specified in clause 519 (Reference to MORT&H's specification clause 519).			
17	Fog Spray Providing and applying low viscosity bitumen emulsion 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 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 (Including Gravel Emulsion) 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 except cost of lime as per chapter - A , Sl. No.5.18
18(i)	Using bitumen emulsion and 9.5 mm or 13.2 mm nominal size aggregate	cum	613.80	
Note	1.Density of aggregates has been assumed 1.5 gms/cc			

CHAPTER - 5

BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18(ii)	2. Tack coat where provided will be measured and paid separately. Using bitumen emulsion and 19 mm or 26.5 mm nominal size aggregate	cum	613.80	Material cost to be added except cost of lime as per chapter - A, Sl. No.5.18
Note	1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.			
18(iii)	Using cutback bitumen and 9.5 mm or 13.2 mm nominal size aggregate	cum	613.80	
Note	1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.			
18(iv)	Using cutback bitumen and 19 mm or 26.5 mm nominal size aggregate	cum	613.80	Material cost to be added except cost of lime as per chapter - A, Sl. No.5.18
Note	1.Density of aggregates has been assumed 1.5 gms/cc 2. Tack coat where provided will be measured and paid separately.			
19	Sand Asphalt Base Course Providing, laying and rolling sand-asphalt base course composed of sand, mineral filler and bituminous binder 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, compacting and finishing (Reference to MORT&H's specification clause 506).	cum	1040.80	Material cost to be added except cost of lime as per chapter - A, Sl. No.5.19
Note	Tack coat will be measured and paid separately			

CHAPTER - 5

BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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 better adhesion between aggregates and binder.</p> <p>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 **</p>	tonne		<p>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 IOL</p>

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<p>** 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 conditions similar to Indian will be acceptable.</p> <p>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>Note 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>			

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<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)	Stress absorbing membrane (SAM) crack width less than 6 mm	sqm	3.20	Material cost to be added as per chapter - A , Sl. No.5.21 except the cost of Geotextile
	<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 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 902.</p>			
21(ii)	Stress absorbing membrane (SAM) with crack width 6 mm to 9 mm	sqm	3.20	

CHAPTER - 5
BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	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 902.			
21(iii)	Stress absorbing membrane (SAM) crack width above 9 mm and cracked area above 50 per cent 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 902.	sqm	3.30	Material cost to be added as per chapter - A ,Sl. No.5.21 except the cost of Geotextile
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 bitumen impregnated geotextile layer after cleaning the road surface, (Contd..)	sqm	209.00	

CHAPTER - 5

BASES AND SURFACES COURSES(BITUMINOUS)

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	geotextile conforming to requirements of clause 703.3, laid over a tack coat with 1.05 kg per sqm of paving grade bitumen 80 - 100 penetration and constructed to the requirement of clause 703.4.5			
22	Recipe Cold Mix Providing and laying of premix of crushed stone aggregates and emulsion binder, 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).			Material cost to be added as per chapter - A, Sl. No.5.22
22(i)	75 mm thickness	cum	315.20	
22(ii)	40 mm thickness	cum	315.20	
22(iii)	25 mm thickness	cum	315.20	
Note	(Case i to iii) 1. These mixes are considered suitable for minor repair work and temporary road surface improvement. 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. 3. Tack coat, where provided, will be measured and paid separately.			

CHAPTER -6

CEMENT CONCRETE PAVEMENT

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Dry Lean Cement Concrete Sub- base Construction of 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 not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/ cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, 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). Note : a) Fly-ash upto 20% by weigh of cementitious material (Cement+Flyash) may be used along with 43/53 grade cement(OPC) as per 601.3.3 of MORT&H's specification. Minimum content of OPC shall not be less than 120 kg. per cum. b) PPC or PSC may be used with prior approval of the Engineer as per clause 601.2.2 MORT&H's specification	cum	201.30	<i>Material cost to be added as per chapter - A Sl. No. 6.1</i>
2	Cement Concrete Pavement Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement content not less than 360 kg per cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, 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 , (Contd...)	cum	1033.60	<i>For consumption of material, refer chapter - A Sl. No 6.2. Only the cost of stone aggregate, sand, cement and steel to be added.</i>

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, dowel bartie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing (Reference to MORT&H's specification 602).</p> <p><i>1.a) Fly-ash upto 20% by weigh of cementitious material (Cement+Flyash) may be used along with 43/53 grade cement(OPC) as per 602.3.2 of MORT&H's specification. Minimum content of OPC shall not be less than 310 kg./cum.</i></p> <p><i>b) PPC or PSC may be used with prior approval of the Engineer as per clause 602.2.2 MORT&H's specification</i></p> <p><i>2. The quantities for cement, coarse aggregate and fine aggregates are for estimating only .The exact quantities will be as per mix design.</i></p>			
3	<p>Rolled Cement Concrete Base</p> <p>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).</p>			<i>ITEM DELETED</i>

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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 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. 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.			<i>Rate to be analysed as per drawing & Technical specification.</i>
5	Construction of Base/Sub-Base of Pavement with Lean Concrete - Flyash. 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.	cum	201.30	<i>Material cost to be added as per chapter - A Sl. No 6.5 except the cost of Flyash . (carriage cost included)</i>

CHAPTER - 6
CEMENT CONCRETE PAVEMENT

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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>			
6	<p>Cement - Flyash Concrete Pavement.</p> <p>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.</p>	cum	1033.60	<p><i>Only the cost of stone aggregate, sand, cement and steel to be added as per chapter - A Sl. No 6.6.</i></p>
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 (Rs.)	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	1096.50	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	637.30	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 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).	Sqm	115.20	For consumption of materials, refer chapter - A, Sl. No 7.3. The cost of all materials have been included excluding bitumen.

CHAPTER - 7

GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4	Laying Boulder Apron in Crates of Synthetic Geogrids			DELETED
5	Reinforced Earth Structures (Reference to MORT&H's specification 3100). <i>Reinforced earth Structures have four main components as under:</i> <i>a) Excavation for foundation, foundation concrete and cement concrete grooved seating in the foundation for facing elements (facia material).</i> <i>b) Facia material and its placement.</i> <i>c) Assembling, joining with facing elements and laying of the reinforcing elements.</i> <i>d) Earth fill with granular material which is to be retained by the wall.</i> Each component is analysed separately as under: considering Average height of wall = 8 m.			
5(i)	Assembling, joining and laying of reinforcing elements (Reference to MORT&H's specification 3103).			
5(i)A	With reinforcing element of steel / Aluminium strips / polymeric strips.			
Type 1	1. Galvanised carbon steel strips	RM	6.50	Cost of all material included except of Type 1 & Type 5.
Type 2	2. Copper Strips	RM	555.30	
Type 3	3. Aluminium Strips	RM	298.10	
Type 4	4. Stainless steel strips	RM	628.00	
Type 5	5. Glass reinforced polymer / fibre reinforced polymer / polymeric strips	RM	6.50	
5(i)B	With reinforcing elements of synthetic geogrids	Sqm	3062.20	Complete Rate
5(ii)	Facing elements of RCC (Reference to MORT&H's specification 3105).	Sqm	164.30	<i>For consumption of materials, refer chapter - 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>
Note	1. The specification and construction details to be adopted shall be as per section 3100 of MoRTH Specification.			

CHAPTER - 7

GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<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> <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>			

CHAPTER - 7

GEOSYNTHETIC AND REINFORCED EARTH

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<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 (Rs.)	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).			Material cost to be added as per chapter - A , Sl. No 8.1.
1A	Using Concrete Mixer	RM	39.90	
1B	Using Concrete Batching and Mixing Plant	RM	35.50	
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).			Material cost to be added as per chapter - A Sl. No 8.2.
2A	Using Concrete Mixer	RM	54.00	
2B	Using Concrete Batching and Mixing Plant	RM	51.90	

CHAPTER - 8

TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
3	Printing New Letter and Figures of any Shade for English/Local/Regional Language may be used. 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).			Complete Rate excluding overhead charges and contractor's profit
3(i)	Hindi/Local (Matras commas and the like not to be measured and paid for Half letter shall be counted as half) Details for 100 letters of 16 cm height i.e. 1600 cm	per cm height per letter	0.80	
3(ii)	English and Roman: Hyphens and the like not to be measured and paid for Detail for 100 letters of 16 cm height. i.e.1600 cm	per cm height per letter	0.50	
4	Retro-Reflectorised Traffic Signs : 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 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).			

CHAPTER - 8

TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4(i)	90 cm equilateral triangle	Each	4106.50	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.
	or			
4(ii)	60 cm equilateral triangle	Each	2485.50	
	or			
4(iii)	60 cm circular	Each	3546.70	
	or			
4(iv)	80 mm x 60 mm rectangular	Each	5192.80	
	or			
4(v)	60 cm x 45 cm rectangular	Each	3438.00	
	or			
4(vi)	60 cm x 60 cm square	Each	4190.10	
	or			
4(vii)	90 cm high octagon	Each	6797.20	
Note	<p>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</p> <p>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.</p>			
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	9658.90	Cost of all material included. Only the cost of material for M-15 grade conc. to be added as per chap.A , Sl No.8.5.

CHAPTER - 8

TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

FOR LETTERING, SIGNS, MARKINGS AND OTHER ROAD MATERIALS				
Serial No	Item	Unit	Rate (Rs.)	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	16482.30	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 excluding overhead charges and contractor's profit

CHAPTER - 8

TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
7A	Truss and Vertical Support	tonne	59302.50	Complete Rate
7B	Aluminium Alloy Plate for Over Head Sign	sqm	333.60	
Note	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. 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.			
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 MORT7H's specification 803.6.2.(Reference to MORT&H's specification 803).	sqm	57.50	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	50.90	
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	56.10	

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TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	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	96.60	
11(ii)	Up to 10 cm in width	sqm	82.10	
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	66.20	
12(ii)	Up to 10 cm in width	sqm	71.60	
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	535.50	

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Serial No	Item	Unit	Rate (Rs.)	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).			
14(i)	5th kilometre stone (precast)	Nos.	1370.90	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(ii)	Ordinary kilometer stone (precast)	Nos.	724.50	
14(iii)	Hectometer stone (precast)	Nos.	224.50	
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	751.60	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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TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	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	565.50	<i>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.8.16.</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 strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per 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	1710.70	<i>Complete Rate</i>

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TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
18	G.I Barbed Wire Fencing 1.8 Metre High : <i>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).</i>	RM	2498.50	Complete Rate
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 <i>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).</i>	RM	2432.70	Complete Rate
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 (Rs.)	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 <i>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).</i>	RM	1316.20	<i>Cost of all material included. Only the cost of material for M-15 grade conc. to be added as per chapter A Sl.No. 8.20</i>
21	Tubular Steel Railing on Precast RCC Posts, 1.2 m High Above Ground Level : <i>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).</i>	RM	839.10	<i>Cost of all material included. Only 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 : <i>Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-30 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).</i>	RM	223.50	<i>Cost of all material included. Only the cost of material for RCC M-30 & HYSD steel reinforcement to be added as per chapter A Sl.No. 8.22</i>

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Serial No	Item	Unit	Rate (Rs.)	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	2469.60	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	3101.30	Complete Rate

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	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.			
24	Road Traffic Signals electrically operated (Reference to MORT&H's specification 812).			As per market Rate.
Note	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.			
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 450 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	2783.80	Complete Rate

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Serial No	Item	Unit	Rate (Rs.)	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		ITEM DELETED
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	2755.00	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 (Rs.)	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 Note <i>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.</i>	RM	745.40	Complete Rate
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	6887.50	Cost of all material included. Only the cost of sodium vapour lamp to be added as per chapter A Sl.No. 8.27
27(ii)	For fixing in Footpath	Each	6833.80	
Note	<i>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.</i>			

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Serial No	Item	Unit	Rate (Rs.)	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. Note <i>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.</i>	Each	6447.30	<i>Cost of all material included. Only the cost of sodium vapour lamp to be added as per chapter A Sl.No. 8.28</i>
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 .			
29(i)	Single row for one utility service	RM	1146.50	<i>Cost of all material included. Only the cost of Cement mortar for Rubble masonry & granular soil to be added as per chapter A Sl.No. 8.29</i>
29(ii)	Double row for two utility services	RM	2211.20	
29(iii)	Triple Row for three utility services	RM	3293.60	
Note	<i>1. Inspection chamber at both ends is the responsibility of the agency who is laying the duct. Hence not included.</i>			

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Serial No	Item	Unit	Rate (Rs.)	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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TRAFFIC, SIGNS, MARKINGS AND OTHER ROAD APPURTENANCES

Serial No	Item	Unit	Rate (Rs.)	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	57028.00	Complete Rate
33(ii)	Message Display	Each		
Note:	Message display board 6 sqm electronically operated with complete electronic fitments for flashing the pre-determined messages. This is a specialised 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. 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			

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
34	Traffic Impact Attenuators at Abutments and Piers.			ITEM DELETED
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	2578.70	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	799.80	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	3157.80	Complete Rate

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Serial No	Item	Unit	Rate (Rs.)	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.	657.30	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	664.80	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 (Rs.)	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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	flexible 8 core electric cable, lightening 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 (Rs.)	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		Rate to be analysed as per drawing & Technical specification.

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Serial No	Item	Unit	Rate (Rs.)	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	2442.00	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	3879.50	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	11419.00	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	2327.70	Cost of cement, sand and bricks to be added as per chapter A Sl. No.8.44.

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Serial No	Item	Unit	Rate (Rs.)	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	469.60	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	Each	393.20	Complete Rate

CHAPTER -9

PIPE CULVERTS

CHAPTER - 9
PIPE CULVERTS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	PCC 1:3:6 in Foundation Plain cement concrete 1:3:6 mix 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 408).	cum	735.70	<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 (Reference to 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>
2A	1000 mm dia	Mtr.	3880.80	
2B	1200 mm dia	Mtr.	5319.50	
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 cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets (Reference to MORT&H's specification 2900).			<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>
3A	1000 mm dia	Mtr.	7761.50	
3B	1200 mm dia	Mtr.	10639.00	

CHAPTER - 9
PIPE CULVERTS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p><i>(From fore page)</i></p> <p>For Item NO.2&3</p> <p>1. In case of cement craddle bedding, quantity of PCC M15 is to be calculated as per design and priced separately and added .</p> <p>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</p>			

CHAPTER -10

MAINTENANCE OF ROADS

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (Rs.)	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, laying fresh material in layers not exceeding 250 mm and compacting with plate compactor or power rammers to restore the original alignment, levels and slopes (Reference to MORT&H's specification 3002).	cum	106.00	Material cost nil
2	Maintenance of Earthen Shoulder (filling with fresh soil) Making up loss of material/irregularities on shoulder to the design level by adding fresh approved soil and compacting it with appropriate equipment (Reference to MORT&H's specification 3003).	sqm	37.30	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 (Reference to MORT&H's specification 3003). Note <i>The earth stripped from earthen shoulders to be dumped on the side slopes locally for disposal.</i>	sqm	13.00	Material cost nil
4	Filling Pot-holes and Patch Repairs with open-Graded Premix surfacing, 20mm. Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on (Contd...)	sqm	21.30	Consumption of materials as per Ch. A., Sl.No. 10.4. Cost of material to be added.

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 511, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2 (Reference to MORT&H's specification 3004.2).			
5	Filling Pot-holes and Patch Repairs with Bituminous concrete, 40mm. Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 504, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2 (Reference to MORT&H's specification 3004.2).			
5(i)	for grading I Material	sqm	51.10	Cost of material to be added Except cost of lime as per Ch. A., Sl.No. 10.5.
5(ii)	for grading II Material	sqm	48.00	
6	Crack Filling Filling of crack using slow - curing bitumen emulsion and applying crusher dust in case crack are wider than 3mm (Reference to MORT&H's specification 3004.3.3).	RM	0.60	Cost of material to be added as per Ch. A., Sl.No. 10.6.
7	Dusting Applying crusher dust to areas of road where bleeding of excess bitumen has occurred (Reference to MORT&H's specification 3004.4).	sqm	0.20	Cost of material to be added as per Ch. A., Sl.No. 10.7.

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8A	Fog Seal (Reference to MORT&H's specification 3004.3.2).	sqm	1.30	Cost of material to be added as per Ch. A., Sl.No. 5.17
8B	Crack Prevention courses (Reference to MORT&H's specification 3004.3.4).			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
8B(i)	Stress Absorbing Membrane (SAM) crack width less than 3 mm			
8B(ii)	Stress Absorbing Membrane (SAM) crack width less than 6 mm	sqm	3.30	
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 cracked area above 50 per cent	sqm	3.30	
8B(v)	Bitumen Impregnated Geotextile	sqm	209.00	
8C	Slurry Seal (Reference to MORT&H's specification 3004.5).			Cost of material to be added as per Ch. A., Sl.No. 10.8C
8C(i)	6mm to 8 mm thickness	sqm	3.60	
8C(ii)	4mm to 6 mm thickness	sqm	2.15	
8C(iii)	2mm to 3 mm thickness	sqm	1.50	
8D	Surface Dressing for maintenance works (Reference to MORT&H's specification 3004.6).			Cost of material to be added as per Ch. A., Sl.No. 5.9.
8D(i)	19 mm nominal chipping size	sqm	5.20	
8D(ii)	13 mm nominal size chipping	sqm	6.00	
	The above mentioned items have already been included in chapter 5.			
9	Repair of Joint Grooves with Epoxy Mortar Repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in concrete pavements using epoxy mortar or epoxy concrete (Reference to MORT&H's specification 3005.1).	RM	892.70	Complete Rate

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	The constituents of epoxy mortar/epoxy concrete will be as per the instruction and manual of the manufacture.			
10	Repair of old Joints Sealant Removal of existing sealant and re sealing of contraction, longitudinal or expansion joints in concrete pavement with fresh sealant material (Reference to MORT&H's specification 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 (Reference to MORT&H's specification 3000).	RM	34.70	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 (Reference to MORT&H's specification 3000). Note <i>Slide clearance involves pushing of loose earth slided 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	70.40	Complete Rate
13	Landslide Clearance in Hard Rock Requiring Blasting (Contd...)	cum	110.90	Complete Rate

CHAPTER - 10
MAINTENANCES OF ROADS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	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 (Reference to MORT&H's specification 3000). <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 (Reference to MORT&H's specification 3000). Note <i>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	4.90	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 (Reference to MORT&H's specification 3000).	cum	3.70	Complete Rate excluding overhead charges and contractor's profit

CHAPTER -11

HORTICULTURE

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	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	20.40	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	60.30	
2(ii)	In rows 7.5 cm apart in either direction	sqm	114.60	
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	81.40	Complete Rate excluding overhead charges and contractor's profit
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	116.70	Complete Rate
5	Turfing Lawns with Fine Grassing including Ploughing, Dressing (Contd...)	sqm	96.30	Complete Rate

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	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	145.90	<i>Complete Rate excluding overhead charges and contractor's profit</i>
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	231.80	<i>Complete Rate</i>
7(b)	Maintenance of hedge for one year	RM	199.10	<i>Complete Rate</i>
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	188706.00	<i>Complete Rate</i>
8(b)	Maintenance of flowering plants and shrubs in central verge for one year	km	214469.00	

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	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	1028.00	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	12.10	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	2615.00	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

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13	Supplying Sludge Supplying sludge duly stacked at site/ store	cum		<i>As per market Rate</i>
14	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 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.	Each	213.10	<i>Cost of Material to be added as per Ch. A., Sl.No. 11.14.</i>
15	Edging with 2nd Class Bricks, Laid Dry Lengthwise 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.	Mtr.	3.30	<i>Cost of Material to be added as per Ch. A., Sl.No. 11.15.</i>
16	Making Tree Guard 53 cm dia and 1.3 m High as per Design from Empty Bitumen Drums 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.	Each	504.00	<i>Complete Rate</i>

CHAPTER - 11
HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	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	966.40	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	7150.70	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	1718.30	Complete Rate

CHAPTER - 11

HORTICULTURE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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.			
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	2355.90	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	244057.00	Complete Rate

BRIDGE WORKS

CHAPTER -12

FOUNDATION

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Excavation for Structures <i>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).</i>			
1(I)	Ordinary soil			
1(I)A	Manual Means			
1(I)A(i)	Depth upto 3 m <i>1. Cost of dewatering may be added where required upto 10 per cent of cost of labour i.e. Rs.2.05/- per cum. Assessment for dewatering shall be made as per site conditions.</i> <i>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.</i> <i>3. The cost of shoring and shuttering, where needed, may be added @ 1 per cent on cost of excavation for open foundation.</i>	cum	107.20	
Note				
1(I)A(ii)	Depth 3 m to 6 m <i>Cost of dewatering may be added where required upto 15 per cent of cost of labour i.e. Rs.7.80/- per cum. Assessment for dewatering shall be done as per actual ground conditions.</i>	cum	137.80	
Note				

Complete Rate of Item No. 1

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1(I)A(iii)	Depth above 6 m	cum	183.80	Complete Rate of Item No. 1
Note	<i>Cost of dewatering may be added where required upto 20 per cent of labour cost i.e. Rs.13.92/- per cum. Assessment for dewatering shall be made as per site conditions.</i>			
1(I)B	Mechanical Means			
1(I) B(i)	Depth upto 3 m	cum	45.20	
Note	<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>			
1(I) B(ii)	Depth 3 m to 6 m	cum	51.70	
Note	<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>			
1(I) B(iii)	Depth above 6m	cum	63.70	
Note	<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>			
1(II)	Ordinary Rock (not requiring blasting)			
1(II)A	Manual Means			
1(II) A(i)	Depth upto 3 m	cum	153.10	
Note	<i>Cost of dewatering upto 10 per cent of labour cost i.e. Rs.14.20/- per cum may be added, where required. (Contd..)</i>			

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	Assessment for dewatering shall be made as per site conditions..			
1(II)B	Mechanical Means	cum	56.90	Complete Rate of Item No. 1
Note	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.			
1(III)	Hard Rock (requiring blasting)			
1(III)A	Manual Means	cum	363.30	
Note	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.			
1(IV)	Hard Rock (blasting prohibited)			Complete Rate of Item No. 1
1(IV)A	Mechanical Means	cum	357.70	
Note	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.			
1(V)	Marshy Soil			
1(V)A	Manual means	cum	436.40	Complete Rate of Item No. 1
Note	1. Cost of dewatering @ 30 per cent of labour cost i.e. Rs.34.80/-, 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. Rs.17.40/-, where required may be added (Contd...)			

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	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			
1(V)B	Mechanical Means	cum	117.70	Complete Rate
Note	<p>1. Cost of dewatering @ 20 per cent of cost as mentioned in column -4, may be added, where required.</p> <p>2. Shoring & strutting @ 10 per cent of cost as mentioned in column -4, where required may be added.</p> <p>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.</p>			
1(VI)	Back Filling in Marshy Foundation Pits	cum	296.10	Complete Rate
2	Filling Annular Space Around Footing in Rock with M15 grade P.C.C (Reference to MORT&H's specification 304).	cum	774.20	Cost of materials to be added as per Ch. A., Sl.No. 12.8A
3	Sand Filling in Foundation Trenches as per Drawing & Technical Specification (Reference to MORT&H's specification 304).	cum	89.80	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). (Contd...)	cum	696.80	Cost of materials to be added as per Ch. A., Sl.No. 12.4.

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Vibrator is a part of minor T & P which is already included in overhead charges of the contractor.			
5	Brick Masonry Work in Cement Mortar 1:3 in Foundation complete excluding Pointing and Plastering, as per Drawing and Technical Specifications (Reference to MORT&H's specification 1300).	cum	872.60	Cost of materials to be added. Consumption of materials to be followed as as per Ch. A., Sl.No. 12.5.
6A	Cement Mortar 1:3 (1 cement : 3 sand) (Sub Analysis)	cum	279.70	
6B	Cement Mortar1:2 (1cement : 2 sand) (Sub Analysis)	cum	279.70	
6C	Cement Mortar1:4 (1cement : 4 sand) (Sub Analysis)	cum	279.70	
6D	Cement Mortar1:6 (1cement : 6 sand) (Sub Analysis)	cum	279.70	
7	Stone Masonry Work in Cement Mortar 1:3 in Foundation complete as per Drawing and Technical Specifications (Reference to MORT&H's specification 1400).			
7A	Square Rubble Coursed Rubble Masonry (first sort) (Reference to MORT&H's specification 1405.1.3).	cum	1226.60	
7B	Random Rubble Masonry (Reference to MORT&H's specification 1405.1.3).	cum	1115.20	
Note	The labour already considered in cement mortar has been taken into account while proposing labour for masonry works.			

CHAPTER - 12
FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications (Reference to MORT&H's specifications 1500, 1700 & 2100).			
8A	PCC Grade M15	cum	805.10	<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A, SI.No. 12.8.</i>
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	763.50	
Note	Add 4% extra cost as formwork over cost of material			
8C	RCC Grade M20			
Case I	Using Concrete Mixer	cum	763.50	
Note	Add 4% extra cost as formwork over cost of material			
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	509.00	
Note	Add 4% extra cost as formwork over cost of material			
8D	PCC Grade M25			
Case I	Using Concrete Mixer	cum	761.70	
Note	Add 3.75% extra cost as formwork over cost of material			
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	507.80	
Note	Add 3.75% extra cost as formwork over cost of material			
8E	RCC Grade M25 (Contd...)			

CHAPTER - 12

FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using Concrete Mixer	cum	761.70	<p style="text-align: center;"><i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.8.</i></p>
Note	Add 3.75% extra cost as formwork over cost of material			
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	507.80	
Note	Add 3.75% extra cost as formwork over cost of material			
8F	PCC Grade M30			
Case I	Using Concrete Mixer	cum	759.80	
Note	Add 3.5% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	506.60	
Note	Add 3.5% extra cost as formwork over cost of material			
8G	RCC Grade M30			
Case I	Using Concrete Mixer	cum	759.80	
Note	Add 3.5% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	506.60	
Note	Add 3.5% extra cost as formwork over cost of material			
8H	RCC Grade M35			
Case I	Using Concrete Mixer	cum	756.20	
Note	Add 3.0% extra cost as formwork over cost of material			
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	504.10	
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, (Contd...)			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<i>Admixtures @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.</i>			
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
9A	Assuming depth of water 1.0 m and height of island to be 1.25 m.	1 No.	105273.30	
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.	526623.50	
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	5460.70	
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	69601.40	Complete Rate

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11	Plain/Reinforced Cement Concrete, in Well Foundation complete as per Drawing and Technical Specification (Reference to MORT&H's specifications 1200, 1500 & 1700).			
11A	Well curb			
11A(i)	RCC M20 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	882.00	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	587.40	
11A(ii)	RCC M25 Grade			
Note	<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	882.00	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	587.40	
11A (iii)	RCC M35 Grade			
Note	<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	882.00	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	586.80	
Note.	<i>If curb concrete is carried out within steel liner, cost of formwork shall be excluded for all items under 11A.</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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11B	Well steining			
11B(i)	PCC M15 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	852.50	
11B(ii)	PCC M20 Grade			
Note	<i>Add 10.0% extra cost as formwork over cost of materia except the cost of admixture if applicable</i>			
Case I	Using Concrete Mixer	cum	808.50	
11B(iii)	RCC M20 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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	538.50	
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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
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>			

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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using Concrete Mixer	cum	808.50	<p style="text-align: center;">Cost of materials to be added except the cost of admixture if applicable. Consumption of materials to be followed as per Ch. A., SI.No. 12.11 .</p>
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	538.50	
11B(vi)	PCC M30 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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
11 B(vii)	RCC M30 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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
11B (viii)	RCC M35 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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	537.90	
11B (ix)	RCC M40 Grade	cum	651.70	
	Using Batching Plant, Transit Mixer and Concrete Pump			
Note	Add 10.0% extra cost as formwork over cost of material except the cost of admixture if applicable.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11C	Bottom Plug Concrete to be placed using tremie pipe <i>Note: 10% extra cement to be added where under water concreting is involved .</i>			
11C (i)	PCC Grade M20 <i>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</i>			
Note				
Case I	Using Concrete Mixer	cum	1030.30	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	570.70	
11C (ii)	PCC Grade M25 <i>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</i>			
Note				
Case I	Using Concrete Mixer	cum	1042.90	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	583.30	
11C (iii)	PCC Grade M30 <i>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</i>			
Note				

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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using Concrete Mixer	cum	1042.90	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 .
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	583.30	
11C(iv)	PCC Grade M35			
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	1042.90	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	583.30	
11D	Intermediate plug			
11D(i)	Grade M20 PCC			
Case I	Using Concrete Mixer	cum	1005.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	565.00	
11D(ii)	Grade M25 PCC			
Case I	Using Concrete Mixer	cum	1017.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	577.00	
11D(iii)	Grade M30 PCC			
Case I	Using Concrete Mixer	cum	1017.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	577.00	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
11E	Top plug			<p style="text-align: center;">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 .</p>
11E(i)	Grade M15 PCC			
Case I	Using Concrete Mixer	cum	775.00	
11E (ii)	Grade M20 PCC			
Case I	Using Concrete Mixer	cum	735.00	
11E (iii)	Grade M25 PCC			
Case I	Using Concrete Mixer	cum	735.00	
Case II	Using Batching Plant, Transit Mixer and Crane/concrete pump	cum	490.00	
11E (iv)	Grade M30 PCC			
Case I	<i>Using Concrete Mixer</i>	cum	735.00	
Case II	<i>Using Batching Plant, Transit Mixer and Crane/concrete pump</i>	cum	490.00	
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	<i>Using Concrete Mixer</i>	cum	763.50	
Case II	<i>Using Batching Plant, Transit Mixer and Concrete Pump</i>	cum	509.00	
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	761.70	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>Add 3.75% 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., SI.No. 12.11 .
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	507.80	
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	759.80	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	506.60	
11F(iv)	RCC Grade M35			
Note	<i>Add 3.0% extra cost as formwork over cost of material except the cost of admixture if applicable.</i>			
Case I	Using Concrete Mixer	cum	756.20	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump	cum	504.10	
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)	RCC M40 Grade			
Note	<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	610.20	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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). Sandy Soil			Complete Rate
12A				
12A (i)	<i>Depth below bed level upto 3.0 M</i>	RM	3943.90	
12A (ii)	<i>Beyond 3m upto 10m depth</i>	RM	5659.20	
12A (iii)	<i>Beyond 10m upto 20m</i>	RM	5942.00	
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>			
12A (iv)	Beyond 20m upto 30 m	RM	9909.00	
Note	<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 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i>			
12A (v)	Beyond 30m upto 40 m	RM	20897.00	
Note	<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>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12B	Clayey Soil (6m dia. Well)			Complete Rate
12B (i)	<i>Depth below bed level upto 3 M</i>	RM	5667.00	
12B (ii)	<i>Beyond 3m upto 10m depth</i>	RM	12484.00	
12B (iii)	<i>Beyond 10 m upto 20 m</i>	RM	13108.00	
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.			
12B (iv)	Beyond 20m upto 30 m	RM	21860.00	
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. 3) Add 5 per cent of cost for dewatering of the cost, if required			
12B (v)	Beyond 30m upto 40 m	RM	46104.00	
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.			
12C	Soft Rock (6m dia well)	RM	17356.00	
Note	<i>Add for dewatering @ 5 per cent of cost, if required.</i>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12D	Hard Rock (6m dia well) For depth in soft rock strata upto 3m	RM	18205.00	Complete Rate
Note	Add for dewatering @ 5 per cent of cost of labour & machinery i.e. Rs.759.40/- per RM, if required.			
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	Sandy Soil			
13A(i)	Depth below bed level upto 3.0 M	RM	6024.00	
13A(ii)	Beyond 3m upto 10m depth	RM	8104.00	
13A(iii)	Beyond 10m upto 20m	RM	8509.00	
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			
13A(iv)	Beyond 20m upto 30 m	RM	14191.00	
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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13A(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	29928.00	Complete Rate
13B	Clayey Soil (7m dia. Well)			
13B(i)	Depth below bed level upto 3.0 M	RM	8104.00	
13B(ii)	Beyond 3m upto 10m depth	RM	11701.00	
13B(iii)	Beyond 10 m upto 20 m	RM	12286.00	
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> <i>2) Add for dewatering @ 5 per cent of cost, if required.</i>			
13B(iv)	Beyond 20m upto 30 m	RM	20488.00	
Note	<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>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
13B(v)	Beyond 30m upto 40 m	RM	43210.00	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.			
13C	Soft Rock (7m dia well)	RM	15645.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost, if required.			
13D	Hard Rock (7m dia well)	RM	21475.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost of labour & machinery i.e. Rs.882.30/- per RM, if required.			
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).			
14A	Sandy Soil			
14A(i)	Depth below bed level upto 3.0 m	RM	7374.00	
14A(ii)	Beyond 3m upto 10m depth	RM	9131.00	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14A(iii)	Beyond 10m upto 20m	RM	9588.00	Complete Rate
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>			
14A(iv)	Beyond 20m upto 30 m	RM	15990.00	
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.			
14A(v)	Beyond 30m upto 40 m	RM	33724.00	
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.			
14B	Clayey Soil (8m dia. Well)			
14B(i)	Depth from bed level upto 3.0 M	RM	9910.00	
14B(ii)	Beyond 3m upto 10m depth	RM	13207.00	
14B(iii)	Beyond 10 m upto 20 m	RM	13867.00	
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.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
14B(iv)	Beyond 20m upto 30 m	RM	23125.00	Complete Rate
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.			
14B(v)	Beyond 30m upto 40 m	RM	48769.00	
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.			
14C	Soft Rock (8m dia well)	RM	17669.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost, if required.			
14D	Hard Rock (8m dia well)	RM	20478.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost of labour & machinery i.e. Rs.971.00/- per RM, if required.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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).			Complete Rate
15A	Sandy Soil			
15A(i)	Depth below bed level upto 3.0 M	RM	7458.00	
15A(ii)	Beyond 3m upto 10m depth	RM	10026.00	
15A(iii)	Beyond 10m upto 20m	RM	10528.00	
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>			
15A(iv)	Beyond 20m upto 30 m	RM	17556.90	
Note	<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 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i>			
15A(v)	Beyond 30m upto 40 m	RM	37030.40	
Note	<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>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
15B	Clayey Soil (9m dia. Well)			Complete Rate
15B (i)	Depth below bed level upto 3.0 m	RM	10448.00	
15B (ii)	Beyond 3m upto 10m depth	RM	14246.00	
15B (iii)	Beyond 10 m upto 20 m	RM	14958.00	
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	24945.00	
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	52608.00	
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.			
15C	Soft Rock (9m dia well)	RM	22224.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost, if required.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
15D	Hard Rock (9m dia well)	RM	25346.00	Complete Rate
	For depth in soft rock strata upto 3m			
Note	<i>Add for dewatering @ 5 per cent of cost of labour & machinery i.e. Rs.1036.20/- per RM, if required.</i>			
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).			
16A	Sandy Soil			
16A (i)	<i>Depth below bed level upto 3.0 M</i>	RM	8999.00	
16A (ii)	<i>Beyond 3m upto 10m depth</i>	RM	10585.00	
16A (iii)	<i>Beyond 10m upto 20m</i>	RM	11115.00	
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>			
16A (iv)	Beyond 20m upto 30 m	RM	18537.00	
Note	<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 2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.</i>			
16A (v)	Beyond 30m upto 40 m	RM	39096.00	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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.			
16B	Clayey Soil (10m dia. Well)			
16B (i)	Depth below bed level upto 3.0 M	RM	11412.00	
16B (ii)	Beyond 3m upto 10m depth	RM	14029.00	
16B (iii)	Beyond 10 m upto 20 m	RM	14730.00	
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.			
16B (iv)	Beyond 20m upto 30 m	RM	24565.00	
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			
16B(v)	Beyond 30m upto 40 m	RM	51807.00	
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.			

Complete Rate

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
16C	3) Add for dewatering @ 5 per cent of cost, if required. Soft Rock (10m dia well) For depth in soft rock strata upto 3m	RM	22775.00	Complete Rate
Note	Add for dewatering @ 5 per cent of cost, if required.			
16D	Hard Rock (10m dia well) For depth in soft rock strata upto 3m	RM	27269.00	
Note	Add for dewatering @ 5 per cent of cost of machinery i.e. Rs.630.40/- per RM, if required.			
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			
17A (i)	Depth from bed level upto 3.0 M	RM	20820.00	
17A (ii)	Beyond 3m upto 10m depth	RM	23525.00	
17A (iii)	Beyond 10m upto 20m	RM	24701.00	
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			
17A (iv)	Beyond 20m upto 30 m	RM	41194.00	

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Serial No.	Item	Unit	Rate (Rs.)	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			
17A (v)	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour. Beyond 30m upto 40 m	RM	86876.00	
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			
17B	2) Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour. Clayey Soil (11 m dia. Well)			
17B (i)	Depth from bed level upto 3.0 M	RM	19055.00	
17B (ii)	Beyond 3m upto 10m depth	RM	28873.00	
17B (iii)	Beyond 10 m upto 20 m	RM	30317.00	
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	50560.00	
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			

Complete Rate

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
17B (iv)	Beyond 30m upto 40 m	RM	106629.00	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.			
17C	Soft Rock (11m dia well)	RM	50804.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost, if required.			
17D	Hard Rock (11m dia well)	RM	61246.00	
	For depth in soft rock strata upto 3m			
Note	Add for dewatering @ 5 per cent of cost of machinery i.e. Rs.740.90/- 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).			
18A	Sandy Soil			
18A (i)	Depth below bed level upto 3.0 m	RM	42817.00	
18A (ii)	Beyond 3m upto 10m depth	RM	48188.00	
18A (iii)	Beyond 10m upto 20m	RM	50597.00	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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.			Complete Rate
18A (iv)	Beyond 20m upto 30 m	RM	84380.00	
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	177955.00	
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	46792.00	
18B (ii)	Beyond 3m upto 10m depth	RM	72734.00	
18B (iii)	Beyond 10 m upto 20 m	RM	76371.00	
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.			
18B (iv)	Beyond 20m upto 30 m	RM	127365.00	

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Serial No.	Item	Unit	Rate (Rs.)	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 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	268608.00	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	119468.00	
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	139556.00	
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 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).			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
19A	Sandy Soil			
19A(i)	Depth from bed level upto 3.0 M	RM	9721.00	Complete Rate
19A(ii)	Beyond 3m upto 10m depth	RM	10531.00	
19A(iii)	Beyond 10m upto 20m	RM	11058.00	
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	18443.00	
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	38895.00	
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	11351.00	
19B(ii)	Beyond 3m upto 10m depth	RM	15571.00	
19B(iii)	Beyond 10 m upto 20 m	RM	16349.00	

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Serial No.	Item	Unit	Rate (Rs.)	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.			
19B(iv)	Beyond 20m upto 30 m	RM	27263.00	Complete Rate
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			
19B(v)	Beyond 30m upto 40 m	RM	57498.00	
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.			
19C	Soft Rock (Twin D Type Well) For depth in soft rock strata upto 3m	RM	25928.00	
Note	Add for dewatering @ 5 per cent of cost, if required.			
19D	Hard Rock (Twin D Type Well) For depth in soft rock strata upto 3m	RM	29412.00	
Note	Add for dewatering @ 5 per cent of cost of labour & machinery i.e. Rs.1197.90/- per RM, if required.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
20	<p>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, 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>	cum	70625.00	<p style="text-align: center;">Cost of materials to be added except the cost of admixture. Consumption of materials to be followed as per Ch. A., SI.No. 12.20.</p>
Note	<p>Using batching plant</p> <p><i>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.</i></p> <p><i>2. In case pneumatic sinking is involved on a dry bed, the provision of barge and boat i.e. Rs.48/- may be deducted. (Contd...)</i></p>			

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<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>			
21	Sand Filling in Wells complete as per Drawing and Technical Specifications (Reference to MORT&H's specification 1210).	cum	89.80	Cost of materials to be added . Consumption of materials to be followed as per Ch. A., Sl.No. 12.21.
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	63456.60	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</p> <p>Using batching plant</p> <p><i>Add 5% of cost of material except the cost of admixture towards cost of forming sump, protective</i></p> <p><i>(Contd...)</i></p>	RM	2785.50	Cost of materials to be added except the cost of admixture . Consumption of materials to be followed as per Ch. A., Sl.No. 12.21.

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>bunds, chiselling and making arrangements for under water concreting with tremie pipe.</i>			
24	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). Pile diameter = 1000mm Using batching plant	RM	4291.20	<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>
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>			
25	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). Pile diameter = 1200mm Using batching plant	RM	4996.00	<i>Cost of materials to be added except the cost of admixture. Consumption of materials to be followed as per Ch. A., Sl.No. 12.25.</i>
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>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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</p> <p>Using batching plant</p>	RM	1788.10	<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>
Note	<p>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 and Rs. 2.90 for labour used for concreting may be provided to cover its usage.</p>			
27	<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>	RM	2546.00	<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 (Rs.)	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, 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 and Rs. 2.90 for labour used for concreting may be provided to cover its usage.</p>			
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</p> <p>Using batching plant</p> <p>Note</p> <p>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 , (Contd..)</p>	RM	3787.00	<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. 12.28.</p>

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	<i>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 and Rs. 1.72 for labour used for concreting may be provided to cover its usage.</i>			
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</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		ITEM DELETED
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>	RM	1126.20	<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>

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Using batching plant 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. 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.			
31	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). Pile diameter = 1000mm Using batching plant 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. 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.	RM	1608.70	Cost of materials to be added except the cost of MS clamp, steel helmet & cushion block and admixture. Consumption of materials to be followed as per Ch. A., Sl.No. 12.31.

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1 32	<p>2</p> <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</p> <p>Using batching plant</p> <p><i>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.</i></p> <p><i>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.</i></p>	3	4	5
Note				ITEM DELETED
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>			ITEM DELETED

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	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	1316.40	<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	4629.70	<i>Complete Rate</i>

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FOUNDATION

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
36	Driven Vertical Steel Piles complete as per Drawing and & Technical Specification (Reference to MORT&H's specifications 1100 & 1900). Section of the pile = H-section steel column 450mm x 250mm (ISHB series)	RM	5231.40	Complete Rate
37	Pile Load Test on single Vertical Pile in accordance with IS:2911(Part-IV) (Reference to MORT&H's specification 1113).			Complete Rate
	a) Initial and routine load test	MT	495.00	
	b) Lateral load test	MT	8250.00	
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.			
38	Cement Concrete for Reinforced Concrete in Pile Cap complete as per Drawing and Technical Specification (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	781.40	
38A(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	546.10	
Note	Add 4.0% extra cost as formwork over cost of material			
38B	RCC Grade M25			
38B(i)	Using Concrete Mixer	cum	781.40	
38B(ii)	Using Batching Plant, Transit Mixer and Concrete Pump	cum	555.20	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>Add 4.0% extra cost as formwork over cost of material</i>			<i>Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 12.38.</i>
38C	RCC Grade M30			
38C(i)	<i>Using Concrete Mixer</i>	cum	781.40	
38C(ii)	<i>Using Batching Plant, Transit Mixer and Concrete Pump</i>	cum	546.10	
Note	<i>Add 4.0% extra cost as formwork over cost of material</i>			
38D	RCC Grade M35			
38D(i)	<i>Using Concrete Mixer</i>	cum	781.40	
38D(ii)	<i>Using Batching Plant, Transit Mixer and Concrete Pump</i>	cum	555.20	
Note	<i>Add 4.0% extra cost as formwork over cost of material</i>			
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	730.90	<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, Fitting and Placing un-coated HYSD bar Reinforcement in Foundation complete as per Drawing and Technical Specifications (Reference to MORT&H's specification 1600).	MT	3110.40	<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, fitting and placing un-coated Mild steel reinforcement complete in foundation as per drawing and technical specification (Reference to MORT&H's specification 1600).	MT	3362.10	<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

CHAPTER - 13
SUBSTRUCTURE

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Brick masonry work in 1:3 in sub-structure complete excluding pointing and plastering, as per drawing and Technical Specifications (Reference to MORT&H's specifications 1300 & 2200).	cum	654.60	Cost of materials to be added as per Ch. A , Sl.No. 13.1.
Note	<i>Add 5% extra cost over material as scaffolding.</i>			
2	Pointing with cement mortar (1:3) on brick work in substructure as per Technical Specifications (Reference to MORT&H's specifications 1300 & 2200).	10 sqm	358.60	Cost of materials to be added as per Ch. A , Sl.No. 13.2.
Note	Scaffolding is already included in item 1 .			
3	Plastering with cement mortar (1:3) on brick work in sub-structure as per Technical Specifications (Reference to MORT&H's specifications 1300 & 2200).	10 sqm	390.60	Cost of materials to be added as per Ch. A , Sl.No. 13.3.
Note	1. Scaffolding is already included in item 1 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.			
4	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1400 & 2200).			
4A	Random Rubble Masonry	cum	984.00	Cost of materials to be added as per Ch. A , Sl.No. 13.4.
4B	Coursed rubble masonry (first sort)	cum	1191.50	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
4C <i>Note</i>	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	1935.80	<i>Cost of materials to be added as per Ch. A , Sl.No. 13.4C .</i>
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1500, 1700 & 2200).			Cost of materials to be added as per Ch. A , Sl.No. 13.5
5A <i>Note</i>	PCC Grade M15 Height upto 5m Add 10% extra cost as formwork over cost of material.	cum	852.50	
5B <i>Note</i>	PCC Grade M20 Height upto 5m Add 10% extra cost as formwork over cost of material.	cum	808.50	
5C 5C(p) <i>Note</i>	PCC Grade M25 Height upto 5m Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
5C(q) <i>Note</i>	Height 5m to 10m 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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using concrete Mixer	cum	837.90	Cost of materials to be added as per Ch. A , Sl.No. 13.5 .
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	558.60	
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	874.70	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	583.10	
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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
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.			
Case I	Using concrete Mixer	cum	837.90	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	558.60	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5D(r)	Height above 10m			Cost of materials to be added as per Ch. A , Sl.No. 13.5 .
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	874.70	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	583.10	
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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	538.50	
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	837.90	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	558.00	
5E(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.			

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Case I	Using concrete Mixer	cum	874.70	Cost of materials to be added as per Ch. A , Sl.No. 13.5 .
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	582.50	
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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	538.50	
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	835.00	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	556.00	
5F(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	874.70	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	582.50	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5G	RCC Grade M30			Cost of materials to be added as per Ch. A , Sl.No. 13.5 .
5G(p)	Height upto 5m			
Note	Add 10% extra cost as formwork over cost of material.			
Case I	Using concrete Mixer	cum	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	539.00	
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	831.30	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	554.20	
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	863.60	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	575.80	
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	808.50	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	537.90	

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
5H(q)	Height 5m to 10m			Cost of materials to be added as per Ch. A , Sl.No. 13.5
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	826.10	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	549.60	
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	852.60	
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	567.20	
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. 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.			

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and Technical Specifications (Reference to MORT&H's specifications 1600 & 2200).	MT	3181.00	<i>Cost of materials to be added except cost of binding wire, as per Ch. A , Sl.No. 13.6.</i>
7	Supplying, fitting and placing Mild steel reinforcement complete in sub-structure as per drawing and Technical Specification (Reference to MORT&H's specifications 1600 & 2200).	MT	2677.70	<i>Cost of materials to be added except cost of binding wire, as per Ch. A , Sl.No. 13.7.</i>
8	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC 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.	118.30	<i>Cost of materials to be added except cost of MS clamp, AC pipe & collar as per Ch. A , Sl.No. 13.8.</i>
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 as per drawing and Technical Specification (710.1.4 of IRC:78 & 2200)			

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9A	Granular material	cum	250.80	<i>Cost of materials to be added , as per Ch. A , Sl.No. 13.9.</i>
9B	Sandy material	cum	251.40	
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	254.10	<i>Cost of materials to be added , 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	1049.00	<i>Rate is inclusive of cost of material</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 (Rs.)	
			Labour, T&P, Machinery etc.	
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	2281.00	<i>Rate is inclusive of cost of material</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	683.00	<i>Rate is inclusive of cost of material</i>
Note	<i>Rate including of cost of foundation anchorage bolts, consumables.</i>			
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	4.20	<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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
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	703.00	<i>Rate is inclusive of cost of material</i>
Note	<i>Rate including of cost of foundation anchorage bolts, consumables.</i>			
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 MORTH's specifications 2000 & 2200).	Tonne Capacity	715.00	<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 (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure 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	881.00	<p style="text-align: center;">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)(c)] to be followed as per Ch. A., Sl.No. 14.1.</p>
<i>Note:</i>	<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	917.80	
<i>Note:</i>	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.A.I(i)(c)	Height above 10m	cum	954.50	
<i>Note:</i>	<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	917.80	
<i>Note:</i>	<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	954.50	
<i>Note:</i>	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.A.I(ii) (c)	Height above 10m	cum	991.20	
<i>Note:</i>	<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	587.30	
<i>Note:</i>	<i>For formwork and staging component add 20 per cent of the material cost.</i>			
1.A.II(i) (b)	Height 5m to 10m	cum	611.80	
<i>Note:</i>	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.A.II(i) (c)	Height above 10m	cum	636.30	
<i>Note:</i>	<i>For formwork and staging component add 30 per cent of the material cost.</i>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.A.II(ii)	For T-beam & slab			
1.A.II(ii) (a)	Height upto 5m	cum	611.80	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.A.II(ii) (b)	Height 5m to 10m	cum	636.30	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.A.II(ii) (c)	Height above 10m	cum	660.80	
Note:	<i>For formwork and staging component add 35 per cent of the material cost.</i>			
1B	RCC Grade M25			
Case I	Using Concrete Mixer			
1.B.I(i)	For solid slab super-structure			
1.B.I(i)(a)	Height upto 5m	cum	881.00	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			
1.B.I(i) (b)	Height 5m to 10m	cum	917.80	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.B.I(i) (c)	Height above 10m	cum	954.50	
Note:	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.B.I(ii)	For T-beam & slab			
1.B.I(ii) (a)	Height upto 5m	cum	917.80	
Note:	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.B.I(ii) (b)	Height 5m to 10m	cum	954.50	
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	991.20	
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	587.30	
Note:	<i>For formwork and staging component add 20 per cent of the material cost.</i>			

Cost of materials to be added .
Consumption of materials
[for the items from Sl. No.1.A.II(ii)(a) to 1.B.II(i)(a)]
to be followed as per Ch. A, Sl.No. 14.1.

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.B.II(i)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 25 per cent of the material cost.</i>	cum	611.80	<p style="text-align: center;">Cost of materials to be added . Consumption of materials [for the items from Sl. No.1.B.II(i)(b) to 1.C.I(ii)(c)] to be followed as per Ch. A, Sl.No. 14.1.</p>
1.B.II(i)(c)	Height above 10m <i>Note: For formwork and staging component add 30 per cent of the material cost.</i>	cum	636.30	
1.B.II(ii)	For T-beam & slab			
1.B.II(ii)(a)	Height upto 5m <i>Note: For formwork and staging component add 25 per cent of the material cost.</i>	cum	611.80	
1.B.II(ii)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 30 per cent of the material cost.</i>	cum	636.30	
1.B.II(ii)(c)	Height above 10m <i>Note: For formwork and staging component add 35 per cent of the material cost.</i>	cum	660.80	
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 <i>Note: For formwork and staging component add 20 per cent of the material cost.</i>	cum	905.50	
1.C.I(i)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 25 per cent of the material cost.</i>	cum	943.30	
1.C.I(i)(c)	Height above 10m <i>Note: For formwork and staging component add 30 per cent of the material cost.</i>	cum	981.00	
1.C.I(ii)	For T-beam & slab			
1.C.I(ii)(a)	Height upto 5m <i>Note: For formwork and staging component add 25 per cent of the material cost.</i>	cum	943.30	
1.C.I(ii)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 30 per cent of the material cost.</i>	cum	981.00	
1.C.I(ii)(c)	Height above 10m <i>Note: For formwork and staging component add 35 per cent of the material cost.</i>	cum	1018.70	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	590.40	
<i>Note:</i>	<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	615.00	
<i>Note:</i>	<i>For formwork and staging component add 25 per cent of the material cost.</i>			
1.C.II(i)(c)	Height above 10m	cum	639.60	
<i>Note:</i>	<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	615.00	
<i>Note:</i>	<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	639.60	
<i>Note:</i>	<i>For formwork and staging component add 30 per cent of the material cost.</i>			
1.C.II(ii)(c)	Height above 10m	cum	664.20	
<i>Note:</i>	<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	890.40	
<i>Note:</i>	<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	928.20	
<i>Note:</i>	<i>For formwork and staging component add 23 per cent of the material cost.</i>			
1.D.I(i)(c)	Height above 10m	cum	965.90	
<i>Note:</i>	<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	928.20	
<i>Note:</i>	<i>For formwork and staging component add 23 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(i)(a) to 1.D.I(ii)(a)]
to be followed as per Ch. A., Sl.No. 14.1.

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.D.I(ii)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 28 per cent of the material cost.</i>	cum	965.90	<p style="text-align: center;">Cost of materials to be added . Consumption of materials [for the items from Sl. No. 1.D.I(ii)(b) to 1.D.II(ii)(c)] to be followed as per Ch. A., Sl.No. 14.1.</p>
1.D.I(ii)(c)	Height above 10m <i>Note: For formwork and staging component add 33 per cent of the material cost.</i>	cum	1003.60	
1.D.I(iii)	For box girder and balanced cantilever			
1.D.I(iii)(a)	Height upto 5m <i>Note: For formwork and staging component add 38 per cent of the material cost.</i>	cum	1041.30	
1.D.I(iii)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 48 per cent of the material cost.</i>	cum	1116.80	
1.D.I(iii)(c)	Height above 10m <i>Note: For formwork and staging component add 58 per cent of the material cost.</i>	cum	1192.30	
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 <i>Note: For formwork and staging component add 18 per cent of the material cost.</i>	cum	580.60	
1.D.II(i)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 23 per cent of the material cost.</i>	cum	605.20	
1.D.II(i)(c)	Height above 10m <i>Note: For formwork and staging component add 28 per cent of the material cost.</i>	cum	629.80	
1.D.II(ii)	For T-beam & slab			
1.D.II(ii)(a)	Height upto 5m <i>Note: For formwork and staging component add 23 per cent of the material cost.</i>	cum	605.20	
1.D.II(ii)(b)	Height 5m to 10m <i>Note: For formwork and staging component add 28 per cent of the material cost.</i>	cum	629.80	
1.D.II(ii)(C)	Height above 10m <i>Note: For formwork and staging component add 33 per cent of the material cost.</i>	cum	654.40	
1.D.II(iii)	For box girder and balanced cantilever			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.D.II (iii) (a) <i>Note:</i>	Height upto 5m <i>For formwork and staging component add 38 per cent of the material cost.</i>	cum	679.00	Cost of materials to be added. Consumption of materials [for the items from Sl. No.1.D.II (iii) (a) to 1.D.II (iii)(c)] to be followed as per Ch. A., Sl.No. 14.1.
1.D.II (iii) (b) <i>Note:</i>	Height 5m to 10m <i>For formwork and staging component add 48 per cent of the material cost.</i>	cum	728.20	
1.D.II (iii)(c) <i>Note:</i>	Height above 10m <i>For formwork and staging component add 58 per cent of the material cost.</i>	cum	777.40	
1E Case I 1.E.I(i)	PSC Grade M-40 Using concrete mixer. For solid slab super-structure			Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1.E.I(i)(a) to.E.I(ii)(c)] to be followed as per Ch. A, Sl.No. 14.1.
1.E.I(i)(a) <i>Note:</i>	Height upto 5m <i>For formwork and staging component add 20 per cent of the material cost except the cost of Admixture.</i>	cum	1069.60	
1.E.I(i)(b) <i>Note:</i>	Height 5m to 10m <i>For formwork and staging component add 25 per cent of the material cost except the cost of Admixture.</i>	cum	1114.20	
1.E.I(i)(c) <i>Note:</i>	Height above 10m <i>For formwork and staging component add 30 per cent of the material cost except the cost of Admixture.</i>	cum	1158.70	
1.E.I(ii) 1.E.I(ii)(a) <i>Note:</i>	For T-beam & slab Height upto 5m <i>For formwork and staging component add 25 per cent of the material cost except the cost of Admixture.</i>	cum	1114.20	
1.E.I(ii)(b) <i>Note:</i>	Height 5m to 10m <i>For formwork and staging component add 30 per cent of the material cost except the cost of Admixture.</i>	cum	1158.70	
1.E.I(ii)(c) <i>Note:</i>	Height above 10m <i>For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.</i>	cum	1203.30	
Case II	Using Batching Plant, Transit Mixer and Concrete Pump			

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SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1.E.II(i)	For solid/voided slab superstructure			Cost of materials to be added , except the cost of Admixture. Consumption of materials [for the items from Sl. No.1.E.I(i)(a) to 1.E.II(iii)(b)] to be followed as per Ch. A., Sl.No. 14.1.
1.E.II(i)(a)	Height upto 5m	cum	707.30	
Note:	For formwork and staging component add 18 per cent of the material cost except the cost of Admixture.			
1.E.II(i)(b)	Height 5m to 10m	cum	737.30	
Note:	For formwork and staging component add 23 per cent of the material cost except the cost of Admixture.			
1.E.II(i)(c)	Height above 10m	cum	767.20	
Note:	For formwork and staging component add 28 per cent of the material cost except the cost of Admixture.			
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	737.30	
Note:	For formwork and staging component add 23 per cent of the material cost except the cost of Admixture.			
1.E.II(ii)(b)	Height 5m to 10m	cum	767.20	
Note:	For formwork and staging component add 28 per cent of the material cost except the cost of Admixture.			
1.E.II(ii)(c)	Height above 10m	cum	797.20	
Note:	For formwork and staging component add 33 per cent of the material cost except the cost of Admixture.			
1.E.II(iii)	For cast-in-situ box girder, segment construction and balanced cantilever			
1.E.II(iii)(a)	Height upto 5m	cum	827.20	
Note:	For formwork and staging component add 38 per cent of the material cost except the cost of Admixture.			
1.E.II(iii)(b)	Height 5m to 10m	cum	887.00	
Note:	For formwork and staging component add 48 per cent of the material cost except the cost of Admixture.			
1.E.II(iii)(c)	Height above 10m	cum	947.00	

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note:	For formwork and staging component add 58 per cent of the material cost except the cost of Admixture.			
1F	PSC Grade M-45			
1F(i)	For solid/voided slab superstructure			
1F(i)(a)	Height upto 5m	cum	705.00	
Note:	For formwork and staging component add 16 per cent of the material cost except the cost of Admixture.			
1F(i)(b)	Height 5m to 10m	cum	735.40	
Note:	For formwork and staging component add 21 per cent of the material cost except the cost of Admixture.			
1F(i)(c)	Height above 10m	cum	765.80	
Note:	For formwork and staging component add 26 per cent of the material cost except the cost of Admixture.			
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	735.40	
Note:	For formwork and staging component add 21 per cent of the material cost except the cost of Admixture.			
1F(ii)(b)	Height 5m to 10m	cum	765.80	
Note:	For formwork and staging component add 26 per cent of the material cost except the cost of Admixture.			
1F(ii)(c)	Height above 10m	cum	796.20	
Note:	For formwork and staging component add 31 per cent of the material cost except the cost of Admixture.			
1F(iii)	For cast-in-situ box girder, segmental construction and balanced cantilever			
1F(iii)(a)	Height upto 5m	cum	826.60	
Note:	For formwork and staging component add 36 per cent of the material cost except the cost of Admixture.			
1F(iii)(b)	Height 5m to 10m	cum	887.40	

Cost of materials to be added , except the cost of Admixture.
Consumption of materials
[for the items
from Sl. No.1.FI(i)(a) to 1.F.II(iii)(b)]
to be followed as per Ch. A., Sl.No. 14.1.

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note:	For formwork and staging component add 46 per cent of the material cost except the cost of Admixture.			
1F(iii)(c)	Height above 10m	cum	948.20	
Note:	For formwork and staging component add 56 per cent of the material cost except the cost of Admixture.			
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	cum	828.60	
Note:	For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.			
1(G)(i)(b)	Height 5m to 10m	cum	890.00	
Note:	For formwork and staging component add 45 per cent of the material cost except the cost of Admixture.			
1(G)(i)(c)	Height above 10m	cum	951.40	
Note:	For formwork and staging component add 55 per cent of the material cost except the cost of Admixture.			
1(H)	PSC Grade M- 55			
1(H)(i)	For cast-in-situ box girder, segmental construction and balanced cantilever			
1(H)(i)(a)	Height upto 5m	cum	841.30	
Note:	For formwork and staging component add 35 per cent of the material cost except the cost of Admixture.			
1(H)(i)(b)	Height 5m to 10m	cum	903.60	
Note:	For formwork and staging component add 45 per cent of the material cost except the cost of Admixture.			
1(H)(i)(c)	Height above 10m	cum	966.00	
Note:	For formwork and staging component add 55 per cent of the material cost except the cost of Admixture.			

Cost of materials to be added , except the cost of Admixture.
Consumption of materials
[for the items
from Sl. No.1F(iii)(c) to 1(H)(i)(c)]

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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> <p>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.</p>			
2	Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications (Reference to MORT&H's specification 1600) .	MT	4169.00	Consumption of materials as per Ch. A., Sl.No. 14.2. Cost of materials except binding wire
3	High tensile steel wires/strands including all accessories for stressing, stressing operations and grouting complete as per drawing and Technical Specifications (Reference to MORT&H's specification 1800) .	MT	11155.00	Consumption of materials as per Ch. A., Sl.No. 14.3 Cost of materials to be added.
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 including reinforcement complete as per drawing and Technical Specifications (Reference to MORT&H's specification 2702.2).	cum	844.40	Cost of materials to be added . Consumption of materials to be followed as per Ch. A., Sl.No. 14.4.

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Serial No.	Item	Unit	Rate (Rs.)	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	115.60	<p>Cost of materials except lime to be added.</p> <p>Consumption of materials to be followed as per Ch. A., Sl.No. 14.5.</p>
Note	<p><i>1.The rates for 6 mm or any other thickness may be worked out on pro-rata basis.</i></p> <p><i>2. Where tack coat is required to be provided before laying mastic asphalt, the same is required to be measured and paid separately.</i></p> <p><i>3.The quantities of binder, filler and aggregates are for estimating purpose. Exact quantities shall be as per mix design.</i></p> <p><i>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.</i></p> <p><i>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.</i></p>			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
6	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, complete as per approved drawings and technical specifications (Reference to MORT&H's specifications 2703, 1500, 1600 & 1700).	RM	125.10	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.6.
Note	1) Add 5% of cost of material of concrete for formwork for casting in casting yard. 2) Add 5% of cost of total material for handling & fixing of precast panels in positions. 3) Quantity of materials have been adopted from Standard plans of MORT&H vide drawing no. SD/202			
7	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).	RM	122.10	Consumption of materials as per Ch. A., Sl.No. 14.7. Cost of materials to be added.
Note	1) Add 12% of cost of material of concrete for formwork. 2) Quantity of materials have been adopted from Standard plans of MORT&H vide drawing no. SD/202			
8	Providing, fitting and fixing mild steel railing complete as per drawing and Technical Specification (Reference to MORT&H's specifications 2703.2 & 1900).	RM	2506.00	Complete Rate

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
9	Drainage Spouts complete as per drawing and Technical specification (Reference to MORT&H's specification 2705).	No.	775.00	Cost of corrosion resistant structural steel to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.9.
Note	<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>			
10	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification (Reference to MORT&H's specifications 2700).	cum	775.00	Cost of materials to be added. Consumption of materials to be followed
11	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification (Reference to MORT&H's specifications 1500, 1600, 1700 & 2704). Using batching plant	cum	708.00	Cost of materials to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.11.
Note:	<p>1) For formwork component add 2 per cent of the material cost.</p> <p>2) The grade of reinforced cement concrete shall be adopted as M30 .</p>			
12	Providing anti-corrosive treatment to HYSD reinforcement with Fusion Bonded Epoxy Coating (FBEC) (Reference to MORT&H's specification 1600).	MT		To be taken as per the prevailing market rates.

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Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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.			
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 add 5 per cent of the material cost except the cost of admixture & HT strand. 2) Add 1% as consumable over the cost of materials except the cost of admixture & HT strand.	cum	9010.90	Cost of materials except admixtures & HT Strand to be added. Consumption of materials to be followed as per Ch. A., Sl.No. 14.13.
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	1408.00	Complete rate. Consumption of materials to be followed as per Ch. A., Sl.No. 14.14.
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).			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	34.00	<i>Complete Rate .</i>
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	927.00	<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	3287.00	<i>Complete Rate</i>
18(ii)	Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing & Technical Specification.	RM	215.00	<i>Complete Rate</i>

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	165.00	Complete Rate
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	15.00	Cost of materials to be added as per Ch. A., Sl.No. 14.18.(iv)
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	515.00	Cost of materials to be added except the cost of galvanised structural steel plate. Consumption of materials to be followed as per Ch. A.,
Note	<u>Continuation of Asphaltic Plug joint:</u> 1) Add 1% of cost of material except Galvanised structural steel plate for welding & foam caulking / backer rod & other incidental.			

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Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	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.			
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	20274.00	Complete Rate
		RM	23729.00	
		RM	33352.00	
		RM	48157.00	
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	10000.00	Complete Rate

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SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p><i>1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i></p> <p><i>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.</i></p> <p><i>3. The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</i></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	23476.00	<i>Complete Rate</i>
Note	<p><i>1. The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i></p> <p><i>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.</i></p>			
23	<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 (Contd...)</p>	RM	102263.00	<i>Complete Rate</i>

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SUPERSTRUCTURE

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p>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> <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>			
24	<p>Modular Strip / Box Seal Joint</p> <p>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).</p>	RM	152797.00	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> <p>3. The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</p>			

CHAPTER -15

RIVER TRAINING & PROTECTION WORKS

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 40 kg each complete as per drawing and Technical specification (Reference to MORT&H's specification 2503).			
1A	Boulder Laid Dry Without Wire Crates.	cum	363.50	Cost of materials to be added , as per Ch. A., Sl.No. 15.1.
Note	<i>Nominal excavation required for preparation of bed has been taken into account while making provision for labour.</i>			
2	Boulder Apron Laid in Wire Crates			
	Providing and laying of boulder apron laid in wire crates made with 4mm dia GI wire conforming to IS: 280 & IS:4826 in 100mm x 100mm mesh (weaved diagonally) including 10 per cent extra for laps and joints laid with stone boulders weighing not less than 40 kg each (Reference to MORT&H's specification 2503).	cum	2037.70	Cost of stone materials to be added as per Ch. A., Sl.No. 15.2.
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)	cum	821.10	Cost of materials to be added as per Ch. A., Sl.No. 15.3.
	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			

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RIVER TRAINING & PROTECTION WORKS

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	a minimum cement content of 250 kg/cum as per IRC: 21-2000 (Reference to MORT&H's specification 2503). <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	363.50	<i>Cost of materials to be added as per Ch. A., Sl.No. 15.4A.</i>
4B	Cement Concrete Blocks of size 0.3x0.3 x0.3 m cast in cement concrete of Grade M15	cum	821.10	<i>Cost of materials to be added as per Ch. A., Sl.No. 15.4B.</i>
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 (Reference to MORT&H's specification 2504).	cum	396.80	<i>Cost of materials to be added as per Ch. 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 (Contd...)	sqm	3065.70	Complete Rate

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
	pitching (Reference to MORT&H's specifications 700 & 2504).			
7	Toe - protection A toe wall 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		
8	Providing and laying Flooring 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	1008.00	<i>Cost of materials to be added as per Ch. 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	1081.40	<i>Cost of materials to be added as per Ch. 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 at cross drainage works for relatively less important works (Reference to MORT&H's specification 2506).	cum	683.90	<i>Cost of materials to be added as per Ch. A , Sl.No. 15.9.</i>

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
10	Curtain wall complete as per drawing and Technical specification (Reference to MORT&H's specification 2507.1).			
10A	Stone masonry in cement mortar (1:3) <i>Coursed rubble masonry (1st sort)</i>	cum	1227.00	<i>Cost of materials to be added as per Ch. A, Sl.No. 15.10A.</i>
10B	Cement concrete Grade M15	cum	805.00	<i>Cost of materials to be added as per Ch. A, Sl.No. 15.10B.</i>
Note	<i>Other items like excavation for foundation, filling behind wall, filter media, weep holes etc. shall be added separately as per approved design.</i>			
11	Flexible Apron :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).	cum	408.80	<i>Cost of materials to be added as per Ch. A, Sl.No. 15.11.</i>
Note	<i>Add 1 % of cost over material to trimming & preparation of bed.</i>			
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 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 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	2381.80	<i>Cost of stone materials to be added as per Ch. A, Sl.No. 15.12.</i>

CHAPTER - 15
RIVER TRAINING & PROTECTION WORKS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<p><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></p>			
13	<p>Gabian Structure for Erosion Control, River Training Works and Protection works</p> <p>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 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).</p>	cum	5117.10	<p>Cost of stone materials to be added as per Ch. A., Sl.No. 15.13.</p>
Note	<p><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></p>			

CHAPTER -16

REPAIR AND REHABILITATION

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
1	Removal of existing cement concrete wearing coat including its disposal complete 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	86.30	<i>Complete Rate</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	64.10	<i>Complete Rate</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). <i>Add 2% of cost of materials(except the cost of wire mesh & Accelerator compound) for miscellaneous consumables, like nozzles, wire brush, cotton waste etc.</i>	Sq m	721.00	<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				
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	114.00	<i>Complete Rate</i>

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	Add 15% cost of material for cement, fixing compound and consumables .			
5	Sealing of cracks/porous concrete by injection process through nipples/Grouting complete as per Technical Specification (Reference to MORT&H's specification 2806).			
Note	Add 20% cost over cement as admixture (Anti shrinkage compound).			
5A	Cement Grout	Kg	175.20	<i>Cost of materials to be added as per Ch. A ,Sl.No. 16.5</i>
5B	Cement Mortar (1:1) Grouting	Kg	175.20	
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).			
Note	Thickness of patching = 25mm <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>	Sqm	1252.30	<i>Complete Rate</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	939.00	<i>Complete Rate</i>

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
8	Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement complete as per Technical Specification (Reference to MORT&H's specification 2804). <i>Thickness of epoxy mortar = 10mm</i>	Sq m	519.30	Complete Rate
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). <i>Average thickness of shotcrete mixture = 40mm</i>	Sq m	126.60	Cost of materials to be added as per Ch. A., Sl.No. 16.9, except the cost of quick setting compound .
10	Applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete (Reference to MORT&H's specification 2800). <i>Thickness of mortar = 10mm</i>	Sqm	96.70	Complete Rate
11	Epoxy bonding of new concrete to old concrete (Reference to MORT&H's specification 2805).	Sqm	613.50	Complete Rate

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
12	<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 : upto 25 m</p> <p>Note Add 20% cost of material for other materials like lead sheet, sleeves, deviator, fixtures etc.; except HTS strands, HDPE pipes & MS plates</p>	MT	235516.00	<p><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></p>
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	250645.00	<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>	MT	230402.00	<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>

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
Note	<i>Add 20% cost of material except HTS strands, HDPE pipes & MS plates for other materials like lead sheet, sleeves, deviator, fixtures etc.</i>			
15	Replacement of Bearings complete as per Technical Specification (Reference to MORT&H's specification 2810).	No	2708.00	Cost of Bearing to be added. All other cost included.
Note	The work entails replacement of all the bearings on one side of the span.			
16	Rectification of Bearings as per Technical Specifications (Reference to MORT&H's specification 2810).	No	2755.40	Add Cost of parts (to be replaced) before applying overhead charges and contractors profit
Note	The rectification of 3 bearings included in this analysis are on the same side of the span.			
17	Replacement of Expansion Joints complete as per drawings	RM	889.20	Cost of materials except epoxy compound to be added , as per Ch. A., Sl.No. 16.17.
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>			
18	Replacement of Damaged Concrete Railing.	RM	192.10	Complete Rate
Note	The rate for the provision of new railing may be adopted from the chapter on superstructure.			
19	Replacement of Crash Barrier.	RM	345.20	Complete Rate
Note	The rate for the construction of new crash barrier may be adopted from chapter 8 on Traffic and Transportation.			
20	Replacement of Damaged Mild Steel Railing	RM	161.50	Complete Rate

CHAPTER - 16
REPAIR AND REHABILITATION

Serial No	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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	48.30	<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	18.30	<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	220.90	Complete Rate

CHAPTER -17

MISCELLANEOUS

CHAPTER - 17
MISCELLANEOUS

Serial No.	Item	Unit	Rate (Rs.)	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)	cum	835.00	<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>
	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.			
2	Repairing Pot-holes with Bituminous Macadam (Grading - II, for compacted thickness of upto 75mm)	cum	835.00	<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>
	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 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 Backed Flexible Prismatic of 3M make (The above is inclusive of Adhesive)	sqm	6552.00	

CHAPTER - 17
MISCELLANEOUS

Serial No.	Item	Unit	Rate (Rs.)	Remarks
			Labour, T&P, Machinery etc.	
1	2	3	4	5
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 Technical Specifications in given n Appendix - 5 of specification for Road & Bridge Works of MoRT&H (Rev-4) and direction of Engineer-in-Charge complete	Kg	2.80	Material cost to be added as per chapter - A , Sl. No.17.4
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	4050.00	Complete Rate excluding overhead charges and contractors profit
6	Supplying & fixing of Raised Pavement Marker (CATS EYE) confirm to ASTN D 4280 , body of the marker will be molded from polycarbonate. The Marker double sided lens YELLOW / WHITE /RED colour. Dimension : 20m height,130mm width and 105 mm length , 3 M make.	Each	250.00	Complete Rate excluding overhead charges and contractors profit
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	415.00	Material cost to be added as per chapter - A , Sl. No.17.4

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)	Rs.1300	Rs.1000	Rs.700	Rs.1550	The rates of Sand & River Bed Materials are in per m ³ of loose net volume (i.e. after deduction for shrinkage)
b)	Medium sand (at site)	Rs.1200	Rs.900	Rs.600	Rs.1450	
c)	Fine Sand (at site)	Rs.1150	Rs.850	Rs.550	Rs.1400	
d)	River Bed Materials (at site)	-	-	Rs.650 (The rate of River Bed Materials is applicable for * marked Districts)	Rs.1500	

TABLE - I (PART-B)

SL No.	DESCRIPTION OF ITEMS	UNIT	FOR ALL DISTRICTS OF SOUTH BENGAL & NORTH BENGAL	Remarks
2	Murum (at quarry)	m ³	Rs120.00	The above rates 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
3	Cinder (at source)	m ³	Rs280.00	
4	Lime (at site)	Tonne	Rs7,500.00	
5	Surki (at site)	m ³	Rs710.00	
6	<u>Bricks, Bats, Jhama Khoa etc.</u>			
	(a) First Class Bricks (Kiln Burnt) (at source / brick field)	1000 Nos	Rs7,200.00	
	(b) First Class Picket Bricks (Kiln Burnt) (at source / brick field)	1000 Nos	Rs6,600.00	
	(c) First Class bats (Kiln Burnt) (at source)	m ³	Rs850.00	
	(d) Jhama Khoa (40-63 mm) (at source)	m ³	Rs900.00	
7	<u>Laterite Boulder</u>			
	(a) Size above 250 mm	m ³	Rs260.00	
	(b) Size above 150 mm to 250 mm	m ³	Rs292.00	

Note : The above rates are exclusive of contractor's profit.

TABLE - II

SUPPLY OF LOCAL STONE MATERIALS (GRAVELS)

Unit: cum Cost in Rs.

SI No.	Item	Name of Quarry	40 mm (in Rs.)	26.5mm (in Rs.)	20 mm (in Rs.)	10 mm (in Rs.)
1	Approved quality double washed gravel completely free from weathered and dead materials (at sources)	a) Damodarpur in the District of Bankura	535	590	590	550
		b) Dhalbhumgarh	905	1000	980	960
		c) Kamalpur in the district of Burdwan (Near Durgapur Steel Town)	905	1000	980	960

- N.B 1. The above rates include Royalty, Cess etc. but exclude Contractor's Profit.
 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 Rs.

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
745.00	722.00	408.00	400.00	575.00	575.00	455.00	455.00	1140.00	1155.00	1135.00	1122.00	1130.00	1130.00	1065.00	703.00	703.00	407.00
Stone Dust : Rs. 225.00																	

CARRIAGE DETAILS

Name of Quarry	Distance of Quarry			
	From Place	Pucca	Kutch	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	

- Remarks :** 1. The above Rates include royalty, cess etc. but exclude 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).

NH PW (ROADS) Dte; WB

SCHEDULE OF RATES

TABLE-IV
SUPPLY OF STONE MATERIALS
SOUTH BENGAL

Local hard stone materials delivered and stacked within a lead of 150 metres from the source :

Unit: Cum

Cost in Rs.

Item	Above 225 mm	225 mm to 150 mm	150 mm to 75mm	63 mm	53 mm	45 mm	40 mm / 37.5 mm	Crusher Broken					Stone
								26.5 mm	20mm/ 22.4 mm	13.20mm	10mm/ 11.2mm	5.6 mm	dust 2.8
													mm -75 micron
1. Approved Quality Local hard black stone (trap) materials delivered and stacked within a lead of 50 m from the quarry site													
a) Rampurhat	472.00	605.00	640.00	685.00	705.00	723.00	817.00	800.00	1035.00	1050.00	325.00	187.00	75.00
b) Panchami	505.00			725.00	705.00	565.00	910.00	1010.00	1080.00	1110.00	355.00	240.00	95.00
c) Malti								967.00	1148.00	1195.00	632.00	610.00	180.00
d) Balarampur (Purulia)								1090.00	1242.00	1280.00	834.00	656.00	180.00

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
Malti	Balarampur (126 kmp of NH 32)	3 km

N.B :

1. The above rates include royalty, cess etc. but exclude contractor's profit.
2. The above rates are for volume in stack after deduction for shrinkage (i.e. loose net volume).

TABLE - V
SUPPLY OF PAKUR STONE MATERIALS (EX - QUARRY)

PAKUR

Local hard stone materials delivered and stacked within a lead of 150 metres from the source:

Unit: Cum Cost in Rs.

Cost of different varieties Pakur stone materials (Rs.)													
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 - 75 micron	Stone 250mmX 125mmX 100mm per 100 Nos.
504.00	550.00	480.00	590.00	620.00	630.00	650.00	766.00	890.00	925.00	550.00	289.00	190.00	790.00

N.B. 1. The above rates include royalty, cess etc. but exclude contractor's profit

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.

TABLE VI

Cost of Pakur stone materials of different sizes at different Railway Stack Yards

Unit : Cum

Cost in Rs.

300

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 250mmX125mmX100mm per 100 Nos.
1	Alipurduar	1765.00	1811.00	1741.00	1851.00	1881.00	1891.00	1911.00	2027.00	2151.00	2186.00	1811.00	1550.00	1451.00	1736.00
2	Andal	1061.00	1107.00	1037.00	1147.00	1177.00	1187.00	1207.00	1323.00	1447.00	1482.00	1107.00	846.00	747.00	1208.00
3	Asansol	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
4	Barasat	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
5	Belghoria	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
6	Berhampore court	1636.00	1682.00	1612.00	1722.00	1752.00	1762.00	1782.00	1898.00	2022.00	2057.00	1682.00	1421.00	1322.00	1639.00
7	Bally	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
8	Burdwan Jn.	1061.00	1107.00	1037.00	1147.00	1177.00	1187.00	1207.00	1323.00	1447.00	1482.00	1107.00	846.00	747.00	1208.00
9	Barakar	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
10	Bauria	1383.00	1429.00	1359.00	1469.00	1499.00	1509.00	1529.00	1645.00	1769.00	1804.00	1429.00	1168.00	1069.00	1449.00
11	Chitpur	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
12	Coochbehar	1765.00	1811.00	1741.00	1851.00	1881.00	1891.00	1911.00	2027.00	2151.00	2186.00	1811.00	1550.00	1451.00	1736.00
13	Dumdum Cant.	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
14	Dalkhola	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
15	Dankuni	1253.00	1299.00	1229.00	1339.00	1369.00	1379.00	1399.00	1515.00	1639.00	1674.00	1299.00	1038.00	939.00	1352.00
16	Dhulian Ganga	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00

NH PW (ROADS) Dte; WB

SCHEDULE OF RATES

NH

Cost of Pakur stone materials of different sizes at different Railway Stack Yards

Unit : Cum

Cost in Rs.

301

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 250mmX125mmX100mm per 100 Nos.
17	Durgapur	1061.00	1107.00	1037.00	1147.00	1177.00	1187.00	1207.00	1323.00	1447.00	1482.00	1107.00	846.00	747.00	1208.00
18	Falakata	1636.00	1682.00	1612.00	1722.00	1752.00	1762.00	1782.00	1898.00	2022.00	2057.00	1682.00	1421.00	1322.00	1639.00
19	Garbeta	1508.00	1554.00	1484.00	1594.00	1624.00	1634.00	1654.00	1770.00	1894.00	1929.00	1554.00	1293.00	1194.00	1543.00
20	Habra	1383.00	1429.00	1359.00	1469.00	1499.00	1509.00	1529.00	1645.00	1769.00	1804.00	1429.00	1168.00	1069.00	1449.00
21	Haldia	1636.00	1682.00	1612.00	1722.00	1752.00	1762.00	1782.00	1898.00	2022.00	2057.00	1682.00	1421.00	1322.00	1639.00
22	Harishchandrapur	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00
23	Jhargram	1701.00	1747.00	1677.00	1787.00	1817.00	1827.00	1847.00	1963.00	2087.00	2122.00	1747.00	1486.00	1387.00	1688.00
24	Kankinara	1253.00	1299.00	1229.00	1339.00	1369.00	1379.00	1399.00	1515.00	1639.00	1674.00	1299.00	1038.00	939.00	1352.00
25	Kalyani	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
26	Kalaikunda	1636.00	1682.00	1612.00	1722.00	1752.00	1762.00	1782.00	1898.00	2022.00	2057.00	1682.00	1421.00	1322.00	1639.00
27	Krishnanagar	1444.00	1490.00	1420.00	1530.00	1560.00	1570.00	1590.00	1706.00	1830.00	1865.00	1490.00	1229.00	1130.00	1495.00
28	Kharagpur Jn.	1571.00	1617.00	1547.00	1657.00	1687.00	1697.00	1717.00	1833.00	1957.00	1992.00	1617.00	1356.00	1257.00	1590.00
29	Mogra	1253.00	1299.00	1229.00	1339.00	1369.00	1379.00	1399.00	1515.00	1639.00	1674.00	1299.00	1038.00	939.00	1352.00
30	Memari	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
31	Malda Town	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00
32	Midnapur	1636.00	1682.00	1612.00	1722.00	1752.00	1762.00	1782.00	1898.00	2022.00	2057.00	1682.00	1421.00	1322.00	1639.00
33	Naihati	1253.00	1299.00	1229.00	1339.00	1369.00	1379.00	1399.00	1515.00	1639.00	1674.00	1299.00	1038.00	939.00	1352.00

PW (ROADS) Dte; WB

SCHEDULE OF RATES

NH PW

Cost of Pakur stone materials of different sizes at different Railway Stack Yards

Unit : Cum

Cost in Rs.

302

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 250mmX125mmX100mm per 100 Nos.
34	Nimtita	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00
35	New Farakka	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00
36	New Jalpaiguri	1444.00	1490.00	1420.00	1530.00	1560.00	1570.00	1590.00	1706.00	1830.00	1865.00	1490.00	1229.00	1130.00	1495.00
37	Purulia	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
38	Panagarh	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
39	Raiganj	1127.00	1173.00	1103.00	1213.00	1243.00	1253.00	1273.00	1389.00	1513.00	1548.00	1173.00	912.00	813.00	1257.00
40	Raniganj	1061.00	1107.00	1037.00	1147.00	1177.00	1187.00	1207.00	1323.00	1447.00	1482.00	1107.00	846.00	747.00	1208.00
41	Raninagar	1508.00	1554.00	1484.00	1594.00	1624.00	1634.00	1654.00	1770.00	1894.00	1929.00	1554.00	1293.00	1194.00	1543.00
42	Salimar	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
43	Sainthia	911.00	957.00	887.00	997.00	1027.00	1037.00	1057.00	1173.00	1297.00	1332.00	957.00	696.00	597.00	1095.00
44	Sankrail	1318.00	1364.00	1294.00	1404.00	1434.00	1444.00	1464.00	1580.00	1704.00	1739.00	1364.00	1103.00	1004.00	1401.00
45	Siliguri	1444.00	1490.00	1420.00	1530.00	1560.00	1570.00	1590.00	1706.00	1830.00	1865.00	1490.00	1229.00	1130.00	1495.00
46	Uluberia	1383.00	1429.00	1359.00	1469.00	1499.00	1509.00	1529.00	1645.00	1769.00	1804.00	1429.00	1168.00	1069.00	1449.00

[ROADS] Dte: WB
SCHEDULE OF RATES

- N.B.
1. The above rates include royalty, cess, development surcharge etc. but exclude 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	Including all taxes and transport charges,Per M.T i.e cost at site	Rs.7560.00		
		53 Grade		Rs.7660.00		
	PPC	-		Rs.6640.00		
	PSC	-		Rs.6530.00		
1 b)	Cement: For all items under Chapter 6 only					
	Cost of cement viz., OPC 43/53 grade , PPC, PSC shall be taken from the Ministry's portal www.morth.nic.in as per their latest guide line for procurement of cement at economic price. Cost of all taxes & carriage from factory is to be added to arrive at the final rate. However if the final rate so arrived is more than the rate of cement as per 1a) above , then lower rate is to used for estimate purpose.					
2	Steel materials					
2(A)	Mild Steel rods/Tor Steel rods/HYSD bars/TMT bars.					
	a) Dia upto 6 mm			Including all taxes except transport charge,Per M.T	Rs.53200.00	
	b) Dia above 6 mm				Rs.51700.00	
2(B)	High Tensile Steel					BASIC RATE
	a)					
	i) 19 T 15 Bearing Plate (No.)		19 T 15 Anchorage	Rs.1815.00		
	ii) 15.2 mm Ancarite Wedge (No.)			Rs.42.00		
	iii) 19 T 15 Tube Unit (No.)			Rs.1980.00		
				Rs.3837.00		
	b)					
	i) 12 T 13 Bearing Plate (No.)		12 T 13 Anchorage	Rs.413.00		
	ii) 1/2 " Ancarite Wedge (No.)			Rs.32.00		
	iii) 12 T 13 Tube Unit (No.)			Rs.660.00		
				Rs.1105.00		
	c)					
	i) 15.2 mm LRPC Strand(MT)		19 T 15 Anchorage	Rs.51700.00		
	ii) 12.7 mm LRPC Strand(MT)		12 T 13 Anchorage	Rs.50600.00		
	iii) 75 x 0.4 GI Sheething (Rmt)		12 T 13 Anchorage	Rs.97.00		
	iv) 90 x 0.5 GI Sheething (Rmt)		19 T 15 Anchorage	Rs.147.00		
	2(C)	Structural Steel (MS)				
	a) Plate		Including all taxes except transport charge, Per M.T	Rs.51900.00		
	b) i) R.S Joist (Light sec.)			Rs.50000.00		
	ii) R.S Joist (Medium sec.)			Rs.50000.00		
	c) Angles, channel, flats etc			Rs.51200.00		
	d) Unequal angles			Rs.55000.00		
	e) Nuts & bolts, Rivets,etc			Rs.60000.00		
	f) Empty drums of packed Bitumen			Rs.200 each		

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 achieved by taking the first published rate of I.O.C of that quarter of the financial year in which the project estimate is 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)			
				RAPID	MEDIUM	SLOW	
		MT	##	##	##		
4	CRMB - BULK			GRADE			
				CRMB-55	CRMB-60		
		at HALDIA	MT	##	##		
5	CRMB - PACKED	at HALDIA	MT	##	##		
6	OXIDISED /AIR BLOWN BITUMEN	at KOLKATA		GRADE			The rate is indicative and only for estimate purpose.
				85/25			
		MT	43000.00				

Note:

Loading & unloading charges carriage cost, valid taxes (i.e Cental excise tax, Sale tax/VAT, others if any) to be added for all the above 6 items.

ANNEXURE - 1B

COST OF ANTI STRIPPING AGENT AT SOURCE

Sl. No.	Product	UNIT	Market Price	Remarks
1	Anti stripping Agent	Kg	Rs.341.00	NOTHING TO BE ADDED (loading, unloading & carriage cost included)

ANNEXURE - II
DAILY LABOUR WAGES CHART

Unit : Per day

A Unskilled labour	: Rs.	265.00
a. Majdoor (Male/ Female)		
B Semiskilled	: Rs.	291.00
a. Mazdoor/Dresser (Semi Skilled)		
b. Mali		
C Skilled	: Rs.	321.00
a. Blacksmith (IInd class)		
b. Mason (IInd class)		
c. Mazdoor/Dresser/Sinker (Skilled)		
D Highly Skilled	: Rs.	353.00
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	: Rs.	1031.00
b. Engineer/Doctor	: Rs.	1469.00
c. Diver	: Rs.	2052.00
d. Para medical personnel	: Rs.	1031.00

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 Burdwan market is 15 KM

Distance of work site from Haldia Refinery is 209 KM

Date of Estimate: 16.04.2015

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), 2015-2016 (w.e.f 16th April 2015).

Distance from Burdwan Jn. Railway Stackyard to worksite 15 Km.

Lead by road = **15 Km.**

COST OF ROAD CARRIAGE : Unit : cu.m.

From Km.	To Km.	Rate @ (Rs.)	Distance (Km.)	Amount (Rs.)	REMARKS
0	1	-	N.A	0.00	For Carriage cost analysis refer Chapter-I, Page-71 of N.H. Schedule of Rates, 2015-2016 (w.e.f 16th April 2015).
0	2	-	N.A	0.00	
0	3	-	N.A	0.00	
0	4	-	N.A	0.00	
0	5	-	5.00	165.30	
6	10	10.70	5.00	53.50	
11	20	9.70	5.00	48.50	
21	50	9.00	0.00	0.00	
51	100	8.00	0.00	0.00	
100	& above	7.50	0.00	0.00	
Total carriage cost = Rs.				267.30	per cum.

Carriage cost = Rs. 267.30 per cu.m.

COST OF PAKUR VARIETY STONE AGGREGATE. AT PROJECT SITE :

ITEM	SIZE	Cost of Pakur variety material at Burdwan Jn. Rly Yard.	LOADING & Unloading	CARRIAGE Cost	TOTAL Cost (cum)	REMARKS
	(mm)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	1) For Cost of Pakur variety material at Burdwan Jn. Rly Yard. refer Table-VI, page-300 of N.H. Schedule of Rates, 2015-2016 (w.e.f 16th April 2015). This rate excludes 10% contractor's profit. 2) For loading/unloading cost refer Chapter-I, Page-71 of N.H. Schedule of Rates, 2015-2016 (w.e.f 16th April 2015). 3) Material costs are in loose net volume
Ballast	75	1037	102	267.3	1406.3	
Ballast	63	1147	102	267.3	1516.3	
Ballast	53	1177	102	267.3	1546.3	
Ballast	45	1187	102	267.3	1556.3	
Ballast	40	1207	102	267.3	1576.3	
Ballast	37.5	1207	102	267.3	1576.3	
Chips	26.5	1323	102	267.3	1692.3	
Chips	20/22.4	1447	102	267.3	1816.3	
Chips	13.2	1482	102	267.3	1851.3	
Chips	10/11.2	1107	102	267.3	1476.3	
Chips	5.6	846	102	267.3	1215.3	
Dust	-	747	102	267.3	1116.3	

2. COST OF VG-30 BULK BITUMEN AT SITE :

Source of material : Haldia Refinery

Lead from Haldia Refinery to work site =

209 Km.

Total lead from Haldia Refinery to site :

209 Km.

Unit : Metric tonne

From Km.	To Km.	Rate @ (Rs.)	Distance (Km.)	Amount (Rs.)	REMARKS
0	1	-	N.A	0.00	For Carriage cost analysis Ref. Chapter-I, Page-71 of NH Schedule of Rates, 2015-2016 (w.e.f 16th April 2015).
0	2	-	N.A	0.00	
0	3	-	N.A	0.00	
0	4	-	N.A	0.00	
0	5	-	5	110.20	
5	10	7.20	5	36.00	
11	20	6.50	10	65.00	
21	50	6.00	30	180.00	
51	100	5.30	50	265.00	
101	& above	5.00	109	545.00	
Total carriage cost = Rs.				1201.20	per Metric tonne

A. Bitmen Price (VG30 Bulk at source)	B. Excise Duty @ 14% of A	C. Education Cess @ 3% of B	D. VAT @ 5% of (A + B + C)	E. Bitmen Price (inclg Duty and Tax) (A + B+ C + D) per MT
29460.00	4124.40	123.73	1685.41	35393.54

Note : i) The rate of Duty,Cess,VAT are subject to change as per latest Govt. Order.

ii) Bitmen 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, 2015 is considered as the estimate is framed on 16.04.2015, i.e. on the 1st quarter of the financial year, 2015-2016.

Cost of bitumen at source

(including all Taxes, VAT, Cess etc.)

=Rs. 35393.54

Loading/unloading

=Rs. 161.00

Carriage cost

=Rs. 1201.20

(For Loading/Unloading Ref. Chapter-I, Page-71 of NH Schedule of Rates, 2015-2016 (w.e.f 16th April 2015).
per Metric tonne

Grand total =Rs. 36755.74

So, Cost at site = Rs. 36755.74 per Metric tonne

or, Rs. 36.76 per Kg.**3. COST OF HYSD / MS BARS :**

Supply of HYSD reinforcement bars shall be from Market at Burdwan

Total lead from site :

15 Kms

Unit : Metric tonne

From Km.	To Km.	Rate @ (Rs.)	Distance (Km.)	Amount (Rs.)	REMARKS
0	1	-	N.A	0.00	For Carriage cost analysis Ref. Chapter-I, Page-71 of NH Schedule of Rates, 2015-2016 (w.e.f 16th April 2015).
0	2	-	N.A	0.00	
0	3	-	N.A	0.00	
0	4	-	N.A	0.00	
0	5	-	5	110.20	
5	10	7.20	5	36.00	
11	20	6.50	5	32.50	
21	50	6.00	0	0.00	
51	100	5.30	0	0.00	
100	& above	5.00	0	0.00	
Total carriage cost = Rs.				178.70	per Metric tonne

ITEM	UNIT	SIZE (mm)	BASIC COST (Rs.)	LOADING UNLOADING (Rs.)	CARRIAGE COST (Rs.)	TOTAL COST (Rs.)	REMARKS
Steel rods	tonne	Upto 6mm	53200	161	178.7	53539.7	Refer values in Table - I, page 305 of N.H. Schedule of Rates , 2015-2016 (w.e.f 16.04.2015).
Steel rods	tonne	Above 6mm	51700	161	178.7	52039.7	

4. COST OF 43 GRADE OPC: Rs.7.56 per Kg.

5. COST OF COARSE SAND : Rs. 700 per CUM

Illustration :1 Providing and laying Dense Bituminous Macadam with 100-120 TPH						
(Ref. Sr. No. 6(ii) of Chapter 5,Page-118 of Schedule of Rates, 2015-2016 (w.e.f 16th April 2015).						
Grading - 2						
UNIT : cu.m.						
A. LABOUR, T&P, MACHINERY ETC. COST COMPONENT:						
A. Total cost Rs.					1197.08	(including cost of lime)
Item	Size	Unit	Quantity	Rate (Rs./ unit)	Cost (Rs.)	Remarks
Chips	37.5mm	cum	0	1576.30	0	
Chips	26.5mm	cum	0.07	1692.30	118.46	
Chips	20mm	cum	0.17	1816.30	308.77	
Chips	13.2mm	cum	0.22	1851.30	407.29	
Chips	5.6mm	cum	0.32	1215.30	388.90	
Dust	2.8 - 0.075	cum	0.66	1116.30	736.76	
Bitumen	VG-30	Kg	104	36.76	3822.60	
B. Total material cost Rs.					5782.77	
(A+B) =Rs.					6979.85	
C. Cost of formwork/scaffolding etc.@ 0 % of B = Rs.					0.00	
Cost of (A+B+C) =Rs.					6979.85	
D. Add overhead charge @ 10 % of (A+B+C) = Rs.					697.98	
(A+B+C+D) = Rs.					7677.83	
E. Add contractor's profit @ 10 % (A+B+C+D)						
= Rs.					767.78	
Total cost (A+B+C+D+E)= Rs.					8445.61	
F. Add labour welfare cess @ 1% (A+B+C+D+E) =						
Rs.					84.46	
Total cost (A+B+C+D+E+F)= Rs.					8530.07	
ITEM RATE =					Rs.8530.07	per cu.m.

Illustration :2 Providing and laying R.C.C. M25 grade using batching plant,						
(Ref.Sr. No.8E Case II of Chapter 12,Page-199 of NH Schedule of Rates,2015-2016(w.e.f 16th April 2015).						
UNIT : cum						
A. LABOUR, T&P, MACHINERY ETC. COST COMPONENT:						
A. Total cost Rs.					507.80	
B. MATERIAL COST COMPONENT :						
Item	Size	Unit	Quantity	Rate (Rs./ unit)	Cost (Rs.)	Remarks
Cement	43 Grade	Kg	403.17	7.56	3047.97	
Sand	Coarse	cum	0.45	700.00	315.00	
Chips	20mm down	cum	0.54	1851.30	999.70	
Chips	10mm down	cum	0.36	1215.30	437.51	
B. Total material cost Rs.					4800.18	
(A+B) =Rs.					5307.98	
C. Cost of formwork/scaffolding etc.@ 3.75 % of B = Rs.					180.01	
Cost of (A+B+C) =Rs.					5487.98	
D. Add overhead charge @ 25 % of (A+B+C) = Rs.					1372.00	
(A+B+C+D) = Rs.					6859.98	
E. Add contractor's profit @ 10 % (A+B+C+D)=Rs.					686.00	
Total cost (A+B+C+D+E)= Rs.					7545.97	
F. Add labour welfare cess @ 1% (A+B+C+D+E) =						
Rs.					75.46	
Total cost (A+B+C+D+E+F)= Rs.					7621.43	
ITEM RATE =					Rs.7621.40 per cu.m.	

Illustration :3 Supplying, Fitting & Placing un-coated HYSD bar Reinforcement.....						
(Ref. Sr. No. 40 of Chap. 12,Page-236of NH Schedule of Rates, 2015-2016 (w.e.f 16th April 2015)						
UNIT : MT						
A. LABOUR, T&P, MACHINERY ETC. COST COMPONENT:						
A. Total cost Rs.					3110.40	
B. MATERIAL COST COMPONENT :						
Item	Size	Unit	Quantity	Rate (Rs./ unit)	Cost (Rs.)	Remarks
HYSD bar	-	Kg	1050	52.04	54641.69	
Binding wire	-	Kg	6	0.00	0.00	
B. Total material cost Rs.					54641.69	
(A+B) =Rs.					57752.09	
C. Cost of formwork/scaffolding etc.@ 0 % of B = Rs.					0.00	
Cost of (A+B+C) =Rs.					57752.09	
D. Add overhead charge @ 25 % of (A+B+C) = Rs.					14438.02	
(A+B+C+D) = Rs.					72190.11	
E. Add contractor's profit @ 10 % (A+B+C+D) = Rs.					7219.01	
Total cost (A+B+C+D+E)= Rs.					79409.12	
F. Add labour welfare cess @ 1% (A+B+C+D+E) =						
Rs.					794.09	
Total cost (A+B+C+D+E+F)= Rs.					80203.21	
ITEM RATE =					Rs.80204.00 per MT	

