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ರಸ್ತೆ ಮತ್ತು ಸೇತುವೆಗಳ ದರಪಟ್ಟಿ 2023-2024

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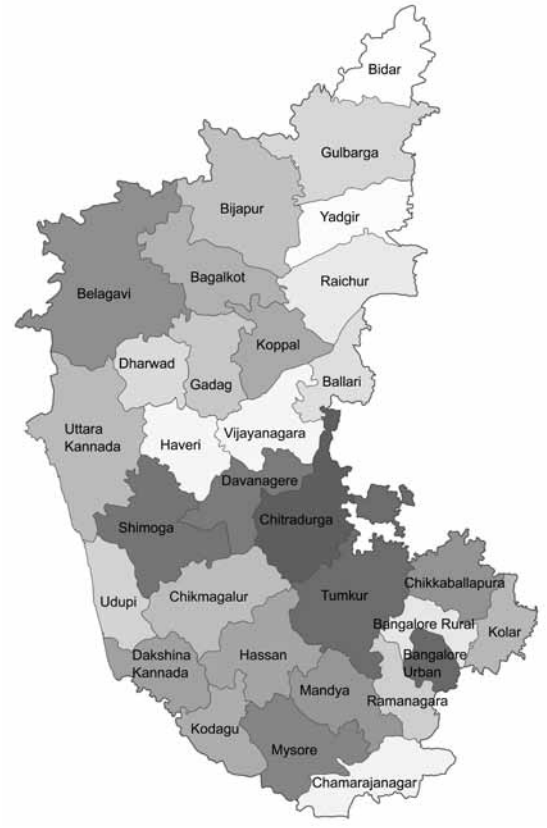
PUBLIC WORKS DEPARTMENT

SCHEDULE OF RATES FOR ROADS & BRIDGES 2023-2024

VOLUME 3

GOVERNMENT OF KARNATAKA



SCHEDULE OF RATES FOR ROAD AND BRIDGE WORKS 2023 - 2024

PUBLIC WORKS DEPARTMENT

VOLUME - 3

PREFACE

1. The Karnataka Schedule of rates for Roads & Bridges comprising of the Specifications, Rate Analysis & Technical details were prepared based on MoRTH Standard Data Book for Analysis of Rates - 2019 & on practical requirements. As per GO:PWD 86 RDF 2022 Dated : 13-02-2023, the revision of this volume is made by updating-specifications, referring to updated IRC codes, Manuals and MoRTH circulars. The revised schedule consists of the following chapters with adequacies prepared by Superintending Engineers of Public Works and Rural Development & Panchayath Raj Engineering Departments.

Sl No.	Chapter
	Roads
1	Unloading, Loading & Carriage of Materials
2	Site Clearance
3	Earthwork, Erosion Control & Drainage
4	Sub-Bases, Bases (Non-Bituminous), Shoulders and Stabilization Methods
5	Bases & Surface courses
6	Cement Concrete Pavements
7	Geosynthetics, Reinforced Earth & Protection Works
8	Traffic Calming Measures, Road Signages & Marking (Road Furnitures)
9	Pipe Culverts
10	Maintenance of Roads
	Bridges
11	Foundations
12	Sub structure
13	Super structure
14	River training & Protection works
15	Repair & Rehabilitation
	Rural Roads and Bridges
16	Panchayath Raj Engineering Department Items
17	Road & Bridge Works Testing & Maintenance.

2. The Area specific loading modified as per Vol-1 Common SR shall be added to the finished rate of items mentioned in this Schedule of rates.

3. Roads & Bridges SR-2023-24 has been prepared on the basis of the "Standard Data Book for Analysis of Rates" of MoRTH, published by Indian Roads Congress. Some items, which do not find place in the Standard Data Book for Analysis of Rates, that are required and not available been provided in the previous SR, looking to the necessity of execution

these items have also been included in new SR. The items pertaining to Rural roads are also considered in the preparation SR.

a. "Specifications" would refer to the "Specifications for Road and Bridge works" (V Revision) published by the Indian Roads Congress in April 2013, on behalf of the Government of India, Ministry of Road Transport & Highways.

b. "Clause" would refer to the clauses of the Specifications referred above.

c. "Engineer-in-Charge" would refer to the Engineer allocated with the works of the division concerned.

d. "Table" would refer to the table of the aforesaid Specifications.

4. The basic rates of materials incorporated in the analysis pertain to materials conforming to IRC standard / MoRTH, IRC & MoRD specifications of best quality available in the market.

5. For labour and machinery, the information provided in Vol-I Common SR is adopted.

6. The finished rates in the SR are inclusive of lead. No separate charges shall be paid to unless in extra ordinary cases with approval of Superintending Engineer.

7. The items of Earth work & Concrete works are to be taken from Volume - I, Common SR. The items which are specific to Roads & Bridges are included in this Volume of SR under relevant Chapters.

8. Value Engineering practices for design, construction & maintenance of roads shall be followed by executing agencies. This includes following design principles as per IRC 37:2018, adopting alternative technologies, usage of GGBS/Flyash/RCA as partial replacement, use of reclaimed road materials, Microsurfacing as per IRC SP:81, adoption of precast technologies, Soil stabilization methods for improving CBR & usage of C&D waste as per guideline IRC 121:2017. For higher traffic volumes, Asphalt Mixes such as SMA, OGFC & Asphalt with modified binders shall be put into practice at site thus improving the speed & quality in construction, improving asset durability & saving costs.

9. Roadway safety markings such as Preformed Adhesive Tapes, Chevron Boards, Audible Vibratory Markers, Cold Plastic Paints conforming to relevant IRC Standards have been included.

10. Road markings in compliance with Rights of Persons with Disabilities (RPwD) Act 2016, Tactile flooring and Inter locking blocks have been included.

11. The specifications in this volume are to be read in conjunction with notes specified for item of work. The scope of the work shall be as per relevant references mentioned.

12. Mode of measurements shall be as per provisions contained in the relevant clauses of the specifications, unless specified otherwise and all the rates shall be rounded off as per IS-2 (1960)

12. The rates in the SR are exclusive of GST.

13. Adoption of SI units in all construction works are made mandatory as per recommendation of Technical Working Group.

14. Special thanks to Principal Secretary, PWD and Secretary PWD, Chairman & Members of TWG, Engineer-in-Chief, PRAMC, Chief Engineers of PWD, Chief Engineer of National Highways, KSHIP, SHDP, KRDCL and PRED, Superintending Engineers of PWD Circles, National Highways and PRED, Under Secretary PWD and appreciation to team of dedicated Engineers of Department who contributed in compiling this document.

15. Due care has been taken to bring Karnataka Schedule of Rates for Roads & Bridges 2023-24 as per MoRTH Standard Data Book 2019, MoRD and IRC specifications and rate analysis verified by team of Engineers to realistic accuracy. However, if any errors are noticed; same could be intimated to Superintending Engineers for necessary corrections and issue of addendums.

Sd/-
(Mohan C. Hondadakeri)
Convenor
Technical Working Group
& Superintending Engineer
Public Works Department, Bengaluru Circle

INDEX

I. BASIC RATES OF MATERIALS (Excluding GST but inclusive of Royalty for applicable items)

Sl. No.	Description	Unit	Basic Rate ₹
1	Aggregates 90 mm to 5.6 mm	m^3	Vol-1 SR
2	AC pipe 100 mm dia	m	60.00
3	Acrylic polymer bonding coat	L	275.00
4	Aluminium Paint	L	150.00
5	Aluminium Alloy plate 2mm Thick or Aluminium composite material ACM sheeting - 3mm Thick fixed with Micro Prismatic (HIP) Type XI sheeting (lettering included)	m^2	4800.00
6	Aluminium Alloy/Galvanised Steel	t	55085.00
7	Aluminium sheeting 2mm thick or Aluminium composite material ACM sheeting - 3mm Thick fixed with Micro Prismatic (HIP) Type IV sheeting including 2% towards cost of drilling holes, nuts, bolts etc.and signs as applicable (lettering included)	m^2	4650.00
8	Aluminium studs 100 x 100 mm fitted with lense reflectors	Nos	300.00
9	Barbed wire	t	65000.00
10	Bearing (Cast steel rocker bearing assembly of 250 t)	Nos	72000.00
11	Bearing (Elastomeric bearing assembly consisting of 7 internal layers of elastomer bonded to 6 Nos. internal reinforcing steel laminates by the process of vulcanisation,)	Nos	8700.00
12	Bearing (Forged steel roller bearing of 250 t	Nos	3310.00
13	Bearing (Pot type bearing assembly consisting of a metal piston supported by a disc, PTFE pads providing sliding surfaces against stainless steel mating together with cast steel assemblies/ fabricated structural steel assemblies duly painted with all components	Nos	60500.00
14	Bearing (PTFE sliding plate bearing assembly of 80 t)	Nos	70000.00
15	Bearing (Supply of sliding plate bearing of 80 t)	Nos	71000.00
16	Bentonite	t	4000.00
17	Binding wire	t	55000.00
18	Bitumen VG40*	t	48787.00
19	Bitumen VG30*	t	46254.00
20	Bitumen VG10*	t	46535.00
21	Bitumen (emulsion) Slow Setting SS1*	t	47332.00
22	Bitumen (emulsion) Slow Setting SS2*	t	44643.00

Sl. No.	Description	Unit	Basic Rate ₹
23	Bitumen (emulsion) Rapid Setting RS1*	t	43200.00
24	Bitumen (emulsion) Microsurfacing	t	64831.00
25	Bitumen (PMB 70E)	t	69623.00
26	Bitumen (PMB 76E)	t	71088.00
27	Cement*	t	Vol-1 SR
28	Cellulose Pelletized Fibres	kg	78.00
29	C.I. Shoes for the pile	kg	88.00
30	Class B GI pipe of 75mm dia	t	44000.00
31	Cold Plastic Plastitrack Roll on Paint	kg	380.00
32	Cold Plastic Rumble Paint	l	240.00
33	Collar for joints 300 mm dia	Nos	220.00
34	Compressible Fibre Board(20mm thick)	m^2	375.00
35	Connectors/ Staples	each	5.00
36	Copper Plate(12m long x 250mmwide)	kg	450.00
37	Corrosion resistant Structural steel*	t	70000.00
38	Corrugated sheet, 3 mm thick, "Thrie" beam section railing	kg	50.00
39	Curing compound	l	212.00
40	Delineators from ISI certified firm as per the standard drawing given in IRC - 79	each	1500.00
41	Detonators	Nos.	10.00
42	Elastomeric slab seal expansion joint assembly manufactured by using chloroprene, elastomer for elastomeric slab unit conforming to clause 915.1 of IRC: 83 (part II),	m	10900.00
43	Epoxy compound with accessories for preparing epoxy mortar	kg	170.00
44	Epoxy mortar	kg	170.00
45	Epoxy primer	kg	350.00
46	Epoxy resin-hardner mix for prime coat	kg	580.00
47	Explosives for blasting	kg	45.00
48	Flag of red color cloth 600 x 600 mm	each	20.00
49	Galvanised MS flat clamp	Nos	45.00

Sl. No.	Description	Unit	Basic Rate ₹
50	Galvanised steel wire crates of mesh size 100 mm x 100 mm woven with 4mm dia. GI wire in rolls of required size.	m^2	155.00
51	Gelatin 80%	kg	110.00
52	Geo grids	m^2	155.00
53	Geomembrane	m^2	60.00
54	Geonets	m^2	75.00
55	Geotextile	m^2	200.00
56	Geotextile filter fabric	m^2	70.00
57	GI bolt 10 mm Dia	Nos	10.00
58	Hardener	kg	1980.00
59	HDPE Flexible pipes 75mm dia	m	100.00
60	HDPE Flexible pipes 90mm dia	m	135.00
61	HDPE Pre-perforated pipes 110mm dia	m	550.00
62	HDPE Pre-perforated pipes 160mm dia	m	800.00
63	HDPE Pre-perforated pipes 200mm dia	m	1050.00
64	Helical pipes 600mm diameter	m	160.00
65	Hot applied thermoplastic compound	L	160.00
66	HTS strand	t	70000.00
67	Joint Sealant Compound (650)	kg	160.00
68	Jute netting, open weave, 2.5 cm^2 opening for seeding and Mulching	m2	15.00
69	LDO for steam curing	L	45.00
70	Masking Tape Rolls	Nos	200.00
71	M.S.shoes @ 35 kg per pile of 15 m	kg	55.00
72	Mild Steel bars*	t	Vol-1 SR
73	Modular strip/box seal expansion joint including anchorage catering to a horizontal movement beyond 70 mm and upto 140mm assembly comprising of edge beams, central beam,2 modules chloroprene seal, anchorage elements, support and control system	m	4750.00

Sl. No.	Description	Unit	Basic Rate ₹
74	Modular strip/box seal expansion joint catering to a horizontal movement beyond 140mm and upto 210mm box/box seal joint assembly containing 3 modules/cells and comprising of edge beams, two central beams, chloroprene seal, anchorage elements, support and control system	m	5850.00
75	Nipples 12mm	Nos	8.00
76	Paint (General Purpose)	L	250.00
77	Pavement Marking Paint	L	250.00
78	Paving Fabric	m^2	20.00
79	Paver Block (Factory made) 60 mm th	m^2	660.00
80	Paver Block (Factory made) 80 mm th	m^2	720.00
81	Paver Block (Factory made) 100 mm th (medium duty)	m^2	800.00
82	Paver Block (Factory made) 100 mm th (heavy duty)	m^2	950.00
83	Perforated geosynthetic pipe 150 mm dia	m	220.00
84	Perforated pipe of cement concrete, internal dia 100 mm	m	255.00
85	Pipes 200 mm dia, 2.5 m long for drainage	m	220.00
86	Plastic sheath, 1.25 mm thick for dowel bars	m^2	5.00
87	Plastic tubes 50 cm dia, 1.2 m high	Nos	24.00
88	Polymer braids	m	25.00
89	Pre moulded Joint filler, 25 mm thick for expansion joint.	m^2	532.00
90	Preformed continuous chloroprene elastomer	m	11500.00
91	Pre-moulded asphalt filler board	m^2	530.00
92	Pre-packed cement based polymer concrete (4.5 MPa)	kg	170.00
93	Primer (General Purpose)	kg	140.00
94	PVC Pipe 110mm outer dia at 2kg per cm^2.	m	155.00
95	Quick setting compound	kg	140.00
96	Random Rubble Stone	m^3	5999.00
97	RCC Pipe NP 2 Light duty non presure pipe 300 mm dia	m	450.00
98	RCC Pipe NP 2 Light duty non presure pipe 450 mm dia	m	775.00
99	RCC Pipe NP 2 Light duty non presure pipe 600 mm dia	m	1150.00
100	RCC Pipe NP 3 heavy duty non presure pipe 900 mm dia	m	4237.00

Sl. No.	Description	Unit	Basic Rate ₹
101	RCC Pipe NP 3 heavy duty non presure pipe 1000 mm dia	m	5150.00
102	RCC Pipe NP 3 heavy duty non presure pipe 1200 mm dia	m	6610.00
103	RCC Pipe NP 4 heavy duty non presure pipe 300 mm dia	m	1000.00
104	RCC Pipe NP 4 heavy duty non presure pipe 900 mm dia	m	5085.00
105	RCC Pipe NP 4 heavy duty non presure pipe 1200 mm dia	m	8466.00
106	Reflectorising Glass Beads	kg	60.00
107	Reinforcement strips 60 mm wide 5 mm thick as per clause 3102	m	190.00
108	Separation Membrane of impermeable plastic sheeting 125 micron thick	m^2	25.00
109	Sheathing duct	m	15.00
110	Silica Fume	kg	13.00
111	Solid Round Glass Fibre Reinforced Polymer (GFRP) Bars	kg	165.00
112	Steel circular hollow pole of standard specification for street lighting to mount light at 5 m height above deck level	each	4300.00
113	Steel circular hollow pole of standard specification for street lighting to mount light at 9 m height above road level	each	7000.00
114	Steel drum 300 mm dia 1.2 m high/empty bitumen drum	Nos	190.00
115	Steel helmet and cushion block on top of pile head during driving.	kg	55.00
116	Steel pipe 25 mm external dia as per IS:1239	m	85.00
117	Steel pipe 50 mm external dia as per IS:1239	m	170.00
118	Strip seal expansion join & complete assembly	m	10250.00
119	Structural Steel*	t	Vol-1 SR
120	Synthetic Geogrid Ultimate tensile strength- 100 kN/m	m^2	60.00
121	Synthetic Geogrid Ultimate tensile strength- 150 kN/m	m^2	65.00
122	Synthetic Geogrid Ultimate tensile strength- 200 kN/m	m^2	70.00
123	Synthetic Geogrid Ultimate tensile strength- 250 kN/m	m^2	75.00
124	Synthetic Geogrid Ultimate tensile strength- 300 kN/m	m^2	78.00
125	Synthetic Geogrid Ultimate tensile strength- 350 kN/m	m^2	80.00
126	Synthetic Geogrid Ultimate tensile strength- 400 kN/m	m^2	90.00
127	Synthetic Geogrid Ultimate tensile strength- 450 kN/m	m^2	92.00
128	Synthetic Geogrid Ultimate tensile strength- 600 kN/m	m^2	95.00

Sl. No.	Description	Unit	Basic Rate ₹
129	Synthetic Geogrid Ultimate tensile strength- 700 kN/m	m^2	100.00
130	Synthetic Geogrid Ultimate tensile strength- 800 kN/m	m^2	105.00
131	Synthetic Geogrid Ultimate tensile strength- 900 kN/m	m^2	110.00
132	Synthetic Geogrid Ultimate tensile strength- 1000 kN/m	m^2	115.00
133	Synthetic Geogrid Ultimate tensile strength- 1200 kN/m	m^2	125.00
134	Synthetic Geogrids as per clause 3102.8	m^2	280.00
135	Tactile Flooring	m^2	750.00
136	Thermoplastic Audible Vibratory Paint - Cold	kg	475.00
137	Thermoplastic Audible Vibratory Paint - Hot	kg	200.00
138	Tie rods 20mm diameter	Nos	85.00
139	Traffic cones with 150 mm reflective sleeve	Nos	350.00
140	Tube anchorage set complete with bearing plate	Nos	11900.00
141	Unslaked lime	t	4250.00
142	Water	KL	44.00
143	Water based cement paint	l	65.00
144	Welded steel wire fabric	kg	55.00
145	Wire mesh 50mm x 50mm size of 3mm wire	kg	35.00
146	Wooden ballies 2" Dia for bracing	each	190.00
147	Wooden ballies 8" Dia and 9 m long	each	215.00
148	Wooden packing	m^3	29000.00
149	Wooden staff for fastening of flag 25 mm dia, one m long	each	8.00

IV. MATERIAL CO-EFFICIENTS

Sl. No.	Item of Work (Short Specifications)		Unit	Co-efficient		
				Jelly Metal / Stone	Sand	Moorum/ Soil
1	4.13/4.14 (i) b	WBM Gr I with Screenings Type A with Binding material	m^3	1.37		0.08
2	4.13/4.14 (i) c	WBM Gr I with Screenings Type B with Binding material	m^3	1.45		0.08
3	4.13/4.14 (i) a	WBM Gr I with moorum as screening	m^3	1.21		0.29
4	4.13/4.14 (ii) a	WBM Gr II with moorum as screening	m^3	1.21		0.29
5	4.13/4.14 (ii) b	WBM Gr II with Screenings Type B with Binding material	m^3	1.45		0.08
6	4.17	Wet Mix Macadam (WMM)	m^3	1.41		
7	4.1, 4.2	Granular Sub Base (GSB)	m^3	1.35		
8	1.8	Soil (Gravel) - Embankment works	m^3			1.15
9	5.14,5.15, 5.16,5.17	Bituminous Concrete (BC)	m^3	1.46		
10	5.31	Semi Dense Bituminous Concrete (SDBC)	m^3	1.43		
11	5.10,5.11, 5.12,5.13	Dense Bituminous Macadam (DBM)	m^3	1.44		
12	5.6,5.7,5.8,5.9	Bituminous Macadam (BM)	m^3	1.42		
13	5.19,5.20	OGPC:Mix Seal Surface (MSS:CGPC) Type A & B	m^2	0.027		
14	5.21 (i)	Seal Coat	m^2	0.009		
15	5.21(ii)	Seal Coat	m^2	0.006		
16	5.22	Mastic Asphalt	m^2	0.0276		
17	5.29	Bituminous Concrete using Waste Plastic	m^2	1.46		
18	5.35	Microsurfacing	m^2	0.008		
19	5.36a	BC with PMB Gr I	m^3	1.46		
20	5.36b	BC with PMB Gr II	m^3	1.46		
21	5.37	Stone Matrix Asphalt	m^3	1.43		

22	5.39	Open Graded Friction Course (OGFC)	m^3	1.48		
23	6.1	Dry Lean Cement Concrete	m^3	0.89	0.45	
24	6.2	Pavement Quality Concrete – M40 grade	m^3	0.90	0.45	
25	6.3	Dry Lean Cement Concrete- Fly Ash Based	m^3	0.89	0.45	
26	6.4	Thin White Topping	m^3	0.90	0.45	
27	6.5	Pavement Quality Concrete – M30 grade	m^3	0.90	0.45	
28	6.6	Plain Cement Concrete – M30 grade	m^3	0.90	0.45	
29	6.8.1	Interlocking Blocks – 60mm	m^2		0.035	
30	6.8.2	Interlocking Blocks – 80mm	m^2		0.046	
31	6.8.4	Interlocking Blocks – 100mm	m^2		0.046	
32	6.8.4	Interlocking Blocks – 100mm	m^2		0.045	
33	6.8.5	Permeable Pavers	m^2		0.035	
34	6.9	Prestressed Cement Concrete Pavement	m^3	0.90	0.45	
35	7.3	Laying Boulder Apron in Crates of Synthetic Geogrids	m^3	1.3		
36	7.6	Facing elements of RCC	m^2	0.16	0.08	
37	8.1	Cast in Situ Cement Concrete M20 Kerb				
	8.1a	a) PCC M15 grade for kerb base	m	0.03	0.015	
	8.1b	b) PCC M20 grade for kerb Cast in Situ	m	0.03	0.015	
38	8.2	Cast in Situ Cement Concrete M20 Kerb with Channel	m	0.03	0.015	
	8.2a	a) PCC M15 grade for kerb base				
	8.2b	b) PCC M20 grade for kerb Cast in Situ	m	0.04	0.02	
39	8.5	Retro-Reflectorised Traffic Signs as per IRC:67:2022 made of Class B Type IV				
		(i) 120 cm equilateral triangle	each	0.11	0.055	
		(ii) 90 cm equilateral triangle	each			
		(iii) 75 cm equilateral triangle	each			
		(iv) 60 cm equilateral triangle	each			
		(v) 120 cm circular	each			

		(vi) 90 cm circular	each			
		(vii) 75 cm circular	each			
		(viii) 60 cm circular	each			
		(ix) 90 mm x 75 mm rectangular	each			
		(x) 80 mm x 60 mm rectangular	each			
		(xi) 60 mm x 50 mm rectangular	each	0.11	0.055	
		(xii) 60 cm x 45 cm rectangular	each			
		(xiii) 60 cm x 60 cm square	each			
		(xiv) 120 cm high octagon	each			
		(xv) 90 cm high octagon	each			
		(xvi) 75 cm high octagon	each			
40	8.6	Retro-Reflectorised Traffic Signs as per IRC:67:2022 made of Class C Type XI				
		(i) 120 cm equilateral triangle	each			
		(ii) 90 cm equilateral triangle	each			
		(iii) 75 cm equilateral triangle	each			
		(iv) 60 cm equilateral triangle	each			
		(v) 120 cm circular	each			
		(vi) 90 cm circular	each			
		(vii) 75 cm circular	each	0.11	0.055	
		(viii) 60 cm circular	each			
		(ix) 90 mm x 75 mm rectangular	each			
		(x) 80 mm x 60 mm rectangular	each			
		(xi) 60 mm x 50 mm rectangular	each			
		(xii) 60 cm x 45 cm rectangular	each			
		(xiii) 60 cm x 60 cm square	each			
		(xiv) 120 cm high octagon	each			
		(xv) 90 cm high octagon	each	0.11	0.055	
		(xvi) 75 cm high octagon	each			

41	8.7	Direction and Place Identification Signs upto 0.9 m2 Size Board.	m^2	0.122	0.061	
42	8.8	Direction and Place Identification Signs with size more than 0.9 m2 size Board.	m^2	0.146	0.073	
43	8.16	Kilometer Stone				
	8.16(i)	5th kilometre stone (precast)	No	0.349	0.184	
	8.16(ii)	Ordinary kilometer stone (precast)	No	0.240	0.127	
	8.16(iii)	200 m stone (precast)	No	0.043	0.023	
44	8.18	Boundary pillar / Guard Stone	No	0.020	4.642	
45	8.22	Tubular Steel Railing on Precast RCC Posts	m	0.058	0.030	
46	8.23	Reinforced Cement Concrete Crash Barrier (New Jersey)				
	8.23(i)	M 25 grade concrete	m	0.06	0.03	
	8.23(ii)	M 30 grade concrete	m	0.40	0.20	
47	8.24	Reinforced Cement Concrete Crash Barrier (New Jersey) at the medians constructed with reinforcement cement concrete with TMT FE 550				
	8.24(i)	M 25 grade concrete	m	0.22	0.11	
	8.24(ii)	M 30 grade concrete	m	0.22	0.11	
48	8.25	Metal Beam Crash Barrier				
	8.25(i)	Type - A, "W" : Metal Beam Crash Barrier	m	0.23	0.12	
	8.25(ii)	Type - B, "THRIE" : Metal Beam Crash Barrier	m	0.23	0.12	
49	8.29	Cable Duct Across the Road				
	8.29(i)	Single row for one utility service	m	0.13	0.04	0.36
	8.29(ii)	Double row for two utility services	m	0.19	0.058	0.72
	8.29(iii)	Triple Row for three utility services	m	0.24	0.075	1.08
50	8.31	Rumble Strips	m^2	0.0071		
51	8.34 (iii)	Permanent Type Barricade in Construction Zone C) With bricks	each		0.09	3.64

52	8.42	Supplying and fixing M15 grade precast cement concrete Kerb stones ..	m			
	8.42.1	300 x 250 x 100 mm size	m		0.00086	
	8.42.2	600 x 200 x 100 mm size	m		0.00043	
	8.42.3	600 x 300 x 150 mm size	m		0.00086	
	8.42.4	900 x 250 x 150 mm size	m		0.00043	
	8.42.5	300 x 300 x 100 mm size	m		0.00107	
	8.42.6	600 x 300 x 100 mm size	m		0.00064	
	8.42.7	300 x 300 x 150 mm size	m		0.00171	
	8.42.8	300 x 200 x 150 mm size	m		0.00107	
53	8.48	Chevron Boards: Supply and installation of retro- reflective Chevron signboards	No	0.11	0.055	
54	8.54	Providing and fixing board displaying information, such as 'Name of work, Tender cost, Name of Contractor, Work completion and liability period	No	0.24	0.127	
55	8.55	Providing and fixing RCC name board of size 1.35x0.60x0.04 m	No	0.29	0.17	
56	8.60.1	Pedestrian Crossings as per IRC 99-2018 using Bituminous Macadam (BM) Gr II and Semi Dense Bituminous Macadam (SDBC) Gr II				
	8.60.1(i)	Single lane with formation width of 5.75 m.	each	4.61		0.15
	8.60.1(ii)	Intermediate lane with formation width of 7.50 m	each	5.44		0.15
	8.60.1(iii)	Two lane for formation width of 9.00 m	each	6.15		0.15
57	8.60.2	Pedestrian Crossings as per IRC 99-2018 using Dense Bituminous Macadam (DBM) Gr II and Bituminous Concrete (BC) Gr II				
	8.60.2(i)	Single lane with formation width of 5.75 m.	each	4.73		0.15
	8.60.2(ii)	Intermediate lane with formation width of 7.50 m	each	5.59		0.15
	8.60.2(iii)	Two lane for formation width of 9.00 m	each	6.32		0.15

58	9.1	Laying Reinforced Cement Concrete Pipe NP4 / Prestressed Concrete Pipe				
	9.1(i)	First Class Bedding in Single Row. i) 1000 mm dia	m		0.0056	0.36
	9.1(ii)	First Class Bedding in Single Row. ii) 1200 mm dia	m		0.0072	0.40
	9.1(iii)	First Class Bedding in Single Row. iii) 1500 mm dia	m		0.0072	0.46
59	9.2	Laying Reinforced Cement Concrete Pipe NP4 / Prestressed Concrete Pipe on				
		First Class Bedding in Double Row. i) 1000 mm dia	m		0.0056	1.00
		First Class Bedding in Double Row. ii) 1200 mm dia	m		0.0072	1.10
		First Class Bedding in Double Row. iii)1500 mm dia	m		0.0072	1.25
60	10.4	Filling Pot-holes and Patch Repairs with Open-Graded Premix surfacing, 20mm (using VG-30 Grade Bitumen)	m^2	0.027		
61	10.5	Filling Pot-holes and Patch Repairs with Bituminous concrete, 40mm (using VG-30 Grade Bitumen)	m^2	0.057		
62	10.15	Patching of Potholes				
	10.15(i)	Shallow Potholes using SDBC Gr II 25 mm thick	m^2	0.0365		
	10.15(ii)	Deep Potholes using WBM Gr II & SDBC Gr lI 25 mm thick	m^2	0.14		
63	10.16	Removing & resetting cobble stones	m^2		0.04	
64	10.17	Resetting of Kerb Stones	No		0.00086	
65		Providing and Constructing Temporary Island 24 m diameter for Construction of Well Foundation for 8m dia. Well.				
	11.1A	Assuming depth of water 1.0 m and height of island to be 1.25 m.	No		36.58	565.48
	11.1 B	Assuming depth of water 4.0 m and height of island 4.5 m.	No		292.68	1356.00

66	11.1 C	Providing and constructing one span service road to reach island location from one pier location to another pier location. Assuming span length 30 m, width of service road 10m and depth of water 1m	m		0.325	15.00
67	11.35	Pneumatic sinking of wells with equipment of approved design,	m^3	1.44	0.72	
68	11.36	Sand Filling in Wells complete as per Drawing and Technical Specifications.	m^3		1.20	
69		Bored cast-in-situ M35 grade R.C.C. Pile excluding Reinforcement				
	11.38	Pile diameter-750 mm	m	0.41	0.21	
	11.39	Pile diameter-1000 mm	m	0.74	0.37	
	11.40	Pile diameter-1200 mm	m	1.06	0.53	
	11.41	Pile diameter-1500 mm	m	1.65	0.83	
70		Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement				
	11.42	Pile diameter - 750 mm	m	0.398	0.199	
	11.43	Pile diameter - 1000 mm	m	0.707	0.353	
	11.44	Pile diameter - 1200 mm	m	1.018	0.509	
71		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement				
	11.45	Pile Diameter = 500 mm	m	0.176	0.088	
	11.46	Pile Diameter = 750 mm	m	0.398	0.199	
	11.47	Pile Diameter = 1000 mm	m	0.707	0.353	
72		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement				
	11.48	Size of pile - 300 mm x 300 mm	m	0.081	0.040	
	11.49	Size of pile - 500 mm x 500 mm	m	0.225	0.112	
	11.50	Size of pile - 750 mm x 750 mm	m	0.506	0.25	
73	12.3 A	Back filling behind abutment, wing wall and return wall complete including compaction				
	12.3 A	Granular material	m^3			1.20
	12.3 B	Sandy material	m^3		1.20	

74	12.4	Providing and laying of Filter media with granular materials/stone crushed aggregates	m^3	1.20		
75	13.2 A	Providing and laying Cement concrete wearing coat M-30 grade including reinforcement	m^3	0.9	0.45	
76	13.3	Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab	m^2	0.0134		
77	13.4	Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm,	m	0.077	0.038	
78	13.5	Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate	m	0.077	0.038	
79	13.8	PCC M15 Grade leveling course below approach slab.	m^3	0.89	0.45	
80	13.9	Reinforced cement concrete M30 grade for approach slab.	m^3	0.90	0.45	
81	13.11	Precast - pretension Girders	m^3	0.90	0.45	
82	13.13 A	Crash Barrier for Bridges (Height 950 mm)	m	0.228	0.114	
83	13.13 B	Crash Barrier for Bridges (Height 1100 mm)	m	0.268	0.134	
84	13.13 C	Crash Barrier for Bridges (Height 1550 mm)	m	0.463	0.232	
85	13.15 (iv)	Providing and filling joint sealing compound.	m		0.01	
86	13.16	Providing and laying of asphaltic plug joint to.	m	0.0625		
87	14.1	Providing and laying boulders apron on river bed for protection against scour with stone boulders.	m^3	*1.2		
88	14.2	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. Boulder Apron Laid in Wire Crates	m^3	*1.2		

89	14.3	Providing and laying of apron with cement concrete blocks of size 0.5x0.5x0.5 m .	m^3	0.89	0.45	
90	14.4 A	Providing and laying Pitching on slopes laid over prepared filter media..	m^3	*1.2		
91	14.4B	Cement Concrete Blocks of size 0.3x0.3 x0.3 m cast in cement concrete of Grade M15	m^3	0.89	0.45	
92	14.5	Providing and laying Filter material underneath pitching in slopes.	m^3	1.2		
93	14.7 A	Toe protection Rubble Stone laid in CM 1:3	m^3	0.296/ 1.2*	0.29	
	14.7 B	Toe protection Cement Concrete Blocks	m^3	1.186	0.60	
	14.7 C	Toe protection Dry Rubble Flooring	m^3	1.2*		
94	14.8 A	Curtain wall complete as per drawing and Technical specification Stone masonry in cement mortar (1:3)	m^3	1.26*	0.33	
	14.8 B	Cement concrete Grade M15	m^3	0.89	0.45	
95	14.9	Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.	m^3	1.20*		
96	14.10	Providing and construction of a gabion structure for retaining earth with segments of wire crates of size 7 m x 3 m x 0.6 m	m^3	1.20*		
97	14.11	Providing and constructing gabion 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	m^3	1.20*		
98	14.12	Providing and making gabion structure with mechanically woven Double twisted Hexagonal shaped wire mesh Gabion Boxes ..	m^3	1.00*		
99	14.13	Embankment Erosion Protection using Fine Aggregates Concrete Filled Fabric Foam Mattress system	m^2	0.09	0.045	
100	15.3	Guniting concrete surface with cement mortar.	m^2		0.04	

101	15.5 B	Sealing of cracks/porous concrete by injection process.	kg		0.387	
102	15.9	Removal of defective concrete.	m^2	0.15	0.15	
103	15.17	Replacement of Expansion Joints complete	m	0.27	0.135	
104	15.21	Repair of concrete crash barrier with cement concert of M-30 grade	m	0.027	0.035	
105	15.22	Carrying out repair of RCC M30 railing.	m	0.009	0.0045	
106	16.10	Granular Sub Base Grading-III	m^3	0.23	0.23	0.74
107	16.11	Mix Seal Surfacing Manual Means	m^2	0.027		
108	16.12	Open Graded Premix Carpet Manual means	m^2	0.027		
109	16.13	Seal Coat	m^2	0.006		
110	16.14	Roller Compacted Concrete Pavement	m^3	0.90	0.45	
111	16.18	Maintenance of WBM Roads	m^2	0.07		
112	16.27	M20–grade PCC	m^3	0.90	0.45	
113	16.28	M30–grade PCC	m^3	0.90	0.45	
114	16.35	Soil Stabilization Nano Technology	m^3	0.36		0.70
115	16.37	Cell Fill Cement Concrete M-30	m^2	0.1	0.045	
116	16.38	Mix Seal Surface using 8% Waste Plastic	m^2	0.027		
117	16.39	Open Graded Premix Carpet using 8% Waste Plastic	m^2	0.027		

V. BASIC NOTES FOR PREPARATION OF SCHEDULE OF RATES

Schedule of rates for Road and Bridge works is indicated as under :

Description of items

1. The description of items is given briefly and linked with the relevant clause of the MoRT&H Specifications for Road and Bridge Works, which may be referred for detailed description, provisions and interpretation.

2. **Mechanical Means**

   Due to mechanization of construction work, rate for various items have been derived 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 deployment of the machines.

3. **Overhead Charges**

   10 Percent overhead charges have been considered in the schedule of Rates.

   (i) Site accommodation, setting up plant, access road, water supply, Electricity and general site arrangements

   (ii) Office furniture, equipment and communication

   (iii) Expenditure on

      i) Office of contractor

      ii) Site Supervision

      iii) Documentation

   (iv) Mobilisation/ Demobilisation of resources

   (v) Labour camp with amenities and transportation to work site.

   (vi) Light vehicles for site supervision including administrative and managerial requirements.

   (vii) Laboratory equipment and quality control including field and laboratory testing.

   (viii) Minor T & P's and survey equipment and setting out works, including verification of line, dimensions, trail pits and boreholes, wherever required.

   (ix) Watch & ward

   (x) Traffic management during construction.

   (xi) Expenditure on safe guarding environment.

   (xii) Financing expenditure.

   (xiii) Labour Insurance.

4. **Contractor Profit**

10 percent of cost of works. Contractor profit is also added on overhead charges.

5. **Basic Inputs**

Other than the Basic given in the standard data book of MoRT&H, the rate for plants & equipments, material and labour are as per the prevailing market rates from the near by authorised dealers/quarry etc.

6. **Plants and Equipments**

6.1 A dozer is preferred 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.

6.2 It has been assumed that a water tanker would make one trip per hour on an average. Water charges have not been included for items where the requirement is very nominal. It is assumed that the same would be covered under sundries. In some cases, water charges are added as per the necessity.

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

6.4 The usage charges for machines include ownership charges, cost of repair and maintenance including replacement of tyres and running and operating charges which includes crew, fuel and lubricants as specified in Vol-I Common SR.

7. **Materials**

7.1 Quantities of materials considered in the rate are approximate for the purpose of estimating and include normal wastages. Actual consumption would have to be based on mix design. If necessary, the cost for concrete works are to be workedout from approved mix designs considering the rate analysis provided in Vol-I Common SR.

7.2 Karnataka has typical topographical conditions having different altitude, wherein maximum construction material are brought from Bengaluru and utilised in different station located in state. Hence, to maintain the uniformity in rates, it is decided to prepare the Roads & Bridges SR 2023-24 considering lead on materials and aggregate. The transportation cost shall be included in the estimate as per distance from the source of procurement of material/aggregate. The following sources have been adopted in the schedule and the rates are inclusive of lead.

(i) Bitumen product - Maharatna / Miniratna companies

(ii) All other items - Bengaluru Rural

7.3 For large scale works (say Rs. 100 crores or more) alternative proposal for cost of aggregates by installing crusher is to be compared with procurement of crushed aggregates from the market and proposal found more economical is to be adopted.

7.4 The specifications of materials shall be governed by section 1000 of MoRT&H Specifications for Road and Bridge Works.

8. **Labour** : Zone II rates issued by Department of labour, GoK rounded off to next highter value is considered for Rate Analysis.

9. **General :**

9.1 The clause numbers refer to MoRT&H Specifications for Road and Bridges Works.

9.2 Assumptions made have been indicated in respective chapter in the form of notes, where necessary.

9.3 Sundries to cater for unforeseen contingency and miscelleneous items have been added in the overhead charges. Additionally if the item needs specific non measurable items sundries have been considered depending on nature of work.

9.4 Arrangement for traffic during construction shall be as per Clause 112 of MoRT&H Specifications for Road and Bridge Works.

9.5 Contractor will make his own arrangements for borrowing earth. However, compensation for earth taken from private land has been included in the rate for construction of embankment with borrowed earth. The royalty charges shall be deducted as per latest Mines & Geology department circular.

9.6 **Credit for Dismantled Material**

Credit for dismantled materials has not been included in this schedule of rates. The dismantled materials should be examined and a realistic assessment made for such materials, which can be utilised for works and to be reflected in the estimate.

9.7 The source of material and samples are required to be approved by the Engineer before start of any work.

9.8 The rates of items include cost of testing dismantled materials.

9.9 The use of surface by construction vehicles shall be governed by Clause 119 of MoRT&H Specifications.

9.10 The contractor shall arrange to provide and maintain adequate equipment for field laboratory as per Clause 121.

9.11 Quality Control of works shall be governed by Section 900 of MoRT&H Specifications.

9.12 The different activities of works shall also be documented by photographs and video cassettes as per Clause 121 of MoRT&H Specifications.

9.13 The classification of soil shall be as per Clause 301.2 of MoRT&H Specifications.

9.14 The earth excavated from foundations has been considered to be backfilled and balance utilised locally for road work except in the case of marshy soil.

9.15 The rate for removal of unsuitable soil does not provide for replacement by suitable soil which will have to be paid separately.

9.16 Work specific Items for hilly terrain are to be analysed separately.

9.17 Grade of cement may be adopted as per mix design. IS:10262:2009

9.18 The coarse and fine aggregates shall conform to IS:383:2016

10. **BRIDGE / BARRAGE WORKS :**

Definitions

a) Major Bridge : Having a total length of above 60 m. measured along the centre line of the bridge between inner face of the dirt walls.

b) Minor Bridge : Having a total length more 6 m. and upto 60 m. measured along the centre line of the bridge between inner face of the dirt walls.

c) Culverts : Having a total length 6 m. or less between the inner face of the dirt walls or extreme vents way boundaries measured at right angle thereof.

Foundation

i) All works below average ground level or lowest water level, whichever is higher shall be termed as foundation work.

ii) Lowest water level shall be the average water level met with at the time of doing the foundation work. The maximum and minimum water levels shall be recorded by the Engineer, just before starting the particular foundation and within a reasonable time at the closer of that foundation work, the average of these two levels shall be the low water level for that foundation work.

Sub-Structure:

The part of the bridge structure below: (a) Soffit level of the deck slab/beams and or (b) Springing level for arch spans, but above average ground level or LWL whichever is higher, shall be termed as sub-structure of the bridge part. (c) For Barrage Works, LWL upto HFL is considered as sub-structure.

Super-Structure

The work above: (a) Soffit level for deck slabs/beams and (b) Springing level for arch span, including kerbs, railing, expansion joints, beams, slabs etc. shall be termed as super-structure of the bridge part.

Concrete

a) The mixing of the concrete, transportation, placing & compaction shall be carried out as per provision made in clause 1708 and 1709 of the specifications of Road and Bridge Works of MoRTH (5th Revision).

b) Equipment used for production, transportation and compaction of concrete shall be as per provision made in clause 1707 of specifications for Road and Bridge works of MoRTH (5th Revision).

c) Finishing of concrete by plastering the surface shall not be done without obtaining written permission from the Executive Engineer. No extra for plastering shall be payable. Light touching up and rubbing the uneven surfaces by carborandum stone/Grinding shall be carried out as part of finishing of concrete surface.

d) The grading, size, quality of coarse aggregates shall be followed strictly as per the specifications for Road and Bridge works" of MoRTH (5th Revision) and respective IRC Codes.

e) The size and quality of aggregate, mixing etc. for plain concrete or RCC works should be as given in "Specification for Road and Bridge works" of MoRTH (5th Revision).

f) The rates of concreting items and for cost of form work and centering, the percentages specified in Vol-I Common SR shall be followed.

g) Admixtures may be used for the concrete work to improve the workability with minimum water cement ratio and shall be provided as per provision made in clause 1705 of "Specification for Road and Bridge works" of MoRTH (5th Revision).

Steel

i) The usage of Steel shall be as specified in Vol-I Common SR (Addendum-III)

ii) Steel used as reinforcement and other structural steel or HT steel shall be measured as per the actual quantity of steel placed in finished structures as per clause 1608 of "Specification for Road and Bridge works" of MoRTH (5th Revision).

Additionalities for Formwork

Sl No.	Type of structure	Percentage on finished rate of concrete per m^3
1.	Solid Slab Super Structure	20%
2.	T-Beam & Slab	25%
3.	Box Girder & Balanced Cantilever	40%
4.	Cast insitu Box girder & Segmental construction	40%
5.	For T-beam & slab, including launching of precast girders by launching truss upto 40 m span	20%
6.	Box Culverts	20%

Bridge / Barrage Works

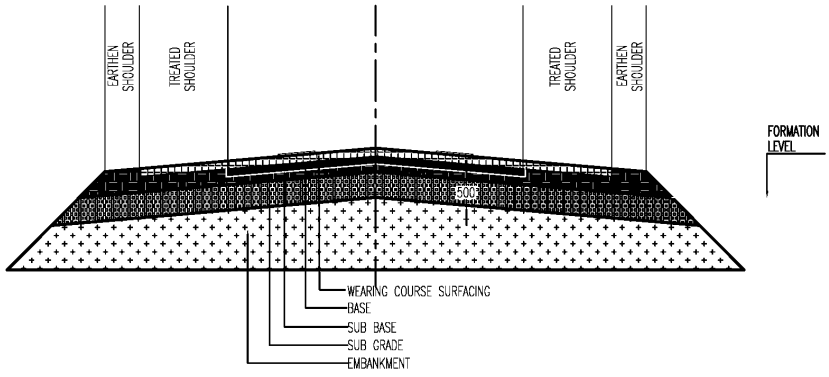
Following additional overhead charges are to be considered in the rate analysis.

Sl. No.	Description	Additional Overhead charges to be considered
1.	Minor Bridges	10%
2.	Bridge cum Barrage	5%
3.	Major Bridges	10%
4.	Bridge Works (Rehabilitation)	20%
5.	Tunnel Works	15%

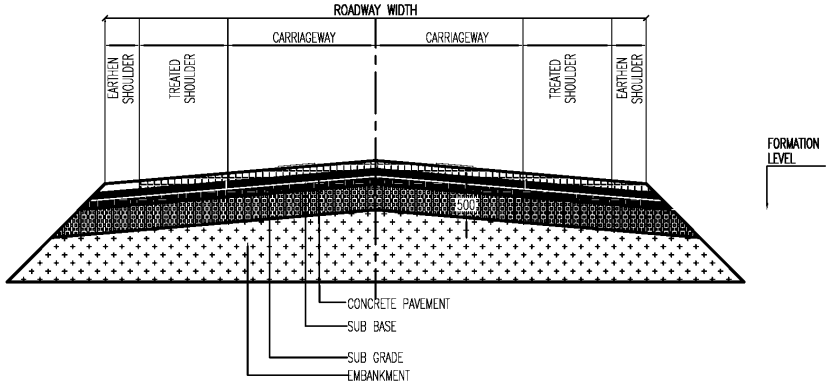
Note : *In chapter 11 to 15 of Vol.3 SR pertaining to Bridge works, Overhead and additiional overheads are already included in Rate Analysis and hence no extra charges shall be added.*

However in Bridge work estimates, additional overhead charges as per above table shall be considered for items of Earthwork & Concrete works taken from Vol.1 Common SR.

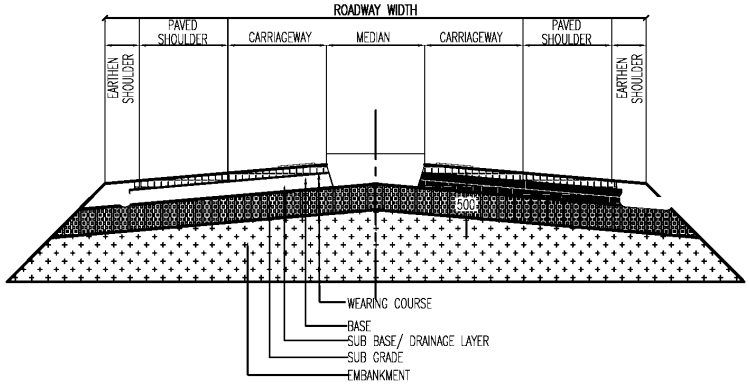
TYPICAL CROSS SECTIONS



Specification to Descibe Road Cross-Section Elements with a Flexible Pavement



Specification to Descibe Road Cross-Section Elements with a Concrete Pavement



Specification to Descibe Road Cross-Section Elements of a Dual Carriageway

VI. CHAPTER WISE SUMMARY

Chapter - 1 : Unloading, Loading & Carriage of Materials

1. Analysis for loading has been done both for manual and mechanical means for adoption as per actual situations.
2. The cost of carriage will vary depending upon the riding surface of the road. Provision has accordingly been made considering surface roads, unsurfaced gravelled roads and katcha tracks.
3. Provision has been made for a tractor trolley instead of tipper where dismantled materials of sorts or material having increased volume as compared with weight are required to be transported. This arrangement is more economical.

Chapter - 2 : Site Clearance

1. Carriage of dismantled materials, bushes, branches of tree and other simillar items has been catered with a tipper mechanical loading and unloading
2. Unless otherwise stated the rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and lead.
3. The Clearing and grubbing road land has been considered both by manual and mechanical means. The rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and lead. The estimator or the sanctioning authority use discretion depending upon quantum of work and particular site conditions for mechanical means.
4. The dismantling of structures has been considered both by manual and mechanical means. The rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and lead. The estimator or the sanctioning authority use discretion depending upon quantum of work and particular site conditions for mechanical means.
5. The rates include T&P and scaffolding required for items of dismantling.
6. Dismantling of Hume pipes has been catered by mechanical means as pipes can be easily rolled by men to a suitable stacking place within the right of way.
7. For dismantling of structures, which remain submerged in water, the cost may be increased by 50%.
8. Dismantling of utilities is required to be done under the supervision of concerned departments with prior information to the users by phone / mail.
9. All minor T&P items unspecified and required for dismantling are already included in overhead charges.

10. For dismantling of utility services like water pipe lines, electric and telephone lines, prior intimation should be given to users.

Chapter - 3 : Earthwork, Erosion Control and Drainage

1. The rates have been analyzed using Mechanical means. Manual means for certain items have also been provided which can be used for areas inaccessible to machines and for small jobs.
2. Rates have been analyzed for average working conditions. *For extra-ordinary conditions, where the management of materials, labour and machinery are difficult, necessary changes can be made by the Superintending Engineers based on actual requirements.*
3. Average achievable outputs of machines have been considered taking into account job and management factors.
4. A water tanker of 6, 12, & 16 KL capacity which is commonly used at construction sites has been considered.
5. The replacement of unsuitable soil by suitable soil shall be included separately in the estimate. The analysis for removal of unsuitable soil does not provide for replacement by suitable soil.
6. In cases where embankment is constructed with earth taken from roadway, the cost of depositing the earth at the site of embankment is already included in the disposal of excavated earth.
7. For narrow and restricted areas, plate compactor has been proposed for compaction to achieve the desired density.
8. In case excavated rock is found suitable for incorporation in works, appropriate credit for the available rock shall be given.
9. The possibility of using the blasted rock fragments for backfilling behind structures or backfilling of foundation pits or filling in medians / separators or use in service road shall be examined before proposing disposal of excavated rock.
10. In case of hill roads, the cut earth can be pushed down the valley in case there is no objection. In that case, cost of disposal is not required to be provided.

Chapter - 4 : Sub-Bases, Bases (Non-Bituminous), Shoulders and Stabilization Methods

1. For construction of sub-base, three alternatives as under have been provided:
    a. Plant mix method
    b. Mix in Place method
    c. Crusher Run method

2. The plant mix method is actually being practiced from quite some time to get better quality of mix. It is also found economical as it can achieve more progress.

Grading Requirements of Granular Sub Base Materials (%)						
IS Sieve Designation	Preferably be used in top layer of Sub Base		Preferably be used in lower Sub Base		Preferably be used in Sub Base cum Drainage Layer	
	Grading I	Grading II	Grading III	Grading IV	Grading V	Grading VI
75.00 mm	100	-	-	-	100	-
53.00 mm	80-100	100	100	100	80-100	100
26.50 mm	55-90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25 - 55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20- 40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10- 15	-	-	0-5	0-8
0.075 mm	<5	< 5	< 5	< 5	-	0-3

3. In case of cement treated sub-base or base course, Plant mixing as well as site mixing with the help of cement spreader, stabilizer equipment is considered in the analysis.
4. Separate rate for penetration coat over top layer of crushed cement concrete base has been provided, as this item is optional.
5. The quantity considered in the output is the compacted quantity. ***The quantities of aggregates provided in the rate analysis, under the head material are the un-compacted quantities.***

Chapter - 5 : Bases and Surface Course (Bituminous)

1. The clauses of MoRTH Specifications, which have been mentioned for each item, may be referred for detailed specifications and construction procedure.
2. The Machinery and equipment included in analysis are as per various specifications of MoRTH and are mandatory. As per the present trend, contractors are procuring machinery and equipment of higher capacity.
3. The outputs taken for the construction equipment are for the compacted quantities of the relevant items and not for loose quantities.
4. The items of bituminous works under maintenance have been added in the Chapter on Maintenance.

5. Tack coat and Prime coat, wherever provided are required to be measured and paid/ separately.

6. *Brooming & Cleaning of surface is a part of the prime coat and tack coat. As such cleaning of surface has not been provided for bituminous courses as the same is already catered in prime/ tack coat. However, for those cases where such coats are not required to be done, cleaning of surface shall be included.*

7. It is presumed that tack coat, where required, will be provided immediately preceding the bituminous layer.

8. Rolling of bituminous courses is required to be done as per Clause 501.6. Provision in the analyses has accordingly been made. It has been observed during actual practice at work sites, that the availability of road roller is generally inadequate. As compaction is the key to good construction, this point is being specifically highlighted to ensure that road rollers are deployed at sites as per provision in the specifications.

9. Spreading of bituminous materials shall be done as per Clause 501.5.3.

10. Mixing, Laying and Rolling Temperatures for Bituminous mixes are to be as per Table 500-2

Bitumen Viscosity Grade	Bitumen Temperature	Aggregate Temperature	Mixed Material Temperature	Laying Temperature	Rolling Temperature
VG – 40	160-170	160-175	160-170	150 Min	100 Min
VG – 30	150-165	150-170	150-165	140 Min	90 Min
VG – 20	145-165	145-170	145-165	135 Min	85 Min
VG -10	140-160	140-165	140-160	130 Min	80 Min

11. Following type of Bitumen & Emulsions are recommended for usage in departmental works

Sl No.	Type	Recommended Uses
I	**Emulsions**	
1.	SS1	A slow setting Emulsion used for priming purpose
2.	SS2	A slow setting Emulsion used for plant mixes with graded fine aggregate in SDBC, MSS, BM, DBM, BC, Slurry Seal & Tack Coat.
3.	RS1	A quick setting Emulsion used for Tack Coat
4.	Modified Emulsion	Modified Emulsion recommended for Micro surfacing.

II	Bitumen	
1.	VG10	Widely used in spraying applications as Tack coat and also for works in very cold climate. It is also used in manufacture of Emulsions and Modified Bituminous products.
2.	VG30	Primarily used to construct heavy duty Bituminous Pavements which caters substantial traffic loads. (Preferably for Traffic <20MSA)
3.	VG40	A stiffer & more viscous graded Bitumen primarily used in highly stressed areas such as Intersections, Toll booths, Truck bays. Asphalt can be produced to improve resistance to Higher temperature & heavier traffic loads. (Preferably for Traffic >20MSA)
4.	Performance Graded Modified Bitumen	VG Bitumen blended with Plastomeric & Elastomeric Polymers categorised into several performance grades as per IS -15642:2019. Primarily used for durable pavements carrying heavy loads, Airport works and in places where pavement temperatures vary widely between Summer & Winter.
Note : *The source of all materials to be used on the project must be tested and expressly approved by the Engineer in Charge and Quality Assurance wing of the department.*		

12. Choice of grade of bitumen shall be made as per IRC - 37:2018.

13. Bituminous layers options recommended as per IRC 37:2018, Table 9.1 & Chief Engineer Quality Assurance Zone, PWD Bengaluru Circular No. 712 dt. 17-03-2021

Bituminous Layer options recommended based on Traffic level

Sl No.	Traffic Level	Surface Course		Base/Binder Course	
		Mix type	Bitumen type	Mix type	Bitumen type
1	>50 msa	SMA	Modified bitumen or VG40	DBM	VG40
		BC	With modified bitumen		
2	20-50 msa	SMA	Modified bitumen or VG40	DBM	VG40
		BC	Modified bitumen or VG40		
3	<20 msa	BC/SDBC/PMC/ MSS/ Surface Dressing (besides SMA, GGRB and BC with modified binders)	VG40 or VG30	DBM/BM	VG40 or VG30

Special cases :

- Mastic Asphalt can also be used for roads in heavy rainfall areas and junction locations.
- BC/SDBC with VG30 is recommended if total bituminous layer requirement is less than 40 mm.

Bituminous Layer Thickness				
Sl No	**Type**	**Reference**	**Recommended Thickness (mm)**	
			Grading I	Grading II
1	Bituminous Macadam	IRC 27 : 2009	80-00	50-75
2	Dense Bituminous Macadam	IRC 111 : 2009	75-100	50-75
3	Bituminous Concrete	MoRTH V Revision	50	30-40
4	Semi Dense Bituminous Concrete	IRC 111 : 2009	40	25

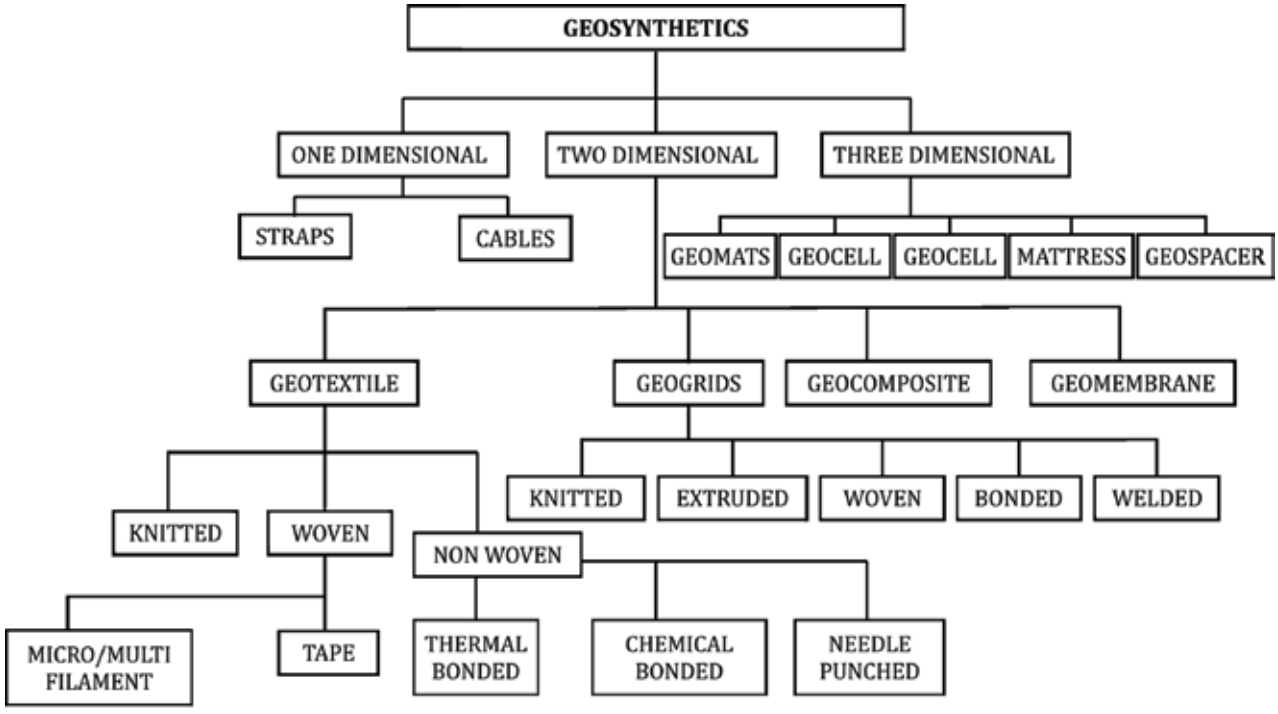
Chapter - 6 : Cement Concrete Pavement

1. Higher capacity of batch mix plants have been considered in the rate analysis of cement concrete pavement works. The items involving Cement Concrete Roads by manual Concrete mixers & Self Loading Mixers are also included in the SR, as decided by the Technical Working Group. The items of M30 grade PQC have also been included.
2. OPC 43 & 53 grade, Portland Slag Cement (PSC) and Portland Pozzolana Cement (PPC) are recommended for the cement concrete pavement i.e, for pavement quality concrete to get higher strength. However, for dry lean concrete, OPC 43 grade, Portland Slag Cement and Portland Pozzolana Cement shall be used.
3. The rate for slip form paver with 9m width provision has been considered for Pavement Quality Concrete whereas, mechanical paver has been provided for dry lean concrete. For smaller length construction by Fixed Form Paver is an alternative. (Necessary cost shall be deducted for using Fixed Form)
4. GGBS as per IS 16715-2018 can be used as concrete admixtures for improved mechanical properties, work ability, early strength gain and corrosion resistance.

Chapter - 7 : Geosynthetic, Reinforced Earth and Protection Works

1. The specifications for geo-synthetics which includes geotextiles, geogrids, geo-nets, geomembranes, geo-composites, geo-cells, geo-synthetic-map, natural geotextiles and Paving Fabric and Glass Grids shall be as per section 700 of MoRT&H Specifications.
2. The geotextile proposed for sub-surface drain shall satisfy the requirements given in Clause 702.2.3.1
3. Bitumen overlay shall follow on the same day where paving fabric is laid.

Classification of Geosynthetics



Chapter - 8 : Traffic Signs, Markings and Other Road Appurtenances (Road Furnitures)

1. Rate analysis for fencing have been workedout for two different heights, i.e., 1.20 m and 1.80 m. Any of these two can be adopted depending upon a particular situation and design.
2. Kerb stone laying and road marking has been provided for laying by mechanical means.
3. Back filling of foundation of boundary pillars has been proposed with stone spalls, tightly packed and compacted.
4. For metal beam crash barrier, a 'W' shaped beam of size 311 X 83 mm flange width made with structural steel corrugated plate 3 mm thick and having a length of 4.5 m has been provided, over a channel post of 150 X 75 X 5 mm with a spacer of channel section 150 X 75 X 5 mm, 330 mm long.
5. Two supports have been provided for direction and place identification signs where size is more than 0.9 m^2. Only one is provided for size upto 0.9 m^2.
6. The size, location of traffic signs shall be as per IRC:67-2022.
7. The analysis for rigid, semi-rigid and flexible crash barriers have been included.
8. Separate rate analysis has been made for Tubular steel railing with RCC posts and MS steel posts.
9. Suggested guidelines for Usage of Retro-Reflective Sheeting as per IRC 67 2022 Table 6.2 shall be followed.

Warranty for Class B and Class C sheet of Cautionary /Mandatory / Informative Sign boards **Class B** (Type IV High intensity micro-prismatic grade sheeting-HIP) shall have 7 years written warranty from the manufacturer and authorised distributor/convertor issued for field performance including the screen printed areas and cut-out sheeting and cut-out durable transparent overlay film and this warranty certificate in original should be submitted to the Engineer in Charge by the contractor/supplier.

Class C(Type XI Micro prismatic grade sheeting) shall have 10 years written warranty from the manufacturer and authorised distributor/convertor issued for field performance including the screen printed areas and cut-out sheeting and cut-out durable transparent overlay film and this warranty certificate in original should be submitted to the Engineer in Charge by the contractor/supplier.

Executing Authorities shall make sure that the contractor shall produce the written warranty from the manufacturer and authorised distributor/convertor, else 20% of single item amount shall be deducted from his bill.

Chapter - 9 : Cross Drainage Works

1. Pipe culverts of size 1000 mm, 1200 mm & 1500 mm dia in single row and two row which are generally provided on roads, have been included. Only laying of pipe has been included in the rate. Auxiliary works such as excavation, backfilling, concrete and masonry shall be paid for separately, as provided under the respective clauses.
2. The choice between first class bedding and cement cradle bedding will depend on particular situations and approved design.
3. The joining of pipes is proposed by collar or flush joints.
4. Backfilling upto 300 mm above top of the pipe shall be carefully done and the soil thoroughly rammed, tamped or vibrated in layers not exceeding 150 mm.
5. Head walls and other ancillary works shall be executed under respective clauses.
6. Pipe shall be laid at least 600 mm below from the sub-base.

Chapter - 10 : Maintenance of Roads

1. In case of rain cuts, it has been assumed that some material cut by rain, approximately 25 percent, will be available at site which can be retrieved and re-used and the balance 75 per cent is required to be provided as fresh material.
2. For making up earthen shoulders, it has been assumed that on an average 150 mm filling will be required. Similarly, for stripping of excess soil from the shoulder, an average depth of 75 mm has been assumed.

3. In the case of choking of drain, it has been assumed that half the depth of drain has been filled with earth/debris, which requires clearance.

4. During the process of landslide clearance on hill roads, it has been assumed that earth will be disposed off by the dozer on the valley side. In case there is any objection to this arrangement due to particular site conditions, resources like loader and tripper will have to be provided for disposal of earth/debris for the lead involved.

5. Pot-hole repair and patchwork shall be done by manual & mechanical means. Additional items for shallow and deep potholes proposed for execution.

6. The cost of other items like repair of ruts and undulation maintenance of earthen shoulders, cross drainage works, minor and major bridges and miscellaneous items like turfing and arboriculture, painting and lettering of km stones, repair to signage, repair to footpath, street light, railing, dividers, separators and under passes for pedestrians has been given in the "Report of the Committee on Norms for Maintenance of Roads in India" published by IRC in January 2001 which may be referred for guidance.

Chapter -11 : Bridge Foundation

1. Excavation for Structures has been provided both by manual and mechanical means. The rate relevant to a particular situation may be adopted as per Vol-I Common SR.

2. The earth excavated from foundation has been proposed to be backfilled and balance quantity utilised for road work locally except for marshy soil where disposal has been provided as per Vol-I Common SR.

3. The rock foundations are required to be prepared which are to be analysed.

4. In case of rocks, excavation has been considered upto a depth of 3 m only.

5. Embedment of foundation in soft and hard rocks has been provided as required by the specifications.

6. Dewatering has been provided in excavation for foundation. In case dewatering is not required for a particular site condition, the same may be omitted while preparing the estimate.

7. Rate analysis for different types of piles like bored, cast in situ, driven precast RCC pile and driven steel piles of H section have been included. If the steel casting in case of driven pile is required to be retained, the same is required to be priced separately.

8. Pile driving rigs including vibratory hammers are assumed to be self contained with power units and necessary accessories required for driving.

9. The quantity of concrete which is required to be stripped off upto a minimum height of 600 mm above the designed top level of the pile has been taken into account in the rate analysis.

10. The levelling course below the pile cap shall be of M 15 grade concrete.

11. Steel reinforcement for cement concrete work is required to be protected with steel plates of thickness not less than 10 mm upto top level of well curb. For height above the top of curb, the thickness of the steel plate may be reduced to 6 mm. This extra height of steel lining should be limited to 3 m.
12. In case of blasting during sinking of wells the inner face of the curb is required to be protected with the steel plates of thickness not less than 10 mm upto top level of well curb. For height above the top of curb, the thickness of the steel plate may be reduced to 6 mm. This extra height of steel lining should be limited to 3 m.
13. The concrete mix used in bottom plug shall have optimum cement content and a slump of about 150 mm to permit easy flow of concrete through tremie to fill up all cavities.
14. Necessary safety precautions shall be taken for excavation in open foundations for which IS 3764:1992 may be refered.
15. A levelling course of 100 mm thickness in M10 shall be provided before laying open foundations.
16. In case of open foundation, dewatering shall not be permitted from the time of placing of concrete upto 24 hours after placement.
17. In case of open foundations in rock, the trenches around the footing shall be filled up with concrete of M-15 grade upto a level of 0.6 m for hard rock and 1.5 m for soft rock above the foundation level. The portion above this may be filled by boulders grouted with cement.
18. When there are two or more compartments in a well, the lower edge of the cutting edge of the middle stems of such wells shall be kept about 300 mm above that of outer stems to prevent rocking.
19. The well curb shall be in RCC of the mix not leaner than M25 grade with minimum steel reinforcement of 72 kg /m^3 excluding bond rods.
20. The top of the bottom plug shall be at least 300 mm above the top of curb.
21. No dewatering shall be carried out within 7 days of casting the bottom plug.
22. In case of cement concrete piles, the minimum grade of concrete shall be M 35 grade.
23. The top of the pile shall be project 50 mm into the pile cap and reinforcement of the pile shall be fully anchored in the pile cap.
24. The minimum thickness of the pile cap should be at least 0.6 m or 1.5 times the diameter of the pile whichever is more.
25. Guidance for piles is obtained from IS : 2911-2010
26. Concrete in driven cast in situ piles shall be cast upto a minimum height of 600 mm above the designed top level of the pile, which shall be stripped off to obtain sound concrete either before final set or after 3 days.

Chapter -12 : Bridge Substructure

1. The cost of form work will vary with the height of sub structure. Provision has accordingly been made on percentage basis.
2. Bridge bearing, being commercial items produced by specialised firms with imported technology and parts, the rates for the same are required to be ascertained from the market for the approved design and technical specifications. These rates are not included in the analysis as they can vary from design to design and based on the loading arrangement and span variations, hence if required they may be analysed on project basis depending upon the loadings and design.
3. Filter media and backfilling behind abutments are required to be provided as per guidelines given in IRC:78.
4. Weep holes shall be provided as per IRC 78 : 2020 & MoRTH Clause 2706 specifications.
5. In case of roller-cum-rocker bearings, only full circular rollers are to be provided.
6. All bearings shall be set truly level so as to have full and even seating.
7. For elastomeric bearing pads, the concrete surface shall be levelled such that the variation is not more than 1.5 mm from a straight edge placed in any direction across the area.
8. The bearing should be procured only from those manufacturers who have been pre qualified by the Ministry of Road Transport and Highways and as per relevant Indian Standards.
9. The bottoms of the girders resting on the bearing shall be plane and truly horizontal.
10. For Spans in grade, the bearing shall be placed horizontal by using sole plates for suitable designed RCC pedestals.

Chapter -12 : Bridge Superstructure

1. The rate for the wearing coat has been analysed as under:
   a. Cement Concrete Wearing Coat.
   b. Asphaltic Concrete wearing coat.
   c. Bitumen mastic wearing coat.

   The item may be selected as per the approved design. In case the thickness of wearing coat is different from that analysed, the rate for the desired thickness may be worked out on pro-rata basis.

2. The rates are analysed for both RCC Railing and MS Railing which can be adopted as per approved design.

3. The length of drainage spout has been provided in such a way that it is connected to the U/G drainage system on the ground in case of flyovers and there is no splashing of water on the structure in case of bridges.

4. The rate for anti corrosive treatment is required to be ascertained from the firms specialized in this work by the concerned Superintending Engineer.

5. Expansion joints involving movements exceeding 40 mm are specialised readymade items commercially produced by reputed firms with imported technology and parts.

6. Supply of new type of expansion joint may be obtained on the basis of competitive bidding from amongst the suppliers pre-qualified by the Ministry of Road Transport and Highways. Further, a warranty of 10 years of trouble free performance may be insisted from the suppliers.

7. For Bridges having wide deck/span length of more than 120 m or/and involving complex movements/ rotations in different directions / planes, provision of special type of modular expansion joints such as swivel joists joints are required for which firms specialised in this field may be consulted. Such cases will require prior approval of Chief Engineer.

Chapter -14 : River Training And Protection Works

1. Three types of Aprons on river bed as under have been catered.

   a. Boulder apron laid dry

   b. Boulder apron laid in wire crates / blocks

   c. Apron laid in cement concrete blocks on M 15

2. A toe wall for toe protection of pitching can be either in dry rubble masonry (uncoursed) or in nominal mix cement concrete M 15. Depending upon the design, the rates may be adopted under respective clauses.

3. The rate analysis for gabion structures comprising of stone boulders laid in blocks have been included. Such structures are suited as retaining structures and for erosion in river training works especially for situations where some settlement of foundation is anticipated. These structures can adjust in minor settlements, being flexible structures, without loosing their functional requirement.

Chapter -15 : Repair And Rehabilitation

1. Removal of cement concrete wearing coat and asphaltic wearing coat has been proposed with pneumatic breakers.
2. The rate for external pre stressing has been analysed for three different spans 25, 50 and 100 m.
3. Sealing of cracks has been proposed with cement grout, cement mortar (1:1) grout and epoxy grout by injecting with grout pump through nipples.
4. Bonding of new concrete with old concrete is proposed with epoxy resin.
5. The repair and placement of the following structures has been included
    a. Bridge Bearings
    b. Expansion Joints
    c. Concrete Railing
    d. Mild Steel Railing
    e. Crash Barrier

ROADS

Chapter - 1

UNLOADING, LOADING & CARRIAGE OF MATERIALS

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER-1 **UNLOADING, LOADING & CARRIAGE OF MATERIALS**		
1.1		a	Loading and Unloading of Stone Boulder/Stone aggregates/Sand/ Kankar/Moorum. (Tipper 5.5 m^3)	**m^3**	**135.00**
1.1		b	Loading and Unloading of Stone Boulder/Stone aggregates/Sand/ Kankar/Moorum. (Tipper 10 m^3)	**m^3**	**119.00**
1.1		c	Loading and Unloading of Stone Boulder/Stone aggregates/Sand/ Kankar/Moorum. (Tipper 14 m^3)	**m^3**	**86.00**
1.1		d	Loading and Unloading of Stone Boulder/Stone aggregates/Sand/ Kankar/Moorum. (Tipper 18 m^3)	**m^3**	**87.00**
1.2			Loading and Unloading of Boulders by Manual Means	**m^3**	**397.00**
1.3			Loading and Unloading of Cement or Steel by Manual Means and Stacking.	**t**	**582.00**
1.4	(i)		**Cost of Haulage Excluding Loading and Unloading**		
			Case-1 : Surfaced Road		
		a	Taking output 10 t load and lead 10 km = 100 t.km	**t.km**	**12.00**
		b	Taking output 18 t load and lead 10 km = 180 t.km	**t.km**	**8.00**
		c	Taking output 25 t load and lead 10 km = 250 t.km	**t.km**	**7.00**
		d	Taking output 32 t load and lead 10 km = 320 t.km	**t.km**	**6.00**
1.4	(ii)		**Case-II : Unsurfaced Gravelled Road**		
		a	Taking output 10 t load and lead 10 km = 100 t.km	**t.km**	**14.00**
		b	Taking output 18 t load and lead 10 km = 180 t.km	**t.km**	**10.00**
		c	Taking output 25 t load and lead 10 km = 250 t.km	**t.km**	**8.00**
		d	Taking output 32 t load and lead 10 km = 320 t.km	**t.km**	**7.00**
1.4	(iii)		**Case-III : Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.**		
		a	Taking output 10 t load and lead 10 km = 100 t.km	**t.km**	**28.00**
		b	Taking output 18 t load and lead 10 km = 180 t.km	**t.km**	**20.00**
		c	Taking output 25 t load and lead 10 km = 250 t.km	**t.km**	**16.00**
		d	Taking output 32 t load and lead 10 km = 320 t.km	**t.km**	**14.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
1.4	(iv)		**Case-IV : Katcha Track in hilly area.**		
			Taking output 10 t load and lead 10 km = 100 t.km	**t.km**	**59.00**
1.4	(v)		**Case-V : Transit mixers**		
			Taking output 15 t load and lead 10 km = 150 t.km	**t.km**	**13.00**
		Note	*1. Carriage of Material shall be applied for dismantling and demolition works only.* *2. Carrying capacity of vehicle shall be decided based on quantity of dismantled and demolished materials and also on type of road surface.*		

Chapter - 2

SITE CLEARANCE

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 2 **SITE CLEARANCE**		
2.1	201	a	**Cutting of Trees, excluding removal of stumps and roots of trees**		
		(i)	Girth from 300 mm to 600 mm	**each**	**595.00**
		(ii)	Girth from 600 mm to 900 mm	**each**	**946.00**
		(iii)	Girth from 900 mm to 1800 mm	**each**	**1,771.00**
		(iv)	Girth above 1800 mm	**each**	**3,543.00**
2.2	201	b	**Removal of stumps and roots including backfilling with suitable material to required compaction**		
		(i)	Girth from 300 mm to 600 mm	**each**	**356.00**
		(ii)	Girth from 600 mm to 900 mm	**each**	**487.00**
		(iii)	Girth from 900 mm to 1800 mm	**each**	**582.00**
		(iv)	Girth above 1800 mm	**each**	**723.00**
2.3	201		**Clearing Grass and Removal of Rubbish & dumping to outside periphery by manual means.**	**100 m^2**	**370.00**
2.4	201		**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, including removal and disposal of top organic soil not exceeding 150 mm in thickness.		
2.4		(i)	**By Manual Means**		
		a	In area of light jungle	**100 m^2**	**1,122.00**
		b	In area of thorny jungle	**100 m^2**	**1,500.00**
2.5		(ii)	**By Mechanical Means using Dozer**		
		a	In area of light jungle	**100 m^2**	**393.00**
		b	In area of thorny jungle	**100 m^2**	**484.00**
2.6			**Clearing & grubbing road land including vegetation, bushes, shrubs, saplings by using weed cutter / minor equipment.**	**100 m^2**	**340.00**
		Note	*The top soil removed during clearing and grubbing of site, if suitable for reuse shall be transported, conserved and stacked and shall be incidental to work.*		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
2.7	202		**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		
2.7		**I**	**Lime /Cement Concrete**		
		(i)	**By Manual Means**		
		a	Lime Concrete, cement concrete grade M-10 and below	**m^3**	**785.00**
		b	Cement Concrete Grade M-15 & M-20	**m^3**	**933.00**
		c	Prestressed / Reinforced cement concrete grade M-20 & above	**m^3**	**2,395.00**
2.8		(ii)	**By Mechanical Means**		
		a	Cement Concrete Grade M-15 & M-20	**m^3**	**719.00**
		b	Prestressed / RCC grade M-20 & above	**m^3**	**1,108.00**
2.9		(iii)	**Dismantling Brick / Tile work**		
			By Manual Means		
		a	In lime mortar	**m^3**	**461.00**
		b	In cement mortar	**m^3**	**610.00**
		c	In mud mortar	**m^3**	**402.00**
		d	Dry brick pitching or brick soling	**m^3**	**371.00**
2.10		(iv)	**Dismantling Stone Masonry**		
			By Manual means		
		a	Rubble stone masonry in lime mortar	**m^3**	**520.00**
		b	Rubble stone masonry in cement mortar.	**m^3**	**610.00**
		c	Rubble Stone Masonry in mud mortar.	**m^3**	**461.00**
		d	Dry rubble masonry	**m^3**	**431.00**
		e	Dismantling stone pitching/ dry stone spalls.	**m^3**	**402.00**
		f	Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials.	**m^3**	**461.00**
2.11		**II**	**By Mechanical means**		
		A	Dismantling Brick / Tile work / rubble masonry / pitching / etc by mechanical means	**m^3**	**180.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
2.12			Wood Work wrought framed and fixed in frames of trusses upto a height of 5 m above plinth level	**m^3**	**1,061.00**
2.13			Steel Work in all types of sections upto a height of 5 m above plinth level excluding cutting of rivet.		
		A	Including dismembering	**t**	**2,777.00**
		B	Excluding dismembering	**t**	**2,009.00**
		C	Extra over item No (V) A and (V) B for cutting rivets.	**t**	**19.00**
2.14		(vi)	Scraping of Bricks Dismantled from Brick work including stacking.		
		A	In lime/cement mortar	**100 Nos.**	**260.00**
		B	In mud mortar	**100 Nos.**	**93.00**
2.15		(vii)	Scraping of Stone from Dismantled Stone masonry		
		A	In cement and lime mortar	**m^3**	**1,040.00**
		B	In Mud mortar	**m^3**	**223.00**
2.16		(viii)	Scarping Plaster in Lime or Cement Mortar from Brick/ Stone Masonry	**m^2**	**32.00**
2.17		(ix)	Removing all type of Hume Pipes and Stacking including Earthwork and Dismantling of Masonry Works.		
		A	Upto 600 mm dia	**m**	**957.00**
		B	Above 600 mm to 900 mm dia	**m**	**1,096.00**
		C	Above 900 mm	**m**	**1,374.00**
		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.		
2.18	202		**Dismantling of Flexible Pavements**		
			Dismantling of Flexible pavements and disposal of dismantled materials and stacking serviceable and unserviceable materials separately		
		I	**By Manual Means**		
		A	Bituminous course	**m^3**	**1,247.00**
		B	Granular course	**m^3**	**876.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		II **By Mechanical Means**		
		A Bituminous course	**m^3**	**322.00**
		B Granular courses	**m^3**	**53.00**
2.19	202	**Dismantling of Cement Concrete Pavement**		
		Dismantling of cement concrete pavement by mechanical means using pneumatic tools, breaking to pieces not exceeding 0.02 m^3 in volume and stock piling at designated locations and disposal of dismantled materials and stacking serviceable and unserviceable materials separately	**m^3**	**563.00**
2.20	202	**Dismantling of Guard Rails**		
		Dismantling guard rails by manual means and disposal of dismantled material with all lifts and lead, stacking serviceable materials and unserviceable materials separately.	**m**	**116.00**
2.21	202	**Dismantling of Kerb Stone**		
		Dismantling kerb stone by manual means and disposal of dismantled material with all lifts and lead	**m**	**22.00**
2.22	202	**Dismantling of Kerb Stone Channel**		
		Dismantling kerb stone channel by manual means and disposal of dismantled material with all lifts and lead	**m**	**30.00**
2.23	202	**Dismantling of Kilometre Stone**		
		Dismantling of kilometre stone including cutting of earth, foundation and disposal of dismantled material with all lifts and lead		
	A	5th KM stone	**each**	**677.00**
	B	Ordinary KM Stone	**each**	**451.00**
	C	200 m stone	**each**	**90.00**
2.24	202	**Dismantling of Fencing**		
		Dismantling of barbed wire fencing/ wire mesh fencing including posts, foundation concrete, back filling of pit by manual means including disposal of dismantled material with all lifts and lead, stacking serviceable material and unserviceable material separately.	**m**	**97.00**
2.25	202	**Dismantling of CI Water Pipe Line**		
		Dismantling of CI water pipe line 600 mm dia including disposal with all lifts and lead and stacking of serviceable material and unserviceable material separately under supervision of concerned department	**m**	**222.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
2.26	202		**Removal of Cement Concrete Pipe of Sewer Gutter**		
			Removal of cement concrete pipe of sewer gutter 1500 mm dia under the supervision of concerned department including disposal with all lifts and lead and stacking of serviceable and unserviceable material separately but excluding earth excavation and dismantling of masonry works.	**m**	**246.00**
2.27	202		**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 lead and stacking the serviceable and unserviceable material separately	**No.s**	**339.00**
		Note	*1) All the serviceable materials resulting from removal of Telephone/ Electric pole & lines shall be handed over to department.* *2) Item No. 2.4 to 2.6 are to be operated only when disposal of debris is considered.* *3) Manual Means of Jungle clearance shall be operated for areas upto 100 m^2 only or in places where operation of machinery is difficult.*		

Chapter - 3

EARTHWORK, EROSION CONTROL AND DRAINAGE

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 3 **EARTH WORK, EROSION CONTROL AND DRAINAGE**		
3.1	301		Removal of Unserviceable Soil with Disposal upto a suitable distance as directed by the Engineer incharge of work	**m^3**	**85.00**
3.2	303		**Presplitting 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, all as specified in clause No. 303	**m^2**	**158.00**
		Note	*The quality & availability of rock shall be checked before affording credit.* *In case some rock is issued to the contractor at site, the item of carriage shall be reduced / restricted to that extent.*		
3.3	305.4.3	(i)	Scarifying Existing Granular Surface to a Depth of 50 mm by Manual Means	**m^2**	**50.00**
3.4	305.4.3	(ii)	Scarifying Existing Granular Surface to a Depth of 50 mm by Mechanical Means using Hydraulic excavator	**m^2**	**5.00**
3.5	305.4.3		Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material by Mechanical Means using Hydraulic excavator with in all lifts and lead	**m^2**	**6.00**
3.6	305		**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	**m^3**	**493.00**
3.7	305.3.4		**Compacting Original Ground**		
			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.	**m^3**	**105.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
3.8	309		**Surface Drains in perforated PVC pipe**		
			Construction of surface 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 beddng below the pipe and 300 mm cushion above the pipe cross section of excavaton 450 x 550 mm. Excavated material to be utlised in roadway at site.	**m**	**813.00**
3.9	309		**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.	**m**	**313.00**
3.10	309		**Underground RCC Drain at Edge of Pavement**		
			Construction of an underground drain 1 m x 1 m (inside dimensions) lined with RCC M-20, 15 cm thick and covered with RCC slab10 cm in thickness on urban roads.	**m**	**4,825.00**
3.11	310		**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 t smooth wheeled roller, complete as per clause 310.	**m^2**	**4.00**
3.12	313		**Construction of rock fill embankment with all lifts and lead**		
			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.	**m^3**	**146.00**
3.13			**Embankment Construction with Flyash/Pond ash available from coal or lignite burning Thermal Plants as waste material.**		
			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. (The cost of Flyash not included)	**m^3**	**127.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
3.14	IRC SP-2014		**Surface Drains in perforated HDPE pipe**		
			Supplying and laying at site Factory made perforated hard HDPE subsoil drainage pipes pre-wrapped with 150 gsm Geotextile for subsoil drainage system including all necessary coupling/fittings for joints & back filling with aggregates. The pipe shall be manufactured from High Density Polyethylene (HDPE). It shall be extruded into an open lattice wall structure, with > 60% of the circumference consisting of open area and a 30% solid area along the invert. The product should satisfy the following parameters as below 1. Ring Stiffness as per ISO 9969: 2016 should be > 0.8 kN/m2 2. Resistance to Acid with 3% HCl for 24 hrs without mass loss, change in colour, softening, cracking or spalling. 3. Resistance to Alkali with 3% KOH for 24 hrs without without mass loss, change in colour, softening, cracking or spalling. (Excavated material to be utlised in roadway at site)		
3.14.1			110mm dia HDPE pipe	**m**	**1,076.00**
3.14.2			160mm dia HDPE pipe	**m**	**1,348.00**
3.14.3			200mm dia HDPE pipe	**m**	**1,621.00**

Chapter - 4

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

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 4 **SUB-BASES, BASES (NON-BITUMINOUS), SHOULDERS AND STABILIZATION METHODS**		
4.1	401		**Granular Sub-Base**		
		A	**Plant Mix Method**		
			Construction of Granular Sub-Base of required grading as per design mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401		
		(i)	For Grading -I Material	**m^3**	**2,488.00**
		(ii)	For Grading -II Material	**m^3**	**2,560.00**
		(iii)	For Grading -III Material	**m^3**	**2,511.00**
		(iv)	For Grading -IV Material	**m^3**	**2,518.00**
		(v)	For Grading -V Material	**m^3**	**2,487.00**
		(vi)	For Grading -VI Material	**m^3**	**2,533.00**
4.2	401	B	**By Mix in Place Method**		
			Construction of Granular Sub-Base of required grading as per design spreading in uniform layers with motor grader on prepared surface mixing by mix in place method with front end loader at OMC and compacting with vibratory roller to achieve the desired density, complete as per clause 401		
		(i)	For Grading -I Material	**m^3**	**2,360.00**
		(ii)	For Grading -II Material	**m^3**	**2,432.00**
		(iii)	For Grading -III Material	**m^3**	**2,384.00**
		(iv)	For Grading -IV Material	**m^3**	**2,390.00**
		(v)	For Grading -V Material	**m^3**	**2,359.00**
		(vi)	For Grading -VI Material	**m^3**	**2,405.00**
		Note	*Any one of the grading for GSB material may be adopted as per design IRC-37:2018.*		
4.3	401 & 407	C	**Using Crusher Run**		
			Construction of granular sub-base using crusher run spreading in uniform layers with motor grader on prepared surface mixing by mix in place method with rotovator at OMC and compacting with vibratory roller to achieve the desired density, complete as per clause 401	**m^3**	**2,303.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
4.4	402	A	**Cement Stabilisation for Improving Sub-grade**		
			Providing, laying and spreading soil on a prepared sub grade, pulverising, mixing the spread soil, in place with rotavator with 2% cement, grading with the motor grader and compacting with the road roller at OMC to the desired density to form a layer of sub grade.	**m^3**	**816.00**
4.5	402	(iii)	**Cement stabilisation in Embankment**		
			Providing, laying and spreading available soil in the embankment on a prepared surface, pulverising, mixing the spreaded soil in place with Soil Stabilisor with 2% of cement using Binder spreader machine grading with the motor grader and compacting with the road roller at OMC to the desired density to form a layer of improved embankment.	**m^3**	**1,081.00**
4.6	403		**Cement Treated Soil for Sub- Base/ Base**		
			Providing, laying and spreading soil on a prepared embankment, pulverising, adding 4% quantity of cement to the spread soil mixing in place with rotavator, grading with 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..	**m^3**	**1,144.00**
4.7	403		**Cement Treated Crushed Rock or combination as per clause 403 and table 400-4 in Sub- Base/ Base**		
			Providing, laying and spreading material on a prepared sub grade, adding the adding the designed quantity of cement to the spread material, mixing in place with rotavator grading with motor grader and compacting with the road roller at OMC to achieve at least desired unconfined compressive strength & to form a layer of sub-base/base.		
		(i)	For Sub-Base Course	**m^3**	**2,776.00**
		(ii)	For Base Course	**m^3**	**2,820.00**
4.8	403	A	**Cement Treated Crushed stone Sub- Base (Plant mix method)**		
			Construction of Granular Sub Base by providing graded Material, mixing with cement in a mechanical mix plant at OMC carriage of mixed material to work site spreading in a uniform layer with mechanical paver on prepared surface and compaction with vibratory power roller to achieve the desired density complete as per clause 401 (2.5% Cement)		
4.9			**Laying using Mechanical Paver**		
		(i)	Grading III materials	**m^3**	**2,904.00**
		(ii)	Grading IV materials	**m^3**	**2,933.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
4.10	403	B	**Cement Treated Crushed stone Sub- Base (By Mix in place method)**		
			Construction of Granular Sub-Base by providing graded Material, mixing, carriage of mixed Material to worksite, spreading in uniform layers with motor grader on prepared surface, mixing with cement at OMC and compacting with vibratory power roller to achieve the desired density, complete as per clause 401 (2.5% Cement)		
			By Mechanical means		
		(i)	For Grading III Material	**m^3**	**3,335.00**
		(ii)	For Grading IV Material	**m^3**	**3,339.00**
4.11	404.3.1		**Making 50 mm x 50 mm Furrows**		
			Making 50 mm x 50 mm furrows, 25mm/ 50mm deep, 45 degrees 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		
		A	25 mm deep furrow cutting	**m^2**	**8.00**
		B	50 mm deep furrow cutting	**m^2**	**16.00**
4.12	404.3.2		**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	**m^3**	**2,078.00**
4.13	404		**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 vibratory roller 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.		
		A	**By Manual Means**		
		(i)	Grading-I (63 mm to 45 mm)		
		(a)	Using Screening Crushable type such as Moorum or Gravel	**m^3**	**2,523.00**
		(b)	Using Screening Type A (13.2mm agg)	**m^3**	**2,687.00**
		(c)	Using Screening Type B (11.2mm agg)	**m^3**	**2,819.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(ii)	Grading-II (53 mm to 22.4 mm)		
		(a)	Using Screening Crushable type such as Moorum or Gravel	**m^3**	**2,453.00**
		(b)	Using Screening Type B (11.2mm agg)	**m^3**	**2,749.00**
4.14		B	**Mechanical means**		
		(i)	Grading-I (63 mm to 45 mm)		
		(a)	Using Screening Crushable type such as Moorum or Gravel	**m^3**	**2,164.00**
		(b)	Using Screening Type A (13.2mm agg)	**m^3**	**2,353.00**
		(c)	Using Screening Type B (11.2mm agg)	**m^3**	**2,485.00**
		(ii)	Grading-II (53 mm to 22.4 mm)		
		(a)	Using Screening Crushable type such as Moorum or Gravel	**m^3**	**2,094.00**
		(b)	Using Screening Type B (11.2mm agg)	**m^3**	**2,406.00**
4.15	405		**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 with lead, laying and compacting the same as sub base/ base course, constructed as WBM to clause 405 except the use of screening or binding Material.	**m^3**	**423.00**
4.16	405.2		**Penetration Coat Over Top Layer of Crushed Cement Concrete Base**		
			Spraying of VG-30 bitumen over cleaned dry surface of crushed cement concrete base at the rate of 25 kg per 10 m^2 by a bitumen pressure distributor, spreading of key aggregates at the rate of 0.13 m^3 per 10 m^2 by a mechanical gritter and rolling the surface as per clause 506.3.8	**m^2**	**153.00**
4.17	406		**Wet Mix Macadam (Plant Mix Method)**		
			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/grader in sub-base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.	**m^3**	**2,559.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
4.18	406		**Cement Treated Crushed stone base Plant Mix Method**		
			Providing, laying, spreading and compacting graded stone aggregate mixed with cement to crushed stone treated base 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 vibratary roller to achieve the desired density. **(Laying using Mechanical paver)**	**m^3**	**3,238.00**
4.19	408		**Construction of Median and Island with Soil Taken from Roadway Cutting**		
			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	**m^3**	**367.00**
4.20	408		**Construction of Median and Island with Soil Taken from Borrow Areas**	**m^3**	**543.00**
			Construction of median and Island above road level with approved material brought from borrow pits, spread, sloped and compacted as per clause 408		
4.21	408		**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.		
4.22	410		**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.	**m^2**	**1,037.00**
			i) For Granular sub base material		
			ii) For Cement concrete grade M15		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			iii) For Cement plaster 1:3		
			iv) Pre-cast cement concrete tiles 300 x 300 mm, 25 mm th		
			v) RCC pipes 200 mm dia		
4.23	407		**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		
		A	**By Mix in Place Method**		
			i) For 53 mm maximum size (Table 400-14)	**m^3**	**2,325.00**
			ii) For 37.5 mm maximum size (Table 400-14)	**m^3**	**2,419.00**
		Note	*Any one of the aggregate grading may be adopted*		
		B	**By Mixing in Plant method**		
			i) For 53 mm maximum size (Table 400-14)	**m^3**	**2,368.00**
			ii) For 37.5 mm maximum size (Table 400-14)	**m^3**	**2,465.00**
4.24	IRC120-2015		**Full Depth Reclamation : Stabilization of in-situ (existing pavement crust) or soil or otherwise sub base/ base course (Suggestive)**		
			Providing pulverizing, spreading, milling and mixing of chemical additives at the appropriate rate as per design in accordance with IRC-37-2018 and IRC SP 89 (Part II) 2018 (Guidelines for Stabilized Pavements). Cementitious additive @ rate of minimum 5% and Commercial Stabilizers (Natural Inorganic Powder Binders b) Water Repelling Nano Chemicals c) Waste Oil d) Petroleum Based Products e) Liquid Stabilized Products f)Synthetic Polymers g) Sulphonate Lignin. Additive should be spread on the existing pavement using a truck mounted cement/ additive spreader capable of spreading to variable width upto 7m. The resultant stabilized mix be profiled to the required grade, level and thickness using motor grader and compacted using 20 t roller in combination with smooth wheel roller to achieve desired proctor density. The tandem roller be followed by Pneumatic Tyre Roller. The minimum unconfined compressive strength (UCS) of stabilized sub base/ base should be 4.5 to 7 MPa after 7 / 28 days of curing as per IRC. The equipments to be used includes binder spreader- water Tanker- Additive TruckRecycler- Padfoot Roller (20 t) + Single Drum Compactor- GraderTandom Roller- Pneumatic Tyre Roller (20 t)	**m^3**	**3,860.00**

Chapter - 5

BASES AND SURFACE COURSES (BITUMINOUS)

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 5 **BASES AND SURFACE COURSES (BITUMINOUS)**		
5.1	502	A	**Prime Coat over WMM/WBM**		
		(i)	Providing and applying primer coat with SS1 grade Bitumen Emulsion on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70 kg/m^2 using mechanical means.	**m^2**	**41.00**
5.2	502	B	**Prime Coat over Stabilised Soil base / Crusher Run Macadam**		
		(i)	Providing and applying primer coat with SS1 grade Bituminous Emulsion on prepared surface of granular Base including cleaning with mechanical Broom of road surface and spraying primer at the rate of 0.90 kg/m^2 using mechanical means.	**m^2**	**53.00**
5.3	503	(i)	**Tack coat on Bituminous surface**		
			Providing and applying tack coat with RS1 Bituminous Emulsion using emulsion pressure distributor at the rate of 0.20 kg/m^2 on the prepared bituminous surface cleaned with mechanical broom	**m^2**	**12.00**
5.4	503	(ii)	**Tack coat on Granular surface treated with primer**		
			Providing and applying tack coat with RS1 Bituminous Emulsion using emulsion pressure distributor at the rate of 0.25 kg/m^2 on Granular Surface.	**m^2**	**14.00**
5.5	503	(iii)	**Tack coat on Cement Concrete pavement**		
			Providing and applying tack coat with RS-1 Bituminous Emulsion using emulsion pressure distributor at the rate of 0.30 kg/m^2 on Cement Concrete pavement.	**m^2**	**17.00**
5.6	504	(i)	**Bituminous Macadam Grading - I for traffic <20 MSA**		
		A	Providing and laying Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,536.00**
		B	Providing and laying Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,378.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		C	Providing and laying Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,462.00**
5.7	504	(i)	**Bituminous Macadam Grading - I for traffic >20 MSA**		
		A	Providing and laying Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,758.00**
		B	Providing and laying Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,601.00**
		C	Providing and laying Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.3% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,685.00**
5.8	504	(ii)	**Bituminous Macadam Grading - II for traffic <20 MSA**		
		A	Providing and laying Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,735.00**
		B	Providing and laying Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,577.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		C	Providing and laying Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,661.00**
5.9	504	(ii)	**Bituminous Macadam Grading - II for traffic >20 MSA**		
		A	Providing and laying Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,964.00**
		B	Providing and laying Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,807.00**
		C	Providing and laying Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading premixed with bituminous binder VG-40 @ 3.4% by weight of mix, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction	**m^3**	**7,890.00**
5.10	505	A	**Dense Graded Bituminous Macadam Grading - I for traffic <20 MSA**		
		A	Providing and laying Dense Graded Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**8,856.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		B	Providing and laying Dense Graded Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**8,692.00**
		C	Providing and laying Dense Graded Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**8,779.00**
5.11	505	A	**Dense Graded Bituminous Macadam Grading - I for traffic >20 MSA**		
		A	Providing and laying Dense Graded Bituminous Macadam with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,140.00**
		B	Providing and laying Dense Graded Bituminous Macadam with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**8,975.00**
		C	Providing and laying Dense Graded Bituminous Macadam with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher to the required grade, level and alignment, rolling with smooth	**m^3**	**9,062.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRTH specification clause No. 505 complete in all respects.		
5.12	505		**Dense Graded Bituminous Macadam Grading - II for traffic <20 MSA**		
		A	Providing and laying Dense Graded Bituminous Macadam with 120 TPH capacity HMP batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,526.00**
		B	Providing and laying Dense Graded Bituminous Macadam with 100 TPH capacity HMP batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,362.00**
		C	Providing and laying Dense Graded Bituminous Macadam with 40/60 TPH capacity HMP using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,449.00**
5.13	505		**Dense Graded Bituminous Macadam Grading - II for traffic >20 MSA**		
		A	Providing and laying Dense Graded Bituminous Macadam with 120 TPH capacity HMP batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,845.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		B	Providing and laying Dense Graded Bituminous Macadam with 100 TPH capacity HMP batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,680.00**
		C	Providing and laying Dense Graded Bituminous Macadam with 40/60 TPH capacity HMP using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 505 complete in all respects.	**m^3**	**9,768.00**
5.14	507	A	**Bituminous Concrete Grading I for traffic <20 MSA**		
		A	Providing and laying Bituminous Concrete with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,705.00**
		B	Providing and laying Bituminous Concrete with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,537.00**
		C	Providing and laying Bituminous Concrete with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,626.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.15	507	A	**Bituminous Concrete Grading I for traffic >20 MSA**		
		A	Providing and laying Bituminous Concrete with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**11,081.00**
		B	Providing and laying Bituminous Concrete with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,913.00**
		C	Providing and laying Bituminous Concrete with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-40 @ 5.2 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**11,002.00**
5.16	507	B	**Bituminous Concrete Grading II for traffic <20 MSA**		
		A	Providing and laying Bituminous Concrete with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**11,033.00**
		B	Providing and laying Bituminous Concrete with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,865.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		C	Providing and laying Bituminous Concrete with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-30, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	m^3	**10,954.00**
5.17	507	B	**Bituminous Concrete Grading II for traffic >20 MSA**		
		A	Providing and laying Bituminous Concrete with 120 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	m^3	**11,424.00**
		B	Providing and laying Bituminous Concrete with 100 TPH capacity hot mix plant batch type using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	m^3	**11,256.00**
		C	Providing and laying Bituminous Concrete with 40/60 TPH capacity hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder VG-40, @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	m^3	**11,345.00**
5.18	509		**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 VG-30 laid on prepared surface and rolling with 8-10 t smooth wheeled steel roller		
		Case-I	19 mm nominal chipping size	m^2	**100.00**
		Case-II	13mm nominal size chipping	m^2	**80.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.19	510		**Open - Graded Premix Surfacing**		
			Providing, laying and rolling of open - graded premix surfacing of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using viscosity grade bitumen VG-30 to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable Hot mix plant of capacity not less than 40/60 TPH laying and rolling with a smooth wheeled roller, finished to required level and grades.	**m^2**	**149.00**
5.20	508		**Close Graded Premix Surfacing/Mixed Seal Surfacing**		
			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 VG-30 bitumen to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable hot mix plant of capacity not less than 40/60 TPH, laying and rolling with a Smooth wheeled roller finishing to required level and grade.		
		(i)	Type - A	**m^2**	**192.00**
		(ii)	Type - B	**m^2**	**176.00**
5.21	511		**Seal Coat**		
			Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A and B seal coats with bituminous binder VG-30		
		(i)	Case - I : Type A Premix Seal coat	**m^2**	**75.00**
		(ii)	Case - II : Type B Premix Seal coat	**m^2**	**52.00**
5.22	516		**Mastic Asphalt**		
			Providing and laying 25 mm thick mastic asphalt wearing course 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 13.2 mm nominal size at the rate of 0.005 m^3 per 10 m^2 and at an approximate spacing of 100 mm c/c in both directions, pressed into surface when the temperature of surfaces is not less than 1000 degrees Centigrade, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 516	**m^2**	**752.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.23	512		**Slurry Seal**		
			Providing and laying slurry seal consisting of a mix 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		
		(i)	**2-3 mm thickness (Type-I)**	**m^2**	**47.00**
		(ii)	**4-6 mm thickness (Type-II)**	**m^2**	**77.00**
		(iii)	**6-8 mm thickness (Type - III)**	**m^2**	**94.00**
5.24	519		**Recycling of Bituminous Pavement with Central Recycling Plant**		
			Recycling pavement by cold milling of existing bituminous layers, planning the surface after cold milling, reclaiming excavated material to the extent of 30 per cent of the required quantity, hauling and stock piling 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 using -		
	A	(i)	Bituminous Macadam Grading - I	**m^3**	**7,070.00**
		(ii)	Bituminous Macadam Grading - II	**m^3**	**7,194.00**
	B	(i)	Dense Graded Bituminous Macadam Grading - I	**m^3**	**7,852.00**
		(ii)	Dense Graded Bituminous Macadam Grading - II	**m^3**	**8,467.00**
	C	(i)	Bituminous Concrete Grading - I	**m^3**	**9,246.00**
		(ii)	Bituminous Concrete Grading - II	**m^3**	**9,486.00**
5.25	513		**Fog Spray**		
			Providing and applying low viscosity SS1 bitumen emulsion for sealing cracks less than 3 mm wide or incipient fretting or disintegration in an existing bituminous surfacing.	**m^2**	**44.00**
			Note: *If crushed stone / Grit of 3 mm size is used along with precoating of emulsion, the rate may be increased by 20%.*		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.26	519		**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.		
		(i)	Using SS1 bitumen emulsion and 9.5 mm or 13.2 mm size aggregate	**m^3**	**1,3817.00**
		(ii)	Using SS1 bitumen emulsion and 19 mm or 26.5 mm nominal size aggregate	**m^3**	**13,764.00**
5.27	506		**Sand Asphalt Base Course**		
			Providing, laying and rolling sand-asphalt base course composed of sand, mineral filler and bituminous binder VG-30 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.	**m^3**	**10,158.00**
5.28	517		**Crack Prevention Courses**		
		(i)	**Stress Absorbing Membrane (SAM) crack width less than 6 mm**		
			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 IRC: SP-53:2010, sprayed at the rate of 9 kg per 10 m^2 and spreading 5.6 mm crushed stone aggregates @ 0.11 m^3 per 10 m^2 with hydraulic chip spreader, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	**m^2**	**71.00**
		(ii)	**Stress Absorbing Membrane (SAM) with crack width 6 mm to 9 mm**		
			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 complying with IRC: SP-53:2010, sprayed at the rate of 11 kg per 10m^2 and spreading 11.2 mm crushed stone aggregates @ 0.12 m^3 per 10 m^2, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	**m^2**	**82.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(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 complying with IRC:SP-53:2010 sprayed at the rate of 15 kg per 10 m^2 and spreading 11.2 mm crushed stone aggregates @ 0.12 m^3 per 10 m^2, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	**m^2**	**108.00**
		Note	*In case 2nd coat is also required to be provided, material provided for the 2nd coat shall be as per table 500-43*		
		(iv)	**Bitumen Impregnated Geotextile**		
			Providing and laying a bitumen premix of crushed stone aggregate and emulsion binder mixed in batch type cold mixing plant , laid over prepared suface, by paver finisher, rolled with a pneumatic tyred roller initially and fnished with a smooth steel wheel roller initially and finished with a smooth smooth steel wheel roller all as per clause 518.3	**m^2**	**329.00**
5.29		A	**Bituminous Concrete Grading I Using waste plastic**		
			Providing and laying Bituminous Concrete with not less than 40/60 TPH capacity HMP using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 4.78% Bitumen and waste plastic 8% of Bitumen of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,091.00**
		B	**Bituminous Concrete Grading II Using waste plastic**		
			Providing and laying Bituminous Concrete with not less than 40/60 TPH capacity HMP using crushed aggregates of specified grading, premixed with bituminous binder VG-30 @ 4.78% Bitumen and waste plastic 8% of Bitumen of mix and filler, transporting the hot mix to work site, laying with mechanical paver finisher 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. 507 complete in all respects	**m^3**	**10,415.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.30	519	A	**Hot Recycling in place of Bituminous pavement with Bituminous Concrete Grading I**		
			Providing and placing Bituminous Concrete with Hot Recycling in place using crushed aggregate of specified grading, with bitumnous binder VG-30 @ 5.2 percent of mix and filler, transporting the aggregates to work site, laying with a Hot Recycling in place to the required grade, level and alignment, rolling with smooth wheeled vibratory and tandem roller to achieve the desired compaction as per MORTH speciication clause No. 519 complete in all respect.	**m^3**	**7,587.00**
	519	B	**Hot Recycling in place of Bituminous pavement with bituminous concrete Grading II**		
			Providing and placing Bituminous Concrete with Hot Recycling in place using crushed aggregate of specified grading, with bitumnous binder VG-30 @ 5.4 percent of mix and filler, transporting the aggregates to work site, laying with a Hot Recycling in place to the required grade, level and alignment, rolling with smooth wheeled vibratory and tandem roller to achieve the desired compaction as per MORTH speciication clause No. 519 complete in all respect.	**m^3**	**7,646.00**
			Semi Dense Bituminous Concrete		
5.31	IRC-37: 2018		Providing and laying **Semi Dense Bituminous Concrete** with 40/60 TPH capacity hot mix plant batch type using crushed aggregates of specified grading premixed with bituminous binder VG-30 @ 5% by weight of mix and filler, transported to site, laid over a previously prepared surface with mechanical paver finisher to the required grade, level and alignment and rolled as per MoRTH V revision.	**m^3**	**10,152.00**
5.32	503		**Tack coat on Bituminous surface**		
			Providing and applying tack coat with VG-10 Bitumen using pressure distributor at the rate of 0.20 kg/m^2 on the prepared bituminous surface cleaned with mechanical broom	**m^2**	**12.00**
5.33	503		**Tack coat on Granular surface treated with primer**		
			Providing and applying tack coat with VG-10 Bitumen using pressure distributor at the rate of 0.25 kg/m^2 on Granular Surface.	**m^2**	**15.00**
5.34	503		**Tack coat on Cement concrete pavement**		
			Providing and applying tack coat with VG-10 Bitumen using pressure distributor at the rate of 0.30 kg/m^2 on Cement Concrete pavement.	**m^2**	**18.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
5.35		**Microsurfacing as per IRC SP 81:2008**		
	IRC 81: 2008	Providing and laying Micro Surfacing Course Type II for traffic <1500CVPD with 6mm thickness as per IRC SP 81:2008 on existing structural sound & distressed pavement surface. (It is to be applied over an existing pavement surface which is structurally sound, but the surface is showing signs of premature ageing, aggregate loss, high degree of polishing, oxidation / hungry surface) comprising of aggregates confirming to section 514 of MoRTH Specification. The Modified Bitumen Emulsion @ 10%, Filler cement @ 2%, Additive @ 0.5% and water as per requirement, aggregates as per Table 500-27. All these ingredients are mixed with required quantity of water to prepare semi fluid mass. The mix shall be spread mechanically using Microsurfacing Paver. The Cost includes cleaning of surface with Air compresser, laying and compacting to provide even riding surface and shall be rolling by Pneumatic Tyre Roller and ensure excessive movement does not occur, including cost of all materials, labour, usage charges of machinery, lead, lifts, loading, unloading, stacking, transporting, etc complete as per technical specification.	**m^2**	**163.00**
		Note *Avoid placement in Hot weather if there is potential for flushing problems. Placement in cool weather can lead to early ravelling and not to be placed when temperature is below 5degrees.*		
5.36		**Bituminous Concrete Using Performance Graded Polymer Modified Bitumen**		
		Providing and laying Bituminous Concrete with 120 TPH HMP Batch Type using crushed aggregates of specified grading, premixed with bituminous binder Performance Graded Polymer Modified Bitumen conforming to IS 15462-2019 and filler as per IRC SP -53-2010 as per design mix requirement table 10.1. The minimum temperature of mix shall be 165-185 degrees & transported to work site & laying at temperature 115-145 degree celsius 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. 507 complete in all respects		
		a Grading I (19mm Nominal Size) with 5.4% PMB 76E -10 Bitumen	**m^3**	**14,680.00**
		b Grading II (13mm Nominal Size) with 5.6% PMB 76E -10 Bitumen	**m^3**	**15,103.00**
		c Grading I (19mm Nominal Size) with 5.4% PMB 70E -10 Bitumen	**m^3**	**14,454.00**
		d Grading II (13mm Nominal Size) with 5.6% PMB 70E -10 Bitumen	**m^3**	**14,869.00**
		Note *Applicable for areas with heavy traffic intensity in terms of commercial vehicles, overloading of trucks and significant variations in daily & seasonal temperature of the pavement and showing early development of distress symptoms like raveling, undulations, rutting, cracking, bleeding, shoving and potholing of Bituminous surfaces.*		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
5.37			**Stone Matrix Asphalt**		
	IRC SP 079 : 2008		Providing and laying Stone Matrix Asphalt (SMA) using crushed aggregates of specified grading, premixed with Modified Bituminous Binder containing Stabilizer additive (Pellitized Cellous fiber at 0.3% on loose fibre basis) on the weight of total mix in the batch and filler(Hydrated lime dust @ 2% of weight of aggregates, transporting the Hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per clause 515 of MORTH V revision using 120 TPH capacity with Sensor paver.		
		a	**SMA -45 mm to 75 mm compacted thickness with 5.8 % VG-30 Bitumen**	**m^3**	**11,857.00**
		b	**SMA -40 mm to 50 mm compacted thickness with 5.8 % VG-30 Bitumen**	**m^3**	**11,889.00**
		Note	*The dosage rate shall be confirmed so that the bitumen draindown does not exceed 0.3% when the designed mix is tested in accordance with ASTM D 6390, "Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures"*		
5.38			**Open Graded Friction Course (OGFC)**		
	IRC SP 129 : 2019		Providing and laying Open Graded Friction Course (OGFC) of 25mm thickness as wearing course as per IRC 129:2019 using crushed aggregates of specified grading premixed with VG40 Bituminous Binder @ 5.5 %, Stabilizer additive (Pellitized Cellulose fiber at 0.3% on loose fiber basis) on the weight of total mix in the batch transporting the Hot mix to work site, laying with sensor paver finisher to the required grade, level and alignment, rolling with smooth wheeled rollers to achieve the desired compaction	**m^3**	**10,440.00**
		Note	*The OGFC mix shall not be laid:* *• In the presence of standing water on the surface.* *• When rain is imminent and during rains, fog, or dust storm.* *• When the base/binder course is damp.* *• When the air temperature on the surface on which it is to be laid is less than 10°C for a mix with conventional bitumen as a binder and is less than 15°C for a mix with polymer modified bitumen as a binder.* *• When the wind speed at any temperature exceeds 40 km/h at 2 m height.*		
5.39			**Stress Absorbing Membrane Interlayer with VG-30 Bitumen**		
	IRC SP 101 : 2019		Providing and laying SAMI (Stress Absorbing Membrane Interlayer) layer as a crack relief layer with chemical additives added @ 0.1% by weight of VG-30 bitumen, laid on prepared stabilized surface followed by cover of crushed stone chippings of specified size and rollling with 80-100 kN static roller including cleaning of base surface as per technical specifications.	**m^2**	**87.00**

Chapter - 6

CEMENT CONCRETE PAVEMENT

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		CHAPTER - 6 **CEMENT CONCRETE PAVEMENTS**		
6.1	601	**Dry Lean Cement Concrete Sub-base**		
	IRC SP 49: 2014	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 14:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 140 kg/ m3 , optimum moisture content to be determined during trial length construction, concrete strength not to be less than 7 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 t vibratory roller, finishing and curing.	**m^3**	**4,920.00**
6.2		**Pavement Quality Concrete using paver - M40 Grade**		
		Construction of **M40 Grade** un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base in recommended proportions, coarse and fine aggregate conforming to IS 383:2016, 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 slip form paver finisher, 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, curing compound, steel channels, finishing to lines and grades as per drawing		
6.2.1		**OPC @ 420 kg/m^3**	**m^3**	**9,061.00**
6.2.2		**OPC @ 315 kg/m^3 & GGBS @ 105 kg/m^3**	**m^3**	**8,206.00**
6.2.3		**OPC @ 357 kg/m^3 & Fly Ash @ 63 kg/m^3**	**m^3**	**8,328.00**
		Note ** The Dowel bars shall be Mild Steel rounds conforming to IS432 of Grade S240.* ** The Tie bars shall be plain Mild Steel bars conforming to IS432 part-I or deformed steel bars complying with IS 1786.*		
6.3		**Construction of Fly Ash Dry Lean cement concrete Sub-Base.**		
	IRC SP 49: 2014	Construction of Dry lean cement concrete sub-base over a prepared sub grade with coarse and fine aggregates confirming to IS 383:2016 the size of coarse aggregates not exceeding 25mm replacing cement by fly ash to the extent of 20 percent, aggregate cement ratio not to exceed 12:1 aggregates gradation after blending to be as per table 600-1, cement & cementitious content not to be less than 140 kg/m3, optimum moisture content to be	**m^3**	**4,735.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		determined during trial length construction , concrete strength not to be less than 7 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 t vibratory roller, finishing and curing.		
6.4		**Thin White Topping**		
		Construction of Thin White Topping with M40 grade plain cement concrete pavement over existing Bituminous surface (Preparation to be done if necessary either by Milling or Levelling course with BM/DLC) with approved grade Cement as per IRC SP 76:2015, coarse and fine aggregate conforming to IS 383:2016, maximum size of fine aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, including fibre reinforcement @ 9.25 kg/m^3, transported to site, laid with slip form paver finisher, spread, compacted and finished in a continuous operation with Texture Curing Machine including provision of contraction joint, joint filler, sealant primer, joint sealant, admixtures, curing compound, steel channels, finishing to lines and grades as per drawing. *(Cost of milling if necessary shall be paid seperately)*		
6.4.1		**OPC @ 420 kg/m^3**	**m^3**	**8,946.00**
6.4.2		**OPC @ 315 kg/m^3 & GGBS @ 105 kg/m^3**	**m^3**	**8,090.00**
6.4.3		**OPC @ 357 kg/m^3 & Fly Ash @ 63 kg/m^3**	**m^3**	**8,210.00**
	Note	• *Slip form or Fixed form pavers both are permitted for operation. Choice is decided based on Road width availability. If fixed form is used cost shall be deducted at Rs. 200.00/m^3* • *The development of effective bond between PCC overlay and existing bituminous pavement is desirable. Extensive surface preparation is necessary. To achieve this, Milling of road surface to be done thoroughly.* • ***Fibre Reinforcement:*** *Usage of fibre reinforcement is mandatory as it reduces plastic shrinkage and increases the ductility and abrasion resistance. The application procedure as per* ***IRC SP:46:2013*** *shall be followed.*		
6.5		**Pavement Quality M30 grade Concrete (RMC) with OPC & GGBS laid using Paver**		
		Construction of **M30 Grade** un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with OPC @ 270 kg/m^3 and GGBS@ 90 kg/m^3, coarse and fine aggregate conforming to IS 383:2016, 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 paver finisher, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation	**m^3**	**7,839.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures, curing compound, steel channels, finishing to lines and grades as per drawing.		
6.6		**Plain Cement Pavement Quality M30 grade Concrete (RMC) with OPC & GGBS laid without Paver**		
		Construction of un-reinforced plain cement concrete pavement using RMC M-30 grade with OPC @ 270 kg/m^3 and GGBS@ 90 kg/m^3 (75:25 proportion) as per approved mix design procedure and thickness as per design, over a prepared sub base. The superplastisiser confirming to IS 9103-1999 Reaffirmed-2008 ,Coarse aggregates and Fine aggregate confirming to IS:383-2016, transported to site, laid in approved fixed side form work (steel channel, laying and fixing of 125 micron thick polythene film, wedges, steel plates including levelling the form work). Spreading the concrete with shovels, rackers and compacted using needle, suitable plate vibrator and finished in a continuous operation including provision of separation membrane and Hessian cloth finishing to lines and grades complete including cost of all materials, labour, all lead & lift, loading charges as per specification & direction of Engineer - incharge of the work. *(Groove cutting shall be paid seperately)*	**m^3**	**6,774.00**
6.7		**Pavement Milling**		
		Milling of existing Bituminous surface to a specified depth up to 40mm using Milling machine including disposal of removed material.	**m^2**	**45.00**
6.8		**Precast Cement Concrete Interlocking Blocks**		
6.8.1	IRC SP 63: 2018	Providing and laying 60mm thick factory made precast M -30 grade Cement Concrete Paver Block as per IRC SP 63:2018 & IS 15658 for Cycle Tracks & Pedestrian Footpaths of approved shape and colour, laid in required pattern and including over 30mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (WMM/WBM Base to be paid separately if necessary as per relevant technical specification)	**m^2**	**1,068.00**
6.8.2	IRC SP 63: 2018	Providing and laying 80mm thick factory made precast M -30 grade Cement Concrete Paver Block as per IRC SP 63:2018 & IS 15658 for Commercial Traffic Axle load repetitions upto 10MSA & for Residential Streets of approved shape and colour, laid in required pattern and including over 40mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (WMM/WBM Base to be paid separately as per relevant technical specification)	**m^2**	**1,161.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
6.8.3	IRC SP 63: 2018		Providing and laying 100mm thick factory made precast M -40 grade Cement Concrete Paver Block as per IRC SP 63:2018 & IS 15658 for Commercial Traffic Axle load repetitions more than 10MSA upto 20MSA for Industrial Streets, Bus & Truck parking of approved shape and colour, laid in required pattern and including over 40mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (WMM/WBM Base to be paid separately as per relevant technical specification)	**m^2**	**1,300.00**
6.8.4	IRC SP 63: 2018		Providing and laying 100mm thick factory made precast M -40 grade Cement Concrete Paver Block as per IRC SP 63:2018 & IS 15658 for Commercial Traffic Axle load repetitions more than 20MSA upto 50MSA & for Arterial streets of approved shape and colour, laid in required pattern and including over 40mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge.(WMM/WBM Base , DLC to be paid separately as per relevant technical specification)	**m^2**	**1,483.00**
6.8.5	IRC SP 63: 2018		Providing and laying Permeable Cement Concrete Paver Block for Pedestrian Footpaths of approved shape and colour, laid in required pattern and including over 30mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge	**m^2**	**1,019.00**
6.8.6	IRC SP 117: 2018		Providing and laying in place 300mm x 300mm x 16mm cement tactile directional and warning tiles (for a person with visual impairment) of the approved brand and make and specified colour for outdoor floors such as footpath, courtyard, multimodals location etc. laid on 20mm thick base of cement mortar 1:4 (1 cement: 4 coarse sand) in all shapes and patterns including grouting the joints with white cement with matching pigments etc. complete as per as per standards.	**m^2**	**1,395.00**
6.9			**Prestressed Precast Concrete Pavements**		
			Pavement rehabilitation and reconstruction are the major activities taken up in the department. Traffic volumes in Bengaluru city and in other Smart cities have increased tremendously over the decade with increasing traffic disruptions and extended lane closures and to resolve the issue of longer delays, a promising alternative rehabilitation strategy called 'Prestressed Precast Concrete Pavement'		
			Design, Construction and Laying of M40 grade Prestressed Precast Concrete Panel (PPCP) pavement, having flexural strength not less than 4.50 MPa and traffic intensity up to 1500 CVPD, casting the PPCP panels as per approved design drawing, in factory or plant with approved methodology in vibratory moulds, providing in position reinforcement conforming to IS:;1786 and uncoated stress relieved low	**m^3**	**13,500.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		relaxation seven ply strand of minimum 12.7 mm diameter conforming to IS:14268, with necessary mechanical pulling arrangement like Rabbit / Bed master including all accessories for stressing and destressing operations as per approved make conforming to IS:1343,prestressing as per approved design and drawing(proof checked) as per technical specifications. The PPCP panels of minimum 200 mm thick shall be cast with concrete prepared in a cement concrete batch mix plant/weigh batcher OPC 315kg/m3 & GGBS 105 kg/ m3, as per approved mix design using coarse / fine aggregate conforming to IS:383, with SuperPlasticizer conforming to IS:9103 and panels cured by steam / membrane curing / sprinkling water. Double mat reinforcement and tie bars shall be TMT steel bar (Fe 550) conforming to IS:1786, the cost being inclusive of straightening, cutting, bending, hooking, placing in position within casting mould, tying with binding wire etc., complete and providing MS Dowel bars conforming to IS:432, precoated with anticorrosive epoxy paint as per IS:13620 at designed spacing. The work shall include surface texturing/ tining of PPCP panels, making necessary slots to accommodate lifting anchors for yard handling, stacking, insertion of dowel / tie bars, transportation of PPCP panels by flat bed trailor (Tandem/ Trident axle with necessary accessories like A frame etc.,) from casting yard laying to the required line, level and alignment over already prepared base (cost for preparation of base to be paid separately) by making all arrangements i.e., cranes, push pull jacks and all other T&P for lifting, placing in alignment of PPCP panels within erection tolerances, post tensioning as per approved design to the required stress, providing 12 mm foam separator sheet pasted at two faces of panels, bed grouting with non shrink highly flowable mortar, grouting dowel/lifting slots using non shrink grout having a minimum of 40 MPa strength in 24 hours, joint sealing with Polysulphide Sealant conforming to IS:11433 (Part I) / BS 5212 – 1990, including cost of all materials, machineries, casting yard, labour etc., complete as per specifications and the direction of Engineer in Charge.		
		Note *To be used where density of traffic is huge to aid in completion of work without provisions for diversions.*		

Chapter - 7

GEOSYNTHETICS AND REINFORCED EARTH AND PROTECTION WORKS

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		CHAPTER - 7 **GEOSYNTHETICS AND REINFORCED EARTH AND PROTECTION WORKS**		
7.1	702	**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 702.2.3 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 and approved drawings including excavation and backfilling	**m**	**1,217.00**
7.2	708	**Laying of Paving Fabric Beneath Pavement Overlay**		
		Providing and laying paving fabric with physical requirement as per table 700-16 over a tack coat of paving grade bitumen VG-10 penetration, laid at the rate of 1 kg per m^2 over thoroughly cleaned and repaired surface to provide a water rsistant layer. Paving fabric to be fee of wrinkling and folding and to be laid before cooling of tack coat, brooming and rolling of surface with pneumatic roller to maximize paving fabric contact with pavement surface.	**m^2**	**90.00**
7.3	703	**Laying Boulder Apron in Crates of Synthetic Geogrids**		
		Providing, preparing and laying of geogrid crated apron 1 m x 5 m, 600 mm thick including excavation and backfilling with baffles at 1 m interval, made with geogrids having characteristics as per clause 704.2, joining sides with connectors/ring staples, top corners to be tie tensioned, placing of suitable cross interval ties in layers of 300 mm connecting opposite side with lateral braces and tied with polymer braids to avoid bulging, constructed as per clause 704.3 filled with stone with minimum size of 200 mm and specific gravity not less than 2.65, packed with stone spalls, keyed to the foundation recess in case of sloping ground and laid over a layer of geotextile to prevent migration of fines, all as per clause 704 and laid as per clause 2503.3 and approved design.	**m^3**	**3,099.00**
7.4	3100	**Reinforced Earth Structures**		
		Reinforced Earth Structures have four main components as under:		
		a) Excavation for foundation, foundation concrete and cement concrete grooved seating in the foundation for facing elements (facia material). b) Facia material and its placement. c) Assembling, joining with facing elements and laying of the reinforcing elements. d) Earth fill with granular material which is to be retained by the wall.		

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
7.4	3103	Assembling, joining and laying of reinforcing elements with Glass reinforced polymer/fibre reinforced polymer/ polymer strips (60 mm wide & 5 mm thick)	**m**	**262.00**
7.5		With reinforcing elements of synthetic geogrid (including cost of loopings for joining with Facia pannel)	**m^2**	**384.00**
7.6	3105	**Facing elements of RCC**	**m^2**	**2,162.00**
		Note		

1. The specification and construction details to be adopted shall be as per section 3100 of MoRTH Specification.

2. Drainage arrangement shall be made as per approved design and drawings.

3. The quantity of filler media shall be calculated as per approved design and specifications and shall be priced separately.

4. Excavation for foundation including foundation concrete and groove in the foundation for seating of bottom most facia panel and capping beam to be calculated as per design and priced separately.

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.

6. For compaction of Earthwork, attention is invited to clause 3105.5 of MoRTH Specification.

7. Length of reinforcing strips will vary with the height of wall and will be as per approved design and drawings.

8. The type of reinforcing elements to be adopted shall be as per approved design and specifications.

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.

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.

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.

12. The cost of reinforced earth retaining wall shall include following:

(i) Excavation for foundation including backfilling.

(ii) Foundation concrete as per approved design.

(iii) Cost of facial pannels and their erection .

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			(iv) Cost of reinforcing elements including their fixing and joining with the facial pannels. *(v) Drainage arrangement including filter media as per approved design and drawings.* *13. The compacted earth filling to be retained shall form part of embankment.* *14. The excavation for foundation including backfilling paid separately* *15. The compacted earth filling to be retained shall form part of embankment/backfilling.*		
7.7	703	(i)	Supplying and laying of bi-axial extruded high module polypropylene geogrid confirmoing to MORT&H specification for base/sub base reinforcement having minimum tensile strength 15kN/m in the longitudinal and transverse direction, with 5kN/m and 7kN/m tensile strength at 2% and 5% strain respectively in the longitudinal and transverse direction, junction efficency not less than 95% and with 38mm X 38mm mesh opening. (The cost is inclusive of wastage)	**m^2**	**76.00**
7.8	703	(ii)	Supplying and laying of bi-axial extruded high module polypropylene geogrid confirmoing to MORT&H specification for base/sub base reinforcement having minimum tensile strength 20kN/m in the longitudinal and transverse direction, with 7kN/m and 14kN/m tensile strength at 2% and 5% strain respectively in the longitudinal and transverse direction, junction efficency not less than 95% and with 38mm X 38mm mesh opening. (The cost is inclusive of wastage)	**m^2**	**82.00**
7.9	703	(iii)	Supplying and laying of bi-axial extruded high module polypropylene geogrid confirmoing to MORT&H specification for base/sub base reinforcement having minimum tensile strength 30kN/m in the longitudinal and transverse direction, with 10.5kN/m and 21kN/m tensile strength at 2% and 5% strain respectively in the longitudinal and transverse direction, junction efficency not less than 95% and with 38mm X 38mm mesh opening. (The cost is inclusive of wastage)	**m^2**	**86.00**
7.10	703	(iii)	Supplying and laying of bi-axial extruded high module polypropylene geogrid conforming to MORT&H specification for base/sub base reinforcement having minimum tensile strength 40kN/m in the longitudinal and transverse direction, with 14kN/m and 28kN/m tensile strength at 2% and 5% strain respectively in the longitudinal and transverse direction, junction efficency not less than 95% and with 38mm X 38mm mesh opening.	**m^2**	**92.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
7.11	703		Supplying and laying High Trength Flexible Geogrids (HSFG) as soil reinforcement / basal reinforcement as per MORT&H 3100 and IRC 113, made of high tenacity polyster core with poyethylene coating with minimum Long Term Design Strength (LTDS) of more than 50% of ultimate tensile strength at 30 degree Celsius corresponding to 12% strain etc., complete and as directed by Engineer-in-chage. (Including cost of overlap and jointing.		
		(i)	Synthetic Geogrid Ultimate tensile strength 100kN/m	**m^2**	**92.00**
		(ii)	Synthetic Geogrid Ultimate tensile strength 150kN/m	**m^2**	**100.00**
		(iii)	Synthetic Geogrid Ultimate tensile strength 200kN/m	**m^2**	**107.00**
		(iv)	Synthetic Geogrid Ultimate tensile strength 250kN/m	**m^2**	**117.00**
		(v)	Synthetic Geogrid Ultimate tensile strength 300kN/m	**m^2**	**119.00**
		(vi)	Synthetic Geogrid Ultimate tensile strength 350kN/m	**m^2**	**122.00**
		(vii)	Synthetic Geogrid Ultimate tensile strength 400kN/m	**m^2**	**137.00**
		(viii)	Synthetic Geogrid Ultimate tensile strength 450kN/m	**m^2**	**140.00**
		(ix)	Synthetic Geogrid Ultimate tensile strength 600kN/m	**m^2**	**144.00**
		(x)	Synthetic Geogrid Ultimate tensile strength 700kN/m	**m^2**	**151.00**
		(xi)	Synthetic Geogrid Ultimate tensile strength 800kN/m	**m^2**	**159.00**
		(xii)	Synthetic Geogrid Ultimate tensile strength 900kN/m	**m^2**	**165.00**
		(xiii)	Synthetic Geogrid Ultimate tensile strength 1000kN/m	**m^2**	**173.00**
		(xiv)	Synthetic Geogrid Ultimate tensile strength 1200kN/m	**m^2**	**180.00**
7.12	BS 7006		**Insitu Soil Reinforcement for Slope Restoration (Soil Nailing)**		
			Designing, Providing drawings and installation of fully threaded (only Milled or Hot thread bars are allowed to avoid any loss of strength), Hot-dip galvanized solid geotechnical bars as soil nail having yield strength ≥ 670 Mpa, ulimate tensile strength ≥ 800 Mpa and minimum galvanization of 500 g/m2 required for construction of soil nailed stabilized slope including supply of galvanized nail plates, dome shape nuts, tapper washer, coupler (if required), centralizer and all accessories, including all lead and lifts as per detailed specification (Conforming to BS 8006 & AFNOR standards)		
		a	20mm dia	**m**	**2,651.00**
		b	25mm dia	**m**	**2,778.00**
		c	28mm dia	**m**	**2,905.00**
		d	32mm dia	**m**	**3,095.00**
		e	35mm dia	**m**	**3,349.00**

Chapter - 8

TRAFFIC CALMING MEASURES, ROAD SIGNAGES & MARKING (ROAD FURNITURES)

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 8 **TRAFFIC CALMING MEASURES, ROAD SIGNAGES & MARKING (ROAD FURNITURE)**		
8.1	409		**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 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		
		a.	PCC M15 grade for kerb base	**m**	**239.00**
		b.	PCC M20 grade for kerb Cast in Situ	**m**	**265.00**
8.2	409		**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 M10 grade foundation 150 mm thick, kerb channel 300 mm wide, 50 mm thick in PCC M20 grade, sloped towards the kerb, kerb stone with channel laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 409		
		a.	PCC M15 grade for kerb base	**m**	**242.00**
		b.	PCC M20 grade for kerb Cast in Situ	**m**	**371.00**
	801		**Printing New Letter and Figures of any Shade**		
8.3			Printing new letter and figures of any shade with synthetic enamel paint black or any other approved colour to give an even shade	**per cm height per letter**	**1.60**
8.4			English and Roman	**per cm height per letter**	**0.90**
8.5	801	A	**Retro-Reflectorised Traffic Signs**		
			Providing and fixing of retro- reflectorised cautionary, mandatory and informatory sign as per IRC:67:2022 made of Class B Type IV retro reflective sheeting fixed over 2 mm thick aluminium sheeting vide clause 803.1, 3mm/4mm thick Aluminium composite material sheet depending on the size of the sign fixed over the back support frame of min 25 x 25 x 3mm angle mounted on a mild steel circular pipe 65 NB, 3.2 mm thickness firmly fixed to the ground by means of properly designed foundation with M25 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing.The sign shall be maintained as per section 12 of IRC:67:2022.		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(i)	120 cm equilateral triangle	**each**	**6,235.00**
		(ii)	90 cm equilateral triangle	**each**	**4,684.00**
		(iii)	75 cm equilateral triangle	**each**	**4,076.00**
		(iv)	60 cm equilateral triangle	**each**	**3,576.00**
		(v)	120 cm circular	**each**	**9,116.00**
		(vi)	90 cm circular	**each**	**6,304.00**
		(vii)	75 cm circular	**each**	**5,201.00**
		(viii)	60 cm circular	**each**	**4,297.00**
		(ix)	90 mm x 75 mm rectangular	**each**	**6,525.00**
		(x)	80 mm x 60 mm rectangular	**each**	**5,417.00**
		(xi)	60 mm x 50 mm rectangular	**each**	**4,394.00**
		(xii)	60 cm x 45 cm rectangular	**each**	**4,224.00**
		(xiii)	60 cm x 60 cm square	**each**	**4,735.00**
		(xiv)	120 cm high octagon	**each**	**9,469.00**
		(xv)	90 cm high octagon	**each**	**6,502.00**
		(xvi)	75 cm high octagon	**each**	**5,337.00**
8.6	801	A	**Retro-Reflectorised Traffic Signs**		
			Providing and fixing of retro- reflectorised cautionary, mandatory and informatory sign as per IRC:67:2022 made of Class C Type XI retro reflective sheeting fixed over 2 mm thick aluminium sheeting vide clause 801.3, 3mm/4mm thick Aluminium composite material sheet depending on the size of the sign fixed over the back support frame of min 25 x 25 x 3mm angle mounted on a mild steel circular pipe 65 NB, 3.2 mm thickness firmly fixed to the ground by means of properly designed foundation with M25 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing.The sign shall be maintained as per section 12 of IRC:67:2022.		
		(i)	120 cm equilateral triangle	**each**	**6,350.00**
		(ii)	90 cm equilateral triangle	**each**	**4,748.00**
		(iii)	75 cm equilateral triangle	**each**	**4,121.00**
		(iv)	60 cm equilateral triangle	**each**	**3,604.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(v)	120 cm circular	**each**	**9,323.00**
		(vi)	90 cm circular	**each**	**6,420.00**
		(vii)	75 cm circular	**each**	**5,282.00**
		(viii)	60 cm circular	**each**	**4,349.00**
		(ix)	90 mm x 75 mm rectangular	**each**	**6,649.00**
		(x)	80 mm x 60 mm rectangular	**each**	**5,505.00**
		(xi)	60 mm x 50 mm rectangular	**each**	**4,449.00**
		(xii)	60 cm x 45 cm rectangular	**each**	**4,273.00**
		(xiii)	60 cm x 60 cm square	**each**	**4,801.00**
		(xiv)	120 cm high octagon	**each**	**9,688.00**
		(xv)	90 cm high octagon	**each**	**6,625.00**
		(xvi)	75 cm high octagon	**each**	**5,423.00**
8.7	801		**Direction and Place Identification Signs upto 0.9 m2 Size Board.**		
			Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67:2022 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick or Aluminium composite material sheet with overall thickness of 4mm with area not exceeding 0.9 m^2 fixed over back support frame of min 35 x 35 x 3mm angle mounted on a mild steel circular pipe 65 NB, firmly fixed to the ground by means of properly designed foundation with M25 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing	**m^2**	**9,010.00**
8.8	801		**Direction and Place Identification Signs with size more than 0.9 m2 size Board.**		
			Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67:2022 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick or Aluminium composite material sheet with overall thickness of 4mm with area exceeding 0.9 m^2 fixed over back support frame of min 40 x 40 x 5mm angle mounted on a mild steel circular pipe 65 NB, firmly fixed to the ground by means of properly designed foundation with M25 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing	**m^2**	**9,702.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.9	802		**Overhead Signs**		
			Providing and erecting overhead signs with a corrosion resistant 2mm thick aluminium alloy sheet reflectorised with high intensity retro-reflective sheeting as per IRC:67:2022 with vertical and lateral clearance given in clause 802.2 and 802.3 and installed as per clause 802.7 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.		
		A	**Truss and Vertical Support**	**t**	**86,527.00**
		B	**Aluminium Alloy Plate for Over Head Sign**	**m^2**	**5,818.00**
8.10	803		**Painting Two Coats on New Concrete Surfaces**		
			Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces	**m^2**	**109.00**
8.11	803		**Painting on Steel Surfaces**		
			Providing and applying two coats of ready mix paint of approved brand on steel surface after thorough cleaning of surface to give an even shade	**m^2**	**96.00**
8.12	803		**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	**m^2**	**105.00**
8.13	803		**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:164:2015 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control		
		(i)	Over 10 cm in width	**m^2**	**203.00**
		(ii)	Up to 10 cm in width	**m^2**	**172.00**
8.14	803		**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		
		(i)	Over 10 cm in width	**m^2**	**143.00**
		(ii)	Upto 10 cm in width	**m^2**	**155.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.15	803		**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 g/m^2 area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35:2015.The finished surface to be level, uniform and free from streaks and holes.	**m^2**	**530.00**
		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.*		
			2. Cost of painter is already included in usage charges of road marking machine.		
8.16	805		**Kilometre Stone**		
			Reinforced cement concrete M15grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc		
		(i)	5th kilometre stone (precast)	**each**	**5,081.00**
		(ii)	Ordinary kilometer stone (precast)	**each**	**2,927.00**
		(iii)	200 m stone (precast)	**each**	**842.00**
8.17	806		**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-79-2019 and the drawings.	**each**	**2,021.00**
8.18	807		**Boundary pillar / Guard Stone**		
			Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25, fixed in position including finishing and lettering but excluding painting	**each**	**748.00**
8.19	808		**G.I Barbed Wire Fencing 1.2 m High**		
			Providing and fixing 1.2 m high GI barbed wire fencing with 1.8 m angle iron posts 40 mm x 40 mm x 6 mm placed every 3 m center to center founded in M15 grade cement concrete, 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per clause 817	**m**	**332.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.20	808		**G.I Barbed Wire Fencing 1.8 m High**		
			Providing and fixing 1.8 m high GI barbed wire fencing with 2.4 m angle iron posts 50 mm x 50 mm x 6 mm placed every 3 m 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	**m**	**543.00**
8.21	808		**Tubular Steel Railing on Medium Weight Steel Channel (ISMC series) 100 mm x 50 mm**		
			Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50 mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings	**m**	**1,975.00**
8.22	808		**Tubular Steel Railing on Precast RCC Posts, 1.2 m High Above Ground Level**		
			Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M20 grade RCC vertical posts1.8 m high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 m centre to, complete as per approved drawing	**m**	**4,203.00**
8.23	811		**Reinforced Cement Concrete Crash Barrier**		
			Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-25 grade concrete with TMT 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 ocations directed by the Engineer, all as specified. (Area = 0.243 m^2/m, single face)		
		(i)	**M 25 grade concrete**	**m**	**2,474.00**
		(ii)	**M 30 grade concrete**	**m**	**2,514.00**
		Note	*i) Excavation and backfilling are incidental to work and not to be measured separately.*		
			ii) If PCC is required below crash barrier then it should be measured & paid separately		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.24		B	**Reinforced Cement Concrete Crash Barrier (New Jersey)**		
			Provision of an Reinforced cement concrete new jersey crash barrier at the medians constructed with reinforcement cement concrete with TMT FE 550 reinforcement conforming MoRTH Specification and as per details given IRC:119 (Fig-6) including dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, as per approved drawing and at locations directed by the Engineer, all as specified		
		(i)	**M 25 grade concrete**	**m**	**2,657.00**
		(ii)	**M 30 grade concrete**	**m**	**2,700.00**
		Note	*i) Excavation and backfilling are incidental to work and not to be measured separately.*		
			ii) If PCC is required below crash barrier then it should be measured & paid separately		
8.25	811		**Metal Beam Crash Barrier**		
		(i)	**Type - A, "W" : Metal Beam Crash Barrier**		
			Providing and erecting a "W" metal beam crash barrier system 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	**m**	**3,640.00**
		(ii)	**Type - B, "THRIE" : Metal Beam Crash Barrier**		
			Providing and erecting a "Thrie" metal beam crash barrier system 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 810	**m**	**4,421.00**
		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.*		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.26			**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.	**m**	**3,083.00**
8.27			**Anti-Glare Devices in Median**		
		(i)	**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 envoirenment and are eco-friendly. The rate for this item areto be taken from Forest/Horticulture/Watershed SR.		
		(ii)	**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.	**m**	**2,627.00**
		Note	*The items of excavation and cement concrete as per approved design to be measured and paid separately*		
8.28			**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 degree 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	**m**	**1,086.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.29			**Cable Duct Across the Road**		
			Providing and laying of a reinforced cement concrete pipe duct, 300 mm dia, across the road (new construction), extending from drain to drain in cuts and toe of slope to toe of slope in fills, constructing head walls at both ends, providing a minimum fill of granular material over top and sides of RCC pipe as per IRC:98-1997, bedded on a 0.3 m thick layer of granular material free of rock pieces, outer to outer distance of pipe at least half dia of pipe subject to minimum 450 mm in case of double and triple row ducts, joints to be made leak proof, invert level of duct to be above higher than ground level to prevent entry of water and dirt, all as per IRC: 98 - 1997 and approved drawings.		
		(i)	**Single row for one utility service**	**m**	**2,212.00**
		(ii)	**Double row for two utility services**	**m**	**4,009.00**
		(iii)	**Triple Row for three utility services**	**m**	**5,834.00**
8.30	813.4		**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	**each**	**430.00**
8.31			**Rumble Strips**		
			Provision of 15 nos 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.	**m^2**	**188.00**
8.32			**Solar Raised Pavement Markers**		
			Supplying & fixing of Solar Raised Pavement Markers made of polycarbonate molded body with circular shape, solar powered, LED self illumination in active mode, 360 degree illumination and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face in passive mode. The marker shall support a load of 20000 kg tested in accordance to ASTM D 4280. The marker should be resistant to dust and water ingress according to IP 65 standards and should withstand tempertures in the range of 0 C to 70 C. Color of lighting could be provided in red or yellow (amber) as per requirement and typicl frequency of blinking is 1 Hz. There should be current losses of less than 20 microamperes at 2.4 V in sleepcharging mode to enhance the life of the marker and a full charge should provide for a minimum autonomy of 50 hours. The height, width and length of the marker shall not	**each**	**2,100.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		be less than 10 mm x 100 mm x 100 mm. Also, the surface diameter of the marker shall not be less than 100 mm respectively. The weight of the marker shall not exceed 0.5 kg. Fixing will be by drilling holes on the road for the shanks to go inside, without nails and using epoxy resin based adhesive and complete as directed by the Engineer		
		Note *Solar Powered Road Markers are more effective which can immediately draw the attention of drivers and shall be provided at locations like approach to road crash prone locations and highly hazardous locations like bridge, toll plaza, sharp curves, pedestrian crossing, lane transition, speed humps, junctions, channelizers, construction sites, rail road crossings, accident prone locations, median opening and lane changing where performance of normal road studs are not that effective due to street lightings and other roadside activities.*		
8.33		**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 45 degree, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55:2014	**each**	**3,687.00**
8.34		**Permanent Type Barricade in Construction Zone**		
	(i)	**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 45 degree, complete as per IRC:SP:55:2014	**each**	**5,676.00**
	(ii)	**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 45 degree, complete as per IRC:SP:55-2014	**each**	**7,681.00**
	(iii)	**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**	**22,688.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.35			**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 55:2014	**each**	**762.00**
8.36			**Water Filled Barricades Work zone sheeting**		
			Providing water filled barricades made up of LDPE to segregate the vehicle movement and work zone as per IRC SP 55 shall be in Trapezoidal Shape 800 mm to 1000 mm in length, 700 mm in heght for Major Roads and expreesway and 500mm tall for othe roads wih intelocking arrangemens, to be placed 0.5m from the edge of the carriage way for expresway and 0.3m for other roads, it should have reboundble work zone sheeting as per ASTM D 4956 52.	**each**	**2,364.00**
8.37			**Tubular Marker / Spring post 450 mm (Flexible Bollards)**		
			Providing Tubular marker made up of Polyurethane used to divide opposing lanes of road users shall be fixible in nature. Tubular marker having height upto 450 mm shall be having 75 mm Reboundable work zone retroreflective sheeting as per ASTM 4956 S2 (Application of Tubular Marker shall be done as per IRC:SP 55:2014)	**each**	**1,093.00**
8.38			**Tubular Marker / Spring post 700 mm (Flexible Bollards)**		
			Providing Tubular marker made up of Polyurethane used to divide opposing lanes of road users shall be fixible in nature. Tubular marker having height 700 mm shall be having 75 mm Reboundable work zone retroreflective sheeting as per ASTM 4956 S2 (Application of Tubular Marker shall be done as per IRC:SP 55:2014)	**each**	**1,214.00**
8.39			**Flagman**		
			Positioning of a smart flagman with a yellow vest and a yellow cap and a red flag 600 x 600 mm securely fastened to a staff 1 m in length for guiding the traffic	**each**	**777.00**
8.40			Supplying and installation of **Flexible Median Marker** (road way indicators, hazard markers) as per IRC 79-2019 for improving median visibility of the road.It shall be made from a combination of tough, high impact resistant engineering thermoplastic material with edge sealed and U shape structure having rebound/ bounce back property having overall height, width and body thickness not less than 180mm, 120mm and 6.5 mm respectively. The reflective sheeting shall be of Type XI Flourescent Yellow as per IRC : 67 and it should be on both	**each**	**353.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			the face. The logo of the manufacturer shall be embossed on either side of the body in the injection molding process . The body of FMM shall bounce back to its original position after 750 numbers of hits using pendulum of 1.8 Kg conforming to ASTM D 256. It shall be fixed by a combination of epoxy adhesive and grouting/Drilling on concrete medians or properly constructed solid medians.		
8.41			Removing & refixing Boundary pillars/Guard stones/KM Stones/200m stones etc in complete manner embedded in Earth excluding painting.	**each**	**66.00**
8.42			**Kerb Stones**		
			Supplying and fixing M15 grade precast cement concrete Kerb stones for Roadway, Sidewalls and gutters fixed with CM 1:3 fixed and finsihed in line as per direction of Engineer in charge. (The cost of PCC shall be paid extra)		
8.42.1			300 x 250 x 100 mm size	**m**	**303.00**
8.42.2			600 x 200 x 100 mm size	**m**	**250.00**
8.42.3			600 x 300 x 150 mm size	**m**	**463.00**
8.42.4			900 x 250 x 150 mm size	**m**	**380.00**
8.42.5			300 x 300 x 100 mm size	**m**	**296.00**
8.42.6			600 x 300 x 100 mm size	**m**	**266.00**
8.42.7			300 x 300 x 150 mm size	**m**	**376.00**
8.42.8			300 x 200 x 150 mm size	**m**	**336.00**
8.43	MoRTH 806		Supplying and Fixing of **Molded Shank Raised Pavement Markers / Cat's Eye** made of polycarbonate and ABS moulded body and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face and shall support a load of 16000 kg tested in accordance to ASTM D 4280 Type H and complying to Specifications of Category A of MORTH Circular No RW/NH/33023/10-97 DO III Dt 11.06. 1997. The height, width and length shall not exceed 50 mm, 100 mm and 102 +/- 2 mm and with minimum reflective area of 13 cm2 on each side and the slope to the base shall be 35 +/- 5 degree. The strength of detachment of the integrated cylindrical shanks, (of diameter not less than 19 +/- 2 mm and height not less than 30+/- 2 mm) from the body is to be a minimum value of 500 Kg. Fixing will be by drilling holes on the road for the shanks to go inside, without nails and using epoxy resin based adhesive as per manufacturer's recommendation and complete as directed by the engineer.The contractor shall submit a two year warranty for satisfactory field performance including stipulated retro-reflectance of the reflecting panel, to the Engineer.	**No.**	**365.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.44	MoRTH 806		Providing and Fixing of **Median Marker** that are made of tough, high impact resistant, injection-molded, thermoplastic body with an isosceles trapezoidal structure of length, width and height not less than 15cm, 10cm and 10cm respectively and thickness not less than 1.8mm, the body structure shall be rounded at its acute angle, all the corners and edges. The plastic used for molding the Median Marker shall have a minimum Notched Izod Impact strength value of 600 J/m at room temperature, when tested in accordance with ASTM D256 and shall retain at least 70% of this value when subjected to accelerated weathering for 1000hrs as per ASTM G155 or UL746C. The logo of the manufacturer shall be embossed on either side of the body in the injection molding process. The Median Marker shall have rectangular-shaped, fluorescent yellow color retro- reflective sheeting of size not less than 8.5cm*8.5cm and with fully reflective micro prismatic cube corners as its retro-reflective elements as per IRC 67 2022 and ASTM D4956 type XI specifications reflectivity values. The retro-reflective sheeting shall be one or both sides of the Median Marker and shall be edge protected with no exposed edges which will prevent edge lifting, vandalism, sheeting damage, etc. The Median Marker shall be fixed by a combination of epoxy adhesive and grouting as per MoRTH specification 806	**No.**	**650.00**
8.45	MoRTH 806		Providing **Vertical Delineator** having wide angle cube corner micro prismatic non metallic reflective sheeting confirming to Type XI of ASTM D4956 -09 with White Color and Red Color combination and having minimum of retro reflective exposed area of 125 Sq CM on top slots and 35 cm2 on bottom slots and no edges shall be exposed for tampering. This tubular delineator shall have a core and shell construction, shell shall be made of tough, high impact resistant, injection-molded, thermoplastic outer body and the inner core shall consist of powder coated or painted Mild steel of minimum thickness 1.0mm.and core-shell structure shall be of height not less than 800 mm above the ground and width not less than 80 mm. The metallic core of the delineator shall extend 300mm beyond the shell length from bottom for installing in the ground. The extended portion shall have slots to insert anchoring rods for enhancing the concrete grip. The logo of the manufacturer shall be embossed on either side of the body in the injection molding process. The engineering thermoplastic used for making the delineator body shall have minimum initial mechanical properties of be fixed by a combination of epoxy adhesive and grouting as per MoRTH specification 806	**No.**	**2,900.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.46	MoRTH 806		Providing and fixing **Steel Pipe delineators** of 100 mm. in diameter and total height of 1300 mm, provided with 2 strips of white retroreflective sheeting of size 50 mm. x 3250 mm. each fixed horizontally and 2 strips of red retroreflective sheeting each having size 50 mm. x 3250 mm. fixed horizontally at top, with M.S. round cap having diameter 11 cm. and wire mesh at top (10 guage thick) and height of wire mesh 15 cm, M.S. hold fast 6 mm thick with 35 cm. in length, fixing the delineators in C.C. 1:4:8 concrete block of size 250 mm. x 250 mm. x 450 mm. with necessary excavation etc. complete.	**No.**	**1,100.00**
8.47			**Preformed Adhesive Tapes as per IRC 67:2022**		
8.47.1			Providing and laying of White Contrast pre-formed patterned pavement tapes on cleaned and dried surface with pre-coated self adhesive, having abrasion resistant high refractive index when tested in accordance with ASTM E170 and skid resistance as per ASTM E 303. Contrast markings shall consist of durable, retroreflective white, pliant polymer materials with durable matte black, non-reflective, pliant polymer borders. The contractor shall produce requisite parameters test certificate from NABL accredited labs.	**m^2**	**8,500.00**
8.47.2			Providing and laying of White pre-formed patterned pavement tapes on cleaned and dried surface with pre-coated self adhesive, having abrasion resistant high refractive index when tested in accordance with ASTM E170 and skid resistance as per ASTM E 303. The contractor shall produce requisite parameters test certificate from NABL accredited labs.	**m^2**	**6,550.00**
		Note	*Cleanliness and dryness of the surface is the most important factor determining adhesion and durability.*		
8.48			**Chevron Boards**		
			Supply and installation of retro- reflective Chevron signboards of 600x450mm made out of cube corner micro prismatic grade sheeting confirming to Type XI standards of IRC:67:2022 & ASTM D 4956-09 specification & fixed over 3 mm thick Aluminium Composite Panel sheet having minimum 0.30 mm thick aluminum skin on both sides & fixed over back support frame of 25x25x 3mm MS angle frame. Supported on 75 mm dia OR 75x75x6mm Mild steel with clear height of not less than 2.1 m from the ground level to the bottom of the Sign board & 60 cm below ground level. The sign post should be painted with one coat of red oxide paint and two coats of synthetic enamel paint of black and white colour with bands of 30 cm height, firmly fixed to the ground by means of foundation with M 20 grade cement, concrete foundation size of 45 cm x 45 cm x 60 cm including cost & conveyance of all materials, equipment,machinery & Labour with all leads and lifts for satisfactory completion of the work as directed by Engineer incharge.	**No.**	**3,586.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.49			**Universal Accessibility Symbol (UAS) as per RPwD Act 2016**		
	RPwD Act 2016		Providing and applying Blue and White coloured Hot Thermo-plastic Road marking paints for marking a 3ft x 3 ft Universal Accessibility Symbol (UAS) in compliance with provision of section 40 of Rights of Persons with Disabilities (RPwD) Act 2016within the parking bay as per the drawings.	**No.**	**1,500.00**
8.50			**Audible Vibratory Profile Edge Line Markings as per IRC 35: 2015**		
	IRC 35-2015		Providing and laying of Profile Edge Line Marking (Audible Vibratory) according to IRC 35 : 2015, Clause 7.7 using		
		a.	Hot applied thermoplastic Road Marking Compound	**m^2**	**1,038.00**
		b.	Cold applied Road Marking Compound	**m^2**	**2,193.00**
		Note	*Raised profile edge lines are for use as an alternative to the edge markings. It is a continuous line marking with ribs across the line at regular intervals. The advantage of ribs is that the vertical edges of the raised ribs are clearly visible above the water film in wet conditions. The other advantage of raised ribs is that they provide audible warning to drivers when vehicle pass over the ribs and produce audible vibrations as warning.Suggested application with 2 mm thick base coat layer above that ribs profile size of length 40 mm x width 140 mm x height 6mm thick (Total 8 mm thick) at the distance of 500 mm between two ribs including reflectorizing glass beads @ 250 g/m2. The minimum and maximum width of raised profile should be 150 mm. The thickness of 8 mm profile should be exclusive of surface applied glass beads. The finished surface to be exclusive of surface applied glass beads. The finished surface to be levelled, uniform and free from streaks and holes, to be applied on edge lines.*		
8.51	IRC 35-2015		**Cold Plastic Paint**		
		a.	Providing and applying Cold plastic paint two component rolled on surfacing material solvent free, high build two pack seamless,tough,skid resistant, material with property of attaining 2mm thickness in single coat application white(or as required colour)based on glass and colour retaining acrylic cross linking resin system for coloured road surfacing including surface cleaning and cost of all material etc. complete. (All inclusive on bitumen or concrete surface) work shall carried out as per IRC 35-2015 clause 2.2)	**m^2**	**1,670.00**
		b.	Providing and applying 3D Cold plastic paint two component rolled on surfacing material solvent free, high build two pack seamless,tough,skid resistant, material with property of attaining 2mm thickness in single coat application white(or as required colour)based on glass and colour retaining acrylic cross link	**m^2**	**2,300.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			ing resin system for coloured road surfacing including surface cleaning and cost of all material etc. complete. (All inclusive on bitumen or concrete surface) work shall carried out as per IRC 35-2015 clause 2.2)		
		Note	** Application areas include Cycle Tracks, Walkways, Bus lanes, Pedestrain crossings, Horizontal road signages.* *Reflectometer testing with minimum threshold values shall be conducted as per table 15 of IRC 35:2015.*		
		c.	Providing and Laying of **Rumble strips** with Two component cold plastic with Primer coating rolled on surfacing material solvent free, high build two pack seamless, tough, skid resistant,for material to give total width of 500 mm and height of 10 mm. Ramp provided to give width of 145 mm, width of ribs to be 55mm laid at C/C distance of 35 mm.For these specialised markings high refractive index glass beads of Ri 1.6 are recommended @ 350g/m2. The finished surface to be levelled, uniform and free from streaks and holes, to be applied on the edge lines, including surface cleaning and cost of all materials etc. complete.	**m^2**	**3,635.00**
8.52	IS 164: 2015		Providing **Water based glossy paint** (Green certified product) to Kerb Stones as per IS 164:2015 technical specifications including cleaning & surface preparation.	**m^2**	**295.00**
8.53	RC 99: 2018		Providing & fixing Polymer rubberised factory made Black & Yellow coloured **Speed retarders/Breakers** with width 350mm & Height 50mm as per IRC 99:2018 with load carrying capacity upto 30t in local streets, parking arena and in areas with speed limit of 20 kmph as per direction of Engineer in-charge.	**m**	**900.00**
8.54	MoRTH 804		Providing and fixing board displaying information, such as 'Name of work, Tender cost, Name of Contractor, Work completion and liability period etc', having rectangular shape of 1.20m x 0.90m size made out 18 gauge (1.25mm) thick mild steel sheet painted with one coat of Zinc chromate stoving primer and two coats of enamel paint on front side and grey stove enamel on back side and border / messages / symbols etc. with approved colour shade paint complete, on M.S.angle of size 35 x 35 x 3 mm frame with properly cross braced M.S. angles of size 35mmx35mmx3mm duly painted including Two M.S. angle iron posts of size 65 mm x 65 mm x 6 mm, 3.65 m long painted with alternate black and white bands of 25 cm width including all fixtures etc.and fixing the boards in 1:4:8 concrete block of size 60 cm x 60 cm x 75 cm including, excavation, refilling, transportation, and labour etc complete. Spec. No. As directed by Engineer in Charge & MoRTH specification 804	**No.**	**9,000.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.55			Providing and fixing RCC name board of size 1.35x0.60x0.04 m fixed in reinforced cement concrete poles of size 0.10x0.10x2.60m in cement concrete M 20 proportion using 20mm and down size graded metal machine mixed with 10mm dia main steel bars and 8mm dia stirpes as shown in drawing. The board shall be provided with 12mm thick cement plaster in cement mortar 1:4 on both the sides. The poles shall be embedded in the ground for a depth of 0.5 m with cement concrete M 10 proportion. The board shall be fixed as per the drawing and at the place indicated by the Engineer in charge of the work. The cost includes excavation, cost of all materials, cost of steel, painting, centering, transportation charges & fixing charges.	**No.**	**5,861.00**
8.56			**Roadway Utilities**		
8.56.1			Providing and laying **Double wall Corrugated HDPE** pipes for Electrical. Telecommunication & Signalling lines having flexibility & anti termite, anti corrosive, good abrasion, fatigue strength & UV resistant and capable of withstanding vehicular traffic and earth loads conforming to IS 16205:2017 as per technical specifications.		
		a.	40mm Outer dia	**m**	**42.00**
		b.	63mm Outer dia	**m**	**95.00**
		c.	110 mm Outer dia	**m**	**200.00**
		d.	200mm Outer dia	**m**	**515.00**
8.56.2			Providing and laying RDSO Certified 1000 (L) x 340 (W) x 230 (H) dimension **Polyolefin Channels** openable type with push fit and slidefit locking arrangement having Mechanical strength > 12 KN capable of withstanding heavy vehicular loads used for covering Signal, Power and Communication cables.	**m**	**2,400.00**
8.57			Supplying & fixing **Composite Fibre Reinforced Polymer (FRP) utility cover** conforming to IS 12592:2002 with sufficient load bearing capacity as per technical specifications.		
		a.	Light Duty Square 400x400 mm with load bearing capacity upto 5t	**No.**	**2,650.00**
		b.	Light Duty Square 450x450 mm with load bearing capacity upto 5t	**No.**	**2,800.00**
		c.	Light Duty Square 600x600 mm with load bearing capacity upto 5t	**No.**	**3,000.00**
		d.	Heavy Duty Square 560x560 mm with load bearing capacity upto 30t	**No.**	**8,000.00**
		e.	Heavy Duty Circular 600 mm with load bearing capacity upto 30t	**No.**	**9,000.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
8.58			Providing and laying Reinforced Cement Concrete pipe light duty NP2 for culverts, roadway utilities& crossingsas per IS 458:2003 in Single row including pointing ends and fixing collars with cement mortar 1:2 including cost of all materials, labour, curing completeas per specifications.		
		a.	300 mm dia	**m**	**853.00**
		b.	450 mm dia	**m**	**1,348.00**
		c.	600 mm dia	**m**	**1,906.00**
8.59			**Safety / Crash Barriers**		
8.59.1	IRC 119: 2015		Providing and erecting W Beam crash Barrier system (MASH TL3/EN1317 H1 complaint) installed by Pile Driving Machine as per MoRTH Circular RW/NH-29023/02/2019-S&R(P&B) dated 01.01.2020. The same should be hot Dip Galvanized as per Indian standard with 550 g/m2 coating on beams and post and all fittings to conform according to IS 1367 and IS 1364.	**m**	**3,696.00**
8.59.2	IRC 119: 2015		Providing and erecting a Thrie Beam crash Barrier (MASH TL4/EN1317 H2 complaint) Installed by Pile Driving Machine as per MoRTH Circular RW/NH-29023/02/2019-S&R(P&B) dated 01.01.2020. The same should be hot Dip Galvanized as per Indian standard with 550 g/m^2 coating on beams and post and all fittings to conform according to IS 1367 and IS 1364.	**m**	**4,554.00**
8.60			**Pedestrian Crossings as per IRC 99-2018**		
8.60.1	IRC 99: 2018		Providing Speed Breakers/Raised pedestrian crossings in Trapezoidal section with 2.5 m Top width and transition length of 0.8 m length and height of 0.1 m as per IRC 99:2018 using **Bituminous Macadam (BM) Gr II and Semi Dense Bituminous Macadam (SDBC) Gr II** for entire formation width & WBM Gr II for Shoulder hump portion only (150 mm thick), completing with road marking paint with applied thermoplastic compound with reflecting glass beeds on bituminous surface and providing 2 Nos. retro reflective traffic signs as per IRC 67 -2022		
		i	Single lane with formation width of 5.75 m.	**No.**	**34,930.00**
		ii	Intermediate lane with formation width of 7.50 m	**No.**	**41,490.00**
		iii	Two lane for formation width of 9.00 m	**No.**	**47,112.00**
8.60.2	IRC 99: 2018		Providing Speed Breakers/Raised pedestrian crossings in Trapezoidal section with 2.5 m Top width and transition length of 0.8 m length and height of 0.1 m as per IRC 99:2018 using **Dense Bituminous Macadam (DBM) Gr II and Bituminous Concrete (BC) Gr II** for entire formation width & WBM Gr II for Shoulder hump portion only (150 mm thick), completing with road marking paint with applied thermoplastic compound with reflecting glass beeds on bituminous surface and providing 2 Nos. retro reflective traffic signs as per IRC 67 -2022		
		i	Single lane with formation width of 5.75 m.	**No.**	**37,970.00**
		ii	Intermediate lane with formation width of 7.50 m	**No.**	**45,454.00**
		iii	Two lane with formation width of 9.00 m	**No.**	**51,869.00**

Cautionary Signboard

Mandatory Signboard

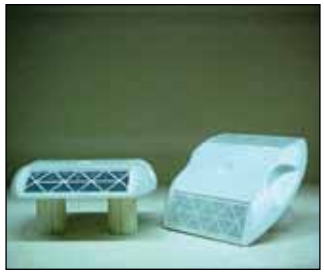
Facility information board

Informatory/Direction Signboards

Over Head Gantry board

Chevron Boards

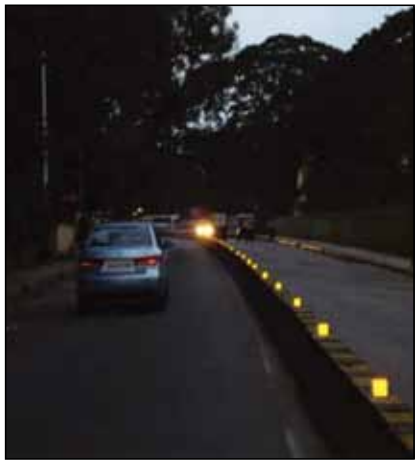
RPM's/Cat Eyes/Road studs

Vertical Delineator


Rigid Median Marker






Flexible Median Marker

Anti Glare Screen

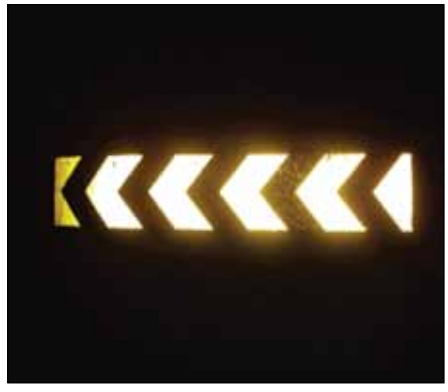
Rumble Strips

Traffic Cones

Standard Delineator

Hybrid Solar Delineator

Aluminum Backed flexible Prismatic Sheeting



Chapter - 9

CROSS DRAINAGE WORKS

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 9 **CROSS DRAINAGE WORKS**		
9.1	2900		**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 .		
		i.	1000 mm dia	**m**	**9,479.00**
		ii.	1200 mm dia	**m**	**10,767.00**
		iii.	1500 mm dia	**m**	**11,098.00**
9.2	2900		**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 .		
		i.	1000 mm dia	**m**	**19,057.00**
		ii.	1200 mm dia	**m**	**21,641.00**
		ii.	1500 mm dia	**m**	**22,416.00**
9.3	IS 18256: 2023		**Solid Round Glass Fibre Reinforced Polymer (GFRP) Bars for Concrete Reinforcement.**		
			Supplying, fitting & placing GFRP (Glass fibre Reinforced Polymer) bars conforming to IRC 137:2022 for structures such as Crash Barriers, Concrete drains, Concrete pavements, Approach slabs as per drawing & technical specification. *(Only GFRP Bars manufactured using Vinyl Ester Resin systems and Glass fibres classified as E-CR or R that meet the requirements of ASTM D578 shall be used.)*	**kg**	**207.00**

Chapter - 10

MAINTENANCE OF ROADS

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 10 **MAINTENANCE OF ROADS**		
10.1	3002		**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	**m^3**	**188.00**
		Note	*Only 75 per cent of fresh material has been provided as 25 per cent can be retrieved at site from earth that is flown down the slope in the form of slurry and deposited at the foot of there in cuts*		
10.2	3003		**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.	**m^2**	**97.00**
10.3	3003		**Maintenance of Earth Shoulder (stripping excess soil)**		
			Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor	**m^2**	**39.00**
		Note	*The earth stripped from earthen shoulders to be dumped on the side slopes locally for disposal.*		
10.4	3004.2		**Filling Pot-holes and Patch Repairs with Open-Graded Premix surfacing, 20mm (using VG-30 Grade Bitumen)**		
			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 510 using HMP 40/60 TPH Capacity compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2	**m^2**	**157.00**
10.5	3004.2		**Filling Pot-holes and Patch Repairs with Bituminous concrete, 40mm (using VG-30 Grade Bitumen)**		
			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 using HMP 40/60 TPH Capacity compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2	**m^2**	**426.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
10.6	3004.3.3		**Crack Filling**		
			Filling of crack using slow - curing bitumen emulsion and applying crusher dust in case crack are wider than 3mm.	**m**	**5.00**
10.7	3004.4		**Dusting**		
			Applying crusher dust to areas of road where bleeding of excess bitumen has occurred.	**m^2**	**3.00**
10.8	3005.1		**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	**m**	**389.00**
10.9	3005.2		**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	**m**	**64.00**
10.10	3000		**Hill Side Drain Clearance**		
			Removal of earth from the choked hill side drain and disposing it on the valley side manually	**m**	**74.00**
10.11	3000		**Land Slide Clearance in soil**		
			Clearance of land slides in soil and ordinary rock by dozer and disposal of the same on the valley side	**m^3**	**669.00**
		Note	*Land 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 m^3 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.*		
10.12	3000		**Landslide Clearance in Hard Rock Requiring Blasting**		
			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.	**m^3**	**122.00**
		Note	*Credit for the rock if found acceptable as construction material shall be afforded*		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
10.13	811		**Replacement of Metal Beam Crash Barrier**		
			Type - A, "W" : Metal Beam Crash Barrier		
			Replacement of "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	**m**	**2,963.00**
10.14			**Type - B, "THRIE" : Metal Beam Crash Barrier**		
			Replacement of "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	**m**	**3,601.00**
10.15			**Patching of Potholes**		
		(i)	**Patching of Shallow Potholes using SDBC Gr II 25 mm thick**		
			Patching of shallow potholes on asphalt surfaces by using Semi Dense Bituminous Concrete 25mm thickness. The Cost is inclusive of removing the failed materials & cleaning on the road surface, preparation of potholes to the required standards sizes before patching them and application of tack coat at 0.20 kg/ m2 over the asphalt surface including lead, loading unloading, rolling and finishing etc., complete as per specification.	**m^2**	**263.00**
		(ii)	**Patching of Deep Potholes using WBM Gr l & SDBC Gr lI 25 mm thick:**		
			Patching of Deep Potholes 75mm thick by restoring the Granular Base course using material confirming to WBM Grade -I with 1ype Sereenings standards wherever necessary by manual means including trimming the pothole to the required shape and size, cleaning the pothole, applying Prime Coat (SS1) at 0.70 kg per m2 over the WBM surface and covering the surface with SDBC 25mm thick including lead, loading unloading, rolling and finishing etc., complete as per specification.	**m^2**	**497.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		(iii) **Cold Bituminous Pothole Patching Mix**		
	IRC 116-2014	Supplying, Placing & Compacting Ready Made Plant mixed Cold Bituminous Pothole patching mix in accordance with IRC 116-2014 in 50kgs plastic sturdy bags. The mix shall contain at least 5.6% MC 800 Cutback Bitumen conforming to IS 217 Specification and suitable anti-stripping agent @ 0.3% by weight. The mix shall be workable for at least 6 months. The material shall be intended for patching potholes up to 40mm thick layers and for deeper potholes, the mix shall be placed and compacted in 40mm thick layers complete as per technical specifications.	**kg**	**17.00**
		Note *1) The mix contains volatile Kerosene and sealed bags shall not be stored in closed building or Warehouse. Properly ventilated place is preferred.* *2) No open flame or smoking shall be permitted near the stored mix.* *3) The mixed material should not be stockpiled not higher than 1.5 m for the first 48 hours.* *4) If the pothole is about 75 mm or less in depth, all mix can be placed in one lift (layer) and compacted. If the pothole is deeper than 75 mm, then the mix should be placed in layers. Each layer should not exceed about 75 mm and should be compacted adequately with hand-held rammer before placing the next layer.* *5) If the pothole is very deep and it is desired to economize on the use of readymade patching mix, it can be done as follows. Clean the pothole and spray a thick film of MC30 cutback bitumen at the bottom as a tack coat. Place graded aggregate of 50 mm maximum size in the pothole and compact it well in layers. Spray another tack coat of MC-30 on compacted aggregate. Place and compact at least 75 mm of the readymade pothole patching mix at the top.*		
	IRC SP 100 : 2014	(iv) Supplying, Placing & Compacting instant all weather, all traffic Plant mixed Cold Bituminous Pothole patching mix in plastic sturdy HDPE bags. The mix shall be tailormade with speciality additives & catalysts as per IRC SP 100:2014 and shall have shelf for at least 6 months. The mix shall be intended for atching potholes up to 40mm thick layers without necessity of application of Tack Coat compacted using Rammers complete as per technical specification.		
		(a) Using Bituminous Concrete with NMAS 9.5mm & 40mm thick	**kg**	**18.00**
		(b) Using Semi Dense Bituminous Concrete with NMAS 13.2mm & 25mm thick	**kg**	**16.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		Removing & Resetting		
10.16		Removing & Resetting existing Heavy Duty Cobble/Interlocking stones/Pavers of thickness 60/75/80/100mm using Cement and 40mm thick sand bed (average thickness) and compacting with plate vibrator to achieve final desired compaction & setting of paver to its final level , including cost of materials, labour and usage charges of machinery complete as per specifications. (The cost of new paver/stones required shall be added separately)	**m^2**	**484.00**
10.17		Removing and resetting of precast kerb stones fixed with CM 1:3 fixed and finished in line as per direction of Engineer in charge. (The cost of PCC shall be paid extra)	**m**	**35.00**

BRIDGES

Chapter - 11

FOUNDATION OF BRIDGES

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER-11 FOUNDATION OF BRIDGES		
			WELL FOUNDATION		
11.1	1200		Providing and Constructing Temporary Island 24 m diameter for Construction of Well Foundation for 8m dia. Well.		
		A	Assuming depth of water 1.0 m and height of island to be 1.25 m.	**No.**	**3,05,748.00**
		B	Assuming depth of water 4.0 m and height of island 4.5 m.	**No.**	**13,40,138.00**
		C	Providing and constructing one span service road to reach island location from one pier location to another pier location. Assuming span length 30 m, width of service road 10m and depth of water 1m	**m**	**8,653.00**
11.2	1200 & 1900		Providing and Laying Cutting Edge of Mild Steel weighing 40 kg per metre for Well Foundation complete as per Drawing and Technical Specification.	**t**	**1,37,098.00**
11.3	Section 1200		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.		
11.3.1		A	**Sandy Soil (6 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.50 m/hr)	**m**	**4,832.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.33 m/hr)	**m**	**6,623.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
11.3.2		B	**Clayey Soil (6 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.33 m/hr)	**m**	**6,629.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.17 m/hr)	**m**	**14,620.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.4		C	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Soft Rock (6 m dia well)	**m**	**36,222.00**
11.5		D	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Hard Rock (6 m dia well)	**m**	**40,530.00**
11.6		E	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in rock bouldery strata (6 m dia well)	**m**	**48,691.00**
11.7	Section 1200		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.		
11.7.1		A	**Sandy Soil (7 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.30 m/hr)	**m**	**6,914.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.22 m/hr)	**m**	**8,995.00**
		(iii)	Beyond 10m upto 20m		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.7.2		B	**Clayey Soil (7 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.22 m/hr)	**m**	**8,995.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.17 m/hr)	**m**	**14,207.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.8		C	Extra over item no 12.13 (A) or (B) irrespective of depth for sinking in Soft Rock (7 m dia well)	**m**	**45,849.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
11.9		D	Extra over item no 12.13 (A) or (B) irrespective of depth for sinking in Hard Rock (7 m dia well)	**m**	**49,733.00**
11.10		E	Extra over item no 12.13 (A) or (B) irrespective of depth for sinking in rock bouldery strata (7 m dia well)	**m**	**63,493.00**
11.11	Section 1200		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.		
11.11.1		A	**Sandy Soil (8 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.25 m/hr)	**m**	**8,413.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.20 m/hr)	**m**	**10,203.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.11.2		B	**Clayey Soil (8m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.18 m/hr)	**m**	**10,998.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.17 m/hr)	**m**	**15,216.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.12		C	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Soft Rock (8m dia well)	**m**	**56,669.00**
11.13		D	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Hard Rock (8m dia well)	**m**	**60,275.00**
11.14		E	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in rock bouldery strata (8m dia well)	**m**	**80,285.00**
11.15	Section 1200		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.		
11.15.1		A	**Sandy Soil (9 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.25 m/hr)	**m**	**8,619.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.18 m/hr)	**m**	**11,198.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.15.2		B	**Clayey Soil (9m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.17 m/hr)	**m**	**11,709.00**
		(ii)	Beyond 3 m upto 10 m depth (Rate of sinking = 0.15 m/hr)	**m**	**16,381.00**
		(iii)	Beyond 10 m upto 20 m (Rate of sinking = 0.15 m/hr)		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.16		C	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Soft Rock (9m dia well)	**m**	**68,685.00**
11.17		D	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Hard Rock (9m dia well)	**m**	**71,869.00**
11.18		E	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in rock bouldery strata (9m dia well)	**m**	**99,068.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
11.19	Section 1200		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.		
11.19.1		A	**Sandy Soil (10 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.20 m/hr)	**m**	**9,990.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.17 m/hr)	**m**	**11,909.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.19.2		B	**Clayey Soil (10 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.18 m/hr)	**m**	**13,658.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.15 m/hr)	**m**	**16,808.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.20		C	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Soft Rock (10 m dia well)	**m**	**81,894.00**
11.21		D	Extra over item no 12.16 (A) or (B) irrespective of depth for sinking in Hard Rock (10 m dia well)	**m**	**84,637.00**
11.22		E	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in rock bouldery strata (10 m dia well)	**m**	**1,19,841.00**
11.23	Section 1200		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.		
11.23.1		A	**Sandy Soil (11 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.15 m/hr)	**m**	**19,975.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.13 m/hr)	**m**	**20,155.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.23.2		B	**Clayey Soil (11 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.10 m/hr)	**m**	**22,509.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.08 m/hr)	**m**	**34,761.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.24		C	Extra over item no 12.12 (A) or (B) irrespective of depth for sinking in Soft Rock (11 m dia well)	**m**	**96,298.00**
11.25		D	Extra over item no 12.17 (A) or (B) irrespective of depth for sinking in Hard Rock (11 m dia well)	**m**	**98,578.00**
11.26		E	Extra over item no 12.17 (A) or (B) irrespective of depth for sinking in rock bouldery strata (11 m dia well)	**m**	**1,42,605.00**
11.27	Section 1200		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.		
11.27.1		A	**Sandy Soil (12 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.05 m/hr)	**m**	**47,123.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.038 m/hr)	**m**	**54,483.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.27.2		B	**Clayey Soil (12 m dia. Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.04 m/hr)	**m**	**54,195.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.03 m/hr)	**m**	**82,684.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering of the cost, if required		
		c	Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 5 per cent of cost for dewatering, if required		
		c	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.28		C	Extra over item no 12.18 (A) or (B) irrespective of depth for sinking in Soft Rock (12 m dia well)	**m**	**1,11,896.00**
11.29		D	Extra over item no 12.18 (A) or (B) irrespective of depth for sinking in Hard Rock (1 m dia well)	**m**	**1,13,693.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
11.30		E	Extra over item no 12.18 (A) or (B) irrespective of depth for sinking in rock bouldery strata (12 m dia well)	**m**	**1,67,360.00**
11.31	Section 1200		Sinking of Twin D Type 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.		
			Dimensions of well		
			Overall length = 12 m		
			Overall width = 6 m		
11.31.1		A	**Sandy Soil**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.18 m/hr)	**m**	**10,566.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.17 m/hr)	**m**	**11,428.00**
		(iii)	Beyond 10m upto 20m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		(iv)	Beyond 20m upto 30 m		
		a	Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
		(v)	Beyond 30m upto 40 m		
		a	Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour.		
11.31.2		B	**Clayey Soil (Twin D Type Well)**		
		(i)	Depth below bed level upto 3.0 m (Rate of sinking = 0.16 m/hr)	**m**	**12,710.00**
		(ii)	Beyond 3m upto 10m depth (Rate of sinking = 0.16 m/hr)	**m**	**18,554.00**
		(iii)	Beyond 10 m upto 20 m		
		a	Add 5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b	Add for dewatering @ 5 per cent of cost, if required.		

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		(iv) Beyond 20m upto 30 m		
		a Add 7.5 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b Add 5 per cent of cost for dewatering of the cost, if required		
		c Add 25 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
		(v) Beyond 30m upto 40 m		
		a Add 10 per cent for every additional meter depth of sinking over the rate of sinking for the previous meter		
		b Add 5 per cent of cost for dewatering, if required		
		c Add 20 per cent of cost for Kentledge including supports, loading arrangement and Labour).		
11.32		C Extra over item no 12.19 (A) or (B) irrespective of depth for sinking in Soft Rock (Twin D Type well)	**m**	**69,184.00**
11.33		D Extra over item no 12.19 (A) or (B) irrespective of depth for sinking in Hard Rock (Twin D Type well)	**m**	**73,435.00**
11.34		E Extra over item no 12.19 (A) or (B) irrespective of depth for sinking in rock bouldary srtata (Twin D Type well)	**m**	**99,900.00**
11.35	1200	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 plateforms 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 clause1208.8 of MoRTH Specifications.	**m^3**	**58,565.00**
11.36	1207	Sand Filling in Wells complete as per Drawing and Technical Specifications.	**m^3**	**2581.00**
11.37	1200 & 1900	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.	**t**	**1,25,424.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			Bored cast-in-situ Piles		
11.38	1100 & 1700		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.		
			Pile diameter-750 mm	**m**	**9,227.00**
11.39	1100, 1600 & 1700		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.		
			Pile diameter-1000 mm	**m**	**12,137.00**
11.40	1100 & 1700		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.		
			Pile diameter-1200 mm	**m**	**15,925.00**
11.41	1100 & 1700		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.		
			Pile diameter-1500 mm	**m**	**22,155.00**
			Driven Cast-in-Place Piles		
11.42	1100 & 1700		Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification		
			Pile diameter - 750 mm	**m**	**7,319.00**
11.43	1100 & 1700		Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification		
			Pile diameter - 1000 mm	**m**	**11,247.00**
11.44	1100 & 1700		Driven cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification		
			Pile diameter - 1200 mm	**m**	**16,517.00**
			Driven Pre-Cast Piles		
11.45	1100 & 1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			Pile Diameter = 500 mm	**m**	**4,366.00**
11.46	1100 & 1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		
			Pile Diameter = 750 mm	**m**	**6,653.00**
11.47	1100 & 1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		
			Pile Diameter = 1000 mm	**m**	**10,086.00**
11.48	1100 & 1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		
			Size of pile - 300 mm x 300 mm	**m**	**3,548.00**
11.49	1100 &1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		
			Size of pile - 500 mm x 500 mm	**m**	**5,123.00**
11.50	1100 &1700		Driven precast vertical M35 grade R.C.C. Piles excluding Reinforcement complete as per Drawing and & Technical Specification		
			Size of pile - 750 mm x 750 mm	**m**	**8,272.00**
			Driven Vertical Steel Piles		
11.51	1100, 1900		Section of the pile - H Section steel column 400 x 250 mm (ISHB Series)	**m**	**9,699.00**
11.52	1100 &1900		Section of the pile - H Section steel column 450 x 250 mm (ISHB Series)	**m**	**11,006.00**
11.53			Dismantling of Reinforced Concrete Pile head complete as per drawing and Technical Specification	**m^3**	**1,540.00**

Chapter - 12

SUB-STRUCTURE OF BRIDGES

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 12 **SUB-STRUCTURE OF BRIDGES**		
12.1	2706 & 2200		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 foce. Complete as per drawing and Technical Specifications	**m**	**138.00**
			Note *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.* *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.*		
12.2	2706 & 2200		Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with PVC Pipe 110mm outer dia at 2 kg per m^2, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical Specifications	**m**	**239.00**
12.3	710.1.4.of IRC:78 & 2200		Back filling behind abutment, wing wall and return wall complete including compaction as per drawing and Technical Specification		
		A	**Granular material**	**m^3**	**1,168.00**
		B	**Sandy material**	**m^3**	**3,049.00**
12.4	710.1.4.of IRC:78 and 2200		Providing and laying of Filter media with granular materials/ stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH 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.	**m^3**	**2,677.00**
12.5	2000, 1000 & 2200		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 MoRTH specifications complete including all accessories as per drawing and Technical Specifications.	**Each tonne bearing capacity**	**389.00**
12.6	2000, 1000 & 2200		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 MoRTH specifications complete including all accessories as per drawing and Technical Specifications.	**Each tonne bearing capacity**	**23.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
12.7	2000 & 2200		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 MoRTH Specifications.	**tonne bearing capacity**	**1,182.00**
12.8	2000 & 2200		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 MoRTH specifications complete including all accessories as per drawing and Technical Specifications.	**cc**	**0.67**
12.9	2000 & 2200		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.	**tonne bearing capacity**	**1,194.00**
12.10	2000 & 2200		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.	**tonne bearing capacity**	**329.00**
12.11	Sugg		**Protection to sub structure by using coal tar epoxy**		
			Providng and applying two coats of Two component, high build, 100% solid content, low VOC., polycyclin aromatic hydro carbon based, Pot life - 2 hours @ 72 deg.F, Tack free - 4.6 hrs, DFE percent 80 - 120 microns (dry) coal tar epoxy coating with Coal tar	**m^2**	**194.00**
12.12			Providing structural steel for sub-structure complete as per drawing and technical specification	**t**	**1,67,741.00**

Chapter - 13

SUPER-STRUCTURE OF BRIDGES

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER-13 **SUPER-STRUCTURE OF BRIDGES**		
13.1	1800		High tensile steel wires/strands including all accessories for stressing, stressing operations and grouting complete as per drawing and Technical Specifications	**t**	**2,34,217.00**
13.2	2702	A	Providing and laying Cement concrete wearing coat M-30 grade including reinforcement complete as per drawing and Technical Specifications. (Batching Plant)	**m^3**	**13,971.00**
13.3	515 & 2702		**Mastic Asphalt**		
			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 0.005 m^3 per 10 m^2 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 515.	**m^2**	**500.00**
13.4	2703, 1500, 1600 & 1700	A	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, c/c 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.	**m**	**2,329.00**
13.5	2703, 1500, 1600 & 1700	A	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.	**m**	**2,264.00**
13.6	2703.2 & 1900		Providing, fitting and fixing mild steel railing complete as per drawing and Technical Specification	**m**	**4,428.00**
13.7	2705		Drainage Spouts using 100 mm GI pipe complete as per drawing and Technical specification	**No**	**3,271.00**
13.8	2700		PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification	**m^3**	**6,811.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
13.9	1500, 1600, 1700 & 2704		Reinforced cement concrete M30 grade for approach slab including reinforcement and formwork complete as per drawing and Technical specification (Batching Plant)	**m^3**	**11,835.00**
13.10	1600		Providing **Fusion Bonded Epoxy Coating (FBEC)** to TMT Bars as per IS:13620-1993 specifications for a thickness of 175micron & permissible variation of 50micron including testing of coating. FREQUENCY OF TEST OF FUSION BONDED EPOXY COAT a)Coating thickness shall be tested at a frequency of not less than one full length bar every twenty bars for each size b) Continuity of coating shall be determined by testing one full length bar in every twenty bars for each size c) Coating thickness over the whole of the coated bar section shall be determined by sectioning and examining one bar in every 20t for each size. d) For testing adhesion of coating, samples shall be selected from a ch size according to the frequency given as: For all types of bar : Minimum 1 for every diameter or as directed by engineer in charge. (The item is to be operated with prior approval of Superintending Engineer)		
			8 mm	**t**	**19,000.00**
			10 mm	**t**	**15,000.00**
			12 mm	**t**	**13,000.00**
			16 mm	**t**	**10,000.00**
			20 mm	**t**	**8,500.00**
			25 mm	**t**	**7,250.00**
			32 mm	**t**	**5,750.00**
13.11	1800 & 2300		**Precast - pretensioned Girders**		
			Providing, precasting, transportation & placing in position pretensioned concrete girders M40 grade as per drawing & technical specifications.The cost is inclusive of : i) Cost of Concrete, Steel , Strands & HDPE pipes ii) Cutting, Bending & making reinforcement cage iii) Cable cutting & threading in position including binding by insulation tape with HDPE pipes etc prestressing & cutting of extra length of HT Strand after de-stressing iv) Steam curing & manual curing v) Handling & transportation of precast girder upto height 5m, stacking in stockyard and placement of girders in position over pier caps including placement of sand jacks, channel and levelling.	**m^3**	**32,274.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
13.12	1700 & 1800		Providing and fixing Helical pipes in voided concrete slabs	**m**	**544.00**
13.13	811		**Crash Barrier for Bridges**		
			Provision of an Reinforced cement concrete crash barrier at the bridge deck & approaches to bridge structure, constructed withReinforced cement concrete with TMT reinforcement conforming to MORT&H specificatios and as per details given in IRC-5 including dowel bars, 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board etc, 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 and approved drawing and at locations directed by the Engineer, all as specified		
		A	Crash Barrier for Bridges (Height 950 mm) as per details given IRC-5 (fig-1) (Area 0.254 m^2 for 1 m length)	**m**	**4,168.00**
		B	Crash Barrier for Bridges (Height 1100 mm) as per details given IRC-5 (fig-2) (Area 0.298 m^2 for 1 m length)	**m**	**4,870.00**
		C	Crash Barrier for Bridges (Height 1550 mm) as per details given IRC-5 (fig-2) (Area 0.514 m^2 for 1 m length)	**m**	**8,389.00**
			Note : *IRC-5 : 2015 shall be followed for reference figures.*		
13.14	800		**Painting on concrete surface**		
			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 m^2.	**m^2**	**84.00**
13.15	2605		**Filler joint**		
		(i)	Providing & fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawing & Technical Specification.	**m**	**2,790.00**
		(ii)	Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing & Technical Specification.	**m**	**137.00**
		(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.	**m**	**231.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
		(iv)	Providing and filling joint sealing compound as per drawings and technical specifications with coarse sand and 6 per cent bitumen by weight	**m**	**48.00**
13.16	2600		**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.	**m**	**1,795.00**
13.17	2606		**Elastomeric Slab Steel Expansion Joint**		
			Providing and laying of an elastomeric slab steel 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 2606 of MoRTH specifications for road & bridge works.	**m**	**15,209.00**
13.18	2600		**Compression Seal Joint**		
			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.	**m**	**18,898.00**
13.19	2607		**Strip Seal Expansion Joint**		
			Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 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.	**m**	**14,291.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
13.20	2600		**Modular Strip / Box Seal Joint**		
			Providing and laying of a modular strip Box seal expansion joint including anchorage catering to a horizontal movement beyond 70 mm and upto 140mm, 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.	**m**	**6,365.00**
13.21	2600		**Modular Strip / Box Seal Joint**		
			Providing and laying of a modular strip box seal expansion joint catering to a horizontal movement beyond 140mm and upto 210mm, 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.	**m**	**7,840.00**
13.22			**Painting with synthetic enamel paint bridge No. and span arragements.**		
			Painting two coats after fillng the surface with synthetic enamel pant bridge No and span arrangements as per as directed by Engineer.	**Nos**	**237.00**
13.23	1700		Providing structural steel for super-structure complete as per drawng and technical specification	**t**	**1,71,183.00**
13.24			**Acrylic anti-carbonation coating for New Concrete**		
			Providing and Applying Acrylic anti-carbonation coating on concrete surface, which is single component, cold applied, water based acrylic polymer and Specially formulated to Protect RCC substrate that is directly exposed to atmospheric conditions like UV radiation, heavy rain, industrial pollution & carbonation. Apply without any dilution @ 0.25L/m2 in 2 coats to achieve DFT of 225 microns, The coating shall have Confirms in accordance with IRC SP:80-2008, Chloride Ion penetration – Concrete Guard (Coulombs) 575 as per ASTM C 1202 : 2019, SRI value of 104 as per ASTM E 1980 : 19 and Crack bridging ability up to 2mm, including priming the surface with 1 coat diluted with water in the ratio 1:1 spreading @ 0.125 L/m2 as self-priming coat. The finished cost to include surface preparation, treatment of cracks completely as per specification as per the direction of the Engineer In charge.	**m^2**	**326.00**

Chapter - 14

RIVER TRAINING AND PROTECTION WORKS

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 14 RIVER TRAINING AND PROTECTION WORKS		
14.1	2503		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.		
		A	Boulder Laid Dry Without Wire Crates.	**m^3**	**1,912.00**
14.2	2503		**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.	**m^3**	**2,454.00**
		Note	*Readymade woven wire crate rolls have been considered in the rate analysis. In case readymade rolls are not available, GI wire 4mm dia. @ 32 kg per 10 m^2 may be provided. In that case 2 per cent of the cost of GI wire may be added for weaving the wire crates.*		
14.3	2503		**Cement Concrete Blocks (size 0.5 x 0.5 x 0.5 m)**		
			Providing and laying of apron with cement concrete blocks of size 0.5x0.5x0.5 m cast in-situ and made with nominal mix of M-15 grade cement concrete with a minimum cement content of 250 kg/m^3 as per IRC: 21-2000.	**m^3**	**6,368.00**
14.4	2504		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**	**m^3**	**1,912.00**
		B	**Cement Concrete Blocks of size 0.3x0.3 x0.3 m cast in cement concrete of Grade M15**	**m^3**	**6,368.00**
14.5	2504		Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification	**m^3**	**3,036.00**
14.6	700 & 2504		**Geotextile Filter**		
			Laying of a geotextile filter between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching/ cement concrete blocks as well as to allow free movement of water without creating any uplift head on the pitching.	**m^2**	**112.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
14.7	2504.4		**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 of different volumes.		
			Providing & Laying flooring complete over Cement Concrete bedding		
		a	Rubble Stone laid in CM 1:3	**m^3**	**5,899.00**
		b	Cement Concrete Blocks	**m^3**	**8,386.00**
		c	Dry Rubble Flooring	**m^3**	**2,663.00**
14.8	2507.2		**Curtain wall complete as per drawing and Technical specification**		
		a	Stone masonry in cement mortar (1:3)	**m^3**	**5,999.00**
		b	Cement concrete Grade M15	**m^3**	**6,243.00**
		Note	*Other items like excavation for foundation, filling behind wall, filter media, weep holes etc. shall be added separately as per approved design.*		
14.9	2507.2		**Flexible Apron**		
			Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.	**m^3**	**2,049.00**
14.10	2503.3		**Gabion Structure for Retaining Earth**		
			Providing and construction of a gabion 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	**m^3**	**2,447.00**
14.11	2503.3		**Gabion Structure for Erosion Control, River Training Works and Protection works**		
			Providing and constructing gabion 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	**m^3**	**3,695.00**

Sl No	Ref. to MoRT&H : IRC	Description	Unit	Rate ₹
		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.		
		Note *Readymade woven wire crate rolls have been considered in the rate analysis. In case readymade rolls are not available, GI wire 4mm dia. @ 32 kg per 10 m^2 may be provided. In that case 2 per cent of the cost of GI wire may be added for weaving the wire crates.*		
14.12	2503	**Gabion structure for errosion control, River Traning Works and Protection Works**		
		Providing and making gabion structure with mechanically woven Double twisted Hexagonal shaped wire mesh Gabio Boxes as per IS 16014:2012, MORT&H Clause 2500, of required size, Mesh Type 10x12 (D=100 mm with tolerance of (+or-) 2%) Zinc coated, Mesh wire diameter 3.0 mm mechanially edged with partitions at every 1m interval and shall have minimum 10 numbers of openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter 2.2 mm, supplied @ 3% by weight of Gabion boxes, filled with boulders with least dimensions of 200 mm, as per drawing. all complete as per directions of Engineer in charge of work.	**m^3**	**2,826.00**
14.13		**Embankment Erosion Protection using Fine Aggregates Concrete Filled Fabric Foam Mattress system**		
		Laying of fine aggregates concrete grade M30 filled fabric of embankments	**m^2**	**2,926.00**

Chapter - 15

REPAIR AND REHABILITATION

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
			CHAPTER - 15 **REPAIR AND REHABILITATION**		
15.1	2809		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.	**m^2**	**202.00**
15.2	2809		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.	**m^2**	**154.00**
15.3	2807		Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy complete as per Technical Specification	**m^2**	**772.00**
15.4	2800		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	**Nos**	**204.00**
15.5	2806		Sealing of cracks/porous concrete by injection process through nipples/Grouting complete as per Technical Specification.		
		A	Cement Grout	**kg**	**277.00**
		B	Cement Mortar (1:1) Grouting	**kg**	**272.00**
15.6	2800		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.	**m^2**	**7,970.00**
15.7	2803		Sealing of crack / porous concrete with Epoxy Grout by injection through nipples complete as per clause 2803.1.	**kg**	**480.00**
15.8	2804		Applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement complete as per Technical Specification	**m^2**	**527.00**
15.9	2807		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/m^3, strength not less than 25 Mpa and workmanship conforming to clause 2807.6.	**m^2**	**597.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
15.10	2800		Applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete	**m^2**	**445.00**
15.11	2805		Epoxy bonding of new concrete to old concrete	**m^2**	**771.00**
15.12	2810		Providing external prestressing with high tensile steel wires/ strands including drilling for passage of prestessing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification Span assumed: 25 m, No. of Cables : 4 Nos., No. of anchorages : 8 No.	**t**	**54,1047.00**
15.13	2810		Providing external prestressing with high tensile steel wires/ strands including drilling for passage of prestessing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification Span assumed: 50 m, No. of Cables : 4 Nos., No. of anchorages : 8 No.	**t**	**42,9901.00**
15.14	2810		Providing external prestressing with high tensile steel wires/ strands including drilling for passage of prestessing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and Technical Specification Span assumed: 100 m, No. of Cables : 6 Nos., No. of anchorages : 12 No.	**t**	**3,92,526.00**
15.15	2808		Replacement of Bearings complete as per Technical Specification	**Nos**	**1,09,966.00**
15.16	2808		Rectification of Bearings as per Technical Specifications	**Nos**	**2,1306.00**
		Note	*The rectification of 3 Bearings included in this analysis are on same side of the span.*		
15.17			Replacement of Expansion Joints complete	**m**	**3,154.00**
		Note	*The rate for the installation of new expansion joints may be taken from chapter on superstructure. Broken concrete will have to be replaced which has been included in this analysis.*		
15.18			Replacement of Damaged Concrete Railing.	**m**	**533.00**
		Note	*The rate for the provision of new railing may be adopted from chapter on Superstructure.*		
15.19			Replacement of Crash Barrier.	**m**	**972.00**
		Note	*The rate for the construction of new Crash Barrier may be adopted from Chapter 8.*		
15.20			Replacement of Damaged Mild Steel Railing	**m**	**445.00**

Sl No	Ref. to MoRT&H : IRC		Description	Unit	Rate ₹
15.21			**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.	**m**	**336.00**
15.22			**Repair of RCC Railing**		
			Carrying out repair of RCC M30 railing to bring it to the original shape.	**m**	**222.00**
15.23			**Repair of Steel Railing**		
			Repair of steel railing to bring it to the original shape	**m**	**422.00**

RURAL ROADS AND BRIDGES

Chapter - 16

PANCHAYATH RAJ ENGINEERING DEPARTMENT ITEMS

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		CHAPTER - 16 **PANCHAYATH RAJ ENGINEERING DEPARTMENT ITEMS**		
		LOADING, UNLOADING, CARRIAGE CRUSHING OF MATERIALS AND SETTING OUT		
16.1		**Loading, Unloading and Stacking of Bricks by Manual Means**		
(i)		Loading of Bricks by manual means including a lead upto 30 m	**1000 Nos.**	**402.00**
(ii)		Unloading and Stacking of Bricks by manual means including a lead upto 30 m	**1000 Nos.**	**402.00**
16.2		**Loading and Unloading of Bitumen Drums by Manual means**		
(i)		Loading of Bitumen Drums by manual means including a lead upto 30 m	**t**	**353.00**
(ii)		Unloading of Bitumen Drums by manual means including a lead upto 30 m	**t**	**324.00**
16.3		**Loading and Unloading of Timber by Manual means**		
(i)		Loading of Timber by manual means including a lead upto 30 m	**t**	**524.00**
(ii)		Unloading of Timber by manual means including a lead upto 30 m	**t**	**524.00**
16.4		**Loading and Unloading of C.C Blocks, Kerb, etc**		
(i)		Loading with care C.C. Blocks, km Stone, 200 m Stone, Boundary Pillar, Kerb, Channel, Bond Stone, etc. by manual means including a lead upto 30 m	**m^3**	**782.00**
(ii)		Unloading with care C.C. Blocks, km Stone, 200 m Stone, Boundary Pillar, Kerb, Channel, Bond Stone, etc. by manual means including a lead upto 30 m	**m^3**	**782.00**
16.5		**Loading and Unloading of Hume pipe**		
(i)		**Loading of RCC Hume pipes by mechanical means including a lead upto 30 m**		
a.		1000 / 1200 mm dia Hume pipe	**No.**	**145.00**
b.		750 mm dia Hume pipe	**No.**	**87.00**
C.		600/450 mm dia Hume pipe	**No.**	**62.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
(ii)		**Unloading of RCC Hume pipe by manual means including a lead upto 30 m**		
A.		1000/1200 mm dia RCC Hume pipes	**No.**	**904.00**
a.		750 mm dia Hume pipe	**No.**	**753.00**
b.		600/450 mm dia Hume pipe	**No.**	**565.00**
(iii)		**Unloading of RCC Hume pipes by mechanical means including a lead upto 30 m**		
a.		1000/1200 mm dia Hume pipe	**No.**	**104.00**
b.		750 mm dia Hume pipe	**No.**	**62.00**
c.		600/450 mm dia Hume pipe	**No.**	**44.00**
		EARTHWORK, EROSION CONTROL AND DRAINAGE		
16.6		**Stripping, Storing and Relaying Top Soil from Right-of-Way (R.O.W)**		
		Stripping, storing and preservation of top soil by keeping it damp in stock piles and keep wet till it is used by road side at 15 m internal and re-application on embankment slopes, cut slopes and other areas in localities where the available embankment material is not conducive to plant growth as per Technical Specification Clause 302.3.2	**m^3**	**739.00**
16.7	**302.3.2**	**Stripping, Storing and Relaying Top Soil from Borrow Areas in Agricultural Fields**		
		Stripping of top soil from borrow areas located in agriculture fields, storing at a suitable place, spreading and relaying after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels to the satisfaction of the farmer/land owner as per Technical Specification Clause 302.3.2.	**m^3**	**318.00**
16.8	**307**	**Surface Drains in Soil**		
		Construction of unlined surface drains of average cross-sectional area 0.40 m2 in soil to specified lines, grades, levels and dimensions. Excavated material to be used in embankment with a lift upto 3m and lead of 50 m (average lead 25 m) as per Technical Specification Clause 307.		
a.		**Manual Means**	**m**	**148.00**
b.		**Mechanical Means**	**m**	**25.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
16.9	**307**	**Surface Drains in Ordinary Rock**		
		Construction of unlined surface drain of average cross-sectional area 0.4 m2 in ordinary rock to specified lines, grades, levels and dimensions as per approved design and Technical Specification. (Excavated material to be used in embankment at site.)		
a.		**Manual Means**	**m**	**222.00**
b.		**Mechanical Means**	**m**	**53.00**
16.10	**401**	**Granular Sub-base - Grading III**		
		Construction of Granular Sub-Base by Mix in Place Method by providing well graded Gravel, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification.	**m^3**	**1,427.00**
		BASES AND SURFACE COURSES (BITUMINOUS)		
16.11	**507**	**Mix Seal Surfacing**		
		Providing, laying and rolling of Close-Graded Premix Carpet (OGPC) surfacing material by Manual Means of 20 mm thickness composed 13.2 mm to 0.9 mm (Type-B) aggregates using **VG30** bitumen 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 three wheel 8-10 kN static roller and finishing to required level and grades as per Technical Specification.	**m^2**	**227.00**
16.12	**508**	**Open-Graded Premix Carpet using Bituminous (VG-30)**		
		Providing, laying and rolling of Open-Graded Premix Carpet by Manual Means of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using VG-30 grade bitumen 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 three wheel 80-100 kN static roller capacity, finished to required level and grades to be followed by seal coat as per Technical specification.	**m^2**	**180.00**
16.13	**508**	**Seal Coat**		
		Providing and laying Seal Coat using VG30 Bitumen by Manual means by sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type B as per Technical Specification.	**m^2**	**62.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		CEMENT CONCRETE PAVEMENT		
16.14	**1502**	**Roller Compacted Concrete Pavement**		
		Construction of Roller Compacted Concrete Pavement (RCCP) with coarse and fine aggregates conforming to IS:383:2016, the size of coarse aggregate not exceeding 25 mm with minimum aggregate cement ratio of 5:1 and with minimum cement content of 310 kg/m3, aggregate gradation to be as per Table 1500.3. After blending, mixing in concrete mixer at optimum moisture content, transporting to site, laying with wheel barrows or steel pans or with mechanical paver, compacting with 80-100 kN smooth wheel, tandem vibratory roller, to achieve, the designed flexural strength, finishing and curing as per drawings and Technical Specification.	**m^3**	**7,203.00**
		PIPE CULVERTS		
16.15	**1101.6**	**Providing and Laying Reinforced Cement Concrete Pipe NP3 as per design in Single Row**		
		Providing and laying reinforced cement concrete pipe NP3 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 Clause 1101.6.		
a.		1200mm dia	**m**	**8,425.00**
b.		1000mm dia	**m**	**7,958.00**
c.		750 mm dia	**m**	**3,335.00**
16.16	**1101.6**	**Providing and Laying Reinforced Cement Concrete Pipe NP3 as per Design in Double Row**		
		Providing and laying reinforced cement concrete pipe NP3 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 as per Clause 1101.6.		
a.		1200 mm dia	**m**	**16,992.00**
b.		1000 mm dia	**m**	**16,007.00**
c.		750 mm dia	**m**	**6,669.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
16.17	**1101.6**	Laying Cement Concrete Pipe NP3 (burried conduits) of 500mm dia on first class bedding of granular material including fixing collar with cement sand mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonary work in head wall and parapets	**m**	**2,592.00**
		MAINTENANCE OF ROADS		
16.18	**1907**	**Maintenance of WBM Road**		
		Maintenance of WBM road including filling up of pot holes, ruts and rectifying corrugated surface, damaged edges and ravelling as per technical specification Clause 1907.	**m^2**	**307.00**
16.19	**1908**	**Maintenance of Drains**		
		The maintenance of drains include erosion, repair, clearing, cleaning, reshaping, regrading, deepening of side drains as well as catch water drains as per technical specification Clause 1908.	**m**	**6.00**
16.20	**1909**	**Maintenance of Culverts**		
(i)		Maintenance of Hume pipe Culvert by way of Clearing, Cleaning, Erosion repair, repairs to cracks, parapet wall and protection work as per drawing and technical specification Clause 1909	**No**	**2,047.00**
		Maintenance of Culverts Slab type		
(ii)		Maintenance of Slab type Culverts by way of clearing, Cleaning, Erosion repair, repairs to cracks, parapet walls and Protection works as per drawing and technical specification.	**No**	**4,331.00**
16.21	**1910**	**Maintenance of Causeway**		
		Maintenance of Causeway by way of minor Surface repairs, replacing Guide Posts, repair of flood gauges, removal of debris, providing boulders and protection work and painting as per technical specification.	**m**	**103.00**
16.22	**1911**	**Maintenance of Road Signs**		
		Maintenance of road signs by way of cleaning and repainting of mandatory / requlatory / cautionary / informatory and place identifications sign board as perdrawings and technical specification.	**km**	**1,984.00**
16.23	**1912**	**Maintenance of Steel and RCC Railing**		
(i)		Repair of steel railing to bring it to original shape cleaning and repainting as per drawing and technical specification.	**m**	**322.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
(ii)		Repair of RCC railing to bring it to the original shape, cleaning and repainting as per drawings and technical specification.	**m**	**1,996.00**
16.24	**1913**	**Maintenance of 200 m and km stones**		
		Maintenance of 200 m & km stones by way of refiting of tilted stones repairing with cement mortar, cleaning, repairing and lettering on 200 m & km stone and 5th km stone as per drawing and technical specification.		
(i)		**Painting two coats with synthetic enamel paint**	**km**	**206.00**
(ii)		**Printing letters and figures of any shade with synthtic enamel paint of any approved colour to give an even shade**	**km**	**1,135.00**
16.25	**1915**	**Cutting of branches of trees shrubs and trimming of grass and weeds**		
(i)		Cutting of branches of trees and shrubs from the road way or with in R.O.W including disposal of wood and leaves to suitable location as per technical specification.	**No**	**226.00**
(ii)		Cutting of shrubs from the road way or with in R.O.W and disposal of shrubs to suitable locations as per technical specifications.	**each**	**15.00**
(iii)		Trimming of grass and weeds from the shoulders/berms and disposing off the same to suitable locations as per technical specifications.	**m^2**	**5.00**
16.26	**1916**	**White washing of parapet walls of CD work and tree trunks**		
		White washing two coats on parapet walls and tree trunks including preparation of surface by cleaning scraping etc. as per technical specifications.	**m^2**	**27.00**
		OTHER ITEMS (CC Pavement, PMGSY Boards & Innovative Technology)		
16.27	**1501**	Providing and constructing un-reinforced plain cement concrete pavement, thickness as per design, over a prepared sub base, with 43 grade cement or any other type as per Clause 1501.2.2 M20 (Grade), coarse and fine aggregates conforming to IS:383:2016, maximum size of coarse aggregate not exceeding 25 mm, mixed in a concrete mixer of not less than 0.2 cum capacity and appropriate weigh batcher using approved mix design, laid in approved fixed side formwork (steel channel, laying and fixing of 125 micron thick polythene film, wedges, steel plates including levelling the formwork as per drawing), spreading the concrete with shovels, rakes, compacted using needle, screed and plate	**m^3**	**6,374.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		vibrators and finished in continuous operation including construction joints, , primer, sealant , curing of concrete slabs for 14-days, and water finishing to lines and grade as per drawing and technical specification clause 1501 with all lead, lifts, loading & unloading charges, cost and conveyance of all materials, labour, equipments etc., complete. as per the directions of the Engineer-in-charge of the work.		
16.28	**1501**	Providing and constructing un-reinforced plain cement concrete pavement, thickness as per design, over a prepared sub base, with 43 grade cement or any other type as per Clause 1501.2.2 M30 (Grade), coarse and fine aggregates conforming to IS:383:2016:, maximum size of coarse aggregate not exceeding 25 mm, mixed in a concrete mixer of not less than 0.2 cum capacity and appropriate weigh batcher using approved mix design, laid in approved fixed side formwork (steel channel, laying and fixing of 125 micron thick polythene film, wedges, steel plates including levelling the formwork as per drawing), spreading the concrete with shovels, rakes, compacted using needle, screed and plate vibrators and finished in continuous operation including construction joints, primer, sealant, curing of concrete slabs for 14-days, and water finishing to lines and grade as per drawing and technical specification clause 1501 with all lead, lifts, loading & unloading charges, cost and conveyance of all materials, labour, equipments etc., complete. as per the directions of the Engineer-in-charge of the work.	**m^3**	**6,754.00**
16.29	**1701**	**Providing and Fixing 'Logo' of PMGSY Project**		
		Providing and fixing of typical PMGSY informatory sign board with Logo as per MORD specifications and drawing. i) The board will be a composite unit consisting of three plates of Aluminium Composite Materials (ACM), material specifications as per Clause 1701.3.7. The top most platewill be in diamond shape of 600mm x 600 mm size, riveted over welded M.S. angle iron frame of 25 mm x 25mm x 5 mm size on back on edges. The middle plate will be 1200 mm x 150 mm size riveted over welded M.S. angle iron frame of 25mm x 25mmx 5 mm size on back on edges. The main lower most plate will be 1500 mm x 600 mm size, riveted over welded M.S. angle iron frame of 25 mm x 25 mm x 5 mm size. Welding of all the sheets over angle iron frame will be done neatly to have plain surface on one side. The angle iron frames of the lower most plate and the middle plate will be welded to two nos. 75 mm x 75 mm (12 SWG) sheet tubes posts placed at 1125 mm apart centre to centre. The top of the middle plate will be flushed with the top of 75 mm dia medium steel tube posts and these posts will be embedded in cement concrete		

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		M15 grade blocks of 450 mm x 450 mm x 600 mm below ground level. The height of bottom of the lower most plate will be 1200 mm from normal ground level and the bottom of middle plate will be 100 mm above the top level of the lower most plate. The diamond shaped plate mounted over angle iron frame will be connected to middle plate by square medium steel section of 47 mm x 47 mm thickness 12 SWG having a spacing of 100 mm between the diamond shaped plate and middle plate and this square section will be welded to the bottom point of the diamond shaped plate. (ii) The lettering and borders, etc. of middle and bottom plate, PMGSY logo on top plate shall be as per clause 1701.4.6 essages/Borders. All the sections of frame and posts will be painted with primer and two coats of Epoxy paint. The steel tube below ground level will be painted with three coats of Epoxy paint. The design, painting and lettering shall be done as per approved drawing. (iii) For warranty and durability the clause 1701.5 and for maintenance the clause 1911 shall be applicable. (iv) A reference number along with the month and year of installation should be placed on the back of a sign in a contrasting colour or by stamping in characters not exceeding 50 mm in height.485777/2019/Dir(Tech) 7		
		Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1	**No**	**15,352.00**
		Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3	**No**	**15,933.00**
16.30		**Providing and Fixing 'Logo Board ' of PMGSY at Starting Point**		
		Providing and fixing of typical Logo board as per specifications and drawing. Two ACP Sheet of 3mm thick, top and Bottom plate duly welded/bolted with MS Square angle 25mm x25mmx 5mm size on back and on the edges. The Top and Bottom plate will be welded/ bolted to 1 nos75x75x6 mm square Hallow section duly embedded in cement concrete M15 Grade of 600*600*600 mm, 450 mm below ground level.Retro-Reflecting Sheet as per IRC:67 Clause 1701.3.8.1 fixed over aluminium sheeting.All sections of steel tube will be painted with primer and two coats of epoxy paint as per drawing.		
a.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1**	**No**	**10,271.00**
b.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3**	**No**	**10,549.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
16.31	**1701**	**Providing and Fixing 'Logo Board ' of PMGSY at Intermediate Point**		
		Providing and fixing of typical Logo board as per specifications and drawing. Two ACP Sheet of 3mm thick, top and Bottom plate duly welded/bolted with MS Square angle 25mm x25mmx 5mm size on back and on the edges. The Top and Bottom plate will be welded/ bolted to 1 nos75x75x6 mm square Hallow section duly embedded in cement concrete M15 Grade of 600*600*600 mm, 450 mm below ground level.Retro-Reflecting Sheet as per IRC:67 made of encapsulated lens type reflective sheeting vide Clause 1701.2.3 fixed over aluminium sheeting.All sections of steel tube will be painted with primer and two coats of epoxy paint as per drawing.		
a.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1**	**No**	**9,673.00**
b.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3**	**No**	**9,889.00**
16.32	**1701**	**Providing and Fixing 'Citizen Information Board A"**		
		Providing and fixing of typical 'Citizen Information Board A" as per specifications and drawing. Two ACP Sheet of 4mm thick having minimum 0.25mm thick aluminum skin both sides and fixed over a back support of Ms plate of 5mm thick. Supported on frame post of 2 no's of MS Suare hallow section 75mmx75mmx6mm which is duly embedded in cement concrete M20 Grade of 600x600x750mm,600mm below ground level.All MS will be stove enameled on both the sides. All sections of framed posts,MS sheet and Stell tubes will be painted with primer and two coats of epoxy paint as per drawing etc..Retro-Reflective Sheet as per IRC 67 fixted over a two no's of Aluminum composite material(ACP) sheeting of size 900x750mm of 4mm thick duly bolted/reveted with MS plate of 5mm thick on backside of ACP Sheet.Including cost and conveyance of all materials,equipment,machinery and labour with all leads and lifts,loading charges charges necessary for satisfactory completion of work as per directed by engineer incharge. (i) For warranty and durability the clause 1701.5 and for maintenance the clause 1911 shall be applicable. (ii) A reference number along with the month and year of installation should be placed on the back of a sign in a contrasting colour or by stamping in characters not exceeding 50 mm in height.485777/2019/Dir(Tech) 7		

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
a.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1**	**No**	**21,514.00**
b.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3**	**No**	**21,538.00**
16.33	**1701**	**Providing and Fixing 'Citizen Information Board B"**		
		Providing and fixing of typical 'Citizen Information Board B" as per specifications and drawing. Two ACP Sheet of 4mm thick having minimum 0.25mm thick aluminum skin both sides and fixed over a back support of Ms plate of 5mm thick. Supported on frame post of 2 no's of MS Suare hallow section 75mmx75mmx6mm which is duly embedded in cement concrete M20 Grade of 600x600x750mm,600mm below ground level.All MS will be stove enameled on both the sides.All sections of framed posts,MS sheet and Stell tubes will be painted with primer and two coats of epoxy paint as per drawing etc..Retro-Reflective Sheet as per IRC 67 fixted over a two no's of Aluminum composite material(ACP) sheeting of size 900x750mm of 4mm thick duly bolted/reveted with MS plate of 5mm thick on backside of ACP Sheet.Including cost and conveyance of all materials,equipment,machinery and labour with all leads and lifts,loading charges charges necessary for satisfactory completion of work as per directed by engineer incharge. (i) For warranty and durability the clause 1701.5 and for maintenance the clause 1911 shall be applicable. (ii) A reference number along with the month and year of installation should be placed on the back of a sign in a contrasting colour or by stamping in characters not exceeding 50 mm in height.485777/2019/Dir(Tech) 7		
a.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1**	**No**	**21,480.00**
b.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3**	**No**	**22,033.00**
16.34	**1701**	**Providing and Fixing 'Maintenance Information Board "**		
		Providing and fixing of typical Maintenance information board as per specifications and drawing. ACP Sheet of 3 mm thick having minimum 0.25mm thick aluminum skin both sides and fixed over a back support of Ms plate of 5mm thick. Supported on frame post of 2 no's of MS Square hallow section 75mmx75mmx6mm which is duly embedded in cement concrete M20 Grade of 600x600x750mm,600mm below ground level.All MS will be stove enameled on both the sides. All sections of framed posts, MS sheet and stell		

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		tubes will be painted with primer and two coats of epoxy paint as per drawing etc..Retro-Reflective Sheet as per IRC 67 fixted over a Aluminum composite material(ACP) sheeting of size 900x1500mm of 3mm thick duly bolted/reveted with MS plate of 5mm thick on backside of ACP Sheet.Including cost and conveyance of all materials,equipment,machinery and labour with all leads and lifts,loading charges charges necessary for satisfactory completion of work as per directed by engineer incharge. (i) For warranty and durability the clause 1701.5 and for maintenance the clause 1911 shall be applicable. (ii) A reference number along with the month and year of installation should be placed on the back of a sign in a contrasting colour or by stamping in characters not exceeding 50 mm in height.485777/2019/Dir(Tech) 7		
a.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.1 Class A Type-1**	**No**	**20,435.00**
b.		**Retro Reflective Trafic Sign As per IRC 67 Clause 1701.3.8.2 Class B Type-3**	**No**	**21,837.00**
16.35		**Stabilized Sub base / Base: With Nano Technology**		
		Stabilized Sub-base / Base: Providing, Laying, Spreading and Compacting in-situ/borrow area soil of CBR >5% mixed with 30% 40mm downsize crushed Aggregate. Application: (1) Rip and loosen soil with excavator / tractor operated ripper and scarify with tractor operated rotavator to achieve desired thickness. Mix aggregates as per mix design with rotavator. (2) Spread OPC Cement 3% by weight of soil aggregate mix and mix with tractor operated rotavator. (3) Prepare and apply Chemical (IRC Accreditation)to achieve strength of minimum 4.5mpa mixed in OMC water (<1000 ppm TDS) on loose mix . Scarify the treated mix with rotavator.(4).Compact the stabilized soil-aggregate-cement base with 8 to 10 tonne vibratory roller to achieve the desired density and thickness.Rates include all material, labour, hire charges of machinery etc. as per MoRD specifications, Tri-party agreement,IRC SP:89 2018 & direction of Engineer-in-Charge.	**m^3**	**2,538.00**
16.36		**Cell Filled Cement Concrete Pavement M-30 Grade**		
		Construction of plastic cell filled cement concrete pavement, with M30 gradeconcrete, thickness as per design, over a prepared sub base, with 53 grade Ordinary Portland Cement (OPC) or any other type as per Clause 1501.2.4 M30 (Grade). Coarse and fine aggregates 2386, maximum in a concrete mixer of not less then 0.2 m^3 capacity and appropeiate weigh		

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
		batcher using approved mix design (As perconforming to IS :IRC 44-2088, laid in approved fixed side formwork (steel channe, wedges, steel plates including levelling the fomwork as per drawing),spreading the concrete with sholvels, rakes, conpacted using screed and plate vibrators and finished in continuous operation,Concrete should have a slump of 30-50mm with use of approved plasticizer if required Formwork of plastic cells should be made of High Density Polyethylene (HDPE), sheets having thickness ranging from 0.20-0.22mm with sides 150mm x 150mm and height of 100mm directed by engineer in charge. To be laid in full widfth of the carriageway.Iron spikes of about 200mm long are to be used to keep the cell walls taut. Nylon thread or rope may be used to prevent collase of cells during placement of concrete. Iron spikes to be taken out for use in other place as soon as the concrete is in place.The subbase should be provided with concrete/stone block or brick on edge on either side of the carriageway protecting the subbase with full thickness of the concrete poavement for its confinement and protection. curing of concrete slabs for 14 - days, curing compound (where specified) and water finishing to lines and grade as per drawing and Technical Specification of cell filled Concrete Pavement Published by NRRDA. as per drawing and technical specification clause 1501 (Adopting cement 350 kg/m^3)	**m^2**	**811.00**
16.37	**508**	**Mix Seal Surface (MSS) using 8% Waste Plastic**		
		Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 13.2 mm to 0.9 mm (Type-B) aggregates using VG-30 Bitumen (with addition of processed waste plastic of Up to 8 % Replaced by weight of bitumen) 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 wheel Roller and finishing to required level and grades as per Morth Technical Specification.	**m^2**	**166.00**
16.38	**508**	**Open Graded Premix Carpet (OGPC) using 8% Waste Plastic**		
		Providing, laying and rolling of Open-Graded Premix Carpet of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using VG-30 Bitumen (with addition of processed waste plastic @ 8 % replaced by weight of bitumen) 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 wheel Roller and finishing to required level and grades as per MoRTH Technical Specification.	**m^2**	**141.00**

Sl No	Ref. to MoRD : IRC	Description	Unit	Rate ₹
16.39.1	**502**	**Primer coat on Stabilized Soil surface.**		
		Providing and applying primer coat with bitumen emulsion **(SS-1)** conforming to IS 8887 on prepared surface of stabilized soil including cleaning of surface and spraying primer at the rate of 1.0 kg/m2 using mechanical means as per Technical Specification.	**m^2**	**92.00**
16.39.2		Providing and applying primer coat with bitumen emulsion **(SS-2)** on prepared surface of granular base including cleaning of surface and spraying primer at the rate of 1.0 kg/ m2 using mechanical means as per Technical Specification.	**m^2**	**50.00**

Chapter - 17

ROAD & BRIDGE WORKS TESTING & MAINTENANCE

Sl. No.		Specification	Unit	Rate ₹
		CHAPTER - 17 **ROAD & BRIDGE WORKS TESTING & MAINTENANCE**		
17-A		**Road testing & Maintenance**		
1	IRC 81-1997	Design of overlay for existing B.T. surface with carrying out testing by Benkelman Beam method as per guide lines in IRC 81:1997 including design and testing at site. The charges for transportation of Benkelman Beam, loaded truck, labour for testing and traffic control are not included.	**km**	**6,300.00**
2	CRRI, New Delhi	Carrying out roughness index / road unevenness test with car mounted / Jeep towed ARUR machine (Automatic road unevenness Recorder) Calibrated from C.R.R.I. New Delhi (Central Road Research Institute) or any other equivalent authority including taking observations, feeding data and giving computerized test result including usage charges of all machinery and labour completed. i) Road surface single lane (B.TW,B.M.) 3.75 m Width.	**km**	**570.00**
3	CRRI, New Delhi	Carrying out roughness index / road unevenness test with car mounted / Jeep towed ARUR machine (Automatic road unevenness Recorder) Calibrated from C.R.R.I. New Delhi (Central Road Research Institute) or any other equivalent authority including taking observations, feeding data and giving computerized test result including usage charges of all machinery and labour completed. i) Road surface single lane (B.TW, BM) 5.5m to 7.00m width	**km**	**1,100.00**
4	CRRI, New Delhi	Carrying out roughness index / road unevenness test with car mounted / Jeep towed ARUR machine (Automatic road unevenness Recorder) Calibrated from C.R.R.I. New Delhi (Central Road Research Institute) or any other equivalent authority including taking observations, feeding data and giving computerized test result including usage charges of all machinery and labour completed. i) Road surface single lane (B.TW,B.M.) Each additional lane Width.	**km**	**570.00**
5	IRC-67: 2022	Carrying out Retro-reflectivity testing of traffic sign boards as per IRC-67:2012	**No.**	**800.00**
17-B		**Bridge Maintenance & Testing**		
1		Providing and fixing 25mm diameter steel anchor dowel in hard rock including drilling hole of 32 mm diameter up to 0.75 mtrs depth, placing the dowel in position and effectively grouting the hole with CM 1:1 proportion etc. complete.	**No.**	**1,250.00**

Sl. No.		Specification	Unit	Rate ₹
2		Dewatering on BHP basis by using water pump including diversion of stream, providing cofferdams, earthern bunds etc. as may be necessary for foundation and other parts of the the works and pumping out water during and after excavation as may be required by using 3.0 BHP pump etc. complete. (prior approval of Superintending Engineer will be necessary)	**hr**	**160.00**
3		Dewatering on BHP basis by using water pump including diversion of stream, providing cofferdams, earthern bunds etc. as may be necessary for foundation and other parts of the the works and pumping out water during and after excavation as may be required by using 5.0 to 9.0 BHP pump etc. complete. (prior approval of Superintending Engineer will be necessary)	**hr**	**175.00**
4		Dewatering on BHP basis by using water pump including diversion of stream, providing cofferdams, earthern bunds etc. as may be necessary for foundation and other parts of the the works and pumping out water during and after excavation as may be required by using 10.0 to 19.0 BHP pump etc. complete. (prior approval of Superintending Engineer will be necessary.	**hr**	**200.00**
5		Providing and injecting epoxy grout including structuring of crack in the body of slab girder by sand blasting, fixing inlet tube arrangement including cost of materials, machinery required for the work and labour charges etc. complete.	**kg**	**1,300.00**
6		Providing and injecting epoxy grout including structuring of cracks in the body of slab girder, fixing inlet tube arrangement including cost of materials, machinery required for the work labour charges etc. (2kg of grout is considered per hole)	**No.**	**2,500.00**
7		Providing fixing of dowel rod of 16 mm dia in the river bed for 400 mm depth @ 1000 mm c/c in single layer and grouting with underwater epoxy grout includes the cost of usage charges of all machineries, barge, boat, cost of all tools and all labour charges etc., complete.	**No**	**4,000.00**
8		Providing fixing of shear links of 12 mm dia in the periphery of the well wall for 100 mm mm depth @ 500 mm c/c bothway and grouting with underwater epoxy grout includes the cost of usage charges of all machineries, barge, boat, cost of all tools and all labour charges etc., complete.	**No**	**750.00**
9		Surface Preparation of Bridge for maintenance: Crack surface shall be cleaned using underwater jet to remove the fungal growth and other foreign materials to enable a clean and visible surface. The item includes the cost of hire charges of all equipment, diving equipment and all charges for divers etc., complete.	**m**	**700.00**

Sl. No.		Specification	Unit	Rate ₹
10		Crack Groove Cutting: Groove shall be cut using hand held electrically operated concrete cutting machine of size of 50 mm wide and 75 mm deep on each side of the crack to form as "V" groove all along the crack to fill the polyester resin/ Epoxy putty (horizontal and vertical cracks). After the groove cutting, the concrete shall be removed from the groove using the pneumatic concrete chipping machine to form "V" groove. The item includes the cost of hire charges for all machineries, tools and barges and all labour charges etc., complete.	**m**	**750.00**
11		Crack Sealing/Filling using epoxy mortar: Base and hardener of the high strength repair mortar . Epoxy putty shall be mixed using the slow speed heavy duty mixing machine to obtain a uniform mix. The mixed materials shall be placed all along the prepared "V" groove and finished smoothly using the putty blade/ trowel within 30 minutes by using the divers. The finished surface shall be allowed for curing minimum of 24 hours to attain the strength. The item includes the cost of usage charges of all equipment , tools and plants and all labour charges etc	**kg**	**1,100.00**
12		Providing Repairing of honeycombs and minor damages with Polymer Modified Mortar to Bridges including material, labour complete in all respect	**kg**	**150.00**
13		Exploratory drilling of Boreholes down to required depth, drilling of 150mm diameter boreholes **in all type of soils except hard rock and large boulders** (boulder core more than 30 mm), including refilling, reinstating surface and disposing off surplus material including use of mechanical rigs with power operated winches as well as percussion / chiselling tool for advancing throughoccasional seams of hard strata to be employed where necessary **in River bed area including standing/flowing water with all necessary arrangements except making of platform under water which shall be paid extra.**		
	A	0 m to 10 m	**m**	**1,278.00**
	B	10 m to 20 m	**m**	**1,342.00**
	C	20 m to 30 m	**m**	**1,412.00**
	D	30 m to 40 m	**m**	**1,533.00**
	E	40 m to 50 m	**m**	**1,766.00**
	F	50 m to 60 m	**m**	**2,087.00**
	G	60 m to 70 m	**m**	**2,247.00**
	H	Extra for 150mm dia. bore in hard Rock/large Boulder at all levels	**m**	**1,992.00**

Sl. No.		Specification	Unit	Rate ₹
14	84	Drilling of NX size borehole (75mm dia.) in all types of **hard rock** and collection of rock core samples from boreholes and preserving in boxes		
	A	0 m to 10 m	**m**	**3,055.00**
	B	10 m to 20 m	**m**	**3,209.00**
	C	20 m to 30 m	**m**	**3,422.00**
	D	30 m to 40 m	**m**	**3,667.00**
	E	40 m to 50 m	**m**	**3,793.00**
	F	50 m to 60 m	**m**	**4,088.00**
	G	60 m to 70 m	**m**	**4,415.00**
15	85	Conducting in-situ full size Plate Load Test (PLT) at selected location as per IS:1888 including making loading arrangements & casting of RCC/cast in-situconcrete footing as per codal provisions including excavation and refilling of trial pit		
	A	Plate size 30cm x 30cm	**Each**	**20,069.00**
	B	Plate size 45cm x 45cm	**Each**	**24,082.00**
	C	Plate size 60cm x 60cm	**Each**	**28,765.00**
16	86	Taking out 100mm dia. & 450mm long undisturbed samples of soil from boreholes, including provision of air tight containers for packing and, labeling incl. transporting the samples to laboratory. Piston sampler shall be used for extracting undisturbed samples where necessary. Samples shall be collected as per IS:2720.	**Each**	**137.00**
17	87	Taking out 100mm dia. & 450mm long disturbed samples of soil from bore holes, including provision of air tight containers for packing, labeling and transporting the samples to laboratory. Samples shall be collected as per IS:2720.	**Each**	**147.00**
18	88	Conducting **standard penetration test** as per IS:2131 at approximate1.5m intervals in bore holes, as directed by the Engineer in charge	**Each**	**802.00**

Sl. No.	Specification	Unit	Rate ₹
17-C	**Concrete Works**		
1	MoRTH 602.6.5	Providing and fixing in position 32 mm dia dowel bars precoated with anticorrosive epoxy paint of required Dia. 600 mm. Long and at 300 mm. C/C and wherever directed including handling, straightening, necessary cutting supported by TMT, chairs with proper alignment by using properly designed assembly of Bulkheads lubricating half length with bituminous paint as directed etc. complete.	**No.**	**480.00**
2	MoRTH 602.6.5	Providing and fixing in position 25mm dia dowel bars precoated with anticorrosive epoxy paint of required Dia. 600 mm. Long and at 300 mm. C/C and wherever directed including handling, straightening, necessary cutting supported by TMT, chairs with proper alignment by using properly designed assembly of Bulkheads lubricating half length with bituminous paint as directed etc. complete.	**No.**	**380.00**
3	MoRTH 602.6.4	Providing and fixing in position, tie bars precoated with anticorrosive epoxy paint of 12 mm dia. 700 mm. long and at 300 mm. C/C and wherever directed including handling, straightening wrapping with paper of approved quality for half length, necessary cutting, handling, straightening , supported by assembly of TMT, chairs with proper alignment etc. complete.	**No.**	**270.00**
4	MoRTH 602.6.3	Cutting transverse contraction joints 3 to 4 mm wide and depth 60mm in concrete slab using concrete cutting machine with diamond studded saw within 4-8 hours of casting of bay / slab etc. complete including subsequent widening of the groove 8 to 10 mm. wide at top having depth of 15 mm. as directed by Engineer incharge.	**m**	**70.00**
5	MoRTH 602.6.3	Providing to contraction joints polysuphide sealent (Pouring grade) confirming to BS : 5212 - 1989 into sawed groove widened at top for sealent reservoir of specified size and shape as per detailed drawing including fixing Polyethylene foam backer rod of required diameter (approx. 25% larger than the initial 3 mm.to 4 mm. joint) overlaid with bond breaking tape as per detailed drawing. Item includes cleaning the joints with water jet / air compressor and allowing joint to become thoroughly dry before sealent is applied and applying primer. (A) Contraction and longitudinal joints (15 mm. deep x 8 mm.wide).	**m**	**165.00**
6	IS 3395-1997	Providing and laying 150 micron Low Density Polyethylene (LDPE) sheet confirming to IS 3395 : 1997 below concrete pavement including all materials and labour complete.	**m^2**	**20.00**

ADDENDUM

Addendum I - Terms & Definitions

Sl. No.	Terms	Definitions
A. ROADS		
1.	Road	A way on land with a right of way for the public.
2.	Urban Road	A road within the limits of the area of Municipality, Military Cantonment, Port or Railway Authority.
3.	Project Road	A road within the limits of the area of a development project of a public authority for the access to forest, irrigation, electricity, coal, sugarcane, steel, etc.
B. HIGHWAY CLASSES BY FUNCTION		
1.	Expressways	Expressways offer superior highway facility with higher specifications. It provides for more lanes, better surface, divided carriageway, controlled access grade separations at cross-roads and fencing etc. Expressways permits only fast moving vehicles and are meant to carry through traffic. The Expressway may be owned by the Central Government or State Government depending upon whether the route is a National Highway or a State Road.
2.	National Highways	The arterial roads of the country for inter-state movements of goods and passengers. They traverse the length and width of the country connecting the National and State capitals, major ports and rail junctions and link up with border roads and foreign highways.
3.	State Highways	The arterial roads in a State for inter-district movements. They traverse the length and width of a state connecting the state capital, district headquarters and important towns and cities and link up with the National Highways and adjacent State Highways.
4.	District Roads	The branch roads of the State and National Highways to serve as the main roads for intra-district movements. They traverse the length and breadth of a district to connect the area of production and marketing in the district to one another and to the National Highways.
5.	Village Roads	These roads serve as the feeder roads as well as the roads for inter village movements. They pass through rural areas connecting the village to one another and to the nearest road of higher category viz. District Roads, State Highways, National Highways, etc.
C. HIGHWAY CLASSES BY WIDTH		
1.	Below Standard Single Lane(BSSL)	Surfaced roads having clear carriageway width of below 3.75 m.
2.	Standard Two Lane (SSL)	Surfaced roads having clear carriageway width between 3.75 m and below 7.0 m.

3.	Standard Divided Highway (SDL)	Surfaced roads having clear carriageway width between 7.0 m and below 10.5 m.
4.	Standard Multi Lane (SML)	Surfaced roads having clear carriageway width of 10.5 m and above.
D. ROAD SURFACE		
1.	Bitumen	A type of construction in which the fragments of coarse aggregate are bound together by bitumen applied either premix or grouting method.
2.	Bitumen Concrete Surfacing	A type of construction in which coarse and fine mineral aggregates are mixed with bitumen and laid not to the desired thickness.
3.	Black Top Surface	The surface of roads made with bitumen as a binder.
4.	Brick Paving	A paving composed of bricks laid in regular courses.
5.	Cement Bound Macadam	A surface in which a matrix of a cement sand mixture is interposed between two layers of road metal spread on the road and the whole mass watered and consolidated so that the matter works into the interstices of the road metal to produce a compact mass.
6.	Cement Concrete	A surface obtained by placing and consolidating cement concrete to required thickness.
7.	Earth Road	A road with the carriageway composed of natural soil.
8.	Gravel Road	A road with the carriageway composed of a consolidated layer of gravel.
9.	Water Bound Macadam	A type of surfacing in which stone fragments are first inter locked by rolling and then bound with smaller stone gravel etc. which enforced into the intersection by brimming, watering and rolling.
10.	Motorable	For Plain Areas: Surfaced or unsurfaced road of minimum 3.0 m Carriageway width is motorable. For Hilly Areas: Surfaced or unsurfaced road of minimum 3.0 m Carriageway width having no horizontal curve of radii less than 14 m and grade not steeper than 7% is motorable. A bridle path is non motorable.

Source : MORTH Transport Research Wing Publication 2019

Addendum II - Contact details of PWD officers

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1	Principal Secretary, PWD	prs.pwd@gmail.com O/o Principal Secretary, Public Works Department Room No. 335, 3rd Floor, Vikasa Soudha, Bengaluru -560001 # 080-22251449 080-22034839
2	Secretary, PWD	secytech-pwd@karnataka.gov.in O/o Secretary, Public Works Department Room No. 334, 3rd Floor, Vikasa Soudha, Bengaluru -560001 # 080-22251548 080-22034852 080-22034834
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8	Chief Engineer National Highways	cenhpwd@gmail.com / cenhpwd@yahoo.co.in O/o The Chief Engineer, National Highways, PWD Annexe Building, Floor-2, K.R. Circle, Bengaluru – 560001 # 080-22276601
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