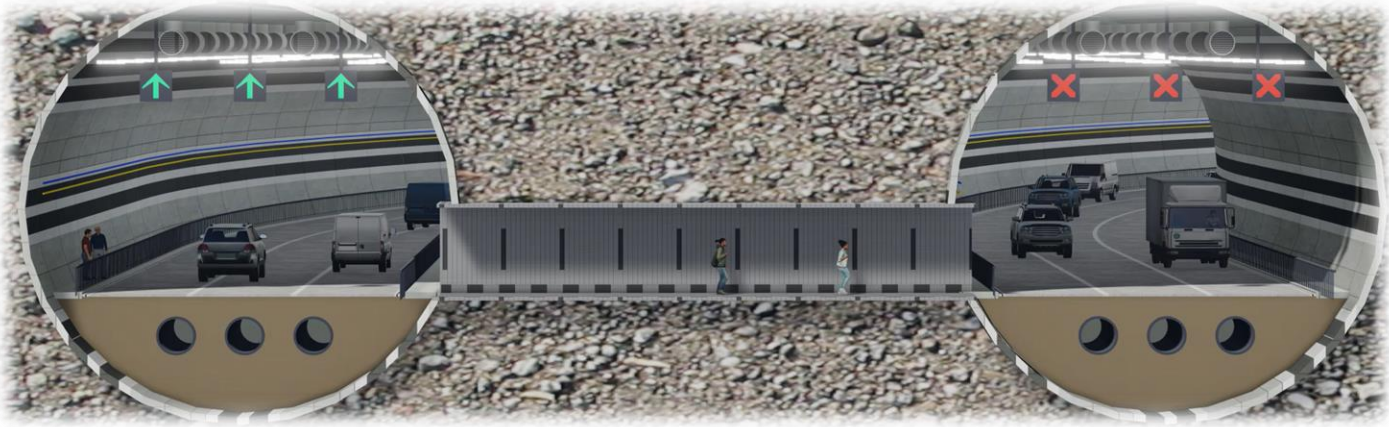
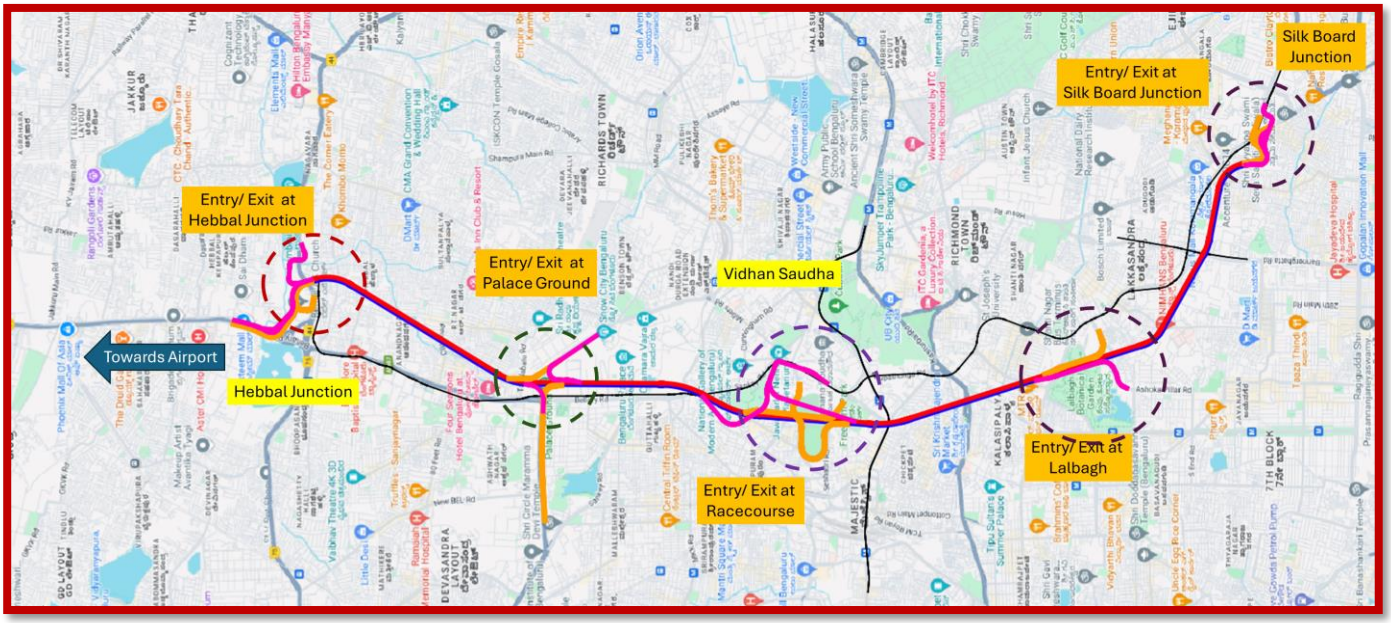
GOVERNMENT OF KARNATAKA



CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR THE WORK OF CONSTRUCTION OF UNDERGROUND VEHICULAR TUNNEL FROM HEBBAL ESTEEM MALL JUNCTION TO SILK BOARD KSRP JUNCTION



DRAFT DETAILED PROJECT REPORT

VOLUME - IV

PRELIMINARY COST

September 2024

Rodic
ENGINEERING. PASSION

RODIC CONSULTANTS PVT. LTD

BRUHAT BENGALURU MAHANAGARA PALIKE

1. Cost Estimate

1.1 General:

Cost estimation is a critical component of project planning, providing essential financial insights for project execution. In addition to direct construction costs, provisions are made for land acquisition and utility shifting. All cost estimates are based on detailed engineering designs and drawings.

1.2 Methodology:

- Tunnel, Cut & Cover Sections: The costs for tunnels, cut-and-cover, Cross-passages and open sections are determined based on cross-sections, plans, and other project-specific drawings.
- TBM Lowering Shaft: Preliminary locations for Tunnel Boring Machine (TBM) launching/Retrieval Shafts have been identified, and the necessary quantities for cost estimation are worked out from the structural drawings.
- Traffic Signs & Road Appurtenances: Quantities for traffic signs, markings, and other project-related facilities (such as road accessories) are calculated from the plan drawings, and costs are determined accordingly.

1.3 Unit Rates of Materials:

- The cost of materials is referenced from a combination of government-issued data and market rates:
- Karnataka PWD Schedule of Rates (SOR) for Road & Bridges 2023-24, Zone 1 serves as a primary reference for material /Item rates.
- A transportation lead of 45 km is assumed for muck disposal and concrete/precast concrete items.
- Some rates are taken from similar projects and prevailing market conditions.
- For specialized components like Tunnel Boring Machines (TBM), tunnel ventilation, firefighting systems, lighting, and electrical components, market rates are applied.
- For the Control Centre Building, rates are sourced from the Delhi Plinth Area Rates 2023.
- The MoRTH Standard Data Book 2019 is used for reference, particularly for the items not available in Karnataka PWD SOR.
- The cost of electromechanical works in the tunnel section is assumed to be 8% of the total tunnel cost as per Industry Practice.
- The cost of high-capacity, high-speed buses for the Neo Bus System is derived from other reference projects.
- GPS/GNSS Toll Systems rates are based on market prices.
- The cost of TBMs (six units) is based on an inquiry from Herrenknecht AG, with 50% buy-back value considered at the project's completion.

2 Labour Rates:

Labour rates are determined according to the Karnataka PWD Schedule of Rates (SOR) for Road & Bridges 2023-24.

3 Plant & Machinery Rates:

Rates for plant and machinery are primarily sourced from the MoRT&H Standard Data Book 2019, with escalations applied to reflect 2024 prices using the wholesale price index. For items not covered in the data book or Karnataka SOR, market rates are used.

4 Overheads, Contractor's Profit, and Other Components:

4.1 Overhead costs for road tunnel works are calculated at 25%, applicable to large projects exceeding Rs. 1000 crores, as per the MoRT&H Standard Data Book.

4.2 Contractor's profit is considered as 10%.

4.3 GST is applied at 18% on the construction cost.

4.4 Contingency provisions are 1% of the total construction cost.

4.5 Supervision charges are calculated at 2% of the construction cost.

This structured approach ensures that all cost elements are thoroughly considered, enabling precise financial planning and effective resource allocation for the project.

Construction of Underground Vehicular Tunnel from Hebbel Esteem Mall junction to Silk Board KSRP junction.

SUMMARY OF COST

Item No.	Description	Length(km)	Rate	Total Amount in Rs.	Total Amount (Rs. in Crores)
BILL NO. 1	Site Clearance			7,889,328.33	0.79
BILL NO. 2	Earth Works			6,305,013.00	0.63
	Sub Total (Bill-1+Bill-2)			**14,194,341.33**	**1.42**
BILL NO. 3	**Tunnel Work**				
A	Main Tunnel				
a.	Tunneling By TBM(Twin Tunnel)	14.54	415.70	60,442,670,696.60	6,044.27
b.	Cross Passages(27 No's)			288,885,247.22	28.89
c.	Cut And Cover Tunnel	4.08	238.96	9,749,568,000.00	974.96
d.	Open Cut (Ramps)	1.53	77.03	1,177,018,400.00	117.70
e.	Shafts (5 No's)			2,655,379,134.97	265.54
f.	Buildings(Control Center)			154,408,200.00	15.44
B	Intermediate Entry/Exit				
a.	Open Cut (Ramps)	3.67	72.77	2,673,569,800.00	267.36
b.	Cut And Cover Tunnel	4.26	219.46	9,348,996,000.00	934.90
c.	NATM Tunnel	8.61	87.02	7,489,811,400.00	748.98
C	**Sub Total Cost Of Tunnel Works(A+B)**			**93,980,306,878.80**	**9,398.03**
D	Electro- Mechanical Works @ 8% Of C			7,518,424,550.30	751.84
E	Tunnel Ventilation & Fire Fighting			4,847,300,000.00	484.73
G	**Pavement**			460,895,480.54	46.09
H	Inter Modal Logistic Building			6,088,190,000.00	608.82
BILL NO. 4	Traffic Signs, Markings ,Crash Barrier Appurtenances			324,287,806.70	32.43
BILL NO. 5	**Road Restoration and Development**				
a.	Reclamation Of Existing Road In Approach Area & Ramps			680,075,000.00	68.01
b.	Street level Development near shaft Location (Road,Footpath,Lighting etc.)			300,000,000.00	30.00
c.	Junction Development			115,651,855.12	11.57
BILL NO. 6	Safety,Environmental Management Plan And Traffic Management During Construction @ 0.25% on **(C) Cost of Tunnel Works.**			234,950,767.20	23.50
BILL NO.7	High-Capacity & High Speed Busses With Driving And Trailling Coaches (Neo-Bus System)				
a.	Traction & Power Supply (OHE)			500,000,000.00	50.00
b.	Telecommunication & Passenger Information System			100,000,000.00	10.00
c.	Fare Collection System			50,000,000.00	5.00
d.	Articulated Coach Of Minimum 18 M Length			400,000,000.00	40.00
BILL NO. 8	Miscellaneous (Trees,Art Work in Tunnel ,Construction Depot & Casting Yard,Tree Trans Plantation And Landscaping etc.)			650,823,320.00	65.08
BILL NO. 9	GPS/GNSS-Based Tolling (10 No's)			110,000,000.00	11.00
B)Estimated Construction Cost Without GST				**116,375,100,000.00**	**11,637.51**
GST @ 18% Payable On Construction Cost Only (On B)				20,947,518,000.00	2,094.75
C) Construction Cost Including GST				**137,322,618,000.00**	**13,732**
Contingencies @ 1% Of (B)				1,163,751,000.00	116.38
Construction Supervision Charges @ 2% Of (B)				2,327,502,000.00	232.75
D) Total Cost Including Centages				**140,813,871,000.00**	**14,081.39**
Land Acquisition, Resettlement, Rehabilitation Cost				8,000,000,000.00	800.00
Utility Shifting Cost				1,000,000,000.00	100.00
E) Total Project Cost (Sum of All the Above)				**149,813,871,000.00**	**14,981.39**

Summary of TCS Schedule						
Sr.No.	Design Chainages		Length		TCS-Type	Remarks
	From	To	(m)	Kms		
Main Tunnel_Hebbal to Silkboard L.H.S						
1	0+000	0+430	430	0.43	TCS-2	open cut
2	0+430	1+380	950	0.95	TCS-6	cut and cover
3	1+380	15+930	14550	14.55	TCS-1	main TBM tunnel
4	15+930	16+530	600	0.6	TCS-6	cut and cover
5	16+530	16+690	160	0.16	TCS-2	open cut
LHS Service Road						
1	0+000	0+170	170	0.17	TCS-4	open cut
2	0+170	0+360	190	0.19	TCS-3	cut and cover
RHS Service Road						
1	0+000	0+450	450	0.45	TCS-4	open cut
2	0+450	0+700	250	0.25	TCS-3	cut and cover
Entry Ramp (From ORR To Main Tunnel (km 1.300) Towards Silk Board/ Sarjapur road)						
1	0+000	0+600	600	0.6	TCS-3	cut and cover
2	0+600	0+814	214	0.214	TCS-4	open cut
Exit Ramp (From Main Tunnel (km 1.300) To ORR Towards ORR (Outer Ring Road))						
1	0+000	0+300	300	0.3	TCS-3	cut and cover
2	0+300	0+400	100	0.1	TCS-4	open cut
Entry Ramp 1 (From Jaya Mahal Road)						
1	0+000	0+170	170	0.17	TCS-2	Open Cut
2	0+170	0+360	190	0.19	TCS-6	Cut And Cover
3	0+360	1+255	895	0.895	TCS-5	Natm Tunnel
Exit Ramp 1 (Towards Siddapura Road near Wilson Garden)						
1	0+000	0+870	870	0.87	TCS-5	NATM Tunnel
2	0+870	0+930	60	0.06	TCS-3	Cut & Cover
3	0+930	1+073	143	0.143	TCS-4	Open Cut
Entry Ramp 2 (From Palace Road towards Hebbal)						
1	0+960	1+550	590	0.59	TCS-3	Cut & Cover
2	1+550	2+347	797	0.797	TCS-5	NATM Tunnel
Exit Ramp 2 (On Race Course Road towards Chalukya Circle from Silk Board)						
1	0+000	0+880	880	0.88	TCS-5	NATM Tunnel
2	0+880	1+530	650	0.65	TCS-3	Cut & Cover
3	1+530	1+864	334	0.334	TCS-4	Open Cut
Entry Ramp (From CV Raman Road To Main Tunnel (km 4.700) Towards Hebbal)						
1	0+000	1+320	1320	1.32	TCS-5	NATM Tunnel
Exit Ramp (From Main Tunnel (km 4.450) To Jaymahal Road Towards Jaymahal Road)						
1	0+360	1+323	963	0.963	TCS-5	NATM Tunnel
Entry Ramp 3 (From Palace Road towards Silk Board)						
1	0+000	0+230	230	0.23	TCS-2	Open Cut
2	0+230	0+960	730	0.73	TCS-6	Cut And Cover
2	0+960	1+100	140	0.14	TCS-3	Cut And Cover
3	1+100	1+906	806	0.806	TCS-5	Natm Tunnel
Exit Ramp 3 (On Seshadri Road towards K R Circle from Hebbal)						
1	0+000	0+830	830	0.83	TCS-5	NATM Tunnel
2	0+830	1+060	230	0.23	TCS-3	Cut & Cover
3	1+060	1+376	316	0.316	TCS-4	Open Cut
Entry Ramp 4 (From Siddapura Road near Ashok Pillar)						

1	0+000	0+150	150	0.15	TCS-4	Open Cut
2	0+150	0+470	320	0.32	TCS-3	Cut And Cover
3	0+470	1+416	946	0.946	TCS-5	Natm Tunnel
Exit Ramp 4 (Towards C V raman Road)						
1	0+000	1+320	1320	1.32	TCS-4	Open Cut
2	1+320	1+610	290	0.29	TCS-3	Cut And Cover
3	1+610	1+910	300	0.3	TCS-5	Natm Tunnel
Ramp-6 Towards Sarjapur						
1	0+000	0+240	240	0.24	TCS-3	Cut And Cover
2	0+240	0+454	214	0.214	TCS-4	Open Cut
Main Tunnel_Airport to Hebbal R.H.S						
1	0+000	0+430	430	0.43	TCS-2	Open Cut
2	0+430	1+400	970	0.97	TCS-6	Cut & Cover
3	1+400	15+930	14530	14.53	TCS-1	Main TBM Tunnel
4	15+930	16+570	640	0.64	TCS-6	Cut & Cover
5	16+570	16+678	108	0.108	TCS-2	Open Cut
Ramp-6 Silk Board Exit From Sarjapur Road						
1	0+000	0+400	400	0.4	TCS-3	Cut And Cover
2	0+400	0+663	263	0.263	TCS-4	Open Cut
TOTAL DESIGN LENGTH			***51229.00***	51.229		

BILL NO.-1
SITE CLEARANCE

Item No.	Description		Unit	Estimated Quantity	Unit Rate in Rs.	Amount in Rs.	Ref. to MoRTH Spec.	Refrence to Rate Analysis
					In Figures	In Figures		
1.01	Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 metres and earth filling in the depression / pit.							
	A	From 300 mm to 600 mm	Nos	10.00	588.00	5,880	201	CHAPTER- SITE CLEARANCE, SR. NO.- 2.1 (i)
	B	From 600 mm to 900 mm	Nos	5.00	702.60	3,513	201	CHAPTER- SITE CLEARANCE, SR. NO.- 2.1 (ii)
	C	From 900 mm to 1800 mm	Nos	5.00	1,091.70	5,459	201	CHAPTER- SITE CLEARANCE, SR. NO.- 2.1 (iii)
	D	Above 1800 mm	Nos	100.00	1,746.70	174,670	201	CHAPTER- SITE CLEARANCE, SR. NO.- 2.1 (iv)
1.02	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.		Ha.	40.63	185,893.50	7,552,109	201	CHAPTER-SITE CLEARANCE, SR. NO.-2.3
1.04	Dismantling of kilometre stone including cutting of earth, foundation and disposal of dismantled material with all lifts and lead upto 1000 m and back filling of pit.							
	C	Hectometre Stone	Nos	1.00	88.50	89		
1.07	Scarifying Existing Bituminous road surface and disposal of scarified material with all lifts and lead as per Technical Specifications Clause 305.							
	A	Bituminous course	Sqm	2982.00	49.50	147,609	305.4.3	CHAPTER-EARTH WORK, EROSION CONTROL AND DRAINAGE Sr. No-3.15
TOTAL FOR BILL NO 1						**7,889,328.33**		

BILL NO.-2
EARTHWORKS

Item No.	Description	Unit	Estimated Quantity	Unit Rate in Rs.	Amount in Rs.	Ref. to MoRTH Spec.	Refrence to Rate Analysis
				In Figures	In Figures		
2.01	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	cu.m.	23430.00	269.10	6,305,013	305	CHAPTER-EARTH WORK, EROSION CONTROL AND DRAINAGE, SR. NO.-3.17
TOTAL FOR BILL NO 2					**6,305,013.00**		

Main Tunnel Cost Estimate

Sr.no	Section	Particular	Description of item	Unit	Qty	Rate	Total Cost		Reference
1		Excavation in soft soil	Excavation for Tunnel by TBM - Soil	m3	1,007,003	537	540,357,810	54.04	Other project reference
2		Excavation in rock	Excavation for Tunnel by TBM - Hard Rock	m3	4,028,011	2,284	9,200,782,726	920.08	Other project reference
		TV Grout	TBM tail void grouting volume, Without any loss	m4	327,922	15,620	5,122,141,640	512.21	Other project reference
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	5,035,014	1,200	6,042,016,800	604.20	Other project reference
4		Ground Stabilization	Ground stabilization with suitable material for TBM launching and Arrival locations; . Ground stabilization quantity will be 30% of Ground Treatment Vol. (Note -: given quantity for ground treated zone)	m3	64,000	450	28,800,000	2.88	Other project reference
5		Bracing	Steel in kg for temporary bracing rings installed in bored tunnel before commencement of cross passage excavation	kg	156,000	113	17,628,000	1.76	DSR KPWD/Vol-II/CH-11/Pg -77
6		Central Drain	800mm diameter tunnel centre drain pipe (GI), in utility tunnel below road	m	28,116	12,450	350,044,200	35.00	RA
7		M35-Side Drain	Longitudinal drain below the road for collection of surface water	m3	5,623	10,870	61,122,010	6.11	RA
8		M35 Concrete	Precast Utility Tunnel box section for drainage below tunnel road level	m3	103,326	10,870	1,123,153,620	112.32	RA
9		Reinforcement steel	Reinforcement for Utility tunnel box structure for Drainage below Tunnel Road Level	kg	10,346,688	92	947,446,220	94.74	DSR KPWD/Vol-I/CH-2/Pg -18
10		M40 Concrete	400mm thick slab for vehicular movement / pavement; M40	m3	70,290	11,056	777,126,240	77.71	RA
11		Reinforcement steel	Total weight of reinforcement in Road slab; typical rebar dia. T25, T20, T10, T8	kg	7,029,000	92	643,645,530	64.36	DSR KPWD/Vol-I/CH-2/Pg -18
12		M35 Concrete	Stabilizing concrete	m3	27,554	10,870	299,511,980	29.95	RA
13	TBM	M20 concrete	Levelling concrete	m3	9,278	9,927	92,102,706	9.21	RA
14		M35 Concrete	Concrete for Precast concrete Slab in Walkway inside the Tunnel for maintenance purpose; M35	m3	5,272	10,870	57,306,640	5.73	RA
15		Reinforcement steel	Tonnage of rebar reinforcement for precast slab in Walkway inside the Tunnel for maintenance purpose	kg	263,600	92	24,137,852	2.41	DSR KPWD/Vol-I/CH-2/Pg -18
16		Dismantling of shotcrete lining	Dismantling of shotcrete lining	m3	177	2,349	416,210	0.04	DSR KPWD/Vol-II/CH-19/Pg -193
17		Dismantling of segment lining	Dismantling of precast segment lining for NATM Cross Passage	m3	154,669	2,349	363,317,481	36.33	DSR KPWD/Vol-II/CH-19/Pg -193
18		Reaction frame	Reaction frame at TBM Launch area, complete set including shoving frame, craddle etc.	kg	800,000	113	90,400,000	9.04	DSR KPWD/Vol-II/CH-11/Pg -77
19		M15 Concrete	PCC head wall at launch and arrival, M15	m3	2,592	9,927	25,730,784	2.57	RA

20		Bullflex seal	Bullflex seal for Launch and arrival	nos.	8	8,727,800	69,822,400	6.98	market rate
21		Ground Treatment	Total Volume of Ground to be treated for Nallah/Misc.	m3	160,000	450	72,000,000	7.20	Other project reference
22		TBM machine	Tunnel Boring Machine for tunneling, suitable for soil, mix ground and rockmass	nos.	6	2,500,000,000	15,000,000,000	1,500.00	market rate
23	Segment	M60 Concrete	Concrete for pre-cast tunnel segments; M60	m3	687,319	17,600	12,096,814,400	1,209.68	RA
24		Reinforcement steel	Total weight of segment reinforcement cages; typical rebar dia. T12, T16, T10, T8	kg	61,858,642	92	5,664,395,848	566.44	DSR KPWD/Vol-I/CH-2/Pg -18
25		Segment Accessories	Segment accessories including spear bolt, nuts, washers, sheathing pipes, dowels, sockets,gaskets,etc.	nos.	424,620	4,080	1,732,449,600	173.24	Other project reference
26	CP	M35 Concrete	Concrete for cast in-situ RC structural lining in cross passage and pump sump; M35 MPa characteristic cube strength	m3	4,821	10,870	52,404,270	5.24	RA
27		Structural steel for Lintel	Lintel above and below the opening with curved props on either side, structural steel	kg	125,164	113	14,143,532	1.41	DSR KPWD/Vol-II/CH-11/Pg -77
28		Fire door	Fire rated doors in cross passages	nos.	52		0	-	
29		Drilling hole	Drilling of drainage hole through segmental lining into the pump sump to connect tunnel drainage into pump sump; drilling diameter to allow installation and grouting of 200mm dia. drainage pipe	m	160	2,426	388,160	0.04	Other project reference
30		200mm PVC drainage pipe	Drainage pipe installed in drill hole from tunnel into the pump sump; diameter 200mm PVC drainage pipe	m	183	2,426	443,958	0.04	Other project reference
31		Drilling hole	Drilling for probing and drainage at cross passage face during cross passage excavation; diameter 76 mm, L=9m	m	351	2,621	919,971	0.09	Other project reference
32		Excavation	Excavation volume in cross passages and pump sumps	m3	20,224	2,284	46,191,616	4.62	RA
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	20,224	676	13,679,826	1.37	Other project reference
33		M25 Concrete	Sprayed concrete at cross passage face	m3	1,319	11,621	15,328,099	1.53	RA
34		MS pipe	Supply and installation of MS pipe for forepoling, dimater 76mm, L=6.0 m long; including grouting with cementitious grout.	m	4,680	1,527	7,146,360	0.71	Other project reference
35		lattice girder	Support girder installed during cross passage excavation; lattice girder, encased in shotcrete	kg	61,093	114	6,971,139	0.70	RA

36	Ground Treatment	Total Volume of Ground to be treated for Cross passages.	m3	28,800	450	12,960,000	1.30	Other project reference
37	Dewatering	Dewatering well complete, including drilling, installation, borehole pump and operation for duration of 4 months; average 20m deep, 250mm drilling diameter, 150mm diameter perforated PVC pipe with geotextile and filter packing; bentonite or grout sealing from RL-10m to surface	m	1,040	423	439,920	0.04	Other project reference
38	Geotextile	Geotextile layer for waterproofing - 500GSM	m2	13,634	350	4,771,900	0.48	Market rate
39	PVC membrane	PVC Memberane for waterproofing - 2mm with signal layer	m2	13,634	1,100	14,997,400	1.50	Market rate
40	Hydrophilic seal	Hydrophilic seal in cross passages	m	1,313	2,000	2,626,000	0.26	Market rate
41	Reinjectable hose	Reinjectable back grouting hose system in cross passages	m	2,678	2,000	5,356,000	0.54	Market rate
42	Reinforcement steel	Weight of rebar reinforcement for permanent linings in cross passage and pump sump; typical diameters T10 to T32	kg	449,275	92	41,140,112	4.11	DSR KPWD/Vol-I/CH-2/Pg -18
43	Steel Fiber	Weight of Steel fibre reinforcement for temporary shotcrete linings in cross passage and pump sump	kg	62,671	275	17,252,574	1.73	Other project reference
44	SN Bolts	Fy>=200 kN, Rock Bolts SN/SDA type, Length 25mm dia Face Bolts	m	7,280	1,022	7,436,520	0.74	Other project reference
45	M30 shotcrete	Shotcrete Min M30 for ground support in cross passage and pump sump	m3	2,090	11,621	24,287,890	2.43	RA
46	Excavation in soft soil	Soil Excavation volume for the cut and cover section in the main tunnel	m3	432,243	633	273,609,819	27.36	DSR KPWD/Vol-I/CH-1/Pg -10
47	Excavation in rock	Rock Excavation volume for the cut and cover section in the main tunnel	m3	185,247	2,284	423,104,148	42.31	RA
48	Backfill	Backfill quantity	m3	217,900	808	176,063,119	17.61	Other project reference
3	Muck Disposal	Muck Disposal & handling, and all other works required	m3	399,590	676	270,288,922	27.03	Other project reference
49	M15 Concrete	M15 Grade of concrete for Soft piles	m3	52,295	9,927	519,134,905	51.91	RA
50	M35 Concrete	M35 Grade of concrete for Hard piles	m3	52,295	10,870	568,449,322	56.84	RA
51	Reinforcement steel	Reinforcement for the cut and cover box section and the secant piles	kg	29,617,790	92	2,712,189,922	271.22	DSR KPWD/Vol-I/CH-2/Pg -18
52	PT Anchors	PT Ground Anchors of PT force 650KN, 488KN and 520KN for supporting the excavation	m	221,910	4,800	1,065,166,154	106.52	market rate
53	SN Bolts	32mm SN Bolts provided as support for excavation	m	36,080	1,413	50,972,020	5.10	Other project reference

54	Cut and Cover	Structural steel for waler	UB 610x229x110.2 steel section provided as steel waler for supporting the secant piles	kg	924,462	113	104,464,206	10.45	DSR KPWD/Vol-II/CH-11/Pg -77
55		M15 Concrete	100mm thick PCC provided at the base of the C&C RCC box	m3	3,918	9,927	38,893,986	3.89	RA
56		M35 Concrete	M35 Grade of concrete for C&C RCC Box section	m3	159,260	10,870	1,731,160,548	173.12	RA
57		M35 Concrete	Precast Utility Tunnel box section for drainage below tunnel road level	m3	9,561	10,870	103,928,070	10.39	RA
58		waterproofing	waterproofing of structure using crystalline admixture in concrete	kg	506,464	150	75,969,630	7.60	market rate
59		Reinforcement steel	Reinforcement for Utility tunnel box structure for Drainage below Tunnel Road Level	kg	574,041	92	52,566,656	5.26	DSR KPWD/Vol-I/CH-2/Pg -18
60		M35 Concrete	Walkway concrete	m3	250	10,870	2,715,326	0.27	RA
61		M35-Side Drain	Longitudinal drain below the road for collection of surface water	m3	267	10,870	2,896,855	0.29	RA
62		Reinforcement steel	Reinforcement in side drains	kg	15,990	92	1,464,252	0.15	DSR KPWD/Vol-I/CH-2/Pg -18
63		Central Drain	800mm diameter tunnel centre drain pipe (GI), cast into utility tunnel below road	m	2,665	12,450	33,179,250	3.32	RA
64		M20 concrete	Levelling concrete	m3	1,399	9,927	13,887,873	1.39	RA
65	Ramp	Excavation in soft soil	Soil Excavation volume for ramp at the entry and exit of the main tunnel	m3	54,928	633	34,769,424	3.48	DSR KPWD/Vol-I/CH-1/Pg -10
66		Excavation in rock	Rock Excavation volume for ramp at the entry and exit of the main tunnel	m3	0	2,284	0	-	RA
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	54,928	676	37,154,148	3.72	Other project reference
67		M15 Concrete	M15 Grade of concrete for Soft piles	m3	2,150	9,927	21,339,424	2.13	RA
68		M35 Concrete	M35 Grade of concrete for Hard piles	m3	2,238	10,870	24,322,492	2.43	RA
69		Reinforcement steel	Reinforcement for the Ramp box section, secant piles and the RCC beam for ramp wall over 6.5m depth	kg	3,705,651	92	339,337,623	33.93	DSR KPWD/Vol-I/CH-2/Pg -18
70		PT Anchors	PT Ground Anchors of PT force 650kN, 488kN and 520kN for supporting the excavations	m	3,075	4,800	14,760,000	1.48	market rate
71		Structural steel for waler	UB 610x229x110.2 steel section provided as steel waler for supporting the secant piles	kg	20,746	113	2,344,298	0.23	DSR KPWD/Vol-II/CH-11/Pg -77
72		M15 Concrete	100mm thick PCC provided at the base of the C&C RCC box	m3	1,230	9,927	12,210,210	1.22	RA
73		M35 Concrete	M35 Grade of concrete for Ramp RCC Box section	m3	28,518	10,870	309,986,312	31.00	RA
74		waterproofing	waterproofing of structure using crystalline admixture in concrete	kg	85,553	150	12,832,920	1.28	market rate
75		M35 Concrete	Walkway concrete	m3	81	10,870	880,470	0.09	RA
76		M35-Side Drain	Longitudinal drain below the road for collection of surface water	m3	86	10,870	934,820	0.09	RA
77		Reinforcement steel	Reinforcement in side drains	kg	5,160	92	472,501	0.05	DSR KPWD/Vol-I/CH-2/Pg -18

78		Roofing steel	Roofing for the ramp at the entry and exit of the main tunnel	kg	200,093	92	18,322,547	1.83	DSR KPWD/Vol-I/CH-2/Pg -18
79		Roofing sheet	Providing and Laying non asbestos high impact polypropylene shee	m2	13,760	727	10,003,520	1.00	DSR KPWD/Vol-II/CH-7/Pg -29
80	Shaft	Excavation in soft soil	Soil Excavation volume for shafts	m3	480,000	633	303,840,000	30.38	DSR KPWD/Vol-I/CH-1/Pg -10
81		Excavation in rock	Rock Excavation volume for shafts	m3	320,000	2,284	730,880,000	73.09	RA
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	800,000	1,200	960,000,000	96.00	Other project reference
82		M15 Concrete	M15 Grade of concrete for Soft piles	m3	10,799	9,927	107,203,904	10.72	RA
83		M35 Concrete	M35 Grade of concrete for Hard piles	m3	10,799	10,870	117,387,573	11.74	RA
84		Reinforcement steel	Reinforcement for the secant piles	kg	1,511,891	92	138,448,437	13.84	
85		PT Anchors	PT Ground Anchors of PT force 650KN, 488KN and 520KN for supporting the excavation	m	53,438	4,800	256,500,000	25.65	market rate
86		SN Bolts	32mm SN Bolts provided as support for excavation	m	12,917	1,413	18,248,021	1.82	Other project reference
87		Structural steel for waler	UB 610x229x110.2 steel section provided as steel waler for supporting the secant piles	kg	202,400	113	22,871,200	2.29	DSR KPWD/Vol-II/CH-11/Pg -77

Entry/ Exits - Cost Estimate								
Sr.no	**Section**	**Particular**	**Description of item**	**Unit**	**Qty**	**Rate**	**Total Cost**	**Reference**
1		Excavation	SC-I	m3	126,781			
2			SC-II	m3	330,780			
3			SC-III	m3	208,658			
4			**Underground Excavation - Blasting (Rock)**	m3	**666,219**	2,284	1,521,643,831	RA
5			Underground Excavation - Excavator(Soil/Soil Like) & Rock Breaker	m3	0			
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	666,219	676	450,640,723	Other project reference
6		SFR Sprayed Concrete - M25	50mm thickness	m3	0			
7			100mm thickness	m3	21,084			
8			150 mm Thickness	m3	16,034			
9			200mm thickness	m3	23,306			
10			250mm thickness	m3	0			
11			300mm thickness	m3	24,099			
12			**Total Shotcrete**	m3	**84,523**	11,621	982,239,742	RA
13		Rock bolt , SN type, 25mm Dia, Fy 200 kN	4m length	pcs	28,121	5,651	158,913,655	RA
14		Rock bolt, SN type, 25mm Dia, Fy 320 kN	6m length	pcs	26,410	5,704	150,640,358	RA

15		Rock bolts, SW type, 25mm Dia, Fb 200 kN	4m length	pcs	1,174	4,086	4,795,983	RA
16		Lattice Girders, Fe 500	95/20/25	t	991	114,107	113,052,211	RA
17			130/25/32	t	1,396	114,107	159,316,025	RA
18		M30 concrete	M30 - Concrete Lining	m^3	104,391	10,671	1,113,959,349	RA
19		Inner Lining Rein	SC-I	t	161	91,573	14,779,150	DSR KPWD/Vol-I/CH-2/Pg -18
20			SC-II	t	403	91,573	36,947,874	DSR KPWD/Vol-I/CH-2/Pg -18
21			SC-III	t	242	91,573	22,168,724	DSR KPWD/Vol-I/CH-2/Pg -18
22		Face Bolt	9 m	m	29,711	1,657	49,230,796	RA
23		Pipe roof	12 m with 4 m over lap	m	39,614	6,155	243,824,170	RA
24		Drainage Hole	Drainage Holes	m	14,672	2,426	35,594,272	Other project reference
25		Weep Hole	Weep hole	m	29,344	2,426	71,188,544	Other project reference
26	NATM	300mm dia pipe	300 mm dia pipe (Tunnel main drainage pipe)	m	7,336	3,000	22,008,000	Other project reference
27		200mm dia pipe	200 mm dia PVC pipe (surface water drainge pipe)	m	7,336	2,500	18,340,000	Other project reference
28		Geotextile mem	Geotextile (500 g/m^2) for protection of the waterproofing membrane & drainage on the finished outer lining surface,	m^2	245,976	350	86,091,628	Market rate
29		PVC membrane	PVC (2mm thick)	m^2	245,976	1,100	270,573,688	Market rate
30		Steel Fibers	Steel Fibre Reinforcement	t	2,536	275,288	698,042,276	Other project reference

31		Overbreak	Unavoidable Overbreak	m^3	66,622	2,284	152,164,374	RA
32		Grouting	Consolidation Grouting with cement slurry (80% OPC, 19.5% MFC & 0.5% Admixture)	t	200	10,068	2,013,600	Market rate
33		M30 concrete	Cavity concreting through bore holes/ local pipes with concrete of grade M30 (Over break filling)	m^3	1,000	450	450,000	Other project reference
34		50mm PVC pipes	Providing and installing PVC pipes (Class IV, minimum Pressure 8Kg/cm2) of 50mm diameters.	m^2	14,672	232	3,403,904	Other project reference
35		Excavation in soi	Soil Excavation volume for the cut and cover section in the main tunnel	m3	680,736	633	430,905,888	DSR KPWD/Vol-I/CH-1/Pg -10
36		Excavation in roc	Rock Excavation volume for the	m3	291,744	2,284	666,401,645	RA
37		Backfill	Backfill quantity	m3	527,693	808	426,375,782	Other project reference

3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	444,787	676	300,860,939	Other project reference
38		M15 Concrete	M15 Grade of concrete for Soft piles	m3	67,819	9,927	673,240,518	RA
39		M35 Concrete	M35 Grade of concrete for Hard piles	m3	67,819	10,870	737,193,958	RA
40		Reinforcement s	Reinforcement for the cut and cover box section and the secant piles	kg	30,498,518	92	2,792,840,825	DSR KPWD/Vol-I/CH-2/Pg -18
41		PT Anchors	PT Ground Anchors of PT force 650KN, 488KN and 520KN for supporting the excavation	m	189,534	4,800	909,762,692	Market rate
42	Cut and cover	Structural steel f	UB 610x229x110.2 steel section provided as steel waler for supporting the secant piles	kg	1,963,280	113	221,850,640	DSR KPWD/Vol-II/CH-11/Pg -77
43		M15 Concrete	100mm thick PCC provided at the base of the C&C RCC box	m3	4,633	9,927	45,993,776	RA
44		M35 Concrete	M35 Grade of concrete for C&C RCC Box section	m3	175,032	10,870	1,902,597,840	RA

45		waterproofing	waterproofing of structure using crystalline admixture in concrete	kg	525,096	150	78,764,400	market rate
46		M35 -Central Dr	Main Drainge pipe provided for removing the waste water from the tunnel	m3	1,759	10,870	19,119,243	RA
47		M35 Concrete	Walkway concrete	m3	402	10,870	4,371,697	RA
48		M35-Side Drain	Longitudinal drain below the road for collection of surface water	m3	429	10,870	4,663,230	RA
49		Reinforcement s	Reinforcement in side drains	kg	25,740	92	2,357,012	DSR KPWD/Vol-I/CH-2/Pg -18
50		Excavation in so	Soil Excavation volume for ramp at the entry and exit of the main tunnel	m3	134,330	633	85,030,890	DSR KPWD/Vol-I/CH-1/Pg -10
51		Excavation in ro	Rock Excavation volume for ramp at the entry and exit of the main tunnel	m3	0	2,284	0	RA
3		Muck Disposal	Muck Disposal & handling, and all other works required	m3	134,330	676	90,862,889	Other project reference
52		M15 Concrete	M15 Grade of concrete for Soft piles	m3	6,679	9,927	66,298,013	RA
53		M35 Concrete	M35 Grade of concrete for Hard piles	m3	6,913	10,870	75,149,253	RA

54		Reinforcement s	Reinforcement for the Ramp box section, secant piles and the RCC beam for ramo wall over 6.5m depth	kg	7,730,064	92	707,842,004	DSR KPWD/Vol-I/CH-2/Pg -18
55		PT Anchors	PT Ground Anchors of PT force 650KN, 488KN and 520KN for supporting the excavation	m	10,875	4,800	52,200,000	Market rate
56	Ramp	Structural steel f	UB 610x229x110.2 steel section provided as steel waler for supporting the secant piles	kg	73,370	113	8,290,810	DSR KPWD/Vol-II/CH-11/Pg -77
57		M15 Concrete	100mm thick PCC provided at the base of the C&C RCC box	m3	2,579	9,927	25,602,130	RA
58		M35 Concrete	M35 Grade of concrete for Ramp RCC Box section	m3	59,413	10,870	645,824,093	RA
59		waterproofing	waterproofing of structure using crystalline admixture in concrete	kg	178,240	150	26,736,048	market rate
60		M35 -Central Dr	Main Drainge pipe provided for removing the waste water from the tunnel	m3	979	10,870	10,642,600	RA

61		M35 Concrete	Walkway concrete	m3	224	10,870	2,433,521	RA
62		M35-Side Drain	Longitudinal drain below the road for collection of surface water	m3	24	10,870	259,576	RA
63		Reinforcement s	Reinforcement in side drains	kg	1,433	92	131,201	DSR KPWD/Vol-I/CH-2/Pg -18
64		Roofing steel	Roofing for the ramp at the entry and exit of the main tunnel	kg	555,608	92	50,877,025	DSR KPWD/Vol-I/CH-2/Pg -18
65		Roofing sheet	Providing and Laying non asbestos high impact polypropylene sheet	m2	38,208	727	27,777,216	DSR KPWD/Vol-II/CH-7/Pg -29

	Estimate of Tunnel Ventilation System				
	DESCRIPTION	**QTY**	**UNIT**	**RATE**	**AMOUNT**
1	Supply, installation, testing and commisioning of jet fans at 25 m^3/s, unidirectional with 2D silencers at both ends. 500 Pa (static total), Thrust = 750N. Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	900.00	Number	2000000.00	1800000000.00
2.1	Supply, installation, testing and commisioning of tunnel ventilation fans at 89 m^3/s, 2000 Pa. Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	4.00	Number	4000000.00	16000000.00
2.2	Supply, installation, testing and commisioning of tunnel ventilation fans at 56 m^3/s, 1000 Pa. Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	4.00	Number	3000000.00	12000000.00
2.3	Supply, installation, testing and commisioning of tunnel ventilation fans at 5.5 m^3/s, 100 Pa. Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	2.00	Number	1000000.00	2000000.00
2.4	Supply, installation, testing and commisioning of tunnel ventilation fans at 56 m^3/s, 1000 Pa. Operating voltage 415 V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	4.00	Number	3000000.00	12000000.00
2.5	Supply, installation, testing and commisioning of tunnel ventilation fans at 102 m^3/s, 2300 Pa. Operating voltage 415 V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	4.00	Number	4600000.00	18400000.00
3.1	Supply, installation, testing and commisioning of tunnel supply axial fans at 25 m^3/s, unidirectional and 500 Pa (static). Operating voltage 415V, 3-phase 50Hz. With all necessesary supports, accesories etc.	8.00	Number	1200000.00	9600000.00
3.2	Supply, installation, testing and commisioning of tunnel supply axial fans at 15 m^3/s, unidirectional and 300 Pa (static). Operating voltage 415V, 3-phase 50Hz. With all necessesary supports, accesories etc.	8.00	Number	900000.00	7200000.00
3.3	Supply, installation, testing and commisioning of tunnel supply axial fans at 2 m^3/s, unidirectional and 30 Pa (static). Operating voltage 415V, 3-phase 50Hz. With all necessesary supports, accesories etc.	4.00	Number	300000.00	1200000.00
3.4	Supply, installation, testing and commisioning of tunnel supply axial fans at 15 m^3/s, unidirectional and 300 Pa (static). Operating voltage 415V, 3-phase 50Hz. With all necessesary supports, accesories etc.	8.00	Number	900000.00	7200000.00

	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
3.5	Supply, installation, testing and commisioning of tunnel supply axial fans at 29 m^3/s, unidirectional and 575 Pa (static). Operating voltage 415V, 3-phase 50Hz. With all necessesary supports, accesories etc.	8.00	Number	1380000.00	11040000.00
4.1	Supply, installation, testing and commisioning of tunnel exhaust axial fans at 30 m^3/s, unidirectional and 1250 Pa (static). Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	8.00	Number	1400000.00	11200000.00
4.2	Supply, installation, testing and commisioning of tunnel exhaust axial fans at 18 m^3/s, unidirectional and 650 Pa (static). Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	8.00	Number	1050000.00	8400000.00
4.3	Supply, installation, testing and commisioning of tunnel exhaust axial fans at 2.5 m^3/s, unidirectional and 65 Pa (static).Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	4.00	Number	350000.00	1400000.00
4.4	Supply, installation, testing and commisioning of tunnel exhaust axial fans at 18 m^3/s, unidirectional and 650 Pa (static).Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	8.00	Number	1050000.00	8400000.00
4.5	Supply, installation, testing and commisioning of tunnel exhaust axial fans at 35 m^3/s, iunidirectional and 1438 Pa (static).Operating voltage 415V, 3-phase 50Hz, 250°C 1hr temperature rating. With all necessesary supports, accesories etc.	8.00	Number	1610000.00	12880000.00
5	Associated Civil Work	20.00	Percent	5548000	387784000
6	Associated Electrical Work and Control Panels	40.00	Percent	11096000	775568000
7	Damper, ducts, filters etc.	30.00	Percent	8322000	581676000
8	Control and Automation System	10.00	Percent	2774000	193892000
9	Fire Protection System	20.00	Percent	5548000	387784000
10	Allowances and Overhead	30.00	Percent	8322000	581676000
	Total Cost				**4847300000.00**

BILL NO.-3
SUB-BASE AND BASE COURSES(Pavement)

Item No.	Description	Unit	Estimated Quantity	Unit Rate in Rs.	Amount in Rs.	Ref. to MoRTH Spec.	Refrence to Rate Analysis
				In Figures	In Figures		
3.01	Construction of granular sub-base by providing close graded Material, 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	cu.m.	10328.40	3319.16	34,281,612.14	401	CHAPTER-SUB-BASES, BASES (NON-BITUMINOUS) AND SHOULDERS, SR. NO-4.1B
TOTAL FOR BILL NO 3					**34281612.14**		

BILL NO.4
Rigid Pavement

Item No.	Description	Unit	Estimated Quantity	Unit Rate in In Figures	Amount in In Figures	Ref. to MoRTH Spec.	Refrence to Rate Analysis
4.01	Dry Lean Cement Concrete Sub- base (Construction of dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/ cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roller, finishing and curing.)	cu.m.	7746.30	4435.08	34,355,460		
4.02	Cement Concrete Pavement (Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @ 400 kg per cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing)	cu.m.	11877.66	7862.48	93,387,864		
4.03	Providing and laying Cement concrete wearing coat M-30 grade including reinforcement complete as per drawing and Technical Specifications	cu.m.	20988.10	14240.00	298,870,544		
	TOTAL FOR BILL NO 4				**426613868.40**		

	Item Description	TOTAL BUILTUP AREA(SQM)	TOTAL BUILTUP AREA(SQF)	RATE/SFT	TOTAL COST
	TOTAL SITE AREA	**6849**	**73969.2**		
1	Tunnel Station Area	2,000.00	21,528.00	3500	75,348,000.0
2	Service Floor Area	5,000.00	53,820.00	2300	123,786,000.0
3	Parking Floor Area	5,000.00	53,820.00	2300	123,786,000.0
4	Retail Floor Area	5,000.00	53,820.00	3500	188,370,000.0
5	Podium Floor Area	2,000.00	21,528.00	3500	75,348,000.0
	TOTAL BUILTUP AREA	**17,000.00**	**183,600.00**		
	PROJECT COST- Civil, mech and plumbing finishing				**586,638,000.0**
1	**STACK PARKING INSTALATION**	**360**		**975,000.00**	**351,000,000.0**
2	**LIFT INSTALLATION**	**4**		**10,000,000.00**	**40,000,000.0**
3	**ESCALLATOR INSTALLATION**	**12**		**20,000,000.00**	**240,000,000.0**
	Total cost of machanical installations				**631,000,000.0**
	Overall Cost				**1,217,638,000.0**
	Overall Cost For 5 Nos				**6,088,190,000.0**

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BILL NO. 7
TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

Sr. No.	Description	Unit	Quantity	Rate	Amount
6.01	Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass Beads on Bituminous Surface (Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .	SQM	22798.25	520.00	11,855,090.00
6.02	Providing and fixing of retro- reflectorised cautionary, mandatory and informatory sign as per IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm (height from crown level of the road and bottom of the sign board shall not be less than 1.5 m.) firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing including painting of vertical post as per specification.				
(a)	90 cm x 30 cm rectangular	NO	8.00	3309.19	26,473.50
(b)	60 cm circular	NO	74.00	4793.00	354,682.00
(e)	90 cm high octagon	NO	24.00	6938.00	166,512.00
6.03	Direction and Place Identification signs upto 0.9 sqm size board. (Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminum sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm (height from crown level of the road and bottom of the sign board shall not be less than 1.5 m.) firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing including painting of vertical post as per specification.				
(a)	1200 x 700	NO	2.00	9075.00	18,150.00
6.05	Erection of Over Head Gantry structure as per drawing including steel work in trusses, steel tubes cutting; fixing in position with welding and bolted complete in all respect.				
(a)	Gantry Mounted Advance Directon	T	7.00	5890.00	41,230.00
6.06	The sign boards made out of 2mm thick aluminum sheet, face to be fully covered by high intensity grade white retro reflective sheeting of encapsulated lens type. The background / border / symbols / legend / arrows shall be made by transparent overlay film of desired colour as per sign details except those in black which shall be of non reflective type. The sign plate shall be fixed with 6mm dia aluminium rivets on MS angle iron frame. The angle iron frame shall be made with angle of size 70mmx70mmx8mm with additional bracing at every 600mm c/c, if any dimension is more than 1200mm.				
(a)	Over Head Gantry Mounted Sign	SQM	28.80	85649.00	2,466,691.20
7.03	Providing and erecting overhead signs with a corrosion resistant 2mm thick aluminium alloy sheet reflectorised with high intensity retro-reflective sheeting of encapsulated lense type 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				
6.07	Reinforced cement concrete M15 grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc				
(a)	5th kilometre stone (precast)	NO	20.00	5697.00	113,940.00
(a)	Ordinary kilometer stone (precast)	NO	1.00	3294.00	3,294.00
(b)	Hectometer stone (precast)	NO	410.00	975.00	399,750.00
6.08	Providing and fixing road delineators complete as per technical specification Section 800.				
(a)	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 toIRC-79 and the drawings.	NO	54.00	1984.00	107,136.00
6.09	Reinforced cement concrete M-15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but including painting) etc. complete.	NO	511.00	898.00	458,878.00

BILL NO. 7
TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

Sr. No.	Description	Unit	Quantity	Rate	Amount
6.10	Road Markers/Road Stud with Lense Reflector (Providing and fixing of road stud 100x 100 mm, die cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973)	NO	6244.00	407.00	2,541,308.00
6.20	RCC Crash Barrier	RMT	102458.00	2984.00	305,734,672.00
TOTAL FOR BILL NO 7					**324,287,806.70**

Road Work_Road Construction including GSB DLC and PQC

Total length in Km

Item No.	Description	Unit	No.	Length (m)	Width (m)	Depth (m)	Quantity	Rate (Rs)	Amount (Rs)
1	Road Construction including GSB DLC and PQC(Normative Cost 2 Lane)	Rmt	1	13.85			13.85	43000000.00	595,550,000.00
2	**Lighting**								
a	Two Lane	Nos	1	197			197.00	25000.00	4,925,000.00
b	4Lane+6 Lane	Nos	1	260			260.00	25000.00	6,500,000.00
3	Drain cum Footpath	Rmt	1	10750			10750.00	6800.00	73,100,000.00

Total Cost =	**680,075,000**

Minor+Major Junctions

Item No.	Description	Unit	Estimated Quantity	Unit Rate in Rs.	Amount in Rs.	Ref. to MoRTH Spec.	Refrence to Rate Analysis
				In Figures	In Figures		
8.01	Clearing and grubbing road land complete as per Technical Specifications Clause 201.	Ha	0.00	185,893.50	-	201	CHAPTER-SITE CLEARANCE, SR. NO.-2.3
8.02	Construction of embankment with approved material from borrow areas with all leads and lifts, compacting to 95% of modified proctor density, all complete as per drawings and Technical Specifications Clause 305. As per Drawing or Directed by Engineer Incharge	Cum	0.00	68.80	-	305	CHAPTER-EARTH WORK, EROSION CONTROL AND DRAINAGE, SR. NO.-3.17
8.03	Construction of subgrade satisfying the requirements of minimum CBR value as indicated in the specification with approved material from borrow areas, with all leads & lifts, compacting to 97% of modified proctor density, all complete as per Technical Specifications Clause 305. As per Drawing or Directed by Engineer Incharge	Cum	2673.88	269.10	719,541	305	CHAPTER-EARTH WORK, EROSION CONTROL AND DRAINAGE, SR. NO.-3.17
8.04	Providing and laying Granular Sub-base of required thickness complete as per Technical Specifications Clause 401. Grading–II (Table –400-2). As per Drawing or Directed by Engineer Incharge	Cum	2846.3	3,319.16	9,447,464	401	CHAPTER-SUB-BASES, BASES (NON-BITUMINOUS) AND SHOULDERS, SR. NO-4.1B
8.05	Providing and laying dense graded bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with VG-10 grade of bitumen @ 4.5% by weight of total mixture	Cum	5368.06	10,117.31	54,310,287	507	CHAPTER-BASES AND SURFACE COURSES (BITUMINOUS), SR. NO.-5.6
8.06	Providing, laying and compacting Wet Mix Macadam (WMM) base with approved material complete as per drawing & Technical Specifications Clause 406.	Cum	2236.69	3,429.30	7,670,281	406	CHAPTER-SUB-BASES, BASES (NON-BITUMINOUS) AND SHOULDERS, SR. NO-4.12
8.07	Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means.	Sqm	8946.76	38.37	343,287	502	CHAPTER-BASES AND SURFACE COURSES (BITUMINOUS), SR. NO.-5.1
8.08	Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25 kg per sqm on the prepared granular surface cleaned with mechanical broom.	Sqm	17893.5	14.21	254,267	503	CHAPTER-BASES AND SURFACE COURSES (BITUMINOUS), SR. NO.-5.8
8.09	Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with VG-10 Grade of bitumen @ 5.4-5.6% by weight of total mixture	Cum	3578.70	11,989.46	42,906,728	509	CHAPTER-BASES AND SURFACE COURSES (BITUMINOUS), SR. NO.-5.8
TOTAL					**115,651,855**		

	High-Capacity & High Speed Busses			
	Item Description	**Qty**	**RATE**	**Amount**
	High-Capacity & High Speed Busses With Driving And Trailling Coaches (Neo-Bus System)			
a	Traction & Power Supply (OHE)	1.00	500000000	500,000,000.0
b	Telecommunication & Passenger Information System	1.00	100000000	100,000,000.0
c	Fare Collection System	1.00	50000000	50,000,000.0
d	Articulated Coach Of Minimum 18 M Length	1.00	400000000	400,000,000.0
	TOTAL			**1,050,000,000.0**

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BILL NO. 8
MISCELLANEOUS ITEMS

SR. NO.	ITEM DESCRIPTION	UNIT	No.	Total QTY	RATE	AMT
8.01	Planting of trees by the road side in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge manure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for ten years	NO	360	360	1567.00	564,120.00
8.02	Making tree guard 53 cm dia. And 1.3 m high as per design from empty bitumen drums including providing and fixing 2 nos. M.S. sheet rings 50 X 0.5 mm with rivets, complete in all respects.	NO	360	360	720.00	259,200.00
8.03	Art Work	ls				50,000,000.00
8.04	Development of Cosnstruction Depot & casting yard	Nos	4	4	150,000,000.00	600,000,000.00
TOTAL FOR BILL NO 8						**650,823,320.00**

	Item Description	Qty	RATE	Amount
	GPS/GNSS-Based Tolling			
a	Whole Arrangement	10.00	11000000	110,000,000.0
	TOTAL			**110,000,000.0**

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