Bill of Quantities for Approx. Cost of Approach Road (Part-01)

SUMMARY OF COST (KM 0+00 TO KM 17+814 & APPROACH-2 660M)

Bill No.	Description	Amount (Rs.)
1	Site Clearance & Dismantling	
2	Earthwork	
3	Sub-Base, Base Courses (Granular)	
4	Bituminous Courses / Concrete Pavements	
4 (a)	Reinforced Earth Embankment	
5	Cross Drainage Structures	
6	Major Bridges & Minor Bridges	
6.1	Cut And Cover	
6.2	Snow Gallary	
7	Drainage & Protection Works	
8	Traffic Signs, Road Markings & Appurtenances	
9	Tunnel	
10	Routine Maintenance During Construction	
11	Catch Dams and Deflection Structures	
12	Snow Clearance	
13	Idle Charge	
	Total Construction Cost --- (A)	
	GST @ 12% of (A)	
	Total Construction Cost --- (B)	

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
Bill No. 1 - SITE CLEARANCE AND DISMANTLING					
1.01	Clearing and grubbing road land including uprooting wild vegetation, grass, bushes, shrubs, saplings and trees of girth upto 300 mm, removal of stumps of such trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, for all leads including removal and disposal of top organic soil not exceeding 150 mm in thickness as per Technical Specification Clause 201.	Hectare	20.57		
1.02	Dismantling of Structures (Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1000 metres) or as per Technical Specification Clause 202.				
a	Cement Concrete Grade M-15 & M-20	cum	21.38		
b	Prestressed / reinforced cement concrete grade M-20 & above	cum	280.44		
c	Dismantling of Brick/Tile Work	cum			
d	Rubble stone masonry in cement mortar.	cum	359.10		
1.03	Dismantling of flexible pavements and disposal of dismantled materials for all leads, stacking serviceable and unserviceable materials separately as per Technical Specification Clause 202.				
	Bituminous courses	cum	2240.48		
	Granular courses	cum	9741.20		
Total for Bill No. 1 - SITE CLEARANCE AND DISMANTLING					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 2 - EARTH WORK					
2.01	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres or as per Technical Specification Clause 301, 302 & 303.				
	Ordinary Soil	cum	255670		
	Ordinary Rock	cum	73049		
	Hard Rock	cum	36524		
2.02	Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-2 or as per Technical Specification Clause 305.	cum	0		
2.03	Construction of embankment with approved materials deposited at site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300-2 or as per Technical Specification Clause 305.	cum	816958		
2.04	Construction of sub-grade and earthen shoulders with approved material obtained from roadway Exc. with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2 as per Technical specifications Clause 305 and as directed by the Engineer-in-charge.	Cum	89442		
2.05	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..	Sqm	6503		
2.06	Filling, grading and compaction with selected material meeting approved design parameters in layers in reinforced zone complete as per Additional Technical Specification Clause A4.	Cum	23890		
2.07	Thermal Insulation with Expanded polystyrene fixed with suitable adhesive on ground as per the directions of the Engineer-in-charge.	cum	184687		
Total for BILL NO. 2 - EARTH WORK					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
Bill No. 3 - SUB-BASE, BASE-COURSES					
3.01	Cement Treated Crushed Rock or combination as per clause 403.2 and table 400.4in Providing, laying and spreading Material on a prepared sub grade, adding the design Grading of material for sub-base course	cum	37278		
3.02	Cement Treated Crushed Rock or combination as per clause 403.2 and table 400.4in Providing, laying and spreading Material on a prepared sub grade, adding the design Grading of material for base course	cum	18001		
3.03	Construction of Aggregate inter layer layer by providing graded stone aggregate by mechanical means including premixing of material with water at OMC in mechanical mixer (Pug mill), carriage of mixed material to site, laying in uniform layers in sub-base/base and compacting with vibratory rollers to achieve the desired density including all material, labour, machinery lighting, barricading and maintenance of diversion etc. complete as per Technical specification clause 406 and as directed by the Engineer-in-charge.	cum	14772		
Total for Bill No. 3 - SUB-BASE, BASE-COURSES					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 4 - BITUMINOUS PAVEMENT COURSES					
4.01	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 0.70 kg/sqm using mechanical means all complete as per Technical specification clause 502 and as directed by the Engineer-in-charge.	sqm	149004		
4.02	Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25 kg /sqm on the prepared granular surface treated with primer cleaned with mechanical broom all complete as per Technical specification clause 503 and as directed by the Engineer-in-charge.	sqm	149004		
4.03	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 Grading-II as per table 500-17, premixed with bituminous binder @ 5.4 per cent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction all complete as per Technical specification clause 507 and as directed by the Engineer-in-charge.	cum	7390		
Total for BILL NO. 4 - BITUMINOUS PAVEMENT COURSES					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO.4a - BILL OF QUANTITIES FOR REINFORCED EARTH EMBANKMENTS					
4.01a	Design, providing construction drawings, providing methodology for construction of Reinforced Earth steepened slope as per BS 8006:2010, FHWA NHI-10-024 (2009), supply of minimum 50mm wide geo synthetic strap , high adherence geosynthetic strap soil reinforcement with higher friction coefficients (varying from 1.5 at top to tanΦ at 6.0 m and below) or equivalent including galvanized steel mesh facia (made from minimum 8mm diameter bars with hot-dip galvanization of 610 grams per sqm to be used), galvanized steel mechanical connectors (610 grams per sqm hot-dip galvanization), non-woven coir geotextile (if any as per approved drawings) as per the technical specification of Reinforced Earth Technology including technical assistance during installation of the Reinforced Earth Structure. This item has to be done by appointing a specialized agency meeting the eligibility criteria as mentioned in the technical specification to form Reinforced Earth steepened slope composite structure.	sqm of fascia area	93,820.00		
4.02a	Supply and laying of PCC leveling pad of M-15 grade (350mm x 150mm) and 100mm thick M-15 grade PCC cover on the berm or bench (wherever applicable) as per approved drawing.	Cum	281.46		
4.03a	Providing and laying of boulders in front of the Reinforced Earth facia (average thickness 400mm) as per technical specification and drawing, size of boulder > 125 mm dressed , as per guidance of site incharge.	cum	28,146.00		
4.04a	Providing and laying of needle punched or continuous filament non-woven geotextile made from polypropylene having minimum mass per unit area as 160 grams per sqmincluding manpower, tools, tackles, all complete.	sqm	2,34,550.00		
4.05a	Supplying and placing of drainage board wrapped with non-woven geotextiles (500 mm x 250 mm) on both sides as horizontal internal drains as per drawings and detailed technical specification including manpower, tools, tackles, all complete.	RM	75,056.00		
Total for BILL NO.4a - BILL OF QUANTITIES FOR REINFORCED EARTH EMBANKMENTS					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO.5 - CULVERTS					
5.01	Earthwork in excavation for structures as per drawing and technical specifications Clause 304 including setting out, construction of shoring and bracing, removal of stumps and other deleterious material and disposal for all leads, dressing of sides and bottom and backfilling in trenches with excavated suitable material.				
	Ordinary soil	cum	2213		
	Ordinary rock	cum	1475		
5.02	Providing and laying plain cement concrete for foundation and substructure of abutment, return wall, wing wall, head wall of HP CD's, pillar, guard wall, causeways excluding cost of skin reinforcement, but including treatment of joints between existing new structures with all leads and lifts as per drawings and technical specifications Clause 1000, 1500, 1700, 2100 & 2200.				
	PCC M15 Leveling Course	cum	2811		
5.03	Providing and laying **Plain/Reinforced Cement Concrete for Substructure** of abutment, box, return wall, wing wall, slab and head wall causeways but excluding cost of reinforcement including treatment of joints between existing and new structures with all leads and lifts complete as per drawings and technical specifications Clause Clause 1000, 1500, 1700 & 2200				
	PCC/RCC Grade M20	cum	0		
5.04	Providing and laying **Plain/Reinforced Cement Concrete for Substructure** of abutment, box, return wall, wing wall, slab and head wall causeways but excluding cost of reinforcement including treatment of joints between existing and new structures with all leads and lifts complete as per drawings and technical specifications Clause Clause 1000, 1500, 1700 & 2200				
	PCC/RCC Grade M30	cum	1114		
5.05	Providing and laying **Plain/Reinforced Cement Concrete for Box Structure** but excluding cost of reinforcement including treatment of joints between existing and new structures with all leads and lifts complete as per drawings and technical specifications Clause Clause 1000, 1500, 1700 & 2200				
	RCC Grade M30	cum	1578		
5.06	Supplying, fitting and placing HYSD bar reinforcement (Fe 500) complete as per drawings and technical specifications Clauses 1000, 1600, 1900, 2100, 2200 & 2300				
	In Box Structure	MT	324		
5.07	Laying Reinforced Cement Concrete Pipe NP4 / Prestressed Concrete Pipe on First Class Bedding in Single Row				
	1200mm dia pipe	m	1098		
5.08	Reinforced Cement Concrete M 30 grade approach slab including reinforcement and formwork complete as per drawing and technical specifications Clause 2704 and as directed by the Engineer-in-charge.	Cum	811		
5.09	Backfilling behind abutment, wing wall, retaining wall, breast wall and return wall complete as per drawings & technical specifications Clause 710.1.4.of IRC:78 & Technical specification clause 305.4.4.	cum	7788		
5.10	Providing and laying 65 mm wearing course on top of deck slab consisting of 25 mm thick mastic asphalt wearing course and 40 mm thick Bituminous concrete laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping of 13.2 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 1000C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 507 and 516.	sqm	3293		

THE APPROACH ROAD WITH AVALANCHE PROTECTION WORKS IN ZOJILA PROJECT

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
5.11	Providing and laying of a filler type expansion joint 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 all complete as per Technical specification Clause 2606 and as directed by the Engineer-in-charge.	m	24		
5.12	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	cum	25		
5.13	Flexible Apron :Construction of flexible apron 750 mm thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.	cum	168		
5.14	Providing weepholes in brick masonry/stone masonry, plain/reinforced concrete abutment, wing wall, return wall with 100 mm dia AC pipe extending through the full width of the structures with slope of 1(V):20(H) towards drawing face complete as per drawing and technical specifications Clause 2200 & 2706	Nr.	1868		
5.15	Providing and laying **filter media with granular crushed aggregates** as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 2504.	cum	1369		
5.16	Providing and fitting Drainage Spouts complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	nr	54		
5.17	Providing and fixing filler type expansion joint in slab bridges and culverts complete as per technical specification section 2600	m	545		
5.18	Providing and fixing RCC Marker posts of dimensions as shown in Drawings and as per Technical Specifications and as directed by the Engineer-in-charge	nr	128		
5.19	Printing of culvert No. and span arrangement of any shade with synthetic enamel paint black or any other approved colour to give an even shade as complete as per Technical specifications and as directed by the Engineer-in-charge.	nr	82		
Total for BILL NO.5 - CULVERTS					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO.6 - BILL OF QUANTITIES FOR Bridge					
6.01	Earth work in excavation for foundation of structures in ordinary soil by mechanical means as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material all complete as per Technical specifications and as directed by the Engineer-in-charge.				
a	Ordinary Soil - Depth Upto 3m	cum	10,686.02		
b	Ordinary Rock - (not requiring blasting)	cum	4,579.72		
6.02	Providing and laying Plain cement concrete in Levelling Course, mechanically mixed and compacted, including centering and shuttering all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.		-		
a	PCC Grade M15	cum	432.52		
6.03	Bored cast-in-situ M40 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)	metre	13,933.80		
6.04	Providing and laying Reinforced Cement Concrete in Foundation mechanically mixed including centering and shuttering but excluding cost of reinforcement, all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.		-		
a	RCC Grade M30	cum	-		
b	RCC Grade M35	cum	1,151.30		
c	RCC Grade M40	cum	6,806.26		
6.05	Providing and laying Reinforced Cement Concrete in Substructure, mechanically mixed and compacted, including centering and shuttering but excluding cost of reinforcement, all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.		-		
a	RCC Grade M30	cum	-		
b	RCC Grade M35	cum	705.95		
c	RCC Grade M40	cum	8,620.37		
6.06	Providing and laying Reinforced cement concrete in super-structure including centering and shuttering but excluding cost of reinforcement, all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.		-		
a	RCC Grade M25	cum	-		
b	RCC Grade M30	cum	-		
c	RCC Grade M35	cum	-		
d	RCC/PSC Grade M40 - Solid Slab	cum	4,190.83		
e	RCC/PSC Grade M45 - T Beam & Slab	cum	5,760.12		
6.07	Supply and fabrication of Mild Steel as per IS 2062 including drilling, welding, riveting, grinding supply of bolts, nuts, washers, fixtures etc. at site. Assembling, erection of fabricated steel structure to proper line, level and camber as per approved drawings and technical specifications section 1900 complete including transportation and handling, painting all exposed surfaces of steel work after erection with one coat of red lead primer paint to IS 102 and two coats of paint including all labour consumable other material machinery tools and tackles complete as per specification and directed by engineers including furnishing of detailed erection scheme and getting the same approved from competent authority	MT	-		
6.07a	Providing, supply and placing at position of Bow Steel Girder and Composite steel girder ncluding all lead lift.	MT	891.31		
6.08	Supplying, fitting and placing HYSD bar reinforcement all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.		-		
a	For Foundation	MT	3,476.51		
b	For Substructure	MT	1,210.69		
c	For Superstructure	MT	1,219.50		
6.09	High tensile steel wires / strands including all accessories for stressing, stressing operations and grouting complete as per drawing and Technical Specifications and as directed by the Engineer-in-charge.	MT	226.73		

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
6.10	Supplying, fitting and fixing in position true to line and level POT/PTFEE bearing conforming to IRC: 83 (Part-III) section IX and clause 2006 of MoRTH specifications complete including all accessories as per drawing and Technical Specifications as directed by the Engineer-in-charge.		-		
(i)	140 tonnes	Nos	-		
(ii)	250 tonnes	Nos	10.00		
6.11	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.	cucm	50,33,600.00		
7.11	Providing and laying Reinforced cement concrete of M35 grade for approach slab including reinforcement and formwork all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.	cum	191.10		
7.12	Construction of precast RCC railing of M35 Grade, true to line and grade, tolerance of vertical RCC post not to exceed 1 in 500, leaving adequate space between vertical post for expansion, complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	m	2,066.04		
7.13	Provision of an Reinforced cement concrete crash barrier constructed with M-40 grade concrete with HYSD reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, complete as per drawing and Technical specifications clause 2703 and as directed by the Engineer-in-charge.	m	2,105.74		
7.14	Providing and fitting Drainage Spouts complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	Each	209.00		
7.15	Providing and fixing filler type expansion joint in slab bridges and culverts complete as per technical specification section 2600	m	136.00		
7.16	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	352.00		
7.17	Backfilling behind abutment, wing wall, retaining wall, breast wall and return wall complete as per drawings & technical specifications Clause 710.1.4.of IRC:78 & Technical specification clause 305.4.4.	cum	18,650.63		
7.18	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 2504.	cum	1,110.21		
7.19	Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification	cum	427.53		
7.20	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	cum	855.07		
7.21	Providing and laying 65 mm wearing course on top of deck slab consisting of 25 mm thick mastic asphalt wearing course and 40 mm thick Bituminous concrete laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping of 13.2 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 1000C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 507 and 516.	sqm	14,278.18		
Total for BILL NO.6 - BILL OF QUANTITIES FOR Bridge					

Item No.	Description of Items	Unit	Quantity	Unit Rate (INR)	Total Amount (INR)
Cut & Cover					
6.10	Designing, providing construction drawing and supplying moulds , spreader beams, lifting eyes, lifting anchors, load chain, consumables that includes lifting anchors, non-woven geotextile, water-proofing membrane for arch joints, including technical assistance during precasting and installation of precast arch units as per technical specification and construction manual of technology provider. Contractor shall tie - up with an executing agency before the pre-bid with adequate similar work experience in Indian conditions.	Lm	2350.00		
6.11	Provinding and supplying of concrete of M 45 Grade for precasting segmental arches at casting yard including demoulding , stacking and curing as per site conditions .	cum	25544.50		
6.12	Providing & Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications for Precast ARCH.	MT	4206.50		
6.13	Providing and supplying of M35 Concrete for casting Stitch Beams and Collar	cum	822.50		
6.14	Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications for Stitch Beams and Collar.	MT	65.80		
6.15	Providing and supplying of concrete of M35 Concrete for casting of raft and foundation beams for erection of segmental arches including all spaces , opening for utilities like wire ducts , embedded drainage pipes etc. as per the final construction drawings	cum	18330.00		
6.16	Providing and supplying of geosynthetic clay liner for sealing at the top of the precast segmental arch , to resitrict the penetration of precipitated water into the filled strata and per enclosed drawing and specifications.	sqm	82250.00		
6.17	Providing and supplying of Grade M15 for DLC	cum	2800.00		
6.18	Providing of 80MT crane with fuel and operator for casting	Month	12.00		
6.19	80MT crane with fuel and operator for erection	Month	12.00		
6.20	Trailer with fuel and operator	Month	12.00		
6.21	Installation of Arch units using 80 MT crane along with tools tackles , manpower etc.	Lm	2350.00		
6.22	Providing , filling and compacting of selected earth fill as per technical specifications by filling earth in layers of 250 mm and compacting to 95% of proctor density , with the ambit of technical specification and direction of engineer - in - charge	Cum	279650.00		
6.23	Clearing and grubbing road land including uprooting wild vegetation, grass, bushes, shrubs, saplings and trees of girth upto 300 mm, removal of stumps of such trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, for all leads including removal and disposal of top organic soil not exceeding 150 mm in thickness as per Technical Specification Clause 201.	Hectare	3.76		
6.24	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres or as per Technical Specification Clause 301, 302 & 303. (Ordinary Rock)	Cum	517000.00		
6.25	Shoulder Pile as per details	Rm	550.00		
				TOTAL AMOUNT =	**-**

Item No.	Item Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 6.2 - SNOW GALLARY					
6.20	Clearing and grubbing road land including uprooting wild vegetation, grass, bushes, shrubs, saplings and trees of girth upto 300 mm, removal of stumps of such trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, for all leads including removal and disposal of top organic soil not exceeding 150 mm in thickness as per Technical Specification Clause 201.	Hectare	0.59		
6.21	Earth work in excavation for foundation of structures in ordinary soil by mechanical means as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material all complete as per Technical specifications and as directed by the Engineer-in-charge.				
	(a) Ordinary Soil - Depth Upto 3m	Cum	9,980.45		
6.22	Providing and laying Plain cement concrete in Levelling Course, mechanically mixed and compacted, including centering and shuttering all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.				
	(a) PCC Grade M15	Cum	595.85		
6.23	Providing and laying Reinforced cement concrete including centering and shuttering but excluding cost of reinforcement, all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.				
	(a) RCC M25 Concrete	Cum	15,306.15		
6.24	Providing and laying Reinforced cement concrete including centering and shuttering but excluding cost of reinforcement, all complete as per drawing and Technical specifications, RCC M25 grade Walk Way	Cum			
6.25	Supplying, fitting and placing HYSD bar reinforcement all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	Tonne	1,913.27		
6.26	Providing and laying 65 mm wearing course on top of deck slab consisting of 25 mm thick mastic asphalt wearing course and 40 mm thick Bituminous concrete laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping of 13.2 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 1000C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 507 and 516.	Sqm	4,500.00		
6.27	Providing and laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 2504.	Cum	4,479.19		
6.28	Providing weepholes in brick masonry/stone masonry, plain/reinforced concrete abutment, wing wall, return wall with 100 mm dia PVC pipe extending through the full width of the structures with slope of 1(V):20(H) towards drawing face complete as per drawing and technical specifications Clause 2200 & 2706	Nos	3,223.00		
6.29	Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long all complete as per Technical specifications and as directed by the Engineer-in-charge.	Rm	900.00		
6.30	Providing, drilling and inserting 600 mm dia perforated PVC pipe wrapped with geotextile as drainage pipes in hill slopes to be reinforced as per approved drawings & Technical Specifications or as directed by the Engineer-in-charge.	Lm	450.00		

Total Amount for Snow gallary **-**

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 7 - DRAINAGE & PROTECTION WORKS					
7.01	Earth work in excavation for foundation of structures in ordinary soil by mechanical means, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material all complete as per Technical specification Clause 304 and as directed by the Engineer-in-charge.				
	Ordinary Soil	cum	1,33,556		
	Ordinary Rock - (not requiring blasting)	cum	77,430		
7.02	Providing and laying Plain cement concrete in Levelling Course, mechanically mixed and compacted, including centering and shuttering all complete as per drawings and Technical specifications Clause 1000, 1500, 1700, 2100 & 2200 and as directed by the Engineer-in-charge.				
	PCC Grade M15	cum	2,535		
	PCC Grade M20	cum	522		
7.03	Providing and laying **Reinforced Cement Concrete for super structure** of all solid slab/ T-Beam slab / approach slab/ R.C.C Box super structure / wearing coat / railing / kerb etc. for CD's and bridges excluding cost of reinforcement, including treatment of joints between existing and new structures with all leads and lifts as per drawings and technical specifications Clause Clause 1000, 1500, 1700 & 2300		-		
	RCC Grade M25	cum	5,474		
	RCC Grade M30	cum	6,344		
7.04	Supplying, fitting and placing HYSD bar reinforcement all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	MT	929		
7.05	Providing weepholes in brick masonry/stone masonry, plain/reinforced concrete abutment, wing wall, return wall with 100 mm dia AC pipe extending through the full width of the structures with slope of 1(V):20(H) towards drawing face complete as per drawing and technical specifications Clause 2200 & 2706	each	22,349		
7.06	Providing and laying **filter media with granular crushed aggregates** as per specification to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and technical specification Clause 2504.	cum	1,383		
7.07	Random Rubble Masonry work in cement mortar 1:5 for substructure complete as per drawing and Technical Specifications	cum	7,527		
7.08	Providing and construction of a **gabion structure** for retaining earth with segments of wire crates each divided into 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.	Cum	81,016		
7.09	Providing and laying Plum cement concrete M15 mix in 40:60 ratio having 40% plum and 60% concrete in parapet wall and other protective works near the existing structues and at other places as and when required using stone aggregates of 20 mm nominal size with mixing mechanically, vibrating with needle vibrator, hire charges of machinery, loading, unloading, curing, finishing the exposed faces etc, complete with all lead and lift [MoRT&H Specification : Section 1000, 1700]	Cum	239		
7.10	Providing and laying of HDPE pipe duct 300 mm dia for utility service as per Technical Specification or as directed by Engineer.	Rmt	15,819		
7.11	Construction of semi-circular drainage chute in cement concrete M-15 with foundation concrete as per drawings and Technical Specification Sections 1500 and 1700 including construction of bell mouth at entry.	m	468		
7.12	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	cum	4,942		
7.13	Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification	cum	1,647		
Total for BILL NO. 7 - DRAINAGE & PROTECTION WORKS					

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 8 - TRAFFIC SIGNS, MARKING AND ROAD APPURTENANCES					
8.01	Retro- reflectorised Traffic signs (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 aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)				
a	90 cm equilateral triangle	each	-		
b	60 cm circular	each	60		
c	80 cm x 60 cmm rectangular	each	-		
d	90 cm high octagon	each	-		
e	60 cm high octagon	each	5		
f	60 CM EQUI. TRIANGLE	each	268		
g	60CM X 45CM RECTANGULAR	each	-		
h	60CM X 60CM SQUARE	each	-		
8.02	Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting of 2 mm thick supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing and all complete as per Technical specifications and as directed by the Engineer-in-charge.				
a	Direction and Place Identification Signs upto 0.9 sqm Size Board.	Sqm	10		
b	Direction and Place Identification Signs with size more than 0.9 sqm size Board.	Sqm	25		
8.03	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 802.6 over a designed support system of aluminium alloy or galvanised steel trestles and trusses of sections and type as per structural design requirements and approved drawings and all complete as per Technical specifications and as directed by the Engineer-in-charge.				
A	Full Width Gantry	nr	5		
B	Cantliever Gantry	nr	13		
8.04	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes all complete as per Technical specification Clause 803 and as directed by the Engineer-in-charge.				
	Lane, Centreline, Edge and other marking	sqm	9,865		
8.05	Kilo Metre Stone (Reinforced cement concrete M15grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc)				
a	5th kilometre stone (precast)	each	2		
b	Ordinary Kilometer stone (Precast)	each	15		
c	Hectometer stone (Precast)	each	186		
8.06	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 stripes, fitted with 80 x 100 mm rectangular or 75 mm dia circular reflectorised panels at the top, buried or pressed into the ground and confirming toIRC-79 and the drawings.)				
a	Delineators	each	620		

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
b	Cluster of red reflectors	each			
c	Hazard/ Object Marker	each	90		
8.07	Boundary pillar (Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but excluding painting)	each	34		
8.08	Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long all complete as per Technical specifications and as directed by the Engineer-in-charge.	Rm	10,672		
8.09	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	each	2,450		
8.10	Supply, install, test and commission 30m high mast pole with 4 x 400 watts Metal Halide lanterns which can withstand forces exerted with wind speeds of 180 kmph with 3 seconds gust, dead weight stress and having high powered electrically driven power tools for raising and lowering of lantern carriage, aviation obstruction luminaries, earthing arrangements, all accessories, lamps, etc. complete for safe working load of 850kg complete as per Technical specifications.	each			
8.11	Supply, install, test and commission 9m high street light pole with 1 x 150 watts Metal Halide lanterns, earthing arrangements and all accessories, lamps, anchor bolts etc. complete as per Technical specifications.	each			
8.12	Supply, install, test and commission 9m high street light pole with 2 x 150 watts Metal Halide lanterns, earthing arrangements and all accessories, lamps, anchor bolts etc. complete as per Technical specifications.	each			
8.13	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	m	14,450		
8.14	Painting on Kerb	Sqm	5,174		
Total for BILL NO. 8 - TRAFFIC SIGNS, MARKING AND ROAD APPURTENANCES					

Item No.	Item Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 9 - TUNNEL					
1.00	TWIN TUNNEL NO. 1 (433M LENGTH)	1.00	433.00		
2.00	TWIN TUNNEL NO. 1 (1927.47M LENGTH)	1.00	1,928.00		

TOTAL COST =

Item No.	Description	Unit	Quantity	Estimated Rate	Estimated Amount
BILL NO. 9 - Routine Maintenace during Construction					
10.01	Carrying out repairs to pot holes and patching to existing Bituminous carriageway surfacing using semi dense bituminous concrete with all lifts and leads complete as per MoRT&H technical specification clause 3004 and as per the direction of engineer.	sqm	59,850.00		
10.02	Providing and applying tack coat with bituminous emulsion at the rate of 0.2 kg per sqm with all lifts and leads complete as per MoRT&H technical specification clause 503.	sqm	59,850.00		
10.03	Sealing of cracks in bituminous surface with fog seal as per technical specification clause 3004	sqm.	3,591.00		
10.04	Routine maintenance of shoulder as per technical specification section 3000 and clause 408	per km per month	478.80		
Total for BILL NO. 9 - Routine Maintenace during Construction					

BILL OF QUANTITIES FOR CATCH DAMS AND DEFLECTING STRUCTURES

Sl No	Description of Items	Unit	Qty	Rate (Rs)	Amount (Rs)
11.01	Design, providing construction drawings, providing methodology for construction of Reinforced Earth steepened slope as per *BS 8006:2010, FHWA NHI-10-024 (2009)* , supply of minimum 50mm wide geo synthetic strap , high adherence geosynthetic strap soil reinforcement with higher friction coefficients (varying from 1.5 at top to tanΦ at 6.0 m and below) or ***equivalent*** including galvanized steel mesh facia (made from minimum 8mm diameter bars with hot-dip galvanization of 610 grams per sqm to be used), galvanized steel mechanical connectors (610 grams per sqm hot-dip galvanization), non-woven coir geotextile (if any as per approved drawings) as per the technical specification of Reinforced Earth Technology including technical assistance during installation of the Reinforced Earth Structure. This item has to be done by appointing a specialized agency meeting the eligibility criteria as mentioned in the technical specification to form Reinforced Earth steepened slope composite structure.	Per sqm of fascia	27,982.50		
11.02	Supply and laying of PCC leveling pad of M-15 grade (200mm x 250mm) and 100mm thick , L shape , M-15 grade PCC cover on the berm or bench (wherever applicable) as per approved drawing.	Cum	109.20		
11.03	Providing and laying of boulders in front of the Reinforced Earth facia (average thickness 400mm) as per technical specification and drawing , size of boulder > 125 mm dressed , as per guidance of site incharge.	cum	22,386.00		
11.04	Providing and laying of needle punched or continuous filament non-woven geotextile made from polypropylene having minimum mass per unit area as 160 grams per sqmincluding manpower, tools, tackles, all complete.	sqm	78,351.00		
11.05	Supply and laying of RCC leveling pad of M-35 grade 500mm thick cover top of avalanche dam as per approved drawing and guidance of engineer - in - charge	Cum	1,638.00		
11.06	Supplying, fitting and placing HYSD bar reinforcement all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	MT	98.28		
11.07	Providing ,supplying and laying of erosion control blanket of 600 GSM , made up of coconut coir , sandwitched between polypropylene net , including U hooks , seeds , manpower , machinaries etc. as per the direction of engineer - in charge	sqm of fascia area	9,828.00		
11.08	Supply , filling and compacting with select fill for reinforced earth slopes , inlcuding watering, ramming, consolidation and dressing complete as per requiremnt at site , the soil to be used as structural fill should be free draining granular fill, as per Morth Section 3100 guidelines or as per the direction and acceptance of Engineer - in - charge.	Cum	78,624.00		
				Total Cost =	

BILL OF QUANTITY TUNNEL

Nilgrar Tunnels (01 & 02)

DESCRIPTION OF ITEM		**AMOUNT (INR)**
TOTAL OF BILL 1	CIVIL ENGINEERING MAIN TUNNEL	
TOTAL OF BILL 2	CIVIL ENGINEERING PORTAL WEST	
TOTAL OF BILL 3	CIVIL ENGINEERING PORTAL EAST	
TOTAL OF BILL 4	CIVIL ENGINEERING ESCAPE TUNNEL	
TOTAL OF BILL 5	CIVIL ENGINEERING SUPERSTRUCTURES	
TOTAL OF BILL 6	ELECTROMECHANICAL & VENTILATION	
	Total Project Construction Cost	

Item No.	Description of Item	Unit	Quantity	Rate	Amount
Schedule A - Dewatering arrangement					
Schedule A1	**Temporary dewatering arrangement**				
A101	Care of water in for up and/or downwards drive	m3			
Total of Schedule A1 - Temporary dewatering arrangement					
Schedule A2	**Permanent dewatering arrangement**				
A201	Provision and installation of main collector pipe, connection pipes, cleaning access pipes etc (non - perforated PVC pipes)				
A201.01	150mm dia (internal) PVC pipe	m	4,750.66		
A201.02	400mm dia (internal) PVC pipe	m	4,750.66		
A202	Provision and laying of drainage pipes (perforated PVC pipes)		-		
A202.01	150mm dia (internal) PVC pipe	m	870.19		
A202.02	250mm dia (internal) PVC pipe	m	9,501.32		
A202.03	Jute geotextile	m2	-		
A203	Manufacture, supply and placing of precast concrete elements for carriageway		-		
A203.01	Precast concrete slot channel drain (L=3m per piece)	pc	1,585.00		
A203.02	Precast concrete Kerbstone (L=3m per piece)	pc	1,585.00		
A204	Provide and install dimple sheets between primary and permanent lining	m2	1,17,587.91		
A205	Protective felt (geotextile) with minimum weight of 500 g/m2 for protection of waterproofing membrane and drainage on the finished outer lining surface, including cost of material, labour,	m2	1,17,587.91		
A206	Provision and installation of 2mm thick PVC or ECB water proofing membrane including cost of all materials, labour, equipment etc.	m2	1,17,587.91		
A207	PVC water stop with serrated bulb (225mm wide, 8-11mm thick)	m	150.00		
A208	Manufacture, supply and placing of pre-cast concrete manholes including bell mouth, manhole cover, cost of all materials, labour, equipment etc.		-		
A208.01	Service duct precast cover	pc	8,633.00		
A208.02	Drainage manhole at cross passage	pc	-		
A208.03	Groundwater drainage manhole @ 100m c/c	pc	48.51		
A208.04	HV cables manhole	pc	-		
A208.05	LV cables manhole	pc	-		
Total of Schedule A2 - Permanent dewatering arrangement			**-**		
Total of Schedule A - Dewatering arrangement			**-**		

Schedule B - Underground Excavation			**-**		
Schedule B1	**Excavation**		-		
B101	**Underground excavation for tunnel as per respective support class. Including all types of niches, lay-bys, including drilling and blasting or other means of excavation, including widening of top heading footings, provision of surface drainage, construction ventilation, lighting arrangement during construction, temporary backfilling for traffic in tunnel, removal of the same and disposal of excavated material to muck disposal area, with all lifts.**		**-**		
B101.01	Exavation in Support Class A; top heading, bench, invert	m3	20,343.31		
B101.02	Exavation in Support Class B; top heading, bench, invert	m3	1,48,447.22		
B101.03	Exavation in Support Class C; top heading, bench, invert	m3	2,06,282.62		
B101.04	Exavation in Support Class D; top heading, bench, invert	m3	-		
B101.05	Exavation in Support Class E; top heading, bench, invert	m3	-		
B101.06	Exavation in Support Class F; top heading, bench, invert	m3	-		
B102	**Excavation of niches; emergency telephone, hydrant cabinet, lay-bys, power supply niches, elec substn**	m3	26,220.19		
B103	**Excavation of cross passages; PCP, without rock mass classification**	m3	787.00		
B104	**Excavation of cross passages; VCP, without rock mass classification**	m3	795.25		
Total of Schedule B1 - Excavation			**-**		
Schedule B2	**Drilling and Grouting**		-		
B201	**Drilling of drainage drilling in the tunnel perimeter and face, diameter 50mm, length 3m to 8m**	m	1,425.20		
B202	**Drilling of exploratory drilling without core recovery, diameter 50mm, length up to 24m**	m	5,700.79		
B203	**Driling or exploratory drilling with core recovery, diameter 76mm**		-		
B203.01	Drilling 0 -10m	m	142.52		
B203.02	Drilling 10 -20m	m	142.52		
B203.03	Drilling 20-30m	m	142.52		
B204	**Strata grouting/Consolidation grouting**		-		
B204.01	Grout quantity	tonnes	297.52		
B204.02	Drill length (74mm dia)	m	248.04		
B205	**Contact grouting between permanent lining and primary lining or ground**		-		
B205.01	Installation of grouting pipes (1m in length)	pc	-		
B205.02	Contact grouting including all necessary works, machineries and materials	tonnes	-		
B205.03	Drill length (74mm dia)	m	-		
Total of Schedule B2 - Drilling and grouting			**-**		
Total of Schedule B - Underground Excavation			**-**		

Schedule C - Primary Support Measures			**-**		
Schedule C1	**Rock Bolts and Anchors**		-		
C101	**Supply, drilling and grouting of grouted rock bolts (SN type); Breaking Load >= 250 kN. The rate shall include costs of all materials, labour, equipment etc**		-		
C101.01	Length of 3m	pc	41.33		
C101.02	Length of 4m	pc	360.12		
C101.03	Length of 6m	pc	2,445.37		
C101.04	Length of 9m	pc	5,823.68		
C102	**Supply, drilling and grouting of grouted rock bolts (SN type); Breaking Load >= 350 kN. The rate shall include costs of all materials, labour, equipment etc**		-		
C102.01	Length of 6m	pc	-		
C102.02	Length of 9m	pc	-		
C103	**Supply, drilling, installation and grouting of self drilling rock bolts (SD type) of Fy >= 350 kN. The rate shall include costs of all materials, labour, equipment etc**		-		
C103.01	Length of 9m	pc	-		
C104	**Supply, drilling, installation and grouting of forepoling (grouted rock bolts (SN type); Breaking Load >= 250 kN). The rate shall include costs of all materials, labour, equipment etc**		-		
C104.01	Length of 6m	pc	67,612.03		
C105	**Supply, drilling, installation and grouting of piperoof. The rate shall include costs of all materials, labour, equipment etc**		-		
C105.01	Steel pipe umbrella with diameter of 114mm, wall thickness of 6.3mm and length of 15m	pc	-		
Total of Schedule C1 - Rock bolts and Anchors			**-**		
Schedule C2	**Shotcrete, lattice girder, lining stress controller and wire mesh**		-		
C201	Shotcreting of primary lining with cube strength of 25 Mpa. Rates include all material, labour, equipment etc required. Reinforcement is compensated seperately		-		
C201.01	50mm thk shotcrete lining	m2	50,507.32		
C201.02	100mm thk shotcrete lining	m2	60,083.09		
C201.03	150mm thk shotcrete lining	m2	-		
C201.04	200mm thk shotcrete lining	m2	-		
C201.05	250mm thk shotcrete lining	m2	-		
C201.06	300mm thk shotcrete lining	m2	-		
C202	Shotcreting of primary invert lining with cube strength of 25 Mpa. Rates include all material, labour, equipment etc required. Reinforcement is compensated seperately.		-		
C202.01	200mm thk shotcrete lining	m2	-		
C202.02	250mm thk shotcrete lining	m2	-		
C203	Shotcreting with with cube strength of 25 Mpa for face sealing and widening of top heading footing in tunnel. Rates shall include all labour, materials, cost of pins, hooks, lead, lift, handling and wastage.	m3	-		
C204	Steel fibre reinforcement; assuming steel fibre content at 30 kg/m3	tonnes	256.01		

C205	Supply and placing of 150 x 150 x 6mm welded wire fabric as reinforcement in primary lining. The rate shall include all labour materials, cost of pins, hooks, lead, lift, handling, wastage	m2	-		
C206	Supply, fabrication and erection of lattice girders and all accessories, including all lead, lift, wastage, storing, drilling holes, fixing, in phases etc and installation of accessories, for joining the lattic girder segments. The rates shall include costs of all materials, labour, equipment, welding etc including additional cost for enlargement of top heading footing.		-		
C206.01	Lattice Girder Type 95/18/26	m	-		
C206.02	Lattice Girder Type 130/22/32	m	-		
Total of Schedule C2 - Shotcrete, lattice girder and wire mesh			**-**		
Total of Schedule C - Primary Support Measures			**-**		
Schedule D - Concrete Work			**-**		
D101	Design mix concrete of cube strength C25/30 or M30 including machine mixed, machine batched, machine vibrated, form work etc. The reinforcement is compensated seperatedly		-		
D101.01	*Concrete lining of tunnel Vault*	*m3*	*41,220.46*		
D101.02	*Concrete lining of tunnel Abutment/Invert*	*m3*	*8,642.18*		
D102	Design mix concrete cube strength C12/15 or M15 including mechanicallly mixed, machine mixed, machine batched, machine vibrated, form work etc. Lean concrete fill in tunnel	m3	*11,999.01*		
D103	Non-fines porous concrete in tunnel	m3	*1,934.70*		
D104	Reinforcement for inner lining		-		
D104.01	Reinforcement for inner lining- Mined Tunnel		-		
D104.01.01	Reinforcement for inner lining of tunnel Vault	tonnes	7,337.17		
D104.01.02	Reinforcement for inner lining of tunnel Abutment/Invert	tonnes	1,515.58		
D104.02	Reinforcement for inner lining - Cut & Cover	tonnes	14.93		
D105	Fire proofing material		-		
D105.01	Polypropylene fibres (Assume dosage of 2kg/m3 of concrete)	tonnes	99.73		
Total of Schedule D - Concrete Work			**-**		
Schedule E - Instrumentation & Monitoring			**-**		
E101	Supply, install, read and maintain 3D monitoring targets (bireflective) in top heading, bench and invert. (Including PCP, VCP)	pc	950.13		
E102	Supply, install, read and maintain multi-rod extensometers (9m long).	pc	6.00		
Total of Schedule E - Instrumentation & Monitoring			**-**		
Schedule F - Pavement			**-**		
F101	Supply, mixing, placing, compacting of concrete pavement with minimum thickness of 24cm (C35) including construction of contraction joints, expansion joints, longitudinal joints, joint sealing compound, reinforcement, dowel rods and tie bars. The rate shall include costs of all materials, labour, equipment, quality checks etc required.	m3	8,692.38		
F102	Dry Lean Concrete 150mm thick	m3	5,194.85		

F103	Supply and placing of 8 mm dia reinforcing mesh @ 200m c/c of Fe 500 as reinforcement in wearing course for first 50m of tunnel length from each portal. The rate shall include all labour materials, cost of pins, hooks, lead, lift, handling and wastage.	m3	5.75		
F104	Supply, preparation of material, placing, compacting of granular sub-base with a minimum thickness of 20 cm. The rates shall include costs of all materials, labour, equipment etc required.	m3	7,485.12		
F105	Debonding layer 125 micron (polythene). The rates shall include costs of all material, labour, equipment etc required.	m2	34,632.31		
F106	Manufacture, supply and placing of pre-cast footh path elements in tunnel as per approved drawings, including application of 2cm mastic asphalt surface. The rate shall include costs of all materials, labour, equipments, quality checks etc required.	m	1,585.00		
Total of Schedule F - Pavement			-		
Total of Bill 1 - Civil Engineering Main Tunnel			-		
Bill 2 - Civil Engineering Portal West			-		
Schedule G - Dewatering Arrrangement			-		
Schedule G1	**Temporary Dewatering Arrangement**		-		
G101	Care of water in temorary portal construction site	ls	2.00		
Total of Schedule G1 - Temporary Dewatering Arrangement			-		
Schedule G2	**Permanent Dewatering Arrangement Portal**		-		
G201	Provision and laying of drainage pipes (perforated PVC pipes)		-		
G201.01	51mm dia (internal) PVC pipe, 3m long each	m	854.00		
G202	Geotextile to be wrapped around perforated drain pipes (jute geotextile) including costs of all materials, labour, equipment etec.	m2	278.78		
Total of Schedule G - Permanent Dewatering Arrangement			-		
Total of Schedule G - Dewatering Arrangement			-		
Schedule H - Open Excavation and Earthwork			-		
H101	Earthwork in open excavation in all kinds of soils and rock, including rock, requiring use of blasting, crow bars etc at portals and construction roads and to make berms, surface drains and the like, diversion of irrgation canal, nallah and the like and disposal of the excavated material, to dumping site etc. The rate for this item includes all site clearances (cutting of trees, shrubs, roots, vegetation etc.), lifts, ascent descent handling and lead to designated muck dump areas. Dressing of cuttings to final profile, demarcation and setting out.		-		
H101.01	Loose excavation as per classification of excavation	m3	98,529.00		
H101.02	Rock excavation as per classification of excavation	m3	61,352.54		
H102	Embankments and fillings in areas of open excavation. Rates shall include supply, preparation of material, filling and compaction in layers.	m3	40,287.18		
H103	Rip-rap layer on embankments with a minimum thickness of 1m for erosion protection. Rates shall include supply, preparation of material, placing, labour, equipment etc required.	m2	5,289.67		
Total of Schedule H -Open Excavation & Earthwork			-		
Schedule I - Primary Support Measures			-		

Schedule I1	**Rock bolt and Anchors**		-		
I101	Supply, drilling, installation and groued SN grouted rock bolts (SN type); Breaking load >= 250 kN. The rate shall include costs of all materials, labour, equipment etc		-		
I101.01	Length of 4m	pc	742.00		
Total of Schedule I1 - Rock Bolts and Anchors			**-**		
Schedule I2	**Shotcrete and Wire Mesh**		-		
I201	Shotcreting with designed mix cement concrete of cube strength C25 (100mm thk) including all material, labour, equipment etc required.	m3	1,324.39		
I202	Shotcreting with designed mix cement concrete of cube strength C25 for temporary surface drains including all material, labour, equipment etc required.	m3	27.45		
I203	Supply and placing of 150x150x6 mm welded wire mesh of Fe 500 as reinforcement in primary lining. The rate shall include all labour materials, cost of pins, hooks, lead, lift, handling and wastage.	m2	13,243.84		
Total of Schedule I2 - Shotcrete and Wire Mesh			**-**		
Total of Schedule I - Primary Support Measures			**-**		
Schedule J - Instrumentation & Monitoring			**-**		
J101	Supply, install, read and maintain 3D monitoring targets (bireflective) on portal slope cut.	pc	268.00		
J102	Supply, install, read and maintain 15m long inclinometers on portal slope and embankment slope.	pc	-		
J103	Supply, install, read and maintain 15m long peizometers on portal slope and embankment slope.	pc	-		
J104	Supply install, read and maintain Settlement marker	pc	-		
Total of Schedule J - Instrumentation & Monitoring			**-**		
Total of Bill 2 - Civil Engineering Portal West			-		
Bill 3 - Civil Engineering Portal East			**-**		
Schedule K - Dewatering Arrrangement			**-**		
Schedule K1	**Temporary Dewatering Arrangement**		-		
K101	Care of water in temorary portal construction site	ls	2.00		
Total of Schedule K1 - Temporary Dewatering Arrangement			**-**		
Schedule K2	**Permanent Dewatering Arrangement**		-		
K201	Provision and laying of drainage pipes (perforated PVC pipes)		-		
K201.01	51mm dia (internal) PVC pipe, 3m long each @ 3m c/c staggered	m	2,089.00		
K202	Geotextile to be wrapped around perforated drain pipes (jute geotextile) including costs of all materials, labour, equipment etc.	m2	482.94		
Total of Schedule K2 - Permanent Dewatering Arrangement			**-**		
Total of Schedule K - Dewatering Arrangement			**-**		

Schedule L - Open Excavation and Earthwork			-		
L101	Earthwork in open excavation in all kinds of soils and rock, including rock, requiring use of blasting, crow bars etc at portals and construction roads and to make berms, surface drains and the like, diversion of irrgation canal, nallah and the like and disposal of the excavated material, to dumping site etc. The rate for this item includes all site clearances (cutting of trees, shrubs, roots, vegetation etc.), lifts, ascent descent handling and lead to designated muck dump areas. Dressing of cuttings to final profile, demarcation and setting out.		-		
L101.01	Loose excavation as per classification of excavation	m3	75,310.77		
L101.02	Rock excavation as per classification of excavation	m3	1,12,419.00		
L102	Embankments and fillings in areas of open excavation. Rates shall include supply, preparation of material, filling and compaction in layers.	m3	27,645.18		
L103	Rip-rap layer on embankments with a minimum thickness of 1m for erosion protection. Rates shall include supply, preparation of material, placing, labour, equipment etc required.	m2	4,874.90		
Total of Schedule L - Open Excavation and Earthwork			-		
Schedule M - Primary Support Measures			-		
Schedule M1	**Rock bolts and Anchors**		-		
M101	Supply, drilling, installation and groued SN grouted rock bolts (SN type); Breaking load >= 250 kN. The rate shall include costs of all materials, labour, equipment etc		-		
M101.01	Length of 4m	pc	592.00		
Total of Schedule M1 - Rock bolts and Anchors			-		
Schedule M2	**Shotcrete and Wire Mesh**		-		
M201	Shotcreting with designed mix cement concrete of cube strength C25 (100mm thk) including all material, labour, equipment etc required.	m3	1,121.40		
M202	Shotcreting with designed mix cement concrete of cube strength C25 for temporary surface drains including all material, labour, equipment etc required.	m3	32.77		
M203	Supply and placing of 150x150x6 mm welded wire mesh of Fe 500 as reinforcement in primary lining. The rate shall include all labour materials, cost of pins, hooks, lead, lift, handling and wastage.	m2	11,214.04		
Total of Schedule M2 - Shotcrete and Wire Mesh			-		
Total of Schedule M - Primary Support Measures			-		
Schedule N - Instrumentation & Monitoring			-		
N101	Supply, install, read and maintain 3D monitoring targets (bireflective) on portal slope cut.	pc	260.00		
N102	Supply, install, read and maintain 15m long inclinometers on portal slope and embankment slope.	pc	-		
N103	Supply, install, read and maintain 15m long peizometers on portal slope and embankment slope.	pc	-		
N104	Supply install, read and maintain Settlement marker	pc	-		
Total of Schedule N - Instrumentation & Monitoring					
Total of Bill 3 - Civil Engineering Portal East					

Bill 5 - Civil Engineering Superstructures

Sr. No.	Description	Area	Rate	Amount
	Schedule A - Bill of Quantities for West Portal Building-Operation Station			
1	Building cost: Framed structure (up to Six Storeys)	768		
	Same rate consider for 2nd Floor	768		
2	Every 0.30 m. deeper foundations over normal depth of 1.20 m. (on G.F. area only)	768		
3	R.C.C. Raft foundations (Ground floor only)	768		
4	Firefighting (for both floor)	1,152		
5	Automatic Fire Alarm System	1,152		
6	Internal Water Supply & Sanitary Installations	1,152		
7	Electrical External Service Connections	1,152		
8	Civil External Service Connections	-		
9	Internal electric installations	-		
10	Water Tank (5000 L x 18/lit)	-		
11	Resisting Earthquake forces	1,152		
12	Stronger structural members to take heavy load above 500 Kgs./sqm. upto 1000 Kgs./Sqm.	1,152		
13	Boundary wall with 1.5 metre. normal height from GL & 0.60 meter high MS grill, and required no. of steel gates/wicket gates etc.	216		
	Total Amount (For West Portal Building) =			

	Schedule A - Bill of Quantities for East Portal Building-Operation Station			
1	Building cost: Framed structure (up to Six Storeys)	384		
2	Extra for every additional storey over six storeys upto twelve storeys (For RCC Framed Structure only)	384		
3	Every 0.30 m. deeper foundations over normal depth of 1.20 m. (on G.F. area only)	384		
4	R.C.C. Raft foundations (Ground floor only)	384		
5	Firefighting	384		
6	Automatic Fire Alarm System	384		
7	Internal Water Supply & Sanitary Installations	384		
8	Electrical External Service Connections	384		
9	Civil External Service Connections			
10	Internal electric installations			
11	Water Tank (5000 L x 18/lit)			
12	Resisting Earthquake forces	384		
13	Stronger structural members to take heavy load above 500 Kgs./sqm. upto 1000 Kgs./Sqm.	384		
14	Boundary wall with 1.5 metre. normal height from GL & 0.60 meter high MS grill, and required no. of steel gates/wicket gates etc.	20		
	Total Amount (For East Portal Building) =			
	Total of Bill 5- Civil Engineering Superstructures			

Bill 6 - Electromechanical & Ventilation

Item No.	Description of Item	Unit	Quantity	Rate	Amount
Schedule A - Bill of Quantities for Electromechanical & Ventilation					
A100	General Costs/ Overhead Costs	Ls	1		
A101	Energy Supply	Ls	2		
A102	Power Distirbution	Ls	2		
A103	Emergency Power Supply	Ls	1.10		
A104	Earthing and equipotential bonding & lightning protection	Ls	1		
A105	Tunnel lighting	Ls	2		
A106	Pipe & Structure Systems - Construction	Ls	2		
A107	Traffic detection and Traffic Control systems	Ls	2		
A108	Safety systems (CCTV, ECS, Fire detection)	Ls	2		
A109	Tunnel radio	Ls	2		
A110	Electrical lines/ cables	Ls	2		
A111	Building and niche installation	Ls	2		
A112	Doors, gates	Ls	2		
A113	Ventilation system and air flow measurement	Ls	2		
A114	SCADA systems & network devices	Ls	2		
A115	Fire water & effluents equipment	Ls	2		
Total of Schedule A - Electromechanical & Ventilation					
Total of Bill 6 - Electromechanical & Ventilation					