



NATIONAL HIGH SPEED RAIL CORPORATION LIMITED (NHSRCL)

(A Joint Sector Company of Govt. of India and Participating State Government)

2nd Floor, Asia Bhawan, Road No.205, Sector-9, Dwarka, New Delhi-110077, India

Addendum No. 9

Country: INDIA

Name of Work: *Construction of Tunnelling Works including Testing and Commissioning for Double Line High Speed Railway using Tunnel Boring Machine (TBM) and New Austrian Tunnelling Method (NATM) between Mumbai Underground Station at Bandra-Kurla Complex (MAHSR Km. 0.773) and Shilphata (MAHSR Km. 21.150) in the State of Maharashtra for the Project for Construction of Mumbai-Ahmedabad High Speed Rail*

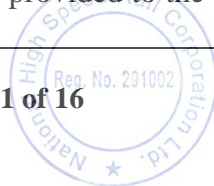
Date: 26.12.2019

Loan Agreement No.: ID-P277 & ID-P279

IFB Number: Package No. MAHSR-C-2

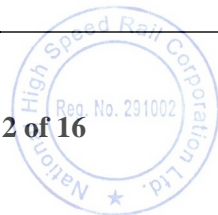
Following are to be considered -

Item No.	Refer Para No.	Original/Existing	Revised
1.	Part 2, Section VI-3, Drawings		<p>Drawings have been modified and new Drawings have been added. The Drawings which have been revised are shown in 'Blue', the Drawings which have been newly added are shown in 'Red' and the Drawings which have been deleted are shown as strikethrough.</p> <p>Refer Attachment No. 1 of this Addendum for revised and new Drawings.</p> <p>Attachment No 1 may be downloaded by the Bidders who have purchased the Bid Document, through the link provided to the respective Bidders.</p>





Item No.	Refer Para No.	Original/Existing	Revised
2.	Part 2, Section VI-3, Drawings		Employer is providing a Drawing change record as Attachment No 2 of this Addendum for Bidders' guidance and reference for the preparation of the Bid. The information being provided is for guidance only and shall not be part of the Contract Agreement.
3.	Part 1, Section IV, Clause 2.0, Attachment No 1 of Addendum No 4	2.0 Bills of Quantities	2.0 Bills of Quantities <Revised > Refer Attachment No 3 of this Addendum.
4.	Part 2, Section VI-2, Sub-Clause 6.3.2, Page 111 of 199 Attachment No 6 of Addendum No 3	6.3.2. Waterproofing	< Sub-Clause 6.3.2. Waterproofing is modified > Refer Attachment No. 4 of this Addendum.
5.	Part 2, Section VI-2. Appendix Page 199 of 199		<Add the following "Appendix.7. Fabrication Work of Steel Segments of Main Tunnel and Equipment Rooms in TBM Section" After Existing Appendix.6. "Technical Specifications for Soil Nail"> Refer Attachment No. 5 of this Addendum.
6.	Section VI-4, Reference Information/Reports, Att-1 D		<Add the following Report after existing Geotechnical Survey Report of Shaft-2> Refer Attachment No 6 of this Addendum.





Item No.	Refer Para No.	Original/Existing	Revised
7.	Part 2, Section VI-1, Attachment No 2 of Addendum No 6 Sub-Clause 6.9.3, Page 93 of 159	The Contractor shall cease any activity likely to produce “Significant” noise at all locations that are less than 150 m from residential area and silence zone as per the Noise Pollution (Regulation and Control) Rules (2000), between the hours of 10.00 pm and 6.00 am, and on Sundays and public holidays. The Site near sensitive zone as per the Noise Pollution (Regulation and Control) Rules (2000) shall be surrounded by the temporary noise barriers if adjacent work is necessary.	The Contractor shall cease any activity likely to produce “Significant” noise at all locations that are less than 150 m from residential area and silence zone as per the Noise Pollution (Regulation and Control) Rules (2000), between the hours of 10.00 pm and 6.00 am, and on Sundays and public holidays. The Site near sensitive zone as per the Noise Pollution (Regulation and Control) Rules (2000) shall be surrounded by the temporary noise barriers if adjacent work is necessary. <i>Note: Any activity producing noise beyond the permissible limit mentioned in Noise Pollution (Regulation and Control) Rules (2000) will be considered significant.</i>
8.	Part 2, Section VI-2, Sub-Clause 4.7 (13)(a), Page No 29 of 199	(a) One Pass Joint – This jointing arrangement consists of male female cast iron parts with steel bars fixed to them. The specifications for the material of this joint shall be as under – i) Cast Iron Spheroidal graphite iron casting conforming to JIS	(a) One Pass Joint – The specifications for the material of this joint shall be as under – i) Cast Iron Spheroidal graphite iron casting conforming to JIS G5502 of Grade FCD 500-07 or equivalent Protective coating - Dacrotized (DX350) (JIS B 1046) or equivalent @ 25 g/m ² or more





G5502 of Grade FCD 500-07 or equivalent

Tensile strength > 500 N/mm²

Yield point or bearing force > 320N/mm²

Elongation > 7%

Protective coating - Dacrotized (DX350) (JIS B 1046) or equivalent 25 g/m² or more

ii) Steel bars –

Hot rolled deformed steel bars conforming to JIS G 3112 Grade SD 345 or equivalent

Diameter – 25 mm

Yield point – 345 to 440 N/mm²

Tensile strength – over 490 N/mm²

Pull out yield strength > 350kN (JIS G3112)

Shear Strength > 152kN (JIS G3112)

ii) Steel bars –

Hot rolled deformed steel bars conforming to JIS G 3112 Grade SD 345 or equivalent

The contractor may use alternative design of segment joint. However, the alternative design of segment joint shall satisfy the following requirements –

(i) *Tensile Spring constant of one set of joint shall be greater than 325,000kN/m i.e., for a segment joint shall be greater than 650,000 kN/m*

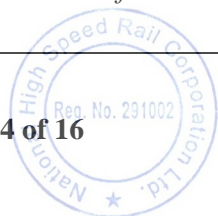
(ii) *Allowable tensile strength of one set of joint shall be greater than 30kN i.e., for a segment joint shall be greater than 60 kN.*

(iii) *Allowable shear Strength of the one set of joint shall be greater than 125kN i.e., for a segment joint shall be greater than 250 kN.*

In addition, the Drawings for RC segments shall have to be modified by the Contractor and submitted to the Engineer for approval.

NOTE:

The cost of alternate design shall be deemed to have been considered by the Contractor in the relevant item of Price Bid.

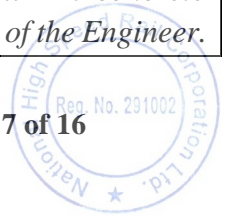


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9.	Part 2, Section VI-2, Sub-Clause 4.8 (2), Page No. 36 of 199	<p>(2) Materials for Steel Segments</p> <p>The material of steel segments shall comply with Table 10 given below: -</p> <p style="text-align: center;">Table 10: Steel segments</p> <table border="1" data-bbox="555 502 1321 1391"> <thead> <tr> <th data-bbox="555 502 719 547">Item</th> <th colspan="2" data-bbox="719 502 1321 547">Material in Use</th> </tr> </thead> <tbody> <tr> <td data-bbox="555 547 719 807" rowspan="3">Steel</td> <td colspan="2" data-bbox="719 547 1321 635">IS: 2062 - Hot Rolled Medium and High Tensile Structural Steel</td> </tr> <tr> <td data-bbox="719 635 869 722">Main Tunnel</td> <td data-bbox="869 635 1321 722">Grade E410 or as shown in the Drawing whichever is higher.</td> </tr> <tr> <td data-bbox="719 722 869 807">Equipment Room</td> <td data-bbox="869 722 1321 807">Grade E350 or as shown in the Drawing whichever is higher.</td> </tr> <tr> <td data-bbox="555 807 719 938">Welding Material</td> <td colspan="2" data-bbox="719 807 1321 938">IS: 814, Covered electrodes for manual metal arc welding of carbon and carbon manganese steel</td> </tr> <tr> <td data-bbox="555 938 719 1107">Injection Hole Pipe</td> <td colspan="2" data-bbox="719 938 1321 1107">Standard products of STKM13A of JIS G3445 “Carbon Steel Tubes for Machine Structural Purposes” (fyk = 325N/mm²) or equivalent</td> </tr> <tr> <td data-bbox="555 1107 719 1195">Injection Hole Plug</td> <td colspan="2" data-bbox="719 1107 1321 1195">PPE nylon products</td> </tr> <tr> <td data-bbox="555 1195 719 1326">Bolt, Nut and Washer</td> <td colspan="2" data-bbox="719 1195 1321 1326">IS:1367 Part 3 for Bolts, Nuts, Washers</td> </tr> <tr> <td data-bbox="555 1326 719 1391">Protective</td> <td colspan="2" data-bbox="719 1326 1321 1391">As per Clause 7.8 of these Specifications</td> </tr> </tbody> </table>	Item	Material in Use		Steel	IS: 2062 - Hot Rolled Medium and High Tensile Structural Steel		Main Tunnel	Grade E410 or as shown in the Drawing whichever is higher.	Equipment Room	Grade E350 or as shown in the Drawing whichever is higher.	Welding Material	IS: 814, Covered electrodes for manual metal arc welding of carbon and carbon manganese steel		Injection Hole Pipe	Standard products of STKM13A of JIS G3445 “Carbon Steel Tubes for Machine Structural Purposes” (fyk = 325N/mm ²) or equivalent		Injection Hole Plug	PPE nylon products		Bolt, Nut and Washer	IS:1367 Part 3 for Bolts, Nuts, Washers		Protective	As per Clause 7.8 of these Specifications		<p>(2) Materials for Steel Segments</p> <p><i>Materials shall conform to the Drawings and shall be in accordance with the standards given in Table 10 of below, unless otherwise specified in these technical specifications. However, in case of non-availability of type and grade of any material, the Contractor can propose alternate options, conforming to these technical specifications, for approval of the Engineer. The alternative shall be of equivalent or of higher specification to that indicated in the Drawings. No claim shall be entertained from the Contractor on this account and payment shall be as per relevant items in the schedule of items, quantities and rates.</i></p> <p style="text-align: center;">Table 10: Steel segments</p> <table border="1" data-bbox="1386 938 2152 1369"> <thead> <tr> <th data-bbox="1386 938 1550 983">Item</th> <th colspan="2" data-bbox="1550 938 2152 983">Material in Use</th> </tr> </thead> <tbody> <tr> <td data-bbox="1386 983 1550 1369" rowspan="3">Steel</td> <td colspan="2" data-bbox="1550 983 2152 1070">IS: 2062 - Hot Rolled Medium and High Tensile Structural Steel</td> </tr> <tr> <td data-bbox="1550 1070 1700 1286">Main Tunnel</td> <td data-bbox="1700 1070 2152 1286">Grade E450 BR for receiving girders of ST-1 steel segments. Grade E410 B0 for all other members.</td> </tr> <tr> <td data-bbox="1550 1286 1700 1369">Equipment Room</td> <td data-bbox="1700 1286 2152 1369">Grade E350 B0.</td> </tr> </tbody> </table>	Item	Material in Use		Steel	IS: 2062 - Hot Rolled Medium and High Tensile Structural Steel		Main Tunnel	Grade E450 BR for receiving girders of ST-1 steel segments. Grade E410 B0 for all other members.	Equipment Room	Grade E350 B0.
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		coating		Welding Material	IS:814, IS:1395, IS:4353, IS:7280, IRS M:28, IRS M:39, IRS M:46, IS:9595
				Injection Hole Pipe	Standard products of STKM13A of JIS G3445 “Carbon Steel Tubes for Machine Structural Purposes” (fyk = 325N/mm2) or equivalent
				Injection Hole Plug	PPE nylon products
				Bolt, Nut and Washer	Grade 10.9, IS:3757.
				Painting	IS:14589, IS:4759, IS 14948, IS:8329, JIS K 5551, JIS K 5552, JIS K 5553, JIS K 5659, JIS B 1046, ISO 8501-1
<i>Note: Priority for Indian Standards</i>					
10.	Part 2, Section VI-2, Sub-Clause 4.8 (3), Page 36 of 199	<p>(3) Fabrication of Steel Segments</p> <p>Steel segments shall be fabricated in a factory for which the Contractor shall obtain approval from the Engineer. For specifications of fabrication of steel segments Clause 7.7 (6) of these specifications shall be referred to.</p>		<p>(3) Fabrication of Steel Segments</p> <p><i>Fabrication of steel segments shall be carried out as per Appendix-7.</i></p>	

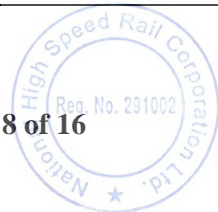


Item No.	Refer Para No.	Original/Existing	Revised
11.	Part 2, Section VI-2, Sub-Clause 4.35, Page 64 of 199		<p><Add Sub-Clause 4.35 after existing Sub-Clause 4.34></p> <p>4.35. Shotcrete</p> <p>The Contractor can use shotcrete in lieu of infill M45 concrete with prior approval of the Engineer. The 28 days strength of shotcrete/shotcrete mortar shall be 35 N/mm² or more. The in-situ cylindrical core specimen for test of compressive strength shall be prepared as per JSCE-F-561-2000. The compressive strength shall be determined as per JIS-A-1107. The Contractor shall carry out mock trials to confirm the efficacy of shotcrete/shotcrete mortar ensuring that there is good adhesion between shotcrete and steel and the width of crack is less than 0.2mm. Results of the mock trial shall be submitted by the Contractor to the Engineer for obtaining his approval.</p>
12.	Part 2, Section VI-2, Sub-Clause 4.8 (5), Page 37 of 199	Inside of steel segments shall be infilled with M45 concrete as shown in the Drawings. The Contractor shall carry out concrete casting test to confirm that no air voids are caused during concreting and the width of crack is less than 0.2mm. The Contractor shall submit method statement for infill concrete of steel segments describing various activities involved to obtain approval from the Engineer. The work shall be carried out as per method statement.	<p>Inside of steel segments shall be infilled with M45 concrete as shown in the Drawings. The Contractor shall carry out mock trials to confirm the efficacy of infill concrete ensuring that there is good adhesion between infill concrete and steel and the width of crack is less than 0.2mm. Results of the mock trial shall be submitted by the Contractor to the Engineer for obtaining his approval.</p> <p><i>The Contractor can use shotcrete in lieu of infill M45 concrete as per the Sub-Clause 4.35 with prior approval of the Engineer.</i></p>





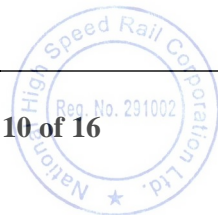
Item No.	Refer Para No.	Original/Existing	Revised
			The Contractor shall submit method statement for <i>infill concrete/shotcrete</i> of steel segments describing various activities involved to obtain approval from the Engineer. The work shall be carried out as per method statement.
13.	Part 2, Section VI-2, Sub-Clause 4.14, Page 42 of 199	During the preliminary excavation thrusting force should be controlled cautiously and data on the actual excavation recorded. Based on ground conditions and geology the driving parameters like number and arrangement of thrust jacks, excavation volume and rate of advance should be carefully controlled to ensure face stability. TBM should be advanced accurately on the designed alignment and pitching, yawing and rolling of TBM should be minimized. The location and attitude (altitude) of the TBM should be precisely surveyed and the thrust force should be applied in the proper position.	During the preliminary excavation thrusting force should be controlled cautiously and data on the actual excavation recorded. <i>No jacking thrust shall be applied at the position of receiving girders in steel segments.</i> Based on ground conditions and geology the driving parameters like number and arrangement of thrust jacks, excavation volume and rate of advance should be carefully controlled to ensure face stability. TBM should be advanced accurately on the designed alignment and pitching, yawing and rolling of TBM should be minimized. The location and attitude (altitude) of the TBM should be precisely surveyed and the thrust force should be applied in the proper position.
14.	Part 2, Section VI-2, Sub-Clause 4.24 (1), Page 56 of 199	<p>(1) <i>Material and fabrication of steel segments of Equipment Rooms</i></p> <p>The above items shall be the same as that for the steel segments of the main tunnel.</p>	<p>(1) <i>Fabrication of steel segments of Equipment Rooms</i></p> <p>Fabrication of steel segments of equipment room shall be carried out as per Sub-Clause 4.8(3).</p>



Item No.	Refer Para No.	Original/Existing	Revised						
15.	Part 2, Section VI-2, Sub-Clause 4.24 (4), Page 57 of 199 Addendum No 3 Item No 116,	<p>(4) Erection of steel segments</p> <p>After excavation profile has stabilized, steel segments shall be erected in a sequence as per noticed method statement. The space between excavated profile and backside of steel segments shall be filled with cement grout <i>of specified strength as shown in the Drawings. The Contractor shall carry out mixing and strength test before construction of Equipment Rooms and submit the report to obtain approval from the Engineer.</i> Inside surface of steel segments shall be infilled with M-45 concrete either at fabrication yard or in-situ. Cable pits and cable trays shall be provided in accordance with the Drawings.</p>	<p>(4) Erection of steel segments</p> <p>After excavation profile has stabilized, steel segments shall be erected in a sequence as per noticed method statement. The space between excavated profile and backside of steel segments shall be filled with cement grout (1 cement : 3 sand and water) of strength 25 N/mm² at 28 days on 100 mm cubes when tested as per IS:4031. Maximum water cement ratio shall be 0.50. Inside surface of steel segments shall be infilled with M-45 concrete either at fabrication yard or in-situ. <i>The Contractor can use shotcrete in lieu of infill M45 concrete as per the Sub-Clause 4.35 with prior approval of the Engineer.</i> Cable pits and cable trays shall be provided in accordance with the Drawings.</p>						
16.	Part 2, Section VI-2, Sub-Clause 4.24 (5), Page 57 of 199	Waterproofing of Equipment Rooms shall be ensured with the help of gaskets as shown in the Drawings.	<p>Waterproofing of joints of steel segments shall be carried out in accordance with the Drawings. The water swellable rubber sealing for M24 bolt in joints shall possess the following characteristics:</p> <table border="1" data-bbox="1384 1059 2186 1391"> <thead> <tr> <th data-bbox="1384 1059 1671 1166">Property</th> <th data-bbox="1671 1059 2186 1166">Value</th> </tr> </thead> <tbody> <tr> <td data-bbox="1384 1166 1671 1279">Hardness</td> <td data-bbox="1671 1166 2186 1279">A45±5 (According to JIS K6253/ISO:48-4 or equivalent)</td> </tr> <tr> <td data-bbox="1384 1279 1671 1391">Tensile Strength</td> <td data-bbox="1671 1279 2186 1391">≥ 4.9 MPa (According to JIS K6251/ISO:527 or equivalent)</td> </tr> </tbody> </table>	Property	Value	Hardness	A45±5 (According to JIS K6253/ISO:48-4 or equivalent)	Tensile Strength	≥ 4.9 MPa (According to JIS K6251/ISO:527 or equivalent)
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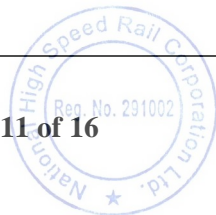


Item No.	Refer Para No.	Original/Existing	Revised	
			Elongation at Break	≥ 400% (According to JIS K6251/ISO:527 or equivalent)
			Increasing rate of volume swelling	≥50%
17.	Part 2, Section VI-2, Sub-Clause 5.27, Page No. 108 of 199	5.27. Inspection of Tunnel lining before Taking Over	5.28 Inspection of Tunnel lining before Taking Over	
18.	Part 2, Section VI-2, Sub-Clause 5.28, Page No. 109 of 199	5.28. Safety, Health and Environment Administration	5.29 Safety, Health and Environment Administration	
19.	Part 2, Section VI-2, Sub-Clause 5.29 Page No. 109 of 199	5.29. Close Out/ Completion Process:	5.30 Close Out/ Completion Process:	
20.	Part 2, Section VI-2, Sub-Clause 5, Page No. 108 of 199		<Add the following Sub-Clause 5.27 under the existing Sub-Clause 5.26> 5.27 Cut and Cover Tunnel	





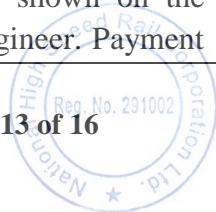
Item No.	Refer Para No.	Original/Existing	Revised
			<p>The Cut and cover portion of main tunnel shall be constructed in accordance with the Drawing. The joint between cut and cover and NATM tunnel shall be provided as per the Drawings. The properties of material for water stop shall conform to the properties mentioned in the Technical Specifications.</p> <p>The filler material shall be polysulphide or polyurethane sealant as per IS:12118 (Part-I & II) or BS-5212.</p>
21.	<p>Part 2, Section VI-2, Sub-Clause 6.3.1, Page 111 of 199</p> <p>Addendum No 3 Item no 78</p>	<p>The work of construction of shafts 2 & 3 shall be taken up in accordance with the Drawings. The walls of shafts shall be constructed by using <i>outside shuttering from bottom to top and waterproofing treatment carried out on the outside surface of the walls</i> as shown in the Drawings. The annular space between RCC walls of shaft and temporary shafts shall be filled up with <i>M20</i> cement concrete <i>after carrying out water proofing treatment on the walls</i>. No extra payment shall be made for filling <i>M20</i> cement concrete in the annular space between walls of shaft and temporary shaft and the cost of the same shall be included in the item rate of RCC for walls of shafts.</p> <p><i>Alternatively, the portion of shafts in rock can be constructed without using outside shuttering. In such case the rock surface of temporary shafts shall be used as outside shuttering. Waterproofing treatment shall be provided on the rock surface of temporary shafts instead of outer surface of walls. However, the quantity of concrete and waterproofing of walls of shafts for payment in rock portion shall be measured from the</i></p>	<p>The work of construction of shafts 2 & 3 shall be taken up in accordance with the Drawings. <i>Waterproofing shall be provided below the base slab of the shafts and on vertical rock surface of temporary shafts as detailed in Sub-Clause 6.3.2.</i> The annular space between outer face of RCC walls of shaft and waterproofing sheet shall be filled up with <i>M35</i> cement concrete. No extra payment shall be made for filling <i>M35</i> cement concrete in the annular space and the cost of the same shall be included in the item rate of RCC for walls of shafts.</p>



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		<p><i>Drawings and no extra payment shall be made for M35 concrete filled in annual space between walls of shaft and the rock. The Contractor shall submit method statement for construction of shafts and ventilation buildings to obtain approval from the Engineer.</i></p>																																																																		
22.	Part 2, Section VI-2, Sub-Clause 7.7, Page 163 of 199	7.7. Structural Steelwork	7.7. Structural Steel work (other than steel segments of Main Tunnel and Equipment Room)																																																																	
23.	Part 2, Section VI-2, Sub-Clause 7.8(c), Table 58 Page No 169 of 199	<table border="1"> <thead> <tr> <th data-bbox="584 644 698 729">S.No.</th> <th data-bbox="698 644 871 729">Steel Materials</th> <th data-bbox="871 644 996 729">Coating</th> <th data-bbox="996 644 1137 729">Specification</th> <th data-bbox="1137 644 1323 729">Volume</th> </tr> </thead> <tbody> <tr> <td data-bbox="584 729 698 813">1</td> <td data-bbox="698 729 871 813">Steel segment (Main Tunnel)</td> <td data-bbox="871 729 996 813"></td> <td data-bbox="996 729 1137 813"></td> <td data-bbox="1137 729 1323 813"></td> </tr> <tr> <td data-bbox="584 813 698 1158">1.1</td> <td data-bbox="698 813 871 1158">Steel Segment</td> <td data-bbox="871 813 996 1158">Zinc rich 15μ + Modified epoxy resin 240μ</td> <td data-bbox="996 813 1137 1158">JIS K 5552 (IS14589)</td> <td data-bbox="1137 813 1323 1158"></td> </tr> <tr> <td data-bbox="584 1158 698 1370">1.2</td> <td data-bbox="698 1158 871 1370">Bolts, Nuts, Washer</td> <td data-bbox="871 1158 996 1370">Dacrotized</td> <td data-bbox="996 1158 1137 1370">DX350: JIS B1046 (ISO 10683)</td> <td data-bbox="1137 1158 1323 1370">25 g/m²</td> </tr> </tbody> </table>	S.No.	Steel Materials	Coating	Specification	Volume	1	Steel segment (Main Tunnel)				1.1	Steel Segment	Zinc rich 15μ + Modified epoxy resin 240μ	JIS K 5552 (IS14589)		1.2	Bolts, Nuts, Washer	Dacrotized	DX350: JIS B1046 (ISO 10683)	25 g/m ²	<table border="1"> <thead> <tr> <th data-bbox="1415 644 1529 770">S.No.</th> <th data-bbox="1529 644 1677 770">Steel Materials</th> <th data-bbox="1677 644 1825 770">Coating</th> <th data-bbox="1825 644 1966 770">Specification</th> <th data-bbox="1966 644 2152 770">Volume</th> </tr> </thead> <tbody> <tr> <td data-bbox="1415 770 1529 813">1</td> <td data-bbox="1529 770 1677 813"></td> <td data-bbox="1677 770 1825 813"></td> <td data-bbox="1825 770 1966 813">Deleted</td> <td data-bbox="1966 770 2152 813"></td> </tr> <tr> <td data-bbox="1415 813 1529 857">1.1</td> <td data-bbox="1529 813 1677 857"></td> <td data-bbox="1677 813 1825 857"></td> <td data-bbox="1825 813 1966 857">Deleted</td> <td data-bbox="1966 813 2152 857"></td> </tr> <tr> <td data-bbox="1415 857 1529 900">1.2</td> <td data-bbox="1529 857 1677 900"></td> <td data-bbox="1677 857 1825 900"></td> <td data-bbox="1825 857 1966 900">Deleted</td> <td data-bbox="1966 857 2152 900"></td> </tr> <tr> <td data-bbox="1415 900 1529 943">2</td> <td data-bbox="1529 900 1677 943"></td> <td data-bbox="1677 900 1825 943"></td> <td data-bbox="1825 900 1966 943">Deleted</td> <td data-bbox="1966 900 2152 943"></td> </tr> <tr> <td data-bbox="1415 943 1529 986">2.1</td> <td data-bbox="1529 943 1677 986"></td> <td data-bbox="1677 943 1825 986"></td> <td data-bbox="1825 943 1966 986">Deleted</td> <td data-bbox="1966 943 2152 986"></td> </tr> <tr> <td data-bbox="1415 986 1529 1029">2.2</td> <td data-bbox="1529 986 1677 1029"></td> <td data-bbox="1677 986 1825 1029"></td> <td data-bbox="1825 986 1966 1029">Deleted</td> <td data-bbox="1966 986 2152 1029"></td> </tr> <tr> <td data-bbox="1415 1029 1529 1072">3</td> <td data-bbox="1529 1029 1677 1072"></td> <td data-bbox="1677 1029 1825 1072"></td> <td data-bbox="1825 1029 1966 1072">Deleted</td> <td data-bbox="1966 1029 2152 1072"></td> </tr> <tr> <td data-bbox="1415 1072 1529 1131">3.1</td> <td data-bbox="1529 1072 1677 1131"></td> <td data-bbox="1677 1072 1825 1131"></td> <td data-bbox="1825 1072 1966 1131">Deleted</td> <td data-bbox="1966 1072 2152 1131"></td> </tr> </tbody> </table>	S.No.	Steel Materials	Coating	Specification	Volume	1			Deleted		1.1			Deleted		1.2			Deleted		2			Deleted		2.1			Deleted		2.2			Deleted		3			Deleted		3.1			Deleted	
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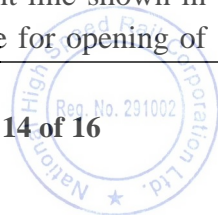


Item No.	Refer Para No.	Original/Existing					Revised
		2	Steel Segment (for Equipment Room)				
		2.1	Steel Segments	Zinc rich 15μ + Modified epoxy resin 240μ	JIS K 5552 (IS1458 9)		
		2.2	Bolts, Nuts, Washer	Dacrotized	DX350: JIS B1046 (ISO 10683)	25 g/m ²	
		3	RC Segment				
		3.1	One-pass Joint	Dacrotized	DX350: JIS B1046 (ISO 10683)	25 g/m ²	
24.	Part-2, Section VI-2, Clause 8, Item No 303,	Measurement for payment for this item shall be in square meter (sqm) as per payment line shown on the Drawings or established at the Site by the Engineer. Payment will be made					a), b) & c) Measurement for payment for these items shall be in square meter (sqm) as per payment line shown on the Drawings or established at the Site by the Engineer. Payment



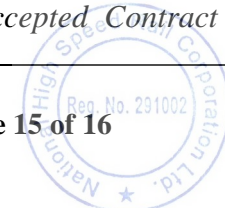


Item No.	Refer Para No.	Original/Existing	Revised
	Attachment 3 of Addendum 4, Page No. 6 of 20	at the Unit Price per sqm entered in the Priced Bill of Quantities.	will be made at the Unit Price per sqm entered in the Priced Bill of Quantities.
25.	Part 2, Section VI-2, Clause 8, Item No. 304 (f) Attachment No 3 of Addendum No 4 Page 8 of 20	(f) The quantity of this item shall be taken as one number which will be for air conditioning of panel room at B4 slab as per the Drawings and the Specification. The payment for the item shall be made at Unit Rate per number, entered in the Priced Bill of Quantities.	(f) The quantity of this item shall be on <i>lumpsum</i> basis complete in all respect which includes air conditioning of panel room at B4 slab as per the Drawings and the Specification. The payment for the item shall be made on <i>lumpsum</i> basis as per unit price entered in the Priced Bill of Quantities.
26.	Part 2, Section VI-2, Clause 8, Item No. 305 Attachment No 3 of Addendum No 4 Page 8 of 20	Measurement for payment for this item shall be the quantity of RC segment erected in running meters measured from inner face of shafts at the centre of tunnel at formation level as shown on the Drawings. The payment for the item shall be made at Unit Rate per running meter length of RC Segment erected, entered in the Priced Bill of Quantities.	Measurement for payment for this item shall be the quantity of RC segment erected in <i>number of rings</i> measured from inner face of shafts at the centre of tunnel at formation level as shown on the Drawings. The payment for the item shall be made at Unit Rate per <i>number of RC segment ring</i> erected, entered in the Priced Bill of Quantities.
27.	Part 2, Section VI-2, Clause 8, Item No. 502 (a), Attachment 3 of Addendum 4, Page 14 of 20	(a) Shotcrete - i). ii) & iii) Measurement for payment of these items shall be in sqm of the area of <i>shotcrete measured inner face</i> of Shaft-3 to start of cut and cover tunnel as shown on the Drawings or established at the Site by the Engineer. <i>The length of shotcrete shall be measured at the centre line of the tunnel.</i> The width of the shotcrete shall be measured as per payment line shown in the Drawings. No deduction shall be made for opening of Equipment	(a) Shotcrete - i). ii) & iii) Measurement for payment of these items shall be in sqm of the area of shotcrete from start of NATM tunnel from Shaft-3 end to start of cut and cover tunnel as shown on the Drawings or established at the Site by the Engineer. <i>The length of shotcrete shall be the same as measured for BOQ Item no. 501.</i> The width of the shotcrete shall be measured as per payment line shown in the Drawings. No deduction shall be made for opening of





Item No.	Refer Para No.	Original/Existing	Revised
		Rooms. Payment shall be made at the Unit Rate per sqm entered in the Priced Bill of Quantities.	Equipment Rooms and Adit. Payment shall be made at the Unit Rate per sqm entered in the Priced Bill of Quantities.
28.	Part 2, Section VI-2, Clause 8, Item No. 502 (c) Attachment No 3 of Addendum No 4 Page 8 of 20	(c) Rock bolts- i). ii) & iii) Measurement for payment of various these items shall be in Nos. of the rock bolts installed as shown on the Drawings or established at the Site by the Engineer. Payment shall be made at the Unit Rate per sqm entered in the Priced Bill of Quantities.	(c) Rock bolts- i). ii) & iii) Measurement for payment of these items shall be in Nos. of the rock bolts installed as shown on the Drawings or established at the Site by the Engineer. Payment shall be made at the Unit Rate per <i>number</i> entered in the Priced Bill of Quantities.
29.	Part 2, Section VI-2, Clause 8, Item No. 514 (a) Attachment No 3 of Addendum No 4 Page 19 of 20	(a) PCC below base concrete- Measurement for payment of this item shall be the quantity measured in running metre length of tunnel at the centre as per the Drawings from start of cut and cover tunnel to end of cut and cover tunnel. The payment for the item shall be made at Unit Rate per meter entered in the Priced Bill of Quantities.	(a) <i>Levelling Concrete</i> - Measurement for payment of this item shall be the quantity measured in running metre length of tunnel at the centre as per the Drawings from start of cut and cover tunnel to end of cut and cover tunnel. The payment for the item shall be made at Unit Rate per meter entered in the Priced Bill of Quantities.
30.	Part 3, Section VIII, Part B-Specific Provisions, Sub-Clause 4.2 Performance Security, Addendum No 3 Item No. 98 Addendum No 7 Item No. 5.	Add new paragraph after last paragraph of Sub-Clause 4.2 with the following: “In the event the Contractor fails to provide the Performance Security within 28 days from the date of receiving of the LOA, it may seek an extension of time for providing the performance security for a period not exceeding a further 15 days on payment of damages for such extended period in a sum calculated at the rate of 0.005% of the Contract price for each	Add new paragraph after last paragraph of Sub-Clause 4.2 with the following: “In the event the Contractor fails to provide the Performance Security within 28 days from the date of receiving of the LOA, it may seek an extension of time for providing the performance security for a period not exceeding a further 15 days on payment of damages for such extended period in a sum calculated at the rate of 0.005% of the <i>Accepted Contract</i>





Item No.	Refer Para No.	Original/Existing	Revised
		day until the Performance Security is provided.”	<i>Amount less Provisional Sums for each day until the Performance Security is provided.”</i>
31.	Part 2, Section VI-1, Division 03000, Sub-Division 03020, Sub-Clause 5.1, 1st and 2nd Paragraph, Page 18 of 24	<p>In addition to the Contractor’s submittals referenced in Sub-Division 03020 Sub-Clause 2.0 [Submission Procedure], the Contractor shall implement a secure document control system such that all documents generated by the Contractor can be transmitted to the Engineer by electronic means (and vice versa) and that all documents generated by either party are electronically captured at the point of origin and can be reproduced later, electronically and in hard copy.</p> <p>The Engineer shall provide one user facility from his system to the Contractor for communication and for storing the documents.</p>	<p><i>Employer is in the process of implementing a document control system such that all drawings/documents related to the construction phase are well documented and archived, etc. The Contractor shall utilize the document control system being setup by the Employer such that all documents generated by the Contractor can be transmitted to the Engineer by electronic means (and vice versa) and that all documents generated by either party are electronically captured at the point of origin and can be reproduced later, electronically and in hard copy. In addition to the Contractor’s submittals referenced in Sub-Division 03020 Sub-Clause 2.0 [Submission Procedure], Contractor shall also transmit all documents through Document Control system provided by the Employer.</i></p> <p><i>Employer shall provide five (5) user license(s) from its system to the Contractor for communication and for storing the documents. Employer may consider Contractor’s request for additional license(s) on case by case basis and Contractor shall bear the cost of additional license(s). All the licenses provided to the Contractor shall be continued up to the Completion of the Contract. The Contractor shall be responsible to maintain periodical backup of data/documents for his record.</i></p>

