**SCOPE OF WORK** 

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| **MAINTENANCE SERVICE WORK** | BOQ of Repair and maintenance of RCC four lane external road of APMT Pipavav. |
| **POINT OF CONTACT** | Sanjay Sharma/ Raj Kumar Pathak |
| **PHONE** | 8340317085 |
| SCOPE OF WORK |
| ***What does the Maintenance Service entail? What are the delivery methods?*** |
| **Repair and maintenance of RCC four lane external road**: Repair & Maintenance of RCC four lane eternal road as per attached Specification of work & Technical guidelines.

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| **BOQ of Repair and maintenance of PQC four lane road of APMT Pipavav**  |
| **S. No.** |  | **Item Description** | **Unit** | **Quantity** | **Rate / Unit (INR)** | **Amount (INR)** |
| 1 | **Sealing With Low Viscous Epoxy Resin** |   |   |   |   |
| 1 | Cut open the cracks up to 10mm width x upto 50mm depth & clean it properly to ensure all loose particles, dust etc are removed from the crack.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | R mt | 600 |   |   |
| 2 | Cut open the cracks up to 10mm width x 100mm depth & clean it properly to ensure all loose particles, dust etc are removed from the crack.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | R mt | 600 |   |   |
| 3 | Cut open the cracks up to 10mm width x 200mm depth & clean it properly to ensure all loose particles, dust etc are removed from the crack.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | R mt | 600 |   |   |
| 4 | Providing & Pouring **Sikadur-52 LP IN IS 15875: 2009, MORTH Section 1700,**, a two-part, solvent- free, low viscosity injection-liquid, based on high strength epoxy resin, by Gravity Means. The epoxy injection system must have a mixed density of 1.1 kg/l at 27°C and the viscosity of ~250 mPas at 30°C The epoxy injection should have following minimum physical properties: Compressive Strength according to ASTM C 579 at +30°C in 7 days should be ≥70N / m m2; Tensile Strength should ~ 50N / mm2 after 7 days at +30°C according to ASTM D 638; Bond Strength to concrete according to ASTM C 882 should be ~10.8N / mm2 after 14 days at +30°C. Flexural strength according to ISO 178 at +30°C in 7 days should be ~ 50N / mm2 Tensile Modulus should be ~2000 N/mm2 after 7 days at +30°C according to ASTM D 638; Tensile Elongation ~1.9% according to ASTM D 638; Material should not shrink as per ASTM C 883.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Kg | 200 |   |   |
| 2 | **Seal & Stitch with Low Viscous Epoxy Resin** |   |   |   |   |
| 1 | Cut open the cracks up to 10mm width x 100mm depth & clean it properly to ensure all loose particles, dust etc are removed from the crack.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | R mt | 600 |   |   |
| 2 | Providing & Pouring **Sikadur-52 LP IN IS 15875: 2009, MORTH Section 1700,**, a two-part, solvent- free, low viscosity injection-liquid, based on high strength epoxy resin, by Gravity Means. The epoxy injection system must have a mixed density of 1.1 kg/l at +27°C and the viscosity of ~250 mPas at +30°C The epoxy injection should have following minimum physical properties: Compressive Strength according to ASTM C 579 at +30°C in 7 days should be ≥70N / mm2 Tensile Strength should be ~ 50N / mm2 after 7 days at +30°C according to ASTM D 638; Bond Strength to concrete according to ASTM C 882 should be ~10.8N / mm2 after 14 days at +30°C; Flexural strength according to ISO 178 at +30°C in 7 days should be ~ 50N/mm2; Tensile Modulus should be ~2000 N/mm2 after 7 days at +30°C according to ASTM D 638; Tensile Elongation ~1.9% according to ASTM D 638; Material should not shrink as per ASTM C 883.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | kg | 350 |   |   |
| 3 | Providing & Pouring **Conbextra GP2 IS 3370-2: 1965, MORTH Section 1700**, a two-part, solvent- free, low viscosity injection-liquid, based on high strength epoxy resin, by Gravity Means. The epoxy injection system must have a mixed density of 1.1 kg/l at +27°C and the viscosity of ~250 mPas at +30°C The epoxy injection should have following minimum physical properties:The compressive strength of the grout must exceed 50 N/mm2at 7 days and 60 N/mm2 at 28 days.The fl exural strength of grout must exceed 9N/mm2 @ 28 days.The fresh wet density of the mixed grout must exceed 2150 kg/m3. Tensile strength3.5N/mm2@ 28 days(W/P - 0.18)Pullout bond strength 17 N/mm2@ 7 days(W/P - 0.18) 20 N/mm2@ 28 daysTime for expansion Start : 20 minutes(after mixing ) Finish : 120 minutes.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | kg | 400 |   |   |
| 4 | Providing & placing 8mm dia bar into 100 mm long slot prepared perpendicular to the crack length; at distance of every 250mm; including cutting of the clot, cleaning, tie rod etc.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | No | 500 |   |   |
| 5 | Sealing of the crack as well as the perpendicular slot with **Sikadur-31 IN IS 15875: 2009, MORTH Section 1700**, a solvent-free, moisture tolerant, thixotropic, two-part structural adhesive and repair mortar, based on epoxy resins and special fillers. The epoxy adhesive and repair mortar should conform to ASTM C 881, Type I, Grade 3, Class B + C Mixed Density should be ~ 1.80 ± 0.01 kg / l at 30°C and on vertical surfaces it should be non-sag up to 10 mm thickness, according to FIP 5.3 with measurement according to ASTM D2730. The material should exhibit following minimum properties: Compressive Strength according to ASTM C-579 at +30°C in 1 day ≥45 N/mm2 , 14 days ≥ 60 N/mm2; Tensile adhesion strength according to ASTM C 882 at +30°C for dry concrete, in 7 days ≥ 10 N/mm2; Flexural Strength according to DIN EN 196 at +30°C in 1 day≥10 N/mm2, in 14 days ≥ 25 N/mm2; Tensile strength according to ISO 527 at +30°C in 3 days ≥ 5N/mm2, in 7 days ≥ 8N/mm2.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Kg | 400 |   |   |
| 3 | **Retrofitting with Dowel Bars** |  |  |  |  |
| 1 | Providing & Cutting a slot of 50mm wide x 500 mm long perpendicular to the crack, at spacing of approx. 400 mm a across the length. The depth of this slot should be more than half the slab thickness. Clean the slot properly with compressed air to remove any loose particles & dust.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | No | 400 |   |   |
| 2 | Providing & Cutting a slot of 50mm wide x 580 mm long perpendicular to the crack, at spacing of approx. 300 mm a across the length. The depth of this slot should be more than half the slab thickness. Clean the slot properly with compressed air to remove any loose particles & dust.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | No | 600 |   |   |
| 3 | Supply of Dowel Bar of 32mm dia x 450mm length.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | No | 20 |   |   |
| 4 | Providing and applying **Sikadur-43 HE (h) IS 15875: 2009, MORTH Section 1700**, a thixotropic, three-part patch repair and filling and bonding mortar, based on a combination of epoxy resins and special fillers. The epoxy mortar should comply with ASTM C 881, Type III, Grade 3, Class E, should have a mixed density of ~2.2 ± 0.1 kg/l at +27°; Hardens without shrinkage; heat deflection temperature of +54°C in 7 days at +30°C according to ASTM D-648; Compressive Strength according to ASTM C 579 at+30°C in 1 day should be ~85 N/mm2, in 3 days should be ~98 N/mm2, in 7 days should be ~104 N/mm2 and in 14 days should be ~108 N/mm2; Flexural Strength according to DIN EN 196 at +30°C in 1 day should be ~20 N/mm2, in 3 days should be ~23 N/mm2, in 7 days should be ~25 N/mm2 and in 14 days should be ~25 N/mm2; Tensile Strength according to ISO 527-2 at +30°C in 7 days should be ~12 N/mm2 and in 14 days should be ~12 N/mm2. Apply Epoxy based priming coat - Sikadur-31IN before the application of Epoxy Mortar - Sikadur 43 HE(h)including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Kg | 250 |   |   |
| 4 | **Sealing with Low viscous Epoxy Resin & Bonded Overlay with Micro-concrete** |  |  |  |
| 1 | Removal of top layer of concrete, up to min. 40mm with help of concrete breaker / cutter machine. Cleaning of entire area to remove any loose particles & dust etc with help of compressed air.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Sq. mt | 260 |   |   |
| 2 | Cut open the cracks up to 10mm width x 50mm upto depth & clean it properly to ensure all loose particles, dust etc are removed from the crack.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | R mt | 1000 |   |   |
| 3 | Providing & Pouring **Sikadur-52 LP IN IS 15875: 2009, MORTH Section 1700**, a two-part, solvent- free, low viscosity injection-liquid, based on high strength epoxy resin, by Gravity Means. The epoxy injection system must have a mixed density of 1.1 kg/l at 27°C and the viscosity of ~250 mPas at 30°C The epoxy injection should have following minimum physical properties: Compressive Strength according to ASTM C 579 at 30° C in 7 days should be ≥70N / mm2 Tensile Strength should ~50N / mm2 after 7 days at ± 30°C according to ASTM D 638; Bond Strength to concrete according to ASTM C 882 should be ~10.8N /mm2 after 14 days at 30°C Flexural strength according to ISO 178 at 30°C in 7 days should be ~ 50N / mm2 Tensile Modulus should be ~2000 N/mm2 after 7 days at ± 30°C according to ASTM D 638; Tensile Elongation ~1.9% according to ASTM D 638; Material should not shrink as per ASTM C 883.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | kg | 150 |   |   |
| 4 | Providing and applying **Sikadur-32 LP IS 15875: 2009, MORTH Section 1700** solvent-free, two component bonding agents, based on selected epoxy resins, and confirming to ASTM C 881, Type II, Grade 2, Class B + C and should have a mixed density of 1.70 kg/l at 27°C The epoxy bond coat should fulfill the following minimum criterion for optimum performance: Compressive Strength in 7 days should be ≥55N / m m2 according to ASTM C 881 at +30°C; Flexural Strength in 10 days should be 30 - 35N / mm2 according to IS 9162-1979 at 30°C Tensile Strength in 14 days should be 18-20 N/mm2 according to ISO 527 at +30°C Bond Strength in 14 days with dry concrete should be ≥10N / mm2 according to ASTM C 882 at +30°C Consumption of the material should be between 0.7 to 0.8 Kgs/m2.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Sq. mt | 400 |   |   |
| 5 | Providing and applying **SikaRep Microcrete-4 IS 15875: 2009, MORTH Section 1700**, factory designed pourable, non-shrink, repair concrete up to 40mm thickness or as per site conditions to match the finish level. Add upto 30% by weight 6mm down. aggregates. The repair micro concrete must comply to the standards of ASTM C1107 and must comply to the following minimum standards: Compressive Strength at an ambient temperature of +30°C according to ASTM C 109 for 70mm Cube in 1 day ~ 25 N/mm2, in 3 days ~35 N/mm2, in 7 days ~ 45N / mm2 and in 28 days ~65N / mm2; Flexural Strength at an ambient temperature of +30°C according to ASTM C 293 in 7 days ~ 7N / mm and in 28 days ~ 8N / mm .including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Kg | 1200 |   |   |
| 5 | **Full Depth Repairs of PQC (RCC External Road damage Portion)** |  |  |  |  |
| 1 | Cut & Remove the concrete up to entire depth; with help of concrete cutter machine & Other equipment's as required.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Cum | 60 |   |   |
| 2 | Providing & placing Dowel Bars of approved dimensions as per instructions of engineer-in-charge: including drilling of holes, cleaning of holes, Epoxy Resin for anchoring - Sika AnchorFix-3030. The anchoring adhesive should be CE approved, have ETA approval for anchoring in cracked and uncracked concrete, ETA approval for post installed rebar connections; Seismic tested (C1 & C2); Suitable for contact with drinking water; Fire resistant; Styrene-free; Shrinkage-free hardening, LEED Attestation available and should have Compressive Strength ~95N / mm2 as per ASTM D 695; Tensile Strength in Flexure ~45N / mm2 as per ASTM D 790; Tensile Strength ~23N / mm2 as per ASTM D 638; Modulus of Elasticity in Tension ~5500 N/mm2 as per ASTM D 638.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | MT  | 1.5 |   |   |
| 3 | Providing & placing Tie Rods of approved dimensions as per instructions of engineer-in-charge including drilling of holes, cleaning of holes, Epoxy Resin for anchoring - Sika AnchorFix-3030. The anchoring adhesive should be CE approved, have ETA approval for anchoring in cracked and uncracked concrete, ETA approval for post installed rebar connections; Seismic tested (C1 & C2); Suitable for contact with drinking water; Fire resistant; Styrene-free; Shrinkage-free hardening, LEED Attestation available and should have Compressive Strength ~95N / mm2 as per ASTM D 695; Tensile Strength in Flexure ~45N / mm2 as per ASTM D 790; Tensile Strength ~23N / mm2 as per ASTM D 638; Modulus of Elasticity in Tension ~5500 N/mm2 as per ASTM D 638.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | MT  | 1.5 |   |   |
| 6 |   | **Applying Pre-Packed Cement-Based Polymer Mortar (GEOKRETE/Equivalent)**: Supply, mixing, and applying pre-packed cement-based polymer mortar (GEOKRETE) with a compressive strength of 45 MPa at 28 days for the replacement of spalled concrete. This material should be applied in layers to repair concrete surfaces that have undergone spalling due to environmental or structural factor. including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | Cum | 50 |   |   |
| 7 |   | Sealent Filling in position the traverse and longitudinal joints of cement concrete pavement of width size upto 25 mm X upto 50mm depth with fresh sealant of Poly-sulphide Tech-seal RDL 941 including 2 coat of primer RDL 942, back up rod, de-bonding strip etc. complete.including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge | RM | 1500 |   |   |
| 8 |   | RCC M-40 Concrete : Providing, supplying and laying mechanically mixed as per design mix M-40 grade concrete in foundations, footings, pedestals, plinth beams, slab, ramps etc laid, consolidated and cured including formwork, steel tubular scaffolding & shuttering, vibrating etc for all heights but excluding of reinforcement steel as per shown in drawing including all manpower, materials, equipments, tools & tackles, PPE etc complete as directed by the Engineer-In-charge. Cement Ultratech, Ambuja and Siddhi. Minimum cement content 450 Kg/Cum. - Using with Yellow Sand | Cum | 60 |   |   |
| 9 |   | Groove Cutting and Filling with Polysulphide - Groove Cutting in trimix/any RCC floor by groove cutter & filled with Polysulphide component of "Sikka" or "Fosroc" company etc including all manpower, materials, tool & tackles, equipments etc completed and as directed by Engineer-in charge. The depth of groove shall be 5 times the width of groove. Max. width 25mm. | RM  | 450 |   |   |

 Existing Bi-partial glass door with ozom 22P sensor system. |

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| **EXCLUSIONS (VENDOR SCOPE)** |
| Transporting, DG for electricity, Water arrangement, manpower, materials, tools & tackles, Equipments are in the Vendor scope.Chemical Product used of make SIKKA/FOSROC/DR. FIXIT. |

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| **INCLUSION (APMT SCOPE)** |
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| **HAZARD ASSOCIATED WITH ACTIVITY** **(DETAILED RISK ASSESSMENT SHALL BE CARRIED OUT AFTER FINALISATION OF CONTRACT)** |
| TRANSPORTATION | 🖵 | SUSPENDED LOAD & LIFTING | 🖵 |
| WORKING AT HEIGHT | 🖵 | STORED ENERGY / HIGH VOLTAGE  | 🖵 |
| WORK NEAR/ON WATER | 🖵 | CONFINED SPACE | 🖵 |
| DANGEROUS GOODS | 🖵 | HOT WORK | 🖵 |
|  | 🖵 |  | 🖵 |
|  | 🖵 |  | 🖵 |

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| **HSSE MANDATORY REQUIREMENT**  |
| 1. Adhere the APMT HSSE policy.
 |
| 1. Approved risk assessment from HSE for the activity.
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| 1. Police verification certificate, customs approval letter for gate pass, and safety pass process
 |
| 1. Relevant medical fitness certificate for high-risk activities
 |
| 1. Dock safety / DISH Competent certificate for all the lifting equipment and gears.
 |
| 1. Calibration certificates for the tools and equipment used by the vendor.
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| 1. Lifting plan for the lifting activity.
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| 1. PPE’s as per risk assessment and APMT standard to be follow.
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| 1. Mobile equipment hiring should be as per APMT policy.
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| **HR MANDATORY REQUIREMENT**  |
| 1. Valid WC policy
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| 1. Valid labor license if applicable. (Mandatory for deploying 50 or more than 50 workmen.)
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| 1. Comply with all the labor laws and statutory compliance. (Salary slip, Appointment letters, PF payment, PT payment, labour welfare fund payment. ER1 submission, consolidated annual return submission – whichever is applicable need to follow statutory guidelines and prescribed timelines, not limited to the prescribed points)
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| 1. No child labour deployment (18 years and above to maintained throughout)
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| **FINANCE MANDATORY REQUIREMENT**  |
| 1. Valid GST registration certificate (All three pages)
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| 1. Valid PAN card copy
 |
| 1. Valid MSME certificate if applicable.
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| 1. Declaration for compliance of section 206AB, 206CCA of income tax act.
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| **ESTIMATED COST** **(REFERENCE FOR PROCUREMENT TEAM ONLY. PLEASE REMOVE THE COST INFORMATION BEFORE FORWARDING TO THE VENDOR)** |
| **EXPENSE** | **DESCRIPTION** | **COST** |
| Service Cost |  | ₹  |
| Material cost |  | ₹ |
|   | **TOTAL** |  ₹ -  |

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| **MILESTONES** |
| **WANTED DELIVERY DATE** | **TASK** | **GOODS REQUIRED** | **SERVICES REQUIRED** |
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| **SKILLS, CERTIFICATES & DOCUMENTS** |
| **DESCRIPTION** | **DESIRED LEVEL** | **REMARKS** |
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REQUISIONER NAME & MANAGER NAME

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| **REQUISIONER NAME**  | RAJ KUMAR PATHAK |
| **EQUIPMENT MANAGER** | SUBIR MEHROTRA  |

COMMENTS / REMARKS

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