

## Work Item Specifications

### A Dismantling, Demolition and Removal

**Item No. A1:** Providing and installation of barricading with retro reflective paint/ film/ tapes (Minimum 2.0Mt. height) for the construction of road work, along with necessary diversion arrangement for existing traffic movement in an unobstructed condition, all relevant markings, sign boards and illumination as per relevant MORT&H specification. Precoated galvanised iron profile sheets shall be of approved make and shade having 0.50 mm (+0.05 %) total coated thickness with zinc coating 120 grams per sqm as per IS: 277, in 550 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Rate to be inclusive of all materials, fabrication works, paint works for information (retro reflective paint), foundation works, transportation, loading, unloading, installation, dismantling and inclusive of all taxes and including the same design for providing openable gates. No extra rental will be given to the contractor in case of any delays from his part for construction or due to any valid time limit extensions. Each barricading sheet is to be numbered with a unique number. The barricading provided shall be retained in position at site continuously i/c shifting of barricading from one location to another location as many times as required during the execution of the entire work till its completion. Rate include its maintenance for damages, painting, all incidentals, labour materials, equipments and works required to execute the job. The barricading shall not be removed without prior approval of Engineer-in-Charge.

Measurement: Measurement shall be taken in square meters (Sq.m.) of the elevational area of barricade actually installed at the site.

**Item No. A2:** Removing and refixing the installed barricading system as per above item description with in site area. Rate to be inclusive of all materials, fabrication works, required for removing and refixing baricading with in site area, foundation works, transportation, loading, unloading, installation, dismantling etc. The barricading provided shall be retained in position at site continuously i/c shifting of barricading from one location to another location as required during the execution of the entire work till its completion. Rate include its maintenance for damages, painting, all incidentals, labour materials, equipments and works required to execute the job. The barricading shall not be removed without prior approval of Engineer-in Charge. The barricading provided shall remain to be the property of the contractor on completion of the work. Blinkers are to be installed on the barricading and rate for blinkers will be payable as per relevant item. Barricading is to be cleaned by means of washing with water on a weekly basis or as and when required as per the instructions of Engineer in charge. Payment shall be made for Sqm area of barricading sheet and number of shifting from start of work till completion of work.

Measurement: Measurement shall be taken in square meters (Sq.m.) of the elevational area of barricade actually installed at the site.

**Item No. A3:** Box cutting the road surface to proper slope and camber for making a base for road work including removing the excavated stuff and depositing on the road side slope as directed upto 50Mt.lead.

The surface of the formation for a width of sub-base, which shall be 15 cm more on either side of base course, shall first be cut to a depth equal to the combined depth of sub-base and surface courses below the proposed finished level (due allowance being made for consolidation). It shall

then be cleaned of all foreign substances. Any ruts or soft yielding patches that appear due to improper drainage conditions, traffic hauling or from any other cause, shall be corrected and the sub-grade dressed off parallel to the finished profile.

Measurement: Measurement shall be taken in cubic metres (Cu.m) of the volume of the road surface excavated.

**Item No. A4:** Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work

Work shall be carried out with utmost care to avoid any damage or deposition on historic surfaces. The work of demolition, disposal or stacking should be done carefully and using manual methods as much as possible.

Measurement shall be considered for actual demolished area and paid for cu.m units.

**Item No. A5:** Demolition of Brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.(ii) In Cement Mortar.

Work shall be carried out with utmost care to avoid any damage or deposition on historic surfaces. The work of demolition, disposal or stacking should be done carefully and using manual methods as much as possible.

Measurement shall be considered for actual demolished area and paid for cu.m units.

**Item No. A6:** Dismantling tiled or stone floors laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.

Temporary barricades and protection shall be installed around the dismantling zone to prevent movement of debris or damage to adjoining structures. Stones or tiles shall be loosened manually, using wooden or bamboo wedges to gently pry out pieces without cracking. The dismantled stones shall be cleaned of adhering mortar using wooden mallets and scrapers. Reusable stones shall be numbered on the underside or non-decorated surface using a reversible medium. Serviceable slabs or tiles shall be sorted, stacked, and stored within the site at a designated storage area, under tarpaulin cover.

Measurement: The work shall be measured in square metres (Sq.m) of flooring dismantled and cleared, including sorting, stacking, and disposal as specified.

**Item No. A7:** Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil

Excavation shall be done carefully using manual means (spade, pickaxe) to prevent disturbance to adjacent old foundations. In areas away from historic structures, mechanical excavation may be permitted with prior approval. Depth shall not exceed 1.5 meters unless otherwise directed. Sides of excavation shall be trimmed and dressed to vertical or specified slope (generally 1:1 for loose soil) to prevent collapse. Serviceable materials such as stone fragments, bricks, or compacted soil suitable for backfilling shall be sorted, cleaned, and stacked separately at pre-designated places within the site. Unserviceable or waste soil shall be transported and disposed

of within 50 meters lead to approved dumping sites, ensuring no damage to surrounding heritage areas. Excavated material shall not be stacked against existing historic walls or temple structures.

- IS 3764:1992 – *Safety Code for Excavation Work*.

Measurement: Measured in cubic meters (Cu.m) of actual excavated volume up to the specified depth (1.5 m). Rate includes sorting, stacking, disposal (50 m lead), and levelling, dressing, and safety provisions.

**Item No. A8:** Removal of existing any type of paving or paving stones of any type, any size, any thickness in required depth including removing paver with spil sub base and breaking sub base i.e concrete or metaling etc under the supervision of concerned department, disposal unserviceable material with all lifts and up to any lead at non objectional place and stacking the serviceable material (paver) upto any private or corporation Land (if corporation land is used then contractor to pay rent to the corporation) store including loading, unloading as directed by Engineer in-charge. : paver blocks at the chowks

Temporary barricades and protection shall be installed around the dismantling zone to prevent movement of debris or damage to adjoining structures. Stones or tiles shall be loosened manually, using wooden or bamboo wedges to gently pry out pieces without cracking. The dismantled stones shall be cleaned of adhering mortar using wooden mallets and scrapers. Reusable stones shall be numbered on the underside or non-decorated surface using a reversible medium. Serviceable slabs or tiles shall be sorted, stacked, and stored within the site at a designated storage area, under tarpaulin cover.

Measurement: The work shall be measured in square metres (Sq.m) of flooring dismantled and cleared, including sorting, stacking, and disposal as specified.

**Item No. A9:** Removal of existing Light Poles/ telephone pole/ electrical pole/ signage pole with fixtures/ signage sheet/ac units all cabling work including excavation, Breaking concrete foundation under the supervision of concerned department, disposal unserviceable material with all lifts and up to any lead at non objectional place and stacking the serviceable material upto any private or corporation Land (if corporation land is used then contractor to pay rent to corporation) store including loading, unloading as directed by Engineer in-charge.

Measurement: The work shall be measured according to the number of fixtures to be dismantled and stacked.

## B Surface Preparation

**Item No. B1:** Supplying of graded stone aggregate of following sizes (for W.B.M. Road)(3)  
Crushed stone aggregate for Hard Quality up to 63 mm size- upto 250mm and 350mm near  
otla/footpath

Coarse aggregate as specified in the item shall be either crushed/broken stone, crushed slag, over burnt (Jhama) brick aggregate or one of the naturally occurring aggregates such as kanker or laterite of suitable quality as stated hereinafter and approved by the Engineer-in-Charge.

The coarse aggregate shall conform to one of the gradings given in Table 16.2 as specified. For crushable type of aggregates such as brick metal, kankar and laterite, grading shall not be regarded as very important, but the material should generally be within the specified range.

**Table 1** Table 16.1 from CPWD Specifications: Road works

**TABLE 16.1**  
**Physical Requirements of Coarse Aggregate for Water Bound Macadam for**  
**Sub-Base / Base Courses**

S. No	Test	Test method	Requirements
1.***	Los Angeles Abrasion value or Aggregate impact value	IS 2386 (Part-4) IS 2386 (Part-4) or IS 5640*	40% (Max.) 30% (Max.)
2.	Combined flakiness and Elongation Indices (Total)**	IS 2386 (Part-1)	35% (Max.)

**Table 2** Table 16.2 from CPWD Specifications: Road works

**TABLE 16.2**  
**Grading Requirements of Coarse Aggregate for W.B.M.**

Grading No.	Size Range	IS Sieve Designation	Percent by weight passing the sieve
1	90 mm to 45 mm	125 mm	100
		90 mm	90 – 100
		63 mm	25 – 60
		45 mm	0 – 15
		22.4 mm	0 – 5

Measurement: Measurement shall be taken in cubic metres (Cu.m) of aggregates supplied and laid on the surface.

**Item No. B2:** Supplying of brick aggregate 40mm nominal size- upto 150mm

Brick aggregate shall be made from over-burnt bricks and dense brick bats. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dust, dirt and other objectionable and deleterious materials.

Measurement: Measurement shall be taken in cubic metres (Cu.m) of aggregates supplied and laid on the surface.

**Item No. B3:** Spreading the stone aggregate for rolling and W.B.M. including filling the interstices to required camber and gradient (excluding spreading of Blindage)(ii) 40mm to 63mm size aggregates (H.B.)

The coarse aggregate shall be spread uniformly and evenly upon the prepared base in required quantities with a twisting motion to avoid segregation. In no case shall these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed base be permitted. The aggregates shall be spread uniformly to proper profile by using templates placed across the road six metres apart. Where specified, approved mechanical devices may be used to spread the aggregates uniformly. The levels along the longitudinal direction upto which the metal shall be laid, shall be first obtained at site to the satisfaction of Engineer-in-Charge, and these shall be adhered to.

The surface of the aggregate spread shall be carefully trued up and all high or low spots remedied by removing or adding aggregate as may be required. The W.B.M. sub-base shall be normally constructed in layer of 100 mm compacted thickness and W.B.M. base shall be normally constructed in layers of 75 mm compacted thickness. No segregation of large or fine particles shall be allowed and the coarse aggregate as spread shall be of uniform gradation with no pockets of fine material. The coarse aggregate shall normally not be spread in lengths exceeding three days average work ahead of the rolling and blending of the proceeding section.

Measurement: The length and breadth shall be measured to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre and at 30 cm from the left and right edges at a cross section taken at 100 metre interval or less as decided by the Engineer-in-Charge by making small pits. The consolidated cubical contents shall be calculated in cubic metres correct to two places of decimal.

**Item No. B4:** Preparing surface by Brushing with wire brushes for removing caked mud etc. sweeping with brooms and finally fanning the cleaned surface with gunney bags to remove all loose dirt etc.(i) Water bound macadam surface (New)

Prior to the application of the binder, all dust, dirt, caked mud, animal dung, loose and foreign material etc. shall be removed 30 cm on either side, beyond the full width to be treated, by means of mechanical sweepers and blowers, if available or otherwise with wire brushes, small picks, brooms etc. The material so removed shall be disposed off as directed by the Engineer-in-Charge. For a water bound macadam surface, the interstices between the road metal shall be exposed upto a depth of about 10 mm by means of wire brushes. The surface shall then be brushed with soft brooms to remove all loose aggregate. Finally the traces of fine dust which get accumulated while brushing shall be thoroughly removed from the surface by blowing with gunny bags. The prepared surface shall be closed to traffic and maintained fully clean till the binder is applied.

Measurement: The length and width of the finished work shall be measured correct to a cm along the finished surface of the road. The area shall be calculated in square metre, correct to two places of decimal.

**Item No. B5 :** Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth - 100mm

Before laying cement concrete for grading, the level markings to the required slope/gradient shall be made only with cement concrete on the surface of the slab at suitable spacing with the

help of string and steel tape (Measuring tape) so that the mason can lay the concrete to the required thickness, slope / gradient easily in between the two level markings.

On getting the level marking approved by the Site Engineer the surface should be sprinkled with thick cement slurry and the concrete should be laid carefully, without throwing from height, in predetermined strips. The concrete should be consolidated by specially made wooden tamping. After the tamping is done the surface should be finished to required slope/gradient with wooden trowels without leaving any spots of loose aggregates etc. The mixed cement concrete must be laid in position, within half an hour of its mixing. In case any quantity of concrete remains unused for more than half an hour the same should be rejected and removed from the site.

Curing shall be done either by spreading straw/Hessian cloth over the graded surface, keeping the same wet for full 10 days or flooding the graded area with water by making kiarries with weak cement mortar, for 10 days.

Measurement: Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sqm. and the cubical contents shall be worked out to nearest 0.001 cum.

**Item No. B6:** Supplying and fixing reinforced concrete heavy duty non-pressure pipes with collars for culverts carrying heavy traffic as per IS 458-1991 specifications including setting the pipes in C.M. 1:2 watering and laying (to level or slopes) of class NP3 of following internal diameters.(ii) 450mm dia. - sewer and rainwater drainage lines.

The pipes shall be with reinforcement as required and shall be of class not lesser than NP2. These shall conform to IS 458 and shall be capable of withstanding a test pressure of 0.07 MPa (7 m head). The reinforced cement concrete pipes shall be manufactured by centrifugal (or spun) process or vibrated casting process. All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding.

Concrete used for the manufacture of reinforced concrete pipes and collars shall be as per design mix. The concrete quality (concrete mix, maximum water-cement ratio, minimum cement content. etc) shall be as per IS 456 for at least very severe environment exposure condition with minimum cement content 260 kg/m<sup>3</sup>. The maximum size of aggregate should not exceed one third of the thickness of the pipe or 20 mm whichever is smaller for pipes above 250 mm internal diameter. But for pipes of internal diameter 80 to 250 mm, the maximum size of aggregate should be 10mm. The reinforcement in the reinforced concrete pipes shall extend throughout the length of the pipe. The circumferential and longitudinal reinforcements shall be adequate to withstand the specified hydrostatic pressure and further bending stresses due to the weight of water when running full across a span equal to the length of pipe plus three times its own weight.

Loading, transporting and unloading of concrete pipes shall be done with care. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain pulley block is recommended. All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used. Pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Pipes shall be laid true to line and grade as specified. Laying of pipes shall proceed upgrade of a slope.

Measurement: The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be

taken along the centre line of the pipes over all fittings such as bends, collars, junctions, etc. which shall not be measured separately.

**Item No. B7:** Ductile Iron Pipes with internal cement mortar lining and external Zinc coating with finishing layer of Bitumen; manufactured, tested and duly marked in strict accordance with and confirming to IS: 8329/2000 (as per latest amendment); suitable for push-on Jointing, along-with one number Rubber Gaskets for each length of pipe (EPDM Gasket as per IS: 5382/1985). (Class-K7) For 450 mm Dia.- water supply

The pipes shall be lowered into the trench by means of suitable pulley blocks, sheer legs chains ropes etc. In no case the pipes shall be rolled and dropped into the trench. One end of each rope may be tied to a wooden or steel peg driven into the ground and the other end held by men which when slowly released will lower the pipe into the trench. After lowering, the pipes shall be arranged so that the spigot of one pipe is carefully centered into the socket of the next pipe, and pushed to the full distance that it can go. The pipe line shall be laid to the levels required. Specials shall also be laid in their proper position as stated above.

After a new pipe has been laid, jointed and back filled (or any valved section thereof), it shall be subjected to the following two tests: (a) Pressure test at a pressure of at least double the maximum working pressure-pipe and joints shall be absolutely water tight under the test. (b) Leakage test (to be conducted after the satisfactory completion of the pressure test) at a pressure to be specified by the authority for duration of two hours.

Measurement: The net length of pipes as laid or fixed, shall be measured in the running metres correct to a cm. specials shall be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joints shall not be included in the length of pipe work

**Item No. B8:** Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.

The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth. Cover shall be measured from top of pipe to the surface of the ground. The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layers.

After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.

The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.

Measurement: The lengths shall be measured in running metre correct to a cm for the trenches in which pipes are to be laid.

**Item No. B9:** Providing & laying R.C.C. hume pipe for cable to be laid 90 cm below ground across the road crossing or on floor with necessary material in an approved manner and making the ground as per original.: 450mm dia. - electric cables

The pipes shall be with reinforcement as required and shall be of class not lesser than NP2. These shall conform to IS 458 and shall be capable of withstanding a test pressure of 0.07 MPa (7 m head). The reinforced cement concrete pipes shall be manufactured by centrifugal (or spun) process or vibrated casting process. All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding.

Concrete used for the manufacture of reinforced concrete pipes and collars shall be as per design mix. The concrete quality (concrete mix, maximum water-cement ratio, minimum cement content. etc) shall be as per IS 456 for at least very severe environment exposure condition with minimum cement content 260 kg/m<sup>3</sup>. The maximum size of aggregate should not exceed one third of the thickness of the pipe or 20 mm whichever is smaller for pipes above 250 mm internal diameter. But for pipes of internal diameter 80 to 250 mm, the maximum size of aggregate should be 10mm. The reinforcement in the reinforced concrete pipes shall extend throughout the length of the pipe. The circumferential and longitudinal reinforcements shall be adequate to withstand the specified hydrostatic pressure and further bending stresses due to the weight of water when running full across a span equal to the length of pipe plus three times its own weight.

Loading, transporting and unloading of concrete pipes shall be done with care. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain pulley block is recommended. All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used. Pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Pipes shall be laid true to line and grade as specified. Laying of pipes shall proceed upgrade of a slope.

Measurement: The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed

**Item No. B10 & B11:** Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth in existing trench for laying of cable below ground / road surface for enclosing cable. (c). 90 mm outer dia. - private connections and general connections : 120mm

Pipes shall be continuous and clear of debris or concrete before cables are drawn. Sharp edges if any at ends shall be smoothened to prevent damage to cable sheathing.

Measurement: The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed

**Item No. B12:** Constructing Brick masonry road gully chamber 500mm x 450mm x 600mm including 500mm x 450mm C.I. horizontal grating with frame complete.



The chamber shall be of brick masonry of specified class and shall have a C.I. grating with frame fixed in 15 cm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) at the top. The size of the chamber shall be taken as the clear internal dimensions of the C.I. frame. The chamber shall have a connection pipe, the length of which in metre between the road gully chamber and the manhole of the drain shall not be less than one by forty (1/40) times the nominal diameter of pipe in mm (i.e. for 150 mm connection pipe, length shall not be less than 3.7 m and for 250 mm connection pipe length shall not be less than 6.25 m). The chamber shall be built at the location fixed by the Engineer-in-Charge. Generally the spacing of the chambers shall be 18 to 36 m depending upon the grading of the road channel and the area of the drainage. R.C.C. gully grating shall be fixed in cement mortar 1:2 (1 cement: 2 coarse sand)

Measurement: Road Gully chambers shall be enumerated

**Item No. B13:** Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1-cement :2-coarse sand : 4 graded stone aggregate 20mm nominal size) foundation concrete 1:3:6 mix (1 cement : 3-coarse sand :6-Brick bats 40 + 50mm size) inside plastering 15mm thick with Cement Mortar 1:3 (1-Cement : 3-coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 mix (1-Cement :2 Coarse sand :4-stone aggregate 20mm nominal size) finished smooth complete including curing and festing (i) Inside size 900mm x 1200mm and 1.5M. deep including C.I. cover with frame size 560mm diameter total weight of cover and frame to be not less than 128 kgs. (Wt. of cover 64 Kg. and Wt. of frame 64 Kg.)(A) With 230mm thick walls of brick msonry using brick having crushing strength not less than 35Kg. / Sq.cm. in Cement Mortar 1:5 (1- Cement: 5-Coarse sand) (2) B type depth 1.50 Metre for 150mm diameter sewer.

Measurement: Manholes shall be enumerated under relevant items. The depth of the manhole shall be reckoned from the top level of C.I. cover to the invert level of channel.

**Item No. B14:** Covering of cable with second class bricks or cement tiles laid cover the cable crosswise & also on both sides with covering of 7.5 Cm. layer of sand above & below cable (16 bricks per meter)

The cables, shall be protected by second class brick of nominal size 22cm x11.4cm x 7cm or locally available size, placed on top of the sand (or, soil as the case may be). The bricks shall be placed breadth-wise for the full length of the cable. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and project at least 5cm over sides of the end cables.

Measurement: The running length of the cable installed is to be measured.

**Item No. B15:** Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each disposable layer by ramming and watering.

Measurement shall be considered as per the actual filled area, for uniform depth after setting period of 1 week in cu.m units.

**Item No. B16:** Filling in plinth with sand under floors including watering ramming, consolidating and dressing complete

Sand filling shall be done in a manner similar to earth filling in plinth except that consolidation shall be done by flooding with water. The surface of the consolidated sand filling shall be dressed to the required level or slope and shall not be covered till the Engineer-in-Charge has inspected and approved the sand filling.

Measurement: The length, breadth and depth of consolidated sand shall be measured with steel tape correct to the nearest cm and cubical contents worked out in cubic metres correct to two places of decimal.

**Item No. B17:** Filling around the pipes with murrum including dressing, tampering etc. complete.

Measurement : Measurement shall be done in the the cubical contents of the total volume of murrum required for filling.

**Item No. B18:** Rolling of earthwork in layers with power roller including filling in depressions which occur during the process.

Immediately following at spreading of the coarse aggregate, it shall be compacted to the full width by rolling with either the three- wheel- power -roller of 8 to 10 tonnes capacity or an equivalent vibratory roller. Initially, light rolling is to be done, which shall be discontinued when the aggregate is partially compacted with sufficient void space in them to permit application of screenings. The rolling shall begin from the edges with the roller running forward and backward and adding the screenings simultaneously until the edges have been firmly compacted.

The roller shall then progress gradually from the edges to the centre, parallel to the centre line of the road and overlapping uniformly each preceding rear wheel track by one half width and shall continue until the entire area of the course has been rolled by the rear wheel. Rolling shall continue until the road metal is thoroughly keyed with no creeping of metal ahead of the roller. Only slight sprinkling of water may be done during rolling, if required. On super-elevated curves, the rolling shall proceed from the lower edge and progress gradually continuing towards the upper edge of the pavement.

Rolling of sub base shall not be done when the sub-grade is soft or yielding or when the rolling causes a wave like motion in the sub-base or sub-grade. When rolling develops irregularities that exceed 12 mm when tested with a three metre straight edge, the irregular surface shall be loosened and then aggregate added to or removed from it as required and the area rolled until it gives a uniform surface conforming to the desired cross-section and grade. The surface shall also be checked transversely by template for camber and any irregularities corrected in the manner described above. In no case shall the use of screenings to make up depressions be permitted.

Measurement: Measurement of the finished work needs to be measured in cubical contents.

## **C Surface Paving and Edging**

**Item No. C1:** Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15cm thick of M200 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1cement:3fine sand) etc complete.

Trenches shall first be made along the edge of the wearing course of the road to receive the kerb stones of cement concrete of specified grade. The bed of the trenches shall be compacted manually with steel rammers to a firm and even surface and then the stones shall be set in cement mortar of specified proportion.

The kerb stones with top 20 cm. wide shall be laid with their length running parallel to the road edge, true in line and gradient at a distance of 30 cm. from the road edge to allow for the channel and shall project about 12.5 cm. above the latter. The channel stones with top 30 cm. wide shall be laid in position in chamber with finished road surface and with sufficient slope towards the road gully chamber. The joints of kerb and channel stones shall be staggered and shall be not more than 10 mm. Wherever specified all joints shall be filled with mortar 1:3 (1 cement : 3 coarse sand) and pointed with mortar 1:2 (1 cement: 2 fine sand) which shall be cured for 7 days.

Measurement: It shall be measured in running metre along the edge of the road correct to a cm.

**Item No. C2:** Providing and casting in situ controlled cement concrete M-200 for Kerb/ kerb blocks including formwork curing and finishing, complete

Measurement: It shall be measured in cubic meters with Length of the finished work (for specified width and height of stone) shall be measured in running metre along the edge of the road correct to a cm

**Item No. C3:** Supply of Dished Channel of VYARA make, as per the below profile drawing, manufactured on Vacuum Wet Press Machine with hydraulic pressing of wet concrete mixture to a minimum of 400 tons with simultaneous vacuuming, using ECO filters with pimple finish. Brand name of the vendor should be embossed on the back side of every piece. size: 600x300x125mm

Measurement: Pieces of dished channel as specified needs to be enumerated.

**Item No. C4:** Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-coarse sand) or L.M. 1:1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (A) 25mm thick

The base concrete or subgrade shall be properly compacted, cured, and cleaned of all dust and loose particles before starting work. The surface shall be checked for line, level, and slope as per the approved drawings to ensure proper drainage in outdoor areas. A neat cement slurry shall be applied on the clean, damp base immediately before laying the mortar bed. Mortar of mix 1:6

shall be laid evenly to an average thickness sufficient to achieve the final floor level. Stones shall be laid on the mortar bed, gently pressed and tapped with a wooden mallet to ensure proper bedding and alignment. Joints shall be kept uniform (typically 3–6 mm) using spacers as required. Grooves shall be provided as per the approved pattern and layout. Joints shall be filled with white/grey cement slurry mixed with pigments to match the colour of each stone. The finished surface shall be even, level, and true to pattern. The surface shall be cleaned thoroughly with water and soft cloth after jointing is complete. The flooring shall be cured using moist hessian or water curing as per site conditions. After curing, the surface shall be washed and polished if required to achieve an even, aesthetically uniform appearance.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

**Item No. C5:** Providing and laying polished kota stone slab 25mm thick in risers of steps, skirting, Dedo and pillars laid on 10mm thick cement mortar 1:3 (1-Cement : 3 coarse sand) and jointed with gray cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

**Item No. C6:** Providing and laying multi-colored stones like Mandhana, black kadappa, leather finished kota stone and rajula stone with avg. thickness of 30mm, in 1:6 cement laid over and jointed with groove and spacer and white and grey cement slurry mixed with pigments to match the shade of the flooring etc. in the outdoor plaza areas.

The base concrete or subgrade shall be properly compacted, cured, and cleaned of all dust and loose particles before starting work. The surface shall be checked for line, level, and slope as per the approved drawings to ensure proper drainage in outdoor areas. A neat cement slurry shall be applied on the clean, damp base immediately before laying the mortar bed. Mortar of mix 1:6 shall be laid evenly to an average thickness sufficient to achieve the final floor level. Stones shall be laid on the mortar bed, gently pressed and tapped with a wooden mallet to ensure proper bedding and alignment. Joints shall be kept uniform (typically 3–6 mm) using spacers as required. Grooves shall be provided as per the approved pattern and layout. Joints shall be filled with white/grey cement slurry mixed with pigments to match the colour of each stone. The finished surface shall be even, level, and true to pattern. The surface shall be cleaned thoroughly with water and soft cloth after jointing is complete. The flooring shall be cured using moist hessian or water curing as per site conditions. After curing, the surface shall be washed and polished if required to achieve an even, aesthetically uniform appearance.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

**Item No. C7:** Providing and Installation of Multicolour rough cut cobble stones 100x100x60mm in 1:4 cement mortar with 6mm grooves upon 50mm pcc bedding concrete and 50mm sand bed including installation as per pattern and design including cutting to shape, curing and cleaning complete as per the instructions of Engineer in charge

Measurement: Measurement shall be in square metres (sqm) of finished surface.

**Item No. C8:** Supplying and fixing cat eye made out from Acrilo beaultile sterine injunction high compressed molding with reflector made of MMC (prismatic type of size 12cm x 6cm x 2.5cm) provided with bituminous adhesive 100g. with each unit for fixing. (High Intensity grade)

The reflective marker shall be fixed to the road surface using the adhesives and the procedure recommended by the manufacturer. No nails shall be used to affix the marker so that they do not pose safety hazard on the roads. Regardless of the type of adhesive used, the markers shall not be fixed if the pavement is not surface dry and on new asphalt concrete surfacing until the surfacing has been opened to traffic for a period of not less than 14 hours. The portions of the highway surface, to which the marker is to be bonded by the adhesive, shall be free of dirt, curing compound, grease, oils, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive.

Measurement: The number of fixtures to be installed needs to be measured.

**Item No. C9:** Solar Stud: Supplying of Solar Raised Pavement Markers made of polycarbonate molded body with circular shape, solar powered, LED self-illumination in active mode, 360 degree illumination and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face in passive mode. The marker shall support a load of 20000 kg tested in accordance to ASTM D 4280. The marker should be resistant to dust and water ingress according to IP 65 standards and should withstand temperatures in the range of 0 C to 70 C. Color of lighting could be provided in red or yellow (amber) as per requirement and typical frequency of blinking is 1 Hz. There should be current losses of less than 20 micro-amperes at 2.4 V in sleep-charging mode to enhance the life of the marker and a full charge should provide for a minimum autonomy of 50 hours. The height, width and length of the marker shall not be less than 10 mm x 100 mm x 100 mm. Also, the surface diameter of the marker shall not be less than 100 mm respectively. The weight of the marker shall not exceed 0.5 Kilograms. Fixing will be by drilling holes on the road for the shanks to go inside, without nails and using epoxy resin based adhesive as per manufacturers recommendation and complete as directed by the engineer.

The reflective marker shall be fixed to the road surface using the adhesives and the procedure recommended by the manufacturer. No nails shall be used to affix the marker so that they do not pose safety hazard on the roads. Regardless of the type of adhesive used, the markers shall not be fixed if the pavement is not surface dry and on new asphalt concrete surfacing until the surfacing has been opened to traffic for a period of not less than 14 hours. The portions of the highway surface, to which the marker is to be bonded by the adhesive, shall be free of dirt, curing compound, grease, oils, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive.

Measurement: The number of fixtures to be installed needs to be measured.

**Item No. C10:** Providing and laying cement concrete pavement (25mm to 50mm thick) with 1:2:4 (1-cement : 2-coarse sand : 4-stone aggregate 20mm nominal size) including finishing with floating coat of neat cement complete.

Measurement: Measured in cubic metres (Cu.m) of cement concrete installed in-situ.

**Item No. C11 :** Providing and fixing heritage markers of approved design and drawings. Rate should include fixing in pavement surface, bedding as per paver area, complete in all respect with all tools, tackles, chemical, etc., complete in all respect.

Measurement: Measured according to the number of such markers supplied and fixed on site.

**Item No. C12:** Providing and laying cement concrete tactile tiles of size 300 x 300 x 25 to 30mm of Vyara, Super, Nishu, etc or equivalent of approved make and pattern having water absorption not over 6% and conforming to IS: 13801:1993, of approved make, pattern and shade (with UV light resistant colours from Lanxess only) in outdoor floors such as footpath, court yard, multi modals location etc., laid on 30 to 40mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

## **D Façade Enhancement Works**

**Item No. D1:** Erection of temporary screen on exterior walls covering the façade using HDPE/jute fabric/plastic for prevention of dust, dirt, pollution and direct impact on the nearby traffic / residents. The material shall be provided on rental basis.as per direction of Engineer/Architect-in-Charge.

Framework posts shall be placed away from the historic structure, ensuring no contact with the surface. The net/fabric/sheet shall be firmly fixed over the framework with adequate overlap at joints. Lower edges shall be properly anchored to prevent displacement due to wind. Screens shall be stretched taut to avoid sagging and ensure full façade coverage.

- IS 15061:2002 – *HDPE Woven Fabric for Shading and Protection*
- IS 7903:2017 – *Jute Fabrics for Packaging and Protection*

Measurement: Measurement shall be taken in square metres (Sq.m) of the façade area covered by the temporary protective screen. The area shall be computed based on the actual surface protected, including overlaps.

**Item No. D2:** Provision for Erection, use and dismantling of temporary supports and shoring on the exterior walls and periphery using heavy MS H frames, Jacks, Bearing Plates, Steel Sheets, Non corrosive painted Studs and clamps, couplers joiners and brackets etc. A temporary support system shall be installed surrounding the structure without causing any damage to historic surface or taking support of it, using H frame of tubular sections during work execution and shall be dismantled after the completion of work for the project duration. In no case scaffolding or any part of it should rest or support on to the historic structure.

Base plates and sole plates shall be placed on firm ground; no component shall rest on stone or heritage masonry. Vertical frames shall be interconnected with horizontal and diagonal braces at every alternate level for rigidity. Platforms shall be constructed using seasoned wooden battens or MS planks supported on ledger beams. Access ladders shall be provided for safe movement of workers. The entire framework shall be anchored and stabilized using ballast or ground fixings, not by tying to the historic structure.

- IS 2750:1964 – *Specification for Steel Scaffolds*
- IS 3696 (Part 1):1987 – *Safety Code for Scaffolds and Ladders*

Measurement: Measured in square metres (Sq.m) of the façade area of the temporary support/shoring system erected around the structure.

**Item No. D3:** Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns etc. and Mass concrete.

The timber framework shall be designed to safely transfer loads during construction of the masonry arcade, or reconstruction of masonry or stone components and shall include all necessary struts, braces, wedges, and props to ensure stability and prevent movement or deformation of the historic structure. Work shall conform to, adapted for heritage conservation.

- IS 14687:1999 (*Guidelines for Formwork*)
- IS 456:2000 (*for general formwork practice*)

Measurement: Measurement shall be taken in square meters (Sq.m.) of the plan area of formwork actually executed at site.

**Item No. D4:** Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete

Before laying cement concrete for grading, the level markings to the required slope/gradient shall be made only with cement concrete on the surface of the slab at suitable spacing with the help of string and steel tape (Measuring tape) so that the mason can lay the concrete to the required thickness, slope / gradient easily in between the two level markings.

On getting the level marking approved by the Site Engineer the surface should be sprinkled with thick cement slurry and the concrete should be laid carefully, without throwing from height, in predetermined strips. The concrete should be consolidated by specially made wooden tamping. After the tamping is done the surface should be finished to required slope/gradient with wooden trowels without leaving any spots of loose aggregates etc. The mixed cement concrete must be laid in position, within half an hour of its mixing. In case any quantity of concrete remains unused for more than half an hour the same should be rejected and removed from the site.

Curing shall be done either by spreading straw/Hessian cloth over the graded surface, keeping the same wet for full 10 days or flooding the graded area with water by making kiarries with weak cement mortar, for 10 days.

Measurement: Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sqm. and the cubical contents shall be worked out to nearest 0.001 cum.

**Item No.D5:** Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:5. (1- Cement : 5 -fine sand)(B) Conventional

Half or cut bricks shall not be used except when necessary to complete the bond; closer and in such case, it shall be cut to required size and used near the ends of walls. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with the handle of the trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of the course, the vertical joints shall be fully filled from the top, with mortar. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate courses shall generally be in one vertical plane. The thickness of the brick course shall be kept uniform. All the fixtures, pipe outlets of water, etc. which are required to be built in the wall shall be embedded in CM, as per the drawings or as directed. The frames of doors, windows, cupboards, etc. shall be housed into the brick work at the correct location and level, as directed. Bricks shall be so laid that all joints are quite flush with mortar. The thickness of joints shall not exceed 12 mm.



- IS 1077:1992 – *Common Burnt Clay Building Bricks – Specification*
- IS 2212:1991 – *Code of Practice for Brickwork*

Measurement: The length, breadth and depth of consolidated material shall be measured with steel tape correct to the nearest cm and cubical contents worked out in cubic metres correct to two places of decimal.

**Item No. D6:** Extra for brick work in superstructure above plinth level upto floor two level (B) Conventional

Half or cut bricks shall not be used except when necessary to complete the bond; closer and in such case, it shall be cut to required size and used near the ends of walls. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with the handle of the trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of the course, the vertical joints shall be fully filled from the top, with mortar. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate courses shall generally be in one vertical plane. The thickness of the brick course shall be kept uniform. All the fixtures, pipe outlets of water, etc. which are required to be built in the wall shall be embedded in CM, as per the drawings or as directed. The frames of doors, windows, cupboards, etc. shall be housed into the brick work at the correct location and level, as directed. Bricks shall be so laid that all joints are quite flush with mortar. The thickness of joints shall not exceed 12 mm.

- IS 1077:1992 – *Common Burnt Clay Building Bricks – Specification*
- IS 2212:1991 – *Code of Practice for Brickwork*

Measurement: The length, breadth and depth of consolidated material shall be measured with steel tape correct to the nearest cm and cubical contents worked out in cubic metres correct to two places of decimal.

**Item No. D7:** Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level

Thermo-Mechanically Treated (TMT) high strength deformed bars used for reinforcement in reinforced cement concrete (RCC) works shall conform to the requirements of IS 1786 (latest revision). The bars shall be manufactured through a controlled thermo-mechanical process to obtain a tough outer martensitic layer with a ductile ferrite-pearlite core, ensuring high strength, excellent ductility, and good weldability.

The steel shall be of grade Fe 500, having a minimum 0.2% proof stress (yield stress) of 500 N/mm<sup>2</sup>. The ultimate tensile strength shall be at least 12% higher than the actual yield stress, and shall not be less than 565 N/mm<sup>2</sup>. The ratio of tensile strength to yield strength shall comply with IS 1786 requirements, ensuring adequate strain hardening characteristics.

The material shall exhibit a minimum percentage elongation of 16%, measured on a gauge length of  $5.65\sqrt{A}$ , where A is the cross-sectional area of the test specimen. In addition, the total elongation at maximum force (Agt) shall not be less than 5%, ensuring adequate ductility and energy absorption capacity, making the bars suitable for use in seismic-resistant and high-performance RCC structures.

The bars shall possess good bend and rebend properties and shall successfully withstand the prescribed bend and rebend tests as specified in IS 1786, without any cracking or surface defects. The steel shall also have controlled chemical composition with low carbon equivalent to ensure good weldability, without the need for special precautions.

All TMT bars shall be free from surface defects such as cracks, laminations, seams, or excessive rust, and shall have well-defined ribs to ensure proper bond with concrete.

Measurement: Thermo-Mechanically Treated (TMT) Fe 500 reinforcement bars shall be measured and paid for in metric tonnes (MT).

**Item No. D9:** Providing and erecting at the site of work steel ventilating column of 150mm internal diameter and 12.20 Metre High from G.L. to bottom of top grill including C.I. grill and base plate bolts and nuts etc. and excavation in foundation of size 120cm. x 120vc. x 165cm. and filling the pit with first layer of cement concrete 1:3:6 mix (1-cement :3-coarse sand :6-graded stone aggregate 20mm nominal size) of 120cm. x 120cm. x 90cm. and remaining pit with B.B.C. 1:3:6 mix (1-cement :3 coarse sand:6-Brickbats 40+50mm size) and providing fillet in Cement concrete 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm. nominal size) at G.L. and 3 coats of silver paint etc. complete.

Measurement: Count shall be taken as per number of fittings required.

**Item No. D12:** Stone work plain ashlar in arches in super structure upto floor V level in cement mortar 1:3 (1 cement : 3 coarse sand) including centering, shuttering and pointing with white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade. Both face dressed : white sandstone: for arch

The stone shall be red or white as specified in the description of item. The stone shall be hard, sound, tough, free from cracks, decay & weathering. In case of red sand stone, white patches or streaks shall not be allowed. However scattered spots upto 10 mm diameter will be permitted. Before starting the work the contractor shall get samples of stone approved by the Engineer-in-Charge.

Every stone shall be cut to the required size and shape chisel dressed on all beds and joints so as to be free from waviness and to give truly vertical and horizontal joints. In exposed masonry, the faces that are to remain exposed in the final position and the adjoining faces to a depth of 6 mm shall be the fine chisel dressed so that when checked with 60 cm straight edge, no point varies from it by more than 1 mm. The top and bottom faces that are to form the bed joints shall be chisel dressed so that variation from 60 cm straight edge at no point exceeds 3 mm. Faces which are to form the vertical joints should be chisel dressed so that variation at any point with 60 cm straight edge does not exceed 6 mm. Any vertical face that is to come against backing of masonry shall be dressed such that variation from straight edge does not exceed 10 mm. All angles and edges that are to remain exposed in the final position shall be true, square and free from chippings. A sample of dressed stone shall be prepared for approval of Engineer-in-Charge. It shall be kept at the worksite as a sample after being approved.

For arch, dome or circular work the stone shall be dressed to require wedge shape so that joints shall be truly radial. Centering and shuttering required for arch dome or circular moulded work shall be constructed as directed by the Engineer-in-Charge.

Measurement: The finished work shall be measured correct to a centimetre in respect of length, breadth and height. The cubical contents shall be calculated in cubic metre nearest to two places of decimal.

**Item No. D13:** Stone work ashlar sunk or moulded or sunk and moulded upto floor five level in cement mortar 1:6 (1 cement : 6 coarse sand) including pointing with white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : white sandstone: for plain masonry with carvings and mouldings.

The stone shall be red or white as specified in the description of item. The stone shall be hard, sound, tough, and free from cracks, decay & weathering. In case of red sand stone, white patches or streaks shall not be allowed. However scattered spots upto 10 mm diameter will be permitted. Before starting the work the contractor shall get samples of stone approved by the Engineer-in-Charge.

Every stone shall be cut to the required size and shape chisel dressed on all beds and joints so as to be free from waviness and to give truly vertical and horizontal joints. In exposed masonry, the faces that are to remain exposed in the final position and the adjoining faces to a depth of 6 mm shall be the fine chisel dressed so that when checked with 60 cm straight edge, no point varies from it by more than 1 mm. The top and bottom faces that are to form the bed joints shall be chisel dressed so that variation from 60 cm straight edge at no point exceeds 3 mm. Faces which are to form the vertical joints should be chisel dressed so that variation at any point with 60 cm straight edge does not exceed 6 mm. Any vertical face that is to come against backing of masonry shall be dressed such that variation from straight edge does not exceed 10 mm. All angles and edges that are to remain exposed in the final position shall be true, square and free from chippings. A sample of dressed stone shall be prepared for approval of Engineer-in-Charge. It shall be kept at the worksite as a sample after being approved.

For arch, dome or circular work the stone shall be dressed to require wedge shape so that joints shall be truly radial. Centering and shuttering required for arch dome or circular moulded work shall be constructed as directed by the Engineer-in-Charge.

Measurement: In case of sunk or moulded work the measurements for the work shall be taken course by course. The plain stone used in conjunction with sunk or moulded stone shall be measured and paid for under the relevant item of stone work.

**Item No. D14:** Providing and Installation of Dovetail shaped Rosewood Dowels after necessary shaping, linseed oil seasoning and Neem oil applied for stone joinery including making chases in the masonry unit, inserting dowels and sealing the gaps by filling fine lime paste.

Rosewood dowels shall be cut to size and shaped manually using saws and chisels. Each dowel shall be immersed in boiled linseed oil for 24 hours, then air-dried for another 24 hours. After drying, a coat of Neem oil shall be applied to all surfaces for additional termite and fungal protection. The prepared dowels shall be stored in dry, shaded areas before installation. The stone joint or surface shall be cleaned and marked for dowel insertion. Using fine chisels and hand drills, chases or sockets shall be carved manually, matching the dovetail shape of the dowel. Care shall be taken to avoid cracks, vibration, or loss of surrounding historic material.

Measurement: Measured in number (Nos.) of dowels installed, including shaping, oil treatment, chase preparation, fixing, and sealing.

**Item No. D14:** Providing and Installation of Dovetail shaped Rosewood Dowels after necessary shaping, linseed oil seasoning and Neem oil applied for stone joinery including making chases in the masonry unit, inserting dowels and sealing the gaps by filling fine lime paste.

Rosewood dowels shall be cut to size and shaped manually using saws and chisels. Each dowel shall be immersed in boiled linseed oil for 24 hours, then air-dried for another 24 hours. After drying, a coat of Neem oil shall be applied to all surfaces for additional termite and fungal protection. The prepared dowels shall be stored in dry, shaded areas before installation. The stone joint or surface shall be cleaned and marked for dowel insertion. Using fine chisels and hand drills, chases or sockets shall be carved manually, matching the dovetail shape of the dowel. Care shall be taken to avoid cracks, vibration, or loss of surrounding historic material.

Measurement: Measured in number (Nos.) of dowels installed, including shaping, oil treatment, chase preparation, fixing, and sealing.

**Item No. D15:** 2mm Aluminium / 4mmACP sheeting fixed with Type-4 Class-B High Intensity Grade Sheeting as per IRC 67 : 2012 reflective sheeting of size including lettering and signs as applicable: FOR NAME PLATES OF different shops

The retro-reflective sheeting shall be weather resistant, suitable for long-term outdoor exposure, and capable of maintaining prescribed luminance and chromaticity values under varying climatic conditions. The sheeting shall be applied using approved pressure-sensitive adhesive or heat-activated process to ensure proper bonding, free from wrinkles, bubbles, or edge lifting. Lettering, symbols, logos, and directional information shall be provided as required, using computer-cut vinyl, screen printing, or overlay films of approved colour, size, and font, in accordance with the approved drawings and design guidelines. All lettering and graphics shall be durable, UV-resistant, and compatible with the reflective sheeting.

The aluminium / ACP sheets shall be properly cut to size, edges smoothened and finished neatly. The plates shall be fixed in position using non-corrosive fasteners (SS / aluminium rivets or screws), spacers, and brackets as required, ensuring firm anchorage and correct alignment. All exposed metal parts shall be protected against corrosion.

The work shall include all materials, labour, fixing accessories, cutting, finishing, and installation complete in all respects, as per approved design, location, and directions of the Engineer-in-Charge.

Measurement: Shop name plates shall be measured in square metres (sqm), as specified in the BOQ.

**Item No. D16:** Providing wood work in frames of Doors, windows cleare story windows and othersimilar works wrought, framede and fixed in position. (A) Indian Teak Wood

The timber shall be well seasoned, kiln-seasoned or air-seasoned, straight-grained, free from sapwood, knots, shakes, cracks, warping, worm holes, or any other defects. The moisture content of the timber shall be within permissible limits as specified in relevant IS codes. All members shall be accurately cut, planed, and shaped to the required profiles and sizes.

The frames shall be properly joined using mortise and tenon joints, secured with wooden pegs or approved fasteners. The frames shall be fixed in position true to line, level, and plumb, using

suitable holdfasts, screws, rawl bolts, or clamps as required, embedded in masonry or concrete with cement concrete blocks or grouted anchors.

The work shall include necessary labour, tools, scaffolding, and cutting, shaping, fixing, and finishing complete in all respects, as per drawings, specifications, and directions of the Engineer-in-Charge.

Measurement: Wood work in frames shall be measured in cubic metres (cum).

**Item No. D17:** Polishing with french polish on new wood and wood based surface to give an even surface including cleaning, the surface of all dirt, dust and sand papering smooth and including a coat of wood filler.

Preparation of surface shall be as per French polish specification, except, knotting, holes and cracks shall be stopped with a mixture of fine saw dust formed of the wood being treated, beaten up with sufficient bees wax to give it cohesion. : The polish shall be applied evenly with a clean soft pad of cotton cloth in such a way that the surface is completely and fully covered. The surface is then rubbed continuously for half an hour. When the surface is quite dry, a second coat shall be applied in the same manner and rubbed continuously for one hour or until the surface is dry. The final coat shall then be applied and rubbed for two hours (more if necessary) until the surface has assumed a uniform gloss and is dry, showing no sign of stickiness. The final polish depends, largely on the amount of rubbing which should be continuous and with uniform pressure with frequent changes in the direction.

Measurement: Measurements shall be taken in sqm considering only the surfaces to be polished.

**Item No. D18:** Coat tarring two coats on new wood and wood based surfaces using 0.16 and 0.12 Litres of coal tar par Sq.M. in the first and second coat respectively to give an even shade including cleaning of all dirt, dust and other foreign matter.

Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer- in-Charge. All portions of timber built into or against or close to masonry or concrete or burried in ground shall be given two coats of boiling coal tar. All junctions of rafters, purlins, beams and wall plates shall be painted with approved wood primer.

Measurement: Measurements shall be taken in sqm considering only the surfaces to be tarred.

## **E Façade Restoration Works**

**Item No. E1:** Providing and installation of temporary propping by jacking, shoring support and structural framing for precarious portions or adjoining areas of structural operations including use of wooden paddings, Rubber or Cloth cushions, MS Jacks, wooden shores, bamboo props, plywood panels, steel plates and PE/foam or other form of coverings including bolting, nailing or fixing without making holes into the historic surfaces, with necessary anchoring and fixing as per the instructions of Engineer in charge.

MS Jacks or adjustable props shall be used for fine adjustment and tightness control. Where multiple supports are needed, cross-bracing or horizontal struts shall be added to prevent lateral sway. All contact points with stone or plaster surfaces shall have non-abrasive padding (rubber, PE foam, or folded cloth) — no metal-to-stone contact allowed. Chain pulley blocks or lifting tackles may be used for gradual load transfer during jacking. Anchoring or clamping shall be achieved through freestanding frames, wedges, or mechanical grips, ensuring no drilling or permanent fastening into the heritage fabric. For inclined or lateral shoring, butt ends of props shall be padded and placed against rigid non-historic bearing surfaces.

- IS 1597 (Part I):1992 – *Construction and Maintenance of Stone Masonry*

Measurement: Measured in square metres (Sq.m) of façade or structure stabilized and supported, including all materials, erection, maintenance, and dismantling.

**Item No. E2:** Manually and very carefully carrying out cleaning treatment using non-abrasive soft plastic bristles brushes, Natural fibre, phosphor bronze, plastic knives, wooden spikes and nylon brushes can be used to remove any dirt, dust, deposition or lined up moss lichens. No metallic / surface abrasive hard material should be used. The cost is inclusive of taking the artifact manually from the storage shelter covered duly with jute or cloth material before any shifting or movement. The artifact shall be laid on its plain or less important surface on the working platform and only dry brushing or cleaning shall be done. The sizes of artifacts are varying including carving depth, shape and size. The Work shall also include keeping back the artifact at designated location specified by the archaeologist/curator –in– charge. The cleaned items shall be inspected by the authority and only those selected for the carrying out next level of cleaning and treatment shall be taken up for further cleaning. Remaining shall be kept safely in the storage area as specified.

The item's number, description, and condition shall be recorded in the artifact register. The artifact shall be manually carried from its storage shelter to the working area under supervision. Artifacts shall be laid on their plain or less carved surface on the padded working platform for cleaning. Cleaning shall be done only by dry mechanical means — using soft natural or synthetic brushes and non-metallic tools. Loose dirt, dust, cobwebs, and biological growths (moss, lichen, bird droppings, etc.) shall be brushed off gently. No water, chemical, detergent, or solvent shall be used. All grooves and undercuts in carvings shall be cleaned using fine-tipped brushes. Every artifact shall be cleaned individually, not in batches, ensuring full control and traceability.

- IS 1805:1973 – *Code of Practice for Preservation of Stone Monuments*

Measurement: Measured in square metres (Sq.m) of artifact surface cleaned for out to out dimensions only.

**Item No. E3:** Chemical Cleaning and treatment including removal of lichen, moss, algae etc. from stone surface using liquor Ammonia and Teepol of the required quantity and proportion, applying OH-100(Ethyl Silicate) by spraying or applying with brush on dry stone surface, including fungicide treatment with Sodium Pentachlorophenoate including application of biocide Biosilo 111 or equivalent and Preservative Fluoline HY or equivalent in proportion 1:15 etc. Complete as per the instruction of Architect/Engineer in charge.

The surface shall be inspected to determine the extent of biological growth, weathering, and porosity. Trial patches shall be executed and approved by the Engineer/Conservation Architect prior to full-scale application using the chemicals and products as specified by Architect in charge. The stone surface shall first be dry-brushed using soft nylon or natural fiber brushes to remove loose dirt and debris. The cleaned area shall be allowed to dry completely for 24–48 hours.

- IS 1805:1973 – *Code of Practice for Preservation of Stone Monuments*

Measurement: Measured in square metres (Sq.m) of stone surface treated, including cleaning, biocidal, consolidating, and preservative applications as described.

**Item No. E4:** Providing and fixing sand stone in situ patch repairs of different shape as approved by engineer in charge including simple moulding carving and make shape as per original including chiseling out bit by bit old decayed stone without disturbing to the adjoining stone and including supply of all required materials labour T&P etc. required for proper completion of work.

Patches shall be designed to replace only the damaged area, maintaining original joints wherever possible. The decayed or weathered stone shall be chiselled out manually, bit by bit, using flat or toothed chisels, ensuring no vibration or hammer impact is transmitted to adjoining stones. Removal shall continue up to sound, hard stone substrate. All loose material, dust, and old mortar shall be cleaned from the cavity with soft brushes. Replacement patch stone shall be cut from matching sandstone and dressed to the required size and shape to fit the cavity precisely. Where profiles or carvings exist, they shall be reproduced by skilled stone carvers based on measured drawings, photographs, or on-site templates. Mouldings, fluting, or decorative details shall replicate the original pattern and tooling finish.

- IS 1597 (Part I):1992 – *Construction of Stone Masonry*

Measurement: Measured in number (Nos.) of patches executed, including chiselling, carving, fixing, and curing.

**Item No. E5:** A preparation site with lime slaking tanks, mixing tanks, grinding mills, storage tanks and pits along with raw material storage should be prepared with curtain walls or enclosures and shed to maintain required environmental condition for preparation of lime mortars, renders, putty, concrete and other

The site should have access for water supply, power connection, and raw material delivery. Temperature and humidity within the enclosure shall be maintained close to ambient levels (20–35°C) to allow slow curing and hydration. Direct sunlight or heavy rainfall on lime mixtures to be prevented through covered roofing. The area shall remain **dust-free and shaded** to ensure proper carbonation of lime. All tools and tanks to be cleaned after each batch to prevent

contamination. On project completion, all temporary tanks, sheds, and walls shall be dismantled carefully, and the site shall be leveled and restored to its original condition.

The yard shall be divided into the following functional zones:

1. **Slaking Area** – for fresh lime slaking.
2. **Mixing and Grinding Area** – for blending lime with aggregates and additives.
3. **Storage Pits** – for maturing lime putty and mortar.
4. **Raw Material Storage Zone** – for lime, sand, surkhi, and organic additives.
5. **Work Area** – for preparation and testing.

#### Construction and Materials

##### a. Slaking Tanks:

- Constructed of brick masonry in lime mortar (1:2 lime:sand) plastered internally with 15 mm thick smooth lime plaster.
- Size: Minimum 2.0 m × 1.5 m × 1.0 m deep for each tank.
- Provided with drain outlet and overflow edge.

##### b. Mixing and Grinding Channel:

- Constructed adjacent to slaking tanks, using common brickwork with the slaking tank corresponding to grinding stone in a radial form not less than 3 meters diameter.
- Fitted with grinding mills (chakki) for homogenous mixing.
- Flooring: 50 mm thick lime concrete (1:2:4 lime:surkhi:aggregate).

##### c. Storage Pits:

- Lime putty storage pits to be brick-lined or clay-lined, waterproofed with lime plaster and cow dung wash.
- Size: Minimum 1.5 m × 1.0 m × 1.0 m per pit.
- Pits to be covered with timber planks or bamboo mats to prevent contamination.

##### d. Raw Material Storage:

- Dedicated space with raised platform and separate bins for Quicklime (CaO), Surkhi or brick dust, River sand, Organic additives (jaggery, gugal, methi, bael pulp, etc.)

IS 2542 (Part I):1983 – *Preparation and Use of Lime Concrete and Mortar*

Measurement: Measurement shall be per job basis, once in the project time span.

**Item No. E6:** Providing and laying Lime concrete including neat finishing with 20mm nominal size gravel/stone aggregate and 40% mortar comprising of 1 lime : 2 surkhi : 4 coarse sand in floor laid to required slope and camber in panels as required including consolidation finishing and tamping curing, cleaning etc complete as per direction of Engineer/Architect-in-Charge.

The surface shall be cleaned thoroughly, removing all dust, loose material, or old coatings. The surface shall be roughened and moistened before placing the concrete. Where cracks or hollows exist, they shall be filled with lime mortar of similar composition. Proper scaffolding, barricading, and signage shall be placed during work. Ensure no loading or walking on newly laid lime concrete



- IS 2542 (Part I & II):1983 – *Code of Practice for Lime Plastering and Finishing*
- IS 712:1984 – *Building Limes – Specifications*

Measurement: Measured in cubic metres (Cu.m) of terrace area laid and the specified thickness of lime concrete laid.

**Item No. E7&E8 :** Colour washing with lime on wall surface (two coats ) over and including a primary coat of white washing to give an even shade after through brooming the surface to remove all dirt, dust, mortar drops and other foreign matter. And extra for subsequent coats

The surface shall be thoroughly broomed, brushed, and cleaned of all dirt, dust, oil, grease, efflorescence, mortar droppings, loose particles, or any other foreign matter. Cracks, holes, or uneven patches shall be properly filled and leveled with lime putty before application. Whitewash shall be prepared by mixing freshly slaked lime with sufficient water to form a thin uniform milk-like solution. The whitewash shall be applied with hair or fiber brushes in vertical and horizontal strokes alternately to ensure even and smooth coverage. A minimum of two coats shall be applied, and each coat shall be allowed to dry before applying the next one. The surface after final coat shall present a uniform finish free from brush marks, streaks, or patches.

- IS: 712 – *Specification for Building Limes*
- IS: 2395 (Part 2) – *Code of Practice for Painting of Buildings: Finishing (Other than Cement Paints)*

Measurement: Measurement shall be taken in square metres (sqm) of the whitewashed surface area.

**Item No. E9&E10:** Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth

The wall surface shall be thoroughly brushed and cleaned of dust, dirt, oil, grease, mortar droppings, efflorescence, loose scales, and any other foreign matter. The surface shall be sandpapered smooth and dusted off completely before applying primer. Holes, cracks, or unevenness shall be filled with approved wall putty and rubbed down to a smooth finish. Previously painted surfaces (if any) shall be thoroughly scraped and cleaned to remove loose paint films before repainting. A coat of approved primer shall first be applied on the prepared surface and allowed to dry completely. Thereafter, two coats of plastic emulsion paint shall be applied using a brush, roller, or spray in uniform colour and texture to achieve an even shade and smooth finish. Each coat shall be allowed to dry thoroughly before applying the next coat, as per manufacturer's instructions. Work shall be carried out under well-ventilated conditions and away from direct sunlight or damp conditions. The painted surface shall be smooth, even, and free from brush marks, patches, and streaks. Final shades shall match the approved sample panel. Any stains, splashes, or paint marks on floors or adjacent surfaces shall be cleaned immediately after completion.

- IS: 5411 (Part 1) — *Plastic Emulsion Paints – Specification*
- IS: 2395 (Part 2) — *Painting of Buildings – Code of Practice*

Measurement: Measurement shall be taken in square metres (sqm) of surface actually painted.

**Item No. E11:** Manual Dismantling of architectural members such as column capital, base, brackets and decorative/carved members carefully layer by layer in a skillful manner using appropriate tools and means without causing any damage to the stone members or adjoining parts of structure including numbering each member using reversible medium and taking down stones with help of chain pulley block and other tools and means. Including carrying and stacking stones and serviceable materials separately at a pre-designated place within a lead upto 100m and lift/lowering upto 8mtr. as directed by Engineer in charge. The carved member shall be protected and lowered very carefully wrapped in jute/rubber or soft covering using husk etc. for stacking at designated place as per direction of Engineer/Architect-in-Charge.

Prior to dismantling, each architectural member shall be photographed, measured, and numbered on its non-decorated surface. Dismantling shall proceed manually and sequentially, starting from the topmost or outermost layer, following the original construction sequence. The use of wooden or padded levers/wedges only; no hammering or mechanical vibration is allowed. Where necessary, chain pulley blocks or lifting tackles shall be used to gradually release the member from its setting. Decorative and carved surfaces shall not come into contact with any hard surface or tool. Stacked materials shall be arranged in the order of numbering for easy identification and retrieval. Each stack shall be covered with tarpaulin or HDPE sheet for protection from dust, sun, and rain.

- IS 1597 (Part I):1992 – *Construction and Maintenance of Stone Masonry*
- *CPWD Manual*

Measurement: Measurement shall be taken in cubic metres (Cu.m) of masonry dismantled.

**Item No. E12:** Providing and resetting stone masonry using stacked good serviceable sandstone from the site including redressing where necessary. Maximum efforts should be taken to put the numbered stones onto its original location unless approved otherwise. The masonry work shall be done in 1:1:1 (lime: stone dust:sand) mortar prepared in lime chakki or grinder in traditional method including mixing of organic additives of jaggery, Gugal and Methi etc. Mortar shall be free from cement and impurities. Masonry as per direction of Engineer/Architect-in-Charge.

To restore dismantled or damaged masonry portions of the identified structures using original salvaged materials in their correct positions, thereby maintaining historical accuracy, structural stability, and material integrity, while using authentic traditional methods and avoiding any modern or incompatible materials such as cement. Stones shall be retrieved from the stacked yard as per the numbering and layout recorded during dismantling. Care shall be taken to retain the original tool marks and carved details during redressing. The sequence of resetting shall follow original alignment, bond pattern, and structural hierarchy. Maximum effort shall be made to place each stone in its original location as per its numbering or photograph record. Any deviation shall be approved by the Architect/Engineer in charge.

- IS 1597 (Part I):1992 – *Construction and Maintenance of Stone Masonry*

Measurement: Measured in cubic metres (Cu.m) of stone masonry reset, including redressing, laying, mortar preparation, curing, and cleaning.

## **F Electrical Works**

- Conduits shall be laid in neat, straight runs with uniform slopes to avoid water accumulation. All bends shall be formed using inspection boxes at accessible points. No sharp bends or kinks permitted. All joints to be solvent welded with PVC adhesive.
- Wiring shall be done only after completion of plastering. All joints in wiring shall be made inside junction boxes with approved connectors. Adequate spare conduit boxes shall be provided for future extension.
- Switchboards shall be fixed at uniform height from finished floor level as per the drawings given by the Architect in charge. Each point shall be wired from the corresponding switch using proper colour-coded wires. All switches, sockets, and fan regulators shall be mounted on common plates wherever possible.
- Fixtures shall be mounted true to alignment with ceiling or wall surface. Ceiling fans shall be installed using down rods of approved length and securely fixed hooks. Exhaust fans shall be installed with proper wall frame and louver arrangement.
- Cables shall be laid in trenches at least 900 mm below ground level. The bed of the trench shall have 75 mm sand cushioning below and above the cable. Cables shall be protected with second-class bricks laid across and on both sides (16 bricks per metre). Cable route markers of CI or GI sheet shall be provided at every 30 m interval and at all turning points.
- Earth electrodes shall be installed as per approved layout and connected with copper/GI strip. Earth pits shall be provided with inspection chambers and watering arrangement. Resistance of each electrode shall be measured and recorded.

### **Tests to be conducted:**

- Insulation resistance test between conductors and earth
- Earth continuity test
- Polarity test of single-pole switches
- Operational test of all switches, sockets, and points
- Earth resistance measurement for each pit (not exceeding 1 ohm)
- Functional testing of light fixtures, fans, and control circuits.

After successful testing, the entire system shall be energized in presence of the Engineer-in-Charge.

IS: 732 – *Code of Practice for Electrical Wiring Installations*

**Item No. F1:** Supplying and erecting Water tight M.S.Box of size 20 x 15 x 15 cm. to erect suitable kitkat fuse / MCB to be erected on polished wooden board inside the box with hinged/sliding door with rubber rings and erected on pole with suitable pole clamp, all duly painted with one coat of red oxide and two coats of paints. (Cost of Fuse / MCB shall be taken extra)

Measurement: Each (Nos.)

**Item No. F2:** Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (a) single door (IP-30) (iii) 4 way

Measurement: Each (Nos.)

**Item No. F3:** Providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat.III

Measurement: Each (Nos.)

**Item No. F4:** Supplying & erecting approved make RCCB + MCB (Electro magnetic type only) working on residual current device having 10 KA short circuit breaking capacity and 30 mAmp. Sensitivity & 30 mili sec. tripping time conforming to IS 12640 test knob facility trip free mechanism operating for rated leakage at nominal ten volt, complete erected including all materials lugs screws etc. completed. [b] 32A / 40A, 4 pole Three Phase Cat. II

Measurement: Each (Nos.)

**Item No. F5:** Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (a) 6 to 32 Amp. Cat.III

Measurement: Each (Nos.)

**Item No. F6:** Earthing: Providing earthing stations for equipment earthing as shown and specified in drawing for equipment complete with : Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications. (a) For Electrical Installation up to 440V in normal soil Length of pipe - 1 Mtr Back filling compound - 1 Nos Bag of 15 Kg

Measurement: Each (Nos.)

**Item No. F7-F8:** Pole to luminaire internal connections: Supplying & erecting XLPE(IS:7098)(1)-88 ISI unarmoured copper cable 1.1 KV grade to be erected as directed of following size.

(A) 2 core 2.5 Sq. mm

(B) 2 core 4 sq.mm

Measurement: Running Metre (RM)

**Item No. F9-F10:** For underground cables to mains: Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cables.:

(A) 3 1/2 core 25 Sq. mm (10 Sq. mm 1/2 core)

(B) 3 1/2 core 35 Sq. mm (16 Sq. mm 1/2 core)

Measurement: Running Metre (RM)

**Item No. F11-F12:** For underground cables to mains: Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand / Solid Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cables.:

(A) 4 core 2.5 Sq. mm

(C) 4 core 6 Sq. mm

Measurement: Running Metre (RM)

**Item No. F13-F15:** For underground cables to mains: Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cables.:

(A) 4 core 10 Sq. mm

(B) 4 core 16 Sq. mm

(C) 4 core 25 Sq. mm

Measurement: Running Metre (RM)

**Item No. F16:** Providing and erecting Pipe type earthing with 40 mm dia 2.5 mtr long 'B' grade G.I. pipe with necessary coupling buch buried in specially prepared earth pit & G.I. earth wire of 8 SWG erected & connected as directed

Measurement: Each (Nos.)

**Item No. F17-F23:** Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size:

(A) With medium class Rigid PVC pipe and accessories:

- (a) 2 wire 1.5 sq. mm
- (b) 2 wire 2.5 sq. mm
- (c) 3 wire 1.5 sq. mm
- (d) 3 wire 2.5 sq. mm
- (e) 4 wire 1.5 sq. mm
- (f) 4 wire 2.5 sq. mm
- (g) 6 wire 2.5 sq. mm

Measurement: Running Metre (RM)

**Item No. F24-F28:** Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables.:

- (A) 2 to 4 core 2.5/4 Sq. mm
- (B) 2 to 4 core 6 Sq. mm
- (C) 2 to 4 core 10 Sq. mm
- (D) 2 to 4 core 16 Sq. mm
- (E) 2 to 4 core 25 Sq. mm

Measurement: Each (Nos.)

**Item No. F29-F33:** Solder less crimping type Copper lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner:

- (A) 1.5/2.5 to 6 Sq.mm
- (B) 10 Sq.mm
- (C) 16 Sq.mm

(D) 25 Sq.mm

(E) 35/50 Sq.mm

Measurement: Each (Nos.)

**Item No. F34-F35:** Providing and erecting Epoxy Outdoor / Indoor end termination Kit suitable for LT PVC insulated armoured cable 1.1 KV grade complete with ferrule bushing and accessories and suitable clamps duly erected and connected to the supply for all cores cables of following size.:

(A) 2.5 to 16 Sq. mm

(B) 25 to 50 Sq. mm

Measurement: Each (Nos.)

**Item No. F36-F37:** Disconnecting the cable connection and Providing straight joint with PVC mould using heat shrink /cast resin type epoxy compound Insulating material and making the joint complete using necessary in line connectors, hardener, earth continuity connection, spacers etc. and reconnecting the same & ensure the joint resistance within the limits as per IS.

(A) up to 25 Sq mm Cable

(B) 35 to 95 Sq. mm cable

Measurement: Each (Nos.)

**Item No. F38-F39:** Disconnecting the cable connection and Providing T joint with PVC mould using heat shrink /cast resin type epoxy compound Insulating material and making the joint complete using necessary in line connectors, hardener, earth continuity connection, spacers etc. and reconnecting the same & ensure the joint resistance within the limits as per IS.

(A) up to 25 Sq mm Cable

(B) 35 to 95 Sq. mm cable

Measurement: Each (Nos.)

**Item No. F40:** Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of pipe to be erected concealed in/ on surface on wall/ceiling complete with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic box, single mounting base frame covered with textured/metallic front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. (a) with medium class Rigid PVC pipe and accessories, Cat III, Note:- Maximum up to 10 mtrs length, excess will be considered as Mains for Point.

Measurement: Measurement to be done in the number of items installed.

**Item No. F41:** Point wiring for on individual Plug with & earthwire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of to be erected concealed in / on surface of wall / ceiling complete with Modular type switch & 5 pin Plug erected on PVC / Metallic box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories, Plug at other place, 5 Mtr max away,[I] For 6A Plug with 2-1.5 sq.mm Cu. Wire, (a) with medium class Rigid PVC pipe and accessories, Cat III, for exhaust fan

Measurement: Measurement to be done in the number of items installed.

**Item No. F42:** Point wiring for secondary light point with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires, in below type of pipe to be erected complete with earth continuity and necessary connection with primary light with accessories erected on Metal PVC wooden box covered covered with appropriate front plate modules erected on in wall ceiling for open / concealed wiring. with necessary Lamp holder ceiling rose / H.D.Connector as directed.as per pipe erected with following type of accessories. Note:- Maximum up to 6 mtrs length, excess will be considered as Mains for Secondary Point. (f) with medium class Rigid PVC pipe and accessories erected concealed on wall/ceiling complete

Measurement: Each Point (Nos.)

**Item No. F43-F49:** Providing following type of Modular Type Accessories mounted with PVC metallic/Wooden box, single mounting base frame covered with textured metallic/white front plate, modules erected with necessary connections as per site situation directed by Engineer In charge.:

- 1) One no. SP 6 Amp cat-iii
- 2) One no. 5 pin plug CAT-III
- 6) Fuse units : 10 to 16 amp cat.III
- 9) 16 Amp one way switch cat-III
- 10) 6/16 amp Universal socket
- 13) single pole modular MCB switch
- 21) Foot Light ... two modules cat-III

Measurement: Each (Nos.)

**Item No. F50:** JETALEGANZAFLS50WLED757P60DTOTG: Energy saving, environmental friendly, long life, High-pressure die cast aluminium housing with LEDs as light source, suitable for highlighting architectural features, sports fields or area lighting.

Measurement: Each (Nos.)



**Item No. F51:** IRVINESPS6WLED830PSYMTGGRY: Environmental friendly, compact, light-weight, energy saving, IP66 LED spike light using COB LED as light source. Offered in Mono – Red, Green, Blue and Warm White Colour. Multi-purpose application like column lighting, tree up-lighting, statue accentuation etc. can be addressed with ease.

Measurement: Each (Nos.)

**Item No. F52:** CLIOLL15WLED730PSYMTOTUG: Environmental friendly, new generation, energy saving, decorative IP 66 LED UP-down Luminaire with wall surface mounting using COB LED as light source

Measurement: Each (Nos.)

**Item No. F53:** FLEXISTRIP50MIP65AC6W/M830V1: Flexible LED strips with optimum brightness & uniformity of light for perfect cove lighting. IP65

Measurement: Running Metre (RM)

**Item No. F54:** ENDURASUNDOWNSL25WLED765PASYBOPC: New generation energy saving and environmental friendly long life LED street light made up of pressure die cast aluminium housing with high efficiency LED as lighting source and lens embedded PC cover having Bottom Opening seperate driver compartment with IP66 protection and impact resistance of IK08.

Measurement: Each (Nos.)

## **G Special Items for Street Enhancement**

**Item No. G1:** Providing and fixing Sand Stone bollards with required foundation SS pin and fixing with proper marking and as per design and drawings complete in all respect.

The bollards shall be made from sound, hard, and durable sandstone of approved quality, free from cracks, veins, or other structural defects, and shall be dressed/finished as specified in the drawings. Each bollard shall be fixed in position with proper setting out and marking.

The work shall include excavation for foundation, provision of suitable concrete footing, stainless steel (SS) dowel/pin anchorage, grouting, alignment, leveling, and fixing the bollard firmly in position to the required line and level. All necessary materials, labour, tools, tackles, scaffolding, and incidental works required for proper installation shall be included.

The bollards shall be installed true to alignment and securely fixed to withstand impact and service conditions, complete in all respects, as per approved drawings and specifications.

Measurement: Sandstone bollards shall be measured in numbers (Nos.), complete.

**Item No. G2:** Providing an installation for roadside signage wall mounted using cast iron brackets and fixing a Corten steel-plate of 6mm thickness over it including laser cut name signage of the monument coated with epoxy paint, as per the design issued by the architect incharge

The Corten steel plate shall be of approved grade and thickness, neatly cut to shape, and fixed securely over the cast iron brackets as per the approved design. The signage text, graphics, and lettering shall be laser cut accurately in accordance with the drawings and design issued by the Architect-in-Charge.

All exposed steel surfaces, including laser-cut edges, shall be treated and finished with approved epoxy paint system to ensure durability, corrosion resistance, and uniform appearance. The cast iron brackets shall be properly anchored to the wall using suitable fasteners, anchor bolts, and fixtures, ensuring correct alignment, plumb, and structural stability.

The item shall include all materials, labour, tools, tackles, scaffolding, cutting, drilling, welding, fixing accessories, surface preparation, painting, and installation complete in all respects, strictly as per the design, drawings, and directions of the Architect-in-Charge.

Measurement: Measured according to the number (Nos.) of signages installed.

**Item No. G3:** Providing an installation of tactile information signage in stone masonry work including shaping and chiselling, embedded with a ceramic plate with multi-colored graphics glazed after printing min. 6mm thick with 1 backup panel using the fixing chemicals, within the chase provided in the masonry construction including curing, as per the design issued by the architect incharge.

The stone surface shall be carefully carved and chiseled to match the dimensions and profile required for embedding the signage components. The ceramic plate and backup panel shall be

fixed within the chase, using approved fixing chemicals ensuring full contact without voids. The 3D model shall be mounted on a stable, level base integrated into the stone or adjoining structure, using corrosion-resistant fasteners or epoxy anchors. Alignment, orientation, and visual clarity shall match the approved architectural drawings and tactile accessibility standards. All materials shall be handled to prevent damage, scratching, or staining during installation. Exposed stone surfaces shall be cleaned and finished neatly, free from mortar stains and rough edges. Ceramic plate surfaces shall be thoroughly cleaned and protected during curing.

Measurement: Measured according to the number (Nos.) of signages installed.

**Item No. G4:** Providing and Installation of Stone Benches as per design using rough cut/manual cut stone slabs of average 1.8m length and 0.6m width with minimum thickness of 0.15m for bench top and 0.4x0.4x0.3m 2pcs base stones with tongue and grooves fixing between top and base and cement concrete pedestal Including installation in excavations using floor stone at bottom of excavation upon rammed earth with 1:4 cement sand mortar in excavated earth complete with line level and orientation as per the design or instructions by Architect / Engineer-in-Charge.

Rough cut or manually dressed surface to match the natural landscape character. All edges to be chamfered or rounded to avoid sharp corners. Visible faces shall be hand-polished lightly to remove burrs while maintaining the rustic appearance. Tongue and groove joints to be manually carved ensuring snug fit between top and supports. All joints filled with 1:4 cement sand mortar or stone dust slurry for uniform bonding. Mortar joints shall not exceed 10 mm in thickness. Excavation to be carried out to the required depth (approx. 150–200 mm below finished ground level). Floor stone slab to be placed at the bottom of the excavation on rammed earth base. Bench base stones to be placed in position, ensuring vertical alignment and plumb. Bench top to be seated firmly over base stones with mortar joints aligned to drawing details. Bench shall be installed true to line, level, and orientation as per design intent. The layout and spacing of benches shall follow the site master plan or Architect's instruction. Temporary supports to be provided until the mortar gains sufficient strength.

Measurement: Measured in number (Nos.) of stone benches installed.

**Item No. G5:** Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.

The covers and frames shall conform to IS 1726 for cast Iron. Manhole covers and frame shall be manufactured from appropriate grade of grey cast iron not inferior than FG150 grade of IS 210. They shall be cleanly cast and shall be free from air and sand holes, cold shuts and warping. Covers shall have on its operative top a raised chequered design to provide for an adequate no-slip grip. The rise of chequers shall be not less than 4mm. Key holes, keys and lifting devices shall be provided in the manhole covered to facilitate their placement in the frames and their operative maintenance. Manhole covers and frames shall be coated with materials having base with a black bituminous composition. The coating shall be smooth and tenacious. It shall not flow when exposed to temperature of 63°C and shall not be so brittle as to chip off at temperature of 0°C. Size and shape and performance requirement of manhole covers and frames shall conform to IS 1726.

Each manhole covers and frame shall have cast on them the following information:

Manufacturer's name or trade-mark, Grade designation, Date of manufacturer The words SWD or 'Sewer' to denote 'storm water drain' or 'sewer' respectively, Identification marks as required by Engineer-in-Charge and logo of The respected Municipal corporation.

Measurement: Measurement shall be taken in the total count of CI Manhole covers required as specified in BOQ.

**Item No. G6:** Mural artwork to be executed on walls specified by the design Architect with required tools, tackles, scaffolding complete in all respect. All spread in 8 nos.

The work shall be carried out by skilled artists and shall include preparation of the wall surface, application of base coats/primers where required, and execution of the mural artwork strictly as per the approved design, theme, colour scheme, and scale. All paints, pigments, binders, and protective coatings shall be of approved quality, suitable for interior/exterior application as applicable, and shall be durable, weather-resistant, and UV-stable.

The item shall include the provision of all required tools, tackles, staging/scaffolding, labour, materials, surface preparation, finishing, and protection, complete in all respects, as directed by the Architect / Engineer-in-Charge.

The mural artwork shall be executed neatly with proper finishing, without stains, drips, or defects, and shall be handed over in a clean and satisfactory condition.

Measurement: Measured in sqm of the area to be embellished with the artwork.