

**DEMOLITION & RE-CONSTRUCTION OF
RESIDENTIAL QUARTERS UNDER O&M ADD
CAP-2019-24**

**TECHNICAL
SPECIFICATIONS**

**SECTION – 1
CIVIL & PUBLIC HEALTH ENGG. WORKS**

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1.0. GENERAL:

- a. The intent of this technical specification covers all construction of all civil works as covered in the scope of contract as per drawings supplied by Owner.
- b. All civil works shall be carried out as per design/drawings provided by the Employer/ Contractor and as per these specification provided by the Employer. In case design/drawings are prepared by the contractor then these shall be approved by the employer before execution. In case any item is not covered under specification then the same shall be carried out as per CPWD specification /applicable BIS Standards and Codes. Any item for which specification is not provided herein and is not covered under CPWD specification/ BIS Standards, the same shall be executed as per manufacturer guidelines with the approval of employer. All materials shall be of best quality conforming to relevant Indian Standards and Codes. In case of any conflict between Standards/ Code and Technical Specification, the order of precedence shall be as under:

1.1 Technical specification,

1.2 BIS codes

1.3 CPWD specification.

The decision of engineer in charge in this regard shall be final and binding.

- c. Wherever reference to CPWD/BIS/National Building Code/ Standard Field Quality Plan (SFQP) is made, it shall be to the latest edition/revision of the same, issued/uploaded up to 28 days prior to the actual date of bid opening for instant package.
- d. The Contractor shall arrange all labour, tools, equipment, materials, temporary works, constructional plant & machinery, fuel supply, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with drawings, specifications and direction of Employer.
- e. All materials including cement, reinforcement steel, structural steel etc. shall be arranged by the Contractor.
- f. The Contractor shall execute the work as per the Field Quality Plan (FQP) which is available on POWERGRID website. All testing required shall be arranged by the Contractor at his own cost.
- g. The bidder shall fully apprise himself of the prevailing conditions at the proposed site, Climatic conditions including monsoon patterns, local conditions and site specific parameters, soil parameters, availability of construction material and shall

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include for all such conditions and contingent measures in the bid, including those which may not have been specifically brought out in the specifications.

- h. Unless leveling is in the scope of the bidder, fairly leveled site with single level/terraces with different levels/ gradual slope shall be handed over to the Contractor, in a phased manner. The finished ground level (FGL) with a tolerance of (+/-) 100mm shall be decided by the Employer. The layout and levels of all structure etc shall be made by the Contractor at his own cost from the general grids of the plot and benchmarks set by the Contractor and approved by the Employer. The Contractor shall provide all assistance in instruments, materials and personnel to the Employer for checking the detailed layout and shall be solely responsible for the correctness of the layout and levels.

In case leveling is in the scope of bidder, FGL shall be decided by the employer.

- i. Employer has standardized its technical specification for various items/ works. Specification for items which are covered in the scope and as defined in Section project & BPS shall only be referred.
- j. The material specification, workmanship and acceptance criteria shall be as per approved standard Field Quality Plan. In case certain item is not covered in FQP, it shall be constructed as per CPWD specification/ relevant BIS.
- k. The Contractor shall bring samples of all materials; finished or raw to the site and shall get them approved from the Engineer-in-Charge before using them in the work. Any material not conforming to approved samples shall be removed within 48 hours of the Engineer-in-Charge's instruction to the Contractor to do so, failing which it shall be removed by the Engineer-in-Charge or his representative from the site at the risk and cost of the Contractor.
- l. Samples of materials to be used with original/colour catalogue with specification shall be brought by contractor well in advance and shall be displayed and kept in separate sample room in site. Samples of all kinds of materials to be used shall require approval of the Owner.
- m. Materials shall be of approved quality and the best of their kind available and shall generally conform to I.S. Specifications. The Contractor shall order all the materials required for the execution of work as early as necessary and ensure that such materials are on site well ahead of requirement for use in the work. The work involved calls for high standard of workmanship combined with speed and to the entire satisfaction of the Engineer in Charge.
- n. Before placement of award for supply & installation of equipment, materials. the contractor shall submit a proposal furnishing all the catalogs & specifications for approval of the Engineer in charge, well in advance

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- o. The work shall be executed at all levels unless otherwise specified.

2.0. POWERGRID SUPPLIED DRAWINGS/ DOCUMENTS

- i) All tender drawings shall be read in conjunction with this specification. Discrepancy if any shall be brought to the notice of Employer prior to quote.
- ii) All foundation drawings including foundations for buildings, equipments etc shall be released to the Contractor after award in a phased manner, after receiving the geotechnical investigation report.
- iii) In case the site conditions warrant any special type of foundations to be used, the same shall be designed and issued by the Employer to the Contractor during detailed engineering unless otherwise mentioned in section project.
- iv) Drawings that have been mentioned and to be issued by the Employer to the Contractor during detailed Engineering shall be made available to the Contractor as per the agreed work schedule finalized after award.

3.0. EXCAVATION AND BACKFILL OF FOUNDATIONS

- 3.1. Excavation for foundations shall be in accordance with CPWD Specification/ the relevant BIS code. Excavation shall include removal of all materials of whatever nature at all depth and whether wet or dry necessary for the construction of foundations. The bottom of excavation shall be levelled both longitudinally and transversely unless otherwise mentioned in the drawings or as directed by Engineer-in-charge. Excavation shall be measured as classified under:-
 - a) Excavation in all kind of soil including soft/ disintegrated rock, PCC, WMM/ WBM, Brickwork/ stone masonry etc (excluding hard rock).
 - b) Excavation in hard rock (required blasting)
- 3.2. If required the sides of excavations should be supported in such a way as is necessary to secure these from falling in, and the shoring, if required, shall be provided and maintained in position as long as necessary. No extra payment shall be made for shoring.
- 3.3. Whenever water table is met during the excavation, it shall be dewatered and water table shall be maintained below the bottom of the excavation level during excavation, The excavation shall be kept free from water:-
 - When concrete and/or masonry works are in progress and till they come above the natural water level
 - Till the Employer considers that the concrete/ mortar is sufficiently set.

No extra payment shall be made for dewatering.
- 3.4. Material unsuitable for foundations shall be removed and replaced by suitable fill material as per specification and to be approved by the Employer
- 3.5. Backfill material around foundations or other works shall be suitable for the purpose for which it is used and compacted. Requirements regarding density / tests of backfilled earth shall be as specified in Field Quality Plan. The sub-grade for the roads and embankment filling shall be compacted to minimum 95% of the Standard

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Proctor's density at OMC (optimum moisture content). Cohesion less material sub-grade shall be compacted to 70% relative density (minimum)

- 3.6. If, excavated material is not suitable or not required for backfill, it shall be disposed off in areas as directed by Employer up to a maximum lead of 2 km from the substation boundary.

3.7. DISMANTLING & DEMOLISHING WORKS

a. The scope of work includes dismantling of existing R.C.C. works at all levels (in foundations or super structures) either manually or by mechanical means including disposal of steel bars and unserviceable material as per direction of Engineer – in-charge. The work of dismantling of RCC works shall be measured in cu. m. Dismantling work must be carried out very carefully under strict close supervision to ensure structural stability of the remaining and/or adjoining/ abutting structure.

b. The scope of work includes Demolishing/dismantling of existing chain link fencing either manually or by mechanical means including disposal of unserviceable material as per direction of Engineer – in-charge. The work of dismantling/demolishing of existing chain link fencing shall be measured in running meter.

3.8. REQUIREMENT FOR FILL MATERIAL UNDER FOUNDATION:

- i. The thickness of fill material under the foundations shall be such that the maximum pressure from the footing, transferred through the fill material and distributed onto the original undisturbed soil will not exceed the allowable soil bearing pressure of the original undisturbed soil.
- ii. The filling shall be done in accordance with clause 4.10 of IS: 1080. For expansive soils the fill materials and other protections etc. to be used under the foundation is to be got approved by the Employer.
- iii. Cohesive Non Swelling (CNS) soil, if required, for filling under / around the foundations, cable trenches, drains, roads etc shall confirm to IS: 9451: 1994 reaffirmed 2004.

4.0. **CEMENT**

- 4.1. The type of cements which can be used are Ordinary Portland Cement (OPC) (conforming to IS: 269), Portland Pozzolana Cement (PPC) (conforming to IS: 1489), and Portland Slag Cement (PSC) (Conforming to IS: 455). Cement shall be supplied by contractor.
- 4.2. Generally PPC type shall be used for concrete work. However depending on availability, OPC may also be used without any additional financial implication to POWERGRID.
- 4.3. Extra care for curing shall be taken for concrete made with OPC 53 grade & PPC.
- 4.4. Extra care for removing form work shall be taken, when PPC is used.
- 4.5. Portland Slag Cement has low heat of hydration and is relatively better resistant to soils and water containing excessive amount of sulphates of alkali metals, alumina and iron, as well as to acidic waters. Hence it can be specifically allowed for above conditions with prior approval of EIC.

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5.0. **CHEMICAL ADMIXTURES & ADDITIVES**

- 5.1. Use of chemical admixtures shall be permitted in accordance, with the provisions of IS 456 and IS 9103.
- 5.2. It shall be the responsibility of the producer to establish compatibility and suitability of any admixture with the other ingredients of the mix and to determine the dosage required to give the desired effect. The amount of admixture added to mix shall be recorded in the production record by the producer.
- 5.3. Admixtures should be stored in a manner that prevents degradation of the product and consumed within the time period indicated by the admixture supplier. Any vessel containing an admixture in the plant or taken to site by the producer shall be clearly marked as to its content
- 5.4. When offering or delivering a mix to a purchaser it should be indicated if such a mix contains an admixture or combination of admixtures or not. The admixtures may be identified generically and should be declared on the delivery ticket.

6.0. **REINFORCED CONCRETE CEMENT (RCC)**

All RCC work including material properties, proportioning, batching, mixing, transporting, pouring, compacting, finishing, curing, sampling, testing, acceptance criterion etc. shall be as per SFQP/ IS : 456

6.1. DESIGN MIX CONCRETE

- 6.1.1 For new substations and extensions, Reinforced cement concrete shall be M-25 or higher design mix conforming to IS: 456. IS: 10262 shall be followed for mix proportioning
- 6.1.2 Design mix concrete may be procured from approved RMC plant as per IS: 4926 or may be prepared by using a portable/mini/compact weigh batch plant conforming to IS: 4925.

Self-loaders viz Ajax Fiori / small portable weigh batcher may be permitted for batching and mixing of concrete subjected to compliance of following:-

- a) Calibration certificate of Self loader/ concrete producing equipment shall be checked before start of concreting works. The accuracy of the measuring equipment shall be within +/- 2% of the quantity of cement and within +/-3% of the quantity of aggregate.
- b) Preferably, print out of each load indicating weight of all the constituent's material i.e. Cement, Fine Aggregate, Coarse Aggregate, Water, Admixture (If any) is to be ensured or proper records shall be maintained to ensure weight of constituents materials.

- 6.1.3 As per provisions of IS: 456, fly ash conforming to grade I of IS: 3812 (part-1) may be used as part replacement of cement, when OPC cement is used for concrete works. Uniform blending with cement is to be ensured.

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6.2. NOMINAL MIX CONCRETE

- 6.2.1 Nominal mix concrete shall be used with approval of engineer in charge. In such cases reinforced cement concrete shall be of nominal mix 1:1.5:3 (1 cement: 1.5 coarse sand: 3 well graded stone aggregate 20mm nominal size) by volume conforming to CPWD specifications. Nominal mix 1:1.5:3 shall be considered equivalent to M-20 for design purpose.
- 6.2.2 For Plain Cement Concrete 1:2:4 (1 cement: 2 fine aggregate: 4 well graded stone aggregate 20mm nominal size), Plain Cement Concrete 1:3:6 (1 cement: 3 fine aggregate: 6 well graded stone aggregate 40mm nominal size), Plain Cement Concrete 1:4:8 (1 cement: 4 fine aggregate: 8 well graded stone aggregate 40mm nominal size) or any other type of PCC, the concrete by volumetric mix shall be prepared and cement consumption shall be as per DSR (CPWD).
- 6.2.3 In case of Nominal mixes, Standard measuring boxes of 35cmX40cmX25cm (35 liters capacity as per CPWD) shall be used for measuring fine and coarse aggregates.
- 6.2.4 However, full 50 kg of OPC/PPC/Slag cement shall be directly unloaded into the mixer hopper to ensure that cement consumption is 400kg per cum of 1:1.5:3 concrete irrespective of different types of cements with different densities.
- 6.2.5 The cement consumption shall be as per DSR (CPWD) for other grades of concretes provided as nominal concrete mixes in the BPS.
- 6.2.6 For volumetric mix concretes, the cement used may be generally PPC type, however concrete may be prepared with OPC also, without any financial implication to POWERGRID.
- 6.2.7 In case of weigh batching of nominal mixes, the proportions of materials for nominal mix concrete shall be in accordance of IS 456.

6.3. SPACERS & COVER BLOCKS

In line with IS 456, spacers and cover blocks (concrete of same strength or PVC) may be used for RCC and PCC.

6.4. MEMBRANE CURING

In line with IS 456, membrane curing may be used in place of moist curing with the approval of Engineer-in-Charge.

7.0. REINFORCEMENT STEEL

Reinforcement steel shall be thermo mechanically treated (TMT) or HYSD reinforcement bars of grade Fe 500 / Fe 500 D / Fe 550 / Fe 550D conforming to IS: 1786. In line with IS 456, reinforcement couplers for mechanical splices complying to IS 16172 may be used. Corrosion resistant steel (CRS) of grade Fe 500 / Fe 500D / Fe 550 / Fe 550D conforming to IS 1786 shall be used in coastal region or site with aggressive soil and water.

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If design of RCC structures shall be done using properties of Fe 550 or Fe 550D, use of Fe 500 / Fe 500D /Fe 500S shall not be permitted.

Reinforcement shall be arranged by contractor.

8.0. **DESIGN OF FOUNDATIONS FOR BUILDINGS & OTHER SWITCH YARD STRUCTURES**

- 8.1. All foundation shall be of reinforced cement concrete. The design and construction of RCC structures shall be carried out as per IS: 456. Minimum 75mm thick lean concrete (1:4:8) shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction.
- 8.2. The switchyard foundation's plinths shall be minimum 300mm and buildings plinth shall be minimum 600 mm above finished ground level respectively. If the site is sloping, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.
- 8.3. Factor of safety for design of tower and equipment structures and foundations:
 - a. Factor of safety for design of tower, equipment structures shall be 1.5 under normal condition and 1.2 under short-circuit condition.
 - b. Factor of safety for design of tower, equipment foundation shall be 1.5 in both normal and short circuit condition as per IS 456.
 - c. Factor of safety for stability of tower, equipment foundation like overturning shall be 2 (without wind or seismic), 1.5 (with wind or seismic) for normal and short circuit condition as per IS 1904.
- 8.4. The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The Isolated/ Combined/ Strip footings / Raft or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.
- 8.5. The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions which produces the maximum stresses in the foundation or the foundation component and as per the relevant BIS Codes of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details.
- 8.6. Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/harmful to the concrete foundations.
- 8.7. If pile foundations are adopted, the same shall be cast-in-situ bored or pre-cast or under reamed type as per relevant parts of IS: 2911. Only RCC piles shall be provided. Necessary initial load test shall be carried out by the Contractor to establish the pile design capacity. Only after the design capacity of pile has been established, the Contractor shall take up the job of piling. Routine tests for the pile shall also be conducted as per IS: 2911/IS :10262. All the testing work shall be planned in such a way that these shall not cause any delay in project completion. RCC for pile works shall be Design Mix of minimum grade M-25 and also minimum cement content shall

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be 400Kg/ cu.m as per IS:2911. In case extra cement is required to meet the provisions of IS: 2911, it will be paid extra.

- 8.8. The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.
- 8.9. All foundations shall extend to a depth of at least 500 mm below virgin ground level as stipulated in IS 1904. However, under exceptional cases of high filling, foundation may be kept on filled up soil with ground improvement.

9.0. **WATER PROOFING TREATMENT**

9.1. **SUNKEN WATER PROOFING (RCC):**

➤ Water proofing treatment shall be done in sunken portion of WCs, bathroom etc. by applying cement slurry mixed with water proofing cement compound consisting of:

- a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/ sqm. This layer will be allowed to air cure for 4 hours.
- b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours.

➤ Treatment and sealing of joints, corners, junction of pipes and masonry with polymer mixed slurry shall be carried out as per CPWD specifications.

9.2. **WATER PROOFING (RCC):**

➤ Integral crystalline slurry of hydrophilic in nature for waterproofing treatment for horizontal surface one coat @1.10 kg per sqm to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels / subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI- 212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm.

The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage.

10.0. **GENERAL SPECIFICATION FOR BUILDINGS**

- 10.1. The material specification, workmanship and acceptance criteria shall be as per approved standard Field Quality Plan attached with this document which is available on POWERGRID web site. In case certain item is not covered in FQP, it shall be constructed as per CPWD specification.

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- 10.2. Post constructional Anti termite treatment shall be carried out for all buildings as per DSR item no. 2.34 & 2.35. Anti termite chemical treatment shall be given to column pits, wall trenches, foundations of buildings, filling below the floors etc. as per IS: 6313 and other relevant Indian Standards.
- 10.3. Reinforced cement concrete with controlled water cement ratio as per IS-code shall be used for all underground concrete structures such as pump-house, tanks, and water retaining structures for achieving water-tightness.
- 10.4. 50 mm thick damp-proof coarse with cement concrete 1:2:4 shall be used at plinth level.
- 10.5. FPS or Modular clay/fly ash based Bricks having minimum 75 kg/cm² compressive strength can only be used for masonry work. Contractor shall ascertain himself at site regarding the availability of bricks of minimum 75 kg/cm² compressive strength before submitting his offer. However, Contractor can propose to use aerated concrete block or solid concrete blocks of compressive strength not less than 75kg/cm² without any cost implication to POWERGRID.
- 10.6. Full brickwork shall be provided with cement mortar 1:6 (1cement: 6 coarse sand). Half brick work masonry shall be provided with cement mortar 1:4 (1cement: 4coarse sand) and two no 6mm dia ms bar at every third course.
- 10.7. 12mm cement plaster of mix 1:6 (1cement: 6 fine sand) shall be provided on the smooth side of internal walls. However rough side of walls shall be provided with 15mm cement plaster of mix 1:6 (1cement: 6 fine sand).
- 10.8. External plaster in two coats - 18mm Cement plaster in two coats under layer 12mm thick cement plaster 1:5 (1 cement: 5coarse sand) finished with a top layer 6mm thick cement plaster (1cement : 6 fine sand). External plastered surface shall be finished with white cement based putty of average thickness 1 mm, of approved brand and manufacturer to prepare the surface even and smooth. After putty the walls shall be finished with Premium Acrylic Smooth exterior paint of approved brand and manufacturer with Silicone additives of required shade (Two or more coats applied @ 1.43 ltr/ 10 sqm. over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm).
- 10.9. 6 mm thk. Cement plaster of mix 1:3 (1 cement: 3 fine sand) to RCC ceiling shall be done except areas where false ceiling are provided.
- 10.10. Top of the brickwork in coping and sills in external walls shall be slightly tilted. Where RCC roof slab, chajjas are projecting beyond the face of the wall, drip course/throating shall be provided where indicated.
- 10.11. To prevent surface cracks appearing between junctions of column/beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go.
- 10.12. Internal walls shall be finished with Plaster of Paris putty of average thickness 2 mm, of approved brand and manufacture, over the plaster surface to prepare the surface even and smooth complete. In case plastered surface of buildings are covered

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under wall panelling, dado work, skirting etc. no putty and painting are required.

- 10.13. Internal walls shall be painted with minimum two coats of premium acrylic emulsion paint having VOC (volatile organic compound) content less than 50gm per litre of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour over priming coat as per manufacturer specification/ recommendation.
- 10.14. Distempering with oil bound washable distemper of approved brand and manufacture to give an even shade shall be used wherever specified.
- 10.15. Non - VOC premium acrylic emulsion paint having volatile organic compound content less than 50gm per litre of approved brand and manufacture shall be used wherever specified.
- 10.16. Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade shall be provided on the steel doors, flush doors and rolling shutters in various buildings or as specified in the drawings. Two or more coats over an under coat of suitable shade with primer paint of approved brand and manufacture.
- 10.17. Two or more coats of French spirit polishing with a coat of wood filler shall be provided on the wooden doors and frames.
- 10.18. Polished vitrified tiles in glazed finish in 120x60 cm size (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only. Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily shall be used in all rooms inside quarter accept Toilet, Kitchen and balconies.
- 10.19. Matt/Antiskid finish vitrified tiles in 60x60 cm size (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only. Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, levelling system and rubber mallet for placing the tiles gently and easily shall be used in Toilet Kitchen and balconies.
- 10.20. 40 mm thick cement concrete Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, but excluding the cost of nosing of steps etc. complete.
- 10.21. Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4

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(1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge for stairs and landing.

- 10.22. Ceramic glazed wall tiles of 1st quality conforming to IS: 15622 (minimum thickness of 8mm) of approved make in all colours, shades as approved by Engineer-in-Charge in dados over 12mm thick bed of cement Mortar 1:3 (1 Cement: 3 Coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete. Height of dado shall be 2.1m high in toilets or elsewhere specified in the drawings or TS.
- 10.23. Polished vitrified tiles in glazed finish in 60x60 cm size (thickness to be specified by the manufacturer), with water absorption less than 0.08% and conforming to IS: 15622, of approved brand & manufacturer, in all colours and shade, in skirting, riser of steps, laid with cement based high polymer modified quick set tile adhesive (water based) conforming to IS: 15477, in average 6 mm thickness, including grouting of joints shall be used in skirting and dado in kitchen , pantry or elsewhere specified in the drawings or TS.
- 10.24. Circular/hexagonal M.S. sheet ceiling fan box shall be provided in the ceiling with clamp of internal dia. 140 mm, 73 mm height, 3 mm thick rim, top and bottom lid of 1.5 mm M.S. Sheet. Lids shall be screwed in to M. S. box by means of 3 mm round headed screws, clamps shall be made of 12 mm dia. M. S. bar bent to shape as per standard drawing with overall length as 80 cm.
- 10.25. All windows, balcony doors and ventilators shall be of uPVC type. uPVC work for doors, windows, ventilators and partitions shall be provided and fixed in building with sections of approved make, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fasteners including necessary filling up of gaps at junctions at top, bottom and sides with required PVC/neoprene felt etc. and joined mechanically wherever required including cleat angle, beading for glazing / panelling, C.P. brass/ stainless steel screws including glazing and fittings as specified. The work shall be carried out as per the specifications, plan drawing and as per instruction of the EIC, however, shop drawing shall be submitted by contractor for approval of the EIC.
- 10.26. All doors except the balcony doors shall be of WPC frame and shutter as per the detailed drawing, specification and instruction of Engineer-in-Charge.
- 10.27. All doors except for toilet shall have 100mm 6 lever CP Brass mortice lock. Chromium plated brass handles of ISI marked and approved size shall be provided for all doors and windows as per requirement and instruction of E.I.C.
- 10.28. Cylindrical keyless lock of 25 mm diameter and 50mm diameter knob on both sides (ISI marked) shall be provided for toilets.
- 10.29. Kitchen door shall have 300x16mm aluminium sliding door bolts.
- 10.30. All Doors shall have aluminum tower bolt (barrel type) 300x10mm as per requirement.

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- 10.31. All windows shall have aluminum tower bolt (barrel type) 150x10mm as per requirement.
- 10.32. Plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand (zone - III) : 6 graded stone aggregate 20 mm nominal size) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth. Minimum width of plinth protection shall be 600 mm.
- 10.33. Wardrobes of required height and about 600 mm deep shall be made out of 18 mm. thk anti termite treated commercial ISI marked BWP grade marine board ply as per IS 710 of approved brand at end verticals, top and bottom, shutters, partition etc complete. The rear side of the unit shall be made with 6mm thk WPC board ISI marked, which shall be finished with 0.8mm thk approved laminate on inner side. The horizontal partition shall be of removable type fixed with necessary SS fittings and hardware. The edges shall be finished with 2mm thick PVC edge banding tape with hot glue by edge bending machine etc. The carcass of the drawers shall be made with 12 mm thk commercial ISI marked boards. All external surfaces shall be finished with 1.0 mm thk factory pressed approved colour and make decorative laminates and Inner surface of the storage cabinet shall be finished with 0.8mm thk factory pressed approved laminates as per approved drawings. Each shutter shall have piano type stainless steel hinges and C.P. Brass or SS 224/125 mm long handle. The unit shall have necessary fittings such as tower bolts, 6 lever CP brass CB locks etc complete. The back wall surface shall be painted with bitumastic/ water proofing adhesive.
- 10.34. Kitchen cabinets of required height and about 600 mm deep shall be made out of 18 mm anti termite treated commercial ISI marked BWP grade marine board ply as per IS 710 of approved brand at end verticals, top and bottom, partition etc complete. The rear side of the unit shall be made with 6mm thk WPC board ISI marked, which shall be finished with 0.8mm thk approved laminate on inner side. The shutter shall be made with 18 mm thk. factory made single extruded WPC (Wood Polymer Composite) solid board one side white color and other side of board laminated with PVC foil of minimum 14 micron thickness of approved design pasted with hot melt adhesive for bathroom/kitchen cabinet etc. of required sizes comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/ mm², modulus of elasticity 850 N/mm² and resistance to spread of flame of Class A category with property of being termite/ borer proof, water/moisture proof and fire retardant. The horizontal partition shall be of removable type fixed with necessary SS fittings and hardware. The edges shall be finished with 2mm thick PVC edge banding tape with hot glue by edge bending machine etc. Inner surface of the storage cabinet shall be finished with 0.8mm thk factory pressed approved laminates as per approved drawings. Each shutter shall have piano type stainless steel hinges and C.P. Brass or SS 100/125 mm long

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handle. The unit shall have necessary fittings such as 304 grade reputed make SS cutlery/utensil baskets, magnets etc. complete. The back wall surface shall be painted with bitumastic/ water proofing adhesive.

- 10.35. The approaches to the building from the township roads shall be constructed with 60 mm thk. factory made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape laid over 50 mm thk. Sand cushion over 75 mm thk. PCC (1:4:8). The sub-base shall be well compacted. The top level of the approach road shall be min. 100 mm above the FGL.
- 10.36. The balcony and the stair railing shall be with Stainless Steel of 304 grade as per approved drawing and instruction of EIC.
- 10.37. Heat Resistant Terrace Tiles (300 mm x 300 mm x 20 mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) shall be used on terraces of the building except mummy slab.
- 10.38. Items/ components of buildings not explicitly covered in the specification but required for completion of the project shall be deemed to be included in the scope.
- 10.39. Double pipe scaffolding shall be used for all the works and as per industry best practices.
- 10.40. Furniture shown in the drawing are indicative only and is not in the scope of bidder.
- 10.41. Where equivalent is indicated, it shall mean material with equivalent quality with the vendors indicated. In case it is not possible to identify similar materials with other vendors, the material shall be selected based on equivalent cost with in identified Vendors as per manufacturers price catalogues.

11.0. EXTERNAL WATER SUPPLY FROM BORE-WELL TO BUILDING OR TRANSIT CAMP

- 11.1. The drawing for the water supply from bore-well to water tank shall be developed by the Contractor. Water supply will be made available to the Contractor from a bore-well by the Employer at any one location within the Township. 80 mm dia CPVC pipe shall be provided by the Contractor from the bore-well to the fire water tank. The underground pipe line shall be laid as per CPWD Specification. The ball valve, NRV etc. shall be provided as per requirement. From this pipe line a 25 mm dia tap off shall be connected by the Contractor to the roof water tank provided for the Quarter & transit camp.
- 11.2. All the plumbing works to be done with Chlorinated Polyvinyl Chloride (CPVC) pipes of required size.
- 11.3. The Contractor shall carry out all the external plumbing/erection works required for supply of water to the building / or transit camp beyond the single point.
- 11.4. A scheme shall be prepared by the Contractor indicating the layout and details of water supply which shall be got approved from the Employer before actual start of work including all other incidental items not shown or specified but as may be

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required for complete performance of the works.

11.5. Bore well is not in the scope of Contractor.

12.0. **MODE OF MEASUREMENT:**

The of measurements for schedule items shall be followed as per the procedure mentioned in the latest CPWD specification and its revisions. For Non-schedule items, measurements shall be done as per the unit mentioned against the items and BOQ description following standard practices.

13.0. **NON-SCHEDULE ITEMS: CIVIL WORKS**

The items not available in Delhi Schedule of Rates and are considered based on market rates of materials & works are termed as Non-Schedule Items. The specification for the non-schedule items is attached with the tender documents. For any item if specification is not provided herein, the item is to be executed as per Bill of Quantity given or available specification of CPWD for similar items. Any item for which specification is not covered under CPWD specification shall be executed as per manufacturer guidelines or as instructed by EIC.

13.1. Construction of drains 300mm wide with 300mm depth by providing base PCC 1:4:8 and full brick wall of mortar 1:6 and plastering with a coat of neat cement of mortar 1:4 (1 cement:4 fine sand) all complete including back filling.

- a. **General:** The dimension of drain shall be 300mm wide and 300 mm depth from the top of the drain to invert of drain. Proper invert level shall be maintained for drainage of water. A gradual slope of 1:1000 shall be maintained. The drain shall be constructed along the plinth protection around the building area and shall be connected to the nearest main drain.
- b. **Measurement:** The mode of measurement for drain shall be running meter. The quantity for each type of drain section shall be measured in meters along the centre line of drain.
- c. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.

13.2. Providing and Fixing Stainless steel 304 grade bracket with necessary screws.

- a. **General:** The SS bracket shall be used for vanity granite slab support in toilet/balcony.
- b. **Material:** Stainless steel 304 grade
- c. **Measurement:** The item shall be measured in kg.
- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.

13.3. Providing brass cupboard locks with six levers of approved quality including necessary screws etc. complete. Size 40mm (in cupboards).

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- a. **General:** To be used on cupboards/ wardrobes. This should generally conform to IS 729. The size of the cupboard lock shall be 40mm.
- b. **Material:** This should generally conform to IS 729. The size of the cupboard lock shall be 40mm. This shall be made of cast brass and shall be of the best make of quality approved by Engineer-In-Charge. These shall be finished bright or plated or oxidised or as specified. The size of the lock shall be denoted by the length of the face across the body in mm. These locks shall be fitted with six levers as specified. False (dummy) levers shall not be used.
- c. **Measurement:** The item shall be measured in numbers.
- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.

13.4. Supply and fixing of SS Handles 100mm.

- a. **General:** To be used on shutters of wardrobe/ kitchen cabinets as per approved drawings. This should generally conform to IS 208.
- b. **Material:** Handles shall be made of 304 grade Stainless steel and size 100mm and should be procured from approved manufacturer decided by the Engineer in charge. The door handles shall be well made and free from defects. These shall be finished correcting to shape and dimensions. All edges and corners shall be removed and finished smooth to facilitate easy handling
- c. **Measurement:** The item shall be measured in numbers.
- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.

13.5. Supply and fixing of SS Handles 125 mm.

- a. **General:** To be used on shutters of wardrobe/ kitchen cabinets as per approved drawings. This should generally conform to IS 208.
- b. **Material:** Handles shall be made of 304 grade Stainless steel and size 100mm and should be procured from approved manufacturer decided by the Engineer in charge. The door handles shall be well made and free from defects. These shall be finished correcting to shape and dimensions. All edges and corners shall be removed and finished smooth to facilitate easy handling
- c. **Measurement:** The item shall be measured in numbers.

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- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above
- 13.6.** Supply and application of Silicon Sealant around UPVC windows and doors of quarters.
- a. **General:** Silicon Sealant around UPVC windows and doors for gap filling. Silicon sealant of matching colour of uPVC profile shall be applied.
 - b. **Material:** Shall be of approved make.
 - c. **Measurement:** The item shall be measured in meters.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above
- 13.7.** Providing and fixing High Grade AISI 304 Stainless Steel Ball Bearing Drawer Slides Soft Closing channels 500mm long with necessary Stainless-Steel screws etc. complete as per directions of Engineer in-charge. Make, Kich or equivalent.
- a. **General:** To be used for drawers in cabinets/cupboards/wardrobes (SS 304 Grade).
 - b. **Material:** High Grade AISI 304 Stainless Steel Ball Bearing Drawer Slides Soft Closing channels 500mm long with necessary Stainless-Steel screws etc. complete as per directions of Engineer in-charge. Make, Kich or equivalent
 - c. **Measurement:** The item shall be measured in pairs.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above
- 13.8.** Providing and fixing Cabinet & Drawer Handle (SS 304 Grade) with necessary SS screws complete as per direction of Engineer in charge of size 10mm x 224 mm (Arch, Dline, Ozone, Godrej Kich Make).
- a. **General:** To be used in Cabinet and cupboards/ wardrobes (SS 304 Grade)
 - b. **Material:** Handles shall be made of 304 grade SS and size 10mm x 224 mm and should be procured from approved manufacturer decided by the Engineer in charge.
 - c. **Measurement:** The item shall be measured in numbers.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above

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- 13.9.** Providing and fixing stainless steel (304 Grade) Cutlery Plain Wired Basket of approximately size 386x500x100 mm along with PVC Cutlery Tray of approximate Size 380-440x501-550x55 mm of Hittice or approved make including stainless steel Patti/ bracket, nails, stainless steel screws etc. complete as per direction of Engineer-in-charge.
- a. **General:** To be used in Kitchen cabinet as per the approved drawing.
 - b. **Material:** Size 386x500x100 mm (SS 304 Grade) along with PVC Cutlery Tray of approximate Size 380-440x501-550x55 mm of Hittice or approved make including stainless steel Patti/ bracket, nails, stainless steel screws etc complete as per direction of Engineer-in-Charge. **Measurement:** The item shall be measured in numbers.
 - c. **Measurement:** The item shall be measured in numbers.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 13.10.** Providing and fixing stainless steel (304 Grade) plain wired basket of size 386x500x100mm of Hittich or approved equivalent make with Stainless steel patti/basket, nails, stainless steel screws etc. complete as per direction of Engineer-in-Charge.
- a. **General:** To be used in Kitchen cabinet as per the approved drawing.
 - b. **Material:** plain wired basket of size 386x500x100mm (SS 304 Grade) of Hittich or approved equivalent make with Stainless steel patti/basket, nails, stainless steel screws etc complete as per direction of Engineer-in-Charge.
 - c. **Measurement:** The item shall be measured in numbers.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 13.11.** Providing and fixing stainless Steel (304 Grade) Grain/plain wired basket of size 386x500x200mm of Hittich or approved equivalent make with Stainless steel patti/basket, nails, stainless steel screws etc. complete as per direction of Engineer-in-Charge.
- a. **General:** To be used in Kitchen cabinet as per the approved drawing.
 - b. **Material:** Grain/plain wired basket of size 386x500x200mm of Hittich or approved equivalent make with Stainless steel patti/basket, nails, stainless steel screws etc. complete as per direction of Engineer-in-Charge.
 - c. **Measurement:** The item shall be measured in numbers.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above

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13.12. Providing and fixing Stainless Steel (304 Grade) Wall mounted door stop (Satin Finish) with rubber buffer of approved make or equivalent.

- a. **General:** To be used for doors wherever required.
- b. **Material:** Stainless Steel (304 Grade) Wall mounted door stop (Satin Finish) with rubber buffer of approved make or equivalent.
- c. **Measurement:** The item shall be measured in numbers.
- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above

13.13. Providing P.O.P decorative moulding, cornices etc. i/c required scaffolding, hacking to plaster surface wherever required. complete as per Architect drawing & direction of Engineer-in-Charge Corner decorative moulding of size 50x75mm.

- a. **General:** To be used in the wall/ beam and ceiling junction of the drawing/ living rooms.
- b. **Material:** Plaster of Paris used for decorative moulding, cornices etc. including required scaffolding, hacking to plaster surface wherever required. complete as per Architect drawing & direction of Engineer-in-Charge
- c. **Measurement:** The item shall be measured in running meter.
- d. **Rate:** The rate shall include the cost of all materials and labour involved in all the operations described above including all scaffolding, hacking wherever required complete.

13.14. Providing and fixing GI plaster mesh (Arpita or equivalent) made of galvanized iron of nominal thickness 0.35mm with a zinc coating of 120 gms per sqm along the junctions of masonry and concrete works including fixing, scaffolding, lead and lifts etc. as per the directions of the Engineer in Charge.

- a. **General:** GI plaster mesh (Arpita or equivalent) to be provided on the junction of walls with beams and column in all quarters and common areas for crack protection.
- b. **Material:** The material should be procured from an approved manufacturer decided by the Engineer in charge. GI wire mesh of 0.35mm thickness with zinc costing of 120grams shall be provided.
- c. **Fixing:** The mesh shall be fixed to different surfaces before plastering with the help of screws and nails at Masonry and column/beam

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junctions. If required drilling can be done. A min of 75mm width shall be provided on either side of the joint. A min of 15cm shall be overlapped wherever mesh is joined. The mesh shall be fixed in such a way that it should be concealed in the plaster.

- d. **Measurement:** The item shall be measured in sqm.
- e. **Rate:** The rate includes the cost of materials and labour involved in the operations described above

13.15. Supply and installation of kitchen chimney Signia 60 cm auto-clean function and a chimney with 60 cm auto-clean technology with 1200 suction capacity of Kutchina or equivalent all complete as per instruction of EIC.

- a. **General:** To be used in kitchen as per approved drawing.
- b. **Material:** Finish: Black, (ii) Size: 60cm (iii) Suction: 1200m³/hr. (iv) Auto-Clean Type: 3rd generation Dry Auto-Clean (v) Switch Control: Touch Control (vi) No of speed control: 3 (vii) Filter type: Baffle Filter (viii) Illumination Type: LED (ix) Voltage/Frequency: 220/240V–50Hz (x) Noise Level: 58DB (xi) Duct Diameter: 150mm (xii) Key points: Multi Speed Wave Sensor /3rd generation Dry Auto-Clean / Touch Interface / lifetime warranty on motor/1yearWarrantyonProduct (xiii) Product Dimension: 596 x 381 x 497mm (xiv) Gross Weight: 14.2kg (xv).
- c. **Measurement:** The item shall be measured in number.
- d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.

14.0. NON-SCHEDULE ITEMS: PHE WORKS:

14.1. Supplying, installing, testing and commissioning approved make 15mm CP health faucet with CP flexible tube 1.2 m long and wall hook of Jaquar or equivalent, CP crutch, nozzle & 2-way Bib Cock of Jaquar or equivalent with wall flange etc. complete. The water flow rate is 6 liters/Min. (Make: Jaquar/Roca/Cera/Grohe)

- a. **General:** To be used in toilets.
- b. **Materials:** 15mm CP health faucet with CP flexible tube 1.2 m long and wall hook and CP crutch, nozzle & way Bib Cock with wall flange etc. complete. The water flow rate is 6 ltrs/Min. All the materials required for the work shall be as per item description and of approved make only as decided by

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Engineer in Charge.

- c. **Measurement:** The item shall be measured in numbers
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 14.2. Providing and fixing Braided hose with Two 15mm Nuts & Rubber washers with both side Nipple of Jaquar or equivalent make -450 mm length. (Make: Kich/Jaquar/Roca/ Arch/ D- Line).
- a. **General:** Shall be used as connecting pipes for wash basin, WC unit, geyser etc.
 - b. **Materials:** 450 mm length with two nos. 15mm Nuts & Rubber washers with both side Nipple. All the materials required for the work shall be as per item description and of approved make only as decided by Engineer in Charge.
 - c. **Measurement:** The item shall be measured in numbers
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 14.3. Supply and fixing of SS Shield coupler 50mmx 40mm Diameter
- a. **General:** Shield coupler 50mmx 40mm Diameter Couplers to be used for connecting pipeline sections (either hard or flexible) shall have adequate strength to withstand stresses.
 - b. **Material:** Stainless steel 304 grade.
 - c. **Measurement:** The item shall be measured in each.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 14.4. Providing and Fixing CPVC ball valves 20 mm.
- a. **General:** Shall be used in CPVC pipes for regulate water flow.
 - b. **Materials:** CPVC ball valves 20 mm of approved make as per the direction of Engineer in Charge.
 - c. **Measurement:** The item shall be measured in each.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above
- 14.5. Providing & fixing Over the Counter Wash basin of size 580x355x130mm, 32mm C.P. Waste coupling of Somany or equivalent (Make: Somany/Jaquar/Roca/Cera/Kohler).
- a. **General:** The item shall be carried out for fixing Over the Counter Wash basin in the common basin area/ toilet of all the quarters.

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- b. **Materials:** Size 580x355x130mm, 32mm C.P. Waste coupling of Somany or equivalent
 - c. **Construction:** Shall be in line with BOQ, CPWD specification. All the materials required for the work shall be as per item description and of approved make only as decided by Engineer in Charge.
 - d. **Measurement:** The item shall be measured in numbers
 - e. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 14.6. Providing and fixing C.P. brass shower arm.
- a. **General:** To be used as shower fittings in the bathrooms in all quarters.
 - b. **Materials:** chromium plated brass of specified diameter of approved make.
 - c. **Measurement:** The item shall be measured in numbers.
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above
- 14.7. Providing and fixing SS AISI-304 Grade Towel rail complete with brackets fixed with CP brass screws PVC sleeves etc. Complete: 650 mm long of KICH or equivalent. (Make: Kich/Jaquar/Roca/Grohe/ Arch/ D-Line)
- a. **General:** The work shall be carried out for fixing Towel rail complete in all the toilets of all units of residential quarter.
 - b. **Materials:** All the materials required for the work shall be as per item description and of approved make only as decided by Engineer in Charge.
 - c. **Measurement:** The item shall be measured in numbers
 - d. **Rate:** The rate includes the cost of materials and labour involved in the operations described above.
- 15.0. **DRAWINGS:**
- 15.1. Tender drawings developed by the consultant / owner are enclosed with the tender documents. These are indicative. Upon placement of award, 2 sets of the drawings, with a “RELEASED FOR CONSTRUCTION” stamp, shall be issued by the Owner to the Contractor matching with the requirement at Site. The Contractor shall execute the work at Site as per these drawings only.
- 15.2. The Drawings shall be made available to the Contractor sequentially as per the

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agreed work schedule.

16.0. FIELD QUALITY PROGRAM

- 16.1. The work shall be executed as per the Standard Field Quality Document No. **C/FQA/SFQP/SITE-CIVIL-2012/REV-04** pertaining to building civil works along with the other quality plans indicated in the technical specifications. All tests on materials and finished products as required in the field quality plan shall be carried out by the Contractor at his own cost. The following guidelines shall govern for carrying various lab tests:
- 16.2. The material testing shall be carried out in any of the NABL accredited laboratories/ Approved TPL of POWERGRID NER.
- 16.3. In case Testing facilities are not available for any specified test given in FQP/Tech Spec/BOQ item Description in these laboratories, the same shall be carried out in any other laboratory where such facilities are available with the specific approval of Engineer in Charge.
- 16.4. The contractor shall arrange at his own cost, packing, forwarding and other incidentals for conducting the tests.

17.0. INTERFACING

The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/walls/floors, fixing of foundation bolts, fixing of lighting fixtures, fixing of supports/embedment, provision of cut outs etc. shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum.

18.0. STATUTORY RULES

- 18.1. Contractor shall comply with all the applicable statutory rules pertaining to factories act (as applicable for the State), Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control etc.
- 18.2. Statutory clearance and norms of State Pollution Control Board shall be followed as per Water Act for effluent quality from plant.
- 18.3. Requirement of sulphate resistant cement (SRC) for sub structural works shall be decided in accordance with the Indian Standards based on the findings of the detailed soil Technical Specification, Section: Civil Works Page 66 of 90 C/ENGG/SPEC/CIVIL/ Rev-12/Jun'24 investigation. In case sulphate resistant cement is used as per requirement, differential cost between sulphate resistant cement and PPC cement shall be payable as an extra item.
- 18.4. All building/construction materials shall conform to the best quality specified in CPWD specifications if not otherwise mentioned in this specification.
- 18.5. All tests as required in the standard field quality plans have to be carried out without any financial.
