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AN ISO 9001:2015 CERTIFIED DEPARTMENT

E-Tender on Design, Engineering, Procurement and Construction (EPC) basis for Proposed Building for BO-I and CAB at Berhampur, Odisha.

DESIGN BASIS REPORT –

ARCHITECHTURAL

STRUCTURAL

SANITARY & PLUMBING

E-Tender on Design, Engineering, Procurement and Construction (EPC) basis for Proposed Building for BO-I and CAB at Berhampur, Odisha.

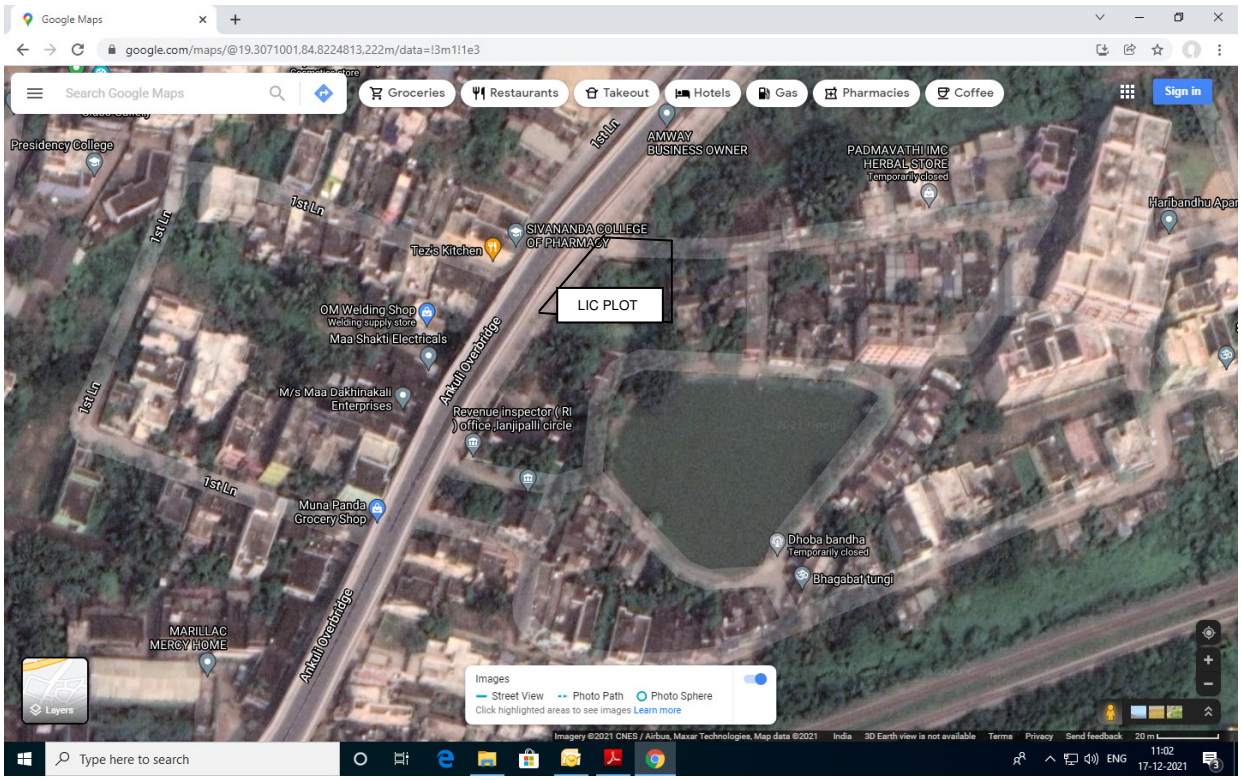
DESIGN BASIS REPORT – ARCHITECTURAL

PREFACE

Life Insurance Corporation of India own a plot of land no. 101/145 and 101/266 of mouza – Kalapuri in Berhampur town in the state of Odisha.

Originally the land of 0.300 Acre was purchased by LIC of India from Govt. of Odisha on 07.04.2004 on Lease Basis. A building plan for S+2 floors for CAB was got sanctioned on 31.12.2004, validation of which expired on 30.11.2007. Later it has been planned again to construct a building for CAB and RMF. Building plan for Stilt+4 has been submitted to Berhampur Development Authority on 2012 after obtaining clearances from Berhampur Municipal Corporation, Fire Department and Central Ground Water Board but approval from BDA not received. Meanwhile Govt. of Odisha planned to construct flyover over the adjacent road and issue of land acquisition arose, which matured during 2016 when 0.054 Acres has been acquired by Government of Odisha on payment of compensation to LIC. Finally as per the survey carried out recently 951.56 SqM. of land is found to be in our possession.

At present, it is proposed to construct one building with Stilt + 3 floors only for housing B.O.-I and CAB, Berhampur office with site development work of the plot to be undertaken as per given concept plan with interior works, furniture, Air-conditioning etc as detailed subsequently. The Stilt floor area of the proposed Building shall be used for parking, Electrical room. The upper three floor shall be used for Office hall, Electrical room, Ladies & gent's toilet. Two staircases and one lift is also to be installed.



GOOGLE MAP

PHOTOGRAPH OF THE PLOT

Project profile:

- The idea is to develop a LIC's Own office building housing BO-I and CAB, Berhampur in the proposed site to match with the growing Policy Holders numbers in the city and to increase the business.
- This building will become landmark of the Berhampur Township.
- The LIC complex envisaged will be with high class office facility.
- The whole Branch office building will be provision with facilities for air-conditioning, Solar light, Rain water harvesting etc.
- The Branch office building proposed to be designed observing the concept and principles of modern design and sustainable building technology, caring the environment and observing energy efficient technology to the extent possible. Utmost care taken for accessibility of disabled persons.

OBJECTIVE AND BASIS OF THE REPORT

This report outlines the concept approach for Planning, Design, Structure, Services etc. and includes:

- Site Composition and Planning
- Structural Design and Construction Technology
- Building Materials & Finishes
- Mechanical, Electrical, Plumbing Systems
- Fire Safety & Security
- Landscape Design and Horticulture Detailing
- Site Management and Logistics
- Project Costing and Tendering Details

Introduction of selection and design of the Mechanical, Electrical and Plumbing (MEPF) and fire detection systems, which are:

- Adopting MEPF design as per requirements of local authorities' jurisdiction
- Viable and adequate MEPF design to meet the design intent and functionality of the building
- Sufficient performance & usability of the building. This project will enhance image of Corporation, raise confidence of our policy holders and thus go a long way in enhancing New Business.
- Best possible operational efficiency & cost effectiveness
- Implementing of the latest innovative, environment friendly, green and energy conservative design features for the project.

The report describes the MEPF systems to achieve most advantageous design for construction, maintenance and also consistent while implementing the prevailing technology for development of the project.

Design of Mechanical, Electrical and Plumbing (MEPF) System:

Selection and design of MEPF system shall be consistent, easy maintainable, logical, energy efficient and economical.

Overview of Project:

This report is prepared to describe the basis of design proposals for Construction of one Commercial Building to be used for housing BO-I and CAB, Berhampur at plot 101/145 and 101/266 of mouza – Kalapuri in Berhampur town in the state of Odisha **on the basis of Engineering Procurement and Construction (EPC) including Design**.

The architectural scheme comprises:

Floor	Consists of
Ground level including Stilt Floor	Security Cabin, landscape, parking facility, flower bed, Manholes, underground storage tanks, septic tank with soak pit, Boundary wall & gate, ramp, staircase, lift, niche for accommodating electrical panels, borewell with pumps and all other services requirements
Floor 1 to Floor 3	Office hall with interiors, Electrical room, staircase, lift as per details given

The Survey details of the Plot is attached separately in file named Drawing.

BUILT-UP & PLOT AREA DETAILS

Keeping in view the Building Bylaws, one conceptual drawing has been prepared which is enclosed in attached File named Drawing. The Area Statement is as follows :

PLOT AREA	**951.56**	**Sqm.**		
	FAR Area (Sqm.)	**Non-FAR Area (Sqm.)**	**Total BUA (Sqm.)**	**Height (Mtr.)**
STILT FLOOR	60.21	361.60	421.81	3
FIRST FLOOR	421.81	0	421.81	3.3
SECOND FLOOR	421.81	0	421.81	3.3
THIRD FLOOR	421.81	0	421.80	3.3
TOTAL	**1325.64**	**361.60**	**1687.24**	**12.9**
PERMISSIBLE FAR			**2.00**	
ACHIEVED FAR			**1.39**	
PARKING SPACE REQUIRED	530.26	40% OF FAR		
PARKING PROVIDED	361.60	Covered		
	175.25	Open		
TOTAL PARKING PROVIDED	**536.85**	**40.50%**		
PERMISSIBLE BLDG. HEIGHT				**15.00**
PERMISSIBLE SETBACK	**3.00**			
PROVIDED SETBACK	**Front**	**Left**	**Right**	**Rear**
	7.23	6.44	3.00	3.00

The above areas mentioned in schematic Architectural drawings are indicative only and given as basis for preparing the final submission drawings.

ARCHITECTURE:

- ✓ The building is designed with attractive and architectural feature to get full office use, maximum frontage & maximumlight and ventilation.
- ✓ Modernized setup with Air conditioned office space consists of modular furniture, partition, chairs, LED light fittings etc.
- ✓ The Building is provided with dual staircase, one for normal access and another staircase for fire escape,
- ✓ The building is provided with lift and ramp provision for physically disabled persons.

LANDSCAPE

The layout contains landscaped areas. The landscape area shall have tree plantation of various species, shrubs and bushes and lawns.

PLANNING CONSIDERATIONS

It is proposed to construct Stilt + 3 stories building in the said plot with modern architectural finishes. Considering the parking requirement as per bylaws, apart from the parking in stilt area, open parking for balance area has been shown. Due to space crunch, there is limited scope for landscaping, hence horticulture work has to be done in pockets suitably. The entire area will be paved by paver block over sand cushioning/ soling to allow surface drainoff to percolate to ground and excess taken to RWH pits, size and no. as per the local byelaws. Septic Tank with Soak Pit, UGR of required capacity to be located suitable. The finished level of plot should be atleast 600mm from the highest point of road crown abutting two sides and Stilt floor will be further 150mm above. Boundary Wall of approved design has to be constructed upto 1.8m height from internal finished level with gate. While designing the building, green building requirement has be followed to the maximum extent.

KEY OBJECTIVES OF DESIGN

Following are the primary objectives of development of this project:

- ✓ To make the building of modern-look as well as in character matching with surrounding building with unique Architectural features
- ✓ To make buildings environment-friendly
- ✓ Maximize energy saving systems to minimize the operational costs.

- ✓ To make buildings safe, secured and friendly for physically challenged persons.
- ✓ Use of grass pavers in surface parking to prevent absorption and radiating heat & to plant maximum evergreen trees to cut off solar heat and keep surroundings cooler.
- ✓ To provide for water harvesting.

FEATURES AND SERVICES TO BE CONSIDERED IN THE DESIGN

- RCC Framed Structure with RCC Overhead tanks
- Masonry work with Flyash bricks upto plinth and AAC blocks in superstructure, with cement-sand plaster, Acrylic Emulsion Paint over 2mm thick wall putty
- Flooring – Staircase: 18mm th Granite, Office Hall by Double Charge Polished Vitrified Tiles over Min 30mm th. Foam/Light Wt Concrete, Toilet Area : Anti-skid tiles in flooring and wall tiles in dado
- TW door frames for all doors except toilet doors which will be of double layered granite stone. Shutters – toughened glass fully glazed shutter for main doors, flush door/ partly glazed shutter for internal doors. Colour anodized Aluminium frame and shutter for Windows with tinted glass panes. Premium quality SS Hardware fittings
- Water proofing for top terrace, lift pit and UGR
- Use of GRCC Jalli/ Curtain wall sections etc in external cladding
- CPVC watersupply pipes and UPVC Soil and waste water pipes and fittings, CP on brass Toilet fittings and premium quality white vitreous sanitarywares, controlled flow with reduced water consumption. Dual water supply pipelines
- Septic Tank and Soak Pit
- External and Internal Electrical Installation work with LED fittings with Substation, Electrical panel, earthing
- Lightning Arrester for building
- Borewell – 2 nos with submersible pumps. Self priming monoblock pumps for UGR
- Air Conditioning with Cassette and High Wall Split AC
- Rain water Harvesting system will feed the water table in that area
- Downcomer Fire fighting system with terrace pump and with Addressable fire detectors with fire alarm system
- Automatic 8 passenger lift with ARD facility, MRL type
- Apart from general building wiring and points, UPS power points, LAN cabling, Telephone points with network racks , panels etc
- Interiors with false ceiling, full and low height partitions, Cash Counters, Modular work stations and standalone tables, chairs , storage units, steel chairs with leatherette tapestry etc

The proposed elevation is developed as follows :


LIC

SCHEDULE OF FINISHES

Sr no	Item	Specifications / Finishes
1.	**Structure**	Framed structure as per relevant IS code and Structural Design with suitable foundation based on Soil Test Report (Uploaded separately).
		Points to be taken into consideration while designing : (i)Minimum M25 Grade Concrete for foundation and superstructure for all structural members. Volumetric Mis 1:1.5:3 for RCC in Gates Pillar, Boundary Wall, tells, Chajjas, Fins and other miscellaneous structures. Overhead and Underground tanks also to be designed in RCC M25. (ii)There will be no sunken slab for toilet portion. All pipes are taken vertically below the slab by core-cutting and then horizontally by ceiling hung MS clamp. (iii)Load of 30mm thick foam/light-weight concrete to be taken on slab which is proposed above RCC slab in Office hall but below flooring to run the conduits. Also 120mm thick Brickbat coba waterproofing suggested on top terrace which should be taken into consideration while designing roof slab. (iv)EGL should be min 600mm above external road level and Slilt level to be min 150mm above EGL.
2	**Anti-Termite Treatment**	Pre-construction Anti-termite treatment with Chloropyriphos 20% EC with 1% concentration as per IS
3	**Earthwork**	**1.** Earthwork in excavation should be by mechanical/ manual means in foundation trenches and drains in any kind of soil **2.** Earth required for filling the plot may be surplus excavated earth after backfilling or to be procured from outside and to be filled in layers of each thickness of 150 to 230 mm (murum filling) and compaction. Plinth filling should be with sand.
4	**Concrete Work**	1.Minimum M25 Grade Concrete for foundation and superstructure for all structural members. Volumetric Mix 1:1.5:3 for RCC in Gates Pillar, Boundary Wall, tells, Chajjas, Fins and other miscellaneous structures. 2. All RCC Footing, beam, slab to be laid over Min 100mm

		thick PCC of M15 laid over Brick-on-edge soling laid on rammed earth.
5	**Masonry Work**	All the external wall will be of 230/250 mm. All internal walls will be 150/100 mm Fly Ash Bricks in C.M. 1:5 in Foundation and Plinth. Light weighted Autoclave Aerated concrete blocks withCM (1:4) as per CPWD specifications or in approved bonding chemical in superstructure above Plinth level..
6	**Flooring / Dado /Skirting**	1. Double charge polished vitrified tile for flooring & skirting of 8 to 12 mm thick and 1000x1000**(Entrance lobby/passage)**/ 600 x 600 mm**(Office Hall and all other areas)** /as approved size on 20mm CM(1:4) bedding of approved shade, pattern & make**..** The basic price shall be Rs. 600/sqm for tile of size 600mm x 600mm and Rs. 750/sqm for tiles above of size 600mmx600mm.
		2. Common toilet, Gents & ladies toilet, Water Cooler Area - Ceramic tiles for**flooring** with anti skid tile size 300x300mm / 300x450mm or more size laid on 20mm thick Cement mortar (1:4) bed and **dado** with approved design Ceramic tiles of size 300x 450 mm fixed on backing of min 12mm thick Cementmortar (1:3) for height of 2100mm. The basic price of the Ceramic floor tiles shall be Rs. 450/sqm and Rs. 550/sqm for ceramic dado tiles.
		4. Main Staircase, Fire escape staircase & entrance (main) steps : 18mm thick Granite for riser, tread and mid landing flooring and skirting with approved shape, size, pattern and make etc. Skirting / dado: 18mm thick Granite for 200 mm high. The basic price of the Granite shall be Rs. 1800 /sqm.
		5. Roads, Pavement & parking – Interlocking paving blocks 60mm thick, M35 grade, 50mm thick sand bed as per requirement. Base of 230mm thick rubble soling/ 125mm thick Brick-on-edge Soling or 100mm thick PCC 1:3:6.
		8. Kerbs, edgings etc - Precast cement concrete of size 450x250x75mm made of 1:2:4 concrete as per approved pattern and setting in position with cement mortar 1:3 (1 cement : 3 coarse sand) complete .

		Marble / Granite slab in flooring and dado a) Samples shall be got approved for each and every location before procurement b) Minimum/Basic price shall not be less than the pricespecified. c) The thickness of flooring slab shall be min. 18mmthick d) Floor bedding shall be 20mm thick of Cement mortar (1:4) and backing plaster shall be of 12mm thick with cement mortar (1:3) on walls.
7.	**Interior & Exterior Finishes**	**1.** Internal plaster to masonry, RCC surfaces shall be provided with minimum 12mm thick Plaster CM(1:4) of approved make, with fiber mesh fixing to all RCC and Brick /block work joints on top of plaster as mentioned above.
		2. Internal plaster to ceiling shall be provided with 6 mm thick Plaster CM(1:4) of approved make.
		3. External plaster to masonry & RCC surfaces shall be minimum 20 mm thick provided in two coats with CM (1:4) in two layers of approved make with fiber mesh fixing to all RCC and Brick /block work joints. Integral waterproofing compound shall be added to Cement mortar as per manufacturer's recommendations.
		4. Internal paint to Masonry, RCC surfaces – Applying Acrylic emulsion paint for all internal walls, staircase, Toilets with approved thickness, Shade, pattern & make etc. All painting work shall be carried out with all necessary surface preparation, min 2 coats of white cement based water proof Putty of approved make, min 1 coat of primer, and 2 or more coats of paint up to the satisfaction of Engineer In charge / Manufacturer specifications, upto false ceiling height
		5. Internal paint to ceiling – Applying Acrylic emulsion distemper over a coat of primer for all internal ceiling with approved Shade,pattern & make etc. All painting work shall be carried out with all necessary surface preparation, minimum 1 coat of primer, and 2 or more coats of paint up to the satisfaction of Engineer In charge / Manufacturer specifications.
		External Finishes : **Use of Structural glazing, CNC Jalli work, Aluminium louvers etc may be used as per the Conceptual Elevation or the Contractor may suggest alternatives for improved looks.**

		6. External Paint - Applying Exterior Grade Premium weather shield elastomeric exterior paint of required shade with approved thickness, Shade, pattern & make etc. All painting work shall be carried out as per manufacturer's specifications with all necessary surface preparation, min 1 coat of exterior primer applied @ **2.20 kg/10 sq m**, and min 3 top coats @ 1.43 ltr/10 sq m of paint up to the satisfaction of Engineer-in-Charge..
8.	**Door and door frames**	**1. Main Door** – 2nd class TW Door frame with Shutters (shutters of 2.1m height maximum) fully glazed with 8mm thick clear toughened glass panel in TW rail and styles with approved shade, design and make etc. The remaining top portion shall be with frame work with 6mm thick toughened glass. Main door should have heavy duty floor springs, double handle with lock, stopper and other hardware required for smooth performance of doors and proper locking system.
		2. All internal Doors - Flush doors single/ double shutter with thickness 35mm with 1mm thick lamination on both sides with approved thickness, shade, design for all other doors etc. **with teakwood frame work** as approved as per design and drawing. All doors shall have4 nos. C. P Brass ball bearing Hinges, Tower Bolts, Dead Locks with round knob, door stopper etc. All hardware's shall be of C.P Brass premium quality.
		3. All Toilet Doors – Solid Flush doors single shutter with thickness 32/30mm with 1mm thick lamination on both sides including top & Bottom with approved thickness, shade, design etc. **with double Granite Frame work as** per approved design and drawing. All doors shall have 3 nos C. P ball bearing Brass Hinges, Tower Bolts, Dead Locks with round knob etc. All hardware's shall be C.P Brass premium quality. All TW surface to be finished with melamine polish.
		4. Rolling shutter - M S grill rolling shutter fabricated out of M S rounds 8mm dia. & connected with 20x5mm thick MS flat, mounted on specially designed pipe shaft with brackets, side guides, locking arrangement, both from inside, outside 27.5cm long springs 2 nos. painting with 2 coats of synthetic enamel paint over a coat of Zinc chromate etc complete.
		Note: Heavy duty CP Brass ball bearing hinges – 4 nos per shutter for doors of thickness of 35mm & above and 3 nos for shutters for doors of thickness of 30/32mm. All TW surface to be finished with Melamine polisdh.

9.	**Windows & Louvers etc**	**1.** Colour Anodized Aluminum heavy duty, minimum 116 X 45 and sash 46 x 82 mm or as per design requirement with 3 track sliding windows with SS 304 Grade as per required size, pattern, colour and make etc. with min. 6mm thick clear glass as shutter as per design with locking arrangement, Sealant and accessories etc. complete.
		2. Colour Anodized Aluminum heavy duty, minimum 116 X 45 and sash 46 x 82 mm or as per design requirement with 3 track sliding windows with SS 304 Grade Mosquito Net Sliding Panel with thickness as 2.3 mm +/-0.2 mm, (2 Track Glass, 1 Track-Mosquito Net) as per required size, pattern, colour and make etc. with min. 6mm thick clear glass as shutter as per design with locking arrangement, Sealant and accessories etc. complete.
		3. Colour Anodized Aluminum heavy duty, frame & shutter as per design requirement with 2 track sliding windows 4 Nos. Panels (Shutters) with thickness as 2.3 mm +/-0.2 mm, (2 Track Glass) as per required size, pattern, colour and make etc. with min. 6mm thick clear glass as shutter as per design with locking arrangement, Sealant and accessories etc. Complete for Inspection area.
		4. Fixed window with 6mm thick fixed clear glass on colour anodized Aluminum Section heavy duty, fixed with glazing clips from both the sides of the window and necessary accessories etc. all complete.
		5. Colour Anodized Aluminum louvered ventilator with size /as per drawing Fixed window / ventilator made of (small series) frame 47 x 50 mm and mullion 47 x 68 mm both having thickness of 1.9 ± 0.2 mm and single glazing bead of appropriate dimension including 6 mm frosted glass and 4 mm thick louver frosted glass with exhaust Fan as per design, colour, pattern and make etc. In addition to above SS Mosquito Net panel to be provided from Inside/outside as per design with colour anodized aluminum frame of requires section, all hinges, locking arrangement etc. as per design and drawing etc. all complete.
		All windows shall be fixed on sub-frame of 16/18 mm thick granite stone.
		Doors and Windows frame/ Shutters/ Glass are to be designed for the Dead Load & Wind Load as per the Codal Provisions or site condition or Local Norms. **Glazing** : All the Glass Panels shall be of toughened Glass. **FLYPROOF MESH** : The Fly proof/ Mosquito proof mesh to be used in doors and windows shall be of s.s. wire

		gauge of Gr 304 of0.5 mm dia wire and 1.40 mm apparture on both side. **Curtain Rods** - 20 mm diameter SS Curtain Rod of grade 304 having minimum 2 mm wall thickness Supported on 2 number heavy duty Decorative Brass Brackets of 150 mm long (3 nos brackets for Rod length of 1.8 Mtr and more) two numbers decorative brass moulding caps at ends / or site condition or design .
10.	**Waterproofing**	**1.Top Terrace** – 120mm thick Integral Cement Base Waterproofing with brickbat coba with guarantee of 10 years
		2. For water tanks, lift Pardi/rafts, from Inside- Minor cleaning work, scarifying the surface to remove laitance, cleaning with compressed air, chasing open construction joints & cracks etc. to form a U shaped groove of 20mm x 20mm and filling with polymer modified mortar using polymer in the ratio of 1pbw polymer:10 pbw cement: 30 pbw quartz sand. Making of angle fillets all around the periphery of the wall with polymer modified mortar in the ratio of in the ratio of 1pbw polymer:10 pbw cement:30 pbw quartz sand. Providing and applying, in depth penetrating type crystalline waterproofing system, applied as a slurry application by brush in two coats with a total consumption of approx.1.50 Kg per Sqm, to be applied over the RCC slab & on vertical surfaces, curing for minimum 3 days etc. complete in all aspects as per manufacturer's instructions and as directed by Engineer/Architect. The area of the floor and sides of tank treated shall be considered for payment purpose.
		4. For Under Ground Water tanks/Sumps/Raft/Lift pit etc from Outside of structure: Providing and laying integral cement based treatment for water proofing on the vertical surface by fixing specified stone slab 22 mm to 25 mm thick with cement slurry mixed with water proofing compound conforming to IS:2645 in recommended proportions with a gap of 20 mm (minimum) between stone slabs and the receiving surfaces and filling the gaps with neat cement slurry mixed with cebex 100- Plasticised expandive grout admixture@ 225 gm per bag of cement and finishing the exterior of stone slab with cement mortar 1:3 (1 cement : 3 coarse sand) 20 mm thick with neat cement punning mixed with water proofing compound in recommended proportion complete at all levels and as directed by Engineer-in-charge : Using rough Kota stone
11.	**Fabrications**	**1**. **Window** / **Balcony Grills**- Mild Steel grill work made of MS square bars, flats, angles etc for windows and ventilators as per design and drawing including necessary welding with approved design and pattern. The grill shall be finished with approved shade of powder coating. **The**

		weight of the security grill shall not be less than 17 Kg/sqmt.
		2. Railing to Staircase- Glass railing with SS baluster with grade SS 304 Gr steel pipes, rods, flats, Hollow sections etc. as per design & drawings includingnecessary SS fittings etc. as per design and drawing with or without RCC Pardi/Brick Parapet. Railing with approved design, pattern and colour etc. The height of railing shall be minimum 1m and weight of the SS railing with handrail shall not be less than 17 Kg/m. the hand rail provided on side wall shall be on pipe of 50mm dia. And weight not less than 3.60 Kg/m.
		3. Window sill /jams of 18 mm thick Granite Stone as per approved design, colour and pattern for full width of wall.
		4. Collapsible Doors: (Security Areas) Providing and fixing in position collapsible Mild steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer and minimum 2 coats of Synthetic Enamel Paint.
		5. M.S Compound Gate: shall be minimum 1.8m height consists of 4m wide main gate along with 1.2m wicket gate at Entry and Exit. It shall be made of MS square bars, flats, Angles and MS sheet etc as per approved drawings and design and the weight of the Ms compound wall gate shall not be less than 50 Kg/Sqmt.
12	**Storm water Drains**	PCC bed Concrete, RCC Slab at Bottom , RCC walls & Precast RCC Covers. Minimum Grade of Concrete shall be M20 Grade and wall & Slab Thickness 150 mm thick.
13	**External Infrastructure Development, site development**	All Infrastructure Development works shall be carried out as per design, drawing. Work mainly includes as follows but not limited to ; Finished Ground level/formation level/Pavement / road levels shall be minimum 600mm above existing average Ground level. 1. Tree Plantation as per requirement as per approved / given list. 2. Existing Trees Protection wherever required. 3. Irrigation System for Landscaped area

		4. All horticulture Work as per given drawings, details & requirement. 5. Rain Water Harvesting as per given drawing & detail andas per minimum EC / Authority requirement.
14.	**Signage**	**All Floor Nos, Meter Room, Entry/Exit, LMR,OHWT, PARKING NOS, Pump Rooms, STP, etc. –** Providing & Fixing suitable nos of **PLATE MADE BY USING ALLUMINIUM COMPOSITE PLATE WITH AUTOGLOW VINYL** WITH PLOTTER CUT GREEN / REDVINYL AS PER SPECIFICATION **Size : 4" x 12"**
		ALL Fire Staircases within case of Fire - Providing & Fixing suitable nos of **PLATE MADE BY USING ALLUMINIUM COMPOSITE PLATE WITH AUTOGLOW VINYL** WITH PLOTTER CUT GREEN / REDVINYL AS PER SPECIFICATION **Size : 3" x 12"**
		Building Name - Providing & Fixing of **SS PU COATED BOX LETTER 18 GAUGE THICK 202 SS** MATERIAL. ABCDEF ..... ETC. **SIZE ; -10"**

NOTE:

a) The water proofing specification mentioned in the tender is minimum requirement. If the contractor may propose new waterproofing concept/method for terrace, podium top, toilet etc along detailed specification /documents for LICI approval. The contractor needs to execute the water proofing method finally approved by the LICI. The work to be strictly carried out as per final approved specification / as per direction of Engineer in charge.

b) The Contractor should submit 10 years Guarantee certificate for the water proofing works and Anti-termite works carried out.

DETAILED SCHEDULE OF FINISHES

Finishing Schedule:

Sr. no.	Location	Flooring	Wall	Ceiling	Others
a)	**Office Hall**	Double Charged Vitrified Tiles (600 x 600) – Basic price Rs. 600/sqm	**Wall:** 12 mm thick Cement Plaster (1:4), 2mm thick (min.) Wall putty finished with Acrylic emulsion paint **Skirting / dado:** similar as flooring (100mm).	6mm thick Cement Plaster(1:3) and Decorative False Ceiling with Gypsum Board on G I F rame with cornice finished with Acrylic Emulsion paint in A.C area and in non A.C area/stores etc 2mm thick wall putty and Acrylic Emulsion paint.	
c)	**Pantry area**	Polished Vitrified Tiles (600 x 600mm) – Basic price Rs. 600/sqm	**Wall:** 12 mm thick Cement Plaster (1:4), 2mm thick (min.) wall putty finished with Acrylic emulsion paint **Skirting / dado:** similar as flooring (100mm).	6mm thick Cement Plaster (1:3), 2mm thick wall putty finished with Acrylic Emulsion paint.	600mm wide Granite Stone Platform with cabinet at bottom, one stainless steel Sink with drainboard 510mm x 1040mm x bowl depth 250mm with swan neck tap and complete set with concealed outlet
d)	**Attached toilet to Branch Manager cabin,**	Ceramic Tiles with antiskid (300X 300) / (450 X 450) (Basic Price – Rs. 450/ Sqm)	**Wall:** 12 mm thick Cement Plaster (1:4). **Skirting/ dado:**	6mm thick Cement Plaster (1:3) and False Ceiling with WPC Board on	1 no of Wall hung WC with Flush Tank, 1 no Counter Top /under Counter Wash basin with

			Ceramic Tiles (300 X 300) / (300 X 450) up to minimum 2.4 m (Basic Price – Rs.550/ Sqm). Remaining area with OBD Paint.	GI Framework,	Granite counter, full width Mirror, SS Towel Rod and other fixtures like Taps, Health Faucets , Paper Holder.
f)	**Ladies common Toilet**	Ceramic Tiles with antiskid (300X 300) / (450 X 450) (Basic Price – Rs. 450/ Sqm)	**Wall:** 12 mm thick Cement Plaster (1:4). **Skirting/ dado:** Ceramic Tiles (300 X 300) / (300 X 450) up to minimum 2.4 m (Basic Price – Rs.550/Sqm). Remaining area with OBD Paint on wall putty.	6mm thick Cement Plaster (1:3) and False Ceiling with WPC Board on GI Framework.	1 no of Wall hung WC with Flush Tank, 1 no Counter Top / under Counter Wash basin with Granite counter Mirror, SS Towel Rodand other fixtures like Taps, Health Faucets, Paper Holder, Tower rod.
g)	**Gents common Toilet**	Ceramic Tiles with antiskid (300X 300) / (450 X 450) (Basic Price – Rs. 450/ Sqm)	**Wall:** 12 mm thick Cement Plaster (1:4). **Skirting/ dado:** Ceramic Tiles (300 X 300) / (300 X 450) up to minimum 2.4 m (Basic Price – Rs. 550/Sqm). Remaining area with OBD Paint on wall putty.	6mm thick Cement Plaster (1:3) and False Ceiling with WPC Board on GI Framework.	2 nos of Wall hung WC with Flush Tank, 3 nos of white vitreous china flat back single half stall urinal of size 580x380x350 mm with 5 litre P.V.C. automatic flushing cistern, 2 nos Counter Top / under Counter Wash basin with Granite counter Full width Mirror of size on basin top , SS Towel Rod and other fixtures like

					Taps, Health Faucets , Paper Holder, Towel rod.
h)	**Physically Handicapped toilet**	Ceramic Tiles with antiskid (300X 300) / (450 X 450) (Basic Price – Rs. 450/ Sqm)	**Wall:** 12 mm thick Cement Plaster (1:4). **Skirting/ dado:** Ceramic Tiles (300 X 300) / (300 X 450) up to minimum 2.4 m (Basic Price – Rs.550/Sqm). Remaining area with OBD Paint on wall putty.	6mm thick Cement Plaster (1:3) and False Ceiling with WPC Board on GI Frame work.	1 no of Wall hung WC with Flush Tank, fixtures like Taps, Health Faucets , Paper Holder, Hand Rail, wash basin, mirror.
d)	**Staircase & Lift lobby**	18mm thick Granite stone in flooring and treads (Basic rate – Rs. 1800 per Sq.mt) Lobby Area – Vitrified Tiles 1000 x 1000mm(Basic rate – Rs. 750 per Sq.mt) **Skirting / dado:** similar as flooring (100mm).	**Wall:** 12 mm thick Cement Plaster(1:4), 2mm thick (min.) wall putty finished with Acrylic emulsion paint	6mm thick Cement Plaster (1:3), 2mm thick wall puttyfinished with Acrylic Emulsion paint.	

Sanitary/ Plumbing Fittings-

Sr. No.	Item	Unit	Minimum Basic Rate	Remarks
1	**WALL MOUNTED WATER CLOSET**	1	**Rs. 7000/-**	
2	**OVER COUNTERTOP VITREOUS CHINA BASIN**	1	**Rs.4000/-**	
3	**HEALTH FAUCET**	1	**Rs.2500/-**	
4	**PILLAR COCK**	1	**Rs.1500/-**	

5	**2 WAY BIB**	**1**	**Rs.1500/-**	
6	**GRAB BAR (FOR ALL TOILETS)**	**1**	**Rs.1500/-**	
7	**TOILET ROLL HOLDER (FOR ALL TOILETS)**	**1**	**Rs.1000/-**	
8	**FLUSH TANK WITH ALL NECESSARY FITTINGS AND FIXTURES. (FOR COMMONTOILETS)**	**1**	**Rs. 2500/-**	
9	**WASH BASIN BELOW COUNTER (COMMON TOILETS)**	**1**	**Rs. 3500/-**	
10	**WALL MIXER WITH SHOWER -3WAY DIVERTER (CONCEALED BODY WITH EXPOSED UNIT & PIPE)**	**1**	**Rs. 7500/-**	
11.	**SHOWER HEAD**	**1**	**Rs. 750/-**	
12.	**URINALS**	**1**	**Rs. 6000/-**	

Door Fixtures:

Hardware fittings including all necessary SS screws, nails, adhesive and any other fixing hard wares, Cutting in door frames, shutters, floors and providing all other fixing arrangement and fixing of all accessories as per manufacturers standard packing and instruction to be included in the quoted rates.

HARDWARE FOR DOOR, WINDOWS & WARDROBES

i. The fittings of door and windows shall be as per Schedule of Doors & Windows attached with this document.

ii. For other fixtures not mentioned in schedule the stainless-steel fittings and fixtures shall be in SS Grade 304, machine made and free of fabrication marks, residual effects of welding/riveting etc.

iii. The fitting shall be finished in a Satin finish (brushed finish-satin's commercial purpose) except wherever specified otherwise. The brush effect shall be uniform and without any variations.

iv. Irrespective of the stipulations contained above, the agency shall produce samples for all the fitting in advance and a written approval for the chosen sample shall be obtained from the LICI. The decision of the LICI in respect of the specification, quality and make of fitting to be used at site shall be final and binding on the agency. Nothing extra shall be payable on this account.

v. All the fittings shall provide with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the specification & elsewhere in this tender document.

vi In wardrobes soft close hinges for wardrobe shutters and ball bearing slide system for drawers of Dorset /Hafele /Godrej or equivalent is to provided.

vii. All the accessories including brackets, nuts, bolts, screws, bushes etc. shall be of the quality and make specified by the manufacture of the fitting.

viii. All the fitting including accessories shall be accompanied with certificate of origin and representative test certificate of conformance with relevant code form the manufacturer with each lot supply. The test certificate shall clearly indicate the lot numbers of the supplied fittings.

ix. The specification and method statement shall be submitted by the agency well in advance before the start of execution. The execution shall be allowed only after due approval of engineer-in-charge.

COLOUR ANODIZED ALUMINUM DOOR ,WINDOWS & VENTILATORS:

Extent and Intent: -

The work shall be carried out in the factory and to be installed at site through an approved Special Agency, who shall furnish all material, labour, accessories, equipment, tool and plants and incidentals required for providing and installing Doors, windows, louvers and other items as called for on the drawings. The supplying of additional fastenings, accessories, fixtures and other items not mentioned specifically herein, but which are necessary to make a complete installation shall be a part of this contract. Hinges for casement window shall be stainless steel Friction stays..

General: -

Aluminum windows etc. shall be provided as per Architectural drawings/ Schedule of Doors and windows. The details shown on the drawings are indicative only. These may be varied slightly to suit the standard adopted by the manufacturers. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and

installation drawings for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

Shop Drawings: -

The contractor shall submit the shop drawings of Doors, windows, louvers and other work, based on the architectural drawings to the Engineer-in-Charge for his approval. The shop drawing shall show full size sections of windows etc. thickness of section (i.e. wall thickness) details of construction, subframe/rough ground profile, anchoring details hardware as well-as connection of windows to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.

Samples: -

Samples of windows louvers etc. shall be fabricated, assembled in the factory and submitted to Engineer-in-Charge for his approval. They shall be of sizes, types etc. as decided by Engineer-in-Charge. All samples shall be provided at the cost of the contractor.

Sections: -

Windows shall be fabricated as per detailed drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-Charge. The permissible tolerance of the extruded sections shall be such as not to impair the proper and smooth function/ operations and appearance of windows.

Handling and Stacking: -

Fabricated materials shall be carried in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care. On receipt of material at site, it shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces/ parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.

Installation:

The Door/ window must be aligned in plumb and water level and installed to the window sill using high quality steel fasteners. The outer frame of window and sill must be sealed with silicone-based sealants from outside and acrylic paintable sealant from inside.

The door/ windows assembled shall be placed incorrect final position on the opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for anchoring. The frame shall then be removed from the opening and laid aside.

Neat holes with parallel sides of appropriate size shall then be drilled in the concrete members with an electric drill at the marking to house the expansion bolts.

The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nut is forced into the anchor shell. The frame shall then be placed in final position in the opening and anchored to the support through cadmium plated machine screws of required size.

The frame shall be set in the opening by using wooden wedges at supports and be plumbed in position. The wedges shall invariably be placed at the meeting at points of glazing bars and frames.

EPDM Rubber / Neoprene gaskets:

The contractor shall provide and install EPDM Rubber / Neoprene gaskets of approved size and profile at all locations as shown and as called for to render the windows absolutely air tight and weather tight. The contractor shall produce samples of the gaskets for approval and shall procure the same after approval only. The EPDM/Neoprene shall be of Osaka make or equivalent.

Fittings: Hinges, stays, handles, tower bolts, locks and other fittings shall be of quality and manufacturer as approved by the Engineer-in-Charge.

Manufacturer's Attendance: The manufacturer immediately prior to the commencement of glazing shall adjust and set all windows and doors and accept responsibility for the satisfactory working of the opening frames.

Silicon sealant: The gaps between frames and supports and also any gaps in the windows sections shall be raked out as directed and filled with silicon sealant of approved colour and make to ensure complete water tightness. The silicon's sealant shall be of such colour and composition that it would not stain the masonry/concrete work, shall receive paint without bleeding, will not sag or run and shall not set hard or ry out under any conditions of weather. The sample of silicon sealant to be used for this purpose shall be got approved from the Engineer-in-Charge before its actual use.

INTERIOR WORKS OF BRANCH OFFICE INCLUDING FURNITURE, CHAIR ETC.

Note : The tentative layout prepared is available in File 'Drawings' uploaded separetely

SCHEDULE OF MODERNIZATION

Sl. No.	Description of Item	Locations	Specifications
			CIVIL & INTERIOR
1	Full Height Partitions	1. Record Room 2. Stores 3. Agents Corner 4. CLIA Corner 5. Ladies Room	: As per specification of full height partition given below with internal face finished with OBD and external face with 1mm thick laminate with TW door frames & Flush Door Shutters for doors.
2	Full Height (Partly Glazed Partitions)	1. Manager Cabins. 2. Agents Corne (Part) 3. CLIA Corner 4. Cash Counter 5. IT Room 6. D.O. Hall	Front & External shall be ***Partly Glazed Partition*** as per specification given below
3	Low Height Partitions	Area other than work stations. For Work Stations, Modular Partitions to be provided.	As per specification given below
4	Seating arrangement	For Branch Manager and other Officers	**Tables in the Branch Manager Cabin: -** i) **Table:** Factory made free standing table unit of size 1800 X 900 X 750 mm height branded Modular Furniture made of 25mm thick pre-laminated particle board table top. Right & left edges of table finished with matching to top finish with 2 mm-thick PVC lipping and other edges half round post formed moulding. ii) **Drawer unit :** - Factory made (Size 450mm X 515 mm X 525 mm height) 0.8mm thick M.S. sheet powder coating. iii) **Side Unit:** - Factory made side Modular side units (size 900x450x750mm) made of MS sheets with powder coating finish with sliding shutters and one intermediate shelf. Top shall be of 25mm thick prelaminated particle board. iv) **Rear side Credenza –** 1 no of 450mm wide MS rear credenza and length as per layout drawing. v) **Chairs** –high back cushioned synchronized tilting chair with casters & 4 nos of Visitors low back cushioned chairs with M.s stand vi) **Sofa set** – 1 no of 3 seater sofa and 1 no of 2 seater sofa. vii) **Center table** – Centre table of size 900x600mm overall

			For Officers :- **i) Table:** Factory made free standing table unit of size 1500 X 750 X 750 mm height branded Modular Furniture made of 25mm thick pre-laminated particle board table top. Right & left edges of table finished with matching to top finish with 2 mm-thick PVC lipping and other edges half round post formed moulding. **ii) Drawer units**: - Factory made (Size 450mm X 515 mm X 525 mm height) 0.8mm thick M.S. sheet powder coating. iii) **Side Unit:** - Factory made side Modular side units (size 900x450x750mm) made of MS sheets with powder coating finish with sliding shutters and one intermediate shelf. Top shall be of 25mm thick prelaminated particle board. **Chairs**: - High back cushioned adjustable tilting chair with casters & 2 nos of Visitors low back cushioned chairs with stand.
5.	Seating arrangement	For Development Officers	**For Development Officers** :- **i) Table:** Factory made free standing table unit of size 1350 X 600 X 750 mm height branded Modular Furniture made of 25mm thick pre-laminated particle board table top. Right & left edges of table finished with matching to top finish with 2 mm-thick PVC lipping and other edges half round post formed moulding. With one Pencil Tray. **ii) Drawer units**: - Factory made (Size 380mm X 515 mm X 525 mm height) 0.8mm thick M.S. sheet powder coating. iii) **Side Unit:** - Factory made side Modular side units (size 900x450x750mm) made of MS sheets with powder coating finish with sliding shutters and one intermediate shelf. Top shall be of 25mm thick prelaminated particle board. **Chairs**: - Medium back cushioned chair with casters & 2 nos of Visitors low back cushioned chairs with stand.
6	Work Stations	For HGA/ Assistant/ RC	**Work Stations** :- Factory made branded Modular Furniture of size 1500x1500mm with keyboard tray, Tables Top with 25mm pre-laminated particle board with Top finished in post-formed moulding supported on M.S. frame & Brackets. **Drawer units**: - Factory made (Size 450x515x525mm height) 0.8mm thick M.S. sheet powder coated. 2nos One with 3 drawers (2 drawers with 1 filing drawer) and Another with top open and one filing drawer. **Work Station Partitions** : - Factory made Tile base free standing partition of height 1200mm(approx.) and 65 mm thick (approx.) made out of cold roll formed M.S section, 4mm thick **Glass panel** at both sides above table top. Pre-laminated tiles on external visible faces and M.S. sheet tiles below table top.

			Chair : 1 nos of Medium back cushioned chair with casters
7	Low Height Storage Units	In suitable places of Min 50 Cum space.	Factory made modular MS powder coated storages made of 24 gauge sheets with top of storage unit provided with 25 mm thick pre-laminated post-formed particle board.
8	Full Height Storage Units	In suitable places of Min. 20 Cum space.	Factory made modular MS powder coated storages made of 24 gauge sheets with top of storage unit provided
9	Side / Rear Credenza		Factory made modular MS powder coated storages made of 24 gauge sheets with sliding type shutters and on top of storage unit provided with pre-laminated 25 mm thick post-formed particle board.
10	False Ceiling	All Office area covered with Air conditioning	***Combination of armstrong tiles and Gypboard of approved make:*** Mineral fibre tiles based ceiling with G.I. frame in area about 70% of total area. Gypboard with G.I. frame in area about 30% of total area.
11	Gypsum & Mineral fibre tiles false ceiling		
12.	Computer Table	Server Room	Factory made branded Modular Furniture, Tables Top with 25mm pre-laminated particle board supported on M.S. frame & Brackets with Top finished in post-formed. **Drawer units**: - Factory made (Size 380x450x725mm height) 0.8mm thick M.S. sheet powder coated.
13.	Wall Finish	Office area	Wall putty and panelling upto ceiling height / false ceiling height with 6 mm BWR Plywood finish with 1 mm thick high pressure laminate and fixed on G.I. frame (25 x 50 mm) as per requirements at wall locations.
14.	Cash counter	Office	Made at site with 19 mm thick BWR plywood for all vertical sides, top Black granite of not less than 18mm thick to counter top with rounded edges and horizontal shelves finished with 1mm thick high pressure lamination matching with furniture on all exposed surfaces, inside with fire retardant paint. Includes Drawer Unit as per detailed specifications.
15	Column paneling	Office	G.I. frame (25 x 50mm) @ 450mm c/c & fixed with 8mm thick wood polymer composite (WPC) board non-combustible and resistant to fire finish with acrylic emulsion paint. Column paneling / cladding shall be provided wherever any electrical fixtures are provided on column surfaces and need to be covered for aesthetical reasons
16	Painting	Office	Acrylic Emulsion.

17	Cover for Safe	Office hall	1.5x1m approximate size in 19mm thick Fire Retardant plywood confirming to IS :5509 ply at sides ,top and front shutters
18.	Centre table	Office hall	Centre table of overall size 1200x600mm x450mm height with 12mm th. glass top . T./W. frame work
19.	Corner table	Office hall	Corner table of overall size 600 x 600 x 450 mm high with 12 mm thk. Clear glass top with itching. Frame work of T.W. sections
20.	Running counter table for agents	Office hall	Running counter type tables of 500 mm wide made of 19 mm thick BWR plywood at top & verticals at 900c/c including t.w. moulding finished with 1 mm thick High pressure laminates etc

Requirement of Factory Made Modular Furniture in Branch Office

Sr. No.	ITEM	Size	Brief Description	Total nos
1.	Free Standing Table for BMs Cabin	1800x900x750 mm	Prelaminated Particle Board	2
2.	Free Standing Tables	1500x750x750 mm	Prelaminated Particle Board	16
3.	Free Standing Tables	1350x600x750 mm	Prelaminated Particle Board	15
4.	Side Unit	900x450x750 mm	M.S. Powder coated with Prelaminated Particle Board Top	36
5.	Side Unit	1200x450x750 mm	M.S. Powder coated with Prelaminated Particle Board Top	2
6.	Backside Credenza	1500x450x750 mm	Same as above	2
6.	Work Stations Triangular as per layout Drawing with gable ends	1500x1500 mm	Prelaminated Particle Board rested on modular partition	41
7.	Tile Based Modular Partition	1200 mm High	Mode of M.S. Powder coated/ Aluninium Frame and Tiles of M.S. Powder coated sheets/ Prelaminated Boards/ Pin-up Boards	As per Layout for workstation and Tables sides of Officers and Development Officers
8.	Drawer Unit(2d+1fd)	450x515x525 mm	M.S. Powder Coated	59
9.	Drawer Unit(1fd)	450x515x525 mm	M.S. Powder Coated	41
10.	Drawer Unit (3d)	380x515x525 mm	M.S. Powder coated	15
11.	Key Board Tray	580x380 mm	Acrylic Key Board with	65

			Telescopic channels	
12.	CPU Trolley	230x270x150 mm	M.S. Powder coated Trolley	65
13.	Cash Counter Table with Counter Top, Drawer Unit	1650x750/750 + 1650x400x1150	Plywood as specified	5

Requirement of Chairs in Branch Office

Sr. No.	USER	Type of Chairs				
		High Back I*	High Back II*	Medium Back	Low back With Caster	Low Back With Stand
1.	Branch Manager Cabin	2	-	-	8	-
2.	Help Desk/ Officers		16	-	-	32
3.	Development Officers	-	15	-	-	30
4.	Development Officers Computer	-	-	-	1	1
5.	Cash Counter	-	-	5	-	-
6.	Work Station	-	-	41	-	-
7.	Agents/CLIA Counter	-	-	-	-	40
8.	Customer Corner	2 set of 3 Seater Stainless Steel Chair cluster of reputed Make with Centre Table.				
9.	Branch Managers Cabin	One 3 Seater Sofa with Centre Table x 2				

* **High Back – I - synchronized tilting mechanism**

* **High Back – II - Adjustable tilting mechanism**

Note : The above quantities are indicative and based on the tentative layout prepared based on present staff strength, which may vary upto 5%. The Contractor has to prepare the layout afresh and carryout the work after taking approval of the layout plan from LIC.

BRANCH OFFCIE MODERNIZATION – DESCRIPTION OF WORK

Sl.no.	Description of work
1.0	**Full height Double skin Calcium silicate partition with low VOC acrylic emulsion paint**
	Providing and fixing partition upto ceiling (inside room) /false ceiling height (outside, towards office hall) consisting of G.I. frame and required board, including providing and fixing of frame work made of special section power pressed/ roll form G.I. sheet with zinc coating of 120 gms/ sqm(both side inclusive), consisting of floor and ceiling channel 50mm wide having equal flanges of 32 mm and 0.50 mm thick, fixed to the floor and ceiling at the spacing of 610 mm centre to centre with dash fastener of 12.5 mm dia meter 50 mm length or suitable anchor fastener or metal screws with nylon plugs and the studs 48 mm wide having one flange of 34 mm and other flange 36 mm and 0.50 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610 mm centre to centre by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall with suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm centre to centre, and fixing of boards to both side of frame work by 25 mm long dry wall screws on studs, floor and ceiling channels at the spacing of 300 mm centre to centre. The boards are to be fixed to the frame work with joints staggered to avoid through cracks, M.S. fixing channel of 99 mm width (0.9 mm thick having two flanges of 9.5 mm each) to be provided at the horizontal joints of two boards, fixed to the studs using metal to metal flat head screws, including jointing and finishing to a flush finish with recommended jointing compound, jointing tape, angle beads at corners (25 mm x 25 mm x 0.5 mm), joint finisher and two coats of primer suitable for board as per manufacture's specification and direction of engineer in charge all complete.
	66mm overall thickness Partition with 8mm thick double skin Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process with Compressive Strength 225 kg/sq.cm, Bending Strength 100 kg./ sq.cm with two or more coats of low VOC interior grade acrylic emulsion paint of approved make and shade over a coat of primer inner side and 1mm thick laminate from external side. Commercial flush door shutter solid core single leaf phenol bonded 30 mm thick of approved make all as per latest IS specification including 3 nos. ISI Stainless Steel butt hinges 125 mm. long (heavy duty of required thickness) with screws including lipping of teak wood of size 30x6 mm all round the edge etc finished with paint/laminate matching with the partition with vision panel on polished TW frame.
2.0	Providing and Fixing overall **66 mm thickness partly glazed /partly calcium silicate** doubel skin partition up to false ceiling height GI frame and 6 mm thick float glass.
	The frame work shall be made of power pressed /roll form GI sheet with zinc coating of 120 gms/ sq m (both sides inclusive), consisting of floor and ceiling channels and two additional channels at 2100 mm level and two additional channels at about 600 mm and 1200 mm from floor level, 50 mm wide having equal flanges of 32 mm and 0.5 mm thick, fixed to the floor and ceiling at the spacing of 610 mm c.c. with dash fastener of 12.5 mm dia, 50 mm length or suitable anchor fastener or metal screws with nylon plugs and studs 48 mm wide having one flange of 34 mm and other flange of 36 mm and 0.5 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610 mm c/c by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall and suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm c/c, and fixing of boards to both sides of frame work by 25 mm long dry wall screws on studs , floor and ceiling channels at spacing of 300 mm center to center.
	The glass pane shall be 6 mm float glass fixed on 19 mm Ply backing(4 sides) in the GI Channels with 30 x 12 mm teak wood beading and melamine polished.**from 1200 mm to 2100 mm level from floor .**
	The glazed partition shall have bands of 1200 mm at bottom, 300 mm from top and side. The bands shall be of 8 mm calcium silicate board and painted with two or more coats of Low VOC Interior grade Acrylic Emulsion Paint of approved make and shade over a coat of primer. Commercial flush door

	shutter solid core single leaf phenol bonded 30 mm thick of approved make all as per latest IS specification including 3 nos. ISI Stainless Steel butt hinges 125 mm. long (heavy duty of required thickness) with screws including lipping of teak wood of size 30x6 mm all round the edge etc finished with paint/laminate matching with the partition with vision panel on polished TW frame.
3.0	Providing and fixing of **1200 mm height approx(Low Height) partition c**onsisting of G.I. frame and required board, including providing and fixing of frame work made of special section power pressed/ roll form G.I. sheet with zinc coating of 120 gms/ sqm(both side inclusive), consisting of floor and ceiling channel 50mm wide having equal flanges of 32 mm and 0.50 mm thick, fixed to the floor and ceiling at the spacing of 610 mm centre to centre with dash fastener of 12.5 mm dia meter 50 mm length or suitable anchor fastener or metal screws with nylon plugs and the studs 48 mm wide having one flange of 34 mm and other flange 36 mm and 0.50 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610 mm centre to centre by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall with suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm centre to centre, and fixing of boards to both side of frame work by 25 mm long dry wall screws on studs, floor and ceiling channels at the spacing of 300 mm centre to centre. The boards are to be fixed to the frame work with joints staggered to avoid through cracks, M.S. fixing channel of 99 mm width (0.9 mm thick having two flanges of 9.5 mm each) to be provided at the horizontal joints of two boards, fixed to the studs using metal to metal flat head screws, including jointing and finishing to a flush finish with recommended jointing compound, jointing tape, angle beads at corners (25 mm x 25 mm x 0.5 mm), joint finisher and two coats of primer suitable for board as per manufacture's specification and direction of engineer in charge all complete.
	66mm overall thickness Partition with **8mm thick double skin Calcium Silicate Board** made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process with Compressive Strength 225 kg/sq.cm, Bending Strength 100 kg./ sq.cm with **two or more coats of low VOC interior grade acrylic emulsion paint** of approved make and shade . **Top shall be Teak wood capping of size 75 X 40 mm with melamine polish.**
4.0	**Wall/column Panelling with 10 mm thick calcium silicate board**
	Providing and Fixing in position concealed GI section for wall /column paneling using board of required thickness fixed on W profile (0.55 mm thick) having a knurled web of 51.55 mm and two flanges of 26 mm each with lips of 10.55 mm, placed @ 610 mm c/c in perimeter channel having one flange of 20 mm and another flange of 30 mm with thickness of 0.55 mm and web length 27 mm. Perimeter channels is fixed on the floor and the ceiling with the nylon sleeves @ 610 mm c/c with fully threaded self tapping dry wall screws. Board is fixed to the W profile with 25 mm counter sunk ribbed head screws @ 200 mm c/c, all complete as per drawing & directions of engineer-in-charge, the joints of the boards are finished with specially formulated jointing compound and 48 mm wide jointing tape to provide seamless finish and providing 10 mm calcium silicate Board of 10 mm thick with tapered edges made with calcareous materials reinforced with cellulose fiber manufactured through autoclaving process to give stable crystalline structure with compressive strength of 225 kg per sq cm and Bending Strength of 100 kg/Sq cm. The finishing with 2 or more coats of Acrylic Emulsion paint over a coat of primer.
5.0	**Cash Counter**
	P/F Cash counter table of overall width 900mm and overall height 1190mm (approx.) made out of FSC Fire Retardent (IS : 5509) Plywood 19mm th. with t.w. lipping at edges all as per drawing consisting of the following: Internal size of cash counter is 1650 mm.X 2500 mm with a variation of +10% (for which no extra cost to be paid or deducted)
	Details of counter and printer table:
	(a)Minimum 16 mm th. Machine cut, machine polished black granite of approved shade with double front edge rounded properly and other edges properly polished at service top of 350 mm width approx fixed on 19mm thick Fire Retardent Ply, the height of the service top to be 1120 mm from the floor

	level. 12 mm thick. float glass with polished edges to be fixed in the middle portion of the service top up to 2100 mm ht. The Granite as well as the 19mm thk. fire retardent plywood of the service top to be suitably cut for fixing the above mentioned glass.
	(b)The working table top of width 900 mm made of 19 mm thk. Fire Retardent plywood finished with 1 mm thk fire retardent high pressured laminates on top &0.8 mm balancing laminate on bottom surface incl half round TW beading of sect. 20 X 12 mm duly polished. The height of the working platform to be 750 mm from the floor with provision of cable manager and cap . On the left side of table top provision to be made for placing printer by cutting 1 slots of size 450 X 20 mm finished with PVC Gasket in the working platform top.
	(c)One drawer unit of 400mm wide(clear internal size) depth 450 mm , drawer unit having three drawers below to be made out of 12 mm thick Fire Retardent ply at sides, 6mm thick fire retardent ply at bottom, 19mm thick fire retardent plywood at front and rear including cash seperation arrangement in top drawer only with with 6mm FSC certified Fire Retardant ply, sliding on Quadrial slides (QSDS 50 of ebco Make), central lock (Ebco Make) Front surface finished with 1.0mm th. fire retardent high pressured laminate and internal surface with 0.8 mm thick same type balancing laminate etc. complete.
	(d)Printer Table On the left side with two compartment of 400mm external width top for paper stationary and bottom for CPU. The top compartment is to be divided in to two equal part by sliding shelf of size 400 X 350 mm made of 19 mm thick fire retardant (IS:5509) Ply wood sliding on sliding channels of approved make finished with 0.8 mm balancing laminate with locking arrangement. The back of this compartment is to be provided with 6 mm fire retardant ply wood. The bottom compartment made up of 19 mm thick fire retardant plywood of size 400x500mm fixed 75mm above floor level. This box for CPU , open from the front and back to be covered with 0.8 mm thick balancing laminate of approved shade & make complete. Top of the unit shall have 1 mm thick fire retardant high pressured laminate and all the exposed edges of the plywood to be provided with TW lipping of size 20 X 6 mm duly polished.
	(e)Articulated key Board station Flexible 360 swivel enabled, Ebco Make(AKS1M model) or equivalent approved , to move freely as per sitting posture with mouse tray, soft palm rest and stow away soft pad to provide support single knob system to enable height and tilt angle as required.
	(f) Providing & fixing 12 mm th plain glass on counter top in suitable size GI / sal wood frame (above) covered with fire retardent plywood and 1 mm fire retardent high pressured laminate with a semi-circular slit of 125 mm dia at service top level and slit of 50 mm at 1.5 meter level from Floor including etching as per design and necessary exposed edges grounded and polished etc.complete as per drawing or as directed.
	(g)1 mm thick high pressured lamination of approved shade and make to be provided on top of working platform , on face of each of the 3 drawers, side hung shutter and on the vertical sides of the counter on the customer side . All exposed edges of the 19 mm thk. fire retardent ply wood to be provided with TW lippings of size 20 X 6 mm duly melamine polished. All the inner sides of the counter not exposed from customer side including the bottom of table top to be covered with 0.8 mm thick balancing laminate of apprd. shade and make it complete.
	(h) Foot rest of Sal wood with support of section 70 X 35 mm to be provided finished with painting.
	(i)making circular slit for cable manager and straight cutting for paper slit including P/F cable manager and paper slit manager all complete as directed.
6.0	**FULL HEIGHT STORAGE UNITS**
	Providing & fixing 450mm deep and **2100mm** approx ht. storage unit as per following:

	The sides, top, bottom shall be made of not less than 0.8mm thick CRC sheet of required size. The members shall be without any burrs and dents.
	4 nos. Intermediate shelves shall be made of not less than 0.8mm thick CRC sheet. Shelves shall have lipped flanges 25 mm in width and 15 mm in depth. Each shelf shall be supported on four adjustable shelf brackets made of steel sheeting not less than 1.6 mm thick. Four rack strips of not less than 1.0 mm thick shall be provided for supporting the shelves, covering the full height of the cabinet.
	Front openable Door Shutter shall be made of not less than 0.8mm thick CRC sheet with provision of sufficient stiffness by providing metal stiffener. The doors shall be provided with handle and 2 way locking system with duplicate keys of non-corrodible material. The door handle and lock shall be of approved make.
	Each unit shall be supplied with level adjuster which allows 25 mm height adjustment with necessary hinges of approved quality.
	All dents, burrs and sharp edges shall be removed from the various components and finished with powder coating of 50 micron of approved shade & colour by engineer in charge.
	The height of storage unit shall have variation of + /- 300mm as per side condition. (The front elevated area shall be measured for payment)
7.0	**LOW HEIGHT STORAGE UNITS**
	The same as above of item no.1.18 but height 1200mm approx with 02 nos. Intermediate shelves and Storage top shall be of 25mm thick Particle Board in one piece with front edge in half round Post formed moulding, finished with 0.6 mm thick approved laminate including Mini fixing joinery. The shades and colour of laminate and PVC lipping shall be as approved by Engineer-in-Charge.
8.0	**Gypsum Board False Ceiling:**
	Providing & erecting single layer at all height suspended ceiling which includes G.I. perimeter channels of Size 0.55 mm thick having one flange of 20mm and another flange of 30mm and a web of 27 mm along with perimeter of ceiling, screw fixed to brick wall/partition with the help of nylon sleeves and screws, at 610 mm centres. Then suspending GYP STEEL ULTRA CRP surface ribbed intermediate channels of size 45 mm(with two flanges of 15 mm each) from the soffit at 1200 mm centres with Gyp steel ULTRA ceiling angle of width 25 mm x 10mm fixed to soffit with GI cleat and steel expansion fasteners.
	Gyp steel ULTRA ribbed ceiling section of having web of 51.5 mm and two flange of 26 mm each with lips of 10.5mm are then fixed to the intermediate channel with the help of connecting clip and in direction perpendicular to the intermediate channel at 457mm centres.
	Single layer of 12.5mm tapered edge Gyp board plain (conforming to IS: 2095 – Part I, 2011) is then screw fixed to ceiling section with 25mm drywall screws at 230mm centres.
	Screw fixing is done mechanically either with screwdriver or drilling machine with suitable attachment. Extra channels will be provided at drops for which no extra cost will be paid.
	Finally Square and tapered edges of the boards are to be jointed and finished so as to have a flush look, which includes filling and finishing jointing compound. Joint paper tape and two coats of Drywall top coat as per recommended practice.
	Rates are inclusive of two coats of Acrylic emulsion interior grade of off white colour over a coat of primer.
	Including making necessary openings for light fittings, AC grills, diffusers, cut outs made with frame of perimeter channels suitably fixed all complete as per drawing and specification and direction. (Note: Only plan area shall be measured for the payment. The drops for design purpose, which are provided as per drawing and as directed will be measured and paid separately. No deductions for light cuttings separately.) The material used in the false ceiling are to be got certified by the manufacturer.
9.0	**Mineral Fibre tiles such as Armstrong or equivalent False Ceiling:**

	Providing and fixing in true horizontal levels False ceiling system (Mirco Look Ultima) of grid size 600x600mm with G.I. ceiling framework as per manufacturer's specifications using 15mm grid and laying Fine fissured acostic ceiling tiles 16mm thick of size 600x600 mm, NRC-0.55 and R.H.-99%-microlook tagular edges (OR) AMF Performance Ceiling System of equivalent specifications. The rates shall be inclusive of providing and fixing adjustable hangers.
	The cost to include the cost of frame work for fixing light fixtures. The light fixtures shall not be fixed directly on to the tiles, complete in all respects. Cut outs will not be deducted while measuring the ceiling area.
	The cost to include the cost of frame work for providing lighting arrangement LED and providing making additional T/angle for creating opening for providing lights for which no extra payment will be made (only plan area will be measured). The material used in the false ceiling are to be got certified by the manufacturer.
10.0	Providing and fixing cover for safe 1.5x1m approximate size in 19mm thick BWR plywood conforming to IS :303 plywood at sides ,top and front shutters with a handle per shutter, tower bolt 1no, 1no magnetic latch, 3 Nos 75mm long 1.5mm thick brass hinges per shutter and approved make lock with keys.1mm thick High pressure laminates to top and sides exposed surfaces and painting of two OR more coats of textured paint/Fire resistant paint to the remaining surfaces all inclusive etc. complete as directed (only front area will be measured for payment).
11.0	Providing and fixing vertical blinds of approved make & shade with 100 mm wide imported slats with top rail, rods for adjustment of blinds, heavy nylon cord acrylic runner and fixing brackets etc. complete. (The area of window openings / panels whichever is less shall be measured for payment)
12.0	Providing & fixing 12 mm thick soft board fixed with 6mm thick BWR plywood conforming to IS :303 plywood backing with approved cloth including teak wood frame work of size 45 mm X 45 mm (finished size) with melamine polishing including fixing arrangement by picture plate etc. complete.
13.0	Providing & fixing Centre Table of overall size 900 x 600 mm x 450 mm height (finished size) with 12 mm thick clear glass top with etching in approved pattern, fixed on framework of Teak wood consistent of four legs of section of 65 x 40 mm (finished size) and with battens of section of 38 x 65 mm connected one at 75 mm above floor & other at top etc. with PU polishing to Teak wood etc. complete as directed.
14.0	Providing & fixing Corner Table of overall size 600 x 600 x 450 mm high with 12 mm thick Clear glass top with etching in approved pattern, fixed on frame work of Teak wood sections 40x40mm (finished size) having four legs and with Teak wood battens of size 25x40mm (finished size) connected at 75 mm above floor level and other at top including PU polishing to Teak wood etc. complete as directed.
15.0	Providing and Fixing over Door Closers sleek type ISI marked with projecting arms of Hyper/Everite/Hardwin or other approved make to be fixed as per the manufacturer's instructions etc., all complete.
16.0	Providing and Fixing Euro profile Mortise Dead Locks 1614 type (Godrej make) or equivalent.
17.0	Providing and fixing double action hydraulic floor spring of approved brand and manufacturer conforming to IS:6315 having brand logo embossed on body/plate with double spring mechanism and door weight upto 125 kg for doors including cost of cutting floors, embedding in floors as required and making good the same matching to the existing floor finishing and cover plates with brass pivot and single piece M.S sheet outer box with slide plate etc. complete as per the direction of Engineer -In Charge. Stainless steel cover plate shall be of minimum 1.25 mm thickness.
18.0	Providing and fixing Stainless steel AISI 316 Grade 300 mm long 22 mm dia handles of Kich or equivalent make
	MODULAR FURNITURE
	Note: The following specifications are common for all work stations: Fabrication, supply and installation of factory made modular work stations with M.S. Frame, Tile based partition system and all accessories as per the technical specifications. All knock down hardware to be suitable for particle board / M.S. sheet fixity complete as per drawing and as directed.
	Fabrication, Supply and installation of factory made modular work stations with Tile based partition system and all accessories as per the technical specifications. All knock down hardware to be suitable for particle board / M.S. Sheet fixity, complete as per drawing and as directed.

	NOTE: All particle boards / pre laminated particle boards shall be of INTERIOR GRADE of approved make.
19.0	MODULAR PARTITION :
	Fabrication, supply & installation of tile based free standing partition of ht. 1200 mm (approx.) and 65 mm thick (minimum) including top trim, end trim, corner filler, adjustable glide screws, top hinged race ways, cover plate, etc. complete for the following type of partition and consist of the following:
	Modular partition frame made out of cold roll formed of powder coated M.S. sections, 16 gauge for core frame & intermediate members. The core frame consists of a rectangular frame fixed with nut & bolt to horizontal sections to form a rigid structure. All M.S. and C.R.C. components shall treated with 7 tank galvanized process & finished with min. 50 micron thick powder coating of approved shade. Each frame supplied with levelling bolts with knurling/fiber knob which allows 25 mm adjustment. The size of the partition will be as specified in the drawings.
	Skirting: Minimum 100 mm high skirting top hinged panel cover of M.S. sheets and finished in approved shade powder coating of minimum 50 micron.
	Raceways: Concealed raceway above work-station top for transporting wires, cables and conduits with top hinged flap out of MS powder coated sheets. The bottom raceway shall be concealed at skirting panel and will have wire carrier hangers and no horizontal member at the floor level.
	Top Trims & End trims: Shall be of extruded aluminum sections of shape and finished with approved shade powder coating. Caps & Corner filler: Shall be of ABS filler Caps which should match very closely to the color of top cap and end trims.
	Tile Panel: Tiles shall be fixed with flush to the partition consisting of the following: i) M.S. Sheet: - 24 gauge M.S. sheet powder coated of minimum 50 microns tile to be fixed at below the table at inner side of partition. ii) Pre-laminated participle Board: - Pre laminated Particle Board (O.S.L.) tiles 12 mm thick of Interior grade conforming to IS: 12823 fixed on external visible faces of work-station partition. The pre laminated particle board tiles shall have sufficient number of clips. iii) Glass Panel: - 4 mm clear sheet glass on both side of modular partition shall be payable separately. iv) Edges: - All the edges shall be finished with hot pressed PVC lipping of matching shade.
	The partitions should have a minimum of 9 kg steel per Sq.mt. of partition frame. The steel should be manufactured by SAIL/TISCO/JINDAL/RIN Ltd./ESSAR STEEL. The supplier of furniture should submit proof of purchase of steel from the manufacturers and test certificates as well. All metal surface shall be powder coated in approved shade.
20.0	**WORK STATION TOP AND GABLE END** :
	Providing and fixing work top of following sized and shall consist of following including powder coated M.S. Brackets and fixed to modular partition.
	Top : Work station top made out of 25mm thick pre-laminated particle board of Interior Grade with front edge in half round mould (post formed section) supported on M.S. frame & Brackets.
	Finish: Top finished in Post formed 0.8 mm thick laminate of approved shade. The bottom finished with balancing laminate of 0.8 mm thick.
	Edge : All other edges finished with matching to top finish with 2 mm PVC lipping.
	Providing and fixing 50 mm dia. Gourmets for cable entry at the specific location after drilling hole of required size in the work station top with ABS cover.
	Size 1500mmX1500mm X 540mm “L” shape work station.
	Size 1350mm X 540mm Linear work station.

	Size 1200mm X 540mm Linear work station.
21.0	Providing and fixing **Gable End** made with 25mm thick interior grade particle board with front edge in half round mould (post-form section) for the following sizes and shall consist of following including powder coated M.S. bracket with fixity to top and partition.
	Finish: - Finish in Post formed 0.8mm thick laminate of approved shade.
	Edge: - All other edges finished with matching to top finish with 2 mm thick PVC lipping.
	Size 515X722mm Gable End.
	Size-475x722mm Gable End.
22.0	**PEDESTAL DRAWER UNIT & ACCESSORIES :**
	Fabricating, supply & placing in position Mobile pedestal drawer unit of following sizes and shall consist of following and with anti toppling device when all drawers are open.
	Carcass: - Shall be of 0.8mm thick M.S. sheet, treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns.
	Drawer :- 2 Nos. of drawers & 1 no. filing drawer (right hand side) made out of 0.6 mm thick M.S. sheet, treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns. The drawers shall be mounted on 2 nos. telescopic channels for smooth operations.
	Locks: - The units shall have central locking (7 lever) lock in front with hinge key in two sets.
	Handles: - The units shall have M.S. pressed concealed handles to every drawer.
	The unit shall have 4 nos. glide screws with height Adjustment of +/- 10 mm.
	Size - 450mm x 515mm x 525 mm (height)
	size - 380 mm x515 mm x525mm (height)
23.0	Same as Sl No. 22.0 above, but Pedestal Drawer Unit of size 450mm x 515mm x 525 mm (height) where Upper part is open for keeping the files & 1 no. filing drawer made out of 0.6 mm thick M.S. sheet, treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns. The drawers shall be mounted on 2 nos. telescopic channels for smooth operations.
	MISCELLANEOUS ACCESSORIES
24.0	Supply & fixing of "INNOFITT " or any other equivalent make acrylic **Key board Tray** of size 580 X380mm with sliding channel on both sides and in-built sliding Mouse pad tray (LHS/RHS) as per the approved sample.
25.0	Providing and Fixing **Metallic Pencil Tray** for Development Officers of "INNOFITT" / "ebco" make, Powder coated of min. 50 micron, size of pencil tray shall be 450mm x 450mm x70xmm (deep) including providing and fixing with telescopic channels etc. all complete as directed.
26.0	Fabricating, Supplying & placing in position below work station movable type M.S. Powder coated **CPU trolley** of size 230mmx270mmx150mm for placing any size of CPU unit, made out of 16 SWG M.S. sheet with 4 no's of lockable type castors etc. complete.

	FREE STANDING TABLE & ACCESSORIES
27.0	Supplying of factory made **free standing table unit** consists of the following :
	Top : Table top shall be of 25mm thick Particle Board in one piece with front edge in half round Post formed moulding, finished with 0.8 mm thick approved laminate including Mini fixing joinery.
	Gable Ends : 2 Nos. shall be of 25mm thick Particle Board in one piece with front and rear edge in half round Post formed mould with leveling bolts which allow 25 mm adjustment, finished with 0.8 mm thick laminate.
	Modesty Panel : shall be of 18mm thick Pre-laminated particle board in one piece with levelling bolts which will allow 25 mm adjustment including making provision for wire management and fixation of switches/sockets.
	Providing and fixing 40mm dia. Gourmets at the specified location after drilling hole of the required size in the work station top with ABS cover.
	Edges: All other edges of tables shall be finished with matching colour to top finish with 2mm thick PVC hot pressed lipping and other half round post formed moulding.
	Finish : Shall be finished in post formed with 0.8 mm thick laminate of approved shade.
	Size - 1800 x 900 x 750 mm (height)
	Size - 1500x750x750 mm (height)
	Size 1350x600x750 mm (height)
	Size 900x500x750 mm (height)
28.0	Providing, supplying & placing in position the credenza unit consisting of following :
	Factory made modular MS powder coated storages, the sides, top, bottom shall be made of 22 gauge MS sheets of required size. treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns. The members shall be without any burrs and dents.
	1 no. Intermediate shelve shall be made of 22 gauge MS sheet. treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns. Shelve shall have lipped flanges 25 mm in width and 15 mm in depth . Four rack strips of not less than 1.0 mm thick shall be provided for supporting the shelve.
	Sliding type shutters shall be made of 22 gauage MS Sheets treated with 7 tank Galvanized process and finished with powder coating of approved shade & thickness of 50 microns. with provision of sufficient stiffness by providing metal stiffener. The doors shall be provided with handle and 2 way locking system with duplicate keys of non-corrodible material. The door handle and lock shall be of approved make.
	Each unit shall be supplied with level adjuster which allows 25 mm height adjustment with necessary hinges of approved quality.
	All dents, burrs and sharp edges shall be removed from the various components and finished with powder coating of 50 micron of approved shade & colour by engineer in charge.
	Top of the credenza unit shall be provided with 25 mm thick pre-laminated post formed particle board moulding at front edge, all the other three edges of which shall be provided with 2 mm thick PVC edge lipping. The shades and colour of laminate and PVC lipping shall be as approved by Engineer-in-Charge.
	Size - 1200 mm x 450 mm x 722 mm (height)
	Size - 900 mm x450 mm x722 mm (height)

	Size - 1500 mm x 450 mm x 722 mm (height)
	CHAIRS
29.0	Providing & supplying of High back chair with leatherette tapestry and steel frame and following sizes with Synchronized tilting mechanism as per following specifications:-
	Seat size –500mm (W) X 460mm (D) approx.
	Back Size -500mm (W) X 720mm (H) approx.
	Seat & Back assembly:
	The seat & back shall be made of 12mm thick hot pressed plywood & moulded polyurethane foam 50 mm thick with density of 45+/-2 Kg/Cum in seat and 32+/-2 Kg/Cum in back and hardness 20Kg on Hamden machine at 25% compression including PVC lipping. The back foam is designed with contoured lumber support for extra comfort.
	Fabric:
	Acrylic fabric for tapestry shall be of LIC approved colour & pattern. The fabric shall be tested for colour fastness and wear & tear. (Basic cost of fabric shall be minimum @ Rs.250/- per metre)
	Tilting & Revolving Mechanism:
	The revolving & adjustable tilting mechanism with locking arrangement in different positions & anti shock back mechanism is provided alongwith height adjustment mechanism & anti toppling mechanism.
	Gas lift:
	The gas lift shall be maintenance free, environment friendly, chrome free cylinder tube fixed in a M.S. black powder coated central column tube 38mm dia, 2.0mm thick, 100mm stroke length & gas pressure of 300N force.
	Pedestal assembly :
	The pedestal shall be made of arc shaped CRC metal folded base with 2.3 mm thick steel strips and fitted with 5 nos. twin wheel pin castors of min. wheel dia. 50 mm. The 5 prongs shall be welded to a central bush made for 2.5 mm thick ERW steel tube with 63 mm OD and 60 mm length. The bush shall accommodate the housing of the gas lift. Diameter of CRC metal base shall be 660 mm with 5 pronged legs duly powder coated having powder coating thickness 50 to 60 microns
	Telescopic bellow assembly :
	The bellow shall be 3 piece telescopic type and injection moulded in black Polypropylene.
	Twin wheel castors :
	The twin wheel castors shall be injection moulded in 30% glass filled nylon & extra smooth.
	Polyurethane armrest :
	The one piece armrest of diamond / rectangular / elliptical shape or any other approved shape are made of black integral skin polyurethane with 50-70 share “A” hardness and reinforced with M.S. insert The armrest shall be scratch proof & weather resistant. Armrests are fitted to the seat with powder coated armrests bracket made of 5mm thick HR Steel
	Powder coating :
	All the steel components shall have epoxy polyester powder coating with dry film thickness of 45 microns (min).
30.0	Providing & supplying of High back chair with leatherette tapestry and steel frame and following sizes with adjustable tilting mechanism as per following specifications:-
	Seat size –480m (W) X 440mm (D) approx.

	Back Size -480mm (W) X 660mm (H) approx.
	Seat & Back assembly:
	The seat & back shall be made of 12mm thick hot pressed plywood & moulded polyurethane foam 50 mm thick with density of 45+/-2 Kg/Cum in seat and 32+/-2 Kg/Cum in back and hardness 20Kg on Hamden machine at 25% compression including PVC lipping. The back foam is designed with contoured lumber support for extra comfort.
	Fabric:
	Acrylic fabric for tapestry shall be of LIC approved colour & pattern. The fabric shall be tested for colour fastness and wear & tear. (Basic cost of fabric shall be minimum @ Rs.250/- per metre)
	Tilting & Revolving Mechanism:
	The revolving & adjustable tilting mechanism with locking arrangement in different positions & anti shock back mechanism is provided alongwith height adjustment mechanism & anti toppling mechanism.
	Gas lift:
	The gas lift shall be maintenance free, environment friendly, chrome free cylinder tube fixed in a M.S. black powder coated central column tube 38mm dia, 2.0mm thick, 100mm stroke length & gas pressure of 300N force.
	Pedestal assembly :
	The pedestal shall be made of arc shaped CRC metal folded base with 2.3 mm thick steel strips and fitted with 5 nos. twin wheel pin castors of min. wheel dia. 50 mm. The 5 prongs shall be welded to a central bush made for 2.5 mm thick ERW steel tube with 63 mm OD and 60 mm length. The bush shall accommodate the housing of the gas lift. Diameter of CRC metal base shall be 660 mm with 5 pronged legs duly powder coated having powder coating thickness 50 to 60 microns
	Telescopic bellow assembly :
	The bellow shall be 3 piece telescopic type and injection moulded in black Polypropylene.
	Twin wheel castors :
	The twin wheel castors shall be injection moulded in 30% glass filled nylon & extra smooth.
	Polyurethane armrest :
	The one piece armrest of diamond / rectangular / elliptical shape or any other approved shape are made of black integral skin polyurethane with 50-70 share “A” hardness and reinforced with M.S. insert The armrest shall be scratch proof & weather resistant. Armrests are fitted to the seat with powder coated armrests bracket made of 5mm thick HR Steel
	Powder coating :
	All the steel components shall have epoxy polyester powder coating with dry film thickness of 45 microns (min).
31.0	Do- as item no. 30.0 above but for medium back cushioned chairs with leatherette tapestry and steel frame and following sizes but with adjustable tilting mechanism as per following specifications in place of synchronized tilting mechanism
	The adjustable central tilting system shall be designed for 17 degree max. tilt. The tension shall be adjustable. It shall be provided with upright locking system. A full 360 degree swivel mechanism shall allow for fluid lateral movement.
	Seat size –450mm (W) X 440mm (D) approx.
	Back Size -450mm (W) X 550mm (H) approx.
	Providing & supplying LOW back Chair with leatherette tapestry and steel frame and one piece armrest injection moulded in back & fixed cushioned chair with tubular cantilever type frame made of 25.4mm

	dia, 14 BG ERW tube with powder coated but having following size:(FOR VISITORS)
	Polyurethane armrest:
	The one piece armrest of diamond / rectangular / elliptical shape or any other approved shape are made of black integral
	skin polyurethane with 50-70 share “A” hardness and reinforced with M.S. insert
	The armrest shall be scratch proof & weather resistant. Armrests are fitted to the seat with powder coated armrests bracket made of 5mm thick HR Steel.
	Powder coating :
	All the steel components shall have epoxy polyester powder coating with dry film thickness of 45 microns (min).
	Seat size –450mm (W) X 440mm (D) approx.
	Back Size -450mm (W) X 470mm (H) approx.
32.0	Providing & supplying low back fixed cushioned chair with tubular cantilever type frame made of 25.4mm dia, 14 BG ERW tube with powder coated but having following size:(For Visitors, Agents, Sub-staff & others)
	Leatherite Tapestry
	Flame retardant leatherette tapestry of Rs.350/- to Rs.400/- per metre of approved shade complete as directed.
	Polyurethane armrest :
	The one piece armrest of diamond / rectangular / elliptical shape or any other approved shape are made of black integral skin polyurethane with 50-70 share “A” hardness and reinforced with M.S. insert The armrest shall be scratch proof & weather resistant. Armrests are fitted to the seat with powder coated armrests bracket made of 5mm thick HR Steel.
	Powder coating :
	All the steel components shall have epoxy polyester powder coating with dry film thickness of 45 microns (min).
	Seat size –450mm (W) X 440mm (D) approx.
	Back Size -450mm (W) X 470mm (H) approx.
33.0	Supplying & fixing **multipurpose perforated chair 3 Seater** in waiting lobby area made of 16 gauge M.S.with chrome plated finishes perforated net with hole size 3mm for seat & Backrest. The structure made of CRC pipes 14 gauge - 50mm dia, pipe ,19mm dia. Pipe, Bar of size 100mm x 75mm, with 32mm wide Arms for individual seats, steel caps and adjustable steel screw. All the structural components and parts shall have chrome plated finishes. Sizes: Seat depth – 450 mm, seat width – 450 mm, back height – 350 mm, seat height - 441mm & overall height – 775 mm (approx.)
34.0	Supplying and fixing **Sofa three seater** as per requirement consisting of the following:
	a) Fully upholstered / cushioned sofa in configuration of seats as per drawings or as directed with seat size 560 x 560 mm each, back 450 mm & arms 150 mm wide.
	b) Made out of good quality Seasoned Hard wood frame work and teak wood arm rest under carriage and grid work of non sag spring, inclusive of 100 mm thick in seat and 75mm thick in back cushion of high density (45+/- Kg/Cum) PU foam, upholstered with flame retardant leatherette tapestry of Rs.350/- to Rs.400/- per metre of approved shade complete as directed.

SPECIAL CONDITIONS FOR PROVIDING AND SUPPLYING STEEL FRAMED AND CUSHIONED, MESH BACK / MOULDED CHAIRS

1. The rates quoted shall be inclusive of all applicable taxes / duties levied by the State/Central Government/Local Bodies including Octroi but exclusive of GST No reimbursement, whatsoever, shall be made to the contractors on account of any taxes or duties or increase in the taxes/duties by act of any legislation.

2. The rates quoted shall be inclusive of Packing Charges, Transportation, etc., supplying and delivery and installation at Site.

3. Modular Furniture / chairs shall be manufactured at ***Business and Institutional Furniture Manufacturer's Association (B.I.F.M.A.), India*** approved / enlisted manufacturers. L.I.C. reserves the right to inspect during the period the Furniture pertaining to L.I.C. are being manufactured. The contractor has to facilitate inspection during the manufacturing.

4. Before executing the supply order, the contractor may have to produce prototype of all different items of Modular Furniture to be provided in the work for approval of Chief Engineer without any extra cost. The rates quoted shall include for the same. The approved samples will form a part of the total supply.

5. During the execution of work, i.e. fabrication of furniture items at contractor's workshop wherever it is located, the Corporation's Engineer may visit and inspect the work at any point of time. The contractor shall arrange for such inspection and co-operate with the Corporation's Engineer.

6. All the furniture supplied shall be got approved by LIC and the contractor shall replace the defective furniture immediately.

SPECIFICATION FOR CHAIRS

1. The contractor shall inspect the site to ascertain the nature and scope of work.

a) The quantities given are provisional and likely to vary.

b) The guarantee period shall be **TWO YEAR** after the date of supply of chairs. Guarantee shall cover all parts except fabric. In case of defects during the guarantee period the defects shall be rectified free of cost. Guarantee shall be on stamp paper by the contractor and manufacturer jointly.

c) Welding done for stand and other parts shall be done by electric welding with approved welding rods of 12 gauges.

d) Unless otherwise mentioned, handles shall be one piece Injection moulded from black Co-polymer Polypropylene (PP handles).

e) **Foam**: Unless otherwise mentioned, chair cushion for seat shall be made up of High Resilience (HR) polyurethane foam moulded to have consistent density of around 55 kg/cum (+/-2) and hardness load 16kgf (± 2) as per IS:7888 for 25% compression.

f) **Castor**: Heavy duty, non skid, twin wheel, injection moulded in Black Nylon.

g) **Revolving & Tilting**: Unless otherwise mentioned, Gas lift with 110mm adjustment of seat height along with a 360 degree swivel mechanism with tilting mechanism. The pneumatic operated mechanisms are mild steel powder coated with an additional M.S. galvanized rod.

h) PVC profile shall be provided by stapling for seat.

i) **Hardware**: All hardware should be of ISI quality.

j) **Upholstery:** The approved colour, texture, design and manufacturer of fabric shall be used.

k) **Stand:** Unless otherwise mentioned, stand shall be of 10 to 12 gauge M.S. sheet, properly welded with powder coating of minimum 50 microns.

l) **Adhesive:** Fevicol SR – 505, synthetic rubber adhesive shall be used for fixing of various items for chairs.

m) **Fabric:** It shall be polyester fabric net for seat and polyester net of high tenacity yarn for back cost as mentioned in the schedule of Chairs. (purchase bill to be submitted)

n) 12+/-1 mm thick hot pressed plywood shall be used for seat.

o) Pipes for chairs shall be M S ERW tube of dia 2.54± 0.03 cm x 0.2± 0.016cm thick.

p) One sample of each chair shall be delivered after taking the acceptance letter.

LANDSCAPE WORK (HARDSCAPE & SOFTSCAPE WORK)

LANDSCAPING & PLANTATION WORKS

While undertaking this work, the contractor shall develop the landscape area for plantation oftrees, shrubs and lawns etc as desired below and as shown in the tender drawings.

i) Green lawn (Natural grass) shall be provided on area about 50 Sqmt.

ii) Shrubs and bushes shall be planted on landscape area of about 150 sqmt. The spacing of bushes/shrubs shall be about 0.15 to 1 meter center to centre depending on the type of shrubs. The species of some of the shrubs/bushes will be as follows: JETROPA, PANDANUS, TAGAR VERIGATED, EMONIA SPECTABILIS, HECONIYA LADY DIANA, LANTANA WHITE, LANTANA RED, BEGONIA, LANTANA BLUE, MURRAYA EXOTICA, WADELLIA, NERIUM OLEANDER DWARF, ALLMENDA DWARF, ABELLIA GREEN etc

iii) Plantation of new tress in the plot area including demarcated landscape area shall be done with below mentioned species of tress:

a) Champa (Plumeria alba) – 03

b) Son Chapha (Michelia champa) – 02

c) Asheka (Polyalthra longifulia) – 05

d) Rakta Kanchan – 03

e) Apta (Bauhiniz racemosa) – 05

f) Weeping fig – 02

g) Neen – 03

h) Bakul – 02

iv) Plantation pots with shrubs for outdoor and indoor made of Concrete pot for outdoor and Ceramic made pot for indoor

a) Concrete pot with size of minimum 36 cm diameter x 40 cm height pot – 10nos.

b) Ceramic pot with size of minimum 5 inch diameter x 5 inch height pot – 10nos.

The Contractor shall submit the detailed working drawings to LICI along with the Layout, Material and the execution plan for approval before commencing the work. The contractor shall prepare the detailed Construction drawings based on the tender drawings. The structural/other services design required for landscaping/horticulture features shall be done by the Contractor.

Major activities to be undertaken for above scope are indicated below; however contractor

shall undertake all other activities as necessary for successful completion of the project. Any other work not covered in here and required to be carried out to meet functional requirement shall be carried out as per manufacturer recommendation and Standard Industry practice. Nothing extra whatsoever shall be paid on this account.

HARDSCAPE CIVIL & FINISHES WORKS

Site Leveling, Landform and finished levels: Site Leveling for its finished levels as proposed in the Grading and drainage plan shall be done by Contractor including excavation and filling with good earth as required. All external proposed finished levels, retaining walls and slopes shall be incorporated by Contractor including necessary excavation, backfilling with excavated earth/borrow earth, compacting, finishing etc. the grading in tender drawing is indicative and can be modified as per approval from engineer in charge.

Drainage: Proper slopes shall be maintained to effectively drain the rain water and collect the storm water, in harvesting pits or retention ponds.

Driveway, Drop off and car parking: Construction of Driveway and Car Parking, these needs to be executed with finishes for efficient connections to thebuilding drop offs and parking areas. Top finish of driveway, drop off and parking shall be as per finishes specified tender elsewhere including base.

Pathway and Paved Plazas.: All pathways to be executed as per finishes specified tender elsewhere with care taken for the levels and as per paving pattern intent.

Gate House, Gate and Boundary wall: It should be done as per tender drawings. Details should be structurally viable. Gate shop drawings to be prepared as per tender drawing. Shop drawings shall be submitted to the engineer in charge for approval.

Irrigation: For watering of landscape area, water taps shall be provided at each locations.

Service Coordination: Coordination of all external services for their proposed locations by respective service consultants. The main aim is to reduce visual impact of theservices in the landscape and merge or hide them within landscape.

SOFTSCAPE- HORTICULTURE WORKS

Planting to be executed as per LIC as per direction of Engineer in charge for the plant species to be planted. Contractor shall prepare shop drawings for the variations proposed for approval to engineer in charge.

Plantation shall be done only after services have been laid and base civil work of the adjoining areas is done. Proper measures to safe-guard the planting shall be taken by Contractor.

Maintenance of the horticulture works shall be carried out by Contractor as specified. Planting intent is in different zones to achieve varying character of planting throughout the site.

TECHNICAL SPECIFICATION FOR LANDSCAPE DEVELOPMENT HORTICULTURE WORKS:

SITE PREPARATION

Preparation of mounds of various size and shape by available excavated / supplied earth in layers, breaking clods, watering of each layer, dressing etc.

Preparation of beds for hedging and shrubbery by excavating 60 cm deep and trenching the excavated base to a further depth of 30 cm, refilling the excavated earth after breaking clods and mixing with sludge or manure in the ratio of 8:1 (8 parts of stacked volume of earth after reduction by 20% : one part of stacked volume of sludge or manure after reduction by 8%), flooding with water, filling with earth if necessary, watering and finally fine dressing, levelling etc. including stacking and disposal of materials declared unserviceable and surplus earth by spreading and levelling as per direction of engineer in charge.

Digging holes in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts.

(a) Holes 1.2 m dia and 1.2 m deep

(b) Holes .90 cm dia, and .90 cm deep

Rough dressing the trenched ground including breaking clods. Uprooting weeds from the trenched area after 10 to 15 days of its flooding with water Including disposal of uprooted vegetation. Fine dressing of the ground.

Spreading of sludge, dump manure and/or good earth in required thickness as per direction of engineer-in-charge

Mixing earth and sludge or manure in the required proportion specified or directed by the Engineer-in-charge

Filling mixture of earth and sludge or manure in the desired proportion in trenches, flooding with water and levelling

GRASSES

Providing & laying grass turf with earth 50mm to 60mm thickness on existing ground prepared with proper level and ramming with required tools wooden and then rolling the surface with light roller make the surface smoothen and light watering the same, as per direction of Engineer in charge.

Supplying & Stacking of Grass at site fresh & free from weeds having proper roots in green including loading, unloading, carriage and all taxes paid etc. and asper direction of Engineer in charge.

TECHNICAL SPECIFICATIONS FOR LANDSCAPE DEVELOPMENT GENERAL

Scope:

Contractor to furnish all materials, labour and related terms necessary to complete the work indicated on drawing and specified here in.

MATERIALS:

Plant materials:

- Plant materials shall be well formed and shaped true to type, and free from disease, insects and defects such as knots, windburn, injuries, abrasion or disfigurement.
- All plant materials shall be healthy, sound, and vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, well-developed root systems.
- All plants shall be hardy under climatic conditions similar to those in the locality of the project. Plants supplied shall conform to the names listed on both the plan and the plant list. No plant material will be accepted if branches are damaged or broken. All material must be protected from the sun and weather until planted.
- All plants shall conform to the requirements specified in the plant list, except that plants larger than specified may be used if approved, but use of such plants shall not increase the contract price. If the use of the larger plant is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant. Deliver plants with legible identification labels.

Topsoil:

Good earth PH range 6.5 to 7.5 Topsoil or good earth shall be a friable loam, typical of cultivated top soil of the locality containing at least 2% of decayed organic matter (humus). It shall be taken from a well-drained arable site. It shall be free of subsoil, stones, earth clods, sticks, roots or other objectionable extraneous matter or debris. It shall contain no toxic material. No top soil shall be delivered in a muddy condition.

Fertilizer:

Dry farm yard manure shall be used. It shall be free from extraneous matter, harmful bacteria insects or chemicals.

Root System:

The root system shall be conducive to successful transplantation. Where necessary, the root-ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible, the roots should be suitably protected in some other way which should not cause any damage to roots.

Condition:

Trees and shrubs shall be substantially free from pests and diseases, and shall be materially undamaged. Torn or lacerated roots shall be pruned before dispatch. No roots shall be subjected to adverse conditions, such as prolonged exposure to drying winds or subjection to water-logging, between lifting and delivery.

Supply and substitution:

Upon submission of evidence that certain materials including plant materials are not available at time of contract, the contractor shall be permitted to substitute other material and plants, with species of equitable amount. All substitutions shall be of the nearest equivalent species and variety to the original specified and shall be subject to the approval of the department.

Packaging:

Packaging shall be adequate for the protection of the plants and such as to avoid heating or drying out.

Marking:

Each specimen of tree and shrub, or each bundle, shall be legibly labelled with its name.

TREES, ORNAMENTAL PLANTS & PALMS PLANTING:

Trees should be supplied with adequate protection as approved. After delivery, it planting is not to be carried out immediately, balled plants should be placed cheek to cheek and the ball covered with sand to prevent drying out. Bare-rooted plants can be heeled in by placing the roots in a prepared trench and covering them with earth which should be watered into avoid air pockets round the roots.

Digging of Pits:

Tree pits shall be dug a minimum of three weeks prior to backfilling. The pits shall be 1.2 m in diameter and 1.2 m deep. It shall be replaced with soil mixture as specified further herein. While digging the pits, the top soil up to a depth of 30 cm may be kept aside, if found good (depending upon site conditions) and mixed with the rest of the soil. If the soil is bad below, it shall be replaced with the soil mixture as specified further herein. The bottom of the pit shall be forked to break up the sub-soil.

Backfilling:

If the excavated soil is normal; it shall be mixed with manure. River sand shall be added to the soil if it is heavy. However, if the soil is bad, the pit shall be refilled with imported good garden soil mixed with manure 2:1 by volume(2 parts of stacked volume of earth after reduction 20%: 1 part of stacked volume of manure after reduction by 8%) The soil backfilled has to be watered through and gently pressed down a day previous to planting to make sure that it may not further settle down after planting. The rest 100mm shall be filled with manure. The soil shall be pressed down firmly by treading it down, leaving a shallow depression all around for watering.

Planting:

No tree pits shall be dug until final tree positions have been pegged out for approval. Care shall be taken that the plant sapling when planted is not buried deeper than in the nursery, or in the pot. Planting should not be carried out in water logged soil.

Plant trees at the original soil depth; the soil marks on the stem is an indication of this and it should be maintained on the finished level, allowing for setting of the soil after planting. All plastic and other imperishable containers should be removed before planting. Any broken or damaged roots should be cut back to sound growth.

The bottom of the planting pit should be covered with 50 mm to 75mm of soil. Bare roots should be spread evenly in the planting pit; and small mound in the center of the pits on which the roots are placed will aid an even spread. Soil should be placed around the roots, gently shaking the tree to allow the soil particles to sift into the root system to ensure close contact with all roots and to prevent air pockets. Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows:

Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied on walls of pit, and initially pit shall be filled to 200 mm depth with earth mixed Chlorpyrifos emulsifiable concentrate 20% with 1% concentration. The balance earth shall be filled in a mixture of 1:2 (part manure to 2 part earth). Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied every 15 days.

Staking:

Newly planted trees must be held firmly although not rigidly by staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.

Methods:

The main methods of staking shall be:

(A) A single vertical stake, 900mm longer than the clear stem of the tree, driven 600mm to 900mm into the soil.

(B) Two stakes as above driven firmly on either side of the tree with a cross-bar to which the stem is attached. Suitable for bare-rooted or balled material.

(C) A single stake driven in at an angle at 450 and leaning towards the prevailing wind, the stem just below the lowest branch being attached to the stake. Suitable for small bare-rooted or balled material.

(D) For plant material 3m to 4.50 m high with a single stem a three-wire adjustable guy system may be used in exposed situations. The end of stake should be pointed and the lower l m to 1.20 m should be coated with a non-injurious wood preservative allowing at least 150 mm above ground level.

Tying:

Each tree should be firmly secured to the stake so as to prevent excessive movement. Abrasion must be avoided by using a buffer, rubber or hessian, between the tree and stake. The tree should be secured at a point just below its lowest branch, and also just above ground level; normally two ties should be used for tree. These be adjusted or replaced to allow for growth.

Watering:

The contractor should allow for the adequate watering in of all newly planted trees and shrubs immediately after planting and he shall during the following growing seasons, keep the plant material well-watered.

Fertilizing:

Fertilizing shall be carried out by application in rotation of the following fertilizers, every 15 days from the beginning of the monsoon till the end of winter:

Sludge of organic well-rotted dry farmyard manure or vermi-compost or approved organic manure as per directions of landscape architect:

SHRUBS, GROUND COVERS, CREEPERS PLANTING IN PLANTERS AND BEDS

All areas to be planted with shrubs shall be excavated, trenched to a depth of 600 mm, refilling it with finely mixed good black garden soil and excavated earth (after breaking the clods and mixing with sludge in the ratio 8:1 (8 parts of stacked volume of earth after reduction by 20%: 1 part of stacked volume of sludge after reduction by 8%). Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid damaging the roots, as follows:

Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied on walls of pit. The balance earth shall be filled in a mixture of 1:2 (part manure to 2 part earth). Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied every 15 days.

Tall shrubs may need staking, which shall be provided if approved by the Landscape Architect depending upon the conditions of individual plant specimen.

For planting shrubs and ground cover shrubs in planters, good earth shall be mixed with sludge in the proportion as above and filled in planters.

Positions of shrubs to be planted should be marked out in accordance with the planting plan. When shrubs are set out, precautions should be taken to prevent roots drying.

Planting holes 45 cm dia and 45 cm deep should be excavated for longer shrubs.

Polythene and other non-perishable containers should be removed and any badly damaged roots carefully pruned. The shrubs should then be set in holes so that the soil level, after settlement, will be at the original soil mark on the stem of the shrub. The hole should be backfilled to half pots depth and firmed by treading. The remainder of the soil can then be returned and again firmed by treading.

Landscape Management

The Contractor shall maintain all planted areas within the landscape contract boundaries for 6 months after the area is handed over to LICI.

Maintenance shall include replacement of dead plants, watering, and weeding, cultivating, control of Insects, fungus and other diseases by mean off spraying with an approved insecticide or fungicide, pruning, and other horticulture operations necessary for the proper growth of the plants and for keeping the landscape contract area neat in appearance.

Safety, Health and Environment:

Pruning and repairs:

Upon completion of planting work under the contract all trees should be pruned and all injuries repaired where necessary. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots

Tree guards:

Where tree guards are necessary, care should be taken to ensure that they are providedas per site conditions.

DESIGN BASIS REPORT FOR STRUCTURAL

SCOPE:

This criterion covers the structural design basis for Proposed "Construction of Branch Office for Life Insurance Corporation of India at above-mentioned Plot.

This structural design criteria are aimed at consolidating the basis of the work that the Contractor's structural designer is going to carry out in delivering the structural framework of the buildings which will be compatible with the Architectural theme, satisfy the functional needs, adhering to the latest available buildings norms and Indian Standards Codal provisions and which will be safe, stable, strong and yet optimally economical.

This design basis report covers the minimum design requirement to establish safe, durable & functional design basis that will form the overall design philosophy to be adopted in the structural design of this project. Not mentioning of any relevant criteria/design requirement in this design basis report will not absolve the Turnkey contractor of the liability to follow the same. The contractor to ensure adherence to the latest available codes be followed at the time of design.

DESCRIPTION OF THE BUILDING

Structural system of building is proposed as combination of columns with conventional beam - slab system. Framing system and column placement shall be done in such a way that functionality of building is not hampered without any compromise of structural arrangements. Structural system consists of RCC footing, column, beam, slab & RCC in Lift core area. Ductility detailing along with recommendations of IS: 1893 (latest edition) & IS: 13920 (latest edition).

The building shall be as per the Architectural requirement for civil and structural works, standard specifications, National Building Code (NBC-2016), CPWD specifications, relevant I.S. codes and local regulations

The Contractor shall assess the adequacy, buildability, constructability and practicality etc of the proposed structural system. The Contractor shall be solely and fully responsible for its design, co-ordination and compliances in accordance with the Codes and Specification and no extra cost and expense or time shall be entertained on this account.

The Structural design of the proposed project has to be based on Indian Standard Codes and should be analyzed for Dead, Live, Wind and Seismic load conditions taking into relevant load combinations recommended by relevant codes of BIS and NBC-2016/latest edition

DESIGN CRITERIA:

The Structural design of the proposed project has to be based on Indian Standard Codes and should be analyzed for Dead, Live, Wind and Seismic load conditions taking into relevant load combinations recommended by relevant codes of BIS and NBC-2016/latest edition

- ✓ The structure proposed is RCC Beam/Slab construction with Columns suitably placed.
- ✓ The vertical loads including the Dead load and super imposed loads are transferred to the soil through columns and foundations. The contractor has to carry out the design of foundation as per soil report enclosed.
- ✓ The type of foundation proposed is shallow foundation considering the building Type, soil strata available as per recommendation of available soil investigation report. However the Tenderer may satisfy himself/ themselves by conducting pre-soil tests if he/ they so requires.
- ✓ The core wall around lifts are of concrete
- ✓ The lateral loads due to wind and seismic forces are dissipated to soil through the proposed RC columns.

DESIGN STANDARDS:

In the analysis, design and detailing of the building, the latest editions of following IndianStandards will be referred:

Sl. No	Code	Description
1	IS: 875(Part 1	Code of Practice for Design Loads (Other than Earthquake) for Buildings and structures – Dead Loads
2	IS: 875(Part 2)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures – Imposed Loads
3	IS: 875(Part 3)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures – Wind Loads

4	IS: 875(Part 5)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures – Special Loadsand Combinations
5	IS: 1893 (Part-1	Criteria for Earthquake Resistant Design of structures
6	IS: 4326	Earthquake Resistance Design and Construction ofBuilding -Code of Practice
7	IS: 13920	Ductile Detailing of Reinforced Concrete StructuresSubjected to Seismic forces
8	IS: 456	Code of Practice for Plain and Reinforced Concrete
9	SP-34	Hand book on Concrete Reinforcement and Detailing
10	IS: 1786	High Strength Deformed Steel Bars and Wires forConcrete reinforcement -Specification
11	SP-16	Design aids for Reinforced Concrete to IS 456-1976
12	IS:800	Code of practice for general construction in steel
13	IS : 1904	Indian Standard Code of Practice for design & constructionfoundations in Soil: General Requirements
14	IS : 3370	Code of practice for concrete structure for the storage ofliquids
15	IS : 2911	Code of Practice for design & Construction of pilefoundation
16	IS: 16700	Criteria for Structural safety of Tall concrete buildings

STRUCTURAL DESIGN

Design Methodology

All structural concrete elements shall be designed according to the Limit state Method as specified in IS: 456-2000. Appropriate loads and its combinations, as per relevant clauses in IS codes, for the most unfavorable effects are chosen for design. Detailing of concrete structures to be done as per IS 13920 (Latest Edition). Wind and seismic forces shall not be considered to act simultaneously.

GENERAL REQUIREMENTS

The bidder has to prepare the detailed design report covering the Design criteria for reinforced concrete element such as pile, column, beam, and slab, etc. and structural steel if provided with detailing requirement. This report shall also be elaborated by explaining the design methods (Limits state and working stress), design stress in concrete steel and design principle etc.

Structural elements of the building shall be designed for fulfilling the requirements of strength and serviceability based on conservative provisions of IS 456, IS 1893, IS 875 and other codes and standards applicable for the design of the building. Structures and structural elements shallbe designed based on Limit state concept for strength and serviceability. Working stress method with the additional provisions mentioned in the liquid retaining structures codes and standards shall be used wherever applicable. All relevant limit states shall be considered in design to ensure an adequate safety and serviceability. In addition to the strength and serviceability requirements, the survivability of the structure should also be investigated to insure that the structure foundation will endure extreme environmental events without catastrophic failure. The structure shall be designed on the basis of the most critical limit state and shall be checked for other limit states.

COMPUTATION METHODS – ANALYSIS

The design of the building shall be carried out after detailed analysis of the structural systems has been completed for various loading and their combinations.

The buildings are planned as a combination of R.C.C. columns, beams and slabs forming framed structure. After preliminary sizing of various structural members, a computer model of the structural frame of Building will be generated for carrying out computer analysis for the effects of vertical and lateral loads that are likely to be imposed on the structure.

The building structure is to be analyzed using latest version of ETABS. Above mentioned Analysis/Design software has been thoroughly tested, validated and recognized internationallyby several organizations and is well suited for the analysis

of building system. Geometrical dimensions, member properties and member-node connectivity, including eccentricities will be modeled in the analysis problem. Variation in material grades, if present, will also be considered. The permissible values of the load factors and stresses will be utilized within the purview of the Indian standards.

The computer analysis will evaluate individual internal forces, reactions at foundation level and deflection pattern of the entire structure and in the individual members. This data will then be used to verify adequacy of the member sizes adopted and after further iteration to arrive at the most optimized design of the structural members. Some re-runs of the analysis programs might be required for arriving at the optimum 3-Dimensional structural frame that satisfy the strength and stability criteria in all respects.

Beams and columns in the structure will be modeled as line members. All slabs shall be modeled as “membrane” element. Rigid Diaphragm is given to reduce degrees of freedom and make problem size smaller. The Structure is analyzed for all possible load combinations i.e. gravity loads, wind earthquake, earth pressure, temperature, etc. acting on it throughout its life span.

DESIGN LOADS:

The building to be analyzed for the following basic load cases:-

1. Dead Load
2. Live Load
3. Seismic Load
4. Wind Load

The Brief Description of each load case is as follows:

Dead Load:

Dead load shall include the weight of all structural components and architectural appurtenances, Electrical, Air-conditioning facilites incorporated in the structures plus hung loads and any other permanent, externally applied load. This should also include equipment dead load. The content of Overhead water tanks shall be measured at full capacity for this purpose.

The following unit weight of material shall be considered for computation of loads. Loads givenin IS: 875 (part-I) shall be made use of for material not listed below.

Unit Weight of Materials:

Sr.No.	Materials	Unit Weight (kN/m^3)
1	Reinforced cement concrete	25
2.	Structural steel	78.5
3.	Water	10
4.	Soil	18
5.	Cement plaster	21
6.	Floor Finish	24

Live Loads

Live loads in different areas shall include dust loads, minor equipment loads, cable trays, small pipe racks/hangers, operation/maintenance loads etc. The loads considered shall not be less than those specified in IS: 875 (Part II).

The loads listed hereunder are minimum loads for the areas involved. Special use areas shall be investigated and loading revised upward as necessary.

S.No.	Description Loads Used	UDL(kN/m^2)
1.	Office	4.0
2.	Toilet & Bathroom	2.0
3.	Staircase, Lobby and Balconies	4.0
4.	Corridors, passages & staircase	4.0
5.	Terrace	1.5
6.	Store Room	5.0
7.	Driveways & Ramps	2.5
8.	Electric Room	5.0
9.	Assembly Place	5.0
10.	AHU room	5.0

Wind Load

The wind loading shall conform to IS: 875 (Part-3): (Latest edition).

Wind parameters shall be considered for calculating design wind speed and pressure shall beas follows:

Basic wind speed = 44m/s as per IS: 875 (Part-3) (Latest

edition)

K1 = As per IS: 875 (Part-3)
K2 = As per IS: 875 (Part-3)
K3 = As per IS: 875 (Part-3)
K4 = As per IS: 875 (Part-3)

The wind pressure at a given height [P(z)] shall be computed as per the stipulations of IS: 875 (Part 3)

For computing the design wind pressure at a given height the basic wind speed (Vb) shall be taken as Vb = 39 m/sec at 10.0 meters height above mean ground level. For computing design wind speed (Vz) at a height z, the risk co-efficient K1 for 50 years as design life period of structure & coefficient K2, Terrain category 2 as pertable 2 of IS: 875 (Part-3) shall be considered. Coefficient K3 shall be determined by taking into account nearby site condition and other features of the station & topography. Importance factor for Cyclone "K4" shall be taken as per IS: 875 (Part-3). The wind direction for design purposes shall be the one which would induce the worst load conditions. However, coefficient K3 shall not be less than one under any circumstances. The wind pressure at a given height shall be computed theoretically in accordance to the IS Codal position given as under: $Pz = 0.6\ Vz^2$ N/m2

Earthquake loads:

Islampur area falls under Seismic Zone IV as per IS: 1893 (Part 1). The building shall be designed for Seismic zone – IV and has the following factors are to be considered for designs:

S.no	Description
1.	Seismic Zone = IV / as per Local statutory requirement whichever is stringent
2.	Zone factor (Z) = 0.24
3.	Importance factor (I) =1.5

4.	Response reduction factor(R) = shall be as per IS: 1893(Part-1) taking into account the structural system adopted.
5.	Soil Type = I (Rocky/Hard Soil) (Please check with the latest soil investigation)
6.	Damping Factor = 5%
7.	Modal Combination = CQC (Complete Quadratic Combination)
8.	Directional combination = SRSS (Square Root of the Sum of Square)
9.	T = 0.09*h / √d or 0.075h.075/√Aw The calculated time period shall be taken in ETAB Analysis and not Autogenerated.
10.	Design Seismic Base Shear Vb = Ah * W

As per clause 5.4.2.2 of NBC-2016 and clause no. 7.2.2 of IS: 1893(Part 1) buildings located in Zone 4 shall be designed for minimum 1.6% of horizontal lateral force. Hence Ah ≥ 0.016 isconsidered in earthquake design.

In calculation earthquake lateral force, Live load reduction as per table 10 ofIS: 1893 (Part 1) shall be considered

The building shall be analyzed by Equivalent static method (ESM) and Response spectrum method (RSM). The base shears due to response spectrum (RSM) in each direction are compared with the respective direction base shear due to equivalent static method (ESM). If the base shear due to ESM if found to be more than the base shear due to RSM then the equivalent scale factor is applied in RSM and the analysis to be redone.

Hydrostatic Load and Buoyancy

Hydrostatic load is the load due to water pressure. The design of structures shall include hydrostatic loads when applicable. The buoyancy load is equal to the weight of the volume of displaced water. Water table upto finished grade level shall be considered.

Equipment Loads

Loadings (both static and dynamic) of major equipments, including AHU units, lift machine, pumps etc obtained from the manufacturer's certified drawings of the specified equipment to be furnished. Where design of structures supporting minor equipment other than those included above has to proceed, the loadings will be

estimated from similar jobs or catalog data.

Weight of equipments, ducts, tanks, pipes, conduits etc. supported by structure shall include maximum possible loading conditions i.e. flooded material contents and associated impacts, testloadings, anchorage and constraint effects.

All structural components shall be designed to accommodate anticipated concentrated loads whichwill or may be applied during the life of the building.

Earth Pressure Load

Earth pressure for all underground structures shall be calculated using coefficients of earth pressure at rest.

In addition to earth pressure and ground water pressure, etc., surcharge load shall also be considered for the design of all underground structures including channels, sumps, cable & pipe trenches, etc., to take into account the vehicular traffic in the vicinity of the structure.

Construction Loads

The integrity of the structures shall be maintained without use of temporary framing struts or ties and bracing so far as possible. However, construction or crane access considerations may dictate the use of temporary structural systems. Special studies shall be made and documented by bidder to ensure stability and integrity of the structures during any periods involving use of temporary bracing systems.

Other Loads

Stresses imparted to structures due to differential settlements, variation of water table, erection and maintenance load, creep and shrinkage shall also be considered in design.

Constructional Loadings

The method of construction and the type of formwork to be used shall be decided by the bidder in advance and should be enclosed in the bids submitted. Construction loadings that may occurduring execution of work shall be considered in the design of the structure. Factors causing temporary loading may include the following depending upon the method of construction.

a) Barrowing of concrete

b) Scaffolding and formwork

c) Loads produced by anchoring devices of climbing scaffolds.

d) Hoist fixings

e) Storage of materials on scaffolding

f) Temporary access

g) Tower crane fixings

i) Works temporarily omitted for access purposes.

j) Effect of wind on form work before concreting.

All loads likely to act on structure but not specified herein shall also be considered for the design of structure.

LOAD COMBINATIONS

The building shall be analyzed for all possible load combinations which the structure may experience during its design life. All the members shall be designed to sustain safely the effect of combination of various loads. Load combinations should include both factored and unfactored load combination of normal and extreme environmental loads. Load combination shall be based on conservative provisions of IS 456, IS 1893 (Latest edition), IS 875 and other codes and standards applicable for the design of structure.

The various loads should be combined in accordance with the stipulations in the relevant design codes. Following load combinations of the member forces to be considered for arriving at the design forces:

Primary Load Cases:

1. Dead Load (D. L.)
2. Live Load (L. L.)
3. Eqx (X- dir. earthquake)
4. Eqy (Y- dir. earthquake)
5. Wx (X- dir. Wind)
6. Wy (Y- dir. Wind)

Whereas X & Y are orthogonal plan direction and Z is vertical direction.

Basic Load Combinations:

A. SERVICE LOAD COMBINATIONS:

1.	(D. L. + L. L.)
2.	(D. L. +0.8 L. L.+ 0.8Eqx)
3.	(D. L. + 0.8 L. L.+ 0.8Eqy)
4.	(D. L. + 0.8 L. L.- 0.8Eqx)
5.	(D. L. + 0.8 L. L.- 0.8Eqy)
6.	(D. L. + Eqx)
7.	(D. L. + Eqy)
8.	(D. L. - Eqx)
9.	(D. L. - Eqy)
10.	(D. L. +0.8 L. L.+ 0.8Wx)
11.	(D. L. + 0.8 L. L.+ 0.8Wy)
12.	(D. L. + 0.8 L. L.- 0.8Wx)
13.	(D. L. + 0.8 L. L.- 0.8Wy)
14.	(D. L. + Wx)
15.	(D. L. + Wy)
16.	(D. L. - Wx)
17.	(D. L. - Wy)

B. FOR FOUNDATION DESIGN:

1.	(D. L. + L. L.)
2.	(D. L. + L. L.+ Eqx)
3.	(D. L. + L. L.+ Eqy)
4.	(D. L. + L. L.- Eqx)
5.	(D. L. + L. L.- Eqy)
6.	(D. L. + Eqx)
7.	(D. L. + Eqy)

8.	(D. L. - Eqx)
9.	(D. L. - Eqy)
10.	(D. L. + L. L.+ Wx)
11.	(D. L. + L. L.+ Wy)
12.	(D. L. + L. L.- Wx)
13.	(D. L. + L. L.- Wy)
14.	(D. L. + Wx)
15.	(D. L. + Wy)
16.	(D. L. - Wx)
17.	(D. L. - Wy)

C. FOR SUPER STRUCTURE DESIGN

1.	1.5(D. L. + L. L.)
2.	1.2(D. L. + L. L.+ Eqx)
3.	1.2(D. L. + L. L.+ Eqy)
4.	1.2(D. L. + L. L.- Eqx)
5.	1.2(D. L. + L. L.- Eqy)
6.	1.5(D. L. + Eqx)
7.	1.5(D. L. + Eqy)
8.	1.5(D. L. - Eqx)
9.	1.5(D. L. - Eqy)
10.	(0.9D. L. + 1.5Eqx)
11.	(0.9D. L. + 1.5Eqy)
12.	(0.9D. L. - 1.5Eqx)
13.	(0.9D. L. - 1.5Eqy)
14.	1.2(D. L. + L. L.+ Wx)
15.	1.2(D. L. + L. L.+ Wy)
16.	1.2(D. L. + L. L.- Wx)

17.	1.2(D. L. + L. L.- Wy)
18.	1.5(D. L. + Wx)
19.	1.5(D. L. + Wy)
20.	1.5(D. L. – Wx)
21.	1.5(D. L. – Wy)
22.	(0.9D. L. + 1.5Wx)
23.	(0.9D. L. + 1.5Wy)
24.	(0.9D. L. - 1.5Wx)
25.	(0.9D. L. – 1.5Wy)

In addition to above, load combinations due to dynamic analysis need to be included.

For non orthogonal columns, additional 30% earthquake load of other direction shall be taken.

i.e. ± Eqx ± 0.3 Eqy

± 0.3 Eqx ± Eqy

Accidental eccentricity of 5% is to be considered as per clause 7.8 of IS: 1893 (Part 1)

Moreover, cracked RC section properties have to be modified separately for factored and un-factored loads as per the clause 7.2 (Table-6) of IS: 16700 (latest edition)

S.no.	Structural Element	Unfactored Load	Factored Load
i.	Slabs	0.35Ig	0.25Ig
ii.	Beams	0.7Ig	0.35Ig
iii.	Columns	0.9 Ig	0.7 Ig
iv.	Walls	0.9 Ig	0.7 Ig

Where, Ig is the gross Moment of Inertia of the section

For Structural Analysis, the moment of inertia shall be taken as per clause no.6.4.3.1 of IS 1986 latest

SITE INVESTIGATION

Brief tasks to be carried out:

a) Collect sub-soil data, undertake detailed survey, wind data, earthquake data & sub-

soil investigations if required by the contractor;

b) Prepare Key map showing the location of the buildings investigated and the important structures, in the vicinity. The reference to the position of the benchmark, location of the trial pits or bore-holes giving identification number for each bore connected to the datum and location of all nullahs, buildings.

c) Prepare detailed designs and drawings for proposed building, Compound wall and any other details required in this project.

d) Whenever required or necessitated by the site conditions, modify designs as well assuggest solutions to the problems come across during actual execution.

e) Obtain approval of designs of each component of buildings from theL IC before execution.

Surveys & Investigations:

The EPC Contractor shall conduct Topographical survey to ascertain the contour levels, location of proposed boundaries, and any other site feature present at site for which he shall getconducted fresh topographical survey done at his own cost. The EPC Contractor shall be held fully accountable for accuracy of levels/design, positions of buildings/facilities etc. on account of details obtained from Topographical survey.

Foundation design

Thefoundation of the proposed building is to be rested on rocky strata available at 3m from existing natural ground level as per soil investigation report. Safe bearing capacity of 65 T/m^2 is recommended for rock strata at 3m from EGL. However it is recommended / restricted to design the building foundation for 25 T/m^2 at 3m from EGL.

The type of foundation proposed is shallow foundation considering the proposed building Type, soil strata available, & foundation adopted for similar structures constructed near vicinity.

If both shallow and deep foundation is adopted in the building foundation, the contractor should check the compatibility of settlement between two type and restrict the total permissible settlement nearly equal in order to avoid secondary stresses on the structure.

It should be noted that nothing extra whatsoever on account of variation between soil data/foundation type provided by LIC & that found by detailed geotechnical investigation to becarried out by bidder shall be payable.

The design of foundation shall be carried out by Limit State or working stress method as

per theprovisions of IS - 456 and on the basis of the soil investigation Report done by the Bidder.

Foundations for Buildings and structures shall be designed to resist forces and moments, caused by vertical loads and by wind or seismic loads, based on static and dynamic analysis done for those structures. The foundation sections shall be sized and reinforced adequately formoments and shear stresses.

Open Foundations:

Open foundations are adopted for footing, the following shall be adhered to:

a) All open foundations shall be designed as per soil investigation report and recommended safe bearing capacity mentioned elsewhere in the tender.

b) The net allowable bearing pressure values to be adopted for design upon LIC approval shall correspond to total permissible settlement as mentioned under para " permissible settlement of foundations" / the permissible settlement from functional requirement/permissible settlement from soil investigation report, whichever is more stringent.

c) Permissible settlement of foundations: The total permissible settlement and differential settlement shall be governed by IS: 1904 and IS: 13063 and from functional requirements, whichever is more stringent. However, total settlement shall be restricted to the following:

i.	All foundations including, isolated/strip continuous/ foundation	- 40 mm
ii.	Other footings of width up to 6m	- 40 mm
iii.	Other footings of width greater than 6.0 m (raft)	- 75 mm
iv.	Footings on rock	- 12 mm
v.	Differential settlement	— 6mm

In case the total permissible settlement is to be restricted to less or greater than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced / reviewed accordingly in consultation with LIC.

Other Requirements

i) In case of high ground water table, for excavations comprehensive dewatering arrangement shall be required. Scheme for dewatering and design with all computations and back-up data ofdewatering and sheet pilling shall be submitted for

LIC information.

ii) The founding level for trenches/channels shall be decided as per functional requirement. Thebottom of excavation shall be properly compacted prior to casting of bottom slab of trenches/channels.

iii) Excavation for open foundations shall be covered with PCC immediately after reaching the founding level. In case of any local loosening of soil at founding level during excavation, the same shall be removed and compensated by PCC of Grade M15. The foundation pits Shall be maintained dry during the complete construction period by means of suitable dewateringsystems.

iv) Backfilling, around foundations and bottom of pipes, thrust blocks, etc. shall be carried out with approved material in layers not exceeding 30 cm thickness and each layer shall be compacted to 90% standard proctor density for cohesive soil and to 75% of relative density for non-cohesive soils.

v) Excess/surplus excavated material shall be disposed off by the Bidder as per the instructionsof the LIC.

STAIRCASE

Staircases built integrally with the structural system of the building and not confined by structural walls, shall be included in the three-dimensional structural model, and its elements designed as per forces induced in them under various load combinations.

COMPOUND WALL

It is required to construct Compound wall all around the periphery of the plot. The details of the compound wall shall be as follows,

The compound wall made of RCC footing (eccentric), columns, two level tie beams, RCC band, , Infill common burnt clay brick masonry, weep holes, fencing at wall top level with steel angles, G.I barbed wire fencing.

The existing road level opposite to the plot may be considered as zero level. The minimum height of the compound wall shall be 1.25m from finished ground level inside the plot.

The spacing of column should not exceed 2.5m at any location. Expansion joint to be provided at every 15m interval. At this location & wall corners, twin columns with 25mm expansion gap to be made.

Infill wall - Full brick work masonry up to 750mm minimum and remaining with half brick wall.

Compound wall footing, column and beam are to be designed properly accordingly.

MATERIALS AND CONSTRUCTION

The cement used for RCC work in the sub structure & super structure will be OPC. All RCC works will be mechanically vibrated to produce dense, sound and durable concrete as per specifications. The water used in all stages of construction shall strictly conform to IS: 456. If any other cement is used it will be taken care of in mix design of concrete.

Cement:

Ordinary Portland cement of grade 43 or higher confirming to IS 8112 and IS 12269 are specified for concrete grades ranging from M: 15 to M: 70. Minimum cement content and water cement ratio of various structural elements shall be as per Table 5 of IS-456.

Aggregates:

The sizes of coarse aggregates shall conform to IS 383. Nominal maximum size of coarse aggregates would be 20 mm, suitably graded as per the requirement of mix design. The fine aggregates shall conform to the specifications of IS 383.

Reinforcement

a) All reinforcement bars will be HYSD bars of Fe500D grade as per IS 1786.
b) Structural Steel shall conform to IS: 2062 as applicable and Structural Steel Tubes shall be Grade Yst 240 as per IS: 1161-1998.

c) The Young's Modulus of Elasticity shall be considered as follows:

For Structural Steel, Es = 200000 Mpa

For Concrete, Ec = 5000 √fck Mpa (IS 456:2000)

Where fck = 28-day characteristic compressive strength of concrete in Mpa.

High Tensile Steel (Fy)=1860N/mm2

Lean Concrete

Lean Concrete of minimum 100mm thickness of lean concrete M15 grade using 20mm down size graded crushed stone aggregate shall be provided under all RCC foundations. Mud mat shall be extended 100mm on all sides beyond the edges of footings. Concrete Mix of M10 to be used for leveling concrete or as plum concrete only.

GRADE OF CONCRETE

The following classification will applies in the design of structural elements:

Exposure	Classification	Minimum Grade of Concrete
Members in contact with the ground	Moderate	M25
Members in interior environments	Mild	M20
Members in above ground exterior environment	Moderate	M25

Based on the above criteria, Minimum grade of Concrete for individual elements are

Sl.No	Class	Grade of conc.
1.	i) Plain cement concrete used for screeds and backfill	M15
	ii) Lean concrete	M15
2.	Paving	M20
3.	i) Reinforced concrete for sub structure, foundation & grade slab of the building	M25
	ii) Reinforced concrete for Super structure, of the building	M25
	iii) Reinforced concrete for water retaining structure	M25
4.	Reinforced concrete for foundation of equipments	M25

Note: Reinforced cement concrete works shall be of Ready mixed concrete (RMC) as per IS: 456, IS 4926, IS 10262. If the Ready mixed concrete is not available due to some reasons, then Chief Engineer may allow to use reinforced cement concrete as per Mix design weigh batched at site. No price adjustment shall be done due to above arrangement.

Minimum Thickness of RCC Structural Elements

The following minimum thickness shall be followed:

S.No.	Member	Minimum thickness
1.	Pile caps	900 mm
2.	Suspended floor / slab / walkways / canopy slabs, etc	125 mm
3.	Ground floor slab (non-suspended)	125 mm
4.	Water Retaining slabs / walls	200 mm
5.	Cable / pipe trenches / underground pits / Launder walls and base slab	125 mm
6.	All footings (including raft foundations)	300 mm
7.	Parapets	125 mm
8.	Sunshades at edge	75 mm
9.	Pre-cast louvers / fins	50 mm
10.	Pre-cast trench cover slabs / floor slabs / louvers	75 mm
11.	Paving	200 mm

From fire resistance point of view minimum thickness of reinforced concrete members shall beas per fig 1 or table 16a of IS 456 or specified above, whichever is higher.

COVER TO REINFORCEMENT:

Clear cover to the main reinforcement shall be as follows.

S.NO	Member	Clear Cover
1.	Slab (roof & floor), Waist slab, ofstaircases whichever is more	25 mm
2.	Beams (Roof & floor) & Lintels Secondary Beams	30 mm

3.	Columns/Shear Walls/Pedestals(Main R/F)	40 mm
4.	Foundation slab, base slab & footings in contact with soil	50mm
5.	Pile	50 mm

Stability of Structures

Design shall be checked against buoyancy due to the ground water during construction and maintenance stages for structures like underground tanks, pits trenches, basements, etc. Minimum factor of safety of 1.25 against buoyancy shall be ensured considering empty condition inside and ignoring the superimposed loading. For purpose of calculating downward load due to any overburden, only the mass located vertically above the projected area shall betaken into consideration.

The building sub-structure shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factor of safety for these cases shall be taken as mentioned in IS: 456 and other relevant IS codes.
Stability of the structure shall also be investigated for loading conditions during construction, repair or other temporary measures

In case where dead load provides the restoring force, only 0.90 times characteristic dead loadshall be considered. Imposed loads shall not be considered as restoring force.

DEFLECTION CRITERIA

Type	Type of Deformation	Limit
VERTICAL	Deflection of all members due to all loads (including temp, creep, shrinkage)	< span /250
VERTICAL	Deflection of all members due to all loads (including temp, creep, shrinkage) of RCC members after erection of partition, application of finishes.	< span /350 or 20mm
HORIZONTAL	**Seismic Load (Inter Story drift)**	**< 0.004 x story height**
HORIZONTAL	**Wind Load (for overall structure)**	**< H/500**

Where, H - total height of the structure.

Care has to be taken to ensure that for all the structural elements, the deflection values arewell within the above limits

CRACKING LIMIT

Limiting values of crack width as per clause 35.3 of IS:456 to be followed in the

design. In general for slabs and beams, the crack width is limited to 0.3mm. For basement retaining wall and water retaining structures, foundations and other underground structures in contact with sub-stratum/backfill crack width is limited to 0.2mm.

BASIC DESIGN CONCEPTS TO BE ADOPTED FOR STRUCTUAL STEEL WORKS

Structural steel design will be carried out as per the National Building Code with specific consultation to IS: 800 (latest) unless noted otherwise. All work shall be done as per relevant latestIS Codes, unless otherwise specified.

INSPECTION AND TESTING

All materials and workmanship shall be as per the technical specification documents and in accordance with the instructions of the Engineer. The Contractor shall provide the necessary assistance, instruments, machines, labour and materials as requested for examining, measuring and testing. All tests that will be necessary in connection with the execution of the work as decided by Engineer shall be carried out at the field-testing laboratory or in the approved laboratories at the bidders cost.

The Contractor shall provide at all times during the progress of the work and the maintenance period proper means of access with ladders, gangways, etc., and the necessary attendants to move and adopt as directed for inspection or measurement of the works by the Engineer-in- charge.

CODES & STANDARDS

1. The engineering & execution of all Civil, Structural & Architectural works shall be based on the latest edition or revision *of* the applicable portion of the following Codes and Specifications.

a) I.S. Codes of practice
b) National building standard
c) Environmental protection agency
d) Indian Road Congress Standards

e) Indian Railway Standards
f) Statutory regulations *of* Tariff Advisory Committee
h) Rules & Regulations of local authorities.

2. Better part of any standard /codes shall be discussed with LIC for incorporation / approval. In absence of any Indian Codes & Specifications for any portion of work, appropriate American / British Standards may be followed subject to prior approval of the LIC.

3. Bidder shall furnish an authorized English translation of documents, references & standards.

DESIGN BASIS REPORT – SANITARY, PLUMBING

Reliable and Satisfactory supply of good potable water and an appropriate disposal arrangement of generated effluent are of prime importance in building. Keeping this crucial aspect in view, the provisions of various requirements are made and discussed in the report.

The various assumptions made for carrying out designs are based on following guide lines /basis.

- The requirement of water for various reasons would be worked out as per guide lines given in IS 1172-1983 Third Revision.

- The requirement of various diameters of pipes and appurtenances for main supply lines and distribution network as well as storage tanks will be provided as per guide lines given in Central Public Health & Environmental Engineering Organization (CPHEEO) manual for water supply and treatment.

- The guide lines and the reference tables given in hand book for public health Engineer published by Indian Water Works Association and Hand Book on Water Supply and Drainage published by Bureau of Indian Standards are referred to where necessary. For fixing the various diameters for required discharges the Hunter's curve is also referred to.

- Good Quality Potable Water Supply would be available.

- The building water would be supplied from the main municipal supply line to UG Tank located at the position as shown in the arena. Water will pumped from UG tank to Overhead tank through Pumps (1W +1S) for both Flushing & Domestic/ drinking System. The water would be distributed by gravity continuously through a network of pipe lines of various diameters to different floors through overhead tanks from here the water will be sent to all the toilet, pantry, water cooler in thebuilding. Respectively. Maximum Efficiency Pump will be selected as per ECBCnorms.

- Water supply to pantries shall be provided at one location near the pantry sink.

- It is envisaged that water purifying machines/ Mineral RO Machines will be installed. (However supply of machines is not in the scope of EPC)

- Provision of water source through Borewell & pumping arrangement as a standby and the pipeline connection to the underground water storage tank & gardening purpose. P.V.C casing pipe required diameter, delivery pipe of required diameter.

SALIENT FEATURES OF THE PROJECT

- Buildings: 1 no of Office building.
- Total No. of Floors—As per architectural DBR and drawings enclosed
- Total No. of Basements— N.A.
- Type of the Buildings –Ground + 3 floor,

DETAILED SCOPE OF WORK

This report proposed to cover the technical details pertaining to the following heads in Plumbing & Sanitary Engineering services:

a. Water Supply System (External)

- Connection of external Municipal/statutory water supply line / proposed sources up to water tank
- Water Storage Tank
- Distribution system of external & internal water supply. Distribution of water of adequate pressure to each and every taps/faucets/outlets.

b. Sewerage Line System

- Collection and navigating the same through pipe line/ drainage system
- Connection to external Sewerage system

c. Rain Water Drainage System and Rain Water Harvesting

- Rain water collection
- Disposal of surplus water to external water drainage system

d. Internal Plumbing Works

- Plumbing
- Internal Water Supply System
- Soil and waste water pipes
- Rain water pipes
- Sanitary & Plumbing Fittings
- Disposal to Manhole

SCHEDULE OFINSTALLATIONS:

Water Supply Pipes	CPVC Pipes
Soil/Waste/RW Pipe	UPVC Heavy duty (Pressure Capacity 6KG/Sq.cm) for Soil & waste water pipes only. Rain water pipes should be 160 mm dia unplasticised Rigid PVC Pipes (6 kg/sq cm)
Sanitary Fittings	Crome plated fittings and fixtures and white vitreous china wares.

	Under counter Wash basin of Oval shape of white glazed Vitreous China 400mm size approx with C.P. swan neck pillar tap (For Ladies & Gents Toilet). Wash basin of white glazed Vitreous China size 550 x 400mm with 15 mm dia. C.P. Brass pillar tap. (For Handicapped Toilet)
	White vitreous china flat back single half stall urinal of size 580x380x350 mm.
	White vitreous china wall-mounted type water closet with White solid plastic seat and lid with integrated Cistern.
Septic Tank with Soak Pit / STP	To be provided as per bylaws of required capacity.
erhead & Underground Tank	RCC M-25 O.H Tank- (5000 ltrs for BO and 10000 Ltrs for fire fighting.) Under ground: M-25 grade cement concrete for reinforced cement concrete water storage capacity 10000 Ltrs. as per drawing.

4. PLUMBING

A. WATER SUPPLY:

* General:

Reliable and Satisfactory supply of good potable water and an appropriate disposal arrangement of generated effluent are of prime importance in building designed for proposed Branch Office. Keeping this crucial aspect in view, the provisions of various requirements are made and discussed in the report.

I) Design Approach

The various assumptions made for carrying out designs are based on following guidelines / basis.

a. The requirement of water for various reasons would be worked out as per guide lines given in IS 1172-1983 Third Revision.

b. The requirement of various diameters of pipes and appurtenances for main supply lines and distribution network as well as storage tanks will be provided as per guidelines given in Central Public Health & Environmental Engineering Organization (CPHEEO) manual for water supply and treatment.

c. The guidelines and the reference tables given in hand book for public health Engineer published by Indian Water Works Association and Hand Book on Water Supply and Drainage published by Bureau of Indian Standards are referred to where necessary. For fixing the various diameters for required discharges the Hunter's curve is also referred to.

d. Good Quality Potable Water Supply would be available.

e. For the whole building water would be supplied from the main municipal supply

line to UG Tanks proposed for the building as shown in the Site Plan. Water will be pumped from UG tank to Overhead tanks through Pumps (1W +1S) for both Flushing & Domestic/drinking System. The water would be distributed by gravity continuously through a network of pipe lines of various diameters to different outlets through overhead tanks for the building from here the water willbe sent to all the toilet, pantry, Water cooler of building. Respectively. Maximum Efficiency Pump will be selected as per ECBC norms.

f. Water supply to pantries shall be provided at one location near the pantry sink.

g. Drinking water treatment through Water Purifying units to be provided in every floor is envisaged. The Contractor need not provide Water Purifying units but necessary provisions of domestic water connection and Electrical point need to be provided near pantry & water cooler to facilitate the office to install the water purifier and give the water and electrical connection form the points provided by the Contractor.

II) WATER SUPPLY DESIGN CRITERIA

The design will be governed by following considerations/ assumptions:

a. Average daily water requirement will be governed by population forecast and the other requirements like mopping, gardening etc which are considered as per IS guide lines and norms.

b. The Peaking factor normally would be between 3 to 5.

III) WATER SUPPLY REQUIREMENT:

The water demand for domestic & flushing requirements shall be as per the municipal corporation norms requirement, latest NBC code. The exact capacity of fire tank shall be as per fire NOC which will be issued by the Mumbai fire department.

The size of the connection will mainly governed by the supply hours and the pressure at which the water will be delivered. Normally the local Municipality would fix the size of connection, once the demand is registered with them.

The minimum water requirement in this project to be worked out considering the population of average 60 Persons. The Total water requirement per person per day shall be minimum 45 Litres/ head/dayThe total water requirement will be as under:

- ✓ Domestic purpose : 1000 litres
- ✓ Flushing Purpose : 2700 litres
- ✓ Water requirement for landscape shall be added to above requirement.

IV) Indicative Storage Tank Capacity:

Water Tank capacity shall be 2.0 Days Water Requirement for Domestic and Flushing water.

The UGT capacity shall be 2/3 of total capacity and OHT shall be of 1/3 of total capacity.

The minimum water tank capacity shall be 10000 litre UGT and 5000 litre capacity at terrace.

V) WATER DISTRIBUTION

The water will be supplied to the overhead tanks from the UG Tank through pumps and distributed through gravity for all the units in the Building. Pumps to be provided as per Electrical DBR & design.

For this a pipe of suitable dia. outlet would be provided. From this connection a network of Heavy duty Pipe line varying in diameter from 100 mm to 15 mm would be provided as per the requirement of water at various locations.

For lawns and gardens a separate main of about 25 dia would be provided from with a net work of pipes would be provided varying in dia from 40 mm to 15mm Pipe line. Further from flushing compartment water would be supplied only to flushing system i.e. Flushing Valve of WC and flush cocks of urinals. For taps on pantry washbasins & water cooler, Domestic supply only will be provided.

VI) Pumping, Overhead Storage & Distribution System

i. Water shall be pumped from underground water tanks to overhead tanks through pumping system and water shall be supplied by gravity to user points in controlled pressure. Vertical down takes pipes shall beprovided in separate clusters as per requirement to cater all user points at all levels have sufficient but controlled water pressure.

ii. A separate water supply system shall be provided for Flushing of WC's and Urinals consisting of Underground tank with two compartments & Overhead tanks and a separate down- takes water supply pipes shall be provided for flushing of WCs & Urinals from overhead tanks through gravity supply. Underground flushing water storage tank shall be provided with water supply connection from Municipal/Borewell..

iii. Required size of Pressure reducing valves shall be provided at suitable locations on the vertical down take pipes & horizontal lines wherever required to achieve the required working pressures.

iv. To prevent any breakdown in the system all mechanical equipments expected to have normally backup in case emergency/or break down.

v. Pumping Machinery - The pumps would be provided with vermin proof panels, capacitors, main and auxiliary switches, starters, phase sequence indicator or pilot lamps meters Volt and Ampere meters. All the accessories will be installed in floor mounted / wall mounted panel board. Copper cables of required sizes with crimping lug connections are considered.

2) INTERNAL PLUMBING SYSTEMS

Plumbing System: As recommended in code of practice for soil and waste pipes

above ground (I.S: 5329 - 1964) shall be of two pipe system, in which separate vertical stacks as per the following is provided :

i. Soil Pipes shall carry the wastes from WC's & Urinals directly to manhole outside the building.

ii. Waste Pipes shall carry the wastes from Wash Basins, Sinks, Floor rains, etc. to Gully Traps outside the building and in turn connect to external manholes.

iii. Vent Pipe - Dedicated vent of required size shall be provided separately for each stack as recommended.

iv. Rainwater Pipes to be provided to dispose water to Rain water harvesting system outside the building through pipes to chambers /external drains / harvesting tank

To ensure that the plumbing system is unhindered, all toilets/wet areas shall be designed with the following structural provisions:

S. No.	Details	Requirements
a)	Wet Areas/ toilets slab to be sunk	Pipe lines of Wash Basins, Sinks & Floor Drains and soil pipes of WC should be taken down though core cutting in the toilet slab and collected below the slab. The ceiling of the toilet will be covered by false ceiling Core Cutting for traps and WC soil pipes shall be provided and marked accordingly

1. Utilisation of Shafts

S. No.	Shafts	Size / Details
a)	Plumbing shafts for Toilets	(i) In the shaft pipes to be placed in such a way so that all vertical pipes are exposed and approachable and accessible within the shaft. (ii) Hence a service platform to be provided (iii) Doors need to be provided for every shaft, at approachable level, for repair & maintenance and cleaning.
b)	Rainwater pipe in shafts	Rainwater pipes with required size from terrace and other places to be placed in plumbing shafts with efficient overview and responsible detail designing and preparing working drawing
c)	Other Shafts	Other shafts may be utilized as per site requirement and final planning and detailing.

2. Fittings and Fixtures

- Sanitary fixtures shall be white /pastel colors/special colors vitreous china and of high end quality and make.
- C.P. fittings shall be as per requirement and of premium quality range and taps & cocks with controlled flow of water.
- For most of the sanitary and plumbing fixtures, basic rates are provided elsewhere in the tender. The fixtures provided shall not be of lesser basic price than the specified in the tender. Due to oversight if basic cost is not specified for any fixtures, it is deemed that the quality/range of the fixtures shall match with the other fixtures provided in a particular toilet.

Materials for Internal Plumbing, Soil, Waste & Rainwater Pipes

- UPVC heavy duty pipes for potable water supply as per relevant BIS Code.
- UPVC Rainwater pipes and fittings as per relevant BIS Code.
- UPVC heavy duty pipes for Soil & Waste water as per relevant BIS Code.

3) DRAINAGE DISPOSAL:

The design of external drainage would be as per guide lines given in CPHEEO and internal drainage arrangements would be done as per guide lines given in the manual published by Bureau of Indian Standards.

The rate of generated effluent is considered as 90% quantity of total water consumed. Separate Ground water infiltration is not considered because: Most of the lines up to sump would run below building and would be provided with concrete encasing. Quality of work is expected to be good and satisfying the testing requirements when tested hydraulically.

The slopes in the gravity lines would be 1 in 80 to 1 in 100 normally.

a) Collection & Disposal System

- The layout of the building is such that major quantum of the effluent would be collected in collection chambers at the ground level from where it will be discharged into the septic tank and soak pit with provision of Inspection chambers wherever required as per design. .

- The effluent from pantry and the toilet blocks on each floor will be connected to the Septic tank through gully trap and Inspection chambers. The internal drainage is to be designed as per guide lines given in CPHEEO manual and National Building code on Water Supply andDrainage SP35 1987.

- All internal piping whether concealed under floor or open stacks in shaft would heavy duty UPVC pipes or other material suitable for high rise building.

- The line from Septic tank to nearest Municipal Sewer with inspection chambers to enable to pump the sewage to Municipal Sewer with proper pipe line, Inspection chambers etc.

Design Parameter for Sewerage System

The design parameters for the drainage system should be as per NBC latest verison and other BIS codal provisions

The indicative data required to design the network are pipe lengths, nodal demands, ground level of the nodes, other design constraints such as peak factor, minimum and maximum allowable velocities, manning coefficients, outfall nodal demand, ground elevation, number of nodes, links etc.

a) Depth of Flow (up to 250 mm dia pipe) full at peak	-	Max. 50%
b) Velocity		
Minimum velocity at peak	-	0.60 m/sec
Maximum velocity at peak	-	3.00 m/sec
c) Peak Factor average flow	-	3 times the
d) Interception factor	-	0.80
e) Manning Constant RCC PIPES)	-	0.011 (for
f) Design Equation Equation.	-	Manning
g) Size of Manholes		
For depth of manholes up to 0.90 m mm	-	600 x 600
For depth of manholes 0.90 to 1.65 m	-	0.90 m. dia
For depth of manhole 1.65 to 2.25 m	-	1.20 m. dia
For depth of manhole 2.25 & above	-	1.50 m. dia
h) Man Hole Interval	-	Max. 45 M
i) Material of pipe	-	RCC NP2/3
j) Min. diameter adopted for sewer pipe	-200/ 250 mm Dia.	

Appurtenances & Material Specifications for the Sewerage System

b) Pipes

i. UPVC Pipes of dia 150mm to 250mm Eco drain (SN-8) pipe as per IS:16098.

ii. R.C.C. Pipes Class NP2/NP3 of dia 200mm and above as per IS:458, for normalslopes and general site conditions(Road crossing etc).

iii. HDPE Pipes is as per IS: 14333.

c) Manholes

The manholes shall be constructed of brick masonry as per standard specifications of National Building Code according to requirement and having details as follows:-

i. Type 'A'-- Rectangular of size 900x800 mm up to 900mm depth.

ii. Type 'B' -- Rectangular of size 1200x900 mm from 900mm & upto 2.45m depth.

iii. Type 'C' -- Circular Manhole of Size 910mm dia for depth upto 1.67m.

iv. Circular Manhole of Size 1220mm dia for depth above 1.67m and upto 2.30m.

v. Circular Manhole of Size 1520mm dia for depth above 2.30m.

d) Manhole Covers

Medium duty for manholes on service roads, having approximate total weight of fame and cover as 116 Kg.

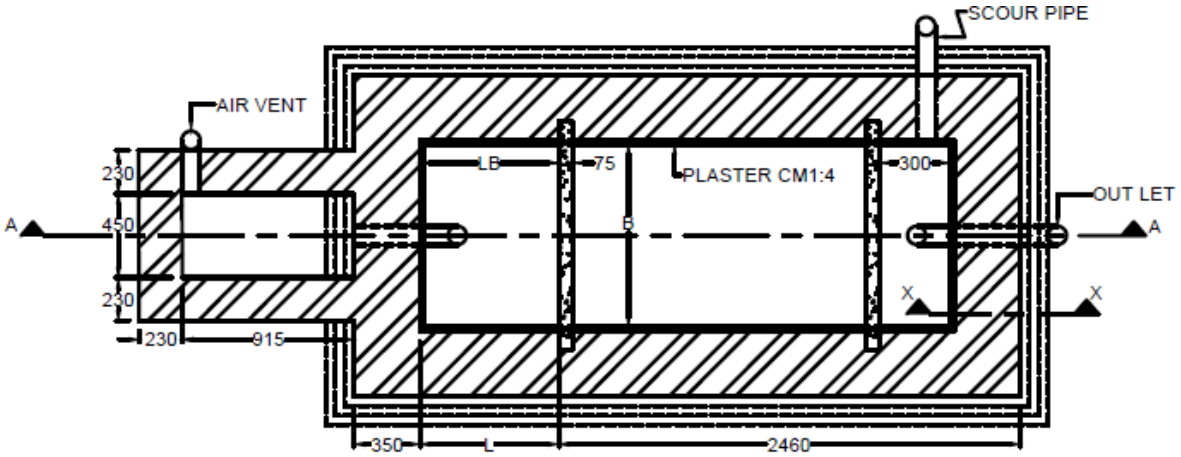
Heavy duty for manholes on roads having frequent heavy traffic will have approximate total weight of frame with cover 170-208 Kg.

4) SEPTIC TANK

It is proposed to construct Septic tank and soak pit, in order to carry out filtration before connecting to Main sewer line and to reduce the level of pollution in the waste water to the limits specified by the Pollution Control Board.

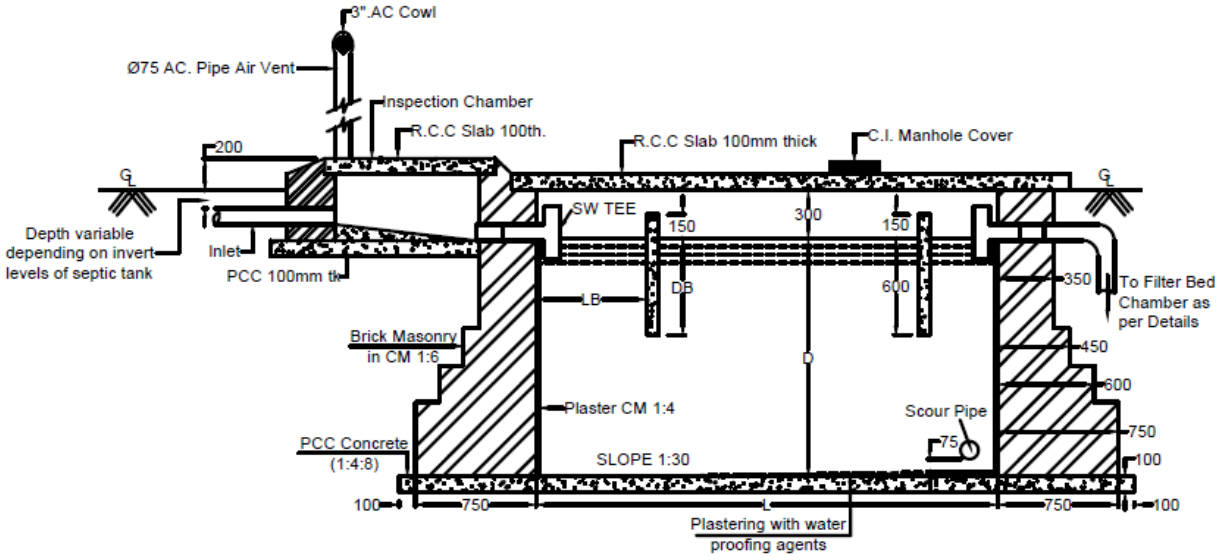
The size of the septic tank to be designed as per latest NBC norms, local statutary requirement, number of occupant's usage and frequency the average cleaning interval, peak flow. Number of occupants for the septic tank design may be considered as 70 persons.

INDICATIVE DETAILS OF SEPTIC TANK AND SOAK PIT

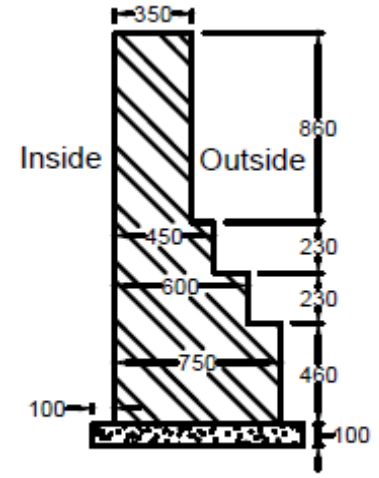


PLAN

Single Compartments Type
(Capacity Upto 30 Persons)
(Not to scale)

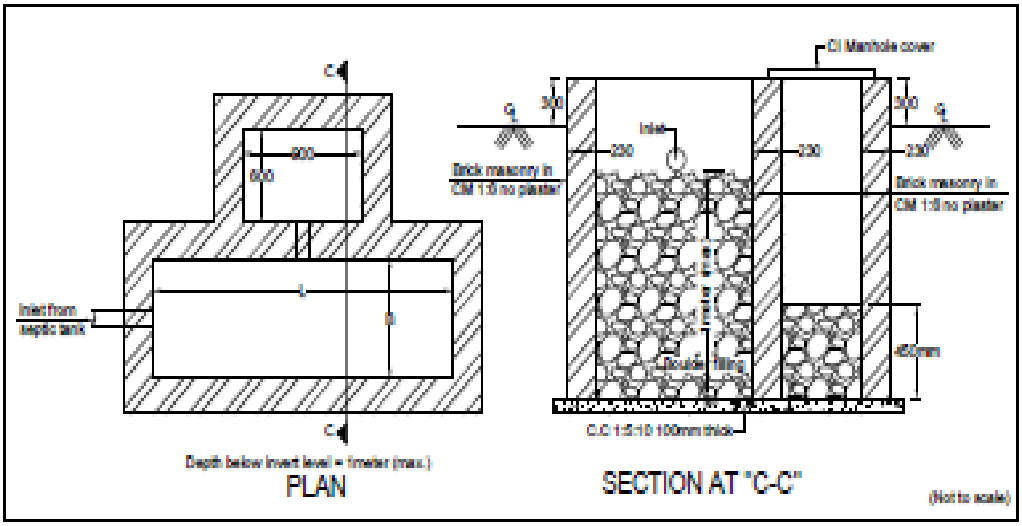


SECTION AT "A-A"



SECTION AT "X-X" (Scale 1:20)

Typical Details of Filter Bed Chamber



5) STORM WATER DRAINAGE:

a) Introduction

The storm water drainage will be provided as per guide lines given in CPHEECO unless otherwise any specific requirements are given. The storm water disposal arrangements would be in two parts as below

i) main Water Pipes of requisite dia. and numbers are proposed for draining rainwater from terraces of various buildings.

ii) The rain water received from roofs and from open plots will be collected in RCC NP2 class pipe or PVC Agri Pipe of 10 Kg/cm2 lines of various diameters. The rainwater will be collected in catch pits which will be disposed in natural course through pipe line connected to these catch pits.

b. Design Criteria

The rain water intensity of 150 mm/hr is to be considered for designing the system.

The run-off factor is considered as unity because at above rate of intensity the water table will be at ground level and there will be hardly any percolation because of paved area

The pipes would be considered as running in half full conditions for design purposes. System Design

c. Rain water pipes

The guide lines as given in National Building code published under manual SP35 are followed for provision of rain water pipes.

The rain water pipe coming down from roof will terminate in a rain water receiving chamber. The chamber then will be connected to Collection System. The rain water receiving chamber will be having RCC heavy type grating at top so that water in surrounding area will also have access in disposal system which will be connected to percolation pits at intervals, so that max water is percolated and ground table is raised

d. Storm Water Drainage

The Collection System for storm water drain will be a RCC pipe line network of various diameters. There will be catch water pits at an average internal of 12 meters or so. This pipe line will be laid with a gradient. The gradient would be differing depending on discharge to be handled and the velocity to be kept. Maximum advantage of available slope would be taken to keep the excavation depth to an optimum. The rain water to be discharged into the municipal storm water drain lines adjacent to the plot with non return valve, so that back flow is prevented.

The catch pits would be B.B masonry chambers of varying depths and having

RCC grating at top. The system will carry surface runoff as well the rain water from roofs of all buildings proposed as new construction.

Also there will be a trench drain from the periphery of the arena to take the surface water to the recharge pits or rain water storage tank the trench will be stone finished because of the level difference which can destroy the PCC also there will be tanks at various intervals to reduce the velocity of the water & also act as a Rain water harvesting Tanks.

e. Rain Water Harvesting

The Governments in all states have provided guide lines for Rain Water Harvesting. A suitable scheme would be introduced and coupled with the Collection System. The scheme will be such that it will be very easy for operation. Very low cost maintenance would be involved. Use of electric power, mechanically operated equipments etc would be totally avoided. The scheme implemented would be with minimum capital cost and minimal recurring expenditure.

APPROVALS, CLEARANCES & DISCLAIMER

As per the latest govt. notifications clearances from local pollution control board authorities and Ministry of Forests and Environment to be obtained for project

Necessary processing for obtaining permissions /NOC for STP, exhaust systems and other environmental related matter, for boring of tube well, or any other permission required from Local /Statutory authority and ultimately obtaining NOC/ permission/connection from local/ statutory authority is the responsibilityof the EPC contractor.

Necessary processing for obtaining permissions /NOC from Fire Fighting authority and ultimately obtaining NOC/ permission/connection from local/ statutory authority is the responsibility of the EPC contractor.

Necessary processing for obtaining permissions for obtaining water supply / sewerage /drainage/electric connections from Local /Statutory authority and ultimately obtaining NOC/ permission/connection from local/ statutory authority is the responsibility of the EPC contractor. However, statutory fees shall be paid by LIC

Data produced in this report shall not be altered without due consent

Discrepancy observed in this Report / Document /Calculations shall be immediately brought to the notice.

LIST OF REFERENCES

- National Building Code 2016 (Govt. of India)
- Hand book of Water Supply and Drainage, Bureau of Indian standards. SP-35 (S&T).
- Manual of water supply & Treatment, Central Public Health and Environmental Engineering Organization.
- Sewerage and Sewage Treatment (Ministry of Urban Development, New Delhi), (Govt. of India)
- Schedule of specifications of C.P.W.D. (Govt. of India) with all latest amendments issued from time to time
- Hand book for Public Health Engineering by Indian Water Works Association.
- Manual on Ground water & Tubewells by Central Board of Irrigation & Power, Govt. of India.
- Ministry of Environment & Forest Guidelines
- Water supply and sewerage by Steel
- Code of practice for provision and maintenance of water supplies for fire

fighting IS: 9668:1990

- Other relevant ISI codes
- Code of basic requirement for water supply, drainage and sanitation IS:1172:1983by Bureau of Indian Standards
- Latest relevant NFPA Codes, USA, in particular NFPA-13, 14,20 & 22 (NFPA)
- Universal Plumbing Co
- Latest Green Building Norms

CONSOLIDATED LIST OF BIS STANDARDS APPLICABLE

S.No.	I.S. Code	Description / Title
1.	I.S : 3989	Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories (2nd rev.) (Amendment 2)
2.	IS:1536	Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
3.	I.S: 1538 (Part-I to XXIII)	Specification for cast iron fittings for pressure for water, gas and sewage.
4.	I.S:3714	Code of practices for laying C.I pipes
5.	I.S:782	Specification for caulking lead
6.	I.S:1239 (Part-II)	Specification for mild steel tubes, tubular and other wrought steel filling.
7.	I.S:1879	Specification for malleable cast iron pipe fittings.
8.	I.S:4984	High-density polythene pipe for potable water supplies, sewage and Industrial effluents.
9.	I.S:783	Width and depth of trench for R.C.C pipes.
10.	I.S:4127	Width and depth of trench for S.W pipes.
11.	I.S: 780	Specification for sluice valve for water works purposes.
12.	I.S:651	Specification for salt glazed stoneware pipe and fittings
13.	I.S:7558	Code of practice for domestic hot water installation.
14.	I.S: 1742	Code of practice for building drainage

15.	I.S: 2064	Code of practice for selection, installation and maintenance of Sanitary appliances
16.	I.S:2065	Code of practices for water supply in building
17.	I.S: 2183 (Part-I)	Code of practice for Plumbing in multistoried buildings.
18.	I.S:1239	Specifications for mild steel tubes tubulars and other wrought steel fittings. (Fifth Revision)
19.	I.S:778	Specifications for copper alloy gate, globe and check valves for water works purposes.
20.	I.S:5312 (Part-I)	Specifications for swing check type reflux (Non return) valve
21.	I.S:908	Specifications for fire hydrant (2nd Revision)
22.	I.S:5290	Specifications for landing valve
23.	I.S:901	Specifications for coupling double male and female instantaneous pattern for fire fighting (3rd revision)
24.	I.S:884	Specifications for first aid hose reel for fire fighting (1st Revision)
25.	I.S:903	Specifications for fire hose delivery couplings branch pipe, nozzles and nozzles spanner (3 revisions)
26.	I.S:933	Specifications for portable chemical from fire Extinguisher
27.	I.S:2171	Specifications for portable fire extinguishers, dry powder. (3rd revision)
28.	I.S:2190	Code of practice for selection, installation and maintenance of portable first aid fire extinguishers.
29.	I.S:2878	Specifications for fire extinguisher carbon dioxide type. (2nd revision)
33.	I.S. : 456	Code of practice for plain and reinforced concrete (3rd Rev.) (Amendment 2)
34.	I.S. : 12820	Code of practice for dimensional requirements of rubber gaskets for mechanical joints and push on joints for use with cast iron pipes and fittings for carrying water, gas & sewage.

35.	I.S. : 1172	Code of basic requirements for water supply, drainage & sanitation (4th Rev.)
36.	I.S. : 1200 (Part-16)	Code of practice for methods or measurements of building and Civil Engineering works: Part 16 Laying of water and sewer lines including appurtenant items (3rd Rev.)
37.	I.S. : 1200 (Part-19)	Code of practice for methods or measurements of building and Civil Engineering works: Part 19 Water supply, plumbing and drains (3rd Rev.)
38.	I.S : 13095	Butterfly valves for general purposes
39.	I.S : 458	Precast Concrete pipes (with or without reinforcement) (3rd rev.) (Amendment 2)
40.	I.S : 1726	C.I. Manhole covers & frames (3rd rev.)
41.	I.S : 1916	Steel cylinder pipe with concrete lining and coating (1st rev.).
42.	I.S : 12592(part1)	Pre-cast concrete manhole covers and frames: Part 1 Covers (Amendment 3)
43.	I.S : 12592(part2)	Pre-cast concrete manhole covers and frames: Part 2 Frames
44.	I.S : 6392	Steel pipe flanges (Amendment 1)
45.	I.S : 6418	C.I and malleable C.I. flanges for general engineering purposes.
46.	I.S : 4985	Unplasticized PVC pipes for potable water supplies (2nd Rev) (Amendment 2)
47.	I.S : 7181	Horizontally cast double flanged pipes for water , gas and sewage.(1st Rev.) (Amendment 1)
48.	I.S : 210	Grey iron casting. (4th Rev.)
49.	BS EN 1057	Copper pipes
50.	BS EN 1254	Copper Fittings

NOTE: FOR MORE TECHNICAL DETAILS PLEASE REFER DETAILE TECHNICALSPECIFICATION & ITEMS. SPECIFICATION OF PIPES AND VALVES EXTRACT FROM N.B.C.