

BIHAR BUILDING BYE-LAWS, 2014

URBAN DEVELOPMENT & HOUSING DEPARTMENT

GOVERNMENT OF BIHAR

Subject List	
Chapter - I Definitions	
1	Short title, Extent and commencement.
2	Definitions
Chapter - II Administration	
3	Applicability
4	Deemed Permission
5	Application
6	Signing the Plans
7	Fees
8	Permission
9	Duration of Permission
10	Notice for Commencement of Work
11	Information at the site of construction
12	Periodic report of Construction
13	Inspection
14	Cancellation
15	completion of Construction
16	Certificate for occupancy
17	Construction not according to Plan
18	Single Window Clearance
19	Art Commission
20	Construction near protected monuments
21	Construction near important building
22	Construction near river front
23	Unsafe building

6/2/14

37/1/14
4-12-14

4/1/14
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24	Demolition of building
25	Responsibility and Duty of the owner
26	Responsibility of Authority
Chapter - III Land Use Classification and Permissible Uses	
27	Zoning
28	Different use of land
Chapter - IV General Requirements	
29	Restriction on permission
30	Requirement of Site
31	Distance from Electric lines
32	Plantation
33	Means of Access
34	Minimum size of Plots and Road width
35	Minimum setbacks & Height for non-high rise buildings
36	Minimum setbacks for high rise buildings
37	General Conditions for Setback
38	Floor Area Ratio
39	Height of a building
40	Off Street Parking Space
41	Requirement of Parts of Building
42	Staircase/Exit Requirements
43	Interior Open Space
44	Height exemption of a Building
45	Exemption in Open Space
46	Mezzanine
47	Basement Cellar
48	Provision of Lift

hwp

3572/20
4/12/14

4/12/14

-ii-

2

49	Heritage Zone
50	Barrier free access for the physically challenged person
51	Rainwater harvesting system
52	Signs and outdoor display structures
53	ICT landing Points
54	Builder to register an association
55	Reference to the standards
56	Life Safety
Chapter - V Additional Requirements For Safety and Services	
57	Restriction on construction of Multi-storied building
58	Maintenance
59	Structural Safety Design, Standards and other Services Requirements
Chapter - VI Integrated Township	
60	Large Projects
Chapter - VII Requirement of Special Occupancy	
61	Outhouse
62	Semi-detached and row housing
63	Shop cum residence
64	Cinema, Multiplex and Theatre building
65	Liquefied Petroleum Gas
66	Petrol Pump
67	Farm House
Chapter - VIII Development And Sub-Division Of Land	
68	Application
69	Use in relation to Development Plans

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4/7/14

70	Size of the plot and road width
71	Area for development
72	Park and Open Spaces
73	Community facilities
74	Exemptions
75	Submission of layout plan
Chapter - IX Compounding, Penalties And Compliance	
76	Restriction on Compounding
77	Compounding Rate
78	Compounding amount
79	Temporary retention
80	Penal Action against Builders/Technical Personnel
81	System for monitoring
Chapter - X E-Governance And Service Delivery	
82	E-Governance
Chapter - XI Savings/Repeals And Interpretation	
83	Repeal and Savings
84	Interim Development Plan
85	Applicability of National Building Code
86	Prior Commitments
87	Decision of the Government to be final
88	Relaxation and modification by the Government
Appendix-A	
<i>बिहार में, भकम्पीय खतरों से न्यूनीकरण के लिये, भवनों के निरूपण एवं निर्माण का परिपत्र, बिहार राज्य आपदा प्रबंधन प्राधिकरण द्वारा निर्गत।</i>	
Annexure - I	
Qualification, Experience & Competence of Technical Personnel and Builder	

628

37/1/14
A/1/14

4/1/14

2

Annexure - II	
Guidelines For installation of Solar Water heating System	
FORMS	
FORM-I	Application for Land Development
FORM-II	Building Plan Application Form
FORM-III	Certificate for Execution of Work as per Structural Safety Requirements
FORM-IV	Certificate for Structural Stability
FORM-V	Form for Supervision
FORM-VI	Check List
FORM-VII A	For Empanelment of Technical Person (Architect, Engineer, Structural Engineer, Town Planner, Supervisor)
FORM-VII B	For Registration of Builder
FORM-VIII A	Form of Approval of Building Permit
FORM-VIII B	Form of Approval of Land Development Permit
FORM-IX	Form of Refusal of Building Permit/ Development Permit
FORM-X	Form of Notice for Commencement of Work (To be Furnished by the Plot Owner(S) and the Builder/ Developer)
FORM-XI	Periodic Progress Report
FORM-XII	Notice of Completion
FORM-XIII	Certificate for Occupancy
FORM-XIV	Maintenance of Register
FORM-XV	Indemnity Bond for Basement
FORM-XVI	Certificate of Undertaking for Hazard Safety Requirement

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321/1/14
4/12/14

4/12/14

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बिहार सरकार
नगर विकास एवं आवास विभाग

अधिसूचना

सं०-11न०वि०(मा०)-06/2013 अधिसूचना सं०-577..... दिनांक-8/12/14 का निम्नलिखित अनुवाद बिहार राज्यपाल के प्राधिकार से इसके द्वारा प्रकाशित किया जाता है जो भारतीय संविधान के अनुच्छेद-348 के खण्ड (3) के अधीन अंग्रेजी भाषा में उसका प्राधिकृत पाठ समझा जायेगा।

बिहार राज्यपाल के आदेश से

राजेन्द्र
4.12.2014
(डॉ० बी० राजेन्द्र)
सरकार के सचिव

नगर विकास एवं आवास विभाग

Government of Bihar
Urban Development and Housing Department

NOTIFICATION

No. 577, UD&HD, -In exercise of the powers conferred under section-321 of the Bihar Municipal Act, 2007 and section - 81 (2)(w) of the Bihar Urban Planning and Development Act, 2012 and in supersession and modification of the all the existing rules on the subject, the Government of Bihar do here by notify the Bihar Building Bye laws, 2014, which shall be enforceable to all the Municipal Areas, since the date of publication and to Gram Panchayat Areas lying within a Planning Area (s), Metropolitan Area (after declaration) in the manner prescribed in these Bye Laws.

CHAPTER -I

DEFINITIONS

1. **Short title, Extent and commencement.**-(1) These byelaws may be called the Bihar Building Byelaws 2014.
- (2) These byelaws shall apply to all building activities in the areas falling in;
 - i. All Municipal Corporations
 - ii. All Municipal Councils

- iii. All Nagar Panchayats
 - iv. All Metropolitan area(s) after declaration by the Government
 - v. All Planning Areas, after notification of implementation of these byelaws, by the Government.
 - vi. Gram Panchayat areas covered under concerned Development Plan/ Planning Authorities or any Planning Scheme notified under Bihar Urban Planning and Development Act 2012 after notification of implementation of these bye laws, by the Government.
 - vii. All existing rules, regulations, byelaws, orders that are in conflict or inconsistent with these bye laws shall stand modified to the extent of the provision of these bye laws.
- (3) The State Government may notify certain areas on its own or on the recommendation of the Planning Authority or Municipalities, where these bye-laws shall not apply.
 - (4) In case Master Plan/Development Plans/Zonal Plans are notified by the authority subsequent to the publication of these bye laws, the corresponding provisions made in the master plan/development plans/zonal plans shall override the provisions made in these bye laws.
 - (5) These bye laws shall come into force on the date of their publication in the Bihar Gazette.

2. Definitions

- (I) In these bye laws, unless the context otherwise requires:
 - (1) "Act" means the Bihar Urban Planning and Development Act 2012;
 - (2) "Municipal Act" means Bihar Municipal Act 2007;
 - (3) "Advertising Sign" means any surface or structure with characters, letters or illustrations applied there to and displayed in any manner whatsoever outdoors for the purpose of advertising or giving information or to attract the public to any place, person, public performance, article, or merchandise, and which surface or structure is attached to, forms part of, or is connected with any building, or is fixed to the ground or to any pole, screen, fence or hoarding or displayed in space, or in or over any water body included in the jurisdiction of the Authority;
 - (4) "Agricultural use" means use of land for the purpose of agriculture, horticulture, sericulture, animal husbandry, poultry farming, plant nursery, piggery, dairy farming, vegetable farming and any activity related to agriculture or milk chilling plant;
 - (5) "Air-Conditioning" means the process of treating air so as to control simultaneously its temperature, humidity, cleanliness and distribution to meet the requirement of conditioned space;

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- (6) "Air Port Reference Point" means a designated point, which is established in the horizontal plane at or near the geometric center of the landing area as defined by the concerned airport authority;
- (7) "Amenity" means roads, street, open spaces, parks, recreational grounds, play grounds, gardens, water supply, electric supply, street lighting, sewerage, drainage, public works and other utilities, services and conveniences;
- (8) "Annexure" means an Annexure appended to these bye laws;
- (9) "Apartment" means a part of the property, provided by the promoter/developer in a multi-storied building intended for any type of independent use, including one or more rooms or enclosed spaces located on one or more floors or any part for the practice of any profession or for the carrying on of any occupation, trade or for business or such other type of independent use as may be prescribed, and with a direct exit to a public street, road or highway or to a Common area or room (whether or not adjacent to the multi-storied building in which such Apartment is located) Provided by the promoter for use by the owner of such Apartment for parking any vehicle or as the case may be for the residence of any domestic aide employed in such an Apartment.
- (10) "Addition/ Alteration" means structural change, such as addition to the covered area or height or the removal of part of a building or construction or cutting into or removal of any wall, partition, column, beam, joist, floor or other support, or a change to the fixture of equipment of the building;
- (11) "Applicant" means the person who is the owner of the land or building or has title to a land or building and includes :
- A. A trustee who is entrusted with or is concerned with any building;
- B. a receiver, executor or administrator or a manager appointed by any Court of competent jurisdiction to have the charge of or to exercise the rights of the owner; and
- C. a mortgagee in possession;
- (12) "Art Commission" means The Bihar Urban Arts and Heritage Commission constituted under Section 77 of the Bihar Urban Planning and Development Act 2012;
- (13) "Authority" means the Designated Officer of the respective Planning Authority. In case of areas not covered under the Planning Authority, it shall be the Chief Municipal Officer of the respective Municipalities;

37/1/14
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- (14) "Balcony" means a projection to serve as passage or sit out place including a hand rail or balustrade;
- (15) "Barsati" means a covered space of the roof used as a shelter during rain. It will have at least one side open and will not cover more than 20 % of the area of the roof and in no case such covered area will not exceed more than 20 sq m. Barsati shall be a common area of the building and shall not be sold out as a separate unit. In case construction is made in violation of the norms mentioned the barsati shall be treated and accounted for as a separate floor under these byelaws.
- (16) "Basement or cellar" means lower storeys of a building, below or partly below the ground level;
- (17) "Builder" means an applicant, land owner, contractor, holder of power of attorney of the land owner, partnership, trust or company which has responsibility for construction, leasing, selling or disposing otherwise of a building for residential and other purposes and duly registered by the Authority;
- (18) "Building" means any structure or erection or part of a structure or erection which is intended to be used for residential, commercial, industrial or any other purpose whether in actual use or not, and in particular. The building shall be classified as below :
- A. "Assembly Building" refers to a building or part of a building where group of people congregate or gather for amusement, recreation, social, religious, patriotic and similar purposes and includes theaters, assembly halls, auditoria, exhibition halls, museum, skating rinks, gymnasium, dance hall, clubrooms recreation piers and stadia;
- B. "Commercial Building" refers to a building or part of a building, which is used for transaction of business, keeping of accounts and records or for similar purposes and includes Banks and Commercial Offices and Corporate offices. It shall include mercantile buildings like shops, stores, market display and sale of merchandise either in wholesale or retail, or offices, storage or services facilities incidental to the sale of merchandise and includes Cinema Halls, Petrol Pumps, Hotels, Restaurants, Clinics, Pathology Labs, Nursing Homes, Lodge-cum-guesthouses & Dharma Kantas, etc.;
- C. "Educational Building" refers to a building used for school, college or daycare purpose for more than 8 hours per week involving assembly, instructions, education or recreation;
- D. "Hazardous Building" refers to a building or part of a building which is used for the storage, handling, manufacture or

processing of highly combustible or explosive materials or products which are liable to burn with extreme rapidity and/or producing poisonous fumes, or the storage, handling, manufacturing or processing of which involves highly corrosive, toxic, obnoxious alkalis, acids or other liquids, gases or chemicals, producing flame, fumes and explosion, poisonous irritant or corrosive gasses and for the storage, handling or processing of any material producing explosive mixture of dust or which result in the division of matter into fine particles subject to spontaneous ignition. This shall include petrol filling stations;

- E. "Industrial Building" refers to a building or part of a building in which products or materials of all kind and properties are fabricated, assembled or processed such as assembly plants, laboratories, power plants, smoke houses, refineries, gas plants, mills, dairies or factories;
- F. "Institutional Building" refers to a building or part of a building which is used for purposes such as Research and Training Centre, Public/Semi Public offices, Hospitals, Dispensaries and Health Centers;
- G. Mercantile Buildings. - These shall include any building or part of a building which is used as shops, stores, market, for display and sale of merchandise, either wholesale or retail, office, stores, and service facilities incidental to the sale of merchandise and located in the same building shall be included under this group.
- H. Residential Building" refers to a building in which sleeping accommodation is provided for normal residential purpose with or without cooking or dining or both facilities and includes one or two or multi-family dwelling dormitories, apartment houses, flats and hostels;
- I. "Public Utility Building" means and includes Post Office, Police Station, Fire Station, Hospital, Dispensary, and Telephone Exchange, sub-station, water works, Taxi Stands, Bus Terminals, etc.;
- J. "Storage Building" refers to a building or part of building used primarily for the storage or sheltering of goods, storehouses, hangers, terminal depot, grain elevators, barn or stables;
- K. "Multi-Level Car Parking Building" means a building partly below ground level having two or more basements or above ground level, primarily to be used for parking of cars, scooters or any other type of light motorized vehicles;

- (19) "Building Accessory" means a subordinate building, use of which is incidental to that of a principal building, on the same plot such as garage, coal or fuel shed, peons, chowkidars, or domestic servants quarters, etc;
- (20) "Building Height" means the vertical distance measured, in the case of flat roofs, from the average level of the centre line of the adjoining street to the highest point of the building adjacent to the street wall and in case of pitched roofs, up to the point where the external surface of the outer wall intersects the finished surface of the sloping roofs, and in the case of gables facing the road the mid point between the eaves level and ridge. Architectural features serving no other function except that of decoration shall be excluded for the purpose of measuring heights of the building.

In case the contiguous ground level of the building is above the average level of the centre line of the adjoining street the height of the building shall be measured from such contiguous ground level or plinth, subject to limit of 0.90 m from the existing average level of the centre line of the adjoining street.

In case of basement, the height of the building shall be measured from the ceiling level of the basement, not exceeding 1.20 m from the existing average level of the centre line of the adjoining street.

- (21) "Building line" means the line up to which the plinth of a building adjoining a street or an extension of a street or on a future street may lawfully extend and includes the lines prescribed in any development plan in operation for any area under the jurisdiction of the Authority or specification indicated in any Planning or Development Scheme, or in these Bye Laws;
- (22) "Built up Area" means the total covered areas on all floors of an immovable property;
- (23) "Canopy" means cantilevered projection over any entrance;
- (24) "Cornice" means a sloping or horizontal structural overhang usually provided over openings or external walls to provide protection from sun and rain; or for architectural consideration.
- (25) "Chajja"/"Sun-Shade" means a sloping or horizontal structural overhang, usually provided at lintel level for protection from sun and rain or for architectural considerations.
- (26) "Chimney" means an upright shaft containing and encasing one or more flues provided for the conveyance to the outer air of any product of combustion; resulting from the operation of any heat producing appliance or equipment employing solid, liquid or gaseous fuel;

- (27) "Combustible materials" means a material, which burns or adds to a fire when used for combustibility in accordance with good practice;
- (28) "Competent Authority" shall mean the Authority Notified by the Urban Development and Housing Department.
- (29) "Conversion" means the change of occupancy to another occupancy or change in building structure or part thereof resulting in change of space or use requiring additional occupancy certificate;
- (30) "Corner plot" means a plot at the junctions of and fronting on two or more intersecting streets. Corner plot" means a plot facing two streets; the frontage would be on the street having larger width. In cases, where the two streets are of same width, then the larger side of the plot will decide the frontage. In such case, the location of a garage (on a corner plot) if provided, within the open space shall be located diagonally opposite the point intersection;
- (31) "Courtyard" means a space permanently open to sky, with or without pergola, enclosed fully or partially by buildings and may be at ground level or any other level within a building;
- (32) "Coverage" means percentage of covered area on the ground floor which is not open to sky excluding the chajja/roof projections up to 0.75 metre width overhanging the open space to the total plot area;
- (33) "Covered Area" means in respect of ground floor, area covered immediately above the plinth level by the building but does not include the open space covered by
- A. gardens, rockery, well and well-structures, rainwater harvesting structures, plant nursery, water-pool (if uncovered), platform round a tree, tank, fountain, bench, chabutara with open top unenclosed on sides by walls, boundary wall, swing, and area covered by chhajja without any pillars etc, touching the ground;
 - B. 'drainage culvert conduit', catch-pit, gully pit, inspection chamber, gutter and the like; and
 - C. compound wall, gate, slide/ swing door, canopy, and areas covered by chajjas or similar projections and staircases which are uncovered and open at least on three sides and also open to sky;
 - D. Watchmen booths, pump houses, garbage shafts, electric cabins or substations, and such other utility structure meant for the services of the building under construction;
- (34) "Cul-de-sac" means such means of access having length up to 150 m. with an additional turning space not less than 81 square meters in area having no dimension less than 9 m.;

- (35) "Damp-Proof Course" means course consisting of some appropriate water proofing material provided to prevent penetration of dampness;
- (36) "Detached building" means a building whose walls and roof are independent of any other building with open spaces on all sides;
- (37) "Development Plan/ Comprehensive Development Plan" includes any development plan either interim or comprehensive or zonal plan in operation for the area under the jurisdiction of the Authority;
- (38) "Deviation" means any construction made in departure from the approved plan by way of alterations or additions, modifications in the total floor area, coverage, floor area ratio (FAR), setbacks, height, parking space, provision of public utilities etc.;
- (39) "Drain" means a line of pipes including all fittings and equipment such as manholes, inspection chamber, traps, gullies and floor traps, used for the drainage of a building or a number of buildings, or yards appurtenant to the buildings within the same cartilage and includes open channels used for conveying surface water;
- (40) "Drainage" means the removal of any liquid by a system constructed for purpose;
- (41) "Dwelling Unit" means an independent housing unit with facilities for living, cooking and sanitary requirements;
- (42) "EWS House" means a house or dwelling unit intended for Economically Weaker Sections with maximum built up area of 32sq.mtr or as decided by the State Government;
- (43) "EWS Plot" means a residential plot intended for Economically Weaker Sections having maximum plot area of 48 sq.mtr or as decided by the State Government;
- (44) "Encroachment" means an act to enter into the possession or rights either of permanent or temporary nature on a land or buildup property of local body or state/ central Government;
- (45) "Existing Use" Use of a building or structure existing authorizedly with the approval of the Authority before the commencement of these Bye laws;
- (46) "Enclosed stair-case" means a stair-case, separated by fire resistant walls from the rest of the building;
- (47) "Existing Building or use" means a building, structure or its use as sanctioned/ approved/ regularized by the Competent Authority, existing before the commencement of these Bye laws;
- (48) "Exit" means a passage, channel or means of egress from any building, storey or floor area to a street or other open space of safety;

- (49) "External Wall" means an outer wall of a building even though adjoining to a wall of another building and also means a wall abutting on an interior open space of a building;
- (50) "Farm House" means a plot of land including construction thereon in the area designated for agricultural use by the Authority.
- (51) "Farm Shed" shall include permanent or temporary structures erected in the plot used for farmhouse;
- (52) "Fire Alarm System" means an arrangement of call points or detectors, sounders and other equipment for the transmission and indication of alarm and sometimes used as signals for testing of circuits and whenever required for the operation of auxiliary services. This device may be work automatically or manually to alert the occupants in the event of fire;
- (53) "Fire Lift" means lift specially designed for use by fire service personnel in the event of fire;
- (54) "Fire Proof Door" means a door or shutter fitted to a wall opening, and constructed and erected with the requirement to check the transmission of heat and fire for a specified period;
- (55) "Fire Resisting Material" means the material, which is normally used for fire resistance;
- (56) "Flat" means a dwelling unit in building.
- (57) "Floor" means the lower surface in a storey on which one normally walks in a building;
- (58) "Floor Area Ratio (FAR)" means the quotient obtained by dividing the total covered area on all floors with the area of the plot;
- (59) "Footing" means the part of a structure, which is in direct contact with the ground and transmitting loads to the ground;
- (60) "Forms" means forms appended to these bye laws
- (61) "Foundation" means that part of a structure, which is indirect contact with and meant for transmitting loads to the ground;
- (62) "Gallery" means an intermediate floor or platform projecting from a wall of an auditorium or a hall providing extra floor area, additional seating accommodation, etc. It shall also include structures provided for seating in stadia;
- (63) "Garage-Private" means a building or a portion thereof designed for parking of privately owned motor vehicles or any other vehicles;
- (64) "Garage-Public" means a building or a portion thereof designed or used for repairing, servicing, hiring, selling or parking of motor driven or any other vehicles;

- (65) "Ground Floor" shall mean storey, which has its floor surface nearest to the ground around the building;
- (66) "Group Housing" means housing complex on plotted development of having multiple apartment blocks;
- (67) "Habitable room" means a room having area of not less than 9.0 sq.m., width 2.4 m. (min.), height 2.75 m. (min.) occupied or designed for occupancy by one or more persons for study, living, sleeping, eating, cooking if it is used as a living room, but does not include bathrooms, water closet compartments, laundries, serving and storage pantries, corridors, cellars, attics and spaces that are not used frequently or during extended periods;
- (68) "Hazardous material"
- A. Means radioactive substances;
 - B. Material which is highly combustible or explosive and/or which may produce poisonous fumes explosive emanations, or storage, handling, processing or manufacturing of which may involve highly corrosive, toxic, obnoxious alkalis or acids or other liquids;
 - C. Other liquids or chemicals producing flame, fumes, explosive, poisonous, irritant or corrosive gases or which may produce explosive mixtures of dust or fine particles capable of spontaneous ignition;
- (69) "Hazardous and obnoxious industry" means industry which creates nuisance to the surrounding development in the form of smell, smoke, gas, dust, air pollution, water pollution and other unhygienic conditions;
- (70) "Natural hazard prone areas" means areas likely to have moderate to high intensity earthquake, or cyclonic storm, or significant flood flow or inundation, or landslides/mud flows/avalanches, or one or more of these hazards;

NOTE: Moderate to very high damage risk zones of earthquakes are shown in Seismic Zones III, IV and V specified in IS: 1893 and flood prone areas in river plains (unprotected and protected) are indicated in the Flood Atlas of India prepared by the Central Water Commission, besides, other areas which can be flooded under conditions of heavy intensity rains, inundation in depressions, back flow in drains, inadequate drainage, etc. as identified through local surveys in the development plan of the area and landslide prone areas as identified by State Government/Land surveys;

- (71) "Heritage Zone" means the area as delineated in Development Plan;

- (72) "Illuminated Exit Signs" means a device for indicating the means of escape during normal circumstances and power failure;
- (73) "Jhamp" means a downward vertical or sloping projection hanging below the balcony to provide protection from direct sun or rain. "
- (74) "Katra/Chawl" means a building so constructed as to be suitable for living in separate tenements each consisting a single room, or of two, but not more than two rooms and with common sanitary arrangements;
- (75) "Land Use" means use of the land proposed in the Development Plan/Zonal Plan. Before coming into operation of the Development Plan /zonal plan, for the purpose of the application of these bye laws, the authority may designate land use zone with the approval of the Government;
- (76) "Latrine-connected" means a latrine connected to the municipal sewer system;
- (77) "Latrine-unconnected" means a latrine not connected to the municipal sewer system; it may be connected to a septic tank or suitable treatment or disposal system;
- (78) "Ledge/Tand" means a shelf-like projection supported in any manner whatsoever, except by means of vertical supports within a room itself but not having projection wider than 1.0 meter and at a minimum clear height of 2.1 meters from the floor level;
- (79) "LIG House" means a house or dwelling unit intended for low income groups with a built up area of maximum 48 sq.mtr or as specified by the State Government;
- (80) "LIG Plot" means a residential plot intended for low income groups with a plot area of maximum 60 sq.mtr or as specified by the State Government;
- (81) "Loft" means an intermediate floor between two floors or a residual space in a pitched roof, above normal floor level with a maximum height of 1.5 meters and which is constructed or adopted for storage purposes;
- (82) "Licensed Technical Person" means Architect registered with the Council of Architecture or Civil Engineer/Structural Engineer/Town Planner/Supervisor licensed by the Authority;
- (83) "Masonry" means an assemblage of masonry units properly bonded together with mortar;
- (84) "Mezzanine Floor" means an intermediate floor between any two floors, above ground level, accessible only from the lower floor;

- (85) "Mixed Land Use" means mixed use of the building/premises consisting of more than one compatible use of which the principal use shall not be less than 2/3rd of total built up area;
- (86) "Multi - Storey or High Rise Building" means a building whose height is 15 meters or more;
- (87) "Mumty or Stair Cover" means a structure with a covering roof over staircase and its landing built to enclose only the stairs for the purpose of providing protection from weather and not used for human habitation;
- (88) "Mitigation" means measures taken in advance of a disaster aimed at minimizing or eliminating its impact on society and on environment including preparedness and prevention;
- (89) "New Area" means such area as notified by the Authority with approval of Urban Development & Housing Department.
- (90) "Non-Combustible Material" means a material, which does not burn nor add heat to a fire when tested for combustibility in accordance with good practice;
- (91) "Non -Conforming Use of a Building or Land" means the use of a building or land existing at the time of commencement of these Bye laws, and which does not conform to the Bye laws pertaining to the zone in which it is located;
- (92) "Occupancy or Use" means the principal occupancy for which a building or a part of a building is used or intended to be used.
- (93) "Old Area" means such area as notified by the Authority with approval of Urban Development & Housing Department.
- (94) "Open Space" means an area forming an integral part of the plot, left open to the sky;
- (95) "Owner" means a person, group of persons, a company, trust, Institute, Registered body, State or Central Government and its departments, undertakings and the like in whose name the property stands registered in revenue records. The owner shall include :
- a) An agent or trustee who receives the rent on behalf of the owner;
 - b) An agent or trustee who receives the rent of or is entrusted with or is concerned with any building devoted to religious or charitable purpose;
 - c) A receiver, executor or administrator or a manager appointed by any court of competent jurisdiction to have the charge of or to exercise rights of the owners, and

d) A mortgage in possession.

- (96) "Parapet" means a low wall or railing built along the edge of a roof or a floor having a minimum height of 1.0 m
- (97) "Parking Space" means an area enclosed or unenclosed, covered or open, of sufficient size to park vehicles, together with a driveway connecting the parking space with a street or any public area and permitting ingress and egress of the vehicles;
- (98) "Partition" means an interior non-load bearing wall, one storey or part of a storey in height.
- (99) "Permit" means a permission or authorization in writing by the Authority to carry out the work regulated by these Bye laws.
- (100) "Plantation" means plantation of plants and trees.
- (101) "Plinth" means the portion of a structure between the surface of the surrounding ground and the surface floor, immediately above the ground.
- (102) "Plinth Area" means the built up area measured at the floor level of ground floor;
- (103) "Porch" means a covered surface supported on pillar or otherwise for the purpose of pedestrian or vehicular approach to a building.
- (104) "Public Utility service" means drainage, sewerage, electricity, water supply, solid waste disposal, sanitation, fire services, roads and any other support or infrastructure and the like for which a building has to depend on public bodies, authorities or agencies;
- (105) "Ramp" means a passage with gradual slope joining two level surfaces.
- (106) "Real Estate Development" means development undertaken for sale.
- (107) "Registered Architect" means an Architect registered with the Council of Architecture and who has not been debarred by the Authority.
- (108) "Registered Builder/ Developer" means a builder empanelled/ registered with the Authority
- (109) "Registered Engineer" means a engineer empaneled/registered with the Authority.
- (110) "Road" means any access viz. highway, street, lane, pathway, alley, or bridge, whether a thoroughfare or not, over which the public have right of passage or access or have passed and had access uninterruptedly for a specified period and includes all bunds, channels, ditches, storm water drains, culverts, side tracks, traffic islands, road side trees and hedges, retaining walls, fences barriers and railings within the road line.

- (111) "Road Width or Width of Road/Street" means the whole extent of space within the boundaries of a road when applied to a new road/street as laid down in the city survey or development plan or prescribed road lines by any act of law and measured at right angles.

Plans under these bye-laws, shall be approved on the basis of width of the road/street that exists on the day of sanctioning of the plans.

while calculating the width of the road/street, the average width shall be taken into consideration which shall be decided and notified by the Authority.

The authority will measure and notify the average width of all roads falling within its area within 2 months of implementation of these bye laws. Average width of the roads will be measured on actual basis and not on any proposed planned widening of roads by measuring the road at suitable intervals.

- (112) "Row Housing" means a row of contiguous houses with only front, rear and interior open spaces.
- (113) "Room Height" means the vertical distance measured from the finished floor level to the finished ceiling.
- (114) "Schedule" means a Schedule appended to these bye laws.
- (115) "Section" means section of the Act and the Municipal Act
- (116) "Semi-Detached Building" means building detached on three sides (front, rear and side) with open spaces as specified under the Bye laws.
- (117) "Set back" means the distance between the plinth lines of the building and the boundary of the plot. The setback shall be measured at ground level.
- (118) "Setback line" means a line usually parallel to the plot boundaries and laid down in each case by the Authority beyond which nothing can be constructed towards the plot boundaries.
- (119) "Settlement" means a human settlement, whether urban or rural in character. It includes habited villages, towns, townships, cities and the areas notified under the control of the Authority.
- (120) "Site" means a parcel or piece of land enclosed by definite boundaries.
- (121) "Site with Double Frontage" means a site having frontage on two streets other than corner plot.
- (122) "Service Floor" means floor in hotel or commercial building above ground floor in case of more than four storied buildings.
- (123) "Service Lane" means a lane provided at rear or side of a plot for service purposes.

- (124) "Service Road" means a road/ lane provided at the front, rear or side of a plot for service purpose.
- (125) "Site Depth" means horizontal distance between the front and rear side boundaries.
- (126) "Smoke Stop Door" means a door for preventing or checking the spread of smoke from one area to another.
- (127) "Stilt floor" means a floor supported by pillars with all sides open to be used for parking, switch room, generator room, society room & information room with minimum height of 2.4 meter.
- (128) "Storage Space" means a space where goods of non-hazardous nature are stored and includes cold storage and banking safe vaults.
- (129) "Store Room" means a room used as storage.
- (130) "Spiral Staircase" means a staircase forming continuous winding curve round a central point or axis provided in a open space having tread without risers.
- (131) "Storey" means the space between the surface of any floor and the surface of the floor next above it, or if there be no floor above it then the space between any floor and the ceiling next above it, but shall not include a service or mezzanine floor;
- (132) "Supervisor" means a person having Diploma in Architectural Assistantship/ Diploma in Civil Engineering/ equivalent qualification.
- (133) "Tenements" means room or rooms in the occupation of, or meant for the occupation of one tenement;
- (134) "To abut" means to abut on a road so that any portion of the building or land is on the road boundary;
- (135) "To erect" a building means:
- A. to erect new building on any site whether previously built upon or not;
 - B. to re-erect any building of which portions above the plinth level have been pulled down or destroyed.
- (136) "Tribunal" means Municipal Building Tribunal under Section 329 of the Municipal Act or Tribunal constituted under the Chapter XII of the Bihar Urban Planning and Development Act 2012.
- (137) "Unsafe Building" means buildings which are structurally and constructionally unsafe, or in-sanitary, or do not provide adequate means of egress, or which constitute fire hazard, or are otherwise dangerous to human life or property, or which in relation to existing use

constitute a hazard to safety/health/public welfare by reason of inadequate maintenance, dilapidation or abandonment.

- (138) "Unauthorized Construction" means the erection or re-erection, addition or alternation, which is not approved or sanctioned by the Authority.
- (139) "Underground/Overhead Tank" means an underground/ overhead water tank, constructed or placed to store water.
- (140) "Verandah" means space with at least one side open to the outside with the exception of one-meter parapet on the upper floors to be provided on the open side.
- (141) "Ventilation" means the supply of outside air into a building through window or other openings due to wind outside and convection effects arising from temperature, or vapour pressure differences (or both) between inside and outside of the building.
- (142) "Water Closet/ W.C." means a privy with arrangement for flushing the pan with water but does not include a bath room;
- (143) "Watercourse" means a natural channel or an artificial channel formed by draining or diversion of a natural channel meant for carrying storm and wastewater.
- (144) "Window" means an opening to the outside other than a door, which provides all or part of the required light or ventilation, or both to an interior space.
- (II) Words and expressions used in these bye laws, but not defined, shall have the same meaning as respectively assigned to them in the Act/Municipal Act/respective Rules and the National Building Code of India, 2005 amended from time to time.

CHAPTER - II

ADMINISTRATION

3. **Applicability.**-Subject to the provisions of the Act and the Municipal Act, these bye laws shall apply:
- (1) To the planning, design and construction of building in case of erection of a building;
 - (2) To all parts of the building whether removed or not, and in case of removal of whole or any part of the building;
 - (3) To the remaining part of the building after demolition and work involved in demolition in case of demolition of whole or any part of a building;

- (4) To the whole building whether existing or new building (except only to that part of the building, which is consistent with these bye laws) in case of alteration of a building;
- (5) To all parts of the building affected by the change in case of change of occupancy of a building; and
- (6) To use of any land or building where sub-division of land is undertaken or use of land or building is changed;
4. **Deemed Permission.**-(1) The construction of any building in respect of which permission has been issued before coming into force of these bye laws, shall, so far as it is not inconsistent with the provisions of the old bye laws, continue to be validly made and the said permission shall be deemed to have been issued under the corresponding provisions of those bye laws.
- (2) Where any building has been constructed before the notification of these byelaws with deviation of an approved plan, the provisions of old byelaws shall be insisted upon.
- (3) Where any building has been constructed without an approved plan, the provisions of these byelaws shall be insisted upon.
5. **Application.**-(1) Any person who intends to develop land, erect, re-erect or make additions or alterations in any building, demolish any building or subdivide a plot for development shall apply to the Competent Authority. The Competent Authority may prescribe separate formats for different categories of buildings and group housing and land development.
- (2) **Colouring of plans-** Plans shall be shown as specified in Table 1. Where items of work are notified, the coloring notation used shall be indexed.

Table 1: Coloring notation of the plans

Sl No.	Item	Site Plan			Building Plan		
		Computer Print/White Print	Blue Print	Ammonia Print	Computer Print/White Print	Blue Print	Ammonia Print
1	2	3	4	5	6	7	8
1	Plot Line	Thick Black	Thick Black	Thick Black	Thick Black	Thick Black	Thick Black
2	Existing Street	Green	Green	Green	-	-	-
3	Future Street	Green dotted	Green dotted	Green dotted	Green dotted	-	-
4	Permissible Building	Thick dotted	Thick dotted	Thick dotted	Thick	Thick	Thick

		black	black	black			
5	Open Spaces	No Colour					
6	Existing out line	Black	White	Blue	Black	White	Black
7	Work Proposed to be demolished	Yellow hatched					
8	Proposed work- (a) Additions and alterations	Red filled	Red	Red	Red	Red	Red
	(b) Entirely new work	Not to be coloured					
9	Drainage and sewerage work	Red dotted					
10	Water Supply work	Black dotted thin					

(3) **Application for development permit**-The application shall be made to the Competent Authority in Form-I. The following shall accompany the application for development permit in the case of development or re-development of land into plots, sub-divisions or land use zones. The documents shall be submitted in 4 copies along with a soft copy in PDF and CAD format.

- (i) **Key Plan**- This shall show the location of land proposed to be subdivided. This shall also show the North point and scale used.
- (ii) **Site Plan**- This shall be drawn on a scale of not less than 1:1000 for plots upto 10 hectares and not less than 1:2000 for plots above 10 hectares and shall show-
 - (a) The boundaries of the site with dimensions and the details of contiguous land belonging to application indicating the kheasra numbers or any other equivalent local denomination, and in case, the continuous land owned by the applicant had been subdivided earlier, public facilities provided in it and all streets within it opening out in the site for which the permission is being sought.
 - (b) The means of access for existing street (name and width of the street is to be mentioned) to the land, which, the applicant intends to sub-divide.
 - (c) The position of all existing structures and features like high tension line, telegraph and electrical poles, underground pipe lines, trees, grave

yards, religious buildings, railway lines, etc. within a distance of 30 meters from the nearest edge of the site.

- (d) All major physical characteristics of land proposed to be developed which include the approximate location and size of water body, normal flood-affected areas and contours at an interval of 0.5 meters in case of the site which has a slope of more than 1 in 20.
- (e) Location of the site in Master Plan/Zonal Development Plan or in zoning as specified by the authority. Copies of Master Plan/Zonal Development Plan shall be supplied by the Authority on Payment. The Master Plan/Zonal Plan shall also be made available on the Web Site of the Authority which could be downloaded by the applicant for use.
- (f) Present and proposed use of land.
- (g) Scale used and North point.

(iii) **Sub-division layout Plan-** This shall be drawn on a scale of not less than 1:500 for Plot upto 10 hectares and not less than 1:1000 for plots above 10 hectares. This shall apply to plans for integrated development schemes also. This shall contain the following-

- (a) Scale used and North point,
- (b) The location of all proposed and existing roads with their widths within the land,
- (c) Building lines showing the set backs with dimensions within each plot where applicable,
- (d) The location of drains, sewers, public facilities and services and electrical lines etc. and their connections to existing public utility services system,
- (e) An analysis indicating, size, area and use of all the plots in the subdivision lay out plan,
- (f) A statement indicating the total area of the site area utilised under roads, open spaces, schools, shopping and other public places along with their percentage with reference to the total area of the site proposed to be subdivided,
- (g) In case of plots which are subdivided in built up areas in addition to the means of access to the subdivision from existing streets and the exiting service lines laid.

(iv) **Specification-** Every application for permission of sub-division of land shall also be accompanied by the following statements-

- (a) A statement containing general specification of all improvements proposed to be made within the area for example, grading and paving of roads and lanes, provision of gutters, side drains, provision of sufficient, safe and assured water supply, arrangement of sewage

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disposal, street lighting and development of parks and playfields and public utilities,

- (b) The purpose for which the land is to be used and a written analysis of distribution of land under different uses,
- (c) General specifications of the materials to be used and estimated cost of the proposed development of the area,
- (d) The quality and quantity of effluent in respect of industrial units. Any other statement required by the Authority.

(v) **Ownership title-** Every application for development permit shall be accompanied by the following for verifying proof of ownership-

- (a) Attested copy of the original sale/lease deed, and
- (b) Attested copy of the revenue receipt (Malguzari receipt) Municipal Holding Tax receipt with khesra/holding No. or mutation records.

In case of mutual partition deeds (un-registered) "DAKHAL KABJA" along with malguzari receipt is essential. Or,
Affidavit or other documents acceptable to the authority.

(4) **Application for building permit-** Application shall be made to the Competent Authority in Form-II. The following shall accompany the application for building permit in the case of permission for erection, re-erection of making material alternation. The documents shall be submitted in 4 copies along with a soft copy in PDF and CAD format.

(i) **Site Plan-** Plan sent with an application shall be drawn to a scale of not less than 1:500 for areas upto hectares and not less than 1:1000 for areas more than 1 hectare and shall show-

- (a) The boundary of the site with the contiguous land around it.
- (b) The position of site in relation to neighbouring street along with the municipal plot number and revenue plot number the name of the street in which the building is proposed to be situated, if any;
- (c) The name of street in which the building is proposed to be situated if any;
- (d) All existing buildings standing on over or under the site;
- (e) The position of the building or of all other building (if any) which the application intends to erect upon his contiguous land to in (a) in relation to:

1. The boundaries of the site and in case where the site has been partitioned, the boundaries of the portion owned by the applicant and also of the portion owned by the other.
2. All adjacent streets, buildings (with number of the stories) and premises within a distance of 15m of the site of the contiguous land (if any) referred to in (a); and

3. If there is no street within a distance 15m of the site, the nearest existing street.
- (f) The means of access from the street to the building and all other building which the owner intends to erect upon his contiguous land referred to in (a);
 - (g) Dimension of the spaces to be left in and around the building to secure a free circulation of air, admission of light and access for scavenging purposes and details of projection (if any) on the open spaces;
 - (h) The width of the street (if any) in front and of any street (if any) at the site of rear of the proposed building;
 - (i) Scale used and the direction of north point relating to plan of the building.
 - (j) Any existing physical features, such as wells, drains etc.
 - (k) Sewerage and drainage lines upto discharge point and water supply lines .
 - (l) Location of trees.
 - (m) Such other particulars as may be prescribed by the authority.
- (ii) **Building Plan-** The plan of the building and two elevations (front and side) and sections accompanying the application shall be drawn to a scale not less than (1:100). The plan shall-
- (a) Include the floor plans /mezzanine plan/ service floor of all floors together with the covered area clearly indicating the size and spacing of all framing members and sizes of rooms and the position of staircase, ramps and lift wells;
 - (b) Show the use or occupancy of all parts of the building;
 - (c) Details of the parking space;
 - (d) Show exact location of essential services for example: WC, sink, bath and the like including the water supply and drainage line;
 - (e) Include two elevation (front and sides) and sectional drawing showing clearly the size of footings, thickness of basement wall, wall construction size and spacing of framing members, floor slabs and roof slabs with their materials and size and locations of doors, windows and other openings. The section shall indicate the heights of building and rooms and also the height of the parapet and the drainage and slope of the roof. At least one section should be taken through the staircase;
 - (f) Show all street elevations (levels), finished ground level;
 - (g) Indicate details of compound walls (including height and sections) around the boundary;
 - (h) give dimensions of the permissible projected portions within open spaces;

- (i) rain water harvesting system, terrace plan indicating the drainage and the slope of the roof;
 - (j) give indications of the north point relative to the plan and scale used; and
 - (k) any other particulars as desired by the Authority.
- (iii) **Services Plan-** Plans, elevations and sections of private water supply and sewerage disposal system independent of the municipal services (if any) drawn to a scale of 1:10 shall be included.
- (iv) **Specifications-** General specification giving type and grade of materials to be used shall accompany the application.
- (v) **Ownership Title-** Every application for building permit shall be accompanied by the following for verifying proof of ownership.
- (a) Attested copy of the original sale/lease deed, and
 - (b) Attested copy of the Revenue Survey sheet/Municipal Survey sheet with Khesra no. or mutation record.
- (5) **Building Plan for Multi-storied/special buildings:** For all multistoried buildings which are 15 m. or more in height and for special buildings like educational, assembly, institutional, industrial, storage, shopping complex and multiplex and hazardous and mixed occupancies with any of the aforesaid occupancies having ground covered area more than 500 sq.m. The following additional information shall be furnished/indicated in the building plan in addition to the items given in (4) as applicable:
- (a) Access to fire appliances/vehicles with details of vehicular turning circle and clear motorable access way around the buildings;
 - (b) Size (width) of main and alternative staircases along with balcony approach, corridor, ventilated lobby approach;
 - (c) Location and details of lift enclosures;
 - (d) Location and size of fire lift;
 - (e) Smoke stop lobby/door, where provided;
 - (f) Refuse chutes, refuse chamber, service duct, etc;
 - (g) Vehicular parking space, parking space for fire brigade and ambulance;
 - (h) Details of how the fire brigade/ ambulance will travel within the plot;
 - (i) Refuse area, if any;
 - (j) Details of building services- Air-conditioning system with position of fire dampers, mechanical ventilation system, electrical services, boilers, gas pipes, etc;
 - (k) Detail of exits including provision of ramps, etc., for hospitals and special risk buildings/uses ;
 - (l) Location of generator, transformer and switch gear room;

- (m) Smoke exhauster system, if any;
 - (n) Details of fire alarm system network;
 - (o) Location of centralized control, connecting all fire alarm systems built-in-fire protection arrangements and public address system, etc.;
 - (p) Location and dimension of static water storage tank and pump room along with fire service inlets for mobile pump and water storage tank;
 - (q) Location and details of fixed fire protection installations, such as sprinklers, wet risers, hose-reels, drenchers, etc; and
 - (r) Location and details of first-aid firefighting equipment/ installations.
 - (s) longitudinal cross section of the building including size of footings, basement and super structure framing members and details of building and room heights and of staircase.
- (i) **Services plans:** The services plan shall include all details of building and plumbing services, and also plans, elevations and sections of private water supply, sewage disposal system and rain water harvesting system.
- (ii) **Landscape Plan:** The landscape plan shall include the area to be developed as lawn, garden, plantation etc.
- (iii) **Specifications:** Specifications, both general and detailed, giving type and grade of materials to be used duly signed by the registered architect, engineer, structural engineer shall accompany the notice.
- (6) **Certificates/Clearances:**
- (i) Attested copy of original sale/ lease deed, attested copy of the revenue receipt/ municipal holding tax receipt/ holding number and mutation records.
 - (ii) In case the applicant is a trust, group of persons, partnership or a company, a registered agreement between the holder of the right, title and interest and the applicant, valid under the Transfer of Properties Act, 1982 and Copies of the Agreement/ Article of Association/ Memorandum/ Bye-laws.
 - (iii) No Objection Certificate from the Bihar State Housing Board / any Regional Development Authority, for the additional constructions, in case the house/ plot is delivered by the Board / Authority.
 - (iv) Necessary environmental clearance from the appropriate authority wherever applicable. [refer to provisions laid down in the Environmental Impact Assessment Notification-2006 dated 14 September 2006, amended by subsequent notifications by Ministry of Environment and Forest, Government of India. The Department of Environment and Forest, Government of Bihar may also prescribe norms for environment clearance.
 - (v) For all buildings with a height of 15.0 meters and above or ground coverage more than 500 sq m, NOC from the authority to be notified

under Chapter VI of the Bihar Fire Service Act 2014, shall be submitted.

- (vi) NOC from Airport Authority of India shall be furnished wherever applicable.
- (vii) A certificate from the registered Engineer that the building plan and the design complies with the Earthquake Safety requirements as stipulated in the बिहार में, भूकम्पीय खतरों से न्यूनीकरण के लिये, भवनों के निरूपण एवं निर्माण का परिपत्र, बिहार राज्य आपदा प्रबंधन प्राधिकरण, पत्रांक-10/विविध/आ०प्र०प्रा०-13/2011-2253/ आ०प्र०, बिहार सरकार, बिहार राज्य आपदा प्रबंधन प्राधिकरण (आपदा प्रबंधन विभाग) as in Appendix A. For buildings above G+2 (maximum 10m height) the registered Engineer shall also supervise the construction of the building so that the provision mentioned in the above mentioned circular are complied with. (See Form-III)
- (viii) For buildings more 15m in height, structural stability certificate in the prescribed Form-IV with Design Basis Report, signed by the engineer /structural engineer and the owner jointly shall be furnished.
- (ix) Supervision certificate in Form-V shall be furnished by the registered architect/ engineer/structural engineer/ supervisor/ town planner undertaking the supervision.
- (x) A check list in Form-VI shall be furnished by the empanelled/registered technical person.

6. **Signing the Plans.**-(1) All the plans shall be prepared and duly signed by a registered/empanelled technical person as specified in Annexure-I (viz. Architect, Engineer, Structural Engineer, Town Planner, Supervisor, Draftsman) and Builder who shall indicate their names, addresses, registration numbers on the body of the plan and in all other relevant documents. The concerned owner of the land shall also sign the plans.

(2) All plans, drawings, statements, design details shall bear the signature of the applicants and shall be duly countersigned by an empanelled Architect/Technical person. All documents and plans related to structural designs shall bear the full name and full signature of a Structural Engineer. Plans and documents related to sanitary arrangements shall bear the full name and full signature of a technical person.

Note: 1. The Empanelled Architect/Technical Person who has prepared the plan shall put the empanelment number/CoA Registration No. and seal on all plans and documents signed by him and shall also furnish a certificate to the effect that he shall supervise the construction of the building and shall be responsible for any deviation from the approved plan except if the Owner/Architect/Technical person intimates that their agreement has been terminated.

2. Wherever required under these bye-laws, the empanelled Structural Engineer, who has prepared the structural design, shall put his seal, and address on all the documents signed by him and shall also furnish a certificate to the effect that he shall supervise the structural part of the construction and shall be responsible for any structural failure except caused by unprecedented natural calamities in Form-IV and except if the owner intimates that his services have been terminated.
3. All aspects related to structural design, building surface, plumbing, electrical installation, sanitary arrangements, fire protection shall adhere to the specification, standards and code of practice recommended in the National Building Code of India, 2005 and any breach thereof shall be deemed to be a breach of the requirements under these Bye laws.
- (3) The technical personnel and builder as specified in sub-bye law (1) & (2) above shall have to be registered/empanelled with the Authority. Their qualifications and competence shall be as per Annexure I. The application form shall be as per Form-VII A & Form-VII B.
- (4) No plans for construction of apartment building, group housing and commercial building shall be entertained unless the builder is registered by the Authority in accordance with the competence as specified in the Annexure I. However for built up area less than 500 sq.m, registration of builder is not mandatory.
- (5) When it comes to the notice of the Planning Authority/ Municipalities/ Urban Local Bodies or any other person that a plan signed by technical personnel or builder referred to under sub-bye law (1) & (2) is in violation of the norms of these byelaws he shall bring this to the notice of the Authority.
- (6) The Authority shall issue a notice asking for a show cause within fifteen days as to why such technical personnel or builder shall not be disqualified/ black listed and legal action taken against him. After receipt of the show cause if any, the matter shall be placed before the Concerned Authority for a decision on such disqualification/ black listing /legal action. The decision of the Concerned Authority on disqualification/black listing shall be published in the notice Board of the Authority.
- (7) An appeal against an order under sub-clause (6) above shall lie with Municipal Building Tribunal under Section 329 of the Municipal Act or Tribunal constituted under the Act.

7. **Fees.-** (1) The Authority shall levy the following fees:

- (I) Every application for permission for building operation or development shall be accompanied by a building fee as specified in these bye laws.
- (II) Fees towards premium FAR as decided by the Authority from time to time with the approval of the Department.
- (III) Fees for retention of structures for temporary period shall be as decided by the Authority from time to time.

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- (IV) Fees for change of occupancy as decided by the Authority from time to time.
- (V) Fees for change of land use as decided by the Authority from time to time.
- (VI) Any other fee decided by the authority with the approval of the Urban Development and Housing Department.
- (VII) The Department may change the fees prescribed in these bye laws through a notification.
- (2) **Development permit fee.**- The scale of fees for development permit shall be as per Table 2.

Table 2 : Development permit fees

Sl no.	Area of Plot	Gram Panchayat within planning area Rs	Nagar Panchayat (Rs)	Municipal Council (Rs)	Municipal Corporation (Rs)
(i)	(ii)	(iii)	(iv)	(v)	(vi)
1	up to 1.0 hectare	5000	6000	8000	10000
2	above 1.0 hectare & up to 2.5 hectare	10000	12000	15000	20000
3	above 2.5 hectare & up to 5.0 hectare	15000	16000	20000	30000

- (i) For development permit above 5 hectare for every addition of 1 hectare or part there will be an additional fees of Rs 2000 per hectare.
- (ii) In the case of development permit for non residential use the above fees shall be doubled for different sizes of land.

(3) **Building permit fee**

Residential buildings: The fees for building permit shall be as per Table 3.

Table-3: Building permits fees
(in Rs per sq meter built-up area)

Sl. no.	Height of Building	Gram Panchayat within planning area	Nagar Panchayat	Municipal Council	Municipal Corporation	
					Population up to 10 Lac	Population above 10 Lac.
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
1	up to 10.0 m	3.0	4.0	6.0	10.0	12.0

2	up to 15.0 m	5.0	6.0	8.0	15.0	18.0
3	More than 15 m	6.0	8.0	12.0	20.0	25.0

(i) **Buildings for Charitable Purpose:**In case of Institutional buildings built for charitable, religious purpose the fees shall be charged at half of the rates prescribed in Table 3.

(ii) **Non-Residential Buildings:** In case of buildings other than those mentioned in (i) above to be used for non-residential purpose, the fees charged shall be double of the rates prescribed in Table 3.

(4) **Fixation of fees**

The fixation of these fees shall be governed by the following. -

- (i) For re-erection of existing building, the fees chargeable shall be the same as that for erection of new building.
- (ii) For additions and alterations in the existing building, the fees shall be chargeable on the added portions only, and on the same scale as for a new building.
- (iii) For revision and revalidation of a plan of a building, which the Authority has already sanctioned, the fees chargeable shall be 1/4 of the fees chargeable on the original plan subject to the condition that the covered area of the building has not increased than in the original sanctioned plan.
- (iv) In case of additions and alterations of building, if the use of the building is also changed, then the chargeable fees shall be calculated on the use proposed.
- (v) In case of basements, for the purpose of calculating the fees the area covered under the basement shall be counted towards the covered area.
- (vi) In the case of buildings with principal and subsidiary occupancies, in which the fees leviable are different, then the fees for the total building scheme shall be calculated as per the rates for individual occupancies.

The owner may withdraw his application and plans at any time prior to the sanction and such withdrawal shall terminate all proceedings with respect to such application. The fees paid in such cases shall not be refunded.

(5) **Infrastructure Development Fees**

The Authority may also impose an infrastructure development fees with the approval of the Department.

8. **Permission.**-(1) No permission or notice shall be required for the works related to the following alterations and the like which do not otherwise violate any provisions regarding general building requirements, structural stability and fire and health safety requirements of the National Building Code-2005:

- (i) Opening and closing of a window or door or ventilator;
- (ii) Providing intercommunication doors;
- (iii) Providing partitions;

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- (iv) Providing false ceiling;
 - (v) Gardening;
 - (vi) White washing;
 - (vii) Painting;
 - (viii) Re-tiling and reproofing;
 - (ix) Plastering and patch work;
 - (x) Re-flooring; and
 - (xi) Construction of sunshades on one's own land.
- (A). No permission shall be necessary for works carried out by Central Government and State Government Departments/ Bihar State Housing Board if the plans are signed by Government Architects. However the Government Architects shall ensure that the plans are prepared as per the provision of these bye laws and the master plan/ development plan wherever applicable. In case of such Government Projects lying in the area outside of any development plan/ scheme, the Government Architects shall ensure to obtain NoCs required as per provision of this bye laws and Acts.
- (B). A separate guideline may be issued for sanctioning of project within the Gram Panchayat area but falling outside the jurisdiction of any Planning Authority.
- (2) All clarifications with respect to deficiency in the plan, documents will be sought for from the applicant within 30 days.
- (3) Once the plan has been scrutinized and objections have been pointed out, the applicant shall modify the plan to comply with the objections raised and re-submit it. The Competent Authority shall scrutinize the re-submitted plan and if there will be further objections, the applicant should be given one more chance to comply with the objections raised within a period of 30 days after which if the final revised plan are not resubmitted the plan shall be rejected.
- (4) The Competent Authority shall communicate either approval in Form-VIII A or refusal in Form-IX within 60 days from date of receipt of application under Bye Law-5 or within 30 days from the compliance of objection raised by the Competent Authority.
- (5) For buildings 15m and above in height, conditional permission shall be accorded directing the builder to develop the onsite and offsite infrastructure like connectivity of sewerage, drainage, water supply, road etc. as per the specification of the local Authority.

The builder/developer shall produce the required NOCs from the concerned Authorities and submit it to the authority before the commencement of work. No separate permission shall be required.

The Planning Authority/Authority shall establish a single window clearance system to process such NOCs and clearances related to it.

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(6) A residential building may be constructed by the owner of the land without prior approval of the plan by the Authority if the size of the plot is not more than 300 sq.meters and if all the conditions mentioned below are satisfied:

- (A). The applicant shall submit an application to the Authority as prescribed in bye law 5(4) along with a certificate from the registered Engineer that the building plan and the design complies with the Earthquake Safety requirements as stipulated in the बिहार में, भूकम्पीय खतरा से न्यूनीकरण के लिये, भवनों के निरूपण एवं निर्माण का परिपत्र, बिहार राज्य आपदा प्रबंधन प्राधिकरण, पत्रांक-10 /विविध /आंप्रंप्रां-13 /2011-2253 /आंप्रं, बिहार सरकार, बिहार राज्य आपदा प्रबंधन प्राधिकरण (आपदा प्रबंधन विभाग: as in Appendix A).
- (B). The height is not more than 10 meters,
- (C). The number of floors does not exceed ground plus two floors,
- (D). No basement/stilt is to be constructed,
- (E). The road, drainage, sewerage and other infrastructure have been developed as per the approved layout plan or provisions for their development has been made in the building plan,
- (F). A notice in Form-X is submitted to the Authority, with a copy of the plan, documents mentioned at A above and the Record of Rights, statement of compliances made to the objection raised by the Authority (if any) 60 days prior to commencement of construction; and
- (G). All other conditions of the bye laws are met;
- (H). The owner shall have to submit a copy of the completion certificate as required.
- (I). The owner and the builder shall remain responsible for any violation of the norms prescribed under the Bye laws. Nothing in this provision will enable the owner and the builder to violate any of the provisions of the Bye laws.
- (J). Detailed guidelines in this regard if required shall be framed by the Authority from time to time.

(7) In case the permission is refused an appeal shall be filed before the Tribunal.

9. **Duration of Permission.**-Every permission granted under these bye laws shall remain valid up to three years from the date such a permission is granted. The completion certificate shall have to be submitted within this period. However in case of failure to submit the completion certificate within the prescribed period the permission shall have to be revalidated before the expiry of the above period on payment of such fee as may be prescribed by the authority and such revalidation shall be valid for another two years.

If the building/development works is not completed within the above mentioned five years period, the applicant shall make a fresh application for approval of building plan.

10. **Notice for commencement of work.**-The owner/applicant, upon commencement of his work under the building permit or for development land shall give notice in Form-X to the Authority that he is starting work and the Authority shall cause inspection of the work to be made within 14 days following the receipt of notice to verify that the building has been allocated and development work is being carried out in accordance with the sanctioned plans. If, however, the authority fails to make the inspection within the specified period, it shall be presumed that the Authority has no objection to the construction.
11. **Information at the site of construction.**-(1) Whereas tests of any material are made to ensure conformity of the requirements of these bye laws, records of the tests data shall be kept available for inspection during the construction of building and for such period thereafter as required by the Authority.
(2) The persons to whom a permit is issued during construction shall keep pasted in a conspicuous place on the property in respect of which the permit was issued, a copy of approved drawings and specifications;
12. **Periodic report of Construction.**-In case of high rise buildings the builder/ owner/ applicant shall submit a periodic progress report after each roof slab casting in Form-XI to the authority. The process of submission of such reports shall be made easy through an online process.
13. **Inspection.**-(1) As a matter of course all construction or work for which a permit is required shall be subject to inspection by the Authority at all reasonable hours with prior intimation.
(2) Inspection, where required, shall be made within seven days following the receipt of periodic report of construction in Form-XI. At the first inspection, the Authority shall determine that the building construction has been taken up in accordance with approved plans. A copy of the inspection report shall also be made available to the builder/ developer.
14. **Cancellation.**-If any time after permission to proceed with any building or development work has been given, the Authority is satisfied that such permission was granted in consequence of any material misrepresentation or fraudulent statement contained in the application given or information furnished, the Authority may cancel such permission and any work done thereafter shall be deemed to have been done without permission.
15. **Completion of Construction.**-(1) The Authority shall permit an empanelled Architect/ Engineer to certify completion of building for residential buildings designed by self or otherwise on a plot size referred to in bye law 8(6). The responsibility of compliance

with respect to provisions of these bye laws shall rest with registered architect/engineer/owner.

- (2) For all buildings including mentioned in (1) above, the owner/concerned empanelled architect/engineer/structural engineer will submit the notice of completion in Form-XII to the Authority that the building has been completed in all respects as per the approved plan and provision of the Byelaws. The said notice shall be accompanied by the following documents:
- Three copies of completed building plans.
 - A fee of Rs.1000/-.
 - Record of Rights relating to ownership.
 - Copy of approved plan and approval letter.
 - Certificate of establishment of fire safety appliances by the nominated authority wherever applicable.
 - Evidence to the effect of all public utility services, and in particular, sewerage, drainage, water supply, and electricity have been linked to the main public utility system.
- (3) The deviations shall also be brought to the notice of the Authority (with relevant documents).
- (4) The team of officials shall visit the site within 15 days and occupancy certificate shall be given. The team will verify the following facts
- Number of floors
 - Building height
 - External Setbacks
 - Building Line
 - Parking space provision
 - Abutting road width
 - FAR
 - Tree Cover
 - Water harvesting structures
 - Land if required to be surrendered.

The team shall record the deviations made from the approved plan.

- (5) Implementation of Life Safety provisions as mentioned in National Building Code 2005 (Group-1 Part-IV Fire and Life Safety-4) shall be complied wherever applicable.

16. Certificate for occupancy.-(1) The Authority shall issue a certificate for occupancy for all category of buildings, for part of a building during its construction or whole of the building after construction in Form-XIII or refuse occupancy, as the case may be, within 30 days from the date of application. The refusal of occupancy certificate shall be a speaking order clearly mentioning the reason for refusal of occupancy certificate. If the Occupancy Certificate is not issued within time limit mentioned above, the applicant shall submit a notice with an affidavit that the construction is strictly as per the approved plans and no dues in development charges or any other form of payment

to be made to the Authority are pending and all the conditions for issuing of occupancy permission are complied with. In case of non compliance of such notice within 15 days, it will be deemed to have been granted. In case of any false statement the applicant shall be liable for punishment under the provisions of these Bye Laws and other suitable legal action.

- (2) Temporary occupancy - Upon the request of the licensed technical personnel, the Authority may issue a temporary certificate of occupancy for a building or a part thereof before the entire work covered by the building permit shall have been completed, provided such portion or portions may be occupied safely prior to full completion of building without endangering life or public welfare.
- (3) Development Certificate- No land or plot thereafter developed shall be given possession in whole or in part until the issue of a development certificate by the authority after affirming that such development is in accordance with the sanctioned plan and prescribed specification as per Performa given in Form-XIII. The Development Certificate shall be issued within 30 days of receipt of the application. The refusal of development certificate shall be a speaking order clearly mentioning the reason for refusal.
- (4) Before issuing occupancy certificate, the competent authority shall verify that the building complies with the provisions of life safety as mentioned in National Building Code 2005(Group-1 Part-IV Fire and Life Safety-4) wherever applicable.
- (5) The department/line agencies dealing with electric power, water supply, drainage and sewerage shall not give connections to building unless such occupancy/ development certificate is produced. Any violation by the department/Authority/Agencies in this regard shall be treated as an offence under the Bihar Municipal Act 2007 and the Act. However a limit connection of water supply and electricity for the purposes of construction can be given after the approval of the Building Plan.
- (6) The occupancy/development certificate shall also state the use/type of occupancy of the building. However, the applicant may apply for change of use/occupancy permitted within the purview of the Development Plan/Zonal Plan/ Zoning Regulations, where so required.
- (7) In case of multi storied building (residential buildings greater than 15m in height) and other special building like educational, assembly, institutional, industrial, storage and hazardous and mixed occupancies with ground covered area more than 500 sq.mtr., periodic inspection shall be made by the authority nominated by the State Government under Chapter VI of the Bihar Fire Service Act 2014, once in five years to ensure the fire safety provisions of the building are in proper order and the building complies with the provision of fire and life safety requirements ('Fire and Life Safety', Part-4 of NBC).In case the building fails to comply with requirement of fire safety the building shall be declared unsafe.
- (8) All occupied buildings and buildings covered under sub-bye law (4) above shall also be subject to periodic physical inspection by a team of multi-

disciplinary professionals of the Authority. This work may be out sourced by the Authority as may be deemed necessary. The team shall report compliance of bye-laws, natural lighting, and ventilation, lift besides structural and electrical safety. If any short comings/deficiencies or violations are noticed during inspection, the occupants shall ensure the compliance of the same within a specified time frame of six months. If not complied with, the building shall be declared unsafe. The period of inspection shall be once in five years.

- (9) An appeal against the decision of the Authority shall lie with the respective Tribunal under the Act or the Municipal Act.

17. Construction not according to plan.-(1) If the Authority finds at any stage that the construction is not being carried on according to the sanctioned plan or is in violation of any of the provisions of these bye laws, it shall notify the owner giving details of deviation and no further construction shall be allowed until necessary corrections in the plan are made and the corrected plan is approved. In case the deviation is within condonable limits the construction shall not be stopped.

- (2) If the owner fails to comply with the requirements at any stage of construction, the Authority may cancel the building permission issued and shall cause notice of such cancellation to be pasted upon the said construction. If the owner is not traceable at the address given in the notice, pasting of such notice on the premises shall be considered as sufficient notification of cancellation to the owner thereof. No further work shall be undertaken or permitted upon such construction until a valid building permission is issued thereafter.
- (3) The notification under sub-bye law (2) shall also be published in as public notice and also on the Website.
- (4) The above-mentioned procedure shall also be followed in case of deviation of the layout.
- (5) An appeal against an order under sub-bye law (2) above shall lie with the respective tribunals under the Act and Municipal Act.

18. Single Window Clearance.-(1) The Planning Authority/ Authority shall set up a Single Window Clearance system to process all the NOCs and grant permissions. There shall be a Website through which all the applications/ documents/ forms shall be filed online. The stages of approval/refusal shall also be communicated through the website.

- (2) Every applicant seeking NoC and permission unless exempted under these Bye Laws shall apply in the Common Application form through website.
- (3) The Common Application form duly filled in together with fees to be paid under these Bye Laws shall be submitted in required number of copies along with relevant enclosures, certificates, fees receipts and attachments in the Single Window Cell in the office of the Authority.
- (4) All applicants shall furnish the form of self certification and also a certificate by Competent Technical Person along with the application at the time of submission of application forms;

- (5) There shall be a check list appended to the common application forms which shall be completed and signed by the applicant and scrutinized and accepted by the authorized representative of Single Window Cell in the office of the Competent Authority before issuing the acknowledgment;
 - (6) Before issuing the acknowledgement, the authorized representative of the Single Window Cell in the office of the Authority, shall satisfy that the application is complete in all respect;
 - (7) The relevant parts of the common application form shall be served on the respective authorities within three working days from the date of issuing the acknowledgment;
 - (8) The respective authority shall process the application and communicate the decision to the Nodal Authority within further 10 working days;
 - (9) In case of rejections of clearances or approvals with modification by the respective authority, the Nodal Authority shall examine the issues involved, may ask the applicant for such modifications as required by the respective authority for further consideration;
19. **Art commission.**-(1) The Urban Art and Heritage Commission shall be constituted by the Government. In areas and zones specified by the Urban Art and Heritage Commission, where the building plan accompanying the application seeking permission, requires the clearance of the Urban Arts and Heritage Commission, Bihar, constituted under section 77 of the Act, the authority shall grant the permission only after the clearance is given by the said Commission. In all other cases, Architectural Control shall be regulated according to the provisions of these bye laws. The Commission may impose such conditions and restrictions as it may think necessary including enforcement of specific color code and architectural features.
- (2) The Authority, on the recommendation of the Urban Arts and Heritage Commission, may issue public notices, from time to time, prescribing the architectural norms in different zones.
20. **Construction near protected monuments.**-(1) No construction or re-construction of any building, within a radius of 100 meters, or such other higher distance from any archaeological site, as may be decided by the Archaeological Survey of India and Bihar State Art, Culture and Youth Department from time to time, from the outer boundary of a declared protected monument shall be permitted.
- (2) (i) No construction above 1st floor and above 7 (seven) meters shall be allowed beyond a radius of 100 meters and within a radius of 300 meters of such monuments.
- (ii) The construction or reconstruction of any building under sub-bye law (2) shall not be above 7 (Seven) meters of total height.

- (3) Notwithstanding anything contained in the sub-bye law (1) & (2) above, construction/re-construction/addition/alteration shall be allowed on production of clearance from A.S.I./State Archaeology Department as the case may be.
- (4) If a building or premises, not covered under The Ancient Monument Preservation Act, 1904, or The Ancient Monuments and Archaeological Sites and Remains Act, 1958, in the opinion of the Authority, is of historical or architectural interest, and is in danger of being demolished or altered or likely to be affected in its character by a development, the Authority shall not grant permission for construction over any land situated near the said building or premises. The matter shall be referred to the Art Commission, whose decision shall be final.
- (5) These provisions shall apply mutatis mutandis in respect of archaeological sites notified by the Art Commission.
- (6) An appeal against the decision under sub-bye law (4) shall lie with the respective Tribunal under the Act or the Municipal Act.

21. Construction near important buildings.-No building exceeding 10 meters height shall be permitted within 200 meters radius from the boundary of the Governor's House, Bihar State Secretariat, Bihar Legislative Assembly, High Court and such other buildings as may be decided by the Authority or the State Government from time to time.

22. Construction near river front.- (1) No construction or re-construction of any building, within a strip of land of 200 metres, or such other higher distance as may be prescribed from time to time by the State Government, from the outer boundary of the river of Ganges (as prescribed by the Irrigation Department), shall be permitted except for repair and renovation work of heritage buildings.

- (2) In case of rivers other than the Ganges, no construction or re-construction of any building shall be allowed, within a strip of land of 100metres, or such distances as prescribed by the State Government, from the outer boundary of the riverfront of any river (as prescribed by the Irrigation Department). The State Government shall notify a list of such rivers.
- (3) No construction shall be allowed within the boundary of the river.
- (4) Notwithstanding the above provision, any Planning Authority or Government Body shall be able to undertake development and beautification work of riverfront, ghats or any other planned development on reclaimed lands with the approval of the Government.

23. Unsafe building.-(1) All unsafe buildings shall be considered to constitute danger to public safety and shall be restored by repairs or demolished or dealt with otherwise as directed by the Authority.

- (2) The Authority shall examine or cause to be examined every building reported to be unsafe or damaged and shall make a written record of such examination.
- (3) Whenever the Authority finds any building or portion thereof to be unsafe, it shall, in accordance with established procedure for legal notice, give to the

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owner or occupier of such building written notices stating the defects thereof. This notice shall require the owner or the occupier within a stated time either to complete specified repairs or improvements or to demolish and remove the building or portion thereof.

- (4) The Authority may recording the reasons thereof directing in writing that the building which in its opinion is dangerous, or has no provision for exit in the event of fire, shall be vacated immediately or within the period specified for the purpose.
- (5) If any person does not comply with the orders of vacating a building, the Authority may with the help of police remove the person from the building.
- (6) In case the owner or occupier fails, neglects or refuses to comply with the notice to repair or to demolish the said building or portion thereof, the Authority shall cause the danger to be removed either by demolition or repair of the building or portion thereof or otherwise.
- (7) In case of emergency, which, in the opinion of the Authority involves imminent danger to human life or health, the decision of the Authority shall be final. The Authority shall forthwith or with such notice as may be possible promptly cause such building or portion thereof to be rendered safe by retrofitting/strengthening to the degree of safety or removed. For this purpose, the Authority may at once enter such structure or land on which it stands, or abutting land or structure, with such assistance and at such cost as may be deemed necessary. The Authority may also get the adjacent structures vacated and protect the public by appropriate fencing or such other means as may be necessary.
- (8) Costs incurred under sub-bye laws (6) & (7) shall be charged to the owner of the premises involved. Such cost shall be charged on the premises in respect of which or for the benefit of which the same have been incurred and shall be recoverable as provided under law.

24. Demolition of building.-(1) Before a building is demolished, the owner shall notify all utilities having service connections within the building, such as water, electricity, gas, sewer and other connections. A permit to demolish a building shall not be issued until a release is obtained from the utilities departments stating that their respective service connections and appurtenant equipment, such as meters and regulators have been removed or sealed and plugged in a safe manner.

- (2) The owner shall take all precautionary measures to avoid noise and dust pollution and shall not create any inconvenience to the neighboring plot owners.

25. Responsibility and Duty of the owner.-(1) Neither granting of the permit nor the approval of the drawing and specifications, nor inspections made by the Authority during erection of the building shall in any way relieve the owner of such building from full responsibility for carrying out the work in accordance with the requirements of these bye laws.

(2) Every owner/applicant shall:

- (A). Permit the Authority to enter the building or premises, for which the permission has been granted at any reasonable time for purpose of enforcing the bye laws;
- (B). Obtain, where applicable, from the competent Authority permissions /clearance required in connection with the proposed work;
- (C). For buildings more than 12m in height, give written notice to the Authority before commencement of work on building site in Form-X and periodic progress report in Form-XI, notice of completion in Form-XII and notice in case of termination of services of Technical persons engaged by him and
- (D). Obtain an Occupancy Certificate from the Authority prior to occupation of building in full or part.

26. Responsibility of Authority.-(1) Approval of plans and acceptance of any statement or document pertaining to such plan shall not exempt the owner or person or persons under whose supervision the building is constructed from the responsibilities imposed under these bye laws, or under any other law for the time being in force.

(2) Approval of plan would mean granting of permission to construct under these bye laws only and shall not mean among other things:

- (A). The title over the land or building;
- (B). Easement rights;
- (C). Variation in area from recorded area of a plot or a building;
- (D). Structural stability;
- (E). Workmanship and soundness of materials used in the construction of the buildings
- (F). Quality of building services and amenities in the construction of the building,
- (G). The site/ area liable to flooding as a result of not taking proper drainage arrangement as per the natural lay of the land, etc. and
- (H). Other requirements or licenses or clearances required for the site / premises or activity under various other laws.

(3) The approval or permission shall not bind or render the Authority liable in any way with regard to the matter specified in sub-bye laws (2) (A.) to (H.) above.

(4) **Maintenance of Register.**-A register in Form-XIV containing the necessary particulars including information as to the manner in which applications for permission have been dealt with by the Authority shall be maintained.

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CHAPTER - III

LAND USE CLASSIFICATION AND PERMISSIBLE USES

27. **Zoning.**-(1) In the Planning area or areas where various use zones viz, residential, commercial, industrial, administrative, institutional, open space uses, transport & communication, green belt, natural drainage channel and water bodies having their zonal boundaries have been indicated, they shall be regulated as per the Table 4. Except as otherwise provided no structure or land hereinafter shall be used and no structure shall be erected, re-erected or altered unless its use is in conformity with these bye laws.
- (2) For all non-confirming land use, no expansion shall be permitted. At the time of redevelopment, stipulated zoning regulations shall be followed.
28. **Different use of land.**-(1) Permission for different uses shall be accorded outright for principal use earmarked in the different zones described in column (2) of table No 4.
- (2) Permission for different uses described in column-3 of the Table shall be permitted on special consideration and approval of Authority and reasons for such consideration shall be recorded in writing.
- (3) The purposes specified in column (4) of the said Table shall not be permitted in the areas reserved for particular uses.
- (4) Residential buildings and others buildings may be permitted in the Urban Agriculture use zone if the following conditions are satisfied along with other conditions of these bye laws :
- A. The land is not a leasehold land;
- B. The coverage is not more than 20%;
- C. The height is not more than 7.0 (seven) meters; and at least 60% of land is used for plantation/ agriculture;
- (5) Projects of planned township development may be allowed in Urban Agriculture Zone by the authority. Such permission shall be accorded by the Authority with the approval of the Bihar Urban Planning and Development Board constituted under the Bihar Urban Planning and Development Act 2012.
- (6) Mixed land use may be permitted in a particular zone on approval by Authority. However, the main use shall cover not less than 2/3rd of the total floor area and the ancillary use shall not exceed 1/3rd of the total floor area.
- (7) Appeals with respect to the above provisions shall lie with the tribunal.
- (8) In case of Government and Government Sponsored projects, the State Government may relax the land use criteria mentioned in table 4.
- (9) Where Development Plan/Master Plan has not been finalized for any Authority, guidelines for classification of land use shall be issued by department.

Table 4: Land use permitted/prohibited in different use zones

SN	Use Zone	Uses/Activities Permitted	Uses/Activities Permissible on approval by Authority	Uses/Activities Prohibited
	1	2	3	4
1	Residential Use Zone	1. Residence plotted (detached, semi-detached and row housing), apartment, group housing, work-cum-residential	1. Places of worship	1. Heavy, large and extensive industries, noxious, obnoxious and hazardous industries
		2. Hostels, boarding and lodging houses	2. Shopping centres	2. Warehousing, storage godowns of perishables, hazardous, inflammable goods, wholesale mandis, junk yards
		3. Night shelters, dharamshalas, guest houses	3. Municipal, State and Central government offices	3. Workshops for buses
		4. Educational buildings (nursery, primary, high school)	4. Colleges and research institutions	4. Slaughter houses
		5. Neighborhood level social, cultural and recreational facilities with adequate parking provisions	5. Petrol filling stations	5. Hospitals treating contagious diseases
		6. Marriage and community halls	6. Places of entertainment, cinema halls, restaurants and hotels	6. Sewage treatment plants and disposal sites
		7. Convenience shopping, local (retail) shopping	7. Markets for retail goods	7. Water treatment plants, solid waste dumping grounds
		8. Community centers, clubs, auditoriums	8. IT and IT enabled services	8. Outdoor and indoor games stadiums, shooting range
		9. Exhibition and art galleries; Zoological garden, botanical garden,	9. Tourism related services	9. Bird Sanctuary
		10. Libraries and gymnasiums	10. Motor vehicle repairing workshop, garages, storage of LPG cylinders	10. International conference centers

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		11. Health clinics, yoga centers, dispensaries, nursing homes and primary health centers.	11. Burial grounds	11. District battalion offices, forensic science laboratory
		12. Public utilities and buildings except service and storage yards, electrical distribution depots and water pumping stations	12. Printing presses employing not more than 10 persons	12. All uses not specifically permitted in column (2) and (3)
		13. Nursery and green houses	13. Godowns /warehousing of non-perishables	
		14. Services for households (salon, parlours, bakeries, sweet shops, dry cleaning, stationary, tailoring, internet kiosks etc.)House hold industry with not more than 10 employees.	14. Bus depots without workshop	
		15. Banks and professional offices not exceeding one floor	15. Household industries if the area for such use does not exceed one floor and there shall be no public display of the goods	
		16. Bus stops, taxi stands, 3 wheeler/auto stands, rickshaw stands	16. Consulates	
		17. Police posts and post offices		
		18. Parks and tot-lots		
		19. Integrated Township		
2	Retail Commercial and Business Use Zone	1. Retail business, mercantile	1. Associated residential uses	1. Polluting industries
		2. Commercial centers	2. Wholesale storage yards	2. Heavy, extensive, noxious, obnoxious, hazardous and extractive industrial

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			units
	3. Banks, financial services.	3. Service garages provided they do not directly about the main road, Stock exchanges	3. Hospitals, research laboratories treating contagious diseases
	4. Perishable goods markets	4. Printing presses employing not more than 10 persons	4. Poultry farms, dairy farms, slaughter houses
	5. Business and professional offices	5. 20 bedded hospitals not treating contagious diseases and mental patients	5. Sewage treatment plants and disposal sites, solid waste treatment plants and dumping grounds
	6. Private offices, Institutional offices, Government and Semi Government offices	6. Weigh bridges	6. Agricultural uses, storage of perishable and inflammable commodities
	7. Shops and shopping malls	7. Colleges, polytechnics and higher technical institutes	7. Quarrying of gravel, sand, clay and stone
	8. Commercial services	8. Sports complex and stadiums. Zoological gardens, botanical gardens	8- Bird sanctuary
	9. Restaurants and hotels	9. Transient visitor's homes	9. Sports training centers
	10. Hostels, boarding houses, social and welfare institutions, guest houses	10. Places of entertainment, recreational uses and museums	10. District battalion offices
	11. Convenience and neighborhood shopping centers, local shopping centers, weekly and formal markets, bakeries and confectionaries	11. Convention centers	11. Forensic science laboratory and all other related activities which may cause nuisance
	12. Cinema halls, theaters, banquet halls, auditoriums	12. Religious places	12. Court
	13. Marriage and community halls, night shelters	13. Public utilities, telephone exchanges	13. All uses not specifically permitted in the column (2) and (3)
	14. Clinics and nursing homes	14. Police posts and post offices	
	15. Petrol Pumps	15. Residential,	

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			apartment, group housing	
		16. IT and IT enabled services	16. Picnic Hut	
		17. Commercial institutes, research and training institutes		
		18. Parking lots		
		19. Taxi stands, 3 wheeler/auto stands, rickshaw stands		
		20. Integrated Township		
3	Wholesale Commercial Use Zone	1. Wholesale and retail business	1. Truck terminal, bus depots and parking	1. Polluting Industries
		2. Wholesale and storage buildings	2. Freight terminal	2. Large scale storage of hazardous and other inflammable materials except in areas, specifically earmarked for the purpose
		3. Commercial and business offices and work places	3. Warehousing, storage godowns of perishable, inflammable goods, coal, wood, timber yards	3. All uses not specifically permitted in columns (2) and (3)
		4. Petrol pumps and service stations on roads of 12 meter or more ROW	4. Service centers, garages, workshops	
		5. Godowns, covered storage and warehousing	5. Non-polluting, non-obnoxious light industries	
		6. Weigh bridges	6. Junk-yards	
		7. Bus stops, taxi stands, 3 wheeler/auto stands, rickshaw stands	7. Gas installation and gas works	
		8. Parking spaces	8. Railway yards and stations, road freight stations	
		9. Restaurants	9. Banks and financial services	
		10. Public utilities	10. Associated residential uses, residential, apartment,	

			group housing	
		11. Police station/ posts, post offices	11. Government and Semi-government offices	
			12. Water treatment plants	
4	Industrial Use Zone	1. All kind of nonpolluting industries	1. Heavy, extensive and other obnoxious, hazardous industries subject to the approval of the Bihar Pollution Control Board	1. General business unless incidental to and on the same site with industry
		2. IT & ITES	2. Industrial Research Institute	2. Schools and colleges
		3. SEZs notified by government of India	3. Technical Educational Institutions	
		4. Loading, unloading spaces	4. Junkyards, sports/ stadiums/ playgrounds	4. Recreational spots or centers
		5. Warehousing, storage and depots of nonperishable and non- inflammable commodities	5. Sewage disposal works, electric power plants, service stations	5. Other non- industrial related activities
		6. Cold storage and ice factory	6. Govt., Semi-govt., private business offices	6. Religious buildings
		7. Gas godowns	7. Banks, financial institutions and other commercial offices	7. Irrigated and sewage farms
		8. Wholesale business establishments	8. Dairy and farming	8. Major oil depot and LPG refilling plants
		9. Petrol filling station with garages and service stations	9. Gas installations and gas works	9. Social buildings
		10. Bus terminals and bus depots and workshops	10. Workshops garages	10. All uses not specifically permitted in columns (2) and (3)
		11. Parking, taxi stands, 3 wheeler/auto stands, rickshaw stands		
		12. Residential buildings for essential staff and for watch and ward	12. Museum	
		13. Public utilities	13. Helipads	
			14. Hospitals and	

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			medical centers	
5	Public & Semi-public Use Zone	1. Government offices, central, state, local and semi-government, public undertaking offices	1. Residential flats, residential plots for group housing and staff housing, Residential, apartment, group housing	1. Heavy, extensive and other obnoxious, hazardous industries
		2. Universities and specialized educational institutions, colleges, schools, research and development centers	2. IT services	2. Slaughterhouses
		3. Social and welfare centers	3. Defense quarters	3. Junkyard
		4. Libraries	4. Hostels, transit accommodation	4. Wholesale mandies
		5. Hospitals, health centers, dispensaries and clinics	5. Entertainment and recreational complexes	5. Dairy and poultry farms, farmhouses
		6. Social and cultural institutes	6. Nursery and kindergarten, welfare center	6. Workshops for servicing and repairs
		7. Religious buildings	7. Open air theater, playground	7. Processing and sale of farm products
		8. Conference halls	8. Residential club, guest house	8. All uses not specifically permitted in columns (2) and (3)
		9. Community halls, marriage halls, dharamashala	9. Bus and Truck terminals, helipads	
		10. Museums, art galleries, exhibition halls, auditoriums	10. Parking areas, taxi stands, 3 wheeler/auto stands, rickshaw stands	
		11. Police stations, police lines, jails		
		12. Local state and central govt. offices uses for defense purpose		
		13. Educational and research institutions		
		14. Social and cultural and religious		

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		institutions		
		15. Local municipal facilities		
		16. Uses incidental to govt. offices and for their use		
		17. Monuments		
		18. Post offices, Telegraph offices, public – utilities and buildings		
		19. Radio and television station		
		20. Integrated Township		
6	Utility and Services Use Zone	1. Post offices, Telegraph offices, public – utilities and buildings	1. Service industry	1. Any building or structure which is not required for uses related to public utilities and activities is not permitted therein.
		2. Water Treatment Plant, Sewage Treatment Plant, Solid waste Treatment Plant solid waste dumping grounds	2. Warehouse/storage godowns	2. Heavy, extensive and other obnoxious, hazardous industries
		3. Radio transmitter and wireless stations, telecommunication centers, telephone exchange	3. Health center for public and staff or any other use incidental to public utilities and services	3. All uses not specifically permitted in column (2) and (3)
		4. Water supply installations	4. Information/Payment kiosk	
		5. Sewage disposal works	5. Incidental/ancillary residential use	
		6. Service stations	6. Truck terminals, helipads	
		7. Cremation grounds and cemeteries/burial ground	7. Commercial use center	
		8. Power plants/ electrical substation		
		9. Radio and television station		
		10. Fire stations		

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7	Open Space Use Zone	1. Specialized parks/ maidans for multipurpose use	1. Building and structure ancillary to use permitted in open spaces and parks such as stands for vehicles on hire, taxis and scooters	1. Any building or structure, which is not required for open air recreation, dwelling unit except for watch and ward, and uses not specifically permitted therein.
		2. Regional parks, district parks, playgrounds, children's parks	2. Commercial use of transit nature like cinemas, circus and other shows	2. All uses not specifically permitted in column (2) and (3)
		3. Clubs	3. Public assembly halls	
		4. Stadiums, picnic huts, holiday resorts	4. Restaurants	
		5. Shooting range, sports training center	5. Parking areas, Caravan parks	
		6. Swimming pools	6. Open air cinemas/ theatre	
		7. Botanical/ zoological garden, bird sanctuary	7. Entertainment and recreational complexes	
		8. Green belts	8. Community hall, library	
		9. Bus and railway passenger terminals	9. Open air theater, theme parks, amphitheatres	
			10. Residential club, guest house	10. Public utilities and facilities such as police post, fire post, post and telegraph office, health center for players and staff
			11. Camping sites	11. Animal racing or riding stables
			12. Yoga and meditation centres	
			13. Commercial uses center	
			14. Special education areas	
			15. Incidental/ancillary residential use	
8	Transportation Use Zone	1. All types of roads	1. Way side shops and restaurants	1. Use/activity not specifically related to transport and communication permitted herein.

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		2. Railway stations and yards	2. Authorised/Planned Vending areas	2. All uses not specifically permitted in column (2) and (3)
		3. Airport	3. Incidental/ancillary residential use	
		4. Bus stops and Bus and Truck terminals	4. Emergency health care centre	
		5. Taxi stands, auto stands, rickshaw stands	5. Tourism related Activities	
		6. Ferry ghats	6. All ancillary (complimentary) uses for above categories (subject to decision of the Authority)	
		7. Parking areas		
		8. Multi level car parking		
		9. Filling stations		
		10. Transport offices, booking offices		
		11. Night shelter, boarding houses		
		12. Banks		
		13. Restaurants		
		14. Workshops and garages		
		15. Automobile spares and services, Godowns		
		16. Loading and unloading platforms (with/without cold storage facility), weigh bridges		
		17. Ware houses, Storage depots		
		18. Utility networks (drainage, sewage, power, tele-communications)		
9	Agricultural and Forest Use Zone	1. Agriculture and Horticulture	1. Houses incidental to this use	1. Residential use except those ancillary uses permitted in agricultural use zone
		2. Dairy and poultry	2. Parks and other	2. Heavy, extensive,

	farming, milk chilling center	recreational uses	obnoxious, noxious and hazardous industries
	3. Storage, processing and sale of farm produce	3. Wayside shops and restaurants	3. Any activity which is creating nuisance and is obnoxious in nature
	4. Dwelling for the people engaged in the farm (rural settlement)	4. Hospital for infectious and contagious diseases, mental hospital after clearance from the Authority	4. All uses not specifically permitted in column (2) and (3)
	5. Farm houses and accessory buildings	5. Agro serving, agro processing, agro business	
	6. Afforestation	6. Cottage industries	
		7. Burial and cremation grounds	
		8. Service industries accessory to obnoxious and hazardous industries	
		9. Ice factory, cold storage	
		10. Godowns and ware houses	
		11. Soil testing lab	
		12. Normal expansion of land uses only in the existing homestead land	
		13. Solid waste management sites, Sewage disposal works	
		14. Electric sub station	
		15. Quarrying of gravel, sand, clay or stone	
		16. Building construction over plots covered under town planning scheme and conforming uses	
		17. Brick kilns and extractive areas	
		18. Eco-tourism, camping sites, eco-parks, eco lodges	5. For notified forest lands only afforestation is permitted and Item no. 18 and 19 from column (3) are permissible by the competent authority
		19. Special outdoor recreations	

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10	Water Bodies Use Zone	1. Rivers, canals	1. Fisheries	1. Use/activity not specifically related to Water bodies Use not permitted herein.
		2. Streams, water spring	2. Boating, water theme parks, water sports, lagoons	2. All uses not specifically permitted in column (2) and (3)
		3. Ponds, lakes	3. Water based resort with special by-laws	
		4. Wetland, aqua culture pond	4. Any other use/activity incidental to Water bodies Use Zone is permitted.	
		5. Reservoir		
		6. Water logged/marshy area		
11	Special Heritage Zone	1. Heritage interpretation center, art galleries & sculpture complex	1. Residential.	1. Use/activity not specifically related to Special Heritage Use Zone not permitted herein.
		2. Public –semi public.	2. Educational and research Institutions	2. Multistoried building
		3 Recreational.	3. Social and cultural institutions	3. Multiplex, Shopping Mall
		4. Theme Parks, Archeological Parks / Gardens.	4. Commercial.	4. Dumping ground
		5. Amphitheaters.	5. Commercial activities	5. Sewerage Treatment
		6. Open Air Museums.	6. Craft based cottage industries	6. All uses not specifically permitted in column (2) and (3)
		7. Restoration of protected and enlisted monuments and precincts by the concerned authority only (ASI / State Archeology)	7. Hotels, guest houses, lodges , resorts	
			8. Auditorium	
			9. camping sites , special training camps	
			10. Hospitals & health centers	

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			11. Multistoried Parking	
12	Environmentally Sensitive Zone	1. River front developments	1. Apartment Buildings, corporate type housing adopting modern technology.	1. Plotted housing
		2. Scenic value areas. Theme parks, yoga parks, sports centres and community recreational areas, International convention centre	2. Hospitals and health institutions	2. Small industries or small institutions
		3. River side green areas	3. Educational, technical, research institutes of higher order	3. Use/activity not specifically related to Environmentally Sensitive Use Zone not permitted herein
		4. Existing village settlements	4. Water Treatment Plant, Sewage Treatment Plant, Solid waste Treatment Plant solid waste dumping grounds	4. No development of any kind is permitted between the River/Canal/Stream and the embankment
		5. Art academy, media centres, food courts, music pavilions		5. All uses not specifically permitted in column (2) and (3)
		6. Parking areas, visitor facilities		
		7. Boating , Picnic huts, Camping sites Special Training camps		
		8. Existing residential or other uses.		
		9. Resorts, sculpture complex, lagoons& lagoon resort, water sports.		
		10. Tourist and pilgrim related commercial activities, hotels and lodges		
		11. Non polluting, agro-based and		

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		processing industries, Storage or Godowns for food grains		
13	Urban Agriculture use zone	1. Independent residence, guest houses	1. Sewage treatment plants and disposal sites	1. Heavy, large and extensive industries, noxious, obnoxious and hazardous industries
		2. Educational buildings (nursery, primary, high school)	2. Water treatment plants, solid waste dumping grounds	2. Warehousing, storage godowns of perishables, hazardous, inflammable goods, wholesale mandis, junk yards
		3. Neighborhood level social, cultural and recreational facilities with adequate parking provisions	3. Outdoor and indoor games stadiums, shooting range	3. Workshops for buses
		4. Marriage and community halls	4. Zoological garden, botanical garden, bird sanctuary	4. Slaughter houses
		5. Community centers, clubs, auditoriums	5. Planned Township Development	5. Hospitals treating contagious diseases
		6. Exhibition and art galleries		6. International conference centers
		7. Public utilities and buildings except service and storage yards, electrical distribution depots and water pumping stations		7. District battalion offices, forensic science laboratory
		8. Nursery and green houses		8. All uses not specifically permitted in column (2) and (3)
		9. Parks and tot-lots		
		10. All permitted activities in 'Agriculture Use Zone'		

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CHAPTER - IV
GENERAL REQUIRMENTS

29. Restriction on permission.-Without prejudice to any other stipulation in these bye laws, no permission to construct a building on a site shall be granted:

- A. In areas of natural waterways or drains, as detailed in the Development Plan, and drainage plan as modified from time to time;
- B. If the orientation of such building is not in harmony with the surroundings, as may be decided by the Art Commission;
- C. If the use to which the site is proposed to be put does not conform to the use earmarked in the Development Plan;
- D. If the building is to be constructed over or under a municipal drain, sewerage line, electrical line, water main, any other government or public land, or public utility services;
- E. If the foundation of the external wall along a street is located at a distance less than 1 meters from the edge of the street or road margin including the drain;
- F. As Bihar is located in Seismic Zone III, IV and V if the Structural Plans are not prepared taking this into account.
- G. In case of areas which get flooded, the Structural Plans are not prepared taking this into account.

30. Requirement of Site.-

- A. No building shall be constructed on any site on any part of which there is deposited refuse, excreta or other offensive matter objectionable to the Authority. Until such refuse has been removed therefrom and the site has been prepared or left in a manner suitable for building purposes to the satisfaction of the Authority;
- B. No permission to construct a building on site shall be granted, if the site is within nine (9) meters of the highest water mark of a tank, unless the owner satisfies the Authority that he will take such measures as will prevent any risk of the domestic drainage of the building passing into the tank. Further the Authority may require the floor of the lowest storey of such building to be raised above the normal maximum flood level of the adjoining ground or to such other level as the Authority may specify;

- C. Wherever the dampness of a site or the nature of the soil renders such precautions necessary, the ground surface of the site between the walls of any building erected thereon shall be rendered damp-proof to the satisfaction of the Authority;
- D. Any land, passage or other area within the cartilage of a building shall, if the Authority so requires, be effectively drained by surface water drains or other means;
- E. If the foundation of the external wall along a street is located at a distance less than 1 meters from the edge of the street or road margin including the drain;

The written approval of the Authority shall be obtained for connecting any sub-soil or surface water drain to a sewer;

31. **Distance from Electric lines.**-As provided in clause-6.4 of National Building Code-2005 no verandah, balcony or the like shall be allowed to be erected or re-erected or any additions or alterations made to a building within the distances quoted below in accordance with the Indian Electricity Rules between the building and any overhead electric supply line. The minimum distance from the electric line shall be as per Table 5.

Table - 5: Minimum distance from electric line

	Vertical distance in meters	Horizontal distance in meters
Low and medium voltage lines and service lines	2.5	1.2
High voltage lines up to and including 11, 000 Volt	3.7	1.2
High voltage lines above 11,000 volt and up to and including 33,000 Volt	3.7	2.0
Extra high voltage line beyond 33,000 Volt	3.7 (Plus 0.3 meters for every additional 33,000 volts or part thereof)	2.0 (Plus 0.3 meters for every additional 33,000 volts or part thereof)

32. **Plantation.**-In every building area, at least 5 % of the land shall be covered by plantation (tree cover), but in case of multi-storied buildings/ Group Housing / Apartment building/ Industrial/ Assembly/ Educational/ Institutional buildings, it is desirable that at least 10% of the land shall be covered by plantation (tree cover). Internal gardens within the building shall be encouraged.
33. **Means of Access.**-(1) Every building/ plot shall abut on a public/ private means of access like streets /roads of duly formed of width as specified in these byelaws or specified in the Master Plan/ Development/Zonal Plan/Scheme.

The minimum width of the road/street required for access to building in an existing colony not developed by any authorized agency such as Regional Development Authority, Municipality, Housing Board, Co-operative societies, Government and Semi government organization shall be as per Table 6.

Table 6: Length of road limitation

Old Area		
Sl. No.	Maximum Length of the road in Meter	Minimum width of road of street in Meter
(i)	(ii)	(iii)
1	Upto 25 meter	3.6 meter or 12 feet
2	Exceeding 25 meter and upto 100 meter	4.8 meter or 16 feet
3	Exceeding 100 meter	6.10 meter or 20 feet
<p>Note-On less than 20 feet wide roads the encroachment from both sides will be removed by measuring 10 feet from the centre line of the width of roads declared by or belonging to Road Construction Department, Patna Municipal, Authority, Housing Board, Co-operative Societies, Government and Semi-Government Organizations. In other cases maximum 10 feet land from such revenue plot on either side will be taken into account to make it 20 feet wide road and the construction falling in between the said width of road will be removed as an encroachment.</p> <p>Similarly 6 feet and 8 feet land from each Revenue plot on either side will be taken into account to make it 12 feet and 16 feet wide road correspondingly.</p>		
New Area (Residential)		
1	75	6.10 (20 ft.)
2	250	9.10 (30 ft.)
3	400	12.20 (40 ft.)
4	1000	18.30 (60 ft.)
5	above 1000	24.40 (80 ft.)
<p>Note- If the developments only on one side of the means of access, the prescribed widths maybe reduced by 1.0 meter each case. In no case, development on plots shall be permitted unless it is accessible by a public street of width not less than 6 m.</p>		
New Area (Non residential)		
1	200	12.20 (40 ft.)
2	400	15.00 (50 ft.)
3	600	18.30 (60 ft.)
4	above 600	24.40 (80 ft.)

Further, in no case the means of access shall be lesser in width than the internal access ways in layouts and subdivision.

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- (2) No building construction activity shall happen on a road with a width of less than 12 ft. (Including Road Widening) in old area.
- (3) In case of areas notified as New Areas by the authority with the approval of the department, no construction shall be allowed where the means of access is less than 20 feet.
- (4) Unless and otherwise specified, development of plots shall not be permitted unless it is accessible by a public/private street with the width specified in these bye laws. The width of the road may be increased in a master plan/development plan/zonal plan but under no circumstance the provisions for width of road shall be less than the provisions made under these bye laws.
- (5) In case of institutional, administrative, assembly, industrial and other non-residential and commercial activities, the minimum road width shall be 12.20 meters.
- (6) In case public land is not available for the road, the plot owners on both sides of the road shall equally surrender their right over the land to the authority to accommodate the road width. The centre line of the road shall be taken as reference for such surrenders.
- (7) While calculating the width of the street for the purpose of sanctioning the building plan, the average width will be taken into consideration. The building plan shall be approved on the basis of the average width of the road as notified by the authority.
- (8) In case of a private road, which gives access to one or more buildings, the owner of the said private road shall develop the road and storm water drain as required by the Local Authority, and transfer the same to the Registered Residents' Welfare Association for maintenance.
- (9) **Access from Highways/ Important Roads.**-No premises other than highway amenities like petrol pumps, motels, etc, shall have an access direct from highways and other roads designated by the Road Construction Department. The Road Construction Department shall notify a list of road, which shall not provide direct access to a specified class of buildings. The Authority shall maintain a register of such roads, which shall be open to public inspection at all times during office hours and published on the web site. These provisions shall, however, be subject to the provisions of the relevant State Highway Act, and National Highway Act.
- (10) The provisions of road width shall be strictly enforced. There shall be no construction over the prescribed road width. Any violation shall be treated as an offence under the Bihar Municipal Act 2007 in addition to provision for removal of land encroachment under the relevant Acts.

34. Minimum size of plots and road width.-(1) The minimum size of plots and road width for different categories of building is given in Table 7.

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Table - 7: Category wise size of plots

Category	Min. road width(m)	Min. size of plot in Sq. m.
Marriage Halls	12.20	1000
Cinema, Multiplex, Shopping Malls, Convention centers, Game centers,	18.30	2000
Social clubs and amenities	12.20	1000
Multi storey car parking	12.20	1000
Office buildings	12.20	300
Primary/Upper Primary school	12.20	2000
High School , Residential school	12.20	6000
+2 College / Junior college	12.20	4000
Degree College	12.20	6000
Technical educational institution	12.20	10000
Petrol pumps / Filling stations	12.20	500
Restaurant	12.20	500
LPG storages	12.20	500
Places of congregation	12.20	500
Public libraries	12.20	300
Conference hall	18.30	1000
Community hall	12.20	500
Nursing homes/polyclinics	12.20	300
Hotel (below three star)	12.20	2000
Hotel (three star and above)	18.30	2000
R&D Lab	18.30	1500
Group Housing	12.20	4000

Note: (i) In exceptional cases the Authority may consider revising the minimum size of plot with the approval of the Government.

(ii) The above (requirement) area of minimum size of the plot may be relaxed by 5% while sanctioning the plan.

(2) No high rise building (building with a height of 15 meters and above) shall be allowed on a plot size less than 800 sq. meters.

35. **Minimum setbacks & Height for non-high rise buildings.**-(1)The minimum setbacks and height of buildings permissible in a given size/plot for residential in non-high rising category shall be as per Table 8 and 9. The minimum setback for commercial and mercantile buildings shall be as per Table 10 and 11.

Table - 8: Minimum setbacks and height of residential buildings

Sno.	Average Depth of plot (In meters)	Building Height Upto G+2 Maximum-10m		Building Height Upto G+3 Maximum-12m		Building Height Upto G+4 Maximum-15m	
		Minimum Front set back (m)	Minimum Rear Set back(m)	Minimum Front set back (m)	Minimum Rear Set back (m)	Minimum Front set back (m)	Minimum Rear Set back (m)
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)

1	Upto 10m	1.5	0.90	No construction shall be permitted		No construction shall be permitted	
2	Exceeding 10m & upto 15 m	1.5	1.2	2.5	1.8	No construction shall be permitted	
3	Exceeding 15m & upto 21 m	1.8	1.5	3.6	2.0	4.0	3.0
4	Exceeding 21m & upto 27 m	2.5	1.8	4.0	2.5	4.5	3.6
5	Exceeding 27m & upto 33m	3.0	2.5	4.0	3.0	5.0	4.0
6	Exceeding 33m & upto 39m	3.0	3.0	4.5	4.0	5.5	4.0
7	Exceeding 39m & upto 45m	4.0	4.0	5.0	4.0	6.0	4.0
8	More the 45m	4.0	4.0	6.0	4.0	6.0	4.5

Table 9. Minimum side set backs for residential buildings

Sl no.	Average Width of plot (In meters)	Building Height Upto G+2 Maximum-10m		Building Height Upto G+3 Maximum-12m		Building Height Upto G+4 Maximum-15m	
		Minimum Side Set back(m)	Minimum Side Set back (m)	Minimum Side Set back (m)	Minimum Side Set back (m)	Minimum Side Set back (m)	Minimum Side Set back (m)
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
1	Upto 10m	NIL	NIL	No construction shall be permitted		No construction shall be permitted	
2	Exceeding 10m & upto 15 m	0.75	0.75	1.5	1.5	No construction shall be permitted	
3	Exceeding 15m & upto 21 m	1.0	1.0	1.5	1.5	2.0	2.0
4	Exceeding 21m & upto 27 m	1.5	1.5	2.0	2.0	2.5	2.5
5	Exceeding 27m & upto 33m	1.5	1.5	2.5	2.5	3.0	3.0
6	Exceeding 33m & upto 39m	2.0	2.0	3.0	3.0	3.66	3.66
7	Exceeding 39m & upto 45m	3.0	3.0	3.66	3.66	4.00	4.00
8	More the 45m	3.66	3.66	4.00	4.00	4.00	4.00

Table: 10 Minimum front and rear setback for commercial/mercantile buildings

Sl no.	Average Depth of plot (In meters)	Building Height up to 15 m	
		Minimum Front set back (m)	Minimum Rear Set back(m)

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(i)	(ii)	(iii)	(iv)
1	Upto 10 m (height of the building shall be restricted to 10m)	4.5	2.0
2	Exceeding 10 m and up to 15 m	4.5	3.0
3	Exceeding 15m and up to 21 m	5.5	4.0
4	Exceeding 21 m and upto 27 m	6.0	4.0
5	Exceeding 27 m and upto 33 m	6.5	4.0
6	Exceeding 33 m and upto 39 m	7.0	4.5
7	Exceeding 39 m and upto 45 m	7.5	4.5
8	More than 45 m	8.0	4.5

Table 11 : Minimum side setbacks for commercial/mercantile buildings

Sl no.	Average Width of plot (In meters)	Building Height upto 15m	
		Minimum Left set back (m)	Minimum Right Set back(m)
(i)	(ii)	(iii)	(iv)
1	Upto 10 m (height of the building shall be restricted to 10 m)	Nil	Nil
2	Exceeding 10 m and upto to 15 m	2.0	2.0
3	Exceeding 15 m and upto 21 m	2.5	2.5
4	Exceeding 21 m and upto 27 m	3.0	3.0
5	Exceeding 27 m and upto 33 m	4.0	4.0
6	Exceeding 33 m and upto 39 m	4.0	4.0
7	Exceeding 39 m and upto 45 m	5.0	5.0
8	More than 45 m and upto 45 m	5.5	5.5

Table 12. Open spaces around industrial buildings

SIN o.	Plot Size	Minimum Front set back (m)	Minimum Rear Set back (m)	Minimum Sides Set back (m)
(i)	(ii)	(iii)	(iv)	(v)
1	550 Sqm to 1000 Sqm.	9.0	4.5	4.5
2	1000 Sqm. to 5000 Sqm.	10.0	6.0	6.0
3	5000 Sqm. to 30000 Sqm.	12.0	9.0	9.0
4	Above 30000 Sqm.	15.0	12.0	10.0

Table 13. Minimum set back for industrial buildings constructed over plot size upto 550 sq m

Sl no.	Width of Plot	Minimum Front set back (m)	Minimum Rear Set back (m)	Minimum Sides Set back (m)
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(i)	(ii)	(iii)	(iv)	(v)
1	Upto 10 mtrs.	3.0	3.0	1.5
2	Above 10 mtrs. & upto 12 mtrs.	4.0	3.0	2.0
3	Above 12 mtrs. & upto 15 mtrs.	5.0	3.0	3.0
4	Above 15 mtrs. & upto 18 mtrs.	6.0	4.0	4.0
5	Above 18 mtrs.	6.0	4.5	4.5

36. **Minimum setbacks for high rise buildings.**-(1)For high-rise/ multi-storied buildings, the open spaces around the building unless or otherwise specified shall be as given in the Table 14.

Table -14: Minimum exterior open spaces around the buildings for all type of high rise buildings unless otherwise specified

Sl. No.	Height of the Building Upto (m.)	Exterior open spaces to be left out on all sides in m.	
		(front setback)	Side and back
1	More than 15 and upto 18	6.5	4.5
2	more than 18 and upto 21	7.5	4.5
3	More than 21 and upto 24	8.0	5.0
4	More than 24 and upto 27	9	6
5	More than 27 and upto 30	10	7
6	More than 30 and upto 35	11	7
7	More than 35 and upto 40	12	8
8	More than 40 and upto 45	13	8
9	More than 45 and upto 50	14	9
10	More than 50	15	9

- (2) In no case the minimum setbacks shall be less than those specified in Bye Law 37 for high rise buildings in the mentioned category.
- (3) In case of multi storied buildings the exterior open space around a building shall be of hard surface capable of taking load of fire engine weighting up to 45 tonnes.

37. **General Conditions for Setback.**-(1)The minimum distance between two buildings will not be less than 1/3rd of the height of the taller building or 18m whichever is lower. However the minimum width of the internal road shall not be less than 4.5 meters.

In all cases, the width of such open space between the buildings on a plot shall not be less than the setback specified for the tallest building subject to a minimum of three meters within a plot.

- (2) The setbacks/open spaces for other occupancies shall be as below;
- A. **Educational buildings** - In case of educational buildings the open spaces around the building shall not be less than 6 meter. The front set back shall be 9 metres.
 - B. **Institutional buildings** - The open spaces around the building shall not be less than 6 m. The front setback shall be 9m.
 - C. **Assembly buildings**- The open space in front shall be not less than 12m and the other open spaces around the building shall not be less than 6m.
 - D. **Malls and Multiplex**- The front set back shall not be less than 12 m, the rear set back shall not be less than 7 m and the side set back shall not be less than 7m.
 - E. **Commercial & Storage buildings** - In case of plots with more than 1000 sq.mtr. area, the open spaces around the building shall not be less than 6.0m. The front setback shall be 9m. In all other cases it shall be as per Table 10.
 - F. **Industrial buildings** -The setbacks shall be as per Table 12 and 13.
 - G. **Hazardous occupancies** - the open spaces around the building shall not be less than 9 m. The front set back shall be 12m.
 - H. **Slum Improvement**-The setback norms shall not apply to slums taken up under an approved programme of the Government subject to the specific sanction of the Government.
 - I. **IT, ITES Buildings**-Abutting on 12 m R/W or more R/W the setback, height, number of floors and FAR shall be applicable as per commercial building in respect of corresponding road width.
- (3) The setbacks shall be calculated on the basis of highest provision of setback mentioned either in the above table or mentioned in these Bye Laws.
- (4) The setbacks are to be left after leaving the affected area of the plot/site, if any, for road widening.
- (5) Where a site abuts more than one road, then the front setback should be insisted towards the bigger road width and for the remaining side or sides, Side and rear setback shall be insisted.

- (6) For Plots above 300 sq.m a minimum 1m wide continuous green planting strip in the periphery sides are required to be developed and maintained within the side or rear setback.
- (7) For narrow plots having extent not more than 400 sq.m and where the length is 4 times of the width of the plot, the setbacks on sides may be compensated in front and rear setbacks so as to ensure that the overall aggregate setbacks are maintained in the site, subject to maintaining a minimum of side setback of 1m in case of buildings of height up to 10 m and minimum of 2m in case of buildings of height up to 12 m without exceeding overall permissible plinth area.
- (8) The master plan/development plan/zonal plan shall also specify a building line for various areas. The setbacks shall accordingly be changed without reducing the minimum required setbacks under these bye laws.

38. **Floor Area Ratio.**-(1) The Floor Area Ratio (F.A.R) for buildings shall be decided on the basis of the road width on which the plot/site abuts as per Table 15 and 16.

Table - 15: Road width and FAR table for (OLD AREA).

Category	Road Width (in meter)	FAR		Floor	Maximum Height (in meter)	Conditions
		Residential	Non residential			
O-I	3.60 (12 ft.)	1.5	Nil	G+2	10	Parking shall be allowed on any floor. Under no circumstances the parking floors or provision for parking shall be used for any other purposes. Mezanine floors or any floor partition shall be computed under FAR and counted as a floor.
O-II	4.80 (16 ft.)	1.8	Nil	G+2	10	
O-III	6.10 (20 ft.)	2.0	Nil	G+3, S+3	12	
O-IV	9.10 (30 ft.)	2.5	Nil	S+5	18	
O-V	12.20 (40 ft.)	2.5	2.0	Maximum Height 24 meter		
O-VI	18.30 (60 ft.) and above	2.5	2.5	No restriction on height and number of floors however it may be regulated by the master plan/development plan/zonal plan.		

Table 16: Road width and FAR table (NEW AREA)

Category	Road Width (in meter)	FAR		Floors	Maximum Height (in meter)	Conditions
		Residential	Non residential			
N-I	6.10 (20 ft.)	2.0	Nil	G+3, S+3	12	Parking shall be allowed on any floor. Under no circumstances

N-II	9.10 (30 ft.)	2.5	Nil	S+5	18	the parking floors or provision for parking shall be used for any other purposes. Mezzanine floors or any floor partition shall be computed under FAR and counted as a floor.
N-III	12.20 (40 ft.)	2.5	2.0	Maximum Height 24 meter		
N-IV	18.30 (60 ft.)	2.5	2.5	No restriction on height and number of floors however it may be regulated by the master plan/development plan/zonal plan		
N-V	24.40 (80 ft.)	3.00	2.5			
N-VI	27.40 (90 ft.)	3.25	3.0			
N-VII	30.50 (100 ft.)	3.50	3.5			



- (2) While sanctioning the plans on building with a road width of 12 feet and 16 feet the Authority shall ensure that enough parking spaces for vehicles have been made within the building and that the vehicles shall not parked on the road. Provisions related to length of the road in Table 6 shall be adhered to.
- (3) Additional FAR up to 10% upto a maximum of 0.25 shall be allowed for dwelling units meant exclusively for LIG/EWS in a group housing scheme.
- (4) In case of Educational, Institutional and Assembly building the maximum permissible FAR shall be 1.50 for plots up to 1000 sq. m. and 1.75 for plots above 1000 sq. m.
- (5) In case of transport related activities such as; railway yards, railway station, bus stands, bus shelters, transport depot, airport, special warehousing, cargo terminals etc. the maximum permissible FAR shall be 1.50.
- (6) In case of Industrial buildings the maximum FAR shall be 0.5 for polluting and hazardous industries. In case of non-polluting and household industries the maximum FAR shall be 1.5.
- (7) The FAR and Height of the building may also be regulated by the master plan/development plan or the zonal plan.
- (8) In case the plot is affected by a road widening and the owner of the plot voluntarily surrenders the affected portion of his land to the Authority without any claim of compensation or through a TDR (Transferable Development Right) scheme implemented by the Government the owner shall be entitled to build on the remaining plot an area, calculated on the basis of the FAR as applied to the total area prior to such surrender. Provided that the surrender of the land shall be effected by a deed of transfer to be executed by the owner in favour of the Authority for widening of road.
- (9) Exclusive multistory parking blocks can be provided within the required setback area without reducing the driveway for the fire tender to the extent of minimum 6 meters. This will not be included in the calculation of FAR.
- (10) FAR shall not include
 - A. Basements or cellars and space under a building constructed on stilts and used only as a parking space, and air conditioning plant room used as accessory to the principal use;
 - B. Stilt Parking

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- C. Exclusive Multi Storey Parking made only for the purpose of parking vehicles and not put to any other use.
- D. Electric cabin or substation, watchman booth of maximum size of 3sq.m. with minimum width or diameter of 1.732 m., pump house, garbage shaft, space required for location of fire hydrants, electric fittings and water tank, society room of maximum 12 sq.mtr.
- E. Projections and accessories buildings as specifically exempted from the open space/setback requirement.
- F. Staircase room and lift rooms above the topmost storey, architectural features, and chimneys and elevated tanks of dimensions as permissible under the NBC; the area of the lift shaft shall be taken only on one floor.
- G. 50% of the area of projected balcony as per bye laws 45(4) shall not include.

(11) Additional FAR may be allowed for Government Buildings/ Government Projects with the prior approval of the Government.

39. Height of a building.-(1) The height of the building shall be governed by the limitations of Floor Area Ratio, open space (setbacks), and the width of the street facing the plot described as detailed below:

- A. The maximum height of a building shall in no case exceed (1.5 times X the width of the road on which the plot abuts) + the front setback. It shall be applicable only in case of unused permissible FAR for plots abutting on road of average existing width not less than 9.10 m wide.
- B. If a building abuts on two or more streets of different widths, the building shall be deemed to face upon the street that has the greater width and the height of the building shall be regulated by the width of the street.

Provided that the roads on the other sides shall also conform to provisions made under bye law 33.

- (2) Notwithstanding anything contained in sub-bye law (1) the height restrictions with respect to approach Funnels and Transitional area of Airport as detailed in Table -17 and 18 shall be adhered to. Any height restrictions imposed by the Airport Authorities shall be adhered to.
- (3) Notwithstanding anything contained in the Tables under sub- bye law(1),no Radio Aerial, T.V. Antenna, Cell phone tower or such similar type of installations exceeding 52 metres in height shall be erected without prior permission of the concerned Civil Aviation Authority/ Airport Authority.
- (4) No building structure or installation exceeding the height indicated in the said Tables shall be permitted unless the applicant produces a 'No-Objection Certificate' from the Airport Authority.

Table- 17: Height restriction with respect to approach funnels

Distance from nearest runway end (in metres)	Maximum Permissible height above the elevation of the nearest runway end
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Up to 360	0
361 to 510	6
511 to 660	9
661 to 810	12
811 to 960	15
961 to 1110	18
1111 to 1260	21
1261 to 1410	24
1411 to 1560	27
More than 1560	30

Table -18: Height restriction with respect to transitional area

Distance of the Inner Boundary of the Transitional Area (Outer Boundary of the Air Port) [Metres]	Maximum Permissible height above the elevation of the airport reference point [metres]
Up to 21	0
22 to 42	3
43 to 63	6
64 to 84	9
85 to 105	12
106 to 126	15
127 to 147	18
148 to 168	21
169 to 189	24
190 to 210	27
More than 210 M	30

40. **Off Street Parking Space.**-(1) In all buildings including Apartment buildings/ Group Housing, Hotels, Restaurants and Lodges, business buildings, commercial buildings, Institutional buildings like hospitals, Educational buildings like schools and colleges, multi-storied buildings/complexes etc. and all other non-residential activities provision shall be made for parking spaces as per the requirements mentioned in Table 19.

(2) The parking spaces may be provided in (for all schemes)

- A. Basements or cellars
- B. on stilt floor
- C. open parking area
- D. exclusive multi-level parking or
- E. Roof top parking in case of commercial/IT/ITES and corporate building
- F. A combination of any or all of the above.

Any provision made for parking shall not be included in the FAR calculation.

Table 19: Parking space for different category of occupancies

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Sl. No.	Category of building/ activity	Parking area to be provided as percentage of total built up area
(1)	(2)	(3)
1	Shopping malls, Shopping malls with Multiplexes/ Cineplexes, Cinemas, Retail shopping centre and marriage halls and banquet halls	35
2	IT / ITES complexes, Hotels, Restaurants, Lodges, Nursing Homes, Hospitals, Institutional and other commercial buildings, Assembly buildings, offices, and Industrial buildings and High-rise buildings and complexes.	30
3	Residential Building, Residential apartment buildings, Group Housing, Clinics and small offices upto 50 sqm.	25

- (3) Off-street parking spaces shall be provided with adequate vehicular access to a street and the area of drives, aisles and such other provisions required for adequate maneuvering of vehicles.
- (4) If the total off-street parking space required under these bye laws is provided by a group of property owners at a place for their mutual benefit, such parking spaces may be construed as meeting the off-street parking requirement, however, subject to the approval of the Authority. The Authority may also decide to develop such parking spaces and charge property owners to bear proportionate cost.
- (5) Garage with locking facilities shall be included in the calculation of floor space for determining the requirement of parking space, unless this is provided in the basement of a building or under a building constructed on stilts with no external walls.
- (6) The parking spaces to be provided shall be in addition to the open spaces (setback) required around a building under these bye laws.
- (7) Misuse of the area specified for parking of vehicles for any other use shall be summarily removed / demolished by the Authority.
- (8) For parking spaces in basements and upper storey of parking floors, at least two ramps of minimum 3.6 m width or one ramp of minimum 5.4 m width and in maximum 1:10 slope shall be provided. Such ramps may be permitted in the side and rear setbacks after leaving 3.60 meter space for movement of fire-fighting vehicles. Access to these may also be accomplished through provisions of mechanical lifts. The slab over which the fire tender shall move shall be cable of taking the load of fire engine, fire vehicle of atleast 45 tonnes.
- (9) Up to 10% of cellar may be utilized for utilities and non-habitation purpose like A/C plant room, Generator room, Electrical installations, laundry etc.

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- (10) At least 15% of the parking space in group housing, apartment buildings shall be earmarked for visitors. Such parking space shall be indicated by painting "Visitor's Parking" on the floor. The Visitors parking facility shall be open to all visitors and shall not be settled with any occupant.
- (11) All buildings with a height of 15 m and above will have parking space earmarked for ambulance, fire tender and physically challenged persons. Such spaces shall be clearly indicated by painting on the floor the purpose for which the parking space is reserved.
- (12) Apart from use of Basement for Services/Parking/ Storage, it may be used for other activities like library, Study Room, Games Room and Laundry only in case of Residential and Institutional Buildings.

41. Requirement of Parts of Building.-The various parts of the buildings shall have the following minimum specifications.

(i) Plinth

(a) Main Buildings: The plinth or any part of a building or outhouse shall be so located with respect to the surrounding ground level that adequate drainage of the site is assured. The height of the plinth shall be not less than 450 mm from the surrounding ground level.

(b) Interior Courtyards and Covered Parking: Every interior courtyard shall be raised at least 150 mm above the determining ground level and shall be satisfactorily drained.

(ii) Habitable Rooms

(a) Height: The height of all rooms for human habitation shall not be less than 2.75 m measured from the surface of the floor to the lowest point of the ceiling (bottom of slab). In the case of pitched roof, the average height of rooms shall not be less than 2.75 m. The minimum clear head room under a beam, folded plates or eaves shall be 2.4 m. In the case of air-conditioned rooms, a height of not less than 2.4 m measured from the surface of the floor to the lowest point of air-conditioning duct or the false ceiling shall be provided. These requirements shall apply to residential, business and mercantile buildings. For educational and industrial buildings, the following minimum requirements apply:

- Educational : Ceiling height 3.6 m for all Buildings regions;
- Industrial: Ceiling height 3.6 m, except Buildings when air-conditioned, 3 meter (Factory Act 1948 and Rules therein shall govern such heights, where applicable).

(b) Size: The area of habitable room shall not be less than 9.5 Sq meter, where there is only one room with a minimum width of 2.4 m. Where there are two rooms, one of these shall not be less than 9.5 Sq meter and the other not less than 7.5 Sq meter, with a minimum width of 2.1 m.

(iii) Kitchen

(a) Height: The height of a kitchen measured from the surface of the floor to the lowest point in the ceiling (bottom slab) shall not be less than 2.75 m, except for the portion to accommodate floor trap of the upper floor.

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(b) Size: The area of a kitchen where separate dining area is provided, shall be not less than 5.0 Sq meter with a minimum width of 1.8 m. Where there is a separate store, the area of the kitchen maybe reduced to 4.5 Sq meter. A kitchen, which is intended for use as a dining area also, shall have a floor area of not less than 7.5 Sq meter with a minimum width of 2.1 m.

(c) Other Requirements: Every room to be used as kitchen shall have:

- unless separately provided in a pantry, means for the washing of kitchen utensils which shall lead directly or through a sink to a grated and trapped connection to the waste pipe;
- an impermeable floor;
- a flue, if found necessary; and
- a window or ventilator or opening of sufficient size.

(iv) Bathrooms and Water-Closets

(a) Height: The height of a bathroom or water-closet measured from the surface of the floor to the lowest point in the ceiling (bottom of slab) shall not be less than 2.4 meter.

(b) Size: The area of a bathroom shall not be less than 1.8 Sq meter with a minimum width of 1.2 m. The floor area of water-closet shall be 1.2 Sq meter with a minimum width of 1.0 m. If bath and water-closet are combined, its floor area shall not be less than 2.8 Sq meter with a minimum width of 1.2 m.

(c) Other Requirements : Every bathroom or water-closet shall:

- be so situated that at least one of its walls shall open to external air;
- not be directly over or under any room other than another water-closet, washing place, bath or terrace, unless it has a water-tight floor;
- have the platform or seat made of water-tight non-absorbent material be enclosed by walls or partitions and the surface of every such wall or partition shall be finished with a smooth impervious material to a height of not less than 1 m above the floor of such a room;
- be provided with an impervious floor covering, sloping towards the drain with a suitable grade and not towards VERANDAH or any other room; and
- have a window or ventilator, opening to a shaft or open space, of area not less than 0.3 m² with side not less than 0.3 m.

(d) No room containing water-closets shall be used for any purpose except as a lavatory and no such room shall open directly into any kitchen or cooking

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space by a door, window or other opening. Every room containing water-closet shall have a door completely closing the entrance to it.

(v) Parapet

Parapet walls and handrails provided on the edges of roof terraces, balcony, verandah, etc shall not be less than 1.0 m and not more than 1.2 m in height from the finished floor level.

42. Staircase/Exit Requirements.-

(1) General

Every building meant for human occupancy shall be provided with exits sufficient to permit safe escape of occupants, in case of fire or other emergency.

- (a) In every building exit shall comply with the minimum requirement of exit except those not essential for general public use.
- (b) All exits shall be free from obstructions.
- (c) No building shall be altered so as to reduce the number, width of protection of exits to less than that required.
- (d) Exits shall be clearly visible and the routes to reach the exits shall be clearly marked and signposted to guide the population of floor concerned.
- (e) Adequate and reliable illumination shall be provided for exits.
- (f) Fire fighting equipment shall be suitably located and clearly marked.
- (g) Alarm devices shall be installed to ensure prompt evacuation of the population concerned.
- (h) All exits shall provide continuous means of egress to the exterior of building or to an exterior open space leading to street.
- (i) Exits shall be so arranged that they may be reached without passing through another occupied unit.

(2) Arrangement of exits- Exits shall be so located so that the travel distance on the floor shall not exceed 20 meters for residential, educational, institutional, and hazardous occupancies and 30 meters for assembly, business mercantile, industrial and storage occupancies.

(3) Capacities of Exits-

- (a) The unit of exit width used to measure capacity of any exit shall be 50cm. A clear width of 25cm. shall be counted as an additional half unit. Clear width less than 25cm. shall not be counted for exit width.
- (b) The occupancies per unit exit which shall be as given in Table 20.

Table 20: Number of occupants as per type of occupancy

S.N	Type of Occupancy	Number of occupants per unit exit	
		Stair Case	Door
(1)	(2)	(3)	(4)
1	Residential	25	75
2	Educational	25	75

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3	Institutional	25	75
4	Assembly	60	90
5	Business	50	75
6	Mercantile	50	75
7	Industrial	50	75
8	Storage	50	75
9	Hazardous	25	10

Explanation:

- (A). Lifts and escalators shall not be considered as an exit.
- (B). 'Travel distance' means the distance from any point in the floor area to any exit measured along the path of egress except that when the floor areas are sub-divided into rooms, used singly or of rooms and served by suite corridors and passage, the travel distance may be measured from the corridor entrance of such rooms or suites to the nearest staircase or verandah having access to the street.
- (C). For the dormitory portions of homes for the aged, orphanages, mental hospitals, etc. these multipliers will be doubled.
- (D). The plinth or covered area shall include, in addition to the main assembly rooms or space, any occupied connecting room or space in the same storey or in the storey above or below where entrance is common to such rooms and space and they are available for use by the occupants of the assembly place.
- (E). No deductions shall be made in the gross area of the corridors, closets or other sub-divisions; all space serving the particular assembly occupancy shall be reckoned.

(4) Other requirements of Exits-

- (a) Every exit doorway shall open into an enclosed stairway, a horizontal exit, on a corridor or passageway providing continuous and protected means of egress.
- (b) No exit doorway shall be less than 100c.m. in width. Doorways shall be not less than 200 c.m. in height.
- (c) Exit doorways shall open outwards, that is away from the room but shall not obstruct the travel along any exit. No door, when opened shall reduce the required width of stairway or landing to less than 90cm. Over head or sliding doors shall not be installed.
- (d) Exit door shall not open immediately upon a flight or stairs; a landing equal to at least the width of the door shall be provided in the stairway at each doorway; level of landing shall be the same as that of the floor which it serves.
- (e) Exit doorways shall be openable from the side which they serve without the use of key.

(5) Other Exits

(i) Revolving Doors-

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- (a) Revolving doors shall not be used as required exits except in residential, business and mercantile occupancies, but shall not constitute more than half the total required door width.
- (b) When revolving door is considered as required exit way the following assumptions shall be made.
 - Each revolving door shall be constituted on half unit exit width.
 - Revolving door shall not be located at the foot of a stairway. Any stairway served by a revolving door shall discharge through a lobby or foyer.

(ii) Stairways -

- (a) Interior stairs shall be constructed of non-combustible materials throughout.
- (b) Interior staircase shall be constructed as a self-contained unit with at least one side adjacent to an external wall and shall be completely.
- (c) A staircase shall not be arranged round a lift shaft unless the latter is entirely enclosed by a material of fire-resistance rating as for that type of construction itself.
- (d) Hollow combustible construction shall not be permitted.
- (e) The minimum width of an internal staircase shall be 100 cm.
- (f) The minimum width of treads without nosing shall be 25 cm. for an internal staircase for residential building. In the case of other buildings the minimum tread shall be 30 cm. The treads shall be constructed and maintained in a manner to prevent slipping.
- (g) The maximum height of riser shall be 10 cm. in the case of residential buildings and 15 cm. in the case of other buildings. They shall be limited to 12 per flight.
- (h) Hand rails shall be provided with a minimum height of 90 cm. from the centre of the trend.

(iii) Fire Escape or external stairs-

- (a) Fire escapes shall not be taken into account in calculating the evacuation time of a building.
- (b) All fire escapes shall be directly connected to the ground.
- (c) Entrance to fire escape shall be separate and remote from the internal staircase.
- (d) The route of fire escape shall be free from obstructions at all times except a doorway leading to the fire escape which shall have the required fire resistance.
- (e) Fire escape shall be constructed of non-combustible materials.
- (f) Fire escape stairs shall have straight flight not less than 75 cm. wide with 20cm. treads and riser not more than 19 cm. The number of riser shall be limited to 16 per flight.

(g) Handrails shall be of a height not less than 100 cm.

(iv) **Spiral Stair (Fire escape)**- The use of spiral staircase shall be limited to low occupant load and to a building of height 9m. unless they are connected to platforms, such as balconies and terraces to allow escapes to pause. A spiral fire escape shall be not less than 150cm. in diameter and shall be designed to give adequate headroom.

(v) **Ramps-**

(a) Ramps with a slope of not more than 1:10 may be substituted or for and shall comply with all the requirements of required stairway as to enclosure, capacity and limiting dimensions; large slopes shall be provided for special uses but in no case greater than 1:8. The ramp with a slope between 1:10 to 1:8 shall be allowed only upto height of 2.4 Meter.

(b) For any height more than 2.4 Meter the slope of ramp shall not exceed 1:20.

(c) For all slopes exceeding 1:10 and where the use is such as to involve danger of slipping the ramp shall be surfaced with approved non-slipping materials.

(d) Ramps with slope upto 1:20 shall be counted towards the covered area for calculating the fees.

(e) The ramps shall not be within required minimum setbacks.

(f) The ramps can be permitted in Basement, Semi-basement, within the minimum set back provided it should not obstruct the movement of fire-engine.

(g) Ramps for Hospital- In case of Hospital, ramp shall not be greater than 1:20.

43. **Interior open space.**-(1) At least one side of all the rooms intended for human habitation, if such room does not abut on the front or the rear or the side setbacks, shall abut on an interior open space whose minimum dimension shall be 3 meters X 3 meters in cases of buildings up to a height of 12meters. In cases where the height of the building is more than 12meters, the width of the interior open space shall be increased at the rate of one meter for every additional 3 (three) meters height. This provision shall be applicable to all categories of buildings, namely, residential, group housing, commercial, institutional, administrative, assembly.

(2) For ventilating the spaces for water closets and bathrooms ventilation shafts shall be provided with size as provided under clause - 8.2.5(b), Group 1, Part-3 of National Building Code of India -2005 (Published by Bureau of Indian Standards) as bye laws for ventilation shaft.

44. **Height exemption of a building.**-The following appurtenant structures shall not be included in the height of the building.

(A). Roof tanks and their supports (with support height not exceeding 1 m.)

- (B). Ventilating, air conditioning, lift rooms and similar service equipment.
- (C). Stair cover (mumty) not exceeding 3.0 m. in height and
- (D). Chimneys, parapet walls and architectural features not exceeding 1.2m. in height.

45. Exemption in Open space.-(1) Every open space provided either in the interior or exterior in respect of any building shall be kept free from any erection thereon and shall be open to the sky and no cornice, roof, or weather shade of more than 0.75 m. in width shall overhang or project over such open space.

- (2) A portico of up to 2.5 m. width and 4.6 m. length with a minimum height of 2.4m from the plinth level may be permitted within the side setback. A garage is permissible at the rear end of side open space provided no openings are located on the side and rear boundary. Access to the top of the portico/garage should not affect the privacy of the neighboring plot.
- (3) The portico provided as above should not rest on the boundary wall and should be open to provide through access to the rear. In case the Portico is not a cantilevered one and supported by pillars the area shall be included in the FAR.
- (4) No projected balcony shall be allowed on setback less than 1.5 meters. Projected balcony shall be allowed with a width of 0.6 meters where the setback is between 1.5 meters to 2.5 meters. For setback more than 2.5 meters projected balcony shall be allowed with a width of 0.9 meters. Projected balcony shall only be allowed on the second floor and above floors. It may be allowed on first floor subject to condition that it shall not obstruct the clear vehicular and pedestrian movement around the building including movement of fire tender. 50% of the area on the projected balcony shall be taken into account for calculation of floor area.

46. Mezzanine.-Mezzanine floor may be permitted above any floor in all types of buildings up to an extent of one-third of the actual covered area of that floor. All Mezzanine floors shall be counted toward FAR calculation, except the mezzanine floor over the ground floor.

The mezzanine floor shall have a minimum height of 2.2 m. The minimum size of the mezzanine floor, if it is to be used as a living room, shall not be less than 9.5 Sq meter. The aggregate area of such mezzanine floor in a building shall in no case exceed one-third the plinth area of the building.

47. Basement Cellar.-(1) Basements/cellars shall not be permitted in low lying area and without adequate drainage facilities to ensure drainage from the basement. Basement shall not be allowed in flood prone areas.

- (2) Construction of basements/cellars may be allowed by the Authority in accordance with the provisions contained in the development plan applicable to the concerned area.
- (3) The basements/cellars shall only be put to the following uses:

- (A). Storage of household or other non-combustible material
 - (B). Strong room, bank cellars etc;
 - (C). Installation of air-conditioning equipments and other machines used for service and utilities of building;
 - (D). Parking places.
- (4) Individual residential and small commercial buildings, plot size minimum 500 Sq. Meter may have one basement. However maximum two basements/cellars may be permitted to be constructed for other buildings leaving the prescribed set back/ open space applicable to the building. Further, in case of apartment/ group housing/commercial/corporate & IT /ITES buildings the basements may be allowed to be constructed under the entire plot area leaving 3 meter space from the boundary of the premises subject to the following;
- (i) In all such cases the owners have to indemnify the Authority against any damage caused by her/him/them to the adjacent property. (Form-XV).
 - (ii) The portion of the basement projecting out of the building line shall flush with the ground.
- (5) The basements shall be used exclusively for parking/ services/storage.
- (6) The basement shall fulfill the following requirements:
- (A). Every basement shall be in every part at least 2.5 m. in height from the floor to the soffit of the roof slab or ceiling;
 - (B). Adequate ventilation shall be provided for the basement. The standard of ventilation shall be the same as required by the particular occupancy according to bye laws. Any deficiency may be met by providing adequate mechanical ventilation in the form of blowers, exhaust fans (one exhaust fan for 50 Sq.m. of basement area), air conditioning system etc;
 - (C). The minimum height of the ceiling of upper basement shall be 1.20 m. and the maximum, 1.5 m. above the average surrounding ground level;
 - (D). Adequate arrangement shall be made, so that surface drainage does not enter the basement;
 - (E). The walls and floors of the basement shall be water-tight and be so designed that the effect of the surrounding soil and moisture, if any, are taken in to account in design and adequate damp proofing treatment is given;
 - (F). The access to the basement shall be separate from the main and alternative staircase providing access and exit from higher floors shall be provided. Where the staircase is continuous in the case of buildings

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served by more than one staircase, the same shall be of enclosed type serving as a fire separation from the basement floor and higher floor.

- (G). Open ramps shall be permitted if they are constructed within the building line subject to provision of (D) above.
- (H). The ramp providing access to basement to be used for parking shall have a gradient not steeper than 1:10 and this shall not obstruct the clear vehicular and pedestrian movement around the building including movement of fire tender (6 meter).

48. Provision of Lift.-(1) Lift shall be provided for buildings above 15 m. height in case of apartments, group housing, commercial, institutional and office buildings.

- (2) The Number and capacity of lift shall be provided as specified in the National Building Code.
- (3) Lift shall be provided at the rate of one lift for twenty dwelling units, or part thereof for residential buildings and at the rate of one lift per one thousand Sq.m. or part thereof of built-up area per floor for non-residential buildings. Built-up area on ground floor and two upper floors shall be excluded in computing the above requirement.
- (4) Notwithstanding anything contained in these bye laws in case of building with 21 m. or more in height, at least two lifts shall be provided.
- (5) All lifts shall be inspected at least once a year by the agency designated by the Authority. The Authority can also outsource the inspection of lifts.

49. Heritage Zone.-(1) The Authority may notify the Heritage Zones in consultation with the Archaeological Survey of India, State Department of Art Culture and Youth and the Art Commission.

- (2) Conservation of Heritage Buildings, Heritage Precincts and Natural features: Conservation of buildings, artifacts, structures, areas and precincts of historic and /or aesthetic and/or architectural and /or cultural significance (Heritage buildings and heritage precincts) and/or natural features of environmental significance shall be taken up by the Authority in accordance with the relevant provisions in-force and those framed from time to time.

50. Barrier free access for the physically challenged person.-Barrier free environment is one, which enables people with disabilities to move about safely and freely and to use all facilities within the built environment. The goal of barrier free design is to provide an environment that supports the independent functioning of individuals so that they can get into and participate in all activities without assistance.

The main purpose is to integrate disabled and elderly persons fully into the society. In view of the above, the Government of India has enacted the Disabilities Act, 1955.

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Section 44, 45 and 46 of the said Act stipulates that the appropriate Governments, local authorities to ensure provisions of barrier free facilities in all new Government buildings and public utilities roads and transport. Also, in 1996 Government of India enacted another person with Disabilities (Equal Opportunity, Protection of Rights and Full Participation) Act for the Barrier Free Environment for differently abled persons.

(1) Site development:

Level of the roads, access paths and parking areas shall be described in the plan along with specification of the materials.

(2) Access Path/ Walk Way:

Access path from plot entry and surface parking to building entrance shall be minimum of 1800 mm. wide having even surface without any steps. Slope, if any, shall not have gradient greater than 5%. Selection of floor materials shall be made suitably to attract or to guide visually impaired persons (Limited to coloured floor material whose colour and brightness is conspicuously different from that of the surrounding floor material or the material that emit different sound to guide visually impaired persons hereinafter referred to as "guiding floor material"). Finishes shall have non slip surface with a texture traversable by a wheel chair. Curbs wherever provided should blend to a common level.

(3) Parking:

For parking of vehicles of handicapped people the following provisions shall be made:

- (A). Surface parking for two car spaces shall be provided near entrance for the physically handicapped persons with maximum travel distance of 30 meter from building entrance.
- (B). The width of parking bay shall be minimum 3.6 meter.
- (C). The information stating that the space is reserved for handicapped persons shall be conspicuously displayed.
- (D). Guiding floor materials shall be provided or a device which guides visually impaired persons with audible signals or other devices which serves the same purpose shall be provided.

(4) Building requirements:

The specified facilities for the buildings for handicapped persons shall be as follows:

- (A). Approach at plinth level: Every building must have at least one entrance accessible to the handicapped and shall be indicated by proper signage.

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This entrance shall be approached through a ramp together with stepped entry.

- (B). Ramp Approach: Ramp shall be finished with non-slip material. Minimum width of ramp shall be 1800 mm. with maximum gradient 1:12, length of ramp shall not exceed 9 meter having 800 mm high hand rail on both sides extending 300mm beyond top and bottom of the ramp. Minimum gap from the adjacent wall to the hand rail shall be 50mm.
- (C). Stepped Approach: For stepped approach width of tread shall not be less than 300 mm. and maximum riser shall be 150 mm. Provision of 800 mm. high hand rail on both sides of the stepped approach similar to the ramp approach shall be made.
- (D). Exit/Entrance Door: Minimum clear opening of the entrance door shall be 900mm and it shall not be provided with a step that obstructs the passage of a wheel chair user. Threshold shall not be raised more than 12 mm.
- (E). Entrance Landing: Entrance landing shall be provided adjacent to ramp with the minimum dimension 1800mm X 2000 mm. The entrance landing that adjoins the top end of a slope shall be provided with floor materials to attract the attention of visually impaired persons (limited to colored floor material whose color and brightness is conspicuously different from that of the surrounding floor material or the material that emits different sound to guide visually impaired persons hereinafter referred to as "guiding floor material"). Finishes shall have a non-slip surface with a texture traversable by a wheel chair. Curbs wherever provided must blend to a common level.
- (F). Corridor connecting the entrance/exit for the handicapped: The corridor connecting the entrance/exit for handicapped leading directly outdoors to a place where information concerning the overall use of the specified building can be provided to visually impaired persons either by a person or by signs, shall be provided as follows:
- i. Guiding floor materials, shall be provided or devices that emit sound to guide visually impaired persons,
 - ii. The minimum width shall be 1250 mm.
 - iii. In case there is a difference of level, slope ways shall be provided with a slope of 1:12
 - iv. Hand rails shall be provided for ramps/slope ways at a height of 800mm.
- (5) Stair ways: One of the stairways near the entrance/exit for the handicapped shall have the following provisions:

- (A). The minimum width shall be 1350 mm.
 - (B). Height of the riser shall not be more than 150mm and width of the tread 300mm. The steps shall not have abrupt (square) nosing.
 - (C). Maximum number of risers on a flight shall be limited to 12.
 - (D). Hand rails shall be provided on both sides and shall extend 30mm on the top and bottom of each flight of steps.
- (6) Lifts: Wherever lift is required as per bye-laws, provision of at least one lift shall be made for the wheel chair user with the following cage dimensions of lift recommended for passenger lift of 13 persons capacity by Bureau of Indian Standards.
- Clear internal depth: 1100mm
 - Clear internal width: 2000mm.
 - Entrance door width: 900 mm.
- (A). A handrail not less than 600 mm. long at 1000mm. above floor level shall be fixed adjacent to the control panel.
 - (B). The lift lobby shall be of an inside measurement of 1800 mm x 1800mm or more.
 - (C). The time of an automatically closing door shall be minimum 5seconds and the closing speed should not exceed 0.25 meter/sec.
 - (D). The interior of the cage shall be provided with a device that audibly indicates the floor the cage has reached and indicates that the door of the cage for entrance/exit is either open or closed.
 - (E). The control panel shall have marking in Braille to help visually impaired.
- (7) Toilets: One special Water Closet, in a set of toilets shall be provided for the use of handicapped with essential provision of washbasin near the entrance for the handicapped.
- (A). The minimum size shall be 1500 x 1750 mm.
 - (B). Minimum clear opening of the door shall be 900mm and the door shall swing out.
 - (C). Suitable arrangement of vertical/horizontal handrails with 50mm clearance from wall shall be made in the toilet.
 - (D). The Water Closet seat shall be 50mm from the floor.
- (8) Drinking Water: Suitable provision of drinking water shall be made for handicapped near the special toilet provided for them.
- (9) Designing for Children: In a building meant for the predominant use of the children, it is necessary to suitably alter the height of the handrail and other fittings and fixtures.

51. **Rainwater harvesting system.**-Provision of rainwater harvesting shall be mandatory for all sizes of plots. The dimension of recharging pits/trenches shall be at least 6 cubic meters for every 100 Sq. m. of roof area. Percolation Pits shall be filled with small pebbles or brick jali or river sand and covered with perforated concrete slabs. Apart from this, the following requirements are optional and may be provided depending on site conditions.
- (A). Terrace Water Collection: The terrace shall be connected to a sump or the well through a filtering tank by PVC pipe. A valve system shall be incorporated to enable the first part of the rainwater collected to be discharged out or to the soil if it is dirty. A filtering tank measuring 0.36 Sq. m. can be constructed near the sump. The tank can be divided by a perforated slab and one part should be filled by small pebbles and other by brick jali. The bottom portion of the tank should have a slope to avoid stagnation of water.
- (B). Open Ground: Where there is open ground, a portion of topsoil shall be removed and replaced with river sand to allow slow percolation of rain water. Any other method proved to be effective in conservation and harvesting of rainwater may be adopted in each and every construction taken up.
52. **Signs and outdoor display structures.**-Signs and outdoor display structures shall be governed by the relevant provisions of the area where no specific guideline for the above structures is framed; the Authority shall prescribe the guidelines with approval of Government.
53. **ICT Landing Points.**-Every multi storied building complex shall have provision for Information and Communication Technology (ICT) landing point in the form of a room near the main entrance gate of dimension not less than 3 m x 4 m. and having 3 m. clear height. The room shall have two fire proof doors of 1.2 m. width opening outwards along with adequate ventilation in the form of windows/ ventilators. Such room shall not be counted in coverage and FAR calculations.
54. **Builder to register an association.**- The builder shall cause to register an Association of apartment owners as required under The Bihar Apartment Ownership Act 2006, before occupancy certificate for 50% or more of the floor area is given.
- The Builder shall submit a copy of the agreement it has entered into with the apartment owners' society. This agreement shall contain the terms of maintenance of public utilities.
55. **Reference to the standards.**-The following standards shall be referred while preparing the design of the building :

- (a) The standards relating to water and sanitation requirements for various occupancies and uses, shall be referred to as per section-1 of part-9 of NBC of India, 2005 group-5,
- (b) Construction of energy efficient building shall be referred to Energy Conservation Building Code, 2007
- (c) Guidelines for installation of solar water heating system shall be referred to as Annexure-II.

56. Life Safety.-

The building design shall comply to the provisions of life safety as mentioned in National Building Code 2005(Group-1 Part-IV Fire and Life Safety-4) wherever applicable and the applicant shall reflect compliance of these provisions in completion certificate.

CHAPTER - V

ADDITIONAL REQUIREMENTS FOR SAFTEY AND SERVICES

- 57. Restriction on construction of Multi-storied building.-**(1) Construction of multi-storied building shall not be permitted villages/wards/municipalities/planning areas specified by the State Government. The Authority may include or exclude any other xareas for prohibition of multi storied building from time to time.
- (2) The Authority may restrict construction of multistoried buildings in any other area on the basis of objective assessment of the available infrastructure and planning needs after obtaining due approval of the Government.
 - (3) Before commencement of these bye laws, where permission has been granted conditionally, such cases shall be dealt with under corresponding provisions of these Bye laws without any major change, or removal of construction, subject to the condition where violation of Heritage Zone conditions has occurred, this relaxation shall not apply.
 - (4) No Condonation in parking requirements, fire fighting provisions, health and structural safety requirements in case of development of Multi Storied buildings shall be allowed.
 - (5) In addition to the provisions of Part 4 Fire and Life Safety of National Building Code of India 2005 (Group 1), the Planning Authority may insist on suitable provisions in building from fire safety and fire fighting point of view depending on the occupancy and height of buildings in the case of Multi Storied building.
- 58. Maintenance.-**(1) In case of buildings with a height of 15.0 meters and above or ground coverage more than 500 sq m, the main entrance to the premises shall not be less than 5 (five) meters in width in order to allow easy access to fire engine. The gate, shall fold back against the compound wall of the premises, thus leaving the exterior access way, within the plot, free for the movement of fire service vehicles. If archway

is provided over the main entrances, the height of the archway shall not be less than 5 (five) meters.

- (2) The space set apart for providing access within the premises shall, in no case, be included in the calculation of requirements pertaining to parking spaces and other amenities required to be provided for the building.
- (3) Every access way shall be properly drained and lit to the satisfaction of the Authority. Manhole covers or any other fittings laid within the right of way of the access way shall be flushed with the finished surface level of it so as not to obstruct safe movement of men and vehicles.
- (4) Reconstruction, addition or alteration to any multi-storied building shall not be taken in a manner, which shall reduce the width of the access way to a level below the minimum prescribed limit under these bye laws.

59. Structural Safety Design, Standards and other Services requirements.-(1) All buildings shall comply with the standards as mentioned below :

Structural Design: The structural design of foundation, elements of masonry, timber, plain concrete, reinforced concrete, pre-stressed concrete and structural steel shall be carried out in accordance with Part-6 of Group-2 structural design and related aspects, section-1 loads, forces and effects] section-2 soils and foundations, section-3 Timber and bamboo, 3A timber, 3B bamboo, section-4 masonry, section-5 concrete, 5A plain and reinforced concrete, 5B pre stressed concrete and section-6 steel, section-7 prefabrication, systems building and mixed/composite construction, 7A prefabricated concrete, 7B systems building and mixed/composite construction of National Building Code of India, 2005 taking into consideration all relevant Indian Standards prescribed by Bureau of Indian Standards including the Indian Standard as given below for structural safety. In case of High Rise Buildings a Certificate of Under Taking for Hazard Safety Requirement shall be submitted in Form-XVI.

For General Structural Safety

1. IS: 456:2000 "Code of Practice for Plain and Reinforced Concrete
2. IS: 800-1984 "Code of Practice for General construction in Steel
3. IS: 801-1975 "Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members in General Building Construction
4. IS 875 (Part 2) : 1987 Design loads (other than earthquake) for buildings and structures Part 2 Imposed Loads
5. IS 875 (Part 3): 1987 Design loads (other than earthquake) for buildings and structures Part 3 Wind Loads
6. IS 875 (Part 4): 1987 Design loads (other than earthquake) for buildings and structures Part 4 Snow Loads
7. IS 875 (Part 5): 1987 Design loads (other than earthquake) for buildings and structures Part 5 special loads and load combination
8. IS: 883:1966 "Code of Practice for Design of Structural Timber in Building

9. IS: 1904:1987 "Code of Practice for Structural safety of Buildings: Foundation"
10. IS 1905:1987 "Code of Practice for Structural Safety of Buildings: Masonry Wall"
11. IS 2911 (Part 1): Section 1: 1979 "Code of Practice for Design and Construction of Pile Foundation Section 1"

For Earthquake Protection

12. IS: 1893-2002 "Criteria for Earthquake Resistant Design of Structures (Fifth Revision)"
13. Is: 13920-1993 "Ductile Detailing of Reinforced concrete Structures subjected to Seismic Forces – Code of Practice"
14. IS:4326-1993 "Earthquake Resistant Design and Construction of Buildings- Code of Practice (Second Revision)"
15. IS:13828-1993 "Improving Earthquake Resistance of Low Strength Masonry Buildings – Guidelines"
16. IS:13827-1993 "Improving Earthquake Resistance of Earthen Buildings – Guidelines",
17. IS:13935-1993 "Repair and Seismic Strengthening of Buildings – Guidelines"

(2) Quality of Materials and Workmanship: All material and workmanship shall be of good quality conforming generally to the accepted standards of Public Works Department and Indian standard specification and codes as included in Part-5 of Group-1 Building Materials and Part-7 of Group-3 Construction practices and safety of National Building Code of India.

(3) Alternative Materials, Methods of Design and Construction and Tests: The provisions of these bye laws are not intended to prevent the use of any material or method of design or construction not specifically prescribed by these bye laws provided any such alternative has been approved. The building materials approved by B.I.S. or any statutory body will form part of the approved building material and technology as part of the bye laws.

(4) Building Services

(A). The Planning design and installation of electrical installations, air conditioning installation of lifts and escalators can be carried out in accordance with Part-8 of Group-4 Building Services, section 1-Lighting and Ventilation, section-2 Electrical and Allied Installations, section-3, Air conditioning and heating, section-4 acoustics, sound insulation and noise control, section-5 installation of lifts and escalators of National Building Code of India, 2005.

(B). The requirements of electric sub-station and the provision of electric sub-station shall also require approval from the concerned Authority.

(5) Plumbing Services

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The planning, design, construction and installation of water supply, drainage and sanitation and gas supply system shall be in accordance with Part-9 of Group-5, Plumbing Services, section-1 water supply, drainage and sanitation (including solid waste management) section-2 gas supply of National Building Code of India 2005.

CHAPTER- VI

INTEGRATED TOWNSHIP

60. **Large Projects.**-(1) Integrated Townships with minimum 5 Ha of land having access from minimum 30 m. R/W road shall be allowed. The road shall have adequate provision for cycle track, footpath, covered drain, plantation, street light and underground utilities.
- (2) The integrated Township shall be permitted in Residential / Institutional/Retail Commercial and Business Zones.
- (3) Permissible land use within the township (%)
- | | | | |
|----|---------------|---|-------|
| A. | Residential | - | 35-50 |
| B. | Commercial | - | 10-15 |
| C. | Institutional | - | 10-15 |
| D. | Recreational | - | 15-25 |
- (4) Other bye laws for approval of Integrated Township
- A. At least 20% of the total area shall be reserved for parks and open space. It shall be developed and maintained by the developer.
- B. At least 10% of the site area shall be reserved for public and semi-public use and shall be handed over to the Authority free of cost and the same shall be allotted by the Authority for development either to the developer or others on lease basis. RCC structure for recreational uses shall not exceed by 25% of total area of such uses.
- C. The FAR shall be calculated on the total area.
- D. Road shown in Development Plan shall be incorporated within the plan and shall be handed over to the Local Authority free of cost after development.
- E. The FAR and coverage shall be 3.0 and 30% respectively. However higher FAR can be allowed if the road width is as per the provisions made for new areas.
- F. At least 25% of the housing units developed will be earmarked for EWS/LIG category.
- G. At least one of the major interconnecting roads shall be 18m wide and shall be open ended. All internal roads shall be developed with pathways and street lighting with good design and practices. Minimum road width with pathways of such roads shall 12m.
- H. All amenities shall be developed by developer and shall be handed over to Authority free of cost through a registered gift deed with completion certificate to obtain occupancy permission. The society/association may in turn enter into agreement with the authority for utilizing, managing and maintaining the roads and open spaces. In case of any violation or

encroachment, the authority shall summarily demolish the encroachments and resume back the roads and open spaces and keep it under its custody.

CHAPTER -VII REQUIREMENT OF SPECIAL OCCUPANCY

61. **Outhouse.**-An outhouse with zero rear and one side set back may be permitted on a plot having an area not less than 400sq.m,provided that:
- (1) The coverage of the outhouse shall not exceed 30 sq.m. and the height shall not exceed 3 m.;
 - (2) The built up area of the outhouse and that of the main building together shall not exceed the permissible FAR for the concerned plot;
 - (3) The outhouse shall not cover more than one third of the width and more than one fourth of depth of the plot and shall not about any public road;
 - (4) A minimum 1.5 m. strip of land shall be kept open to the sky between the main building and the outhouse;
 - (5) No opening either in the form of windows or doors or ventilators shall be provided to the adjoining properties;
 - (6) Outhouses with sloping roof would only be permitted. In no case permission for outhouses would be granted with reinforced concrete cement flat roof.
62. **Semi-detached and row housing.**-(1) Owners of adjacent similar dimension plot abutting a road may be permitted to construct row or semi-detached buildings.
- (2) The orientation of the row or semi-detached building shall preferably be such to ensure proper ventilation.
 - (3) For semi-detached buildings over two adjacent plots, the setbacks, the height and the FAR shall be regulated by treating both the plots as one.
 - (4) In case of row housing, the length of a row shall not exceed 50 m. along the road on which such houses abut. In case, the dwelling units in a row are scattered the maximum length of the road shall be 100 m.
 - (5) The minimum size of the plot on which a unit of a row housing may be allowed shall be 50 sq. m.
63. **Shop cum residence.**-Where plots are in a row for shop-cum-residential purpose the Authority may allow construction of shop-cum-residential building without any side set backs up to a depth of 10 meters from the front exterior wall. Provided that no part of the building up to said depth is used for residential purpose on the ground floor. No building exceeding 12 meters in height shall be allowed to be constructed as a shop-cum-residential plot, unless so permitted under the zonal Development Plan, provided that the shop-cum-residence shall have 2/3rd of the total floor area used for shops. The FAR and other parameters shall conform to that specified for commercial buildings.

64. **Cinema, Multiplex and Theatre building.**-(1) The relevant provisions of the Bihar Cinemas (Regulation) Act, 1954 shall apply for planning, designing and construction of Cinema and Theatre buildings.
- (2) No permission for construction of a building to be used as a cinema hall, theatre or auditoria for cultural show shall be granted unless the construction of such buildings conforms to the provisions of the Bihar Cinemas (Regulation) Act, 1954 or any other law in the subject for the time being in force in the State.
- (3) All cinema, theatre or auditoria buildings shall conform to IS; 4898-1968 and acoustics design of such buildings shall adhere to the requirements of IS; 2526-1963.
- (4) Exits and fire safety requirements shall be in accordance with Part IV (Fire and life safety) of National Building Code of India, 2005.
65. **Liquefied Petroleum Gas.**-(1) Vacant space shall be maintained at all times, with the following distances for storage shed used for the storage of liquefied petroleum gas cylinders between any building, public space, public road or any adjoining property which may be built upon and the said storage shed. The minimum clear distance shall be as per Table 21.

Table - 21: Minimum distances required for storage shed of liquefied petroleum gas cylinders

Quantity of Compressed Gas in Cylinders (Kg.)	Minimum Clear Distance to be Kept (metres.)
0-100	1
101 -1000	3
1001-4000	5
4001-8000	7
8001-12000	9
12001-30,000	12
Over 30,000	15

- (2) Notwithstanding anything contained in the conditions specified above, cylinders containing liquefied petroleum gas exceeding 100 Kilograms but not exceeding 300 Kilograms may be kept in a storage shed forming part of, or attached to building, if it is separated there from by a substantial partition and the only means of access to it is from outside. Such a storage shed shall not be situated under any staircase or near other entrances to or exits from the rest of the building or other buildings. A shed used for storage of liquefied petroleum gas cylinders shall be surrounded by a suitable fence to prevent unauthorized persons from having access to the shed.
66. **Petrol Pump.**-(1) Minimum distance from the road intersections shall be:
- A. For minor roads having less than 30 m. width - 50 m.
- B. For major roads having width 30 m. or more -100 m.

- (2) The minimum distance of the property line of petrol pump from the centre line of the road shall not be less than 15 meters on roads having less than 30 m width. In case of roads having 30 m or more width, the width of the road shall be protected.
- (3) Plot size:
- A. Only for filling stations -30mX20m
 B. Filling-cum-service station 40 m X30 m
 C. Frontage of the plot shall not be less than 30 m
- (4) New petrol pump shall not be located on roads having less than 30 m width
- (5) Every petrol pump shall have public toilets with W.C. separately for men and women.
- (6) (A) Other controls
- i. Ground coverage - 20%
 ii. FAR - 1.0
 iii. Max. Height -7m
 iv. Canopy equivalent to permissible ground coverage within setback line,
 v. Front set back - minimum 9 m
- (B) Other regulations
- i. NOC from Explosives/Fire Department
 ii. License from the District Magistrate
 iii. Ground coverage will exclude canopy area
- (C) Compressed Natural Gas (CNG) mother station
- i. Plot size (Max)- 36 m X 30 m
 ii. Maximum ground coverage - 20%
 iii. Maximum height-7m(single storey)
 iv. Building component- control room/office/dispensary, store, pantry and W.C.

67. Farm House.-(1) For construction of Farm House Building in Agriculture and Forest use Zone

- (2) Minimum size of plot- Minimum size of a plot for farmhouse shall not be less than 1.00 hectare.
- (3) Maximum coverage and FAR shall be as given in the table-22.

TABLE - 22 : Maximum coverage and FAR

A	Maximum permissible ground coverage for all types of activity	10%
B	Maximum permissible FAR	0.20

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C	Residential accommodation of watch and ward/maintenance staff	40 sq m.
D	Maximum height	7m.
E	Setbacks	Front/side abutting road 15.0 m. and all other sides 9.0

- (4) Other Provisions: Minimum 65% of the total area of the farmhouse shall be under plantation/cultivation. At least 100 trees per hectare shall be planted out of which at least 50 percent shall be evergreen trees.
- (5) Water supply, Sewerage and drainage:
- A. In case of a plot for a farmhouse having dwelling units, the owner thereof shall be responsible to make lawful arrangements for potable water.
- B. The owner shall be responsible to provide drains in the farm house to be used for rain water and in case of dairy farm open or closed sanitary drains to clean sheds, as may be required by the Authority.
- C. The owner shall be responsible to provide septic tank with necessary disposal trenches for disposal of human and animal waste in the farmhouse within his own premises.
- (6) Electrification - The owner of a farmhouse shall obtain electric connection directly from the appropriate authority authorized for distribution on such terms and conditions at his own cost as decided by the appropriate Authority from time to time.

CHAPTER-VIII

DEVELOPMENT AND SUB-DIVISION OF LAND

68. **Application.**-(1) Applications for subdivision of land for utilizing selling, leasing out or otherwise disposing it off shall be made to the Authority in Form-I.
- (2) The applications for subdivision shall be in addition to the requirements specified in Bye laws-5(3)(iii) accompanied by-
- i. A copy of the title deed of the land in question;
 - ii. An affidavit with regard to the right, title and interest of land and such other particulars as the Authority may require;
 - iii. An authenticated copy of the certificate with regard to the payment of development charges, if any.
 - iv. An authenticated copy of the receipt towards payment of fee to the Authority as prescribed under bye-laws-7(2);

- v. A no-objection certificate, from the lessor in case the land is not leasehold unless the lease deed permits undertaking sub-division as applied for;
 - vi. A site plan traced out of revenue village settlement map in operation indicating therein in red colour the lands to which the application relates and surrounding plots;
 - vii. An index plan of the site showing adjoining areas within a radius of 150 m. round from the proposed site marking clearly therein the boundaries of the proposed layout in red colour, existing road, structures, burial ground and high tension or low-tension power line passing through the site of the layout plan and the level of the site;
 - viii. A detailed plan to a scale not less than 1:100 showing the proposed layout (sub-division) indicating size of plot width of the proposed road, open space and amenities provided;
 - ix. Land use analysis indicating the survey plot number, the bye-plot number, the detailed dimensions of all the plots, the area of each-plot and the use to which they are proposed to be put;
 - x. In case of land originally belonging to any religious endowments, a no-objection certificate from the endowment commissioner or wakf board as the case may be; and
- (3) Where permission for sub-division of land is granted, such permission shall be communicated to the applicant in Form-VIII B within 60 days from the receipt of the application.
- (4) Where permission for sub-division of land is refused such refusal shall be communicated to the applicant in Form-IX.

69. Use in relation to Development Plans.-(1) Subdivision of land shall normally be permitted for the purpose for which the concerned land is earmarked in the development plan. Such subdivision may be for residential, commercial industrial, institutional or combination of one or more of this purpose or such other purpose as may be considered conforming to the provisions in the development plan: provided that in every subdivision plan spaces for roads, community facilities and public utilities as specified in this part or such other facilities as the Authority may determine shall be incorporated.

- (2) After a subdivision plan has been approved the Authority shall not permit construction of a building on any of the plot unless the owners have laid down and made street or streets and provided amenities as approved or transferred the land covered by roads, open spaces or other public purposes to the concerned local body.

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- (3) Subdivision of land for residential purpose in green-belt use zone shall not be permitted unless such sub-division in the opinion of the Authority forms a part of the normal expansion of existing human habitation.
- (4) The sub division shall conform to the proposals of the development plans.

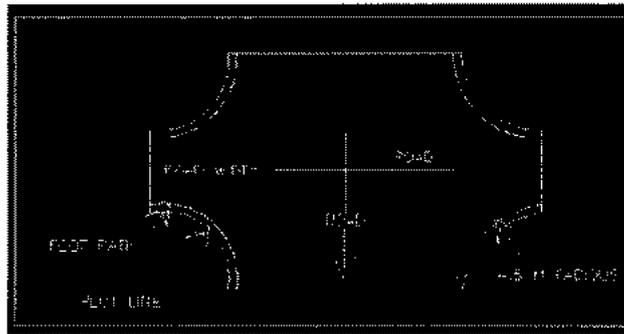
70. Size of the plot and road width.-(I) Minimum Road Widths for Subdivision in Residential Area No sub divided plot will be less than 50 sq.mt. However the Authority reserves the right to relax in special cases such as EWS housing. The size of the plot shall be according to the relevant sub-division of plot size in the zones as per Table-23.

Table-23: Minimum road widths for sub division in residential area

sl.no.	Length of road in (m)	Min. width of road** (m)
1	Up to 250	9.0
2	Above 250 up to 500	12.0
3	Above 500 to 1000	15.0

**For EWS housing scheme, the minimum road width may be relaxed.

Note- All junction of service roads shall have sufficient weaving angle. In no case it shall be less than the space arrived at drawing a quadrant of a circle of 4.5m. radius at the edge of the actual road lines leaving the width of pedestrian walks (foot path) and the plot boundaries shall be rounded of by drawing a quadrant of the circle of 2.7m radius at the edge of plot boundaries (see figure). It can also be provided but cut in place of rounded comers is to be determined by the Authority.



- (II) **Commercial Business and Industrial.**-The maximum length permissible for different classification of roads in areas other than residential shall be as indicated in Table 24. No roads in these areas shall be less than 12m in width.

Table -24: Minimum road widths for sub division in commercial and industrial area

Class of Road	Width (m)	Maximum length permissible (m)
1	12	200

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2	18	600
3	24	Above 600

The width of the Master Plan roads shall be as per the width prescribed in the Master Plan.

Alleys- Alleys shall be provided in commercial and industrial areas except where Authority may relax this requirement or when assured provision is made for service access such as off street loading/unloading and parking coexistent with and adequate for the use provided. The width of alleys where provided shall not be less than 6m. and no dead end alleys shall be permitted unless provided with an adequate turn around facilities.

Junctions.- The layout shall be provided at the junctions of roads in such a way that as far as possible all roads do meet at right angle, roads meeting at less than 45° shall not be permitted unless adequate arrangements for the circulation of traffic with desirable weaving length is available.

(III) **Sub-division Bye-laws for plots in Built-up area.-**The sub-division of plots in existing built-up areas, in which the greater part has been developed as a business, industrial or residential area and which has been provided with all essential facilities like roads, water supply, sewerage, electricity etc. the norms as laid down in these Bye-law shall apply.

(IV) If the area to be sub-divided is less than 1 acre or 0.4 hectare than the minimum width of roads and access ways for internal development shall be 6m. In case the plot faces a road less than 6m. in width, then the plot boundary at the front shall be set back, so that the distance from the centre line of road to the new plot boundary is not less than 3m.

Note- If the area to be sub-divided is more than 1 acre in that case, the layout has also to be accorded by the concerned committee authorized by the Authority. If the area to be sub-divided is more than 1 acre or 0.4 hectare, then the minimum width of roads and access ways for internal development shall be 7m. and shall be further subjected to the provisions of bye-law. In case the plot faces a road less than 7m in width, then the plot boundary at the front shall be set back, so than the distance from the centre line to the new plot boundary is not less than 3.5m.

71. **Area for development.-**Apart from the provision for amenities and open spaces, the area for residential development shall be up to maximum of 50% of the total land area.

72. **Park and Open Spaces.-**Parks and open spaces shall not be less than 10% of the total land area. This shall be relinquished to the Authority and if required, the Authority may handover area over for maintenance to the residents' welfare association or owner

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or developer. If the site is not utilized for which it is leased out within a prescribed period, it will be resumed back to the Authority.

73. **Community facilities.**-Community facilities shall be provided minimum 10% of the plot area.
74. **Exemptions.**-(1) In case of developable area for residential development is less than 50% by providing for Master Plan roads or any other road or due to statutory reasons, prescribed by the Authority in a layout, the applicant may be exempted from complying with civic amenities reservation.
- (2) For layout over 10.0 ha, commercial land uses such as Business offices, shopping complexes and Retail up to 2-3% may be permitted, subject to provision of separate access.
- (3) For residential development upto 0.30 hectare of land, the requirement of open space may not be insisted on.
75. **Submission of layout plan-** The layout plan may be submitted for approval to Authority by the signature of the members of the concerned Society in lieu of Secretary/president of the society. Even a single member of the Society may apply with his signature, if he is authorized by all the members of the society for doing the same.

CHAPTER IX

COMPOUNDING, PENALTIES AND COMPLIANCE

76. **Restriction on Compounding.**-(1) Any deviation pertaining to unauthorized development shall not be compounded;
- A. Where construction has been undertaken on Government land or land belonging to local body or land not owned by the person undertaking such development;
- B. Where FAR or height has been exceeded or front setback has been reduced from the prescribed norms under these bye laws.
- C. Where development has been undertaken un-authorizedly within the prohibited limits of any ancient or archaeological monuments.
- D. Where such developments interfere with the natural drainage of the locality;
- E. Where development has been undertaken un-authorizedly over the area earmarked /approved for parking; and,
- F. Where road or drain whether public or private, whether constructed or natural, has been encroached.

- G. Where number of floors have been increased from permissible limit/sanctioned map.
- (2) Subject to the provisions contained in sub bye law (1), the Authority shall have the power to determine such other circumstances under which compounding may be prohibited.
 - (3) The Authority may, either before or after the institution of the proceedings under the provisions of the Act compound any offence:
 - A. Where development has been undertaken without permission, but within the framework of use restrictions and the provisions of these bye laws applicable to the concerned plot;
 - B. Where development has been undertaken in deviation of the approved plan, but within the framework of the use restriction and the provisions, norms, and stipulations of these bye laws; and
 - C. The Authority may however compound deviations beyond the permissible norms of these bye laws up to 10% in respect of side and rear setbacks, 5% in respect to FAR and 5% in respect to height with a maximum limit of 0.90 m.

77. **Compounding Rate.**-Compounding Rates for various categories shall be as per Table-25;

Table 25: Compounding rates

SN	Situations	Compounding fee per sq.m. (in Rs.)	
		Residential/ Institutional	Others
1.	Where development has been undertaken without permission, but within the framework of use restrictions and the provisions of the Bye laws applicable to concerned plot	2000	3000
2.	Where development has been undertaken in deviation to the approved plan, but within the frame work of use, restrictions and the provisions of norms and stipulations of these bye laws.	2000	2000
3.	Constructions beyond permission but within the limit as mentioned in bye-laws 76(3)(C)	10000	20000

78. **Compounding amount.**-At least 50% of the compounding amount shall be utilized for development of public utility services and protection of heritage sites and structures.

79. **Temporary retention.**-The Authority may allow retention of any unauthorized structure for temporary period on deposit of retention fee. The type of structure to be

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retained, the period of retention and the fees to be deposited shall be decided by the Authority from time to time.

- 80. Penal Action against Builders/ Technical Personnel.**-(1) Notwithstanding anything contained in these bye laws, the Authority reserves the right to debar/ black list and take legal action against the builder/ technical person who has deviated from the professional conduct or has made any fraudulent statement or has misrepresented/suppressed any material facts in his application/ plan or is involved in construction of the building deviating from the approved plan/norms of these bye laws.
- (2) Before taking any action under clause (1) specified above, the Authority shall issue a notice specifying the reasons thereof asking for a show-cause within 15 days as to why such builder/technical person shall not be debarred/black listed. After receipt of the show cause, if any, the same shall be placed before the Authority for a decision on debarring/black listing the technical person/builder. The decision of the Authority in this regard shall be published in the Notice Board of the Authority and the Govt. website.
- (3) An appeal against an order under (2) above shall lie under Section-79 of the Act and Section- 329 of the Bihar Municipal Act 2007.
- 81. System for monitoring-** A system for monitoring shall be put in place by all authorities to ensure that the Bye laws are followed and prompt action shall be taken in case of violation of these bye laws.

CHAPTER -X

E-GOVERNANCE AND SERVICE DELIVERY

- 82. E-Governance.**-(1) The State Government shall set up an integrated E-Governance system to be used by all the authorities. All the applications and the associated documents to be submitted to the various authorities under these byelaws shall be submitted through the E-Governance system.
- (2) All notices shall be issued through the E-Governance system.
- (3) The E-Governance system shall have an inbuilt reminder mechanism to approve applications wherever provisions have been made for approval within a specified time limit under these bye-laws.
- (4) The E-Governance system shall periodically generate reports of occasions where the Authorities have failed to perform their statutory duties within the prescribed time. The Authorities shall with their comments forward these reports to the State Government at periodic intervals specified by the State Government.
- (5) Single Window Clearance shall be facilitated through E-Governance system.

CHAPTER-XI
SAVINGS / REPEALS AND INTERPRETATION

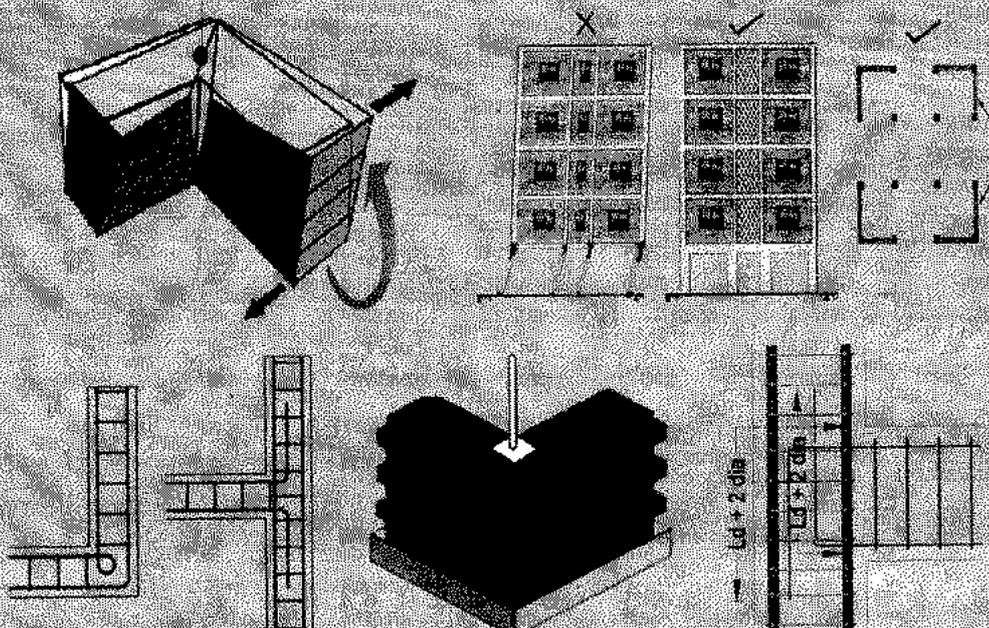
- 83. Repeal and Savings.**-(1) The Patna Planning Standards and Building Bye Laws 1981 with all its amendments and associated executive orders are hereby repealed.
- (2) Notwithstanding such repeal, anything done or any action taken under the bye laws so repealed shall be deemed to have been done or taken under these bye laws;
- 84. Interim Development Plan.**-(1) The Authority may prepare Interim Development Plans (IDP) for newly included development areas including rayati land within a reasonable time frame so that development may not be held up in the name of pendency of Interim Development Plan. Where such IDP has not been prepared, the general provisions of these bye laws shall apply without any zonal restrictions.
- (2) The Authority shall ensure that resources for land acquisition and cost of land are mobilized or are likely to be mobilized within the time frame projected for implementation of such Interim Development Plans.
- 85. Applicability of National Building Code.**-Where no express provision has been made in respect of any matter connected with planning and building standards by the Act, the Rules, the Development Plan, the Town Planning Schemes, or these Bye laws or by any resolution of the Authority, the provisions of the National Building Code of India, 2005 shall mutatis mutandis be applicable.
- 86. Prior Commitments.**-If any Department of Government/Statutory Authority has given any commitment for a project under PPP with the prior approval of Government, but the building plan of such project has not yet been approved by the Authority as on date of enforcement of these Bye laws, such commitment shall be treated to be made under these Bye laws.
- 87. Decision of the Government to be final.**-In case of any dispute in interpretation of these bye laws, the decision of the State Government shall be final.
- 88. Relaxation and modification by the Government.**-The Authority may recommend to the Government for relaxation/modification of any of the clauses of these Bye laws in the general interest of the public pertaining to projects/schemes developed by the Govt. agencies and the decision of the Government in this regard shall be final.

A Building Bye Laws Review Committee shall be constituted by the Urban Development and Housing Department for periodic review and reconsideration and necessary modification of these Bye Laws.

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2. *[Signature]* 4.12.17
3. *[Signature]*
4. *[Signature]*



बिहार में, भूकम्पीय खतरों से न्यूनीकरण के लिये, भवनों के निरूपण एवं निर्माण का परिपत्र



जुलाई 2012



बिहार राज्य आपदा प्रबंधन प्राधिकरण

द्वितीय तल, पन्त भवन, बेली रोड, पटना,

फोन-0612 2522032

website-www.bsDMA.org

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माननीय मुख्य सचिव, बिहार द्वारा
बिहार सरकार के विभिन्न विभागों को निर्गत परिपत्र की प्रतियाँ,
सभी संबन्धित अभियंताओं को
सुगमता से उपलब्ध कराने एवं अनुपालन सुनिश्चित करने में
सुविधा प्रदान करने के उद्देश्य से छपवायी गयी है।

प्रस्तुति:-

पद्मश्री, डा . आनन्द स्वरूप आर्य,
अवकाशप्राप्त प्राध्यापक, आई . आई . ओ . रूड़की,
सदस्य, बिहार राज्य आपदा प्रबंधन प्राधिकरण।

बरुण कान्त मिश्र,
कार्यपालक अभियंता, पथ निर्माण विभाग,
सह माननीय सदस्य, डा . आर्य के आप्त सचिव।

बिहार टेक्स्टबुक पब्लिशिंग कॉरपोरेशन लि. पाठ्य-पुस्तक भवन बुद्ध मार्ग,
पटना द्वारा आदेशित तथा विजयश्री प्रिंटेर्स, पटना द्वारा 2000 प्रतियाँ मुद्रित

पत्रांक-10/विविध/आ.प्र.प्रा.-13/2011-2253/आ.प्र.

बिहार सरकार

बिहार राज्य आपदा प्रबंधन प्राधिकरण

(आपदा प्रबंधन विभाग)

द्वितीय तल, पंत भवन, पटना-800001

प्रेषक,

मुख्य सचिव,
बिहार।

सेवा में,

प्रधान सचिव/सचिव,

भवन निर्माण विभाग, बिहार, पटना।

ग्रामीण कार्य विभाग, बिहार, पटना।

नगर विकास एवं आवास विभाग, बिहार, पटना।

स्वास्थ्य विभाग, बिहार, पटना।

शिक्षा विभाग, बिहार, पटना।

पथ निर्माण विभाग, बिहार, पटना।

जल संसाधन विभाग, बिहार, पटना।

प्रबंध निदेशक,

संरचना विकास प्राधिकरण (प्ला.),

उद्योग भवन, गाँधी मैदान, पटना।

अध्यक्ष-सह-प्रबंध निदेशक,

पुलिस भवन निर्माण निगम, पटना।

अध्यक्ष,

बिहार राज्य पुल निर्माण निगम,

नेताजी सुभाष चन्द्र बोस रोड, पटना।

प्रबंध निदेशक,

बिहार स्टेट हाउसिंग बोर्ड,

नेताजी सुभाष चन्द्र बोस रोड, पटना।

प्रबंधक निदेशक,

बिहार राज्य पर्यटन विकास निगम,

सोन भवन, वीरचन्द्र पटेल पथ, पटना।

प्रबंधक निदेशक,

रोड कंसट्रक्शन कॉरपोरेशन, पटना।

पटना, दिनांक-17.07.2012

विषय - भारवाहक दीवार या आर.सी.सी. फ्रेम संरचना पर आधारित, बिहार में भवनों के निरूपण एवं भवन के निर्माण के दौरान, भूकम्प से संभावित खतरों के न्यूनीकरण से संबंधित परिपत्र भेजने के संबंध में।

महाशय,

बिहार राज्य आपदा प्रबंधन प्राधिकरण के माननीय सदस्य प्रो. ए. एस. आर्य द्वारा तैयार भारवाहक दीवार या आर.सी.सी. फ्रेम संरचना पर आधारित, बिहार में भवनों के निरूपण एवं भवनों के निर्माण के दौरान, भूकम्प से संभावित खतरों के न्यूनीकरण से संबंधित परिपत्र की छाया प्रति (1-33 पृष्ठों में) संलग्न कर भेजी जा रही है।

सभी संबंधित विभाग अपने स्तर से इस परिपत्र को निर्गत करते हुए अनुपालन सुनिश्चित करेंगे।

अनु.-यथोक्त

दिश्वासभाजन,

ह.

मुख्य सचिव, बिहार

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(परिपत्र का प्रारूप)

परिपत्र संख्या पटना, दिनांक

प्रेषक प्रमुख अभियंता (उचित पदनाम)
..... विभाग / निगम / बोर्ड / प्राधिकार / परिषद्

सेवा में सभी अभियन्ता, सभी वास्तुविद्

विषय भारवाहक दीवार या आर.सी.सी. फ्रेम संरचना पर आधारित, बिहार में, भवनों के निरूपण एवं भवनों के निर्माण के दौरान, भूकम्प से सम्भावित खतरों के न्यूनीकरण के लिये परिपत्र।

महाराज,

26 जनवरी 2001 को गुजरात में आये भूकम्प में, भुज में बहुत सारे मकान ढह गये थे जिससे जानमाल की व्यापक हानि हुई। Epicenter से 225 कि.मी. दूर अहमदाबाद शहर में पचासों बहुमंजिली भवन क्षतिग्रस्त हुए, एवं कई ढह गये। क्षति के कारणों की जाँच से यह पता चला कि, यदि भारतीय मानक संस्थान द्वारा प्रकाशित, भूकम्प से सुरक्षा सम्बंधी संहिताओं के प्रावधानों का, भवन संरचना निर्माण में अनुपालन किया गया होता तो बहुत सारे भवन को ढहने से बच जाते और व्यापक पैमाने पर जानमाल की क्षति नहीं होती।

बिहार राज्य के अधिकांश भू-भाग विनाशकारी भूकम्प जोन IV एवं V में पड़ते हैं। अतएव, भवन संरचना निर्माण सम्बंधी प्रमुख संहिताओं के प्रसंग के साथ, बिहार में, ईट जोड़ाई के भारवाहक दीवार संरचना एवं बहुमंजिली आर.सी.सी. फ्रेम संरचना पर आधारित, भूकम्परोधी भवनों के निरूपण एवं निर्माण के महत्वपूर्ण चरणों में आवश्यक उपाय अपनाने के लिये यह परिपत्र निर्गत किया जाता है। इस परिपत्र का अनुपालन सुनिश्चित किया जाय।

	विषय सूची	पृष्ठ संख्या
भाग - 1	सामान्य जानकारी	2
भाग - 2	भूकम्परोधी निरूपण	2
भाग - 3	भवन स्थल मिट्टी की जाँच, नींव का चयन	4
भाग - 4	भूकम्परोधी प्लान एवं संरचना व्यवस्था	7
भाग - 5	ईट जोड़ाई के भारवाहक दीवारों के भवन	11
भाग - 6	प्रबलित (Reinforced) कंक्रीट संरचना के भवन	16
भाग - 7	भवन निर्माण में आवश्यक सावधानियाँ	23
भाग - 8	निरीक्षण एवं गुण नियंत्रण	25
अनुलग्न	संरचनात्मक आरेखनों का नमूना - कुल सात आरेखन	

पृष्ठ संख्या 1

6/2/17

प्रमुख अभियंता
4.12.17

भाग - 1 सामान्य जानकारी

1.1 निरूपण कार्यालय में, भारतीय मानक संस्थान द्वारा प्रकाशित नवन निर्माण से सम्बंधित निम्नलिखित प्रमुख संहिताओं के अद्यतन संस्करण सुलभ प्रसंग हेतु उपलब्ध रखें :-

(क) भवन संरचना की सामान्य सुरक्षा

- 1 IS National building code 2005
- 2 **IS 456 - 2000** Plain and Reinforced Concrete -- Code of Practice
- 3 IS SP 16 - 1980 Design Aids to IS 456-1978
- 4 **IS 800 - 2006** Code of Practice for General Construction in steel
- 5 IS 875 (part 1) - 1987 Unit weights of building materials and stored materials: Code
- 6 **IS 875 (part 2) - 1987** Imposed (Live) Loads for Buildings and Structures: Code
- 7 **IS 875 (part 3) - 1987** Wind Loads for Buildings and Structures: Code of Practice
- 8 IS 1905 - 1987 Structural use of Unreinforced Masonry: Code of Practice

(ख) नींव की सुरक्षा

- 9 IS:1892 - 1979 Subsurface investigation for foundations: Code of Practice
- 10 IS: 2131-1981 Method of Standard Penetration Test for soils (First Revision)
- 11 IS: 1498-1970 Classification and identification of soils for engineering purposes
- 12 **IS 1904 - 1986** Foundations in Soils: Code for General Requirements
- 13 **IS 6403 - 1981** Determination of Bearing capacity of Shallow foundations: Code
- 14 IS 2950 Part 1-1981 Design and Constkuctidn of Raft foundations: Code of Practice
- 15 **IS 2911(Part 1/ Sec 2)** Bored cast in situ Plain Concrete Pile Foundation: Code
- 16 IS 2911 (Part 3) - 1980 Bored cast in situ Under-reamed Pile Foundation: Code
- 17 IS 2911 (Part 4) - 1985 Load Test on Pile Foundation: Code of Practice

(ग) निर्माण सामग्रियों की जाँच

- 18 IS 383 - 1970 Specification for coarse and fine aggregates for concrete
- 19 IS 1199-1959 Methods of sampling and analysis of concrete
- 20 IS 516-1959 Methods of tests for strength of concrete

(घ) भूकम्प से सुरक्षा

- 21 **IS 1893 (Part1) - 2002** Criteria for Earthquake Resistant Design of Structures(5th revision)
- 22 **IS 13920 - 1993** Ductile detailing of RCC structures against EQ forces:Code
- 23 **IS 4326 -1993** Earthquake Resistant Design and Construction of Buildings: Code

1.2 भवनों के निरूपण के दौरान इन संहिताओं में वर्णित प्राक्धानों से पूरा-पूरा अवगत होने के लिये, समय-समय पर, निरूपण अभियंताओं का प्रशिक्षण आयोजित किया जाय।

भाग - 2 भूकम्परोधी निरूपण

2.1 भूकम्प

भूगर्भ में विशाल चट्टान खंड खिसकते रहते हैं, जिन्हें टेक्टोनिक प्लेट कहा जाता है। दीर्घाकार यूरेशियन टेक्टोनिक प्लेट को, भारत-आस्ट्रेलिया टेक्टोनिक प्लेट विशाल बल के साथ लगातार ढकेल रहा है और यूरेशियन प्लेट के नीचे जा रहा है, जिससे हिमालय की उत्पत्ति हुई है।

विशाल बल द्वारा, भूगर्भ स्थित चट्टानों के टूटने से उत्पन्न विस्फोट के फलस्वरूप, भूगर्भ परत से होते हुए, भूकम्प तरंग सभी दिशाओं में फैल जाती है। भूतल से विस्फोट की गहराई, उत्सर्जित उर्जा, भूतल के नीचे चट्टान के स्वरूप एवं विस्फोट से स्थल विशेष की दूरी पर, भूकम्प की तीव्रता निर्भर करती है।

1/12/14

Dr. Anshu
1-12-14
Dr. Anshu

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भूकम्प तरंग के कारण जमीन का तल डोलता है। भवन के नीचे और निचले भाग जमीन के साथ चलते हैं, जबकि जड़त्व के कारण भवन के छत एवं उपरी हिस्से अपने मूल स्थिति में रहते हैं, और भवन भी डोलने लगता है। क्षैतिज दिशाओं में, उर्ध्वाधर की अपेक्षा ज्यादा दोलन होता है। इससे भवन के कमजोर दीवार या पीलर झुककर टूट सकते हैं।

सम्भावित भूकम्प तीव्रता के आधार पर बिहार को तीन भूकम्प जोन में बाँटा गया है। भूकम्प जोन सारणी-1 में दर्शाया गया है।

सारणी-1 : बिहार के भूकम्प जोन

भूकम्प जोन	बिहार राज्य के जिले
V सर्वाधिक क्षति करनेवाला	सीतामढ़ी, मधुबनी, दरभंगा, सहरसा, सुपौल, मधेपुरा, अररिया एवं किशनगंज
IV अधिक क्षति करनेवाला	पूर्वी चम्पारण, पश्चिमी चम्पारण, शिवहर, छपरा, सिवान, गोपालगंज, मुजफ्फपुर, वैशाली, समस्तीपुर, बेगूसराय, खगड़िया, पूर्णियाँ, कटिहार, भोजपुर, पटना, जहानाबाद, नालन्दा, नवादा, शेखपुरा, लखीसराय, जमुई, मुंगेर, भागलपुर एवं बाँका
III मध्यम क्षति करनेवाला	बक्सर, कैमूर, रोहतास, औरंगाबाद एवं गया

2.2 भूकम्परोधी निरूपण का सिद्धांत (IS 1893 Clause 6.1.3)

IS 1893 Clause 6.1.3 में, सम्भावित भूकम्प के विभिन्न तीव्रता में, भवन के क्षति का अनुमान इस प्रकार किया गया है :-

- बारबार आनेवाले गौण भूकम्प (Design Basis Earthquake से कम तीव्रता) के दौरान, उर्ध्वाधर और क्षैतिज बलों को वहन करने वाले भवन के मुख्य अंग क्षतिग्रस्त नहीं होना चाहिए। भवन के अन्य हिस्सों में, जो भार वहन नहीं करते मरम्मत योग्य क्षति हो सकती है।
- यदा-कदा आनेवाले मध्यम भूकम्प (DBE) के दौरान, भवनों के मुख्य अंगों में मरम्मत योग्य क्षति हो सकती है। भवन के अन्य भागों को भूकम्प के बाद दोबारा बनाने की आवश्यकता पड़ सकती है।
- आसाधारण शक्तिशाली भूकम्प (Maximum Considered Earthquake) के दौरान, भवनों के मुख्य अंगों को अति अपूर्णनीय क्षति पहुंच सकती है, लेकिन भवन ढहना नहीं चाहिए।

2.3 भारतीय मानक संस्थान द्वारा प्रकाशित भूकम्परोधी निरूपण संहिताओं का अनुपालन

- सामान्यतया, आर.सी.सी. अवयवों का निरूपण IS:456-2000 के Limit State तरीके से किया जाता है। इसके साथ ही, बिहार में भूकम्प से सम्भावित खतरों के न्यूनीकरण के लिये, IS:1893 Part 1-2002, IS:4326-1993 एवं IS:13920-1993 के सम्बन्धित कंडिका में वर्णित प्रावधानों का समावेश भी भवन संरचना के निरूपण में करना चाहिए।
- IS:13920 के प्रावधान से, आर.सी.सी. संरचना की तन्यता (Ductility) बढ़ जाती है, जिससे प्रबल भूकम्प में भी संरचना फटे बिना, तनकर या मुड़कर स्थायी विकृति प्राप्त करने में समर्थ हो जाता है।
- IS:1893 Part 1-2002 विभिन्न संरचनाओं पर भूकम्प बल मूल्यांकन तथा भूकम्परोधी निरूपण की मूल संहिता है। गणना में, R (Response Reduction Factor) का मान IS:1893 Part 1-2002 के table 7 से लेते हैं। IS:13920 के अनुपालन से R का मान बढ़ जाता है।
- IS:13920-1993 के अनुपालन से, यद्यपि कुछ अतिरिक्त व्यय होंगे, परन्तु R के बढ़ने के कारण, IS:1893 Part 1-2002 के अनुपालन की अपेक्षा कुल लागत में कमी होगी और सुरक्षा भी बढ़ेगी।
- IS:4326-1993 में, भूकम्परोधी भवनों के सामान्य सिद्धांत तथा ईट जोड़ाई के भारवाहक दीवार पर आधारित संरचना एवं अन्यान्य निर्माण के लिये निर्माण पदार्थों का चुनाव, निरूपण एवं निर्माण विशिष्टियाँ सन्निहित हैं।

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भाग - 3 भवन स्थल मिट्टी की जाँच, नींव का चयन

3.1 भवन स्थल

- (i) निम्न प्रकार के प्रस्तावित भवन स्थलों पर, भवन के नींव तथा संरचना के निरूपण में अतिरिक्त सावधानी रखें :-

भवन के स्थल पर, भूतल के नीचे, भूगर्भ जल से संतृप्त महीन बलुआही मिट्टी हो, या,
भवन के स्थल पर, भूतल के नीचे, नींव फैलनेवाली चिकनी मिट्टी या मुलायम सिल्ट हो, या,
भवन स्थल मिट्टी भरकर बनाया गया हो, या,
भवन स्थल के पास जमीन में, अत्यधिक ढलान हो या जलजमाव हो।

- (ii) बाढ़प्रस्त क्षेत्रों में, वार्षिक उच्चतम बाढ़ स्तर से उपर, उँचे जगहों पर, भवन स्थल चुने जाये। यदि भवन स्थल उच्चतम बाढ़ स्तर से उपर न हो, तो जमीन भरकर, मकान की कुरसी की उँचाई, उच्चतम बाढ़ स्तर से, कम से कम 450 मिलीमीटर उपर रखा जाय।

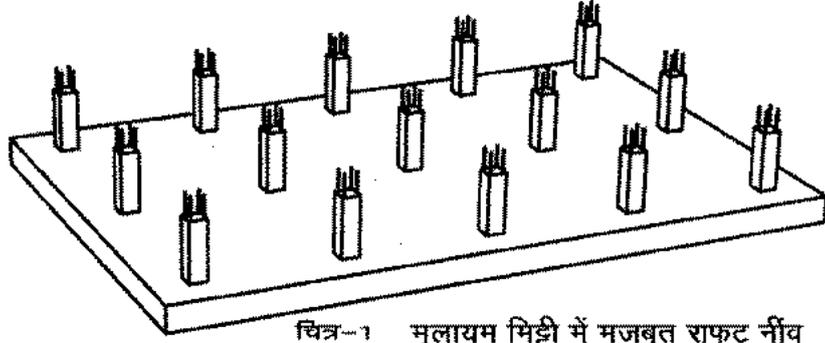
3.2 भूमिगत मिट्टी प्रकृति की जाँच

- (i) नींव की मिट्टी जाँच के लिये, 4000 वर्गमीटर के सघन भवन स्थल में, सभी कोनों पर एक-एक एवं बीच में एक, यानी कुल पाँच borehole पर्याप्त होंगे। दोनों दिशाओं में 50 मीटर के अंतराल पर penetration test कराये जा सकते हैं। (IS:1892 - 1979, Clause 2.3.1)
- (ii) नींव तल के नीचे, कम से कम नींव की चौड़ाई का ड्योढ़ा गहराई तक, मिट्टी जाँचा जाना चाहिए। नींव तल के नीचे, एक borehole, नींव की चौड़ाई का दुगुना गहराई तक जाना चाहिए। अगर भवन के नींव सघन हों तो, पूरे नींव को एकीकृत मानकर, चौड़ाई का ड्योढ़ा गहराई तक, मिट्टी जाँचा जाना चाहिए। कम गहराई पर कमजोर मिट्टी की स्थिति में, ठोस परत की गहराई तक, मिट्टी जाँच किया जाना चाहिए। (IS:1892 Clause 2.3.2 एवं Table 1)
- (iii) मिट्टी जाँच के दौरान भूगर्भ में स्थिर जलस्तर की भूतल से गहराई, मौनसून के पहले तथा मौनसून के बाद का भूगर्भ जलस्तर तथा वार्षिक उच्चतम बाढ़तल प्राप्त कर लें। (IS:1892 Clause 2.4)
- (iv) नींव के नीचे स्थित ठोस मिट्टी परत, मध्यम मिट्टी परत एवं मुलायम मिट्टी परत के लिये भूकम्प का प्रभाव अलग-अलग होता है। (IS 1893 Figure 2 एवं Table 1)
- (v) मिट्टी जाँच में, Borehole की गहराई तक Standard Penetration Test (IS 2131-1981), विभिन्न परत की मिट्टी का वर्गीकरण (IS 1498 - 1970), Grain size distribution, Field density, Plastic and Liquid limits (IS 2720 Part 3, Part 4, Part 5), Cohesion, Angle of internal friction (IS 2720 Part 11, Part 12), तथा cohesive soil का coefficient of consolidation (IS 2720 Part 11, Part 15 - 1986) ज्ञात किया जाना चाहिए।
- (vi) मिट्टी जाँच के रिपोर्ट में, प्रस्तावित भवन के लिये, नींव के प्रकार की अनुशंसा एवं खुली या पाईल नींव के भार वहन क्षमता की गणना प्राप्त कर लें। साथ ही, द्रवीकरण (Liquefaction) की सम्भावना का विश्लेषण एवं तदनुकूल उपयुक्त नींव के प्रकार की अनुशंसा भी प्राप्त कर लेना आवश्यक है।

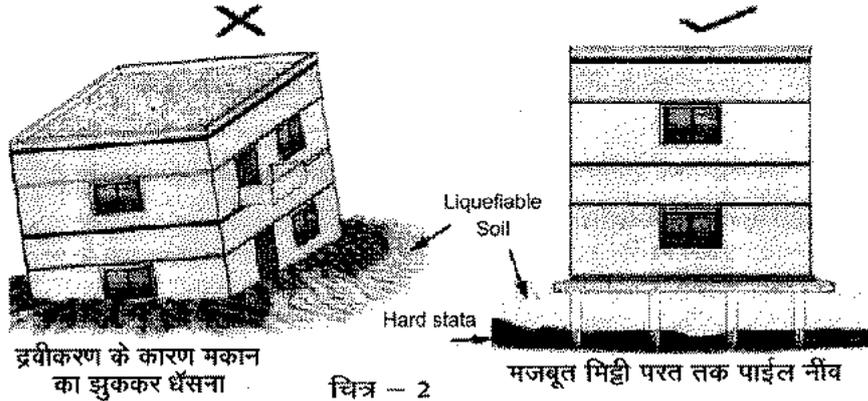
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3.3 नींव का चयन

- (i) फैलनेवाली चिकनी मिट्टी, विरल नरम महीन बालू अथवा मुलायम सिल्ट परत पर भवन की नींव आधारित करने से बचना चाहिए। यदि ऐसे परत पर नींव आधारित करना ही पड़े, तो मजबूत राफ्ट नींव अथवा मजबूत मिट्टी परत तक पाईल नींव का प्रावधान किया जाय। (IS 4326 Clause 5.3.3)। चित्र - 1 देखें।



- (ii) भूगर्भ जल में डूबे हुए, समान आकार के कणवाले एवं विरल नरम महीन बालू परत (वर्गीकरण SP) का, जिसका N-value 15 से कम है, भूकम्प में द्रवीकरण हो सकता है। 15 जनवरी 1934 को आये भूकम्प में द्रवीकरण के कारण, उत्तरी बिहार के 300 किलोमीटर लम्बे तथा करीब 50 किलोमीटर चौड़े, बहुत सारे इलाके दलदली हो गये थे तथा इन जिलों में बहुत सारे मकान झुक गये या धँस गये थे। अतएव, ऐसे परत पर नई आवासीय योजना अथवा महत्वपूर्ण भवन के नींव आधारित करने से बचें। यदि नींव आधारित करना ही पड़े, तो द्रवीकरण नहीं हो सकने वाले मजबूत मिट्टी परत तक पाईल नींव का प्रावधान किया जाय। (IS 1893 Clause 6.3.5.2)। चित्र - 2 देखें।



3.4 नींव की भार वहन क्षमता

- (i) नींव की गहराई इतनी होनी चाहिए जिससे नींव स्तर पर आवश्यक भार वहन क्षमता प्राप्त हो, मौसम परिवर्तन के कारण मिट्टी के संकुचन एवं फूलने से नींव प्रभावित नहीं हो, बहते जल से नींव के कट जाने की सम्भावना नहीं हो। (IS:1904-1986 Clause 7.1)

Handwritten signatures and notes:
 In the bottom left, there are several handwritten signatures and initials, including 'S. S. Saha' and '4-12-14'.
 In the bottom right, there is a handwritten signature 'R' and the page number '5'.

(ii) खुली नींव की भार वहन क्षमता का आकलन IS 6403 – 1981 के आधार पर तथा Settlement का आकलन IS 8009 (Part I) – 1976 के आधार पर किया जाना चाहिए। खुली नींव के Plate Load Test एवं Settlement का परीक्षण, IS 1888 – 1982 के आधार पर किया जा सकता है।

(iii) Bored Cast in situ कंक्रीट पाईल नींव का व्यास, लम्बाई एवं भार वहन क्षमता का आकलन IS 2911 Part 1 sec 2-1979 के आधार पर, Bored Cast in situ Under-Reamed पाईल नींव (चित्र – 3) का व्यास, लम्बाई एवं भार वहन क्षमता का आकलन IS 2911 Part III-1989 के आधार पर तथा पाईल नींव के भार वहन का परीक्षण IS 2911 Part 4-1985 के आधार पर किया जाना चाहिए।

(iv) Raft foundation का निरूपण, IS 2950 Part 1-1981 के आधार पर किया जाना चाहिए। sub-grade reaction (K), IS 2950 Part 1-1981 Appendix B के अनुसार निर्धारित करना चाहिए।

(v) चयनित नींव एवं नींव के नीचे की मिट्टी परत के आधार पर, भूकम्प बल के साथ गणना में, नींव की भार वहन क्षमता में 25 प्रतिशत से लेकर 50 प्रतिशत तक की बढ़ोतरी अनुमान्य है। (IS 1893 Clause 6.3.5.2, Table 1)

(vi) अगर नींव पर आकलित भूकम्पीय बल का मान, Dead Load एवं Live Load के योग के चौथाई से कम हो तो नींव का निरूपण Dead Load एवं Live Load के योग के आधार पर किया जा सकता है। (IS: 1904 - 1986 Clause 15.1.6)

(vii) विभिन्न प्रकार के भवन संरचना एवं उसके नींव के नीचे की मिट्टी परत के आधार पर, 50 से 100 मिलीमीटर के बीच settlement अनुमान्य है। (IS 1904 - 1986 Table 1)

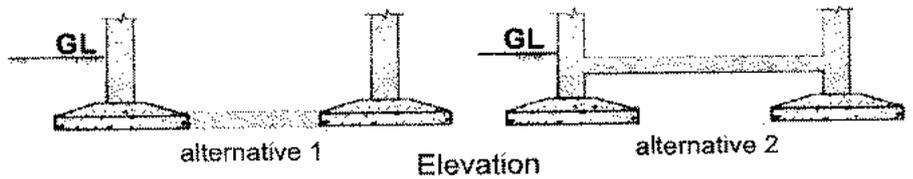
(viii) IS:1904-1986 Clause 17.1 एवं Clause 17.2 के आधार पर, नींव की स्थिरता की जाँच करनी चाहिए।

(ix) संरचना पायों के नीचे अलग-अलग खुली नींव या पाईल नींव होने पर, सभी नींव को दोनों क्षैतिज दिशाओं में, टाई बीम से बाँध देना चाहिए। सभी टाई बीम एक ही तल पर रखना चाहिए। (IS 4326 Clause 5.3.4)। चित्र – 4 देखें।



चित्र - 3

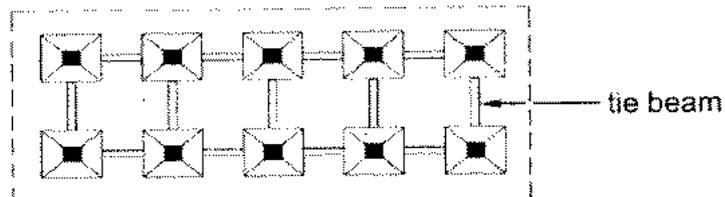
बल्ब वाला RCC पाईल नींव



alternative 1

Elevation

alternative 2



Plan

चित्र - 4

टाई बीम से नींव का बंधन

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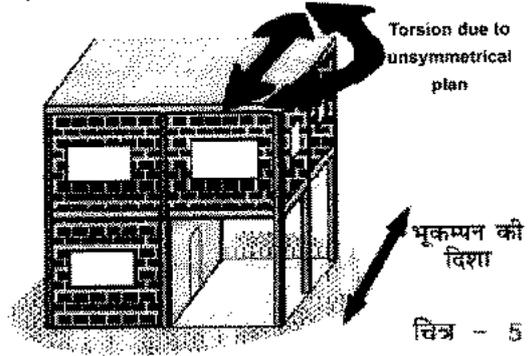
भाग - 4 भूकम्परोधी प्लान एवं संरचना व्यवस्था

4.1 भूकम्परोधी भवनों के वास्तुविदीय प्लान एवं संरचना व्यवस्था

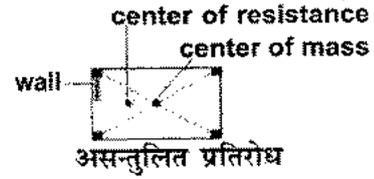
(i) आपातकालीन सेवा प्रदान करने वाले भवन, बच्चे या बूढ़े व्यक्तियों द्वारा प्रयुक्त भवन तथा सामुदायिक भवन को अपेक्षाकृत ज्यादा सशक्त एवं भूकम्परोधी बनाना है। (IS:1893, Table 6)

(ii) जहाँ तक सम्भव हो, भवन के छत एवं उपरी मंजिलें हल्का रखें एवं एक इकाई के रूप में भवन के अंग एक-दूसरे से पर्याप्त बँधा हो (IS:4326-1993 clause 4)। निचले मंजिल की दृढ़ता (stiffness) उपर की मंजिल से ज्यादा रहना चाहिए। उर्ध्वाधार एवं क्षैतिज बलों के नींव की ओर अग्रसर होने का रास्ता सीधा एवं सरल होना चाहिए।

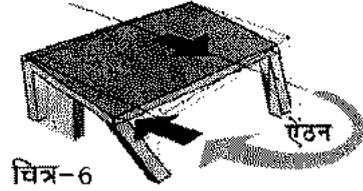
(iii) भूकम्प के दौरान भवन के ऐंठन से बचाव के लिये, जहाँ तक सम्भव हो, अस्त-व्यस्त ग्रिड के बदले एकसमान आयताकार ग्रिड पर प्लान करना चाहिए। भवन के Plan, Elevation यहाँ तक कि दरवाजों एवं खिड़कियों को भी यथासम्भव symmetrical रखना चाहिए। चित्र - 5 देखें।



(iv) भूकम्प के दौरान भवन के ऐंठन से बचाव के लिये (चित्र - 6 देखें), जहाँ तक सम्भव हो, भूकम्परोधी अवयव यथा तिरछा बन्धनी, आर. सी. सी फ्रेम, shear wall, पीलर, दीवार इत्यादि भवन के दोनों दिशाओं में symmetrical रखना चाहिए, प्लान में भूकम्परोधी अवयव एक समान वितरित रखना चाहिए, तथा प्लान में आर.सी.सी. Lift core को symmetrical स्थान पर रखना चाहिए।

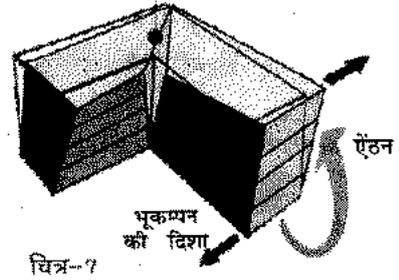


(v) अगर shear wall का प्रावधान किया गया हो, तो, आर.सी. सी. फ्रेम के द्वारा shear wall के साथ पर्याप्त सम्पर्क स्थापित कर, क्षैतिज बल के उचित अन्तरण की व्यवस्था करना चाहिए। (IS:4326-clause 6.2.2.2)



(vi) जहाँ तक सम्भव हो, अंग्रेजी के L, T, E तथा Y अक्षरों वाली भवन के नक्शे में आकृतियों को लगभग सरल आयताकार खंडों में पृथक् कर देना चाहिए एवं इन आयताकार खंडों की लम्बाई, इसके चौड़ाई के तीन गुने से कम रखना चाहिए। (IS:4326, Clause 4.4.2, 4.4.3)। L shape भवन में, भूकम्पन के कारण उत्पन्न stress concentration एवं ऐंठन को चित्र-7 में दिखाया गया है।

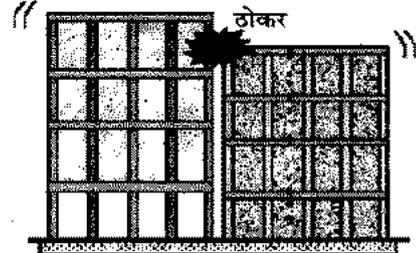
Stress Concentration in a L-Shape Building



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(vii) विभिन्न क्रिया-कलाप वाले विशाल भवन के निर्माण को किफायती बनाने के लिये, इसे अलग-अलग खंडों में बनाकर, विभिन्न खंड के लिये आवश्यक भूकम्प सुरक्षा स्तर (Importance factor) का प्रावधान किया जाना चाहिए।

(viii) विभिन्न कुल उँचाई वाले या मंजिलों की भिन्न-भिन्न उँचाई वाले या असममित (Unsymmetrical) प्लान वाले दो निकटवर्ती भवन भूकम्प के दौरान अलग-अलग प्राकृतिक आवृत्ति में डोलते हैं और अपने निकटवर्ती भवन को टोकर मार कर क्षतिग्रस्त कर सकते हैं। चित्र-8 देखें। अतएव, भवन के अलग-अलग खंडों के बीच पर्याप्त जगह (गैप) छोड़ा जाना आवश्यक है। यह गैप, दोनों निकटवर्ती भवनों के गतिशील भूकम्पीय क्षैतिज विचलन पर निर्भर करता है। आर. सी. सी फ्रेम संरचना के खण्डों के बीच कम से कम 40 मिलीमीटर गैप रखा जाना चाहिए। (IS 1893 Clause 7.11.3, IS:4326 Table 1)



चित्र-8 भवनों के बीच अपर्याप्त गैप

4.2 Expansion Joint : भवन संरचना में 30 मीटर से 45 मीटर तक की दूरी पर Expansion Joint रखा जाना चाहिए। (IS:456, Clause 27.2, IS:3414, Table 2)

4.3 जहाँ तक सम्भव हो, भवन का प्लान बनाते समय, IS 1893 Clause 7.1 में वर्णित भवन की निम्नलिखित अनियमितता से बचना चाहिए अथवा संरचना व्यवस्था में उचित सुधार कर लेना चाहिए :-

(क) क्षैतिज अनियमितता (प्लान में)

- i) Torsional: किसी अक्ष पर, एक छोर का क्षैतिज विचलन दोनों छोर के औसत क्षैतिज विचलन के 1.2 गुना से ज्यादा हो।
- ii) Re-entrant corners: प्लान में, किसी भी दिशा में, आयताकार से विचलन 15 प्रतिशत से ज्यादा हो।
- iii) Diaphragm discontinuity: प्लान में, बीच में खुली जगह कुल परिवर्द्ध जगह के 50 प्रतिशत से ज्यादा हो, या, एक मंजिल से दूसरे मंजिल के बीच diaphragm stiffness 50 प्रतिशत से ज्यादा बढ़ जाय।
- iv) Out-of-plane offsets: जैसा कि IS 1893 Clause 7.1 Table 4 में दिया गया है।
- v) Non-parallel systems: जैसा कि IS 1893 Clause 7.1 Table 4 में दिया गया है।

(ख) उर्ध्वाधर अनियमितता (Elevation में)

- i) Soft-storey: किसी भी मंजिल का Lateral stiffness उसके उपरी मंजिल के Lateral stiffness के 70 प्रतिशत से कम हो, या, उसके तीन उपरी मंजिल के Lateral stiffness के औसत के 80 प्रतिशत से कम हो।

Extreme Soft-storey: किसी भी मंजिल का Lateral stiffness उसके उपरी मंजिल के Lateral stiffness के 60 प्रतिशत से कम हो, या, उसके तीन उपरी मंजिल के Lateral stiffness के औसत के 70 प्रतिशत से कम हो। खुला पार्किंग वाले जमीन के मंजिल इसी श्रेणी में आते हैं।

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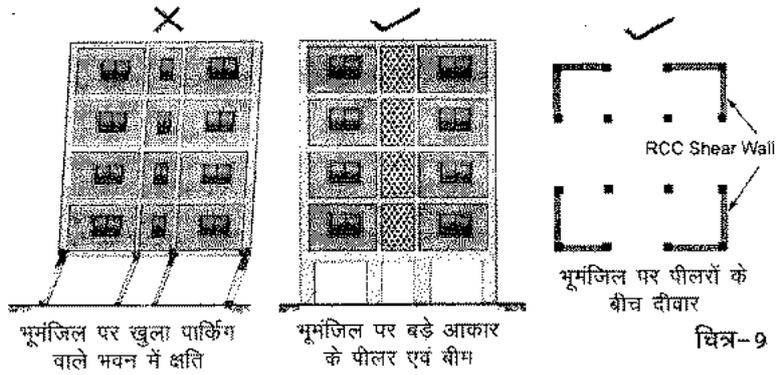
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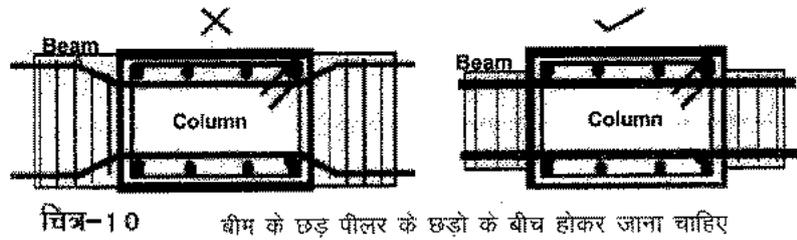
- ii) **Mass:** छत को छोड़कर, किसी भी मंजिल का वजन (भूकम्प बल गणना करने के लिये) अपने निकटवर्ती मंजिल के वजन के दुगुना से ज्यादा हो।
- iii) **Geometric:** जैसा कि IS 1893 Clause 7.1 Table 5 में दिया गया है।
- iv) **In plane discontinuity:** जैसा कि IS 1893 Clause 7.1 Table 5 में दिया गया है।
- v) **Weak-storey:** किसी भी मंजिल का Lateral strength उसके उपरी मंजिल के Lateral strength के 80 प्रतिशत से कम हो।

4.4 भूतल के मंजिल पर खुला पार्किंग वाले भवनों में, उपरी मंजिलों पर भरे गये दीवारों के कारण, उपरी मंजिलों की अपेक्षा, भूमजिल पर stiffness में भारी कमी रहती है। इस गंभीर अनियमितता के चलते, भूकम्प के दौरान उपरी मंजिलें एक इकाई की तरह दोलन करते हैं जबकि भूमजिल के तन्यता (ductility) की आवश्यकता पूरी नहीं हो पाती। इससे भवन के धराषायी होने की प्रबल सम्भावना बनी रहती है। अतएव, ऐसा खुला मंजिल पर, बड़े आकार के पीलर या तिरछा बन्धनी या आर.सी.सी Shear Wall या पीलरों के बीच दीवार बनाया जाना चाहिए। चित्र -- 9 देखें।

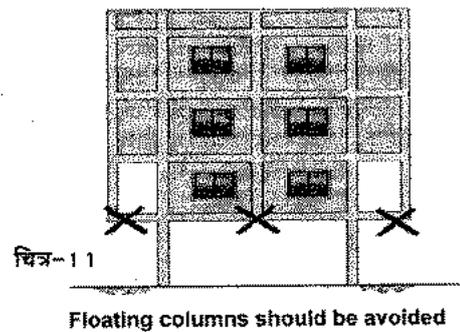


(i) भवन के अंदर, पीलर मुक्त बड़े जगह के आधुनिक मांग को पूरा करने के लिये, भवन के परिधि पर, पर्याप्त सम्बद्ध मजबूत फ्रेम या shear wall का प्रावधान करना चाहिए।

(ii) छोटे आकार (माप) के पीलर का उपयोग न करें। पीलर एवं बीम के जोड़ पर पीलर की चौड़ाई बीम से ज्यादा होना लाभकारी है। बीम के छड़ पीलर के छड़ों के बीच होकर जाना चाहिए। चित्र--10 देखें।

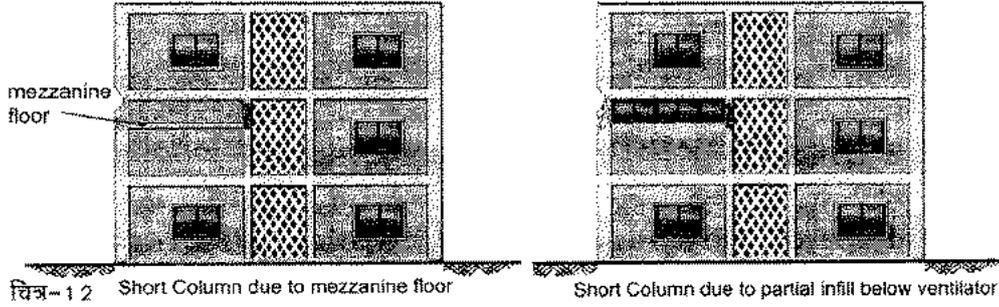


4.5 Floating column के प्रावधान करने से, बलों को नीचे की ओर अग्रसर होने की दिशा में, 90 डिग्री से परिवर्तन हो जाता है और ये बल अपने आधार प्रदान करनेवाले बीम को भी प्रभावित करते हैं। चित्र--11 देखें। अतएव, प्रत्येक पीलर को नीचे से प्रारम्भ कर उपरी मंजिल के छत तक ले जाना ही ठीक है।



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- 4.6 यदि किसी पीलर के दोनों तरफ दीवार हो और पीलर का कुछ अंश ही दिखता हो, जैसे कि खिड़कियों या भेन्टीलेटर के बीच पड़नेवाले पीलर सिल्ल से लिंटल स्तर तक खुले रहते हैं। चित्र-12 देखें। ऐसे पीलर, भवन संरचना पर भूकम्प के क्षैतिज बल प्रभाव से, Short column की तरह व्यवहार करते हैं और अन्य सामान्य पीलर की अपेक्षा कई गुना अधिक क्षैतिज बल प्राप्त कर, क्षतिग्रस्त हो जाते हैं। अतएव, किसी भी मंजिल पर सभी पीलर की उँचाई समान रखना अच्छा होगा। अन्यथा, IS 13920-1993 Clause 7.4 के अनुसार, पीलर के पूरी उँचाई में विशेष चूड़ी (Special Confining Reinforcement) का प्रावधान करना चाहिए।

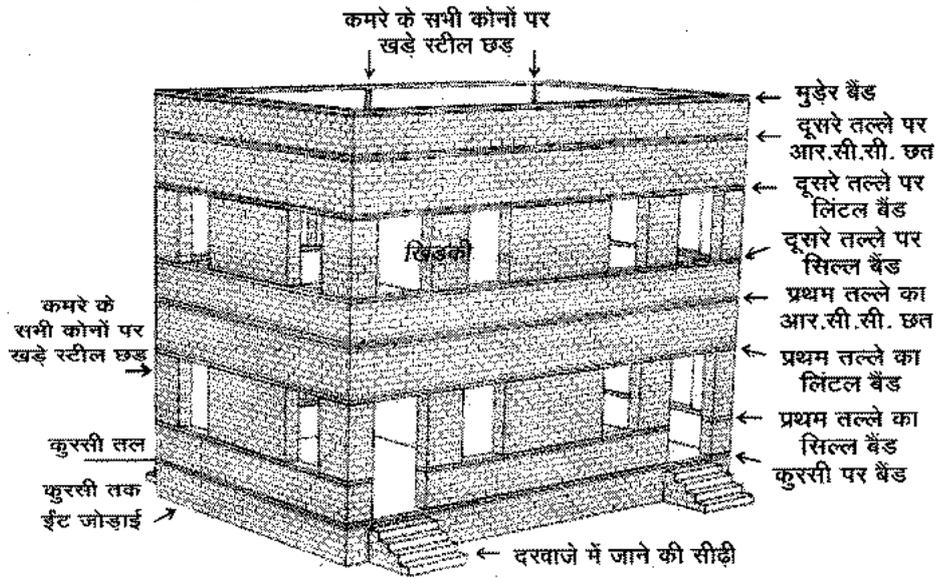


- 4.7 सहायक (Secondary) बीम पर क्रियाशील उर्ध्वाधर बल, जबतक समुचित ढंग से पीलर पर अन्तरित (transfer) नहीं हो जाता, ये बल अपने आधार प्रदान करनेवाले अवयवों को प्रभावित करते हैं। अतएव, सहायक बीम को किसी अन्य सहायक बीम पर आधारित करने के बदले, मुख्य बीम पर ही आधारित करना अच्छा है।
- 4.8 सामान्यतः आर.सी.सी. फ्रेम के निर्माण के बाद में भरे गये ईट दीवारों का, फ्रेम के पीलरों अथवा उपरी बीम से संरचनात्मक जोड़ नहीं रहता, जिससे क्षैतिज भूकम्पीय बल के कारण दीवार अपने तल के लम्बवत् दिशा में टूटकर बिखर सकते हैं। लम्बवत् दिशा में स्थायित्व के लिये, पीलरों एवं बीम के बीच कसा हुआ दीवार जोड़ना चाहिए। पीलरों एवं बीम के बीच समुचित रूप से बँधे दीवार, तिरछा बन्धनी की तरह कार्य करते हैं और फ्रेम का क्षैतिज प्रतिरोध शक्ति बढ़ाते हैं।
- 4.9 बड़े-बड़े अलंकृत कारनिस या भवन के दीवारों से चिपकाये गये पत्थर, भूकम्प के दृष्टिकोण से खतरनाक हैं। इन्हें मुख्य संरचना के साथ जकड़ देना चाहिए। False ceilings हल्के सामग्रियों से बनाना चाहिए तथा इन्हें भी मुख्य संरचना के साथ जकड़ कर रखना चाहिए। (IS:4326, Clause 4.3.3, 4.8)
- 4.10 Cantilevers : जहाँ तक सम्भव हो, बहुत सारे या भवन से अत्यधिक बाहर निकले हुए cantilever अंगों के उपयोग से बचना चाहिए। (IS:4326, Clause 4.3.1)। भूकम्प के दौरान, छत का मुड़ेर, छत के उपर निकला पानी टंकी या लिफ्ट मशीन कमरा, भवन के छत को आधार मानकर भवन से अलग प्राकृतिक आवृत्ति में झोलते हैं, जिससे इनके झोलने की गति बढ़ जाती है। अतएव इन्हें अतिरिक्त बल के लिए स्थायित्व की जाँच एवं निरूपण करना चाहिए। (IS:1893 Clause 7.12.2)
- 4.11 सीढ़ी संरचना : सामान्यतया विभिन्न मंजिलों को जोड़नेवाली सीढ़ी में उत्पन्न तिरछा बल सीढ़ी के जोड़ों की सामर्थ्य की अपेक्षा बहुत अधिक होता है और सीढ़ी Landing के मोड़ पर टूट सकते हैं। सीढ़ी के Landing पर sliding joint का समुचित निरूपण करके प्रावधान करने से, यह तिरछा बल मुक्त हो सकता है अथवा, सीढ़ी के दोनों बगल आर.सी.सी. से परिवन्धित साखा प्रतिरोधी दीवार का प्रावधान करके सीढ़ी के बीम को दीवार के साथ जकड़ दिया जा सकता है। (IS:4326, Clause 5.5)

भाग - 5 ईट जोड़ाई के भारवाहक दीवारों के भवन

5.1 ईट जोड़ाई के भारवाहक दीवार पर आधारित संरचना

- (i) ईट जोड़ाई के भारवाहक दीवार आधारित भवनों को आपदारोधी बनाने के निम्नलिखित तरीके, भारतीय मानक संस्थान के IS:4326 पर आधारित हैं। IS:4326 के प्रावधानों को सरलीकृत कर, विवरणी एवं सारणी तैयार किये गये हैं।
- (ii) ईट जोड़ाई भारवाहक दीवार के भूकम्परोधी व्यवस्था : क्षैतिज दिशा में तथा उर्ध्वाधर दिशा में, नीचे से छत तक, ईट जोड़ाई वाली सभी दीवारों को आपस में एक बक्सा की तरह, एक इकाई के रूप में, जुड़ा रहना चाहिए। दीवार के विभिन्न तल पर, क्षैतिज भूकम्परोधी आर.सी.सी. बैंड और सभी कमरे के कोनों पर, दीवार के अंदर स्टील के खड़े छड़ का प्रावधान करने से, यह तीनों दिशाओं में बंधे बक्से पर बेल्ट की तरह मकान को लपेट लेता है। चित्र - 13 देखें।



चित्र-13: ईट जोड़ाई एवं सपाट आर. सी. सी. छत वाले दोमंजिले मकान के आवश्यक अंग बिहार के प्रत्येक भूकम्प जोन के लिये, मकान की अधिकतम उँचाई, ईट जोड़ाई मसाला का अनुपात, क्षैतिज भूकम्परोधी आर.सी.सी. बैंड की आवश्यकता एवं दीवार के कोनों एवं किनारों पर खड़े स्टील के छड़ की आवश्यकता नीचे दर्शायी गयी है :-

भूकम्प जोन	मकान की अधिकतम उँचाई	ईट जोड़ाई मसाला का अनुपात	क्षैतिज भूकम्परोधी आर.सी.सी. बैंड	दीवार के कोनों एवं किनारों पर खड़े स्टील के छड़
V	तीन मंजिल (12 मीटर से कम)	सिमेंट:बालू - 1:4	कुरसी बैंड लिटल बैंड सिल्ल बैंड छत बैंड	कमरों के सभी कोनों पर तथा एक मीटर से बड़े दरवाजों एवं खिड़कियों के दोनों तरफ, पाखों में
IV	चार मंजिल (15 मीटर से कम)	सिमेंट:बालू - 1:6	कुरसी बैंड लिटल बैंड छत बैंड	कमरों के सभी कोनों पर तथा 2.5 मीटर या बड़े द्वारों के दोनों पाखों में
III	चार मंजिल (15 मीटर से कम)	सिमेंट:बालू - 1:8	कुरसी बैंड लिटल बैंड छत बैंड	दो मंजिल से उँचे मकान के कमरों के सभी कोनों पर

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5.2 दीवार की मजबूती के लिये, अंदर-अंदर दीवार की लम्बाई, दीवार की मोटाई का 35 गुना या अधिकतम 8 मीटर से ज्यादा नहीं रखना चाहिए। अधिक लम्बे दीवारों में प्रति 4 मीटर पर भीति-स्तम्भ (buttress) बनाकर कर, आर.सी.सी. बीम के सहारे, सामने के भीति-स्तम्भ से बाँध देना अच्छा होगा। दीवार की उँचाई, अपने मोटाई का 15 गुना या अधिकतम 4 मीटर रखना चाहिए।

5.3 मकान के कमरों के दीवार में खिड़कियों एवं दरवाजों के आकार को कम से कम रखना चाहिए। चित्र - 14 देखें।

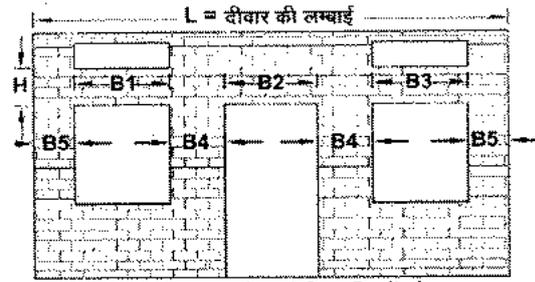
(i) कमरे के किसी भी दीवार में, दरवाजों एवं खिड़कियों की चौड़ाई का योग, $B_1+B_2+B_3$,

एकमजिले मकान में L के 50 प्रतिशत से कम रखें,
दो मजिले मकान में L के 42 प्रतिशत से कम रखें,
तीनमजिले मकान में L के 33 प्रतिशत से कम रखें।

(ii) दरवाजों एवं खिड़कियों के बीच दीवार की चौड़ाई, B_4 , दो ईट की लम्बाई से ज्यादा रखें।

(iii) दीवार के कोने से दरवाजा या खिड़की की दूरी, B_5 , एक ईट की लम्बाई से ज्यादा रखें।

(iv) खिड़की एवं भेन्टीलेटर के बीच दीवार की उँचाई, H, 450 मिलीमीटर से ज्यादा रखें।



चित्र-14 : दरवाजों एवं खिड़कियों के आकार

5.4. क्षैतिज भूकम्परोधी आर.सी.सी. बैंड

(i) 100 मिलीमीटर या 150 मिलीमीटर मोटा तथा दीवार की मोटाई के बराबर चौड़ा, आर.सी.सी. क्षैतिज भूकम्परोधी बैंड, पूरे भवन के सभी बाहरी तथा अंदर के सभी दिवारों पर बनाया जाय।

लिटल स्तर पर बैंड एवं कुरसी स्तर पर बैंड प्रत्येक भवन में होंगे। जहाँ कुर्सी स्तर पर आर.सी.सी. बीम दिया गया हो, वहाँ कुरसी स्तर पर बैंड आवश्यक नहीं है।

पूर्वनिर्मित (precast) आर.सी.सी. बीम (या तख्ता) से जोड़कर बनाये गये छतों में, छत के स्तर पर तथा ढलान वाले भवनों में, छत के निचले स्तर पर छत बैंड आवश्यक है।

एक या दो तरफ ढलान वाले भवनों में त्रिभुजाकार ओरी पर गेबल बैंड, आवश्यक है। सपाट आर.सी.सी. या आर. बी. छतवाले भवनों में, जहाँ छत दीवार के उपर, दीवार के 2/3 मोटाई तक चढ़ती हो, ceiling के स्तर पर रूफ बैंड आवश्यक नहीं है।

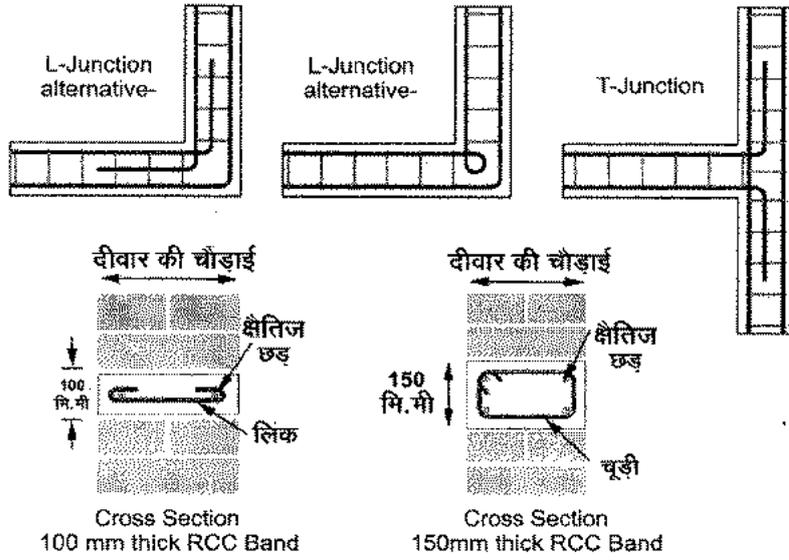
आधा ईट मोटी दीवारों में सभी भवनों में खिड़कियों के सिल्ल पर भी बैंड बनाने चाहिए।

(ii) दीवार के कोनों पर एवं दीवार के जोड़ों पर, बैंड में छड़ों को, छड़ के व्यास के 50 गुना की दूरी तक, दूसरे दीवार पर चढ़ाना चाहिए। पूरी लम्बाई तक जाने में, आर.सी.सी. बैंड के छड़ों को अगर बीच में जोड़ना पड़े, तो छड़ के व्यास के 50 गुना की दूरी तक एक दूसरे पर चढ़ाकर तार से बाँध देना चाहिए।

(iii) भवनों के सभी दरवाजों एवं खिड़कियों के लिटल (सरदल) एक ही तल पर रखना ठीक होगा।

IS:4326 के प्रावधानों को सरलीकृत कर, विभिन्न भूकम्प जोन में दीवार की लम्बाई, आर.सी.सी. बैंड की मोटाई तथा साधारण एवं महत्वपूर्ण भवनों के लिये छड़ों की संख्या एवं छड़ों का व्यास, सारणी - 2 में दर्शाया गया है।

चित्र-15 में छड़ों के बाँधने का तरीका वर्णित है।



चित्र-15 : दो दीवारों के जोड़ पर, बैंड में छड़ बाँधने का सही तरीका

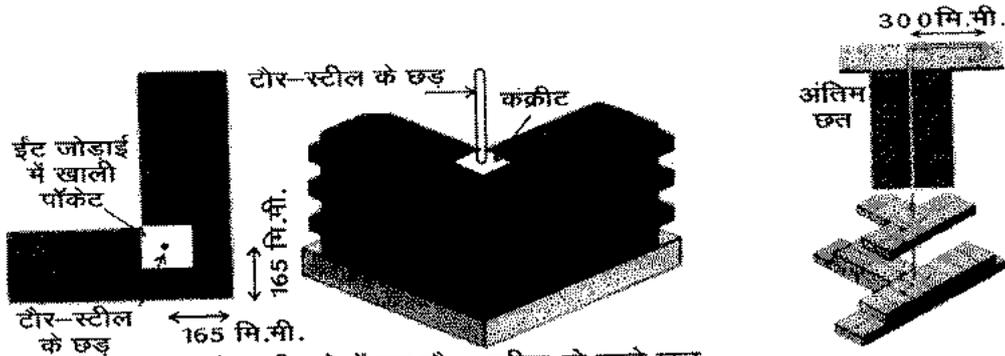
भूकम्प जोन	दीवार की भीतरी लम्बाई	आवासीय भवन			महत्वपूर्ण सार्वजनिक भवन (स्कूल, अस्पताल, सभाभवन, आंगनवाड़ी इत्यादि)		
		छड़ों की संख्या	छड़ों का व्यास	आर.सी.सी. बैंड की मोटाई	छड़ों की संख्या	छड़ों का व्यास	आर.सी.सी. बैंड की मोटाई
III	5 मीटर या कम	2	8 मि.मी.	100 मि.मी.	2	8 मि.मी.	100 मि.मी.
	6 मीटर	2	8 मि.मी.	100 मि.मी.	2	10 मि.मी.	100 मि.मी.
	7 मीटर	2	10 मि.मी.	100 मि.मी.	2	12 मि.मी.	100 मि.मी.
	8 मीटर	2	12 मि.मी.	100 मि.मी.	4	10 मि.मी.	150 मि.मी.
IV	5 मीटर या कम	2	8 मि.मी.	100 मि.मी.	2	10 मि.मी.	100 मि.मी.
	6 मीटर	2	10 मि.मी.	100 मि.मी.	2	12 मि.मी.	100 मि.मी.
	7 मीटर	4	8 मि.मी.	150 मि.मी.	4	10 मि.मी.	150 मि.मी.
	8 मीटर	4	10 मि.मी.	150 मि.मी.	4	12 मि.मी.	150 मि.मी.
V	5 मीटर या कम	2	10 मि.मी.	100 मि.मी.	2	10 मि.मी.	100 मि.मी.
	6 मीटर	2	12 मि.मी.	100 मि.मी.	2	12 मि.मी.	100 मि.मी.
	7 मीटर	4	10 मि.मी.	150 मि.मी.	4	10 मि.मी.	150 मि.मी.
	8 मीटर	4	12 मि.मी.	150 मि.मी.	4	12 मि.मी.	150 मि.मी.

5.5 उर्ध्वाधर भूकम्परोधी प्रबलन – सभी कमरे के कोनों पर खड़े छड़

ईट जोड़ाई वाले भवनों में, भूकम्प से सुरक्षा के लिए, सभी कमरों के कोनों पर, कंक्रीट के अंदर तौर-स्टील के छड़ खड़ा करें। चित्र-16 देखें।

कंक्रीट डालने के लिये, ईट जोड़ाई में खाली पॉकेट बनायें। ये खड़े छड़ नीव से प्रारम्भ होकर, सभी आर.सी.सी. बैंड होकर, अंतिम छत की ढलाई के अंदर 300 मिलीमीटर मुड़ जानी है। पूरी उँचाई तक जाने में, अगर छड़ों को जोड़ना हो तो, छड़ की व्यास के 50 गुना लम्बाई तक, छड़ एक-दूसरे पर चढाकर तार से बाँधना चाहिए।

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चित्र-16 : कमरों के सभी कोनों पर टोर-स्टील के खड़े छड़

IS:4326 के प्रावधानों को सरलीकृत कर, विभिन्न भूकम्प जोन में साधारण एवं महत्वपूर्ण भवनों के लिये छड़ों की संख्या एवं छड़ों का व्यास, सारणी - 3 में दर्शाया गया है।

सारणी - 3 : कमरे के कोनों पर खड़े टोर स्टील के एक छड़				
भूकम्प जोन	मकान के तल की संख्या	मकान का तल	आवासीय भवन	महत्वपूर्ण सार्वजनिक भवन (स्कूल, अस्पताल, सभाभवन, आंगनवाड़ी इत्यादि)
III	एक मंजिल	पहला मंजिल	-	10 मि.मी.
		दूसरा मंजिल	-	10 मि.मी.
	दो मंजिल	पहला मंजिल	-	12 मि.मी.
		तीसरा मंजिल	10 मि.मी.	10 मि.मी.
		दूसरा मंजिल	12 मि.मी.	12 मि.मी.
	तीन मंजिल	पहला मंजिल	12 मि.मी.	12 मि.मी.
		चौथा मंजिल	10 मि.मी.	10 मि.मी.
		तीसरा मंजिल	10 मि.मी.	12 मि.मी.
		दूसरा मंजिल	12 मि.मी.	16 मि.मी.
	IV	एक मंजिल	पहला मंजिल	10 मि.मी.
दूसरा मंजिल			10 मि.मी.	12 मि.मी.
दो मंजिल		पहला मंजिल	12 मि.मी.	16 मि.मी.
		तीसरा मंजिल	10 मि.मी.	12 मि.मी.
		दूसरा मंजिल	12 मि.मी.	16 मि.मी.
तीन मंजिल		पहला मंजिल	12 मि.मी.	16 मि.मी.
		चौथा मंजिल	10 मि.मी.	12 मि.मी.
		तीसरा मंजिल	12 मि.मी.	16 मि.मी.
	दूसरा मंजिल	16 मि.मी.	16 मि.मी.	
V	एक मंजिल	पहला मंजिल	12 मि.मी.	12 मि.मी.
		दूसरा मंजिल	12 मि.मी.	12 मि.मी.
	दो मंजिल	पहला मंजिल	16 मि.मी.	16 मि.मी.
		तीसरा मंजिल	12 मि.मी.	12 मि.मी.
		दूसरा मंजिल	16 मि.मी.	16 मि.मी.
		पहला मंजिल	20 मि.मी.	तीन मंजिल तक ही अनुमान्य

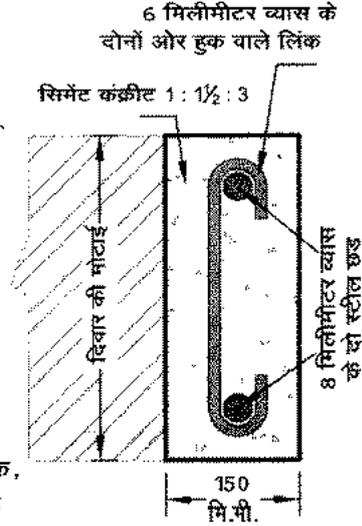
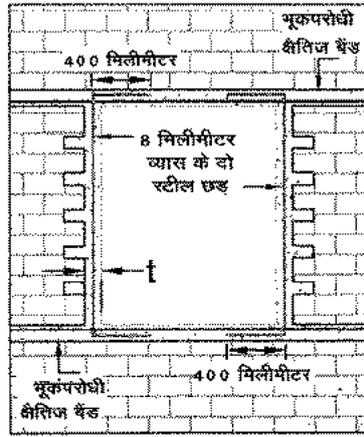
1/16

5/11/14

✓

5.6 दरवाजों एवं खिड़कियों के दोनों तरफ खड़े छड़

भूकम्प से, खिड़कियों एवं दरवाजों के कोनों पर दरार बनने से रोकने के लिए, भूकम्प जोन V में, एक मीटर से बड़े दरवाजों एवं खिड़कियों के दोनों तरफ, भूकम्प जोन IV में 2.5 मीटर या उससे बड़े द्वारों के दोनों तरफ पाखों में, 150 मिलीमीटर मोटा कंक्रीट के अंदर, टॉर-स्टील के 8 मिलीमीटर व्यास के दो छड़ खड़ा करना चाहिए। चित्र-17 देखें। खड़ा छड़ को, 200 मिलीमीटर के अंतराल पर, 6 मिलीमीटर व्यास के हुकवाले लिंक से बाँधना चाहिए। खड़े छड़ को निचले एवं उपरी बैंड के अंदर 400 मिलीमीटर मोड़ दें।



दरवाजों एवं खिड़कियों के दोनों तरफ, दीवार में कंक्रीट में खड़े स्टील छड़

चित्र-17

t पर आड़ीकाट

5.7 भारवाहक दीवार वाले भवनों के लिये, सपाट आर.सी.सी. क्षैतिज छत हो सकते हैं अथवा स्टील या लकड़ी के कैंची (ट्रस) डालकर, ढालवाँ छत बनाये जा सकते हैं।

सपाट क्षैतिज आर.सी.सी. छत अच्छा होगा।

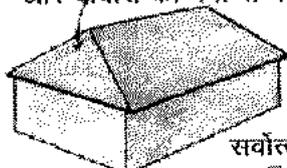
ढलान छत वाले भवनों में, छत के स्तर पर छत बैंड आवश्यक है।

ढालदार छत पर खपरैल के बदले स्टील शीट लगाए।

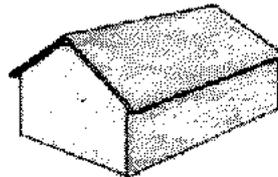
ढालदार छतों के आँधी से बचाव हेतु एक या दो तरफ ढाल के बदले चारों तरफ ढलान वाला छत बनाना चाहिए। चित्र-18 देखें।

ढालदार छत के टाई लेवल पर क्षैतिज बन्धनी तथा ढालवाँ छत में तिरछा बन्धनी (cross bracing) लगायें।

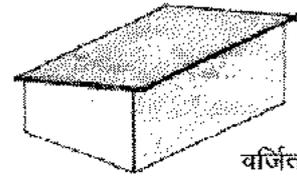
चार तरफ ढालवाले छत तूफानरोधी हैं और दीवारों को वर्षा से बचाते हैं



सर्वोत्तम
चारों तरफ ढाल ✓



तिरकोने दीवारों को छत के साथ बाँधें दो तरफ ढाल



वर्जित
एक तरफ ढाल ✗

चित्र-18

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भाग - 6 प्रबलित (Reinforced) कंक्रीट संरचना के भवन

6.1 भवन संरचना पर क्रियाशील बल

- विभिन्न सामग्रियों के वजन का आकलन, IS : 875 Part 1 के आधार पर किया जाना चाहिए।
- फर्श एवं छत पर Imposed Loads (LL) का आकलन, IS : 875 Part 2 के आधार पर करें।
- औंधी में वायु वेग एवं दबाव का आकलन, IS : 875 Part 3 के आधार पर तथा भूकम्प बल का आकलन, IS : 1893 Part 1-2002 के आधार पर किया जाना चाहिए।
- संरचना पर भूकम्पीय प्रभाव एवं वायुवेग के प्रभाव का, अलग-अलग विश्लेषण किया जाना चाहिए। (IS 1893 Clause 6.2(b))

6.1.1 भूकम्प बल की गणना के लिये DL एवं LL का योग (W)

- भवन संरचना पर भूकम्प प्रभाव के विश्लेषण में, प्रत्येक मंजिल के पीलर के उपर contributory area के आधार पर Dead load एवं Imposed load की गणना की जाती है। सभी मंजिल के वजन का योग करने पर कुल वजन W का मान प्राप्त होता है।
- गणना में, 3 kN/sqm तक के Imposed Loads का 25 प्रतिशत तथा 3 kN/sqm से अधिक के Imposed Loads का 50 प्रतिशत लेते हैं। छत के Imposed Loads की उपेक्षा कर देते हैं। (IS 1893 Clause 7.3 Table 8)
- IS 1893 Clause 7.3, Table 8 के अनुसार तथा IS: 875 Part 2 Clause 3.2.1 के अनुसार Imposed load में दोनों प्रकार का छूट साथ-साथ नहीं लेना है।

6.1.2 भूकम्पीय त्वरण के प्रभाव का विश्लेषण

- दोनों क्षैतिज दिशाओं में अलग-अलग भूकम्पीय त्वरण के प्रभाव का विश्लेषण करते हैं। (IS 1893 Clause 6.1.5)
- भवन के प्रत्येक मंजिल पर, Positive value या Negative value वाले अप्रत्याशित Torsional के प्रभाव का, Static eccentricity के साथ समावेश करना है। (IS: 1893:2002 Clause 7.9.2)

6.1.3 DL, LL एवं EL का संयोजन (IS 1893 Clause 6.3.1)

निम्नलिखित संयोजनों के अधिकतम मान के लिये, आर.सी.सी. संरचना के अवयवों का निरूपण किया जाता है।

$1.5(D + L)$			
$1.2(D + L \pm ExP)$	$1.2(D + L \pm ExN)$	$1.2(D + L \pm EzP)$	$1.2(D + L \pm EzN)$
$1.5(D \pm ExP)$	$1.5(D \pm ExN)$	$1.5(D \pm EzP)$	$1.5(D \pm EzN)$
$0.9(D \pm 1.5 ExP)$	$0.9(D \pm 1.5 ExN)$	$0.9(D \pm 1.5 EzP)$	$0.9(D \pm 1.5 EzN)$

Where, D = Dead Load, L = Live Load, E = Earthquake Load,
x: along X axis, z: along Z axis,
P: Positive eccentricity, N: Negative eccentricity

6.2 बहुमंजिली आर.सी.सी. फ्रेम संरचना पर भूकम्पीय प्रभाव के विश्लेषण की विधियाँ

IS 1893 Part 1- 2002 में फ्रेम संरचना के विश्लेषण की दो विधियों का उल्लेख है:-

- 1) Static Analysis एवं 2) Dynamic analysis

IS: 1893 Clause 7.8.1 के अनुसार, भवन की निम्नलिखित अधिकतम उँचाई तक ही Static Analysis किये जा सकते हैं।

संरचना	Zone III	Zone IV	Zone V
नियमित भवन	90 m	40 m	40 m
अनियमित भवन	40 m	12 m	12 m

6.3 Static Analysis (Coefficient Method) (IS 1893 Clauses 7.5 to 7.7)

(i) Fundamental Time Period, T_a , (by empirical expressions)

$T_a = 0.075 h^{3/4}$, दोनों दिशाओं में, अनावृत फ्रेम के लिये, (Clause.7.6.1)

$T_{ax} = 0.09h/\sqrt{d}$, x दिशा में, पर्याप्त दीवारवाले फ्रेम के लिये, (Clause.7.6.2)

$T_{az} = 0.09h/\sqrt{b}$, z दिशा में, पर्याप्त दीवारवाले फ्रेम के लिये

जहाँ, h = भवन की उँचाई, $d = x$ दिशा में, भवन के आधार की माप

$b = z$ दिशा में, भवन के आधार की माप

(ii) The design horizontal Seismic coefficient,

$$A_h = (Z/2).(I/R).(S_a/g) \quad (\text{IS 1893 Clause 6.4.2})$$

Where, Z = Zone Factor, (IS 1893 Table 2)

I = Importance Factor, (IS 1893 Table 6)

R = Response Reduction Factor for appropriate system (IS 1893 Table 7)

S_a/g = Average response acceleration coefficient for different soil sites, corresponding to time periods, with 5% damping, using the response spectra curves (IS: 1893 Fig 2)

यहाँ, A_h का दो मान प्राप्त होता है:- x दिशा में, T_x के लिये, A_{hx}
z दिशा में, T_z के लिये, A_{hz}

(iii) x तथा z दिशा में, Design Seismic Base Shear, $V_B = A_h W$ (IS 1893 Clause 7.5.3)

(iv) भूकम्प त्वरण से प्रभावित फ्रेम के अवयवों में Forces की गणना

प्रत्येक मंजिल पर (बीम-पीलर के जोड़ पर) भूकम्प के लिये प्राक्कलित Dead load एवं Imposed load लगाते हुए, प्रत्येक मंजिल को rigid diaphragm मानकर तथा IS: 1893:2002 Clause 7.9.2 में वर्णित Torsional प्रभाव को लेते हुए, कम्प्यूटर सॉफ्टवेयर का उपयोग से फ्रेम के अवयवों में shears, moments, axial forces की गणना की जा सकती है।

6.4 Modal / Dynamic analysis (IS 1893-2002 Clause 7.8)

(i) Fundamental Time Periods by dynamic analysis (कम्प्यूटर सॉफ्टवेयर के उपयोग से)

x दिशा में, T'_x तथा z दिशा में, T'_z का मान प्राप्त करते हैं।

सामान्यतया Static Analysis की अपेक्षा ये Time Periods ज्यादा होते हैं।

(ii) The design Horizontal Seismic Coefficient, $A'_h = (Z/2).(I/R).(S_a/g)$

x दिशा में, T_x के लिये, A'_{hx} एवं z दिशा में, T_z के लिये, A'_{hz}

(iii) भूकम्प त्वरण से प्रभावित फ्रेम के अवयवों में Forces की गणना

प्रत्येक मंजिल पर (बीम-पीलर के जोड़ पर) भूकम्प के लिये प्राक्कलित Dead load एवं Imposed load लगाते हुए, प्रत्येक मंजिल को rigid diaphragm मानकर तथा IS: 1893:2002 Clause 7.9.2 में वर्णित Torsional प्रभाव को लेते हुए, कम्प्यूटर सॉफ्टवेयर का उपयोग से फ्रेम के अवयवों में shears, moments, axial forces की गणना की जा सकती है।

(iv) Scaling

यदि dynamic analysis के base shear (V'_B) का मान Static analysis के base shear (V_B) से कम हो तो, dynamic analysis द्वारा गणना की गयी सभी shears, moments, axial forces को V_B / V'_B के अनुपात में बढ़ा देना है। (IS: 1893 Clause 7.8.2)

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6.5 Maximum allowable Storey Drift (IS 1893 Clause 7.11.1)

भवन संरचना पर, क्षैतिज भूकम्पीय बल के Load factor 1.0 के लिये, किसी भी मंजिल पर, उस मंजिल की उँचाई के 250 वें भाग से Storey Drift अधिक नहीं होना चाहिए।

6.6 soft storey तथा खुला पार्किंग वाले भवन के फ्रेम का भूकम्पीय प्रभाव के लिए विश्लेषण

ऐसे भवन के अनावृत (bare) फ्रेम विश्लेषण में, उपरी मंजिल के दीवारों के तिरछा बन्धनी प्रभाव की उपेक्षा कर देने के फलस्वरूप, जमीन के मंजिल पर Stiffness में परिवर्तन, परिलक्षित नहीं हो पाता है। इस हेतु IS 1893 Clause 7.10 में soft storey तथा खुला पार्किंग वाले भवन के फ्रेम विश्लेषण की alternative विधि बतायी गयी है:-

- (i) पीलर के बीच दीवारों के तिरछा बन्धनी प्रभाव का समावेश करते हुए, dynamic विश्लेषण की जाय। अथवा,
- (ii) पीलर के बीच दीवारों के तिरछा बन्धनी प्रभाव की उपेक्षा करके, अनावृत बीम-पीलर फ्रेम का विश्लेषण किया जाय और soft storey तथा खुला पार्किंग वाले मंजिल में,

बीम एवं पीलर का $2.5 \times$ Calculated storey shear and moment के लिये, निरूपित किया जाय, अथवा,

पीलर का Calculated shear and moment के लिये, सामान्य तरीके से निरूपित किया जाय तथा दोनों क्षैतिज दिशाओं में, भवन के केंद्र से दूर, सममित स्थान पर (symmetrically placed), $1.5 \times$ Calculated lateral storey shear प्रतिरोध करने के लिये, Shear Wall का प्रावधान किया जाय।

6.7 आर.सी.सी. संरचना के अवयवों का विस्तृत वर्णन

DL, LL, EL के महत्तम संयोजन के लिये, IS 456 2000 के Limit State तरीका से, आर.सी.सी. फ्रेम के अवयवों (यथा बीम, पीलर, shear wall, टाई बीम, नींव इत्यादि) का निरूपण करने के बाद, IS: 13920-1993 के आधार पर, longitudinal छड़, अवयवों के कंक्रीट कोर परिबन्धित करने के लिये चूड़ी तथा अक्षीय बल के लिये टाई बीम का निरूपण करना चाहिए तथा जोड़ों के विस्तृत वर्णन के साथ, फ्रेम के अवयवों के लिये अपनाये गये निरूपण का स्पष्ट विस्तृत आरेखन तैयार करना चाहिए।

6.7.1 Tension में, छड़ का development length

IS 456 2000 Clause 26.2

$L_d = \frac{\sigma_s}{4 \cdot \sigma_{bd}}$ जहाँ, σ_s = छड़ का व्यास, σ_s = छड़ में तनाव (tensile stress)

σ_{bd} = design bond stress in limit state method for torsteel bars in tension

Grade of concrete	M 20	M 25	M 30	M 35	M 40 and above
Design bond stress	1.92	2.24	2.4	2.72	3.04

Tension में, छड़ का Anchorage value:-

छड़ के प्रत्येक 45 डिग्री मोड़ के लिये 4ϕ दूरी की दर से अधिकतम 16ϕ की दूरी तक।

6.7.2 आर.सी.सी. फ्रेम के अवयवों के आकार (IS 13920-1993 Clause 6.1, Clause 7.1)

- (i) बीम या पीलर की चौड़ाई 200 मिलीमीटर से कम नहीं रखना है।
- (ii) बीम में Factored axial stress $< 0.1 f_{ck}$ होना चाहिए।
- (iii) बीम का $b \geq 0.3 D$ होना चाहिए।
- (iv) पीलर में Factored axial stress $> 0.1 f_{ck}$ होने पर न्यूनतम चौड़ाई की जाँच करनी है।
- (v) यदि c/c beam span > 5 मीटर या पीलर का Unsupported length > 4 मीटर हो तो, पीलर की चौड़ाई, $B > 300$ मिलीमीटर रखनी चाहिए, साथ ही, पीलर की चौड़ाई $B > 0.4 \times$ पीलर का D (Larger side) होना चाहिए।

1/10

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6.7.3 आर.सी.सी. फ्रेम के अवयवों में Longitudinal छड़ (IS 13920-1993 Clause 6.2, 7.2)

(i) बीम में Longitudinal छड़

न्यूनतम Tensile छड़, $(0.24(\sqrt{f_{ck}}/f_y).b.D)$ होना चाहिए।

अधिकतम Tensile छड़, $0.025 b.D$ होना चाहिए।

जोड़ों पर, bottom छड़ > जोड़ों पर, top छड़ का आधा।

Span में bottom छड़ > जोड़ों पर, top छड़ का चौथाई।

where b = breadth of beam, d = effective depth, D = Overall depth
 f_{ck} = Characteristic cube compressive strength of concrete in mpa
 f_y = Characteristic yield strength of steel in mpa

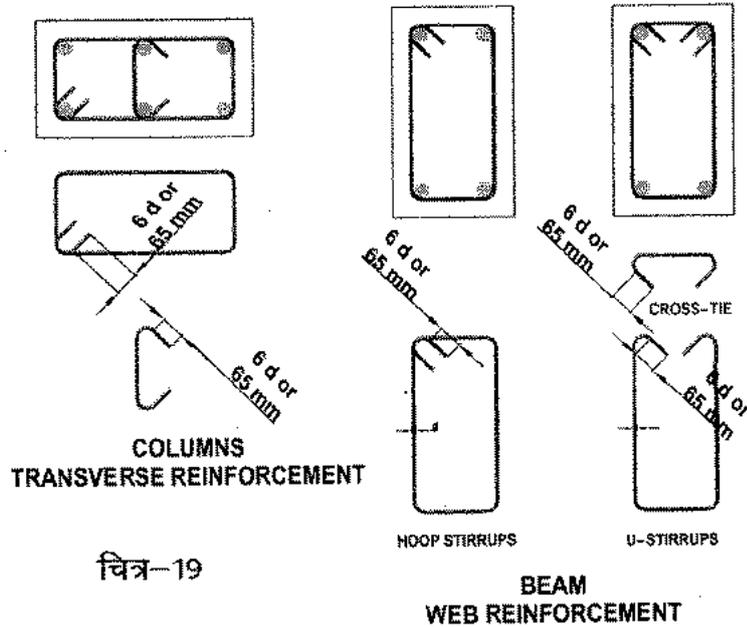
(ii) Lapping consideration से, पीलर में Longitudinal छड़ 4% से अधिक मत रखें।

(iii) Longitudinal छड़ का जोड़ (Lap)

- छड़ों को एक दूसरे पर, Tension में development length की दूरी तक चढ़ाएँ।
- कहीं भी आधा से अधिक छड़ों को मत जोड़ें।
- बीम में छोरों के पास के एक-तिहाई span पर छड़ों को जोड़ना चाहिए।
- पीलर में केवल उँचाई के बिचले आधे भाग में छड़ों को जोड़ना चाहिए।
- छड़ों के पूरे जोड़ पर 150 मिलीमीटर c/c की दूरी पर चूड़ी का प्रावधान करें।

6.7.4 आर.सी.सी. फ्रेम के अवयवों में चूड़ी

आयताकार चूड़ी का हूक 135 डिग्री का होना चाहिए, जो चूड़ी के छड़ के व्यास का छः गुना या कम से कम 65 मिलीमीटर, परिबन्धित कंक्रीट कोर के अंदर घुसता हो। चित्र-19 देखें।



चित्र-19

(i) बीम में चूड़ी

चूड़ी छड़ का व्यास, कम से कम 6 मिलीमीटर या 5 मीटर से बड़ा span के लिये कम से कम 8 मिलीमीटर होना चाहिए। बीम में चूड़ी की आपसी c/c दूरी, कम से कम $d/2$ पर रखना चाहिए। (IS 13920-1993 Clause 6.3)

भूकम्प दोलन के दौरान, संरचना अवयवों में बल की दिशा बदलती रहती है, अतएव, बीम के कर्तन प्रतिरोध (shear resistance) के लिये bent up bars तथा inclined hoops प्रभावी नहीं होते हैं।

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यदि बीम के web का depth 750 मिलीमीटर से ज्यादा हो, तो, प्रत्येक face पर, web area का 0.05 प्रतिशत side face reinforcement डालना है। इसका Spacing, web thickness या 300 मिलीमीटर से ज्यादा नहीं होगा। (IS 456 2000 Clause 26.5.1.3)

यदि बीम का एंठन होता हो, तो, आयताकार चूड़ी की आपसी c/c दूरी, $x_1, (x_1+y_1) / 4$, या 300 मिलीमीटर से कम होगा। जहाँ, x_1 एवं y_1 , stirrup का छोटा तथा बड़ा भुजा है। यदि बीम का आकार 450 मिलीमीटर से अधिक हो तो side face reinforcement का प्रावधान करें। (IS 456 2000 Clause 26.5.1)

(ii) पीलर में चूड़ी

i. IS 456-2000 Clause 26.5.3.2 के अनुसार

यदि किसी longitudinal छड़ के दोनों तरफ 75 मिलीमीटर c/c से कम दूरी पर छड़ हो, तो, उस छड़ पर चूड़ी का मोड़ होना आवश्यक नहीं है।

यदि चूड़ी के मोड़ पर स्थित दो longitudinal छड़ के बीच की c/c दूरी, चूड़ी के व्यास के 48 गुना से कम हो, और कोई तीसरा longitudinal छड़ बीच में पड़ता हो, तो, उस छड़ को खूला चूड़ी से जोड़ सकते हैं।

चूड़ी छड़ का व्यास, अधिकतम आकारवाले longitudinal छड़ के व्यास का चौथाई या 6 मिलीमीटर से ज्यादा होना चाहिए।

ii. IS 13920-1993 Clause 7.3 के अनुसार

चूड़ी में सामानान्तर leg की c/c दूरी, 300 मिलीमीटर से ज्यादा नहीं रखना है।

चूड़ी की आपसी c/c दूरी, पीलर के छोटे क्षैतिज माप की दूरी का आधा से ज्यादा नहीं होगा।

6.7.5 पीलर में Special Confining Reinforcement (IS 13920-1993 Clause 7.4)

भूकम्पन के दौरान, पीलर के कंक्रीट कोर को परिवन्धित करने के लिये, विशेष चूड़ी आवश्यक है।

(i) आयताकार विशेष चूड़ी का cross section area, $A_{sh} = 0.18 S.h.f_{ck} (A_g / A_k - 1.0) / f_y$

जहाँ, S = चूड़ी का c/c आपसी दूरी

h = चूड़ी का larger dimension, (अधिकतम 300 mm)

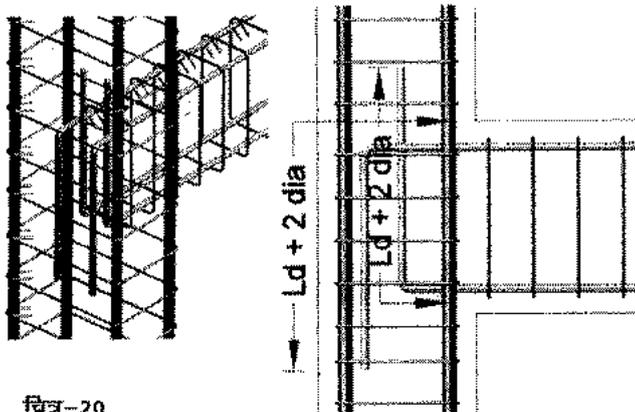
A_g = पीलर का कुल cross section area

A_k = परिवन्धित कंक्रीट कोर का कुल cross section area

(ii) विशेष चूड़ी की c/c आपसी दूरी, पीलर के छोटे क्षैतिज माप की दूरी का चौथाई या 100 मिलीमीटर से अधिक नहीं होगा, न तो यह 75 मिलीमीटर से कम होगा।

6.7.6 आर. सी. सी. संरचना के जोड़ों का विस्तृत विवरण

(i) बीम के अंत में, बीम के छड़ों को पीलर के अंदर, Tension में Development Length + 10 ϕ - anchorage value of 90 degree bend की दूरी तक, ले जाना चाहिए। (IS 13920-1993 Clause 6.2.5) | चित्र-20 देखें।



चित्र-20

Anchorage of beam bars at an external joint

6/26

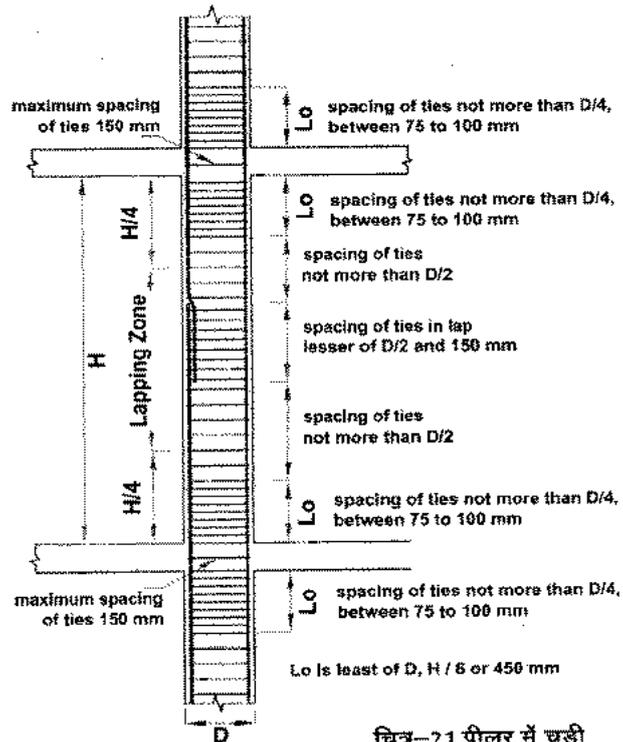
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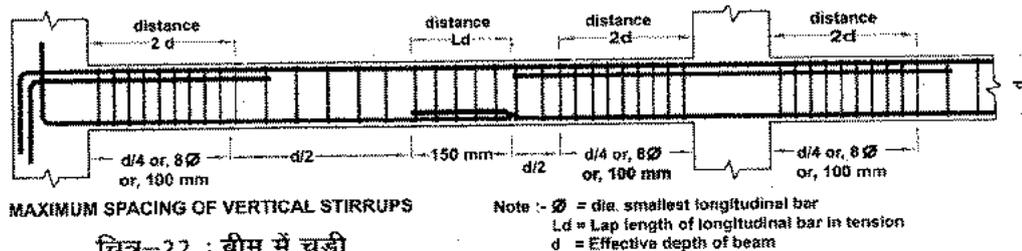
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d

- (ii) Bending में बीम के plastic होने से पहले ही इसका brittle shear failure न हो जाय, यह सुनिश्चित करने के लिये, (a) Gravity load के कारण बीम के छोर पर shear का 1.2 गुणा करें और (b) IS 456 के आधार पर गणना की गयी. बीम के छोरों का moments of resistance के कारण बीम के छोर पर shear का 1.4 गुणा करें; इन दोनों shear का योग करके इस shear capacity के लिये, बीम का निरूपण करना चाहिए। (IS 13920-1993 Clause 6.3.3)। कम्प्यूटर सॉफ्टवेयर का उपयोग से आवश्यक stirrup की गणना की जा सकती है।
- (iii) बीम के छोर पर $2d$ तक चूड़ी की आपसी c/c दूरी, कम से कम $d/4$ या बीम के न्यूनतम आकारवाले छड़ के व्यास का आठ गुना होना चाहिए। ढलाई के दृष्टिकोण से यह दूरी 100 मिलीमीटर से कम मत रखें। फ्रेम के जोड़ के पास बीम में पहला चूड़ी, 50 मिलीमीटर से कम दूरी पर आरम्भ हो जाना चाहिए। (IS 13920-1993 Clause 6.3.5)
- (iv) पीलर का brittle shear failure, बीम के plastic moment capacity से पहले नहीं हो जाए, इस हेतु प्रत्येक मंजिल पर, प्रत्येक जोड़ पर, दोनों क्षैतिज दिशाओं में, न्यूनतम shear capacity का प्रावधान करना चाहिए। प्रत्येक जोड़ पर, दोनों तरफ के बीम के, IS 456-2000 के आधार पर गणना की गयी moment of resistance के 1.4 गुणा के योग में, मंजिल की उँचाई से भाग देकर पीलर के इस shear capacity की गणना करते हैं। (IS 13920-1993 Clause 7.3.4)
- (v) फ्रेम के जोड़ों के पास पीलर में, कम से कम, पीलर के बड़े क्षैतिज माप की दूरी तक या पीलर के clear height / 6 की दूरी तक या 450 मिलीमीटर की दूरी तक special confining चूड़ी का प्रावधान करना है। (IS 13920-1993 Clause 7.4.1)



चित्र-21 पीलर में चूड़ी



चित्र-22 : बीम में चूड़ी

- (vi) पीलर के नीचे के अंदर कम से कम 300 मिलीमीटर की दूरी तक special confining चूड़ी का प्रावधान करना है। (IS 13920-1993 Clause 7.4.2)

- (vii) पीलर के छोरों पर जैसा special confining चूड़ी आवश्यक है, वैसा ही चूड़ी पीलर-बीम के जोड़ों के अंदर में भी प्रावधान करना है। परन्तु, यदि किसी जोड़ पर चारों तरफ से बीम आकर मिलते हों एवं प्रत्येक बीम की चौड़ाई, पीलर की चौड़ाई का तीन-चौथाई हो, तो, आधा चूड़ी का प्रावधान कर सकते हैं, ऐसे चूड़ी की c/c दूरी 150 मिलीमीटर से ज्यादा नहीं होगा। (IS 13920-1993 Clause 8)
- (viii) Strong Column and Weak Beam Design के लिए, फ्रेम के किसी भी बीम-पीलर के जोड़ पर, पीलर के moments of resistance का योग, बीम के moments of resistance का योग के 1.2 गुना से ज्यादा रखी जा सकती है।
- 6.7.7 टाई बीम : भूतल के नीचे, संरचना पीलर को बाँधने वाले टाई बीम को, पीलर के load का $A_h/4$ गुना अतिरिक्त अक्षीय बल (tension / compression) के लिये, निरूपण करना चाहिए। (IS 1893 Clause 7.12.1)
- 6.7.8 Short column : किसी बन्धनी या बिचला तल्ला या बगल से सटे कम उँचाई वाले आर.सी.सी. दीवार के कारण, यदि पीलर के stiffness में बदलाव हो, तो, पीलर के पूरी उँचाई में विशेष चूड़ी (Special Confining Reinforcement) का प्रावधान करना है। (IS 13920-1993 Clause 7.4)
- 6.7.9 यदि, कोई पीलर, मजबूत दीवार का आधार-हो या दीवार पर आधारित हो, तो, उस पीलर के पूरी उँचाई में, विशेष चूड़ी (Special Confining Reinforcement) का प्रावधान करना है। पीलर के छड़ों को परिवन्धित करने के लिये, दीवार के अंदर, पीलर के सबसे मोटे छड़ के tension में development length की दूरी तक, विशेष चूड़ी का प्रावधान करना है। (IS 13920-1993 Clause 7.4)
- 6.7.10 Cantilever Projection : मकान के मुख्य संरचना से बाहर निकले, उर्ध्वाधर Projection हेतु A_h के 5 गुना भूकम्प बल के लिए तथा क्षैतिज Projection हेतु A_h के 3.33 गुना भूकम्प बल के लिए, स्थायित्व की जाँच एवं निरूपण करें। (IS 13920-1993 Clause 7.12.2)
- 6.7.11 Separation Joint : यदि निकटवर्ती भवन समरूप नहीं हों तो विभिन्न तल पर Separation Joint के बीच गैप, दोनों निकटवर्ती भवनों के store drift के योग के R गुना से ज्यादा होना चाहिए। समरूप भवन की स्थिति में इसे आधा कर सकते हैं। (IS 1893 Clause 7.11)
- 6.7.12 Frame के साथ Shear walls की संरचना व्यवस्था
- Shear Wall, संरचना के क्षैतिज बल प्रतिरोधी व्यवस्था का हिस्सा है। प्रत्येक मंजिल पर अपने Lateral Stiffness के अनुपात में, क्षैतिज भूकम्पीय बल प्रतिरोध करने के लिये, Shear walls एवं Frames निरूपित किये जाते हैं, साथ ही, base shear के 25 प्रतिशत के लिये, Frames अलग से निरूपित किये जाते हैं। (IS 1893 Clause 4.9)
 - Shear Wall की मोटाई 150 मिलीमीटर से कम नहीं होगा। प्रत्येक दिशा में, कम से कम प्रबलन छड़, gross area का 0.25 प्रतिशत होना चाहिए। अगर दीवार की मोटाई 200 मिलीमीटर से ज्यादा हो या दीवार में factored shear stress $0.25 \sqrt{f_{ck}}$ से ज्यादा हो तो छड़ दीवार के दोनों फलक पर होना चाहिए। (IS 13920-1993 Clause 9.1)
 - Shear Wall के Shear Strength एवं क्षैतिज छड़ IS 13920-1993 Clause 9.2 के अनुसार होना चाहिए।
 - IS 456-2000 के अनुसार, सम्मिलित अक्षीय बल एवं bending के लिये, Shear Wall का वैसे ही निरूपण किया जाता है, जैसे कि पीलर के लिये करते हैं। Cracked section का moment of resistance, uncracked section के moment of resistance से ज्यादा होना चाहिए। अगर, Shear Wall में, boundary elements का प्रावधान नहीं किया गया हो, तो, दीवार के छोरों पर दो लेयर में 12 मिलीमीटर के चार छड़ का प्रावधान करना चाहिए। (IS 13920-1993 Clause 9.3)

17/4

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भाग - 7 भवन निर्माण में आवश्यक सावधानियाँ

- भूकम्परोधी निर्माण के लिये, निरूपण के अनुरूप विषिष्टि का अनुपालन नितान्त आवश्यक है।
- 7.1 बालू एवं स्टोनचिप्स : बालू एवं स्टोनचिप्स IS 383 के विवरण के अनुसार होना चाहिए। हमेशा साफ और ताजा भवन निर्माण सामग्रियों का उपयोग करना चाहिए। स्वच्छ जल (यथा पीने का पानी) का उपयोग करना चाहिए। (IS 456 2000 Clause 5.3, 5.4)। गर्द से बचाने के लिए, बालू और स्टोनचिप्स को पोलीथीन चादर बिछाकर उसपर रखनी चाहिए तथा पोलीथीन चादर से ढक देनी चाहिए।
- 7.2 सिमेंट : सामान्य निर्माण में, OPC, Slag cement या PPC सिमेंट का उपयोग किया जा सकता है। सिमेंट ताजा होना चाहिए। सिमेंट को आर्द्रता से बचाए। ईट जोड़ाई के लिये OPC 43 ग्रेड का सिमेंट अथवा पी.पी.सी पर्याप्त है। ईट जोड़ाई हेतु OPC 53 ग्रेड सिमेंट का उपयोग न करें, यह शीघ्र जमता है और जोड़ाई के उपरान्त अधिक जल की आवश्यकता होती है। सिमेंट के मिश्रण में पानी मिलाने के एक घंटे के अंदर-अंदर, उपयोग कर लेना आवश्यक है, अन्यथा, मसाले या कंक्रीट की शक्ति घट जाती है।
- 7.3 एडमिक्चर : यदि एडमिक्चर का उपयोग करना हो, तो, पिछले अनुभवों के आधार पर IS 9103-1999 के प्रावधान के अनुसार, mix design के साथ, अनुमोदित किस्म का एडमिक्चर का उपयोग करना चाहिए। जबतक पर्याप्त जाँच न कर ली जाय, retarders, plasticizers तथा superplasticisers की मात्रा क्रमशः, सिमेंट के वजन का 0.5, 1.0 तथा 2.0 प्रतिशत तक ही रखें। (IS 456 2000 Clause 5.5, 10.3.3)
- 7.4 भवन के विभिन्न अवयवों में प्रयुक्त कंक्रीट ग्रेड 20 mm nominal maximum size aggregate एवं exposure की निम्न स्थिति के लिये, आर.सी.सी. कंक्रीट ग्रेड इस प्रकार रखना चाहिए। (IS 456 2000 Table 3, Table 5) :-

Exposure	Exposure Conditions	सिमेंट की न्यूनतम मात्रा kg/m ³	जल/सिमेंट का अधिकतम अनुपात	न्यूनतम कंक्रीट ग्रेड
Mild	Surfaces protected against weather	300	0.55	M 20
Moderate	Exposed to rain, Under water	300	0.50	M 25

आर.सी.सी. में कंक्रीट का न्यूनतम ग्रेड M20 है।

भूकम्प जोन IV या V में, आर.सी.सी. का कंक्रीट ग्रेड M25 अच्छा है।

आर.सी.सी. पीलर के लिये M25 या उच्चतर कंक्रीट ग्रेड रखना चाहिए।

मौसम से सुरक्षित, आर.सी.सी. बीम, स्लैब, इत्यादि के लिये कंक्रीट ग्रेड M20 रख सकते हैं।

आर.सी.सी. नींव के लिये कंक्रीट ग्रेड M25 रखना चाहिए।

कंक्रीट को दीर्घायु बनाने के लिए जल/सिमेंट का अनुपात कम से कम रखें।

ईट जोड़ाई के भारवाहक दीवार पर आधारित साधारण भवन संरचना के लिये, कंक्रीट ग्रेड M20 में, सिमेंट, बालू एवं स्टोनचिप्स का अनुपात 1:1.5:3 रख सकते हैं।

- 7.5 कंक्रीट का संघटन
भवन निर्माण सामग्री उपयोग से एक दिन पहले ही इकट्ठा कर लें। बालू एवं स्टोनचिप्स का निरन्तर ग्रेडिंग करते रहें। बालू एवं विभिन्न आकार के स्टोनचिप्स के समुचित ग्रेडिंग से अधिकतम घनत्व का कंक्रीट प्राप्त होना चाहिए। IS 10262-1982 के आधार पर, कंक्रीट का Mix design कर सकते हैं। कंक्रीट के सभी संघटकों को मात्रा (तौल) के आधार पर मिलाना चाहिए। यदि मात्रा के आधार पर संघटन व्यावहारिकतः संभव नहीं हो, तो आयतन के आधार पर मिला सकते हैं। ऐसी स्थिति में मात्रा तथा आयतन का सम्बन्ध लगातार जाँचते रहना होगा। Bulking तथा नमी के कारण बालू एवं जल के आयतन में घट देना चाहिए। जल-सिमेंट का अनुपात हमेशा बनाए रखना चाहिए। (IS 456 2000 Clause 10.2)।

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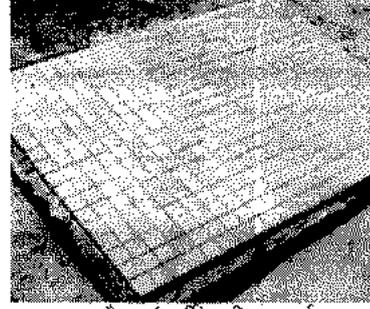
2

7.6 कंक्रीट का आवरण (कवर) (IS 456 2000 Clause 26.4)

जंग से बचाव के लिये, छड़ों के ऊपर, नीचे तथा बगल में, निम्नलिखित मोटाई का कंक्रीट आवरण (कवर) प्रदान करने के लिये, पर्याप्त संख्या में कवर ब्लॉक और एक मीटर की दूरी पर चेंबर का उपयोग किया जाता है। चित्र-23 देखें। एक घंटे अग्नि प्रतिरोध के लिये, कंक्रीट का न्यूनतम कवर इस प्रकार होना चाहिए :-

छत (स्लैब) के मुख्य छड़	20 मिलीमीटर
छत (स्लैब) के सहायक छड़	15 मिलीमीटर
बीम के मुख्य छड़	25 मिलीमीटर या
	छड़ का व्यास, जो भी ज्यादा हो
बीम की चूड़ी	15 मिलीमीटर
पीलर का खड़ा छड़	40 मिलीमीटर
नींव का छड़	50 मिलीमीटर

भारवाहक ईट जोड़ाई वाले भवनों के भूकम्परोधी आर.सी. सी. बैंड में स्थित स्टील छड़ के लिये, कम से कम 25 मिलीमीटर का कंक्रीट का आवरण रखना अनिवार्य है।



कवर ब्लॉक (बफी) की ढलाई



स्टील छड़ के मोड़ कर चेंबर बनाएं
चित्र-23

7.7 कंक्रीट का मिश्रण बनाना

कंक्रीट मिक्सर के साथ जल के आयतन मापने का इंतजाम कर लें। कंक्रीट के एकसमान स्वरूप एवं रंग प्राप्त होने तक (कम से कम 2 मिनट) मिक्सर को चलाते रहें। निरन्तर Slump की जाँच करें। (IS 456 2000 Clause 10.3)

7.8 कंक्रीट की ढलाई, सघनीकरण

जहाँ तक सम्भव हो, कंक्रीट को 1.5 मीटर से ज्यादा उँचाई से नहीं गिराना चाहिए। निर्धारित आकार वाले शटरिंग में स्टील छड़ का जाल या पिंजरा तैयार कर, आरेखन से मिला लें। फ्रेम के जोड़ों पर, पीलर एवं बीम के छड़ों के सीधा रखें। बीम के छड़ पीलर के छड़ों के बीच होकर जाना चाहिए।

भाईब्रेटर की सहायता से कंक्रीट सघन करना चाहिए। पीलर को बीम के निचले तल तक ढलाई करने के दौरान, 150 से 200 मिलीमीटर के गैप छोड़ देने से, पीलर में बीम के नीचे hinge बन जाता है, और भूकम्पीय दोलन में पीलर क्षतिग्रस्त हो जाता है। अतएव, पीलर एवं बीम के जोड़ पर समुचित रूप से कंक्रीट ढालने के लिये, पर्याप्त जगह रहना चाहिए। सँकरे स्थानों में एवं किनारों पर, 16 मिलीमीटर स्टील के छड़ की सहायता से, कंक्रीट को ढूस - ढूस कर सघन करना चाहिए।

7.9 कंक्रीट एवं पलस्तर को स्वच्छ जल से लगातार भिगोकर रखना

नये ढाले गये कंक्रीट के समतल सतह के ऊपर, क्यारी बनाकर उसमें पानी डालना चाहिए एवं खड़े सतहों पर, जूट की बोरी से ढककर, उसपर पानी डालना चाहिए। कंक्रीट ढलाई के उपरान्त साधारण पोर्टलैंड सिमेंट से बनाये गये कंक्रीट एवं प्लास्टर के सतह को, अगले 10 दिनों तक तथा सम्मिश्रित सिमेंट के लिये, 14 दिनों तक लगातार स्वच्छ जल से भिगोकर रखना चाहिए। (IS 456 2000 Clause 13.5)।

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7.10 ढाले गये कंक्रीट का षटरिंग हटाने का समय

सामान्यतः, जहाँ तापक्रम 15 डिग्री सेंटीग्रेड से नीचे नहीं हो एवं पर्याप्त समय तक कंक्रीट को लगातार स्वच्छ जल से भिगोकर रखा जाता हो, सारणी - 4 में दिखाये गये षटरिंग हटाने की न्यूनतम अवधि अपनायी जा सकती है। (IS 456 2000 Clause 11.3.1)

सारणी - 4 षटरिंग हटाने की न्यूनतम अवधि			
क्र. सं.	षटरिंग का प्रकार	साधारण पोर्टलैंड सिमेंट के लिये	पेजोलाना पोर्टलैंड सिमेंट के लिये
1	पीलर, दीवार, बीम के लिये खड़ा षटरिंग	16-24 घंटे	24 घंटे
2	छत के नीचे षटरिंग (षटरिंग हटाने के साथ ही फौरन अबलम्ब लगायें)	3 दिन	6 दिन
3	बीम के नीचे षटरिंग (षटरिंग हटाने के साथ ही फौरन अबलम्ब लगायें)	7 दिन	10 दिन
4	छत के नीचे अबलम्ब 1) 4.5 मीटर तक विस्तार 2) 4.5 मीटर से अधिक विस्तार	7 दिन 14 दिन	10 दिन 17 दिन
5	बीम या मेहराब के नीचे अबलम्ब 1) 6 मीटर तक विस्तार 2) 6 मीटर से अधिक विस्तार	14 दिन 21 दिन	21 दिन 24 दिन

7.11 ईट की जोड़ाई : दीवाल के निर्माण में एक ही आकार प्रकार के ईट का उपयोग करें। घिमनी भट्टे के ईट, लाल रंग के, ठीक से पके होने चाहिए, कम पके या अत्यधिक पके नहीं। ईट के आपस में टकराने पर खनकदार आवाज निकलनी चाहिए। ईट जोड़ाई भारवाहक दीवार आधारित भवनों के ईट की दाब प्रबलता 50 किलोग्राम प्रति वर्ग सेंटीमीटर होना चाहिए। मसाले के जल को ईट सोख लेता है, अतएव, इस्तेमाल से पहले ईट को कम से कम 4 घंटे स्वच्छ जल में डुबोकर रखना अनिवार्य है। जोड़ाई का पूरा ताकत प्राप्त करने हेतु, प्रत्येक ईटों के बीच 10 मिलीमीटर की दूरी रखें, जिसे सिमेंट-बालू मसाले से पूरा पूरा भर दें। दीवार सही-सही उर्ध्वधर खड़ा होना चाहिए।

भाग - 8 निरीक्षण एवं गुण नियंत्रण

8.1 एकबार ढल जाने के बाद, कंक्रीट में हेर फेर करना बहुत मुश्किल तथा महंगा है। अतएव, ढलाई से पहले ही संरचना अवयवों के आकार का, षटरिंग के लेवल का, कंक्रीट के संघटन एवं मिश्रण का, छड़ों के स्थान एवं संख्या का तथा षटरिंग हटाने के समय कंक्रीट के सतह का अनवरत सख्त नियमनिष्ठ निरीक्षण आवश्यक है। (IS 456 2000 Clause 13.6)।

8.2 नीचे के पाराग्राफ में प्रासंगिक, भारतीय मानक संस्थान द्वारा प्रकाशित संहिताओं के अद्यतन संस्करण, गुण नियंत्रण के लिये, निर्माण के विभिन्न चरण में अवलोकन हेतु उपलब्ध रखें।

8.3 निर्माण सामग्री, स्टील एवं कंक्रीट के समुचित नमूना की जाँच मान्य प्रयोगशाला में करके, गुण नियंत्रण परीक्षण हेतु जाँच फल को रजिस्टर में दर्ज कर रखना चाहिए।

(i) बालू एवं स्टोनचिप्स का चलनी द्वारा विप्लेषण

IS: 2386 Part I 1963 के अनुसार चलनी द्वारा विप्लेषण करने पर, बालू (4.75 मि.मी. से छोटा आकार), स्टोनचिप्स तथा उनके मिश्रण में, हानिकारक सामग्री IS: 383 1970 Clause 3.2 के अनुसार और उनके आकार विप्लेषण क्रमशः IS: 383 के Table 4, Table 2 एवं Table 5 के अनुरूप होना चाहिए।

(ii) स्टोनचिप्स का Crushing Value

IS: 2386 Part IV 1963 Clause 2 के अनुसार स्टोनचिप्स का Crushing Value का मान ज्ञात करने पर यह 45 प्रतिशत से कम नहीं होना चाहिए। (IS: 383 1970 Clause 3.3)

(iii) स्टील छड़ की जाँच

स्टील छड़ों के प्रतिमीटर वजन की जाँच कर लें। Fe 415, Fe 500, Fe 550 की संख्या, न्यूनतम 0.2% Proof Stress या Yield stress का मान N/mm^2 में दर्शाता है। Yield stress एवं Elongation की जाँच करने पर जाँचफल IS: 1786-1985 के Table 3 के अनुरूप होना चाहिए।

(iv) सिमेंट की जाँच

IS: 4031 Part V 1988 Clause 2 के अनुसार, सिमेंट के Initial setting time (30 मिनट से ज्यादा) एवं Final setting time (600 मिनट से कम) की जाँच करनी चाहिए। IS: 4031 Part VI 1988 के अनुसार सिमेंट के Compressive strength जाँच करने पर जाँचफल इस प्रकार होना चाहिए:-

सिमेंट	प्रासंगिक संहिता	3 दिन पर	7 दिन पर	28 दिन पर
33 Grade OPC	IS 269-1989	16 mpa	22 mpa	33 mpa
Portland Slag Cement	IS 455-1989	16 mpa	22 mpa	33 mpa
Portland Pozzolana Cement	IS 1489 Part 1 -1991	16 mpa	22 mpa	33 mpa
43 Grade OPC	IS 8112-1989	23 mpa	33 mpa	43 mpa
53 Grade OPC	IS 12269-1987	27 mpa	37 mpa	53 mpa
Approximate Strength		50 %	70 %	100 %

(v) कंक्रीट मिश्रण की जाँच :

IS: 1199-1959 Clause 5.1 के अनुसार, कंक्रीट मिश्रण का Slump जाँच करने पर, जाँचफल, कम छड़ वाले अवयवों में 25-75 mm, घने छड़ वाले अवयवों में 50-100 mm, पम्प किये जाने वाले कंक्रीट में 75-100 mm तथा Tremie कंक्रीट में 150 mm होना चाहिए। (IS 456 2000 clause 7.1)

कंक्रीट मिश्रण के cube का नमूना IS: 1199-1959 clause 3 के अनुसार लेना चाहिए तथा 28 दिनों पर IS: 516-1959 के अनुसार जाँच करना चाहिए। प्रत्येक पाली में कम से कम एक नमूना लेना आवश्यक है। पचास घनमीटर कंक्रीट तक प्रति पाँच घनमीटर पर एक नमूना लेना चाहिए। (IS: 456-2000 Clause 15.2)

तीन नमूना का औसत, जाँच फल कहा जाएगा। किसी भी नमूने का जाँच फल, औसत से 15 प्रतिशत से ज्यादा भिन्न होने पर, जाँच निष्फल माना जाएगा। (IS: 456-2000 Clause 15.4)।

चार क्रमिक जाँच फल का औसत $fck + 4 mpa$ से ज्यादा होना चाहिए। किसी भी नमूने का पृथक जाँच फल $fck - 4 mpa$ से ज्यादा होना चाहिए। (IS 456 2000 Clause 16.1)।

6/2/14
5/12/14
2

GENERAL NOTES

- All dimensions and details are to be verified with the relevant architectural and service drawings and ambiguity, if any should be brought to the head of the design engineers.
- Do not scale, only written dimensions are to be followed.
- All dimensions in millimeters. Grid dimensions in feet & inches.
- Abbreviation
NLS Not to scale
EGL Existing Ground Level
- REINFORCING STEEL
PL Pile/In Level
STPS Stirrups
- Unless noted otherwise specified all reinforcements shall be M-25 CRS 500 conforming to IS:1785-1987 with maximum yield stress of 500 mpa noted on drawings as 'Torr'.
- CONCRETE**
Unless noted otherwise, concrete mix for all elements shall be M-25 Grade having 25 N/mm² compressive strength at 28 days and shall be conforming to IS:456-2000.
- All concrete mix shall be machine mixed and machine vibrated.
- COVER**
Unless noted otherwise, clear cover to main reinforcements shall be:
Flooring, Rat Beam - 50 mm
Columns - 40 mm
Beams - 30 mm
Slab - 20 mm
Surfaces retaining water - 50 mm
- DESIGN FOR BEARING CAPACITY OF SOIL**
Foundations has been designed for G+4 floors. Safe bearing capacity of soil has been adopted 150 kN/sqm.
- SLAB REINFORCEMENTS**
10. In slab, bottom face reinforcements has been shown in firm lines and top face reinforcements has been shown in dotted lines.
- Distribution reinforcements, if not shown, shall be # 8 @ 200 mm c/c.
- LAP LENGTH (Ld)**
12. Lap length for reinforcement at any section shall be .50 x dia. of bar
- CAMBER**
13. Unless noted otherwise, camber in terrace slab shall be provided as follows: (Shorter span shall be considered)
Shorter Span, upto and including 3.0 m Camber 20 mm
Shorter Span, above 3 m to 4 m Camber 30 mm
- BEAM COLUMN JUNCTION**
14. At beam - column junction, beam bars in conflict with column bars shall be gradually bent at a slope of 1:5 and placed clear of column bars. Under no circumstances, column vertical bars shall be bent to accommodate beam bars.
15. Confining stirrups at beam - column junction shall be provided in the portion of junction, at the spacing indicated. However, if beams are connected on all four directions of column, the stirrup spacing should be doubled. In case of difficulty in providing closed stirrups, U-type stirrups may be provided, extending into beam by length, Ld = 50 dia.

CONSTRUCTION DETAILS

- Not more than 50 % of bars shall be lapped at any section.
- For floor beams and slabs, the location of lapping shall be close to 0.2 Linear supports for bottom reinforcement and close to mid-span for top reinforcement (See Fig. 1).
- Unless noted otherwise indicated in the drawing, construction joint should be approved by engineer at site. Construction joint should be at quarter span of beams and slabs. In no construction construction joint shall be at the support or mid span.

GENERAL INSTRUCTIONS

- RCC Soffing under floor shall be done, to provide solid base to vertical props under roof beams and slabs, before laying RCC roof.
- Slab of toilet at upper floors shall not be sunk, to avoid cutting of RCC beam for disposal of soil and waste water. Either European WC may be provided along with raising toilet floor by 150 mm, or, for vertically repeating toilets, disposal pipes may be laid below beam bottom, along with concealing the traps and pipes by false ceiling.
- Column reinforcements projecting above any floor for future expansion, shall be installed with anti - corrosive paint and projecting reinforcements shall be concealed by casting with lean concrete mix 1:3:6. Top of projecting columns or parapets shall be neatly plastered with cement mortar of mix 1:4 providing uniform slope towards inner side with provision of drip course.
- Parapet walls shall be stiffened with vertical RCC stiffener projecting from roof and by providing a RCC band at the top of parapet. Height of parapet wall shall be equal to window sill height.
- Bars for lintel band shall be provided in columns. (See Fig. 2).

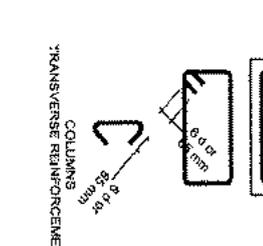
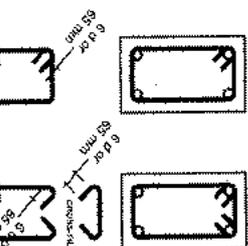
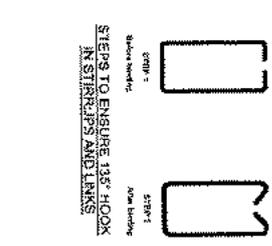
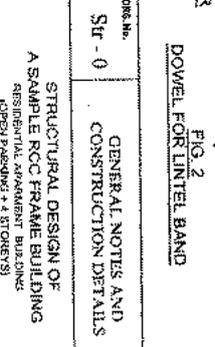
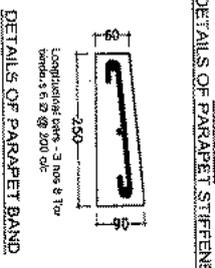
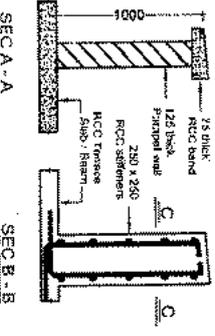
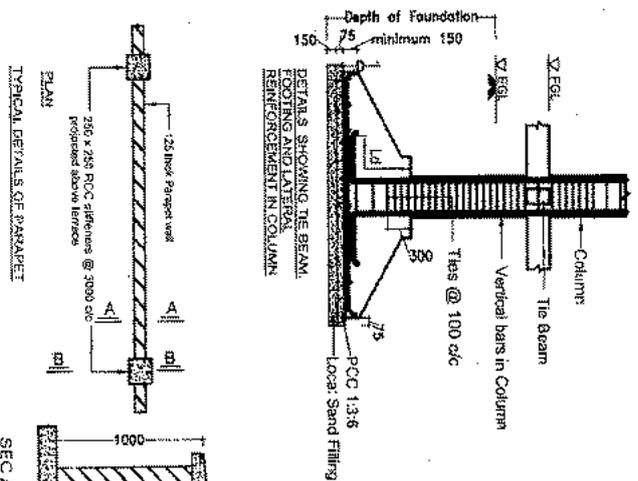
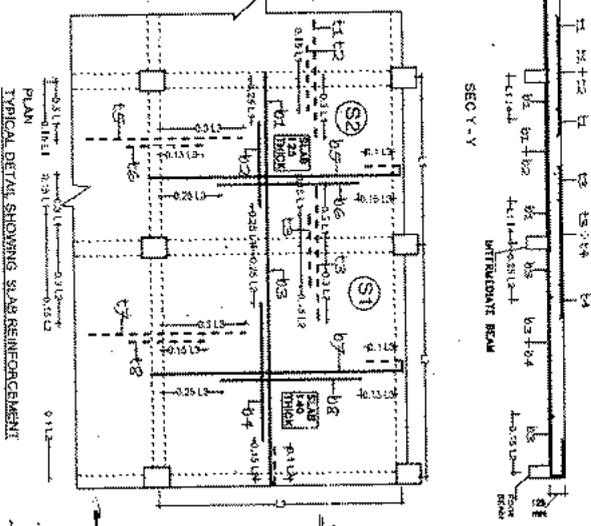


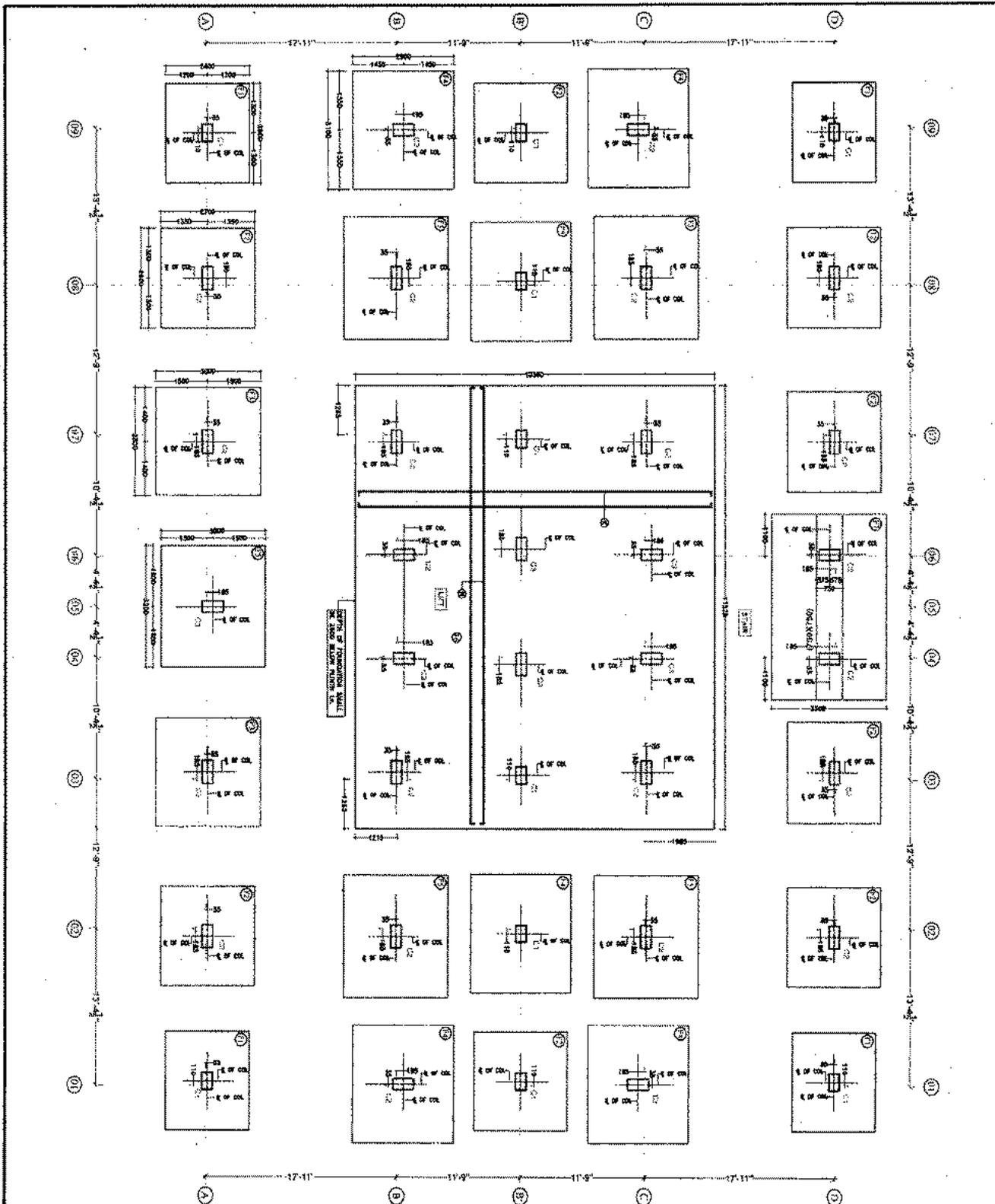
FIGURE 1
DETAILS OF LAP AND STIRRUPS IN BEAMS



SECTION Y-Y
MITRATED BEAM

GENERAL NOTES AND CONSTRUCTION DETAILS
Sr - 0
STRUCTURAL DESIGN OF A SAMPLE RCC FRAME BUILDING
RESISTANT FRAMEWORK BUILDING
(PAPER NUMBER: 44 STORES)

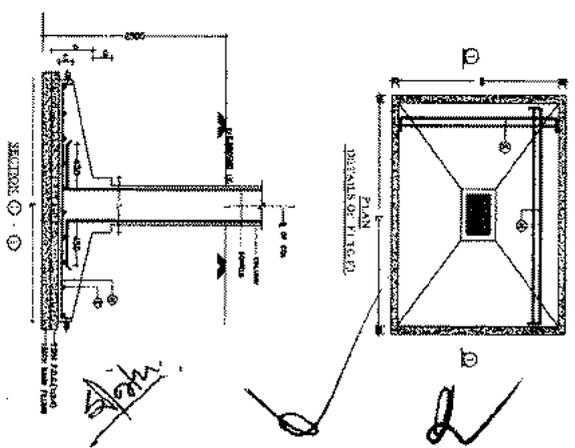
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FOOTING SCHEDULE

FOOTING NUMBER	FOOTING SIZE	A	B	C	PERIMETER	AREA	PERIMETER	AREA
F1	2400	2400	150	450	18-11'6"	18-11'6"	18-11'6"	18-11'6"
F2	2700	2800	700	150	7'10"	18-11'6"	18-11'6"	18-11'6"
F3	3000	1800	775	750	12-11'6"	24-11'6"	24-11'6"	24-11'6"
F4	3100	2800	800	150	7'10"	18-11'6"	18-11'6"	18-11'6"
F5	3000	3000	500	700	14-0"	24-11'6"	24-11'6"	24-11'6"
F6	1	1125	1050	150	7'10"	18-11'6"	18-11'6"	18-11'6"

CONCRETE FOOTING (PERIN DETAILS)



FOUNDATION SCHEDULE AND STORAGE PLAN

- NOTES:
1. FOUNDATION SHALL BE CONCRETE ON GRAVEL.
 2. REINFORCING BARS SHALL BE #4 OR #5.
 3. CONSTRUCTION DETAILS SHALL BE AS SHOWN ON SCHEDULE 8.
 4. SEE SECTION 1100 FOR DETAILS.

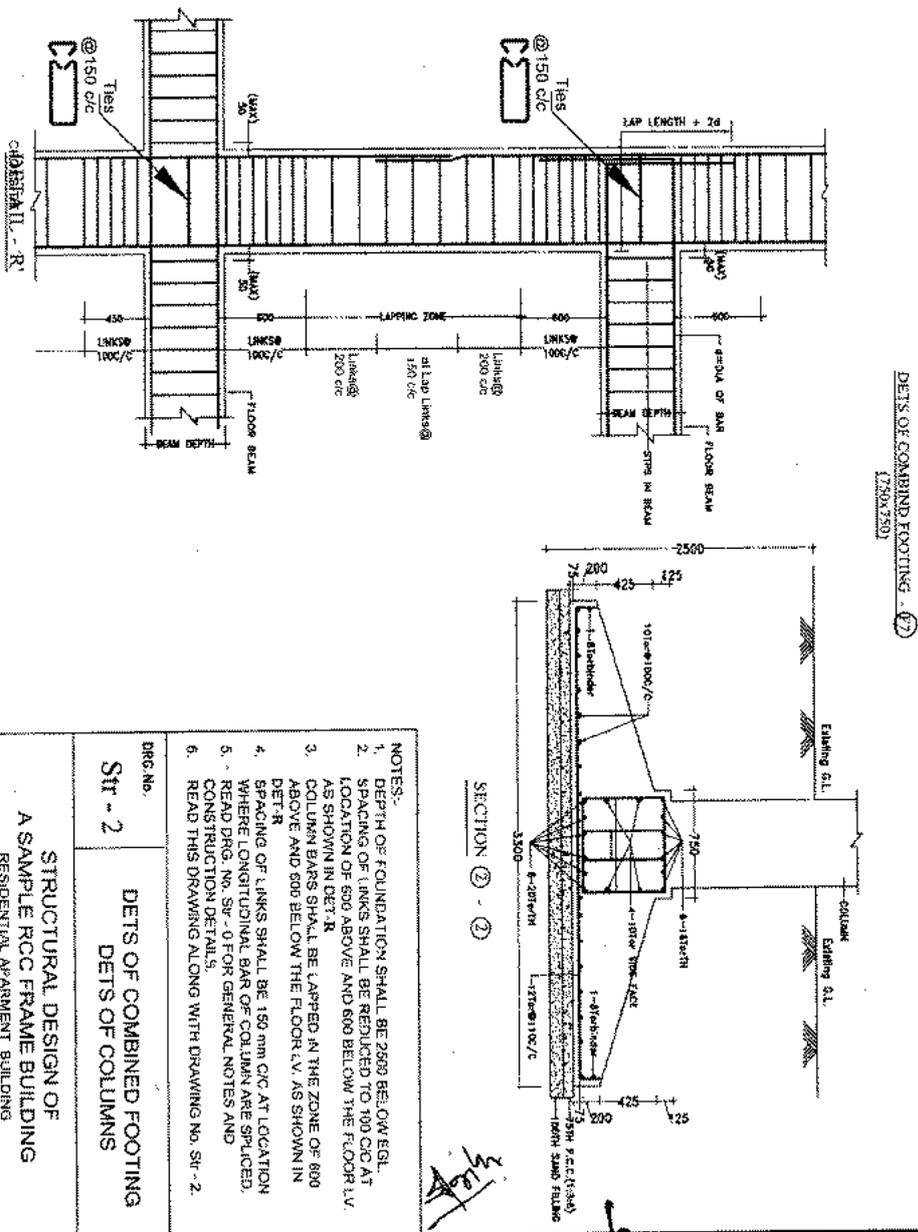
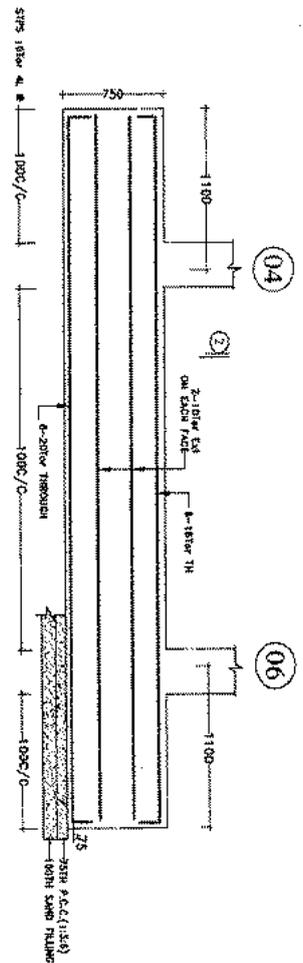
FIG. NO. 1 LAYOUT AND FOUNDATION PLAN

STRUCTURAL DESIGN OF
A SAMPLE RCC FRAME BUILDING
(OPEN PARKING + 4 STOREYS)

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COLUMN SCHEDULE

COLUMN MKTD	FOUNDATION TO 1st FLOOR Lv		1st FLOOR TO 3rd FLOOR Lv		3rd FLOOR TO TOP Lv	
	COLLIMN SIZE	CONCRETE MIX	COLLIMN SIZE	CONCRETE MIX	COLLIMN SIZE	CONCRETE MIX
C1	L	450	L	450	L	450
	B	300	B	300	B	300
	SECTION WITH MAIN STEEL					
C2	L	600	L	600	L	600
	B	300	B	300	B	300
	SECTION WITH MAIN STEEL					
C3	L	600	L	600	L	600
	B	300	B	300	B	300
	SECTION WITH MAIN STEEL					



NOTES:

- DEPTH OF FOUNDATION SHALL BE 2609 BELOW EGL.
- SPACING OF LINKS SHALL BE REDUCED TO 100 C/C AT LOCATION OF 600 ABOVE AND 600 BELOW THE FLOOR LV AS SHOWN IN DET. R.
- COLUMN BARS SHALL BE LAPPED IN THE ZONE OF 600 ABOVE AND 600 BELOW THE FLOOR LV AS SHOWN IN DET. R.
- SPACING OF LINKS SHALL BE 150 mm C/C AT LOCATION WHERE LONGITUDINAL BAR OF COLUMN ARE SPLICED.
- READ DRG. NO. SV - 0 FOR GENERAL NOTES AND CONSTRUCTION DETAIL.
- READ THIS DRAWING ALONG WITH DRAWING NO. SV - 2.

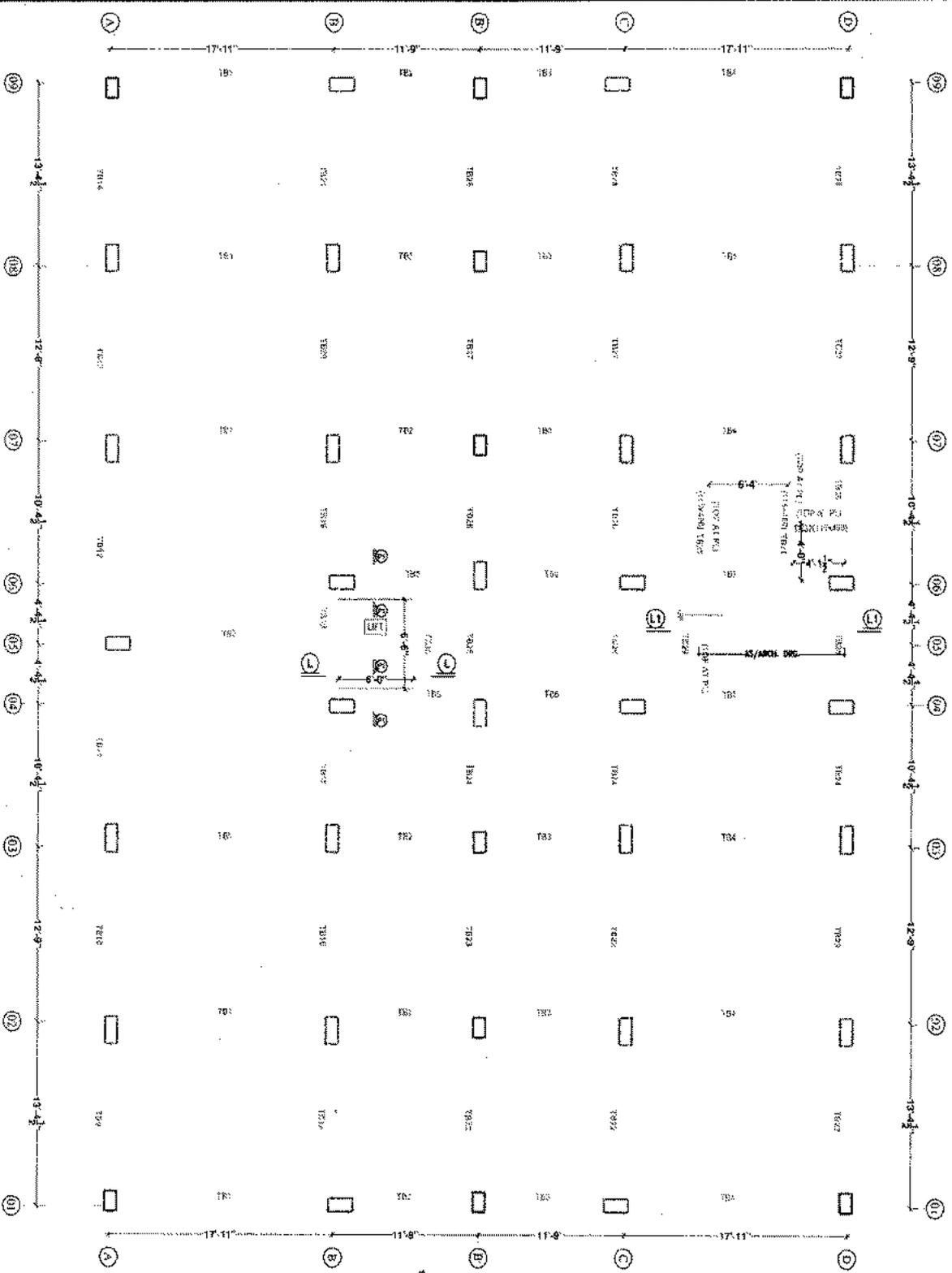
DRG. NO. **SV - 2**

DETAILS OF COMBINED FOOTING

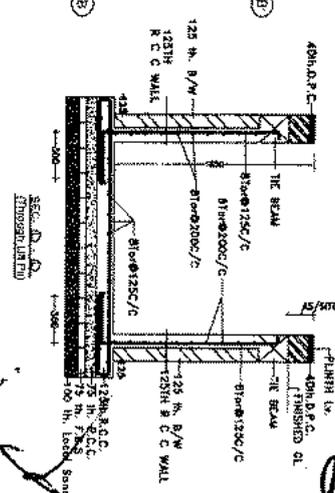
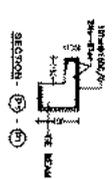
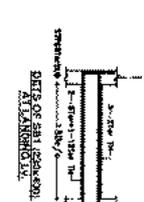
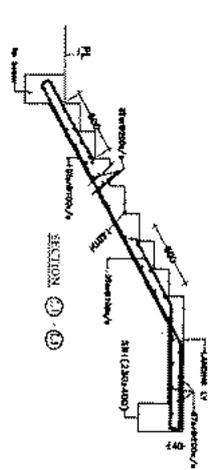
DETAILS OF COLUMNS

STRUCTURAL DESIGN OF A SAMPLE RCC FRAME BUILDING
RESIDENTIAL APARTMENT BUILDING
(OPEN PARKING + 4 STOREYS)

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NOTE: ALL THE BEAMS SHALL BE AT FINISHED GROUND EXCEPT TB31, TB32, TB33 & TB34.

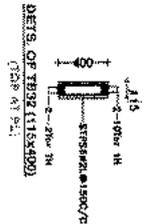
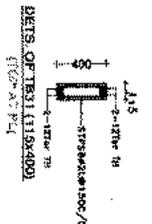
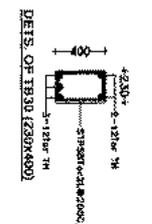
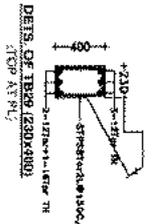
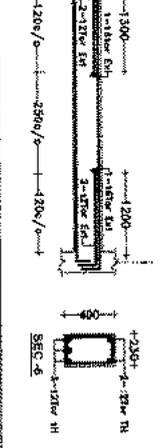
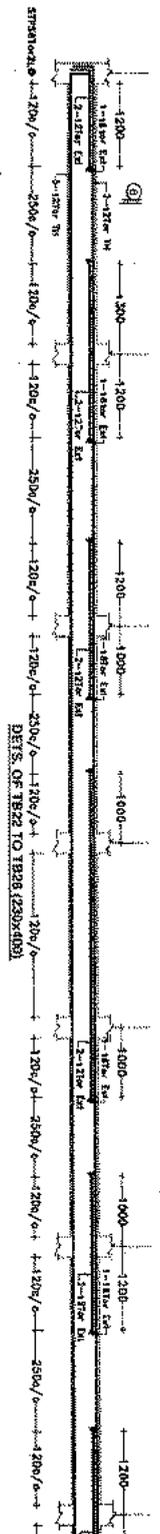
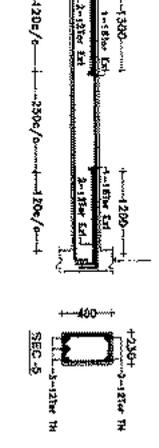
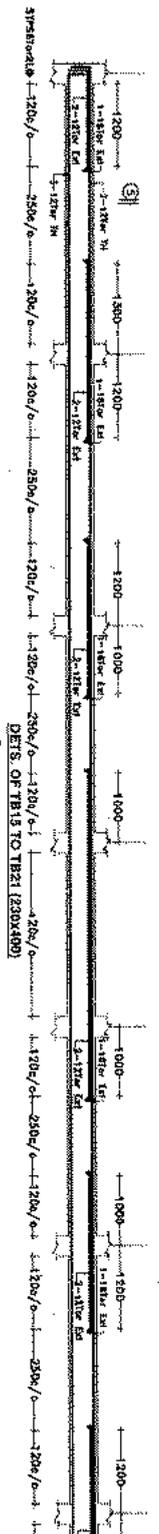
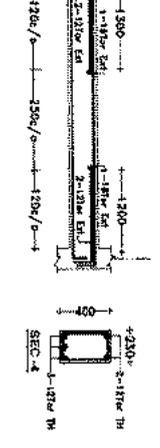
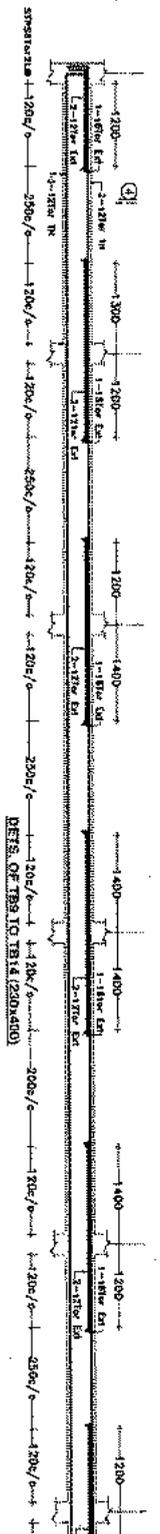
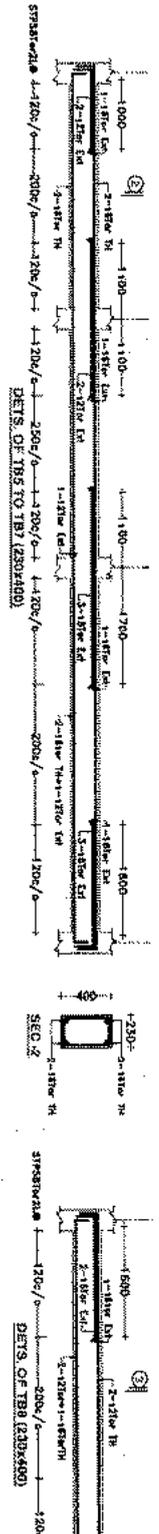


- NOTES:
1. REFER TO S.P. 6 FOR GENERAL NOTES AND CONSTRUCTION DETAILS.
 2. REFER TO S.P. 4 FOR REINFORCEMENT DETAILS.

DRG. No. **Str - 3** THE BEAM PLAN

STRUCTURAL DESIGN OF
A SAMPLE RCC FRAME BUILDING
RESIDENTIAL APARTMENT BUILDING
(OPEN PARKING + 4 STOREYS)

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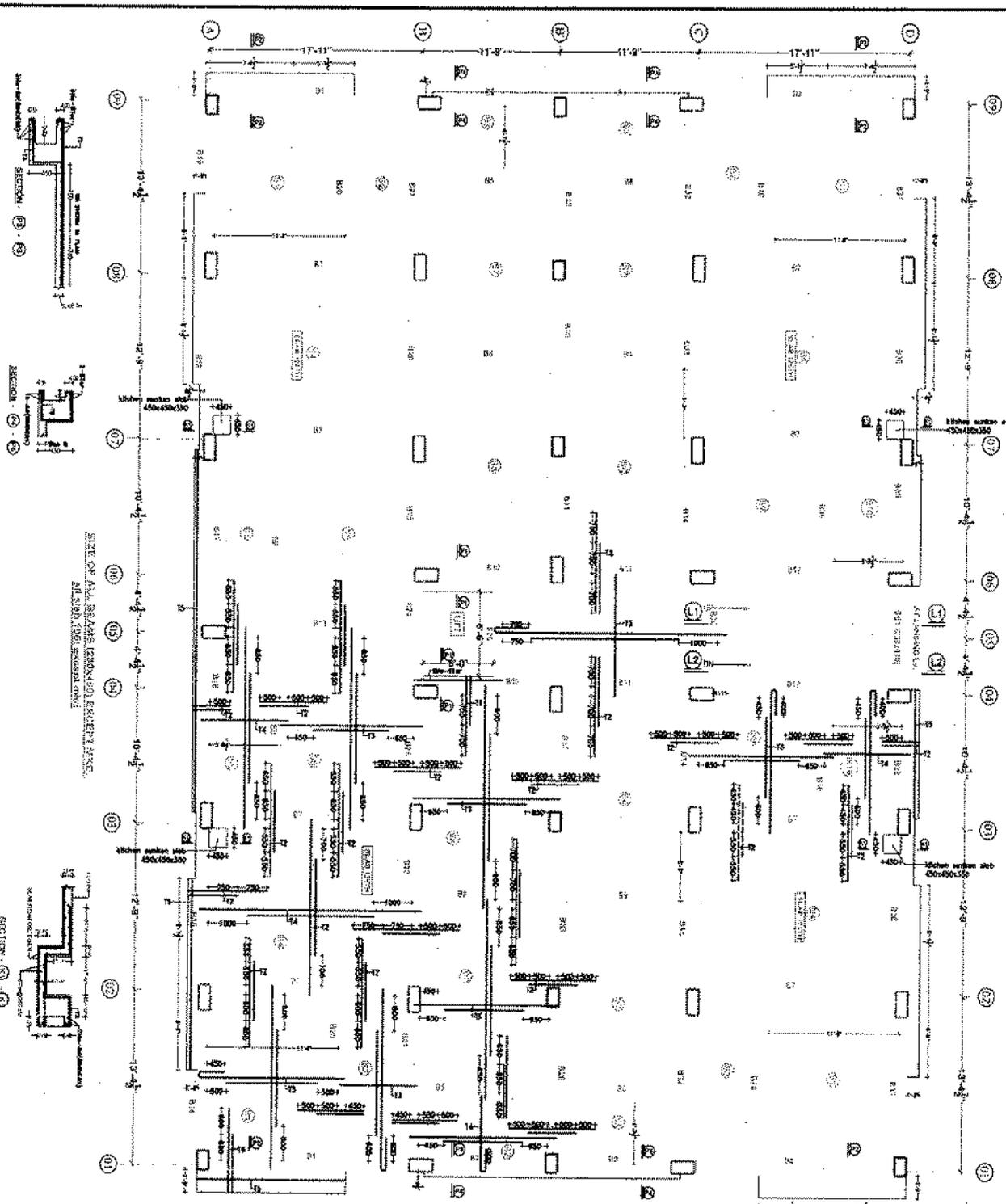


- NOTES:-
1. READ THIS DRAWING ALONG WITH DRG NO. SR-3.
 2. WHEREVER SHOWN BEAM BAR SHALL BE ANCHORED INTO COLUMN UP TO A DISTANCE EQUAL TO 5X TIMES DIA OF BAR. DISTANCE MEASURED FROM FACE OF THE COLUMN.
 3. READ DRG. NO. SA-0 FOR GENERAL NOTES AND CONSTRUCTION DETAILS.

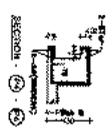
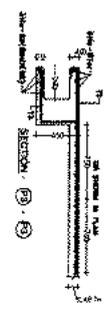
DRG. NO. **SR - 4** THE BEAM DETAILS

STRUCTURAL DESIGN OF A SAMPLE RCC FRAME BUILDING
RESIDENTIAL APARTMENT BUILDING
(OPEN PARKING + 4 STOREYS)

Handwritten notes and signatures at the bottom of the page, including a date '12/11/2017' and a signature.



SITE OF ALL BEAMS (EXCEPT EXISTING)
 FILLS IN AND EXPOSED ONLY



REINFORCEMENT SCHEDULE

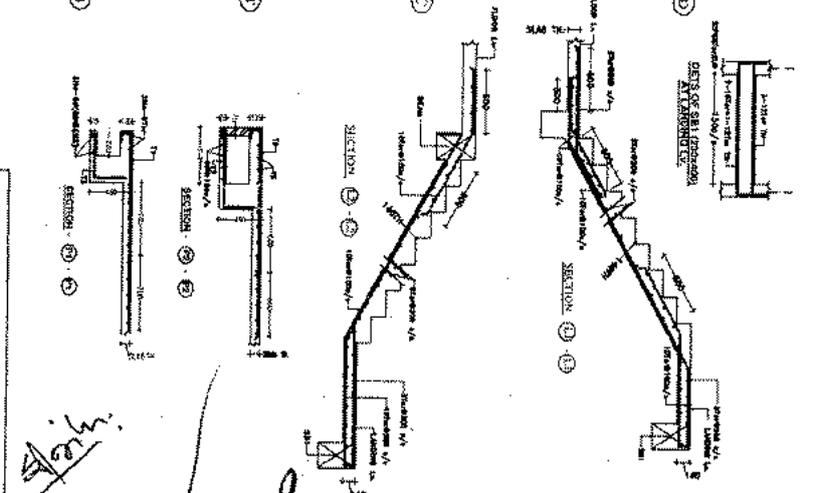
T1	2 # 1600 C/C
T2	2 # 1125 C/C
T3	2 # 1150 C/C
T4	2 # 1125 C/C
T5	2 # 1200 C/C
T6	1 # 1100 C/C

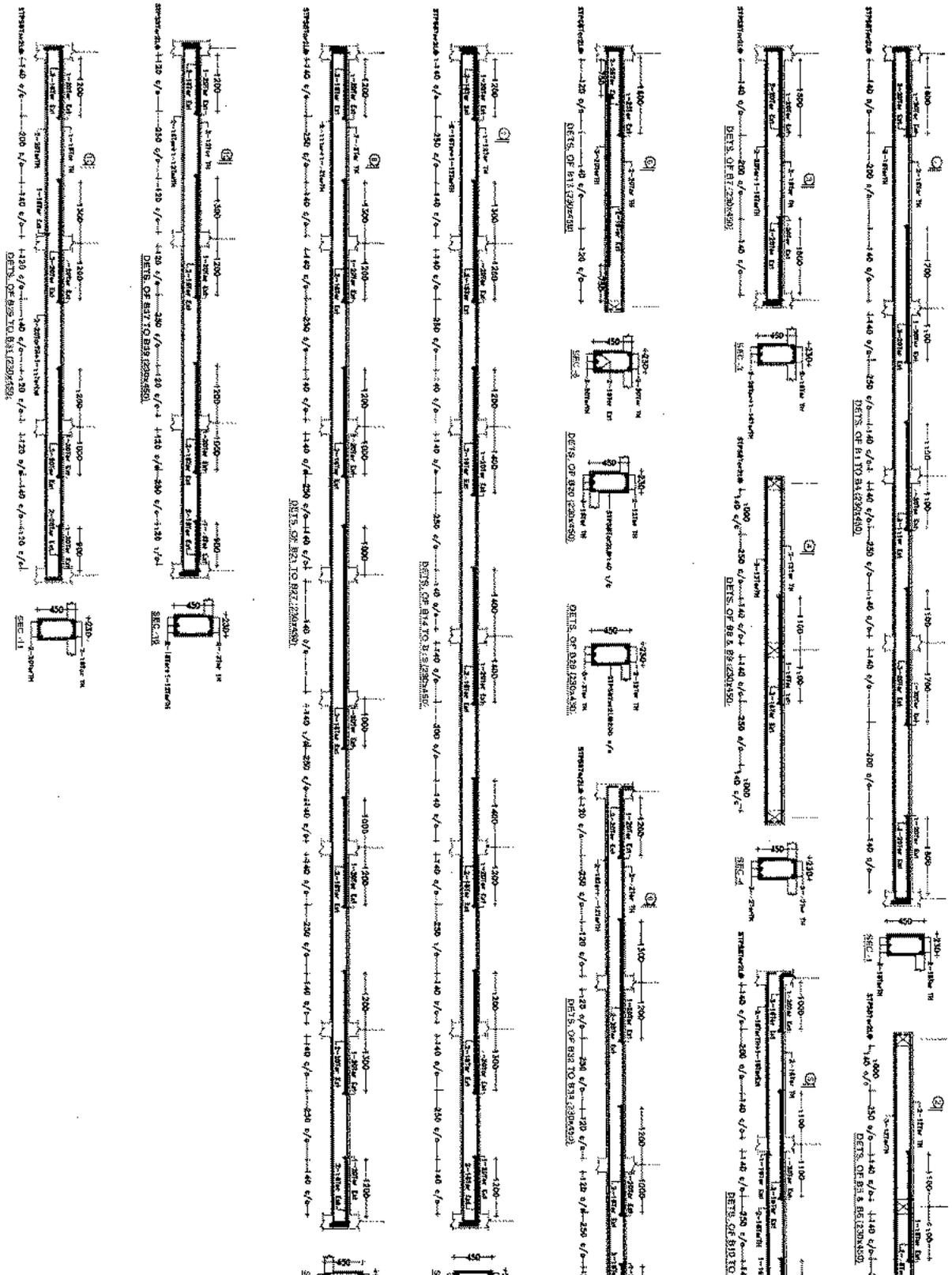
**ARRANGEMENT OF BEAMS
 AND DETAILS OF SLABS
 AT TYPICAL FLOORS**

A RESIDENTIAL APARTMENT BUILDING AT PATNA

DATE: 11/17/2017
 SHEET: 5
 SAMPLE DRAWING

- NOTES:
1. SLAB - 100 R EXCEPT 400.
 2. TOP REINFORCEMENT IN SLAB SHOWN THIS BOTTOM REINFORCEMENT IN SLAB SHOWN THIS.
 3. AS PER REINFORCEMENT NOT SHOWN SHALL BE.
 4. (a) 1 # 100 C/C EXTRA AT SUPPORT IN TOP LAYER.
 5. (b) 1 # 100 C/C EXTRA AT SUPPORT IN TOP LAYER.
 6. WHEREVER SHOWN REINFORCEMENT IN TOP LAYER WITH COLUMN UP TO A DISTANCE EQUAL TO 3 TIMES DIA OF BAR. DISTANCE MEASURED FROM FACE OF COLUMN.
 7. REINFORCEMENT IN SLAB - 100 R EXCEPT 400. NOTES AND COMBINATION IS 100 R.
 8. REFER DRAWING NO. 5 - FLOOR BEAM DETS.





NOTES:
 1. READ THIS DRAWING ALONG WITH DRC NO. SR-1, 5.
 2. WHENEVER SHOWING BARS SHALL BE ANCHORED BY A DISTANCE MEASURED FROM FACE OF THE COLUMN.
 3. READ DRC. NO. SR-8 FOR GENERAL NOTES AND CONSTRUCTION DETAILS.

DETS. OF BEAMS AT TYPICAL FLOORS

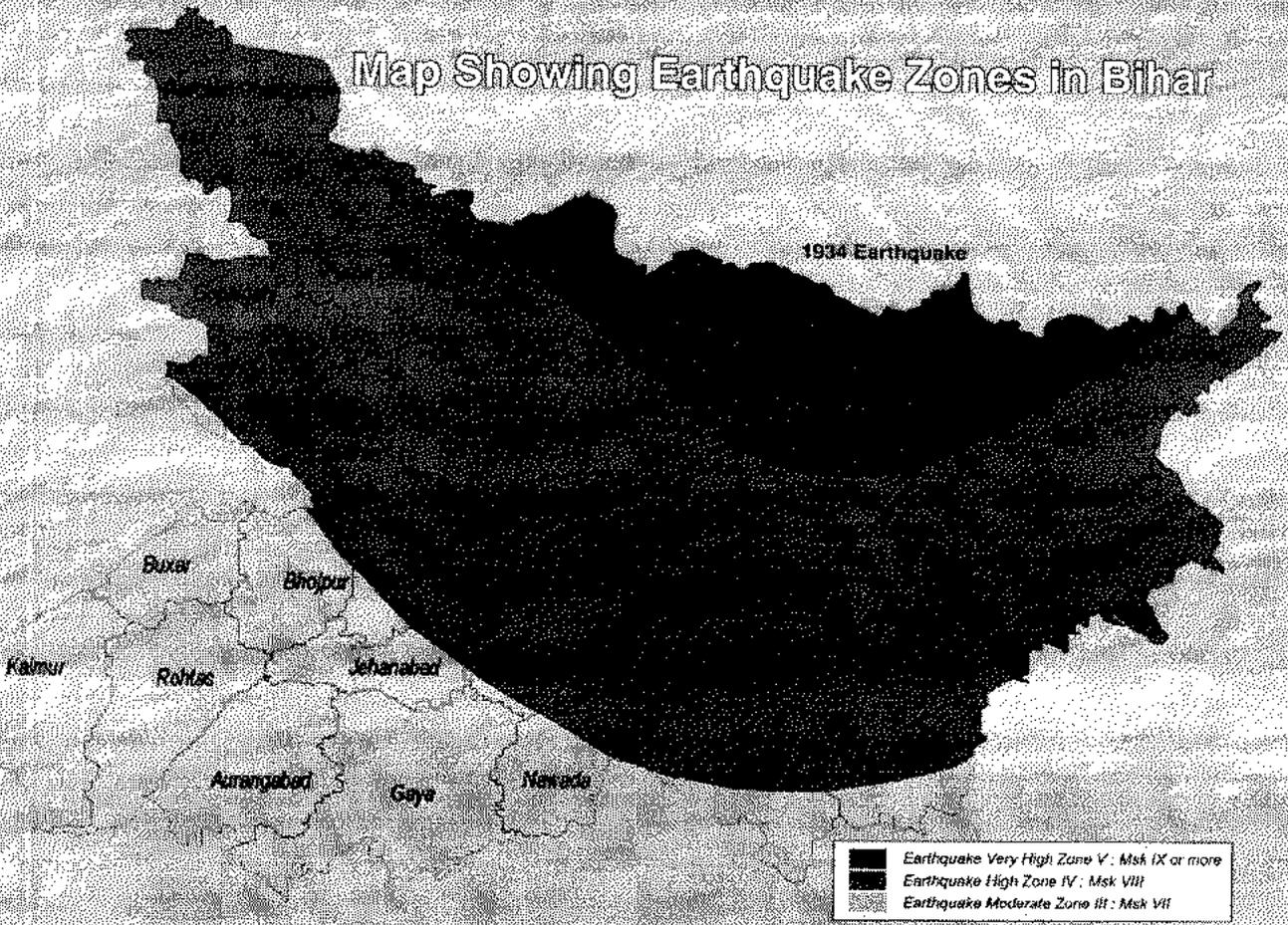
A RESIDENTIAL APARTMENT BUILDING AT PATNA

DRC NO. SR-6

SAMPLE DRAWING

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Map Showing Earthquake Zones in Bihar



104 Day 10/12/2024 4:11:15 AM

C) Duties & Responsibilities

- i) She/ He shall be responsible for making adequate provisions as per the approved plans but also in conformity with the stipulations of the National Building Code 2005 and the BIS standards for safe and sound construction non-hazardous, functioning of the services incorporated in the building and for making adequate provisions for services and equipment for protection from the fire hazards as per the stipulations of the National Building Code of India in the buildings and shall obtain N.O.C. from the Chief Fire Officer or concerned Authority/ before applying for occupation certificate.
- ii) She or He shall, on behalf of the owner, apply for the progress certificates completion certificates and the occupancy certificates and obtain the same as required under the bye laws.

D) Registration

- i) The registration fees if any shall be payable as prescribed by the Authority from time to time.
- ii) If he/she is found negligent in his/her duties and responsibilities. The Authority may black-list an Engineer in case of serious defaults or repeated defaults and shall inform the Institution of Engineers, India to take suitable action against such person. The registration shall be liable to be revoked temporarily or permanently by the Authority in such cases of negligence and default.

(3) STRUCTURAL ENGINEER

A) Qualification & Experience

The minimum qualifications for a structural engineer shall be degree in Civil Engineering/ equivalent, registration with the Institution of Engineers, India and not be in arrears of subscription with minimum 2 years experience in structural engineering practice.

Note - The 2 years experience shall be relaxed to one year in the case of Post Graduate degree in Structural Engineering/ higher qualification.

B) Competence

The licensed structural Engineers shall be competent to submit the structural details and calculations for all buildings and undertake supervision.

In case of buildings having special structural features, as decided by the Authority, which are within the horizontal areas and vertical limits specified in chapter A-2.1.1(b), A-2.2.1(b) and A-2.4.1(a) of NBC 2005 they shall be designed only by structural engineers.

C) Duties and Responsibilities

- i) To prepare a report of the structural design.
- ii) To prepare detailed structural design and to prescribe the method and technique of its execution strictly on the basis of the National Building Code or relevant BIS specifications.
- iii) To prepare detailed structural drawings and specifications for execution indicating thereon, design live loads, safe soil bearing capacity, specifications of material, assumptions made in design, special precautions to be taken by contractor to suit the design assumptions etc. whatever applicable.
- iv) To supply copies of structural drawings to the site supervisor.
- v) To inspect the works at all important stages and certify that the work being executed is up to the satisfaction of the Architect.

- vi) To certify the structural safety and overall structural soundness of the building to the Architect.
- vii) To advise the Owner/Architect/Engineer for arranging for tests and their reports for soil, building material etc. for his evaluation and design consideration.
- viii) To prepare the revised calculations & drawings in case of any revision with reference to the earlier submission of drawing and design in a particular case.
- ix) To submit the certificate of structural safety and over all structural soundness of building to Authority.
- x) In case of multistoried buildings and buildings of a special nature as identified by the Authority from time to time, the Structural Calculations/ Drawings shall be got vetted by Indian Institute of Technology/National Institute of Technology or any organization empanelled by the State Disaster Management Authority or the Building Construction Department.

D) Registration

- i) The registration fees if any shall be payable as prescribed by the Authority from time to time.
- ii) If he/she is found negligent in his/her duties and responsibilities. The Authority may black-list a Structural Engineer in case of serious defaults or repeated defaults and shall inform the Institution of Engineers, India to take suitable action against such person. The registration shall be liable to be revoked temporarily or permanently by the Authority in such cases of negligence and default

(4) TOWN PLANNER

A) Qualification & Experience

The minimum qualification for a town planner shall be recognized Post Graduate Degree/ Diploma in Town Planning/ Undergraduate Degree in Town Planning and registered membership of ITPI and not be in arrears of subscription.

B) Competence

The licensed town planner shall be entitled to submit:

- i) All plans and related information connected with development of land of all areas including integrated township.
- ii) Certificate of supervision for development of land of all areas.

C) Duties and Responsibilities

He/She shall be responsible for making adequate arrangements to ensure not only that the work is executed as per the approved plans but also in conformity with the stipulations of the National Building Code, 2005 and the BIS standards for safe and sound construction non-hazardous, functioning of the services incorporated in the building and for making adequate provisions for services and equipment for protection from the fire hazards as per the stipulations of the National Building Code of India 2005.

D) Registration

- i) The registration fee if any shall be payable as prescribed by the Authority from time to time.
- ii) The Authority may black list a Town Planner in case of serious defaults or repeated defaults and shall inform the Institute of Town planners, India. The registration shall be liable to be revoked temporarily or permanently by the Authority in such case of negligence or default.

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(5) SUPERVISOR

A) Qualification and Experience

The minimum qualifications for a supervisor shall be recognized Diploma in Civil or Architecture, or Draftsmanship in Civil or Architectural Assistantship plus 5 years experience in building design, construction and supervision.

B) Competence

The licensed supervisor shall be entitled to submit:

- i) All plans and related information connected with building permit for residential buildings on plot up to 100 sq. m. and up to two storeys,
- ii) Certificate of supervision for buildings as per (i).

C) Duties and Responsibilities

- i) To adhere strictly to the architectural and structural drawings/specifications and written instructions of the structural Engineer and Architect/ Engineer.
- ii) To follow the provisions of NBC, 2005 or BIS specifications as regards materials, components, quality control and the process of construction.
- iii) To bring to the notice of the structural Engineer and Architect/Engineer/any situation or circumstances which in his opinion are liable to endanger the safety of structure.
- iv) To deposit with the Authority one set of working drawings of the works executed along with the progress certificates before proceeding to the next stage of the work.
- v) He shall be in charge of site and responsible for supervision of the work.
- vi) He shall ensure that all the works under his charge are carried out in conformity with the approved drawings and as per the details and specifications supplied by the Architect/Engineer.
- vii) He shall take adequate measures to ensure that no damage is caused to the work under construction and the adjoining properties.
- viii) He shall also ensure that no undue inconvenience is caused in the course of his work in the people in neighbourhood.

D) Registration

- i) The registration fees if any shall be payable as prescribed by the Authority from time to time.
- ii) If he/she is found negligent in his/her duties and responsibilities. The Authority may blacklist supervisor in case of serious defaults or repeated defaults. The registration shall be liable to be revoked temporarily or permanently by the Authority in such cases of negligence and default

(6) GROUP AGENCY

- i) When any Group or Agency comprising of qualified Architect/ Engineer/Town Planner is practicing, then the qualifications and experience, competence, duties and responsibilities and registration will be the combination of individual qualification and experience, competence, duties& responsibilities and registration as provided in Schedule 1 to 5.
- ii) The Authority may also empanel public undertakings/agencies engaged in development work for quick execution of Government/Private projects within its jurisdiction.

(7) **BUILDER**

A) Qualification

- i) A person/ firm engaged in construction activities/ building activities in an urban area.
- ii) A person or group of persons having qualification of Civil Engineering, Architecture and Town Planning.
- iii) The Authority may classify the builders into different categories considering their experience, expertise and annual turnover. Separate Guidelines for eligibility, criteria and classification of builder will be issued by the Urban Development and Housing Department.

B) Duties and Responsibilities of Builders

- i) He/She shall appoint a qualified Architect/ Engineer/ Town Planner to prepare plans, designs, drawings and specifications for execution of the works in accordance with the requirements of these bye laws.
- ii) He shall not cause or allow any deviations from the approved drawings in the course of the execution of the project and shall bear responsibility for any irregularity committed in the use and function of the building or its parts for which the approval has been obtained.
- iii) He shall not commence the use of building or shall not give the possession to occupy the building to any one before obtaining the occupancy certificate from the Authority.
- iv) He shall provide adequate safety measures for structural stability and protection against fire hazards likely from installation of services like electrical installation, plumbing, drainage, sanitation, water supply etc. wherever required under the bye laws.
- v) He shall submit the completion certificate and obtain occupancy permission from the authority.
- vi) He shall explain the construction / design and its intended use as per approved plan, to the prospective purchaser of the premises under construction.

C) REGISTRATION

- i) The builders shall have to be registered with the Authority on payment of such fees as decided by the Authority from time to time.
- ii) The Authority may debar or black list the builder as referred to in the Bye laws.

ANNEXURE-II

GUIDELINES FOR INSTALLATION OF SOLAR WATER HEATING SYSTEM

Bye laws-55(c)

1. Installation of Solar Assisted Water Heating System in Buildings: to ensure the implementation of the guidelines issued by ministry of non-conventional energy sources on accelerated development and deployment of solar water heating systems in domestic, industrial and commercial sectors. No new building in the following categories in which there is a system of installation for supplying hot water shall be built unless the system of the installation is also having an auxiliary solar assisted water heating system:-
 - i) Hospitals and Nursing Home
 - ii) Hotels, Lodges, and Guest Houses, Group Housing with the plot area of

- 4000 sq m.
- iii) Hostels of Schools, Colleges and Training Centres with more than 100 Students.
 - iv) Barracks of armed forces, paramilitary forces and police
 - v) Individual residential buildings having more than 150 sq m. plinth area
 - vi) Functional Buildings of Railway Stations and Air Ports like waiting rooms, retiring rooms, rest rooms, inspection bungalows and catering units
 - vii) Community Centres, Banquet Halls, Barat Ghars, Kalayana Mandaps and buildings for similar use.

A. Definitions

i)	“Solar Assisted Water Heating System	A device to heat water using solar energy as heat source.
ii)	“Auxiliary back up”	Electricity operated or fuel fired boilers/systems to heat water coming out from solar water heating system to meet continuous requirement of hot water.
iii)	“New Building”	Such buildings of above said categories for which construction plans have been submitted to the Authority for clearance.
iv)	“Existing building”	Such buildings, which are licensed to perform their respective business.

B. Guidelines for Installation of Solar Water Heating System

- i. **New Buildings:** Clearance of plan for the construction of new buildings of the aforesaid categories shall only be given if they have a provision in the building design itself for an insulated pipeline from the rooftop in the building to various distribution points where hot water is required. The building must have a provision for continuous water supply to the solar water heating system. The building should also have open space on the rooftop, which receives direct sun light. The load bearing capacity of the roof should at least be 50 kg. persq m. All new buildings of above said categories must complete installation of solar water heating systems before obtaining necessary license to commence their business.
- ii. **Existing Buildings:** Installation of Solar Assisted Water Heating Systems in the existing building shall be made mandatory at the time of change of use to above said category provided there is a system or installation for supplying hot water.
- iii. **Capacity:** The capacity of solar water heating system to be installed on the building of different categories shall be decided in consultation with the local body. The recommended minimum capacity shall not be less than 25 lt. per day for each bathroom and kitchen subject to the condition that maximum of 50% of the total roof area is provided with the system.

Handwritten signatures and dates:
 5/12/14
 4/12/14

- iv. Specifications: Installation of Solar Assisted Water Heating Systems shall conform to BIS specification IS 12933. The solar collectors used in the system shall have the BIS certification mark.
 - v. Auxiliary System: Wherever hot water requirement is continuous, auxiliary heating arrangement either with electric elements or oil of adequate capacity may be provided.
2. A separate guide lines shall be issued for installation of solar plant, solar power backup and metering system by the Urban Development and Housing Department.

FORM-I
APPLICATION FOR LAND DEVELOPMENT
BYE LAWS NO.-5(3), 68(1)

Application No.-_____

**APPLICATION FOR DEVELOPMENT/ RE-DEVELOPMENT OF LAND FOR
OBTAINING DEVELOPMENT PERMIT**

From:
Name and Address
(in Block letters)

.....
.....
.....
.....

For Office use only
Regd. No.....
Date:.....

Signature of Authorised Person

Tel No./Mobile No.

Email id:

To

.....
.....
.....
.....

Madam/Sir

I/We hereby apply for permission to undertake development/ re-development of land, in respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village/Mohalla...../Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authority/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012.

The said land shall be used for..... purpose.

I/We do enclose herewith the following plans (4 copies in case of privately owned plots/ 8 copies in case of Govt. leased Govt. plots) and specifications duly signed by me and Town Planner /Architect /Engineer /Supervisor /Group - agency.....bearing Regd.No..... License/Empanelment No..... who has/have prepared the plans, designs etc. and who will supervise the developments. The parameters and checklist prepared by the Technical person is enclosed.

I/We the owner(s) of every part of the land to which this application relates, request for permission of the above development of land which may kindly be accorded.

B/L

John

30/11/14

✓

✓

Documents furnished.

- | | |
|---|-----------------------|
| 1. Four /Eight sets of the layout Plan: | Yes/No/Not applicable |
| 2. Ownership document: | Yes/No/Not applicable |
| 3. Supervision certificate in form-V: | Yes/No/Not applicable |
| 4. Affidavit for peaceful possession of the land: | Yes/No/Not applicable |
| 5. Certificate for Structural Stability in form-IV: | Yes/No/Not applicable |
| 6. NOC from lessee in case of lease hold: | Yes/No/Not applicable |
| 7. NOC from Fire Authority: | Yes/No/Not applicable |
| 8. NOC from Airport Authority: | Yes/No/Not applicable |
| 9. Environmental clearance: | Yes/No/Not applicable |
| 10. Details of Fee: | Yes/No/Not applicable |
| 11. Checklist: | Yes/No/Not applicable |
| 12. any other certificate/NOC (Please specify): | Yes/No/Not applicable |

Place:

Signature of Owner(s)

Date:

Name of Owner(s)

hnp

for info.
for info.
4-12-14

b

R

FORM-II

BUILDING PLAN APPLICATION FORM

BYE LAWS NO.-5(4)

Application No.-.....

APPLICATION FOR PERMISSION TO ERECT, REERECT, DEMOLISH OR TO MAKE ANY ADDITIONS OR ALTERATION IN A BUILDING

From:
Name and Address
(in Block letters)

For Office use only
Regd. No.

.....
.....
.....
.....

Signature of Authorised Person

Tel No/ Mobile No.....
Email Id

To

.....
.....
.....
.....

Madam/Sir

I/We hereby apply for permission to erect, re-erect, demolish or to make additions or alteration in any place in a building and carry out:-

- a) Construction ofstorey (Stories) building.
- b) Re-construction of an existing building
- c) Alteration/addition to the existing building;
- d) Revalidation/renewal of plan for construction of all..... storied building;
- e) Demolition
- f)(if any other please specify).

In respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village/Mohalla...../Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authority/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012, the said land shall be used for..... purpose.

I/We do enclose herewith the following plans (4 copies in case of privately owned plots/ 8 copies in case of Govt. leased Govt. plots) and specifications duly signed by me and Town Planner /Architect /Engineer /Supervisor /Group agency.....bearing Regd.No..... License/Empanelment No..... who has/have prepared the plans, designs etc. and who will supervise the developments. The parametersand checklist

Handwritten signatures and dates:
1. *Signature*
2. *Signature* 4/12/14
3. *Signature*
4. *Signature*

prepared by the Technical person is enclosed.

I/We the owner(s) of every part of the land/building to which this application relates, requests, permission for the above building plan may kindly be accorded.

Documents furnished.

- | | |
|---|------------------------|
| 1. Four/Eight sets of the building Plan: | Yes/No/Not applicable |
| 2. Ownership document: | Yes/No/Not applicable |
| 3. Supervision certificate in form-V: | Yes/No/Not applicable |
| 4. Affidavit for peaceful possession of the land: | Yes/No/Not applicable |
| 5. Structural stability certificate: | Yes/No/Not applicable |
| 6. NOC from lessee in case of lease hold: | Yes/No/Not applicable |
| 7. NOC from Fire Authority: | Yes/No/Not applicable |
| 8. NOC from Airport Authority: | Yes/No/Not applicable |
| 9. Environmental clearance: | Yes/No/Not applicable |
| 10. Details of Fee | Yes/No/Not applicable |
| 11. Checklist of the proposed building: | Yes/No/Not applicable |
| 12. any other certificate/NOC (Please specify): | Yes/No/Not applicable. |

Place:

Signature of Owner(s)

Date-

Name of Owner(s)

Handwritten initials

Handwritten signature and date: 4-12-17

Handwritten mark

Handwritten mark

FORM-III

**CERTIFICATE FOR EXECUTION OF WORK AS PER STRUCTURAL
SAFETY REQUIREMENTS
BYE LAWS NO.-5(6) (VII)**

From

.....
.....
.....
.....

(Name and address of the applicant in block letters)

TO

.....
.....
.....
.....

With respect to the building work of erection, re-erection or for making alteration in the..... Khata No.building on in with respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village/Mohalla...../Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authority/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of within the Development Plan Area of I certify;

1. that the building has been constructed according to the sanctioned plan and structural design(copy of the drawings as executed enclosed),which incorporates the provisions of structural safety norms as specified in Part- 6 (Structural Design) of the National Building Code of India, 2005 and other relevant codes; and the design complies with the Earthquake Safety requirements as stipulated in the बिहार में, भूकम्पीय खतरों से न्यूनीकरण के लिये, भवनों के निरूपण एवं निर्माण का परिपत्र, बिहार राज्य आपदा प्रबंधन प्राधिकरण, पत्रांक-10/विविध/ अप०प्र०प्रा०-13/2011-2253/ आ०प्र०, बिहार सरकार, बिहार राज्य आपदा प्रबंधन प्राधिकरण (आपदा प्रबंधन विभाग) as in Appendix A.
2. That the construction has been done under my supervision and guidance and adheres to the drawings and specifications submitted and records of supervision have been maintained.

Any subsequent changes from the completion drawings shall be the responsibility of the owner

Signature of owner
With date

Name and Signature of competent Technical Person
with Registration No. and date---

Address:

Handwritten signatures and dates at the bottom of the page, including a signature dated 4/12/14 and another signature dated 4/12/14.

FORM-IV

CERTIFICATE FOR STRUCTURAL STABILITY

BYE LAWS NO.-5(6) (viii) & 6(2) Note-2

With respect to the building work of erection, re-erection or for making alteration with respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village/Mohalla...../Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of....., I certify that the structural plans and details of the building submitted for approval satisfy the structural safety requirements for all situations including natural disasters like cyclone & earth quake etc., as applicable under the Byelaws and stipulated under Part- 6 (Structural Design) of the National Building Code of India, 2005 and other relevant codes; and the information given therein is factually correct to the best of my knowledge. I undertake responsibility with regard to supervision of the work at each stage of construction,(after laying of foundation &after casting of each floor) and submission of Periodic Progress Report to.....Authority regularly to the effect that the building is being constructed conforming to the approved plan and as per the structural plan prepared by me. I, will be responsible and liable for action by..... Authority/Government, if the plan/design contain misrepresentation or fraudulent information and the construction is made in deviation of approved plan or if there is any structural failure due to wrong /unsafe structural design, use of low quality material and/or poor workmanship endangering the in-mates/public.

Attached: Design Basis Report

Signature of owner with Date

Signature of the Registered Engineer/Structural Engineer with Date and Registration No.

Name:

Address:

.....
.....
.....

hdf

Signature of owner: *[Handwritten Signature]*
Date: 4-12-74
Signature of Registered Engineer: *[Handwritten Signature]*

FORM-V

FORM FOR SUPERVISION
BYE LAWS NO.-5(6)(ix)

I hereby certify that the development/ erection/ re-erection/ demolition or material alteration in / of the building in respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village/Mohalla...../Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under various Planning Authority/ Gram Panchayat areas covered under Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 shall be carried out under my supervision and I certify that all the materials (type and grade) and the workmanship of the work shall be generally in accordance with the general and detailed specifications submitted along with and that the work shall be carried out according to the sanctioned plans.

Signature of Empanelled Technical Person

Name of the Technical Person with registration number.

Address.....
.....
.....

Date:

12/6

Jayashim
4.12.14

FORM VI

CHECK LIST

BYE LAWS NO.-5(6) (x)

1. Name of the Applicant:
2. Name of the Owner:
3. Name of the Builder/Developer and Name of the Project:
4. Ownership documents: Established/Non established
5. Land Area

As per Document	As per Building Plan	As per Possession

6. Tenancy:- Lease hold/Free hold.

If lease hold:

- (i) Name of Lesser:
- (ii) Purpose of lease:
- (iii) Duration of lease:

7. Existing off site Physical Infrastructure:

- a) Road
- b) Sewerage
- c) Drainage
- d) Water facility
- e) Availability of drain
- f) Telephone
- g) Electricity

8. Nature of Construction: New Construction/Reconstruction/Addition/Alteration

9. (i) Amount of fee deposited
- (ii) Covered area on all floors

10

Use applied	Prescribed Land use in the development plan (if any)	Whether permissible/not permissible/special consideration

11. (i) Whether first permission/Revised permission/Revalidation.....
- (ii) No of floor(s).....

12. Contents of Building Plan:

- (i) Site Plan
- (ii) Lay out plan
- (iii) All floor plan
- (iv) Elevations Front/Rear/Right/Left/Cross section
- (v) Plan of foundation
- (vi) Septic tank and Soak pit

Handwritten signatures and dates:
 4-12-14

- (vii) Recharging pit & Rain Water harvesting Plan
- (viii) Drain Section
- (ix) Area statement
- (x) Schedule of doors and windows

13. Approach road:-
 (i) Nature of road
 (ii) Width of road:-

As per site /key plan	Site inspection report

- (iii) Whether the approach road as shown connected to an existing public road in the site plan.....
- (iv) Whether such connection is available in settlement sheets or Cadastral Map : Yes/No
- (v) If private , whether
- a) transferred to the Authority: Yes/No
 - b) indicated in the final settlement plan: Yes/No
 - c) mentioned in the ownership document: Yes/No
14. Whether the plot is affected by proposed road/proposed drain/ proposed lake/any other public use.....
15. Whether the plot is within 100 meter/100-300 meter of State/A.S.I. protected monuments.....

Whether the plot is within 200 meter radius of important buildings (i.e. Governor House, High Court, State Secretariat, Legislative Assembly)

16. Building Parameters:

Category	Requirement as per norm	Approved building plan	Proposal	Remarks
1	2	3	4	5
Basement/stiltsqmt				
1st floorsqmt				
2 nd floorsqmt				
3 rd floorsqmt				
4 th floorsqmt				
Other Floors				
Society room				
Front set back				
Rear set back				
Left/Right side set back				
FAR				
Parking				
Height				
No. of dwelling unit				
Population density				
No. of staircase				

12/2

12/2

12/2

12/2

No. of lift				
Recharging pit				
Fee deposited				
Any other item				
Exemptions (i) height (ii) setback (iii) FAR				

17. Whether falls in the Airport funnel zone.....

18. Provision of proposed on site physical infrastructure

- (i) Water Supply:-
- (ii) Sewerage:-
- (iii) Drainage:-
- (iv) Electrical Installation:-

19. Clearance/Certificate produced:

- (i) General Affidavit:-
- (ii) Structural Stability Certificate:-
- (iii) Form of Supervision:-
- (iv) NOC from Fire Authority:-
- (v) Undertakings with regard to quality construction/Water supply/Sewerage/Drainage/Waste disposal/firefighting (wherever applicable)

Any other (specify)

N:B: (RS: Required and Submitted, RNS: Required not Submitted, NR: Not Required)

20. Involvement of Technical Person & Builder:

(i) Architect/Engineer: -

Name:-CoANo
(for Architect)
Empanelment No:

(ii) Engineer/Structural Engineer:-

Name:
Empanelment No:

(iii) Builder:

(iv) Any other:

Name: Empanelment No:

Name-

Signature of Technical Person

Handwritten notes and signatures:
10/11/17
S. K. Singh
4-12-17

FORM-VII A

**FOR EMPANELMENT OF TECHNICAL PERSON (ARCHITECT, ENGINEER,
STRUCTURAL ENGINEER, TOWN PLANNER, SUPERVISOR)**

BYE LAWS NO.-6(3)

Self-Attested
passport size
photo of the
applicant

1. Name.....
(In block letters)
2. Father's/Husband's
Name.....
3. Date of Birth..... 4. Nationality.....
5. Educational Qualification.....
6. Professional Experience.....
7. Registration No. With Council of Architecture, New Delhi.....
8. Registration with other relevant Institutions/ULBs.....
9. Details of other Academic & Professional Achievements.....
10. Details of Certificates relating to qualifications/ testimonials, if any as per column 5 & 6 with
self attested copies.....
11. Details of Bank Draft/Postal Order (separately for empanelment Rs. 500/.....
12. Permanent Address-.....
13. Address for Correspondence-.....
14. Tel. No./Mob. No. -
15. Email id -

DECLARATION

I hereby solemnly affirm and declare that the information as furnished above are true and correct to the best of my knowledge and belief. I further undertake that if any information at any stage shall be found to be false, my empanelment shall be liable to be cancelled without any prior notice in that regard and I shall not claim any compensation etc. for such a default on my part. In case of any discrepancies found later, I shall be liable for punishment under the relevant provisions of law as also under Municipal Act and the Act.

Place.....

Date.....

Name and Signature of the Applicant

FORM-VII B
FOR REGISTRATION OF BUILDER
BYE LAWS NO.-6(3)

Self-Attested
passport size
photo of the
applicant

To,
The Authority
.....
.....

1. Name of the Firm
2. Type of Firm-(Partnership/Company)
3. Name of Partners/Directors.....
(In block letters)
4. Father's/Husband's Name.....
5. Date of Birth..... 6. Nationality.....
7. Registration No.....
8. PAN / DIN.....
9. Sales Tax No.....
10. VAT No.....
11. Income Tax Statement of Last Three Consecutive Financial Year.....
12. Category applied for.....
13. Details of fee.....
14. Permanent Address-.....
15. Address for Correspondence-.....
16. Tel. No./Mob. No.....
17. Email id -

DECLARATION

I hereby solemnly affirm and declare that the information as furnished above are true and correct to the best of my knowledge and belief. I/we have not been barred for building construction activities by any competent authority and further undertake that if any information at any stage shall be found to be false, my registration shall be liable to be cancelled without any prior notice in that regard and I shall not claim any compensation etc. for such a default on my part. In case of any discrepancies found later, I shall be liable for punishment under the relevant provisions of law as also under Municipal Act and the Act.

Place.....

Date.....

Name and Signature of the Applicant

Key

Bihar Building Bye-Laws

Spoken

Sanjay Kumar
4/12/14

te

M2

FORM-VIII A
FORM OF APPROVAL OF BUILDING PERMIT
BYE LAWS NO.-8(4)

With respect to your Application No. dated....., permission is hereby granted in favour of;

Smt / Shri for

- a) Construction of a building
- b) Reconstruction of.....building
- c) Alteration ofbuilding
- d) Alteration or additions in the existing building
- e) Institution of change of the use of building
..... (Specify)

in respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under..... Planning Authority/.....Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or any Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within thedevelopment plan/.....Area Development Scheme of subject to the following conditions/ restrictions.

- a) The land/ Building shall be used exclusively for..... purpose and the uses shall not be changed to any other use without prior approval of this Authority.
- b) The development shall be undertaken strictly according to plans enclosed with necessary permission endorsement
- c) Parking space measuring..... sq. m. as shown in the approved plan shall be kept open and no part of it will be built upon.
- d) The land over which construction is proposed is accessible by an approved means of access of m. width.
- e) The land in question must be in lawful ownership and peaceful possession of the applicant.
- f) The applicant shall free gift m. wide strip of land of the road in the name of the authority for the purposes as mentioned in these Byelaws.
- g) The permission is valid for period of three years with effect from the date of issue.
- h) Permission accorded under the provision cannot be construed as evidence in respect of right title interest of the plot over which the plan is approved.
- i) Any dispute arising out of land record or in respect of right/ title/ interest after this approval the plan shall be treated automatically cancelled during the period of dispute.
- j) Any other conditions.

By Order
Authorised Officer

Handwritten signature

Handwritten signature

Handwritten signature
4/12/14

Handwritten signature

Handwritten signature

Memo No...../....., Dated.....

Copy along with..... copies of the approved plans to
Smt./ Shri.....

Authorised Officer/
Authority

.....

Memo No...../....., Dated.....

Copy with a copy approved plan forwarded to the.....Municipal Corporations/
/Nagar Panchayats/Metropolitan area/..... Planning Area under.....Planning
Authority/Gram Panchayat areas covered under ----- Development Plan/
Planning Authorities/ or Planning Scheme for information.

Authorised Officer/
Authority

.....

Memo No...../....., Dated.....

Copy forwarded to Town & Country Planning Organization, Bihar, Patna,/
.....

Authorised Officer/
Authority

.....

Handwritten initials

Handwritten signature

Handwritten signature and date 4/12-14

Handwritten mark

Handwritten mark

FORM-VIII B
FORM OF APPROVAL OF LAND DEVELOPMENT PERMIT
BYE LAWS NO.-68(3)

With respect to your Application No..... dated....., permission is hereby granted in favour of;

Smt./ Shri for

- a) for layout plan of land development
- b) Institution of change of the use of land
(Specify)

in respect of Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under respective Planning Authority/ Gram Panchayat areas covered under various Development Plan/ Planning Authorities/ or any Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of subject to following additions/ restrictions.

- a) The Land shall be used exclusively for..... purpose and the uses shall not be changed to any other use without prior approval of this Authority.
- b) The development shall be undertaken strictly according to plans enclosed with necessary permission endorsement
- c) Parking space measuring..... sq. m. as shown in the approved plan shall be kept open and no part of it will be built upon.
- d) The land over which construction is proposed is accessible by an approved means of access of m. width.
- e) The land in question must be in lawful ownership and peaceful possession of the applicant.
- f) The applicant shall free gift m. wide strip of land in the..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under respective Planning Authority/ Gram Panchayat areas covered under various Development Plan/ Planning Authorities/ or any Planning Scheme notified under Bihar Urban Planning and Development Act 2012 for the further widening of the road to the standard width.
- g) The permission is valid for period of three years with effect from the date of issue.
- h) Permission accorded under the provision cannot be construed as evidence in respect of right title interest of the plot over which the plan is approved.
- i) Any dispute arising out of land record or in respect of right/ title/ interest after this approval the plan shall be treated automatically cancelled during the period of dispute.
- j) Any other conditions.

By Order
Authorised Officer

.....

Memo No..... /....., Dated.....

Copy along withcopies of the approved plans to
Smt./ Shri.....

Authorised Officer/
Authority
.....

Memo No..... /....., Dated.....

Copy with a copy approved plan forwarded to the Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under ----- Planning Authority/ Gram Panchayat areas covered under ----- Development Plan/ Planning Authorities/ or any Planning Scheme for information.

Authorised Officer/
Authority
.....

Memo No..... /....., Dated.....

Copy forwarded to Town & Country Planning Organization, Bihar, Patna,/.....

Authorised Officer/
Authority
.....

h.p.
for

Shyama
4.12.17

a

FORM-IX
FORM OF REFUSAL OF BUILDING PERMIT/ DEVELOPMENT PERMIT
BYE LAWS NO. - 8(4) &68(4)

From,

.....
.....

To,

Smt/Sri.....
.....

With respect to the Application No..... dated....., your reply to the objections made by this office vide its letter No.Dated..... has not been found satisfactory.

Your application for permission to undertake building/land development on Plot No (CS).....Plot No (MSP)..... Khata No..... Holding No. Village.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered underDevelopment Plan/ Planning Authorities/ or any Planning Scheme notified under Bihar Urban Planning and Development Act 2012 is hereby refused on the following grounds.

- 1.....
- 2.....
- 3.....
- 4.....

Two copies of the plans are retained in this office for record and reference and the rest are returned herewith.

Authorised Officer/
Authority

.....

Copy forwarded to the.....Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or any..... Planning Scheme for information.

Authorised Officer/
Authority

.....

Kef

Alank

Bihar Building Bye-Laws

Jayshree
4/12/14

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FORM-X
FORM OF NOTICE FOR COMMENCEMENT OF WORK
(TO BE FURNISHED BY THE PLOT OWNER(S) AND THE BUILDER/ DEVELOPER)
BYE LAWS NO.-8(6)(F), 10

From

.....
.....
.....
.....

(Name and address of the applicant in block letters)

To

.....
.....
.....
.....

Sir,

I/We hereby give notice of the erection of building in with respect of Plot No .(CS).....Plot No (MSP)..... Khata No..... Holding No.
Village.....Mohalla...../ Ward No.....of..... Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of to be commenced on as per the permission given in your letter no. dated..... Under the supervision of authority/ empanelled Architect/ Engineer/ Structural Engineer..... Regd. No. in accordance with the approved plan.

Yours faithfully,

Signature(s) of the Owner

Handwritten initials

Handwritten signature

Handwritten signature
4.12.17

Handwritten initials

FORM-XI
PERIODIC PROGRESS REPORT

(To be submitted by the Empanelled Structural Engineer/ Architect/Engineer)

BYE LAWS NO.-12, 13

From

.....
.....
.....
.....

To

.....
.....
.....
.....

Ref Authority approval letter No..... Dated.....

Madam/ Sir,

I/We hereby certify that the construction of the building up to plinth level/ground floor roof slab level/first floor roof slab level/second floor roof slab level/.....of the building with respect of Plot No (CS)..... Plot No (MSP)..... Khata No..... Holding No. Village.....Mohalla...../ Ward No.....of.....Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of....., has been supervised by me/us and has been constructed strictly conforming to the sanctioned plan and structural design as per the provision of NBC, 2005. The work has been done to my/our best satisfaction. All the materials used in construction of this building are strictly in accordance with BIS/ISI specifications and norms conforming to National Building Code, 2005 covering all the safety factors including earthquake and cyclone. I/we will be responsible and liable for action by..... Authority/Govt. if there is any structural failure and fire endangering the inmates and public.

Yours faithfully

Signature of the Architect/Engineer

Name

Empanelment No.

Signature of Structural Engineer

Name

Empanelment No.

Name & Signature of Owner/Applicant

Handwritten signatures and dates:
Bihar Building Bye-Laws
4/12/12

Handwritten signature

FORM-XII
NOTICE (CERTIFICATE) OF COMPLETION
BYE LAWS NO.-15

From

.....
.....
.....
.....

(Name and address of the applicant in block letters)

TO

.....
.....
.....
.....

Sir,

I hereby certify that the development, of erection, re-erection or for material alteration in with respect of Plot No(CS)..... Plot No (MSP)..... Khata No..... Holding No. Village.....Mohalla...../ Ward No.....of.....Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of has been supervised by me and has been completed by the date..... according to the sanctioned plan (vide No..... dated) and provisions of the Byelaws . Implementation of life safety provisions has been complied as mentioned in Byelaws 16(5). The work has been completed to my best satisfaction, the workmanship and all the materials (type and grade) have been used strictly, in accordance with the general and detailed specifications.

I/We hereby also enclose the plan and documents as required under these Byelaws and request to issue the occupancy permission for the said building and premises.

Signature of Technical Person

Name of the Technical Person

Signature of the Owner(s)

Name of the Owner(s)

Address:

Date:

Handwritten initials

Handwritten signature

Handwritten signature and date 4.12.14

Handwritten signature

FORM-XIII
CERTIFICATE FOR OCCUPANCY
BYE LAWS NO.-16(1), 16(3)

The development of land/work of erection, re-erection or for material alteration undertaken with respect of Plot No (CS)..... Plot No (MSP)..... Khata No..... Holding No. Village.....Mohalla...../ Ward No.....of.....Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under..... Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 vide approval no..... dated.....has been completed under the supervision of Competent Technical Person (Name....., Empanelment no.) as per the notice of completion submitted on the date..... . On inspection it is observed that the development of land/ erection, re-erection or alteration undertaken with respect to above plot(s) conform/ do not conform the approved plan and the conditions imposed vide letter No..... dt..... The development of land/building is permitted (temporary occupancy/occupancy) for occupancy subject to the following

- 1.....
- 2.....
- 3.....

The occupancy of building is not permitted due to the following reasons :

- 1.....
- 2.....
- 3.....

One set of completion plans duly certified is returned herewith.

Name and Signature of Authorised Officer

..... Authority

FORM-XIV
MAINTENANCE OF REGISTER
BYE LAWS NO.-26(4)

Sl. No.	Name and address of the applicant	Date of receipt of application	Date of permission/refusal with letter No.	Date of Submission of commencement of work	Date of submission of Periodic Progress Reports	Submission of notice of completion	Date of issue/refusal of occupancy permission with letter no.	Remarks	Signature of the Authorized Person
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)

6/12

4/12/14

4.12.14

R

FORM-XV
INDEMNITY BOND FOR BASEMENT
BYE LAWS NO.-47(4) (i)

This Indemnity Bond is executed by Shri/Smt..... S/O, D/O, W/O Shri/Smt.....
R/Oin favour of..... Authority.

Whereas the executant has submitted to the concerned Authority the plans for, sanction of basement over Plot No (CS)..... Plot No (MSP)..... Khata No..... Holding No. Village.....Mohalla...../ Ward No.....of.....Municipal Corporations/ Municipal Council/ Nagar Panchayats/ Metropolitan area/ Planning Area under.....Planning Authority/ Gram Panchayat areas covered under.....Development Plan/ Planning Authorities/ or Planning Scheme notified under Bihar Urban Planning and Development Act 2012 within the development plan area of..... under the provisions of the Building Bye laws made there under:-

And whereas the concerned Authority has agreed to sanction the aforesaid construction subject to the conditions that the owner shall indemnify the concerned Authority in the event of any loss or damage being cause to the adjoining building on account of the construction of the said basement either at the time of digging of its foundations or in the course of its construction or even thereafter and also against any claim of any concern thereto.

And whereas the executant has agreed to execute an indemnity bond to the above affect and also to abide by the terms imposed by the concernedAuthority to the grant of sanction for construction of the basement.

Now this deed witnesses:

1. That in consideration of the sanction of the plans by..... Authority for construction of the basement the executant undertakes that he/she shall at all times keep..... Authority free from any liability, loss or damages/flowing from any injury or damage caused to the adjoining built-up properties or to any person as a consequence of the construction of at the time of digging of its foundations or during the course of its construction or at any time thereafter.
2. The owner agreed and undertakes that in the event of any claim being made by any person or persons against the concerned Authority either in respect of the sanction granted by the concerned Authority to the owner for the construction of basement or in respect of the construction or manner of construction of the basement by the owner of the consequences flowing from the said sanction the executant shall be responsible and liable and not..... Authority.
3. The executant agrees and undertake to indemnify the concerned Authority fully in respect of any amount which the concerned Authority may be required to pay to any person either by way of compensation or on any other account as a result of any claim or suit or any other proceedings concerning the sanctioning of the construction of the basement of the making thereof and also in respect of the costs and expenses which the concerned Authority may incur on

defending any action.

4. Without prejudice to the above undertaking the executant hereby binds itself to pay to..... Authority to the full extent any amount which..... Authority may be required to pay to any person in connection with, relating to or concerning the sanctioning of the basement or the making thereof.
5. The owner agrees and undertakes that this bond shall remain in full force and effect till the executant faithfully observes/performs the undertaking herein before contained. In witness whereof the executant above named has signed this bond on this..... of..... atday

Indemnifier

Witness:

(Signatures) _____

1. Name _____

Full Address _____

(Signatures)

2. Name _____

Full Address _____

(Signatures)

FORM-XVI
CERTIFICATE OF UNDERTAKING
FOR HAZARD SAFETY REQUIREMENT

BYE LAWS NO.-59

To,

REF: Proposed work of (Title of project) C.S.No./R.S.No.
..... in Ward No. at Village
..... Mohalla/Tola..... Scheme No.
..... of Village/Town/City.

1. Certified that the building plans submitted for approval will satisfy the safety requirements as stipulated under Building Bye laws 59 and the information given therein is factually correct to the best of our knowledge and understanding.
2. It is also certified that the structural design including safety from hazards based on soil conditions shall be duly incorporated in the design of the building and these provisions shall be adhered to during the construction.

Signature of Owner with date
Name and Address in Block Letters

.....
.....

Signature of Structural Engineer on Record with date.....
Name and Address in Block Letters.....

.....
.....
.....

Handwritten signatures and dates:
4.12.14

By order of the Governor of Bihar

Rajender
4.12.2014
(Dr. B. Rajender)
Secretary

Urban Development & Housing Department

Memo No-11नंविं(मां)-06 / 2013 /UD&HD.578./Patna, dated..8/12/14
Copy to-Superintendent, Secretariat Printing Press, Gulzarbagh, Patna/ E-Gazette Cell, Finance Department, Patna, Bihar with C.D. for publication in an extra ordinary issue of the Bihar Gazette.

He is requested to make available 200 copies of published Gazette for official use immediately.

Rajender
4.12.2014
Secretary

Urban Development & Housing Department

Memo No-11नंविं(मां)-06 / 2013/UD&HD.578./Patna, dated..8/12/14
Copy to- Divisional commissioner, Patna, Magadh, Bhagalpur, Tirhut, Saran, Munger, Kosi, and Purnea/ All District Magistractes for information and necessary action.

Rajender
4.12.2014
Secretary

Urban Development & Housing Department

Memo No-11नंविं(मां)-06 / 2013/UD&HD.....578./Patna, dated..8/12/14
Copy to- All Municipal commissioners/ All Municipal officers/ All Municipal Corporations/ All Municipal Councils/ All Nagar Panchayats for information and necessary action.

Rajender
4.12.2014
Secretary

Urban Development & Housing Department

Memo No-11नंविं(मां)-06 / 2013/UD&HD.578./Patna, dated..8/12/14
Copy to- Principal Secretary to the Hon'ble Chief Minister/ Private Secretary to Hon'ble Minister, Urban Development & Housing Department, Bihar for information and necessary action.

Rajender
4.12.2014
Secretary

Urban Development & Housing Department