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TAMIL NADU FIRE AND RESCUE SERVICES DEPARTMENT

From
Thiru. Abhash Kumar, I.P.S.,
DGP / Director,
Tamil Nadu Fire and Rescue Services,
No.17, Rukmani Lakshmipathi Salai,
Egmore, Chennai – 600 008.

To
The Member Secretary,
Chennai Metropolitan
Development Authority,
No.1, Gandhi Irwin Road,
Egmore, Chennai – 600 008.

R.Dis.No.1070/C1/2023

Dated.23.03.2023

PP NOC No.35/2023

Sir,

Sub : Tamil Nadu Fire and Rescue Services – Directorate – High Rise Building – Issue of Revised Planning Permission NOC requested - Inspection at M/s. SPR Constructions Pvt. Ltd., 12, Stephenson Road, Cooks Road, and New Farrens Road Perambur, Chennai-600011 in R.S.No.218/1, 218/2, 219/1, 219/2, 219/3, 219/4, 219/5, 219/6, 220/2, Block No.11 & R.S.No.221/2, 222/1 & 222/2, Block No.12, Perambur Town, Chennai - Reg.

Ref : 1) The applicant letter dated:20.01.2023.
2) The Additional Director, (Operation & Training), Directorate, Chennai, Report Rc.No.16988/C/2022, Dated:20.03.2023.

Kindly refer to the letter cited above. The MSB inspection committee of the northern region has inspected the site of M/s. SPR Constructions Pvt. Ltd., 12, Stephenson Road, Cooks Road, and New Farrens Road Perambur, Chennai-600011 in R.S.No.218/1, 218/2, 219/1, 219/2, 219/3, 219/4, 219/5, 219/6, 220/2, Block No.11 & R.S.No.221/2, 222/1 & 222/2, Block No.12, Perambur Town, Chennai for which the revised PP NOC has been requested. The committee has made certain observations with regard to fire and life safety, which are reproduced below:-

Observation:

PP NOC for this building has already been given vide letter R.Dis.No.3043/C1/2022 (PP NOC No.45/2022), Dated:21.04.2022. Now, the applicant has again requested for revision of PP NOC for block (s) 4, 6, 7 & 8. For the block (s) 1, 2 & 5, Completion Certificate have already been issued vide ref 8, 9, and 10.

S. No	Name of the block / occupancy	Floor details	Height in meters	Status
1	Block -1. Residential Apartment (On combined podium)	Combined stilt floor + 38 floors (With floor area - 38,878.80 sq. mtrs.)	127.40	CC issued CC No.13/2021 Dated:24.03.2022.
2	Block -2. Residential Apartment (On combined podium)	Combined single basement with blocks 3 & 4) + Combined stilt floor (part) with block 1, 3 & 4) + ground floor (part) + 38 floors (with floor area -45,647.63 sq. mtrs.)	127.40	CC issued CC No.02/2021 Dated:20.01.2022.
3	Block - 3. Residential Apartment / residential occupancy (On combined podium)	Combined single basement for parking + combined stilt floor with block 1, 2 & 4) and ground floor (part) + 47 floors (with floor area - 53,392.54 Sq. m.)	162.50	No Changes, applied for CC

4	Block - 4. Residential Apartment / residential occupancy (On combined podium)	Double basement also extended to the area below the open space + Combined stilt floor (Part) with block 1, 2& 3) and ground floor (part) + 45 floors (with floor area - 72,982.55 sq. mtrs.)	147.05	Proposal submitted for revised planning permission
5	Block -5. Educational building / Educational occupancy	Basement (part) + ground + 3 Floors (with FLOOR AREA 15,060.70 sq. mtrs)	17.00	CC issued CC No.12/2021 Dated:29.03.2021.
6	Block -6. Mixed occupancy (Assembly, Mercantile and, Business)	Separate triple basement floor (1 st basement partly shops and partly parking; 2 nd and 3 rd basement parking use) + ground floor + 1 st floor to 4 th floor (shops, food court and multiplex) + 5 th floor (parking + multiplex) + 6 th floor to 9 th floor (partly shops and partly parking) + 10 th floor (shops) + 11 th floor to 15 th floor for offices with the floor	60.00	Proposal submitted for revised planning permission.

		area of 240037.94 sq. mtrs.		
7	Block -7. Mixed occupancy (Assembly, Mercantile Residential and Car parking)	Double basement floor (parking) + ground floor (partly shops and partly parking) + 1 st and 2 nd floor (shops, parking, residential) + 3 rd floor (offices, club house, and residential) + 4 th to 45 th floors for residential with floor area - 81,507.55 sq. mtrs.	149.15	Proposal submitted for revised planning permission.
8	Block -8. Hospital building / Institutional occupancy	4 basements (1 st basement partly Radiation room and partly parking, 2 nd basement for radiation room, 3 rd and 4 th basement for parking) + ground floor +11 floors with (floor area - 29440.68 sq. mtrs.)	45.00	New proposal.

Observation for revised planning proposals:

It relates to revised planning proposal for the construction of multistoried group development of various occupancies with 4 number of blocks - block 4, 6, 7 & 8 comprising of residential, assembly, business, mercantile and institutional building.

Block No.4

Block No.4 residential building consists of combined 1st and 2nd basement floor (parking) and extended 3rd basement floor part (i.e. only below to the 1st & 2nd extended basement floor) + combined stilt floor part cum ground floor part with (block 1, 2 & 3) + 1st floor to 45th floor with the height of 147.05 meters up to the terrace level and total floor area 72982.55 square meter. The proposal should have a 20 meters side setback at all around the building. As the set-back area is used for the purposes of operation of 104 meters aerial ladder platform vehicles along with other emergency vehicles and also used as assembly points, the side set back should not be restricted by 8 meters drive way.

Block No.6

Block No.6 mixed occupancy (assembly, mercantile and, business) consist of triple basement floor (at 1st basement floor for partly used for shops & partly used for parking, 2nd and 3rd basement floor for parking use) + ground floor to 4th floor (for shops, food court, multiplex (9 screens)) + 5th floor (for parking, multiplex) + 6th floor to 9th floor (partly shops & partly parking) + 10th floor (for shops) + 11th floor part to 15th floor part for office use with the height of 60 meters and total floor area 240037.94 square meter. As per table 7 of the National Building Code of India, Part IV - fire and life safety, mercantile occupancy shall be permitted up to 30 meters height of the building. The proposal should have a 12 meters side setback at all around the building. The side setback around the building shall be as per the Tamil Nadu Combined Development and Building Rules, 2019 and it must be kept free for movement and operation of aerial ladder platform fire fighting vehicles.

Block No.7

Block-7 (residential + commercial+ club house) consists of double basement floor (parking) + ground floor (partly shops + partly parking) 1st & 2nd floor (partly shops, partly parking & partly residential) + 3rd floor (partly office, partly club house & partly residential) + 4th floor to 45 floor residential

use with the height of 149.15 meters and total floor area 81507.55 square meter. The proposal should have a 20 meters side setback at all around the building. The side set back should not be restricted by 8 meters drive way.

Block No.8

Block No.8 institutional building consists of 4 basement floor (1st basement floor for radiation room, 2nd basement partly parking and party radiation room, 3rd & 4th basement floor for parking use) + ground floor + 11 floors with the height of 45 meters. The total plot area is 200226.50 square meter and the total floor area is 29440.68 square meter. Since, evacuation of patients in emergencies is critical to hospital occupancy, all critical patients and those incapable of self-preservation and having physical impairment shall be housed within 30 meters height. Other types of patients and occupancies incidental to the hospitals such as consultation rooms, nurse's stations, medical shops, canteens alone should be housed at heights beyond 30 meters but not more than 45 meters. Hence, private rooms as shown in the drawing should be changed to occupancies incidental to hospital occupancy. The proposal should have a 10 meters side setback at all around the building. The side setback around the building shall be as per Tamil Nadu Combined Development and Building Rules, 2019 and it must be kept free for movement and operation of fire fighting vehicles.

The above mentioned block of buildings are classified to come under Group "A" Residential Building, Sub-Division "A-4" Apartments, Group "C" Institutional Building, Sub-Division "C-1" and Group D Assembly Building, Sub-Division D-6 as per the classification of the National Building Code of India Part IV fire and life safety second revision – 2016.

The following fire & life safety measures should be provided in the proposed buildings before the issue of compliance certificate as listed below for each of the occupancies separately:

Block- 4 (The residential building)

1. There should be a wet-riser per thousand square meters area covering all floor areas with landing valves along with delivery hoses. The raiser should be fully charged with adequate pressure at all times & should have both automatic and manual operation. To feed the wet-riser and sprinkler system an underground static water tank of minimum capacity 200000 liters should be provided with refilling facilities for per set of pumps. A terrace level tank of capacity 20000 liters also should be provided respective tower terrace. To charge the wet riser system and the sprinkler system one set of pumps shall be provided for each 100 hydrants or part thereof with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. Two sets of pump, each set containing an electrical pump of capacity 2850 LPM for hydrant and an electrical pump of capacity 2850 LPM for sprinkler, an equal capacity of a diesel pump and two electrical pumps of each capacity of 180 LPM as a jockey pump should be provided near the underground water tank. The pumps should be capable of developing pressure of 3.5 kg/cm² at terrace level hydrant point. Lower levels in these high rise buildings are likely to experience high pressure and thereof, it is recommended to consider multi-stage, multi-outlet pump (creating pressure zone) or variable frequency drive pumps or any other equivalent arrangement. In this regard, for safe installation and maintenance practices, the BIS Code 13039 & 3844: 2013 should be followed.
2. Yard hydrants should be provided all around the building including the podium. As per NBC 2016 part IV clause 5.1.1 (f) pressure at the hydrant shall however not exceed 7 bar considering the safety of operator.
3. Fire service inlets fitted with NRV at ground level should be provided.

4. Hose reel assembly should be covering each floor area.
5. Manual fire alarm call points should be provided at all floors. Manual call point should be break glass not pull station.
6. Automatic sprinkler system should be provided at all floors including Basement and ramps at all level. As per the BIS Code 15105 -2021- The design and installation of automatic sprinkler system and also the points mentioned in the general conditions.
7. Automatic detection system should be provided at all floors as per NBC Part - 4 clauses 4.9
 - Should be integrated with BMS system for enable operation of various system and equipment to facilitate requirement leading to life safety, compartmentation and fire protection and equipment may include electromechanical systems such as air handling units; pressurization systems; smoke management systems.
 - Detection system should also facilitate with monitoring of fire water storage tanks and pumps, pressures in hydrant and sprinkler system, etc.,
 - Voice evacuation systems should be vernacular language using pre-recorded messages and integrate with fire alarm panels for alerting the zone of fire and surrounding zones / floors as required for annunciation
 - Appropriate visual warning arrangement through visual strobes / beacons should be provided in all floors to ensure visual as well as alarm for persons with hearing impairment.
8. Public address system should be provided connecting all the floors.
9. Alternative & independent power systems should be provided to fire pumps, emergency lighting system and fire lift.
10. Number of ramp and exit location and their width should be conforms to the requirements of National Building Code of India, Second Revision part IV 2016.

11. Refuge area:-

As it is a super high rise building with more than 120 meters height, it is considered that evacuation of occupants involves high risk, the refuge area should be provided from the building at the height 30 m and thereafter for every 30 meters. Refuge area provided shall be planned to accommodate the occupants of two consecutive floors (this shall consider occupants of the floor where refuge is provided and occupants of floor above) by considering area of 0.3 m² per person for the calculated number of occupants and shall include additionally to accommodate one wheelchair space of an area of 0.9 m² for every 200 occupants, portion thereof, based on the occupant load served by the area of refuge or a minimum of 15 m², whichever is higher, shall be provided as under:

- The refuge area shall be provided on the periphery of the floor and open to air at least on one side protected with suitable railings.
- Refuge area(s) shall be provided at/or immediately above 24 m and thereafter at every 15 m or so.
- A prominent sign bearing the words "REFUGE AREA" shall be installed at the entry of the refuge area, having height of letters of minimum 75 mm and also containing information about the location of refuge areas on the floors above and below this floor. The same signage shall also be conspicuously located within the refuge area.
- Each refuge area shall be ventilated and provided with first aid box, fire extinguishers, public address speaker, fire man talk back, and adequate emergency lighting as well as drinking water facility.
- Refuge areas shall be approachable from the space they serve by an accessible means of egress.
- Refuge areas shall connect to firefighting shaft (comprising fireman's lift, lobby and staircase) without having the occupants requiring to return to the building spaces through which travel to the area of refuge occurred.

- The refuge area shall always be kept clear. No storage of combustible products and materials, electrical and mechanical equipment, etc., shall be allowed in such areas.
- Refuge area shall be provided with adequate drainage facility to maintain efficient storm water disposal.
- Entire refuge area shall be provided with sprinklers.
- Where there is a difference in level between connected areas for horizontal exits, ramps of slope not steeper than 1 in 12 shall be provided (and steps should be avoided).

12. Fire escape - internal staircases and external staircase:

a) Internal staircases:

As it is a super high rise building with more than 120 meters height and at every floor 5 flats, one staircase should have minimum width of 1.5 meters and others shall have minimum width of 1.25 meters for the evacuation. The minimum width of tread without nosing shall be 300 mm and the tread shall be constructed and maintained in a manner to prevent slipping. The maximum height of riser shall be 150 mm and the number shall be limited to 12 per flights.

b) Fire exit:

As per clause 4.4.2.4.3.1 of the National Building Code of India part IV fire and life safety 2016 - every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full use in the case of fire or other emergency.

c) External staircases:

As per clause 4.4.2.4.3.4 the National Building Code of India part IV fire and life safety 2016 - all external stairs shall be directly connected to the ground. Entrance to the external stairs shall be separate and remote from the internal staircase.

Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs. The route to the external stairs

shall be free of obstructions at all times. The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance. No external staircase, used as a fire escape, shall be inclined at an angle greater than 45 degrees from the horizontal.

d) Fire lift

As per clause 2.27 the National Building Code of India part IV fire and life safety 2016. To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 sq. mtrs of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.

13. The first aid firefighting equipment's should be provided at all floors in accordance with the IS 2190: 2010 requirements.
14. Illuminated exit signage's should be provided with alternative source of power supply or battery back – up with "GLOW TYPE". As per NBC part - 4 clauses 3.4.7.4
15. Fire lift, electrical installation and wiring, AC duct & other service ducts should meet the requirements of NBC of India, Part 4, Second Revision 2016.
16. The service ducts such as power cables, communication cables, A/C ducts etc., should be protected with proper fire sealing/fire dampers.
17. The cable gallery should be routed through fire resistant duct or fire protected tray. Suitable detectors shall be provided along the lines of the cable gallery.
18. As per section 3.2 of BIS 12459, 1988 – code of practice for fire safety in cable regularization, 1m transparent fire retardant coatings shall be applied to all cables at termination points in electrical panels and all cables inside the distribution boxes.
19. Fire resistant and low smoke emission cable should be used.
20. Assembly points should be designated at the ground floor as per the requirements of fire and life safety measures.

21. Dos and don'ts laminated hanging pads should be available in all floors in prominent places.
22. Evacuation route plan should be displayed in each floor at prominent places.
23. The effective fire protection should be provided and guaranteed for the outrigger and belt trusses to maintain the connections between the core and mega columns.
24. Progressive evacuation strategy shall be effective by applying and practicing through designated evacuation lift; hence the lift shaft should be pressured for inhibiting smoke suction effect during incidents as per NBC 6.3.2 (h).
25. As per the NBC part-4 clauses 4.9 in buildings where automatic fire alarm system is provided the following shall also be monitored from fire alarm panel
 - 1) Water level in all tanks.
 - 2) Hydrant and sprinkler pressures of respective zones as provided.
 - 3) Pump ON / OFF status.
 - 4) All isolation valves, wherever provided with supervisory switch
 - 5) Other requirements to meet electro-mechanical service interfaces.
26. Personal emergency evacuation plan (PEEP)

Occupant those who have functional limitation include visual, hearing, mobility, upper extremities, cognitive and other impairments require an additional appropriate fire safety measures such as evacuation chairs, evacuation elevators, egress stairway with photo luminescent markings and floor warden.

Looking towards the near future landing zone will be established for unmanned aerial vehicle (UAVs) deployed for package delivery as well as human transport.
27. **Fire stop as per NBC part 4.2.32:** All gaps between floor slabs and facade assembly shall be sealed at all levels by approved fire resistance

sealant material of equal fire rating as that of floor slab to prevent fire and smoke propagation from one floor to another.

28. Openable panels shall be provided on each floor and shall be spaced not more than 10 m apart measured along the external wall from Centre-to-Centre of the access opening. Such openings, shall be openable at a height between 1.2 m, and 1.5 m from the floor and shall be in the form of openable panels of size not less than 1500 mm x 1000 mm opening outwards.

29. As per clause 4,5.1 of the National Building Code of India part IV Fire and Life safety 2016, All floors should be compartmented with area of 750 meter squared.

30. **Service ducts / refuse chute:** (As per NBC part – 4, clauses 3.4.5.4 and 3.4.5.5)

I. Service duct shall be enclosed by walls and door, if any, of two hours fire rating. If ducts are larger than 10 Sq. Meters the floor should seal them, but provided suitable opening for the pipes to pass through, with the gaps sealed.

II. A vent opening at the top of the service shaft shall be provided between one fourth and one half of the area of the shaft. Refuse chutes shall have an outlet at least of wall of non-combustible material with fire resistance of not less than two hours. They shall not be located within the staircase enclosure or service shafts or air conditioning shafts. Inspection panel and door shall be tight fitting with one hour fire resistance; the chutes should be as far away as possible from exits.

III. Refuse chutes shall not be provided in staircase walls and A/C shaft etc.,

31. **Fire fighting shaft (fire tower)**

As per clause 2.24 of NBC -2016 part IV – an enclosed shaft having protected area of 120 min fire resistance rating comprising protected lobby, staircase and fireman's lift, connected directly to exit discharge

or through exit passageway with 120 min fire resistant wall at the level of exit discharge to exit discharge. These shall also serve the purpose of exit requirements / strategy for the occupants. The respective floors shall be approachable from fire-fighting shaft enabling the fire fighters to access the floor and also enabling the fire fighters to assist in evacuation through fireman's lift. The firefighting shaft shall be equipped with 120 min fire doors. The firefighting shaft shall be equipped with fireman talk back, wet riser and landing valve in its lobby, to fight fire by fire fighters. Fire shaft shall be planned which houses a fireman's lift, 2 hours fire rated staircase and hose reel provision.

32. Fire fighting pump house – basement \ double basement

As it is super high rise building with more than 120 meters height and considered as a high hazard, a separate fire fighting pump house should be provided for Block 3 & 4, the pump house design as per clause 5.1.2.2 of the National Building Code of India part IV fire and life safety 2016.

Block No.6 - (commercial, retail market & multiplex)

1. There should be a wet-riser and hose reel system per thousand square meters area covering all floor areas with landing valves along with delivery hoses. The raiser should be fully charged with adequate pressure at all times & should have both automatic and manual operation. To feed the wet-riser and sprinkler system an underground static water tank of minimum capacity 200000 liters should be provided with refilling facilities for per set of pumps. A terrace level tank of capacity 20000 liters also should be provided respective tower terrace. To charge the wet riser system and the sprinkler system one set of pumps shall be provided for each 100 hydrants or part thereof with maximum 4 sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers. As this occupancy involves market, business and public assembly having more

than 240000 sq. mtrs with huge fire load this building categorized as High hazard occupancy. Therefore, one set of pump containing an electrical pump of capacity 2850 LPM for hydrants, an electrical pump of capacity 2850 LPM for sprinkler system, an equal capacity of a Diesel Pump and two electrical pumps of each capacity of 180 LPM as a Jockey pump should be provided near the underground water tank, cater to the specific fire fighting needs of this building. The pumps should be capable of developing pressure of 3.5 kg/cm² at terrace level hydrant point. Lower levels in these high rise buildings are likely to experience high pressure and thereof, it is recommended to consider multi-stage, multi-outlet pump (creating pressure zone) or variable frequency drive pumps or any other equivalent arrangement.

2. Yard hydrants should be provided all around the building. As per NBC 2016 part IV clause 5.1.1 (f) pressure at the hydrant shall however not exceed 7 bar considering the safety of operator.
3. Fire service inlets fitted with NRV at ground level should be provided.
4. Hose reel assembly should be covering each floor area.
5. Manual fire alarm call points should be provided at all floors. Manual call point should be break glass not pull station.
6. Automatic sprinkler system should be provided at all floors including basement and ramps at all level. And it should be installed as per the IS 15105 - 2021 the design and installation of Automatic sprinkler system.
7. Automatic detection system should be provided at all floors as per NBC Part-4 clauses 4.9
 - Should be integrated with BMS system for enable operation of various system and equipment to facilitate requirement leading to life safety, compartmentation and fire protection and equipment may include electro-mechanical systems such as air handling units; pressurization systems; smoke management systems.

- Detection system should also facilitate with monitoring of fire water storage tanks and pumps, pressures in hydrant and sprinkler system, etc
- Voice evacuation systems should be vernacular language using pre-recorded messages and integrate with fire alarm panels for alerting the zone of fire and surrounding zones/floors as required for annunciation
- Appropriate visual warning arrangement through visual strobes/beacons should be provided in all floors to ensure visual as well as alarm for persons with hearing impairment.

8. Public address system should be provided connecting all the floors.

9. Alternative & independent power systems should be provided to fire pumps, emergency lighting system and fire lift.

10. Number of ramp and exit location and there width should be conforms to the requirements of National Building Code of India, Second Revision part IV 2016.

- Assembly occupancy of Multiplex exits should be separate and lead the occupant directly to exit discharge
- The minimum width of exit passageway should be 2 .0 M (clause 6.4.2.2)
- The common path of travel should be 30 m. The maximum dead end of corridor distance should not exceed 6m.
- Where wheeled carts or buggies are used by customers, adequate provision shall be made for the transit and parking of such carts to minimize the possibility that they might obstruct means of egress. Any other storage or hindrances causing obstruction in exits should be avoided.

11. The staircases shall not be arranged around a lift shaft as per the requirements of National Building Code of India 2016.

12. Fire escape - internal staircases and external staircase:

a) Internal staircases:

As per clause 4.4.2.4.3.2 of the National Building Code of India part IV fire and life safety 2016 - all staircases shall have minimum width of 2 meters. The minimum width of tread without nosing shall be 300 mm and the tread shall be constructed and maintained in a manner to prevent slipping. The maximum height of riser shall be 150 mm and the number shall be limited to 12 per flights.

b) Fire exit:

As per the Clauses 4.4.2.4.3.1 of National Building Code of India part IV fire and life safety 2016 - Every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full use in the case of fire or other emergency.

c) External staircases:

As per clauses 4.4.2.4.3.4 the National Building Code of India part IV fire and life safety 2016 - all external stairs shall be directly connected to the ground. Entrance to the external stairs shall be separate and remote from the internal staircase.

Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs. The route to the external stairs shall be free of obstructions at all times. The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

No external staircase, used as a fire escape, shall be inclined at an angle greater than 45 degrees from the horizontal.

d) Fire lift (as per clauses 2.27 of NBC part - IV)

To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 Sq.mts. of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.

13. Well-equipped fire control room shall be provided on the ground floor of the building as per clause No. 4.10 of National Building Code of India - 2016, a qualified fire officer shall be employed to maintain the all fire prevention & protection arrangements provided to buildings. He should be responsible for fire safety of the building and In charge of BMS maintained by the developer.
14. All the staircase should be pressurized.
15. As per clause 4, 5.1 of the National Building Code of India part IV fire and life safety 2016; all floors should be compartmented with area of 2000 meter squared.
16. The first aid firefighting equipment's should be provided at all floors in accordance with the IS 2190: 2010 requirements.
17. Illuminated exit signage's should be provided with alternative source of power supply or battery back – up with "GLOW TYPE".
18. Fire lift, electrical installation and wiring, AC duct & other service ducts should meet the requirements of NBC of India, Part 4, Second Revision 2016.
19. The service ducts such as power cables, communication cables, A/C ducts etc., should be protected with proper fire sealing/fire dampers.
20. The cable gallery should be routed through fire resistant duct or fire protected tray. Suitable detectors shall be provided along the lines of the cable gallery.
21. As per section 3.2 of BIS 12459, 1988 – code of practice for fire safety in cable regularization, 1m transparent fire retardant coatings shall be applied to all cables at termination points in electrical panels and all cables inside the distribution boxes.
22. Fire resistant and low smoke emission cable should be used.
23. Assembly points should be designated at the ground floor as per the requirements of fire and life safety measures.
24. Dos and don'ts laminated hanging pads should be available in all floors in prominent places.

25. Evacuation route plan should be displayed in each floor at prominent places.

26. If the construction is done with prefabricated materials, sufficient Natural vent/mechanized ventilation system should be provided.

27. **Refuge area** - as per clause 6.4.2.2 of the National Building Code of India part IV fire and life safety 2016, Refuge area to be provided on the floor at or immediately above 18 meters shall be not less than 10 percent of gross area of floor. Next refuge area to be at / on the floor immediately above 24 m. The refuge area shall be 10 percent of the respective floor, which may be divided into two or more separate refuge areas at each of the respective floors, with each being not less than 100 m². Refuge area shall also meet all the requirements of life safety.

- The refuge area shall be provided on the periphery of the floor and open to air at least on one side protected with suitable railings.
- A prominent sign bearing the words "REFUGE AREA" shall be installed at the entry of the refuge area, having height of letters of minimum 75 mm and also containing information about the location of refuge areas on the floors above and below this floor. The same signage shall also be conspicuously located within the refuge area.
- Each refuge area shall be ventilated and provided with first aid box, fire extinguishers, public address speaker, fire man talk back, and adequate emergency lighting as well as drinking water facility.
- Refuge areas shall be approachable from the space they serve by an accessible means of egress.
- Refuge areas shall connect to firefighting shaft (comprising fireman's lift, lobby and staircase) without having the occupants requiring returning to the building spaces through which travel to the area of refuge occurred.

- The refuge area shall always be kept clear. No storage of combustible products and materials, electrical and mechanical equipment, etc shall be allowed in such areas.
- Refuge area shall be provided with adequate drainage facility to maintain efficient storm water disposal.
- Entire refuge area shall be provided with sprinklers.
- Where there is a difference in level between connected areas for horizontal exits, ramps of slope not steeper than 1 in 12 shall be provided (and steps should be avoided).

28. Progressive evacuation strategy shall be effective by applying and practicing through designated evacuation lift; hence the lift shaft should be pressured for inhibiting smoke suction effect during incidents. as per NBC 6.3.2 (h)

29. Personal emergency evacuation plan (PEEP)

Occupant those who have functional limitation include visual, hearing, mobility, upper extremities, cognitive and other impairments require an additional appropriate fire safety measures such as evacuation chairs, evacuation elevators, egress stairway with photo luminescent markings and floor warden.

30. Looking towards the near future landing zone will be established for unmanned aerial vehicle (UAVs) deployed for package delivery as well as human transport.

31. **Fire stop as per NBC part 4.2.32:** All gaps between floor slabs and façade assembly shall be sealed at all levels by approved fire resistance sealant material of equal fire rating as that of floor slab to prevent fire and smoke propagation from one floor to another.

32. Openable panels shall be provided on each floor and shall be spaced not more than 10 m apart measured along the external wall from Centre-to-Centre of the access opening. Such openings, shall be open able at a height between 1.2 m, and 1.5 m from the floor and shall be

in the form of openable panels of size not less than 1500 mm x 1000 mm opening outwards.

33. Fire fighting shaft (fire tower)

As per clause 2.24 – An enclosed shaft having protected area of 120 min fire resistance rating comprising protected lobby, staircase and fireman's lift, connected directly to exit discharge or through exit passageway with 120 min fire resistant wall at the level of exit discharge to exit discharge. These shall also serve the purpose of exit requirements / strategy for the occupants. The respective floors shall be approachable from fire-fighting shaft enabling the fire fighters to access the floor and also enabling the fire fighters to assist in evacuation through fireman's lift. The firefighting shaft shall be equipped with 120 min fire doors. The firefighting shaft shall be equipped with fireman talk back, wet riser and landing valve in its lobby, to fight fire by fire fighters. Fire shaft shall be planned which houses a fireman's lift, 2 hours fire rated staircase and hose reel provision.

34. Service ducts / refuse chute: As per NBC part -4 clauses 3.4.5.4 and 3.4.5.5 shall be provided.

35. Combined triple basement: As per NBC part -3 12.9 and as per NBC part -4 clauses 4.2.19 shall be followed.

36. Fire fighting pump house – basement \ double basement

A separate fire fighting pump house should be provided as per clause 5.1.2.2 of the National Building Code of India part IV fire and life safety 2016.

37. Lightning protection of buildings:

The lightning protection for buildings should be provided as given National Building Code 2016 in Part 8 `Building Services, Section 2 electrical installations.

38. Access:

Two entrance gates each of width not less than 4.50 meters and height clearance not less than 5 meters shall be provided. The main entrance

to the plot shall be of adequate width to allow easy access to the fire engine and in no case shall it measure less than 6 m. The entrance gate should be fold back against the compound wall of the premises. Thus leaving the exterior access way within the plot free for movement of fire tender. If the main entrance at the boundary wall is built over, the minimum clearance shall be 5 meters.

39. Courtyards:

1. The courtyards on all sides of the building shall be paved suitably to bear the load of fire engines weighing up to 65m tones and shall be flushed to road level
2. The courtyards shall be in one plane.

40. Atrium:

1. Smoke detectors should be provided on the underside of each floor protruding into the atrium, at the atrium roof and adjacent to each return air intake from the atrium. Within atrium space, beam type or aspirating type smoke detectors shall be used to ensure detection of smoke, considering factors such as stratification of smoke.
2. Hydrants shall be available at the floor of the atrium and also at the adjoining upper spaces / floors of the atrium. Sprinklers are required to be installed for coverage of glass areas of retail, tenant and other areas adjoining the exit access corridor and atrium.
3. Smoke exhaust fans shall be capable of operating effectively at 250°C for 120 min.
4. Atrium smoke management system fans shall be provided with emergency power.

Block No.7 (residential and commercial building)

1. There should be a wet-riser per thousand square meters area covering all floor areas with landing valves along with delivery hoses. The raiser should be fully charged with adequate pressure at all times & should

have both automatic and manual operation. To feed the wet-riser and sprinkler system an underground static water tank of minimum capacity 200000 liters should be provided with refilling facilities for per set of pumps. A terrace level tank of capacity 20000 liters also should be provided respective tower terrace. To charge the wet riser system and the sprinkler system one set of pumps shall be provided for each 100 hydrants or part thereof with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers, Hence, one set of pump containing an electrical pump of capacity 2850 LPM for hydrants, an electrical pump of capacity 2850 LPM for sprinkler system, an equal capacity of a diesel pump and two electrical pumps of each capacity of 180 LPM as a jockey pump should be provided near the underground water tank. The pumps should be capable of developing pressure of 3.5 kg/cm^2 at terrace level hydrant point. Lower levels in these high rise buildings are likely to experience high pressure and thereof, it is recommended to consider multi-stage, multi-outlet pump (creating pressure zone) or variable frequency drive pumps or any other equivalent arrangement. As per clause 5.1.2.2 of the National Building Code of India, Part -IV fire and life safety 2016; firefighting pump house should be provided; exclusively to feed the system for block -7 only. The fire pump room at such level shall have dedicated connectivity through passageway (with 120 min integrity) from the firefighting shaft. Such fire pump room, shall have 120 min fire resisting wall and provided with adequate ventilation with talk-back connectivity to the main fire pump room and fire command centre.

2. Yard hydrants should be provided all around the building including the podium. As per NBC 2016 part IV clause 5.1.1 (f) pressure at the hydrant shall however not exceed 7 bar considering the safety of operator.
3. Fire service inlets fitted with NRV at ground level should be provided.
4. Hose reel assembly should be covering each floor area.

5. Manual fire alarm call points should be provided at all floors. Manual call point should be break glass not pull station.
6. Automatic sprinkler system should be provided at all floors including Basement and ramps at all level. And it should be installed as per the IS 15105 - 2021 the design and installation of Automatic sprinkler system.
7. Automatic detection system should be provided at all floors
 - Should be integrated with BMS system for enable operation of various system and equipment to facilitate requirement leading to life safety, compartmentation and fire protection and equipment may include electromechanical systems such as air handling units; pressurization systems; smoke management systems.
 - Detection system should also facilitate with monitoring of fire water storage tanks and pumps, pressures in hydrant and sprinkler system, etc.,
 - Voice evacuation systems should be vernacular language using pre-recorded messages and integrate with fire alarm panels for alerting the zone of fire and surrounding zones/floors as required for annunciation
 - Appropriate visual warning arrangement through visual strobes/beacons should be provided in all floors to ensure visual as well as alarm for persons with hearing impairment.
8. Public address system should be provided connecting all the floors.
9. Alternative & independent power systems should be provided to fire pumps, emergency lighting system and fire lift.
10. Number of ramp and exit location and their width should be conforms to the requirements of National Building Code of India, Second Revision part IV 2016.
11. As per clauses 4.4.2.5(b) and E-2 of the National Building Code of India, Part - IV fire and life safety 2016 – the internal staircases should be Pressurized.

12. As per clauses 6.1.1.3 (Sub-Division A-4) of the National Building Code of India, Part - IV fire and life safety 2016 - fire door shall be provided for all other staircases and pressurized staircases.

13. Fire escape - internal staircases and external staircase:

a) Internal staircases:

As it is a super high rise building with more than 120 m height and at every floor 15 flats, two staircase should have minimum width of 1.5 meters and others shall have minimum width of 1.25 meters for the evacuation. The minimum width of tread without nosing shall be 300 mm and the tread shall be constructed and maintained in a manner to prevent slipping. The maximum height of riser shall be 150 mm and the number shall be limited to 12 per flights.

b) Fire exit:

As per the National Building Code of India part IV fire and life safety 2016 - Every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full use in the case of fire or other emergency.

c) External staircases:

As per the National Building Code of India part IV fire and life safety 2016 - all external stairs shall be directly connected to the ground. Entrance to the external stairs shall be separate and remote from the internal staircase. Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs. The route to the external stairs shall be free of obstructions at all times. The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

No external staircase, used as a fire escape, shall be inclined at an angle greater than 45 degrees from the horizontal.

d) Fire lift:

To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 Sq.m. of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.

14. Floors should be compartmented /zoned with the area of each compartment being not more than 2000 square meters in the entire commercial / retail occupancy. This should be adopted.
15. Life safety provision for multilevel vehicle car parking facilities shall comply with Annex-H; as per National Building Code of India, Part -IV fire and life safety 2016.
16. As per clauses 4.7 of the National Building Code of India, Part -IV fire and life safety 2016 – where LPG pipe line run in building, the same shall be run in separate shafts exclusively for this purpose and away from the staircases.
17. Above proposed super high living structures; gas leakage detectors shall be provided in all kitchens that link to a gas solenoid valve for emergency shut off; and also integrated with fire detection and alarm system must be provided in addition.
18. Illuminated exit signage's should be provided with alternative source of power supply or battery back – up with "GLOW TYPE".
19. Fire lift, electrical installation and wiring, AC duct & other service ducts should meet the requirements of NBC of India, Part 4, and Second Revision 2016.
20. The service ducts such as power cables, communication cables, A/C ducts etc. should be protected with proper fire sealing/fire dampers.
21. The cable gallery should be routed through fire resistant duct or fire protected tray. Suitable detectors shall be provided along the lines of the cable gallery.
22. As per section 3.2 of BIS 12459, 1988 – code of practice for fire safety in cable regularization, 1m transparent fire retardant coatings shall be

applied to all cables at termination points in electrical panels and all cables inside the distribution boxes.

23. Fire resistant and low smoke emission cable should be used.
24. Assembly points should be designated at the ground floor as per the requirements of fire and life safety measures.
25. Dos and don'ts laminated hanging pads should be available in all floors in prominent places.
26. Evacuation route plan should be displayed in each floor at prominent places.
27. If the construction is done with prefabricated materials, sufficient natural vent / mechanized ventilation system should be provided.
28. A trained fire officer with a crew shall be arranged to maintain as well as to operate the fire protection systems in case of any need.
29. The effective fire protection should be provided and guaranteed for the outrigger and belt trusses to maintain the connections between the core and mega columns.

30. Refuge area:-

As it is a super high rise building with more than 120 meters height evacuation of occupants takes time, the refuge area should be provided from the building at the height 30 m and more than every 30 meters. Refuge area provided shall be planned to accommodate the occupants of two consecutive floors (this shall consider occupants of the floor where refuge is provided and occupants of floor above) by considering area of 0.3 m² per person for the calculated number of occupants and shall include additionally to accommodate one wheelchair space of an area of 0.9 m² for every 200 occupants, portion thereof, based on the occupant load served by the area of refuge or a minimum of 15 m², whichever is higher, shall be provided as under:

- The refuge area shall be provided on the periphery of the floor and open to air at least on one side protected with suitable railings.
- Refuge area(s) shall be provided at/or immediately above 24 m and thereafter at every 15 m or so.

- A prominent sign bearing the words "REFUGE AREA" shall be installed at the entry of the refuge area, having height of letters of minimum 75 mm and also containing information about the location of refuge areas on the floors above and below this floor. The same signage shall also be conspicuously located within the refuge area.
- Each refuge area shall be ventilated and provided with first aid box, fire extinguishers, public address speaker, fire man talk back, and adequate emergency lighting as well as drinking water facility.
- Refuge areas shall be approachable from the space they serve by an accessible means of egress.
- Refuge areas shall connect to firefighting shaft (comprising fireman's lift, lobby and staircase) without having the occupants requiring to return to the building spaces through which travel to the area of refuge occurred.
- The refuge area shall always be kept clear. No storage of combustible products and materials, electrical and mechanical equipment, etc shall be allowed in such areas.
- Refuge area shall be provided with adequate drainage facility to maintain efficient storm water disposal.
- Entire refuge area shall be provided with sprinklers.
- Where there is a difference in level between connected areas for horizontal exits, ramps of slope not steeper than 1 in 12 shall be provided (and steps should be avoided).

31. Fire command center (FCC): As per clauses 3.4.12 of National building code of India 2016, shall be on the entrance floors (Commercial & Apartment) of the building having direct access. The control room shall have the main fire alarm panel, communication system, pressurization system, smoke management system and building management system etc.

32. Progressive evacuation strategy shall be effective by applying and

practicing through designated evacuation lift, hence the lift shaft should be pressured for inhibiting smoke suction effect during incidents.

33. Floors should be compartmented / zoned with the area of each compartment being not more than 2000 square meters. This should be marked in the plan.

34. Personal emergency evacuation plan (PEEP); Occupant those who have functional limitation include visual, hearing, mobility, upper extremities, cognitive and other impairments require an additional appropriate fire safety measures such as evacuation chairs, evacuation elevators, egress stairway with photo luminescent markings and floor warden.

35. This High rise group development building premises has many numbers of blocks with different types of occupancy; where huge occupant load always exists. As per National Building Code of India; a qualified fire officer with experience of not less than 3 years shall be appointed who will be available on the premises. To prepare fire orders and fire operational plans and get them promulgated. (1) Impart regular training to the occupants of the buildings in the use of firefighting equipment's provided on the premises and keep them informed about the fire emergency evacuation plan, (2) to keep proper liaison with city fire brigade, (3) to ensure that all fire precautionary measures are observed at the times.

36. Fire fighting pump house – basement \ double basement:

As it is super high rise building with more than 120 meters height, a separate fire fighting pump house should be provided as per clause 5.1.2.2 of the National Building Code of India part IV fire and life safety 2016.

37. Lightning protection of buildings:

The lightning protection for buildings should be provided as given National Building Code 2016 in Part 8 `Building Services, Section 2 electrical installations.

Institutional building (hospital block - 8)

One wet-riser should be provided every 1000 sq. mts area covering all floor area with landing valves along with delivery hoses. The riser should be fully charged with adequate pressure at all times and should have both automatic and manual operation. To feed the wet-riser system and yard hydrant system an underground static water tank of minimum capacity 200000 liters should be provided with refilling facilities. A terrace level tank of capacity 20000 liters also should be provided. To charge the wet-riser, yard hydrant and sprinkler system two electrical pumps of capacity 2850 LPM should be provided near the underground water tank and an equal capacity of diesel pump should also be provided as an alternative arrangement. Two electrical pump of capacity of 180 LPM should be provided as a jockey pump. Pumps should have the capacity of developing pressure of 3.5 kg/cm² at terrace level.

1. Yard hydrants should be provided all around the building.
2. Fire service inlets fitted with NRV at ground level should be provided.
3. Hose reel assembly should be covering each floor area.
4. Manual fire alarm call points should be provided at all floors. Manual call point should be break glass not pull station.
5. Automatic sprinkler system should be provided at all floors including Basement and ramps at all level. And it should be installed as per the IS 15105 - 2021 the design and installation of automatic sprinkler system.
6. Automatic detection system should be provided at all floors
 - Should be integrated with BMS system for enable operation of various system and equipment to facilitate requirement leading to life safety, compartmentation and fire protection and equipment may include electromechanical systems such as air handling units; pressurization systems; smoke management systems.

- Detection system should also facilitate with monitoring of fire water storage tanks and pumps, pressures in hydrant and sprinkler system, etc.,
 - Voice evacuation systems should be vernacular language using pre-recorded messages and integrate with fire alarm panels for alerting the zone of fire and surrounding zones/floors as required for annunciation
 - Appropriate visual warning arrangement through visual strobes/beacons should be provided in all floors to ensure visual as well as alarm for persons with hearing impairment.
7. Public address system should be provided connecting all the floors.
 8. Alternative & independent power systems should be provided to fire pumps, emergency lighting system and fire lift.
 9. Automatic smoke ventilation system should be provided
 10. Do's and don'ts laminated hanging pads should be provided in all floors in prominent places.
 11. Escape lighting and exit signage's should be provided as per clauses 3.4.7 of part IV NBC 2016
 12. Fire prevention and life safety measures should be followed for hospital building as per clauses 6.3.1 and 6.3.2 of part IV NBC 2016
 13. Assembly point should be designated at ground floor.
 14. Evacuation route plan should be displayed in all floors.
 15. Alternate and independent power system should be provided to fire pumps, emergency lighting and fire lift.
 16. Number of exits, location and its width should be conforms the requirement of NBC of India, Part 4, 2016.
 17. Fire escape staircases should be prescribed as per the clause 4.4.2.5 of the NBC part IV fire and life safety 2016.
 18. Minimum two numbers of staircase should be provided with pressurization with the width of 2.0 meters and they should be away from each other.

19. All the dead end corridor length in exit access shall not exceed 6 meters for hospital building.
20. For the principle of progressive horizontal evacuation in hospitals minimum of two horizontal exits accessible should be provided from all parts of floor as per clause 6.3.2 NBC Part IV 2016.
21. Compartmentation should meet the requirement as per clause 4.5.1 & 4.5.2 NBC part IV 2016.
22. Each compartment should be able to accommodate, in addition to its own, patients from adjoining compartment also considering 3.5 m² per person. If patients are not bed-ridden, a factor of 0.6 m² person is recommended.
23. All critical patients and those incapable of self – preservation and having physical impairment should be housed within 30m height.
24. Other types of patients and occupancies incidental to the hospitals such as consultation rooms, nurse's stations, medical shops, canteens, etc., may be housed at heights beyond 30 m but not more than 45 m.
25. Basement should not be used to store flammables or for pathological or other laboratories particularly those involving usage of chemicals.
26. Operation theaters, delivery rooms, Intensive care units, recovery rooms, etc., that containing patients lacking self-preservation in case of emergencies should be fire /smoke separated (120 min minimum rating) from all the adjoining areas.
27. Aisles, corridors, ramps, etc., through which patients are moved should have minimum width of 2.4 m throughout. Aisles, corridors and ramps in other areas not intended for the housing, treatment
28. All exits from hospital or infirmary sections should not less than 2.0 m in width.
29. Minimum width of door of single of double occupancy patient room should be 1.25 m while for the wards for 3 to 5 patient beds should be 1.50 m, to permit movement of patients. The minimum width of door for wards for more than 5 patient beds and for areas necessarily requiring patient evacuation on

bed (such as ICU, recovery units, delivery rooms, etc.,) should have door width of 2.0 m may be reduced to minimum 1.5 m where two such doors are provided in such areas.

30. Any sleeping accommodation or suite exceeding 100 m² in area should have at least two doorways leading to the exit access corridors.
31. Floor surface of corridors should not be inclined at a gradient steeper than 1 in 12 to the horizontal.
32. Exit access corridors from a compartment to another compartment should be divided at the compartment intersection by a fire door of 120 min fire rating in the fire compartment wall.
33. Rooms designated for laboratory and the like should not exceed 100 m² in area and if additional space is required, fire separation of 120 min should be provided.
34. Storage of flammable liquids in laboratories or in any other area should not be more than 3 litre for every 10m² area.
35. Disposal of any equipment and other (particularly hazardous) materials should be accomplished in the premises by a disposal specialist or at a safe location away from the health care facility by competent personnel using procedures established in concurrence with the safe practices.
36. A stretcher lift in a lift bank should also act as fireman's lift meeting the requirement of part 8 'Building services, section 5 Installation of lifts, Escalators and Moving Walks, Subsection 5A Lifts' of the code.
37. Progressive evacuation strategy progressive evacuation strategy shall be effective by applying and practicing through designated evacuation lift; hence the lift shaft should be pressured for inhibiting smoke suction effect during incidents. As per NBC 6.3.2 (h)

a) Internal staircases:

As per clause 4.4.2.4.3.2 of the National Building Code of India part IV fire and life safety 2016 - all staircases shall have minimum width of 2 meters. The minimum width of tread without nosing shall be 300 mm and the tread shall be constructed and maintained in a

manner to prevent slipping. The maximum height of riser shall be 150 mm and the number shall be limited to 12 per flights.

b) Fire exit:

As per the National Building Code of India part IV fire and life safety 2016 - Every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full use in the case of fire or other emergency.

c) External staircases:

As per the National Building Code of India part IV fire and life safety 2016 - all external stairs shall be directly connected to the ground. Entrance to the external stairs shall be separate and remote from the internal staircase.

Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs. The route to the external stairs shall be free of obstructions at all times. The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

No external staircase, used as a fire escape, shall be inclined at an angle greater than 45 degrees from the horizontal.

d) Fire lift:

To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 sq. mtrs. of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.

38. One number of ramp should be provided with the width of 2.4 meters for easy evacuation for stretcher patients as per the Requirements NBC of India, Part 4, 2016.

39. Ramp:

a) Ramps shall comply with all the applicable requirements for staircases regarding enclosure, capacity and limiting dimensions,

excepts where specified in 6.1 to 6.9 for special uses and occupancies.

- b) The slope of a ramp shall not exceed 1 in 12 (8 percent).
- c) Ramp(s) shall be surfaced with approved slip resistant materials that are securely attached. No perforations are permissible on ramp floors.
- d) Any changes in travel direction in ramp shall be preceded by landings of 1.5m X 1.5m size.
- e) Ramps and intermediate landings shall continue with no decreases in width along the direction of egress travel.
- f) Outside ramps and landings shall be designed to minimize water accumulation on their surfaces.
- g) Ramps shall have landings located at the top, at the bottom, and at doors opening onto the ramp.
- h) Every landing shall be not less than 1500 mm long in the direction of travel.
- i) Where the ramp is not part of an accessible route, the ramp landings shall not be required to exceed 1250 mm in the direction of travel, provided that the ramp has a straight run.
- j) Handrails shall be provided on all ramps on both sides. (Above requirements are not applicable to basement car parking ramps)
The ramps shall in addition comply with the requirements given in 13 of part 3 "Development control rules and General Building Requirements" of the code.

40. Refuge area should be provided at 24th meter and 39th meter level as per the requirements of NBC of India, Part 4, 2016.

41. Horizontal exits / refuge area should meet the requirements of ANNEX-E4 of part IV NBC 2016.

42. Travel distance (based on occupancy and construction type) should be maintained as per clauses 4.4.2.1 and 4.4.2.2 of Part 4 Of NBC 2016.

43. Enclosed Parking Structures should meet the requirements of ANNEX-H4 of Part IV NBC 2016.
44. The first aid firefighting equipment's should be provided at all floors in accordance with the IS 2190:2010 requirements.
45. Gas supply - gas bank / gas manifold should be in accordance with NBC 2016 part 4 Fire and life safety 4.7.1 to 4.7.9.
46. Clear side set back area of 10 meters should be provided all around the hospital building without any obstructions so as to allow Fire service vehicle to move closer to the building at the time of emergency and it should be designed to withstand a weight of 65tons at any point of operation for the use of Hydraulic platform vehicle. In any case, no ramp, landscape garden and swimming pool shall be allowed in the setback area. The entire setback area earmarked shall be hard paved or provided with reinforced concrete so as to withstand the weight of the aerial ladder platform.

Side setback:

Setback area should be free of any obstruction, such as fountains, statues, flower pots, decorative idols, ramp etc., to facilitate movement of vehicle and people during emergencies as per the Tamil Nadu Combined development and building rules 2019 rule no.35 (23). Side setback should be starts from the periphery of the building.

47. Minimum of two large 'louvered windows' (with adequate safety provision) shall be provided in each floor for easy evacuation of persons, wherever the building is fully glazed.
48. Electrical installation and wiring, ducts should meet the requirements of clauses 3.4.6 of NBC of India, Part 4, 2016.
49. The width and height of any arch or gate, if any, should have the clearance of not less than 4.5m and 5m respectively.
50. The service ducts such as power cables, communication cables, ducts etc., should be protected with proper fire sealing/fire dampers.

51. The fire dampers should be located at air conditioned ducts for check the spread of heat, flame, smoke and gases.
52. Fire resistant and low smoke emission cable should be used.
53. Fire command centre should be provided as per NBC-2016, Part-4 Clause 3.4.12 Fire command centre (FCC) a) Fire command centre shall be on the entrance floor of the building having direct access. The control room shall have the main fire alarm panel with communication system (suitable public address system) to aid floors and facilities for receiving the message from different floors. b) Fire command centre shall be constructed with 120 min rating walls with a fire door and shall be provided with emergency lighting. Interior finishes shall not use any flammable materials. All controls and monitoring of fire alarm systems, pressurization systems, smoke management systems shall happen from this room. Monitoring of integrated building management systems, CCTVs or any other critical parameters in building may also be from the same room. c) Details of all floor plans along with the details of firefighting equipment and installations (2 sets laminated and bound) shall be maintained in fire command centre. d) The fire staff in charge of the fire command centre shall be responsible for the maintenance of the various services and firefighting equipment and installations in coordination with security, electrical and civil staff of the building.
54. To operate and maintain the robust fire fighting and life safety system, a fire crew with head of a fire officer holding the qualification of BE-Fire / Divisional Officer course from National fire service college Nagpur or equivalent and fire personnel who has served in a reputed fire brigade not below in the rank of Assistant District officer with minimum 3 years experiences shall be appointed as per clause of 4.10 of Part IV NBC 2016.
55. Fire lift, electrical installation and wiring, AC duct & other service ducts should meet the requirements of NBC of India, part IV 2016.

56. Authorized persons should be available to handle flammable, poisonous and Anastasia Medicines.
57. Ambulance position should be marked visibly.
58. Patients lift with special provisions should also be provided with enough room for transporting of stretcher trolley.
59. The storage of oxygen and nitrogen cylinders shall be separated with manifold connection and away from hospital. At every floors level of the hospital emergency stop valve to be provided with suitable visible warning.
60. The hospital building should be provided with integrated building management system.
61. Fire drill and fire order shall be conducted twice in a year & Fire order shall be kept ready.
62. The distribution system of Oxygen should meet the requirements of standard practice.
63. The cable gallery should be routed through fire resistant duct or fire protected tray.
64. As per section 3.2 of BIS 12459, 1988 – code of practice for fire safety in cable regularization, 1m transparent fire retardant coatings shall be applied to all cables at termination points in electrical panels and all cables inside the distribution boxes.
65. CO₂ or smoke management system fans shall be provided with emergency power, planned with 6 air changes per hour automatically in the parking area.

General conditions of four blocks (4, 6, 7 & 8)

I. Automatic sprinkler system should be provided as follow as per IS 15105 - 2021

- 1) As per IS 15105-2021 Annex – B 2.2 High rise sprinkler systems shall be sub-divided into sprinkler installations such that the height difference between the highest and lowest sprinkler on any one installation does not exceed 45 meters.

2)As per IS 15105-2021 Annex -B-2.3 Standing water pressures at non-return and alarm Valves should be as follows.

- a) The minimum standing pressure at any non-return or alarm valve inlet shall be no less than 1.25 times the static head difference between the valve and the highest sprinkler on the installation.
- b) Non-return valves controlling installation flow shall operate correctly with a ratio of service pressure to installation pressure not exceeding 1.16 : 1, as measured by valve lift and pressure equalization upstream of the non-return valve.

3)As per IS 15105-2021 Annex -B-2.4 **Water pressures** should be as follows

- a) Pipe work, fittings, valves and other equipment shall be capable of withstanding the maximum pressure likely to be encountered.
- b) To overcome the problem of pressures in excess of 12 bar, hydraulic alarm gongs may be driven via a pressure reducing valve controlled by a diaphragm valve connected to the main installation control valve alarm port.

4)As per IS 15105-2021 Annex – B - 2.5 Pumping requirement should be as follows. It is necessary to use multistage multi outlet pumps for high rise structures in view of the 45 meters restrictions for sprinkler systems.

5)As per IS 15105-2021 Annex – B - 2.6 **Sprinkler installation** should be as follows

- a) Installation shall follow various clauses from the sections concerned with respect to sprinkler selection, location, spacing, etc., Attention is also drawn to various requirements in **E-6** of SP 7 (Part 4) for sprinkler installation in high rise buildings.
- b) Sprinkler installation shall be installed in the entire building throughout the building in all zones irrespective of the heights

at upper zones.

- c) Apart from main sprinkler riser, standby riser(s) duly fed by separate installation control valve(s) shall also be available for each zone.
- d) A controlling valve and a water flow monitoring device shall be provided at each floor / level of high-rise buildings and the entire sprinkler installation along with floor wise components shall be provided with continuous supervisory arrangements.
- e) Pressure in the sprinkler installation piping shall not exceed 7 bar and pressure at the most remote sprinkler at any level shall not be less than 0.5 bar and also not more than 5 bar. Density of application shall not be less than 5lpm/m².
- f) Pressure reducing valve stations shall be required to maintain allowable pressures within the installation piping everywhere
- g) Software based hydraulic calculations are necessary to prove the pressures at all levels from the pumps. Where required, pressure reducing arrangements shall be made.

6) As per IS 15105 - 2021 Annex - F sprinkler installation should be arranged in **zoning concept** as follows

(It applies only to OH sprinkler installations of the wet pipe type)

- a) The protected floor area should be controlled by any one installation alarm valve on any one floor shall not exceed 12 000 m².
- b) Car parks and areas involving the unloading and storage of goods shall be on a separate un-zoned installation.
- c) Building concerned shall be fully sprinkler protected to enable zoning.
- d) The protected floor area to be controlled by any one installation alarm valve shall not exceed 12000 m².

7)As per IS 15105 - 2021 Annex - F **Zoning requirements** should be as follows:

- a) The protected floor area per zone shall not exceed 6000 m².
- b) Each zone shall be independently controlled by a single zone subsidiary stop valve, installed in a readily accessible position at the floor level of the zone it controls. Each valve shall be secured open and be labeled to identify the area of protection it controls. Each zone shall be fitted with a flushing valve no less than 20 mm nominal diameter, either on the end of the distribution pipe hydraulically most remote from the water supply, or on the end of each distribution pipe spur, as appropriate. The valve outlet shall be fitted with a brass plug cap.
- c) Permanent test and drainage facilities for the zones shall be provided immediately downstream of the water flow alarm switch on each zone. The test facility shall simulate operation of any single sprinkler head. Adequate provision shall be made for the disposal of wastewater.
- d) The installation alarm valve of a zoned sprinkler installation shall have two stop valves, one on each side of a single alarm valve with a bypass connection of the same nominal bore around all three valves, fitted with a normally closed stop valve. Each of the three stop valves shall be fitted with tamper proof devices to monitor their status.

8)As per IS 15105 - 2021 Annex - F **Monitoring of the installation** should be as follows:

- Zoned sprinkler installations shall be provided with tamper-proof devices to monitor the status of:
 - a) Each stop valve (that is either fully open or not fully open), including subsidiary stop valves, capable of interrupting the flow of water to sprinklers.

- b) Water flow into each zone immediately downstream of each zone subsidiary stop valve, to indicate the operation of each zone, by means of a water flow alarm switch capable of detecting a flow equal to or greater than that from any single sprinkler.
 - c) Water flow through each main installation alarm valve set.
 - The monitoring devices required by **F-4** (a) and **F-3** (e) shall be electrically connected to a control and indicating panel, installed at an accessible location on the premises, where the following indications and warnings shall be given:
 - a) Green visual indicators to indicate that each monitored stop valve is in its correct operational position.
 - b) Audible devices and amber visual indicators to indicate that one or more control valve sets are not fully open.
 - c) Audible devices and amber visual indicators to indicate that one or more zone subsidiary stop valves are not fully open.
 - d) Audible devices and amber visual indicators to indicate that the static pressure in any trunk main supplying the system has fallen to a value 0.5 bar or more below the normal static pressure.
 - e) Audible devices and red visual indicators to indicate that water is flowing in to the installation.
- 9)As per IS 15105 - 2021 Annex - F **Drawings** for all installation which are cut in to zones, full detailed block plan shall be prepared to exhibit the positions of all zone control valves.
- 10)As per IS 15105 - 2021 Annex-G **Sprinkler installation—supervision** should be provided.
- a) The aim of supervising sprinkler systems is the continuous monitor of the main functions of the system, that is, those whose failure might impair the correct automatic operation of the system in case of fire, and the raising of a supervisory alarm to allow corrective

measures to be taken. This annex specifies requirements, which are additional to that elsewhere in the standard. They shall be complied with whenever monitoring is specified.

- b) All devices used for monitoring shall have at least IP 54 protection as specified in relevant Indian Standard. No more than 15 non-addressable supervisory alarm devices shall be connected to a common indication.
- c) All signaling and alarm circuits shall be fully supervised and a fault alarm shall be given in the event of short or open circuit where this corresponds to a fault.
- d) Control and indicating equipment shall be in accordance IS 2189.
- e) If no fire alarm system is provided, then main control panel of sprinkler pump in fire pump room shall be provided with facilities listed in this Annex.

11) As per IS 15105 - 2021 Annex - G **Supervisory functions**

- a) The position of all normally open stop valves the closing of which could prevent water flowing to the sprinklers, including water supply valves, control valve sets, subsidiary valves and sectional valves. An indication shall be given whenever the valve is less than fully open.
- b) The position of all normally open stop valves the closing of which could prevent the correct operation of an alarm or indicating device, for example, pressure switch, hydraulic alarm, flow switch. An indication shall be given whenever the valve is less than fully open.
- c) All critical liquid levels, including water storage tanks and engine fuel tanks. An indication shall be given before a water storage level drops more than 10 percent below its nominal fill level, or before a fuel level drops more than 25 percent below its nominal fill level. In the case of pressure tanks a further indication shall be given before the level reaches 10 percent above its nominal fill level.

- d) Pressures, including at water supplies and downstream of all dry and alternate control valve sets. On town main supplies and indication shall be given if the static pressure drops below the calculated running pressure. In all other cases an indication shall be given when the static pressure drops by more than 20 percent below the tested level.
- e) The power supply to electrical pump sets or other critical electrical equipment. An indication shall be given if one or more phases fail at any point in the main supply, or in the control circuit or an electric or diesel pump controller or any other critical control equipment.
- f) Minimum temperature of the sprinkler valve and pump room. An indication shall be given if the temperature drops below the minimum required level.

II. Fire escape - internal staircases and external staircase:

a) Internal staircases:

The design of the staircase should take in to account the following:

1. The minimum headroom in a passage under the landing of a staircase and under the staircase shall be 2.2 m
2. Access to exit staircase shall be through a fire door of a minimum 120 min fire resistance rating.
3. No living space, store or other fire risk shall open directly into staircases.
4. The exit (including staircases) shall be continuous from refuge floors or terrace level, as applicable, to the level of exit discharge.
5. No electrical shafts / air conditioning ducts or gas pipes, etc., shall pass through or open in the staircases.
6. Lifts shall not open in staircase.
7. No combustible material shall be used for decoration/wall paneling in the staircase.
8. Beams / columns and other building features shall not reduce the head room / width of the staircase.

9. The floor indication board, indicating the location/designated number of staircase, respective floor number and direction to exit discharge shall be placed inside the staircase, on the wall nearest to the fire door. It shall have size not less than 300 mm × 200 mm.
10. Individual floors shall be prominently indicated on the wall outside the staircase and facing it.

b) External staircases:

As per clause 4.4.2.4.3.4 the National Building Code of India part IV fire and life safety 2016 - all external stairs shall be directly connected to the ground. Entrance to the external stairs shall be separate and remote from the internal staircase.

Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs. The route to the external stairs shall be free of obstructions at all times. The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance. No external staircase, used as a fire escape, shall be inclined at an angle greater than 45 degrees from the horizontal.

III. Fire lift:

As per clause 2.27 the National Building Code of India part IV fire and life safety 2016. To enable fire services personnel to reach the upper floors with the minimum delay, one fire lift per 1200 sq. mts. of floor area shall be provided and shall be available for the exclusive use of the fireman in an emergency.

- a. The lift shall have a floor area of not less than 1.4 sq. mts. It shall have loading capacity of not less than 545 Kg. (8 persons) with automatic closing doors of minimum 0.8mts width.
- b. The electric supply shall be on a separate service from electric supply mains in a building and the cables run in a route safe from fire, that is within a lift shaft. Lights and fans in the elevator having

wooden paneling or sheet steel construction shall be operated on 24-volt supply.

- c. Firefighting lift should be provided with a ceiling hatch for use in case of emergency, so that when the car gets stuck up, it shall be easily open able.
- d. In case of failure of normal electric supply, it shall automatically switch over to the alternate supply.
- e. The operation of a fire lift shall by a single toggle of two-button switch situated in a glass-fronted box adjacent to the lift at the entrance level. When the switch is on landing; call points will become inoperative and the lift will be on car control only or on a priority control device. When the switch is off, the lift will return to normal working. This lift can be used by the occupants in normal times.
- f. The words 'FIRE LIFT' shall be conspicuously displayed in fluorescent paint on the lift landing doors at each floor level.
- g. The speed of the fire lift shall be such that it can reach to the top floor from ground level within one minute.
- h. Each fire lift shall be equipped with suitable inter-communications equipment for communicating with the control room on the ground floor of the building.

IV. Lift enclosure / lift:

As per NBC part - 8 Building services section 5 installation of lift clauses 7.11 to 7.2.4 fire safety requirement of lift.

- a. Walls of lift enclosures shall have a fire rating of two hours.
- b. Lift shafts shall have a vent at the top of area not less than 0.2 sq m.
- c. Lift motor room shall be located preferably on top of the shaft and separated from the lift shafts by the enclosures of the shaft or by the floor of the motor room.

- d. Landing door in lift enclosures shall have a fire resistance of not less than one hour.
- e. The number of lifts in one lift bank shall not exceed four. Lift car doors shall have fire resistance of not less than one hour. A wall of two hours fire rating shall separate individual shafts in banks. Minimum one lift in every lift bank must be a "Fire Lift".
- f. If the lift shaft and lobby is in the core of the building a positive pressure between 25 and 30 pa shall be maintained in the lobby and a possible pressure of 50 pa shall be maintained in the lift shaft. The mechanism for the pressurization shall act automatically with the fire alarm/sprinkler system and it shall be possible to operate this mechanically also.
- g. Exit from the lift lobby, if located in the core of the building, shall be through a self-closing fire smoke check door of one-hour fire resistance.
- h. Lift shall not normally communicate with the basement. If however, lifts are in communication, the lift lobby of the basement shall be pressurized as in (g) with self-closing door as in (h).
- i. Grounding switch (eg), at ground floor level shall be provided to enable the fire service to ground the lifts.
- j. Telephone/talk back communication facilities may be provided in lift cars for communication system and lifts shall be connected to the fire control room of the building.
- k. Suitable arrangements such as providing slope in the floor of the lift lobby shall be made to prevent water used during firefighting, etc., at any landing from entering the lift shafts.
- l. A sign shall be posted and maintained on every floor at or near the lift indicating that in case of fire, occupants shall use the stairs unless instructed otherwise. The sign shall also contain a plan for each floor showing the location of the stairways.
- m. Floor marking shall be done at each floor on the wall in front of the lift-landing door.

n. Alternate power supply shall be provided in all the lifts.

V. Fire fighting pump house – basement \ double basement

As per clause 5.1.2.2 of the National Building Code of India part IV fire and life safety 2016

- a) It is preferable to install the pump house to provide positive suction and not lower 1st Basement level. Pump house shall be situated so as to be directly accessible from the surrounding ground level.
- b) Pump housing shall be installed not lower than the first basement. When installed in the basement, staircase with direct accessibility (or through enclosed passageway with 120 min fire rating) from the ground, shall be provided. Access to the pump room shall not require to negotiate through other occupancies within the basement.
- c) Pump house shall be separated by fire walls all around and doors shall be protected by fire doors (120 min rating).
- d) Pump house shall be well ventilated and due care shall be taken to avoid water stagnation.
- e) No other utility equipment shall be installed inside the fire pump room.
- f) Insertions like flexible couplings, bellows, etc., in the suction and delivery piping shall be suitably planned and installed.
- g) Installation of negative suction arrangement and submersible pumps shall not be allowed.
- h) Pump house shall be sufficiently large to accommodate all pumps and their accessories like PRVs, installation control valves, valves, diesel tank and electrical panel.
- i) Battery of diesel engine operated fire pump shall have separate charger from emergency power supply circuit.
- j) Exhaust pipe of diesel engine shall be insulated as per best engineering practice and taken to a safe location at ground level, considering the back pressure.

- k) Talk back connectivity should be available between the pump room at various zones as well as at ground level and fire command center.

VI. The basement shall have the following requirements: (As per NBC part -3, clauses 12.9 and NBC part -4 clauses 4.2.19)

- Design criteria:

As basements lack natural light and ventilation, their access points and integrating them into a building plan must be thoroughly studied. Ramps with very steep slopes should not be allowed and gradient of 1 in 8 or more should alone be permitted. Ramps should not be constructed affecting the open space adjacent to the building. It should meet the following criteria; access, ventilation, firefighting and escape provisions. Brightly lit, colour coded sections are must to identify the different sections of the basements.

- Flooding in basements:

Water logged and catchment areas should be thoroughly studied prior to permitting basements in particular areas. Limiting of basement area with reference to plot coverage should be ideal.

- a) Every basement shall be in every part at least 2.4m in height from the floor to the underside of the roof slab or ceiling.
- b) Adequate ventilation shall be provided for the same as required by the particular occupancy according to byelaws. Any deficiency may be met by providing adequate mechanical ventilation in the form of blowers, exhaust fans, air-conditioning systems, etc.
- c) The minimum height of the ceiling of any basement shall be 0.9 m and the maximum, 1.2 m above the average surrounding ground level;
- d) Adequate arrangements shall be made such that surface drainage does not enter the basement;
- e) The walls and floors of the basement shall be watertight and be so designed that the effects of the surrounding soil and moisture,

if any are taken into account in design and adequate damp proofing treatment is given; and

f) The access to the basement shall be separate from the main and alternative staircase supply from the licensee's service and alternative supply cables. The door/doors provided for the services room shall have fire resistance of not less than two hours.

- Basements shall be separately ventilated. Vents with cross-sectional area (aggregate) not less than 2.5 percent of the floor area spread evenly around the perimeter of the basement shall be provided in the form of grills, or breakable stall board lights or pavement lights or by way of shafts. Alternatively, a system of air inlets shall be provided at basement floor level and smoke outlets at basement ceiling level. Inlets and extracts may be terminated at ground level with stall board or pavement lights as before, but ducts to convey fresh air to the basement floor level have to be laid. Stall board and pavement lights should be in positions easily accessible to the fire brigade and clearly marked 'SMOKE OUTLET' or 'AIR INLET' with an indication of area served at or near the opening.
- The staircase of basements shall be of enclosed type having fire resistance of not less than 2 h and shall be situated at the periphery of the basement to be entered at ground level only from the open air and in such positions that smoke from any fire in the basement shall not obstruct any exit serving the ground and upper stores of the building and shall communicate with basement through a lobby provided with fire resisting self-closing doors of 1hr resistance. For travel distance to be provided as per National Building code of India 2016. If the travel distance exceeds as per National Building code of India 2016 an additional -staircases shall be provided at proper places.
- In multi-storey basements, intake ducts may serve all basement levels, but each basement levels and basement compartment shall

have separate smoke outlet duct or ducts. Ducts so provided shall have the same fire resistance rating as the required smoke extraction time for smoke extraction ducts.

- Mechanical extractors for smoke venting system from lower basement levels shall also be provided. The system shall be of such design as to operate on actuation of heat/smoke sensitive detectors or sprinklers, if installed, and shall have a considerably superior performance compared to the standard units. It shall also have an arrangement to start it manually.
- Mechanical extractors shall have an internal locking arrangement, so that extractors shall continue to operate and supply fans shall stop automatically with the actuation of fire detectors.
- Mechanical extractors shall be designed to permit 12 air changes per hour in case of fire or distress call. However, for normal operation, air changes schedule as per National Building code of India 2016.
- Mechanical extractors shall have an alternative source of supply.
- Ventilating ducts shall be integrated with the structure and made out of brick masonry or reinforced cement concrete as far as possible and when this duct crosses the transformer area or electrical switchboard fire dampers shall be provided.
- All floors shall be compartmented with area of each compartment not exceeding 3000m². Compartmentation shall be achieved by means of fire resisting wall of 2hr rating or fire curtain of 2 h rating or water curtain. In case of water curtain, existing water storage shall be supplemented by water demand for water curtain nozzles for 60 min considering the largest size of compartment. The water supply for the water curtain nozzles shall be through independent electric pump of adequate capacity (flow and head) with piping / riser for the water supply to the nozzles.

VII. Electrical services:

(As per NBC part-8 Building services section -2 Electrical and allied installation of the code section 7 of National Electrical code 2011 should be followed)

1. The electric distribution cables/wiring shall be laid in separate duct. The duct shall be sealed at every alternate floor with non-combustible materials having same fire resistance as that of the duct.
2. Water mains, telephone lines, intercom lines, gas pipes or any other service lines shall not be laid in the duct of electric cables.
3. Separate circuits for water pumps, lifts, staircase & corridor lighting shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes so that fire in one circuit will not affect the others.
4. The inspection panel doors and any other opening in the shaft shall be provided with airtight fire doors having the fire resistance of not less than two hours.
5. Medium & low voltage wiring running in shaft and within false ceiling shall run in metal conduit.
6. An independent & well-ventilated service room shall be provided on the ground floor with direct access from outside or from the corridor for the purpose of termination of electric supply. The doors provided for the service room shall have fire resistance of not less than two hours.

VIII. Electrical services should conform to the following:

- a) The electric distribution cables/wiring shall be laid in a separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits;

- b) Water mains, telephone lines, intercom lines, gas pipes or any other service line shall not be laid in the duct for electrical cables; use of bus ducts/solid rising mains instead of cables is preferred;
- c) Separate circuits for firefighting pumps, lifts, staircases and corridor lighting and blowers for pressurizing system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Such circuits shall be protected at origin by an automatic circuit breaker with its no-volt coil removed. Master switches controlling essential service circuits shall be clearly labeled;
- d) The inspection panel doors and any other opening in the shaft shall be provided with air-tight fire doors having fire resistance of not less than 2 h;
- e) Medium and low voltage wiring running in shafts and within false ceiling shall run in metal conduit. Any 230 V wiring for lighting or other services, above false ceiling, shall have 660 V grade insulation. The false ceiling, including all fixtures used for its suspension, shall be of non-combustible material and shall provide adequate fire resistance to the ceiling in order to prevent spread of fire across ceiling reference may be made to good practice {4(29)};
- f) An independent and well ventilated service room shall be provided on the ground level or first basement with direct access from outside or from the corridor for the purpose of termination of electric supply from the licensees' service and alternative supply cables. The doors provided for the service room shall have fire resistance of not less than 2 h;
- g) If the licensees agree to provide meters on upper floors, the licensees' cables shall be segregated from consumers' cables by providing a partition in the duct. Meter rooms on upper floors shall not open into stair case enclosures and shall be ventilated directly to open air outside; and

h) Suitable circuit breakers shall be provided at the appropriate points.

IX. General conditions for setback:

1. The width and height of any arch or gate, if any, should have the clearance of not less than 4.5 m and 5 m respectively.
2. As per Tamil Nadu Combined Development and Building Rules, 2019 and it must be kept free for movement and operation of fire fighting vehicles. In any case, no ramp, landscape garden and swimming pool shall be allowed in the setback area. The entire setback area earmarked shall be hard paved or provided with reinforced concrete so as to withstand the weight of the aerial ladder platform.
3. Any ramp should not exceed the building line and should not obstruct the side back area at all around the building for the easy movement of an aerial ladder platform vehicle operation during emergency.
4. The applicant should not provide any obstruction like transformer yard, generator, etc., in the setback area so as to facilitate the easy movement and operation of an aerial ladder platform vehicle during emergency. The setback area slop gradient should not be elevated from the ground level. The entry, movement and exit of the setback should have no slope and should be hard paved and support the operation of the aerial ladder platform.
5. Ramp for fire tender movement: Ramp shall be planned in 1:12 slope.
6. Assembly points should be provided for each blocks.

X. As per 3.4.10.2 of NBC-2016 glass façade should be in accordance with the following.

- a) For fully sprinkled buildings having fire separation of 9 meter or more, tempered glass in a non-combustible assembly, with ability to hold the glass in place, shall be provided. It shall be ensured that

sprinklers are located within 600 mm of the glass façade providing full coverage to the glass.

- b) All gaps between floor-slabs and façade assembly shall be sealed at all levels by approved fire resistant sealant material of equal fire rating as that of floor slab to prevent fire and smoke propagation from one floor to another.
- c) Openable panels shall be provided on each floor and shall be spaced not more than 10 meter apart measured along the external wall from centre -to- centre of the access openings. Such openings shall be operable at a height between 1.2m and 1.5 m floor, and shall be in the form of openable panels (fire access panels) of size not less than 1000 mm X 1000 mm opening outwards. The wordings, "FIRE OPENABLE PANEL – OPEN IN CASE OF FIRE, DO NOT OBSTRUCT" of at least 25 mm letter height shall be marked on the internal side. Such panels shall be suitably distributed on each floor based on occupant concentration. These shall not be limited to cubicle areas and shall be also located in common areas/corridors to facilitate access by the building occupants and fire personnel for smoke exhaust in times of distress.

XI. Fire station

Fire station shall be planned in New Farrens Road - fire station shall be house the following.

1. 200 square feet office with toilet and store facility.
2. 1 fire tender bay – 6 meter X 20 meter (height 5 meters clear)
3. 15000 liters capacity of underground sump.
4. A small open ground (1200 square feet area)

However the following defects / deficiencies have been observed from the submitted drawing, it has to be intimated to the applicant to make change in the plan.

Residential Block -4

1. As per NBC part-4 clauses 2.24 An enclosed shaft (firefighting shaft (fire tower) having protected area of 120 minutes fire resistance rating comprising protected lobby, staircase and fireman's lift, connected directly to the exit discharge or through exits passageway with 120 minutes fire resistant wall at level of exit discharge, but in the submitted drawing it is not given in the submitted drawing.
2. Fire command center (FCC) as per clauses 3.4.12 shall be on the entrance floor of the building having direct access. The control room shall have the main fire alarm panel, communication system, pressurization system, smoke management system, and building management system etc. This feature should be included in the plan.
3. As per NBC part-4 clauses 4.5.2 all Floors should be compartmented / zoned with the area of each compartment being not more than 750 square meters. This should be marked in the plan.
4. As per NBC part-4 clauses 2. 39, A defend in place or a staging arrangement ,providing safety from fire and smoke originating from the area of incidence, by allowing alternative egress from a compartment to an area of refuge or another compartment at or near the same level. This also includes such egress from a compartment to an adjoining building.
5. A horizontal exit shall be through a fire door of 120 minutes rating in a fire resisting wall. Horizontal exit require separation with the refuge area or adjoining compartment through 120 minutes fire barrier. The adjoining compartment of the horizontal exit should allow unlocked and ease of egress and exit for the occupants using defend in place strategy.
6. As per NBC part-4 clauses 5.1.1 para – f, the pressure at the hydrants shall however not exceed 7.0 bar, considering the safety of the operator. If the hydrant pressure is 7.0 bar on the ground , it may not be sufficient/adequate above 30 meters in height hence multi-levels of pumps and water storage tanks must be provided with in the building

to supply water above the height where the pressure inadequate by fire pump

7. The proposed super high rise residential buildings have the important feature to develop independent tower structure on the podium. It is stated as per NBC that the fire and life safety of the building depend on the erection of appropriate gradient of ramp for maneuvering of emergency vehicle. It is observed that ramp for podium is not yet constructed.

- It is also observed that the space around the building on the podium has been involved some erection of permanent structure for aesthetic feature. It is important that there is close access of Aerial vehicle platform to the building on podium during emergency. Hence it should be removed.
- As per the NBC Part -3 clauses 4.6.1.3, the fire tender access to podium shall be minimum 7.5 m wide ramp should be provided, and also there is an independent access, and egress of emergency vehicle to and from the podium by ramp should be provided.

Block 6 (commercial & retail market)

1. The committee observed that there is a mercantile occupancy of above 30 meters in the market building. As per the NBC 2016 the mercantile occupancy shall be permitted up to 30 meters height of the building.
2. The proposal of block VI building now currently proposed to extend which is intended for multi screen assembly occupancy on southern side. It is observed in the plan that the ramp provision for basement is shown on the setback area.
3. In the Multi screen floors, the details of the seating numbers have not been mentioned clearly.
4. As per BIS; all fire escapes of screen occupancy should directly connected to the ground, so that it has to revise in the plan.
5. Floor compartmentation not shown in the drawing.

6. In the drawing courtyard has a difference in its floor level for that slop ramp has given but the courtyards should be in one plane for the movement of fire vehicle.

Block 7 (residential and commercial)

1. In the site plan, basement ramp exceed the building line and is obstructing the building set back area in will affect the movement of firefighting vehicles. It should be changed.
2. The western side setback area of the proposed building has been obstructed with the 2 number of elevated ramps and landscape provisions; as such obstructions would impede the movements of emergency vehicles. It should be rectified.
3. Occupancy details, stairway provisions, exit provisions have not been mentioned clearly in the commercial / retail occupancy area. It should be rectified.
4. As per NBC part-4 clauses 2.24 an enclosed shaft having protected area of 120 minutes fire resistance rating comprising protected lobby, staircase and fireman's lift, connected directly to the exit discharge or through exits passageway with 120 minutes fire resistant wall at level of exit discharge. The respective floors shall be approachable from firefighting shaft enabling the fire fighter to access the floor and also enabling the fire fighter to assist in evacuation through fireman's lift. The firefighting shaft shall be equipped with 120 minutes fire door. The firefighting shaft should be equipped with fireman talk back, wet riser and landing valve in its lobby, to fight
5. Fire command center (FCC) as per clauses 3.4.12 shall be on the entrance floor of the building having direct access. The control room shall have the main fire alarm panel, communication system, pressurization system, smoke management system, and building management system etc. This feature should be included in the plan.

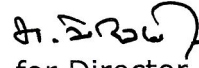
6. As per NBC part-4 clauses 4.5.2 all floors should be compartmented /zoned with the area of each compartment being not more than 2000 square meters. This should be marked in the plan.
7. As per NBC part-4 clauses 2. 39, A defend in place or a staging arrangement, providing safety from fire and smoke originating from the area of incidence, by allowing alternative egress from a compartment to an area of refuge or another compartment at or near the same level. This also includes such egress from a compartment to an adjoining building.
8. A horizontal exit shall be through a fire door of 120 minutes rating in a fire resisting wall. Horizontal exit require separation with the refuge area or adjoining compartment through 120 minutes fire barrier. The adjoining compartment of the horizontal exit should allow unlocked and ease of egress and exit for the occupants using defend in place strategy.

Block 8 (hospital building)

1. As per submitted plan copies refuge area is not provided at 39th meters height of level.
2. As per submitted plan copies Alternative staircase is not provided for the emergency evacuation as per NBC part - 4 2016 clauses 4.4.2.4.3.1.
3. As per submitted plan copies dead end of the corridor is more than 6 meters. As per NBC 2016 Part IV clause 4.2.2.2 - (C) the dead end corridor length in exit access shall not exceed 6 meters for Institutional building.
4. As per submitted plan copies only one staircase was provided for 1st basement but as per clause 4.2.1.9 in no case shall there be less than two independent basement exits.

The MSB inspection team has recommended to issue of revised planning permission / no objection certificate to the proposed building subject to the fulfillment of the above mentioned conditions.

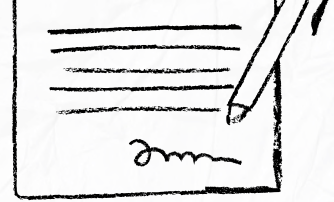
In view of compliance with the above said facts a revised PP/NOC is issued from the fire service point of view so as to accord planning permission for the above said proposed building subject to fulfillment of all the above said conditions, as recommended by the MSB committee. After completion of this project the compliance certificate should be obtained to ensure fire safety measures.


for Director,
Fire and Rescue Services,
Tamil Nadu.

To:
M/s. SPR Constructions Pvt. Ltd.,
Stephenson Road,
B&C Mills, SPR City,
Chennai – 600 012.



Copy to:
The Additional Director (Operation & Training),
Fire and Rescue Services, Directorate,
Chennai.



our services doesn't just end there



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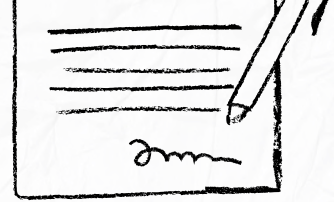
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