WAVE City

Subject: Explanation for electric system in basement as noted UPRERA letter dated 03rd August, 2024 with reference to the project named "UCHDPL-EDEN", District Ghaziabad, Application ID No. 1157507 under U.P. Real Estate Regulatory Authority

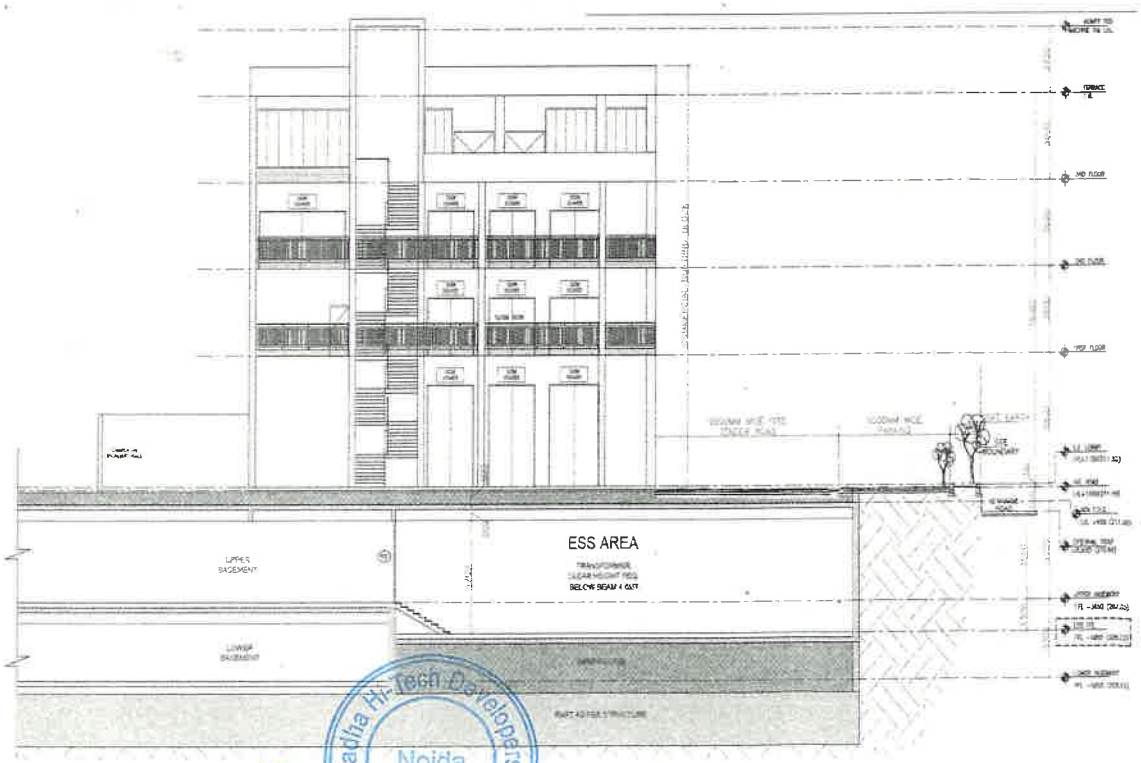
UPRERA Observation No. 7: Electric supply system are established in basement.

Explanation and Reply to Observation No. 7

The electrical system/sub-station for project "UCHDPL-EDEN" is in basement and shall be in compliance with various Codes, Rules and Regulation as specified in National Building Code, 2016, Central Electrical Authority Rules 2023 and as elaborated below.

The electrical system/sub-station shall employ Dry-Type transformer as required by National Building Code 2016, Central Electrical Authority Rules 2023, in the first basement at periphery of the basement building. Furthermore the enclosed Transformer area shall comprise of 1Nos. 3.15MVA dry type transformers. However its safety specifications shall be exceed/equal in-terms of firefighting and civil and structural requirements of much larger 10MVA transformer such as:

1. The ceiling slab in/over the dry type transformers room shall be box type or shall comprise of two concrete slabs. This box slab shall give more than 4 hour fire rating. The intervening cavity shall provide necessary insulation.



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2. The walls shall be made using fire bricks so as to exceed 4 hours fire rating specified otherwise.

3. The transformer room shall have automatic fire fighting system as per Central Electricity Regulations 2023, Gazette Notification dated 8th June, 2023, Part III, Section 4, Chapter Vi, Clause 46 (2) (ix), as applicable in case of 10MVA transformers.

As noted above, the sub-station at project "UCHDPL-EDEN" shall comply with and is in accordance with following codes, rules and regulations as specified by **National Building Code, Central Electricity Regulations 2023, Indian Electricity Rules 1956, U.P. Directorate of Electrical Safety** and their stringent safety rules and regulations as noted under :

1. The electric system/sub-station at "UCHDPL-EDEN" project shall comply with requirements specified in National Building Code 2016, Part 8, Section 2, Clause 4.2.1.13) at Page 20, which specifies :

   "13) Dry-type installation — In case electric substation has to be located within the mainmulti-storeyed building itself for unavoidable reasons, it shall be a dry-type installation withvery little combustible material, such as, a dry type transformer with Vaccum (or SF6) breakers as HT switchgear and ACB or MCCB as medium voltage (MV) switchgear. Suchsubstations shall be located on the ground level or on first basement, and shall have directaccess from the outside of the building for operation and maintenance of the equipment."

2. The electric system/sub-station at "UCHDPL-EDEN" Project shall comply with requirements specified in **Central Electricity Regulations** 2023, **Gazette Notification dated** 8th June, 2023, Part **III,** Section 4, Chapter Vi, Clause 46 (2) (x) lays down **following** safety **measures for installation** of **sub-station in basement** where electricity voltage exceeds 650V is supplied, converted, transformed, or used:

   "Clause/Para 46 (2) (x) undertake the following measures, where it is necessary to locate the substation, or switching station in the basement, namely: —

   (a) the transformer room be in the first basement at the periphery;
   (b) the direct access to the transformer room be provided from outside and the surrounding walls of four hours fire withstand rating be provided as per relevant standards;
   (c) the entrances to the transformer room be provided with fire resistant doors of two hour fire rating and the door shall always be kept closed and a notice of this effect be affixed on outer side of the door;
   (d) a curb of a suitable height be provided at the entrance in order to prevent the
   (e) flow of oil from a ruptured transformer into other parts of the basement;
   (f) the cables to primary side and secondary side have sealing at all floors and wall opening of atleast two hours fire withstand rating; and
   (g) Fire Retardant Low Smoke Low Halogen cable as per relevant standards be used;

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(h) *ensure that oil filled transformers installed indoors in other than residential or commercial buildings are placed on the ground floor or not below the first basement;*

(i) *ensure that only dry type transformer shall be used inside the residential and commercial buildings;*

(j) *ensure that cable trenches inside the substations and switching stations containing cables are filled with sand, pebbles or similar non-inflammable materials or completely covered with non-inflammable slabs; and*

(k) *ensure that unless the conditions are such that all the conductors and apparatus may be made dead at the same time for the purpose of cleaning or for other work, the said conductors and apparatus shall be so arranged that these may be made dead in sections and that work on any such section may be carried on by the person*

(l) *designated or appointed or engaged or permitted under these regulations without danger".*

3. The sub-station shall be erected in compliance with rules and regulations of U.P. Directorate of Electrical Safety. The U.P. Directorate of Electrical Safety undertake and conducts:

3.1. Early and periodic inspection of various installations under central electricity authority regulation/Indian electrical rules, 1956

a. *Regarding electrical installations, the following initial inspections are carried out underthe Indian Electrical Rules, 1956 by the Directorate of Electrical Safety: -*

b. *Early inspection of medium voltage electrical installation under rule-51*

c. *Inspection of electrical installations of generators over 10 kilowatt capacity under Rule-47-A*

d. *Inspection of electrical installations of multi-storey buildings (height 15 meters) under rule-50 'A'.*

e. *Inspection of electrical installations of high voltage and extra high voltage under rule- 632- Under the Rule-46 of the Indian Electricity Rules, 1956, all electrical acquisitions of low voltage (commercial), medium voltage and high voltage are inspected at the specified intervals.*

f. *Regular periodic inspection of electrical acquisitions under Uttar Pradesh Energy Section-3 Notification No. -1389 P-3/ 94-23-106 / P-93, dated May 06, 1994 is done at the following intervals: -*

i. *All high, very high and medium voltage installations will be inspected and tested once in three years.*

ii. *All low voltage installations will be inspected and tested once in five years.*

3.2. Upon installation of the electric system/sub-station the necessary NOC from U.P. Directorate of Electrical Safety shall be obtained by the Uppal Chadha Hi-Tech Developers Private Limited being owned of the project.

4. The electric system/sub-station in basement shall conform to following compliances as noted above.

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S.No.	Statutory Norms	Compliance Note
1.	In case electric substation has to be located within the main multi-storeyed building itself for unavoidable reasons, it shall be dry-type installation with very little combustible material, such as, a dry type transformer with vacuum (or SF6) breakers as HT switchgear and ACB or MCCB as medium voltage (MV) switchgear. Such substations shall be located on the ground level or on the first basement, and shall have direct access from the outside of the building for operation and maintenance of the equipment.	1 Nos. 3.15MVA dry type transformer is proposed of indoor duty, vacuum cast coil with class H insulation. HT Breakers shall be SF6 based. LT Breakers shall be ACB/MCCB. Access route directly from ground level with minimum 3.75m height is provided for transformer installation and maintenance.
2.	The transformer room be in the first basement at the periphery.	Substation is proposed at the periphery of Basement-1.
3.	Direct access to the transformer room be provided from outside and the surroundings wall of four hour fire withstand rating be provided as per relevant standards.	Access route from Ground level with minimum 3.75m height is provided for transformer installation and maintenance. All surrounding walls are four hour fire rated.
4.	The entrances to the transformer room be provided with fire resistant doors of two hour fire rating and the door shall always be kept closed and a notice of this effect be affixed on outer side of the door.	Fire resistant doors of two hour fire rating are proposed for entrance to the transformer room.
5.	The cables to primary side and secondary side have sealing at all floors and wall opening of atleast two hours fire withstanding rating.	Two hour rated fire block sealant shall be provided on wall openings.
6.	Fire Retardant Low Smoke Low Halogen cable as per relevant standards be used.	All cables shall be FRLSH (Flame Retardant Low Smoke & Halogen).
7.	Ensure that only dry type transformer shall be used inside the residential and commercial buildings.	Dry Type transformers are proposed of indoor duty, vaccum cast coil and Class H insulation.
8.	Fire Suppression System proposed with every LT Switchgear Enclosure to reduce vulnerability to fire.	The main panels housing LT switchgear shall have automatic gas based Fire Suppression system.

Therefore, the electrical system/sub-station shall be installed in full-compliance as noted above with requisite codes, rules and regulations as required under **National Building Code 2016, Central Electricity Authority Gazette Notification** dated 8th June, 2023 and

U.P. Directorate of Electrical Safety and therefore Honorable Authority may kindly be pleased to consider the explanation favorably.

In view of the above mentioned submissions, it is most humbly prayed that this Honorable Authority may kindly be pleased to approve our application for project registration under UPRERA.

ANNEX – 15
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i) Substations with oil-filled equipment/ apparatus [transformers and high voltage panels] shall be either located in open or in a utility building. They shall not be located in any floor other than the ground floor or the first basement of a utility building. They shall not be located below first basement slab of utility building. They shall have direct access from outside the building for operation and maintenance of the equipment.

ii) Substations/Utility buildings (where the substation or oil-filled transformer is located) shall be separated from the adjoining buildings including the main building by at least 6 m clear distance to allow passage of fire tender between the substation/utility building and adjoining building/main building.

iii) There shall be no interconnecting basement with the main building underneath the oil-filled transformers.

iv) Provisions for oil drainage to a point at a lower level and separated by adequate fire barrier shall be provided. If there is a floor directly below the ground floor level or first basement where the oil-filled transformers and oil-filled circuit breakers are placed, then they shall be separated by a fire barrier of appropriate fire rating as per Part 4 'Fire and Life Safety' of the Code and proper oil drainage system shall be provided to avoid possible leakage of oil into the lower floor.

v) Substation equipment having more than 2 000 litre of oil whether located indoors in the utility building or outdoors shall have baffle walls of 4 h fire rating between apparatus (*see also* Part 4 'Fire and Life Safety' of the Code for fire safety related requirements).

vi) Provisions shall be made for suitable oil soak-pit, and where use of more than 9 000 litre of oil in any one oil tank, receptacle or chamber is involved, provision shall be made for the draining away or removal of any oil which may leak or escape from the tank, receptacle or chamber containing the same. Special precautions shall be taken to prevent the spread of any fire resulting from the ignition of the oil from any cause and adequate provision shall be made for extinguishing any fire which may occur.

vii) In respect of all oil type transformers located at basement, a kerb (sill) of a suitable height shall be provided at the entrance in order to prevent the flow of oil from a ruptured transformer into other parts of the basement in the event of the possibility of oil spillage from the transformer on its failure.

viii) Adequate fire barriers or deflectors shall be provided to avoid flames from the substation reaching or affecting the upper floors (*see also* Part 4 'Fire and Life Safety' of the Code).

ix) For transformers having large oil content (more than 2 000 litre), Rule 44(2) of the *Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations*, 2010 as amended from time-to-time shall apply (*see* Annex B).

13) *Dry-type installation* — In case electric substation has to be located within the main multi-storeyed building itself for unavoidable reasons, it shall be a dry-type installation with very little combustible material, such as, a dry type transformer with vacuum (or SF_6) breakers as HT switchgear and ACB or MCCB as medium voltage (MV) switchgear. Such substations shall be located on the ground level or on first basement, and shall have direct access from the outside of the building for operation and maintenance of the equipment.

Exceptionally, in case of functional buildings, such as air traffic control towers, data centres and buildings of height more than 100 m having high electrical load requirement, dry-type installations/substations may also be provided at upper level. This measure will decrease the current flow and short-circuit rating at various points, thereby reducing vulnerability to fire. In such cases, a base substation shall be located at ground floor/first basement to cater to the main MV/LV panel which feeds life and safety services loads as defined in **4.2.1** (29). The base substation shall be located in such a way to provide direct access to the firemen in case of any emergency. The power supply control to any substation or transformer located at upper floors shall be from the base substation so that in case of fire, the electrical supply can be easily disconnected to avoid additional losses.

14) The power supply HV cables voltage shall not be more than 12 kV and a separate dedicated and fire compartmented shaft should be provided for carrying such high voltage cables to upper floors in a building. These shall not be mixed with any other shaft and suitable fire detection and suppression measures shall be provided throughout the length of the cable on