Mosharaf Apparels Studio Limited

Baniarchala, Bhabanipur, Gazipur sadar, Gazipur
(24.157541, 90.406538)
12th & 18th August 2021

RSC RMG SUSTAINABILITY COUNCIL

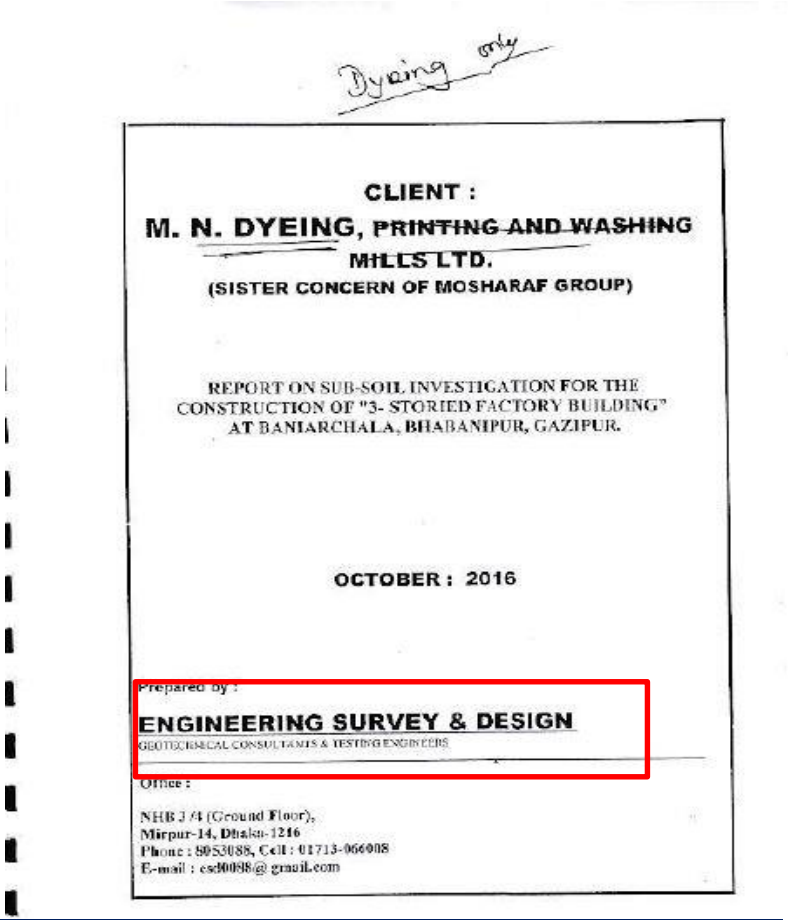
Building Information

1. Building-1 – G+4
2. Utility Building – G+2 with partial basement
3. Childcare & Security Room – Single storied shed
4. Fire Pump Room – Single storied shed with basement

Observations

Foundation adequacy to be verified

Observation: Building-1



Dyeing only

CLIENT :

M. N. DYEING, ~~PRINTING AND WASHING~~ MILLS LTD.

(SISTER CONCERN OF MOSHARAF GROUP)

REPORT ON SUB-SOIL INVESTIGATION FOR THE CONSTRUCTION OF "3- STORIED FACTORY BUILDING" AT BANIARCHALA, BHABANIPUR, GAZIPUR.

OCTOBER : 2016

Prepared by :

ENGINEERING SURVEY & DESIGN

GEOTECHNICAL CONSULTANTS & TESTING ENGINEERS

Office :

NHB J /4 (Ground Floor),
Mirpur-14, Dhaka-1216
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Provided Geotechnical investigation was carried out for 3 storied Building by "Engineering Survey & Design".

Building-1 is constructed up to 5 storied

Observation: Building-1

CONCLUSION & RECOMMENDATIONS

This Recommendations submitted in this report are prepared on the basis of supplied SPT & available subsurface Samples from field for the exclusive use of the following project

Client	:	M. N. Dyeing, Printing and Washing Mills Ltd.
Name of Work	:	Construction of 3-storied Factory Building
Location	:	Baniarchala, Bhabanipur, Gazipur.

From the field and laboratory test results, it can be concluded as follows:

- The sub-soil formation encountered at the proposed site is almost homogeneous. The sequence of litho logical composition as well as consistency of the soil at different depths has been depicted in the respective bore logs BH-1 through BH-13.
- RCC Cast-in-situ piles may be installed below the foundation. **Determining effective length of a pile segment requires engineering judgment.** The allowable Load Bearing Capacity (ton) of 18 inch dia RCC cast-in-situ pile is given below for different depth

Dia of pile (inch)	Depth (ft) from EGL	Allowable Load Bearing Capacity (Ton) Considering factor of Safety = 2.5				
		BH - 1	BH - 2	BH - 3	BH - 4	BH - 5
	45	33.32	30.92	40.17	57.90	40.03
	50	52.62	46.70	53.60	61.53	51.94
	55	57.07	54.22	60.45	66.05	54.82
		BH – 6	BH - 7	BH - 8	BH - 9	BH - 10
	45	39.89	52.81	54.11	49.39	38.87
18	50	47.52	54.78	56.91	49.57	43.19
	55	53.54	57.66	54.85	59.71	47.57
		BH - 11	BH - 12	BH - 13		

Cast in situ pile suggested in provided Geotechnical investigation report. But as per drawing, pre-cast pile has been constructed for Building-1. The capacity of pre-cast pile are not mentioned in the geotechnical report.

4.3 SOIL INVESTIGATION REPORT

The sub-soil exploration at the site consists of total 04 (Four) Nos. exploration boring up to a depth of 70' below from EGL. The soil investigation and the report has been prepared by "AB Soil & Foundation Engineers" at Sector -9, Uttara Model Town, Dhaka-1230.

Pile Capacity Calculation (soil test report AB Soil & Foundation Engineers dated March 2016)

Book : Foundation Design and Construction by M. J. Tomlinson, 4th edition

Skin friction for cohesive soil is $Q_s = \alpha\, Cd\, As$

- α adhesion factor
- C_d Undisturbed shear strength = N/8 ksf
- A_s Surface area of the pile

Skin friction for cohesionless soil $Q_s = K_s\, Pd \tan\delta\, As$

- K_s Earth pressure coefficient (1.0 for loose condition)
- P_d γ_d d = depth of pile over which the skin friction is calculated
- δ angle of wall friction = 0.75 ϕ
- A_s Surface area of the pile

Base resistance of the pile for cohesionless soil $Q_b = A_b\, Pd\, (Nq - 1)$

- P_d Effective overburden pressure at pile base level γd, γ = unit weight of soil, d = depth
- N_q Bearing capacity factor (Fig. 7.4, Brezantevs Bearing capacity factor)
- A_b Area of pile section

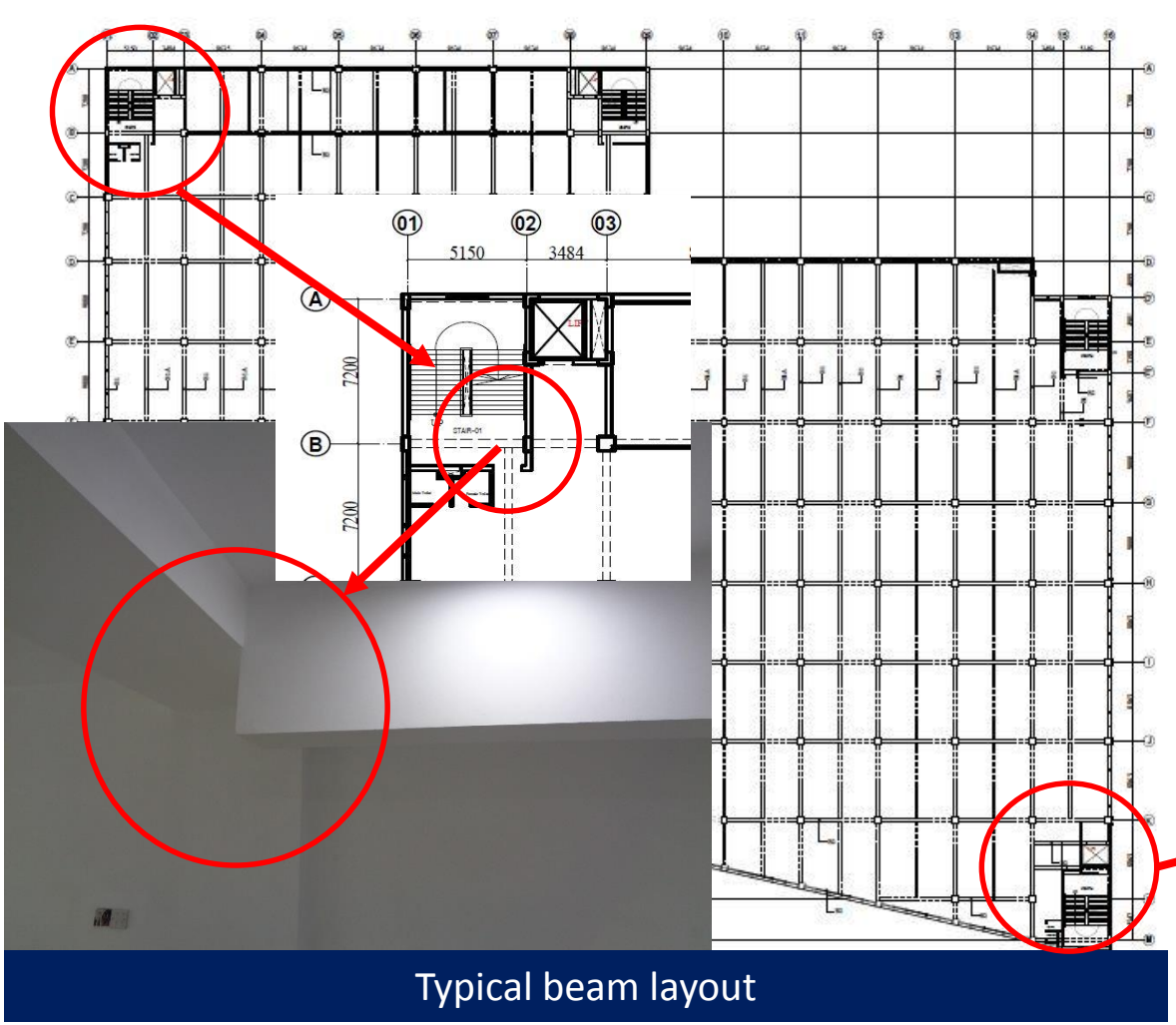
Capacity Calculation of pre-cast pile included in DEA report in reference to another soil investigation report (AB Soil & Foundation Engineering) which was not available during inspection.

Factory is required to verify the foundation adequacy as per the actual foundation type & capacity. Also, justify the geotechnical investigation report.

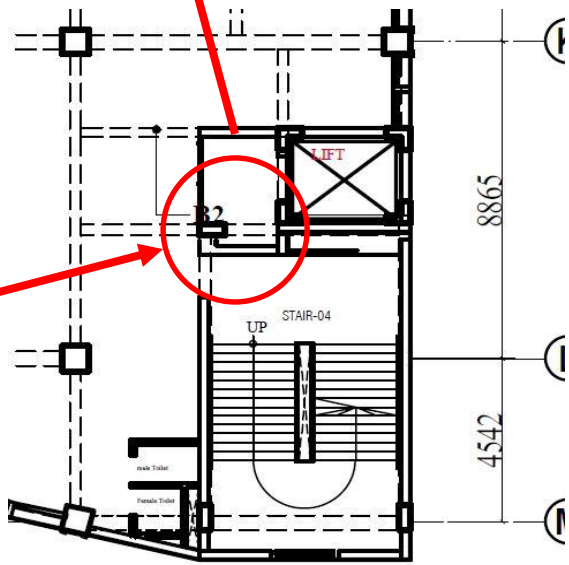
Observation: Building-1

Irregularities in load transfer system

Observation: Building-1



Typical beam layout



At those highlighted areas, beams are resting neither as per beam layout nor in usual way. Therefore, load transfer system is apparently irregular. Factory engineer is required to check the load transfer system of those highlighted beams.

Observation: Building-1

Water ponding on roof slab

Observation: Building-1

Water ponding on roof slab

Water ponding was found on roof slab. Factory is required to provide necessary slope and improve drainage system to prevent water ponding.

Observation: Building-1

Exposed reinforcement left at roof level

Observation: Building-1

Exposed reinforcement left at roof level

Exposed reinforcement is left at roof level & staircase which was prone to corrosion. Factory is required to provide rust proof paint on exposed reinforcement to protect from corrosion.

Observation: Building-1

Falling hazard on 4th floor

Observation: Building-1

No periphery wall was found near North-West stair on 4th floor

No periphery wall was found near North-West stair on 4th floor. Factory is required to provide adequate protection to avoid possible falling hazard.

Observation: Building-1

Stack of construction material on roof slab

Observation: Building-1

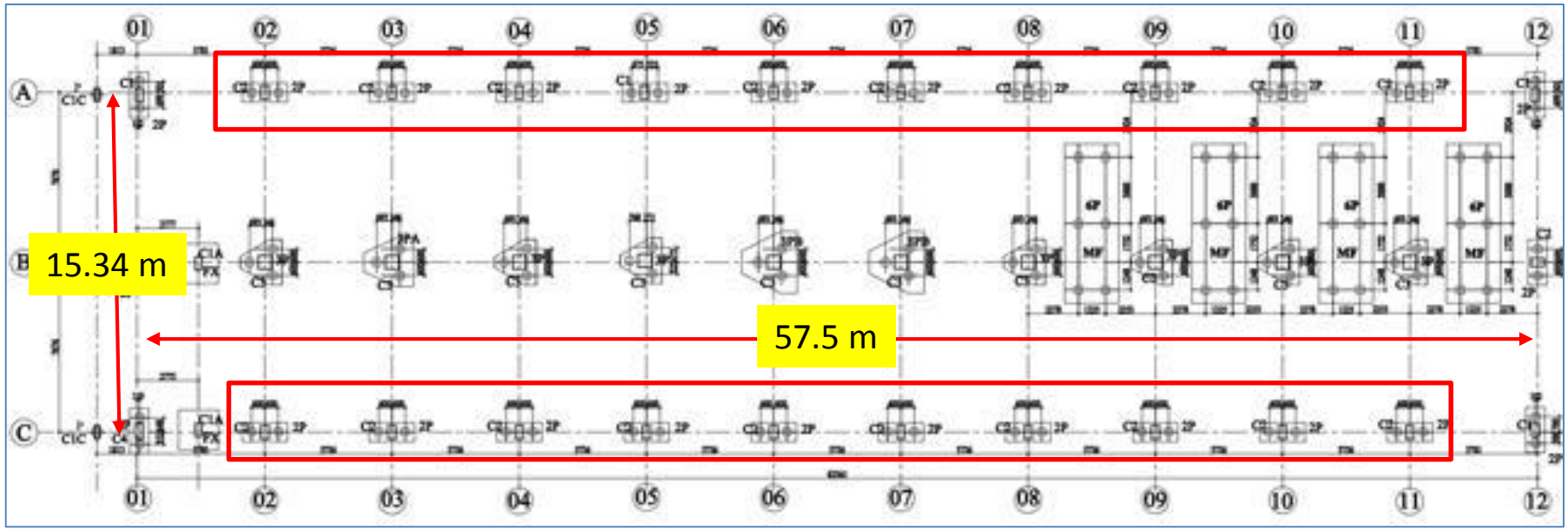
Construction material on roof slab

Stack of construction material was found on both roof slab. Factory is required to remove all construction materials from those areas.

Observation: Building-1

Lateral Stability

Observation: Utility Building



The length of the building is very long compared to its width. The building has only two spans along short direction and the height of the 3 storied building is 17.78 m. The piles of the 2-pile group foundation are placed along the long direction. So, the building seems to be laterally unstable. In the provided design report, lateral stability has not been verified. However, the factory engineer is required to check the lateral stability of the structure and update the design/assessment report accordingly.

Observation: Utility Building

Foundation adequacy to be verified

Observation: Utility Building

CLIENT:

MOSHARAF GROUP

HEAD OFFICE:
RED CRESCENT BORAK TOWER
37/3/A, Level-7
71-72, OLD ELEPHANT ROAD
RAMNA, DHAKA-1000

REPORT ON
THE SUBSOIL INVESTIGATION FOR THE PROPOSED M.N DYEING PRINTING & WASHING MILLS LTD. (PRINTING 2-STORIED UTILITY BUILDING) FOR MOSHARAF GROUP AT BANIARCHALA, MEMBERBARI, BHABANIPUR, GAZIPUR

MAY, 2017

UNIQUE BORING AND ENGINEERING LTD.
34, GREEN ROAD, NOWAB MANSION
(3RD FLOOR), DHAKA-1205.
TEL. 58615731, 58615887
MOBILE : 01711-524718, 01711-822552
e-mail : ubel2009@yahoo.com

Geotechnical investigation was carried out for 2 storied Building

Building is constructed up to 3 storied

Observation: Utility Building

5. EVALUATION OF BEARING CAPACITY

Bearing capacity has been determined for shallow as well as piled foundation. In the case of piled foundation attention was given to bored cast in situ RCC pile. Also, allowable pile capacity for 500mm dia cast in situ RCC pile have been evaluated at different depths measured from EGL. The evaluated values have been provided in Table-1, Table-2 & Table-3.

6. CONCLUSION

Under this soil condition piled foundation may be considered as the appropriate type of foundation for the proposed building. Among different types of piles we prefer bored cast in situ RCC pile. Such a pile of dia 500mm having tip level at 16.5m below EGL is expected to carry around 50 tons per pile in compression which should be confirmed by load test results.

The designer would finally select the appropriate type, size and length of pile.

MD. SHAHJAHAN KHAN
M. Sc. Engg. (Civil, Major-Geotechnical) FIEB
Managing Director

Base resistance of the pile for cohesionless soil $Q_b = A_b Pd\ (Nq - 1)$

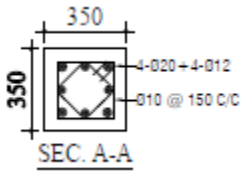
Effective overburden pressure at pile base level γd, γ = unit weight of soil, d = depth

Bearing capacity factor (Fig. 7.4, Brezantev's Bearing capacity factor)

Area of pile section

14 inch square pile

DEPTH	LAYER THICKNESS	AVG. SPT	Ks	PHI	Nq-1	Alpha	Cd	As	Pd	Skin Friction Qsul	Cum. Skin Friction Qsu	End Bearing Qbu	Ultimate Capacity Qu
ft	ft	no.	const	deg	cons	deg	ksf	sft	ksf	kip	kip	kip	kip
20	20	11	1			0	2.2	92.4	0.575	0.00	0.00	21.17	21.17
25	5	14	1	0	0	0.55	2.8	23.1	1.006	35.57	35.57	26.94	62.51
30	5	23	1	0	0	0.55	4.6	23.1	1.006	58.44	94.02	44.26	138.27
35	5	26	1	35	60	0.55	5.2	23.1	1.006	66.07	160.08	64.54	224.62
40	5	28	1	35.6	66	0.55	5.6	23.1	1.006	71.15	231.23	71.00	302.23
45	5	31	1	36.3	75	0.55	6.2	23.1	1.006	78.77	310.00	80.68	390.68
50	5	22	1	33.8	47	0.55	4.4	23.1	1.006	55.90	365.90	50.56	416.46
55	5	26	1	35	60	0.55	5.2	23.1	1.006	66.07	431.97	64.54	496.51
60	5	30	1	36	72	0.55	6	23.1	1.006	76.23	508.20	77.45	585.65



NDATION

Dyeing, Printing & Washing Mills Ltd." building is on piles. One 14" (P) with 60'-0"ft long are used The piles provided under each column are shown in the as built pile layout drawing. The nos of piles under each column are

Cast in situ pile suggested in provided Geotechnical investigation report. But as per drawing, pre-cast pile has been constructed for Utility Building. The capacity of pre-cast pile are not mentioned in the geotechnical report.

Capacity Calculation of pre-cast pile included in DEA report in reference to another soil investigation report (AB Soil & Foundation Engineering) which was not available during inspection.

Factory is required to verify the foundation adequacy as per the actual foundation type & capacity. Also, justify the geotechnical investigation report.

Observation: Utility Building

Prepared load plan to be verified and updated

Observation: Utility Building

Heavy Machin on 1st floor

Table 1: Floor occupancy and live load

Serial	Floor	Height of Floor (ft)	Live load (psf)
1	Ground floor	24'-2"	Supported on grade
3	1st floor	23'-3"	100
4	2nd floor	23'-9 "	100
7	Roof		30

Floor Finish Load:

Floor finish load is considered 25 psf in all over the structure.

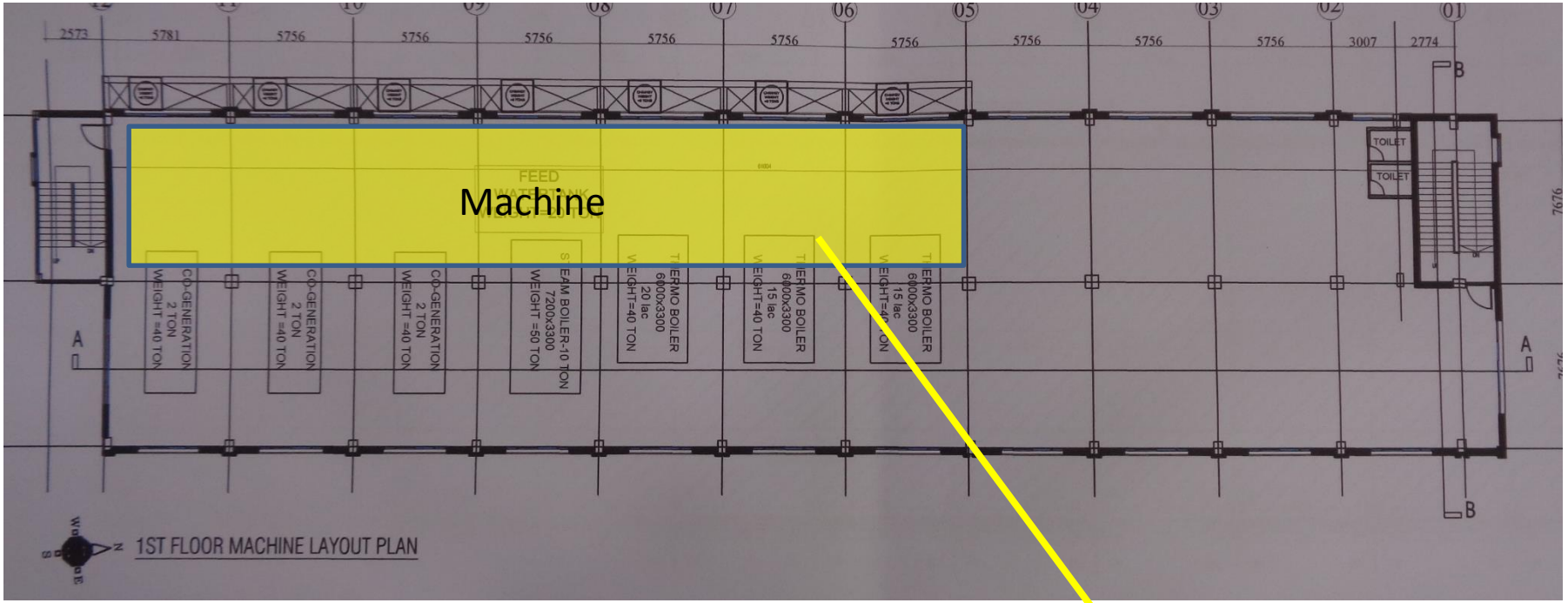
Live load for 1st floor considered as 5 kPa

Live load for 1st floor is considered as 5 KPa but live load was found more than 5 kPa on that locations due to heavy machineries. Factory engineer is required to verify and update the live load plan as per site condition.

Observation: Utility Building

Discrepancy in as-built drawing

Observation: Utility Building

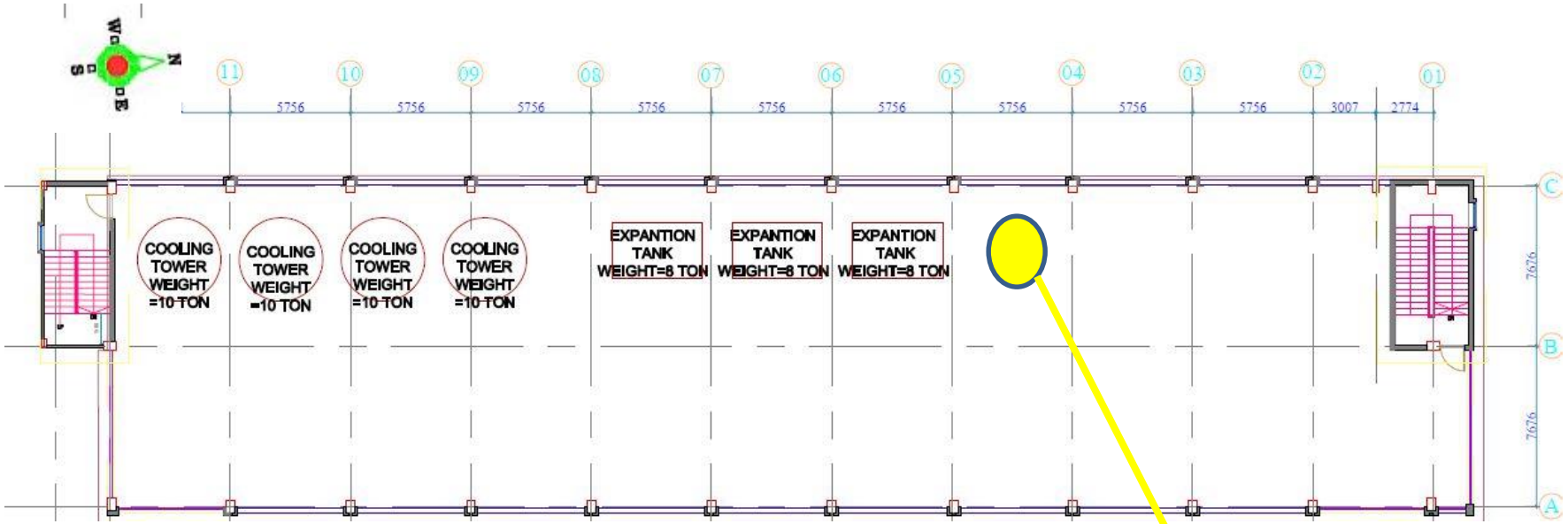


Heavy Machine on 1st floor shown at east side

Heavy machineries on 1st floor was shown at east side in floor layout but found at west side of the floor. Factory engineer is required to update the as-built drawing as well as load plan.

Heavy Machin on 1st floor found at west side

Observation: Utility Building

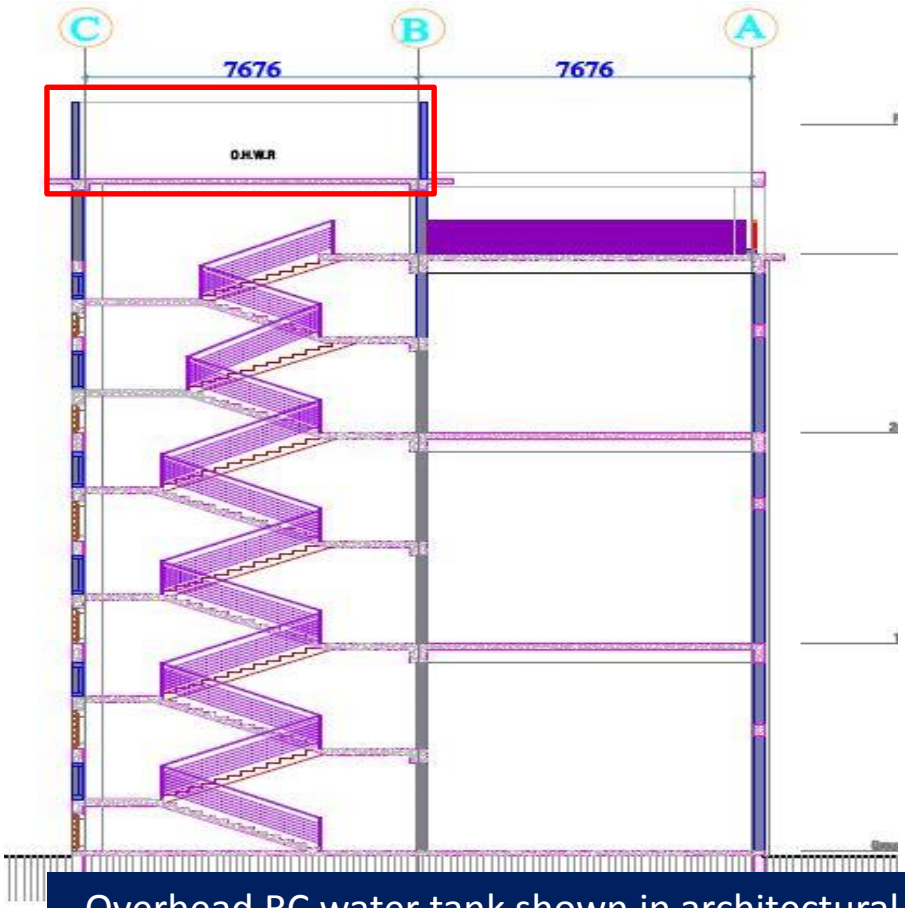


Roof plan

A plastic water tank having capacity of 3000 liter was found on roof slab which was not shown in as-built drawing. Factory engineer is required to update the as-built drawing as well as load plan.

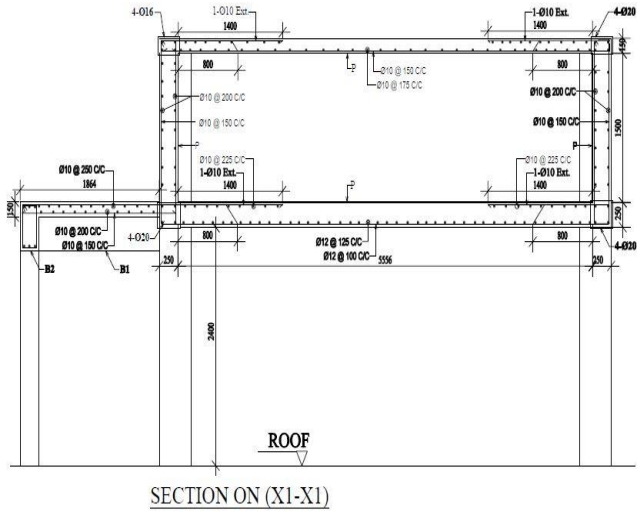
Plastic water tank of 3000 liter

Observation: Utility Building



Overhead RC water tank shown in architectural drawing

No overhead RC water tank on staircase roof.



Overhead RC water tank section in structural drawing

Overhead water tank section shown in as-built drawing, but no overhead RC water tank found on staircase roof. Factory engineer is required to update both as-built architectural and structural drawing.

Observation: Utility Building

Improper drainage system on roof slab

Observation: Utility Building

Water stagnant on roof slab

Water stagnant was found on roof slab due to improper drainage system. Factory is required to provide necessary slope and improve drainage system to prevent water ponding.

Observation: Utility Building

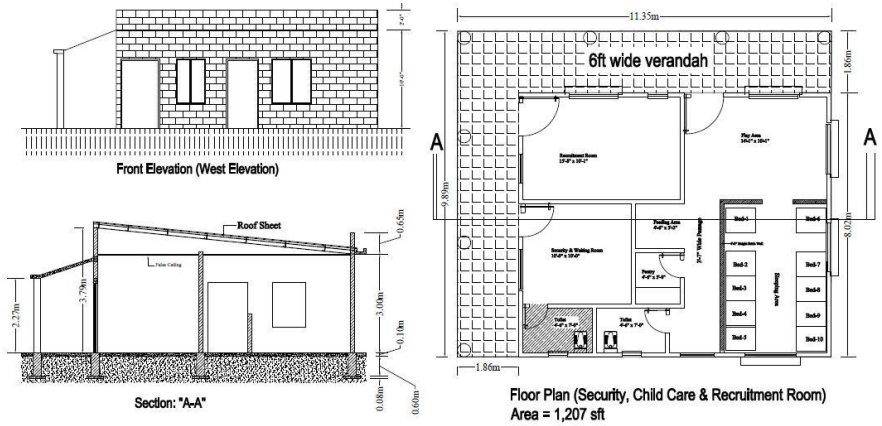
Lack of documentation

Observation: Childcare and Security Room

Isometric view

Steel shed rest on masonry wall

Only an architectural plan was provided by the factory, but no structural drawing were available. Factory engineer is required to produce full set of as-built structural drawing.

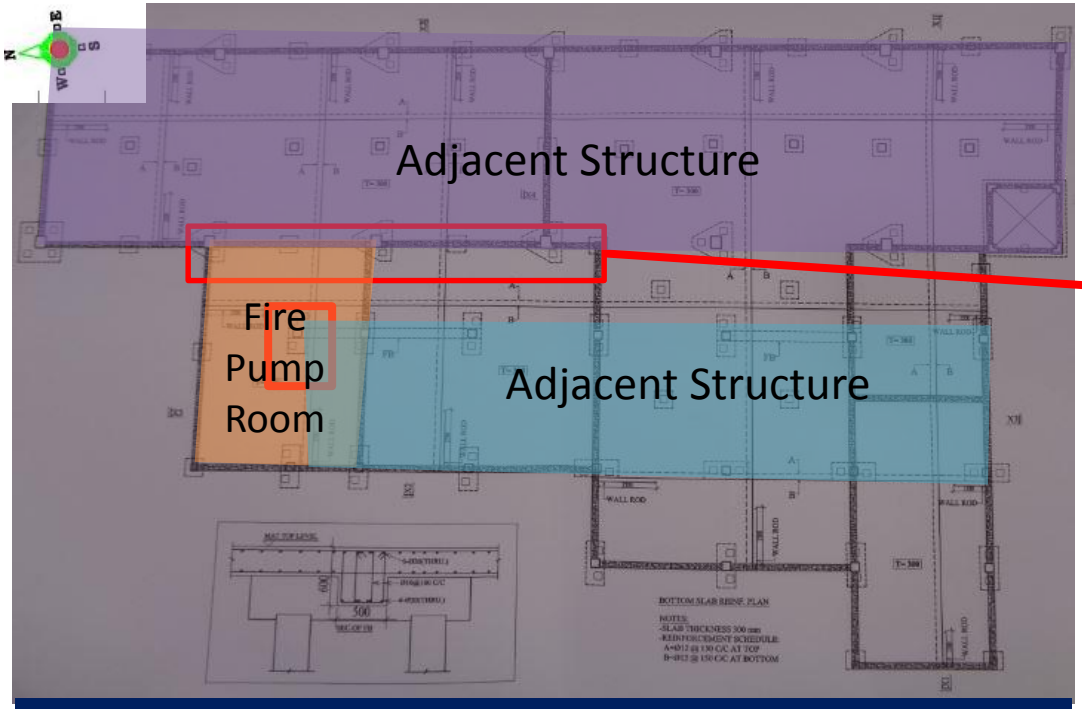


Provided architectural plan

Observation: Childcare and Security Room

Structural system to be verified

Observation: Fire Pump Room

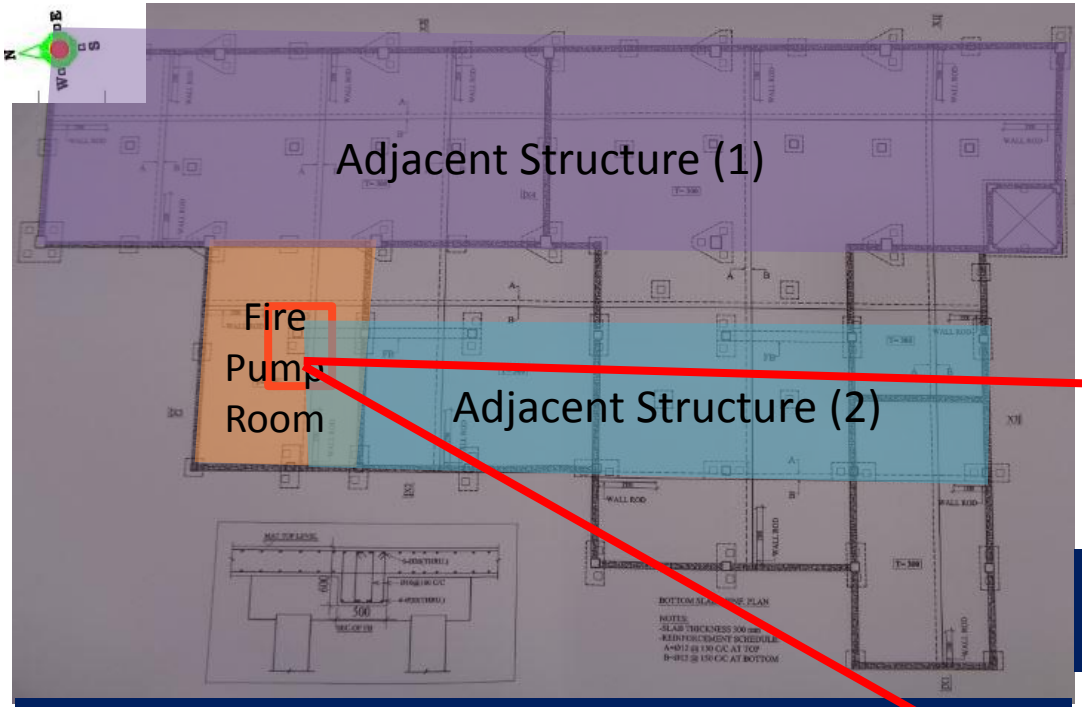


Provided ground floor layout

Steel beams are connected to adjacent structure

Grade beams of Fire Pump Room structurally connected with the grade beams of the adjacent buildings. Also, rafter of shed is resting on corbels of adjacent building

Observation: Fire Pump Room



Provided ground floor layout

Main Column of pump room (Corner column of adjacent structure) at ground floor

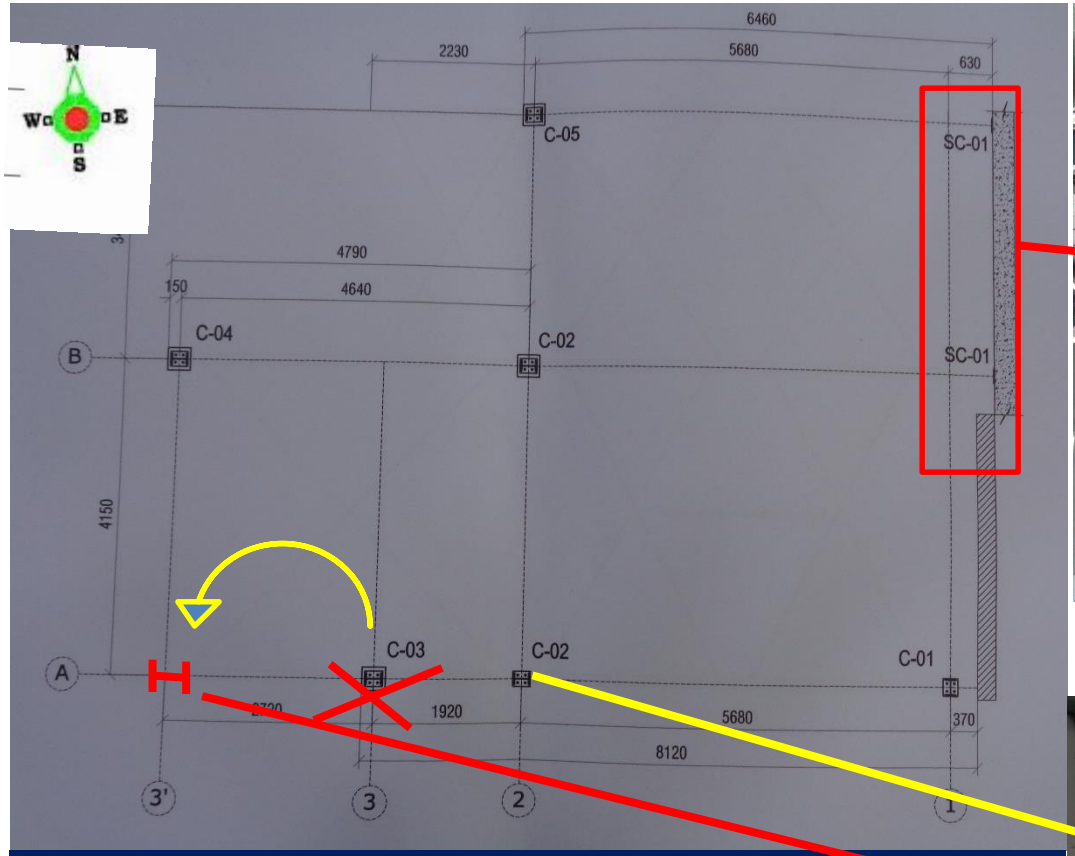
Fire pump room is located under the north-east corner of adjacent structure (2). The main column of fire pump room is the corner column of that building.
Provided ground floor slab indicates that Fire Pump Room is structurally connected with adjacent buildings at grade beam level. No geotechnical investigation report was available for this area. Therefore, foundation adequacy could not be verified. Factory engineer is required to verify the structural integrity and the foundation system for the Fire Pump Room.

Main Column of pump room (Basement)

Observation: Fire Pump Room

Incomplete as-built drawing

Observation: Fire Pump Room



Provided Ground floor slab detail

Steel columns missing,
Rafter resting on corbel

No structural detail was available for the column and beam, RC wall and foundation. One steel column found at different position and two steel columns were found missing. Also, no rafter layout was shown in drawing. Factory engineer is required to produce full set of as-built structural drawing.

Column found at different position

Observation: Fire Pump Room

Problems Observed

Building-1:

Item 01: Foundation adequacy to be verified

Item 02: Irregularities in load transfer system

Item 03: Water ponding on roof slab

Item 04: Exposed reinforcement left at roof level

Item 05: Falling hazard on 4th floor

Item 06: Stack of construction material on roof slab

Utility Building:

Item-07: Lateral Stability

Item-08: Foundation adequacy to be verified

Item 09: Prepared load plan to be verified and updated

Item 10: Discrepancy in as-built drawing

Item 11: Improper drainage system on roof slab

Childcare and Security Room:

Item-12: Lack of documentation

Fire Pump Room:

Item 13: Structural system to be verified

Item 14: Incomplete as-built drawing

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Foundation adequacy to be verified (Building-1)	Factory is required to verify the foundation adequacy as per the actual foundation type & capacity. Also, justify the geotechnical investigation report.	6-weeks
02	Foundation adequacy to be verified (Building-1)	Implement remediation work if required.	6-months
03	Irregularities in load transfer system (Building-1)	Factory engineer is required to check the load transfer system of the building.	6-weeks
04	Irregularities in load transfer system (Building-1)	Implement remediation work if required.	6-months
05	Water ponding on roof slab (Building-1)	Factory is required to provide necessary slope and improve drainage system to prevent water ponding.	6-months
06	Exposed reinforcement left at roof level (Building-1)	Factory is required to provide rust proof paint on exposed reinforcement to protect from corrosion.	6-months
07	Falling hazard 0n 4th floor (Building-1)	Factory is required to provide adequate protection to avoid possible falling hazard.	6-weeks
08	Stack of construction material on roof slab (Building-1)	Factory is required to remove all construction materials from the roof.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
09	Lateral Stability (Utility Building)	Factory engineer is required to check the lateral stability of the structure and update the assessment report accordingly.	6-weeks
10	Lateral Stability (Utility Building)	Implement remediation work if required.	6-months
11	Foundation adequacy to be verified (Utility Building)	Factory is required to verify the foundation adequacy as per the actual foundation type & capacity. Also, justify the geotechnical investigation report.	6-weeks
12	Foundation adequacy to be verified (Utility Building)	Implement remediation work if required.	6-months
13	Prepared load plan to be verified and updated (Utility Building)	Factory engineer is required to verify and update the live load plan as per site condition.	6-weeks
14	Prepared load plan to be verified and updated (Utility Building)	Implement the updated load plan.	6-months
15	Discrepancy in as-built drawing (Utility Building)	Factory engineer is required to update the as-built drawing.	6-weeks
16	Improper drainage system on roof slab (Utility Building)	Factory is required to provide necessary slope and improve drainage system to prevent water ponding.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	Lack of documentation (Childcare and Security Room)	Factory engineer is required to produce full set of as-built structural drawing.	6-weeks
18	Structural system to be verified (Fire Pump Room)	Factory engineer is required to verify the structural integrity and the foundation system.	6-weeks
19	Structural system to be verified (Fire Pump Room)	Implement remediation work if required.	6-months
20	Incomplete as-built drawing (Fire Pump Room)	Factory engineer is required to produce full set of as-built drawing.	6-weeks