

# MM Knit Wear (Extension Buildings)

Ambagh Road, Konabari, Nilnagar, Gazipur

(24.0134766N, 90.3216321E)

8 June, 25 August & 6 September 2021

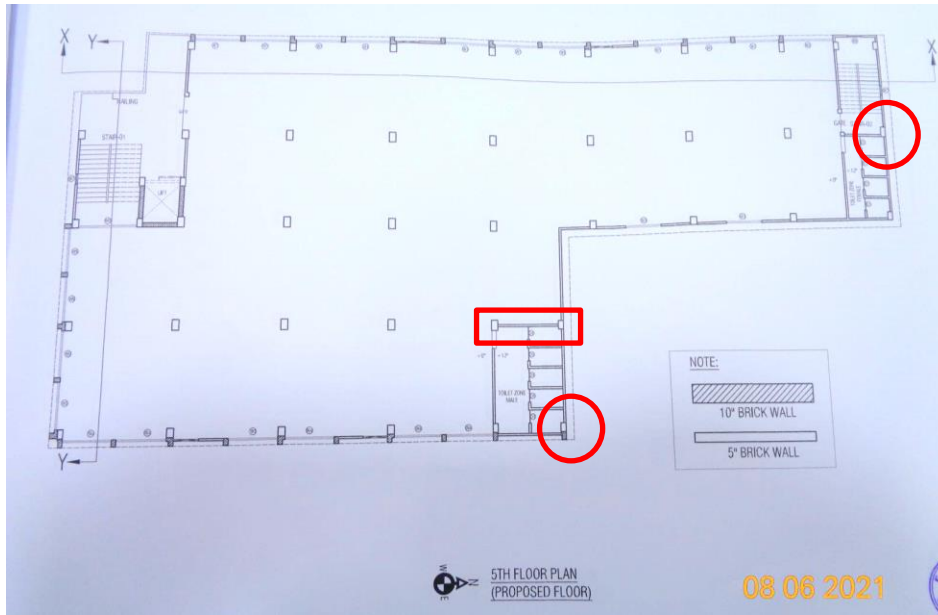


# Buildings Information

1. Building 4 (Unit-4) (G+6)
2. Building 5 (Twin Building) (G+7)
3. Building 6 (Dining & Accessories) (G+6) with mezzanine at ground floor
4. Building 7 (Steel Building) (G+3) with mezzanine at ground floor
5. Building 8 (Medical) (G+1)
6. Building 9 (WTP) (B+G+4)
7. Building 10 (Utility) (G+1)
8. Building 11 (Mamun Knit) (G+6)
9. Shed 2 (Dying & AOP) (single storied) with two double storied RC block
10. Shed 3 (Boiler & Transformer) (single storied)
11. Shed 4 (Chemical Shed) (single storied)

# Observations

**High stress in column and foundation.**



Column Layout Plan

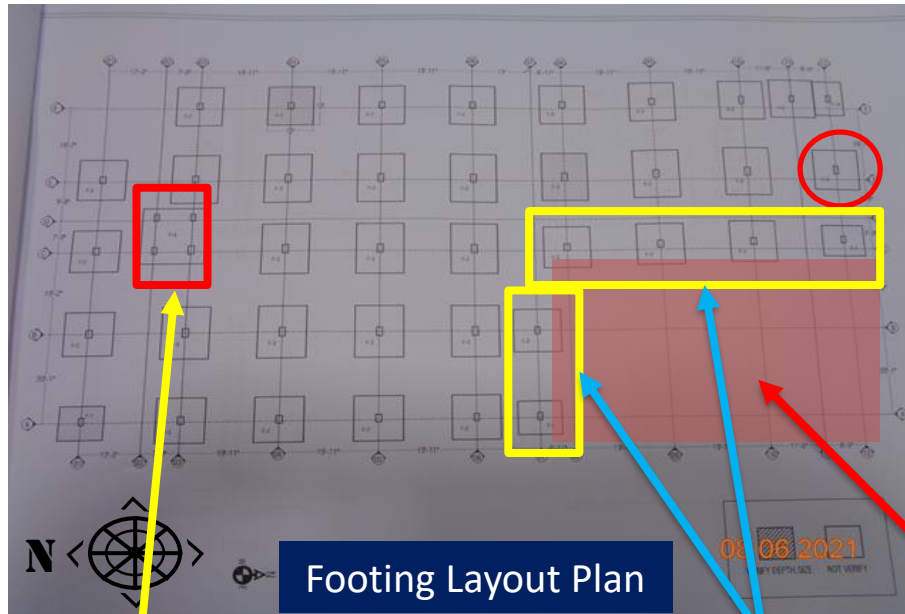
Cursory calculation indicates that columns are stressed above normal design limit considering observed 2 kPa live load and equivalent concrete strength (11.87 Mpa) based on core test results. Factory engineer is required to review design, load & column stresses of the building.



OHWT Loading



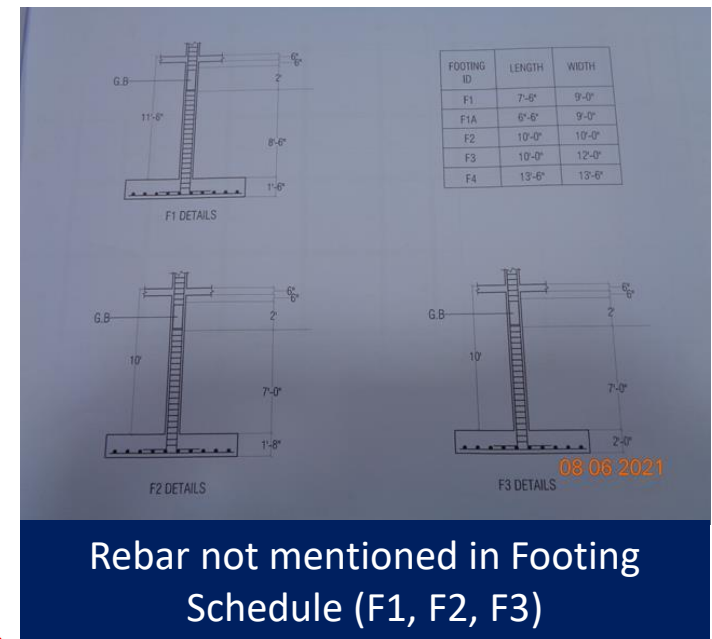
Floor Loading



No details of "F4" footing was found in drawing.

Footings may be shared with columns of adjacent buildings (Building 3).

Cursory calculation indicates that footings are stressed above normal design limit considering observed live load (2 kPa), equivalent concrete strength (17.17 MPa) based on core test results and ultimate soil bearing capacity 7.5 ksf (359.1 kN/m<sup>2</sup>). Factory engineer is required to review design, load & footing stresses of the building and suggest remedial actions accordingly.

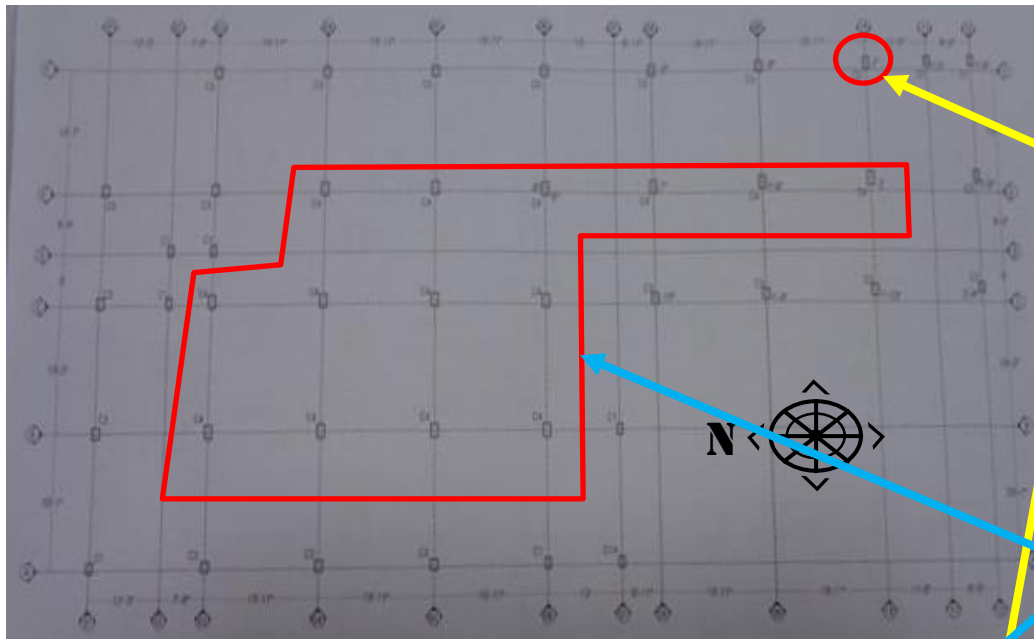


**Building 3**



**Building 4**

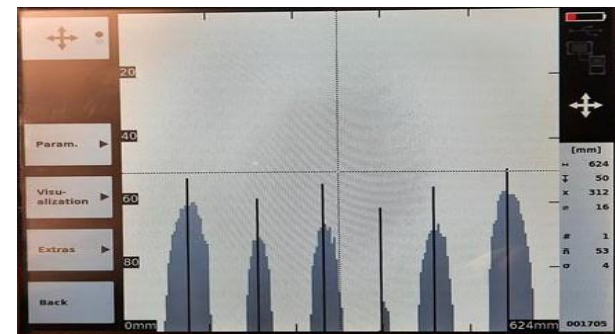
# Discrepancies in as-built drawing



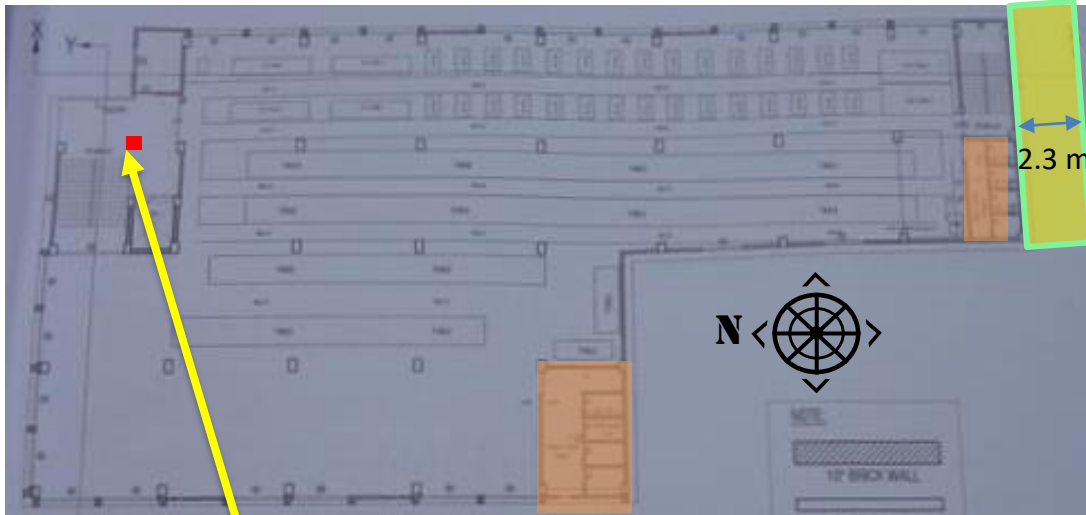
Rebar number of exterior column, (C2 type) was found less than mentioned in column schedule above roof level. On short face, the number of rebar was found 2 instead of 3.

Rebar number of interior column, (C4 type) was found less than mentioned in column schedule. On long face, the number of rebar was found 6 instead of 7.

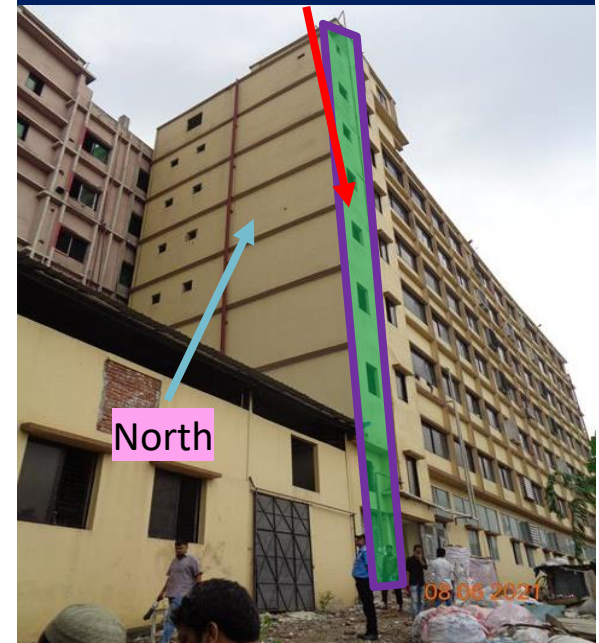
| COLUMN SCHEDULE |                                                 |                                                 |                                                 |                                                 |                                                 |
|-----------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| ID NO.          | BELOW GB<br>CLEAR COVERING 2.5"                 | GROUND FLOOR<br>CLEAR COVERING 1.5"             | 1ST TO 2ND FLOOR<br>CLEAR COVERING 1.5"         | 3RD TO 4TH FLOOR<br>CLEAR COVERING 1.5"         | 5TH TO 6TH FLOOR<br>CLEAR COVERING 1.5"         |
| C1A             | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" |
| C1              | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" |
| C2              | 12-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 12-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 12-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 12-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-16 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" |
| C3              | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" |
| C4              | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" | 10-20 mm Ø<br>10 mm Ø 8" C/C<br>SIZES-12" X 20" |



Rebar Scan Image (C4 column)



Cantilever portion at north side -Not shown in drawing



Discontinue column at stair roof

350 ~ 375 mm floor buildup not mentioned in drawing



350 ~ 375 mm build-up on typical floor toilet block



**Floor load plan not available**



Uncontrolled loading on 5th floor storage areas

Load plan of the building was not produced. Also, load management program was not implemented. Produce and actively manage a loading plan for all floor plates within the factory considering the floor capacity and column capacity.

**Crack in brick wall**



Some cracks were found in brick wall at 2<sup>nd</sup> floor. Factory engineer is required to investigate the cause of cracks and suggest proper remedial actions in the crack investigation report.

**Column susceptible to trolley impact**



Columns having no barrier/protection at ground floor

Columns of the chemical storage area are susceptible to trolley impact. The factory engineer is required to take necessary measures to prevent the vehicle impact by providing the barrier around the columns.

**Corroded rebar at roof**



Cover the exposed rebar or provide rust proof paint on rebar.

**Dampness on toilet block wall**



Dampness was found on toilet block wall. Factory engineer is required to investigate the source of dampness and take necessary measures to prevent the dampness.

**Water ponding on roof**

## Water Ponding on roof



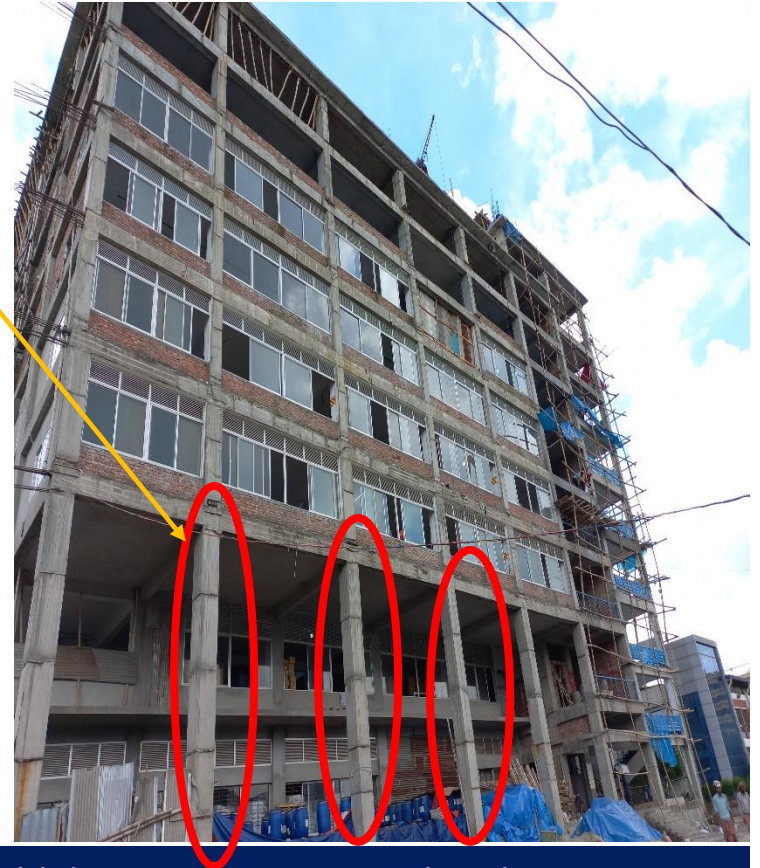
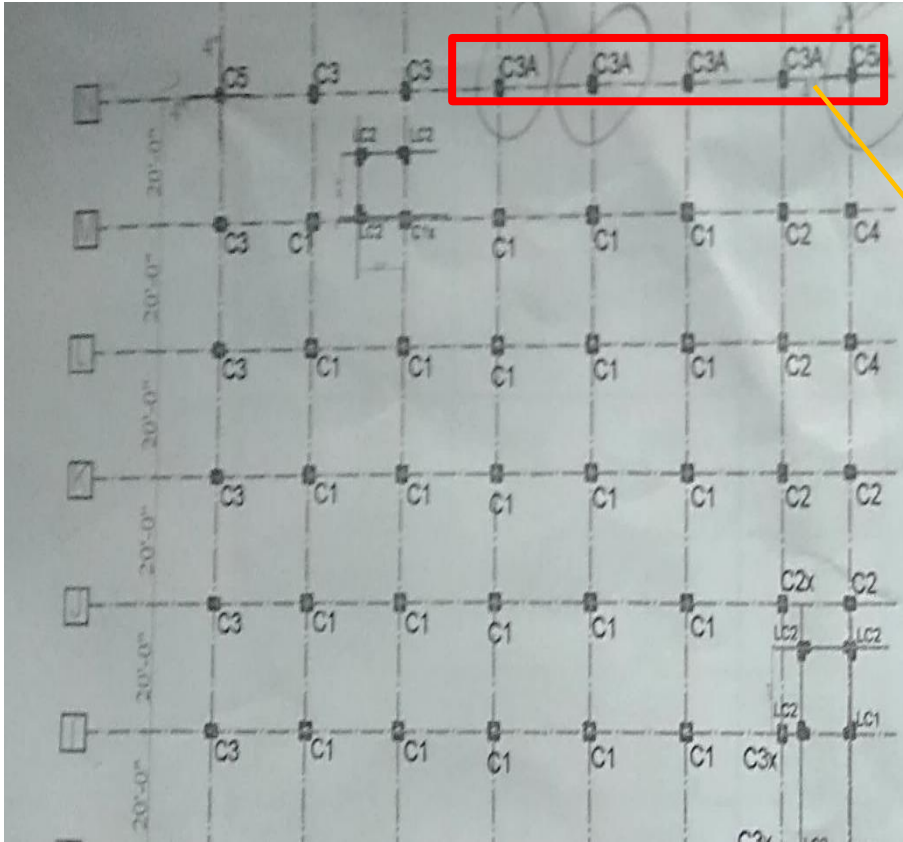
08 06 2021

Factory is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress.

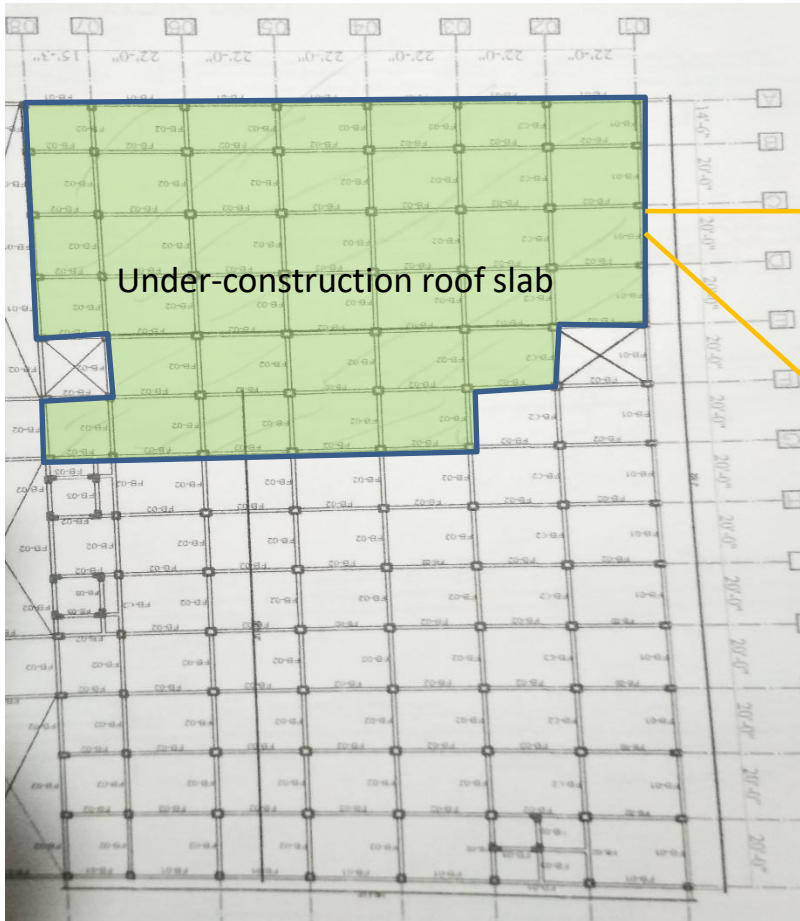
**Structural design report not available**



As per BNBC every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. Design report was not found which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).



The adequacy check of (C3A and C5A) columns should be incorporate in the design report considering slenderness effects.



Top bar splice near support/column



Bottom bar splice at mid span of beam

Splice of rebar is places in tension zone of beams at several locations. That does not comply with the seismic detailing requirements. The factory engineer is required to check the seismic detailing in the design report.

# Floor load management program



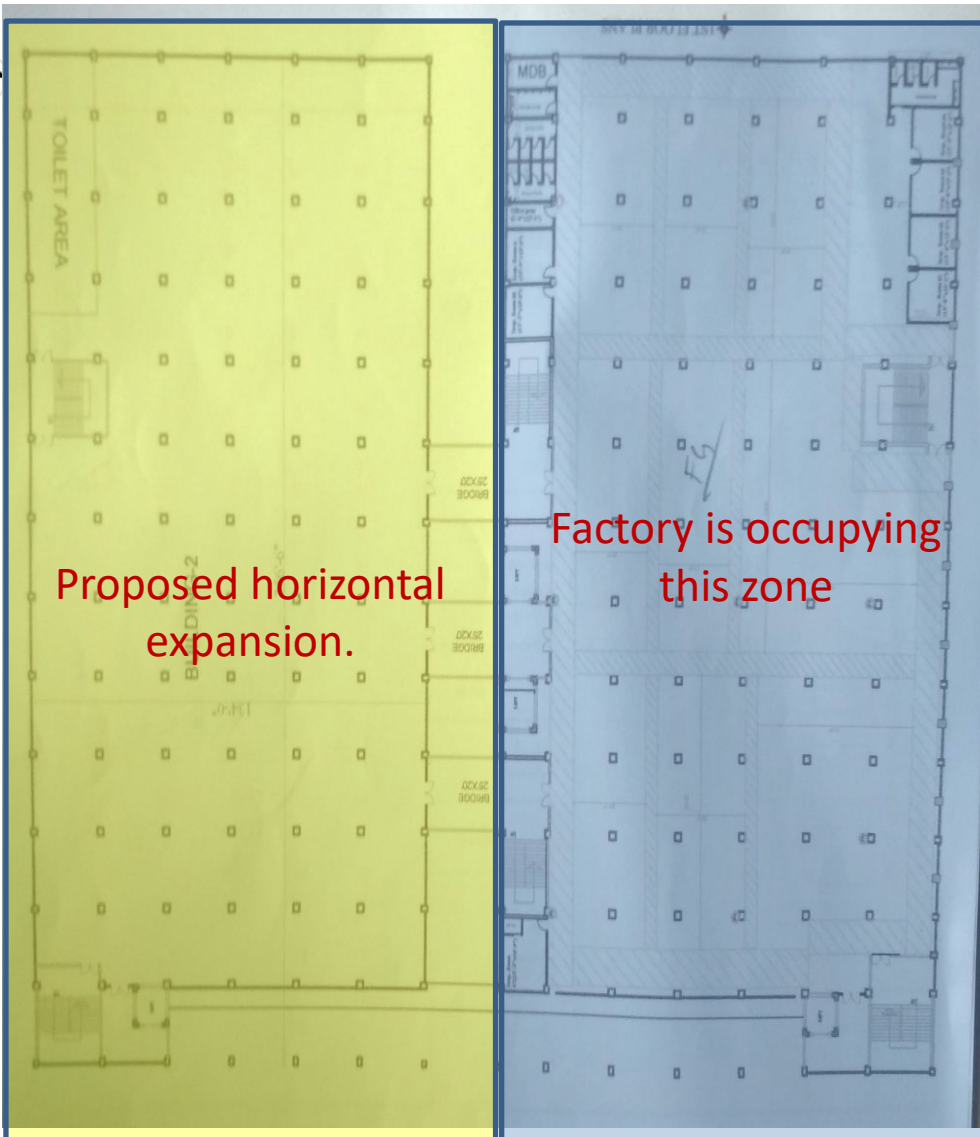
Uncontrol loading on floor



Dining area

Load plan of the building was not produced. Also, load management program (load plan posting, stack height restriction and signage) was not implemented. Produce and actively manage a loading plan for all floor plates within the factory considering the floor, column and foundation capacity.

## **Future horizontal expansion of the structure**



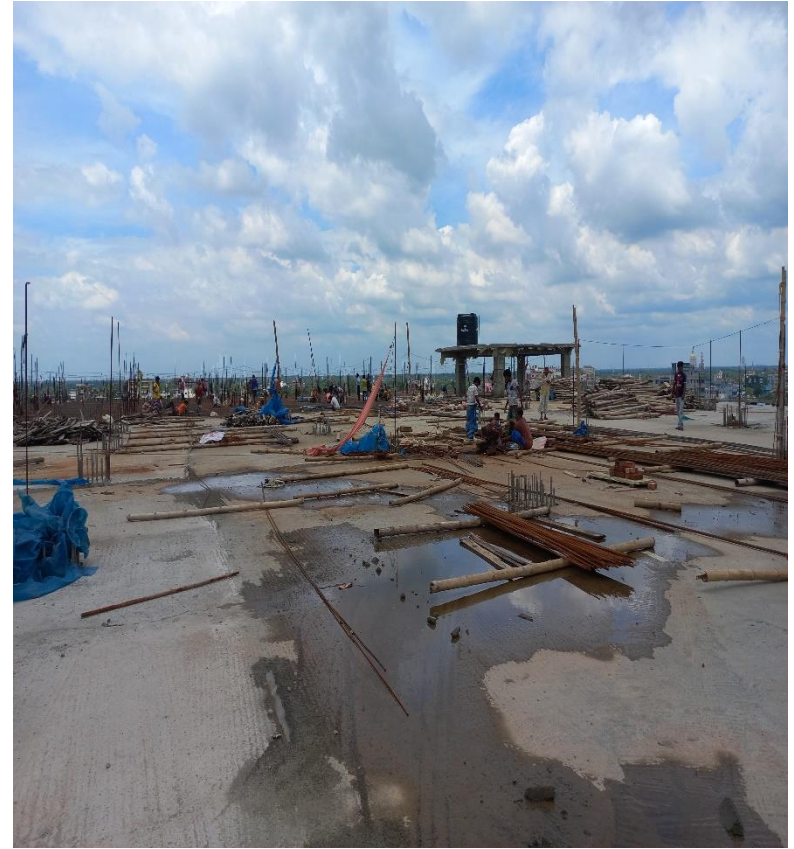
Proposed building layout plan



If the factory plan to horizontally expand the structure, prior to commencement of further construction a Details Engineering Assessment (DEA) is required to carry out as per BNBC guideline.

**Water ponding on roof**

## Water ponding on roof



Factory is required to develop proper drainage system on roof with adequate slope or apply water proofing compound on roof slab to resist water ingress.

# **Construction debris and exposed rebar**



The construction debris at different floor should be removed.



The factory engineer is required to cover the exposed rebar with concrete or apply rust proof paint to protect the rebar from the corrosion.

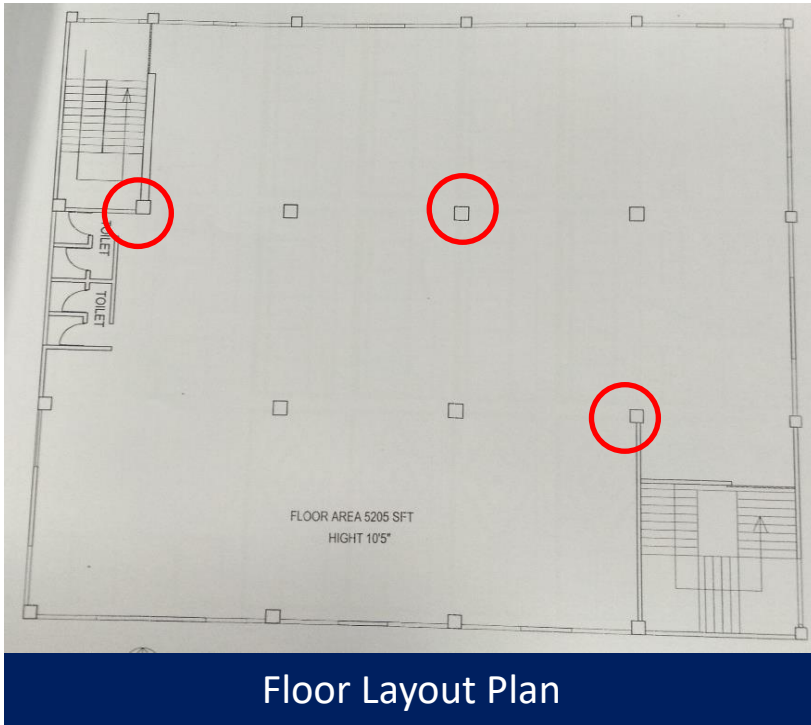
## **Falling hazard at roof and stair**

## Falling hazard at roof and stair: No guard rails



The factory engineer is required provide parapet wall along the periphery of the roof slab and install railing at stairs to prevent falling hazards.

## High stressed column



Floor Layout Plan



Toilet zone with 325 mm floor buildup



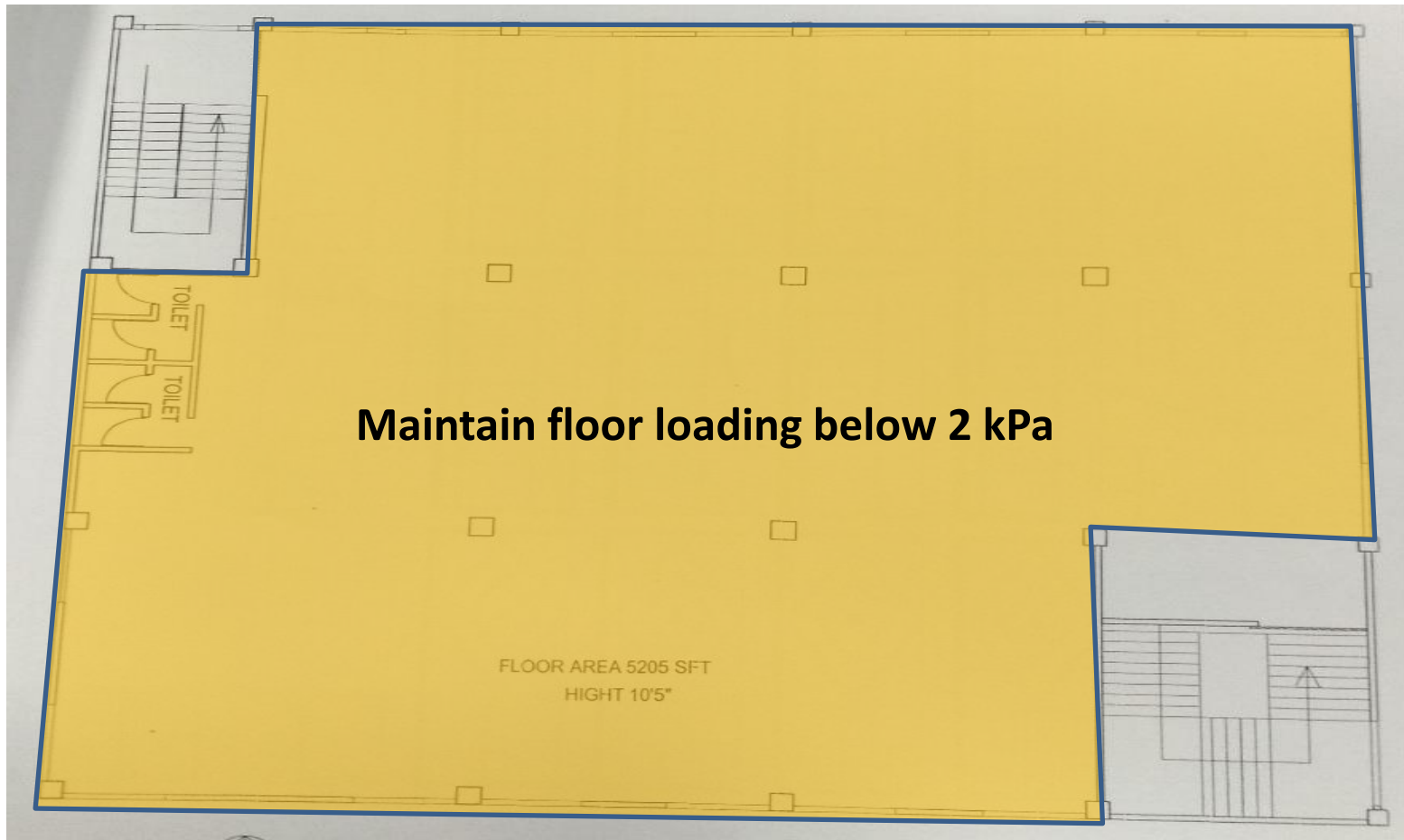
Cursory calculation indicates that columns are stressed above normal design limit considering observed 2 kPa live load. Factory engineer is required to review design, load & column stress.

No geotechnical report was available. Factory engineer is required to prepare a geotechnical investigation report and check the foundation adequacy.



Uncontrolled floor Loading





The floor live load at marked zone at all floor level must not exceed 2 kPa until a Details Engineering Assessment is completed.

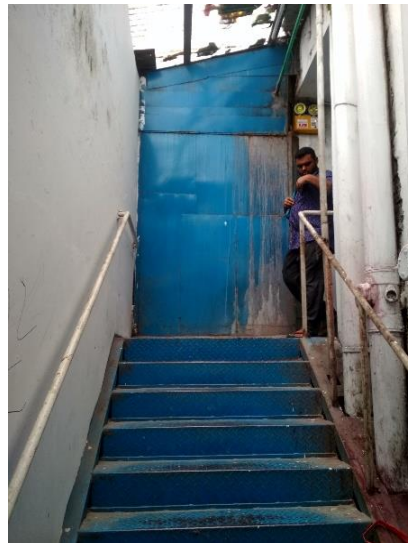
# Floor load management program



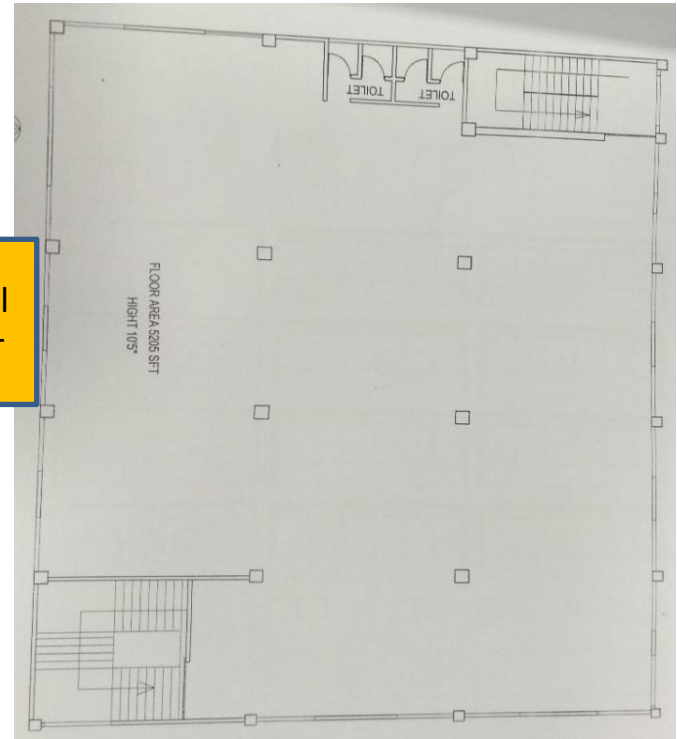
Uncontrol floor Loading

Floor Load plan of the building was not produced. Also, load management program (load plan posting, stack height restriction and signage) was not implemented. Produce and actively manage floor loading plan for all floor plates within the factory considering the floor, column and foundation capacity.

# Discrepancies in as-built drawing

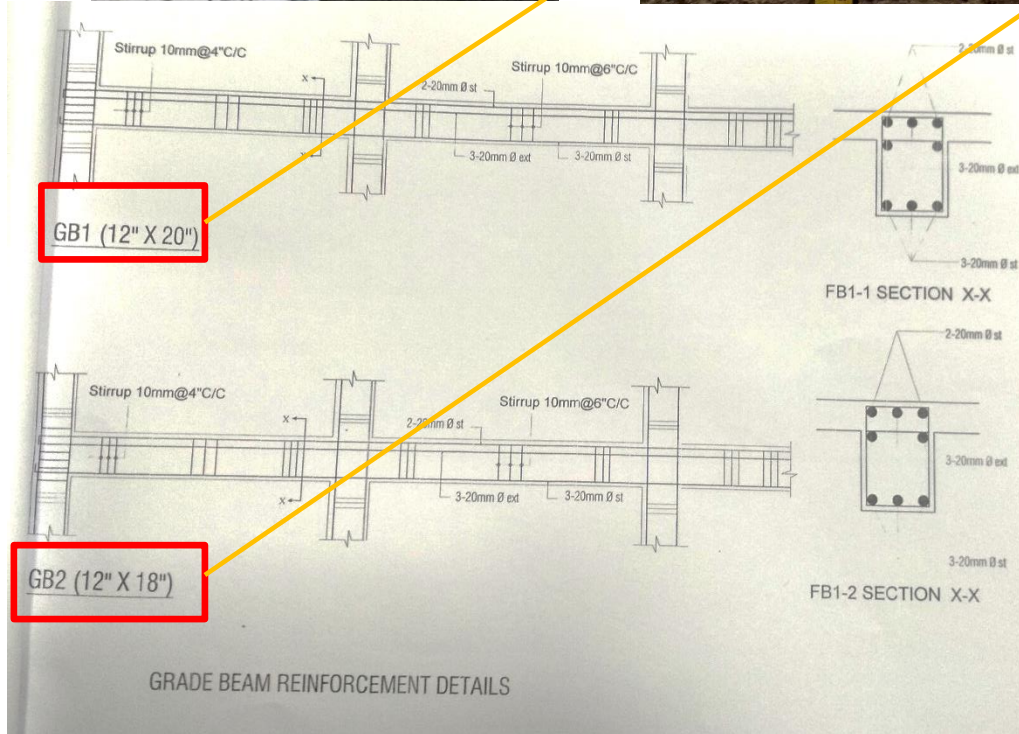


Steel stair

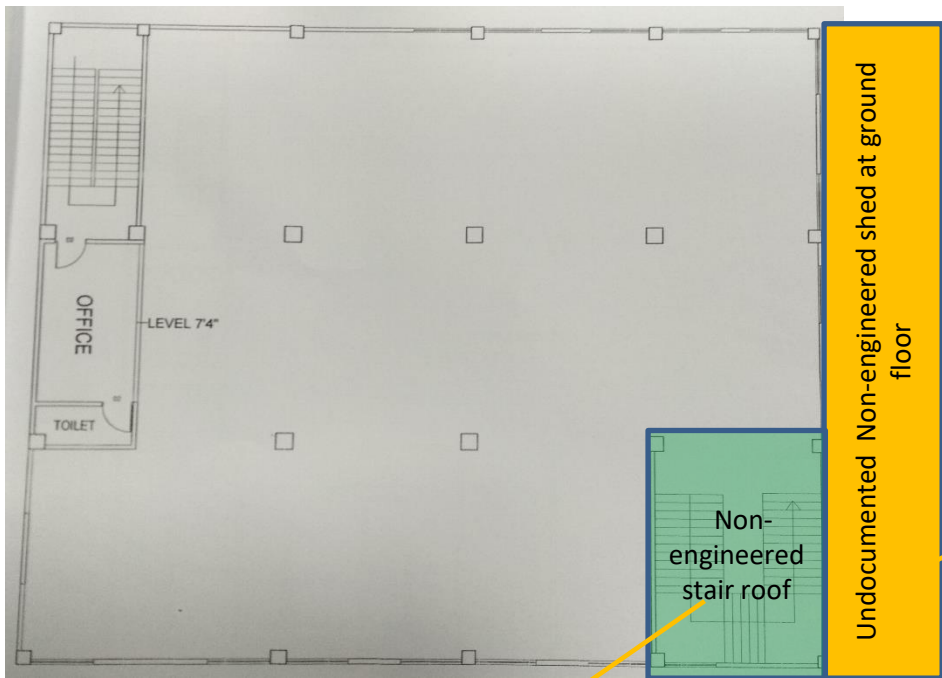


An undocumented steel stair was found at 6<sup>th</sup> Floor of building-6. This structure bridged the Building-2 and Building-6.





The size of grade beam GB-1 and GB-2 were mentioned 12"X20" and 12"X18". But at site the depth of GB-1 and GB-2 were found 16" and 14" respectively instead of 20" and 18".



Factory engineer is required to up prepare update as built drawing for this structures. Also, incorporate adequacy check for these parts against lateral load.

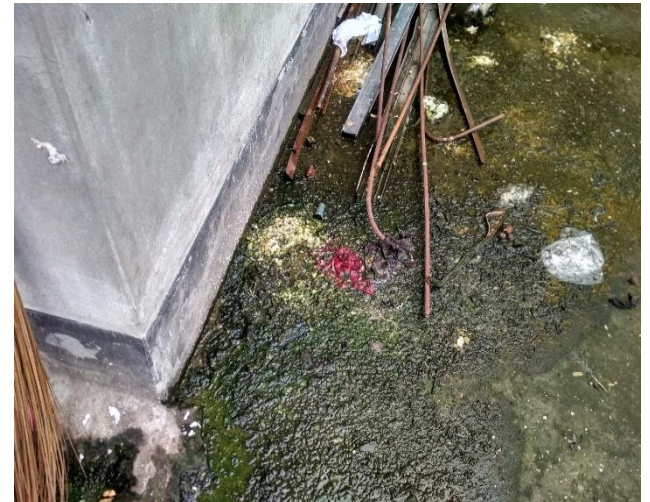
**Water ponding on roof**

## Water ponding on roof



Stagnant of water

Factory is required to water proofing compound and develop proper drainage system on roof with adequate slope to resist water ingress to slab.



Vegetation

## Observations: Building 6

**Dampness on wall**



Dampness was found on wall at several locations of different floors. Factory engineer is required to investigate the source of dampness and take necessary measures to prevent the dampness.

## **Unrestrained brick wall at roof**



The top end of peripheral walls are unrestrained. The heights of these wall varies from 5.5m to 7.5 m. Factory engineer is required check the lateral stability of this walls or reduce the heights to a minimal level.

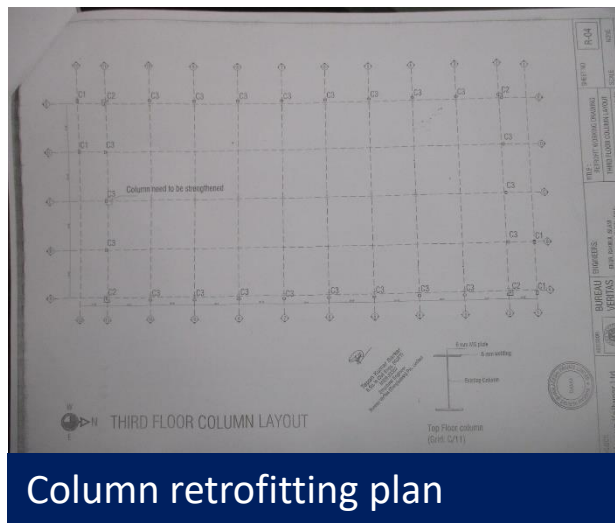
## **Exposed rebar of column**



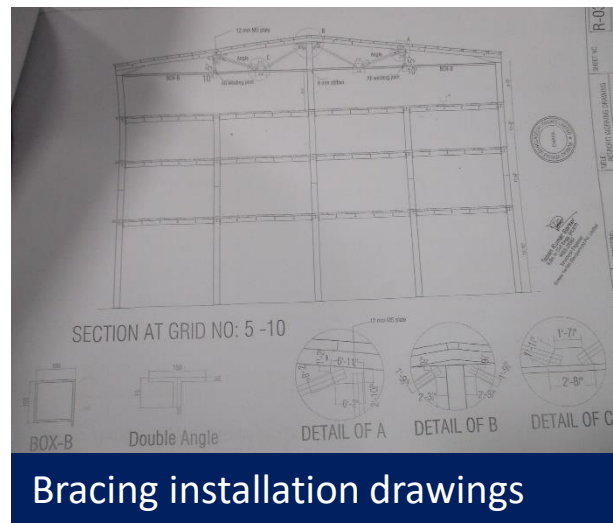
Rebar exposed to check its diameter  
but not covered.

The factory is required to cover the rebar with proper concrete materials.

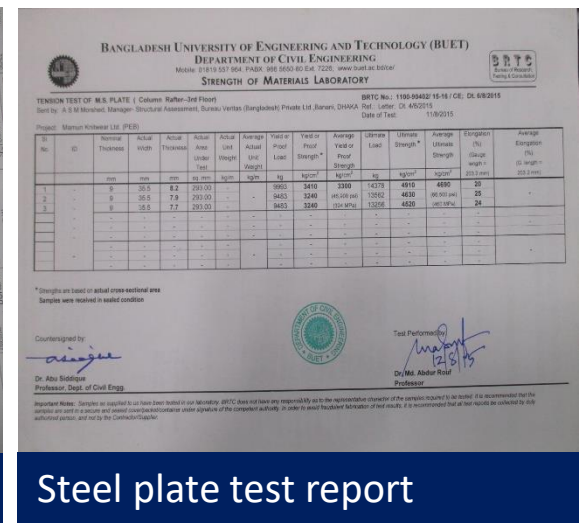
**Design report to be prepared**



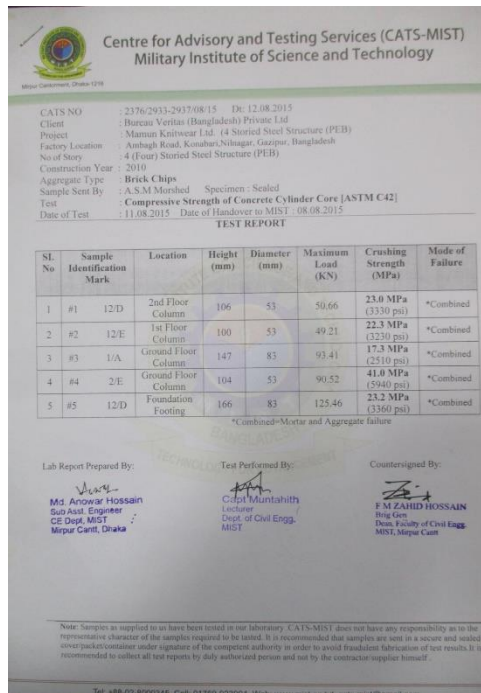
Column retrofitting plan



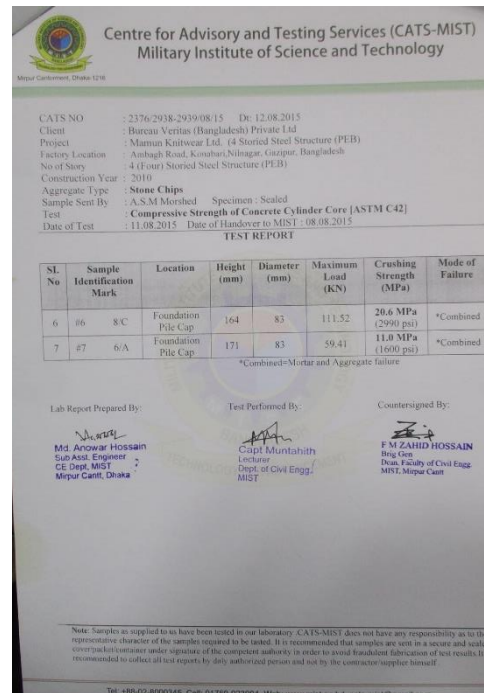
Bracing installation drawings



Steel plate test report



Concrete core test report



A set of retrofitting drawings & material test reports were available on site but there were no soil test report and design report available.

As per BNBC, every building designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. However, before starting any remedial action, the factory is required to submit the design report and retrofitting scheme to RSC for review.

## **Mismatch in as-built drawing**



Roof extents



350 mm built-ups at rooftop toilet zone

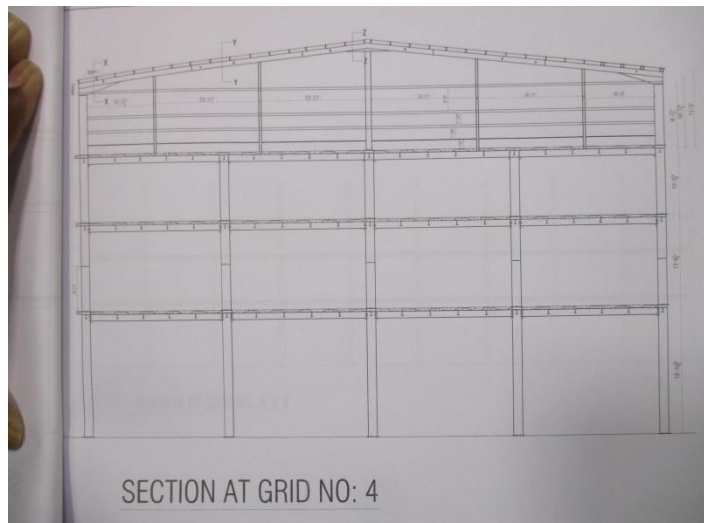


Wash zone

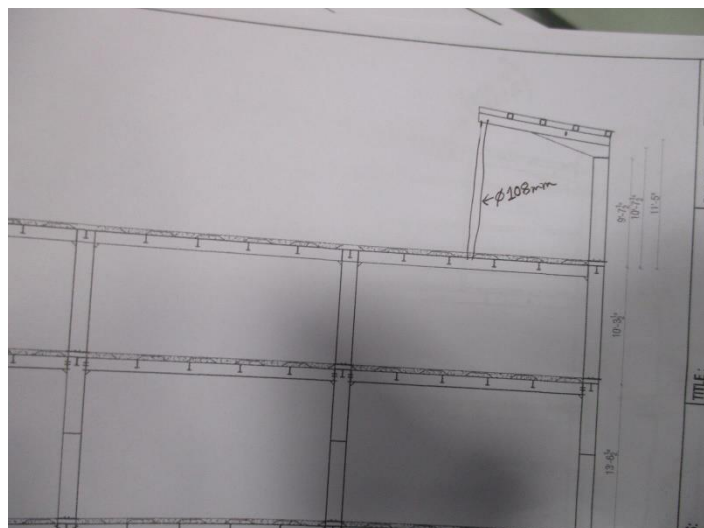


225 mm built-ups at rooftop wash zone

At open area of the roof, undocumented toilet zone & wash space with floor built-ups and pump room with lightweight steel shed was observed.



Steel pipe column in grid- 4

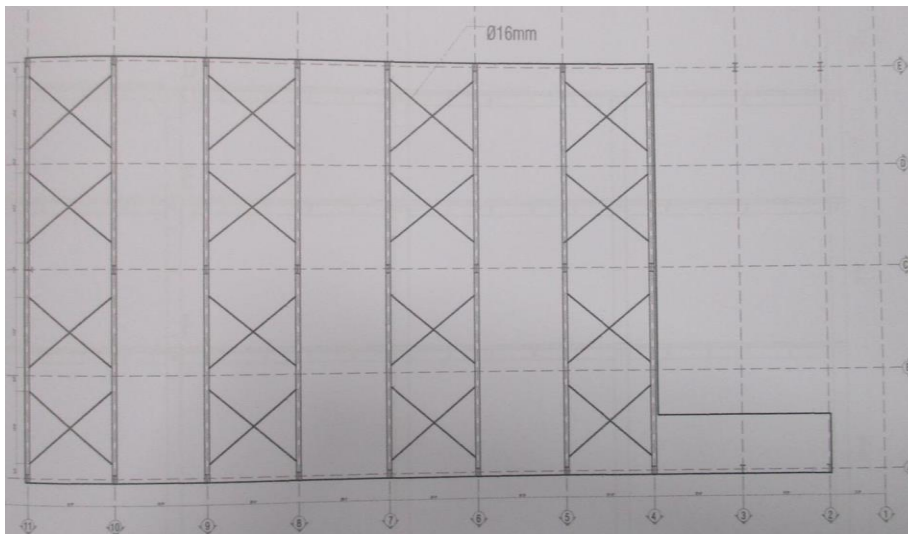


Steel pipe column in grid- 2, 3



Size of steel pipe column in grid- 2, 3 & 4 has not mentioned in the drawings. The factory is required to survey the structure and update the as-built drawings accordingly.

**Absence of compression member at roof**



Bracing layout



No compression member at ridge



Cable bracing at roof



No compression member at eave

No compression member at the roof and lateral load transfer media is absence. The factory is required to determine the size, position of load transfer media and install accordingly.

**Floor load plan to be prepared**



Storage was observed on Mezzanine, 1<sup>st</sup> and 2<sup>nd</sup> floor of the building. Floor load plan was not available. The factory is required to produce and actively manage floor load plan based on foundation, column and floor capacity.

About 3 kPa live load was observed on Mezzanine, 1<sup>st</sup> and 2<sup>nd</sup> floor

## Observations: Building 7

## **Stagnant water on the roof slab**



Stagnant water on the open roof area.

Factory is required to develop proper drainage system on the roof with adequate slope to resist water ingress into the concrete slab.

**Crack on the drop wall of porch**



Crack of drop wall

A crack on the drop wall of porch was found. Factory engineer is required to investigate reason of this crack and suggest proper recommendation in the investigation report.

# **Water ponding and vegetation growth**



Factory is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress. Remove the vegetation and apply appropriate remedial measure.

**Water tank mounted on parapet wall & falling hazard at roof.**



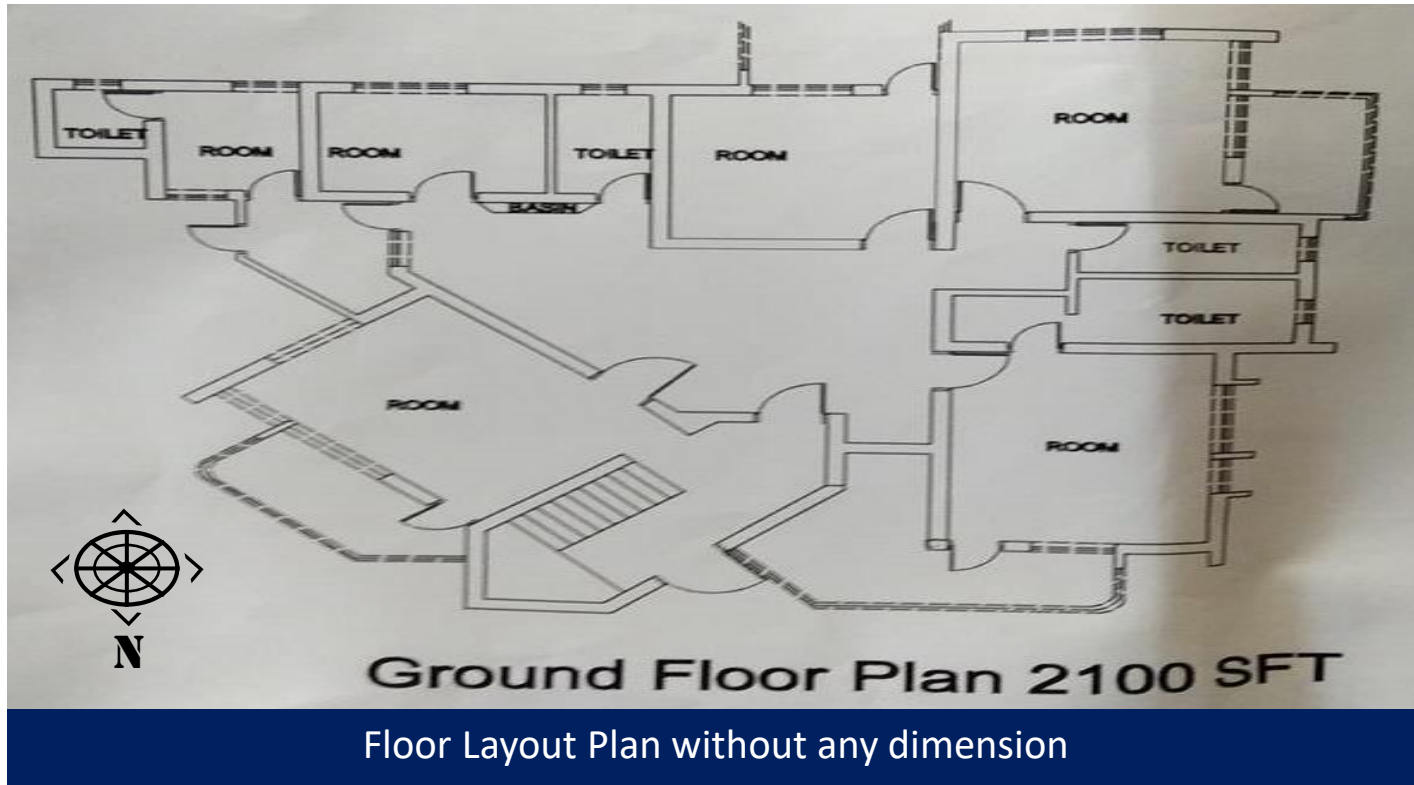
PVC water tank rest on parapet wall



No parapet wall in some area of the roof

Provide adequate support to the water tank to prevent accidental event cause by lateral load. Check the load bearing capacity of the wall beneath the water tank. Construct parapet wall at all edges of the roof.

**Incomplete as built drawing.**



In the factory provide drawing, there is no dimensions of building and walls. Also, there was no appropriate structural details available for this structure.

## Observations: Building 8

**Structural design report not available**



As per BNBC every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. Design report was not found which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

## Observations: Building 9

# Floor load management program

**Observations: Building 9**



4 kPa floor live load on typical floor

Load plan of the building was not produced. Also, load management program (posting load plan, stack height marking and signage) was not implemented. Produce and actively manage a loading plan for all floor plates within the factory considering the floor and column capacity.

## Observations: Building 9

**Water ponding on roof**

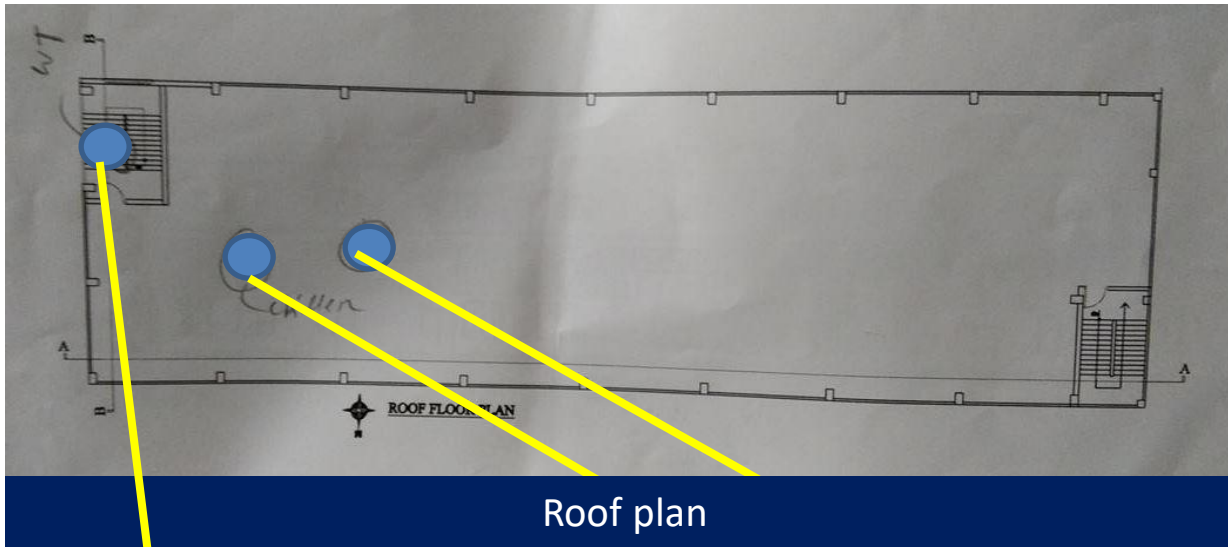


Factory is required to develop proper drainage system on roof with adequate slope or apply water proofing compound on roof slab to resist water ingress.

## Observations: Building 9

# **Discrepancies between as built drawing and on-site condition**

**Observations: Building 10**



Chiller Machines and water tank not shown in the roof plan

## Observations: Building 10



**Design report needs to be prepared**



Front View

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing was available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

## **Exposed reinforcement at staircase**

**Observations: Building 10**



Exposed rebar at stair landing slab

Exposed reinforcement is left unchecked at staircase which is prone to corrosion and hazardous as well. Factory is required to provide rust proof paint on exposed reinforcement to protect from corrosion and rearrange the rebars; so that people climbing the stair are not prone to any danger.

## Observations: Building 10

**Load plan not produced**

**Observations: Building 10**



Load plan of the building was not produced. Also, load management program (load plan posting and signage) was not implemented. Produce and actively manage a loading plan for all floor plates within the factory considering the floor, column and foundation capacity.

## Observations: Building 10

**Water ponding on roof**



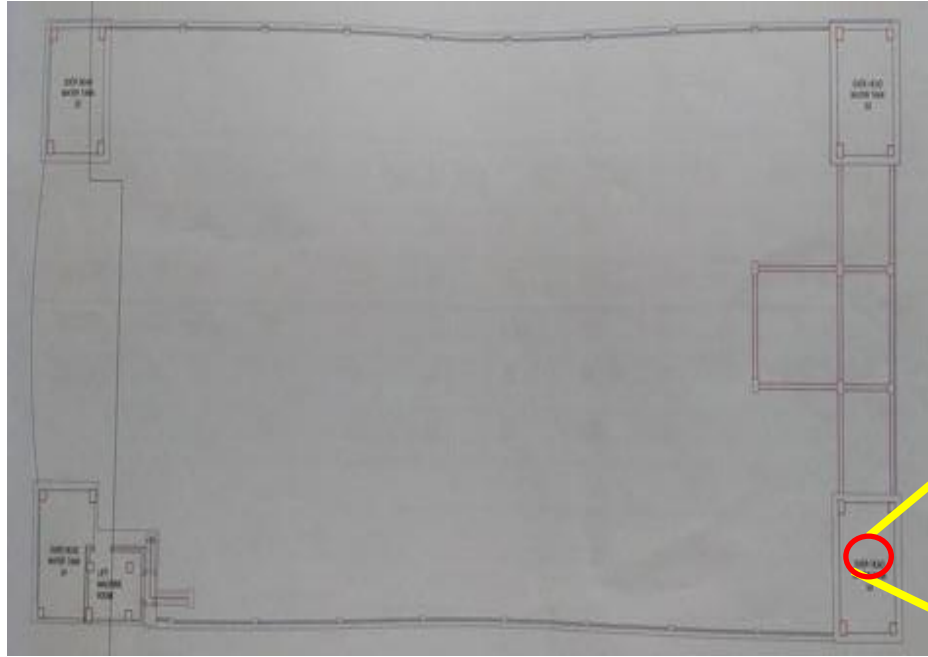
Water ponding on roof



Vegetation

Factory is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress.

# **Discrepancies between as built condition and on-site observation**



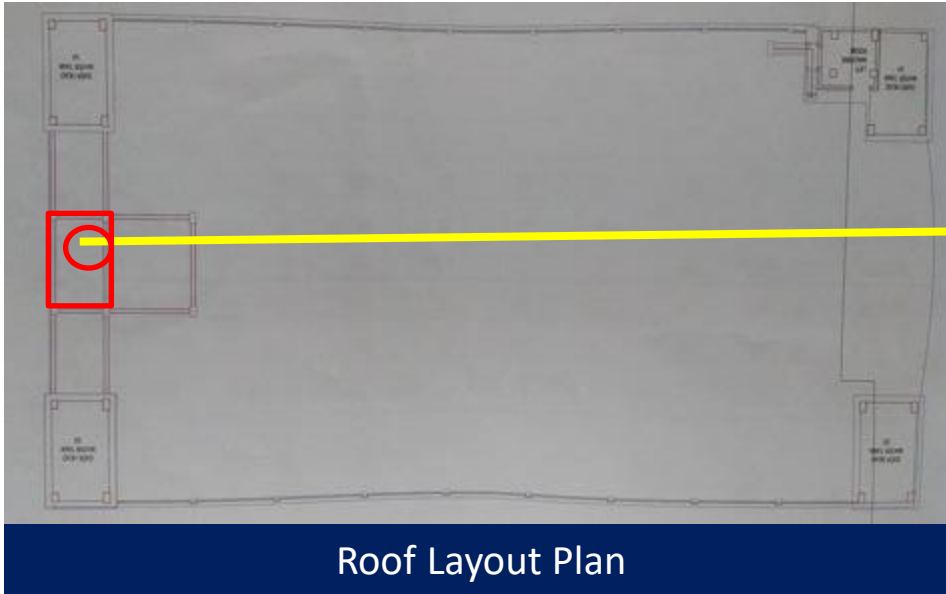
Roof Layout Plan



Chiller machine and stair not mentioned in the drawing

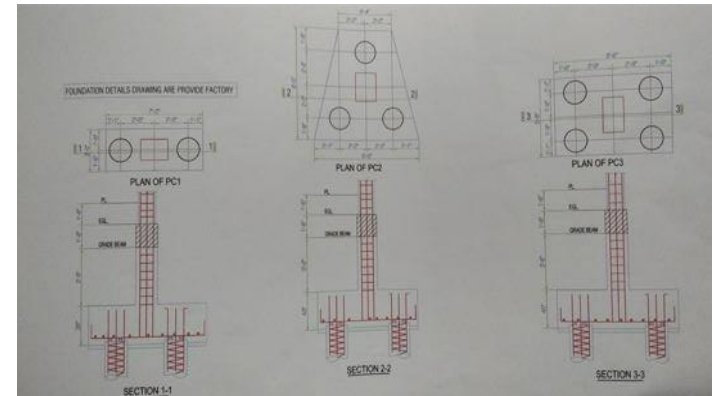


Undocumented steel stair

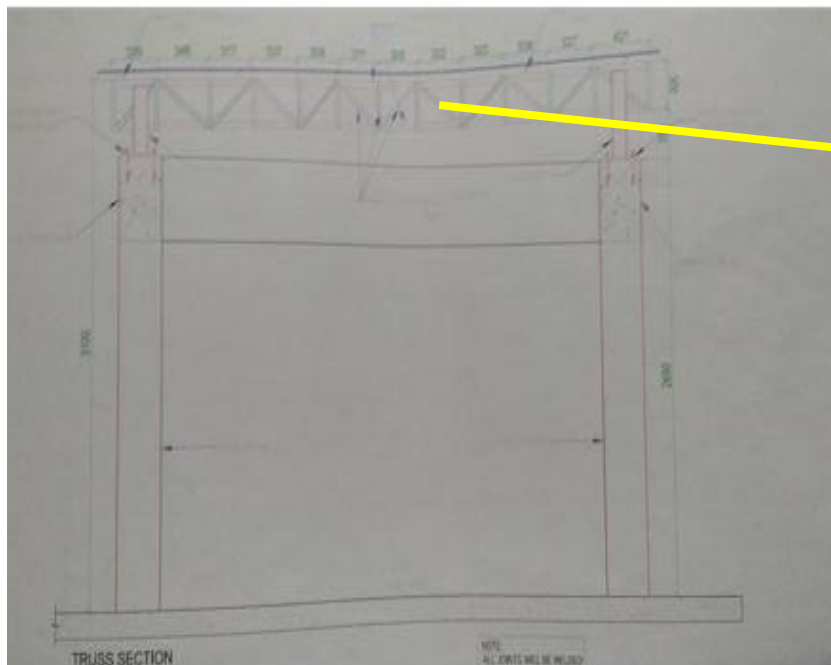


Chiller Machine and roof top shed not mentioned in the drawing

Factory engineer is required to survey all the structural elements and produce correct as-built drawings accordingly.



Rebar details are not mentioned in the pile cap drawing



Truss Section

Connection details for truss sections not shown in the drawing

Factory engineer is required to install the missing bolts and carry out connection adequacy check for all the connections and implement remedial work accordingly. Moreover, no roof bracing or compression member was observed in the shed during inspection. Factory engineer is required to carry out lateral stability check for this steel shed.



Missing Bolts

**Design report needs to be prepared**

**Observations: Building 11**



As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing was available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

# Floor load management program

**Observations: Building 11**



4 kPa floor loading on storage area

The produced load plan of this building does not comply with BNBC. Also, load management program (posting load plan, marking stack height and signage) was not implemented. Produce and actively manage a loading plan for all floor plates within the factory considering the floor, column and foundation capacity.

## Observations: Building 11

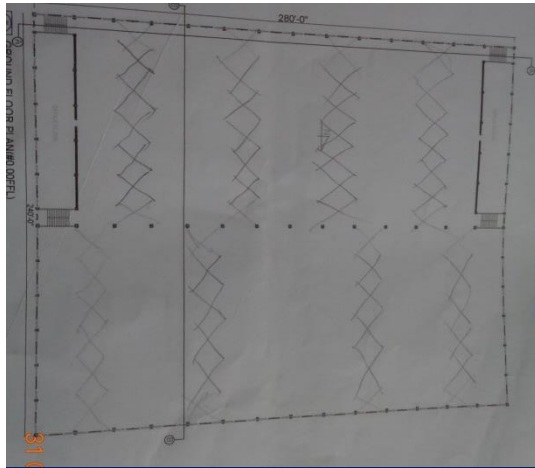
**Water ponding on roof**



Factory is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress.

## Observations: Building 11

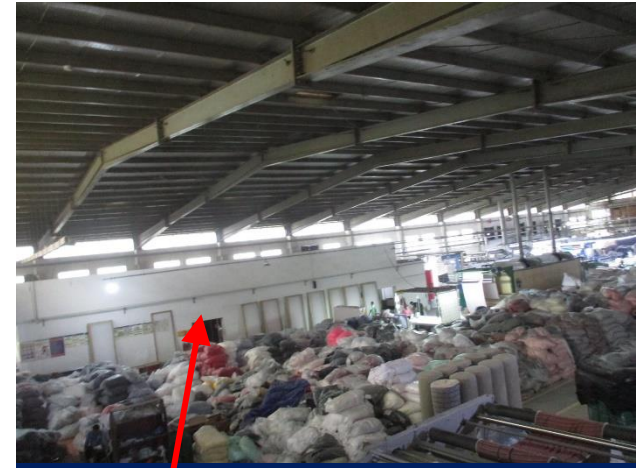
**Lack of as-built drawing**



Bracing layout missing



Floor void not shown in drawing



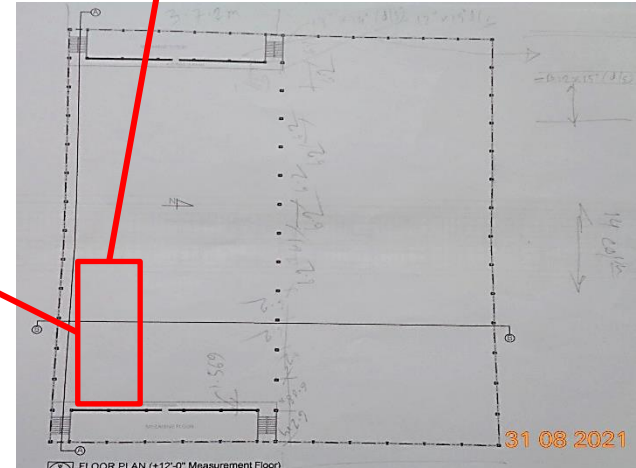
14 column grid onsite



Steel frame not shown in drawing



This room not shown in drawing



15 column grid in drawing

Number of column grid did not match with provided drawings. Roof bracing layout, void in floor, stair steel framing and ground floor accessories rooms were missing in the provided drawings. The factory engineer is required to survey the structure and prepare a set of as-built drawings accordingly.

# Absence of Design Documents



Shed-2

Only structural drawings were available for shed-2. No lateral load transfer media was observed along the ridge of the steel roof. Also, stability check was not available. As per BNBC, every building designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. However, the factory is required to prepare full set of Engineering Assessment (EA) report with adequacy check of all structural members (for both stress and stability) and submit to RSC for review.

## Floor load plan of RC blocks



2 storied RC block



Void in 1st floor slab

Floor load plan was not available for the 2 storied RC blocks. There was two large voids in floor slab have not shown in the drawings. The factory engineer is required to check the floor capacity and prepare a set of floor load plan for the RC blocks based on foundation and floor capacity of the structure.

**Lack of lateral stability**



No bracing system at roof



Poor connections

No bracing and lateral load transfer media is provided in the roof of this structure. Also, poor connection details of truss observed. The factory engineer is required to check lateral stability of the structure and suggest necessary measure accordingly.

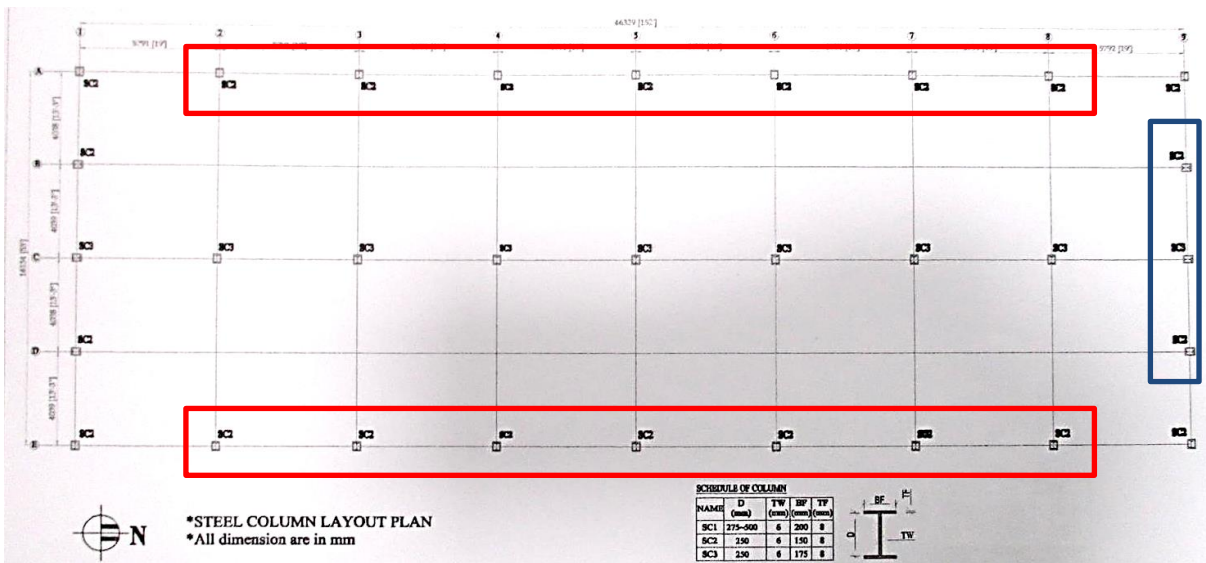
## **Corrosion on steel member**



Corrosion on steel member.

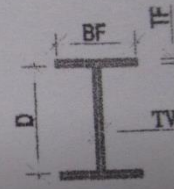
Remove rust and apply anti rust proofing paint on steel member.

## **Inconsistency in as-built drawing**



Column layout plan of Shed-4 (Part-B)

| NAME | D (mm)  | TW (mm) | BF (mm) | TF (mm) |
|------|---------|---------|---------|---------|
| SC1  | 250-300 | 5       | 150     | 6       |
| SC2  | 250     | 5       | 150     | 6       |
| SC2  | 225     | 5       | 125     | 6       |



Steel column schedule



Vertical (wall) bracing



Gable column web along the frame

The column in red marked area is SC1 but in drawing it shown as SC2. The column web in blue marked area is placed along the frame but in drawing it shown as perpendicular to the frame. Wall bracing was observed onsite but only the roof bracing layout was shown in drawings. The factory is required to prepare the as-built drawings.

**Lack of lateral stability system**



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No roof bracing and lateral load transfer media in Part-A of Shed-4.



Lateral load transfer media is missing in Part-B of Shed-4. Also, compression member absence in cable bracing system.

The factory engineer is required to check the stability system and determine the size & position of bracing & compression strut accordingly.

## Deflection of rafter



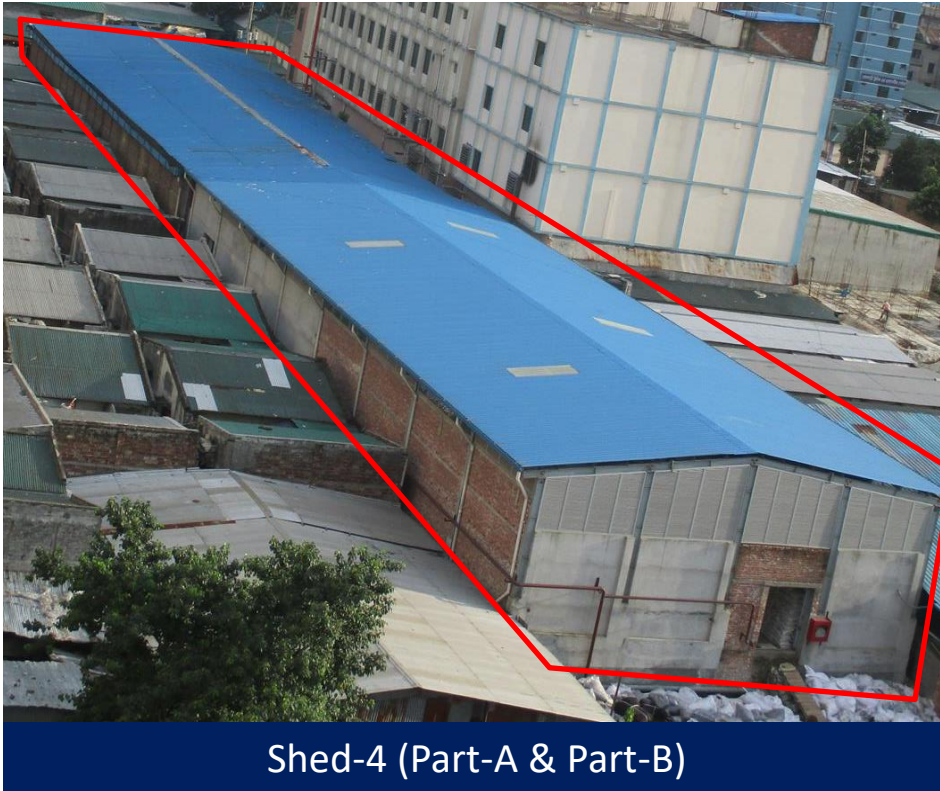
Poor connection



No bracing system; Rafter deflection at roof level in Part-A

The rafter is deflected and there is no bracing system in part-A of Shed-4. The factory engineer is required to check the adequacy of the rafter and connections for gravity and lateral forces. Also, check the lateral stability of the structure and suggest necessary remedial actions accordingly.

# Requirement of Design Report



Shed-4 (Part-A & Part-B)

Only structural drawings were available for shed-4. As per BNBC, every building designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. However, the factory is required to prepare and submit the design report to RSC for review.

# Problems Observed

## **Building 4:**

Item 01: High stress column and foundation.

Item 02: Discrepancies in as-built drawing.

Item 03: Floor load plan not available.

Item 04: Crack in brick wall.

Item 05: Column susceptible to trolley impact.

Item 06: Corroded rebar at roof.

Item 07: Dampness at toilet block wall.

Item 08: Water ponding on roof.

## **Building 5:**

Item 09: Structural design report not available.

Item 10: Floor Load Management Program.

Item 11: Future horizontal expansion of the structure.

Item 12: Water Ponding on Roof.

Item 13: Construction debris and exposed rebar.

Item 14: Falling hazard at roof and stair.

## **Building 6:**

Item 15: High stress column.

Item 16: Floor Load Management Program.

Item 17: Discrepancies in as-built drawing.

Item 18: Water ponding on roof.

# Problems Observed (continued)

Item 19: Dampness at wall.

Item 20: Unrestrained brick wall at roof.

Item 21: Exposed rebar of column.

## **Building 7:**

Item 22: Design report to be prepared.

Item 23: Mismatch in as-built drawing.

Item 24: Absence of compression member at roof.

Item 25: Floor load plan to be prepared.

Item 26: Stagnant water on the roof slab.

## **Building 8:**

Item 27: Crack on the drop wall of porch.

Item 28: Water ponding and vegetation growth.

Item 29: Water tank mounted on parapet wall & falling hazard at roof.

Item 30: Incomplete as built drawing.

## **Building 9:**

Item 31: Structural design report not available.

Item 32: Floor Load Management Program.

Item 33: Water ponding on roof.

## **Building 10:**

Item 34: Discrepancies between as built drawing and on-site condition.

Item 35: Design report needs to be prepared.

Item 36: Load plan not produced.

# Problems Observed (continued)

Item 37: Exposed rebar at stair-case.

Item 38: Water ponding on roof.

## **Building 11:**

Item 39: Discrepancies between as built drawing and on-site condition.

Item 40: Design report needs to be prepared.

Item 41: Floor Load management program.

Item 42: Water ponding on roof.

## **Shed 2:**

Item 43: Lack of as-built drawing.

Item 44: Absence of Design Documents.

Item 45: Floor load plan of RC blocks.

## **Shed 3:**

Item 46: Lack of lateral stability.

Item 47: Corrosion on steel member.

## **Shed 4:**

Item 48: Inconsistency in as-built drawing

Item 49: Lack of lateral stability system.

Item 50: Deflection of Rafter.

Item 51: Requirement of Design Report.

# Priority Actions

| Item No. | Observation                                     | Recommended Action Plan                                                                                                                                                    | Recommended Timeline |
|----------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 01       | High stress column and foundation. (Building 4) | Maintain live loading below 2 kPa in all floor levels.                                                                                                                     | Immediate - Now      |
| 02       | High stress column and foundation. (Building 4) | A Detail Engineering Assessment to be commenced.                                                                                                                           | Immediate - Now      |
| 03       | High stress column and foundation. (Building 4) | Factory Engineer to review design, loads and column stresses in all column and foundations.                                                                                | 6-weeks              |
| 04       | High stress column and foundation. (Building 4) | Produce and actively manage a loading plan for all floor plates within the factory building considering floor, column and foundation capacity.                             | 6-weeks              |
| 05       | High stress column and foundation. (Building 4) | Detail Engineering Assessment to be completed.                                                                                                                             | 6-weeks              |
| 06       | High stress column and foundation. (Building 4) | Continue to implement floor load plan.                                                                                                                                     | 6-months             |
| 07       | High stress column and foundation. (Building 4) | Carry out the remedial works as per DEA recommendation.                                                                                                                    | 6-months             |
| 08       | Discrepancies in as-built drawing [Building 4]. | Factory Engineer is required to survey the structure and prepare accurate as-built (architectural and structural) drawings in compliance with section 1.9.1.2 as per BNBC. | 6-weeks              |

| Item No. | Observation                                       | Recommended Action Plan                                                                                                                                            | Recommended Timeline |
|----------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 09       | Floor load management program. [Building 4].      | Produce and actively manage a floor loading plan for each floor considering floor, column and foundation capacity.                                                 | 6-weeks              |
| 10       | Floor load management program. [Building 4].      | Implement floor load management program (Posting load plan, load restriction height marking, signage, maintaining load resister).                                  | 6-months             |
| 11       | Crack in brick wall [Building 4].                 | Factory engineer is required to investigate the cause of crack and repair the crack as per recommendation from investigation report.                               | 6-weeks              |
| 12       | Column susceptible to trolley impact (Building 4) | The factory engineer is required to take necessary measures to prevent the vehicle impact by providing barrier around the columns.                                 | 6-weeks              |
| 13       | Corroded rebar at roof [Building 4].              | All exposed reinforcement is to be protected from corrosion which may cause degradation of the concrete.                                                           | 6-weeks              |
| 14       | Dampness on toilet block wall (Building 4)        | Building Engineer is required to investigate the reason of dampness & apply suitable method to repair dampness.                                                    | 6-weeks              |
| 15       | Water ponding on roof [Building 4].               | Factory engineer is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress. | 6-weeks              |

| Item No. | Observation                                                 | Recommended Action Plan                                                                                                                                                               | Recommended Timeline |
|----------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 16       | Structural design report not available. (Building 5)        | Building engineer to prepare the design document including a design report, and a set of structural drawings in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC-2006. | 6-weeks              |
| 17       | Structural design report not available. (Building 5)        | Review the design of the structures considering the lateral loading described in BNBC-2006.                                                                                           | 6-weeks              |
| 18       | Structural design report not available. (Building 5)        | Complete implementation of any remedial works deemed necessary by the design review.                                                                                                  | 6-months             |
| 19       | Floor load management program. [Building 5].                | The factory engineer is required to produce floor loading plan for each floor considering floor & column capacity.                                                                    | 6-weeks              |
| 20       | Floor load management program. [Building 5].                | Implement floor load management program (Posting load plan, load restriction height marking, signage, maintaining load resister).                                                     | 6-weeks              |
| 21       | Future horizontal expansion of the structure. [Building 5]. | For any horizontal expansion, a details engineering assessment is required to be completed per BNBC guideline prior to any construction.                                              | 6-months             |
| 22       | Future horizontal expansion of the structure. [Building 5]. | Complete implementation of any remedial works deemed necessary by the DEA prior to any construction.                                                                                  | 6-months             |

| Item No. | Observation                                          | Recommended Action Plan                                                                                                                                           | Recommended Timeline |
|----------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 23       | Water ponding on roof [Building 5].                  | Factory engineer is required to develop proper drainage system on roof with adequate slope or apply water proofing compound on roof slab to resist water ingress. | 6-weeks              |
| 24       | Construction debris and exposed rebar. [Building 5]. | Remove all the construction debris from all floor areas.                                                                                                          | 6-weeks              |
| 25       | Construction debris and exposed rebar. [Building 5]. | Apply rust proof agents on the exposed rebar to prevent corrosion.                                                                                                | 6-weeks              |
| 26       | Falling hazard at roof and stair. [Building 5].      | Take appropriate measure to prevent falling hazards at roof and stair.                                                                                            | 6-weeks              |
| 27       | High stress column. (Building 6)                     | Maintain live loading below 2 kPa in all floor levels.                                                                                                            | Immediate - Now      |
| 28       | High stress column. (Building 6)                     | A Detail Engineering Assessment to be commenced.                                                                                                                  | Immediate - Now      |
| 29       | High stress column. (Building 6)                     | Factory Engineer to review design, loads and column stresses in all columns.                                                                                      | 6-weeks              |
| 30       | High stress column. (Building 6)                     | Produce and actively manage a loading plan for all floor plates within the Factory building considering floor capacity and column capacity.                       | 6-weeks              |
| 31       | High stress column. (Building 6)                     | Conduct geotechnical investigation, prepare report and check the foundation adequacy.                                                                             | 6-weeks              |

| Item No. | Observation                                     | Recommended Action Plan                                                                                                                                                    | Recommended Timeline |
|----------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 32       | High stress column. (Building 6)                | Detail Engineering Assessment to be completed.                                                                                                                             | 6-weeks              |
| 33       | High stress column. (Building 6)                | Continue to implement load plan.                                                                                                                                           | 6-months             |
| 34       | High stress column. (Building 6)                | Carry out the remedial works where necessary.                                                                                                                              | 6-months             |
| 35       | Floor load management program. [Building 6].    | The factory engineer is required to produce floor loading plan for each floor considering floor & column capacity.                                                         | 6-weeks              |
| 36       | Floor load management program. [Building 6].    | Implement floor load management program (Posting load plan, load restriction height marking, signage, maintaining load resister).                                          | 6-weeks              |
| 37       | Discrepancies in as-built drawing [Building 6]. | Factory Engineer is required to survey the structure and prepare accurate as-built (architectural and structural) drawings in compliance with section 1.9.1.2 as per BNBC. | 6-weeks              |
| 38       | Discrepancies in as-built drawing [Building 6]. | Provide adequacy check for the steel stair, undocumented shed at ground floor and the stair roof shed.                                                                     | 6-weeks              |
| 39       | Water ponding on roof [Building 6].             | Factory engineer is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress.         | 6-weeks              |

| Item No. | Observation                                   | Recommended Action Plan                                                                                          | Recommended Timeline |
|----------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------|
| 40       | Dampness at wall. (Building 6)                | Building Engineer is required to investigate the reason of dampness & apply suitable method to repair dampness.  | 6-weeks              |
| 41       | Unrestrained brick wall at roof. (Building 6) | Factory engineer is required check the lateral stability of this walls or reduce the heights to a minimal level. | 6-weeks              |
| 42       | Exposed rebar of column. [Building 6].        | All exposed reinforcement is to be protected from corrosion and back fill the exposed area with micro concrete.  | 6-weeks              |
| 43       | Design report to be prepared. (Building 7)    | Conduct geotechnical investigation, prepare report and check the foundation adequacy accordingly.                | 6-weeks              |
| 44       | Design report to be prepared. (Building 7)    | Factory Engineer to review design, loads and stresses in all structural members and foundations.                 | 6-weeks              |
| 45       | Design report to be prepared. (Building 7)    | Prepare a set of remedial drawings with necessary details.                                                       | 6-weeks              |
| 46       | Design report to be prepared. (Building 7)    | Carry out the remedial works where necessary.                                                                    | 6-months             |
| 47       | Design report to be prepared. (Building 7)    | Continue to implement floor load plan.                                                                           | 6-months             |
| 48       | Mismatch in as-built drawing. (Building 7)    | The factory engineer is required to survey the structure and update as-built drawings accordingly.               | 6-weeks              |

| Item No. | Observation                                         | Recommended Action Plan                                                                                                                                            | Recommended Timeline |
|----------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 49       | Absence of compression member at roof. (Building 7) | The factory is required to check the stability requirements and determine the size & position of load transfer media.                                              | 6-weeks              |
| 50       | Absence of compression member at roof. (Building 7) | Install remedial works where necessary.                                                                                                                            | 6-months             |
| 51       | Floor load plan to be prepared. (Building 7)        | Produce and actively manage a loading plan for all floor plates within the factory building considering column, floor and foundation capacity.                     | 6-weeks              |
| 52       | Floor load plan to be prepared. (Building 7)        | Continue to implement floor load plan.                                                                                                                             | 6-months             |
| 53       | Stagnant water on the roof. (Building 7)            | Factory is required to develop proper drainage system on the roof with adequate slope to resist water ingress into the concrete slab.                              | 6-months             |
| 54       | Crack on the drop wall of porch(Building 8)         | The factory is required to engage a consultant to investigate the reason and extent of the crack.                                                                  | 6-weeks              |
| 55       | Crack on the drop wall of porch(Building 8)         | Carry out the suitable remedial works as per the crack investigation report.                                                                                       | 6-weeks              |
| 56       | Water ponding and vegetation growth [Building 8].   | Factory engineer is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress. | 6-weeks              |

| Item No. | Observation                                                               | Recommended Action Plan                                                                                                                                                          | Recommended Timeline |
|----------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 57       | Water tank mounted on parapet wall & falling hazard at roof [Building 8]. | Provide adequate support to the water tank to prevent accidental event cause by lateral load.                                                                                    | Immediate - Now      |
| 58       | Water tank mounted on parapet wall & falling hazard at roof [Building 8]. | Check the load bearing capacity of the wall beneath the water tank.                                                                                                              | 6-weeks              |
| 59       | Water tank mounted on parapet wall & falling hazard at roof [Building 8]. | Construct parapet wall at all edges of the roof.                                                                                                                                 | 6-weeks              |
| 60       | Incomplete as built drawing [Building 8].                                 | Factory Engineer is required to survey the structure and prepare accurate as-built (architectural and structural) drawings                                                       | 6-weeks              |
| 61       | Structural design report not available. (Building 9)                      | Building engineer to prepare the design document including a design report, and a set of structural drawings in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. | 6-weeks              |
| 62       | Structural design report not available. (Building 9)                      | Review the design of the structures considering the lateral loading described in BNBC.                                                                                           | 6-weeks              |
| 63       | Structural design report not available. (Building 9)                      | Complete implementation of any remedial works deemed necessary by the design review.                                                                                             | 6-months             |

| Item No. | Observation                                       | Recommended Action Plan                                                                                                                                                    | Recommended Timeline |
|----------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 64       | Floor load management program. [Building 9].      | The factory engineer is required to produce floor loading plan for each floor considering floor & column capacity.                                                         | 6-weeks              |
| 65       | Floor load management program. [Building 9].      | Implement floor load management program.                                                                                                                                   | 6-weeks              |
| 66       | Water ponding on roof [Building 9].               | Factory engineer is required to develop proper drainage system on roof with adequate slope or apply water proofing compound on roof slab to resist water ingress.          | 6-weeks              |
| 67       | Discrepancies in as-built drawing [Building 10].  | Factory Engineer is required to survey the structure and prepare accurate as-built (architectural and structural) drawings in compliance with section 1.9.1.2 as per BNBC. | 6-weeks              |
| 68       | Design Report needs to be prepared [Building 10]. | Factory engineer is required to prepare the design Report in compliance with section 1.9.1.1 (part-6, BNBC).                                                               | 6-weeks              |
| 69       | Design Report needs to be prepared [Building 10]. | Implement any remediation work if required.                                                                                                                                | 6-months             |
| 70       | Load plan not produced. [Building 10].            | The factory engineer is required to produce floor loading plan for each floor considering floor & column capacity.                                                         | 6-weeks              |

| Item No. | Observation                                                           | Recommended Action Plan                                                                                                                                                                   | Recommended Timeline |
|----------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 71       | Load plan not produced. [Building 10].                                | Implement floor load management program (Posting load plan, load restriction height marking, signage, maintaining load resister).                                                         | 6-weeks              |
| 72       | Exposed reinforcement left at staircase [Building 10].                | Factory is required to provide rust proof paint on exposed reinforcement to protect from corrosion and re-arrange the rebars; so that people climbing the stairs are not prone to danger. | 6-months             |
| 73       | Water ponding on roof [Building 10].                                  | Factory engineer is required to develop proper drainage system on roof with adequate slope and apply water proofing compound on roof slab to resist water ingress.                        | 6-weeks              |
| 74       | Discrepancies between drawings and on-site observation [Building 11]. | Factory engineer is required to survey all the structural elements properly and produce correct as built drawings.                                                                        | 6-weeks              |
| 75       | Discrepancies between drawings and on-site observation [Building 11]. | Factory engineer is required to carry out connection adequacy check for all the connections and check the lateral stability for this steel shed.                                          | 6-weeks              |
| 76       | Discrepancies between drawings and on-site observation [Building 11]. | Carry out the remedial works where necessary.                                                                                                                                             | 6-months             |

| Item No. | Observation                                       | Recommended Action Plan                                                                                                           | Recommended Timeline |
|----------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 77       | Design Report needs to be prepared [Building 11]. | Factory engineer is required to prepare the design report in compliance with section 1.9.1.1 (part-6, BNBC).                      | 6-weeks              |
| 78       | Design Report needs to be prepared [Building 11]. | Implement any remediation work if required.                                                                                       | 6-months             |
| 79       | Floor load management program [Building 11].      | The factory engineer is required to produce floor loading plan for each floor considering floor, column & foundation capacity.    | 6-weeks              |
| 80       | Floor load management program [Building 11].      | Implement floor load management program (Posting load plan, load restriction height marking, signage, maintaining load resister). | 6-weeks              |
| 81       | Water ponding on roof [Building 11].              | Factory is required to implement proper drainage system and other remedial measures to prevent water ponding.                     | 6-weeks              |
| 82       | Lack of as-built drawing [Shed 2].                | Factory engineer is required to survey the structure and prepare accurate as-built drawings.                                      | 6-weeks              |
| 83       | Absence of Design Documents. [Shed 2].            | Factory engineer is required to prepare a set of design report in compliance of BNBC, Part-6, section 1.9.1.                      | 6-weeks              |
| 84       | Absence of Design Documents. [Shed 2].            | Conduct geotechnical investigation, prepare report and check the foundation adequacy accordingly.                                 | 6-weeks              |

| Item No. | Observation                                  | Recommended Action Plan                                                                                               | Recommended Timeline |
|----------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|
| 85       | Absence of Design Documents. [Shed 2].       | Implement recommendation of design report.                                                                            | 6-months             |
| 86       | Floor Load Plan of RC Blocks. [Shed 2].      | Produce and actively manage a floor loading plan within the factory building considering floor, column and foundation | 6-weeks              |
| 87       | Floor Load Plan of RC Blocks. [Shed 2].      | Implement floor loading plan.                                                                                         | 6-months             |
| 88       | Lack of lateral stability [Shed 3].          | Factory engineer is required to carry out lateral stability check of the shed against lateral forces.                 | 6-weeks              |
| 89       | Lack of lateral stability [Shed 3].          | Implement remediation work where required.                                                                            | 6-months             |
| 90       | Corrosion on steel member [Shed 3].          | Remove rust and apply anti rust proofing paint on steel                                                               | 6-weeks              |
| 91       | Inconsistency in as-built drawing. [Shed 4]. | Factory engineer is required to survey the structure and prepare accurate as-built drawings.                          | 6-weeks              |
| 92       | Lack of lateral stability system. [Shed 4].  | Factory engineer is required to carry out lateral stability check of the shed against lateral forces.                 | 6-weeks              |
| 93       | Lack of lateral stability system. [Shed 4].  | Implement remediation work where required.                                                                            | 6-months             |

| Item No. | Observation                             | Recommended Action Plan                                                                                      | Recommended Timeline |
|----------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------|
| 94       | Deflection of Rafter. [Shed 4].         | Factory engineer is required to carry out lateral stability check of the shed against lateral forces.        | 6-weeks              |
| 95       | Deflection of Rafter. [Shed 4].         | Check the connection adequacy.                                                                               | 6-weeks              |
| 96       | Deflection of Rafter. [Shed 4].         | Implement remediation work where required.                                                                   | 6-months             |
| 97       | Requirement of Design Report. [Shed 4]. | Factory engineer is required to prepare a set of design report in compliance of BNBC, Part-6, section 1.9.1. | 6-weeks              |
| 98       | Requirement of Design Report. [Shed 4]. | Conduct geotechnical investigation, prepare report and check the foundation adequacy accordingly.            | 6-weeks              |
| 99       | Requirement of Design Report. [Shed 4]. | Implement recommendation of design report.                                                                   | 6-months             |