

Far East Knitting & Dyeing Industries Ltd (Extension 2)

Chandona, Thana-Kaliakoir, Gazipur

(24.042314, 90.263026)

15 January 2024



1. Building Information

Building-17 (New Dyeing Building): Six-storied (G+2M+5) RC building with two mezzanine floors.

Building-28 (Skynet Building): 7-storied (B+G+6) RC building with a basement and a mezzanine floor inside the ground floor.

Building-3 (Mosque Building): Two-storied (G+1) RC building.

Building-33 (REB Building): Four-storied (G+3) RC building.

Building-14 (New ETP Building): Three-storied (G+2) RC building.

Building-32 (Kitchen building): Two-storied (G+1) RC structure.

Building-29 (Bonded Warehouse Building): Two-storied (G+1) Prefabricated Steel building.

Building-24 (Stenter Shed): Single-storied Prefabricated steel building.

Building-21 (Sleeting Shed): Single-storied Prefabricated steel building.

Building-30 (Utility building): Single-storied RC Structure.

Building-22 (Fire Pump Room): Single-storied shed with basement.

Building-7 (Cooling Tower Building): Single-storied RC building.

Building-35 (Fair Shop building): Single-storied RC Structure.

Building-23 (Wastage Shed): Single-storied light-weight steel shed.

Building-31 (Security Shed): Single-storied light-weight steel shed.

Building-15 (RMS Room): Single-storied RC building with a lightweight steel roof shed.

2. Observations:

Building-17 (New Dyeing Building):

Observation: Lateral stability needs to be reviewed (Building-17)



Description: DEA documents of the building need to be reviewed against lateral loading by RSC. The building engineer is required to submit DEA documents to RSC for review.

Observation: Column and shear wall damage due to Trolley impact (Building-17)



Description: During the inspection, damaged column and shear wall were found due to trolley impact load. The building engineer is required to repair the column and provide a safety guard around the column to protect it from trolley impact.

Building-22 (Fire Pump Room):

Observation: Lack of stability against uplift forces and improper connections. (Building-22)



Severe corrosion on steel members

Description: Lack of stability system against uplift force & improper connections were observed in the structure. The building engineer is required to carry out an Engineering Assessment (EA) to check the stability of the structure against uplift force and suggest proper remedial actions accordingly. Submit the EA documents to RSC for review.

Observation: Corrosion on steel member. (Building-22)



Severe corrosion on steel members

Description: Severe corrosion was observed on steel members. The building engineer is required to remove the corrosion and provide a rust-proof coating on all steel members to protect from corrosion.

Building-23 (Wastage Shed):

Observation: Lack of lateral stability. (Building-23)



No independent support at Northside



Improper connection



Description: Lack of lateral stability system (absence of load transfer media) & improper connections were observed in the structure. The building engineer is required to carry out an Engineering Assessment (EA) to check the stability of the structure against uplift force and suggest proper remedial actions accordingly. Submit the EA documents to RSC for review.

Observation: Absence of as-built drawing. (Building-23)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part 6 of BNBC.

The building engineer is required to prepare as-built drawings and submit the documents to RSC.

Building-28 (Skynet Building):

Observation: Inconsistency in design report (Building-28).



**CHAPTER 3: INVESTIGATIVE STUDIES
AND TESTING OF MATERIAL**

3.1 Sampling of Concrete Cores and Lab Tests: To find out the concrete strength, Total 03 (three) cores samples of 70mm diameter were collected from different portion of Mat slab of the Building (Figure 3.1). These cores have been tested in Military Institute of Science and Technology (MIST) Lab to find its compressive strength. It has been found that the strength of the cores varies from 3780 to 4830 psi. Therefore, equivalent strength of concrete has been taken as 3586 psi according to ACI-214 and ACI 562 (see Table 3.1).

The Test Results of core samples from MIST-Dhaka is shown in Annex 3.

Table 3.1
Far East Yarn Dyeing

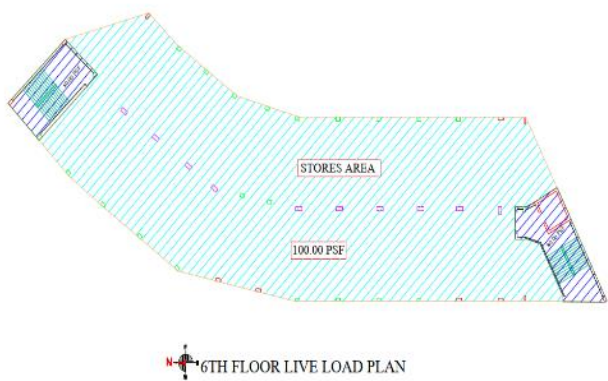
Core Compressive Strength :

Calculations of Corrected Core Compressive Strength :

$f_c = F_{rd} * F_{da} * F_{mc} * F_{d} * f_{core}$, where, f_c = equivalent core strength,
 f_{core} = core strength, F_{rd} , F_{da} , F_{mc} , F_d = strength correction factors due to length-dia ratio, diameter, moisture content, damage respectively

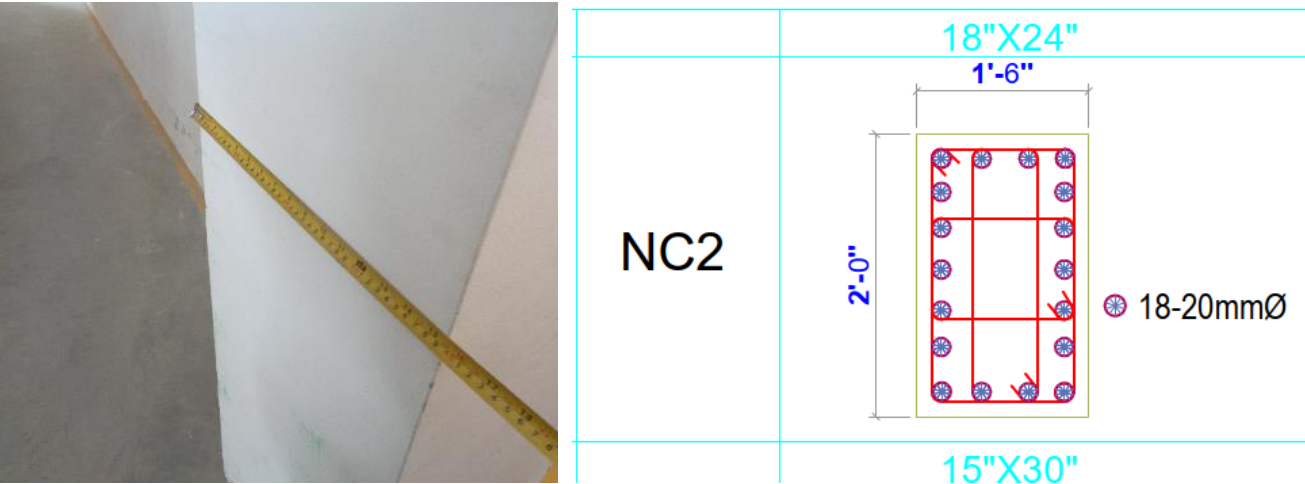
Description: Equivalent concrete strength is considered as 24.72 MPa (3585 psi) for all structural members based on the concrete core test report of the MAT foundation. The building engineer is required to check the column capacity based on in-situ concrete strength and update the design report.

Observation: Load plan doesn't comply with BNBC (Building-28)



Description: Live load for storage area is considered as 5 kPa at several floors but as per BNBC-2006 live load for storage areas is required to be considered as 6 kPa (minimum). The building engineer is required to revise the load plan as per BNBC requirements and check the design accordingly.

Observation: Discrepancy in as-built drawing (Building-28)



Description: The dimension of column NC2 was measured as 500 mm X 350 mm instead of 600mm X 450 mm on the 2nd floor. The building engineer is required to update the as-built drawing.

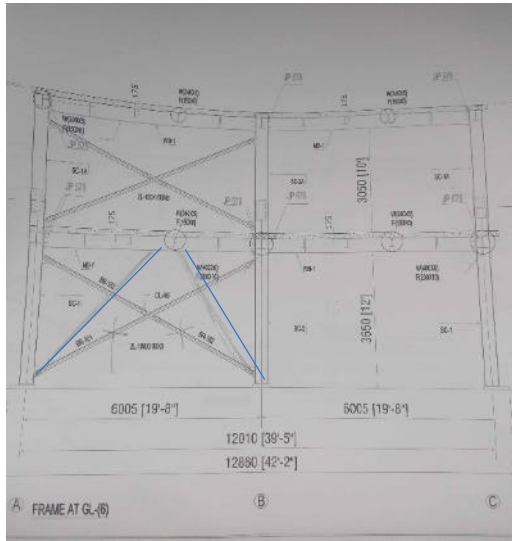
Observation: Column plaster damaged due to trolley impact (Building-28)



Description: Column plaster was found damaged due to trolley impact at several locations. The building engineer is required to repair the damaged plaster and provide protection to avoid trolley impact.

Building-29 (Bonded Warehouse Building):

Observation: Mismatch in as-built drawings. (Building-29)



Description: During the inspection, the mismatch was found in the as-built drawing. The bracing layout of the on-site condition did not match the as-built drawing. The building engineer is required to survey the whole structure and revise the as-built drawing as per actual on-site conditions. Also, submit the design documents to RSC for review.

Building-31 (Security Shed):

Observation: Absence of as-built drawing. (Building-31)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part 6 of BNBC.

The building engineer is required to prepare as-built drawings and keep on-site for verification.

Building-32 (Kitchen Building):

Observation: Lack of design report (Building-32)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following 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, a design report was not available which is required to be prepared in compliance with section 1.9.1.1 (part 6, BNBC).

Building-3 (Mosque Building):

Observation: Absence of design report. (Building-3)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Observation: Mismatch in as-built drawings. (Building-3)

SCHEDULE OF COLUMN REINFORCEMENT DETAILS			
NAME OF COLUMN	UP TO 08	09 TO 17TH FLOOR	
C1			400x800mm Ø
C2			400x600mm Ø



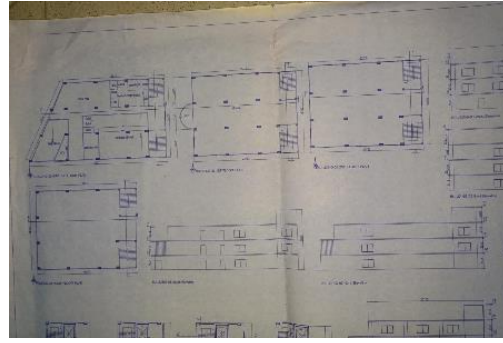
Mismatch in column size at column schedule

Description: In the as-built structural drawing, the C1 and C2 column sizes don't match with on-site conditions. In the drawing, C1 and C2 column sizes are shown as 400X800 whereas C1 and C2 column sizes were found 400X600 and 400X575 respectively on-site.

Observation: Possible overstress in the column due to vertical extension. (Building-3)



Building 3 constructed up to 2 storey



Local authority permit drawing (Proposed 3 story)

Description: The building is permitted for three (G+2) storey from Gazipur City Corporation (local authority). Currently, the building is two (G+1) storied. The factory has a plan to construct six more floors above the current roof. Proposed drawings were available during the inspection for an eight-story building. Considering existing concrete strength from column cores, stress in the column exceeds the normal design limit if the building is vertically extended above 5 storey (G+4). However, the building engineer is required to carry out a Detailed Engineering Assessment (DEA) considering BNBC provision and complete necessary remedial works before the commencement of further construction above 5 storey (G+4). Moreover, the factory is required to take approval from the local authority before constructing the building above 3 storey (G+2).

Observation: Corrosion in exposed rebar (Building-3)



Description: Corrosion was observed on exposed rebars. The building engineer is required to remove the corrosion and provide a rust-proof coating on all exposed rebars to protect from corrosion.

Observation: Possible falling hazard (Building-3)



Description: During inspection, the railing was found missing at some locations on the roof and the stairs. The factory is required to provide railing to prevent probable falling hazards.

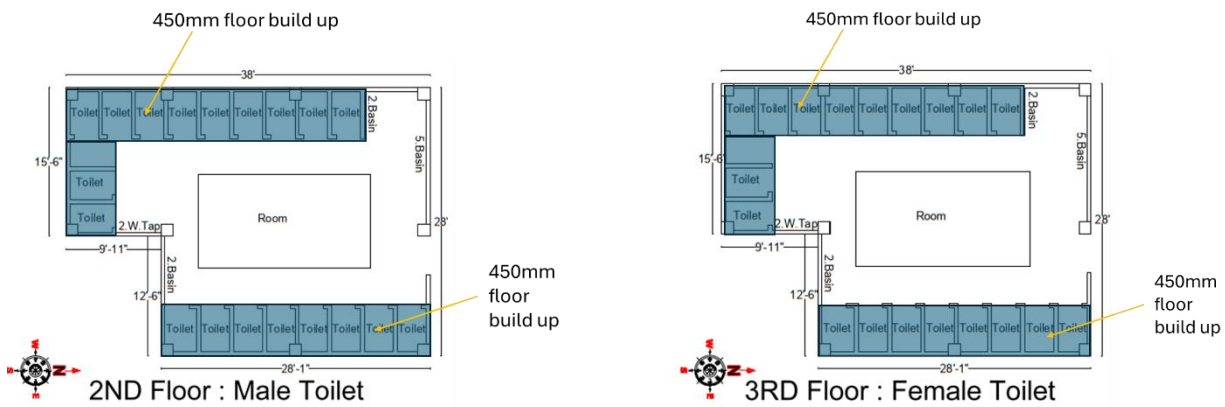
Building-33 (REB Building):

Observation: Lack of design documents. (Building-33)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings, test reports and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Observation: Mismatch in as-built drawing (Building-33)



Floor build-up missing in as-built architectural drawing

Description: During the inspection, 450 mm floor build-up was found in the 2nd and 3rd-floor toilet areas. The building engineer is required to prepare accurate as-built drawings and submit to the RSC for review.

Observation: Dampness and vegetation found in the brick wall, beam, column and slab. (Building-33)



Description: During the inspection, severe dampness and vegetation were found in the brick wall, beam, column, and slab. The building engineer is required to investigate the cause of dampness, remove vegetation, and repair the dampness accordingly.

Observation: Crack in the brick wall on 1st floor. (Building-33)



Description: During inspection, a crack was found in the brick wall of the 1st floor. The building engineer is required to investigate the cause and extent of the crack, suggest necessary remedial actions, and submit to RSC for review.

Observation: Lack of anchorage of plastic water tanks. (Building-33)



Description: During the inspection, plastic water tanks on the roof were found not anchored. The factory is required to anchor or laterally brace all non-structural elements including plastic water tanks to resist earthquake forces.

Building-14 (New ETP Building):

Observation: Lack of design documents. (Building-14)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Observation: Frequency of testing doesn't comply with the BNBC requirement. (Building-14)

Centre for Advisory and Testing Services (CATS-MIST)
Military Institute of Science and Technology

Compressive Strength of Concrete Cylinders

CATS Reference: 137N/1070/017 Date: 16.03.2017

Client: Far East Knitting & Dyeing Industries Ltd.
Project Address: Far East Knitting & Dyeing Industries Ltd. Gajipur/ETP

Sample Brought By: Md. Morshed Hossain Siddiquee

Test Method: ASTM C 39/C 39M

Sample: Concrete Cylinders Date of Receiving: 26.02.2017

Sample Location: ETP Wall Sample Condition: Unsealed

Mixture Proportion: As per Design Design Strength: 28 MPa

Date of Casting: 26.02.17 Date of Cracking: 28.02.17

Age in days: 28 days Cement Type: PCC

Curing in days: 28 days Cement Brand: Seven Kings/ Bachchubhara

Aggregate Type: Stone Chips

Sr. No.	Sample No.	Length (mm)	Diameter (mm)	Crushing Load (kN)	Crushing Strength (MPa)	Average Strength (MPa)	Failure Type	Failure Type
1	1	200	150.0	279.2	18.6	18.6	Combined	Shear
2	2	200	150.0	206.1	13.7	13.7	Combined	Shear
3	3	200	150.0	268.3	17.9	17.9	Combined	Shear

Note: 1. Sample is received in unsealed condition without signature from the competent authority. Therefore, authenticity of the sample and its history could not be verified.

Test Supervised By: Md. M. Al-Kibria
Designation: Sr. Asst. Engineer
Branch: Civil Engineering
MIST, Mirpur Cantonment

Counter-signed By: Dr. M. M. Hossain
Designation: Asst. Prof.
Branch: Civil Engineering
MIST, Mirpur Cantonment

Note: Samples are supplied to us have been tested in our laboratory. CATS-MIST does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples to be used in design and loaded construction under signature of the competent authority in order to facilitate fabrication of test results. It is recommended to collect all test reports by duly authorized person and not by the contractor/supplier himself.

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Cylinder test report of ETP Wall

Centre for Advisory and Testing Services (CATS-MIST)
Military Institute of Science and Technology

Compressive Strength of Concrete Cylinders

CATS Reference: 137N/1070/017 Date: 16.03.2017

Client: Far East Knitting & Dyeing Industries Ltd.
Project Address: Far East Knitting & Dyeing Industries Ltd. Gajipur/ETP

Sample Brought By: Md. Morshed Hossain Siddiquee

Test Method: ASTM C 39/C 39M

Sample: Concrete Cylinders Date of Receiving: 19.02.2017

Sample Location: ETP Mat Foundation Sample Condition: Unsealed

Mixture Proportion: As per Design Design Strength: 28 MPa

Date of Casting: 24.12.2016 Date of Cracking: 22.02.2017

Age in days: 30 days Cement Type: PCC

Curing in days: 28 days Cement Brand: Seven Kings/ Bachchubhara

Aggregate Type: Stone Chips

Sr. No.	Sample No.	Length (mm)	Diameter (mm)	Crushing Load (kN)	Crushing Strength (MPa)	Average Strength (MPa)	Failure Type	Failure Type
1	1	200	150.0	282.2	18.8	18.8	Combined	Shear
2	2	200	150.0	281.8	18.8	18.8	Combined	Shear
3	3	200	150.0	289.0	19.3	19.3	Combined	Shear

REMARKS: 1. Sample is received in unsealed condition without signature from the competent authority. Therefore, authenticity of the sample and its history could not be verified.

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MIST, Mirpur Cantonment

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Designation: Asst. Prof.
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Cylinder test report of Mat Foundation

Description: As per the structural construction drawing, concrete strength was considered 28 MPa and 30 MPa. To confirm design strength, the number of cylinders taken is not adequate as per the frequency test criteria of BNBC (Section 5.12). The building engineer is required to verify the mentioned design strength of concrete by taking adequate core samples.

Observation: Corrosion in steel section. (Building-14)



Description: Severe corrosion was observed on steel members (steel truss and rafter). The building engineer is required to remove the corrosion and provide rust-proof coating on all steel members to protect from corrosion.

Observation: Dampness on 1st floor RC beam, column, slab and wall. (Building-14)



Description: Dampness was found on the RC beam, column, slab and wall of 1st floor at chemical storage area. The building engineer is required to find the source of dampness and take necessary remedial actions to repair the damp areas.

Observation: Apparently non-engineered roof shed of the ETP office and lab room. (Building-14)



Description: Apparently non-engineered steel roof was observed at the ETP office and lab room. Apparently inadequate members and poor connection between support and rafter. The building engineer is required to check the stability of the lightweight steel roof against uplift force.

Building-7 (Cooling Tower Building):

Observation: Lack of design report. (Building-7)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Building 24 (Stenter Shed):

Observation: Lack of design report. (Building-24)



Description: 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, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Building 21 (Sleeting Shed):

Observation: Lack of design report. (Building-21)



Description: As per BNBC, every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, a set of as-built drawings and load plans which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.

Building 15 (RMS Room):

Observation: Apparently non-engineered roof shed. (Building-15)



Description: Apparently non-engineered lightweight steel roof shed. Apparently inadequate steel rafters and poor connection between support and rafters. Replace the non-engineered shed with a properly engineered structure.

3. Action Plan:

Serial	Observation	Action Plan	Timeline
1	Lateral stability needs to be reviewed (Building-17)	The building engineer is required to submit DEA documents to RSC for review.	within 6 weeks
2	Lateral stability needs to be reviewed (Building-17)	Carry out remedial work if required.	within 6 months
3	Column and shear wall damage due to Trolley impact (Building-17)	The building engineer is required to repair the column and provide safety guard around the column to protect from trolley impact.	within 6 weeks
4	Lack of stability against uplift force and improper connections. (Building-22)	The building engineer is required to carry out an Engineering Assessment (EA) to check the stability of the structure against uplift force and suggest proper remedial actions accordingly. Submit the EA documents to RSC for review.	within 6 weeks
5	Lack of stability against uplift force and improper connections. (Building-22)	Carry out remedial work if required.	within 6 months
6	Corrosion on steel member. (Building-22)	The building engineer is required to remove the corrosion and provide rust-proof coating on all steel members to protect from corrosion.	within 6 weeks
7	Lack of lateral stability. (Building-23)	The building engineer is required to carry out an Engineering Assessment (EA) to check the stability of the structure against uplift force and suggest proper remedial actions accordingly. Submit the EA documents to RSC for review.	within 6 weeks
8	Lack of lateral stability. (Building-23)	Carry out remedial work if required.	within 6 months
9	Absence of as-built drawing. (Building-23)	The building engineer is required to prepare as-built drawings and submit the documents to RSC.	within 6 weeks
10	Inconsistency in design report (Building-28)	The building engineer is required to check the column capacity based on in-situ concrete strength and update the design report.	within 6 weeks
11	Load plan doesn't comply with BNBC (Building-28)	The building engineer is required to revise the load plan as per BNBC requirements and check the design accordingly.	within 6 weeks
12	Load plan doesn't comply with BNBC (Building-28)	Implement remediation work if required.	within 6 months
13	Discrepancy in as-built drawing (Building-28)	The building engineer is required to update the as-built drawing.	within 6 weeks

14	Column plaster damaged due to trolley impact (Building-28)	The building engineer is required to repair the damaged plaster and provide protection to avoid trolley impact.	within 6 weeks
15	Mismatch in as-built drawings (Building-29)	The building engineer is required to survey the whole structure and revise the as-built drawing as per actual on-site conditions.	within 6 weeks
16	Mismatch in as-built drawings (Building-29)	The building engineer is required to submit Design documents to RSC for review.	within 6 weeks
17	Mismatch in as-built drawings (Building-29)	Carry out remedial work if required.	within 6 months
18	Absence of as-built drawing. (Building-31)	The building engineer is required to prepare as-built drawings and keep on-site for verification.	within 6 weeks
19	Lack of design report (Building-32)	The building engineer is required to prepare design report in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
20	Lack of design report (Building-32)	Implement remediation work if required.	within 6 months
21	Absence of design report. (Building-3)	The building engineer is required to prepare design report in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
22	Absence of design report. (Building-3)	Carry out remedial work where required.	within 6 months
23	Absence of design report. (Building-3)	The factory is required to take approval from local authority before constructing the building above 3 storey (G+2).	within 6 months
24	Mismatch in as-built drawings. (Building-3)	The building engineer is required to revise the as-built drawing as per actual site condition.	within 6 weeks
25	Possible overstress in column due to vertical extension. (Building-3)	The building engineer is required to carry out a Detailed Engineering Assessment (DEA) prior to the commencement of further construction.	within 6 weeks
26	Possible overstress in column due to vertical extension. (Building-3)	Carry out remedial work where required.	within 6 months
27	Corrosion in exposed rebar (Building-3)	The building engineer is required to remove the corrosion and provide rust-proof coating on all exposed rebars to protect from corrosion.	within 6 weeks

28	Possible falling hazard (Building-3)	The factory is required to provide railing at roof and stairs to prevent probable falling hazard.	within 6 weeks
29	Lack of design documents. (Building-33)	The building engineer is required to prepare design documents in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
30	Lack of design documents. (Building-33)	Carry out remedial work where required.	within 6 months
31	Mismatch in as-built drawing (Building-33)	The building engineer is required to revise the as-built drawing as per actual site condition.	within 6 weeks
32	Dampness and vegetation found in the brick wall, beam, column and slab. (Building-33)	The building engineer is required to investigate the cause of dampness, remove vegetation and repair the dampness accordingly.	within 6 months
33	Crack in brick wall at 1 st floor. (Building-33)	The building engineer is required to investigate the cause and extent of the crack, suggest necessary remedial actions and submit to RSC for review.	within 6 weeks
34	Crack in brick wall at 1 st floor. (Building-33)	Carry out remedial work where required.	within 6 months
35	Lack of anchorage of plastic water tanks. (Building-33)	The factory is required to anchor or laterally brace all non-structural elements including plastic water tanks to resist earthquake forces.	within 6 months
36	Lack of design documents. (Building-14)	The building engineer is required to prepare design documents in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
37	Lack of design documents. (Building-14)	Carry out remedial work where required.	within 6 months
38	Frequency of testing doesn't comply with BNBC requirement. (Building-14)	The building engineer is required to verify the mentioned design strength of concrete by taking adequate core samples.	within 6 weeks
39	Corrosion on steel section. (Building-14)	The building engineer is required to remove the corrosion and provide rust-proof coating on all steel members to protect from corrosion.	within 6 weeks
40	Dampness on 1 st floor RC beam, column, slab and wall. (Building-14)	The building engineer is required to find the source of dampness and take necessary remedial actions to repair the damp areas.	within 6 months
41	Apparently non-engineered roof shed of ETP office and lab room. (Building-14)	The building engineer is required to check the stability of the lightweight steel roof against uplift force.	within 6 weeks

42	Apparently non-engineered roof shed of ETP office and lab room. (Building-14)	Carry out remedial work where required.	within 6 months
43	Lack of design report. (Building-7)	The building engineer is required to prepare design report in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
44	Lack of design report. (Building-7)	Carry out remedial work where required.	within 6 months
45	Lack of design report. (Building-24)	The building engineer is required to prepare design report in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
46	Lack of design report. (Building-24)	Carry out remedial work where required.	within 6 months
47	Lack of design report. (Building-21)	The building engineer is required to prepare design report in compliance with section 1.9.1.1 and section 1.9.1.2, part-6 of BNBC.	within 6 weeks
48	Lack of design report. (Building-21)	Carry out remedial work where required.	within 6 months
49	Apparently non-engineered roof shed. (Building-15)	Replace the non-engineered shed with a properly engineered structure.	within 6 months