

Nippon Garment Industries Ltd.

93, Auchpara, Tongi, Gazipur - 1712
(23.915849N, 90.393507E)

25th February 2015



Observations

Observations Building 1

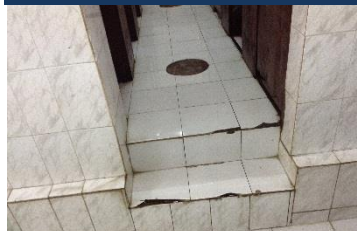
**High stress level in column around toilet
on Ground Floor from floor build up in
toilets at first and second floor.**

Observations building 1

Cursory calculations indicate column (marked with red circle) at the Ground Floor is highly stressed under their current loading condition.



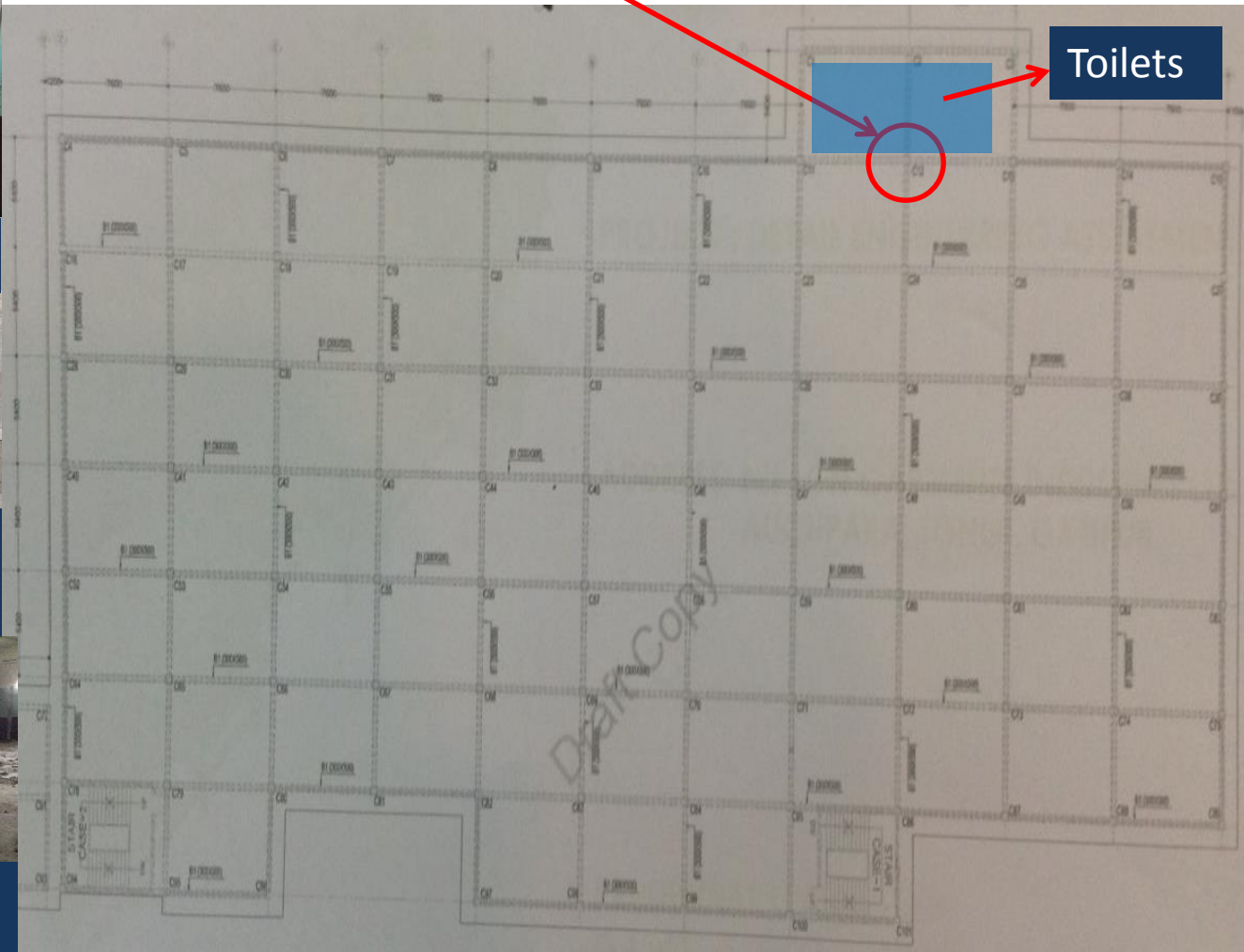
Male Toilets



**Female Toilets
1st floor**



**Female Toilets
2nd floor**



Toilets

Observations Building 1

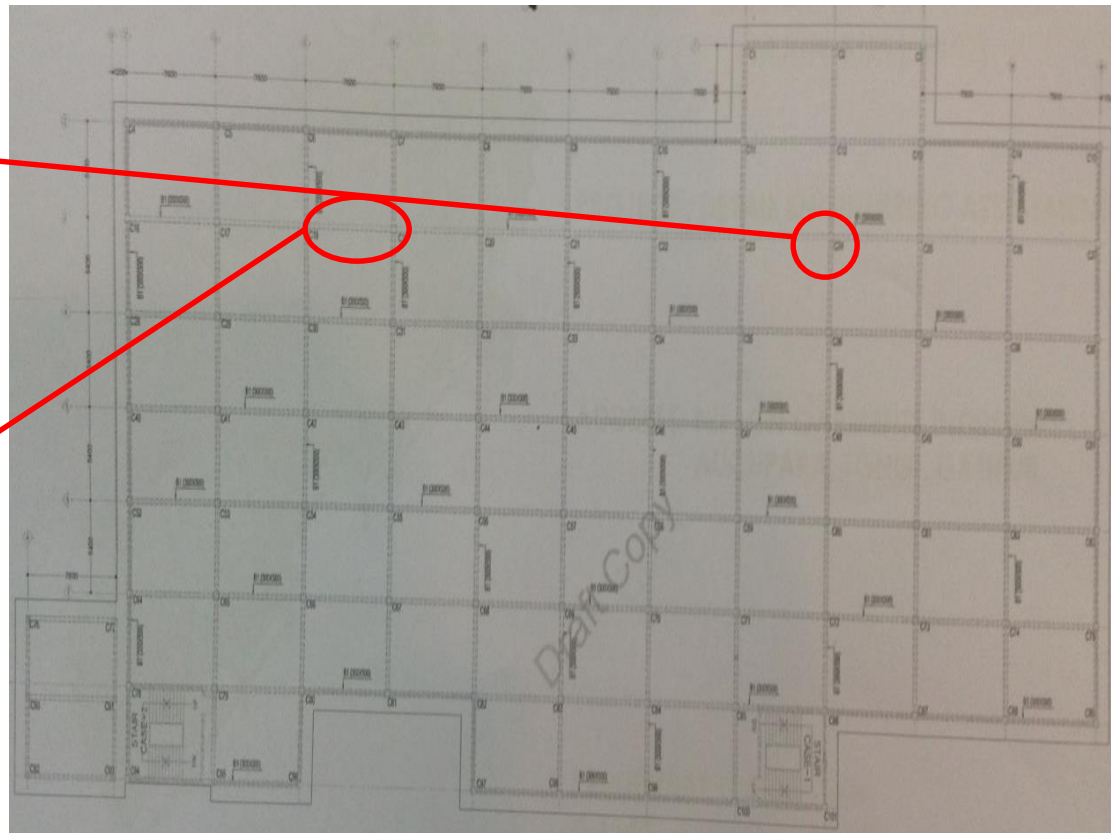
Cracking on beams and columns



Cracking on column at second floor



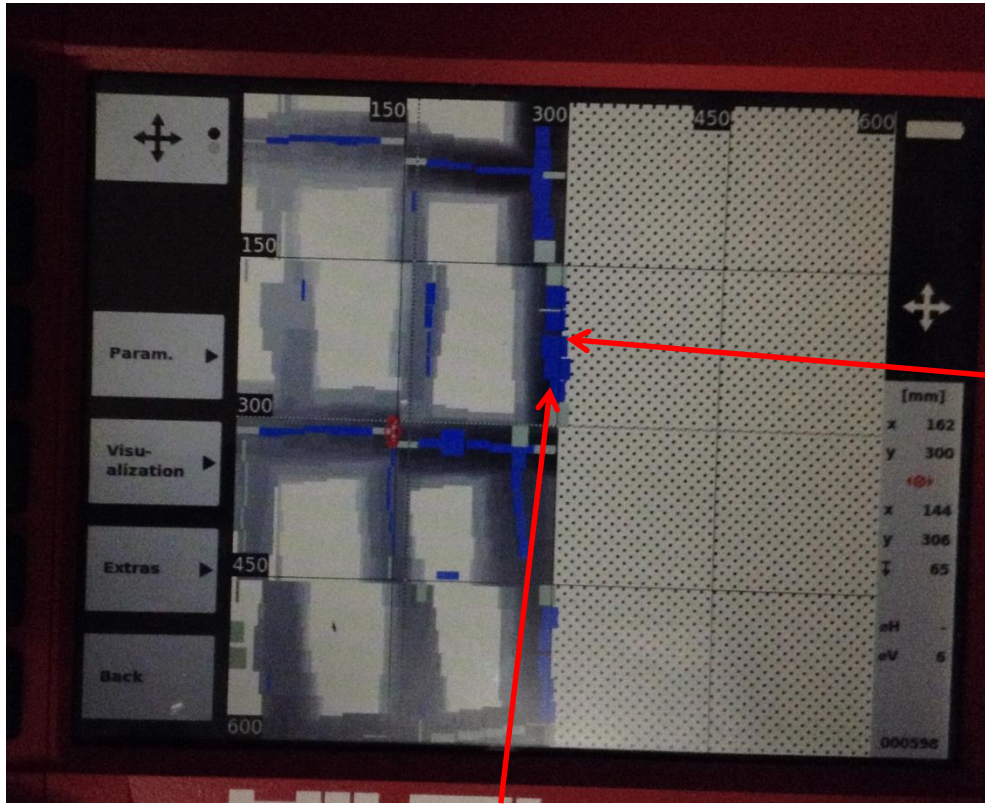
Cracking on beam at first floor



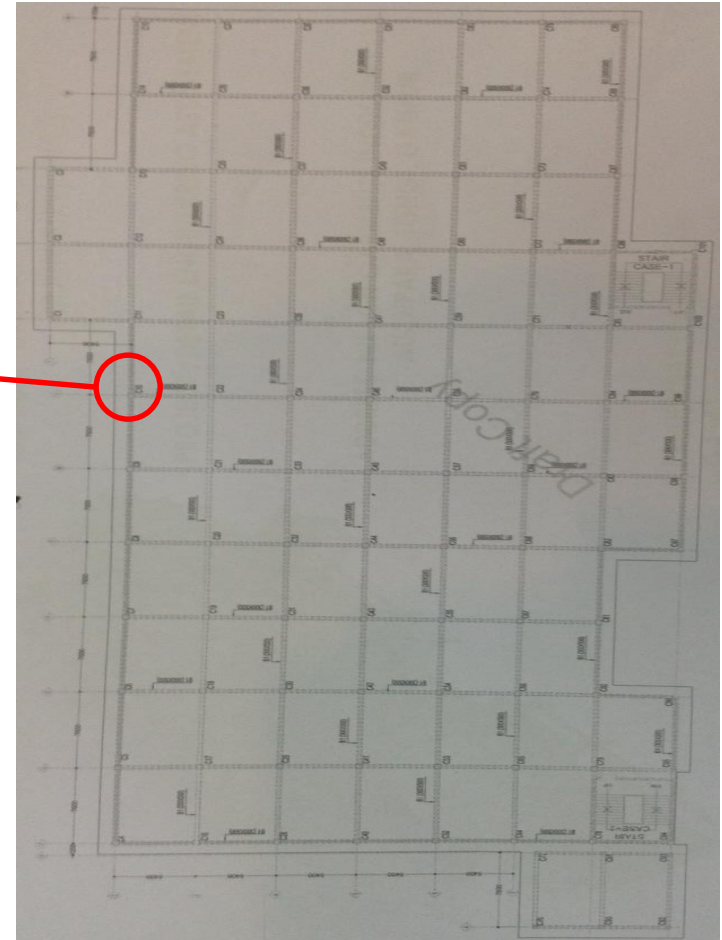
Observations Building 1

Discrepancy between information on drawings and site observations

Observations Building 1



Ferroscan indicated 3 bars in each face (i.e. 8 bars in total). Drawings indicate 12 bars



Observations Building 1

Evacuation stairs lack stability and do not appear very robust

Observations Building 1



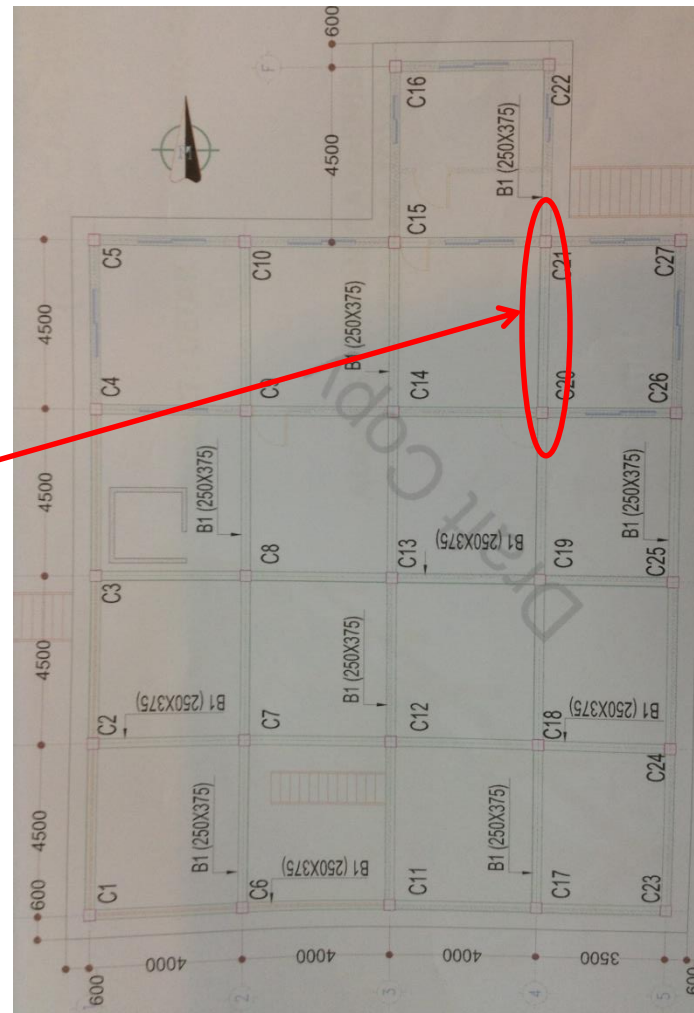
Lightweight stair with minimal stability due to lack of vertical bracing and does not appear very robust. To be checked for full emergency stair loading.

Observations

Building 2

Cracking on beam

Observations Building 2

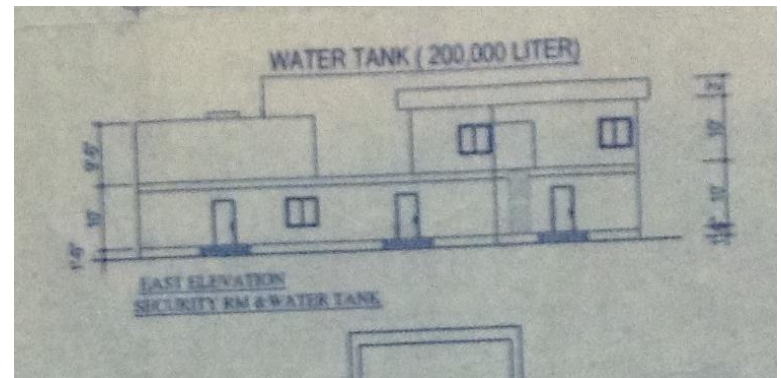


Significant cracking on beam at first floor

**Uncovered water tank (Not in Use).
High stress level in columns under tank, if
tank is filled in the future**

Observations Building 2

Cursory calculations indicate that columns below tank would be over stressed if tank gets filled with water.



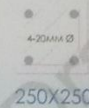
Observations Building 2

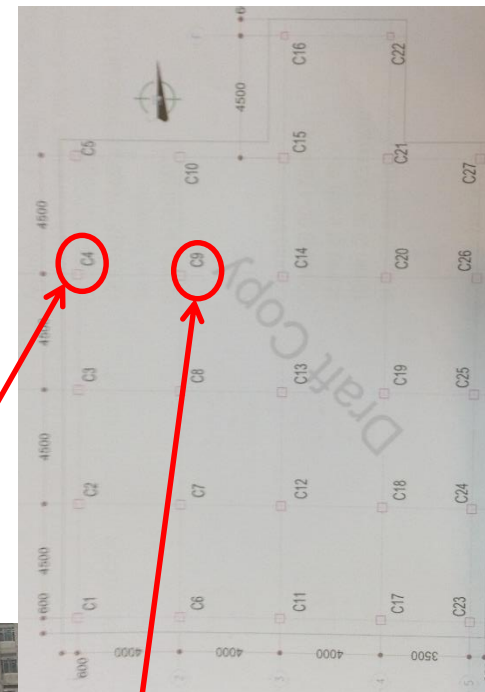
Discrepancies between information on drawings and site observations

Observations Building 2

COLUMN SCHEDULE:

SIZE & REINFORCEMENT AS PER REBAR LOCATOR

Name of Column	GROUND FLOOR	1ST FLOOR
C1-C15 C17-C21 C23-C27	 350X350	 350X350
C16,C22	 250X250	 250X250



Only 6 rebars were observed on site. Drawings show 10 bars.

Column dimensions were measured as 300mmX300mm excl. plaster



Observations Building 2

Apparently non-engineered structures

Observations Building 2



Additional tin shaded parking area appeared non-engineered



Stair is constructed from small structural sections



Non-engineered stair structure for water reservoir



Non-engineered stair structure

Observations Building 3

Cracking on column

Observations Building 3

Issues with roof steel work

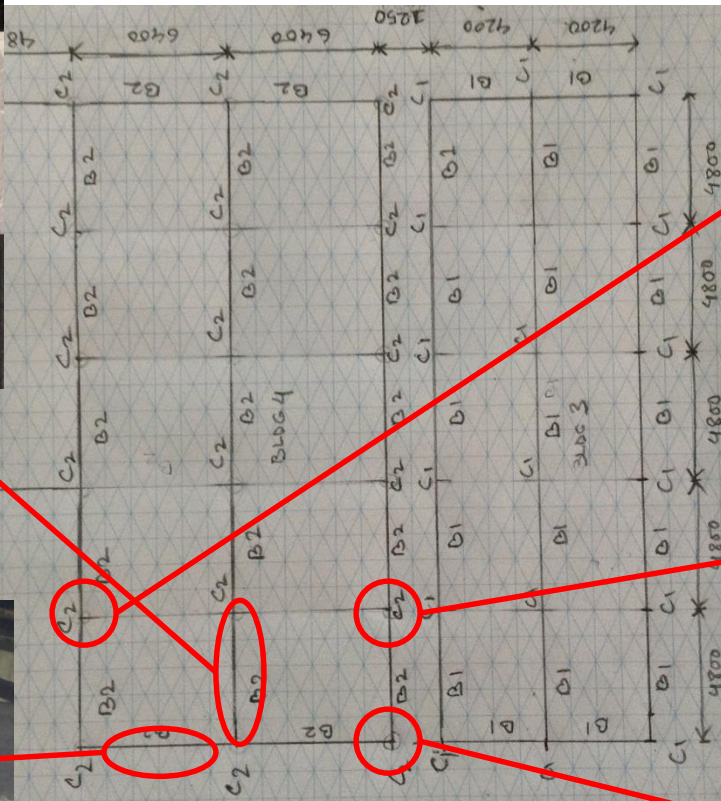
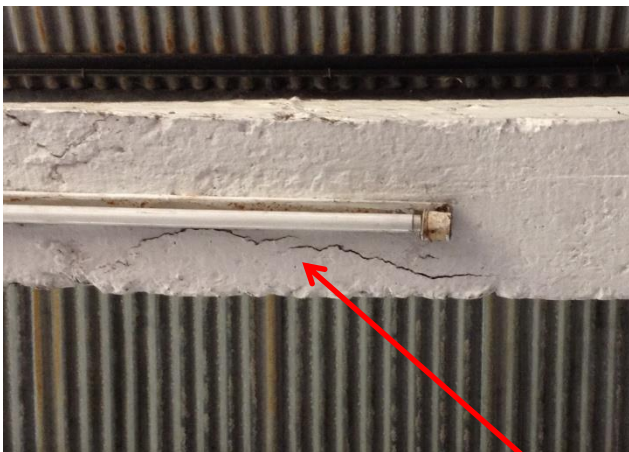
Observations Building 3

Observations

Building 4

Cracking on columns and beams

Observations Building 4



Significant cracking on number of columns and beams (likely due to corrosion of reinforcement)

Observations Building 4

Lightweight roof structure appears non-engineered and is unlikely to be able to withstand strong wind events. Gutter is leaking leading to corrosion.

Observations Building 4

Priority Actions

Problems Observed

Building 1

ITEM 1 : High stress level in column (at ground floor level) from around toilets areas.

ITEM 2 : Cracking to beams and columns

ITEM 3 : Discrepancy between information on drawings and site observations

ITEM 4 : Evacuation stairs lack stability and do not appear very robust

Building 2

ITEM 1 : Cracking to beam

ITEM 2 : Uncovered water tank (Not in Use). High stress level in column under tank on if tank is full

ITEM 3 : Discrepancies between information on drawings and site observations

ITEM 4 : Apparently non-engineered structures

Building 3

ITEM 1: Cracking to columns

ITEM 2: Issues with roof steel work

Building 4

ITEM 1: Cracking to columns and beams

ITEM 2: Lightweight roof structure appears non-engineered and is unlikely to be able to withstand strong wind events. Gutter is leaking leading to corrosion.

Building 1

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	High stress level in all columns, in particular to columns around toilet on Ground Floor (grid lines J1, K1, L1, J2, K2 & L2). Core results indicate low concrete strengths	A Detail Engineering Assessment to be commenced on building 1, see attached Scope.	Immediate - Now
2	High stress level in all columns, in particular to columns around toilet on Ground Floor (grid lines J1, K1, L1, J2, K2 & L2). Core results indicate low concrete strengths	Building Engineer to review concrete strengths and as built reinforcement to columns supporting toilet area to assess column capacity and if necessary reduce floor loads (by removing toilet raised platform) in this area.	Immediate - Now
3	High stress level in all columns, in particular to columns around toilet on Ground Floor (grid lines J1, K1, L1, J2, K2 & L2). Core results indicate low concrete strengths	Detail Engineering Assessment to be completed on building 1.	6-weeks
4	High stress level in all columns, in particular to columns around toilet on Ground Floor (grid lines J1, K1, L1, J2, K2 & L2). Core results indicate low concrete strengths	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	6-weeks
5	High stress level in all columns, in particular to columns around toilet on Ground Floor (grid lines J1, K1, L1, J2, K2 & L2). Core results indicate low concrete	Continue to implement load plan	6-months

Detail Engineering Assessment

This Schedule develops a minimum level of information, Analysis and testing expected as part of a Detail Engineering Assessment.

The Building(s) have been visually assessed and it is deemed necessary that a detailed engineering assessment be carried out by a competent Engineering Team employed by the factory Owner.

This Request should be read in conjunction with the BUET developed Tripartite Guideline document for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of this document should be referenced. This document also gives guidance on required competency of Engineering Team.

We expect that the following will be carried out:

1. Development of Full Engineering As-Built Drawings showing Structure, loading, elements, dimensions , levels, foundations and framing on Plan, Section and Elevational drawings .
2. The Engineering team are to carry out supporting calculations with a model based design check to assess the safety and serviceability of the building against loading as set out in BNBC-2006, Lower rate provisions can be applied in accordance with the Tripartite Guidelines following international engineering practice, justification for these lower rate provisions must be made.
3. A geotechnical Report describing ground conditions and commenting on foundation systems used/proposed.
4. A report on Engineering tests carried out to justify material strengths and reinforcement content in all key elements studied.
5. Detailed load plans shall be prepared for each level showing current and potential future loading with all key equipment items shown with associated loads.
6. The Engineering team will prepare an assessment report that covers the following:
 - As-Built drawings including
 - Plans at each level calling up and dimensioning all structural components
 - Cross sectional drawings showing structural beams, slabs, floor to floor heights, roof build-ups and Basic design information of the structure
 - Highlight any variation between As-built compared to the designed structure
 - Results of testing for strength and materials
 - Results of geotechnical assessment and testing/investigation
 - Details of loading, inputs and results of computer modelling
 - Commentary on adequacy/inadequacy of elements of the structure
 - Schedule of any required retrofitting required for safety or performance of Structure

Any proposals for Retrofitting to follow guidance developed in the Tripartite Document

Item No.	Observation	Recommended Action Plan	Recommended Timeline
6	Cracking on beams and columns	As part of the DEA noted in Item 1 the Building engineer is to investigate the cracking in the beams	6-weeks
7	Cracking on beams and columns	Building Engineer to expose surface of the concrete beam in a number of locations to determine if the cracking extends through the finish into the beam. Also beams repaired with epoxy to be checked in case of reoccured cracks and make recommendations for remedial measures if required.	6-weeks
8	Cracking on beams and columns	Carry out remedial work if required.	6-weeks
9	Cracking on beams and columns	Make structural alterations as advised by Factory Engineer.	6-months
10	Discrepancy between information on drawings and site observations	As part of the Detail Engineering Assessment (see Item 1), Factory Engineer to update the engineering drawings (especially for number of rebars in columns).	6-weeks
11	Evacuation stairs lack stability and do not appear very robust	Building engineer to check the capacity of the evacuation stair and make any necessary alterations.	6-months

Building 2

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Cracking to beam	Building engineer to make recommendations for remedial measures if required.	6-weeks
13	Cracking to beam	Carry out remedial work if required.	6-weeks
14	Cracking to beam	Make structural alterations as advised by Factory Engineer.	6-months
15	Uncovered water tank	Building Engineer to review concrete strengths and as built reinforcement to columns supporting the water tank to assess column capacity and if necessary reduce column loads by demolishing the tank or the columns need to be strengthened if the tank is required for future use.	6-weeks
16	Uncovered water tank	Or clearly mark on tank that it is not to be filled and cover to prevent rain water filling (consider making hole in tank at base so water can not collect in tank)	6-weeks
17	Discrepancies between information on drawings and site observations	Factory Engineer to update the engineering drawings (especially for number of rebars in columns).	6-weeks
18	Apparently non engineered structures	Building engineer to check the capacity of the lightweight steel structures and stairs and make any necessary alterations.	6-months

Building 3

Item No.	Observation	Recommended Action Plan	Recommended Timeline
19	Cracking to columns	Building engineer to investigate cause of cracking in columns and make recommendations for remedial measures.	6-weeks
20	Cracking to columns	Make structural alterations as advised by Factory Engineer.	6-weeks
21	Issues with roof steel work	Building engineer to check the capacity of the lightweight roofs and make any necessary alterations.	6-months

Building 4

Item No.	Observation	Recommended Action Plan	Recommended Timeline
22	Cracking on columns and beams	Building engineer to investigate cause of cracking in columns and make recommendations for remedial measures.	6-weeks
23	Cracking on columns and beams	Make structural alterations as advised by Factory Engineer.	6-months
24	Apparently non-engineered structures	Building engineer to check the capacity of the lightweight roofs and make any necessary alterations.	6-months