

A.M. Design Ltd.

Diakhali, Beron, Jamgara, Ashulia, Bangladesh

(23.937403N,90.296808E)

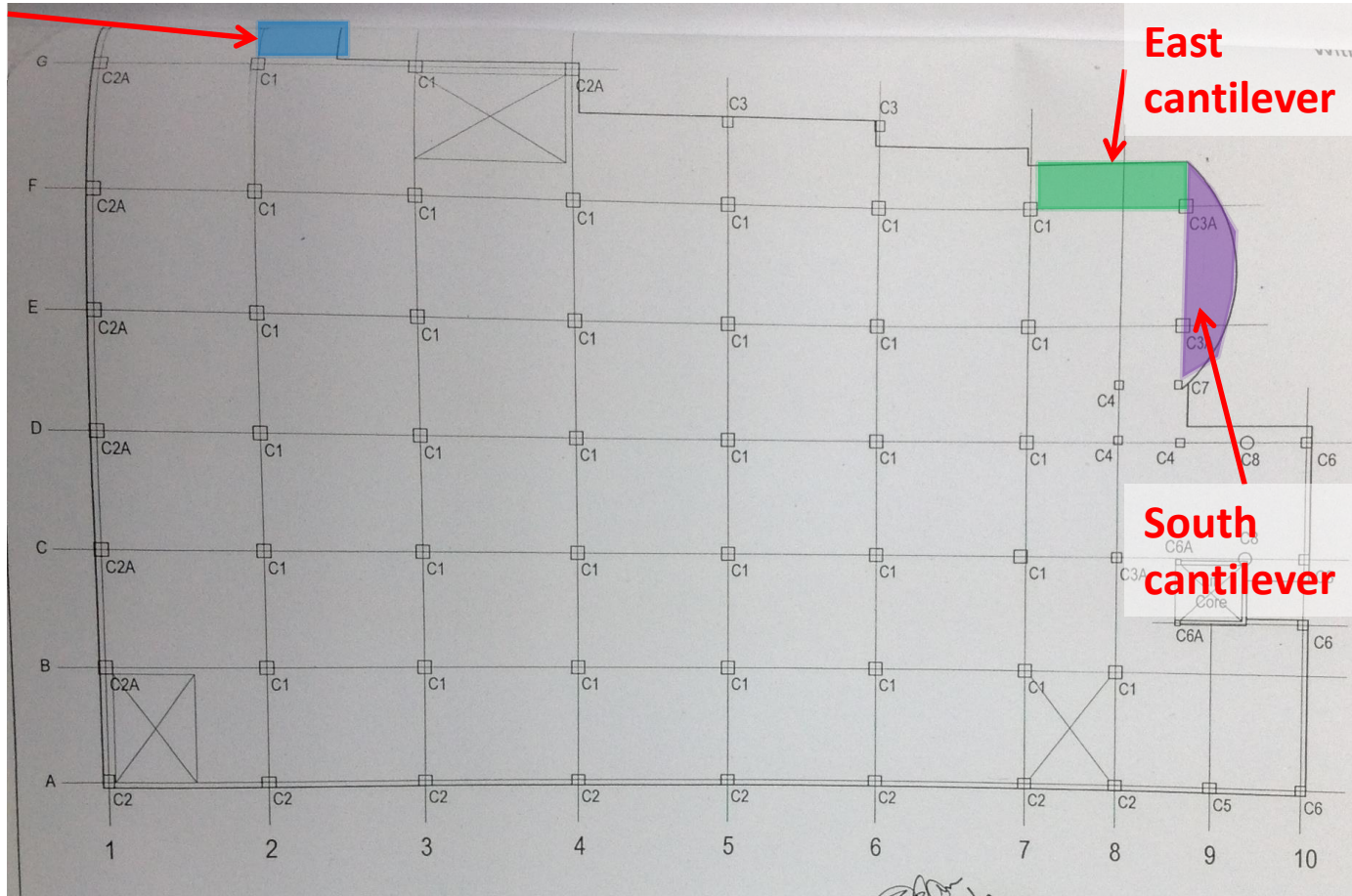
3 May 2014



Observations

Sensitivity of cantilever areas to loading

**Northeast
cantilever**



Cantilever slabs are particularly sensitive to heavy loading.

South cantilever – second floor



South cantilever – third floor



South cantilever slab is used for material storage up to approximately 2m on second and third floors.

Deflection of South cantilever at first floor level observed in Boardroom.



Washroom block housed within Northeast cantilever at first floor. Additional loading due to floor build ups in this area.

Concentrated areas of high loading

**Bonded
warehouse**



**Material rolls in within bonded warehouse
stacked to approximately 1.25m high.**



**Numerous locations of
concentrated material storage
throughout building. No loading
management system in place.**



2 x 2000l plastic water tanks located on beam line between columns.



2 x 2000l and 2x 1000l plastic water tanks supported on reinforced concrete beam spanning between columns. No apparent drainage system for standing water on roof.



110mm concrete slab

**Additional dead loading observed in washroom areas:
Up to 120mm solid build up on slab in toilet cubicles. 110mm slab above washroom. 175mm solid masonry walls with tile.**

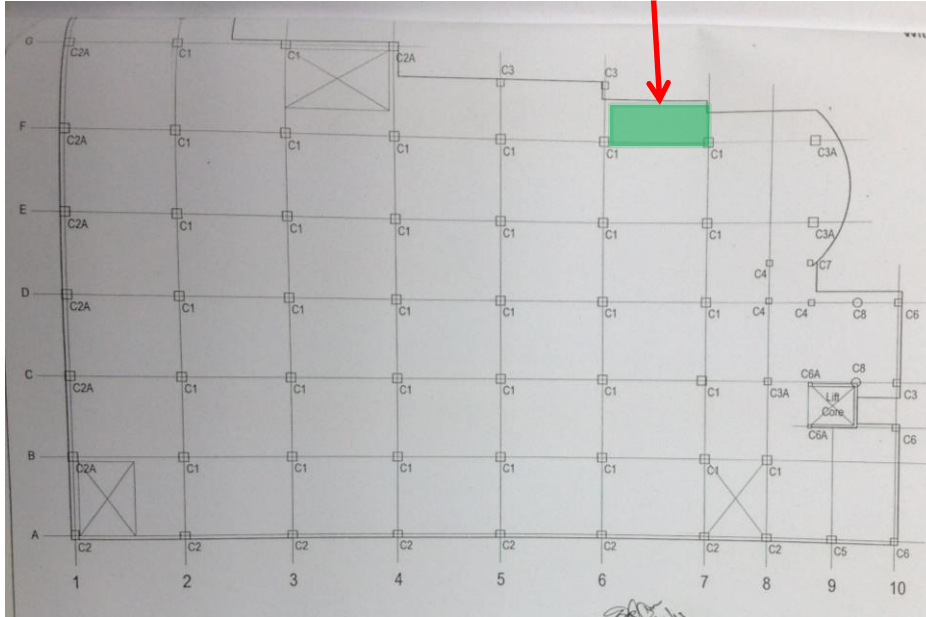


175mm

120mm

**No stiffening edge beam to assumed one way
spanning slab**

Assumed one way spanning slab with no perimeter edge beam



East bay GL 6-7 does not have a downstand beam at the perimeter to support masonry infill walls. Deflection of slab evident by cracking observed on east façade.



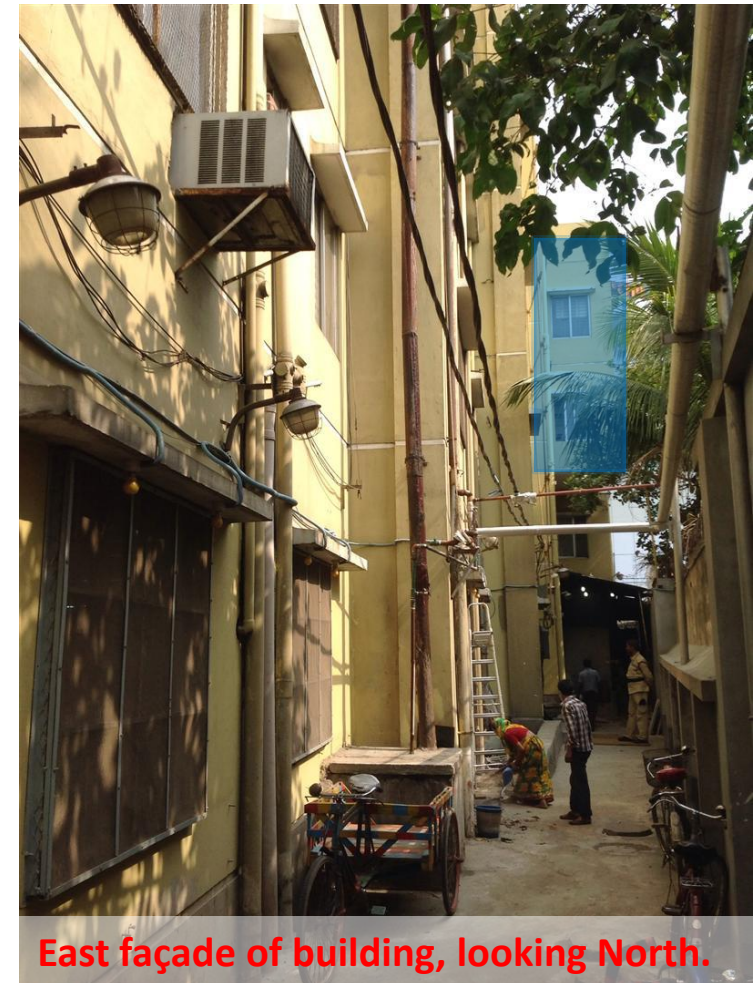
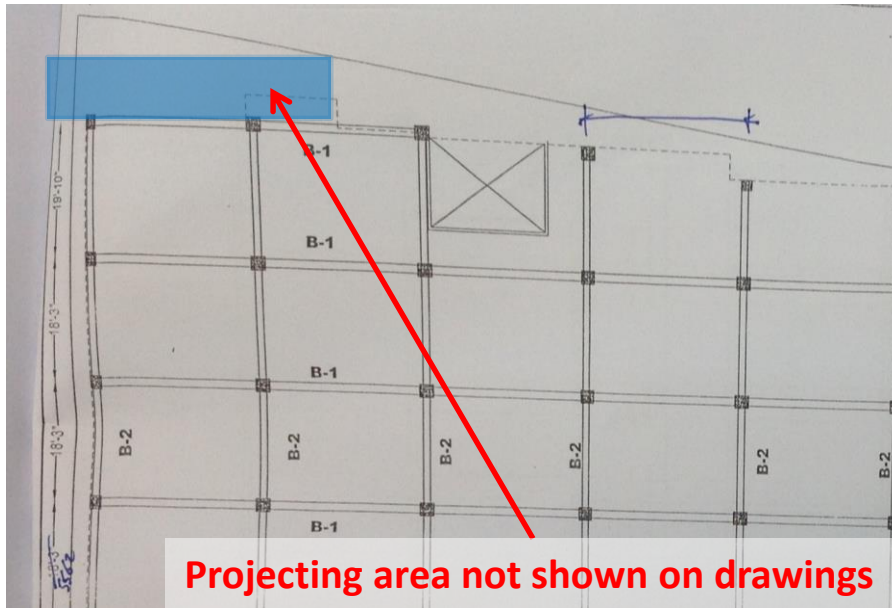
Cracking in East facade



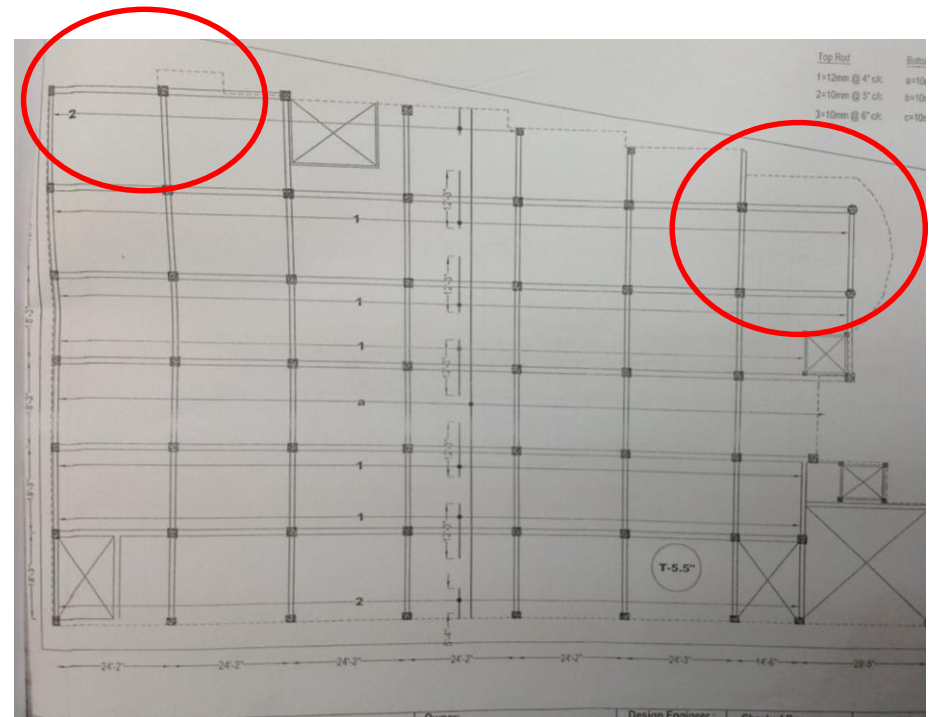
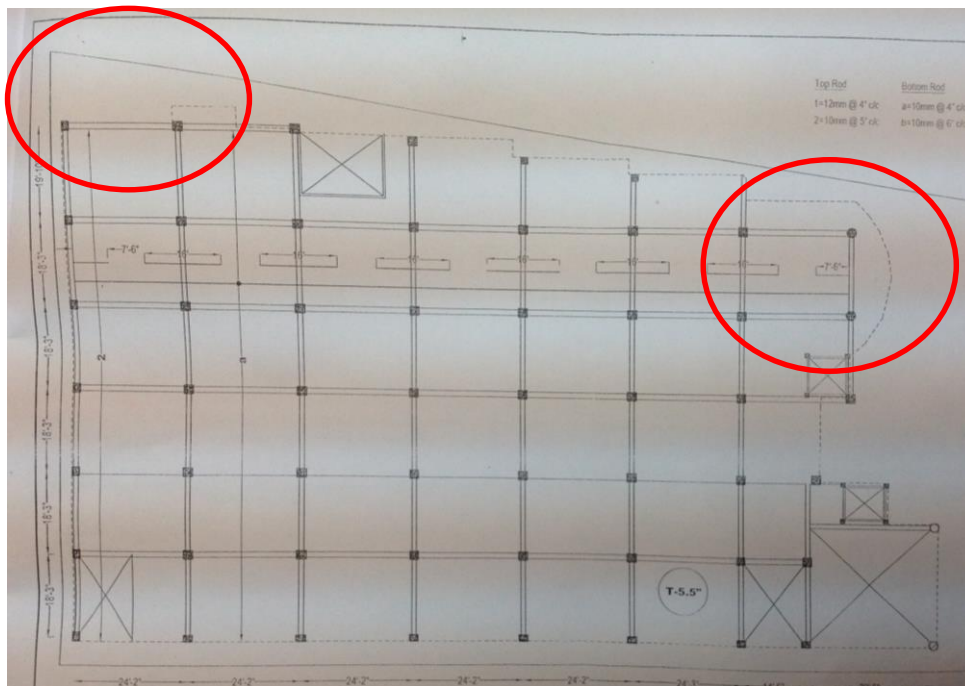
No downstand beam provided

No stiffening edge beam to assumed one way spanning slab

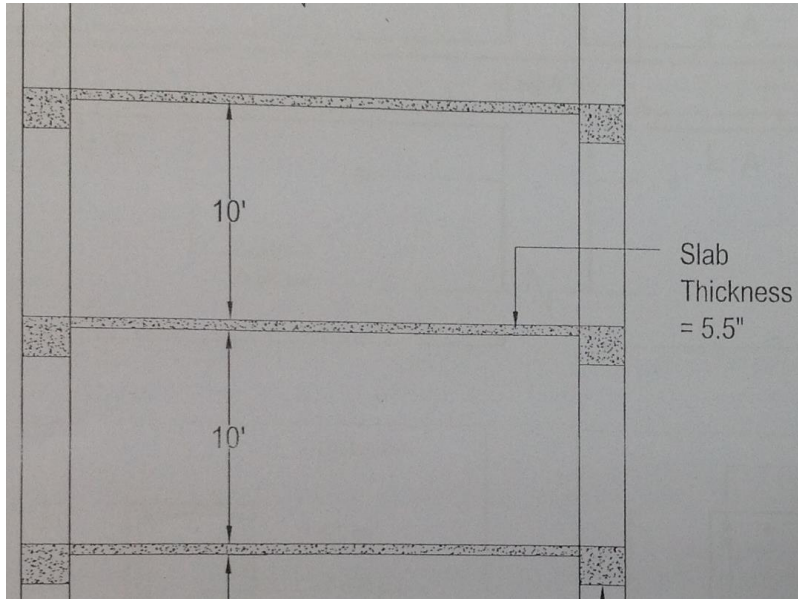
Discrepancies between structural drawings and as built structure



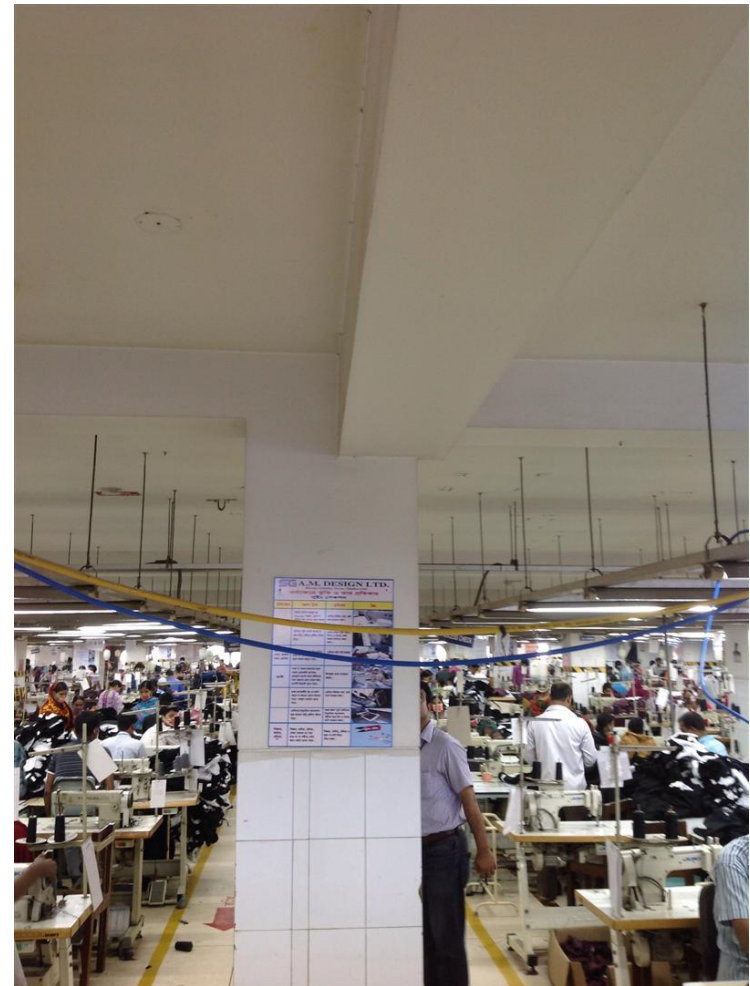
Structural drawings do not provide details for projecting area in North East corner of building. Architectural and permit drawings do show this area.



Incomplete reinforcement structural drawings and no details for cantilever slabs to Northeast or South of building.



5.5" thick slab indicated on drawings (140mm). Slab thickness observed on site varied between approximately 140mm and 170mm.

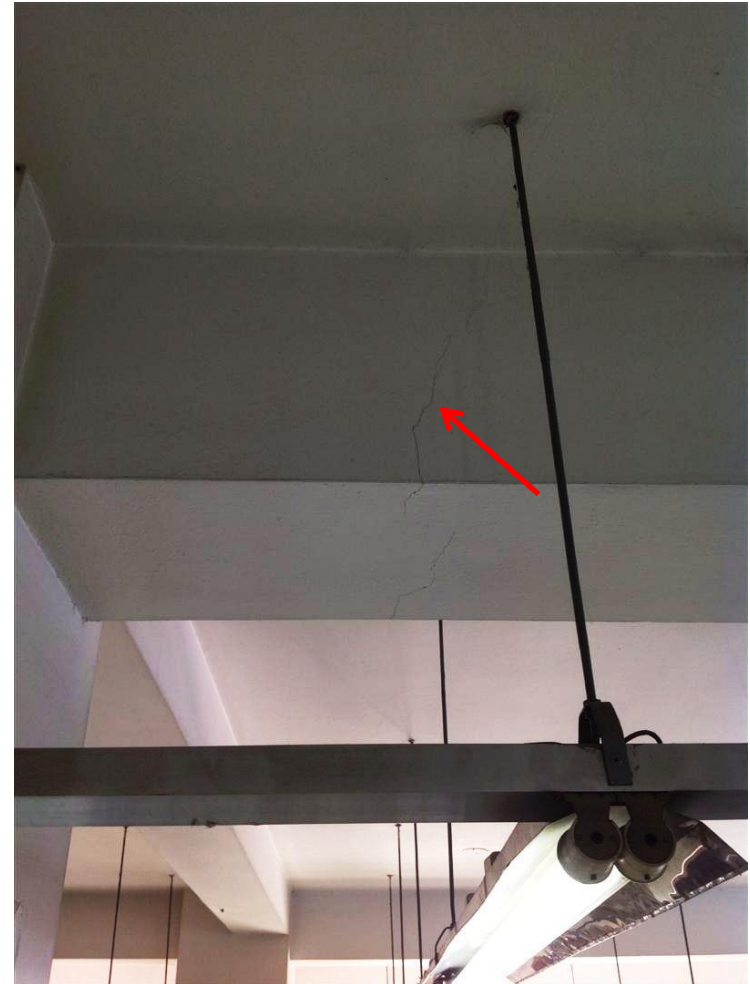


Beam frames into column eccentrically in a number of locations.

Minor hairline cracks observed in structural elements



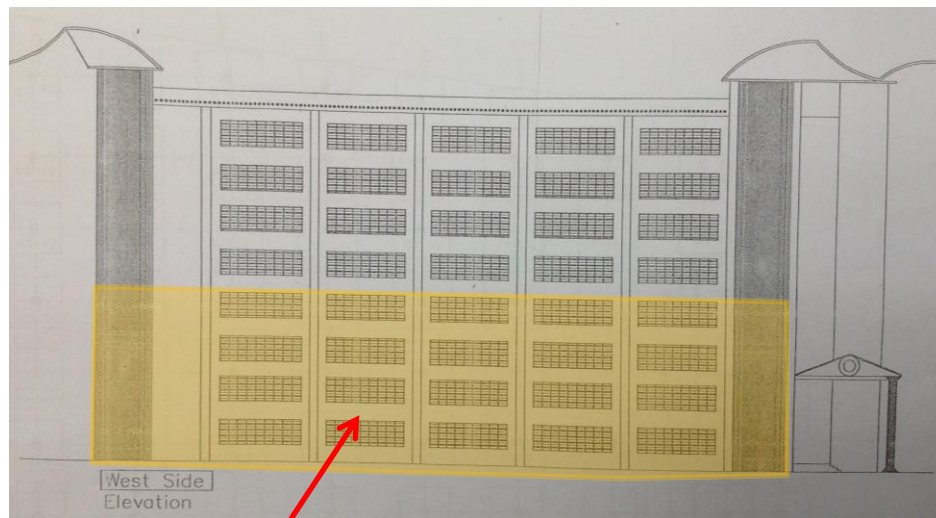
Hairline cracks observed at soffit of roof slab. Evidence of dampness in at location of crack.



Vertical cracking observed in sides and soffits of a number of beams throughout the building.

Minor hairline cracks observed in structural elements

Future vertical extension



Extent of constructed building

Factory Management indicate that they intend to extend the structure vertically in the future. Four additional storeys are planned. Column reinforcement continues past slab level at existing roof.

Architectural drawings reviewed show complete eight storey building. Permit drawings do not indicate the number of storeys that have been approved.

Non-engineered structures



Numerous non-engineered lightweight structures around perimeter of building observed. Factory management indicate these structures are to be removed.

Non-engineered structures



Lightweight tin roof over staircore. Tin roof susceptible to wind uplift due to inadequate holding down details.

Problems Observed

1. Sensitivity of cantilever areas to loading
2. Concentrated areas of high loading
3. No stiffening edge beam to assumed one way spanning slab
4. Discrepancies between structural drawings and as built structure
5. Minor hairline cracks observed in structural elements
6. Future vertical extension
7. Non-engineered structures

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Sensitivity of cantilever areas to loading	Building Engineer to assess capacities of cantilever slabs and develop and implement loading plans for these areas as necessary	6-weeks
2	Sensitivity of cantilever areas to loading	Building Engineer to implement loading plans specific for cantilever areas. (to be incorporated in Item 2 actions)	6-weeks
3	Concentrated areas of high loading	Building Engineer to develop loads plans for all buildings, accounting for usage, floor build ups, solid partition walls and areas of concentrated loading. Factory management to implement load plans.	6-months
4	No stiffening edge beam to assumed one way spanning slab GL 6/7 parallel to GL G	Building Engineer to confirm one-way spanning slab parallel to GL G (as assumed). IF slab is designed/constructed as a cantilever about GL F a verification of the slab design is required.	6-weeks
5	No stiffening edge beam to assumed one way spanning slab GL 6/7 parallel to GL G	Building Engineer to monitor façade cracking due to unstiffened slab edge and restrict floor use with loading plans as defined in item 1	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
6	Discrepancies between structural drawings and as built structure	As built structural drawings to be generated/updated for all buildings on factory complex. As built drawings to account for structural framing as observed on site.	6-months
7	Discrepancies between structural drawings and as built structure	As built drawings to be revised, as necessary, as future modifications are made to the building. Any strengthening works, as required, to be included on the as built drawings.	6-months
8	Minor hairline cracks observed in structural elements	Building Engineer to identify areas of structural cracking throughout building.	6-months
9	Minor hairline cracks observed in structural elements	Building Engineer to continue to monitor size, length and location of structural cracking throughout.	6-months
10	Future vertical extension	Prior to future extension commencing, Building Engineer to verify column capacities exceed future design loading, accounting for actual loading throughout existing building. Loading plans to be updated as required.	6-months
11	Non-engineered structures	Building Engineer to review the adequacy of non-engineered structures throughout complex. Particular attention should be paid to the stability of these structures and the holding down connection details.	6-months