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Denitex Limited.

9/1, Kornopara, Savar, Dhaka-1340
(23.823528, 90.256569)
22 March, 2016

Client Summary Report

Observations & Actions

Authors:

MD. Abdul Momin/Abu Daud Kabir Ahmed/Md. Kamruzzaman Shohug

Reviewed by: Mohammad Ahsan Ullah

Approved by: Mohammad Shafiq Uddin





Executive Summary

On Tuesday 22 March, 2016 Md. Abdul Momin, Abu Daud Kabir Ahmed & Md. Kamruzzaman Shohug of Bangladesh ACCORD foundation carried out a visual structural survey of the Denitex Limited at the address and coordinates given on the cover page of this report.

We met the Denitex Limited management including Mohammed Shamsud Doha (Director Administration), Biplob Kumar Hazra (Manager Compliance) and many others.

Factory Building: Initially, permission of a 6(six) storied building was taken by the “Bangladesh luggage Industries” from the local authority on 02 November, 1990. Further, building permit for 6th story with 1 storied dining shed at roof was taken from the Department of Inspection for Factories and Establishments (DIFE) on 06th August, 2015. Construction of this building started in 1989 & completed in different phases. In 1997, portion of the 5 storied was completed. Construction of 6th floor started in 2014 & completed in 2016. However, factory authority is not clear about the construction phase of the building. In 2015, factory management has retrofitted almost all the interior columns under consultancy & supervision of “Design & Development Solution (DDS)”. During inspection the factory was 6 storied building & not fully under operation.



Executive Summary (Continued)

We were provided with the as built drawings along with the drawings prepared for retrofitting by “Design & Development Solution (DDS)”. Factory has also provided a copy of Design report prepared by the same consultant. We found discrepancy in as built drawing and no core and rebar test report was found in the design report hence the retrofitting construction was done without any proper engineering judgment

Dinning Shed: A proposed steel structure at roof of factory building (6 storied) will be used as dining shed. It is not constructed yet.

Utility Building: It is a 6 storied building with underground reservoir which construction started from 2014 & completed in 2015.. Construction of some architectural framing is still going on.

Boiler Building: Two storied boiler building constructed in 2014.

We were given a soil test reports report for 6 storied building dated on October, 2013 prepared by “**Geo-Tech Builders**”.

We have some important concerns that need to be addressed **immediately**, which give rise to our recommendation for an immediate **Detail Engineering Assessment**



Executive Summary (Continued)

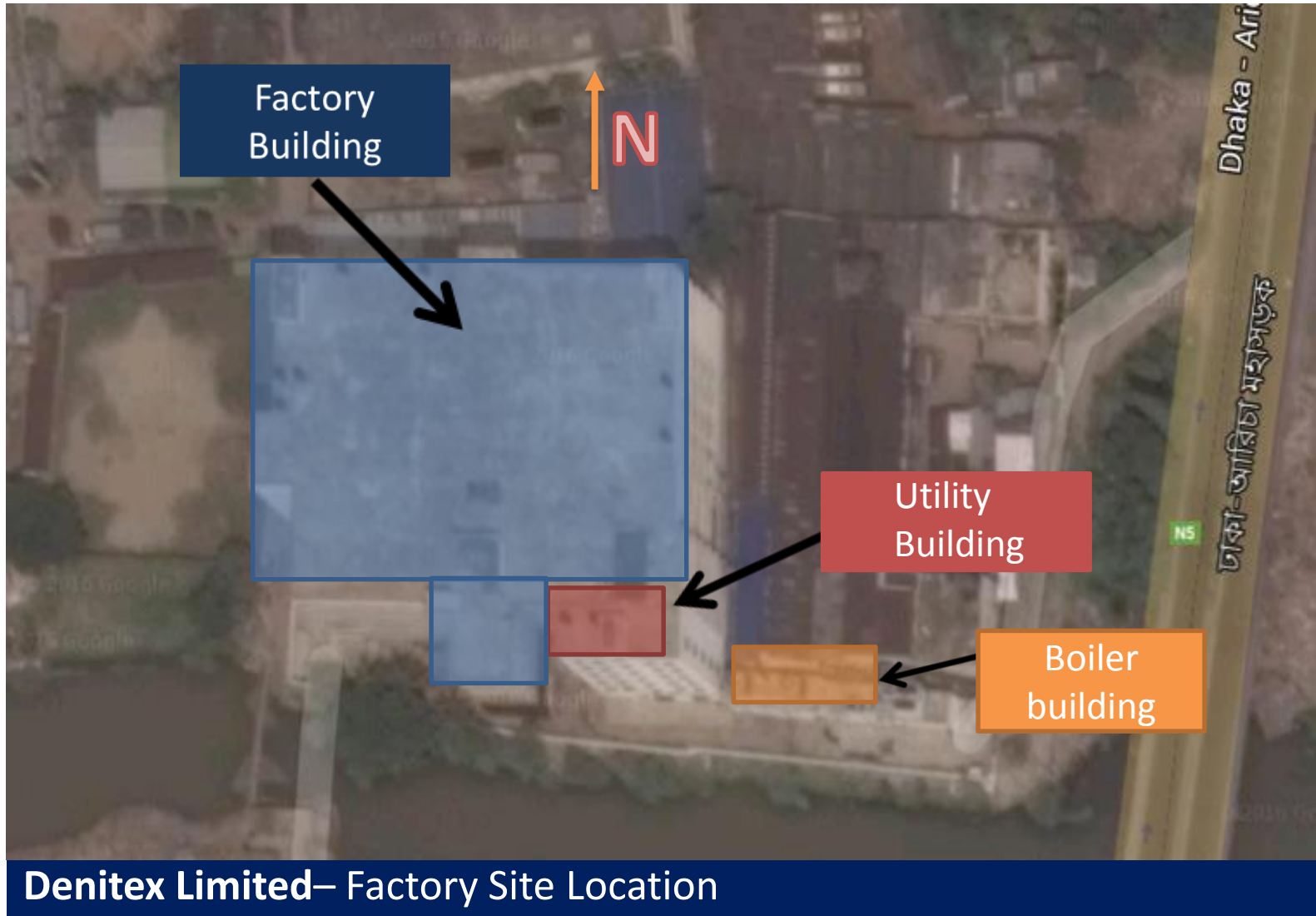
At this point we see no reason to suspend operations in the facility due to these concerns, subject to immediate responses to the required actions noted at the end of this report within the timeframe noted.

Further actions with associated priorities and timeframes are given at the end of this report. Please note that these actions should be completed as soon as practically possible and certainly within the timeframe noted.

Our Limitations and Assumptions are also noted at the end of this report.



Building Extents



Denitex Limited– Factory Site Location

Building Extents



Observations



Building 1: Factory building

1. High stress on column.
2. Discontinued beam, eccentric beam, deflected beam & crack on beam.
3. Inconsistencies of drawings and As built construction.
4. Inconsistencies of drawings and As built construction.
5. No water proofing membrane appears on roof.
6. Exposed reinforcement of column.
7. Questionable in retrofitting drawing & construction



Building 1



High Stress on Column



RCC column in cantilever
portion of the building
only in roof for
Architectural Purpose.

22/03/2016 00:58

RCC columns in roof provided for architectural purposes not continued to the bellow floor hence acting as point load in cantilever portion of the building.



10" high concrete
plinth.

22/03/2016 01:24

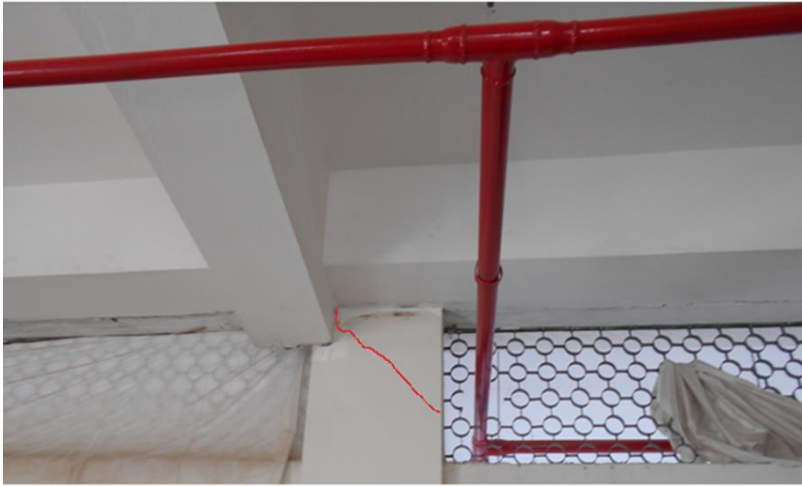
9 (5000 L) water tank upon 10" built up



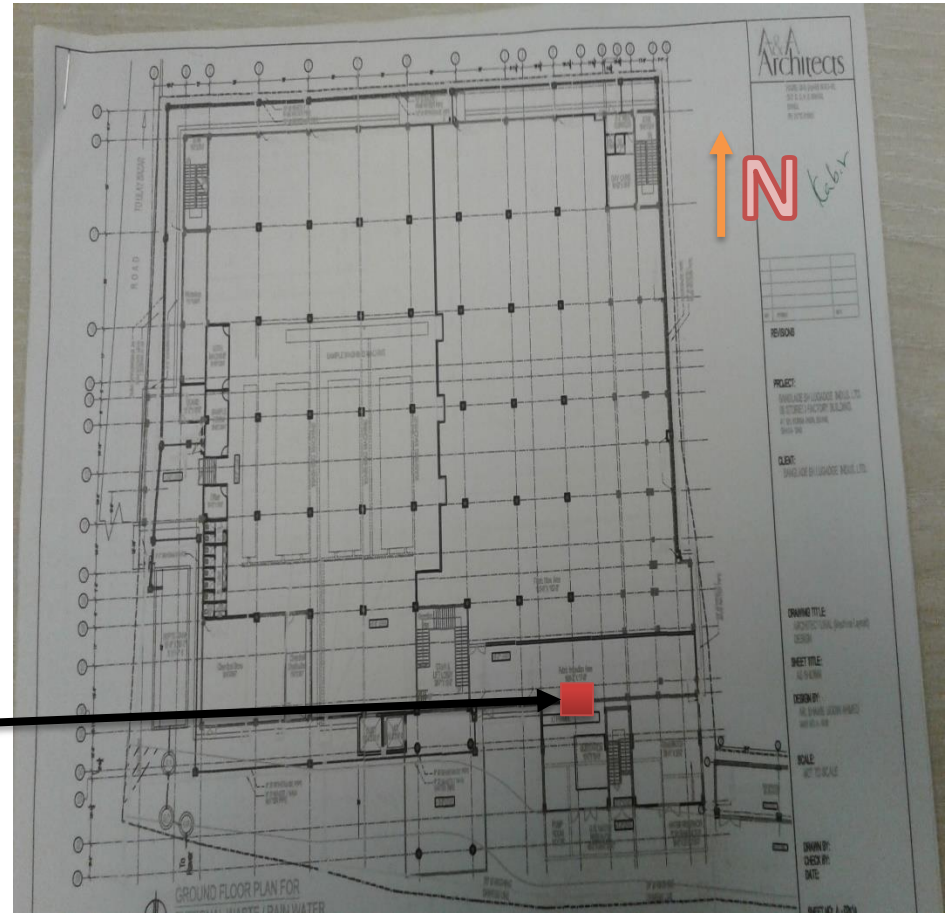
RCC columns only in roof
for architectural purpose

22/03/2016 00:59

High stress on column



Column with eccentric beam found cracked
Unclear Beam-Column arrangement.



After plaster removal, significant crack depth found.

High stress on column



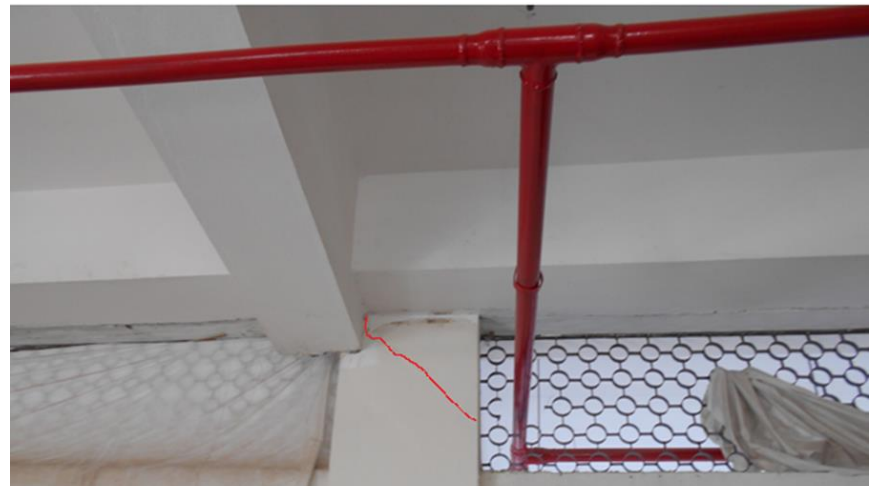
Discontinued, offset, eccentric & Deflected beam.



Beam offset to the column at 4th Floor

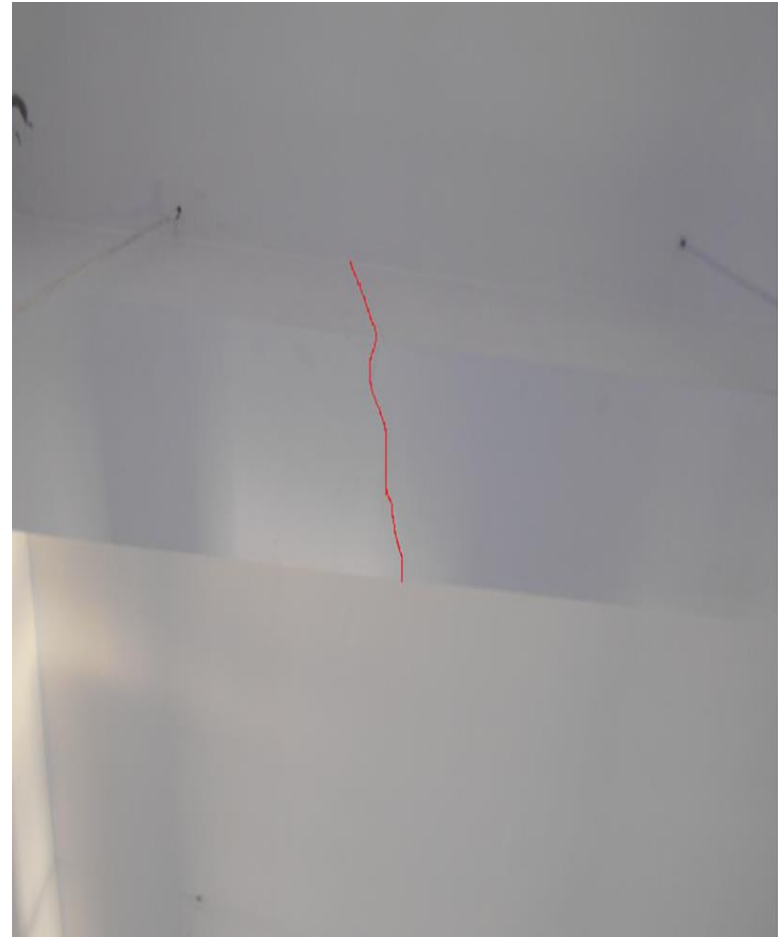


Discontinued beam in every floor on several grid



Eccentric beam in 5th floor

Discontinued, Deflected, Offset and Eccentric beam.

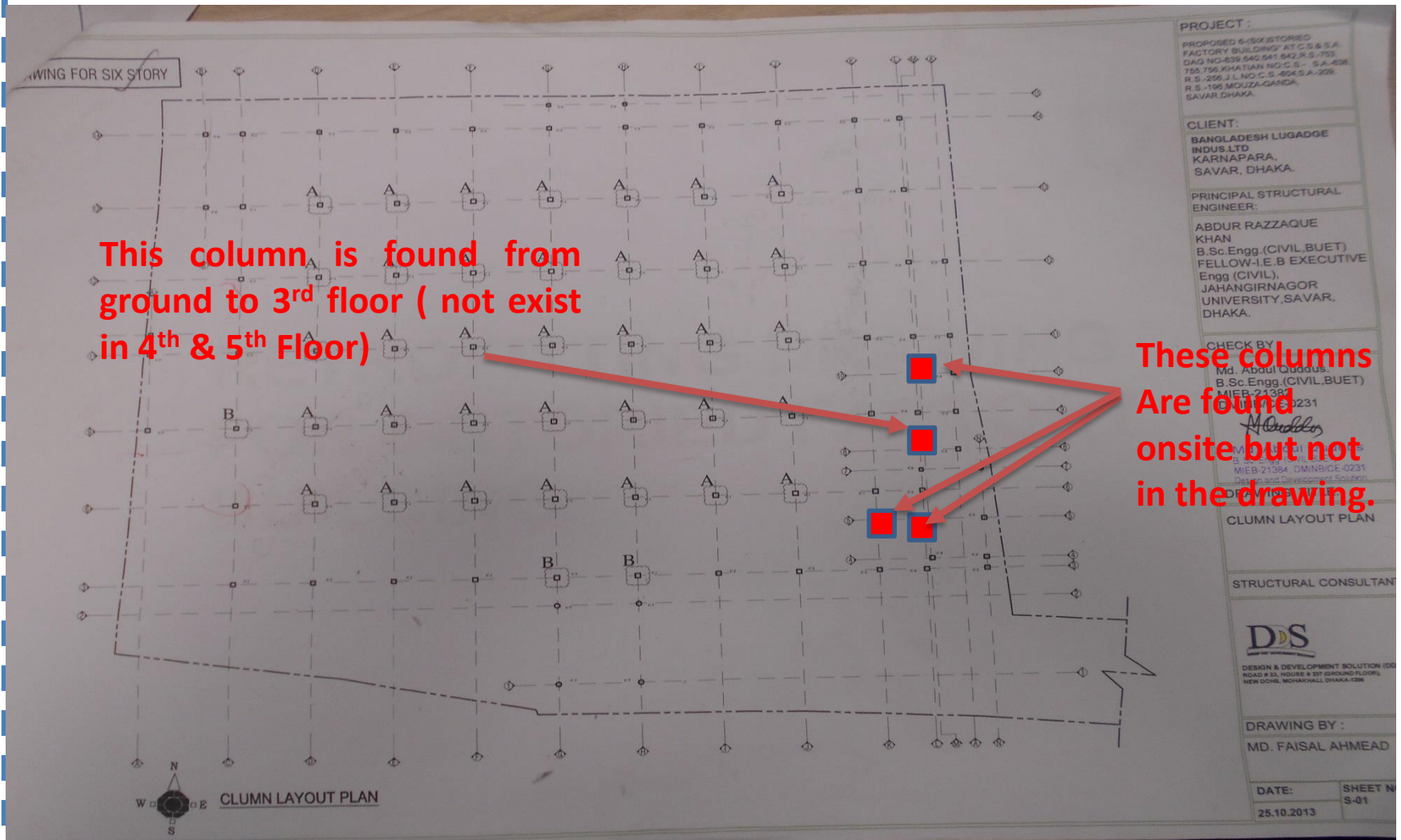


Deflected beam with crack observed in 5th Floor of the building.

Discontinued beam and Eccentric beam.



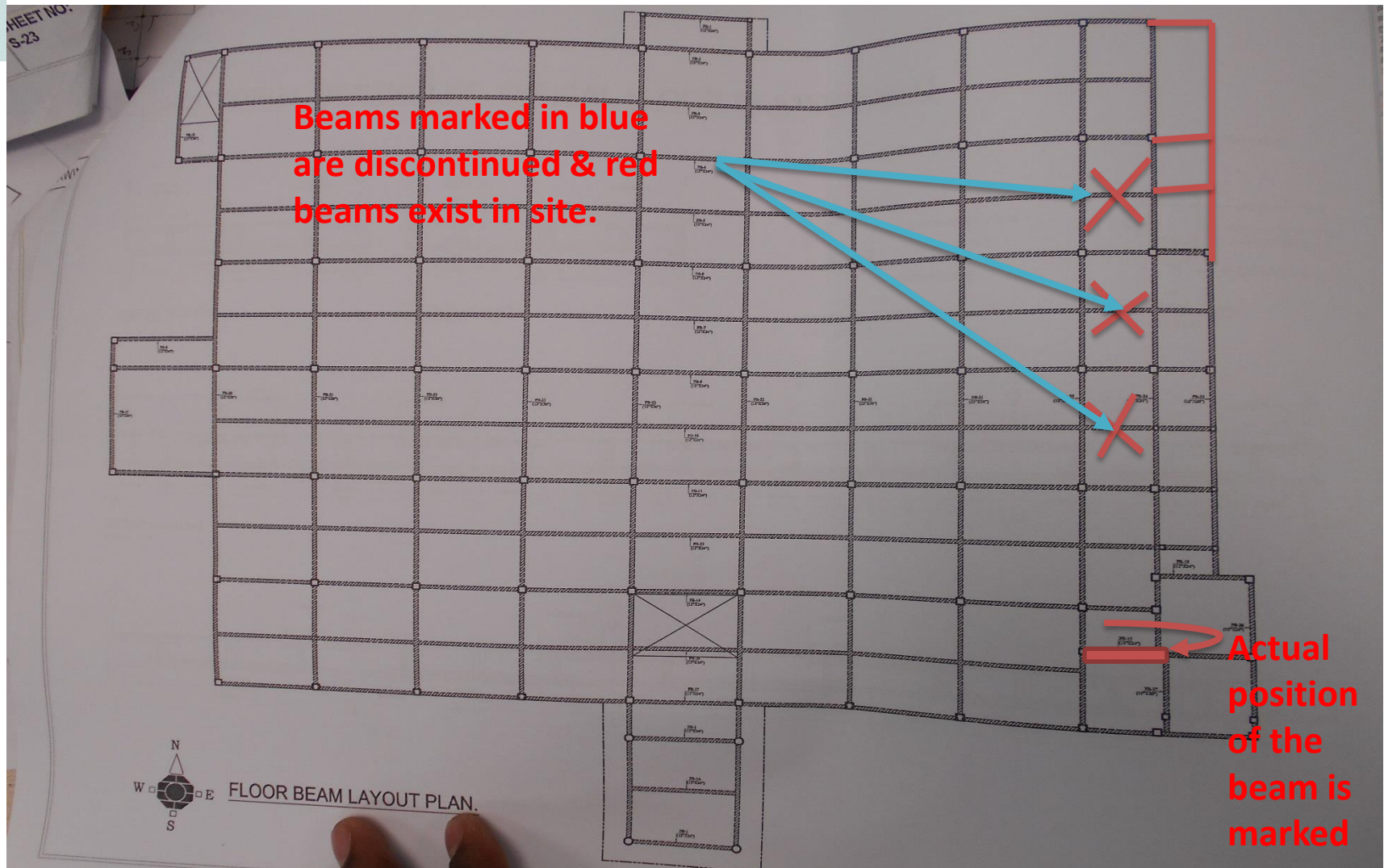
Inconsistencies of drawings and As built construction.



Inconsistencies of drawings and As built construction.

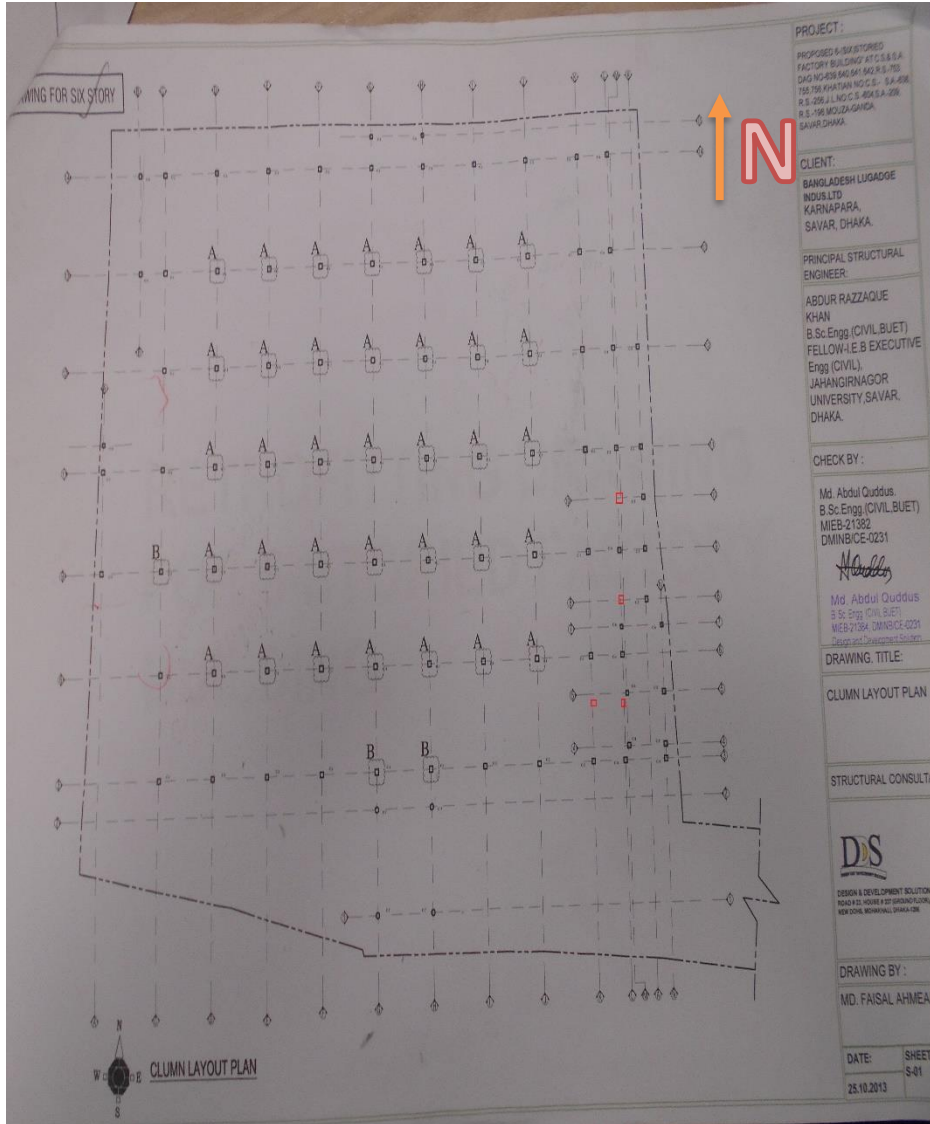


SHEET NO.
S-23



Beam layout Plan

Inconsistencies of drawings and As built construction.



SCHEDULE OF COLUMN SIZE AND REINFORCEMENT			
COLUMN ID	BELOW GRAUND LEVEL		4TH TO 6TH FLOOR
	NOS. OF REINFORCEMENT	COLUMN SIZE	NOS. OF REINFORCEMENT
C1	● 14-20mm	23" x 23"	● 10-20mm ○ 4-16mm
C1A	● 12-20mm	23" x 23"	● 12-20mm ○ 6-16mm
C2	● 8-20mm ○ 8-25mm	23" x 23"	● 10-20mm ○ 6-16mm
C3	● 8-20mm ○ 8-25mm	20" x 20"	● 8-20mm ○ 8-16mm
C4	● 16-25mm	18" x 33"	● 8-20mm ○ 8-25mm

C5, C6 & C7 column is not shown in column schedule but found in column layout of structural drawing.

Inconsistencies of drawings and As built construction.

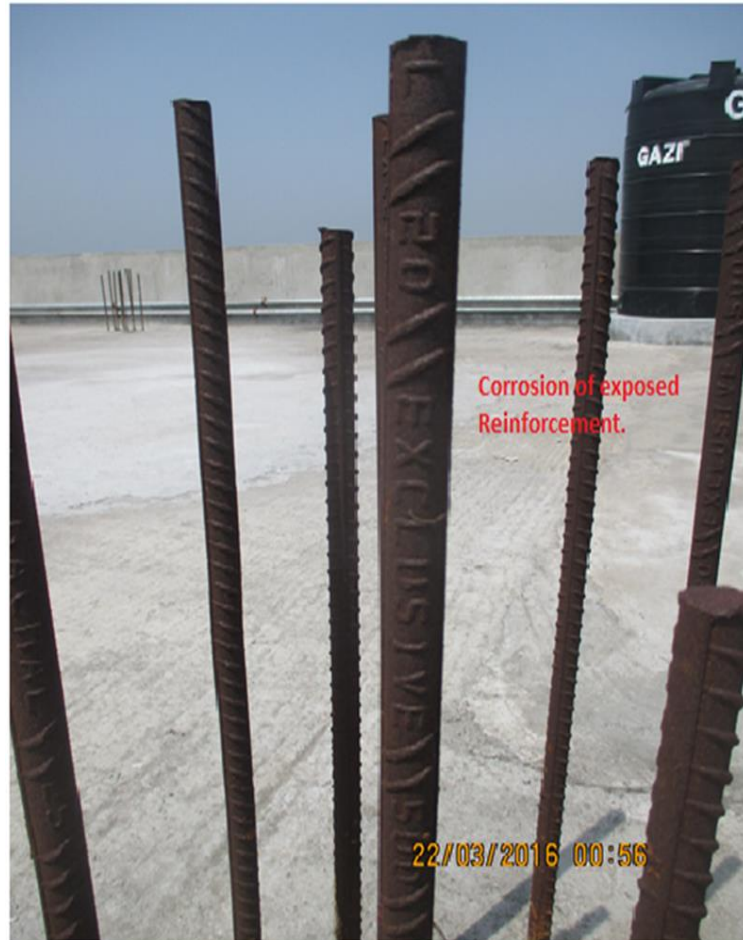


**No water proofing membrane appears on roof &
Exposed reinforcement of column.**



There did not appear to be any waterproofing to the concrete roof. The concrete of the roof will be subject to large temperature changes as it heats up in the sun and cools. This will induce stresses in the structure and could lead to cracking of the concrete slab. In the long term the cracking and lack of waterproofing could cause leaks and durability issues for the structure.

No water proofing membrane appears on roof.



Corrosion in exposed reinforcement. Steel reinforcement projects from roof slab.

Inconsistency of drawings

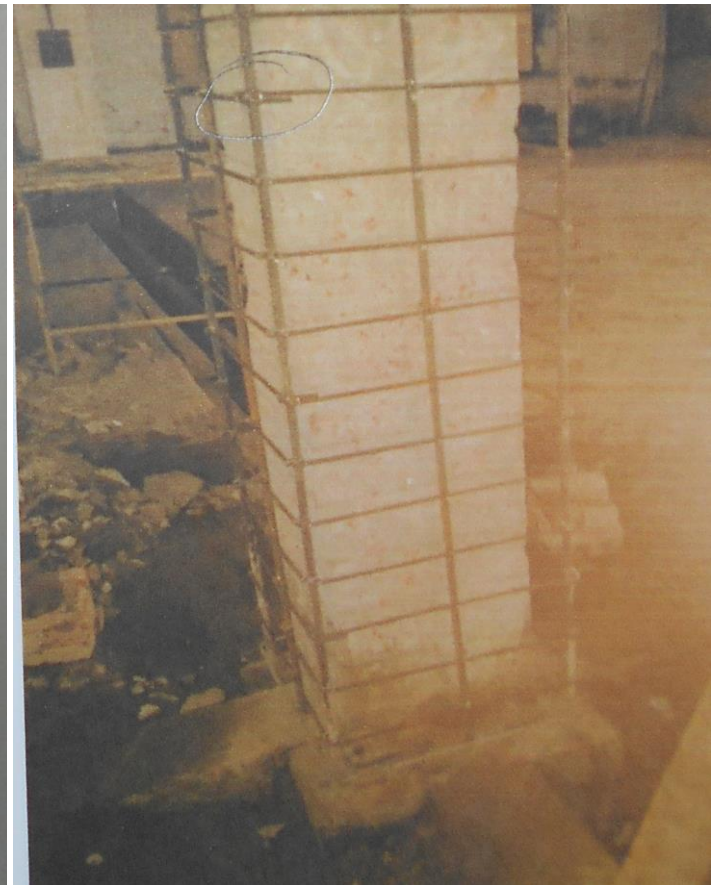
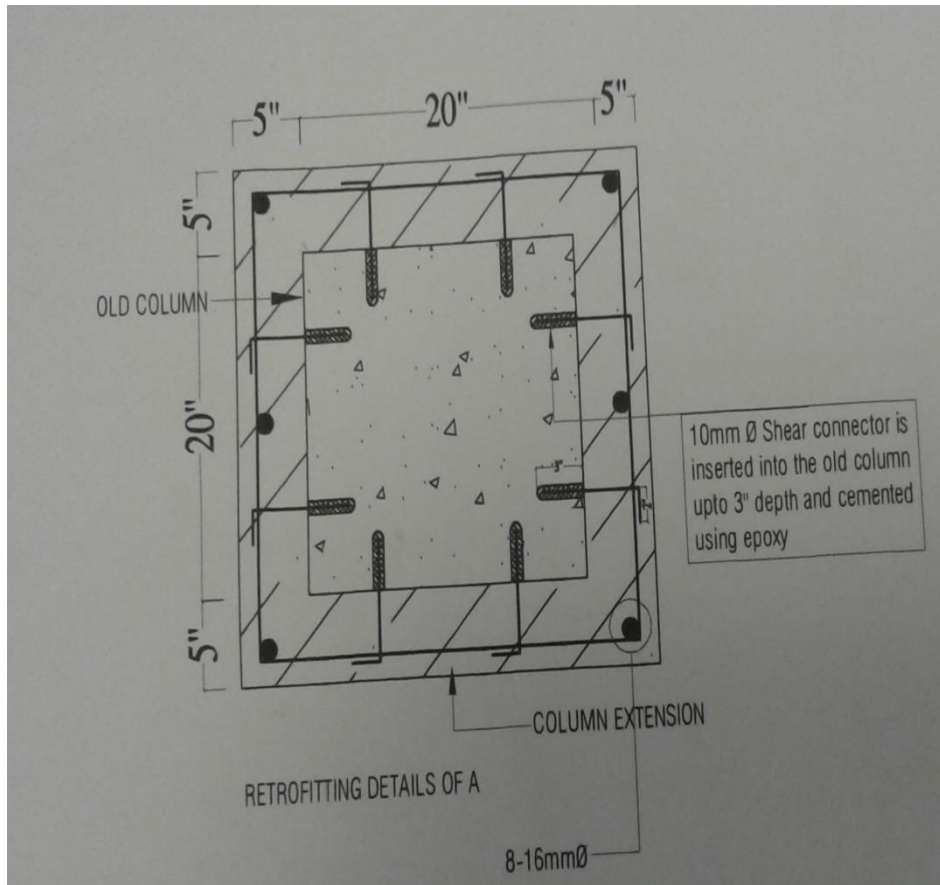


Observations On Design report of Design & Development Solution (DDS)

1. No core test was done for retrofitting work. Rebound hammer test was performed as Concrete strength for analysis.
2. Some Columns in the building are found highly stressed even after retrofitting conditions.
3. As built drawing is not matched with actual situation.
4. Improper detailing of column & Questionable construction work during retrofitting.
5. No. of reinforcement mismatch with retrofitting drawing.



Questionable retrofitting drawing & construction.



Distance between longitudinal reinforcement is greater than 6" but no lateral ties are provided for confinement of the longitudinal reinforcement.

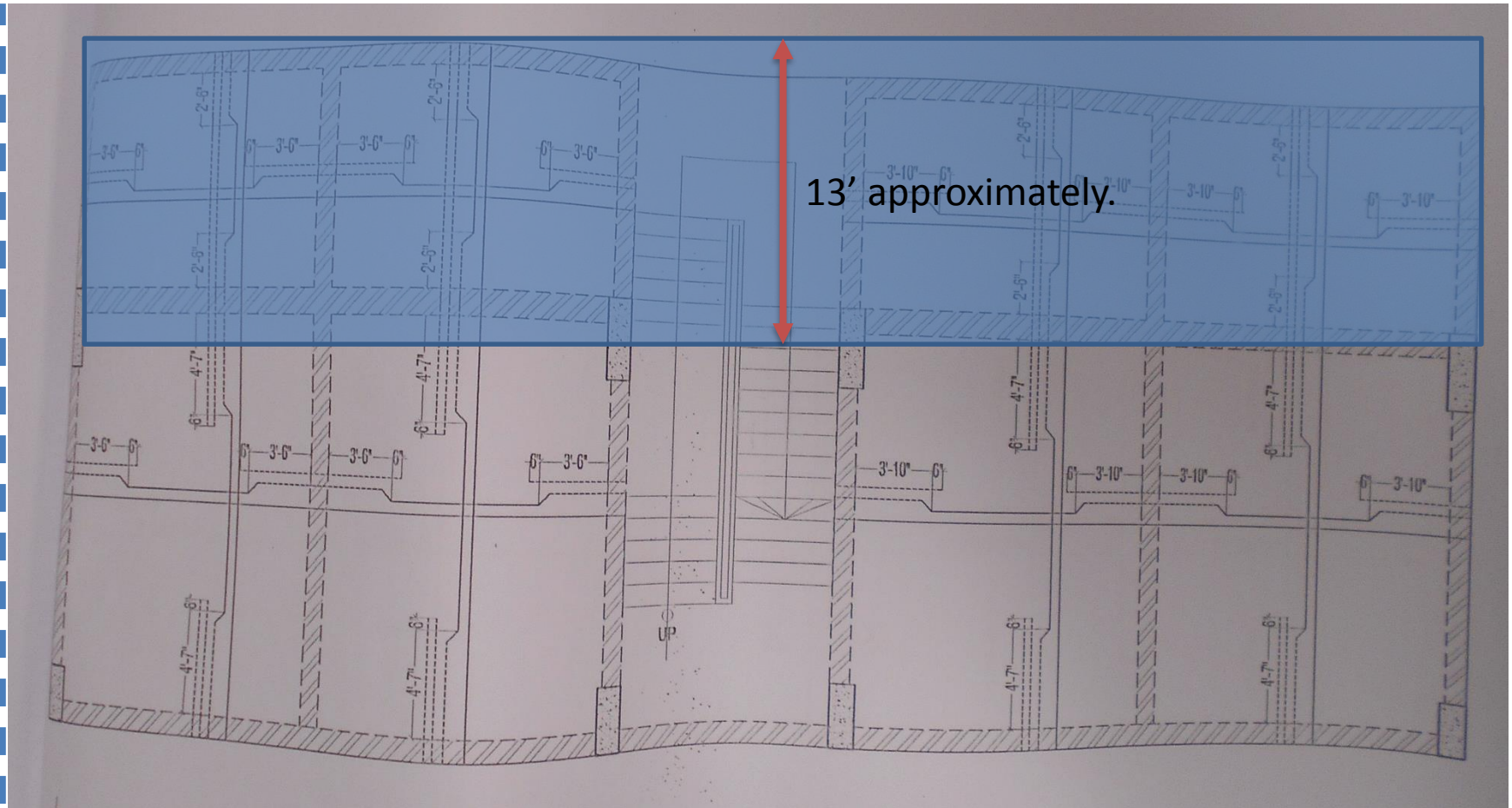
Questionable in retrofitting drawing & construction.



Building 2



Large cantilever portion of the building



Large beam-cantilever portion with of approximately 13' .



Problems Observed

Building -1: Factory Building

Item 1: High stress on column.

Item 2: Discontinued beam, eccentric beam, deflected beam & crack on beam.

Inconsistencies of drawings and As built construction.

Item 3: Inconsistencies of drawings and As built construction.

Item 4: No water proofing membrane appears on roof.

Item 5: Exposed reinforcement of column.

Item 6: Questionable in retrofitting drawing & construction

Building -2: Utility Building

Item 7: Large cantilever portion of the building with RCC column (not continued below) at roof.



Item 1 and actions

Building 1 : Factory Building. High stress on column

Priority 1

(Immediate - Now)

- No additional loads to be applied on area indicated in red on all floors
- Factory Engineer to review design, loads and columns stresses in area identified above.
- Verify insitu concrete stresses by 100mm diameter cores.
- A Detail Engineering Assessment of Factory to be commenced, see attached Scope
- No vertical or horizontal extension before completion of Detail Engineering Assessment.

Priority 2

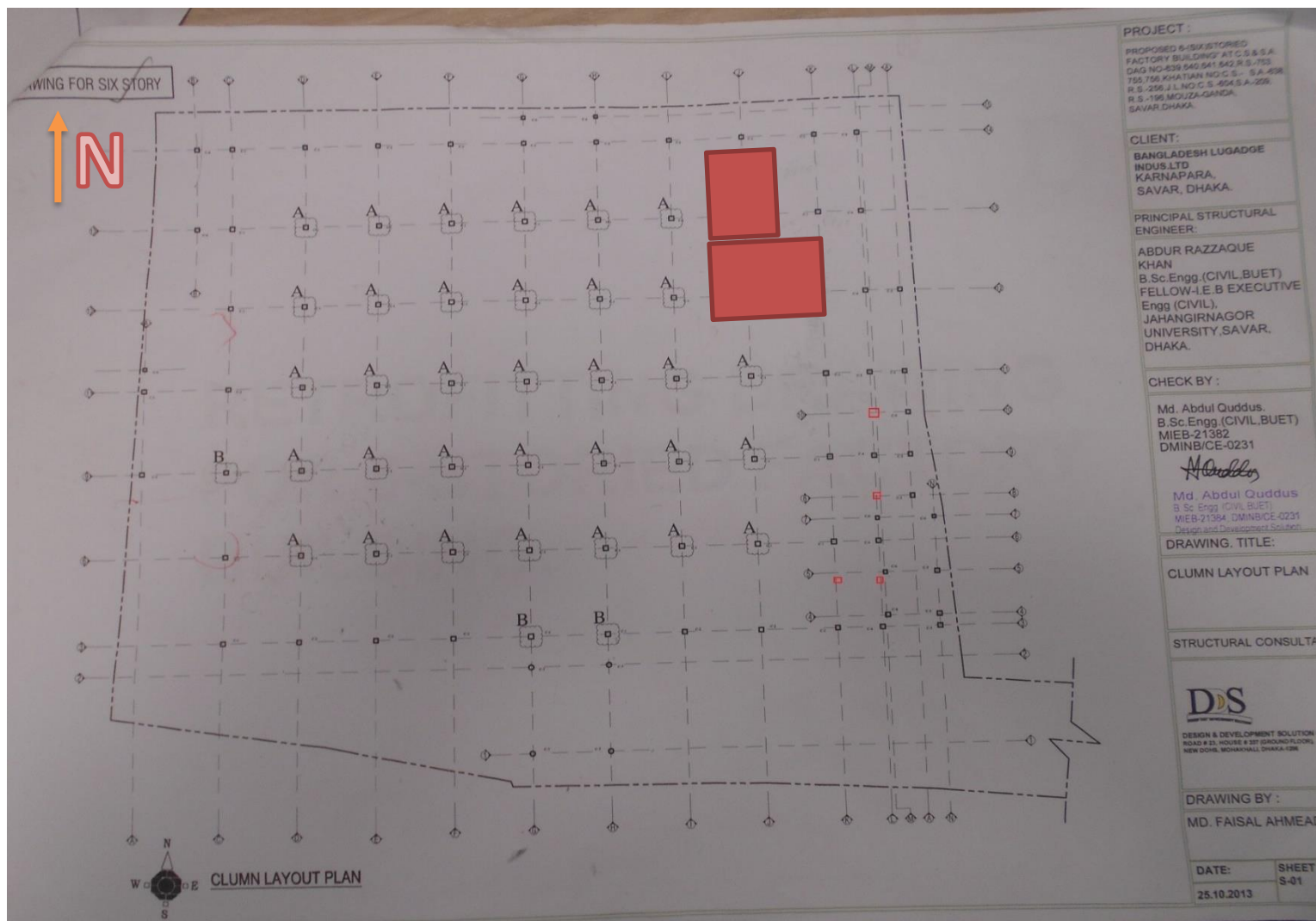
(within 6-weeks)

- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Building engineer to investigate the crack of the column.
- Detail Engineering Assessment to be completed

Priority 3

(within 6-months)

- Continue to implement load plan



Column layout showing areas to be evacuated.



Item 2 and actions

Building 1: Factory Building

Discontinued beam, eccentric beam, deflected beam & crack on beam.

Priority 1

(Immediate - Now)

- None required

Priority 2

(within 6-weeks)

- Building engineer to review the design of beams of the building.
- Building engineer to investigate the cracks of the beam & suggest remedial action.

Priority 3

(within 6-months)

- Perform strengthening work to the deflected beams if deemed necessary by the DEA.



Item 3 and actions

Building 1: Factory building.

Inconsistencies of drawings and As built construction.

Priority 1

(Immediate - Now)

- None Required

Priority 2

(within 6-weeks)

- Review actual existing site conditions and update structural and permit drawings as required

Priority 3

(within 6-months)

- Not Applicable



Item 4 and actions

Building 1: Factory building

No water proofing membrane appears on roof & Exposed reinforcement of column.

Priority 1

(Immediate - Now)

- None required

Priority 2

(within 6-weeks)

- Protect projecting bars by casting a concrete 'cap' over area of column.
- Fix water tank overflow so that it doesn't discharge on to column below.

Priority 3

(within 6-months)

- Investigate options to ensure that the structure is not subject to deterioration arising from possible thermal cracking in concrete roof and consequent water penetration.
- Consideration should be given to waterproofing the roof.



Item 5 and actions

Building 1: Factory building

Questionable in retrofitting drawing & construction

Priority 1

(Immediate - Now)

- None required

Priority 2

(within 6-weeks)

- Building engineer to re-check the design of retrofitting scheme taken previously

Priority 3

(within 6-months)

- None required



Item 6 and actions

Building 2: Utility Building. Large cantilever slab

Priority 1

(Immediate - Now)

- None required

Priority 2

(within 6-weeks)

- Building engineer to find the actual slab thickness & carry out a design adequacy check for the cantilever portion of the slab.

Priority 3

(within 6-months)

- None required



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 ACCORD DEA guideline , ACCORD standard for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of these document should be referenced. These 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 ACCORD DEA guideline , ACCORD standard 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 see ACCORD DEA guideline & ACCORD standard more details.
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 ACCORD DEA guideline & ACCORD standard (<http://bangladeshaccord.org/factories/resource-centre/>).

Survey Limitations and Assumptions



This report is for the private and confidential use of Accord for whom it was prepared together with their professional advisors as appropriate. It should not be reproduced in whole or in part or relied upon by third parties for any use without the express written permission of ACCORD.

This report can be used in discussion with the supplier or factory owner as a means to rectify or address any observations made. The report is not comprehensive and is limited to what could be observed during a visual inspection of the building.

This Report is not intended to be treated as a generalised inspection and does not cover the deterioration of structural members through dampness, fungal or insect attack, nor does it deal with problems and defects of a non-structural nature. Other non structural aspects of the building such as fire safety have not been assessed in this survey.

Except as otherwise noted, drains and other services were not viewed or tested during our inspection and are therefore similarly excluded from this Report. We have not inspected any parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

External inspection of the façade walls has generally been carried out from ground level only by visual sighting. No opening up works were carried out (except as noted) and we rely on the Architects and Engineers drawings provided to us for our views on concealed parts of the structure and in particular foundations. Strengths of materials and components are untested and we recommend that the factory owners Building Engineer carries out insitu testing over and above those suggested to satisfy themselves with the material strengths and component details.

Recommendations, where given, are for the purpose of providing indicative advice only, are not exhaustive, relate solely to identifying key and obvious structural defects as identified in this presentation, and do not take the form of or constitute a specification for works. We take no responsibility for the works as constructed. This report does not interfere with the factory owners Building Engineers responsibility for the structural performance of this building, The Building Engineer remains fully responsible for the structural adequacy of the building.

This report does not comment in detail on the future seismic performance of the building and only highlights the fact that the building may experience significant damage or collapse in a seismic event along with many others in the Dhaka region.

The observations in this report are based on the Engineering Judgement of the lead surveyor/engineer at the time of the survey. We assume in making these observations that no covering up of faults defects, filling or plastering over cracking or significant repair work has been carried out by the building owner. Any future alteration or additional work by the building owner will void this report.