Powertex Fashions Ltd (Extension)

Dr. Panjabali- Dr. Assaduzzaman Industrial Park, Kathora, National University, Gazipur
Geographic Coordinates: (23.948175, 90.363196)
21 August 2023

RSC RMG SUSTAINABILITY COUNCIL

Building Information

Building 2: Two storied (G+1) building.

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

Shed 3: Single storied shed.

Observations

Foundation found marginally overstressed

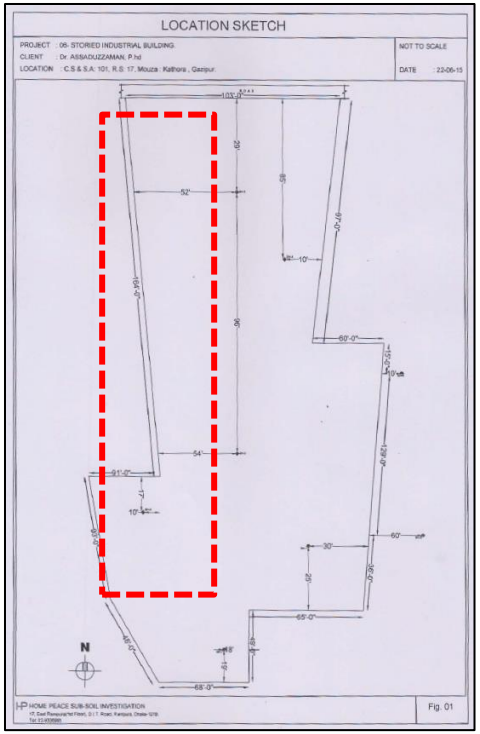
Observation: Building 2

Table No.-4

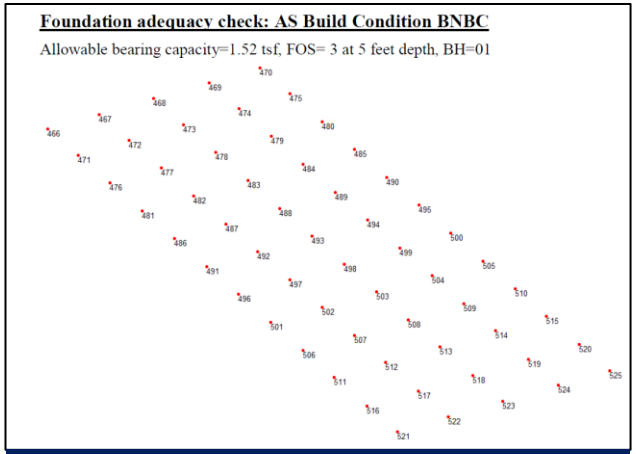
BEARING CAPACITY CHART FOR SHALLOW FOUNDATION (F.S=3)

Bore Hole No.	Depth (ft)	Field SPT Value N_f	Allowable Cohesion, C (TSF)	ALLOWABLE BEARING CAPACITY (TSF)	
				Continuous footing.	Isolated Column footing
01	5	9	0.206	1.176	1.528
	7.5	9	0.205	1.176	1.528
	10	11	0.252	1.437	1.868
	15	13	0.298	1.698	2.208
	20	12	0.275	1.568	2.038
	25	14	0.321	1.829	2.377
02	5	11	0.252	1.437	1.868
	7.5	12	0.275	1.568	2.038
	10	9	0.206	1.176	1.528
	15	11	0.252	1.437	1.868
	20	15	0.344	1.959	2.547
	25	10	0.229	1.306	1.698
03	5	5	0.115	0.653	0.849
	7.5	10	0.229	1.306	1.698
	10	9	0.206	1.176	1.528
	15	10	0.229	1.306	1.698
	20	13	0.298	1.698	2.208
	25	15	0.344	1.959	2.547
04	5	9	0.206	1.176	1.528
	7.5	12	0.275	1.568	2.038
	10	10	0.229	1.306	1.698
	15	12	0.275	1.568	2.038
	20	14	0.321	1.829	2.377
	25	9	0.206	1.176	1.528
05	5	7	0.160	0.914	1.189
	7.5	9	0.206	1.176	1.528
	10	11	0.252	1.437	1.868
	15	10	0.229	1.306	1.698
	20	12	0.275	1.568	2.038
	25	12	0.275	1.568	2.038
06	5	6	0.138	0.784	1.019
	7.5	8	0.183	1.045	1.359
	10	9	0.206	1.176	1.528
	15	13	0.298	1.698	2.208
	20	10	0.229	1.306	1.698
	25	11	0.252	1.437	1.868
07	5	5	0.115	0.653	0.849
	7.5	7	0.160	0.914	1.189
	10	12	0.275	1.568	2.038
	15	12	0.275	1.568	2.038
	20	14	0.321	1.829	2.377
	25	18	0.413	2.351	3.057
08	5	7	0.160	0.914	1.189
	7.5	8	0.183	1.045	1.359
	10	7	0.160	0.914	1.189
	15	8	0.183	1.045	1.359
	20	10	0.229	1.306	1.698
	25	14	0.321	1.829	2.377

Bearing capacity chart for the shallow foundation from soil test report.



Bore hole layout and approximate Building-2 location (marked)



Allowable bearing capacity has been considered 1.52 tsf with FoS-3 at 5ft depth for BH-01.

Footing adequacy check table in EA report

Footing area check: (DL+LL)

FOS CHECK AS PER BNBC-2006 Standards (EXISTING)									
Joint Location	Column ID	Unfactored load (kip)	Footing Type	Footing Size		Ultimate Bearing Capacity (ksf)	AS PER BNBC-2006 STANDARD		
				Length (ft)	Width (ft)		Develop stress (ksf)	FOS	Remarks
466	C1	56.791	F3A	7	7	9.2	1.159	7.9379	ABOVE 2.5
467	C2	77.397	F2	7.4	6	9.2	1.74318	5.2777	ABOVE 2.5
468	C2	72.678	F2	7.4	6	9.2	1.63689	5.6204	ABOVE 2.5
469	C2	78.044	F2	7.4	6	9.2	1.75775	5.234	ABOVE 2.5
470	C1	57.057	F2	7.4	6	9.2	1.28507	7.1592	ABOVE 2.5
471	C2	94.662	F2A	8	7	9.2	1.69039	5.4425	ABOVE 2.5

In EA report, the of footing capacity has been shown more than FoS-2.5 considering allowable bearing capacity 1.52 tsf (FoS-3) for BH-01. But the BH-01 is far away from the building-2 where the BH-03 & BH-07 are nearer to Building-2. Considering the allowable bearing capacity 0.849 tsf (FoS-3) for BH-03 & BH-07, the footing capacity was found marginally overstressed for few footings. Factory engineer is required to revise the EA considering actual bearing capacity of soil and suggest the factory for remedial works if required.

Observation: Building 2

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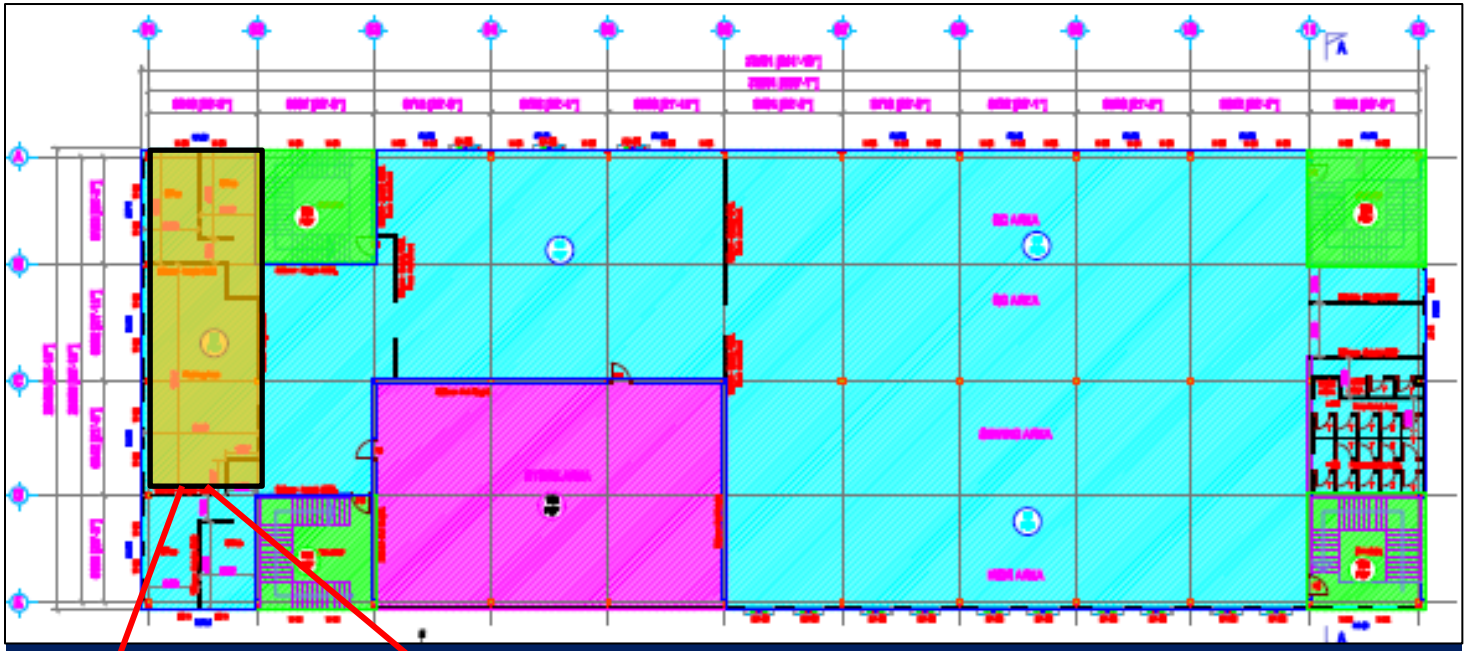
Floor loading mismatch with load plan

Observation: Building 2



Load plan at first floor

Over loading at first floor

In the load plan 3kPa floor loading has been considered. During inspection, storage was found in the marked location. Building Engineer is required to implement the floor load management system.

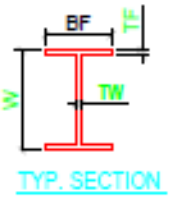
Observation: Building 2

Discrepancy between as-built drawing & site condition

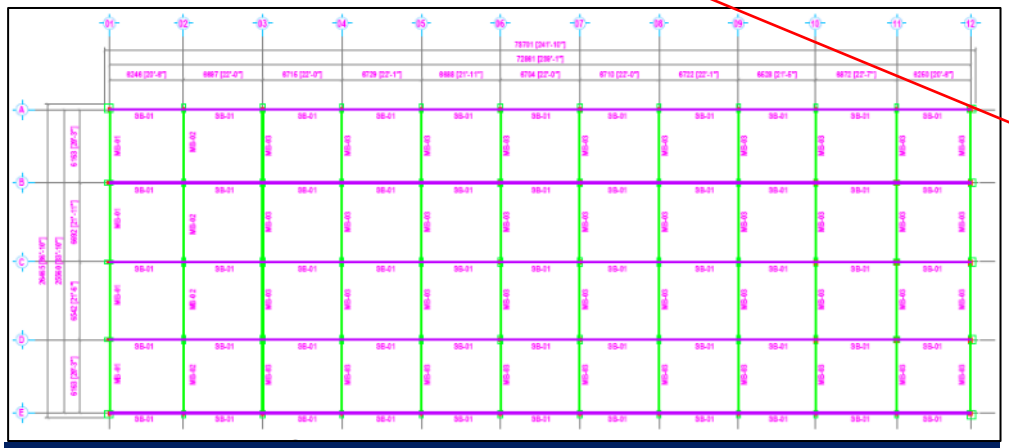
Observation: Building 2

SCHEDULE OF BEAM MATERIALS:

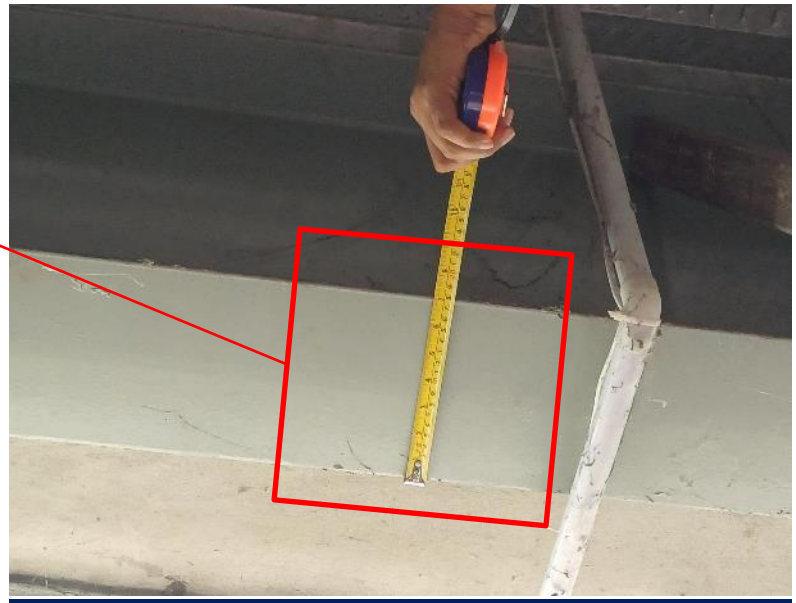
NAME	W (mm)	TW (mm)	BF (mm)	TF (mm)
MB-01	545	6	200	8
MB-02	565	6	200	10
MB-03	570	6	200	10
SB-01	395	5	150	6



TYP. SECTION



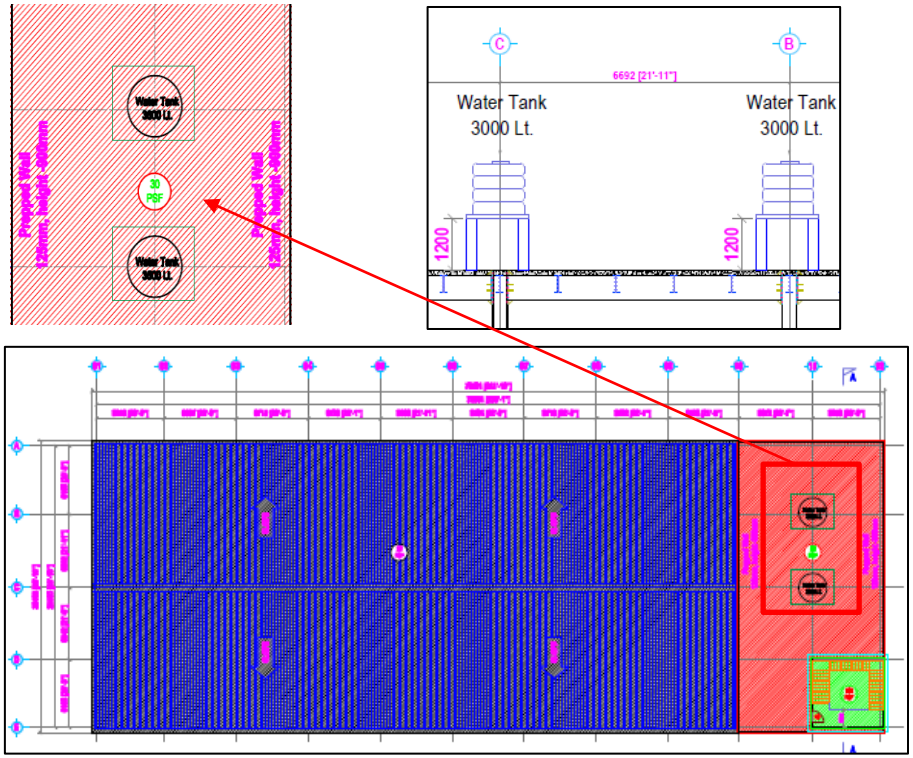
Beam layout



Flange width of MB-01 beam was found 175 mm instead of 200 mm

Mismatch found in steel beam size. Building Engineer is required to survey the structure and update the as-built drawings. Revise the assessment as per the updated as-built drawing.

Observation: Building 2



Roof Layout plan

3000L & 5000L Water Tank

As built architectural drawings and roof live load layout plan is showing two 3000L PVC water tank. During inspection, one 5000L PVC water Tank and one 3000L PVC water tank was found. Building Engineer is required to revise the architectural drawings & check the capacity of structure according to existing water tank loading.

Observation: Building 2

Bracing Connection and Column & Beam connection

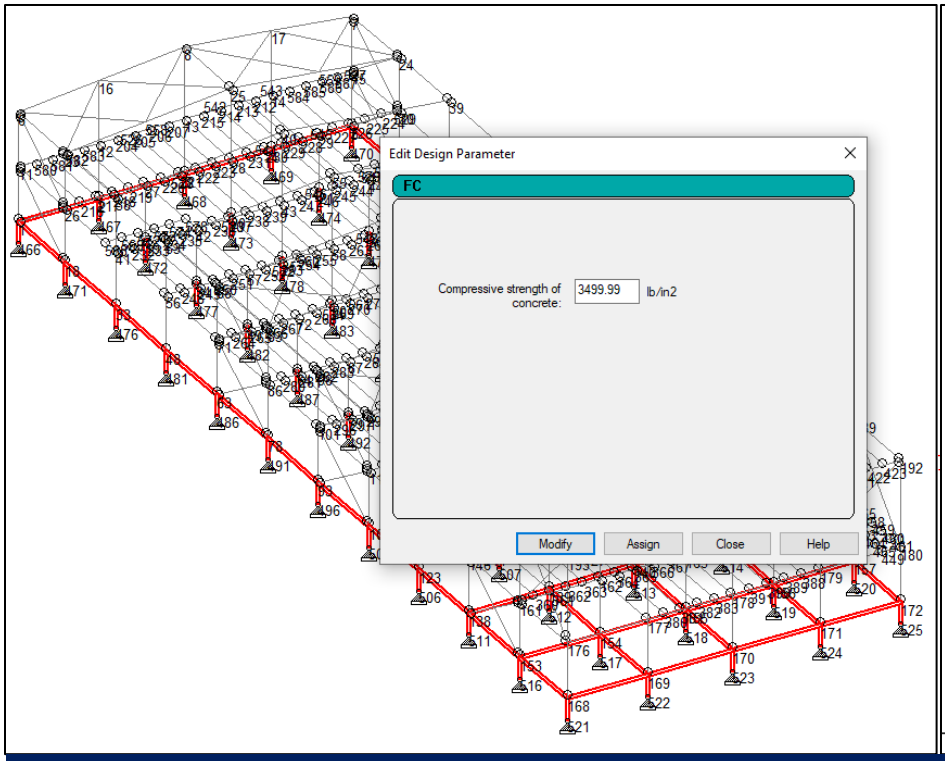
Connection details was found missing in the drawings. Building Engineer is required to include connection details in as built drawings and provide all types of connection adequacy check in EA report.

The details of the stairs were not available in as-built drawing. Building Engineer is required to survey the structure and update the as-built drawing. Also, Building Engineer is required to provide the adequacy check for the stairs.

Observation: Building 2

Engineering assessment (EA) needs to revise

Observation: Building 2



3. MATERIALS :

a) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.

b) CONCRETE DIMENSIONS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES AND/OR THICKNESS OF BLINDING CONCRETE.

c) CONCRETE QUALITY AND MIX CONSTITUENTS ARE TO BE IN ACCONDANCE WITH THE SPECIFICATION

d) TYPE :CONCRETE COMPRESSIVE STRENGTH (CYLINDER) CONSIDERED AS FOLLOWS :

I) FOR FOOTING WORK: f'c = MINIMUM 3500 psi
II) FOR COLUMN, FOOTING, GRADE BEAM, FLOOR BEAM:f'c=MINIMUM 3500 psi
III) FOR SLAB AND STAIR: f'c = MINIMUM 3500 psi
IV) FOR LINTEL, FIN, SIL, FALSE SLAB etc: f'c = MINIMUM 3500 psi

e) MINIMUM CYLINDER STRENGTH: BASED ON CYLINDER TEST OF DIAMETER D = 100mm & HEIGHT = 200mm
I) 28 DAYS STRENGTH = AS SPECIFIED IN 2(a)
II) 7 DAYS STRENGTH = 75% OF THE 28 DAYS STRENGTH.

f) CURING OF C.C & R.C.C WORK :
I) CURING TIME MINIMUM 21 DAYS
II) METHOD OF CURING :
* HORIZONTAL SURFACE: BY PONDING OF WATER
* OTHER SURFACES: BY WRAPPING MOIST JUTE FABRIC AND SPRINKLING WATER BY HOSE PIPE FREQUENTLY.

Rebar Strength fy = 72500 psi

ADDRESS: | CLIENT:

Concrete strength has been considered 3.5 ksi in FEA model and general note of the construction drawing

The concrete strength has been considered 3.5 ksi but no credible test report was available to support the concrete strength value. Factory engineer is required avail the proper documents to support the considered concrete strength or provide concrete core test report to check the in-situ concrete strength. Factory engineer is required to suggest the factory authority for the remedial works if required.

Observation: Building 2

Corrosion in steel column

Corrosion in steel member

Corrosion in steel member is found during inspection. Factory is required to identify all corroded member, repair the corrosion and apply suitable anti-corrosive coating to prevent further corrosion in steel members.

Observation: Building 2

Falling hazard due to opening at wall

Observation: Building 2

Unsafe Opening at wall at roof stair

During inspection, an unsafe opening of wall was observed at intermediate landing of roof stair. Building Engineer is required to take adequate measures for safe access to the stair.

Observation: Building 2

Dampness & Water ponding

Observation: Building 2

Dampness in column and grade beam due to broken PVC pipe

Vegetation on facade wall damp grade-beam due to exit of down pipe

Building engineer is required to take adequate remedial measures to prevent column and beam from dampness and vegetation.

Water ponding signage at roof

Building engineer is required to provide adequate slope at roof to prevent water ponding and dampness.

Observation: Building 2

Lack of anchorage of nonstructural elements

Observation: Building 2

Steel racks without anchored/braced.

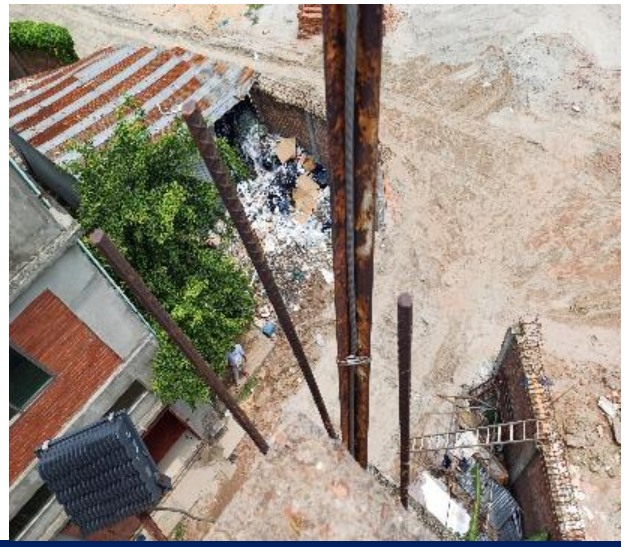
Building engineer is required to be provide adequate anchor/braced all non-structural elements to avoid falling hazard due to seismic events.

Observation: Building 2

Exposed re-bar at roof.

Observation: Building 2





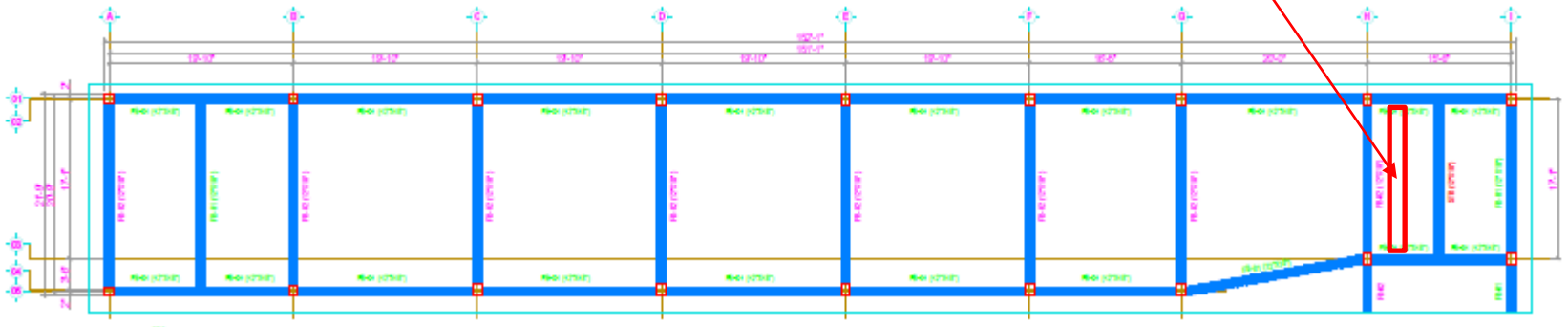
Exposed corroded rebar at roof

Building engineer is required to identify the exposed corroded rebar and take adequate measures to protect exposed rebar from corrosion.

Observation: Building 2

Discrepancy between as-built drawing & site condition

Observation: Building 3

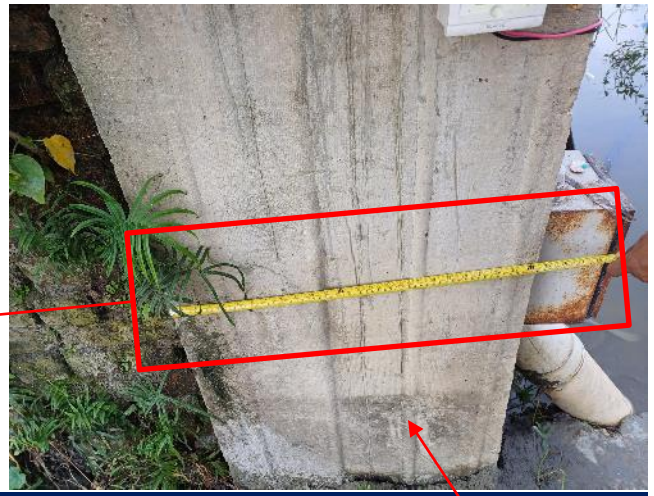


During inspection beam distance at stair was found 2 feet from grid H, which is mismatched with as built drawings. Building engineer is required to check the beam layout and update drawings as per site condition.

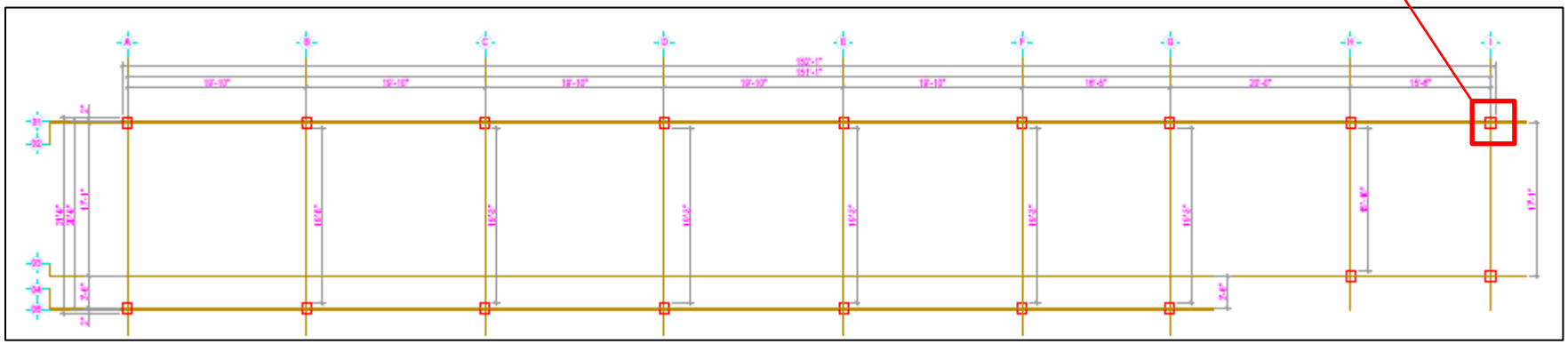
Observation: Building 3

SCHEDULE OF COLUMN

COLUMN TYPE	BELOW G.L	GROUND TO ROOF FLOOR.	TIE BAR
C-01	16" × 14", 10-16mmØ	14" × 12", 10-16mmØ	.....



Column size mismatch with as built drawings in below ground level



Column layout

During inspection column size found 24”x12” instead of 16”x24”. Building engineer is required to check the column size and update drawings as per site condition.

Observation: Building 3

Undocumented water tank at roof of stair

Building engineer is required to update architectural drawings with water tank and check the capacity of structure for water tank loading.

Observation: Building 3

Engineering assessment (EA) needs to revise

Observation: Building 3

Material Data:

Concrete compressive strength, f'c = 3000 psi for Column, Beam and Footing

Rebar strength fy= 72,500 psi

3. MATERIALS :

a) ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.

b) CONCRETE DIMENSIONS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES AND/OR THICKNESS OF BLINDING CONCRETE.

c) CONCRETE QUALITY AND MIX CONSTITUENTS ARE TO BE IN ACCONDANCE WITH THE SPECIFICATION

d) TYPE :CONCRETE COMPRESSIVE STRENGTH (CYLINDER)

CONSIDERED AS FOLLOWS :

I) FOR FOOTING WORK: f'c = MINIMUM 3000 psi

II) FOR COLUMN, FOOTING, GRADE BEAM, FLOOR BEAM:f'c=MINIMUM 3000 psi

III) FOR SLAB AND STAIR: f'c = MINIMUM 3000 psi

IV) FOR LINTEL, FIN, SIL, FALSE SLAB etc: f'c = MINIMUM 3000 psi

e) MINIMUM CYLINDER STRENGTH: BASED ON CYLINDER TEST OF DIAMETER D = 100mm & HEIGHT = 200mm

I) 28 DAYS STRENGTH = AS SPECIFIED IN 2(a)

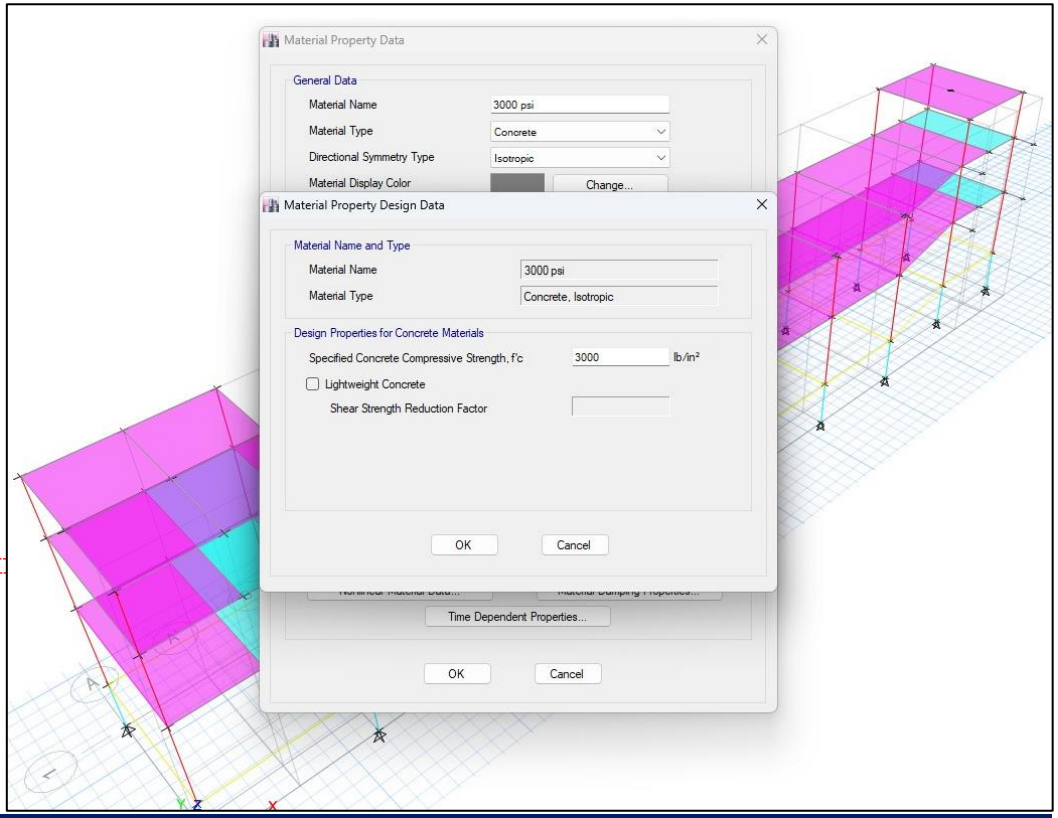
II) 7 DAYS STRENGTH = 75% OF THE 28 DAYS STRENGTH.

f) CURING OF C.C & R.C.C WORK :

I) CURING TIME MINIMUM 21 DAYS

II) METHOD OF CURING :

* HORIZONTAL SURFACE: BY PONDING OF WATER



Concrete strength has been considered 3 ksi in FEA model and general note of the construction drawing and in engineering assessment report. Also, the fy=72.5 ksi has been considered.

The concrete strength has been considered 3 ksi and fy=72.5 ksi but no credible test report was available to support the strength value. Factory engineer is required avail the proper documents to support the considered concrete strength or provide concrete core test report to check the in-situ concrete strength.
For the steel, factory is required to provide the tensile strength test report.
Factory engineer is required to suggest the factory authority for the remedial works if required.

Observation: Building 2

Falling hazard at roof and stair

Observation: Building 3

Falling hazard at roof

Falling hazard at stair

Falling hazard was found at roof and stair. Building engineer is required provide parapet at roof and railing in stair to mitigate the falling hazard.

Observation: Building 3

Exposed rebar at roof

Observation: Building 3

Exposed rebar at roof

Building engineer is required to identify the exposed corroded rebar and take adequate measures to protect exposed rebar from corrosion.

Observation: Building 3

Dampness in beam & wall

Observation: Building 3

Dampness in stair area

Building engineer is required to identify dampness of source of the dampness and suggest proper remedial measures.

Vegetation grown on the facade wall

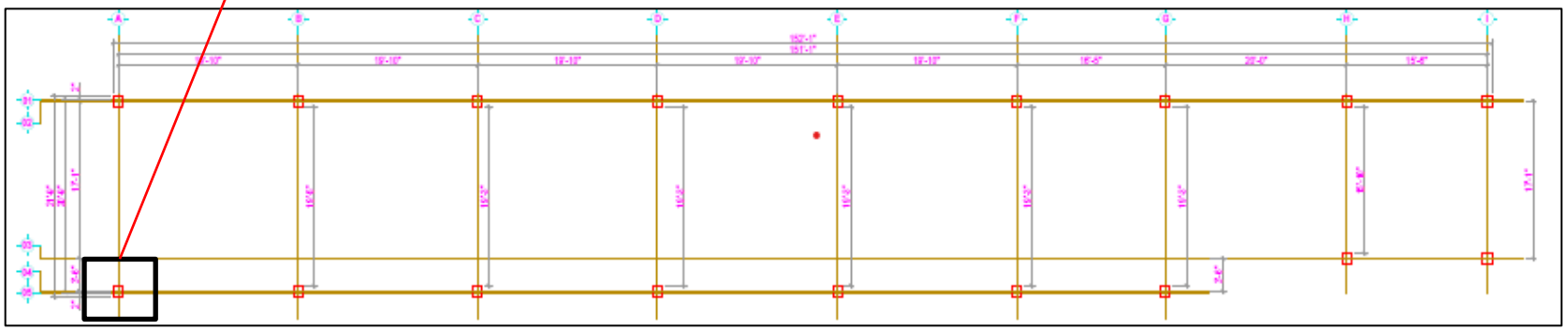
Building is required to take necessary measures to prevent vegetation from facade wall.

Observation: Building 3

Damaged column in ground floor

Observation: Building 3

Damaged Column



Building engineer is required to rectify damaged column in ground floor with appropriate technique.

Observation: Building 3

Connection adequacy of lightweight roof shed

Observation: Shed 3

Non-Engineered structure

Lightweight roof shed

Building engineer is required to check the connection adequacy for the lightweight roof system and provide adequate documents for this structure.

Observation: Shed 3

Problems Observed

Building 02:

Item 01: Foundation found marginally overstressed.
Item 02: Floor loading mismatch with load plan.
Item 03: Discrepancy between as-built drawing & site condition.
Item 04: Engineering assessment (EA) needs to revise.
Item 05: Corrosion in steel column.
Item 06: Falling hazard due to opening at wall.
Item 07: Dampness & Water ponding.
Item 08: Lack of anchorage of nonstructural elements.
Item 09: Exposed re-bar at roof.

Building 03:

Item 10: Discrepancy between as-built drawing & site condition.
Item 11: Engineering assessment (EA) needs to revise (Building-02)
Item 12: Falling hazard at roof and stair.
Item 13: Exposed rebar at roof.
Item 14: Dampness in beam & wall.
Item 15: Damaged column in ground floor.

Shed 03:

Item 16: Connection adequacy of lightweight roof shed.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Foundation found marginally overstressed (Building-02)	Building engineer is required to review the design load and adequacy of the foundations and suggest necessary remedial actions accordingly.	6-weeks
02	Foundation found marginally overstressed (Building-02)	Carry out suggested remedial works if required.	6-month
03	Floor loading mismatch with load plan (Building 02)	Building Engineer is required to update the load plan as per BNBC.	6-weeks
04	Floor loading mismatch with load plan (Building 02)	Implement the floor loading plan.	6-weeks
05	Discrepancy between as-built drawing & site condition (Building 02)	Building Engineer is required to survey the whole structure and prepare accurate as-built drawing.	6-weeks
06	Discrepancy between as-built drawing & site condition (Building 02)	Revise the Engineering assessment (EA) based on actual site condition.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
07	Discrepancy between as-built drawing & site condition (Building 02)	Building Engineer is required to include all the connection adequacy check in EA report.	6-weeks
08	Discrepancy between as-built drawing & site condition (Building 02)	Carry out suggested remedial works if required	6-months
09	Engineering assessment (EA) needs to revise (Building-02)	Provide creditable material test report or Verify in-situ concrete stresses by 100mm dia. cores from minimum of 4 columns. Revise the Engineering assessment (EA) and submit to RSC	6-weeks
10	Engineering assessment (EA) needs to revise (Building-02)	Revise the Engineering assessment (EA) and submit to RSC	6-weeks
11	Engineering assessment (EA) needs to revise (Building-02)	Carry out suggested remedial works if required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Corrosion in steel column (Building 02)	Building Engineer is required to repair the corrosion and take necessary measures to prevent further corrosion in steel members.	6-weeks
13	Falling hazard due to opening at wall (Building 02)	Building engineer is required to provide barrier to prevent falling hazard.	6-weeks
14	Dampness & Water ponding (Building 02)	Building engineer is required to stop the source of moisture and suggest proper remedial measures to repair dampness in the column and grade beam.	6-weeks
15	Dampness & Water ponding (Building 02)	Building engineer is required to take necessary measures to remove the vegetations from the facade wall.	6-weeks
16	Dampness & Water ponding (Building 02)	Building engineer is required to provide adequate slope to prevent water ponding at roof.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	Lack of anchorage of nonstructural elements (Building 02)	Building engineer is required to be provide adequate anchor/braced all non-structural elements to avoid falling hazard due to seismic event.	6-weeks
18	Exposed re-bar at roof (Building 02)	Building engineer is required to take necessary measures to repair the corrosion and measures to prevent further corrosion.	6-weeks
19	Discrepancy between as-built drawing & site condition (Building 03)	Building Engineer is required to survey the whole structure and prepare accurate as-built drawing.	6-weeks
20	Discrepancy between as-built drawing & site condition (Building 03)	Revise the Engineering assessment (EA) based on actual site condition.	6-weeks
21	Discrepancy between as-built drawing & site condition (Building 03)	Carry out suggested remedial works if required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
22	Engineering assessment (EA) needs to revise (Building-03)	Provide creditable material test report or Verify in-situ concrete stresses by 100mm dia. cores from minimum of 4 columns. Revise the Engineering assessment (EA) and submit to RSC.	6-weeks
23	Engineering assessment (EA) needs to revise (Building-03)	Revise the Engineering assessment (EA) and submit to RSC.	6-weeks
24	Engineering assessment (EA) needs to revise (Building-03)	Carry out suggested remedial works if required.	6-months
25	Falling hazard at roof and stair (Building 03)	Building engineer is required to provide parapet wall at roof and install railing in stair area to mitigate falling hazard.	6-weeks
26	Exposed rebar at roof (Building 03)	Building engineer is required to take necessary measures to repair the corrosion and measures to prevent further corrosion.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
27	Dampness in beam & wall (Building 03)	Building engineer is required to investigate the source of dampness and suggest proper remedial action to prevent dampness.	6-weeks
28	Damaged column in ground floor (Building 03)	Building engineer is required to repair damaged column in ground floor with appropriate technique.	6-weeks
29	Connection adequacy of lightweight roof shed (Shed 03)	Building engineer is required to check the connection adequacy for the lightweight roof system and provide adequate documents for this structure	6-weeks
30	Connection adequacy of lightweight roof shed (Shed 03)	Carry out suggested remedial works if required.	6-months