

# Lalmai Footwear Ltd. (Extension)

Dhanpur, Chapapur, PS: Adarsha Sadar, Cumilla-3500, Bangladesh.

(23.43195953208, 91.2154119820)

25 September 2024



## 1. Building information

- I. Building 4- Workers' Dining & Rest House is a partially four-storied (G+3) reinforced concrete (RC) building.
- II. Shed 7- Braiding Shed- Cycle Stand & Shop Shed is a single-storied (G) prefabricated steel shed.
- III. Shed 14- Wastage Goods Stack Area is a single-storied (G) steel shed.
- IV. Shed 17- Kitchen & Store is a single-storied (G) steel shed.

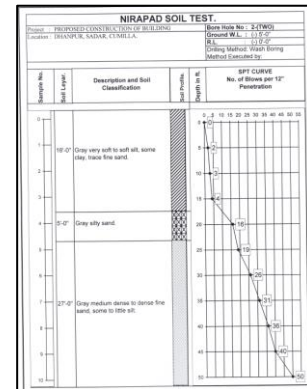
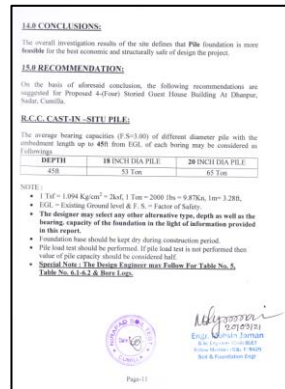
## 2. Observation

### Observation 1: High stress in the foundation (Building 4- Workers' Dining & Resthouse).

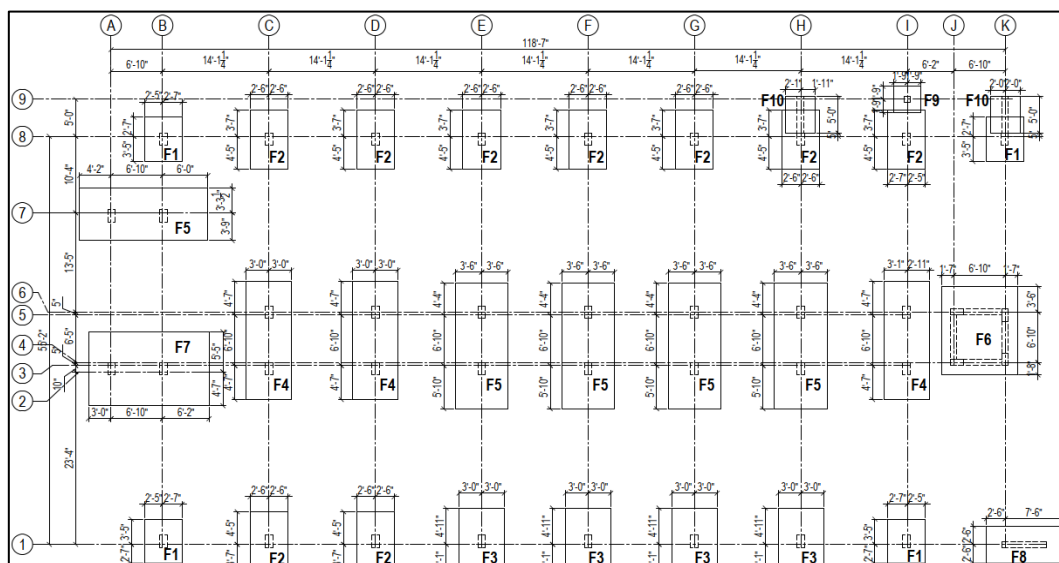
**12.0 Bearing Capacities Of The Shallow Foundation From Field & Laboratory Test (Values In Tsf, F.S.=3.00):**  
**Table No. 8**

| Bore Hole No | Depth in Ft | Field SPT | Corrected Spt | Cohesion Tsf | Bearing capacity (Tsf)         |                               |
|--------------|-------------|-----------|---------------|--------------|--------------------------------|-------------------------------|
|              |             |           |               |              | For circular or Square footing | For Strip or cautions footing |
| BH-1         | 5           | 3         | 3             | 0.19         | 0.66                           | 0.36                          |
|              | 10          | 4         | 4             | 0.25         | 1.01                           | 0.53                          |
|              | 15          | 4         | 4             | 0.25         | 1.20                           | 0.59                          |
|              | 20          | 17        | 16            | -            | 3.24                           | 1.94                          |
| BH-2         | 5           | 2         | 2             | 0.13         | 0.50                           | 0.26                          |
|              | 10          | 3         | 3             | 0.19         | 0.85                           | 0.43                          |
|              | 15          | 4         | 4             | 0.25         | 1.20                           | 0.59                          |
|              | 20          | 16        | 15.5          | -            | 3.17                           | 1.84                          |
| BH-3         | 5           | 1         | 1             | 0.06         | 0.35                           | 0.16                          |
|              | 10          | 2         | 2             | 0.13         | 0.70                           | 0.33                          |
|              | 15          | 3         | 3             | 0.19         | 1.05                           | 0.49                          |
|              | 20          | 12        | 12            | -            | 2.63                           | 1.45                          |
| BH-4         | 5           | 2         | 2             | 0.13         | 0.50                           | 0.26                          |
|              | 10          | 3         | 3             | 0.19         | 0.85                           | 0.43                          |
|              | 15          | 4         | 4             | 0.25         | 1.20                           | 0.59                          |
|              | 20          | 18        | 16.5          | -            | 3.32                           | 2.04                          |

Note:  
SPT correction depends on overburden Pressure, Water Table, F.S.=3.00 as Bangladesh National Building Code (BNBC).



### Soil test report



### Foundation Layout

**Description:** Cursory calculation indicates high stress in the foundation (footing) considering the recommended soil bearing capacity in the geotechnical report and footing sizes in the drawing. The building engineer is required to review the adequacy of footings and comply with BNBC based on the soil-bearing capacity.

The geotechnical investigation report consists of 4 borehole data up to a depth of 15m. As per BNBC-2020 table no 6.2.13 requirement a 30 m bore is required to determine the harmonic average SPT "N" value.

**Observation 2:** Lack of design report and material test report. (Building 4- Workers' Dining & Resthouse).



**Description:** Only the as-built drawings were available for the building, no design report and material test report were available. The building engineer is required to prepare Detail Engineering Assessment (DEA) & verify the in-situ concrete strength by taking concrete cores from columns.

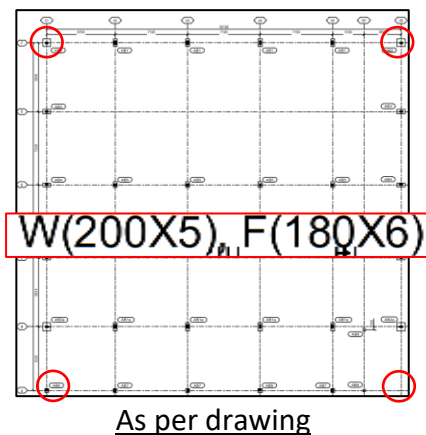
**Observation 3:** Inconsistencies in EA report. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed)

|                                                                                        |
|----------------------------------------------------------------------------------------|
| <b>Seismic Load:</b>                                                                   |
| Seismic Load has been considered in accordance with BNBC, 2020.                        |
| Weight of the building, W = Weight of the building plus 25% live load of the structure |
| Seismic Zone = 2                                                                       |
| Importance factor, I = 1.0                                                             |
| Response modification co-efficient, R = 4.5                                            |
| Site Class = C                                                                         |
| From Table 6.C.1, $S_s = 0.5$ , $S_1 = 0.2$                                            |
| From Table 6.C.2, Site Co-efficient, $F_a = 1.15$                                      |
| From Table 6.C.3, Site Co-efficient, $F_v = 1.725$                                     |
| $C_s$ for steel moment resisting frame = 0.0724                                        |

| 7. Material Properties |                                                               |                       |
|------------------------|---------------------------------------------------------------|-----------------------|
| No.                    | Structural Components                                         | Yield* Strength (MPa) |
| 1                      | Built-up Sections (Pre-engineered steel in columns and beams) | $F_y = 248$           |
| 3                      | Cold formed secondary members                                 | $F_y = 345$           |
| 4                      | Sheeting Panels Bare & Pre-painted                            | $F_y = 345$           |
| 5                      | Mezzanine Deck Panels                                         | $F_y = 345$           |
| 6                      | Diagonal "X" Bracing Cable                                    | $P_u = 1275$ KN       |
| 7                      | Anchor Bolts                                                  | $F_y = 245$           |
| 8                      | High Strength Bolts                                           | $F_t = 660$           |

**Description:** In the EA report of the Braiding Shed- Cycle Stand & Shop Shed the response modification co-efficient is considered as IMRF (R=4.5) without any justification/calculation. Also, steel material strength for secondary steel members is considered 345 MPa without any test report. The building engineer is required to update the EA report as per BNBC-2020 requirements based on in-situ material strength and submit it to the RSC for review.

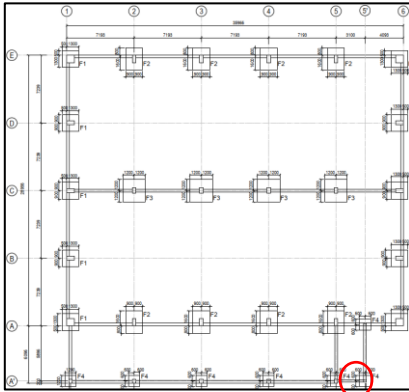
**Observation 4:** Mismatch in the as-built drawing. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed).



**Description:** During the inspection, a mismatch was found in the as-built drawing. All corner columns were found W-200(5) X F 180 (5) instead of W-200(5) X F 180 (6). The building engineer is required to survey the full structure and update the as-built drawing as per on-site conditions.



**Observation 5:** Improper connection between RC column and Steel Rafter. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed).

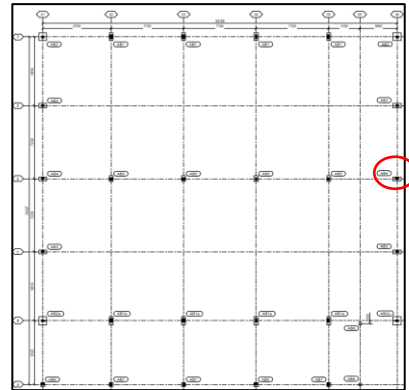


**Description:** Improper connection was found between the RC column and the steel rafter. The building engineer is required to check the connection adequacy and proposed remedial works.

**Observation 6:** Damage to steel column. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed).



Onsite condition



Steel column layout

**Description:** During the inspection, a damaged steel column was identified. The building engineer is required to investigate the condition and repair with a suitable method.

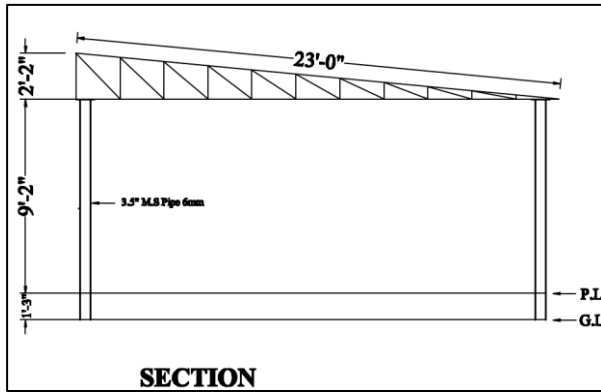
**Observation 7:** Incomplete lateral load resisting system. (Shed 14- Wastage Goods Stack Area)



Wastage Goods Stack Area

**Description:** Steel trusses are provided along the short direction. No lateral transfer media (struct) and horizontal/vertical cable bracing were provided along the long direction. Therefore, lateral stability in the long direction is incomplete. The building engineer is required to design the lateral load-resisting system, prepare a safety check report and submit it to the RSC for review.

**Observation 8:** Incomplete structural drawing. (Shed 14- Wastage Goods Stack Area)



Wastage Goods Stack Area

**Description:** A set of drawings was found on site, but the column size of the truss details was missing in the structural drawing. The building engineer is required to survey the full structure and update the as-built drawings with foundation & connection details.

**Observation 9:** Incomplete lateral load resisting system. (Shed 17- Kitchen & Store)



Kitchen & Store

**Description:** Steel trusses are provided along the short direction. No lateral transfer media (struct) and horizontal/vertical cable bracing provided along the long direction. Therefore, lateral stability in the long direction is incomplete. The building engineer is required to design the lateral load-resisting system, prepare a safety check report and submit it to the RSC for review.

**Observation10.** Unavailable building permits/approval drawing. (Building 4- Workers' Dining & Resthouse, Shed 7- Braiding Shed- Cycle Stand & Shop Shed)



**Description:** The Building Permit/Approval drawing from the Local Authority was not available during the inspection. The building engineer is required to seek and collect the building Permit/Approval drawing.



### 3. Action Plan

| Item No. | Observation                                                                                               | Action Plan                                                                                                                                                                         | Timeline        |
|----------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1.       | High stress in the foundation. (Building 4- Workers' Dining & Resthouse)                                  | Carry out a geotechnical investigation to close the vicinity of the building following BNBC-2020 requirements and determine the accurate soil bearing capacity at foundation depth. | within 6 weeks  |
| 2.       |                                                                                                           | The building engineer is required to review the adequacy of footings as per the updated geotechnical investigation report.                                                          | within 6 weeks  |
| 3.       | Lack of design report and material test report. (Building 4- Workers' Dining & Resthouse)                 | Verify in-situ concrete strength by taking concrete cores following BNBC guidelines from lower-tier columns.                                                                        | within 6 weeks  |
| 4.       |                                                                                                           | Conduct a Detail Engineering Assessment (DEA) for the building and submit the DEA to the RSC for review.                                                                            | within 6 weeks  |
| 5.       |                                                                                                           | Carry out suggested remedial works.                                                                                                                                                 | within 6 months |
| 6.       | Inconsistencies in Engineering Assessment (EA) report. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed)   | The building engineer is required to update the EA report as per BNBC-2020 requirements based on in-situ material strength and submit it to the RSC for review.                     | within 6 weeks  |
| 7.       |                                                                                                           | Carry out suggested remedial works if required.                                                                                                                                     | within 6 months |
| 8.       | Mismatch in the as-built drawing. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed).                       | The building engineer is required to survey the full structure and update the as-built drawing with connection details.                                                             | within 6 weeks  |
| 9.       | Improper connection between RC column and steel rafter. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed). | The building engineer is required to check the connection adequacy and proposed remedial works.                                                                                     | within 6 weeks  |
| 10.      |                                                                                                           | Carry out suggested remedial works.                                                                                                                                                 | within 6 months |
| 11.      | Damage to steel column. (Shed 7- Braiding Shed- Cycle Stand & Shop Shed).                                 | The building engineer is required to investigate the condition and repair with a suitable method.                                                                                   | within 6 weeks  |
| 12.      | Incomplete lateral load resisting system. (Shed 14- Wastage Goods Stack Area)                             | The building engineer is required to design the lateral load-resisting system (strut, bracing & connections), prepare a safety check report and submit it to the RSC for review.    | within 6 weeks  |
| 13.      |                                                                                                           | Carry out remedial work where required.                                                                                                                                             | within 6 months |



|     |                                                                                                                                          |                                                                                                                                                                                  |                 |
|-----|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 14. | Incomplete structural drawing. (Shed 14- Wastage Goods Stack Area)                                                                       | The building engineer is required to prepare an accurate as-built drawing with connection details.                                                                               | within 6 weeks  |
| 15. | Incomplete lateral load resisting system. (Shed 17- Kitchen & Store)                                                                     | The building engineer is required to design the lateral load resisting system (strut, bracing & connections), prepare a safety check report and submit it to the RSC for review. | within 6 weeks  |
| 16. |                                                                                                                                          | Carry out remedial work where required.                                                                                                                                          | within 6 months |
| 17. | Unavailable building permits/approval drawing. (Building 4- Workers' Dining & Resthouse, Shed 7- Braiding Shed- Cycle Stand & Shop Shed) | The building engineer is required to seek and collect the building Permit/Approval drawing.                                                                                      | within 6 months |

## Survey Limitations and Assumptions

This report is for the private and confidential use of RSC 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 RSC.

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 generalized 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 in situ 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.