Former Nestle Canteen Building, Hayes

Report on the Investigation of Certain Façade Steel Frame Elements

Final Report – 5049

Barratt London

PROJECT: **Nestle Former Canteen Building, Hayes**

TITLE: **Report on the Investigation of Certain Façade Steel Frame Elements**

CLIENT: **Barratt London**

Final Report No: **5049**

Compiled By: **A Akida MSc Eng & J Dear BEng (Hons)**

Issued on: **8th June 2022**

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Report on the Investigation of Certain Façade Steel Frame Elements

1.0 INTRODUCTION

1.1. Terms of Reference

Purpose:	To determine certain steel frame element construction details and condition as requested by the Client's Design Team
Location:	North Hyde Gardens, Hayes, UB3 4RF
Consultants:	GB Geotechnics Ltd (GBG)
Instructed by:	Barratt London
Date of Instruction:	19th April & 19th May, 2022

1.2. General

This is the final report of the investigation. It therefore supersedes any previous reports whether written or oral and completes all work currently ordered under this contract.

The report represents the best professional opinions of the Authors, based on the results of the site inspections and their experience of investigating numerous buildings of a similar age and of a similar construction.

1.3. Structure description, background, Scope and Purpose

The Main Factory on the Nestle site was originally built in the 1930's, and has been used throughout its history as an industrial building. The former Canteen building comprises a large open single storey double height central Main Hall area, a double storey Wraparound adjoining the southern and western sides and a single storey Locker Room adjoining the northern end. A single storey Wraparound is present on the eastern side of the Main Hall, although this is also referred to as the Colonnade.

A suite of previous investigative works have been carried out by various parties in order to ascertain the condition of the former Canteen Building, as well as certain construction details. GBG carried out some initial inspections and exploratory work to the former Canteen building in 2016, as well as investigative works to ascertain further information on the construction, condition and material property of the structural elements in 2020, on behalf of the Client's Design Team.

Previous Condition Survey Reports

- W1530 CS001 Condition Survey - Canteen Building
- Elliott Wood's Nestle FINAL Structural Survey
- 0000-S-Z-M-800-00-S101 T2 DEMOLITION STRATEGY
- GBG Report 4097 RevA
- GBG Report 4689

It is understood that in order to re-use the building and to gain a building warranty, the building would need to be certified for a residual design life of 60 years.

Following previous investigations into certain structural elements carried out by GBG (Report 4689) and an assessment of the structures overall condition and repair needs by the Client's Design Team, it is believed this would require a major overhaul of the structure.

Further investigative works were required to inspect the condition of representative Wraparound steel façade elements to assist the Client's Design Team in assessing the extent of repairs required to the façade, and more specifically, to assess the extent of opening up works that will be required to check the effect of corrosion on the capacity of the steel elements and to facilitate the repairs.

The final scope of the investigation agreed, as detailed in GBG proposal document *0422 jd Barratt London Nestle Canteen P01,* is summarised below.

Columns

We allowed for targeting a total of 4No. façade columns that exhibit cracking to the encasement.

At each column location we were to carry out the following:

- Shallow trial pit in order to expose the base of the column.
- Locally removing the encasement to expose the base of the steel column and baseplate for inspection.
- Locally removing the encasement to the column at a height of around 1m above ground f.f.l. to expose the steel column for inspection.
- At each column/baseplate exposure location; locally removing the corrosion product such that the extent of corrosion and residual section size of the steel can be measured. An estimate of the loss in the cross sectional area of the steel due to corrosion was also be provided along with photographs of interest. This was to enable an assessment to be made by the Client's Structural Engineers as to whether the residual capacity of the columns needs to be assessed and whether any strengthening works are required along with repair.
- An intumescent paint was to be applied to the exposed steel to provide temporary fire and corrosion protection. The trial pits were to be backfilled and compacted to the ground f.f.l. as a temporary measure.

Beams

We allowed for targeting a total of 2No. first floor façade beams that exhibit defects to the encasement.

At each beam location we were to carry out the following:

- Locally removing the encasement to expose the steel beam for inspection.
- At each beam exposure location; locally removing the corrosion product such that the extent of corrosion and residual section size of the steel can be measured. An estimate of the loss in the cross sectional area of the steel due to corrosion was also to be provided along with photographs of interest. This was to enable an assessment to be made by the Client's Structural Engineers as to whether the residual capacity of the columns needs to be assessed and whether any strengthening works are required along with repair.
- An intumescent paint was to be applied to the exposed steel to provide temporary fire and corrosion protection.

2.0 THE SURVEY

2.1. General

Survey Dates:	24th, 25th, 27th, 30th and 31st May 2022 – five daytime survey sessions (5 x c.8 hours duration)
Personnel:	2 to 4-person survey team

2.2. Methodology

The main investigative techniques used were trial pit excavation, traditional intrusive breakouts, physical/direct and in-direct measurement, enabling both on-site interpretation as well as a more detailed analysis of the data off site.

Trial Pit Excavation

Trial pits were excavated using a combination of electrical breakers and hand tools, after first scanning the floor areas for services using a C.A.T. scanner. A specialist Licenced Asbestos Contractor was employed to remove sub-base material where Asbestos Containing Materials (ACMs) were identified during the investigated.

Traditional Intrusive Breakouts

Traditional intrusive inspection techniques were employed to expose the steel façade columns and beams for sizing and inspection. This was generally achieved using a combination of light electrical breakers/drills and hand tools. Angle grinders or high speed drills fitted with wire brush attachments were used to locally remove corrosion product back to sound steel to allow residual steel thickness measurements to be made.

Physical/Direct and Indicrect Measurement

Element sizes and spacing's were measured using a combination of Vernier callipers, tape measures and laser distance measurers. An ultrasonic thickness gauge was used to estimate the thickness of column and beam components where direct access was not available, such as the webs and some plates.

Reinstatement & Waste

An intumescent paint was applied to the exposed steel columns and beams to provide temporary fire and corrosion protection. The trial pits were to be backfilled and compacted to the ground f.f.l. as a temporary measure. Any Asbestos Containing Material waste was removed by the licensed Asbestos contractor ahead of backfilling.

2.3. Access, Areas Surveyed and Site Relocation

Access to the site was provided by the Client and generally available throughout the external areas to be surveyed. The building was vacant throughout the investigation period. The high level elements were accessed via a tower provided by GBG or Mobile Elevated Working Platform (MEWP) provided by the Client.

All results and survey locations are referenced to the layouts shown on the survey drawings provided to us by the Client, which are reproduced within Appendix 1.

3.0 FINDINGS

3.1. Presentation of Results

The results of the construction detailing and comments on the condition of the elements inspected/exposed at the survey locations are presented in full on the survey drawings in Appendix 1 (as outlined in the table below) and summarised under the heading **3.2 Observations**. A selection of photographs of interest is presented within this report and on the survey drawings to help illustrate the findings of the survey. An electronic copy of the photographs has also been provided separately.

Drawing Content	Drawing Reference
Details of Ground Floor Column Construction and Condition	5049-1
Details of Ground Floor Column Construction and Condition Below Ground Level	5049-2
Details of First Floor Beam Construction and Condition	5049-3

Glossary of key words used in the report in reference to corrosion of steel

Light surface corrosion:

Onset of corrosion evident in places but no section loss

Moderate surface corrosion:

Further developed surface corrosion, but no measurable section loss

Heavy surface corrosion:

Heavy corrosion deposits and flaking evident, with onset of section loss (<10%)

Severe corrosion:

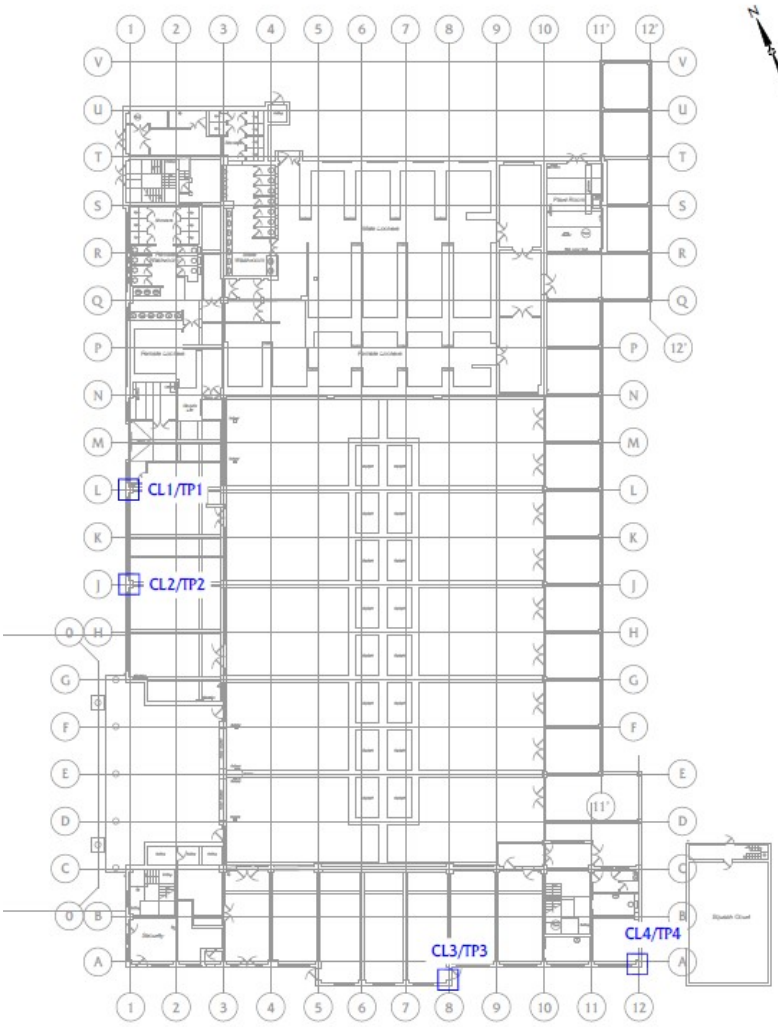
Clear significant loss of section (>10%)

3.2. Observations

Columns

A total of 4No. steel façade columns (CL1 to 4) were selected for investigation based on the areas identified by the Client's Design Team, where cracking had been observed to the external render finish/masonry. Columns CL1 and CL2 were selected on the western façade whilst CL3 and CL4 were selected on the southern façade. Initially, each of the columns were locally exposed for inspection at a height of around 1m above ground f.f.l, prior to carry out a trial pit excavation and localised exposure of the base of each column at the interface with the concrete foundation.

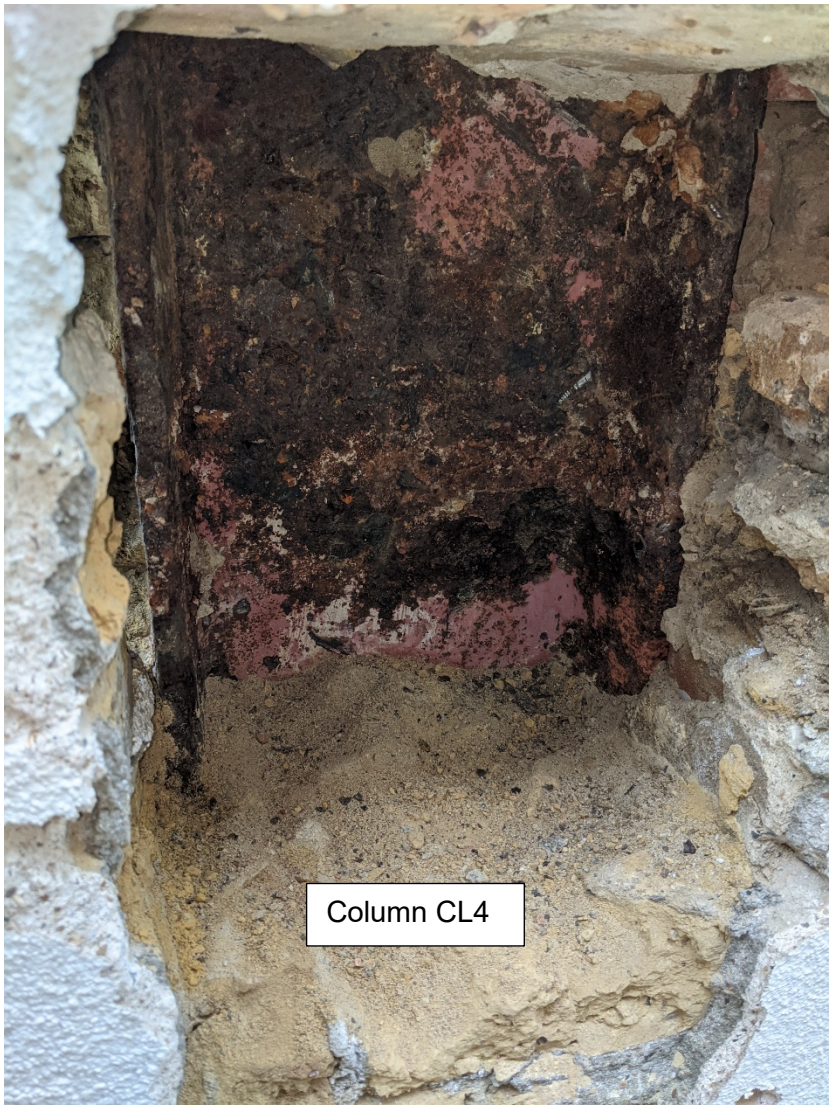
FIG.1: PLAN OF GROUND FLOOR SHOWING LOCATIONS OF COLUMNS SURVEYED NOT TO SCALE



Above ground level, each of the columns are encased in solid brickwork masonry, with a render finish to the external façade.

The steel columns locally exposed above ground level on the western façade (CL1 and CL2) exhibited no more than light surface corrosion.

On the southern façade, the steel column locally exposed above ground at CL3 exhibited moderate surface corrosion (further developed surface corrosion, but no measurable section loss), whilst the column locally exposed at CL4 exhibited moderate to heavy surface corrosion (heavy corrosion deposits and flaking evident, with onset of section loss, <10%).



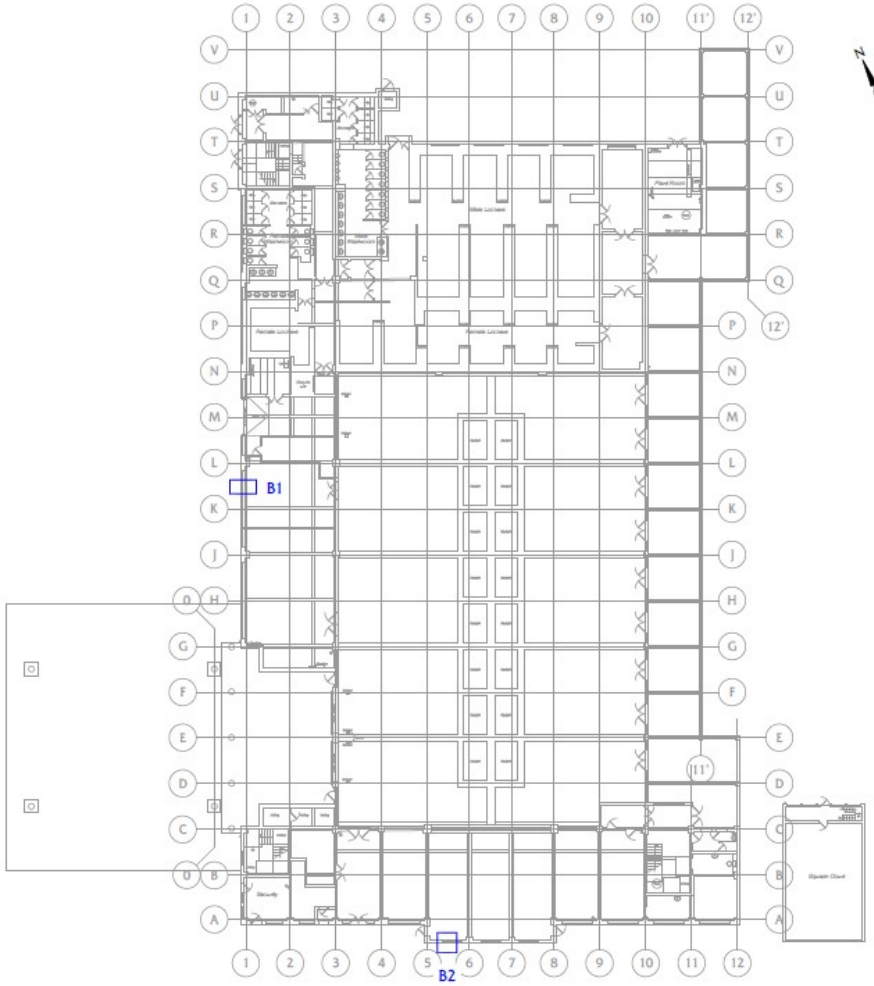
At each of the four column locations a portion of the base of the column and gusset plates/angles were locally exposed. Any base plate is fully embedded within the top of the concrete foundation and was not disturbed/exposed. The lower portions of the gusset plates/angles are typically encased in concrete, whilst the upper portions of the gusset plates/angles are encased in a mixture of concrete and brickwork. The bases of the column sections are typically encased in masonry.

At each of the four locations the gusset plates/angles and connecting rivet and bolt heads exposed (typically encased in concrete) exhibited no more than light surface corrosion. However, the base of the column sections typically exhibited moderate surface corrosion (further developed surface corrosion, but no measurable section loss). The base of the column section at location CL1 exhibited heavy surface corrosion (heavy corrosion deposits and flaking evident, with onset of section loss, <10%).

Beams

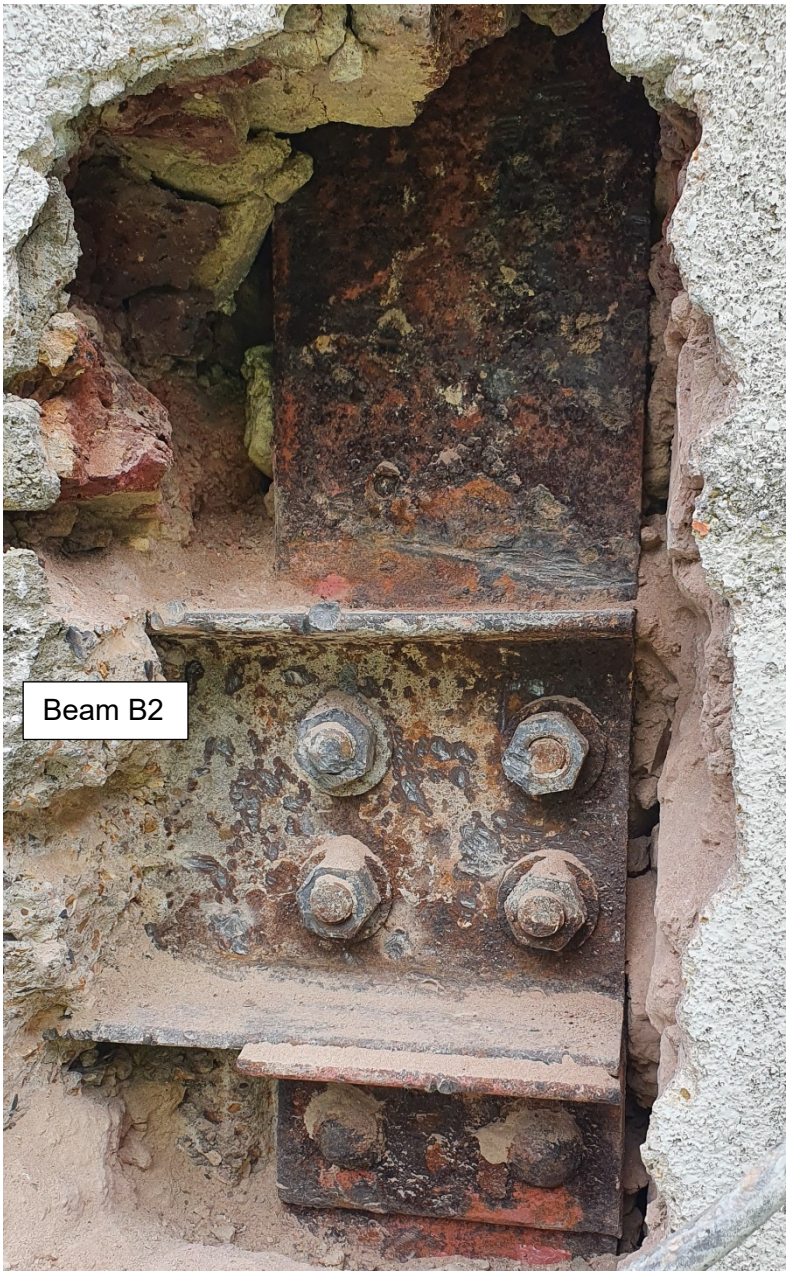
A total of 2No. first floor steel façade beams (B1 and 2) were selected for investigation based on the areas identified by the Client's Design Team, where cracking had been observed to the external render finish. Beam B1 was on the western façade whilst beam B2 was on the southern façade. Each of the beams were locally exposed for inspection.

FIG.3: PLAN OF GROUND FLOOR SHOWING LOCATIONS OF BEAMS SURVEYED NOT TO SCALE



Each of the beams were found to be encased in concrete, with a render finish to the external façade.

The steel beams locally exposed (B1 and 2) exhibited no more than light surface corrosion.



3.3. Recommendations

The residual capacity of the columns that exhibit heavy surface corrosion should be assessed by the Client's Structural Engineer.

As part of any repair of the steel frame elements and masonry encasement materials, it is imperative to mitigate further water ingress.

Given the variability in the condition of the small sample of steel column sections investigated at low and below ground level (where encased in masonry), it should be expected that there are other low level areas around the façade where the columns exhibit heavy surface corrosion, or potentially more severe corrosion. It is therefore recommended that, prior to any repairs, the lower portions of the columns and the column bases below ground level are opened up and similarly inspected. Any significantly corroded sections will need to be cleaned and repaired/protected and/or strengthened as directed by the Client's Structural Engineer, prior to any encasement repairs.

The steel columns should also be exposed for inspection at higher levels where cracking is evident to the external render/masonry (following the line of the column). It would also be prudent to inspect any steel beam locations where cracking is identified to the concrete encasement (following the line of the beam), although the steel beams are expected to be in better condition throughout where encased in concrete.

It should also be borne in mind that any repair warranty periods will be such that regular inspection and maintenance of the repaired and unrepaired areas should be expected over the required future design life of the building (60 years).

The installation of an impressed current cathodic protection system within the masonry could reduce the future levels of corrosion of the embedded steel and also reduce the regularity of future repairs. Anodes are installed into the brickwork externally to protect the steel columns and beams through an electronically impressed current.

Maintenance of this type of system's electronics would be expected at c.5-10-year intervals, although maintenance of the system electronics is unobtrusive and can be carried out remotely (but on site).

Specialist advice should be sought from a Corrosion Engineer with regards to the installation of cathodic protection systems.

APPENDIX 1
SURVEY DRAWINGS (INCLUDING PHOTOGRAPHS)

DETAILS OF GROUND FLOOR COLUMN CONSTRUCTION AND CONDITION
NESTLE FORMER CANTEEN BUILDING, HAYES

FIG.1: PLAN OF GROUND FLOOR SHOWING LOCATIONS OF COLUMNS SURVEYED NOT TO SCALE

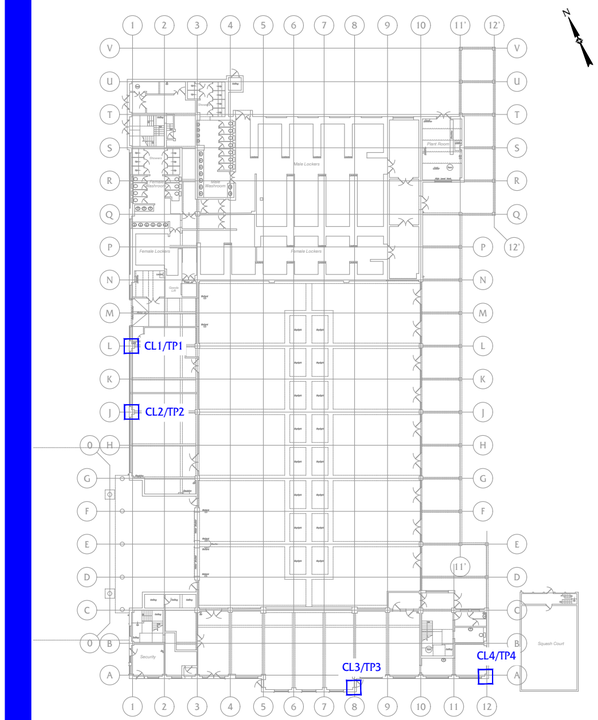
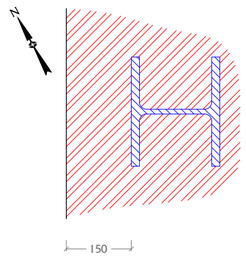


FIG.1a: PART PLAN SHOWING COLUMN CL1 CONSTRUCTION DETAILS AND CONDITION (1m ABOVE GROUND F.F.L.) SCALE 1:10



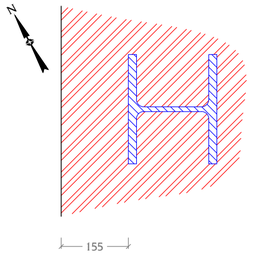
COLUMN CL1 RESIDUAL SECTION SIZE:

D: 252mm
B: 204mm
T: 18.7mm
t: 11mm

NOTES:

CRACKING OBSERVED TO RENDER. STEEL COLUMN EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS)

FIG.1b: PART PLAN SHOWING COLUMN CL2 CONSTRUCTION DETAILS AND CONDITION (1m ABOVE GROUND F.F.L.) SCALE 1:10

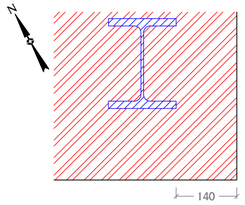


COLUMN CL2 RESIDUAL SIZE:
D: 253mm
B: 207mm
T: 19.6mm
t: 10.6mm

NOTES:

CRACKING OBSERVED TO RENDER. STEEL COLUMN EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS)

FIG.1c: PART PLAN SHOWING COLUMN CL3 CONSTRUCTION DETAILS AND CONDITION (1m ABOVE GROUND F.F.L.) SCALE 1:10

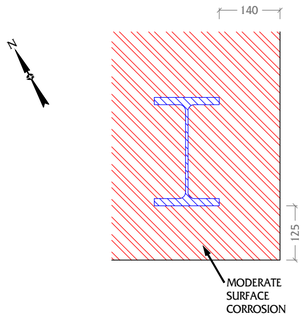


COLUMN CL3 RESIDUAL SECTION SIZE:
D: 207mm
B: 156mm
T: 16.8mm
t: 6.2mm

NOTES:

CRACKING OBSERVED TO RENDER. STEEL COLUMN EXPOSED EXHIBITS MODERATE SURFACE CORROSION (FURTHER DEVELOPED CORROSION, BUT NO MEASURABLE SECTION LOSS)

FIG.1d: PART PLAN SHOWING COLUMN CL4 CONSTRUCTION DETAILS AND CONDITION (1m ABOVE GROUND F.F.L.) SCALE 1:10



COLUMN CL4 RESIDUAL SECTION SIZE:

D: 250mm
B: 150.5mm
T:16.7mm
t: 5.7mm

NOTES:

CRACKING OBSERVED TO RENDER. STEEL COLUMN SECTION EXPOSED EXHIBITS MODERATE TO HEAVY SURFACE CORROSION (HEAVY CORROSION DEPOSITS AND FLAKING EVIDENT IN PLACES WITH ONSET OF SECTION LOSS)

P1a: CL1 COLUMN EXPOSURE

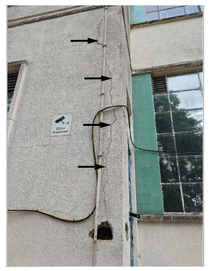
P1b: CL1 COLUMN FLANGE

P1c: CL1 CLOSE UP OF COLUMN FLANGE

P1d: CL1 REAR COLUMN FLANGE

P1e: CL2 COLUMN EXPOSURE

P1f: CL2 CLOSER VIEW OF COLUMN FLANGE



P1g: CL3 COLUMN EXPOSURE AND CRACKING

P1h: CL3 COLUMN EXPOSURE

P1i: CL3 COLUMN FLANGES AND WEB

P1j: CL3 COLUMN FLANGE

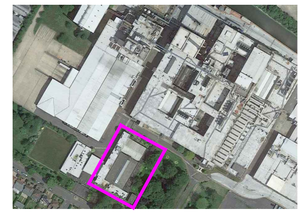
P1k: CL4 EXPOSURE TO COLUMN FLANGE

P1l: CL4 EXPOSURE TO COLUMN FLANGE AND WEB

P1m: CL4 CLOSER VIEW OF COLUMN FLANGES WEB

P1n: CL4 CLOSER VIEW OF COLUMN FLANGE

AERIAL VIEW OF SITE



SYMBOLS USED

PLAN EXTENT OF BUILDING SURVEYED

AREA SURVEYED

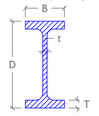
MATERIAL TYPES

STEELWORK

BRICKWORK

CONCRETE

STEEL MEASUREMENT DETAILS (BEAM / COLUMN)



PROJECT DETAILS

GBG REPORT No. 5049 ACCOMPANIES THIS DRAWING.

STRUCTURE INVESTIGATED	TWO STOREY STEEL FRAMED FORMER CANTEEN BUILDING
LOCATION	NORTH HYDE GARDENS, HAYES, UB3 4RF
PURPOSE OF INVESTIGATION	TO DETERMINE CERTAIN STEEL FRAME ELEMENT CONSTRUCTION DETAILS AND CONDITION AS REQUESTED BY THE CLIENT'S DESIGN TEAM

THIS DRAWING HAS BEEN PREPARED USING EXISTING DRAWINGS AND/OR PRINTS OF DRAWINGS AS SUPPLIED BY THE CLIENT AND SUPPLEMENTED BY MEASUREMENTS TAKEN ON SITE. ALL DIMENSIONS THEREFORE ARE TO BE CHECKED ON SITE PRIOR TO PREPARING DRAWINGS OR COMMENCING ANY WORK.

0 METRES 5

AT A SCALE OF 1:100 - ORIGINAL DWG SIZE A2 (420mm x 594mm)

REF.	REVISION	DATE

ALL ORIGINAL DRAWINGS ARE PRODUCED IN COLOUR

Project: NESTLE FORMER CANTEEN BUILDING, HAYES

Client: BARRATT LONDON

Title: DETAILS OF GROUND FLOOR COLUMN CONSTRUCTION AND CONDITION

Drawn	Date	Scale	Dwg. No. 5049-1
VC	MAY 22	AS SHOWN	
CAD	PM	APP	

GBG INNOVATION IN STRUCTURAL INVESTIGATION

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DETAILS OF GROUND FLOOR COLUMN CONSTRUCTION AND CONDITION BELOW GROUND LEVEL
NESTLE FORMER CANTEEN BUILDING, HAYES

FIG.1: PLAN OF GROUND FLOOR SHOWING LOCATIONS OF COLUMNS SURVEYED NOT TO SCALE

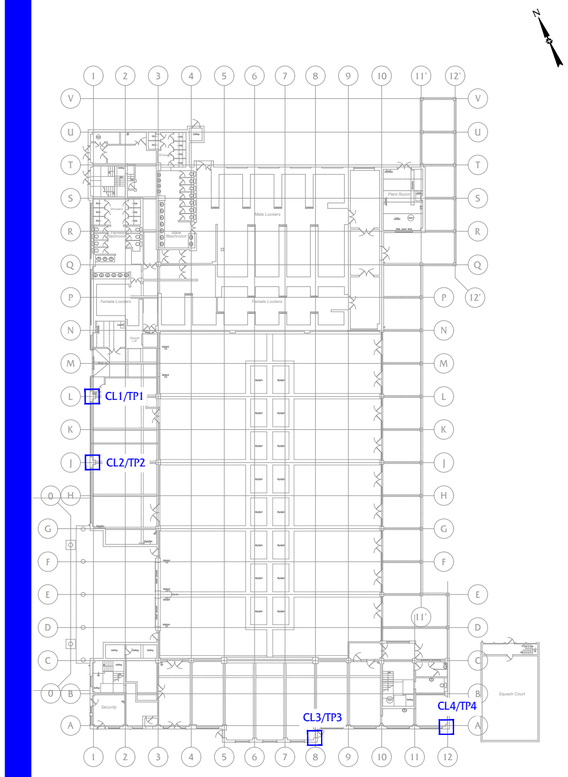
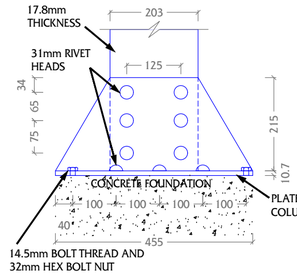


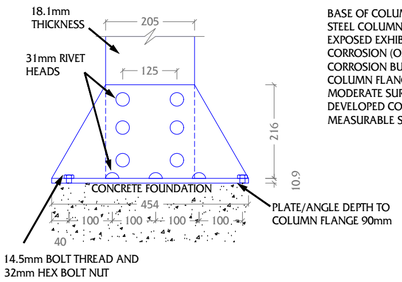
FIG.2a: PART ELEVATION SHOWING COLUMN CL1 DETAILS AND CONDITION (BELOW GROUND AT TRIAL PIT TP1) SCALE 1:10



NOTES:

BASE OF COLUMN ENCASED IN MASONRY. STEEL COLUMN PLATE, RIVETS & BOLTS EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS). STEEL COLUMN FLANGE EXPOSED EXHIBITS HEAVY SURFACE CORROSION (HEAVY CORROSION DEPOSITS AND FLAKING EVIDENT WITH ON-SET OF SECTION LOSS).

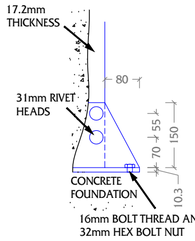
FIG.2b: PART ELEVATION SHOWING COLUMN CL2 DETAILS AND CONDITION (BELOW GROUND AT TRIAL PIT TP2) SCALE 1:10



NOTES:

BASE OF COLUMN ENCASED IN MASONRY. STEEL COLUMN PLATE, RIVETS & BOLTS EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS). STEEL COLUMN FLANGE EXPOSED EXHIBITS MODERATE SURFACE CORROSION (FURTHER DEVELOPED CORROSION BUT NO MEASURABLE SECTION LOSS).

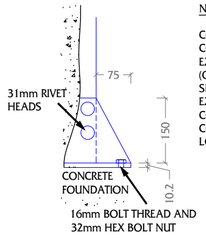
FIG.2c: PART SECTION LOOKING NORTH SHOWING COLUMN CL3 DETAILS AND CONDITION (BELOW GROUND AT TRIAL PIT TP3) SCALE 1:10



NOTES:

COLUMN ENCASED IN CONCRETE. STEEL COLUMN PLATE, RIVETS & BOLTS EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS). STEEL COLUMN FLANGE EXPOSED EXHIBITS MODERATE SURFACE CORROSION (FURTHER DEVELOPED CORROSION BUT NO MEASURABLE SECTION LOSS).

FIG.2d: PART SECTION LOOKING NORTH SHOWING COLUMN CL4 DETAILS AND CONDITION (BELOW GROUND AT TRIAL PIT TP4) SCALE 1:10

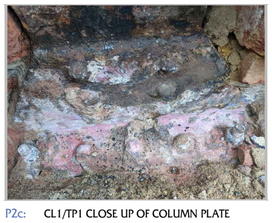


NOTES:

COLUMN ENCASED IN CONCRETE. STEEL COLUMN PLATE, RIVETS & BOLTS EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS). STEEL COLUMN FLANGE EXPOSED EXHIBITS MODERATE SURFACE CORROSION (FURTHER DEVELOPED CORROSION BUT NO MEASURABLE SECTION LOSS).

P2a: CL1/TP1 COLUMN EXPOSURE

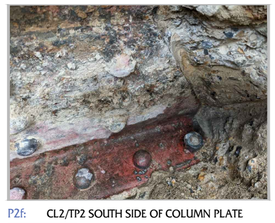
P2b: CL1/TP1 CLOSE UP OF COLUMN FLANGE



P2c: CL1/TP1 CLOSE UP OF COLUMN PLATE

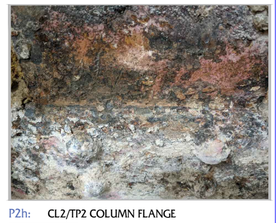
P2d: CL2/TP2 COLUMN EXPOSURE

P2e: CL2/TP2 CLOSER VIEW OF COLUMN EXPOSURE

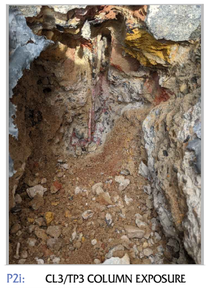


P2f: CL2/TP2 SOUTH SIDE OF COLUMN PLATE

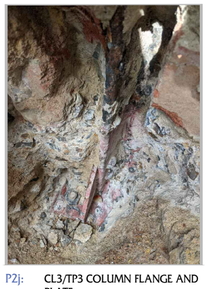
P2g: CL2/TP2 NORTH SIDE OF COLUMN PLATE



P2h: CL2/TP2 COLUMN FLANGE



P2i: CL3/TP3 COLUMN EXPOSURE



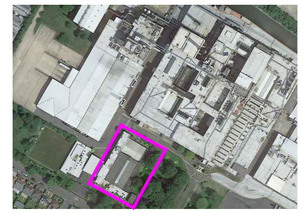
P2j: CL3/TP3 COLUMN FLANGE AND PLATE

P2k: CL4/TP4 COLUMN EXPOSURE

P2l: CL4/TP4 CLOSER VIEW OF COLUMN EXPOSURE

P2m: CL4/TP4 COLUMN FLANGE AND PLATE WEB

AERIAL VIEW OF SITE



SYMBOLS USED

PLAN EXTENT OF BUILDING SURVEYED

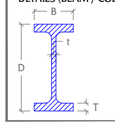
AREA SURVEYED

MATERIAL TYPES

STEELWORK

CONCRETE

STEEL MEASUREMENT DETAILS (BEAM / COLUMN)



PROJECT DETAILS

GBG REPORT No. 5049 ACCOMPANIES THIS DRAWING.

STRUCTURE INVESTIGATED	TWO STOREY STEEL FRAMED FORMER CANTEEN BUILDING
LOCATION	NORTH HYDE GARDENS, HAYES, UB3 4RF
PURPOSE OF INVESTIGATION	TO DETERMINE CERTAIN STEEL FRAME ELEMENT CONSTRUCTION DETAILS AND CONDITION AS REQUESTED BY THE CLIENT'S DESIGN TEAM

THIS DRAWING HAS BEEN PREPARED USING EXISTING DRAWINGS AND/OR PRINTS OF DRAWINGS AS SUPPLIED BY THE CLIENT AND SUPPLEMENTED BY MEASUREMENTS TAKEN ON SITE. ALL DIMENSIONS THEREFORE ARE TO BE CHECKED ON SITE PRIOR TO PREPARING DRAWINGS OR COMMENCING ANY WORK.

0 METRES 5

AT A SCALE OF 1:100 - ORIGINAL DWG SIZE A2 (420mm x 594mm)

REF.	REVISION	DATE

ALL ORIGINAL DRAWINGS ARE PRODUCED IN COLOUR

Project: NESTLE FORMER CANTEEN BUILDING, HAYES

Client: BARRATT LONDON

Title: DETAILS OF GROUND FLOOR COLUMN CONSTRUCTION AND CONDITION BELOW GROUND LEVEL

Drawn	Date	Scale	Dwg. No. 5049-2
VC	MAY 22	AS SHOWN	
CAD	PM	APP	

INNOVATION IN STRUCTURAL INVESTIGATION

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DETAILS OF FIRST FLOOR BEAM CONSTRUCTION
NESTLE FORMER CANTEEN BUILDING, HAYES

FIG.3: PLAN OF GROUND FLOOR SHOWING LOCATIONS OF BEAMS SURVEYED NOT TO SCALE

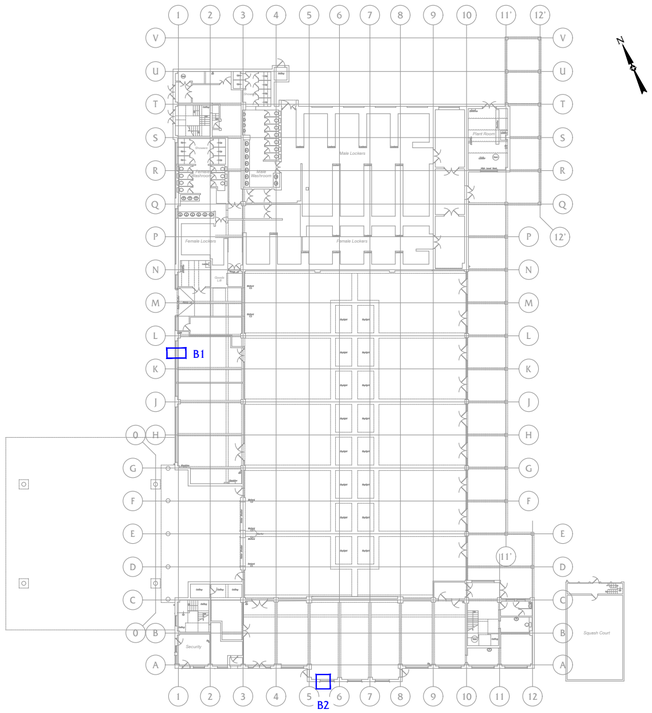
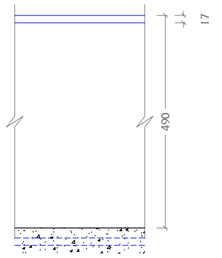


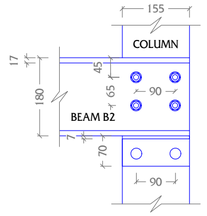
FIG.3a: PART ELEVATION LOOKING EAST SHOWING DETAILS OF BEAM B1 SCALE 1:10



NOTE:

STEEL BEAM ENCASED IN CONCRETE AND WHERE EXPOSED EXHIBITS LIGHT SURFACE CORROSION (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS)

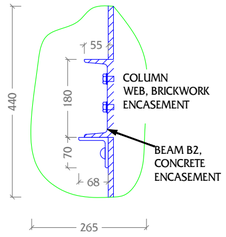
FIG.3c: PART ELEVATION LOOKING NORTH SHOWING DETAILS OF BEAM B2 SCALE 1:10

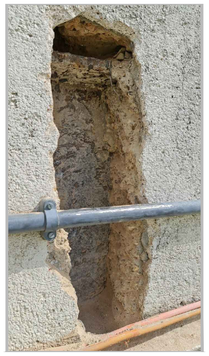


NOTES:

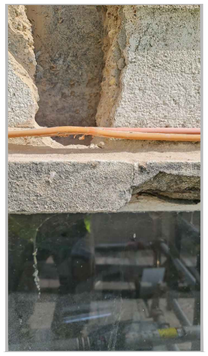
STEEL BEAM AND COLUMN EXPOSED EXHIBITS LIGHT SURFACE CORROSIONS (ONSET OF SURFACE CORROSION BUT NO SECTION LOSS)

FIG.3c: PART SECTION LOOKING WEST SHOWING DETAILS OF BEAM B2 TO COLUMN CONNECTION EXPOSED SCALE 1:10





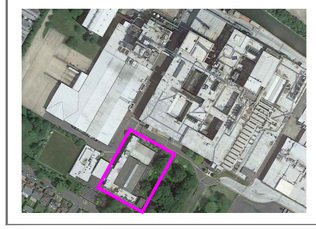
P2a: B1 BEAM EXPOSURE



P2b: B1 LOWER SECTION OF BEAM ENCASEMENT WITH SPALLED CONCRETE

P2c: B2 BEAM TO COLUMN CONNECTION EXPOSURE

AERIAL VIEW OF SITE



SYMBOLS USED

PLAN EXTENT OF BUILDING SURVEYED

AREA SURVEYED

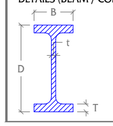
MATERIAL TYPES

STEELWORK

BRICKWORK

CONCRETE

STEEL MEASUREMENT DETAILS (BEAM / COLUMN)



PROJECT DETAILS

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0 METRES 5

AT A SCALE OF 1:100 - ORIGINAL DWG SIZE A2 (420mm x 594mm)

REF.	REVISION	DATE

ALL ORIGINAL DRAWINGS ARE PRODUCED IN COLOUR

Project: NESTLE FORMER CANTEEN BUILDING, HAYES

Client: BARRATT LONDON

Title: DETAILS OF FIRST FLOOR BEAM CONSTRUCTION

Drawn	Date	Scale	Dwg. No. 5049-3
VC	MAY 22	AS SHOWN	
CAD	PM	APP	

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INNOVATION IN STRUCTURAL INVESTIGATION

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