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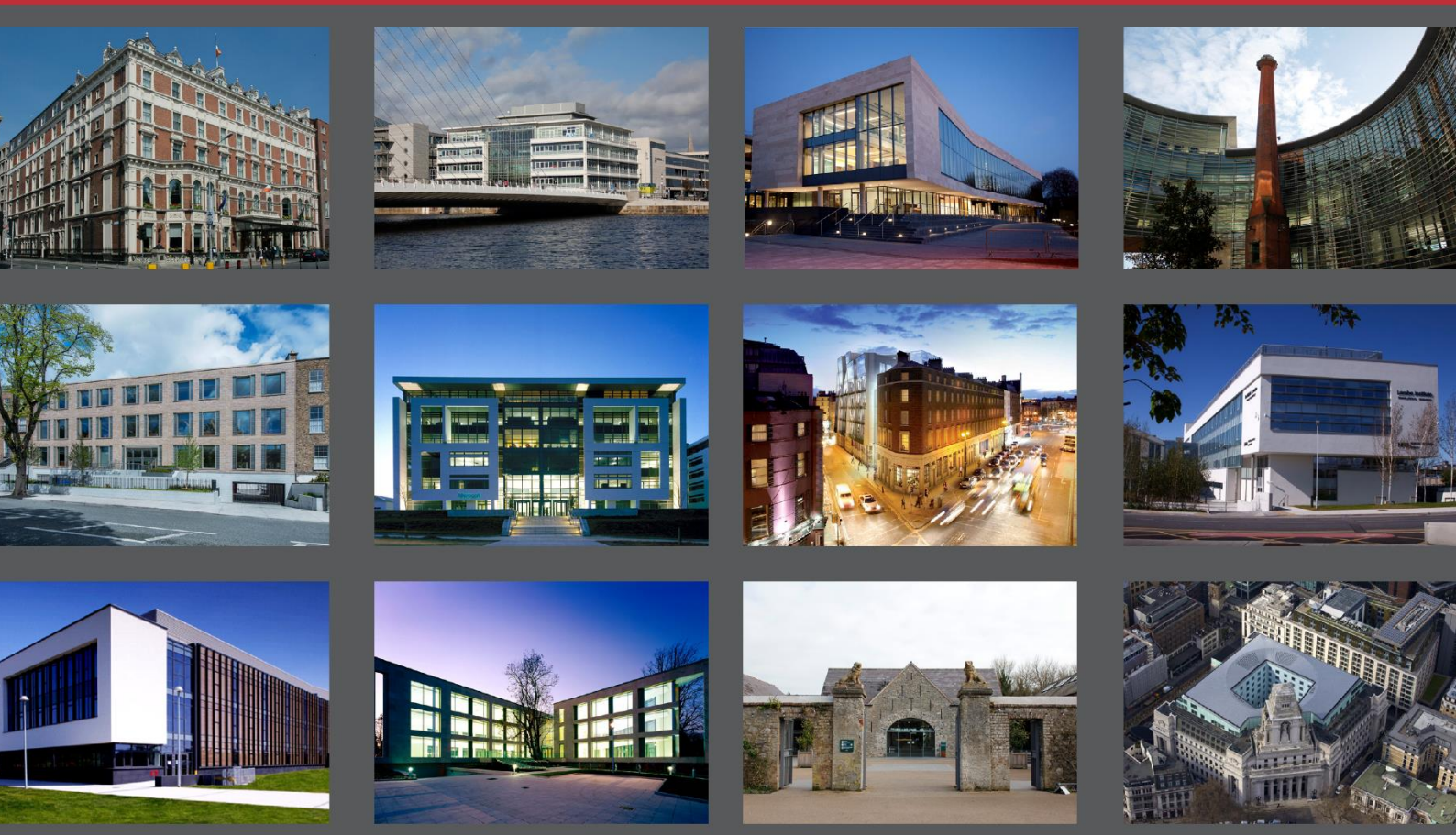

Proposed Strategic Housing Development on the Former Player Wills Site and Undeveloped Land Owned by Dublin City Council at South Circular Road, Dublin 8.

Structural Assessment Report for Planning

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PROJECT: **PROPOSED STRATEGIC HOUSING DEVELOPMENT ON THE FORMER PLAYER WILLS SITE AND UNDEVELOPED LAND OWNED BY DUBLIN CITY COUNCIL AT SOUTH CIRCULAR ROAD, DUBLIN 8.**

PROJECT NO. **19.117**

DOCUMENT TITLE: **STRUCTURAL ASSESSMENT REPORT FOR PLANNING**

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STRUCTURAL ASSESSMENT REPORT
FOR
PROPOSED PLAYER WILLS SHD
AT
SOUTH CIRCULAR ROAD,
DUBLIN 08

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1.0 INTRODUCTION

1.1 INTRODUCTION

DBTR-SCR1 Fund, a Sub-Fund of the CWTC Multi Family ICAV intend to apply to An Bord Pleanála for permission for a mixed-use Build to Rent Strategic Housing Development at the former 'Player Wills' site (2.39 hectares) and adjoining lands (0.67 hectares) under the control of Dublin City Council. A public park, public road and works to South Circular Road and to facilitate connections to municipal services at Donore Avenue are proposed on the Dublin City Council land. The former 'Player Wills' site incorporates Eircode's: D08 T6DC, D08 PW25, D08 X7F8 and D08 EK00 and has frontage onto South Circular Road, St. Catherine's Avenue and Donore Avenue, Dublin 8. The Dublin City Council undeveloped land adjoins the former 'Player Wills' site to the west and the former 'Bailey Gibson' site to the east. The total area of the proposed development site is 3.06 hectares.

The design rationale is to create and deliver a high quality, sustainable, residential led mixed use strategic housing development within this inner city brownfield site which respects its setting and maximises the site's natural attributes while achieving maximum efficiency of existing infrastructure. The Proposed Site Layout is illustrated on Drawing No. PL0003 contained within the architectural suite of drawings.

The development will consist of;

i. the demolition of all buildings (15,454 sq.m GFA), excluding the original fabric of the former Player Wills Factory, to provide for the development of a mixed use(residential, community, arts and culture, creche, food and beverage and retail) scheme comprising predominantly build to rent apartment dwellings (492 no.) together with a significantly lesser quantity of single occupancy shared accommodation private living areas (240 no.), with an average private living floor area of 24.6 sq.m (double the minimum private living space size required for single occupancy shared accommodation) and a arts/culture/community hub within the repurposed ground floor of the former factory building;

ii. change of use, refurbishment, modifications and alterations to the former Player Wills Factory building (PW1) to include the removal of 1 no. later addition storey (existing 4th storey) and the later addition rear (northern) extension, retention and modification of 3 no. existing storeys and addition of 2 no. storeys set back on the building's south, east and west elevations with an 8-storey projection (max. height 32.53m) on the north eastern corner, with a cumulative gross floor area of 17,630 sq.m including ancillary uses, comprising;

    a. at ground floor 852 sq.m of floor space dedicated to community, arts and cultural and exhibition space together with artist and photography studios (Class 1 and Class 10 Use), 503 sq.m of retail floor space (Class 1 Use), 994 sq.m of café/bar/restaurant floor space, 217 sq.m of co-working office floor space (Class 3 Use) and ancillary floor space for welfare facilities, waste management and storage;

    b. 240 no. single occupancy shared accommodation private living areas, distributed over levels 1-4, including 2 no. rooms of 30 sq.m, 49 no. rooms of 25 sq.m; 14 no. rooms of 23 sq.m, 58 no. rooms of 22.5 sq.m, 8 no. rooms of 20 sq.m, 104 no. rooms of 19 sq.m and 5 no. disabled access (Part M) rooms (3 no. 32 sq.m and 2 no. 26 sq.m); 21 no. kitchen/dining areas, and, 835 sq.m of dedicated shared accommodation services, amenities and facilities distributed across levels 1-4, to accommodate uses including lounge areas, entertainment (games) area, 2 no.

external terraces (Level 03 and 04), laundry facilities, welfare facilities and waste storage;

c. 47 no. build-to rent apartments distributed across levels 1-7 including 12 no. studio apartments; 23 no. 1 bed apartments, 8 no. 2 bed apartments: and, 4 no. 3-bed apartments;

d. 1,588 sq.m of shared (build to rent and shared accommodation) services, amenities and facilities including at ground floor reception/lobby area, parcel room, 2 no. lounges and administration facilities; at Level 01 entertainment area, TV rooms, entertainment (games room), library, meeting room, business centre; at Level 02 gym and storage and at Level 07, a lounge area.

e. Provision of communal amenity outdoor space as follows; PW1 - 450 sq.m in the form of roof terraces dedicated to shared accommodation and 285 sq.m roof terrace for the proposed apartments .

f. a basement (190 sq.m) underlying the proposed 8-storey projection to the northeast of PW1 to accommodate plant.

iii. the construction of 445 no. Build to Rent apartment units, with a cumulative gross floor area of 48,455 sq.m including ancillary uses distributed across 3 no. blocks (PW 2, 4 and 5) comprising;

a. PW2 (45,556 sq.m gross floor area including ancillary uses) - 415 no. apartments in a block ranging in height from 2-19 storeys (max. height 63.05m), incorporating 16 no. studio units; 268 no. 1 bed apartments, 93 no. 2 bed apartments and 38 no. 3-bed apartments. At ground floor, 2 no. retail unts (combined 198 sq.m) (Class 1 use), and a café/restaurant (142 sq.m). Tenant services, amenities and facilities (combined 673 sq.m) distributed across ground floor (lobby, mail room, co-working and lounge area), Level 06 (terrace access) and Level 17 (lounge). Provision of communal amenity open space including a courtyard of 1,123 sq.m and roof terraces of 1,535 sq.m

b. Double basement to accommodate car parking, cycle parking, waste storage, general storage and plant.

c. PW4 (1,395 sq.m gross floor area including ancillary uses) - 9 no. apartments in a part 2-3 storey block (max. height 10.125m) comprising, 2 no. 2-bed duplex apartment units and 7 no. 3-bed triplex apartment units. Provision of communal amenity open space in the form of a courtyard 111 sq.m

d. PW5 (1,504 sq.m gross floor area including ancillary uses) - 21 no. apartments in a 4 storey block (max. height 13.30m) comprising 12 no. studio apartments, 1 no. 1-bed apartment, 5 no. 2-bed apartments, and 3 no. 3-bed apartments. Provision of communal amenity space in the form of a courtyard 167sq.m. Provision of communal amenity open space in the form of a courtyard 167 sq.m

iv. the construction of a childcare facility (block PW4) with a gross floor area of 275 sq.m and associated external play area of 146 sq.m;

v. the provision of public open space with 2 no. permanent parks, 'Players Park' (3,960 sq.m) incorporating active and passive uses to the northwest of the former factory building on lands owned by Dublin City Council; 'St. Catherine's Park' (1,350 sq.m)a playground, to the north east of the Player Wills site adjacent to St. Catherine's National School. A temporary public park (1,158 sq.m) to the northeast of the site set aside for a future school extension. The existing courtyard (690 sq.m) in block PW1 (former factory building) to be retained and enhanced and a public plaza (320 sq.m) between proposed blocks PW and PW4.

vi. 903 no. long-stay bicycle parking spaces, with 861 no. spaces in the PW2 basement and 42 no. spaces at ground level in secure enclosures within blocks PW4 and PW5. 20 no. spaces reserved for non-residential uses and 110 no. short-stay visitor bicycle spaces provided at ground level.

vii. 4 no. dedicated pedestrian access points are proposed to maximise walking and cycling, 2 no. from South Circular Road, 1 no. from St. Catherine's Avenue and 1 no. from Donore Avenue.

viii. in the basement of PW2, 148 no. car parking spaces to serve the proposed build to rent apartments including 19 no. dedicated disabled parking spaces and 6 no. motorcycle spaces. 20 no. spaces for a car sharing club ('Go Car' or similar). 10% of parking spaces fitted with electric charging points.

ix. in the basement of PW2, use for 81 no. car parking spaces (1,293 sq.m net floor area) including 5 no. dedicated disabled parking spaces, 3 no. motorcycle spaces and 10% of parking spaces fitted with electric charging points to facilitate residential car parking associated with future development on neighbouring lands. The area will not be used for carparking without a separate grant of permission for that future development. In the alternative, use for additional storage (cage/container) for residents of the proposed development.

x. 37 no. surface level car parking spaces including 3 no. disabled access and 3 no. creche set down spaces and 10% fitted with electric charging points. 2 no. loading bays and 2 no. taxi set-down areas.

xi. development of internal street network including a link road (84m long x 4.8m wide) to the south of the proposed 'Players Park' on land owned by Dublin City Council that will provide connectivity between the former 'Bailey Gibson' site and the 'Player Wills' site.

xii. vehicular access will be provided via Donore Avenue with a one-way exit provided onto South Circular Road to the east of block PW1(the former factory building);

xiii. replacement and realignment of footpaths to provide for improved pedestrian conditions along sections of Donore Avenue and South Circular Road and realignment of centreline along sections of Donore Avenue with associated changes to road markings;

xiv. a contra-flow cycle lane is proposed at the one-way vehicular exit to the east of PW1 (former factory building) to allow 2-way cycle movements via this access point;

xv. decommissioning of existing 2 no. ESB substations and the construction of 2 no. ESB substations and associated switch rooms, 1 no. single ESB substation in PW 1 (43.5 sq.m) and 1 no. double ESB substation in PW2 (68 sq.m);

xvi. the construction of a waste and water storage building (combined 133 sq.m, height 4.35m) to the west of building PW1;

xvii. all ancillary site development works; drainage, rooftop solar photovoltaics (20 no. panels total), landscaping, boundary treatment and lighting.

This report focuses on the existing factory building, referenced as block PW1, the majority of which is proposed to be retained and integrated into the new development.

1.2 EXISTING STRUCTURE

The factory building structure consists of a masonry clad steel frame with insitu concrete slabs. The building was constructed in a number of phases dating from 1924-1949. The original building was a two-storey structure, with an additional level constructed in stages between the 1920 and 1930s. The third storey maintains the structural grid of the levels below, with a reduction in the column sizes to that of the lower floors. Also, in the late 1920's the building was extended to the north, with the internalization and removal of a significant portion of the original northern façade. The fourth storey, constructed in 1949, covers only part of the building footprint and does not maintain the same structural grid. This forth level is proposed to be demolished. Refer to Figure 1.1.

Figure 1.1 – Player Wills Factory – Construction Stages.

At the time of BMCE's appointment, the factory building had been derelict for some time. The building roof drainage outlets were blocked almost throughout and waterproof membranes on the roof had failed, leading to significant water ingress and associated deterioration of both structural and non-structural elements (refer to Photos 1-10 in Appendix A). In addition, the factory contained a high proportion of Asbestos Containing Materials (ACM's). No design or as-built information was available in relation to the building structure.

A large-scale asbestos remediation project was carried out on the building, along with an initial strip out, removal of all non-structural partitions from within the building, to allow better assessment of the original building structure.

Upon completion of those works, a schedule of structural opening-up works and fabric testing was prepared to allow a structural assessment of the building be carried out. The following testing was carried out over a number of months:

- Exposure of existing pad and strip footings at all typical locations.
- Concrete core sampling and compressive testing of suspended slabs at levels 1,2 & 3.
- Slabs exposures at levels 1,2 & 3 to determine slab depths, reinforcement details, cover.
- Steel sampling from typical columns and beams on all floors for strength tensile testing and metallurgy analysis (some testing ongoing).
- Surveying of the brick and concrete encased steel structure within the external brick façade.
- Cathodic protection trials of encased steel subsequently (ongoing).

Investigation works pertaining to the primary structural elements are discussed in more detail below. At the time of preparation of this report, some of the investigations into the external façade are ongoing. A mark-up of our findings of the primary steel frame is provided in Appendix B.

2.0 STRUCTURAL INVESTIGATIONS

This section discusses the various structural investigation works which have been carried out to enable an assessment of the existing structure and subsequently design for the proposed new building. Refer to the following appendices for further details of these opening up and testing regime:

- Appendix D – United Metals Investigation Works;
- Appendix E – McFarland Consulting Façade Steelwork Survey
- Appendix F – Load Test Solutions Material Testing.

2.1 STEEL FRAME

2.1.1 Steel Sections and Properties

Due to the age of the structure, the steel sections sizes are not standard section sizes as used today. To establish section properties, dimensional measurements were carried out to compare the steel sections against historical imperial size section tables. At the time of construction of this building, the use of mild steel had started to become commonplace but cast iron and wrought iron steel was still available as a structural building product (refer to Photos 11-15 for images of the steel structure). To establish definite material properties, a number of steel samples were taken from external façade columns, internal columns and beams, over a number of floors, due to the different construction stages. The results of this testing confirmed that the steel used to construct this building was mild steel, generally comparable in its material properties to that commonly in use today, although to a lower design strength than typically adopted in modern construction. The results for the steel testing can be seen in Appendix F.

2.1.2 Ground and First Floor Internal Columns

The ground floor columns are 180mm diameter solid steel sections and the first floor columns are 160mm diameter solid steel sections. Initial testing of the steel concluded that it is mild steel, however tensile testing indicate that the steel grade for these columns is less than the expect S235. Three tests across various columns indicate the steel stress capacity is 215N/mm^2. Our calculations show that these columns are sufficient for the proposed new building loads above, including the additional levels based on the lightweight form of construction as discussed in Section 3.2 below

2.1.3 Second Floor Internal Columns

The roof over the second floor (third floor) was constructed in two separate phases. The earlier phase consisted of the west wing of the building north of the first three bays back from the South Circular Road. This was built in the late 1920's and here the columns are 100mm diameter solid steel sections. These columns do not have the capacity to support the proposed additional levels due to their slender cross section. These columns will need to be replaced to provide sufficient capacity for support of the proposed additional floors.

The remainder of the roof over the second floor (third floor) was constructed in the 1930's, and here the columns are universal beam sections to historic imperial section tables. Testing confirms the applicable strength grade as S235. Calculations carried out to date show that these columns are also insufficient in strength to cater for the proposed extended building loads, and they will need to be replaced to provide sufficient capacity for support of the proposed additional floors.

2.1.4 Perimeter Steel Frame

During the investigations, it was discovered that the external brick façade piers encase structural steel columns, and that the concrete lintels are an encasement to structural steel beams (refer to Photos 16-20 in Appendix A). Corrosion of the steelwork was noted in the initial opening up works and the results of this initial opening up can be seen in Appendix E. As a result, specialist cathodic protection testing has been commissioned so as to investigate its effectiveness of protecting the steel within the facade. This is to establish if this method of corrosion protection will be successful in preventing further corrosion of the structural steelwork, which would affect its loadbearing capacity, and also result in expansive corrosion having deleterious effects on the encasing brick façade. This cathodic protection testing has commenced and a report outlining the findings and long term corrosion protection for the encased steel elements will be produced upon completion of the testing.

Upon completion of this testing, an analysis of the perimeter steelwork for the proposed development will be undertaken, and any strengthening works required identified. Where any invasive works are required to strengthen the steelwork within the façade, this work will primarily be carried out from within the building.

2.1.5 First and Second Floor Beams

The first and second floor beams are generally identical in layout and section size. Tensile testing indicates that a strength grade of at least S235 could be used, and up to S275 in place. Calculations show that these beams are sufficient for the proposed new building loads at level 1 and 2, including the higher loaded areas (communal and gym area).

2.1.6 Third (roof) Floor Beams

As noted in Section 2.1.3, the third level was constructed in two phases, after the main building was complete. Both primary and secondary beam sizes (in both phases) at this level are smaller than that of the floor below. Tensile testing indicates that a strength grade of S275. Calculations show that these beams are insufficient for the proposed new building loads.

The primary beams would have to be significantly strengthened to support the transferred columns for the proposed new structure above. These strengthening works would likely be invasive, result in major alterations to the original structure. Additional secondary transfer beams would be required at the lines of support for the new structure above, and to supplement the existing secondary beams so as to reduce the load per beam.

2.2 SLAB ON GRADE

A number of ground floor slab exposures were carried out. To do this, in conjunction with footing exposures, the slab was locally saw-cut and removed to expose typical cross sections of the slab. The existing ground floor slab consists of a 180mm thick slab (thickness varies slightly due to variable subgrade levels) over a crushed rock base (refer to Photo 21-22 in Appendix A). The slab does not have either a radon barrier or damp-proof membrane in place. It also does not have any insulation. All of the above was expected given the age of the structure. To comply with the requirement of current building regulations, along with necessary works to install new drainage and other sub-floor services, it will be necessary to remove the existing ground floor slab and replace this will a new slab with a compliant radon and damp-proof membrane and insulation.

2.3 SUSPENDED SLABS

Local opening of the existing slabs (approximately 500mm*500mm) was carried out at each area related to a different construction period. The concrete around the reinforcement was broken away to identify the type, spacing and size of the reinforcement, along with concrete cover for determination of exposure and fire rating capacity (refer to Photos 23-27 in Appendix A). Concrete core samples were taken for compressive testing. Several samples of the reinforcement were also taken for tensile testing.

Non-structural screed containing timber batons at regular spacings have been cast above the structural slabs on levels 1 and 2. Given that the building was exposed to years of wet and damp conditions, these timber batons have rotted. To ensure the new construction is not subject to the potential effects of leaving these screeds in place, the screeds shall be removed and replaced with new non-structural floor screeds.

2.3.1 First and Second Floor Slabs

The first and second floor slabs consist of 114-120mm reinforced concrete structural slabs with 65-75mm thick non-structural screeds. The reinforcement consists of 4.1-4.3mm diameter round wire bars. Tensile testing on several steel samples confirmed the yield strength to be at least 500N/mm^2. Compressive tests were carried out on concrete core samples which returned results in the range of 28.8-56.2N/mm^2. Our analysis of these slabs confirms capacity to cater for the proposed new floor loads at these levels, including communal and gym areas. Results of the material testing are included in Appendix F.

The floor slab at both levels can provide the required fire rating without additional work.

2.3.2 Third (roof) Slab

The section of this slab constructed in the later 1920's covering the west wing of the building (approximately 30% of the full floor area) had a similar thickness, strength and reinforcement content to the original levels 1 and 2.

The section of the floor constructed in the 1930's has a slab thickness between 98-107mm. The reinforcing steel used in the slab is a wound wire type steel. The tensile test results for this slab show yield strengths as low as 384N/mm2, with a much lower quantity of tensile steel than provided in the other slabs. The cover to the reinforcement in this slab was found to be as little as 10mm.

2.4 FOUNDATIONS

A number of footing exposures were carried out, typically two each at internal atrium columns location, internal columns and at external façade piers (refer to Photos 28-31 in Appendix A). These exposures comprised of locally removing the ground floor slab around each element to establish the footing type, size, depth and founding material. As expected, all foundations were found to be conventional concrete spread footings, with tiered bases which were common at the time of construction. The concrete was found to be in good condition. Compressive tests on core samples were also carried out, giving results of 59.1 and 61.3 N/mm2. The footings are founded on a soft to firm brown boulder clay with relatively low bearing capacity of 80kN/m2.

An assessment of the building loads was carried out to compare the proposed five level residential development to that of the original three level factory building. Due to the reduction in live loading,

it is possible to found the proposed development on the existing foundations without additional strengthening, once any new concrete elements (floor slabs/screeds) are kept to a minimum, and the new roof constructed from lightweight material.

3.0 FINDINGS AND RECOMMENDATIONS

3.1 FINDINGS

An extensive amount of testing, opening up and structural assessment has been carried out to determine the capacity of the existing structure of the Player Wills Factory Building, with some testing yet to be complete.

It was found that the foundations have the capacity for the proposed development once the additional building load does not exceed the original building loads.

It was found that the primary steel beams and concrete slabs for the First and Second Floor have the capacity for the proposed development.

Based on the proposed structure for the new levels, the existing internal 160mm diameter columns at First floor level and the 180mm diameter columns at Ground floor level have capacity for the proposed development. Further assessment is being carried out on the cathodic protection trials for the external façade columns to confirm they have capacity for the proposed development.

The third level extension to the original two storey building has been found to be inferior in quality and strength to that of the original building. The existing columns on the top level are small, and only fit for minor building loads. Likewise, the beams are undersized to take even typical floor loads as they were originally designed to support the roof.

The slab at this level is of very poor quality. The slab thickness, at less than 100mm, does not meet the minimum thickness required for 90 minute fire rating. Both the reinforcement quantity and tensile strength are very low resulting in an insufficient flexural strength in the slab, even for residential floor loads.

3.2 RECOMMENDATIONS

Considering the extremely poor quality of the existing roof slab, and low capacity of the supporting steel structure at level 2, it is recommended that the third floor structure, including the columns from Level 2 up, be replaced with a new structural steel and composite metal slab (approximately 110mm thick). This new structure would be designed so as to be suitable to transfer the loads from the new structure above to the existing structure below.

The façade, and the perimeter columns within the façade build up, would be protected and retained. Temporary works would be required during the construction works of the new third floor.

A cross section of the proposed structure for the additional levels for the development, including the replaced Level 3 is provided in Appendix C. This structure will require to be constructed from lightweight materials so as to allow the existing columns up to Level 2 and foundations be re-used.

Appendix A

Photographs

Photo 1: Original Building Condition

Photo 2: Original Building Condition

Photo 3: Original Building Condition

Photo 4: Original Building Condition

Photo 5: Original Building Condition

Photo 6: Original Building Condition

Photo 7: Original Building Condition

Photo 8: Original Building Condition

Photo 9: Original Building Condition

Photo 10: Original Building Condition

Photo 11: Typical Ground/First Column and beam

Photo 12: Typical column head connection

Photo 13: Level 2 column (1930's section) with level 3 beams

Photo 14: Level 2 column for 1920's section

Photo 15: Level 2 in 1930’s section

Photo 16: Embedded Steel

Photo 17: Embedded Steel

Photo 18: Embedded Steel

Photo 19: Embedded Steel

Photo 20: Embedded Steel

Photo 21: Ground Floor Slab

Photo 22: Ground Floor Slab

Photo 23: Core sample, with non-structural screed with timber batons

Photo 24: Core Sample

Photo 25: Level 1 Reinforcement

Photo 26: Level 2 reinforcement

Photo 27: Level 3 reinforcement

Photo 28: Tiered spread footing

Photo 29: Tiered spread footing

Photo 30: Tiered spread footing

Photo 31: Tiered spread footing

Appendix B

Existing Structure Mark-up

A1

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECTS DRAWINGS. FIGURED DIMENSIONS ONLY (NOT SCALING)TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT-ASK!
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

DESIGN

DESIGN AND SEQUENCING OF ALL TEMPORARY SUPPORT WORKS IS TO BE CARRIED OUT BY THE ENABLING WORKS CONTRACTOR. ALL TEMPORARY SUPPORT WORKS INDICATED ON THIS DRAWING ARE A GENERAL GUIDE ONLY. TEMPORARY WORKS DESIGN SHALL INCLUDE BUT NOT BE LIMITED TO:

- ASSESSMENT OF LATERAL STABILITY AND PROVISION OF LATERAL LOAD RESISTING BRACING/FRAMES/INFILL PANELS, AS NECESSARY, TO PROVIDE LATERAL STABILITY ONCE EXISTING STAIR AND LIFT CORES HAVE BEEN REMOVED, UNTIL SUCH TIME AS THE PERMANENT LATERAL LOAD RESISTING ELEMENTS (STAIRS AND LIFT CORES) HAVE BEEN CONSTRUCTED.
- VERTICAL PROPPING TO BEAMS AND SLABS AROUND LOADBEARING ELEMENTS TO BE DEMOLISHED UNTIL NEW PERMANENT VERTICAL SUPPORTS HAVE BEEN CONSTRUCTED.
- FAÇADE RETENTION SYSTEM FOR RETAINED FAÇADE ALONG GRID 10,A-D.
- TEMPORARY PROPPING TO FACILITATE DEMOLITION OF NON-LOADBEARING MASONRY PARTITIONS, IF REQUIRED.
- ASSESSMENT OF CAPACITY OF EXISTING STRUCTURAL STEEL COLUMNS AND BEAMS FOR TEMPORARY LOADING AND PROVISION OF PROPPING WHERE REQUIRED. IN PARTICULAR, THOSE STEEL ELEMENTS WHICH HAVE EXTENSIVE CORROSION.

HEALTH & SAFETY

THE PSCS FOR THE ENABLING WORKS CONTRACTOR IS TO PREPARE A SPECIFIC SAFETY PLAN FOR THE TEMPORARY WORKS

NOTES ON VIBRATION CONTROL

VIBRATION & NOISE TO BE IN ACCORDANCE WITH THE FOLLOWING:
-BS 5228 PARTS 1 & 4, (1997/1992), 'NOISE CONTROL ON CONSTRUCTION AND OPEN SITES.'
-BS 6472 (1992), 'GUIDE TO EVALUATION OF HUMAN EXPOSURE TO VIBRATION IN BUILDINGS'
-BS 7385 PART 2 (1993) 'EVALUATION AND MEASUREMENT FOR VIBRATIONS IN BUILDINGS.'
VIBROGRAPGHS ARE TO BE INSTALLED AT THE LOCATIONS 'V1' &'V2' INDICATED ON PLAN. MAXIMUM ALLOWABLE PEAK PARTICLE VELOCITY (P.P.V.) = 5mm/s AT 4Hz INCREASING TO 10mm/s AT 15Hz.

PARTITIONS

NON-LOADBEARING MASONRY PARTITION WALLS ARE TO BE DEMOLISHED FROM THE TOP FLOOR WORKING DOWNWARDS. THE DEMOLITION WASTE IS TO BE REMOVED FROM EACH FLOOR PRIOR TO COMMENCEMENT OF DEMOLITION OF WALLS ON THE FLOOR BELOW.

1 2 3 4 5 6 7 8 9 10

A B C D E F G H J K L M N

EXTENT OF DEMOLITION TO BE CONFIRMED

FR1

3500 MAX

ExSC

'X' BRACING

EXISTING FACADE TO BE RETAINED TO THIRD FLOOR PARAPET LEVEL.
FACADE RETENTION SYSTEM TO BE PROVIDED TO LATERALLY SUPPORT WALL TO DEMOLITION CONTRACTOR'S DESIGN. THE RETENTION SYSTEM TO BE DESIGNED TO EXTEND MAXIMUM 3.5m FROM TE FACE OF THE RETAINED FACADE

X-BRACE - INDICATIVE CROSS BRACING TO PROVIDE TEMPORARY LATERAL STABILITY UNTIL PERMANENT WORKS HAVE BEEN CONSTRUCTED.

FULL GROUND FLOOR SLAB TO BE REMOVED ENTIRELY, INCLUDING EXCAVATION TO 500mm BELOW PROPOSED NEW FINISHED FLOOR LEVEL.
EXTENT NOT HATCHED FOR CLARITY ON DRAWING.

EXISTING STAIR CORE TO BE DEMOLISHED.
CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS. AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION. PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO STAIR CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

POTENTIAL FOR INFILL MASONRY PANELS WITHIN EXISTING WINDOW OPES FOR TEMPORARY LATERAL STABILITY.

EXISTING LIFT CORE TO BE DEMOLISHED. CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS. AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION. PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO LIFT CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

EXISTING STAIR AND LIFT CORE TO BE DEMOLISHED.
CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS. AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION. PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO STAIR CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

EXISTING STAIR CORE TO BE DEMOLISHED.
CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS.
AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION.
PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO STAIR CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

PRIOR TO DEMOLITION, VERIFY THE LOCATION OF ALL LOADBEARING STEEL COLUMNS WITHIN MASONRY WALLS. ISOLATE THE NON-LOADBEARING WALLS FROM THE COLUMNS PRIOR TO COMMENCEMENT OF DEMOLITION.

4100

LEGEND

FR1	DENOTES STEEL FRAME FOR FACADE RETENTION
ExSC	DENOTES EXISTING STEEL COLUMN / ENCASED COLUMN TO BE RETAINED
	DENOTES WALLS TO BE RETAINED
	DENOTES AREA TO BE DEMOLISHED
VM1	DENOTES VIDEOGRAPH MONITOR INSALLED PRIOR TO DEMOLITION

PW1 ENABLING WORKS GROUND FLOOR PLAN

(SCALE 1 : 150)

ISSUE	DATE	DESCRIPTION	
P01	21.01.20	ISSUED FOR COMMENT	KS

Project Engineer: CIARAN O'RAFFERTY | Project Director: | DRN

BM STAGE **PRELIMINARY**

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Consulting Engineers, Civil , Structural , Project Management.E-mail: bmce@bmce.ie Web: www.bmce.ie
The Institution of Structural Engineers ACEI

CLIENT: CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PROJECT TITLE: PLAYER WILLS SOUTH CIRCULAR ROAD

BM PROJECT No.: 19.117

MODEL | REFERENCE | SUITABILITY | REVISION
S0 | P01.01

DRAWING TITLE: PW1 ENABLING WORKS GROUND FLOOR PLAN

DWG | DRAWING REFERENCE: PW-BMD-00-00-S-4000 | STATUS | REVISION: P01

A1

NOTES

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2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

DESIGN

DESIGN AND SEQUENCING OF ALL TEMPORARY SUPPORT WORKS IS TO BE CARRIED OUT BY THE ENABLING WORKS CONTRACTOR. ALL TEMPORARY SUPPORT WORKS INDICATED ON THIS DRAWING ARE A GENERAL GUIDE ONLY. TEMPORARY WORKS DESIGN SHALL INCLUDE BUT NOT BE LIMITED TO:

- ASSESSMENT OF LATERAL STABILITY AND PROVISION OF LATERAL LOAD RESISTING BRACING/FRAMES/INFILL PANELS, AS NECESSARY, TO PROVIDE LATERAL STABILITY ONCE EXISTING STAIR AND LIFT CORES HAVE BEEN REMOVED, UNTIL SUCH TIME AS THE PERMANENT LATERAL LOAD RESISTING ELEMENTS (STAIRS AND LIFT CORES) HAVE BEEN CONSTRUCTED.
- VERTICAL PROPPING TO BEAMS AND SLABS AROUND LOADBEARING ELEMENTS TO BE DEMOLISHED UNTIL NEW PERMANENT VERTICAL SUPPORTS HAVE BEEN CONSTRUCTED.
- FAÇADE RETENTION SYSTEM FOR RETAINED FAÇADE ALONG GRID 10,A-D.
- TEMPORARY PROPPING TO FACILITATE DEMOLITION OF NON-LOADBEARING MASONRY PARTITIONS, IF REQUIRED.
- ASSESSMENT OF CAPACITY OF EXISTING STRUCTURAL STEEL COLUMNS AND BEAMS FOR TEMPORARY LOADING AND PROVISION OF PROPPING WHERE REQUIRED. IN PARTICULAR, THOSE STEEL ELEMENTS WHICH HAVE EXTENSIVE CORROSION.

HEALTH & SAFETY

THE PSCS FOR THE ENABLING WORKS CONTRACTOR IS TO PREPARE A SPECIFIC SAFETY PLAN FOR THE TEMPORARY WORKS

NOTES ON VIBRATION CONTROL

VIBRATION & NOISE TO BE IN ACCORDANCE WITH THE FOLLOWING:
-BS 5228 PARTS 1 & 4, (1997/1992), 'NOISE CONTROL ON CONSTRUCTION AND OPEN SITES.'
-BS 6472 (1992), 'GUIDE TO EVALUATION OF HUMAN EXPOSURE TO VIBRATION IN BUILDINGS'.
-BS 7385 PART 2 (1993) 'EVALUATION AND MEASUREMENT FOR VIBRATIONS IN BUILDINGS.'
VIBROGRAPGHS ARE TO BE INSTALLED AT THE LOCATIONS 'V1' &'V2' INDICATED ON PLAN. MAXIMUM ALLOWABLE PEAK PARTICLE VELOCITY (P.P.V.) = 5mm/s AT 4Hz INCREASING TO 10mm/s AT 15Hz.

PARTITIONS

NON-LOADBEARING MASONRY PARTITION WALLS ARE TO BE DEMOLISHED FROM THE TOP FLOOR WORKING DOWNWARDS. THE DEMOLITION WASTE IS TO BE REMOVED FROM EACH FLOOR PRIOR TO COMMENCEMENT OF DEMOLITION OF WALLS ON THE FLOOR BELOW.

EXTENT OF DEMOLITION TO BE CONFIRMED

FR1

3500 MAX

EXISTING FACADE TO BE RETAINED TO THIRD FLOOR PARAPET LEVEL.
FACADE RETENTION SYSTEM TO BE PROVIDED TO LATERALLY SUPPORT WALL TO DEMOLITION CONTRACTOR'S DESIGN. THE RETENTION SYSTEM TO BE DESIGNED TO EXTEND MAXIMUM 3.5m FROM TE FACE OF THE RETAINED FACADE

'X' BRACING

X-BRACE - INDICATIVE CROSS BRACING TO PROVIDE TEMPORARY LATERAL STABILITY UNTIL PERMANENT WORKS HAVE BEEN CONSTRUCTED.

STRUCTURE OF GLAZED ATRIUM TO BE PARTIALLY RETAINED. CLADDING TO BE REMOVED. EXTENT TO BE CONFIRMED.

POTENTIAL FOR INFILL MASONRY PANELS WITHIN EXISTING WINDOW OPES FOR TEMPORARY LATERAL STABILITY.

EXISTING STAIR CORE TO BE DEMOLISHED.
CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS.
AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION.
PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO STAIR CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

EXISTING LIFT CORE TO BE DEMOLISHED. CARRY OUT EXPLORATORY WORKS TO CONFIRM IF ANY STEEL COLUMNS ARE ENCASED WITHIN THE STAIR AND NOTIFY THE ENGINEER OF FINDINGS. AWAIT INSTRUCTION BEFORE PROCEEDING WITH DEMOLITION. PROVIDE TEMPORARY PROPPING TO SUPPORT SLAB EDGES CURRENTLY SPANNING ONTO LIFT CORE WALLS UNTIL SUCH TIME AS PERMANENT WORKS ARE CONSTRUCTED.

EXISTING STAIR CORE TO BE DEMOLISHED.
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EXISTING STAIR AND LIFT CORE TO BE DEMOLISHED.
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LEGEND

FR1	DENOTES STEEL FRAME FOR FACADE RETENTION
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	DENOTES WALLS TO BE RETAINED
	DENOTES AREA TO BE DEMOLISHED
VM1	DENOTES VIDEOGRAPH MONITOR INSALLED PRIOR TO DEMOLITION

PW1 ENABLING WORKS FIRST FLOOR PLAN

(SCALE 1 : 150)

ISSUE	DATE	DESCRIPTION	DRN
P01	21.01.20	ISSUED FOR COMMENT	KS

Project Engineer: CIARAN O'RAFFERRY | Project Director:

BM STAGE **PRELIMINARY**

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The Institution of Structural Engineers ACEI International Federation of Consulting Engineers

CLIENT
CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PROJECT TITLE
PLAYER WILLS SOUTH CIRCULAR ROAD

BM PROJECT No. 19.117

MODEL | REFERENCE | SUITABILITY S0 | REVISION P01.01

DRAWING TITLE
PW1 ENABING WORKS FIRST FLOOR PLAN

DWG | DRAWING REFERENCE PW-BMD-00-01-S-4001 | STATUS | REVISION P01

A1

NOTES

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- ASSESSMENT OF CAPACITY OF EXISTING STRUCTURAL STEEL COLUMNS AND BEAMS FOR TEMPORARY LOADING AND PROVISION OF PROPPING WHERE REQUIRED. IN PARTICULAR, THOSE STEEL ELEMENTS WHICH HAVE EXTENSIVE CORROSION.

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EXTENT OF DEMOLITION TO BE CONFIRMED

EXISTING FACADE TO BE RETAINED TO THIRD FLOOR PARAPET LEVEL.
FACADE RETENTION SYSTEM TO BE PROVIDED TO LATERALLY SUPPORT WALL TO DEMOLITION CONTRACTORS DESIGN. THE RETENTION SYSTEM TO BE DESIGNED TO EXTEND MAXIMUM 3.5m FROM TE FACE OF THE RETAINED FACADE

X-BRACE - INDICATIVE CROSS BRACING TO PROVIDE TEMPORARY LATERAL STABILITY UNTIL PERMANENT WORKS HAVE BEEN CONSTRUCTED.

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POTENTIAL FOR INFILL MASONRY PANELS WITHIN EXISTING WINDOW OPES FOR TEMPORARY LATERAL STABILITY.

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VOID

EXISTING STAIR CORE TO BE DEMOLISHED.
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	DENOTES WALLS TO BE RETAINED
	DENOTES AREA TO BE DEMOLISHED
VM1	DENOTES VIDEOGRAPH MONITOR INSALLED PRIOR TO DEMOLITION

PW1 ENABLING WORKS SECOND FLOOR PLAN

(SCALE 1 : 150)

ISSUE	DATE	DESCRIPTION	DRN
P01	21.01.20	ISSUED FOR COMMENT	KS

Project Engineer: CIARAN O'RAFFERRY | Project Director:

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The Institution of Structural Engineers ACEI

CLIENT
CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PROJECT TITLE
PLAYER WILLS SOUTH CIRCULAR ROAD

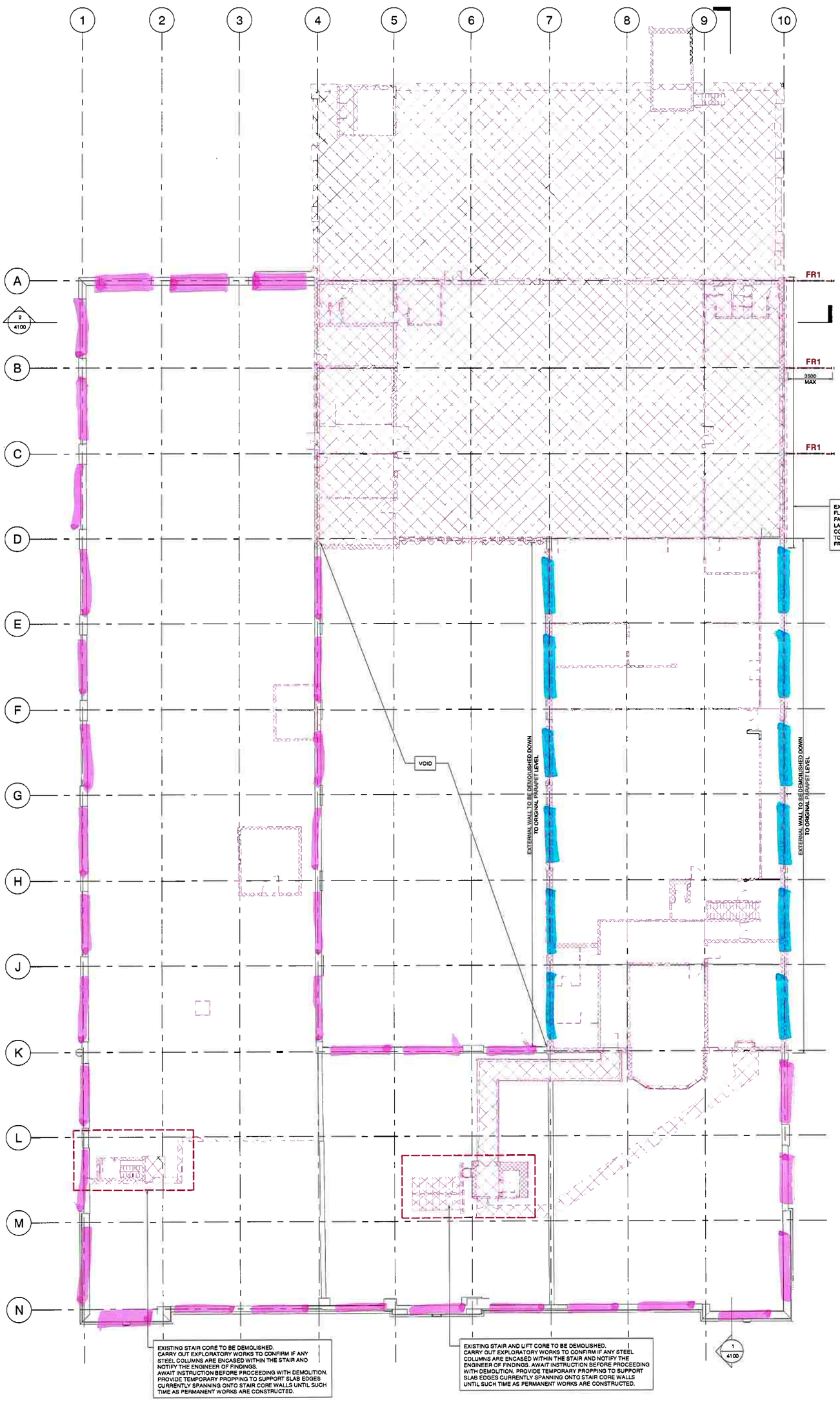
BM PROJECT No.
19.117

MODEL	REFERENCE	SUITABILITY	REVISION
		S0	P01.01

DRAWING TITLE
PW1 ENABLING WORKS SECOND FLOOR PLAN

ORIG	DRAWING REFERENCE	STATUS	REVISION
	PW-BMD-00-02-S-4002		P01

A1



PW1 ENABLING WORKS THIRD FLOOR PLAN

(SCALE 1 : 150)

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PARTITIONS

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LEGEND

FR1	DENOTES STEEL FRAME FOR FACADE RETENTION
ExSC	DENOTES EXISTING STEEL COLUMN / ENCASED COLUMN TO BE RETAINED
	DENOTES WALLS TO BE RETAINED
	DENOTES AREA TO BE DEMOLISHED
VM1	DENOTES VIDEOGRAPH MONITOR INSALLED PRIOR TO DEMOLITION

ISSUE	DATE	DESCRIPTION	DRN
P01	21.01.20	ISSUED FOR COMMENT	KS

Project Engineer: CIARAN O'RAFFERRY | Project Director:

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CLIENT
CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PROJECT TITLE
PLAYER WILLS SOUTH CIRCULAR ROAD

BM PROJECT No.
19.117

MODEL	REFERENCE	SUITABILITY	REVISION
		S0	P01.01

DRAWING TITLE
PW1 ENABLING WORKS THIRD FLOOR PLAN

DWG	DRAWING REFERENCE	STATUS	REVISION
	PW-BMD-00-03-S-4003		P01

Project Title: PLAYER WILLS SITE Job No: 19.117

Part of Structure: EXISTING EXTERNAL + ATRIUM COLUMNS

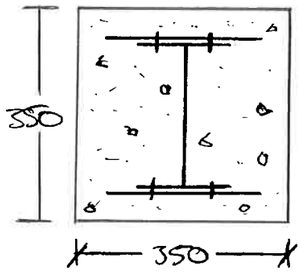
Originator: JDM Checker: Date: 25/02/2020 Sheet No:

BM BARRETT MAHONY

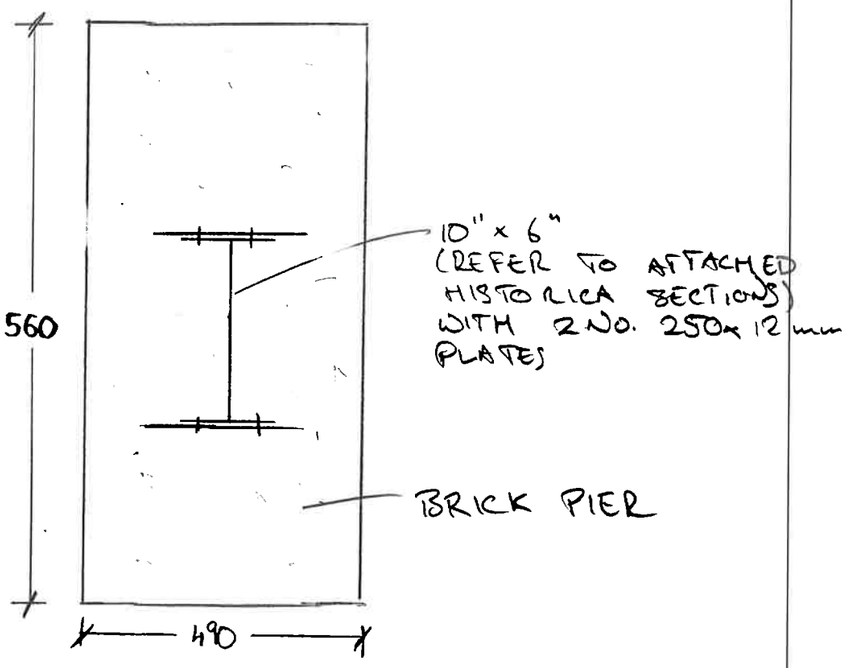
Calculation Status: Preliminary ☐ Planning ☐ Tender ☐ Construction ☐

REF.	CALCULATIONS	OUTPUT

GROUND TO FIRST FLOOR COLUMNS



10"x 6" (REFER TO HISTORICAL SECTIONS ATTACHED) WITH 2No. 250 x 12mm PLATES



Project Title: Job No:

Part of Structure:

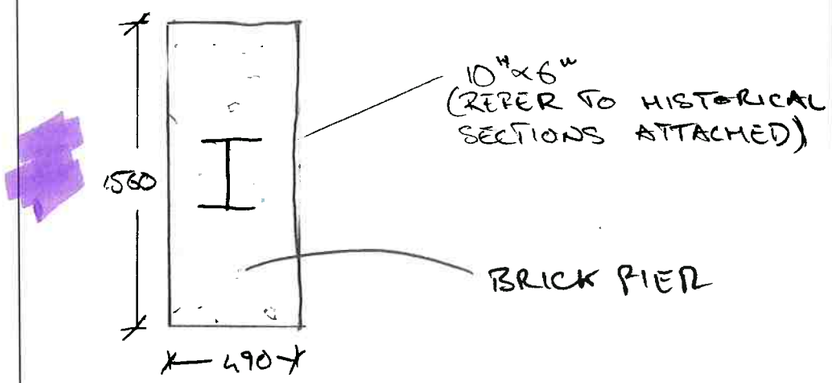
Originator: Checker: Date: Sheet No:

BM
BARRETT MAHONY

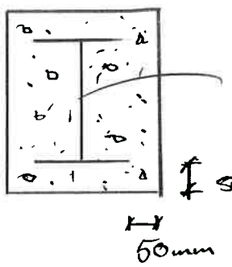
Calculation Status: Preliminary ☐ Planning ☐ Tender ☐ Construction ☐

REF.	CALCULATIONS	OUTPUT

FIRST TO SECOND + SECOND TO THIRD FLOOR COLUMNS

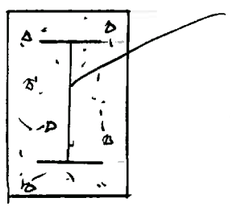


TYPICAL FIRST FLOOR + SECOND FLOOR PERIMETER BEAMS.



14"x6" (REFER TO ATTACHED HISTORICAL SECTIONS)
BEAM TYPICALLY ENCASED IN 50mm CONCRETE.

TYPICAL 3RD FLOOR PERIMETER BEAM



12" x 6" (REFER TO ATTACHED HISTORICAL SECTIONS)

BEAMS ENCASE WITH 50mm OF CONCRETE TYPICALLY

REINFORCED CONCRETE BEAMS IN HIGHLIGHTED LOCATIONS

TABLE NO. 3.7 PROPERTIES OF BEAMS TO BRITISH STANDARD 4. 1903

IMPERIAL UNITS See separate page for notes

Ref No.	Size D x B	Approximate Mass/ft	Metric Equivalent D x B	Mass/m	Thickness Web Flange	Area	Mom. of Inertt. X - X	Rad. of Gyr. Y - Y	Sec. Mod. X - X	Sec. Mod. Y - Y
	ins	lbs	mm	kg	ins	ins2	ins4	ins	ins	ins3
BSB 1	3 x1.50	4.0	76x 38	6	0.16 0.25	1.18	1.66 0.12	1.19	0.33	1.11 0.17
BSB 2	3 x3	8.5	76x 76	13	0.20 0.33	2.50	3.79 1.26	1.23	0.71	2.53 0.84
BSB 3	4 x1.75	5.0	102x 44	7	0.17 0.24	1.47	3.67 0.19	1.58	0.36	1.84 0.22
BSB 4	4 x3	9.5	102x 76	14	0.22 0.34	2.80	7.53 1.28	1.64	0.68	3.76 0.85
BSB 5	4.75x1.75	6.5	121x 44	10	0.18 0.33	1.91	6.77 0.26	1.88	0.37	2.85 0.30
BSB 6	5 x3	11.0	127x 76	16	0.22 0.38	3.24	13.6 1.46	2.05	0.67	5.45 0.97
BSB 7	5 x4.50	18.0	127x114	27	0.29 0.45	5.29	22.7 5.66	2.07	1.03	9.08 2.51
BSB 8	6 x3	12.0	152x 76	18	0.26 0.35	3.53	20.2 1.34	2.40	0.62	6.74 0.89
BSB 9	6 x4.50	20.0	152x114	30	0.37 0.43	5.88	34.7 5.41	2.43	0.96	11.6 2.40
BSB 10	6 x5	25.0	152x127	37	0.41 0.52	7.35	43.6 9.11	2.44	1.11	14.5 3.64
BSB 11	7 x4	16.0	178x102	24	0.25 0.39	4.71	39.2 3.41	2.89	0.85	11.2 1.71
BSB 12	8 x4	18.0	203x102	27	0.28 0.40	5.30	55.7 3.57	3.24	0.82	13.9 1.79
BSB 13	8 x5	28.0	203x127	42	0.35 0.58	8.24	89.4 10.3	3.29	1.12	22.3 4.10
BSB 14	8 x6	35.0	203x152	52	0.44 0.60	10.29	110.6 17.9	3.28	1.32	27.6 5.98
BSB 15	9 x4	21.0	229x102	31	0.30 0.46	6.18	81.1 4.20	3.62	0.82	18.0 2.10
BSB 16	9 x7	58.0	229x178	86	0.55 0.92	17.06	229.7 46.3	3.67	1.65	51.05 13.20
BSB 17	10 x5	30.0	254x127	45	0.36 0.55	8.82	145.7 9.78	4.06	1.05	29.14 3.91
BSB 18	10 x6	42.0	254x152	63	0.40 0.74	12.36	211.6 22.9	4.14	1.36	42.32 7.64
BSB 19	10 x8	70.0	254x203	104	0.60 0.97	20.58	345.0 71.6	4.09	1.87	69.01 17.9
BSB 20	12 x5	32.0	305x127	48	0.35 0.55	9.41	220.1 9.74	4.84	1.02	36.69 3.90
BSB 21	12 x6	44.0	305x152	66	0.40 0.72	12.95	315.4 22.3	4.94	1.31	52.57 7.42
BSB 22	12 x6	54.0	305x152	80	0.50 0.88	15.88	375.6 28.3	4.86	1.33	62.60 9.43
BSB 23	14 x6	46.0	356x152	69	0.40 0.70	13.53	440.6 21.6	5.71	1.26	62.95 7.20
BSB 24	14 x6	57.0	356x152	85	0.50 0.87	16.77	533.1 27.9	5.64	1.29	76.16 9.31
BSB 25	15 x5	42.0	381x127	63	0.42 0.65	12.35	428.2 11.9	5.89	0.98	57.09 4.78
BSB 26	15 x6	59.0	381x152	88	0.50 0.88	17.35	629.1 28.2	6.02	1.28	83.88 9.40
BSB 27	16 x6	62.0	406x152	92	0.55 0.85	18.23	726.0 27.1	6.31	1.22	90.74 9.02
BSB 28	18 x7	75.0	457x178	112	0.55 0.93	22.07	1150.0 46.6	7.22	1.45	127.7 13.30
BSB 29	20 x7.50	89.0	508x191	132	0.60 1.01	26.16	1671.0 62.6	7.99	1.55	167.1 16.70
BSB 30	24 x7.50	100.0	610x191	149	0.60 1.07	29.39	2655.0 66.9	9.50	1.51	221.2 17.80

Appendix C

Proposed Additional Level Structure

1. DEMOLISH EXISTING SLAB AND BEAMS
2. INSTALL NEW PRIMARY BEAMS ALONG EXISTING COLUMN LINE.
3. INSTALL SECONDARY TRANSFER BEAMS TO TRANSFER THE LOADS FROM THE COLUMNS ABOVE TO THE PRIMARY BEAMS.
4. INSTALL NEW SECONDARY STEEL AND PERIMETER BEAMS.
5. INSTALL NEW COMFLOR 51+ WITH 110mm SLAB (SIMILAR TO NEW FLOOR ABOVE).
6. INSTALL NEW COLUMNS LEVEL 02 - LEVEL 03.

COLUMNS FROM LEVEL 04 ABOVE

TRANSFER SECONDARY BEAMS - 406 x 178 UB 74

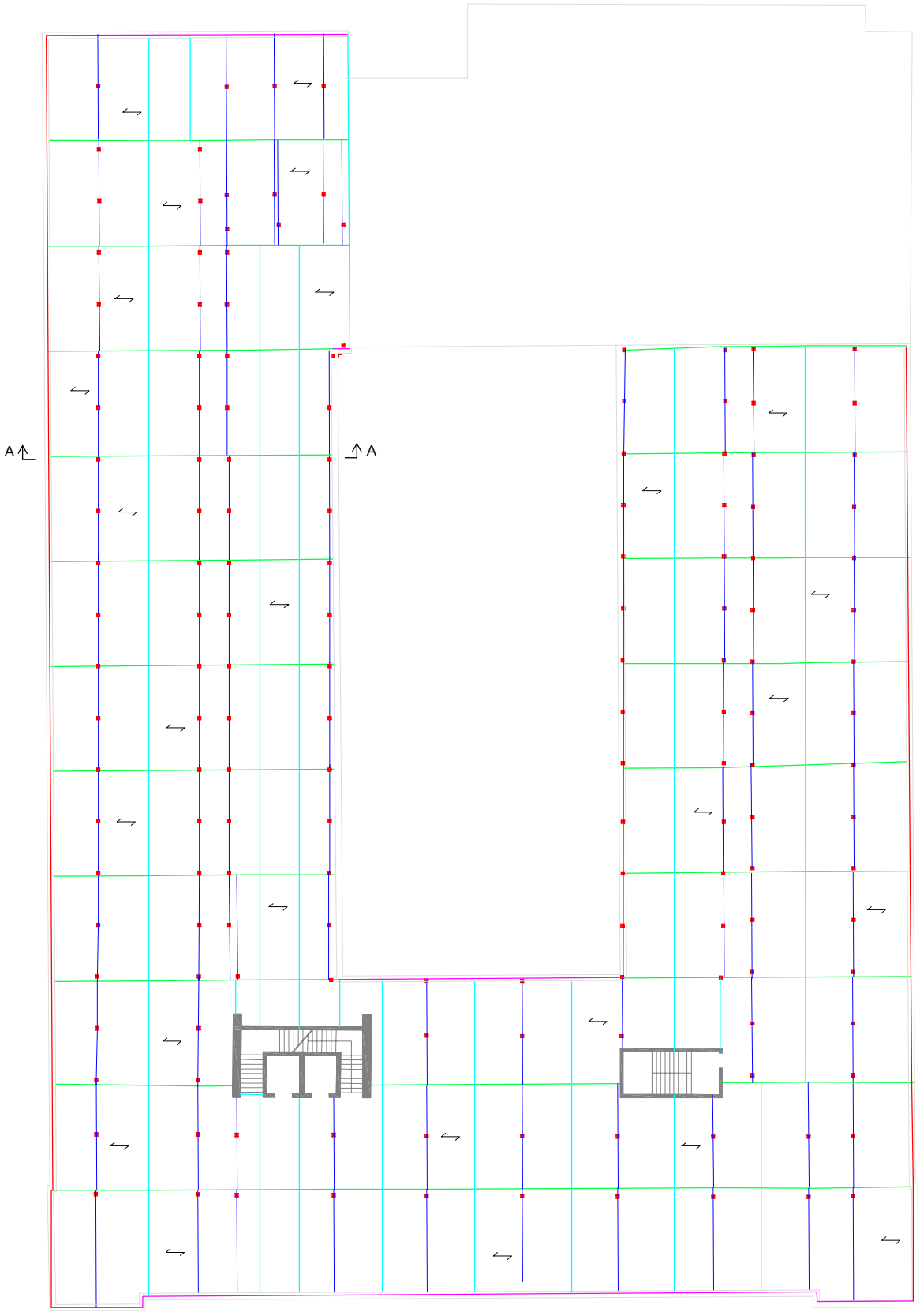
NEW SECONDARY BEAMS - 305 x 127 UB 48

NEW PRIMARY BEAMS INSTALLED ALONG EXISTING COLUMN LINE - 533 x 210 UB 109

NEW PRIMARY BEAMS - 533 x 165 UB 66

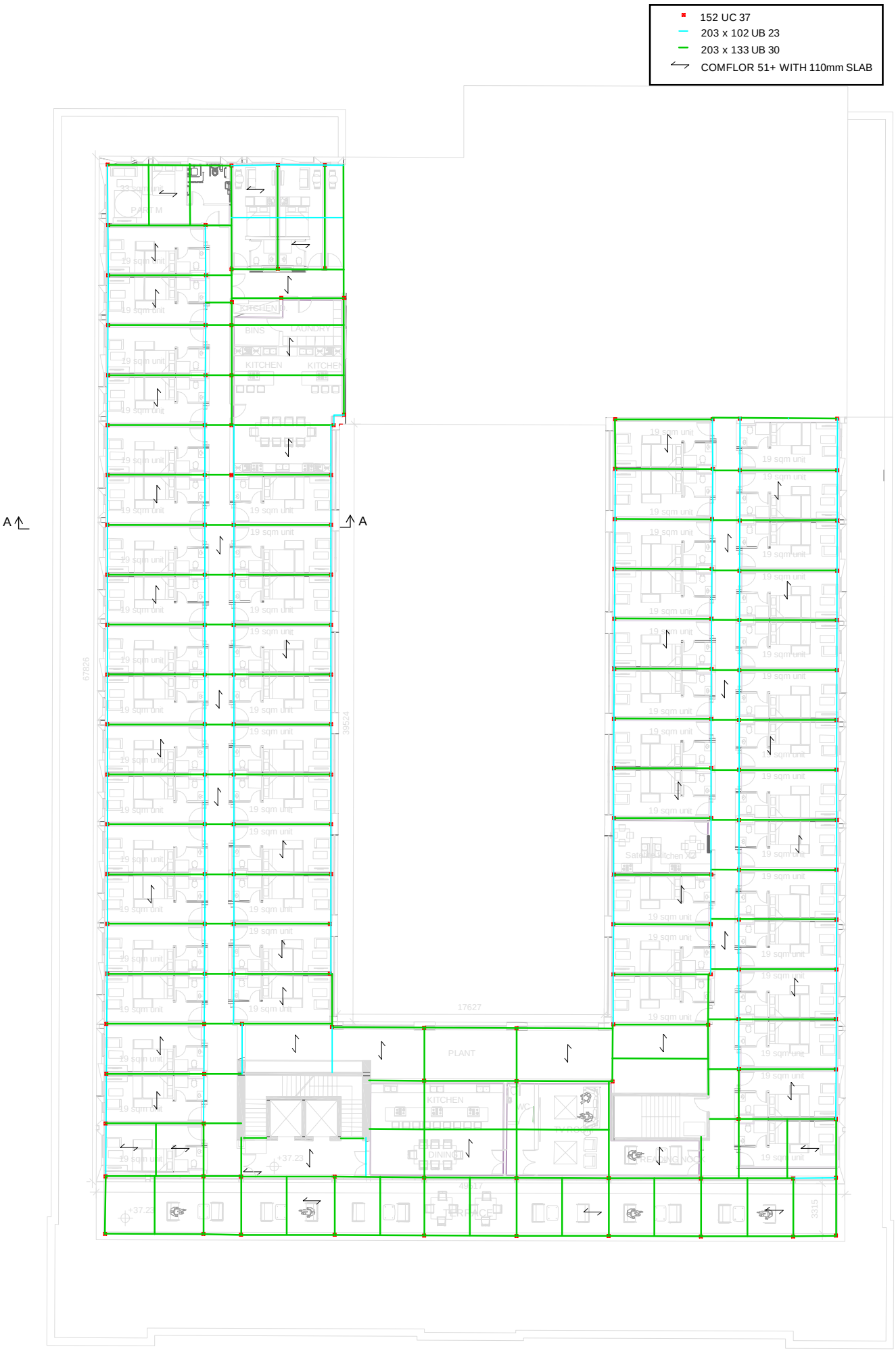
COMFLOR 51+ WITH 110mm SLAB

NEW PERIMETER BEAMS - 305 x 127 UB 33



LEVEL 03

BMCE 18/08/2020



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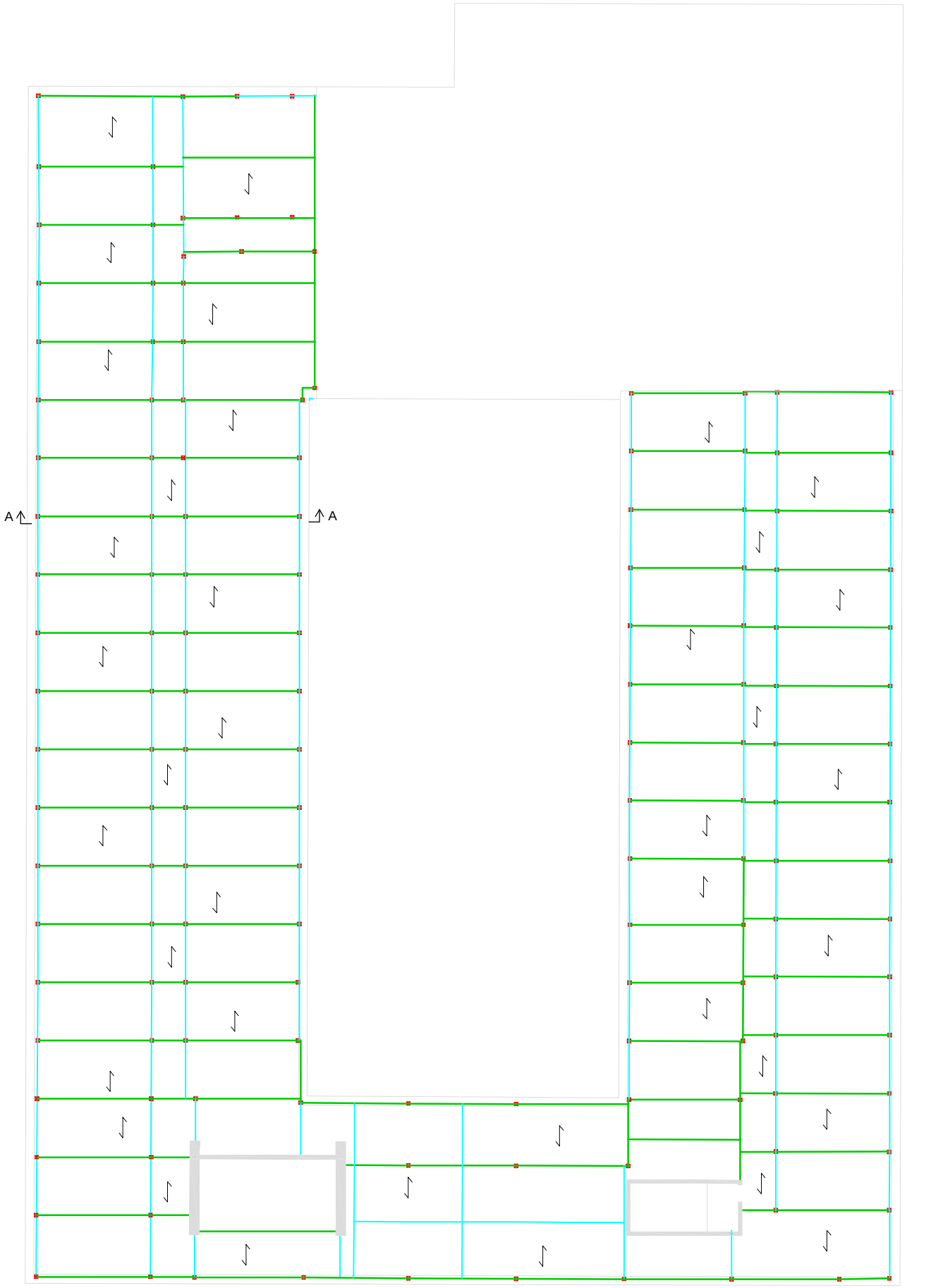
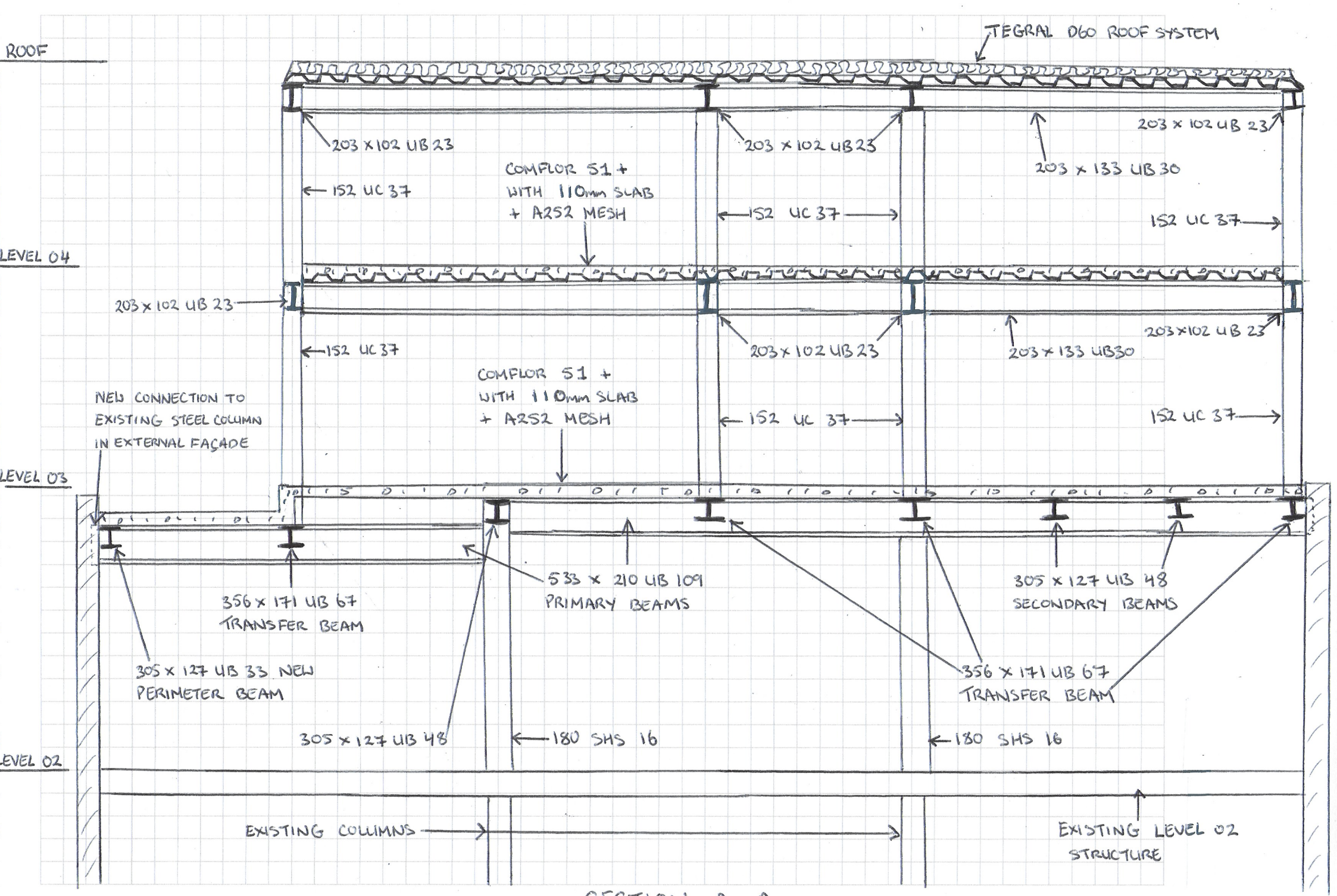


ROOF

BMCE 18/08/2020


ROOF
TEGRAL D60 ROOF SYSTEM
203 x 102 UB 23
203 x 102 UB 23
203 x 133 UB 30
203 x 102 UB 23
152 UC 37
COMFLOR 51 +
WITH 110mm SLAB
+ A252 MESH
152 UC 37
152 UC 37
LEVEL 04
203 x 102 UB 23
203 x 102 UB 23
203 x 133 UB30
203 x 102 UB 23
152 UC 37
COMFLOR 51 +
WITH 110mm SLAB
+ A252 MESH
152 UC 37
152 UC 37
NEW CONNECTION TO
EXISTING STEEL COLUMN
IN EXTERNAL FAÇADE
LEVEL 03
356 x 171 UB 67
TRANSFER BEAM
533 x 210 UB 109
PRIMARY BEAMS
305 x 127 UB 48
SECONDARY BEAMS
305 x 127 UB 33 NEW
PERIMETER BEAM
356 x 171 UB 67
TRANSFER BEAM
305 x 127 UB 48
180 SHS 16
180 SHS 16
LEVEL 02
EXISTING COLUMNS
EXISTING LEVEL 02
STRUCTURE

SECTION A-A

Appendix D

United Metal Investigation Works

Bailey Gibson
United Metals

Player Wills

Address :	
Generated on	- 20/02/2020
Stages	- United Metals - Player Wills
Building trades	- Investigation Works
Stakeholders	- United Metals Recycling (Ireland) Ltd Casey Niall
Drawings	- 2019-10-16 (United Metals - Player Wills) - First floor plan (United Metals - Player Wills) - Second floor plan (United Metals - Player Wills) - Third floor plan (United Metals - Player Wills) - ground floor investigation 1 (United Metals - Player Wills)


27
25
23
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24
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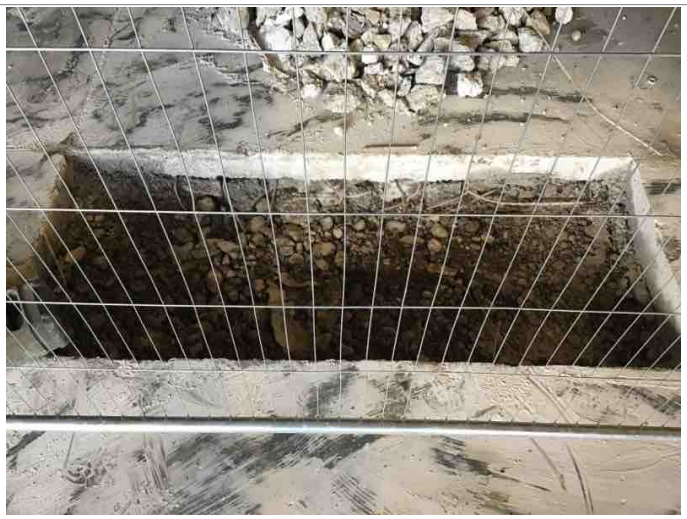
St Catherine's Ave

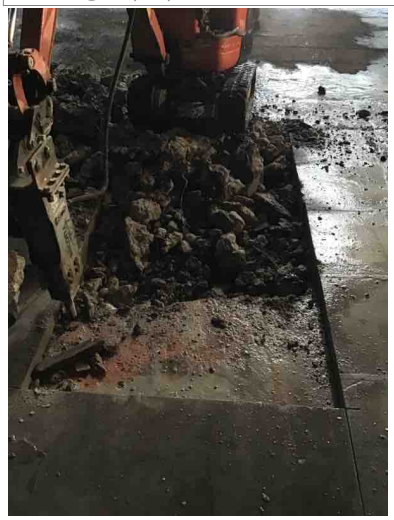
22 16/10/2019

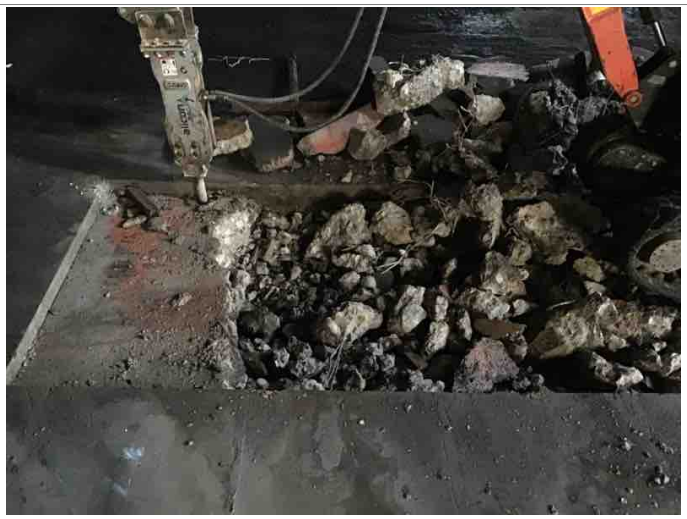


23 16/10/2019

24 16/10/2019

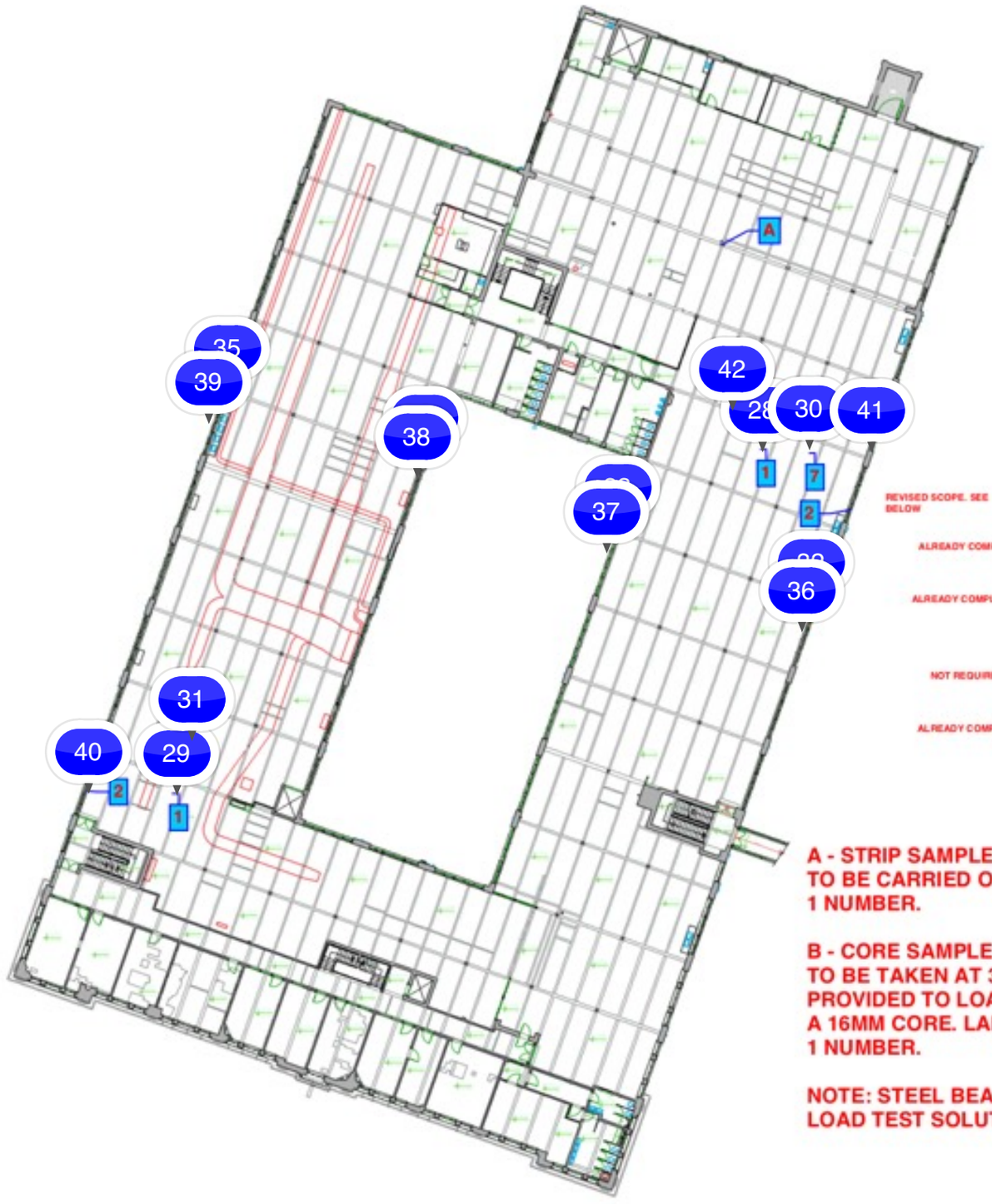
25 16/10/2019





26 16/10/2019

27 16/10/2019



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECT'S DRAWINGS FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - ASK
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

BUILDING SURVEY

THE SURVEYOR SHALL CONFIRM THE BOTTOM FLANGE WIDTH AND THICKNESS OF ALL STEEL BEAMS ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY.
THE SURVEYOR SHALL CONFIRM ALL COLUMN SIZES ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY. UNIVERSAL BEAM AND COLUMN SECTION FLANGE THICKNESSES SHALL ALSO BE INCLUDED

CONDITION SURVEY

A CONDITION SCHEDULE OF THE STRUCTURE SHALL BE CARRIED TO FACILITATE IDENTIFICATION AND TENDERING OF RECTIFICATION WORKS TO STRUCTURE TO BE RETAINED. THE SURVEY IS TO FOCUS ON LOADBEARING ELEMENTS OF STRUCTURE - SLABS, BEAMS, COLUMNS AND MASONRY OR CONCRETE WALLS. THE SURVEY IS TO BE CARRIED OUT ON A GRID BASIS THROUGHOUT THE BUILDING AND SHALL INCLUDE BOTH PHOTOGRAPHS AND DESCRIPTIONS

OPENING UP WORKS SCHEDULE

NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE ~~4 No.~~ 2 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS. DO NOT CUT REINFORCMENT. CONFIRM SLAB THICNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	RING BEAM EXPOSURE 2No.	REMOVE CONCRETE COVER OVER A LENGTH OF 300MM OFF THE INTERNAL EDGE AND ACROSS BASE OF THE BEAM AT 1M OFF MASONRY PIER. CONFIRM COVER DEPTH, AND REINFORCEMENT DETAILS
~~3~~	~~PILOT HOLES TO INTERNAL STEEL COLUMNS 4No.~~	~~DRILL A PILOT HOLE, 10MM DIAMETER THROUGH ONE SIDE OF THE COLUMN AT A HEIGHT OF 300MM. CONFIRM WALL THICKNESS~~
~~4~~	~~CONFIRMATION OF BEAM LAYOUT 3No.~~	~~REMOVE CEILING AS NECESSARY TO CONFIRM SECONDARY BEAM ARRANGEMENT MATCHES MAIN GRID~~
~~5~~	~~CONFIRM IF BEAMS ARE CONCRETE ENGAGED STEEL 2 No.~~	~~DRILL PILOT HOLES IN DOWNSTAND BEAM AT MID DEPTH WITH 10MM MASONRY DRILL BIT. CONFIRM IF BEAM IS CONCRETE OR ENGAGED STEEL. IF CONCRETE, REMOVE COVER CONCRETE OVER 300MM LENGTH ACROSS BASE AND ONE SIDE TO EXPOSE REINFORCEMENT. CONFIRM ALL DIMENSIONS. IF STEEL, EXPOSE BOTTOM FLANGE AND CONFIRM BEAM DEPTH, FLANGE THICKNESS AND WIDTH.~~
~~6~~	~~BRICK COMPRESSIVE TEST 2 No.~~	~~REMOVE 10NO. BRICKS FROM BELOW WINDOW, ADJACENT TO PIER, AND CARRY OUT COMPRESSIVE TESTING ON SAME.~~
7	SLAB CONCRETE COMPRESSIVE TEST ~~4 No.~~ 2 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME
~~8~~	~~CONFIRM IF MASONRY WALLS ARE CORBEARING OR INFILL 5 No.~~	~~DRILL 10MM HOLES THROUGH WALL 150MM BELOW FIRST FLOOR SLAB SOFFIT WITH A MASONRY BIT TO CONFIRM IF BEAM IS PRESENT. CONFIRM COLUMN LOCATIONS IN WALL, IF PRESENT~~

REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS.
PROVIDE SAFETY COVERS AT SLAB EXPOSURE LOCATIONS

REVISED SCOPE. SEE BELOW

ALREADY COMPLETE

ALREADY COMPLETE

NOT REQUIRED

ALREADY COMPLETE

A - STRIP SAMPLE TO BE TAKEN FROM WEB OF COLUMN. TO BE CARRIED OUT BY LOAD TEST SOLUTIONS. 1 NUMBER.

B - CORE SAMPLE THROUGH CIRCULAR COLUMN. CORE TO BE TAKEN AT 300MM ABOVE BASE AND SAMPLE PROVIDED TO LOAD TEST SOLUTIONS FOR TESTING. USE A 16MM CORE. LARGER THAN THE PREVIOUS CORE TEST 1 NUMBER.

NOTE: STEEL BEAM SAMPLES WILL ALSO BE TAKEN BY LOAD TEST SOLUTIONS

REVISED 28.01.2020

PRELIMINARY

BM GARRETT BARRY

CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

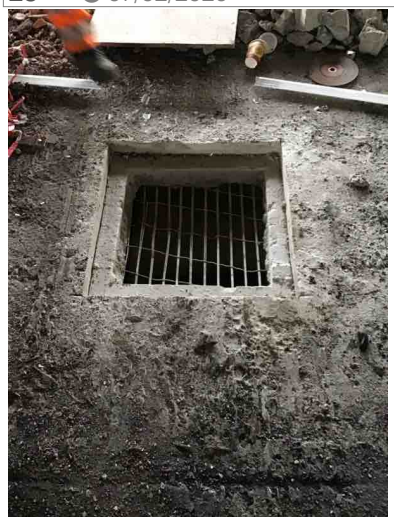
PLAYER WILLS FACTORY — 19.117

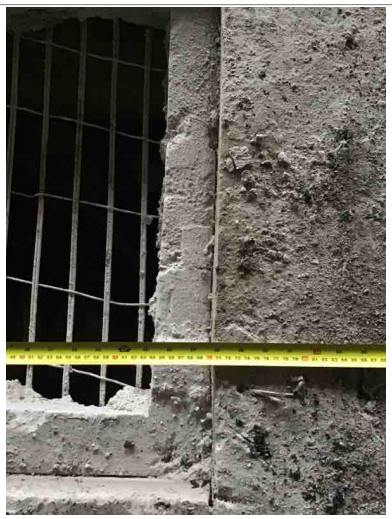
PLAYER WILLS FACTORY OPENING UP WORKS FIRST FLOOR PLAN

PWF-BMD-00-00-S-4101 — P01

NOTES

28 07/02/2020







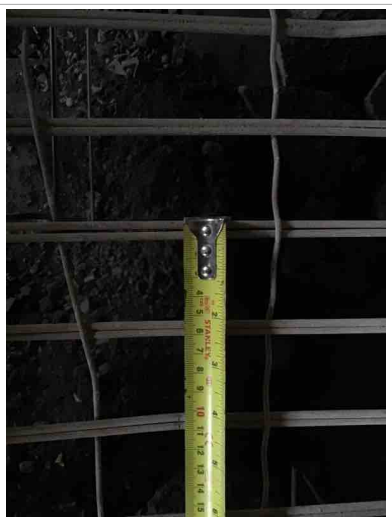
29 07/02/2020








STANLEY



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37 07/02/2020


38 07/02/2020


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40 07/02/2020


41 07/02/2020

42 07/02/2020

NOTES

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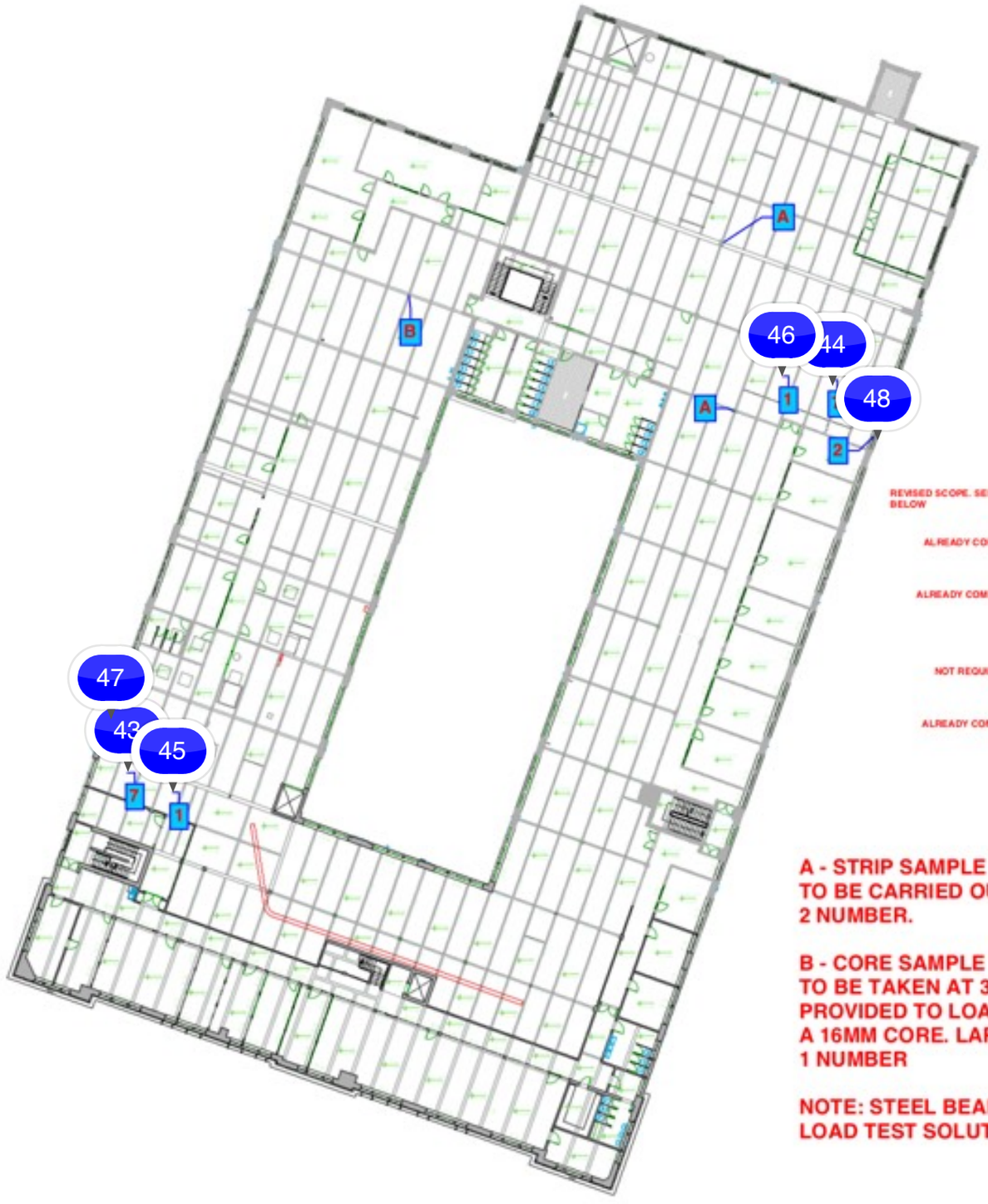


BUILDING SURVEY

THE SURVEYOR SHALL CONFIRM THE BOTTOM FLANGE WIDTH AND THICKNESS OF ALL STEEL BEAMS ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY.
THE SURVEYOR SHALL CONFIRM ALL COLUMN SIZES ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY. UNIVERSAL BEAM AND COLUMN SECTION FLANGE THICKNESSES SHALL ALSO BE INCLUDED

CONDITION SURVEY

A CONDITION SCHEDULE OF THE STRUCTURE SHALL BE CARRIED TO FACILITATE IDENTIFICATION AND TENDERING OF RECTIFICATION WORKS TO STRUCTURE TO BE RETAINED. THE SURVEY IS TO FOCUS ON LOADBEARING ELEMENTS OF STRUCTURE - SLABS, BEAMS, COLUMNS AND MASONRY OR CONCRETE WALLS. THE SURVEY IS TO BE CARRIED OUT ON A GRID BASIS THROUGHOUT THE BUILDING AND SHALL INCLUDE BOTH PHOTOGRAPHS AND DESCRIPTIONS

OPENING UP WORKS SCHEDULE

NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE ~~4 No.~~ 2 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS. DO NOT CUT REINFORCMENT. CONFIRM SLAB THICNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	RING BEAM EXPOSURE 2No.	REMOVE CONCRETE COVER OVER A LENGTH OF 300MM DOWN THE INTERNAL FACE AND ACROSS BASE OF THE BEAM AT 1M OFF THE MASONRY PIER. CONFIRM COVER DEPTH, AND REINFORCEMENT DETAILS – TOP AND BOTTOM BARS AND LINKS
~~3~~	~~PILOT HOLES TO INTERNAL STEEL COLUMNS 4No.~~	~~DRILL A PILOT HOLE, 10MM DIAMETER THROUGH ONE SIDE OF THE COLUMN AT A HEIGHT OF 300MM. CONFIRM WALL THICKNESS~~
~~4~~	~~CONFIRMATING OF BEAM LAYOUT 2No.~~	~~REMOVE CEILING AS NECESSARY TO CONFIRM SECONDARY BEAM ARRANGEMENT MATCHES MAIN GRID~~
~~5~~	~~CONFIRM IF BEAMS ARE CONCRETE ENCASED STEEL 5 No.~~	~~DRILL PILOT HOLES IN DOWNSTAND BEAM AT MID DEPTH WITH 10MM MASONRY DRILL BIT. CONFIRM IF BEAM IS CONCRETE OR ENCASED STEEL. IF CONCRETE, REMOVE COVER CONCRETE OVER 300MM LENGTH ACROSS BASE AND ONE SIDE TO EXPOSE REINFORCEMENT. CONFIRM ALL DIMENSIONS. IF STEEL, EXPOSE BOTTOM FLANGE AND CONFIRM BEAM DEPTH, FLANGE THICKNESS AND WIDTH.~~
~~6~~	~~DRIED COMPRESSIVE TEST 2 No.~~	~~REMOVE 100D. DRIES FROM BELOW WINDOW, ADJACENT TO PIER, AND CARRY OUT COMPRESSIVE TESTING ON SAME~~
7	SLAB CONCRETE COMPRESSIVE TEST ~~4 No.~~ 2 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME AND PROVIDE RESULTS
~~8~~	~~CONFIRM IF MASONRY WALLS ARE LOADBEARING OR INFILL 2 No.~~	~~DRILL 50MM HOLES THROUGH WALL 150MM BELOW FIRST FLOOR SLAB SOFFIT WITH A MASONRY BIT TO CONFIRM IF BEAM IS PRESENT. CONFIRM COLUMN LOCATIONS IN WALL IF PRESENT~~
REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS. PROVIDE SAFETY COVERS AT SLAB EXPOSURE LOCATIONS		

REVISED SCOPE. SEE BELOW

ALREADY COMPLETE

ALREADY COMPLETE

NOT REQUIRED

ALREADY COMPLETE

A - STRIP SAMPLE TO BE TAKEN FROM WEB OF COLUMN. TO BE CARRIED OUT BY LOAD TEST SOLUTIONS. 2 NUMBER.

B - CORE SAMPLE THROUGH CIRCULAR COLUMN. CORE TO BE TAKEN AT 300MM ABOVE BASE AND SAMPLE PROVIDED TO LOAD TEST SOLUTIONS FOR TESTING. USE A 16MM CORE. LARGER THAN THE PREVIOUS CORE TEST. 1 NUMBER

NOTE: STEEL BEAM SAMPLES WILL ALSO BE TAKEN BY LOAD TEST SOLUTIONS

REVISED 28.01.2020

PRELIMINARY

BM

CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PLAYER WILL FACTORY — 19.117

PLAYER WILLS FACTORY OPENING UP WORKS SECOND FLOOR PLAN

PWF-BMD-00-00-S-4102 — P01

NOTES

43 07/02/2020

44 07/02/2020

45 07/02/2020

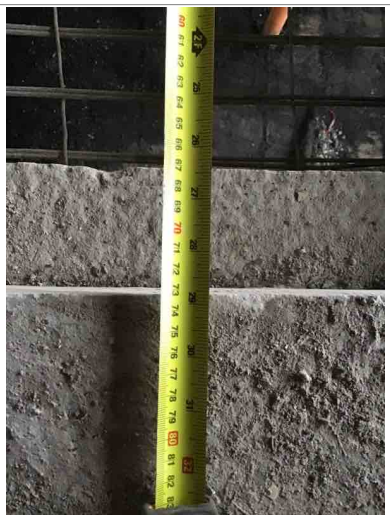

STANLEY


STANLEY


STANLEY


STANLEY

46 07/02/2020



47 07/02/2020

48 07/02/2020

SECOND FLOOR PLAN

PWF-BMD-00-00-S-4102 | P01

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OPENING UP WORKS SCHEDULE		
NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE 3 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS BELOW. DO NOT CUT REINFORCEMENT. CONFIRM SLAB THICKNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	SLAB CONCRETE COMPRESSIVE TEST 3 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME
REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS. REINSTATE WATERPROOFING TO ROOF SLAB WHERE EXPOSURES HAVE BEEN CARRIED OUT		

REVISED 28.01.2020

ISSUE	DATE	DESCRIPTION	BY	CK

DRAWING STAGE: PRELIMINARY

BM BARRETT MAHONY

Institution of Structural Engineers | ACEI

CLIENT: CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND

PROJECT TITLE: PLAYER WILLS FACTORY | BM PROJECT No.: 19.117

MODEL REFERENCE | MODEL REV. | SUITABILITY

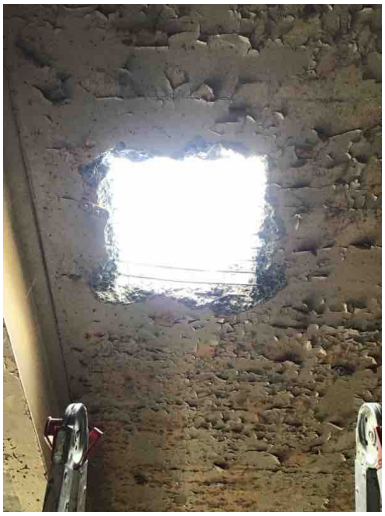
DRAWING TITLE: PLAYER WILLS FACTORY OPENING UP WORKS THIRD FLOOR PLAN

DRAWING No.: PWF-BMD-00-00-S-4103 | ISSUE: P01

50 17/02/2020







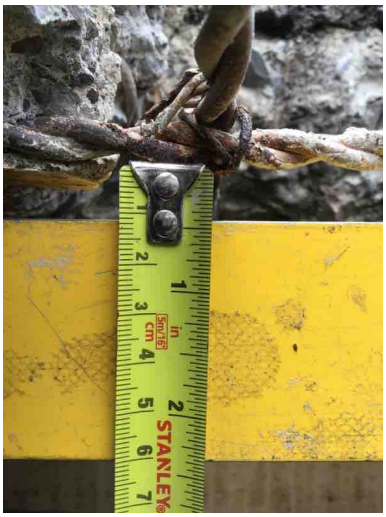
51 17/02/2020

52 17/02/2020









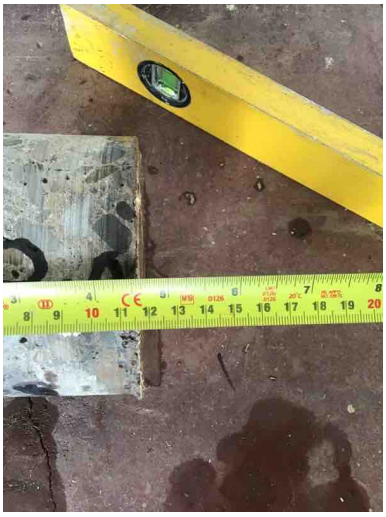

53 17/02/2020



54 17/02/2020





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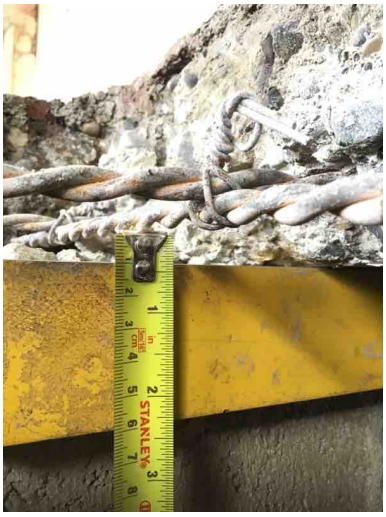


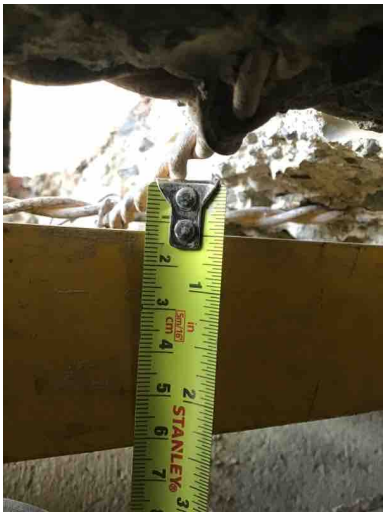

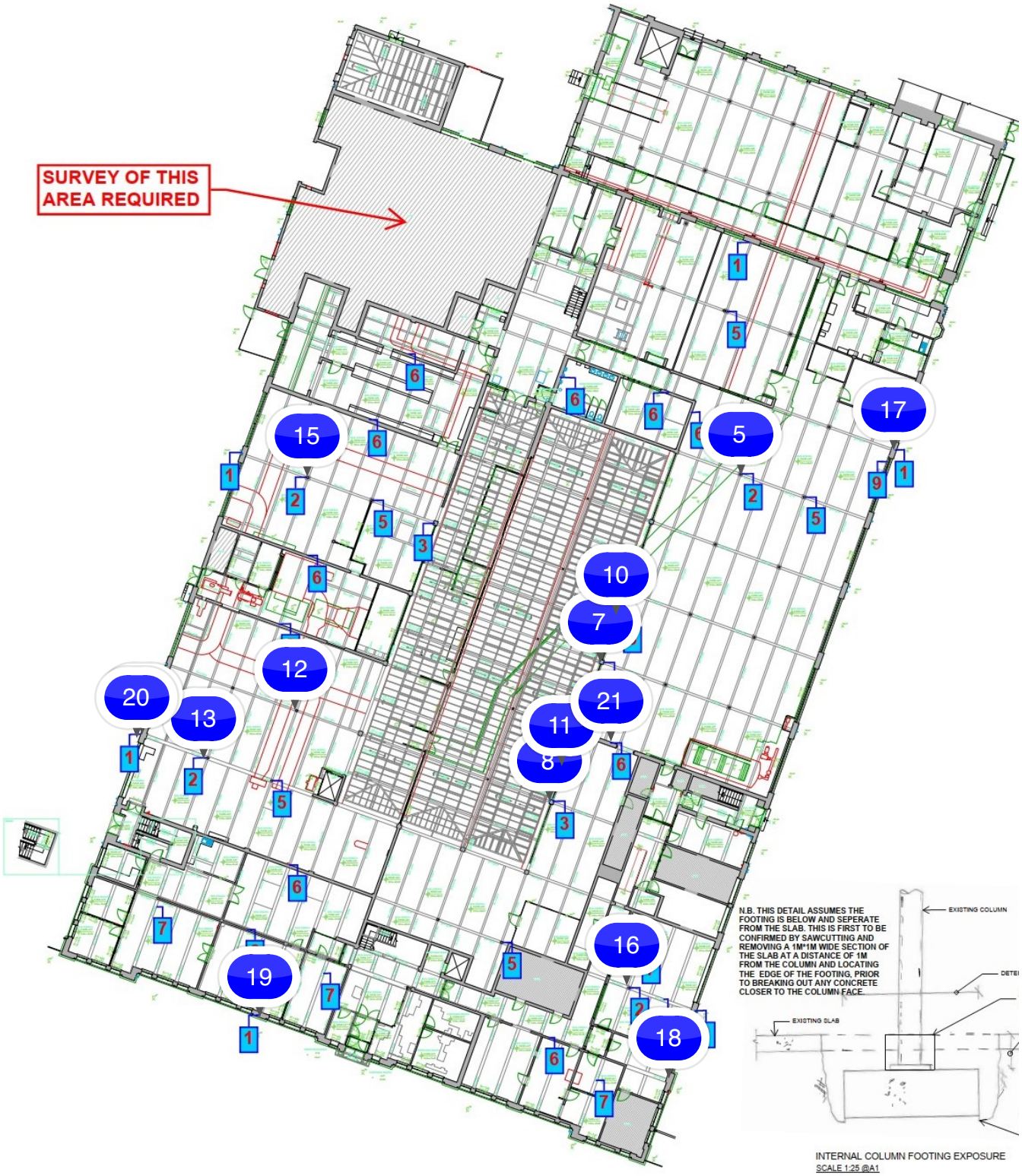
SURVEY OF THIS AREA REQUIRED
15
5
17
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16
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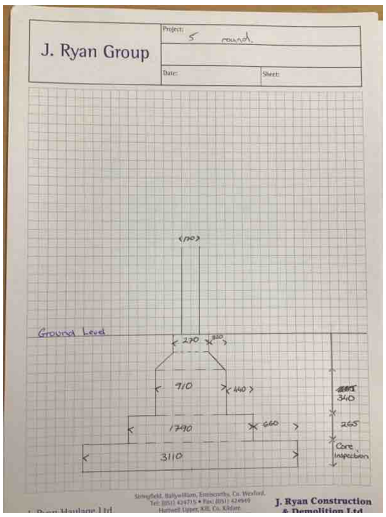
18
N.B. THIS DETAIL ASSUMES THE FOOTING IS BELOW AND SEPERATE FROM THE SLAB. THIS IS FIRST TO BE CONFIRMED BY SAWCUTTING AND REMOVING A 1M*1M WIDE SECTION OF THE SLAB AT A DISTANCE OF 1M FROM THE COLUMN AND LOCATING THE EDGE OF THE FOOTING, PRIOR TO BREAKING OUT ANY CONCRETE CLOSER TO THE COLUMN FACE.
EXISTING COLUMN
EXISTING SLAB
INTERNAL COLUMN FOOTING EXPOSURE
SCALE 1:25 @A1

5 24/09/2019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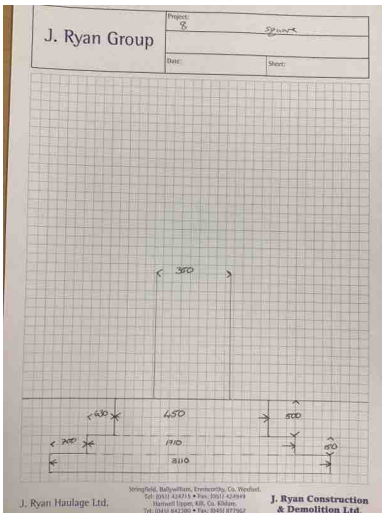
Project:
5 rooms
Date:
Sheet:
Ground Level
270
710
440
1790
660
3110
340
265
Core
J. Ryan Construction
& Demolition Ltd

7 24/09/2019

Steel Investigation

8 24/09/2019


J. Ryan Group
J. Ryan Haulage Ltd.
J. Ryan Construction & Demolition Ltd.

10 24/09/2019

Steel Investigation

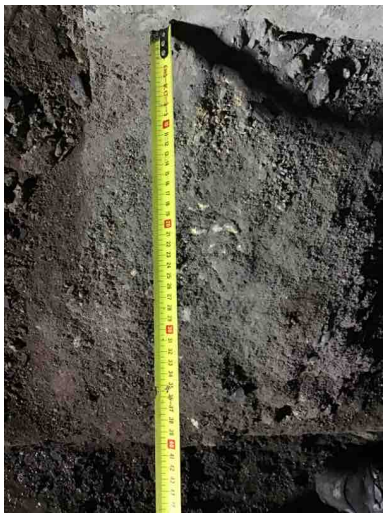


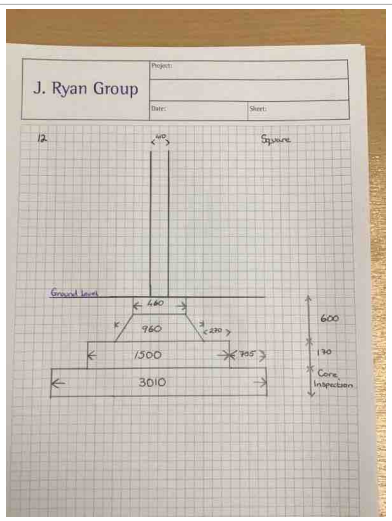
11 24/09/2019

Steel Investigation



12 24/09/2019

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Project:
Date:
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Square
Ground Level
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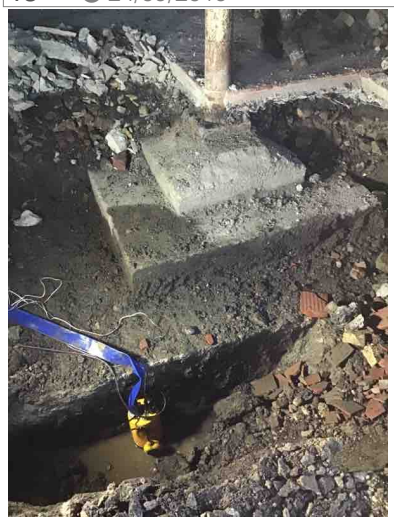
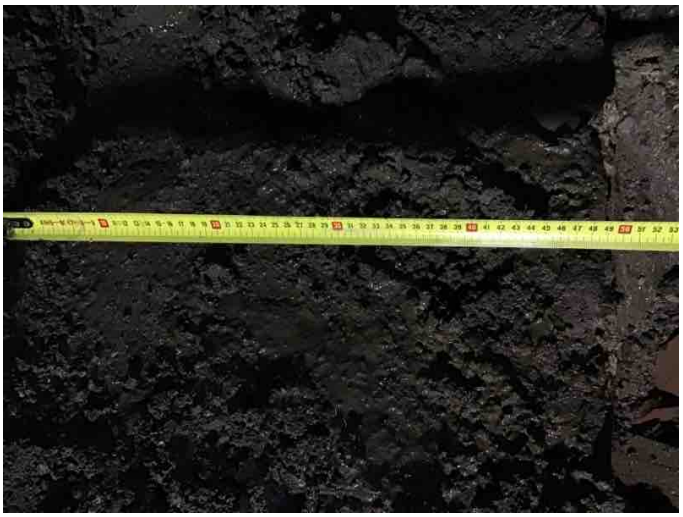
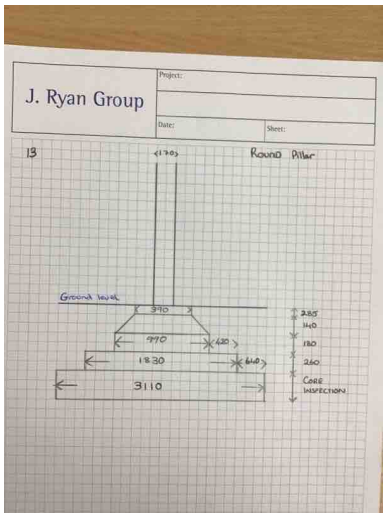
220
1500
705
3010
600
170
Core Inspection

13 24/09/2019






J. Ryan Group
Project:
Date:
Sheet:
13
Round Pillar
Ground level
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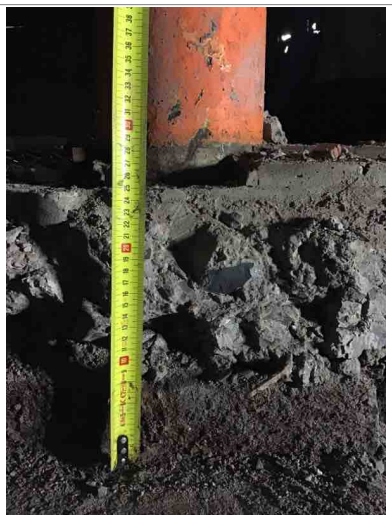
1830
3110
285
140
180
260
Core inspection

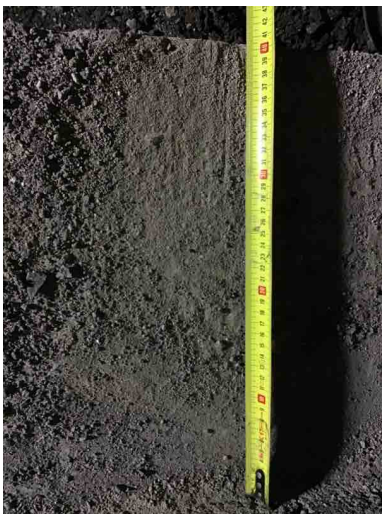
14 24/09/2019

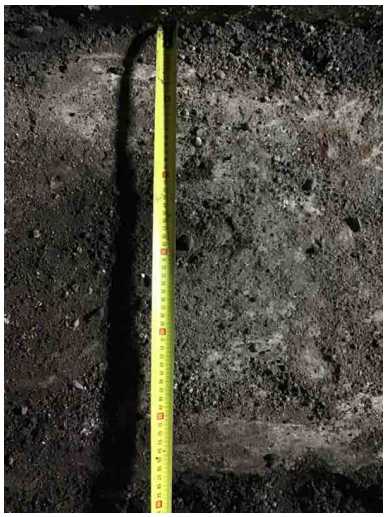
Inside Wall Investigation

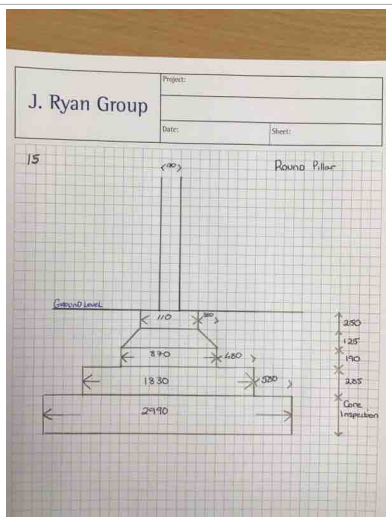
15 24/09/2019





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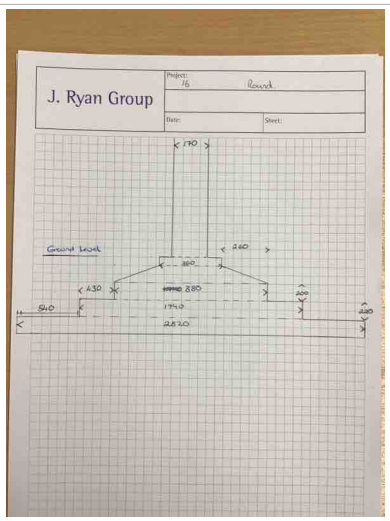
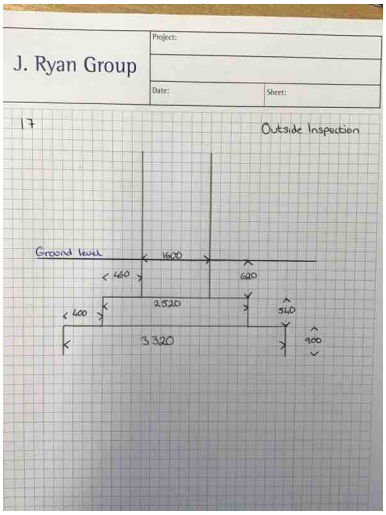
Project:
Date:
Sheet:
15
Round Pillar
Ground Level
110
380
370
680
1830
520
2990
250
125
190
285
Core Inspection

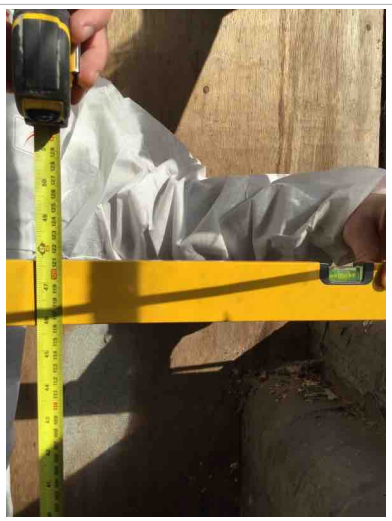
16 24/09/2019


J. Ryan Group
Project:
16
Rough
Date:
Sheet:
170
Ground Level
240
380
430
880
200
840
1740
2820
220

17 25/09/2019

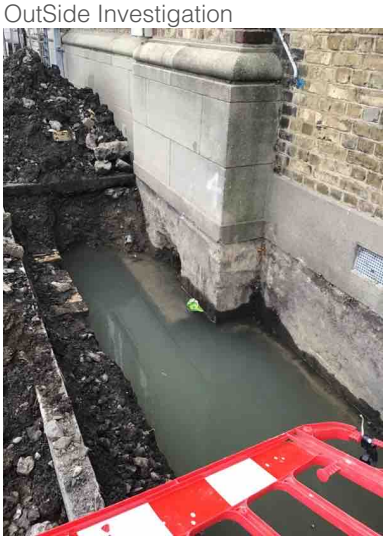
OutSide Investigation

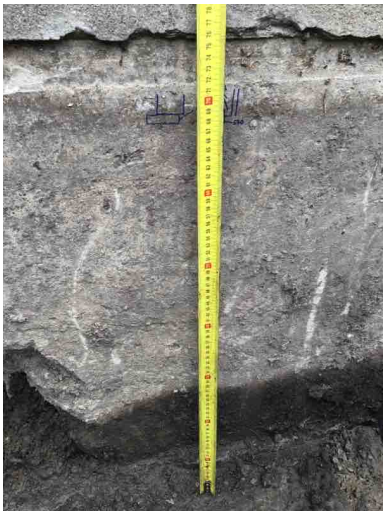


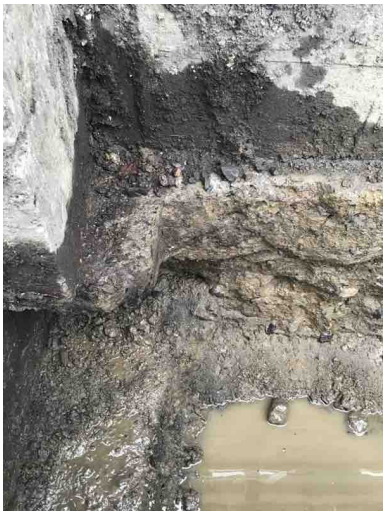


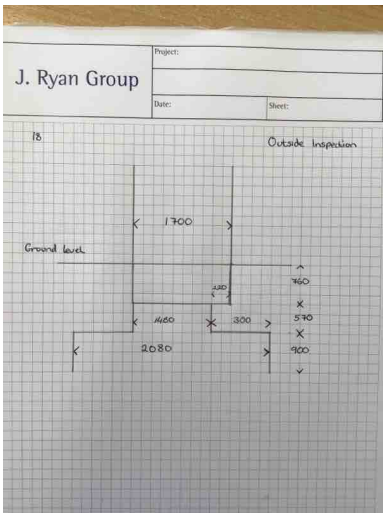
18 25/09/2019

OutSide Investigation






STABILA
MADE IN GERMANY
Type 70
24"

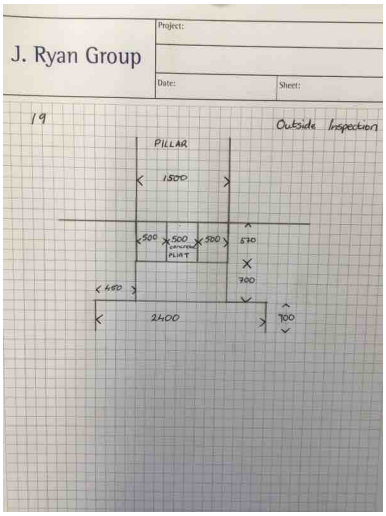
19 25/09/2019

OutSide Investigation







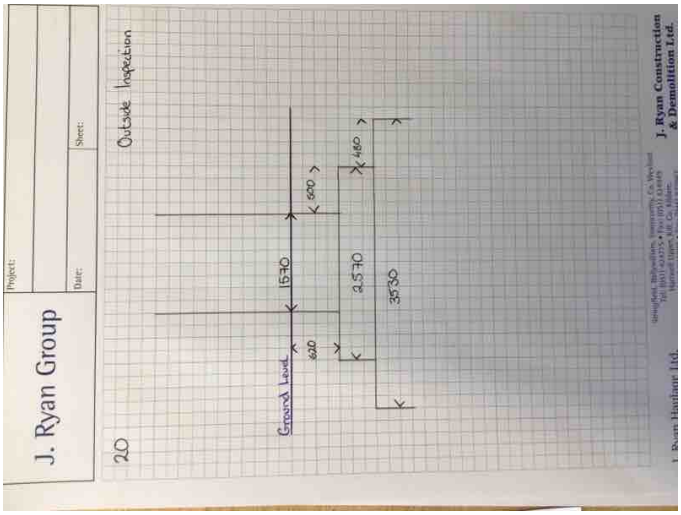

J. Ryan Group
Project:
Date:
Sheet:
19
Outside Inspection
PILLAR
1500
500
500
500
570
700
600
2400
700


STABILA
MADE IN GERMANY


TABILA
ADE IN GERMANY
Type 70
60 cm / 24"

20 25/09/2019

OutSide Investigation



21 27/09/2019

Brick Investigation

United Metals Recycling (Ireland) Ltd Casey Niall
Address : Eastway Business Park, Ballysimmon
Limerick

Phone : 0877827946
email : niall.casey@unitedmetals.ie

Appendix E

McFarland Consulting Façade Steelwork Survey

McFarland Consulting

Unit A3, Harbour Court, 5 Heron Road, Belfast BT3 9HB
Tel: +44 (0) 28 9073 8100
Email: info@mcfarlandconsulting.co.uk
www.mcfarlandconsulting.co.uk

Player Wills Factory – Column Condition Survey

19575-MCL-XX-RP-J-0001-P01

To:	Ciaran O'Rafferty	**From:**	Jason Kearney
Re:	Player Wills Factory, Column Condition Survey	**Date:**	22/06/2020

1.0 INTRODUCTION

On the 10th March 2020, McFarland Consulting Limited (MCL) were instructed by Arran Timms, of Virtus, to commence investigative works concerning the remediation of cracked brickwork piers at the Player Wills Factory, Dublin. This report relates to the first phase of investigative works; a condition survey of affected columns and lintels by means of visual inspection. The survey was undertaken between the 27th and 28th May 2020 by 2no. MCL Corrosion Engineers.

2.0 SCOPE OF WORKS

The scope of works included undertaking a visual inspection of encased columns and lintels within the existing factory building and subsequently assigning a condition rating to each. The condition rating considers:

- Whether the columns/lintels are presently exhibiting cracking, spalling or delamination;
- Whether the columns/lintels are visibly saturated or stained; and
- The proximity of rainwater goods to the encased elements (as a likely source of water ingress to date).

Only those columns and lintels to be retained as part of the refurbishment works were surveyed. The findings of this condition survey will inform the selection of localised investigations, including non-destructive testing and cathodic protection trials, that are to be undertaken in subsequent phases of works.

3.0 CAVEATS AND EXCLUSIONS

Any information made available to us in the course of the investigation whether verbal or in the form of drawings, documents, reports etc. has been assumed to be bona fide and of reliable content.

4.0 DESCRIPTION OF THE STRUCTURE

This derelict factory building, constructed in 1923, is a masonry clad steel frame structure that is to be refurbished for residential use. The steel frame is exposed within the building interior, however, across the exterior elevations the steel columns have been encased within brick piers. The columns located along the perimeter of the central atrium are also encased; the ground floor columns are encased in concrete whilst the columns on the upper floors are encased in brick. It is evident from opening up works undertaken by others that no cavity space exists between the steel columns and the surrounding brick encasement at the majority of locations. There was evidence of a small cavity space having been incorporated within 1no. second floor encased column located adjacent to the internal atrium space.

Additionally, a combination of steel sections encased in concrete and reinforced concrete has been used in the construction of window lintels throughout the building. The encased steel lintels are present over ground, first and second floor windows. Reinforced concrete lintels are present over a selection of second floor windows.

5.0 FINDINGS AND OBSERVATIONS

The visual inspection of the encased columns and lintels was undertaken from ground level around the exterior of the building and from the respective floor levels within the building interior such that the exposed faces of each element could be inspected. The exterior faces of the atrium columns (those facing into the atrium void space) were visually inspected from the surrounding roof level.

The exterior and interior faces of each element were inspected and subsequently assigned a condition rating and corresponding colour indicator, in accordance with the convention outlined in Figure 1 below. Where the assigned condition rating for the interior and exterior faces of the same element differed, the more severe condition is considered to apply to the element overall.

An observation register for each element can be found in Appendix A. Plan drawings indicating the assigned condition rating for each element on a floor by floor basis can be found in Appendix B.

Observed Condition	Colour Rating
Visual inspection inhibited – i.e. obscured from view by surface finishes, increased pier thickness, mechanical damage (demolition activities) etc. Element not encased in brickwork/concrete.	No Colour
No obvious defects observed	
Fine to moderate cracking of brickwork or concrete observed. Evidence of saturation observed - increased likelihood of corrosion of embedded steel.	
Heavy cracking of brickwork or concrete observed. Bulging or displacement of brickwork observed. Spalled or delaminated concrete observed.	

Figure 1: RAG Condition Rating

A summary of observations is outlined below:

- Numerous instances of cracking were observed on the brickwork encasement at column locations. The severity of cracking ranged from hairline cracking to heavy cracking. The orientation of the observed cracking tended to be vertical, following the alignment of the embedded steel column (Plates 1 to 3). In the most severe of cases, 2no. parallel vertical cracks, coinciding with alignment of the column flanges, were present over the full height (storey height) of the affected columns (Plates 4 to 6).

Plate 1

Plate 2

Plate 3

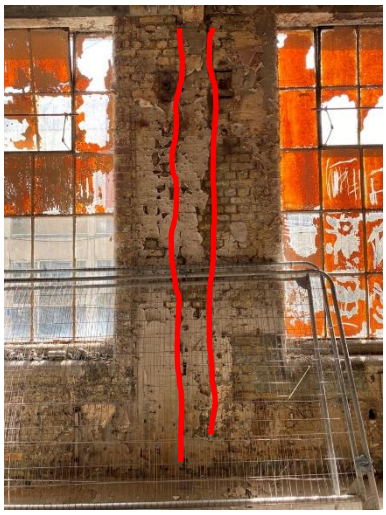


Plate 4

Plate 5

Plate 6

- Bulging and displacement of the brickwork encasement was identified at 1no. location (Plate 7).

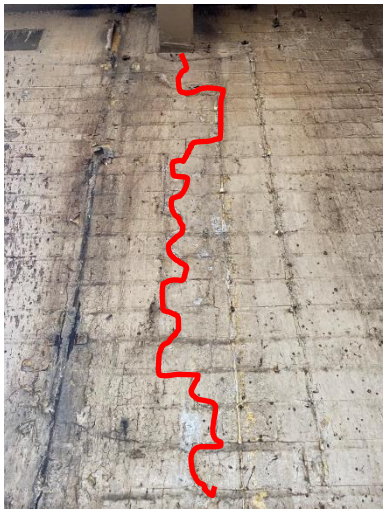


Plate 7

- Evidence of saturation was identified at a number of encased column and lintel locations (Plates 8 and 9). Saturation was particularly prevalent across the south elevation internally (Plates 10 and 11). Whilst the areas where saturation was evident often also exhibited cracking, there were instances where saturation was not accompanied by observable defects. Nonetheless, there is an increased likelihood of corrosion occurring at these locations given the availability of moisture to support the corrosion process.

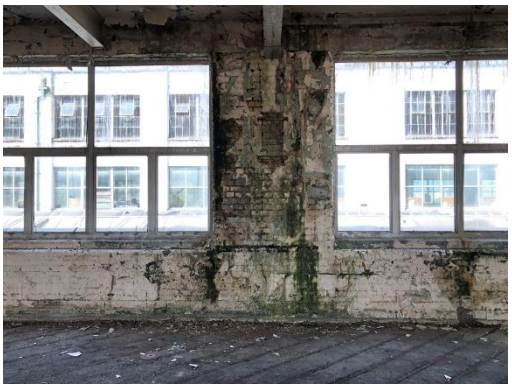


Plate 8

Plate 9

Plate 10

Plate 11

- Numerous instances of cracking were observed on concrete encased lintels. The cracking was predominantly vertical in orientation, likely coinciding with the position of supplementary stirrups (Plates 12 and 13) – this type of bar reinforcement was observed surrounding the steel lintel sections at locations where opening up works had been undertaken (by others). At a limited number of locations, horizontal cracking was also observed, likely coinciding with the bottom flange of the encased lintel (Plates 14 to 16). Localised cracking of the concrete encasement was also observed at the point of connection between encased lintels and secondary beams (Plate 17).

Plate 12

Plate 13

Plate 14

Plate 15

Plate 16

Plate 17

- Numerous instances of cracking were also observed on reinforced concrete lintels, likely coinciding with the position of shear links (Plate 18). At a selection of reinforced concrete lintels, spalled concrete and exposed corroded reinforcement was identified (Plate 19). Reinforced concrete lintels are believed only to be present over a selection of second floor window locations.

Plate 18

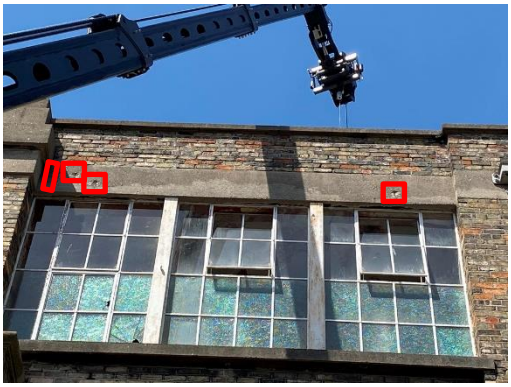


Plate 19

- Within the interior of the building, surface finishes (paint coatings, tiling, plasterwork, panelling etc.) may have inhibited the identification of defects (plate 20). Additionally, along the southern building elevation (gridline N) the existence of inbuilt chimney flues, thickened brick piers and exterior stone cladding may have concealed defects (Plates 21 to 23).

Plate 20

Plate 21

Plate 22

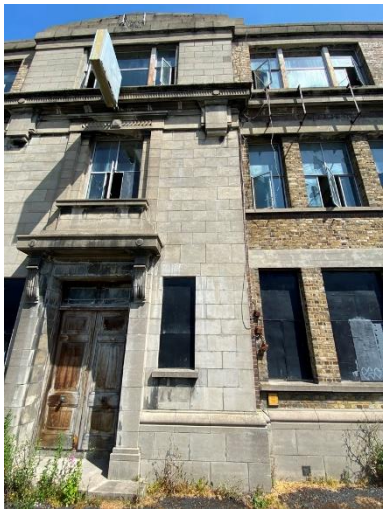


Plate 23

- Localised areas of brick/concrete encasement have been removed (by others) to expose the embedded steel sections or steel reinforcement. The condition of the steel present at these locations varied, from exhibiting little or no corrosion (Plates 24 and 25) to exhibiting moderate surface corrosion (Plates 26 and 27). From the limited number of elements exposed, it appears that the embedded columns located along the eastern elevation are worst affected.

Plate 24

Plate 25

Plate 26

Plate 27

6.0 CONCLUSIONS

Cracking of the encasement surrounding columns and lintels was observed at numerous locations throughout the building, both on external and internal faces. The survey also indicates a significant concentration of defects to the eastern aspect of the building on the first floor. In addition to the observed cracking, spalled and delaminated concrete was also identified on a selection of reinforced concrete lintels located on the second floor.

The nature of the observed cracking, in conjunction with the condition of the embedded steel exposed in localised areas, would suggest that steel corrosion is a likely cause of the observed defects. The lack of cavity space provided between the embedded steel columns and the surrounding brick encasement is likely contributing to the cracking observed at these locations. In the absence of a cavity space, the build-up of expansive corrosion products on the surface of the steel columns imposes increased stress directly onto the surrounding brickwork, subsequently causing it to crack. However, cracking arising from structural deficiencies or structural movement cannot be ruled out; these considerations should be checked by a suitably qualified structural engineer.

Nonetheless, it is recommended that further investigations are undertaken to determine whether the embedded steel is likely to be actively corroding, and the extent over which this may be occurring. It is also recommended that investigations are undertaken to determine the presence of deleterious contaminants or the action of deterioration processes which may be contributing to the corrosion of the embedded steel.

Appendix A – Observation Register

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3	Column	0	Interior	Not Encased		
			Exterior	Heavy Vertical Cracking - (2no Parallel)		
A2	Column	0	Interior	Heavy Vertical Cracking - (1no)		
			Exterior	Heavy Vertical Cracking - (2no Parallel)		
A1	Column	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
B1	Column	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
C1	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
D1	Column	0	Interior	Isolated Fine Vertical Cracking - (1no)		
			Exterior	Visually Sound		
E1	Column	0	Interior	Encasement Partially Removed		
			Exterior	Visually Sound		
F1	Column	0	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
G1	Column	0	Interior	Encasement Partially Removed		
			Exterior	Heavy Vertical Cracking - ( )		
H1	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
J1	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
K1	Column	0	Interior	Obscured from View		
			Exterior	Isolated Heavy Vertical Cracking - (1no)		
L1	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
M1	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
N1	Column	0	Interior	Obscured from View		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N2	Column	0	Interior	Visually Sound		
			Exterior	Heavy Vertical Cracking - ( )		
N3	Column	0	Interior	Cracked Render and Saturation		
			Exterior	Visually Sound		
N4	Column	0	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
N5	Column	0	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
N6	Column	0	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
N7	Column	0	Interior	Cracked Render		
			Exterior	Visually Sound		
N8	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
N9	Column	0	Interior	Cracked Render		
			Exterior	Visually Sound		
N10	Column	0	Interior	Visually Sound		
			Exterior	Heavy Vertical Cracking - ( )		
M10	Column	0	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
L10	Column	0	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (2no Parallel)		
K10	Column	0	Interior	Encasement Partially Removed		
			Exterior	Visually Sound		
J10	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
H10	Column	0	Interior	Visually Sound		
			Exterior	Visually Sound		
G10	Column	0	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F10	Column	0	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
E10	Column	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
D10	Column	0	Interior	Moderate Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		
D4	Column	0	Interior	Mechanical Damage		
			Exterior	n/a		
E4	Column	0	Interior	Visually Sound		
			Exterior	n/a		
F4	Column	0	Interior	Visually Sound		
			Exterior	n/a		
G4	Column	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	n/a		
H4	Column	0	Interior	Visually Sound		
			Exterior	n/a		
J4	Column	0	Interior	Visually Sound		
			Exterior	n/a		
K4	Column	0	Interior	Visually Sound		
			Exterior	n/a		
K5	Column	0	Interior	Visually Sound		
			Exterior	n/a		
K6	Column	0	Interior	Moderate Horizontal Cracking - ( )		
			Exterior	n/a		
K7	Column	0	Interior	Visually Sound		
			Exterior	n/a		
J7	Column	0	Interior	Visually Sound		
			Exterior	n/a		
H7	Column	0	Interior	Visually Sound		
			Exterior	n/a		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
G7	Column	0	Interior	Visually Sound		
			Exterior	n/a		
F7	Column	0	Interior	Mechanical Damage		
			Exterior	n/a		
E7	Column	0	Interior	Fine Horizontal Cracking - ( )		
			Exterior	n/a		
D7	Column	0	Interior	Visually Sound		
			Exterior	n/a		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
A2	Column	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
A1	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
B1	Column	1	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
C1	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		
D1	Column	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
E1	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
F1	Column	1	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
G1	Column	1	Interior	Isolated Moderate Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		
H1	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
J1	Column	1	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
K1	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
L1	Column	1	Interior	Heavy Vertical Cracking - (2no. Parallel)		
			Exterior	Visually Sound		
M1	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
N1	Column	1	Interior	Visually Sound c/w Chimney Thickening		
			Exterior	Heavy Vertical Cracking - ( )		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N2	Column	1	Interior	Visually Sound c/w Chimney Thickening		
			Exterior	Isolated Heavy Vertical Cracking - ( )		
N3	Column	1	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N4	Column	1	Interior	Visually Sound c/w Chimney Thickening		
			Exterior	Visually Sound		
N5	Column	1	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N6	Column	1	Interior	Visually Sound c/w Chimney Thickening		
			Exterior	Isolated Moderate Vertical Cracking - ( )		
N7	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
N8	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
N9	Column	1	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N10	Column	1	Interior	Visually Sound		
			Exterior	Heavy Vertical Cracking - ( )		
M10	Column	1	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - ( )		
L10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Heavy Vertical Cracking - ( )		
K10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
J10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
H10	Column	1	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Heavy Vertical Cracking - ( )		
G10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Heavy Vertical Cracking - ( )		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Heavy Vertical Cracking - ( )		
E10	Column	1	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Heavy Vertical Cracking - ( )		
D10	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Heavy Vertical Cracking - ( )		
D4	Column	1	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
E4	Column	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
F4	Column	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
G4	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound & Saturated		
H4	Column	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
J4	Column	1	Interior	Isolated Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		
K4	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
K5	Column	1	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
K6	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
K7	Column	1	Interior	Visually Sound		
			Exterior	Visually Sound		
J7	Column	1	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Heavy Vertical Cracking - ( )		
H7	Column	1	Interior	Isolated Heavy Vertical Cracking - (1no)		
			Exterior	Heavy Vertical Cracking - ( )		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
G7	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Saturation Evident		
F7	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Heavy Vertical Cracking - ( )		
E7	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Isolated Heavy Vertical Cracking - ( )		
D7	Column	1	Interior	Heavy Vertical Cracking - (2no Parallel)		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
A2	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
A1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
B1	Column	2	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
C1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
D1	Column	2	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
E1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
F1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
G1	Column	2	Interior	Isolated Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
H1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
J1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
K1	Column	2	Interior	Isolated Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
L1	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
M1	Column	2	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N1	Column	2	Interior	Visually Sound c/w Chimney Thickening		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N2	Column	2	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
N3	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
N4	Column	2	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N5	Column	2	Interior	Visually Sound + Saturation		
			Exterior	Visually Sound		
N6	Column	2	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
N7	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
N8	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
N9	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
N10	Column	2	Interior	Obscured from view		
			Exterior	Visually Sound		
M10	Column	2	Interior	Visually Sound + Saturation		
			Exterior	Visually Sound		
L10	Column	2	Interior	Visually Sound + Saturation		
			Exterior	Visually Sound		
K10	Column	2	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
J10	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
H10	Column	2	Interior	Visually Sound c/w Thickened Pier		
			Exterior	Visually Sound		
G10	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F10	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
E10	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
D10	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
D4	Column	2	Interior	Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
E4	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
F4	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
G4	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound + Saturated		
H4	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
J4	Column	2	Interior	Isolated Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
K4	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
K5	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
K6	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
K7	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
J7	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
H7	Column	2	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - ( )		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
G7	Column	2	Interior	Visually Sound		
			Exterior	Heavily Saturated		
F7	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
E7	Column	2	Interior	Visually Sound		
			Exterior	Visually Sound		
D7	Column	2	Interior	Heavy Vertical Cracking - (Bulging)		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3/4	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
A2/3	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
A1/2	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (1no)		
A/B1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
B/C1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
C/D1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
D/E1	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
E/F1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (1no)		
F/G1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
G/H1	Lintel	0	Interior	Fine Vertical Cracking - (2no)		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
H/J1	Lintel	0	Interior	Isolated Mechanical Damage		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
J/K1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
K/L1	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
L/M1	Lintel	0	Interior	Flaking Paint Obscuring View		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
M/N1	Lintel	0	Interior	Heavy Horizontal & Moderate Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N1/2	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N2/3	Lintel	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (5no)		
N3/4	Lintel	0	Interior	Cracked Render & Saturation		
			Exterior	Isolated Moderate Vertical Cracking - (4no)		
N4/5	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N5/6	Lintel	0	Interior	Visually Sound + Saturation		
			Exterior	Visually Sound		
N6/7	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N7/8	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N8/9	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N9/10	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
M/N10	Lintel	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Isolated Fine Vertical Cracking - (3no)		
L/M10	Lintel	0	Interior	Moderate Vertical Cracking - (4no)		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
K/L10	Lintel	0	Interior	Heavy Vertical Cracking - (3no)		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
J/K10	Lintel	0	Interior	Moderate Vertical & Horizontal Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
H/J10	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (1no)		
G/H10	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G10	Lintel	0	Interior	Fine Vertical Cracking - (2no)		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
E/F10	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
D/E10	Lintel	0	Interior	Fine Vertical Cracking - (1no)		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
D/E4	Lintel	0	Interior	Mechanical Damage		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
E/F4	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Fine Vertical Cracking - (2no)		
F/G4	Lintel	0	Interior	Localised Fine Vertical Cracking - ( )		
			Exterior	Visually Sound		
G/H4	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
H/J4	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
J/K4	Lintel	0	Interior	Fine Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
K4/5	Lintel	0	Interior	Visually Sound		
			Exterior	Visually Sound		
K5/6	Lintel	0	Interior	Visually Sound		
			Exterior	Visually Sound		
K6/7	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
J/K7	Lintel	0	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
H/J7	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
G/H7	Lintel	0	Interior	Visually Sound		
			Exterior	Isolated Fine Vertical Cracking - (1no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G7	Lintel	0	Interior	Mechanical Damage		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
E/F7	Lintel	0	Interior	Fine Vertical Cracking - (3no)		
			Exterior	Visually Sound		
D/E7	Lintel	0	Interior	Visually Sound		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3/4	Lintel	1	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
A2/3	Lintel	1	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (5no)		
A1/2	Lintel	1	Interior	Isolated Heavy Vertical Cracking & Localised Spall - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
A/B1	Lintel	1	Interior	Heavy Vertical Cracking - (2no)		
			Exterior	Visually Sound		
B/C1	Lintel	1	Interior	Moderate Vertical Cracking - (2no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
C/D1	Lintel	1	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
D/E1	Lintel	1	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical & Horizontal Cracking - (3no)		
E/F1	Lintel	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
F/G1	Lintel	1	Interior	Visually Sound		
			Exterior	Visually Sound		
G/H1	Lintel	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Isolated Fine Vertical Cracking - (3no)		
H/J1	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
J/K1	Lintel	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
K/L1	Lintel	1	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
L/M1	Lintel	1	Interior	Moderate Vertical Cracking - (1no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
M/N1	Lintel	1	Interior	Obscured from view		
			Exterior	Isolated Heavy & Moderate Vertical Cracking - (4no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N1/2	Lintel	1	Interior	Obscured from view		
			Exterior	Crazing of Render		
N2/3	Lintel	1	Interior	Isolated Heavy Vertical & Horizontal Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N3/4	Lintel	1	Interior	Moderate Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
N4/5	Lintel	1	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
N5/6	Lintel	1	Interior	Visually Sound		
			Exterior	Visually Sound		
N6/7	Lintel	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Isolated Heavy Vertical Cracking - (4no)		
N7/8	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (1no)		
			Exterior	Isolated Heavy Vertical Cracking - (1no)		
N8/9	Lintel	1	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
N9/10	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
M/N10	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (3no)		
			Exterior	Visually Sound		
L/M10	Lintel	1	Interior	Visually Sound		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
K/L10	Lintel	1	Interior	Visually Sound		
			Exterior	Visually Sound		
J/K10	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (1no)		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
H/J10	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (1no)		
			Exterior	Visually Sound		
G/H10	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (4no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G10	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Visually Sound		
E/F10	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Visually Sound		
D/E10	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (2no)		
			Exterior	Visually Sound		
D/E4	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
E/F4	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
F/G4	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (3no)		
			Exterior	Isolated Moderate Vertical Cracking - (4no)		
G/H4	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
H/J4	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (4no)		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
J/K4	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
K4/5	Lintel	1	Interior	Visually Sound		
			Exterior	Visually Sound		
K5/6	Lintel	1	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
K6/7	Lintel	1	Interior	Visually Sound		
			Exterior	Visually Sound		
J/K7	Lintel	1	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Isolated Fine Vertical Cracking - (2no)		
H/J7	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		
G/H7	Lintel	1	Interior	Obscured from view		
			Exterior	Isolated Heavy Vertical Cracking - (3no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G7	Lintel	1	Interior	Obscured from view		
			Exterior	Isolated Heavy Vertical Cracking - (2no)		
E/F7	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (3no)		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
D/E7	Lintel	1	Interior	Isolated Heavy Vertical Cracking - (1no)		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
A3/4	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
A2/3	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
A1/2	Lintel	2	Interior	Isolated Heavy Horizontal Cracking - (1no)		
			Exterior	Visually Sound		
A/B1	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
B/C1	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
C/D1	Lintel	2	Interior	Isolated Fine Vertical Cracking - (3no)		
			Exterior	Visually Sound		
D/E1	Lintel	2	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		
E/F1	Lintel	2	Interior	Isolated Moderate Vertical Cracking - ( )		
			Exterior	Visually Sound		
F/G1	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
G/H1	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (3no)		
			Exterior	Visually Sound		
H/J1	Lintel	2	Interior	Isolated Heavy Vertical Cracking - (2no)		
			Exterior	Visually Sound		
J/K1	Lintel	2	Interior	Isolated Heavy Vertical Cracking - (2no)		
			Exterior	Visually Sound		
K/L1	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
L/M1	Lintel	2	Interior	Isolated Moderate Horizontal Cracking - (1no)		
			Exterior	Visually Sound		
M/N1	Lintel	2	Interior	Isolated Heavy Vertical Cracking - ( )		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
N1/2	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
N2/3	Lintel	2	Interior	Obscured from view		
			Exterior	Visually Sound		
N3/4	Lintel	2	Interior	Isolated Heavy Vertical Cracking - (1no)		
			Exterior	Visually Sound		
N4/5	Lintel	2	Interior	Isolated Heavy Vertical Cracking - (2no)		
			Exterior	Visually Sound		
N5/6	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (2no)		
			Exterior	Visually Sound		
N6/7	Lintel	2	Interior	Isolated Heavy Vertical & Horizontal Cracking - (3no)		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
N7/8	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (1no)		
			Exterior	Visually Sound		
N8/9	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (1no)		
			Exterior	Visually Sound		
N9/10	Lintel	2	Interior	Heavy Horizontal Cracking - ( )		
			Exterior	Visually Sound		
M/N10	Lintel	2	Interior	Heavy Vertical & Horizontal Cracking - (2no)		
			Exterior	Visually Sound		
L/M10	Lintel	2	Interior	Heavy Vertical Cracking - (2no)		
			Exterior	Localised Spalled Concrete - (4no)		
K/L10	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
J/K10	Lintel	2	Interior	Isolated Fine Vertical Cracking - (2no)		
			Exterior	Localised Spalled Concrete - (1no)		
H/J10	Lintel	2	Interior	Visually Sound		
			Exterior	Localised Spalled Concrete - (1no)		
G/H10	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G10	Lintel	2	Interior	Isolated Fine Vertical Cracking - (1no)		
			Exterior	Visually Sound		
E/F10	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
D/E10	Lintel	2	Interior	Visually Sound		
			Exterior	Localised Spalled Concrete - (1no)		
D/E4	Lintel	2	Interior	Isolated Fine Vertical Cracking - (1no)		
			Exterior	Visually Sound		
E/F4	Lintel	2	Interior	Isolated Fine Vertical Cracking - (2no)		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		
F/G4	Lintel	2	Interior	Isolated Fine Vertical Cracking - (2no)		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
G/H4	Lintel	2	Interior	Visually Sound		
			Exterior	Visually Sound		
H/J4	Lintel	2	Interior	Isolated Fine Vertical Cracking - (2no)		
			Exterior	Visually Sound		
J/K4	Lintel	2	Interior	Isolated Heavy & Moderate Vertical Cracking - (3no)		
			Exterior	Visually Sound		
K4/5	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
K5/6	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (1no)		
K6/7	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
J/K7	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Fine Vertical Cracking - (1no)		
H/J7	Lintel	2	Interior	Isolated Moderate Vertical Cracking - (3no)		
			Exterior	Isolated Heavy Vertical Cracking - (5no)		
G/H7	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		

Red, Amber, Green (RAG) Condition Rating

McFarland Consulting

Element Ref:	Type	Level	Face	Notes	Face-by- Face RAG Rating	Combined RAG Rating
F/G7	Lintel	2	Interior	Isolated Fine Vertical Cracking - (3no)		
			Exterior	Isolated Fine Vertical Cracking - (2no)		
E/F7	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (2no)		
D/E7	Lintel	2	Interior	Visually Sound		
			Exterior	Isolated Moderate Vertical Cracking - (3no)		

Appendix B – Condition Rating Plan Drawings

Ground Floor

Notes:

Survey was undertaken in May 2020.

Drawing is not to scale.

This drawing is for indicative purposes only.

Legend:

- No obvious defects observed
- Fine to moderate cracking of brickwork or concrete observed. Evidence of saturation observed - increased likelihood of corrosion of embedded steel.
- Heavy cracking of brickwork or concrete observed. Bulging or displacement of brickwork observed. Spalled or delaminated concrete observed.
- A — Heavy cracking or spalling observed on external face.
- B — Heavy cracking or spalling observed on internal face.

Rev	Chk'd by	Amendment	Date
P01	JK	For Issue	Jun20
P00	ERM	Draft for Comment	Jun20

For comment		As constructed	
For tender		Inspection	✓
For construction		Other	

Client
CWTC Multi Family ICAV
70 Sir John Rogerson's Quay
Dublin 2
D02 R296

Project Ref. 19575

Project Name
Player Wills Factory
Column & Lintel Remediation

Drawing Title
Condition Survey
Ground Floor

Date:	17/06/2020	Drawn by:	ERM
Paper Size:	A3	Checked by:	JK
Scale:	N/A	Approved by:	EMcK

McFarland Consulting
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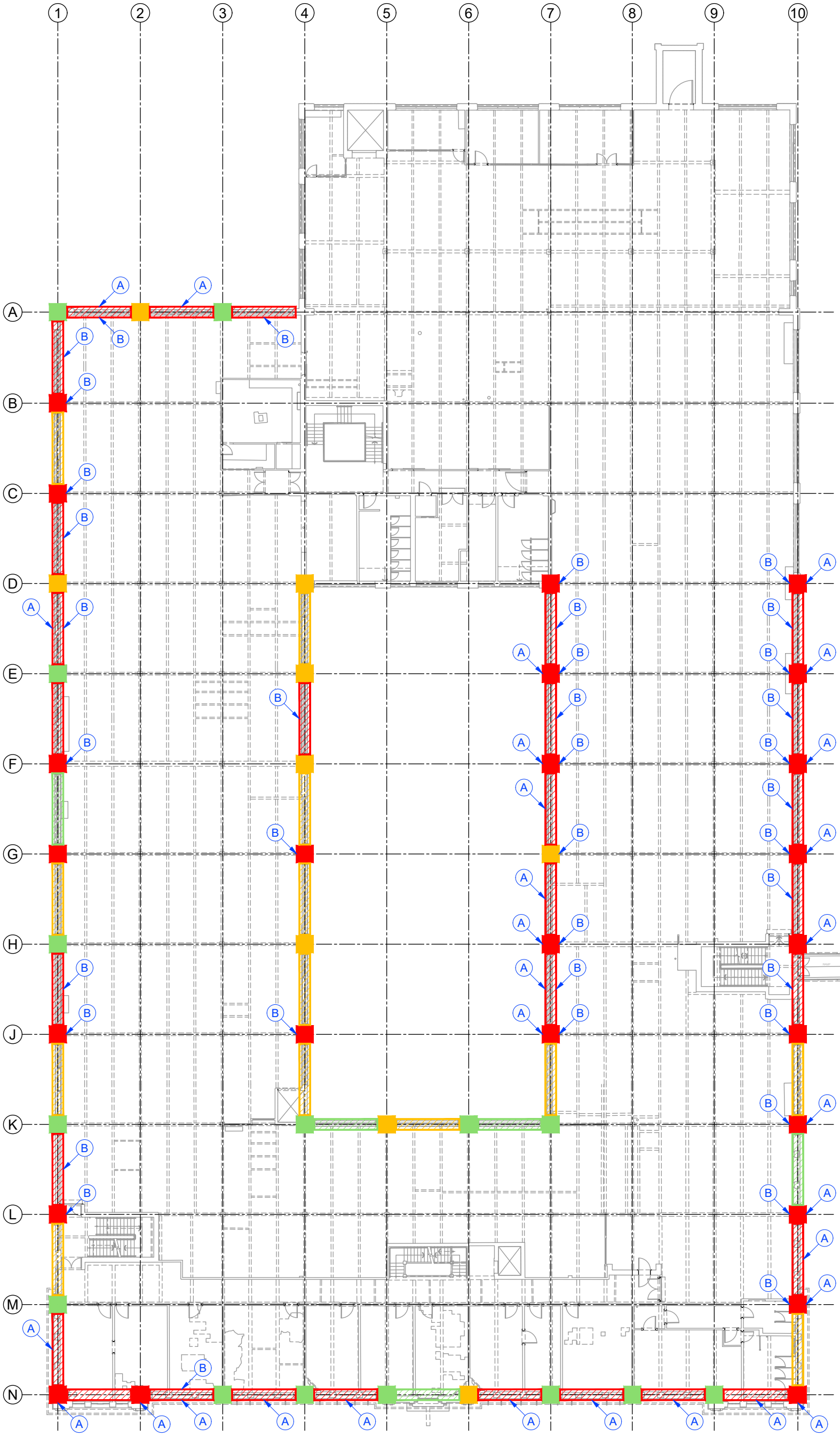
Drawing No. 19575-MCL-00-DR-J-0001 Rev P01



First Floor

Notes:

Survey was undertaken in May 2020.

Drawing is not to scale.

This drawing is for indicative purposes only.

Legend:

No obvious defects observed

Fine to moderate cracking of brickwork or concrete observed. Evidence of saturation observed - increased likelihood of corrosion of embedded steel.

Heavy cracking of brickwork or concrete observed. Bulging or displacement of brickwork observed. Spalled or delaminated concrete observed.

A Heavy cracking or spalling observed on external face.

B Heavy cracking or spalling observed on internal face.

Rev	Chk'd by	Amendment	Date
P01	JK	For Issue	Jun20
P00	ERM	Draft for Comment	Jun20

For comment		As constructed	
For tender		Inspection	✓
For construction		Other	

Client
CWTC Multi Family ICAV
70 Sir John Rogerson's Quay
Dublin 2
D02 R296

Project Ref. 19575

Project Name
Player Wills Factory
Column & Lintel Remediation

Drawing Title
Condition Survey
First Floor

Date:	17/06/2020	Drawn by:	ERM
Paper Size:	A3	Checked by:	JK
Scale:	N/A	Approved by:	EMcK

McFarland Consulting
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Drawing No. 19575-MCL-01-DR-J-0002 Rev P01

Notes:

Survey was undertaken in May 2020.

Drawing is not to scale.

This drawing is for indicative purposes only.

Legend:

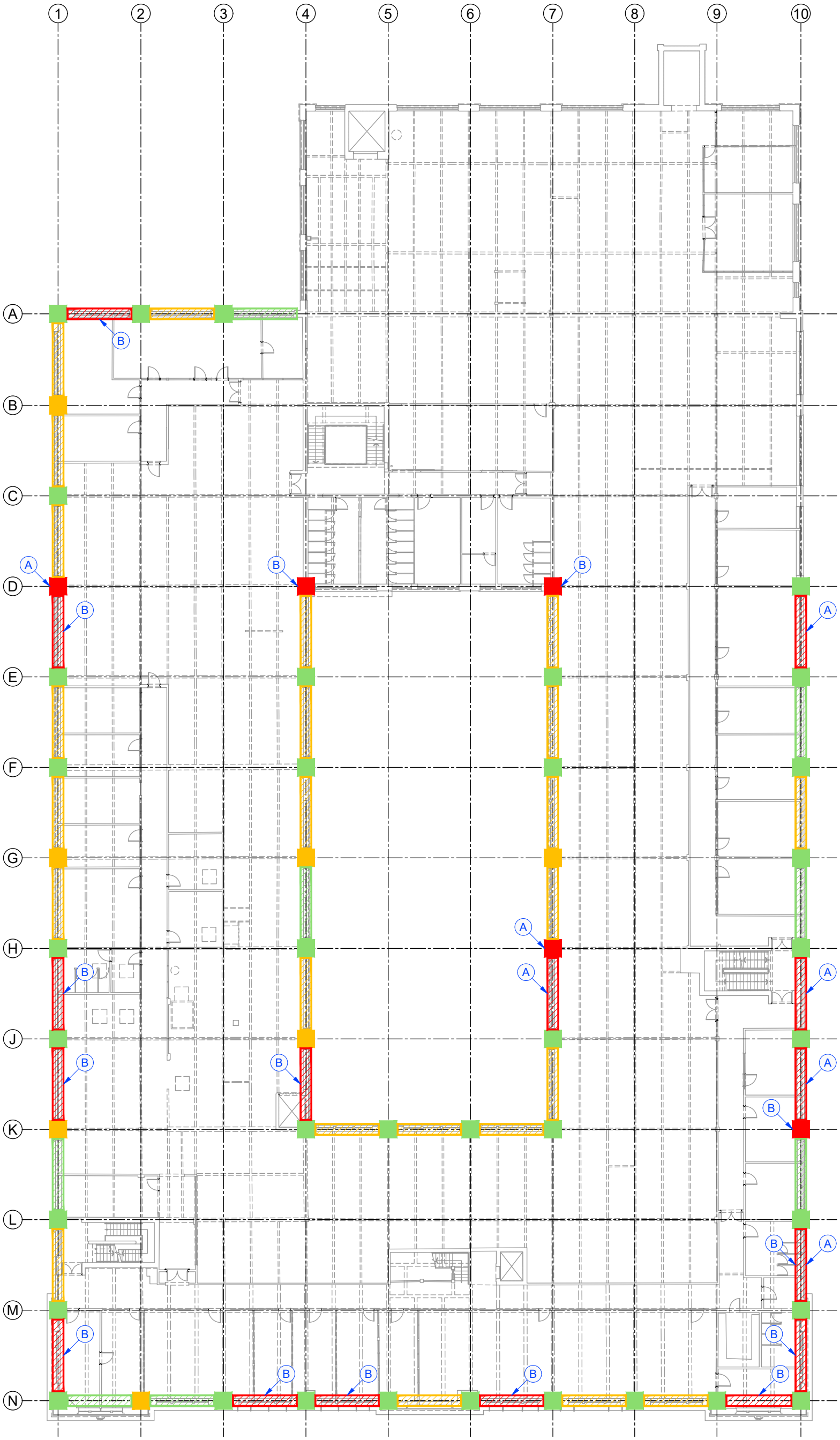
No obvious defects observed

Fine to moderate cracking of brickwork or concrete observed. Evidence of saturation observed - increased likelihood of corrosion of embedded steel.

Heavy cracking of brickwork or concrete observed. Bulging or displacement of brickwork observed. Spalled or delaminated concrete observed.

A Heavy cracking or spalling observed on external face.

B Heavy cracking or spalling observed on internal face.



Second Floor

P01	JK	For Issue	Jun20
P00	ERM	Draft for Comment	Jun20
Rev	**Chk'd by**	**Amendment**	**Date**

For comment		As constructed	
For tender		Inspection	✓
For construction		Other	

Client
CWTC Multi Family ICAV
70 Sir John Rogerson's Quay
Dublin 2
D02 R296

Project Ref. 19575

Project Name
Player Wills Factory
Column & Lintel Remediation

Drawing Title
Condition Survey
Second Floor

Date:	17/06/2020	Drawn by:	ERM
Paper Size:	A3	Checked by:	JK
Scale:	N/A	Approved by:	EMcK

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Drawing No.	Rev
19575-MCL-02-DR-J-0003	P01

Appendix F

Load Test Solutions Material Testing

Report 1510-3

Steel Investigations at former Player Wills Factory

22/05/2020

LOAD TEST SOLUTIONS
Structural Testing Specialists

Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise

Ph: 057-8670629 Mobile: 087-3620086

CONTENTS

Appendices

1. INTRODUCTION

Load Test Solutions was requested by Barrett Mahony Consulting Engineers on behalf of their client to carry out steel investigations and testing at the former Player Wills Factory, South Circular Rd, Dublin 8.

This report presents the findings of the testing and investigation.

2. SCOPE OF WORK

The scope of the works is to determine the current condition of steel within the structure through a programme of testing commensurate with testing and inspection techniques used on structures of a similar nature.

The following table shows the testing and examination schedule:

Table 1 Test Quantities

Test	Beam	Column	Slab reinforcing
Tensile strength	7	8	17
Steel Hardness	15	6	N/A
Steel diameter	N/A	N/A	7
Chemical composition	2	3	3
Metallographic examination	0	1	0

2.1 THE STRUCTURE

The structure on site consists of a steel and reinforced concrete structure.

3. FINDINGS OF STRUCTURAL SURVEYS

The findings of the investigations are detailed below.

A photographic record is provided in Appendix A and drawings of the test areas and locations are included in Appendix B.

Site test results are given in Appendix C

Laboratory testing results are given in Appendix D

3.1 STEEL THICKNESS MEASUREMENTS

A measurement of the thickness of reinforcing steel was made at the slab breakout areas.
An additional measurement was recorded for reinforcing steel in a window head beam.

Measurements are noted on the drawings in Appendix B.

3.2 STEEL HARDNESS TESTS

Hardness testing was carried out on-site using the Proceq Equitip 3 portable hardness tester.

Location	Min HV (Vickers)	Max HV (Vickers)	Mean HV (Vickers)
First floor main beam	99	183	133
First floor main beam	112	174	141
First floor main beam	102	162	128
First floor sec beam	84	105	91
First floor sec beam	89	137	118
First floor u column	97	149	121
First floor cast column	116	174	142
Second floor main beam	101	160	129
Second floor main beam	93	108	99
Second floor main beam	128	173	145
Second floor sec beam	86	159	108
Second floor sec beam	100	120	109
Second floor u column	99	182	143
Second floor rivet column	93	164	123
Third floor main beam	100	179	125
Third floor main beam	91	182	120
Third floor main beam	99	159	110
Third floor sec beam	86	145	105
Third floor sec beam	86	102	94
Third floor u column	84	105	91
Third floor u column	86	137	108

3.3 TENSILE STRENGTH TESTS

Tensile strength tests were carried out by Sandberg LLP in accordance with ISO 6892-1:2016 B

Test results are listed in Appendix D

3.4 CHEMICAL COMPOSITION TESTS

Chemical composition tests were carried out by Sandberg LLP and compared to the relevant steel standards for assessment.

Test results are listed in Appendix E

Appendix A

Photographs

Beam Sample

Column Sample

Slab Reinforcing Steel

Roof Slab Reinforcing

Beam above windows reinforcing steel

Appendix B

Drawings

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECTS DRAWINGS.FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

BUILDING SURVEY

THE SURVEYOR SHALL CONFIRM THE BOTTOM FLANGE WIDTH AND THICKNESS OF ALL STEEL BEAMS ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY.
THE SURVEYOR SHALL CONFIRM ALL COLUMN SIZES ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY. UNIVERSAL BEAM AND COLUMN SECTION FLANGE THICKNESSES SHALL ALSO BE INCLUDED

CONDITION SURVEY

A CONDITION SCHEDULE OF THE STRUCTURE SHALL BE CARRIED TO FACILITATE IDENTIFICATION AND TENDERING OF RECTIFICATION WORKS TO STRUCTURE TO BE RETAINED. THE SURVEY IS TO FOCUS ON LOADBEARING ELEMENTS OF STRUCTURE - SLABS, BEAMS, COLUMNS AND MASONRY OR CONCRETE WALLS. THE SURVEY IS TO BE CARRIED OUT ON A GRID BASIS THROUGHOUT THE BUILDING AND SHALL INCLUDE BOTH PHOTOGRAPHS AND DESCRIPTIONS

OPENING UP WORKS SCHEDULE

NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE ~~4 No.~~ 2 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS. DO NOT CUT REINFORCMENT. CONFIRM SLAB THICNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	RING BEAM EXPOSURE 2No.	REMOVE CONCRETE COVER OVER A LENGTH OF 300MM OFF THE INTERNAL EDGE AND ACROSS BASE OF THE BEAM AT 1M OFF MASONRY PIER. CONFIRM COVER DEPTH, AND REINFORCEMENT DETAILS
~~3~~	~~PILOT HOLES TO INTERNAL STEEL COLUMNS 4No.~~	~~DRILL A PILOT HOLE, 10MM DIAMETER THROUGH ONE SIDE OF THE COLUMN AT A HEIGHT OF 300MM. CONFIRM WALL THICKNESS~~
4	~~CONFIRMATINO OF BEAM LAYOUT 3No.~~	~~REMOVE CEILING AS NECESSARY TO CONFIRM SECONDARY BEAM ARRANGEMENT. MATCHES MAIN GRID~~
5	~~CONFIRM IF BEAMS ARE CONCRETE ENCASED STEEL 2 No.~~	~~DRILL PILOT HOLES IN DOWNSTAND BEAM AT MID DEPTH WITH 10MM MASONRY DRILL BIT. CONFIRM IF BEAM IS CONCRETE OR ENCASED STEEL. IF CONCRETE, REMOVE COVER CONCRETE OVER 300MM LENGTH ACROSS BASE AND ONE SIDE TO EXPOSE REINFORCEMENT. CONFIRM ALL DIMENSIONS. IF STEEL, EXPOSE BOTTOM FLANGE AND CONFIRM BEAM DEPTH, FLANGE THICKNESS AND WIDTH.~~
6	~~BRICK COMPRESSIVE TEST 2 No.~~	~~REMOVE 10NO. BRICKS FROM BELOW WINDOW, ADJACENT TO PIER, AND CARRY OUT COMPRESSIVE TESTING ON SAME~~
7	SLAB CONCRETE COMPRESSIVE TEST ~~4 No.~~ 2 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME
8	~~CONFIRM IF MASONRY WALLS ARE LOADBEARING OR INFILL 5 No.~~	~~DRILL 10MM HOLES THROUGH WALL 150MM BELOW FIRST FLOOR SLAB SOFFIT WITH A MASONRY BIT TO CONFIRM IF BEAM IS PRESENT. CONFIRM COLUMN LOCATIONS IN WALL, IF PRESENT~~
REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS. PROVIDE SAFETY COVERS AT SLAB EXPOSURE LOCATIONS		

REVISED SCOPE. SEE BELOW

ALREADY COMPLETE

ALREADY COMPLETE

NOT REQUIRED

ALREADY COMPLETE

A - STRIP SAMPLE TO BE TAKEN FROM WEB OF COLUMN. TO BE CARRIED OUT BY LOAD TEST SOLUTIONS. 1 NUMBER.

B - CORE SAMPLE THROUGH CIRCULAR COLUMN BY UNITED METALS TO BE PROVIDED TO LOAD TEST SOLUTIONS FOR TESTING. 1 NUMBER.

C - SLAB REINFORCEMENT SAMPLE TO BE TAKEN FROM SLAB EXPOSURE AREA FOR TENSILE TEST. SAMPLE SIZE TO BE SUFFICIENT TO CARRY OUT THREE NUMBER TENSILE TESTS ON THE REINFORCEMENT.

D - STEEL BEAM WEB SAMPLES. TWO NUMBER. ONE FROM PRIMARY BEAM. ONE FROM SECONDARY BEAM AT AREA MARKED D.

ISSUE	DATE	DESCRIPTION	DRN. / CHKD.	P.E. / P.D.
		REVISED 28.01.2020		

DRAWING STAGE: **PRELIMINARY**

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London Office: 12 Nth Street, London SE1 2AY, United Kingdom Tel. (0044) 084 5413 2722
Consulting Engineers, Civil , Structural , Project Management. E-mail: bmce@bmce.ie Web: www.bmce.ie

CLIENT: **CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND**

PROJECT TITLE: **PLAYER WILLS FACTORY** — BM PROJECT No. **19.117**

MODEL REFERENCE — MODEL REV. — SUITABILITY

DRAWING TITLE: **PLAYER WILLS FACTORY OPENING UP WORKS FIRST FLOOR PLAN**

DRAWING No. **PWF-BMD-00-00-S-4101** — ISSUE **P01**

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECTS DRAWINGS FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

BUILDING SURVEY

THE SURVEYOR SHALL CONFIRM THE BOTTOM FLANGE WIDTH AND THICKNESS OF ALL STEEL BEAMS ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY.
THE SURVEYOR SHALL CONFIRM ALL COLUMN SIZES ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY. UNIVERSAL BEAM AND COLUMN SECTION FLANGE THICKNESSES SHALL ALSO BE INCLUDED

CONDITION SURVEY

A CONDITION SCHEDULE OF THE STRUCTURE SHALL BE CARRIED TO FACILITATE IDENTIFICATION AND TENDERING OF RECTIFICATION WORKS TO STRUCTURE TO BE RETAINED. THE SURVEY IS TO FOCUS ON LOADBEARING ELEMENTS OF STRUCTURE - SLABS, BEAMS, COLUMNS AND MASONRY OR CONCRETE WALLS. THE SURVEY IS TO BE CARRIED OUT ON A GRID BASIS THROUGHOUT THE BUILDING AND SHALL INCLUDE BOTH PHOTOGRAPHS AND DESCRIPTIONS

OPENING UP WORKS SCHEDULE

NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE ~~4 No.~~ 2 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS. DO NOT CUT REINFORCMENT. CONFIRM SLAB THICNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	RING BEAM EXPOSURE 2No.	REMOVE CONCRETE COVER OVER A LENGTH OF 300MM DOWN THE INTERNAL FACE AND ACROSS BASE OF THE BEAM AT 1M OFF THE MASONRY PIER. CONFIRM COVER DEPTH, AND REINFORCEMENT DETAILS – TOP AND BOTTOM BARS AND LINKS
~~3~~	~~PILOT HOLES TO INTERNAL STEEL COLUMNS 4No.~~	~~DRILL A PILOT HOLE, 10MM DIAMETER THROUGH ONE SIDE OF THE COLUMN AT A HEIGHT OF 300MM. CONFIRM WALL THICKNESS~~
~~4~~	~~CONFIRMATINO OF BEAM LAYOUT 2No.~~	~~REMOVE CEILING AS NECESSARY TO CONFIRM SECONDARY BEAM ARRANGEMENT MATCHES MAIN GRID~~
~~5~~	~~CONFIRM IF BEAMS ARE CONCRETE ENCASED STEEL 5 No.~~	~~DRILL PILOT HOLES IN DOWNSTAND BEAM AT MID DEPTH WITH 10MM MASONRY DRILL BIT. CONFIRM IF BEAM IS CONCRETE OR ENCASED STEEL. IF CONCRETE, REMOVE COVER CONCRETE OVER 300MM LENGTH ACROSS BASE AND ONE SIDE TO EXPOSE REINFORCEMENT. CONFIRM ALL DIMENSIONS. IF STEEL, EXPOSE BOTTOM FLANGE AND CONFIRM BEAM DEPTH, FLANGE THICKNESS AND WIDTH.~~
~~6~~	~~BRICK COMPRESSIVE TEST 2 No.~~	~~REMOVE 10NO. BRICKS FROM BELOW WINDOW, ADJACENT TO PIER, AND CARRY OUT COMPRESSIVE TESTING ON SAME~~
7	SLAB CONCRETE COMPRESSIVE TEST ~~4 No.~~ 2 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME AND PROVIDE RESULTS
~~8~~	~~CONFIRM IF MASONRY WALLS ARE LOADBEARING OR INFILL 3 No.~~	~~DRILL 10MM HOLES THROUGH WALL 150MM BELOW FIRST FLOOR SLAB SOFFIT WITH A MASONRY BIT TO CONFIRM IF BEAM IS PRESENT. CONFIRM COLUMN LOCATIONS IN WALL, IF PRESENT~~
REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS. PROVIDE SAFETY COVERS AT SLAB EXPOSURE LOCATIONS		

REVISED SCOPE. SEE BELOW

ALREADY COMPLETE

ALREADY COMPLETE

NOT REQUIRED

ALREADY COMPLETE

A - STRIP SAMPLE TO BE TAKEN FROM WEB OF COLUMN. TO BE CARRIED OUT BY LOAD TEST SOLUTIONS. 2 NUMBER.

B - CORE SAMPLE THROUGH CIRCULAR COLUMN BY UNITED METALS TO BE PROVIDED TO LOAD TEST SOLUTIONS FOR TESTING. 1 NUMBER.

C - SLAB REINFORCEMENT SAMPLE TO BE TAKEN FOR TENSILE TEST FROM SLAB EXPOSURE AREA. SAMPLE SIZE TO BE SUFFICIENT TO CARRY OUT THREE NUMBER TENSILE TESTS ON THE REINFORCEMENT.

D - THREE NUMBER BEAM WEB SAMPLES, 1 EACH IN THE AREAS MARKED D TO BE TAKEN FROM A BEAM AT THE CEILING OF LEVEL 2 BY LOADTEST SOLUTIONS

ISSUE	DATE	DESCRIPTION	DRN. / CHKD	P.E. / P.D.
		REVISED 28.01.2020		

DRAWING STAGE: **PRELIMINARY**

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Consulting Engineers, Civil , Structural , Project Management. E-mail: bmce@bmce.ie Web: www.bmce.ie

CLIENT: **CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND**

PROJECT TITLE: **PLAYER WILL FACTORY** | BM PROJECT No. **19.117**

MODEL REFERENCE | MODEL REV. | SUITABILITY

DRAWING TITLE: **PLAYER WILLS FACTORY OPENING UP WORKS SECOND FLOOR PLAN**

DRAWING No. **PWF-BMD-00-00-S-4102** | ISSUE **P01**

NOTES

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2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

BUILDING SURVEY

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THE SURVEYOR SHALL CONFIRM ALL COLUMN SIZES ON ALL LEVELS AND INCLUDE THIS INFORMATION ON THE SURVEY. UNIVERSAL BEAM AND COLUMN SECTION FLANGE THICKNESSES SHALL ALSO BE INCLUDED

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OPENING UP WORKS SCHEDULE		
NUMBER	TITLE	DESCRIPTION
1	SLAB EXPOSURE 3 No.	BREAK OUT 500MM*500MM AREA OF SLAB AT MIDSPAN BETWEEN BEAMS BELOW. DO NOT CUT REINFORCEMENT. CONFIRM SLAB THICKNESS AND REINFORCMENT DETAILS - TOP AND BOTTOM.
2	SLAB CONCRETE COMPRESSIVE TEST 3 No.	CORES TO BE TAKEN THROUGH SLAB, CLEAR OF BEAMS. CARRY OUT COMPRESSIVE TESTS ON SAME
REPAIR CONCRETE COVER, WHERE REMOVED, WITH SIKA CONCRETE REPAIR MORTAR AND PRIMERS. REINSTATE WATERPROOFING TO ROOF SLAB WHERE EXPOSURES HAVE BEEN CARRIED OUT		

A - SLAB REINFORCEMENT SAMPLES TO BE TAKEN FOR TENSILE TESTS FROM SLAB EXPOSURE AREAS. SAMPLE SIZE TO BE SUFFICIENT TO CARRY OUT NINE (3 AT EACH LOCATION) NUMBER TENSILE TESTS ON THE REINFORCEMENT.

ISSUE	DATE	DESCRIPTION	ORIG	P.E	P.D
		REVISED 28.01.2020			

DRAWING STAGE: **PRELIMINARY**

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Consulting Engineers, Civil . Structural . Project Management. E-mail: bmce@bmce.ie Web: www.bmce.ie

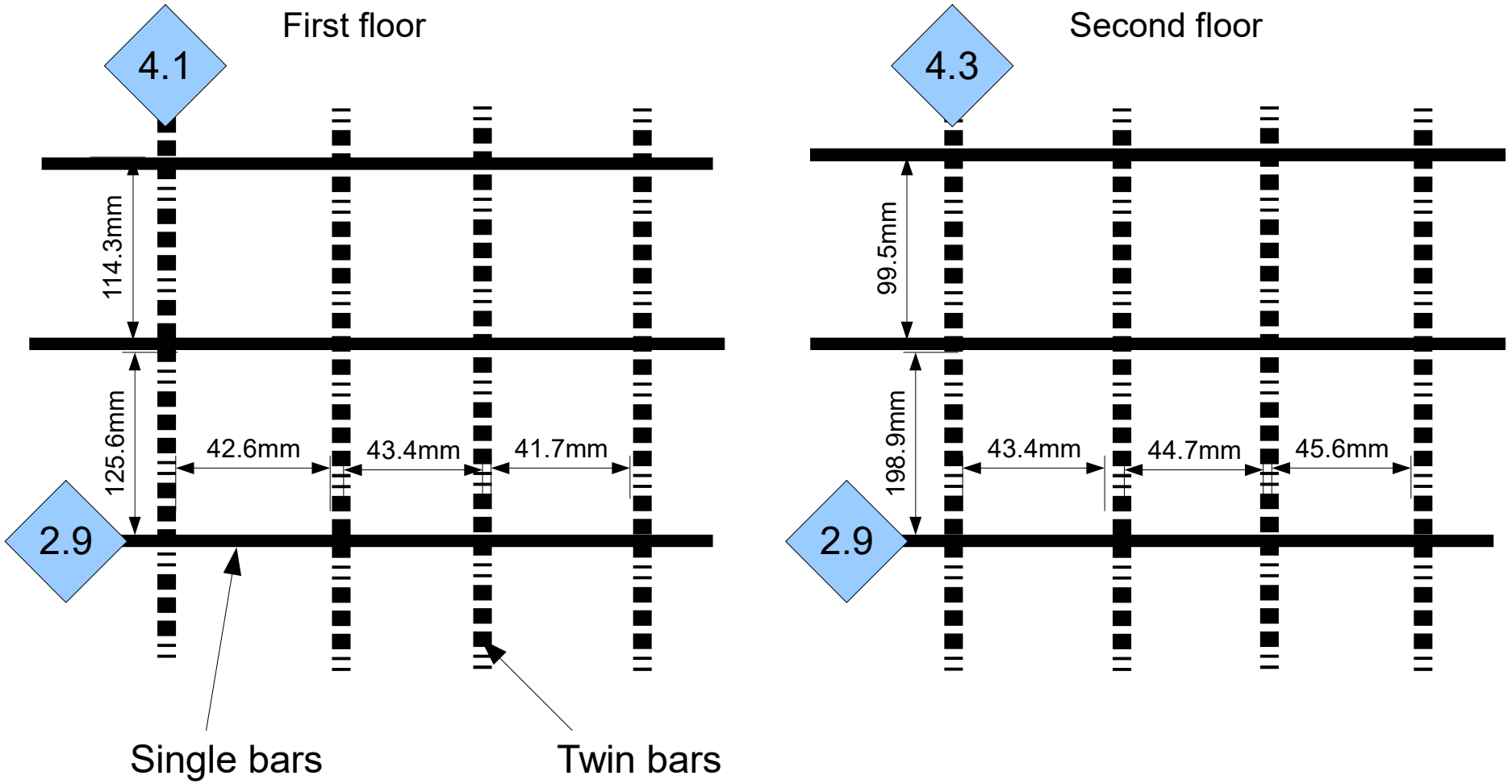
CLIENT: **CWTC MULTI FAMILY ICAV ACTING SOLELY IN RESPECT OF ITS SUB FUND DBTR SCR1 FUND**

PROJECT TITLE: **PLAYER WILLS FACTORY** | BM PROJECT No. **19.117**

MODEL REFERENCE | MODEL REV. | SUITABILITY

DRAWING TITLE: **PLAYER WILLS FACTORY OPENING UP WORKS THIRD FLOOR PLAN**

DRAWING No. **PWF-BMD-00-00-S-4103** | ISSUE **P01**

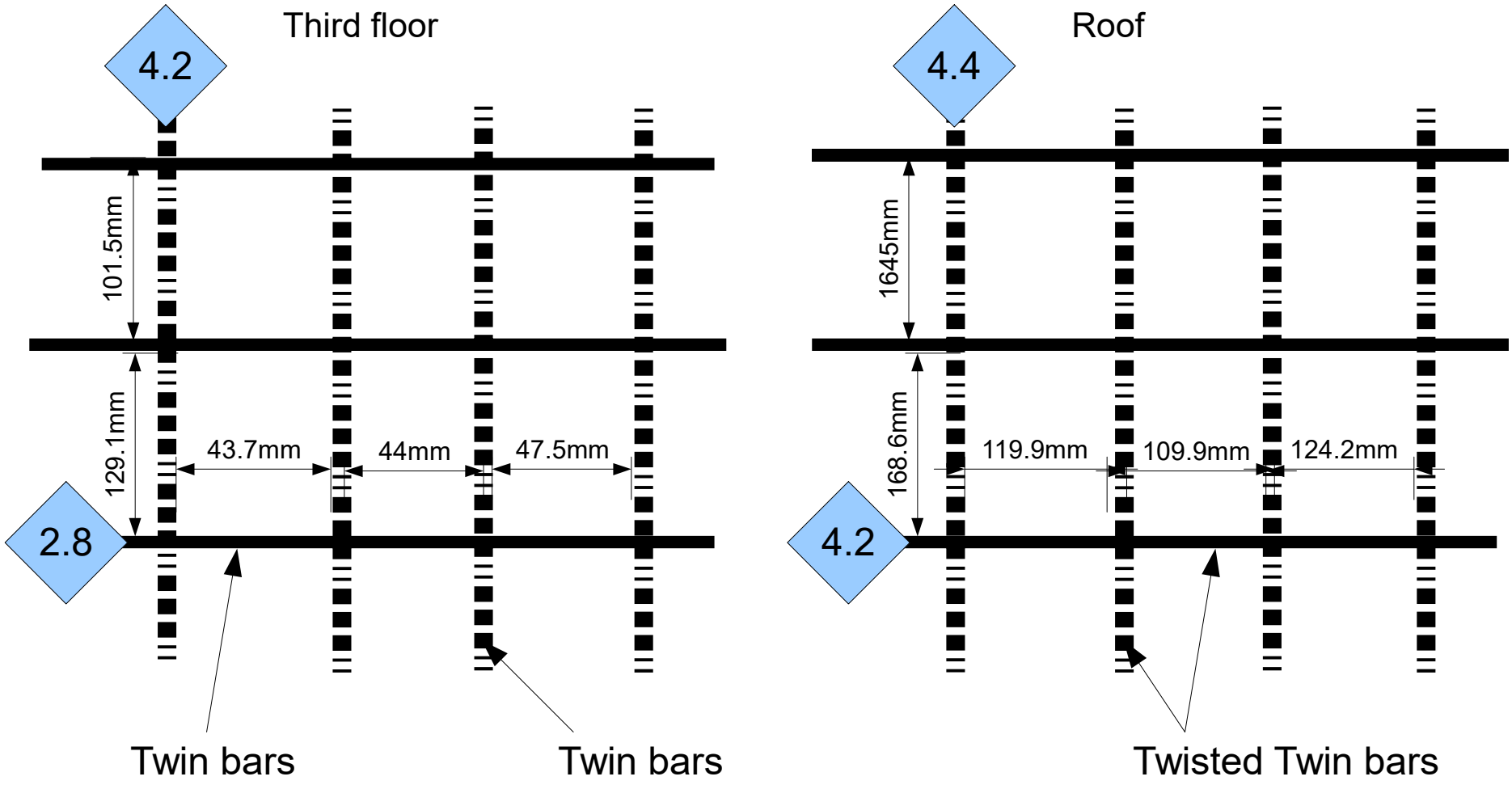


xx

Bar size (mm) per bar

LOAD TEST SOLUTIONS
Structural Testing Specialists

Drawn By: TF
Job No. 1510
Scale: Not to scale
Date: 27/05/2020

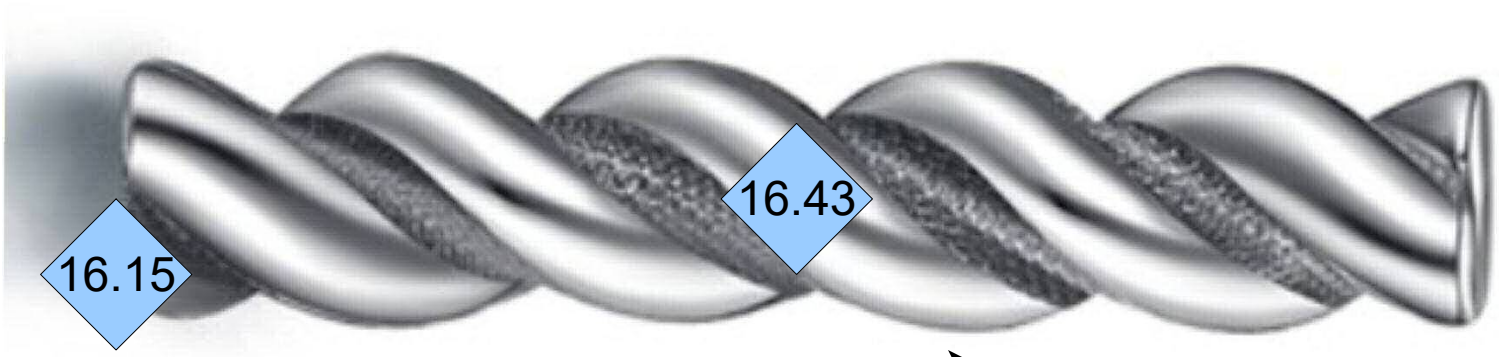


xx

Bar size (mm) per bar

LOAD TEST SOLUTIONS
Structural Testing Specialists

Drawn By: TF
Job No. 1510
Scale: Not to scale
Date: 27/05/2020



Beam above windows Twisted Twin bars

xx

Bar size (mm) per bar

LOAD TEST SOLUTIONS
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Drawn By: TF
Job No. 1510
Scale: Not to scale
Date: 27/05/2020

Appendix C

Steel Hardness Test Results

Steel Hardness Test Results

Location	Min HV (Vickers)	Max HV (Vickers)	Mean HV (Vickers)
First floor main beam	99	183	133
First floor main beam	112	174	141
First floor main beam	102	162	128
First floor sec beam	84	105	91
First floor sec beam	89	137	118
First floor u column	97	149	121
First floor cast column	116	174	142
Second floor main beam	101	160	129
Second floor main beam	93	108	99
Second floor main beam	128	173	145
Second floor sec beam	86	159	108
Second floor sec beam	100	120	109
Second floor u column	99	182	143
Second floor rivet column	93	164	123
Third floor main beam	100	179	125
Third floor main beam	91	182	120
Third floor main beam	99	159	110
Third floor sec beam	86	145	105
Third floor sec beam	86	102	94
Third floor u column	84	105	91
Third floor u column	86	137	108

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Appendix D

Tensile Test Results

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MATERIALS TESTING

UKAS TESTING
0262

TENSILE TEST CERTIFICATE
BS EN ISO 6892-1:2016 B

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email: ho@sandberg.co.uk
web: www.sandberg.co.uk

Certificate:	66370/M/6	**Order Ref:**	Proforma No. 2
Samples Received:	13 March 2020	**Tested By:**	AT
Test Date:	29 April 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	Upper Yield		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MA 324	PB1 - Beam Web. 1st Floor	28.65	7.60	266*	14.64	511	29.0
MA 325	SB1 - Beam Web. 1st Floor	28.65	9.38	328	14.24	497	31.5
MA 326	2A - Col Web. 1st Floor	29.22	8.11	278	12.60	431	37.5
MA 327	1B - Solid Col. 1st Floor (Cored)	28.94	6.21	215*	12.72	440	16.5
MA 331	2B - Solid Col. 2nd Floor (Cored)	28.94	5.44	188*	10.56	365	31.5
MA 332	SFSB1 - Beam Web. 2nd Floor	29.03	9.53	328	13.68	471	35.0
Specification: BS EN 10025-2:2019							
	Grade S235			235 min		360-510	26 min
	Grade S275			275 min		410-560	23 min
	Grade S355			355 min		470-630	22 min

Comments: * Upper yield phenomenon was not exhibited, therefore the 0.2% Proof Stress value has been reported instead.
The tensile properties of sample MA 324 would comply with the requirements for a grade S235 structural steel with the exception of its UTS value.
The tensile properties of samples MA 325, MA 326 and MA 332 would comply with the requirements for a grade S275 structural steel.
Cored samples MA 327 & 331 produced lower 0.2% PS results than anticipated which would not comply with any of the principle structural steel grades. These low results could be consequent of the sample's orientation when removed from the structural element, ie 90 degrees to the rolling direction.

For Sandberg LLP

Date: 4 May 2020

N. Fetter

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TENSILE TEST CERTIFICATE
BS EN ISO 6892-1:2016 B

Certificate:	66370/M/7	**Order Ref:**	Proforma No. 2
Samples Received:	13 March 2020	**Tested By:**	AT
Test Date:	29 April 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	Upper Yield		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MA 333	SFSB2 - Beam Web. 2nd Floor	28.94	9.19	318	13.78	476	31.5
MA 334	SFSB3 - Beam Web. 2nd Floor	28.94	8.12	281	12.28	425	37.5
MA 335	SFC1 - Col Web. 2nd Floor	29.22	9.80	336	12.78	437	34.0
MA 336	SFC2 - Col Web. 2nd Floor	29.42	9.96	339	11.76	400	37.5
Specification: BS EN 10025-2:2019							
	Grade S235			235 min		360-510	26 min
	Grade S275			275 min		410-560	23 min
	Grade S355			355 min		470-630	22 min

Comments: The tensile properties of samples MA 333, MA 334, MA 335 and MA 336 would comply with the requirements for a grade S275 structural steel with the exception of the UTS value for sample MA 336.

For Sandberg LLP

Date: 4 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
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TENSILE TEST CERTIFICATE
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Certificate:	66370/M/8	**Order Ref:**	Proforma No. 2
Samples Received:	13 March 2020	**Tested By:**	NAF
Test Date:	27-28 April 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	0.2% Proof Stress		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MA 328-1	SFS1 - RC Slab. 1st Floor	12.88	7.62	592	7.76	603	17.5
MA 328-2	SFS1 - RC Slab. 1st Floor	13.07	7.84	600	8.17	625	17.5
MA 328-3	SFS1 - RC Slab. 1st Floor	13.07	8.35	639	8.70	665	N/D*
MA 329-1	SFS1 - RC Slab. 2nd Floor	13.07	8.08	618	8.12	621	15.0
MA 329-2	SFS1 - RC Slab. 2nd Floor	12.82	8.18	638	8.26	644	15.0
MA 329-3	SFS1 - RC Slab. 2nd Floor	12.88	7.84	609	8.13	631	17.5

Comments: * Elongation not determined - final fracture occurred outside gauge length.
Results for the above samples of steel reinforcing wire strand were not assessed for strength grade. This was because no specific client specification was supplied or identified for assessment purposes.

For Sandberg LLP

Date: 4 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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Certificate:	66370/M/9	**Order Ref:**	Proforma No. 2
Samples Received:	13 March 2020	**Tested By:**	NAF
Test Date:	27-28 April 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	0.2% Proof Stress		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MA 330-1	SFS2 - RC Slab. 2nd Floor	12.95	8.16	630	8.32	643	15.0
MA 330-2	SFS2 - RC Slab. 2nd Floor	12.82	8.14	635	8.33	650	17.5
MA 330-3	SFS2 - RC Slab. 2nd Floor	12.38	7.91	639	8.04	650	15.0
MA 337-1	R1 - RC Slab. 3rd Floor	13.27	7.12	537	8.76	660	15.0
MA 337-2	R1 - RC Slab. 3rd Floor	13.33	7.12	534	8.82	662	14.0
MA 337-3	R1 - RC Slab. 3rd Floor	13.14	7.53	573	8.58	653	17.5

Comments: Results for the above samples of steel reinforcing wire strand were not assessed for strength grade. This was because no specific client specification was supplied or identified for assessment purposes.

For Sandberg LLP

Date: 4 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
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Certificate:	66370/M/10	**Order Ref:**	Proforma No. 2
Samples Received:	13 March 2020	**Tested By:**	NAF
Test Date:	27-28 April 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	0.2% Proof Stress		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MA 338-1	R2 - RC Slab. 3rd Floor	12.63	4.94	391	5.69	451	22.5
MA 338-2	R2 - RC Slab. 3rd Floor	12.63	4.85	384	5.73	454	N/D*
MA 339-1	R3 - RC Slab. 3rd Floor	12.38	8.79	710	8.99	727	14.0
MA 339-2	R3 - RC Slab. 3rd Floor	12.44	8.87	713	9.02	725	15.0
MA 339-3	R3 - RC Slab. 3rd Floor	12.44	8.76	704	8.99	723	12.5

Comments: * Elongation not determined - final fractured occurred within the test machines grips. Results for the above samples of steel reinforcing wire strand were not assessed for strength grade. This was because no specific client specification was supplied or identified for assessment purposes.

For Sandberg LLP

Date: 4 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TENSILE TEST CERTIFICATE
BS EN ISO 6892-1:2016 B

Certificate:	66370/M/3	**Order Ref:**	Email dated 26/09/2019
Samples Received:	28 October 2019	**Tested By:**	AT
Test Date:	01 November 2019	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	0.2% Proof		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MZ 1012	Main Beam	28.56	7.20	252	13.18	462	35.0
MZ 1013	Beam 2	28.46	7.47	263	14.46	508	32.5
MZ 1014	Column	28.56	7.41	260	11.88	416	36.5
MZ 1015	Col B/P	29.22	7.61	261	13.88	475	28.5
Specification: BS EN 10025-2:2019							
	Grade S235			235 min		360-510	26 min
	Grade S275			275 min		410-560	23 min
	Grade S355			355 min		470-630	22 min

Comments: The tensile properties for samples MZ 1012, MZ 1013, MZ 1014 and MZ 1015 all conformed to the structural steel grade S235.

For Sandberg LLP

Date: 5 November 2019

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TENSILE TEST CERTIFICATE
BS EN ISO 6892-1:2016 B

Certificate:	66370/M/4	**Order Ref:**	Email dated 6/12/2019
Samples Received:	20 December 2019	**Tested By:**	NAF
Test Date:	02 January 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

Specimen Reference		Area mm^2	0.2% Proof		Ultimate Tensile		Elongation %
Met lab Ref	Sample Ref		Load kN	Stress N/mm^2	Load kN	Stress N/mm^2	
MZ 1251	Column Sample 7mm Dia. 75mm long	19.09	4.280	225	7.60	398	18.0
Specification: BS EN 10025-2:2019							
Grade S185				185 min		290-510	18 min
Grade S235				235 min		360-510	26 min
Grade S275				275 min		410-560	23 min
Grade S355				355 min		470-630	22 min

Comments: The tensile properties for samples MZ 1251 conformed to the structural steel grade S185.

For Sandberg LLP

Date: 9 January 2020

Neale Fetter - Assistant Manager - Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Appendix E

Chemical Composition Results

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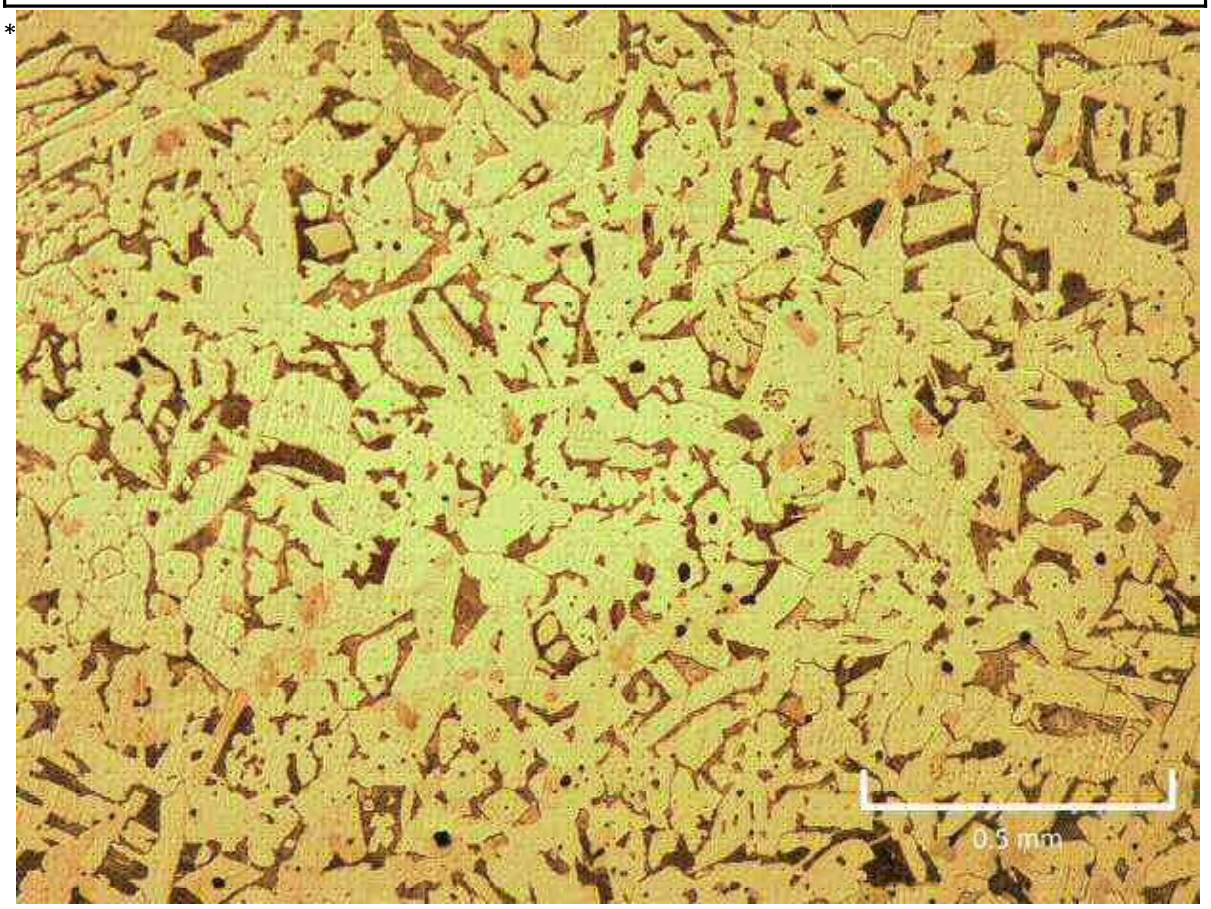
TEST CERTIFICATE
METALLOGRAPHIC EXAMINATION
TO BS EN ISO 643 : 2012

Certificate:	66370/M/5	**Order Ref:**	Email dated 6/12/2019
Samples Received:	20 December 2019	**Tested By:**	MC
Test Date:	08 January 2020	**Test Procedure:**	M/5/3/2 & M13/3/0
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.		

*



Met Lab Ref:	MZ1 251		Client Ref: Column Sample 7mm Dia. 75mm long	
Examined By:	MC	Mag: X84	Etchant: 2% Nital	Grain Size Index: 5.0
Comments: Metallographic examination revealed a microstructure comprising of pearlite within a ferritic matrix, with a coarse grain structure. This would be typical ofthat expected of a low alloy carbon steel material.				

For Sandberg LLP

Date: 9 January 2020

N. Fetter

Neale Fetter - Assistant Manager- Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TEST CERTIFICATE

Certificate:	66370/M/1	**Samples Received:**	28 October 2019	**Test Date:**	31 October 2019
Reference:	Email dated 26/09/2019	**Tested By:**	Metaltech Services Limited	**Test Procedure:**	OES
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.				

CHEMICAL COMPOSITION %

Met Lab Ref	Client Description	C	Si	Mn	S	P	Ni	Cr	Mo	Cu	V	Nb	Al	CEV
MZ 1012	Main Beam	0.10	0.02	0.48	0.022	0.011	0.10	<0.01	<0.01	0.10	<0.01	0.005	<0.01	0.199
MZ 1013	Beam 2	0.16	0.02	0.49	0.022	0.017	0.32	<0.01	<0.01	0.10	<0.01	0.005	<0.01	0.276
MZ 1014	Column	0.15	0.09	0.60	0.036	0.032	0.06	<0.01	<0.01	0.06	<0.01	0.003	<0.01	0.261
Specification:														
	BS EN 10025-2:2019													
	Grade S235 (max)	0.19	-	1.5	0.045	0.045				0.60				0.35
	Grade S275 (max)	0.24	-	1.6	0.045	0.045				0.60				0.40
	Grade S355 (max)	0.27	0.6	1.7	0.045	0.045				0.60				0.45

Comments : Results contained in this certificate are outside the UKAS accreditation for this laboratory but have been performed on our behalf by another laboratory that is so accredited. Metaltech Services Limited Report No. MSL 4945-1.
Carbon Equivalent Values (CEV) for the above samples were found to be acceptable, and as such they would be considered readily weldable using standard welding techniques and consumables as specified in BS EN 1011 : Part 2 : 2001, which supersedes withdrawn standard BS 5135 :1984.

For Sandberg LLP

Neale Fetter - Assistant Manager Metallurgy Department

Date: 5 November 2019

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TEST CERTIFICATE

Certificate:	66370/M/2	**Samples Received:**	28 October 2019	**Test Date:**	31 October 2019
Reference:	Email dated 26/09/2019	**Tested By:**	Metaltech Services Limited	**Test Procedure:**	OES
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.				

CHEMICAL COMPOSITION %

Met Lab Ref	Client Description	C	Si	Mn	S	P	Ni	Cr	Mo	Cu	V	Nb	Al	CEV
MZ 1015	Col B/P	0.23	0.01	0.54	0.024	0.052	0.02	<0.01	<0.01	0.02	<0.01	0.002	<0.01	0.329
Specification: BS EN 10025-2:2019														
	Grade S235 (max)	0.19	-	1.5	0.045	0.045				0.60				0.35
	Grade S275 (max)	0.24	-	1.6	0.045	0.045				0.60				0.40
	Grade S355 (max)	0.27	0.6	1.7	0.045	0.045				0.60				0.45

Comments	:	Results contained in this certificate are outside the UKAS accreditation for this laboratory but have been performed on our behalf by another laboratory that is so accredited. Metaltech Services Limited Report No. MSL 4945-1. The above sample MZ 1015 gave high phosphorus content, exceeding the maximum allowable limit for modern structural steels. The CEV value for this sample is within the maximum allowable limits, therefore material of this quality would be considered weldable using standard welding techniques and consumables as specified in BS EN 1011 : Part 2 : 2001, which supersedes withdrawn standard BS 5135 : 1984, however consideration for the high phosphorus content should be made.

For Sandberg LLP

Date: 5 November 2019

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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TEST CERTIFICATE

Certificate:	66370/M/12	**Samples Received:**	13 March 2020	**Test Date:**	07 May 2020
Reference:	Proforma No. 2	**Tested By:**	RoTech Laboratories	**Test Procedure:**	ICP
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.				

CHEMICAL COMPOSITION %

Met Lab Ref	Client Description	C	Si	Mn	S	P	Ni	Cr	Mo	Cu	V	Nb	Al	CEV
MA 328	SFS1 - First Floor RC Slab (Strand)	0.039	<0.01	0.39	0.071	0.053	0.04	0.01	<0.01	0.04	<0.01	<0.01	<0.003	0.115
MA 330	SFS2 - Second Floor RC Slab (Strand)	0.041	<0.01	0.51	0.052	0.045	0.04	0.01	<0.01	0.04	<0.01	<0.01	<0.003	0.137
MA 337	R1 - Third Floor RC Slab (Twisted Strand)	0.088	<0.01	0.45	0.034	0.069	0.10	0.04	0.02	0.06	<0.01	<0.01	0.003	0.188
Specification:														

Comments	:	Results contained in this certificate are outside the UKAS accreditation for this laboratory but have been performed on our behalf by another laboratory that is so accredited. RoTech Laboratories Report No. 20-05033. Materials are a Carbon-Manganese steel with no intentional alloying, the Sulphur and Phosphorous levels are high for steel. If the materials are to be welded consideration on the low CEV, High Sulphur and Phosphorus levels must be taken. The material is not considered readily weldable according to BS EN 1011, thus it would be prudent to seek advice of a welding engineer prior to welding the material.

For Sandberg LLP

Date: 11 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

SANDBERG
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TEST CERTIFICATE

Certificate:	66370/M/11	**Samples Received:**	13 March 2020	**Test Date:**	14 April 2020
Reference:	Proforma No. 2	**Tested By:**	Metaltech Services Limited	**Test Procedure:**	OES
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW, Co Laois, Ireland.				

CHEMICAL COMPOSITION %

Met Lab Ref	Client Description	C	Si	Mn	S	P	Ni	Cr	Mo	Cu	V	Nb	Al	CEV
MA 332	SFSB1 - Beam Web. 2nd Floor	0.19	<0.01	0.66	0.038	0.039	0.04	<0.01	<0.01	0.02	<0.01	<0.01	0.001	0.310
Specification:														
	BS EN 10025-2:2019													
	Grade S235 (max)	0.19	-	1.5	0.045	0.045				0.60				0.35
	Grade S275 (max)	0.24	-	1.6	0.045	0.045				0.60				0.40
	Grade S355 (max)	0.27	0.6	1.7	0.045	0.045				0.60				0.45

Comments	:	Results contained in this certificate are outside the UKAS accreditation for this laboratory but have been performed on our behalf by another laboratory that is so accredited. Metaltech Services Limited Report No. MSL 5402 Carbon Equivalent Value (CEV) for the above sample was found to be acceptable, and as the material would be considered readily weldable using standard welding techniques and consumables as specified in BS EN 1011 : Part 2 : 2001, which supersedes withdrawn standard BS 5135 :1984.

For Sandberg LLP

Date: 4 May 2020

Neale Fetter - Assistant Manager Metallurgy Department

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

SANDBERG
CONSULTING ENGINEERS
INVESTIGATION INSPECTION
MATERIALS TESTING

Sandberg
40 Grosvenor Gardens
London SW1W 0EB

Tel: 020 7565 7000
Fax: 020 7565 7100
email: ho@sandberg.co.uk
web: www.sandberg.co.uk

24 September 2020

Your Ref: Proforma Invoice Paid 02/09/20
Our Ref : 68141/M

Load Test Solutions Ltd
Unit 2 Zone 5
Clonminam Business Park
Portlaoise
R32 W2RW

For the attention of Tom Fox

Dear Tom

Re: Tensile & Metallographic Testing

Please find attached Certificates 1 to 3 including revised certificate 3 for your records.

Yours sincerely

Amy Tolladay
Senior Technician - Metallurgy Department

Enc.

SANDBERG
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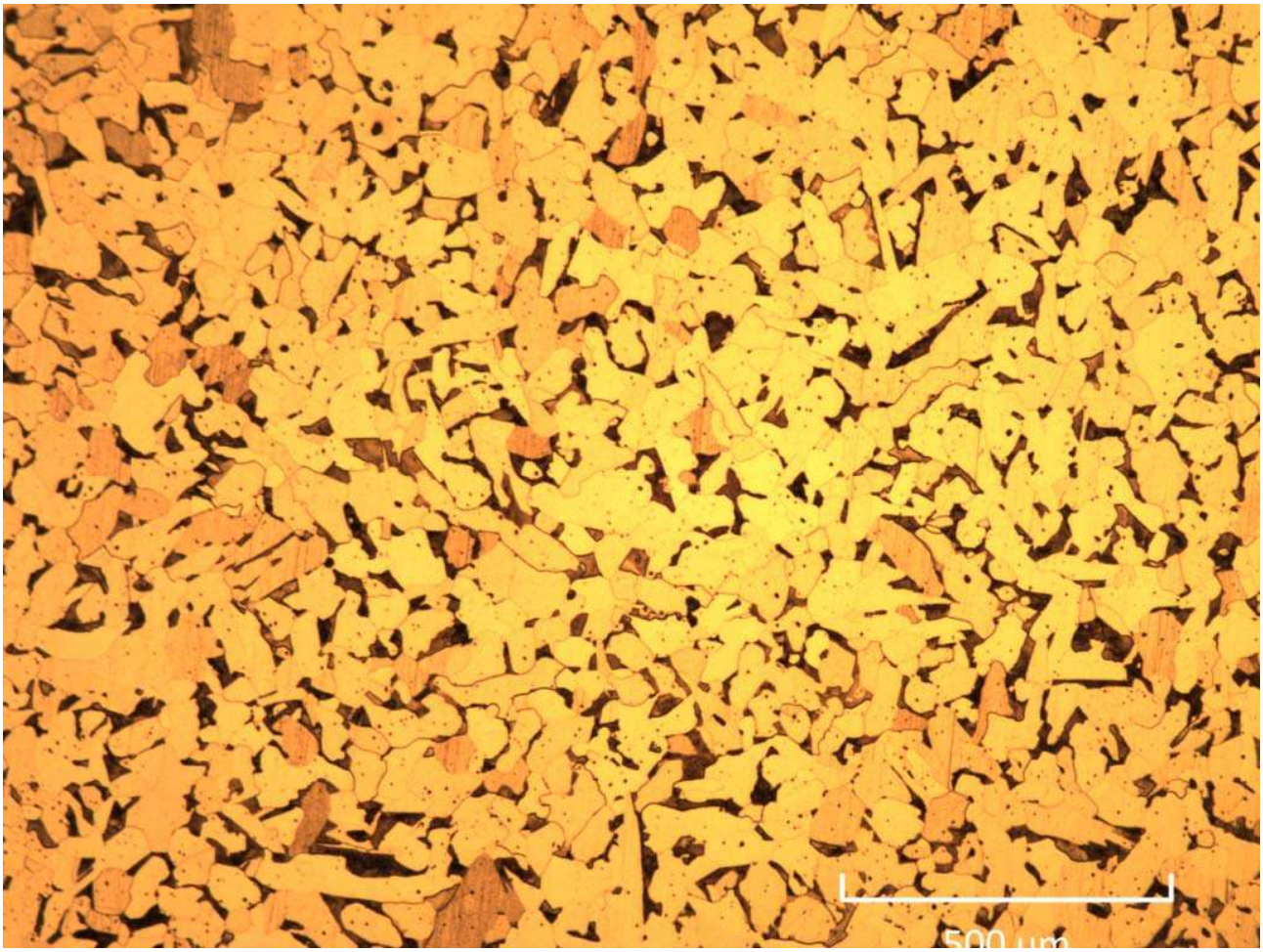
UKAS TESTING
0262

TEST CERTIFICATE
METALLOGRAPHIC EXAMINATION
TO BS EN ISO 643:2020

Certificate:	68141/M/1	**Order Ref:**	Proforma Paid 02.09.20
Samples Received:	26 August 2020	**Tested By:**	MC
Test Date:	11 September 2020	**Test Procedure:**	M5/3/2 & M13/3/0
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW.		



Met Lab Ref:	MA 784		Client Ref:	Col 1	
Examined By:	SET	Mag: x 84	Etchant:	2% Nital	Grain Size Index: 6.5
Comments:	Metallographic examination revealed a microstructure comprising of a small amount of pearlite within a ferritic matrix. This would be typical of that expected of a low carbon, low alloy steel material.				

For Sandberg LLP

Date: September 16, 2020

Simon R P Morris - Senior Associate

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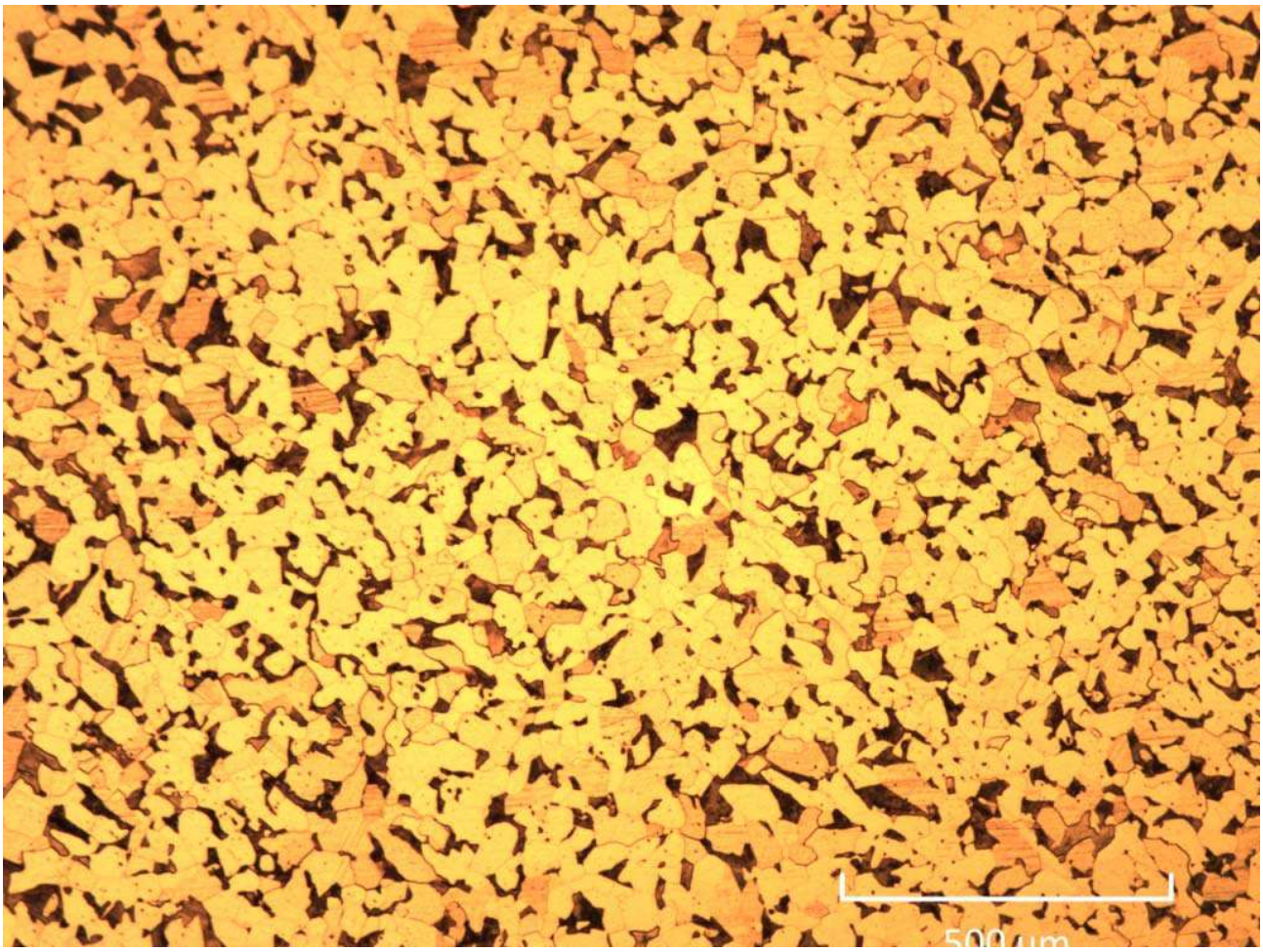
UKAS TESTING
0262

TEST CERTIFICATE
METALLOGRAPHIC EXAMINATION
TO BS EN ISO 643:2020

Certificate:	68141/M/2	**Order Ref:**	Proforma Paid 02.09.20
Samples Received:	26 August 2020	**Tested By:**	MC
Test Date:	11 September 2020	**Test Procedure:**	M5/3/2 & M13/3/0
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW.		



Met Lab Ref:	MA 785		Client Ref:	Col 2	
Examined By:	SET	Mag: x 84	Etchant:	2% Nital	Grain Size Index: 6.5
Comments:	Metallographic examination revealed a microstructure comprising of a small amount of pearlite within a ferritic matrix. This would be typical of that expected of a low carbon, low alloy steel material.				

For Sandberg LLP

Date: September 16, 2020

Simon R P Morris - Senior Associate

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UKAS TESTING
0262

TENSILE TEST CERTIFICATE
BS EN ISO 6892-1:2019 B

Certificate:	68141/M/3/Rev01	**Order Ref:**	Proforma Paid 02.09.20
Samples Received:	26 August 2020	**Tested By:**	AT
Test Date:	16 September 2020	**Test Procedure:**	M10/3/3
Client Details:	Load Test Solutions Ltd, Unit 2 Zone 5, Clonminam Business Park, Portlaoise, R32 W2RW.		

Specimen Reference		Area mm²	0.2% Proof		Ultimate Tensile		Elongation %
Met Lab Ref	Sample Ref		Load kN	Stress N/mm²	Load kN	Stress N/mm²	
MA 784	Col 1 (From 180 mm thick solid steel column)	28.65	6.34	222	12.78	446	36.0
MA 785	Col 2 (From 160 mm thick solid steel column)	28.84	6.36	221	12.48	443	36.0
Specification: BS EN 10025-2:2019 (150-200 mm thick)							
	Grade S235			185 min		340-490	21 min
	Grade S275			215 min		280-540	18 min
	Grade S355			285 min		450-600	17 min

Comments:	The tensile properties of samples MA 784 and MA 785 would conform to the requirements for a grade S275 material (150 to 200 mm thick).

For Sandberg LLP

Date: September 24, 2020

Simon R P Morris - Senior Associate

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

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AUTHORISATION FOR THE RETENTION OF MATERIALS, SAMPLES AND TEST SPECIMENS

CLIENT:	Load Test Solutions		
DATE REPORT ISSUED:	24 September 2020	JOB NO:	68141/M

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report. Thereafter we will either dispose of them or retain them for a further period, whichever you require. However, we cannot accept requests for indefinite retention and the maximum period of retention without review by yourselves is 6 months.

A charge is made for storage at £50 per 0.025 m^3 (approximately one cubic foot) or part thereof per quarter commencing at the end of our standard 2 month retention period. You will be invoiced for the storage charges at the start of each quarterly period.

If you wish to retain them for a specified period, or if you intend to collect any of these items, please complete the form below and return it to the Grosvenor Gardens address with 1 month.

PLEASE KEEP UPPER HALF FOR REFERENCE

PLEASE COMPLETE 'A' OR 'B' AND RETURN IF APPROPRIATE

A. Please RETAIN/PREPARE FOR COLLECTION* all materials.
* Delete as appropriate

If materials are to be retained please give retention period

If materials are to be collected please give intended date of collection

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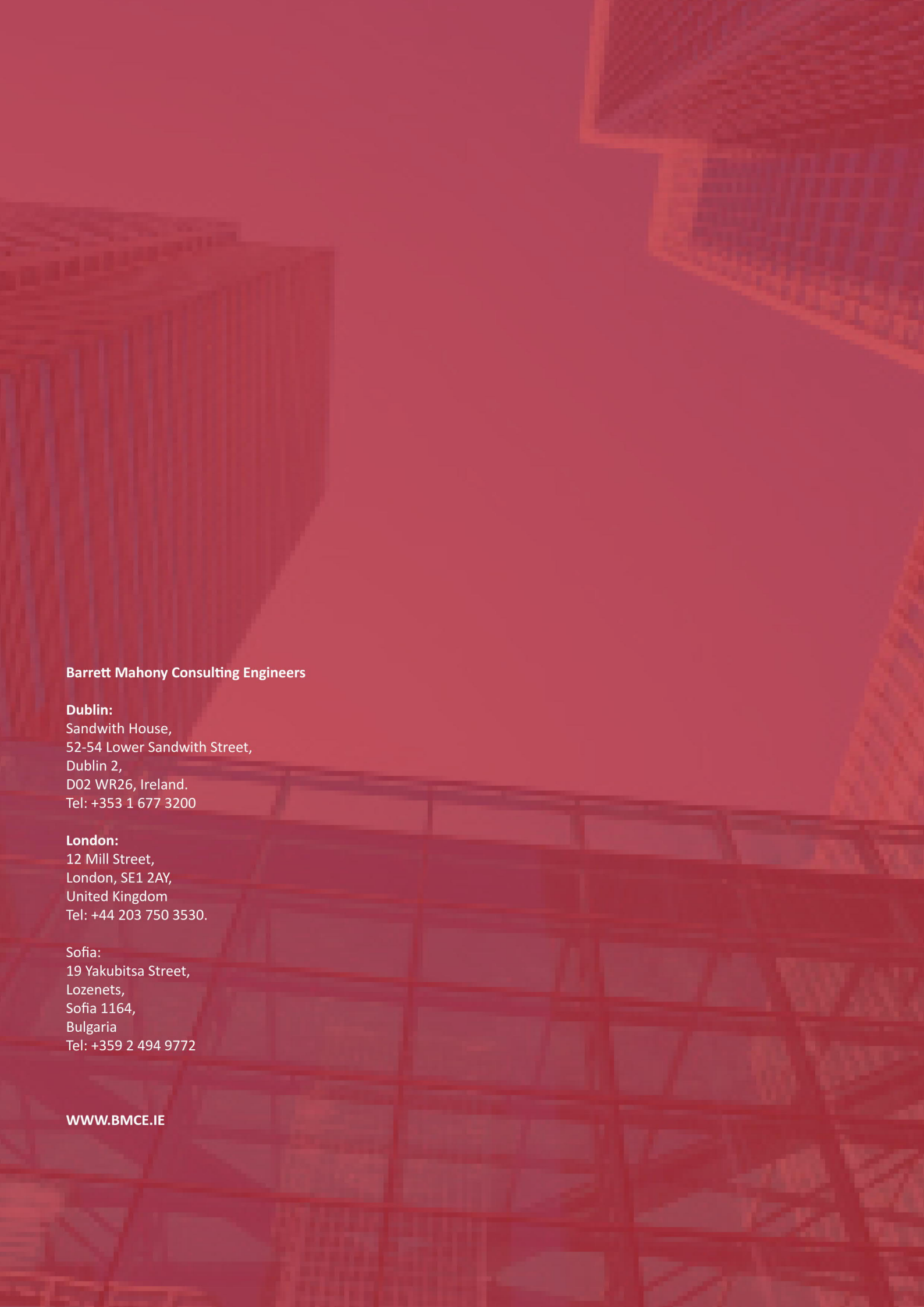
B. If you require only certain materials, samples or test specimens to be retained or collected please describe them below and give retention period or intended collection date.

(Any material not listed will be disposed)

TO BE RETAINED/COLLECTED (delete as appropriate)			JOB NO:
Contact Name		Signature	
Company		Date	



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