

25-2780

Burton Place Apartments

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for

BWP Consultant

Structural Investigation Report

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1 Executive Summary

CCS Consulting Ltd have been appointed on behalf of BWP Consultant to complete structural engineering investigations and risk assessment of Burton Place Apartments, on Burton Place, Manchester, to assist in the completion of Building Safety Case Risk Assessments. This report should be read in conjunction with the *CCS 252780-CCS-S1-XX-RP-S-0001 - Moho Structural Investigation Report (BSA)*, the Fire Strategy & associated FRAEW documentation (by others), which we understand has been commissioned by BWP Consultants. These reports are expected to feed into the overall Building Safety Case Risk Assessment.

The building was subject to visual structural inspections to ascertain the current structural condition of the building, highlight any risks associated with the structure and advise on whether any remedial works are required.

The building is primarily of steel construction, with composite concrete floor plates forming the superstructure, except at roof level, which consists of a lightweight metal deck construction. Below ground, the two-level basement construction is an in-situ concrete frame, shared between this building and Moho Building.

At the time of inspection, the building was occupied and in use. A limited visual inspection of the structure was undertaken, as finishes prevented full access to all structural elements. Structurally, the general condition of the building frame appeared to be in average condition; however, there are some elements within the building where remediation works and / or further investigations are recommended.

The primary defects to the superstructure observed are in relation to minor water ingress, and subsequent damp, mould, water staining, ponding and corrosion to finishes and internal fittings. Should these defects remain untreated and worsen, deterioration, in the form of corrosion, may occur to the primary structural frame and floor slabs.

Water ingress is also noted within the two-level basement car park. There is evidence of reinforcement steel corrosion and failed movement joints between Burton Place and Moho due to the water ingress. Minor cracks were also noted to the underside of concrete beams within the basement, primarily in the location of service penetrations. Monitoring of these defects are recommended to check for further deterioration.

During the visual inspection, several defects were observed and are most likely attributable to poor workmanship / waterproofing detailing introduced at the time of the original construction, between 2000 and 2003. These defects are expanded upon within this report.

Note this report does not comment on fire protection. any requirements or specifications in this regard should be determined by the appointed Fire Engineer or Fire Consultant.

2 Introduction

2.1 BSCR Requirements

This report has been prepared to address structural considerations relevant to the Building Safety Case Report, which is required for buildings defined as Higher-Risk Buildings (HRBs) under the Building Safety Act. The Building Safety Case Report is an integrated, multidisciplinary document for which the Principal Accountable Person is responsible for compilation and submission.

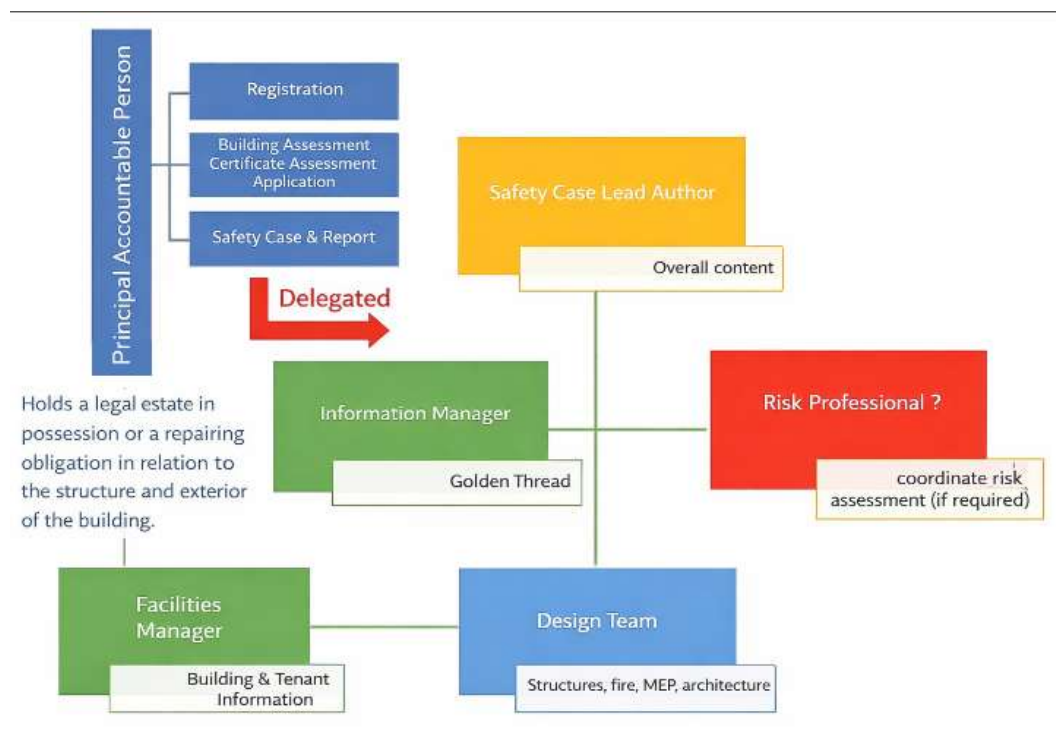


Figure 1 - Safety Case Report - Typical Roles

CCS Consulting Ltd has provided initial input to the Building Safety Case Report in the capacity of Structural Engineering Consultant. To complete the Building Safety Case Report, additional information will be provided by other parties and specialist consultants to develop a holistic understanding of the building and the interaction between its various systems. Collectively, these systems contribute to the overall safety and performance of the building.

The contributing parties are expected to include, but are not limited to, the following:

- The Principal Accountable Person (PAP)
- Safety Case Lead Author
- Risk Professional
- Information Manager

- The Building/Facilities Manager
- Building Surveyor
- Building Services Consultant
- Fire Specialist

The Safety Case Report is a live document and, in accordance with Section 85 of the Building Safety Act, must be reviewed and updated when changes are made to the building or when new investigatory or analytical information becomes available.

This report addresses the structural aspects of Burton Place Apartments and comprises the following:

- Key descriptive information relating to the existing building.
- Identification of materials and construction techniques known to have been in use at the time of the building's construction.
- Observations on the condition of the existing structure, insofar as this could be determined from non-intrusive investigations.
- Identification of potential structural incident scenarios relevant to building safety risks affecting occupants and those in the vicinity of the building.

In preparing this report, certain open questions and outstanding actions may remain. It will be necessary for the Principal Accountable Person to obtain any missing information and update the associated risk assessments accordingly. The findings should be reviewed on a regular basis to ensure that new information and any subsequent changes to the building are appropriately reflected in the Safety Case Report.

2.2 Site Description

Burton Place Apartments is located on the junction between Burton Place and Ellesmere St, in Castlefield, Manchester (M15 4PT). The site is approximately 1 km west of Manchester City Centre and is centred on National Grid Reference 382727, 397309.



Figure 2 - 3D Aerial View of Burton Place Apartments Building (Taken from Google Maps 2025).

The site is accessed from Ellesmere Street. Access to the site was coordinated by BWP Consultant. CCS Consulting Ltd was granted access to the ground floor commercial units, the 2-level basement car park, internal communal areas and various residents' apartments.

The site is a brownfield development. Historical imagery obtained from Google Earth indicates a different building profile and form of construction at this location in between December 2000 and April 2003.



Figure 3 – Historical Mapping of the Site from December 2000.

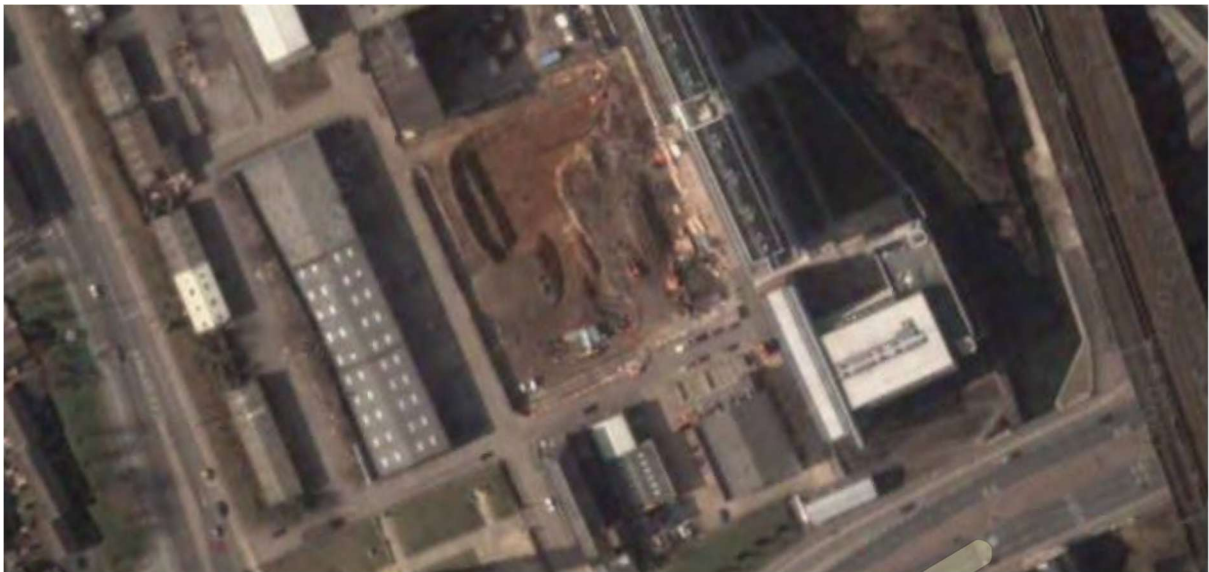


Figure 4 – Historical Mapping of the Site from April 2003.

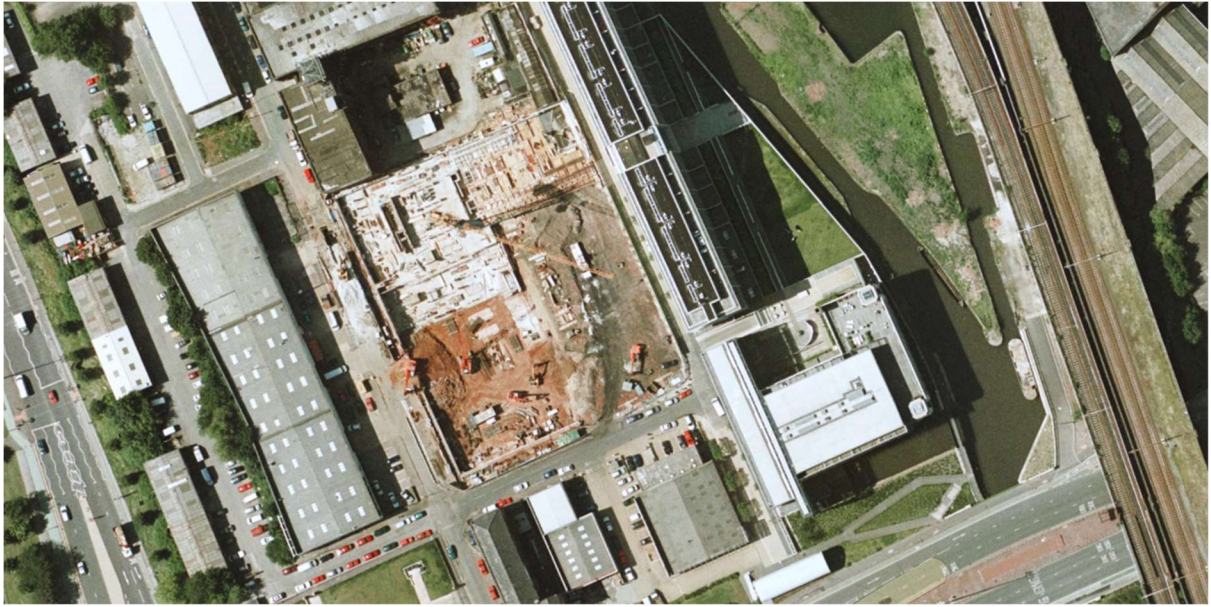


Figure 5 – Historical Mapping of the Site from August 2003.

2.3 Structural Engineering Brief & Scope of Works

CCS Consulting Ltd has been appointed by BWP Consultants to undertake a structural investigation of Burton Place Apartments, Burton Place, Manchester, in support of the completion of the Building Safety Case Risk Assessments. This report should be read in conjunction with the *CCS 252780-CCS-S1-XX-RP-S-0001 - Moho Structural Investigation Report (BSA)*, the Fire Strategy and associated FRAEW documentation prepared by others, which we understand have been commissioned by BWP Consultant. These documents are intended to inform the overall Building Safety Case Risk Assessment.

The scope of services provided by CCS Consulting Ltd comprised a visual, non-intrusive survey of the property, including commentary on the quality of construction, the structural stability of the building, identification of risks associated with the structure, and advice on whether remedial works may be required.

The observations, comments, and assessments contained within this report are based on the following:

- Inspections undertaken during site visits on 5th and 6th February 2026. Access was provided to communal areas on all floors, maintenance areas including plant and service rooms, the basement car park and several residential apartments, with the permission of the occupants.
- General observations of the external elevations from ground level.

No intrusive or opening up works to the structure were undertaken as part of this commission, other than observations of structural elements exposed at the time of the survey.

In preparing this report, certain questions may remain outstanding actions may be required. It will be necessary for the Principal Accountable Person to obtain any missing information and update the associated risk assessments accordingly. The findings should be reviewed on a regular basis to ensure that new information and any subsequent changes to the building are appropriately reflected in the Safety Case Report.

2.4 Inspections & Surveys

The visual inspection was undertaken by CCS Engineers Katherine Etchells and Joseph Firth on 5th and 6th February 2026. Access to the building was facilitated by Realty Management Ltd and included all communal areas, back-of-house areas at basement and roof level access, and several occupied apartments, with the permission of the residents.

CCS Engineers were granted access to the following areas to carry out visual observations of the structural arrangement and condition of the building:

- Two-level car park, comprising a two-level basement (this is shared with the Moho building, refer to report *CCS 252780-CCS-S1-XX-RP-S-0001 - Moho Structural Investigation Report (BSA)*).
- Three internal staircases
- Communal areas on each floor, including corridors, lobbies and refuge / storage areas.
- Ground Floor Commercial Units (where access was granted)
- Apartments (where access was granted)
- Roof level access from Level 7.

A visual, non-intrusive survey of the building was undertaken to identify defects affecting the existing structure. No opening-up works were carried out as part of this inspection.

2.5 Survey & Reporting Limitations

CCS Engineers were unable to access all parts of the development due to occupancy; however, a representative sample of the structure at each floor level was achieved. Access was restricted to a limited number of locations, as not all apartments were available for inspection. Whilst the surveyed areas were selected to provide a representative overview of the structure, it cannot be confirmed that un-surveyed areas are in a similar condition.

All apartments were fully plaster boarded, with boxing out constructed around all structural columns. As a result, the column locations could be identified and confirmed to align with the drawings provided; however, the columns size and the structural arrangement of the beams and slabs could not be confirmed.

The existing foundations and ground conditions could not be inspected; however, no evidence of settlement was observed. A desktop study of the ground conditions will be completed at part of this report to compare with the proposed foundation design.

2.6 Statement

CCS' Conditions of Engagement, together with the Company's standard Terms and Conditions of Appointment, are provided in Appendix B of this report. These documents include certain limitations and exclusions that define the scope of our brief. If any of these limitations or exclusions raise concerns, we recommend that you contact this office promptly, as you may need to consider extending our brief and/or commissioning further specialist investigations.

This report has been prepared solely for the benefit of the addressee, to whom we owe a duty of care. It is confidential and may not be disclosed, in whole or in part, to any third party without the prior written consent of CCS Consulting Ltd regarding both the form and context of such disclosure. Any consent granted does not entitle the third party to rely on the report, nor does it confer any rights under the Contracts (Rights of Third Parties) Act. The report may not be assigned to any third party.

3 Building Information

3.1 General Description

The building comprises nine levels, including two basement levels and seven above-ground floors. The basement levels function as a shared car park between this building and the Moho Building on Ellesmere Street. Levels 1 to 6 serve as residential apartment floors, while Level 0 (ground floor) accommodates a series of eight number commercial units. The building has a 'C'-shaped plan. Throughout this report, the building will be divided into the 'C' body and the 'C' returns, as indicated in the figure below.

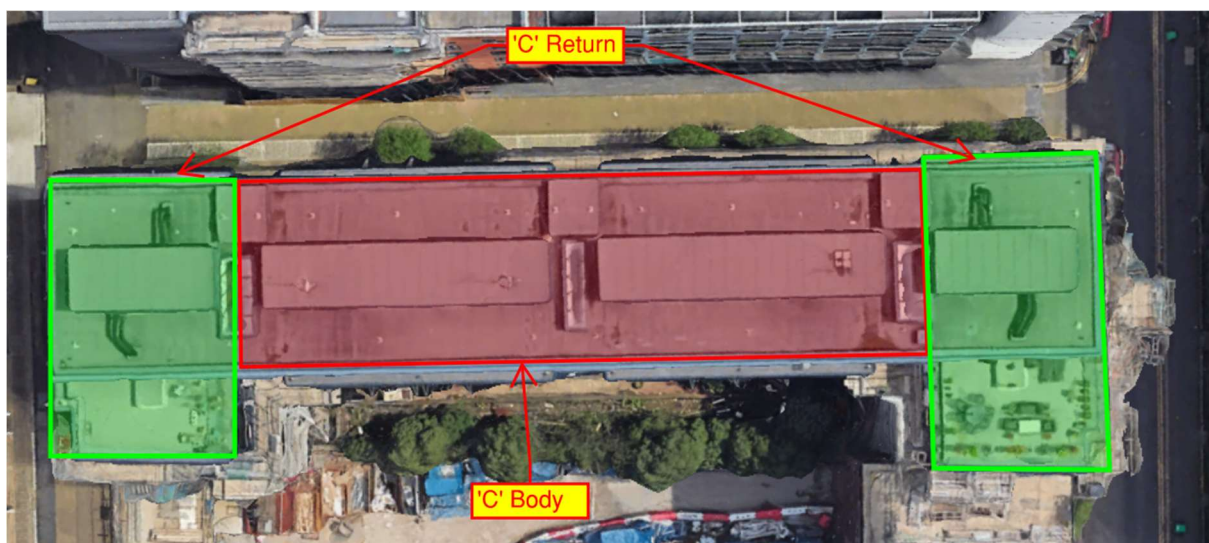


Figure 6 - Building Reference Diagram

The building is primarily steel framed construction, with composite concrete floor plates forming the superstructure, except at roof level, which consists of a lightweight metal deck construction. Below ground, the construction is an in-situ concrete frame, shared between this building and the Moho Building. Stability is provided by braced bays throughout the steel frame at each level and floor diaphragms.

Structurally, the general condition of the building frame was in average condition, however, some elements within the building are considered poor condition and require remediation works and / or further investigations.

The overall height of the building is approximately 24 m to the roof level, based on the structural drawings provided. The 2-storey basement extends approximately 6 m below ground level (approximately 3 m per level).

Burton Place comprises 90 residential units. A staircase and lift are provided within each block (three total) of the building. The building is understood to have been constructed around 2003.

3.2 High Risk Buildings

The key criteria for a high-risk building are:

1. Building Use - What is the building used for? Does it meet any of the included or excluded categories of building?
 - a. The building contains over two residential units – Burton Place contains 90 residential apartments.
 - b. The building is not a secure residential institution.
2. Legal definition of building - How does the building definition in Regulations apply to the building structure?
 - a. The structure meets the definition of a building under Regulation 4 of The Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023.
3. Building height / No. of storeys - How do the methods for measuring height and storeys in the Regulations apply to the building? Does the building meet either the 18-metre or 7- storey height threshold when measured using these methods?
 - a. The building is seven-storeys (plus basements), and the top floor is over 24 m in height.

Therefore, Burton Place Apartments meets the criteria for a High-Risk Building.

3.3 Relevant Design Codes & Building Regulations

The following Codes and Standards relating to structural aspects of design are concurrent with the date of construction and plans provided. This list comprises the “general” codes envisaged to be used based on the age and type of construction and there may be further codes of practice used in the original design which are not referenced.

- Eurocodes and corresponding National Annex Design Codes
- Building Regulations – Approved Document A - 2000 Edition

The Building Regulations applicable at the time of the construction of the building (circa 2003) would have been the Building Regulations 2000, along with the relevant guidance contained within Approved Document A (Structure) & B (Fire Safety) – 2000 Edition, including subsequent amendments issued in 2002.

Building class requirements within Approved Document A were adopted to ensure buildings are sufficiently robust to sustain a limited extent of damage or failure without collapse. In the 2000 Edition, Burton Place would be classified as a Class 2B building as it is a residential apartment building greater than 4 storeys but not exceeding 15 storeys.

Under the 2000/2002 version of Approved Document B, the building would be categorised as Purpose Group 2(b): Other Residential, which includes self-contained flats and similar residential accommodation. A minimum of 120 minutes (2 hours) fire resistance for loadbearing walls, floors, and structural frames.

3.4 Building Drawings

Structural “as-built” drawings have not been made available for review; however, construction issue drawings have been provided by Joule Consulting Engineers Ltd.

The drawings indicate the general arrangement and sections of the structure, including member sizes and reinforced concrete (RC) detailing.

These General Arrangement drawings have been reviewed and used to cross-reference the as-built condition for the purposes of this structural assessment.

3.5 Missing Information

At present, no structural engineering reporting or calculations has been shared with CCS Consulting Ltd. Information on fire protection elements such as fire-boarding or intumescent coatings should be obtained, if possible, for review by the relevant Fire Consultant as part of the wider Building Safety Case Report.

3.5.1 Building Control

CCS Consulting Ltd has not had access to the relevant building control portal or information.

It is unknown whether any further building information exists within the building control database. It is recommended that the building's Accountable Person, or Principal Accountable Person make further efforts to obtain information which may be available from the database.

3.5.2 Archived Paper-Based Storage

It is unknown whether any further building information exists a paper-based archive. It is recommended that the building's Accountable Person, or Principal Accountable Person make further efforts to obtain information which may be available from archive storage.

4 Building Construction

4.1 Building Risk Classification

Burton Place is classified as a Class 2B building under the Building Regulations 2000, which were in force at the time of construction (circa 2003). Approved Document A of the Building Regulations sets out varying levels of structural robustness requirements depending on building type and size.

For new buildings designated as Class 3, a systematic risk assessment is required, considering all normal hazards that could reasonably be foreseen, as well as any abnormal hazards. As Burton Place falls within Class 2B, a systematic risk assessment would not have been required to satisfy the Building Regulations in effect at the time.

Notwithstanding this, assessments conducted under the Building Safety Act may consider the standards applicable at the time of construction. In accordance with the 'non-worsening' principle, any potential deficiencies associated with historical standards should be identified and risk-assessed to determine whether they present an unacceptable level of risk.

4.2 Primary Load-Bearing Structure

The primary vertical load-bearing structure of the building consists of a hot-rolled steel frame incorporating Universal Beams (UB), Universal Columns (UC), Rectangular Hollow Sections (RHS), Parallel Flange Channels (PFC), and Circular Hollow Sections (CHS). Columns are arranged on a variable grid ranging from 3.6 m to 4.5 m, aligned with the internal layout. Secondary beams throughout the floor plate are provided at a maximum spacing of 3.6 m.

Within the 'C' profile of the building, three columns typically extend down to ground level, while two additional columns terminate at first-floor level to support cantilevered sections of approximately 1.3 m.

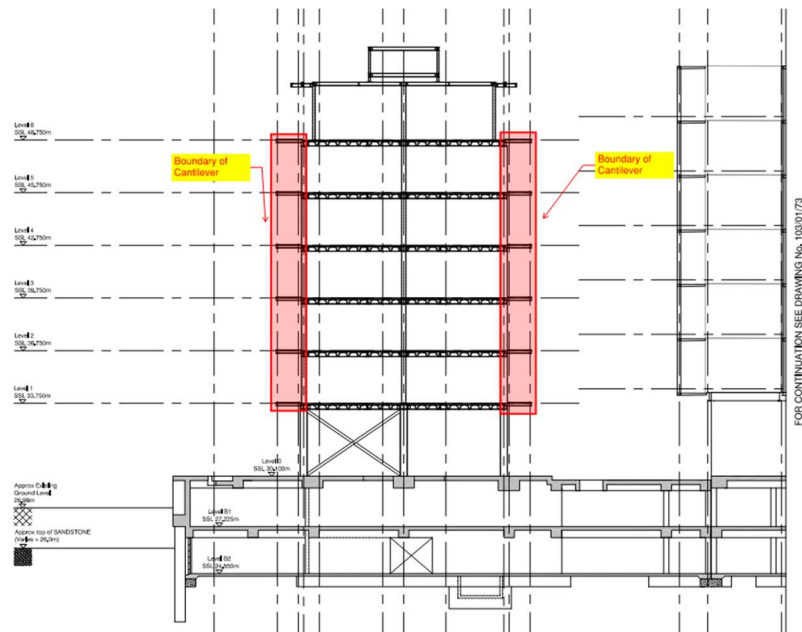


Figure 7 - Cantilever Within The 'C' Body Of The Building 'Section B-B' (Extract From Joule Consulting Engineers Ltd Drawing Reference 103-01-71)

In the wider return leg of the building, seven columns are provided, including one that supports a cantilever of similar length.

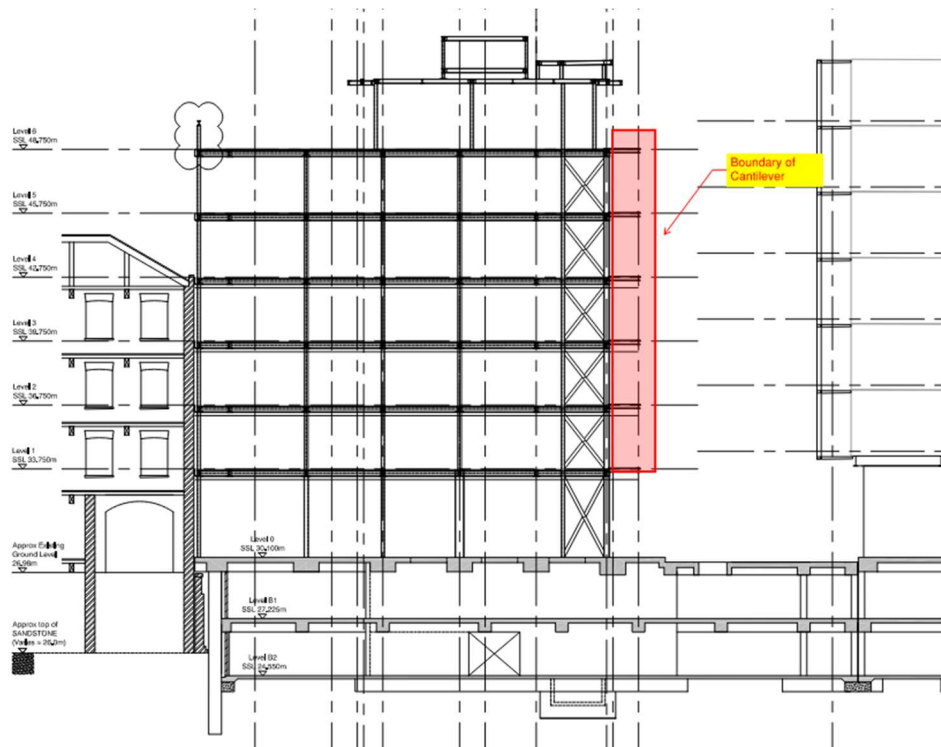


Figure 8 - Cantilever Within The 'C' Return Of The Building 'Section C-C' (Extract From Joule Consulting Engineers Ltd Drawing Reference 103-01-72)

Balconies are integrated into the primary steel frame and are cantilevered where required, typically extending approximately 1.3 m beyond the supporting columns. Cantilevered sections are assumed to be supported through moment-resisting connections, as no struts or additional bracing elements are visible. Column and beam profiles vary depending on location and loading requirements.

4.3 Floor Construction

The building is shallow composite floor slabs, positioned within the depth of steel beams. Steel plates welded to the bottom flange provide bearing for the decking, allowing the slab to sit within the beam depth. Maximum floor spans are approximately 3.6 m between beam centres.

- Composite floor systems vary by location:
- Atriums and corridors: 200 mm concrete slabs on Holorib Z28 profiled metal decking.
- Balconies: 150 mm concrete slabs on Holorib Z28 decking.
- Perimeter apartments: SD225 decking with appropriate concrete topping.

No structural screed is indicated for the composite floor slabs.

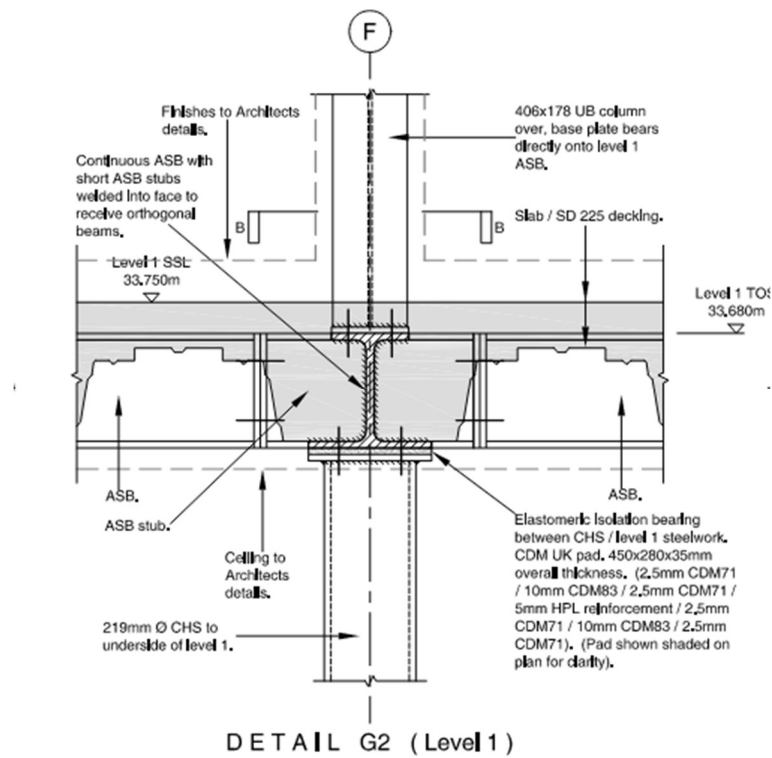
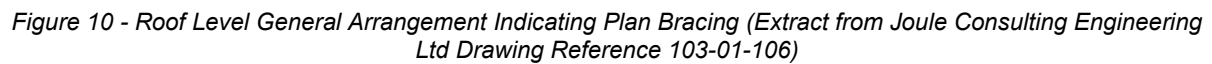


Figure 9 - Typical Floor Detail (Extract from Joule Consulting Engineers Ltd Drawing Reference 103-01-125)

4.4 Roof Construction

The roof structure is formed from a lightweight steel framing system supported off the primary steel frame below. Secondary steel members span between primary beams and support the roof build-up.

The roof build-up comprises a metal deck with insulation and waterproofing layers above. The exact thickness and specification of the insulation and waterproofing system have not been provided within the available drawings. No specialist roofing details have been issued, and therefore, commentary is limited to the primary supporting structure.



A lightweight steel-framed housing structure is provided at the roof level. This to accommodate plant / equipment enclosures. The housing and support frame for the plant / equipment is constructed from steel members forming a framed enclosure supported off the roof steelwork below.

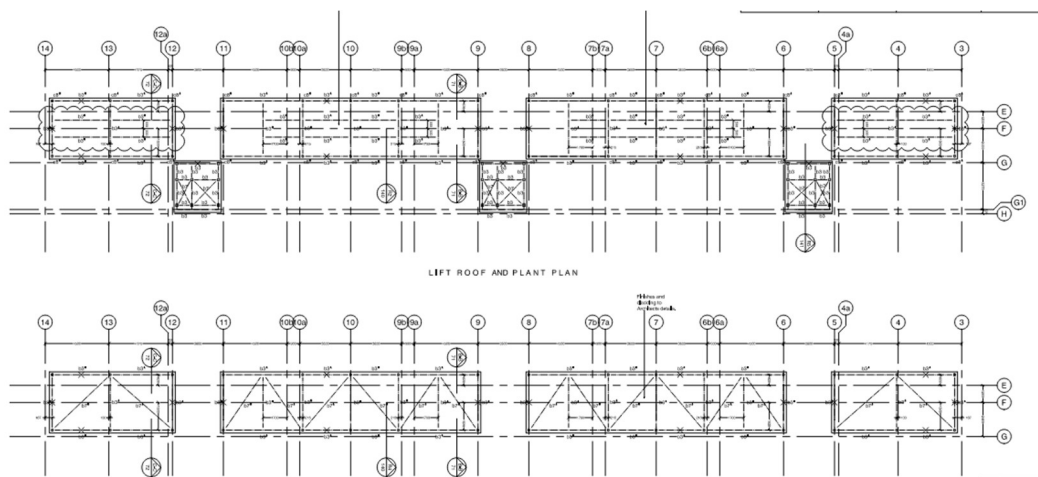


Figure 11 – GHA Building, Superstructure, Lift roof and Plant Roof Plan (Extract from Joule Consulting Engineering Ltd Drawing Reference 103-01-107)

4.6 Staircases Construction

The staircases throughout the building are constructed entirely from steel.

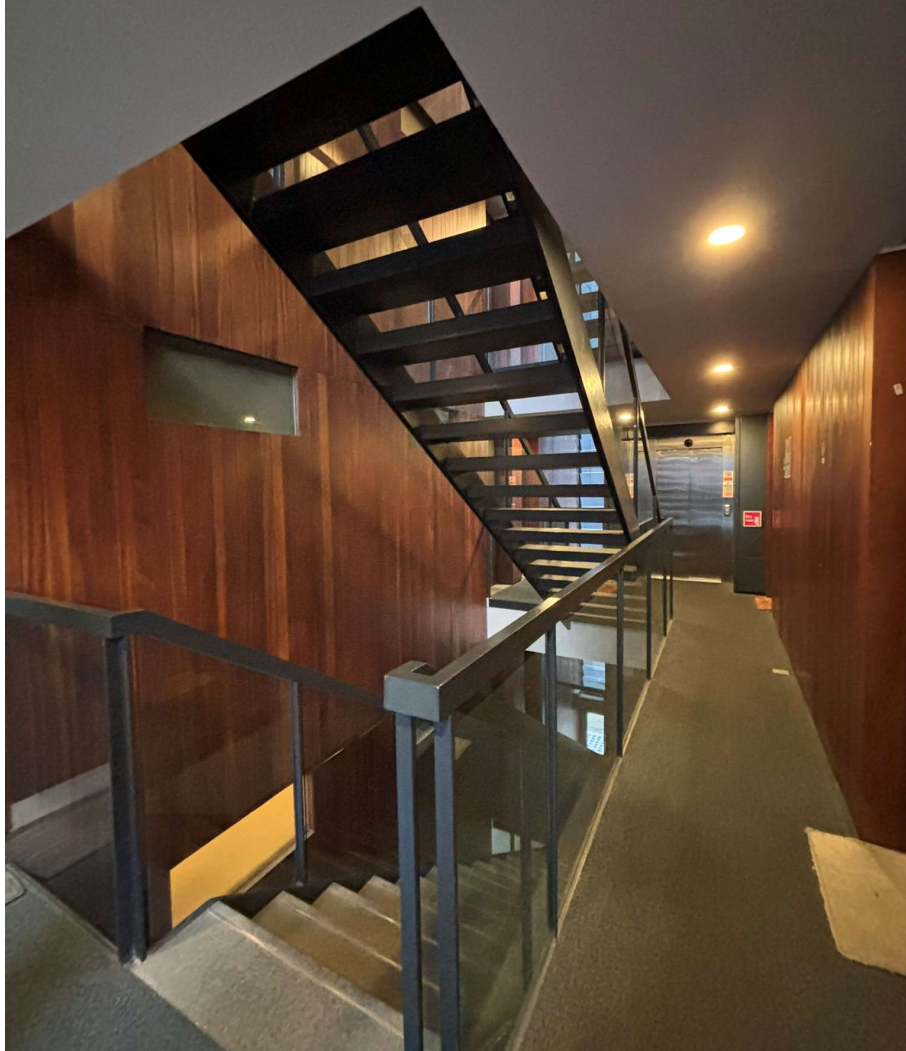


Figure 12 – Typical photograph of steel staircase

Each stair flight comprises 250 mm × 12 mm plate stringers. The treads are formed from 10 mm thick angle plates fully welded to the stringers, creating a ladder-type frame arrangement. This welded steel assembly forms the primary stair structure at all levels, including the basement.

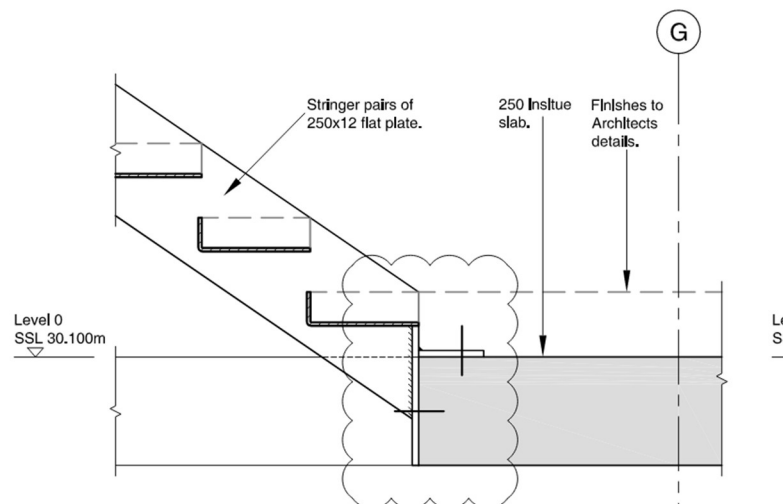


Figure 13 - Extract of Steel Staircase (Extract from Joule Consulting Engineering Ltd Drawing Reference 103-01-136)

Edge protection / barrier surrounding the staircase comprises of glazed cantilever panels.

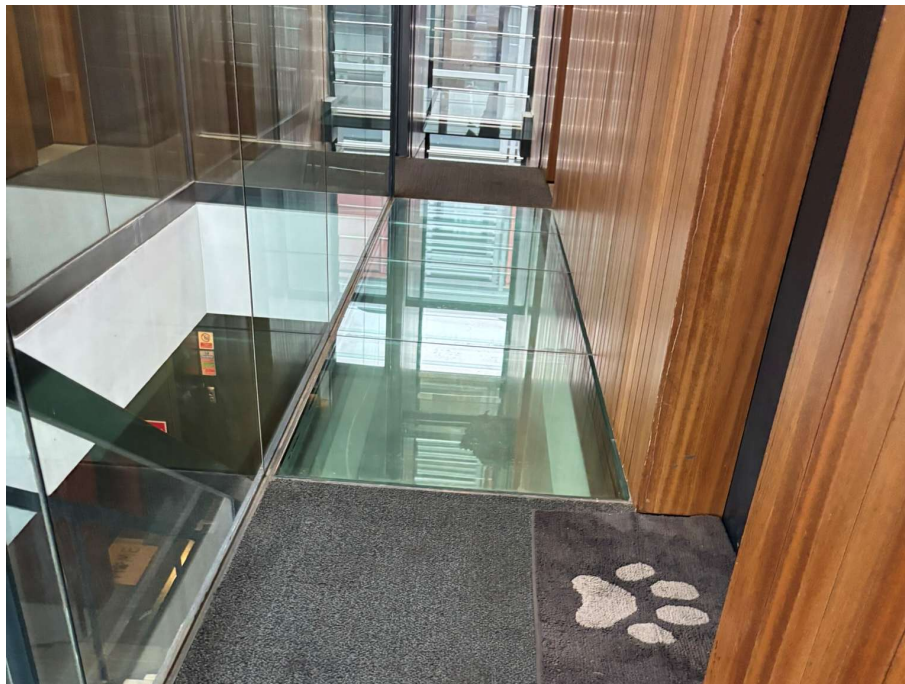


Figure 14 - Typical Photograph of Staircase Edge Protection / Barrier

4.7 Basement Construction

The basement structure comprises reinforced concrete columns and beams supporting suspended slabs at Ground and Upper Basement (Level B1).

Columns are approximately 300 mm × 800 mm and 300 mm × 400 mm, while beam widths vary from 220 mm to 600 mm, depending on location and structural requirements.

Slabs are 200 mm thick reinforced concrete with A393 mesh at the top; no bottom mesh is indicated. Suspended slabs are supported on downstand beams and columns, arranged to accommodate functional requirements including vehicle circulation.

The lowest basement slab is assumed to act as a ground-bearing slab.

4.8 Ground Conditions, Retaining Structure, and Foundations

No site-specific geotechnical investigation has been provided to confirm the suitability of the proposed foundation solution. Historic data from the British Geological Survey (BGS) indicates a borehole located approximately 200 m from the site, suggesting that the subsurface may comprise sandstone strata approximately 2 m below ground level, with overlying loose fill or soil layers. Local variation in strata should be expected.

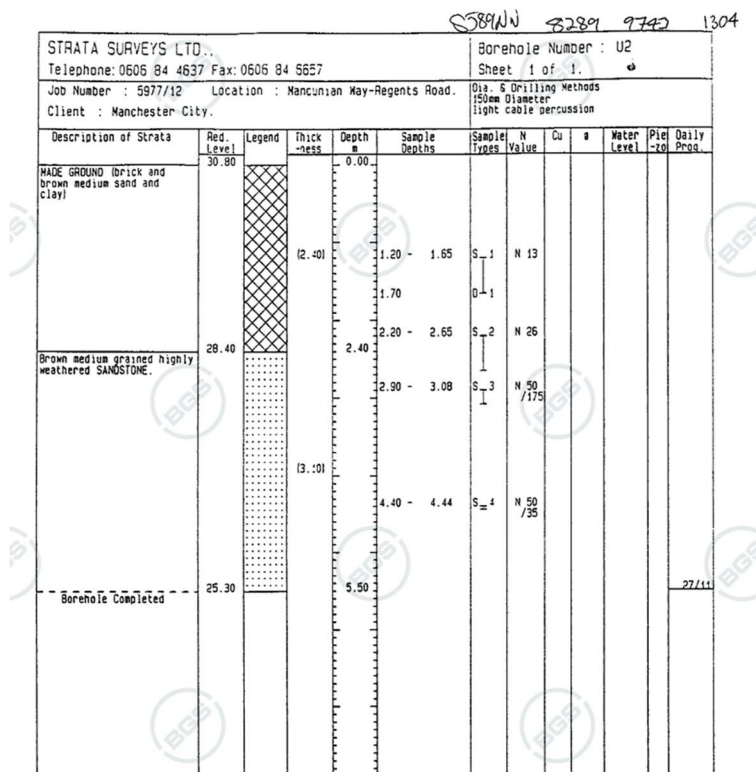


Figure 15 - Borehole Reference SJ89NW1611 (Extracted British Geological Survey Website)

Earth retention around the basement perimeter is provided by 600 mm diameter bored cast-in-situ piles, forming a perimeter retaining system. The piles are assumed to provide lateral support against earth pressures at basement walls. The type of piles (secant or contiguous) is not specified in the drawings.

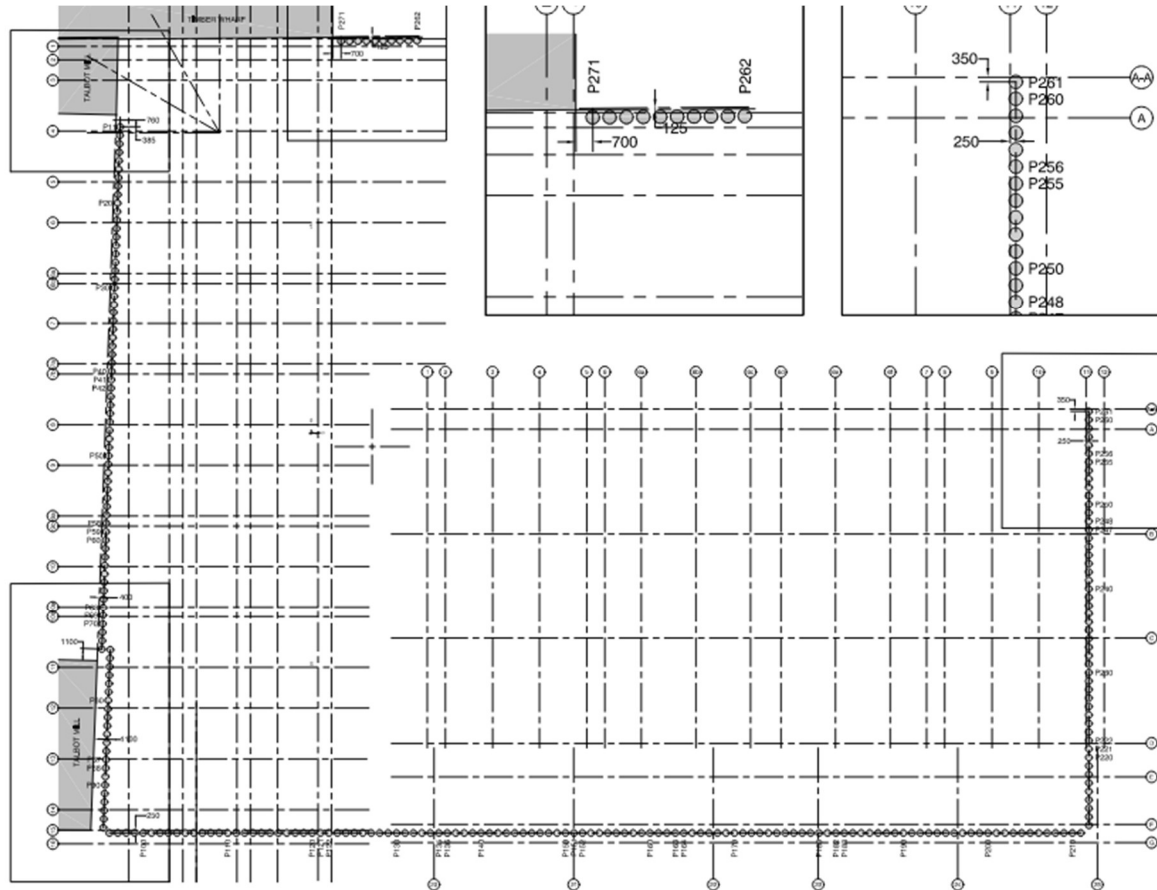


Figure 16 – Earth Retaining Structure arrangement (Extract from Joule Consulting Engineering Ltd Drawing Reference 103-01-51)

Suitability of pile-retaining structure: Bored piles are conceptually suitable for retaining basement walls in sandstone strata. The 600 mm diameter is reasonable for typical basement wall heights and moderate soil pressures. Piles must penetrate competent sandstone to provide adequate lateral resistance. Secant piles would provide additional watertightness, while contiguous piles can be adequate for structural retention if water ingress is managed.

The foundation system for the superstructure comprises pad foundations for columns. Pad foundations are presumed to be reinforced concrete; however, no specific sizes, depths, reinforcement, or concrete grades are provided.

Suitability of pad foundations: Sandstone is typically competent and capable of supporting significant vertical loads if intact. Pad foundations bearing on sandstone at ~2 m depth is generally feasible for high compressive loads.

4.9 Vertical Load Transfer

Vertical loads in the building, including dead and imposed loads, are transmitted from the roof and floors down to the foundations through a continuous chain of structural elements.

At the roof, dead loads from the metal deck, roof coverings, plant housings, and equipment, together with live loads such as maintenance personnel or snow, are supported by roof beams. Any localised pop-outs or plant housing are supported on steel frames that deliver their loads directly into the primary beams and columns.

Composite floor slabs carry their own weight and imposed loads, transferring these through secondary beams into the primary beams. Cantilevered sections of approximately 1.3 m rely on moment-resisting connections in the primary frame to safely convey their loads into columns without additional struts.

Steel stair flights and cantilevered balconies transfer their self-weight and applied loads directly into adjacent beams and columns, which then feed into the primary vertical frame.

At basement level, the primary columns deliver combined vertical loads into pad foundations and, where present, the ground-bearing slab. Suspended basement slabs transfer column and beam loads to supporting down stand beams and columns, rest on pad foundations. The piles additionally carry the weight of the basement walls and any retained earth pressures, transmitting the forces into competent sandstone or other load-bearing strata. This arrangement establishes a continuous vertical load path from roof to ground.

4.10 Lateral Load Transfer

Lateral loads from wind or other horizontal forces are resisted by a combination of vertical bracing, floor diaphragm action, plan bracing at roof level, and the stiffness of the basement structure.

Above basement level, vertical steel cross-bracing provides the primary lateral resistance. Floor slabs act as horizontal diaphragms, collecting lateral forces and transferring them to vertical bracing elements. Cantilevered sections rely on moment-resisting connections in the frame to resist horizontal deflection where no direct bracing is present.

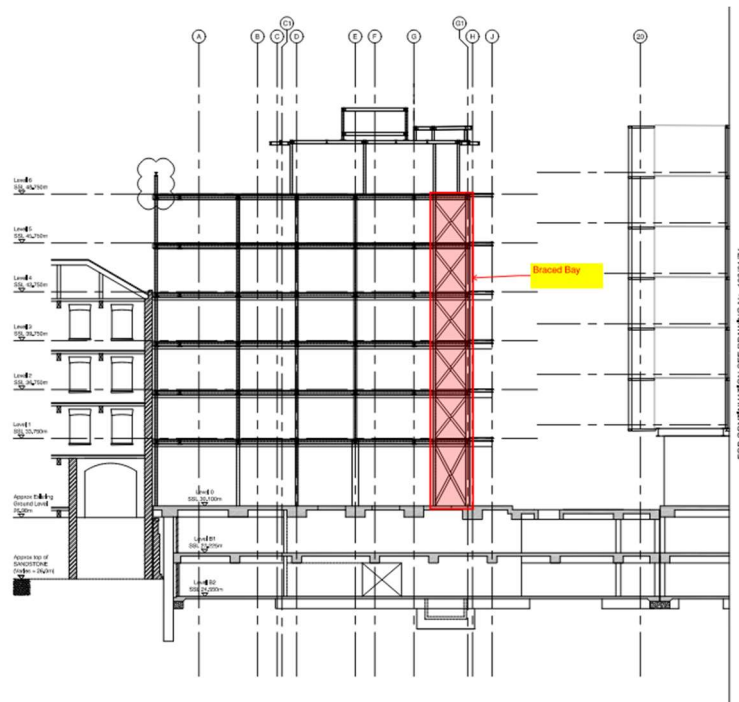


Figure 17 - Bracing 'Section C-C' (Extract from Joule Consulting Engineers Ltd Drawing Reference 103-01-72)

At roof level, plan bracing is provided to accommodate the limited lateral capacity of the lightweight metal deck. This includes additional bracing around roof pop-outs and roof housing, which are further supported by vertical bracing within the housing. These elements ensure that lateral forces from roof features are transferred effectively into the primary vertical bracing system.

At basement level, the perimeter bored piles form a lateral retaining system, resisting earth pressures and providing stiffness to the basement walls. The basement slab, columns, and down stand beams also contribute to lateral stiffness, helping distribute horizontal forces throughout the basement structure.

4.11 Façade and Parapet

The façade predominantly consists of a curtain wall system with glazed panels. At ground floor, glazing is fully exposed for transparency, while at upper levels, glazing is recessed and paired with metal louvers for shading, privacy, and ventilation. In corridors, louvers span between steel columns.

Specialist façade drawings have not been provided for this report, therefore, it is not possible to comment on the detailed façade build-up, support, or construction in apartment areas. Basement levels do not feature a façade.

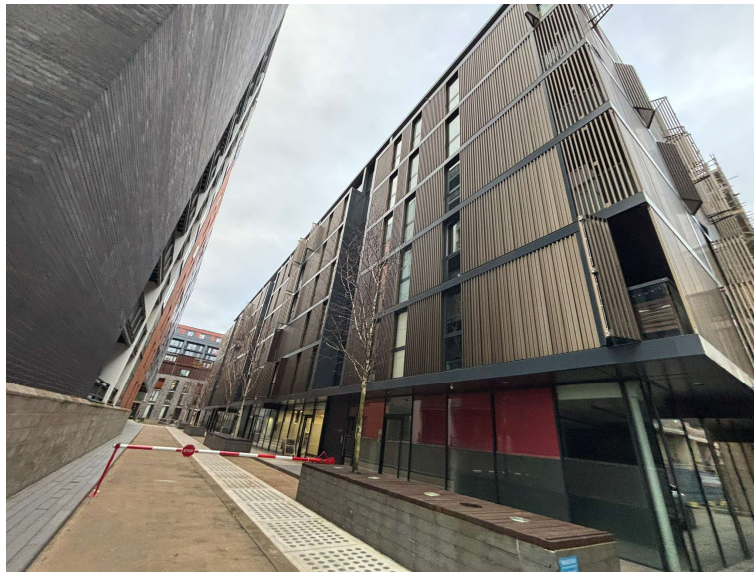


Figure 18 - Typical Photograph of Facade

The perimeter is glazed with still uprights, maintaining a consistent vertical rhythm. At Level 7, the parapet is glazed with still uprights. In corridors, louvers span between steel columns.

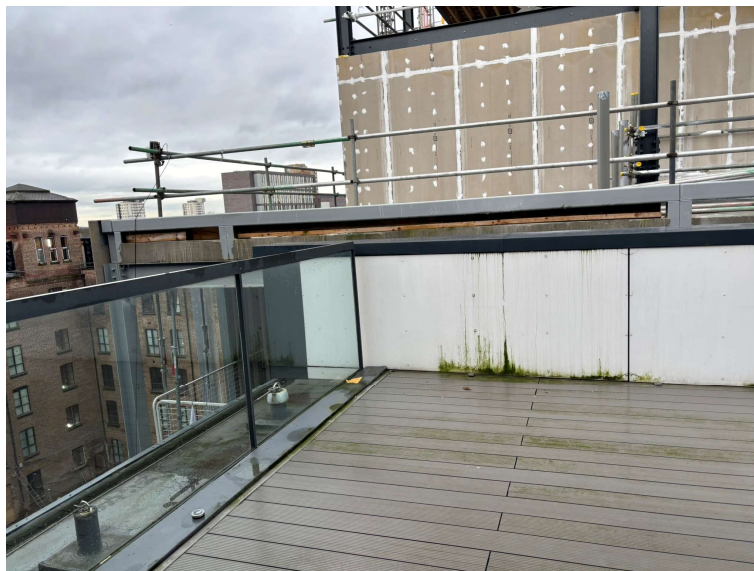


Figure 19 – Typical Photograph of Level 7 Parapet

5 Materials or Construction Techniques Observed with Known Challenges

The materials and / or techniques discussed in the section have been identified as being in use around the time of the construction of Burton Place Apartments. An impression on the condition of the building is presented in Section 6 and a risk assessment has been completed in Section 6.1.

5.1 Steelwork (General)

The primary frame of the building from ground floor to roof is formed from hot rolled steelwork. The performance and level of robustness provided by steel framed construction depends on several interrelated factors, including:

- The grade and specification of the structural steel, including yield strength, toughness and compliance with the relevant Standards at the time of construction.
- The quality of fabrication and erection, including dimensional tolerances, welding quality, bolted connections and site workmanship.
- The form and effectiveness of corrosion protection systems, such as paint coatings, galvanising or intumescent fire protection.
- The age of the structure and the exposure environment, particularly where moisture, condensation, pollutants or aggressive atmospheres are present.
- Bolted connections may exhibit loose, missing or corroded fixings, inadequate preload or non-compliance with current standards, while welded connections can suffer from poor workmanship, cracking, lack of fusion or fatigue-related defects.
- The adequacy of detailing, noting that many older steel frames may not satisfy the robustness, fire resistance or durability requirements of current Standards and Codes of Practice.

Steel structures are inherently susceptible to corrosion when exposed to moisture and oxygen, particularly where protective coatings are damaged, poorly applied or have deteriorated with age. Corrosion commonly initiates at connections, welds, bolt groups and locations prone to water ponding or condensation.

Progressive corrosion reduces the effective cross-sectional area of steel members, resulting in a loss of strength and stiffness. Corrosion at connections can impair load transfer and, in advanced cases, may compromise local member performance or overall structural stability.

Steel relies on applied fire protection systems to achieve the required fire resistance. Damage or loss of these systems, whether due to impact, corrosion of the substrate or poor maintenance, will reduce fire performance. As steel rapidly loses strength at elevated temperatures, the integrity of fire protection is critical to maintaining structural stability in a fire.

5.2 Concrete (General)

The two-level basement construction, including retaining structures and foundations are formed from concrete. The performance and level of robustness provided by concrete construction depends on many factors:

- The concrete mix including quantity and type of aggregate used in the mix, water content, type of cement used and cement content.
- Thickness/size of the element and cover to the embedded reinforcing steel. (and thus, protection of reinforcement)
- Age (effects of carbonation and chlorides (see below)
- Many older concrete frames are likely to have detailing shortcomings when judged by the requirements of modern Standards and Codes of Practice.

Concrete deteriorates over time due to carbonation, which can lead to acceleration of corrosion to the embedded reinforcing steel in the presence of water. The embedded reinforcement should be protected by the concrete cover, specified at the design stage in accordance with exposure conditions and the intended design life of the structure.

The product of corrosion (rust) is significantly greater in volume than original steel, generating tensile stresses within the surrounding concrete. This typically results in cracking and progressive spalling of the concrete cover, leading to a need for repair. In advanced cases, reinforcement corrosion may ultimately compromise structural integrity. Water ingress through the building fabric can significantly accelerate this process.

The concrete cover also contributes to fire resistance. Loss of cover due to spalling will therefore reduce both the durability and fire performance of the affected structural elements.

5.3 Cladding Systems (General)

The performance and robustness of cladding systems depend on a range of factors, including:

- The type of cladding system and materials used, such as rainscreen panels, insulated sandwich panels, curtain walling or masonry cladding.
- The quality and durability of fixings, support rails, anchors and brackets, including their corrosion resistance and compatibility with adjacent materials.
- The adequacy of detailing at interfaces, joints, openings and penetrations, including allowance for thermal movement, drainage and ventilation.
- The age of the system and its exposure to weather, noting that many older cladding installations may not comply with current Standards, Codes of Practice or fire safety requirements

Cladding systems are subject to deterioration due to weathering, thermal movement and moisture ingress, particularly where joints, seals, flashings or membranes fail. Water penetration can lead to corrosion of concealed fixings and support systems, especially where protective coatings are damaged or incompatible materials are in contact.

Cladding systems form a critical component of the external wall construction under Approved Document B. Defects such as inadequate or missing cavity barriers, degraded fixings or non-compliant materials can adversely affect fire performance, including fire spread and structural stability. Loss of integrity within the cladding build-up may therefore present both durability and Fire safety risks, particularly in the context of current post-Grenfell guidance.

5.4 Disproportionate Collapse

Requirements to prevent disproportionate collapse were introduced after the Ronan Point collapse in 1968. In 1970 the Regulations were amended to include a requirement that "the building shall be constructed so that in the event of an accident the building will not suffer collapse to an extent disproportionate to the cause", and in 1972 CP 110, the unified code of practice for concrete, was revised. It was in these publications that the term 'robustness' was formally used for the first time.

Design requirements for disproportionate collapse are set out in Building Regulations Approved Document A. Burton Place Apartments is classified as 2B, as set out earlier in this report.

To comply with these requirements, the building must provide effective horizontal and vertical ties to floors, walls and columns.

Based on the date of construction of the building, the building should have been adequately designed with provision for disproportionate collapse. The steel frame is presumed to provide effective horizontal and vertical ties through the beam to column connections. It is not confirmed whether the connections have been designed for an adequate tie force as connection force drawings have not been reviewed.

The composite floor slabs are assumed to tie and restraint the steel frame and provide diaphragm action to transfer lateral loads through the building to the stability cores & bays. There is assumed to be plan bracing at roof level, typical with lightweight roof construction with steel framed buildings.

6 Visual Inspections / Condition Assessment

The building was subject to visual structural inspections to ascertain the current structural condition of the building, highlight any risk associated with the structure and advise on whether any remedial works were required.

The observations regarding conditions are limited to what could be seen via visual inspection of areas visible from floor level. No opening up works, or other investigations have been carried out at this stage.

6.1 Primary Steel Frame

Within the shared corridor areas between apartments, exposed steel beams along the southern elevation at Gridline C were observed to exhibit minor signs of corrosion. The corrosion visible at the time of inspection appeared to be limited to surface corrosion only and is not currently considered to be of structural concern. Monitoring of the steelwork is recommended, along with the replacement of the protective coating system, if the condition worsens and deterioration is considered significant.



Figure 20 - Typical photograph of surface corrosion with corridors

In the corridor between the apartments at Level 7, evidence of historic water ingress was observed, including areas of mould growth. At the time of the survey, no active water penetration was noted. As this was a visual structural survey only, it was not possible to determine whether the previous water

ingress has resulted in deterioration of any concealed structural members. It is recommended that finishes be locally removed in the affected areas and that a targeted structural inspection be undertaken.



Figure 21 - Typical photograph showing evidence of water ingress, mould to soffit of roof construction



Figure 22 - Typical photograph showing evidence of water ingress, risk of corrosion to steelwork

At Ground Floor, within Unit 2 (the easternmost unit at the north-east corner of the building), water ingress was identified. This has resulted in minor visible surface corrosion to the leg supports of the raised access floor system. The full extent of the corrosion is unknown due to floor finishes concealing the structure; however, corrosion was observed centrally within the unit. In addition, corrosion was noted to the column base plate just off Gridline 13H. It is unclear whether this is a localised issue or more widespread. Further intrusive investigations are recommended to determine the extent of deterioration and any required remedial works.



Figure 23 - Photograph of corrosion to baseplate just off Gridline 13H



Figure 24 - Typical Photograph of corrosion to raised access floor support

Defects to the lateral stability system of the steel frame would be visible via significant movement of the structure. No evidence of cracking to internal finishes or the façade was observed during the inspection. On this basis, the lateral stability system is assumed to be in satisfactory condition at the time of survey.

6.2 Floor Construction and Balconies

No structural defects were observed in relation to the floor construction or balconies. Based on visual inspection, these elements are assumed to be in good condition.

6.3 Roof Construction

The roof construction and associated finishes generally appear to be in good condition. It was evident that localised repairs had previously been undertaken.

Areas of ponding water were observed. This is likely due to partially blocked downpipes or gutters; however, inadequate falls to the roof finish cannot be ruled out.

As outlined in Section 6.1, water ingress and mould have been identified. It is currently unknown whether these are historic occurrences or indicative of ongoing moisture penetration. These areas should therefore be monitored to determine whether active water ingress is present and to assess whether defects may be localised to the roof waterproofing system.

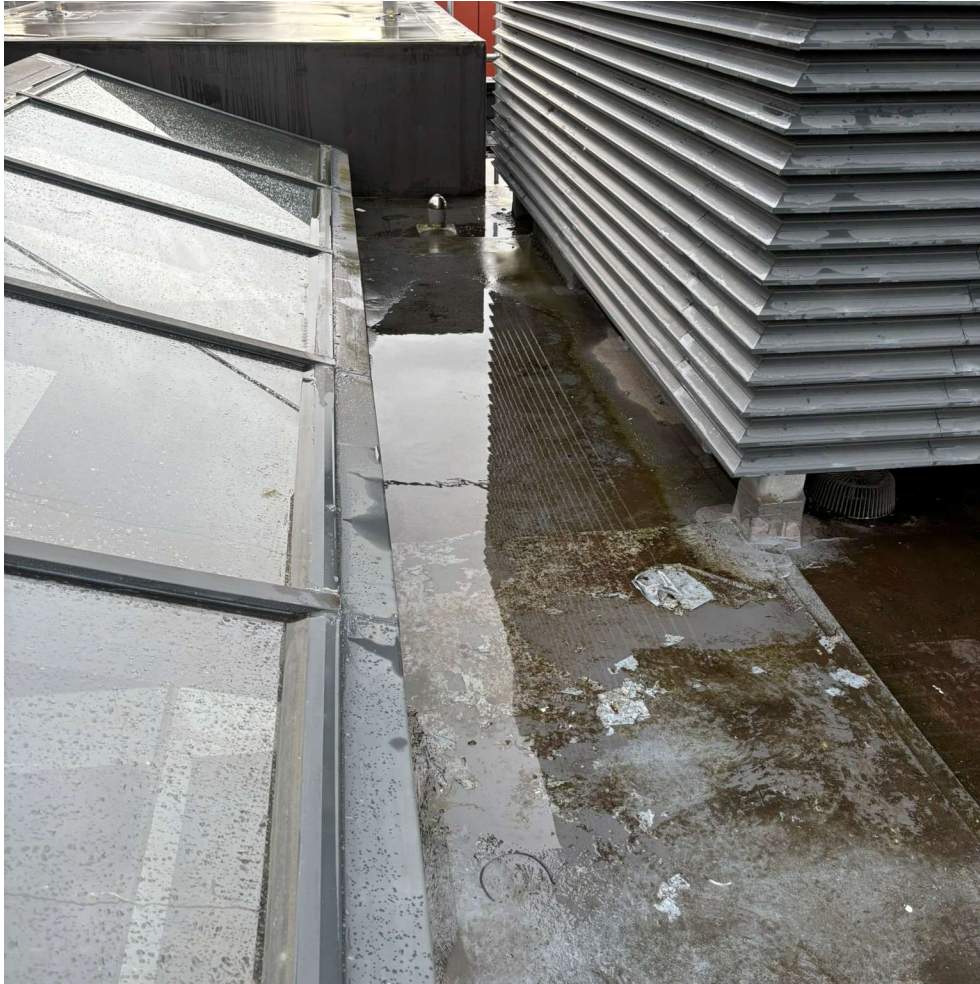


Figure 25 - Typical photograph of pooling

It should be noted that rainfall had occurred prior to the inspection, and therefore, it was not possible to determine whether ponding is persistent or temporary. It is recommended that all gutters and downpipes be cleaned and cleared, followed by monitoring of the roof during subsequent rainfall events to determine whether ponding remains. If pooling persists, further investigation into the adequacy of the roof falls should be undertaken.

6.4 Staircases

The lightweight steel staircases are in generally good condition. However, minor water staining was noted in isolated areas. While this is not currently considered structurally significant, monitoring of the area is recommended.



Figure 26 – Minor staining to the plasterboard from run-off from the steel staircase.

6.5 Basement and Retaining Structure

Within the basement, water ingress was noted in areas external to the main building footprint, where the in-situ concrete deck construction transitions to a floor construction that allows natural light into the space.



Figure 27 - Typical photograph of water ingress at joints of basement lightwell

Hairline cracking was observed to the soffit of the in-situ reinforced concrete floor plate. The cracking is fine in nature and is considered consistent with shrinkage or curing-related cracking. At the time of inspection, it is not considered to be of structural concern; however, the affected areas should be monitored to ensure that no progressive widening or associated movement occurs.

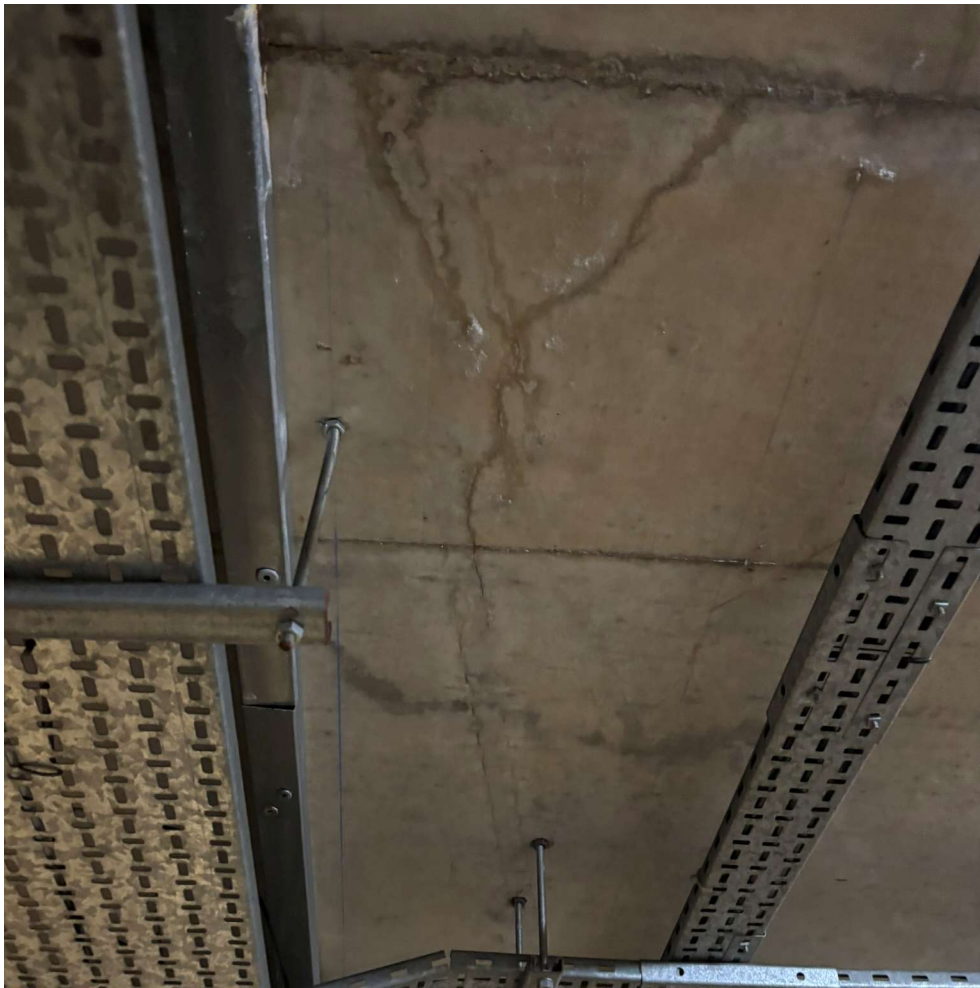


Figure 28 - Typical photograph of cracking to the basement soffit

Additional hairline cracking was observed in concrete beams where service penetrations have been formed. Given the fine nature of the cracking, this is also likely attributable to shrinkage or curing effects. These areas should similarly be monitored as a precautionary measure.



Figure 29 - Typical Photograph of Cracking Local to Service Opening in Basement Beams

Between Burton Place and the Moho Building, a movement joint is present. Signs of joint failure were observed, including voids between the two structures that are permitting water ingress. It is recommended that the joint be raked out and properly reinstated to prevent further moisture penetration.



Figure 30 - Typical Photograph of Failed Movement Joint Plus Water Ingress



Figure 31 - Typical photograph of cracking to concrete basement slab at service penetration corner

6.6 Foundations

The foundations were not inspected as part of this survey due to lack of access and the visual nature of the inspection. Therefore, no direct comment can be made regarding their condition. However, there is no evidence of settlement or differential movement within the superstructure. On this basis, the foundations are assumed to be performing satisfactorily, although this assumption is limited by the scope of the inspection.

6.7 Façade

The façade appears to be in sound condition, with minimal signs of deterioration observed. It is noted that the façade has been recently refurbished and reclad in line with the BSA requirements.

7 Building Safety Risk Assessment

A structural risk assessment has been undertaken in relation to the structural elements of the building. CCS Consulting Ltd has endeavoured to identify all credible and reasonably foreseeable hazards and has undertaken a risk assessment of these hazards. Hazards have been identified through the desktop assessment and review of the building information which is presented in Sections 3 and 4 of this report, and through a visual survey which is presented in Section 6.

In assessing risk, the consequence and probability of the hazard causing harm is considered first with only the known controls in place and used to determine if further mitigation/action should be applied. Where mitigation is required, it is to be proportionate to the risk, reasonable and practicable.

It may be the case that there are existing controls in place which CCS Consulting Ltd is unaware of and therefore are not considered in this assessment.

In line with general practice, assessments are only required against the codes applicable at the time of construction. However, safety must also be demonstrated and there have been some significant code developments which render additional checks on structures designed to previous code versions necessary or appropriate.

This risk assessment aims to record hazards and existing control measures which have been identified. In determining appropriate risk measures and dealing with non-compliant assets, we have used the ALARP (as low as reasonably practicable) principle, recommended by the HSE.

7.1 Risk Classification

Table 1 – Risk Classification

Risk Classification	Description
Level 1 - Very Low Risk	Defect presents little to no risk to the property in the short to medium term - very low likelihood of developing.
Level 2 - Low Risk	Defect presents minimal risk to the property in the short to medium term – may develop in the long term, minor remedials required.
Level 3 - Medium Risk	Defect requires remedial action but does not pose an immediate danger to the property – monitoring recommended.
Level 4 - High Risk	Defect poses a risk to the structural integrity of the property - prompt response required to prevent development into an increased severity defect – monitoring recommended.
Level 5 - Very High Risk	Urgent issue with the defect posing an imminent risk to the structural integrity of the property and recommended remedials require immediate response to rectify the issue.

7.2 Structure Incidents Risk Assessment

The Structural Incidents considered are summarised in the Risk Assessment table below. In summary, the main risk identified with the Burton Place Apartment Building is water ingress into the carpark areas within the basement.

Table 2 - Structural Incident Risk Assessment

Ref. No.	Incident Risk	Description	Likelihood	Consequence	Actions / Recommendations	Summary
SI01	Vehicle Impact from Road	The building is positioned on Ellesmere Street however; it is set back from the road behind bollards etc. It is unclear how much protection these provide.	Improbable	Significant	No Actions Required	Low Risk
SI02	Vehicle Impact from Internal Carpark	The concrete structure is exposed within the carpark/basement. It is unclear if the design has considered vehicle impact.	Negligible	Negligible	No Actions Required	Low Risk
SI03	Aeroplane Impact	No information has been provided to state if this building has been designed for an aeroplane impact. As the building is outside the Manchester airport flight path and only 7 storeys above ground, the likelihood of a plane impact is negligible. Therefore, it is likely the building has not been designed for aeroplane impact as detailed design for specific, high-energy impacts relies on specialised analysis and simulation methods.	Negligible	Catastrophic	No Actions Required	Very Low Risk
SI04	Floods	The building is in an area of low risk of surface water flooding and medium risk for river and sea flooding stated on the government website. The site is outside Flood zones 2 & 3 defined by the environment agency and therefore has a low probability of flooding.	Improbable	Significant	No actions required	Low Risk
SI05	Current Overloading of Building	The building construction started in 2003 and since completion, no known alterations have been made.	Negligible	Serious	Calculations and Building Control Certificate should be made available to PAP for the long term.	Low Risk
SI06	Future Overloading of Building	CCS Consulting are not aware of any proposed plans to change any part of the building or undertake a change of use. Future changes of use may pose a risk if unmitigated.	Negligible	Serious	Consultation with Structural Engineer if change of use is to be adopted.	Low Risk

Ref. No.	Incident Risk	Description	Likelihood	Consequence	Actions / Recommendations	Summary
SI07	Structural Instability under Lateral Loads	The building was started constructed in 2000-2003 and no change in usage or alterations to the stability system has been made.	Improbable	Serious	Calculations and Building Control Certificate should be made available to PAP for the long term.	Low Risk
SI08	Explosion	It is not known whether the building has a gas supply. Other potential sources of explosion though cannot be ruled out, such as malicious actions. The building is understood to have been designed for disproportionate collapse according to Building Regulations Approved Document A, with effective horizontal and vertical ties as discussed in Section 7.4.	Improbable	Catastrophic	No Actions Required	Low Risk
SI09	Balcony Collapse	The balcony structure is a galvanised cantilevered steel frame, fixed back to the primary steel frame of the building. It is assumed the balconies have been designed from the appropriate vertical and lateral (impact / barrier) loads.	Improbable	Serious	No Actions Required	Low Risk
SI10	Incompatible Alterations	The building was constructed started in 2000-2003 and no known alterations have been made.	Negligible	Minor	No Actions Required	Very Low Risk
SI11	Incorrect Design Assumptions	The original design would have been subject to the building regulations of the time and should have been undertaken in accordance with current design codes.	Improbable	Significant	Calculations and Building Control Certificate should be made available to PAP in long term.	Low Risk
SI12	Subsidence, Settlement, Heave & Ground Slip	The original design would have been subject to the building regulations of the time and undertaken in accordance with current design codes as a requirement for buildings of this size. There is no evidence of subsidence or settlement in the past 20 years. As the building has a two-storey basement and is away from any mature trees, it is unlikely to suffer from ground heave / effects of tree roots.	Negligible	Negligible	No Actions Required	Low Risk
SI13	Poor Detailing	No reports or calculations have been provided to assess the quality of structural detailing including steel connections.	Improbable	Minor	Steel Fabrication drawings and details should be maintained for the long-term records of the building.	Medium Risk

Ref. No.	Incident Risk	Description	Likelihood	Consequence	Actions / Recommendations	Summary
SI14	Age / Quality Deterioration	The usual design working life of a building is typically 50 years. At the time of the survey, the building is approximately 22 years old and therefore should be without severe levels of decay such as corrosion of steelwork and carbonisation of concrete.	Improbable	Significant	Refer to Defect Schedule for further details and remedials.	Low Risk
SI15	Use of Deleterious Materials	No evidence of wood-wool was noted on site. No areas of likely RAAC were identified. Non-compliant cladding panels have been recently replaced. Due to the age of the building, there is no risk of asbestos, PCBs & Lead containing materials.	Improbable	Significant	No Actions Required	Low Risk
SI16	Poor Maintenance	All buildings require maintenance to repair damage and maintain protective coatings and systems. If protective coatings are not maintained, water ingress accelerates deterioration of steelwork via corrosion. There is evidence of water leaks on site within the carpark and the roof soffit, which is a sign of poor maintenance.	Likely	Minor	Refer to Defect Schedule for further details and remedials.	Medium Risk
SI17	Damp Water Penetration	Water ingress can lead to corrosion of steelwork and steel reinforcement embedded in concrete. Initially, this could lead to spalling of the concrete surface, which leads to localised reduction in capacity, and loss of fire resistance. If left to progress, ongoing corrosion may lead to sufficient reduction in capacity resulting in structural failure.	Improbable	Serious	Refer to Defect Schedule for further details and remedials.	Low Risk
SI18	Flat Roof Water Ponding	Flat roofs are present across the whole building. It is likely that the roof finishes are designed and detailed to provide protection to the structure from water ingress. The building was visited on a wet day and there was standing water.	Likely	Serious	Risk to be considered in maintenance strategy.	Medium Risk
SI19	Poor Workmanship /Construction	Structural performance is contingent on quality of workmanship and execution in construction. The general quality of construction was good	Negligible	Negligible	Refer to Defect Schedule for further details and remedials.	Medium Risk

7.3 Defects Schedule

A summary of the building defects is presented in the Defect Schedule below, together with associated remedial recommendations and proposed actions moving forward.

Table 3 – Burton Place Apartments Defect Schedule

Ref. No.	Defect Location	Defect Description	Severity	Image Reference	Remedial Recommendations
DF01	Gridline C	Surface corrosion on the steel beam within the corridor area	Low	Photograph Reference 1, 6	On going monitoring recommended. Existing protective to be removed and reinstated if defect worsens.
DF02	Level 2, 4 & 7 (Corridor between apartments)	Historic water ingress to soffit.	Low	Photograph Reference 1, 3, 4, 5	Finishes to be removed locally where historic water ingress is present. A structural survey is to be completed to determine any deterioration to the steel frame. Any remediations to be developed following the structural survey.
DF03	Unit 2 (north-east corner)	Water ingress within the Ground Floor	Low	Photograph Reference 7	Waterproofing details to be inspected (external finished removed). Input from the architecture for remediation detail.
DF04	Unit 2 (north-east corner)	Corrosion to the raised access floor leg supports	Low	Photograph Reference 9	Refer to remediation recommendation detail DF03. In addition, all corroded support legs to be replaced
DF05	Just of Gridline 13H ground floor level	Corrosion to the column base plate	Low	Photograph Reference 8	Floor finishes to be removed locally and a structural survey undertaken. Remediation details to be developed following the structural survey

Ref. No.	Defect Location	Defect Description	Severity	Image Reference	Remedial Recommendations
DF06	Steel staircases in the corridor between apartments	Minor surface corrosion to lightweight	Low		Existing protective to be removed and reinstated (Input from fire engineering would be required)
DF07	Throughout Roof Level	Ponding water at roof level	Low	Photograph Reference 10, 11	Gutters to be cleaned and the maintenance manual reviewed
DF08	Basement level between gridline J and Gridline 1	Water ingress within basement areas external to the main building footprint at the transition between in-situ deck and natural light floor construction.	Medium	Photograph Reference 12, 13	Joint to be inspected. Remedial Detail to be developed
DF09	Throughout basement	Hairline shrinkage cracking to soffit of in-situ reinforced concrete basement floor plate	Low	Photograph Reference 16, 17	No actions or remedial details are required. Continual monitoring of cracks is recommended. Contact CCS Engineers if cracks worsen.
DF10	Basement Gridline 2	Failed movement joint between Burton Place and Moho Building, with voids allowing water ingress	Low	Photograph Reference 14	Existing movement joints to be raked out and reinstated.
DF11	Throughout basement	Hairline cracking to basement concrete beams local to service penetrations	Low	Photograph Reference 15	No actions or remedial details are required. Continual monitoring of cracks is recommended. Contact CCS Engineers if cracks worsen.
DF12	Roof Level 7	Moss Growth to parapet	Low	Photograph Reference 19	Clean roof finishes and the maintenance manual reviewed
DF13	Basement Level 1 Between gridline J and 1	Water Ponding	Low	Photograph Reference 18	Refer to DF08 Remediation

Ref. No.	Defect Location	Defect Description	Severity	Image Reference	Remedial Recommendations
DF14	Roof Level Gridline D	Missing fixing to the cladding at the roof level	Low	Photograph Reference 19	Install fixing / reinstate fixings (input from cladding specialist required)
DF15	Roof Level Gridline 15	Deflection to Roof	Low	Photograph Reference 20	No actions or remedial details are required. Continual monitoring deflection. Contact CCS Engineers if cracks worsen
DF16	Level 6 – Gridline 7D	Gap between external finishes	Low	Photograph Reference 21	Input from architectural required for infill detail
DF17	Level 7 – Roof	Standing water to the guttering	Low	Photograph Reference 22	Gutters to be cleaned and the maintenance manual reviewed
DF18	Level 7 – off grid line A	Moss growth to parapet	Low	Photograph Reference 23	Clean and the maintenance manual reviewed

7.4 Disproportionate Collapse

Building class requirements within Approved Document A were adopted to ensure buildings are sufficiently robust to sustain a limited extent of damage or failure without collapse. In the 2000 Edition, Burton Place would be classified as a Class 2B building as it is a residential apartment building greater than 4 storeys but not exceeding 15 storeys.

Table 11 Building consequence classes	
Consequence Classes	Building type and occupancy
1	Houses not exceeding 4 storeys Agricultural buildings Buildings into which people rarely go, provided no part of the building is closer to another building, or area where people do go, than a distance of 1.5 times the building height
2a Lower Risk Group	5 storey single occupancy houses Hotels not exceeding 4 storeys Flats, apartments and other residential buildings not exceeding 4 storeys Offices not exceeding 4 storeys Industrial buildings not exceeding 3 storeys Retailing premises not exceeding 3 storeys of less than 2000m ² floor area in each storey Single-storey educational buildings All buildings not exceeding 2 storeys to which members of the public are admitted and which contain floor areas not exceeding 2000m ² at each storey
2b Upper Risk Group	Hotels, blocks of flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys Educational buildings greater than 1 storey but not exceeding 15 storeys Retailing premises greater than 3 storeys but not exceeding 15 storeys Hospitals not exceeding 3 storeys Offices greater than 4 storeys but not exceeding 15 storeys All buildings to which members of the public are admitted which contain floor areas exceeding 2000m ² but less than 5000m ² at each storey Car parking not exceeding 6 storeys
3	All buildings defined above as Consequence Class 2a and 2b that exceed the limits on area and/or number of storeys Grandstands accommodating more than 5000 spectators Buildings containing hazardous substances and/or processes
Notes:	
1. For buildings intended for more than one type of use the Consequence Class should be that pertaining to the most onerous type.	
2. In determining the number of storeys in a building, basement storeys may be excluded provided such basement storeys fulfil the robustness requirements of Consequence Class 2b buildings.	
3. BS EN 1991-1-7:2006 with its UK National Annex also provides guidance that is comparable to Table 11.	

Figure 32 – Building Consequence classes taken from Building Regulations' Approved Document A Table 11.

Class 2B buildings should provide effective horizontal ties, as described in the Codes and Standards listed under paragraph 5.2 for framed and load-bearing wall construction. Together with effective vertical ties, checks should have been completed for the removal of each supporting column and each beam supporting one or more columns (one at a time in each storey of the building) so the building remains stable and that the area of floor at any storey at risk of collapse does not exceed 15% of the floor area of that storey or 70m², whichever is smaller, and does not extend further than the immediate adjacent

storeys. 15% of the floor area is over 150m², therefore the maximum area for floor collapse is 70m². The typical maximum floor area for a column is approximately 26m² and therefore within the requirements.

Based on the date of construction of the building, the building should have been adequately designed with provision for disproportionate collapse. The steel frame is presumed to provide effective horizontal and vertical ties through the beam to column connections. It is not confirmed whether the connections have been designed for an adequate tie force as connection force drawings have not been reviewed.

The composite floor slabs are assumed to tie and restraint the steel frame and provide diaphragm action to transfer lateral loads through the building to the stability cores & bays. There is assumed to be plan bracing at roof level, typical with lightweight roof construction with steel framed buildings.

The Approved Document A states, where the notional removal of such columns would result in an extent of damage more than the above limit, then such elements should be designed as a “key element”.

7.5 Fire Requirements

Under the 2000/2002 version of Approved Document B, the building would be categorised as Purpose Group 2(b): Other Residential, which includes self-contained flats and similar residential accommodation. For buildings of this type, the minimum required periods of fire resistance were determined from Table A1 & A2.

PERFORMANCE OF MATERIALS AND STRUCTURES

B

Table A2 Minimum periods of fire resistance						
Purpose group of building	Minimum periods (minutes) for elements of structure in a:					
	Basement storey (S) including floor over		Ground or upper storey			
	Depth (m) of a lowest basement		Height (m) of top floor above ground, in a building or separated part of a building			
	More than 10	Not more than 10	Not more than 5	Not more than 18	Not more than 30	More than 30
1. Residential (domestic):						
a. Flats and maisonettes	90	60	30*	60**†	90**	120**
b. and c. Dwellinghouses	Not relevant	30*	30*	60@	Not relevant	Not relevant
2. Residential:						
a. Institutional	90	60	30*	60	90	120#
b. Other residential	90	60	30*	60	90	120#
3. Office:						
- Not sprinklered	90	60	30*	60	90	Not permitted
- Sprinklered (2)	60	60	30*	30*	60	120#

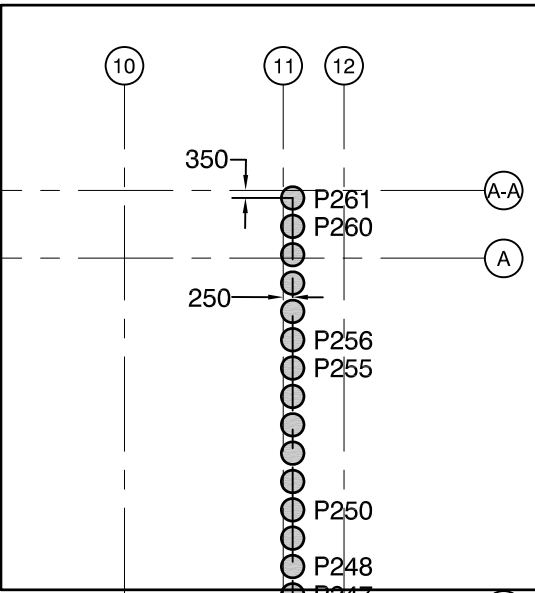
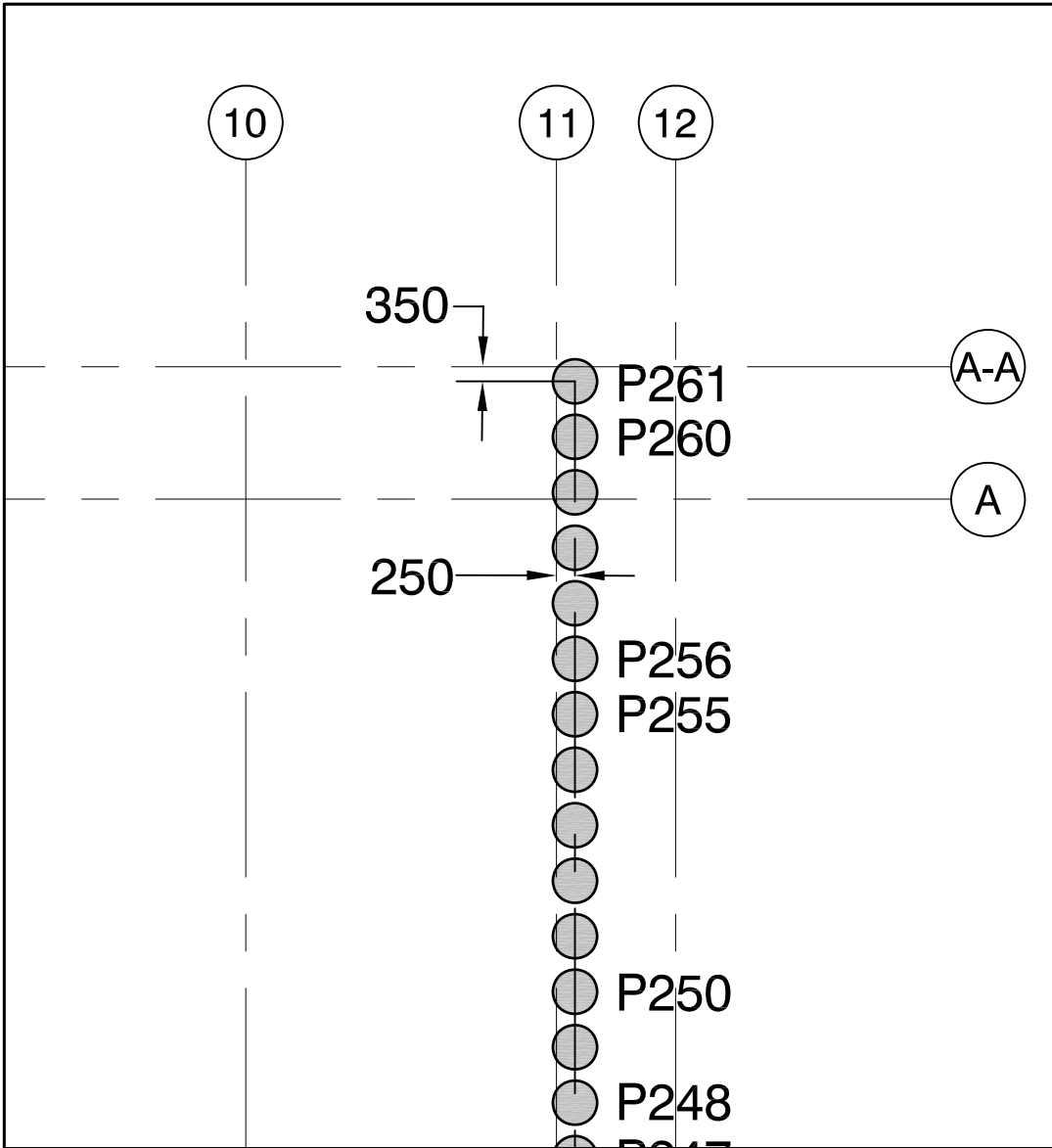
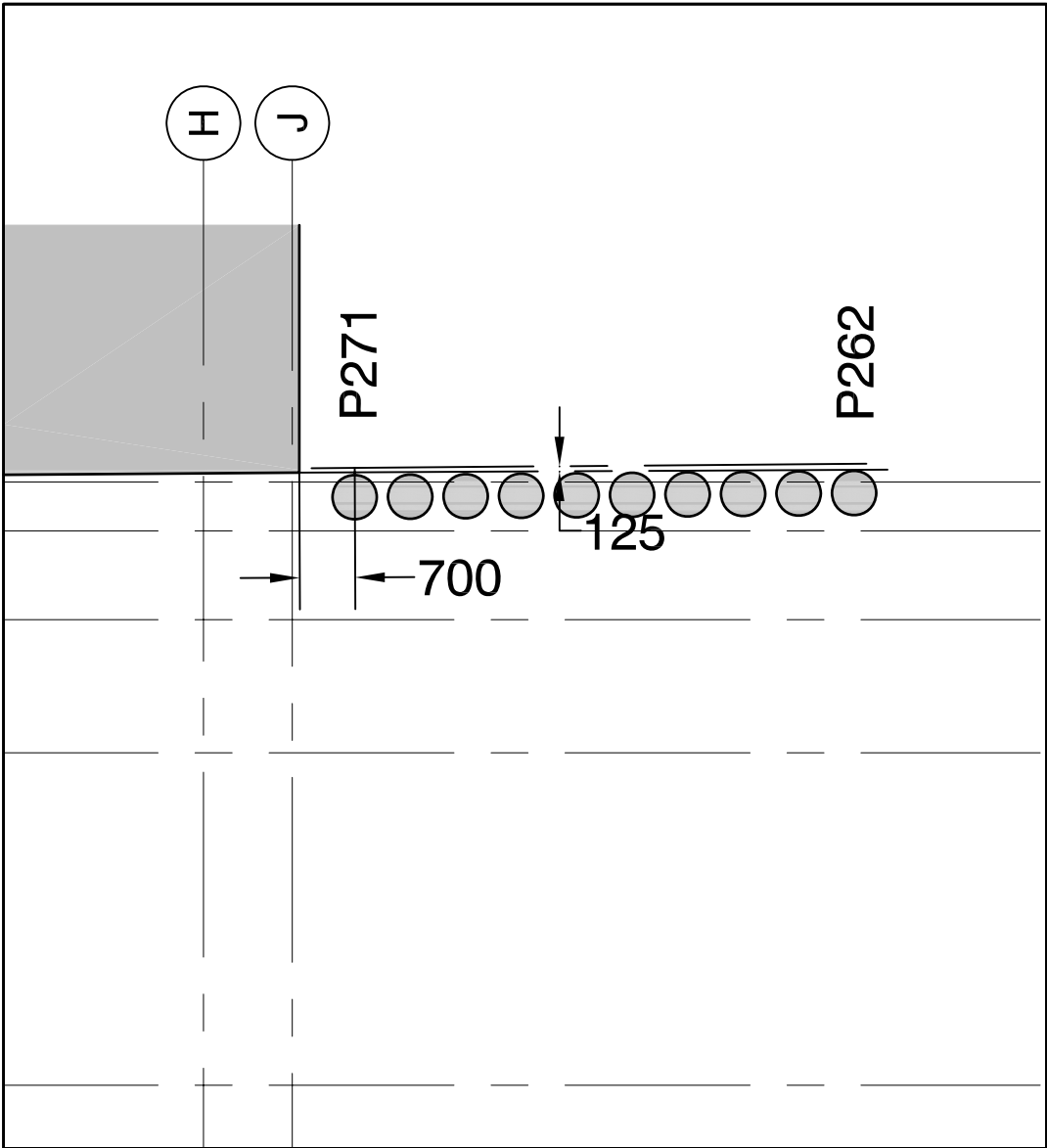
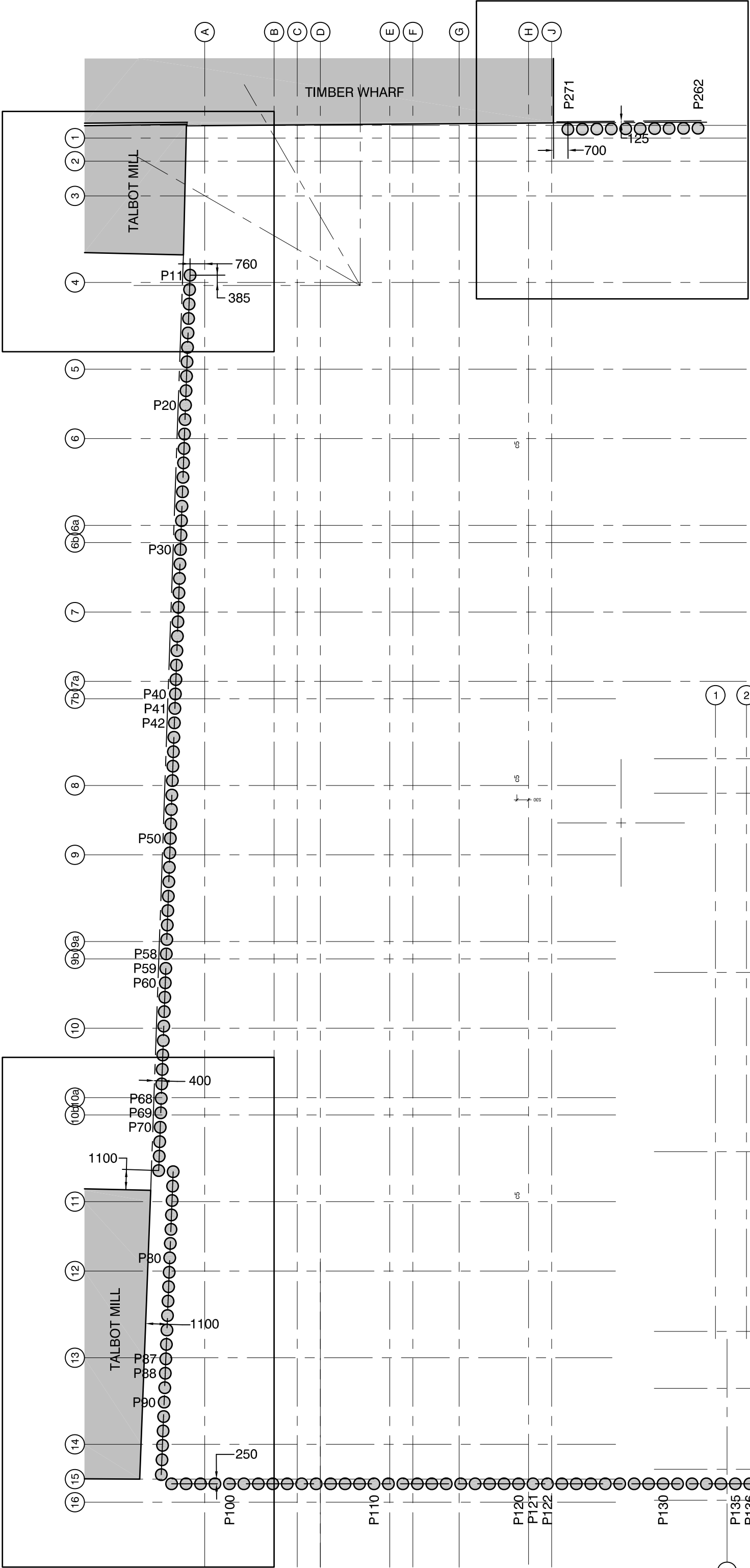
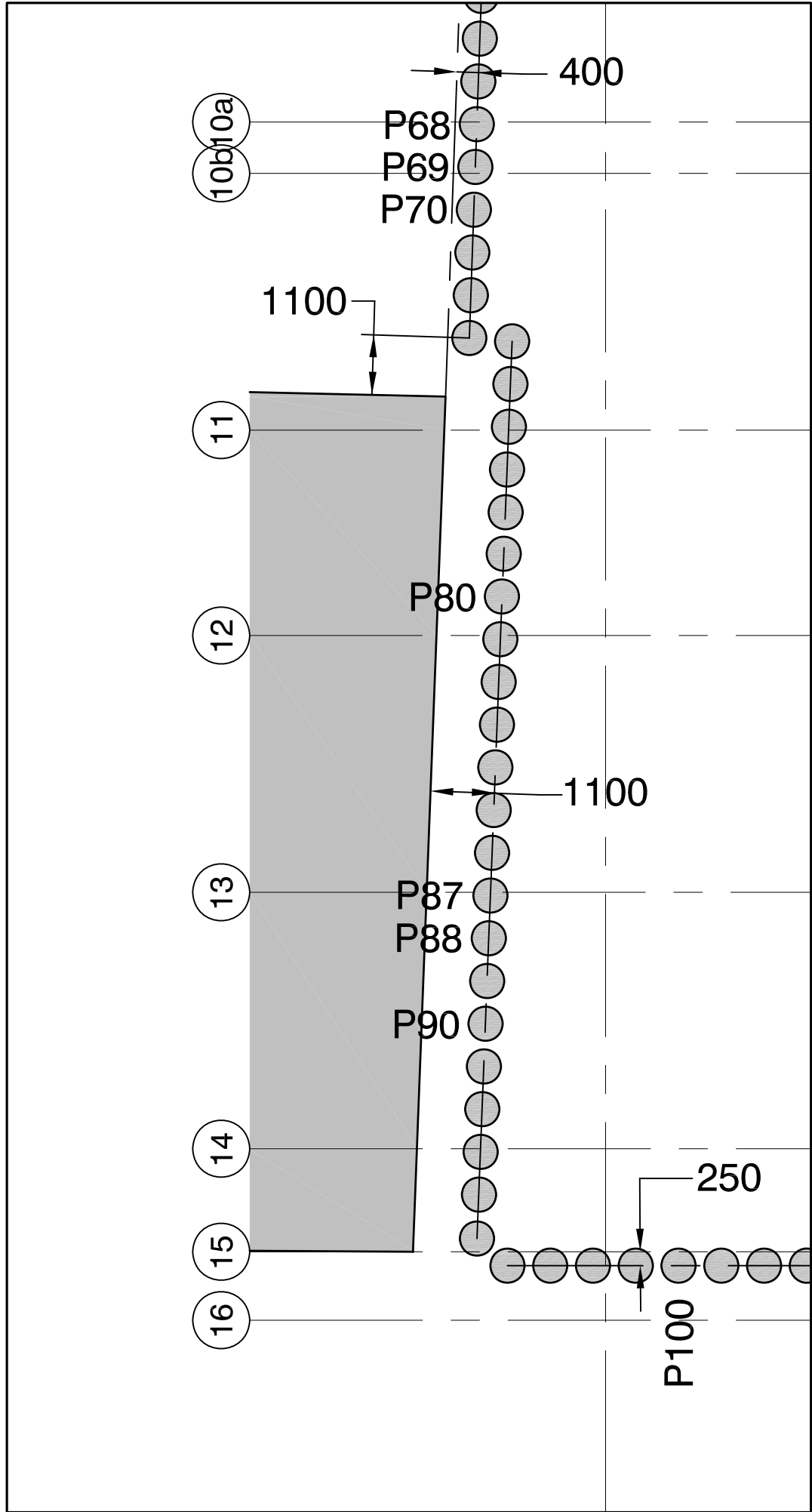
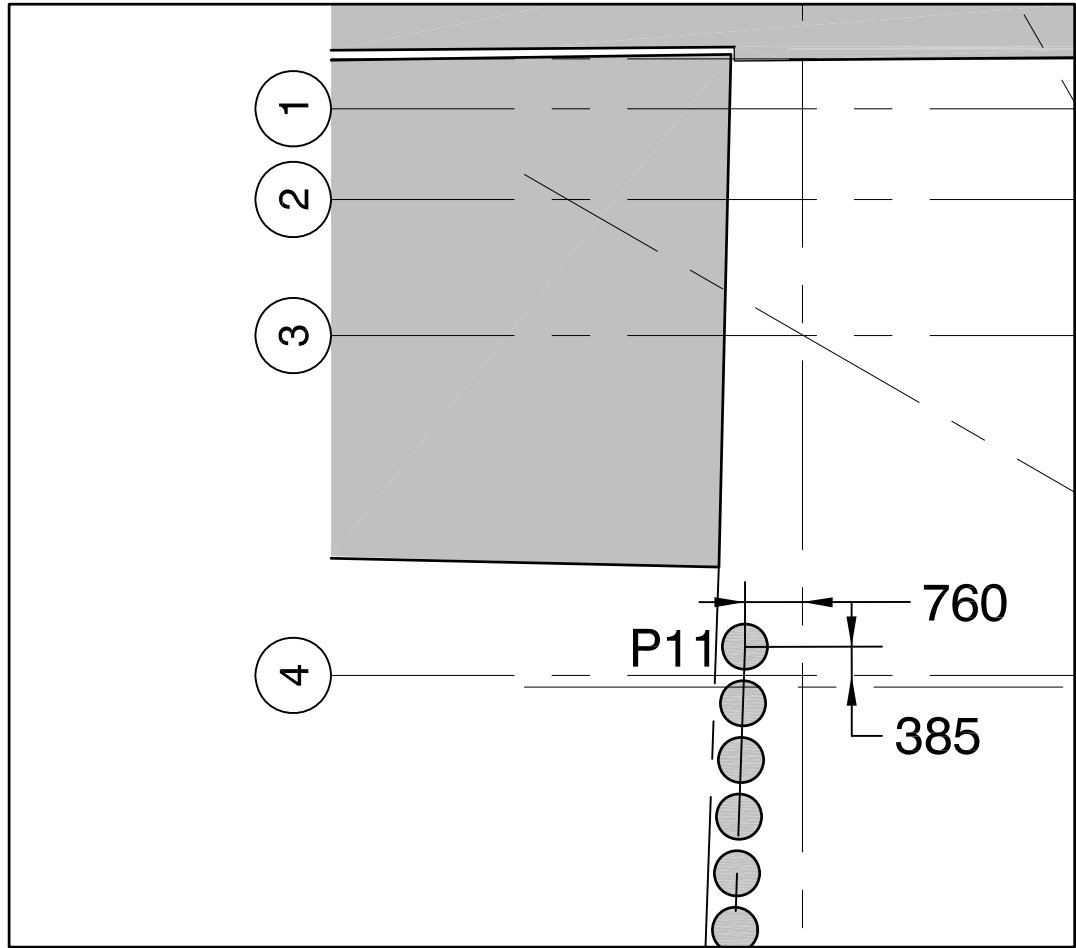
Figure 33 - Minimum Periods of Fire Resistance (taken from Building Regulation 2000 Approved Doc. B Table A2)

For a residential building over 30m, the minimum periods of fire resistance required at the time were as follows:

- Structural elements above ground level: A minimum of 120 minutes (2 hours) fire resistance for loadbearing walls, floors, and structural frames, reflecting the enhanced requirements for tall residential buildings under the 2000/2002 edition of Approved Document B.
- Structural elements below ground level Typically 60 minutes for basement depth no more for 10m, dependent on specific risk factors.

These values represent the standards in place under the 2000/2002 edition of Approved Document B, prior to the updates introduced in the 2006 edition, which further revised fire resistance requirements for tall residential buildings.

8 Appendix A – Archive Information



1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.
2. For general notes refer to drawing No. 103-01-21.
3. Setting out is the responsibility of the architect. Refer to architects general arrangements and details for all setting out information.
4. For pile details refer to pile table, drawing No. 103-01-50

For setting out of grids relative to existing site features refer to Architects drawings.

All piles to be 600mm diameter at 750mm c-c.

FOR INFORMATION

Date	Issue	Revised	Checked	By
02.05.07	Issued for information and inclusion in health and safety file.	B	TP	SJW
28.02.03	Issued for information.	B	TP	SJW
12.02.03	Issued to NHBC for information.	B	TP	SJW
14.01.03	Pile 272 omitted in line with revised setting out information. Cut off levels to piles 220 to 222 amended in line with revised Architects information.	B	TP	SJW
02.12.02	Issued to MEDC for Information.	A	TP	SJW
22.11.02	Issued for Tender - Insitu Concrete Package.	A	TP	SJW
11.11.02	Issued for Construction. Piles 1 to 10 omitted in line with clients instruction.	A	TP	SJW
01.11.02	Issued for construction	-	TP	SJW

joule

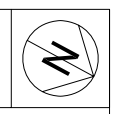
Joule Consulting Engineers Ltd
T 0161 832 3487
F 0161 832 3793
W www.jouleconsultingengineers.co.uk
E mail@jouleconsultingengineers.co.uk

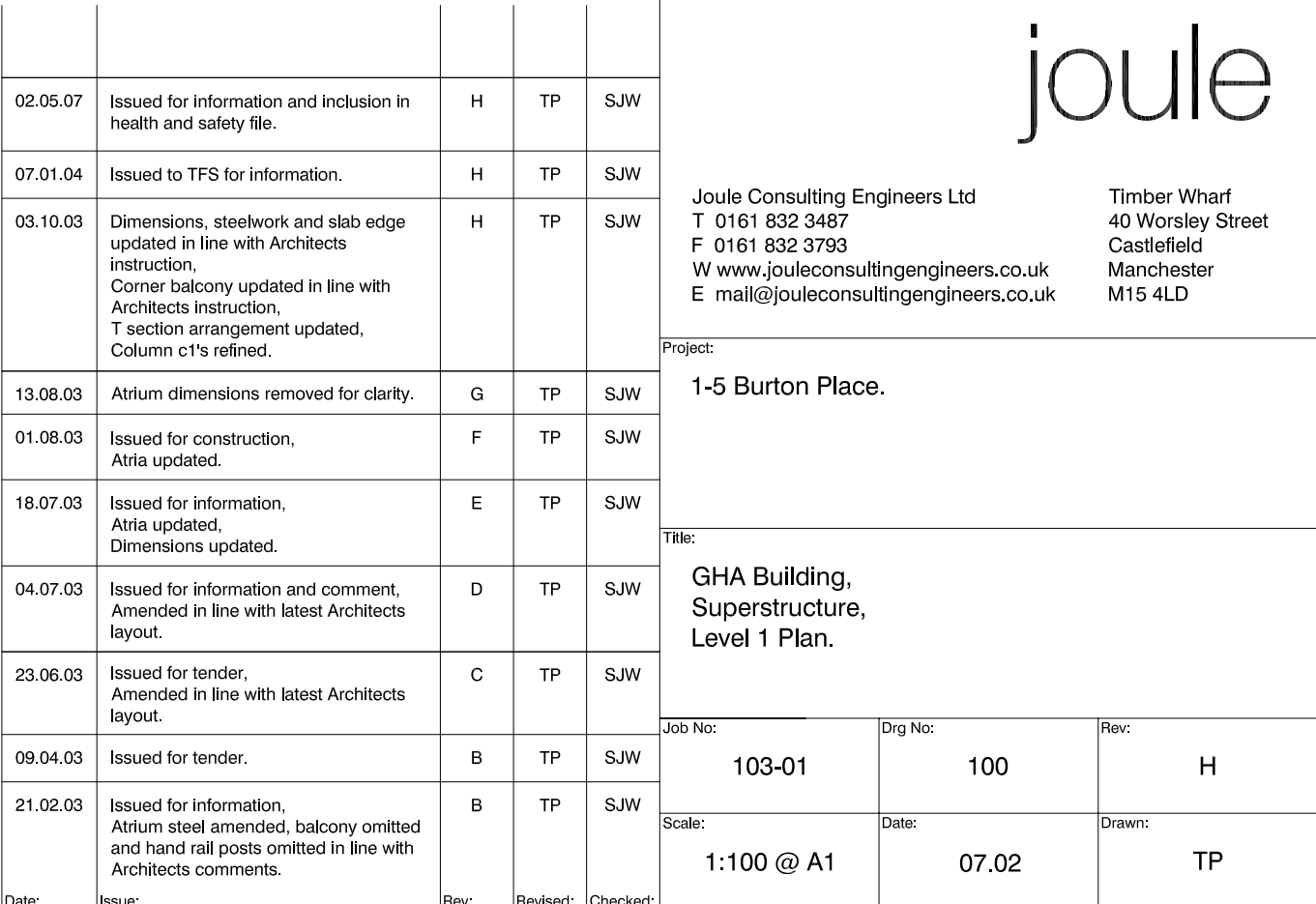
Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

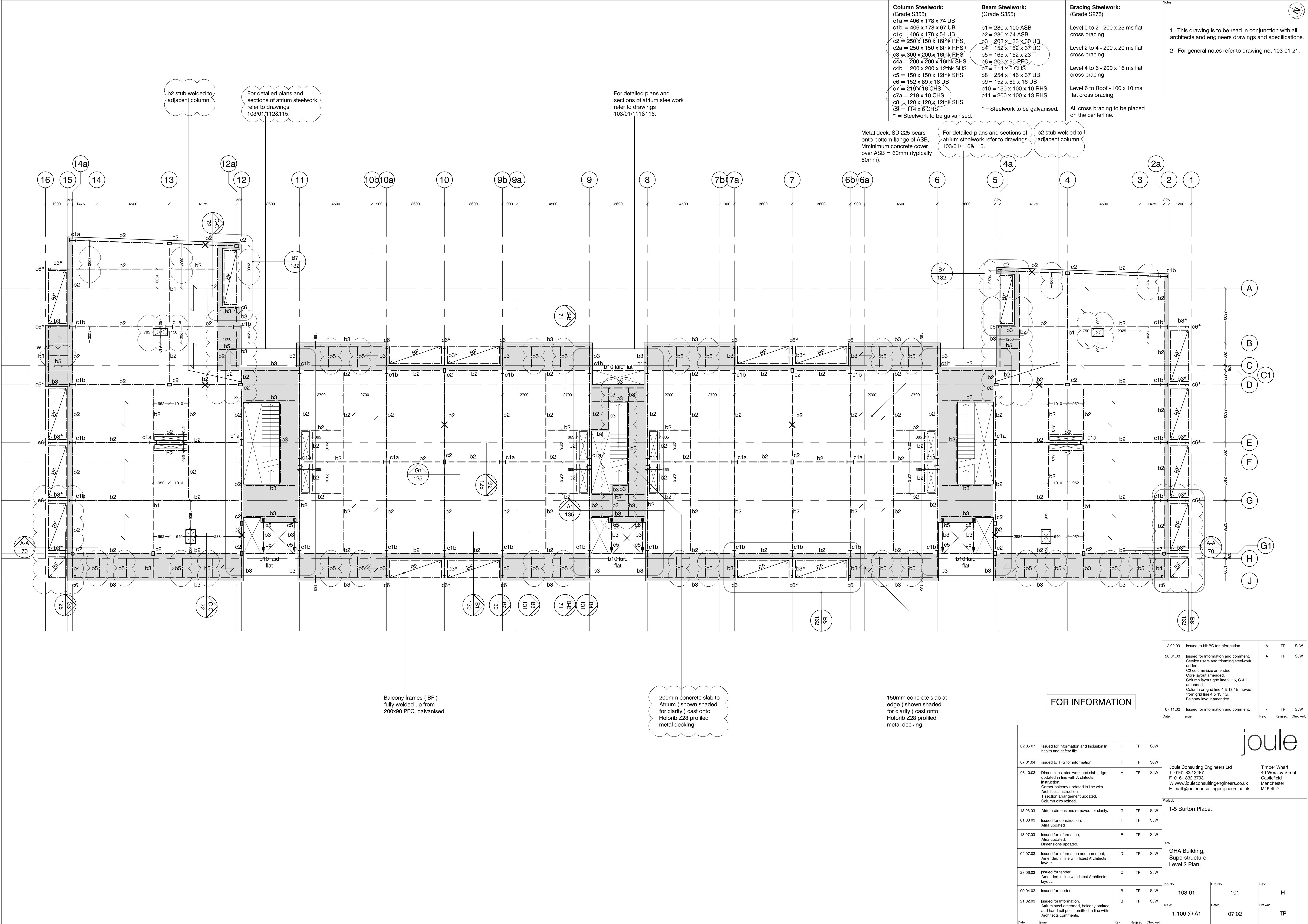
Project:
1-5 Burton Place.

Title:
Pile Layout.

Job No: 103-01	Orig No: 51	Rev: B
Scale: 1:200 @ A1	Date: 10.02	Drawn: TP







Column Steelwork:
(Grade S355)
c1a = 406 x 178 x 74 UB
c1b = 406 x 178 x 67 UB
c1c = 406 x 178 x 54 UB
c2 = 250 x 150 x 16thk RHS
c2a = 250 x 150 x 8thk RHS
c3 = 300 x 200 x 16thk RHS
c4a = 200 x 200 x 16thk SHS
c4b = 200 x 200 x 12thk SHS
c5 = 150 x 150 x 12thk SHS
c6 = 152 x 89 x 16 UB
c7 = 219 x 16 CHS
c7a = 219 x 10 CHS
c8 = 120 x 120 x 12thk SHS
c9 = 114 x 6 CHS
* = Steelwork to be galvanised.

Beam Steelwork:
(Grade S355)
b1 = 280 x 100 ASB
b2 = 280 x 74 ASB
b3 = 203 x 133 x 30 UB
b4 = 152 x 152 x 37 UC
b5 = 165 x 152 x 23 T
b6 = 200 x 90 PFC
b7 = 114 x 5 CHS
b8 = 254 x 146 x 37 UB
b9 = 152 x 89 x 16 UB
b10 = 150 x 100 x 10 RHS
b11 = 200 x 100 x 13 RHS
* = Steelwork to be galvanised.

Bracing Steelwork:
(Grade S275)
Level 0 to 2 - 200 x 25 ms flat cross bracing
Level 2 to 4 - 200 x 20 ms flat cross bracing
Level 4 to 6 - 200 x 16 ms flat cross bracing
Level 6 to Roof - 100 x 10 ms flat cross bracing
All cross bracing to be placed on the centerline.

Notes:
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.
2. For general notes refer to drawing no. 103-01-21.

b2 stub welded to adjacent column.

For detailed plans and sections of atrium steelwork refer to drawings 103/01/112&115.

For detailed plans and sections of atrium steelwork refer to drawings 103/01/111&116.

Metal deck, SD 225 bears onto bottom flange of ASB. Minimum concrete cover over ASB = 60mm (typically 80mm).

For detailed plans and sections of atrium steelwork refer to drawings 103/01/110&115.

b2 stub welded to adjacent column.

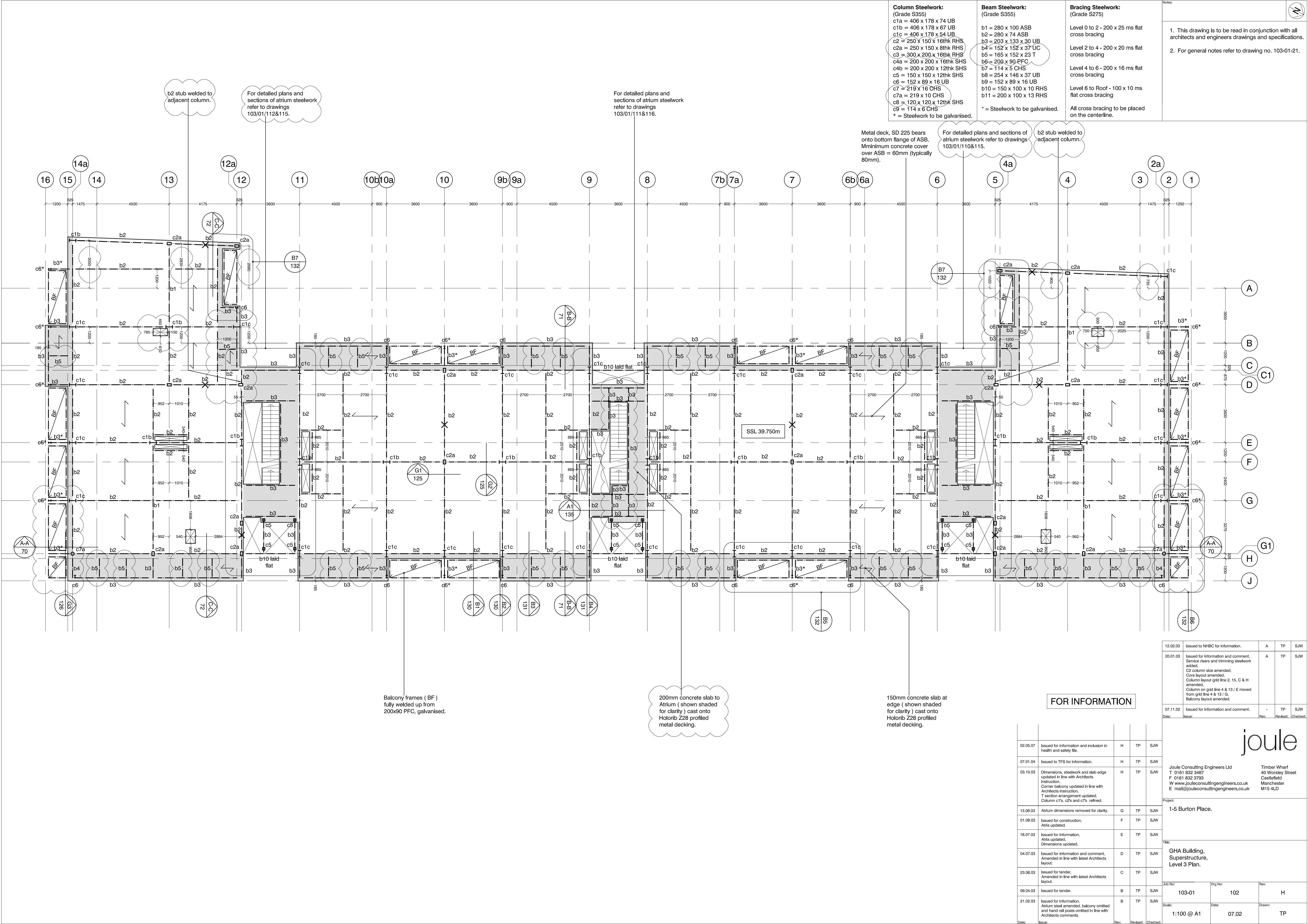
Balcony frames (BF) fully welded up from 200x90 PFC, galvanised.

200mm concrete slab to Atrium (shown shaded for clarity) cast onto Holorib Z28 profiled metal decking.

150mm concrete slab at edge (shown shaded for clarity) cast onto Holorib Z28 profiled metal decking.

FOR INFORMATION

12.02.03	Issued to NHBC for information.	A	TP	SJW
20.01.03	Issued for information and comment. Service risers and trimming steelwork added. C2 column size amended. Core layout amended. Column layout grid line 2, 15, C & H amended. Column on grid line 4 & 13 / E moved from grid line 4 & 13 / G. Balcony layout amended.	A	TP	SJW
07.11.02	Issued for information and comment.	-	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:
joule				
Joule Consulting Engineers Ltd T 0161 832 3487 F 0161 832 3793 W www.jouleconsultingengineers.co.uk E mail@jouleconsultingengineers.co.uk				
Project: 1-5 Burton Place.				
Title: GHA Building, Superstructure, Level 2 Plan.				
Job No:	103-01	Orig No:	101	Rev:
Scale:	1:100 @ A1	Date:	07.02	Drawn:
Date:	Issue:	Rev:	Revised:	Checked:
02.05.07	Issued for information and inclusion in health and safety file.	H	TP	SJW
07.01.04	Issued to TFS for information.	H	TP	SJW
03.10.03	Dimensions, steelwork and slab edge updated in line with Architects instruction. Corner balcony updated in line with Architects instruction. T section arrangement updated. Column c15 refined.	H	TP	SJW
13.08.03	Atrium dimensions removed for clarity.	G	TP	SJW
01.08.03	Issued for construction, Atrium updated.	F	TP	SJW
18.07.03	Issued for information, Atrium updated. Dimensions updated.	E	TP	SJW
04.07.03	Issued for information and comment. Amended in line with latest Architects layout.	D	TP	SJW
23.06.03	Issued for tender, Amended in line with latest Architects layout.	C	TP	SJW
09.04.03	Issued for tender.	B	TP	SJW
21.02.03	Issued for information, Atrium steel amended, balcony omitted and hand rail posts omitted in line with Architects comments.	B	TP	SJW



Notes:	
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.	
2. For general notes refer to drawing no. 103-01-21.	

Column Steelwork: (Grade S355)	Beam Steelwork: (Grade S355)	Bracing Steelwork: (Grade S275)
c1a = 406 x 178 x 74 UB c1b = 406 x 178 x 67 UB c1c = 406 x 178 x 54 UB c2a = 250 x 150 x 16thk RHS c2a = 250 x 150 x 8thk RHS c3 = 300 x 200 x 16thk RHS c4a = 200 x 200 x 16thk SHS c4b = 200 x 200 x 12thk SHS c5 = 150 x 150 x 12thk SHS c6 = 152 x 89 x 16 UB c7 = 219 x 16 CHS c7a = 219 x 10 CHS c8 = 120 x 120 x 12thk SHS c9 = 114 x 6 CHS * = Steelwork to be galvanised.	b1 = 280 x 100 ASB b2 = 280 x 74 ASB b3 = 203 x 133 x 30 UB b4 = 152 x 152 x 37 UC b5 = 165 x 152 x 23 T b6 = 200 x 90 PFC b7 = 114 x 5 CHS b8 = 254 x 146 x 37 UB b9 = 152 x 89 x 16 UB b10 = 150 x 100 x 10 RHS b11 = 200 x 100 x 13 RHS * = Steelwork to be galvanised.	Level 0 to 2 - 200 x 25 ms flat cross bracing Level 2 to 4 - 200 x 20 ms flat cross bracing Level 4 to 6 - 200 x 16 ms flat cross bracing Level 6 to Roof - 100 x 10 ms flat cross bracing All cross bracing to be placed on the centerline.

Metal deck, SD 225 bears onto bottom flange of ASB. Minimum concrete cover over ASB = 60mm (typically 80mm).

For detailed plans and sections of atrium steelwork refer to drawings 103/01/110&115.

b2 stub welded to adjacent column.

b2 stub welded to adjacent column.

For detailed plans and sections of atrium steelwork refer to drawings 103/01/112&115.

For detailed plans and sections of atrium steelwork refer to drawings 103/01/111&116.

Balcony frames (BF) fully welded up from 200x90 PFC, galvanised.

200mm concrete slab to Atrium (shown shaded for clarity) cast onto Holorib Z28 profiled metal decking.

150mm concrete slab at edge (shown shaded for clarity) cast onto Holorib Z28 profiled metal decking.

FOR INFORMATION

12.02.03	Issued to NHBC for information.	A	TP	SJW
20.01.03	Issued for information and comment. Service risers and trimming steelwork added. C2 column size amended. Core layout amended. Column layout grid line 2, 15, C & H amended. Column on grid line 4 & 13 / E moved from grid line 4 & 13 / G. Balcony layout amended.	A	TP	SJW
07.11.02	Issued for information and comment.	-	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

02.05.07	Issued for information and inclusion in health and safety file.	H	TP	SJW
07.01.04	Issued to TFS for information.	H	TP	SJW
03.10.03	Dimensions, steelwork and slab edge updated in line with Architects instruction. Corner balcony updated in line with Architects instruction. T section arrangement updated. Column c1c, c2c and c7c refined.	H	TP	SJW
13.08.03	Atrium dimensions removed for clarity.	G	TP	SJW
01.08.03	Issued for construction. Atria updated.	F	TP	SJW
18.07.03	Issued for information. Atria updated. Dimensions updated.	E	TP	SJW
04.07.03	Issued for information and comment. Amended in line with latest Architects layout.	D	TP	SJW
23.06.03	Issued for tender. Amended in line with latest Architects layout.	C	TP	SJW
09.04.03	Issued for tender.	B	TP	SJW
21.02.03	Issued for information. Atrium steel amended. balcony omitted and hand rail posts omitted in line with Architects comments.	B	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

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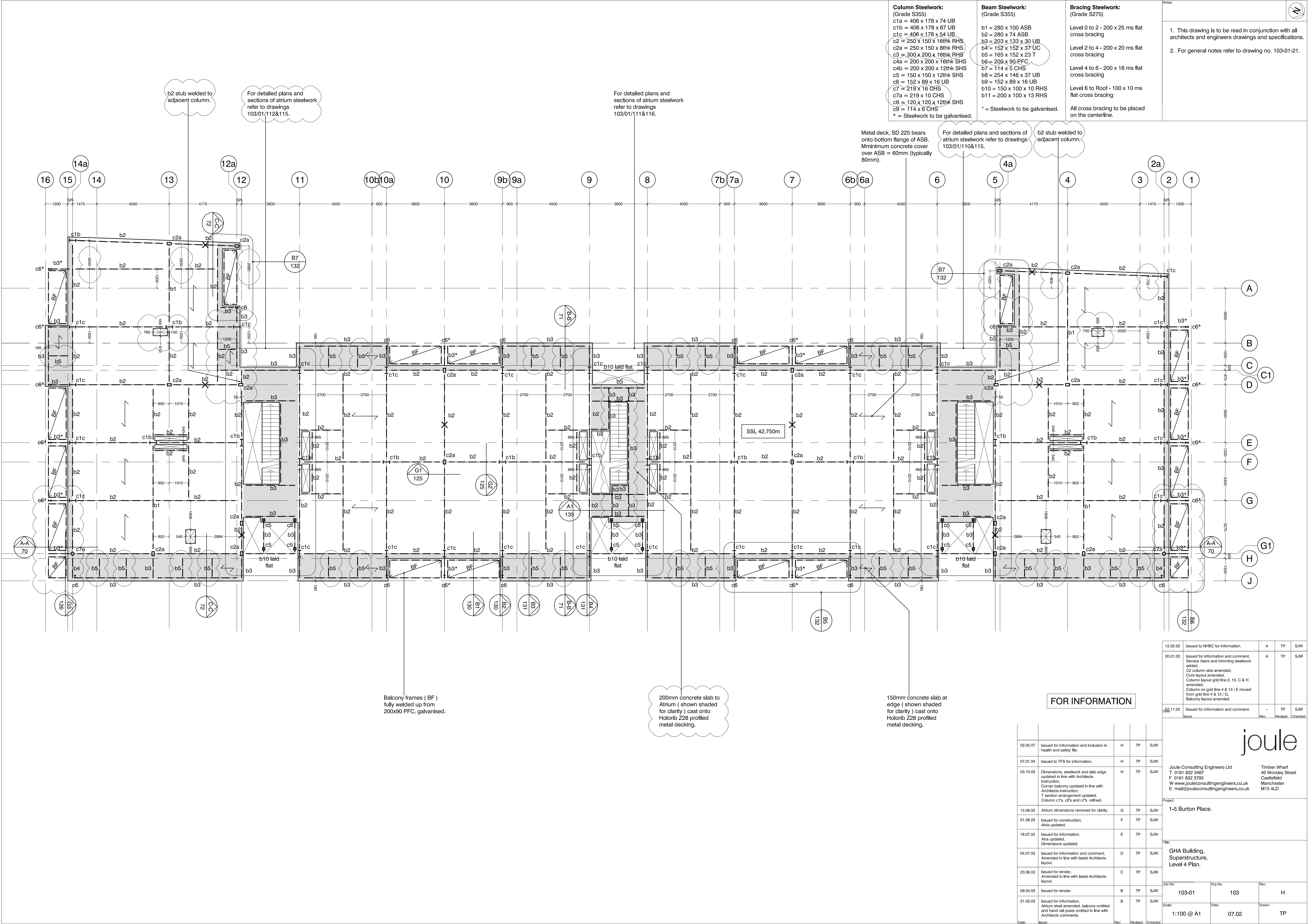
Project:
1-5 Burton Place.

Title:
GHA Building,
Superstructure,
Level 3 Plan.

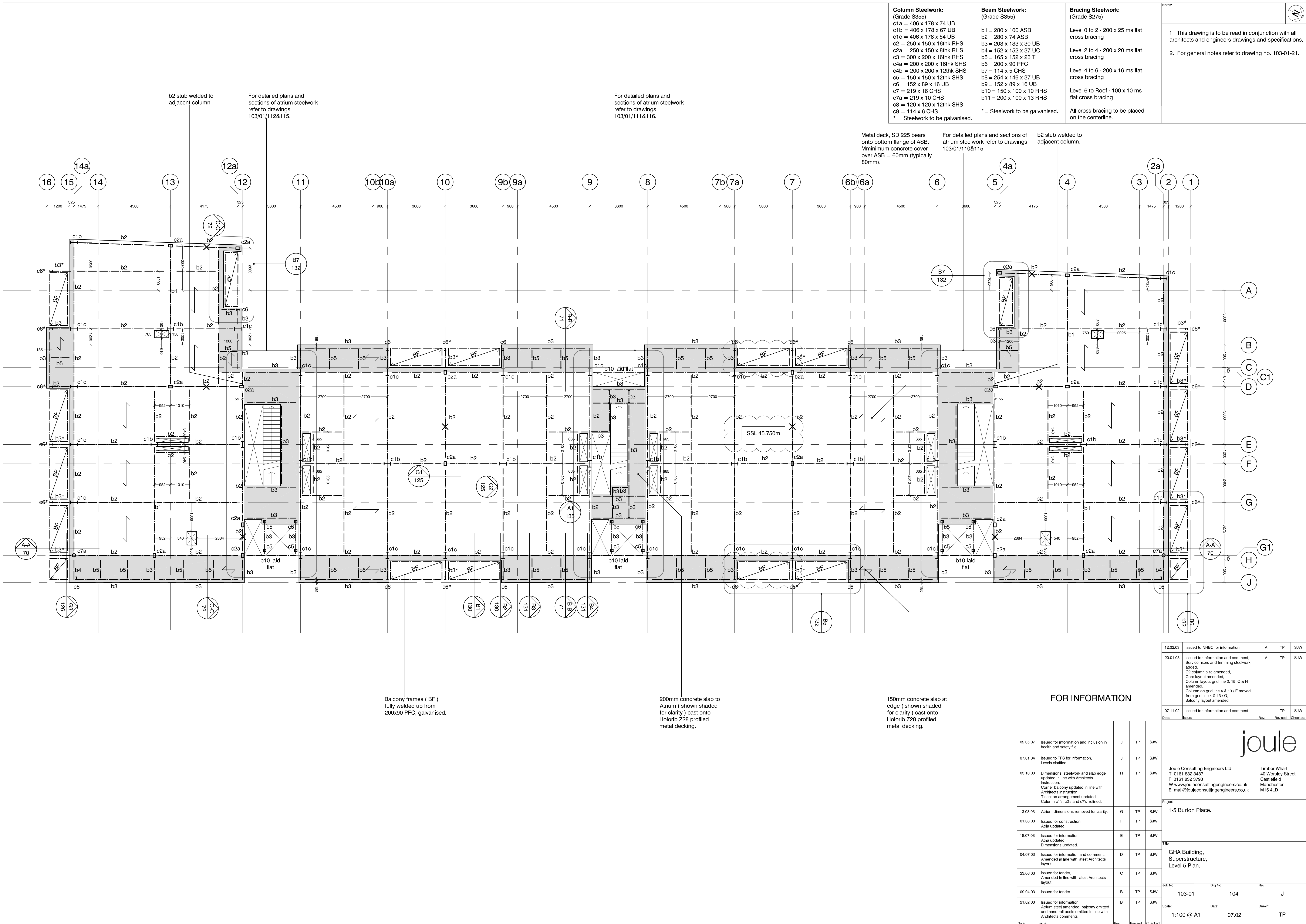
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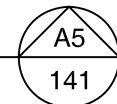
Orig No: 102
Date: 07.02

Rev: H
Drawn: TP

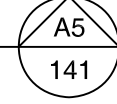


Notes:				Revision			
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.				2. For general notes refer to drawing no. 103-01-21.			
12.02.03				Issued to NHBC for information.	A	TP	SJW
20.01.03				Issued for information and comment. Service risers and trimming steelwork added. C2 column size amended. Core layout amended. Column layout grid line 2, 15, C & H amended. Column on grid line 4 & 13 / E moved from grid line 4 & 13 / G. Balcony layout amended.	A	TP	SJW
07.11.02				Issued for information and comment.	-	TP	SJW
Date:				Issue:	Rev:	Revised:	Checked:
02.05.07				Issued for information and inclusion in health and safety file.	H	TP	SJW
07.01.04				Issued to TFS for information.	H	TP	SJW
03.10.03				Dimensions, steelwork and slab edge updated in line with Architects instruction. Corner balcony updated in line with Architects instruction. T section arrangement updated. Column c1's, c2's and c7's refined.	H	TP	SJW
13.08.03				Atrium dimensions removed for clarity.	G	TP	SJW
01.08.03				Issued for construction. Atria updated.	F	TP	SJW
18.07.03				Issued for information. Atria updated. Dimensions updated.	E	TP	SJW
04.07.03				Issued for information and comment. Amended in line with latest Architects layout.	D	TP	SJW
23.06.03				Issued for tender. Amended in line with latest Architects layout.	C	TP	SJW
09.04.03				Issued for tender.	B	TP	SJW
21.02.03				Issued for information. Atrium steel amended, balcony omitted and hand rail posts omitted in line with Architects comments.	B	TP	SJW
Date:				Issue:	Rev:	Revised:	Checked:
103-01				103	H		
1:100 @ A1				07.02	TP		
Scale:				Date:	Drawn:		
Job No:				Draw No:	Rev:		
103-01				103	H		
1-5 Burton Place.							
Title:				GHA Building, Superstructure, Level 4 Plan.			
Project:				1-5 Burton Place.			
Joule Consulting Engineers Ltd T 0161 832 3487 F 0161 832 3793 W www.jouleconsultingengineers.co.uk E mail@jouleconsultingengineers.co.uk				Timber Wharf 40 Worsley Street Castlefield Manchester M15 4LD			
joule							

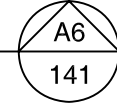




Finishes to lift roof and cladding
to Architects details.

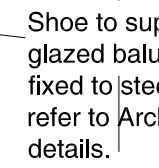


Glazed roof light, refer to Architects details.

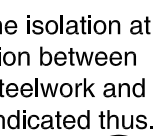


Treads, 218x85x10 thick
MS plate to form angle,
welded in shop to stringer
infill to Architects details

Treads, 312x85x10
thick MS plate to form
angle, fully welded in
shop to stringer infill to
Architects details.



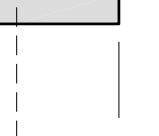
Treads, 266x85x10 thick
MS plate to form angle, fu
welded in shop to stringer
infill to Architects details.



Stringers, pairs of 250x12
MS plate welded to MS
treads. Cantilevered glass
balustrade fixed into string
to Architects
details.



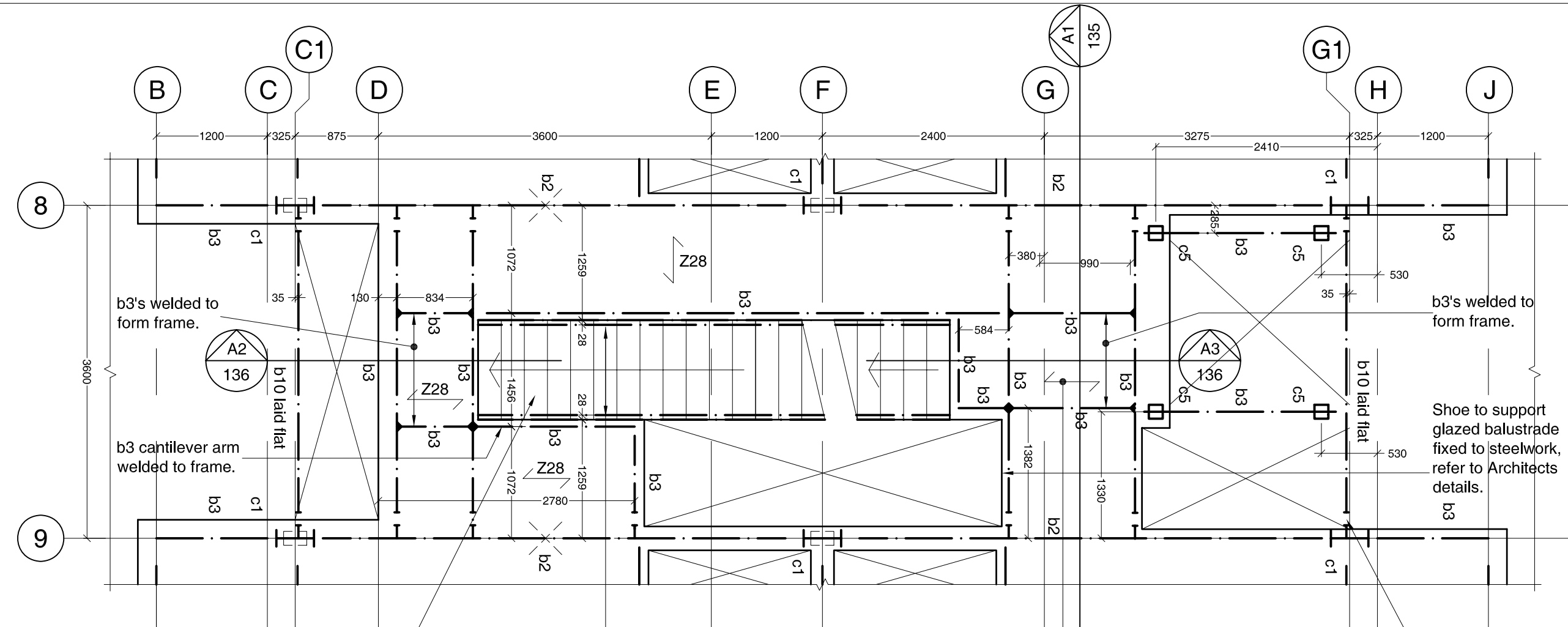
Steel post runs through to foundation at Level B2.



* = Steelwork to be galvanised.

02.05.07	Issued for information and inclusion in health and safety file.	C	TP	SJW
13.01.04	Issued to Helex flooring for information.	C	TP	SJW
07.01.03	Issued to TFS for information, Setting out updated.	C	TP	SJW
03.10.03	Treads updated in line with latest Architects requirements. Level 0 to B2 stringers added. Steelwork updated in line with latest Architects requirements. Section markers added.	B	TP	SJW
13.08.03	Dimensions updated throughout. Steel arrangement amended in line with latest Architects layouts.	A	TP	SJW
01.08.03	Issued for construction.	B	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

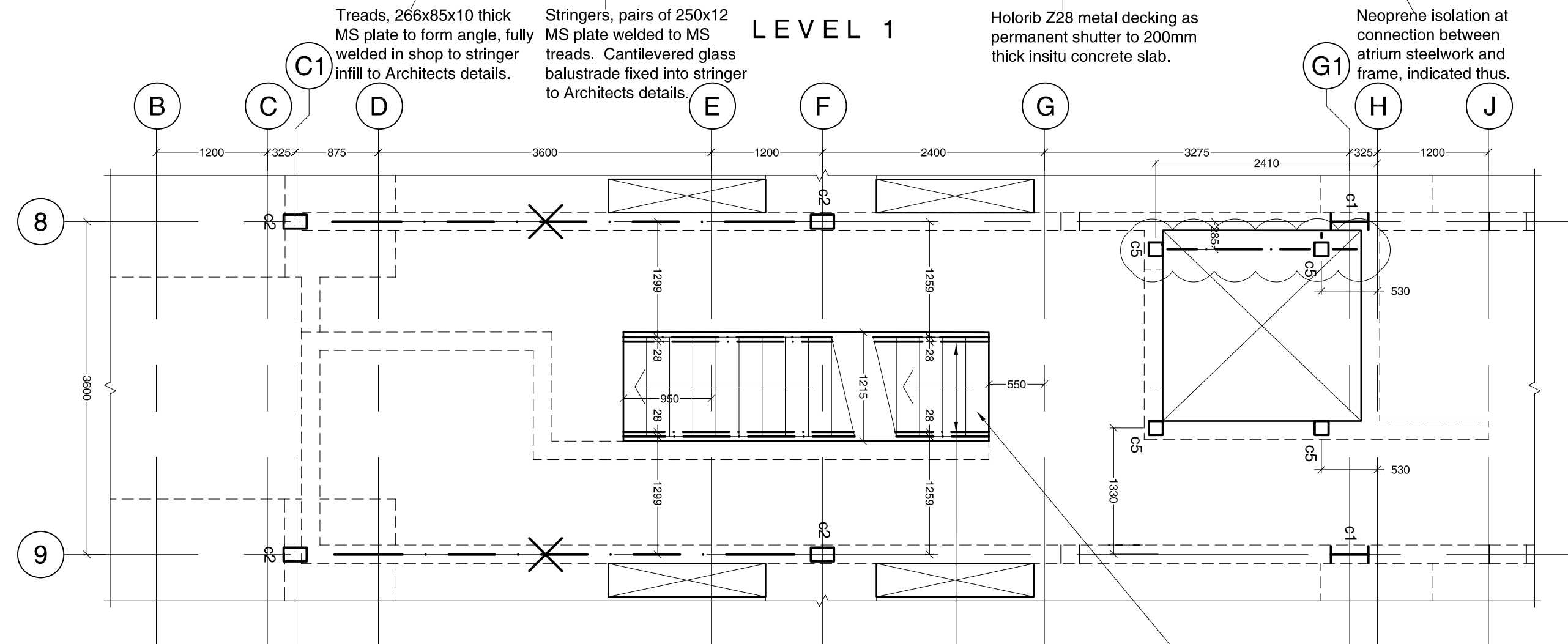
Job No:	Dwg No:	Rev:
103-01	110	C
Scale:	Date:	Drawn:
1:50 @ A1	07.02	TP



All cross bracing to be placed on the centreline

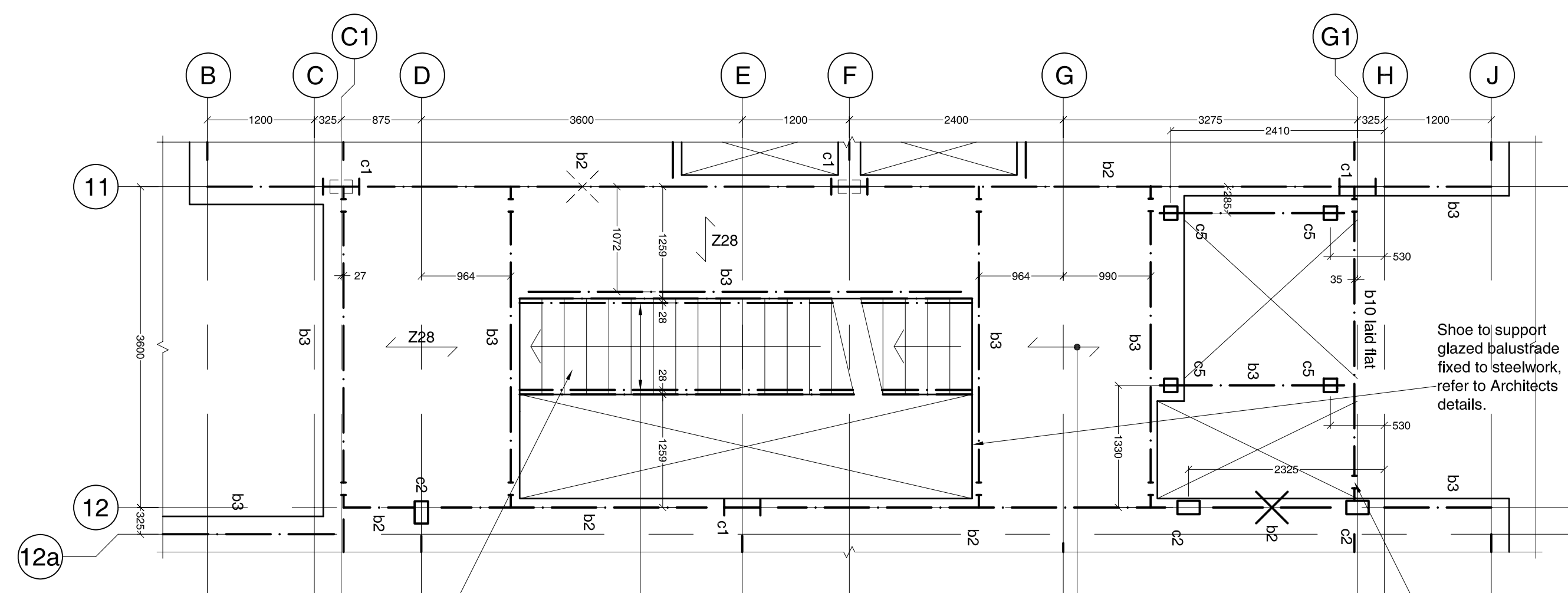
* = Steelwork to be galvanised

* = Steelwork to be galvanised



02.05.07	Issued for information and inclusion in health and safety file.	C	TP	SJV
13.01.04	Issued to Helex Roofing for information.	C	TP	SJV
07.01.03	Issued to TFS for information, Setting out updated.	C	TP	SJV
03.10.03	Treads updated in line with latest Architects requirements, Level 0 to B2 stringers added, Steelwork updated in line with latest Architects requirements, Section markers added.	B	TP	SJV
13.08.03	Dimensions updated throughout, Steel arrangement amended in line with latest Architects layouts.	A	TP	SJV
01.08.03	Issued for construction.	-	TP	SJV
Date	Issue	Rev	Respon	Check

Job No: 103-01	Drig No: 111	Rev: C
Scale: 1:50 @ A1	Date: 07.02	Drawn: TP



Notes:	
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications. 2. For general notes refer to drawing no. 103-01-21.	

Bracing Steelwork:
(Grade S275)

Level 0 to 2 - 200 x 25 ms flat cross bracing

Level 2 to 4 - 200 x 20 ms flat cross bracing

Level 4 to 6 - 200 x 16 ms flat cross bracing

Level 6 to Roof - 100 x 10 ms flat cross bracing

All cross bracing to be placed on the centreline.

Beam Steelwork:
(Grade S355)

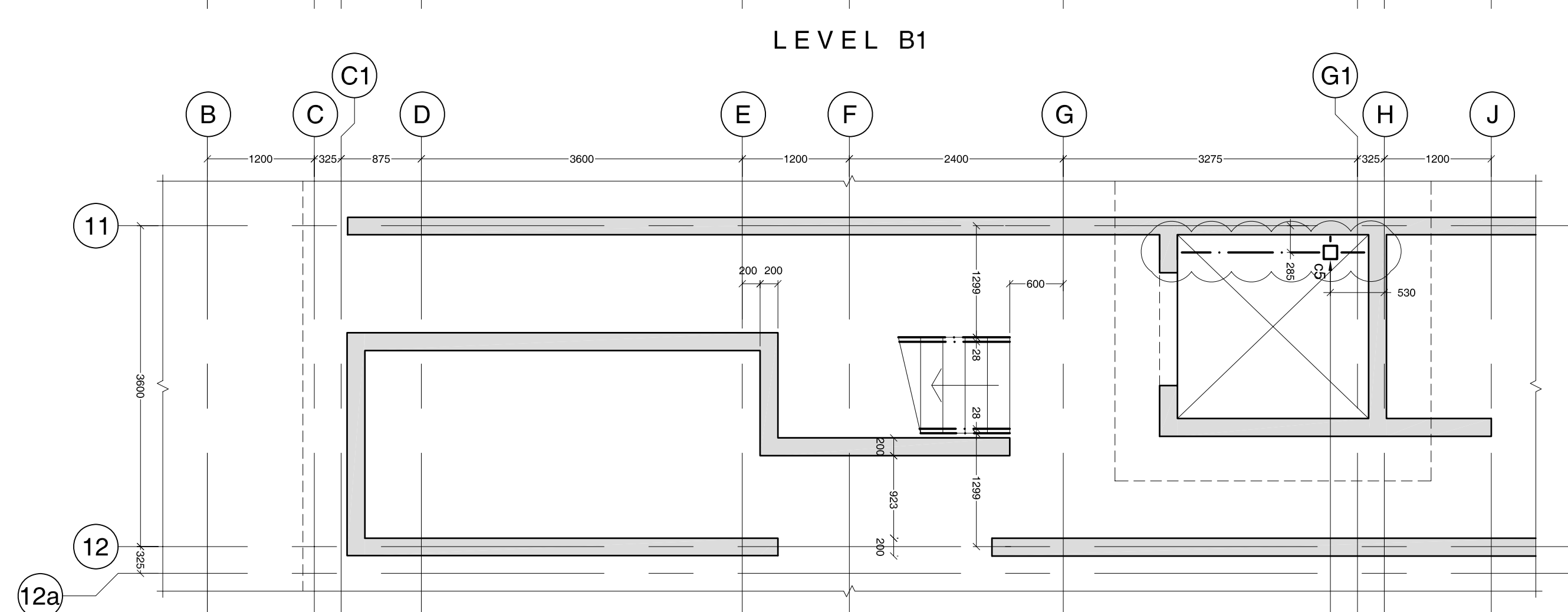
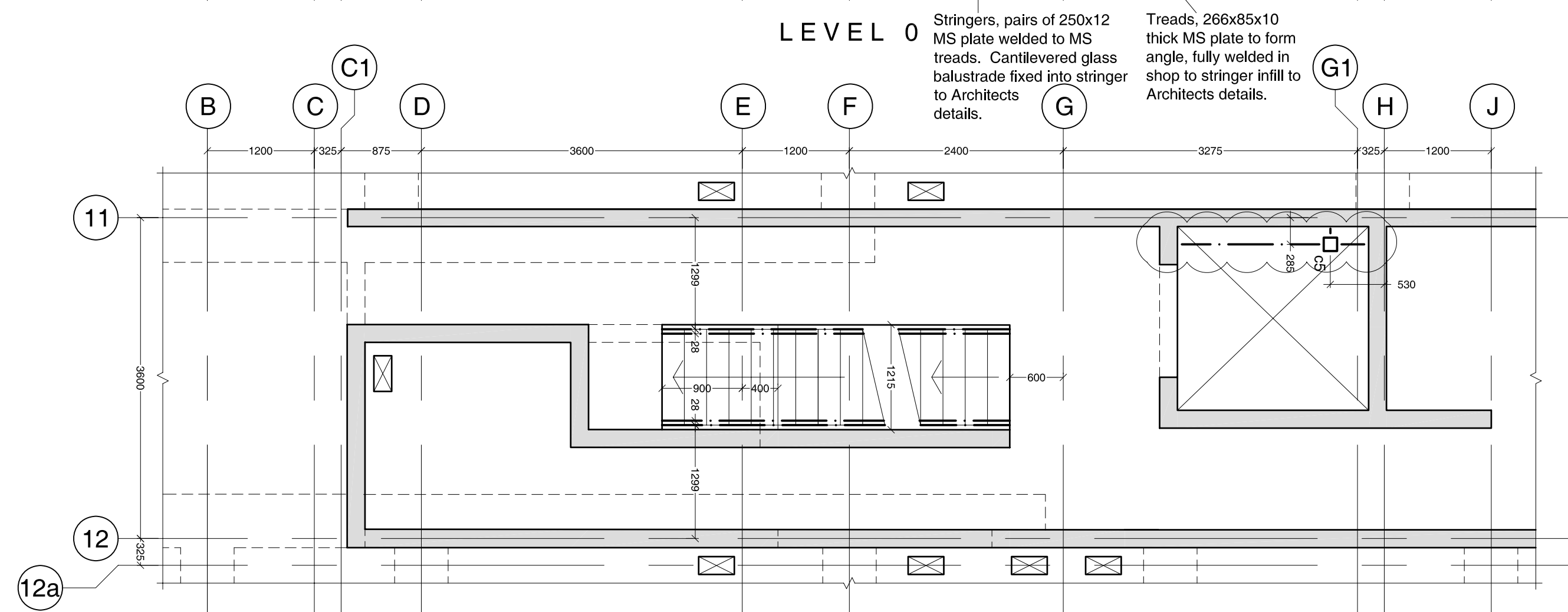
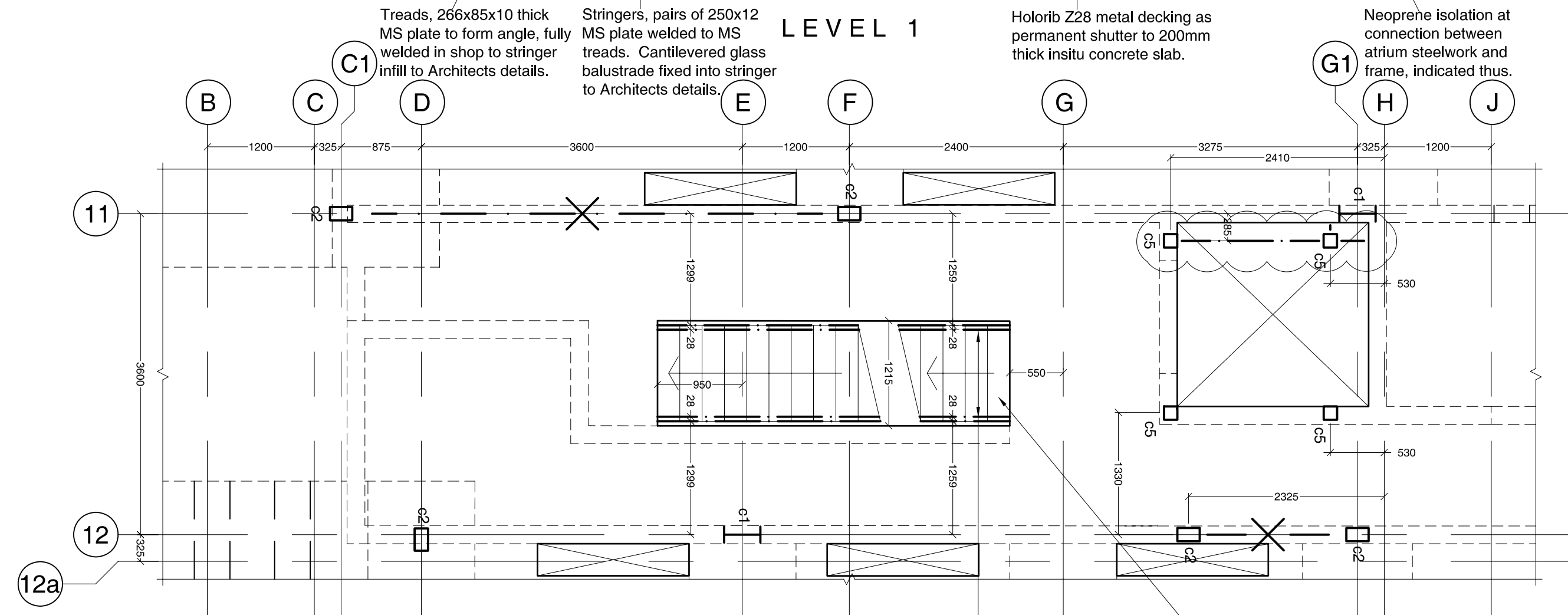
b1 = 280 x 100 ASB
b2 = 280 x 74 ASB
b3 = 203 x 133 x 30 UB
b4 = 152 x 152 x 37 UC
b5 = 165 x 152 x 23 T
b6 = 200 x 90 PFC
b7 = 114 x 5 CHS
b8 = 254 x 146 x 37 UB
b9 = 152 x 89 x 16 UB
b10 = 150 x 100 x 10 RHS
b11 = 200 x 100 x 13 RHS

* = Steelwork to be galvanised.

Column Steelwork:
(Grade S355)

c1a = 406 x 178 x 74 UB
c1b = 406 x 178 x 67 UB
c1c = 406 x 178 x 54 UB
c2 = 250 x 150 x 16thk RHS
c2a = 250 x 150 x 8thk RHS
c3 = 300 x 200 x 16thk RHS
c4 = 200 x 200 x 16thk SHS
c4b = 200 x 200 x 12thk SHS
c5 = 150 x 150 x 12thk SHS
c6 = 152 x 89 x 16 UB
c7 = 219 x 16 CHS
c7a = 219 x 10 CHS
c8 = 120 x 120 x 12thk SHS
c9 = 114 x 6 CHS

* = Steelwork to be galvanised



FOR INFORMATION

02.05.07	Issued for information and inclusion in health and safety file.	C	TP	S/JW
13.01.04	Issued to H&S Roofing for information.	C	TP	S/JW
07.01.04	Issued to TFS for information, Settling out updated.	C	TP	S/JW
03.10.03	Trends updated in line with latest Architects requirements. Level 0 to BE structures added. Steelwork updated in line with latest Architects requirements.	B	TP	S/JW
13.08.03	Dimensions updated throughout. Steel arrangement amended in line with latest Architects layouts.	A	TP	S/JW
01.08.03	Issued for construction.	-	TP	S/JW
Date:	Issue:	Rev:	Revised:	Checked:

joule

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Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
1-5 Burton Place.

Title:
Atrium Steelwork,
Plans,
Atrium 3.

Job No:	103-01	Drq No:	112	Rev:	C
Scale:	1:50 @ A1	Date:	07.02	Drawn:	TP

- Notes:
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.
 2. For general notes refer to drawing no. 103-01-21.

FOR INFORMATION

02.05.07	Issued for information and inclusion in health and safety file.	C	TP	SJW
13.01.04	Issued to Helix Roofing for information.	C	TP	SJW
07.01.04	Issued to TFS for information. Tread size and number updated in line with latest Architects information.	C	TP	SJW
03.10.03	Steelwork updated in line with latest Architects requirements. Treads updated in line with latest Architects requirements.	B	TP	SJW
13.08.03	Note amended.	A	TP	SJW
01.08.03	Issued for construction.	-	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

joule

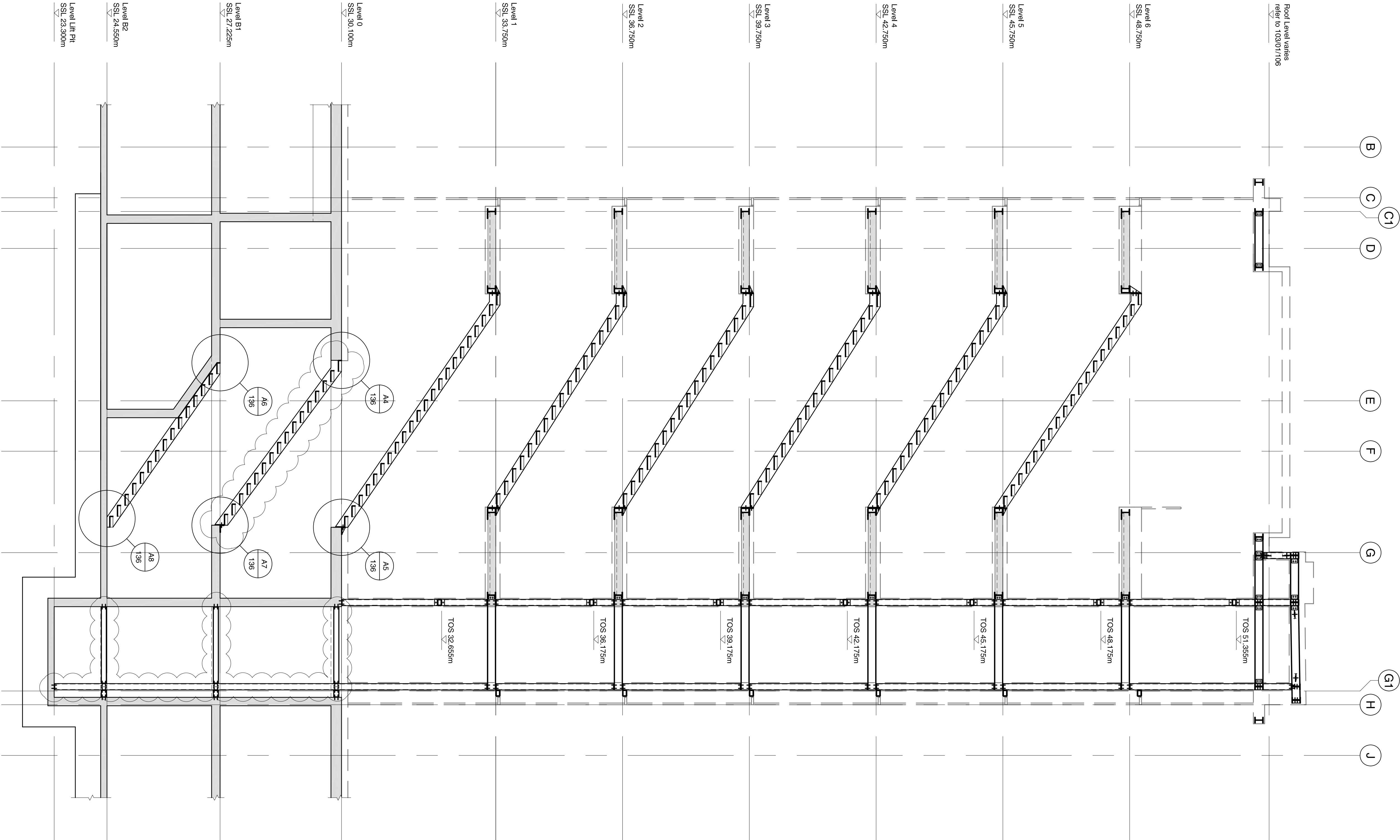
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E mail@jouleconsultingengineers.co.uk

Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
1-5 Burton Place.

Title:
Atrium Steelwork,
Sections,
Atrium 1 & 3.

Job No:	103-01	Orig No:	115	Rev:	C
Scale:	1:50 @ A1	Date:	07.02	Drawn:	TP



- Notes:
1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.
 2. For general notes refer to drawing no. 103-01-21.

FOR INFORMATION

02.05.07	Issued for information and inclusion in health and safety file.	C	TP	SJW
13.01.04	Issued to Helix Roofing for information.	C	TP	SJW
07.01.04	Issued to TFS for information. Tread size and number updated in line with latest Architects information.	C	TP	SJW
03.10.03	Steelwork updated in line with latest Architects requirements. Treads updated in line with latest Architects requirements.	B	TP	SJW
13.08.03	Note amended.	A	TP	SJW
01.08.03	Issued for construction.	-	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

joule

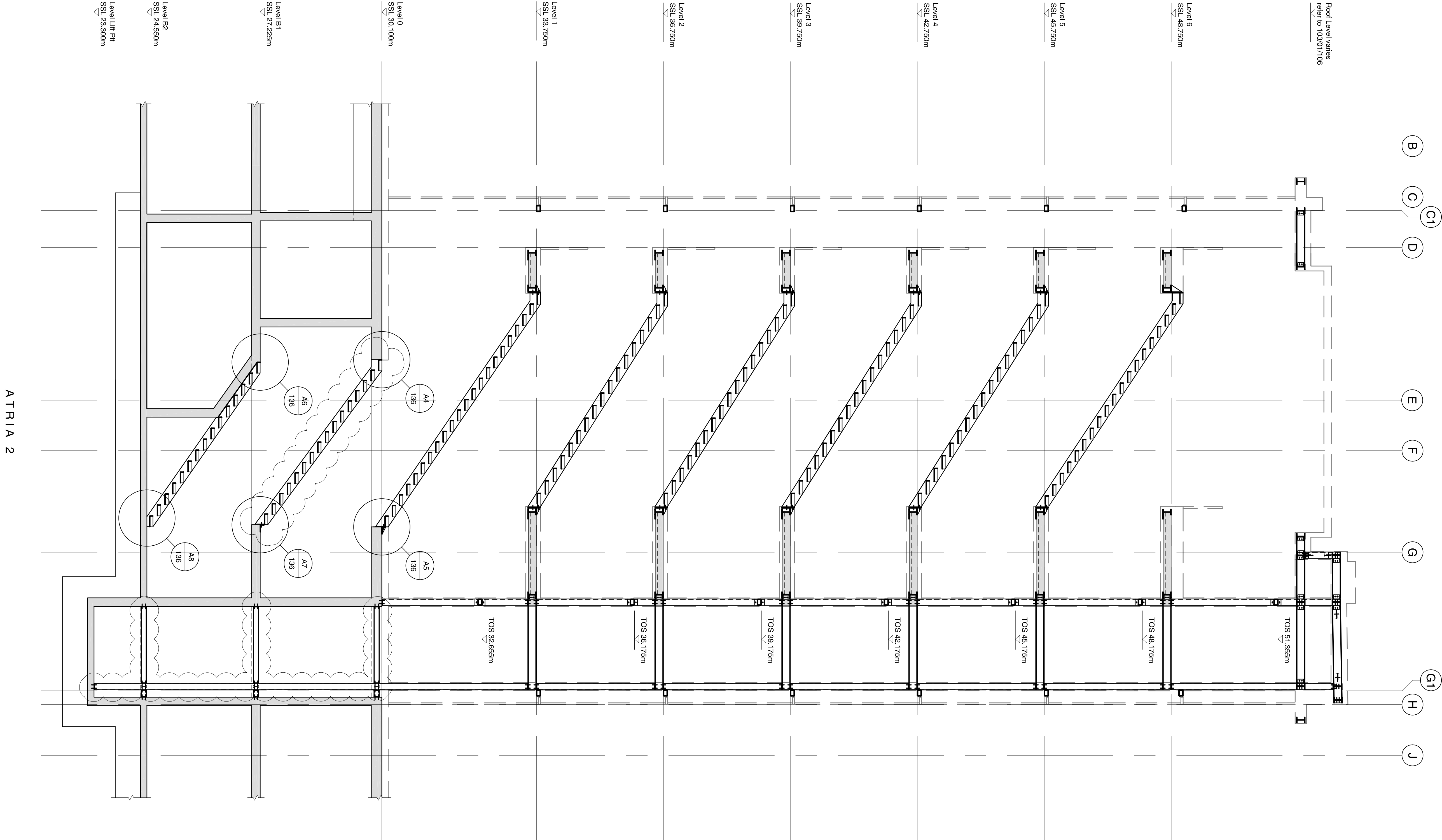
Joule Consulting Engineers Ltd
T: 0161 832 3457
F: 0161 832 3793
W: www.jouleconsultingengineers.co.uk
E: mail@jouleconsultingengineers.co.uk

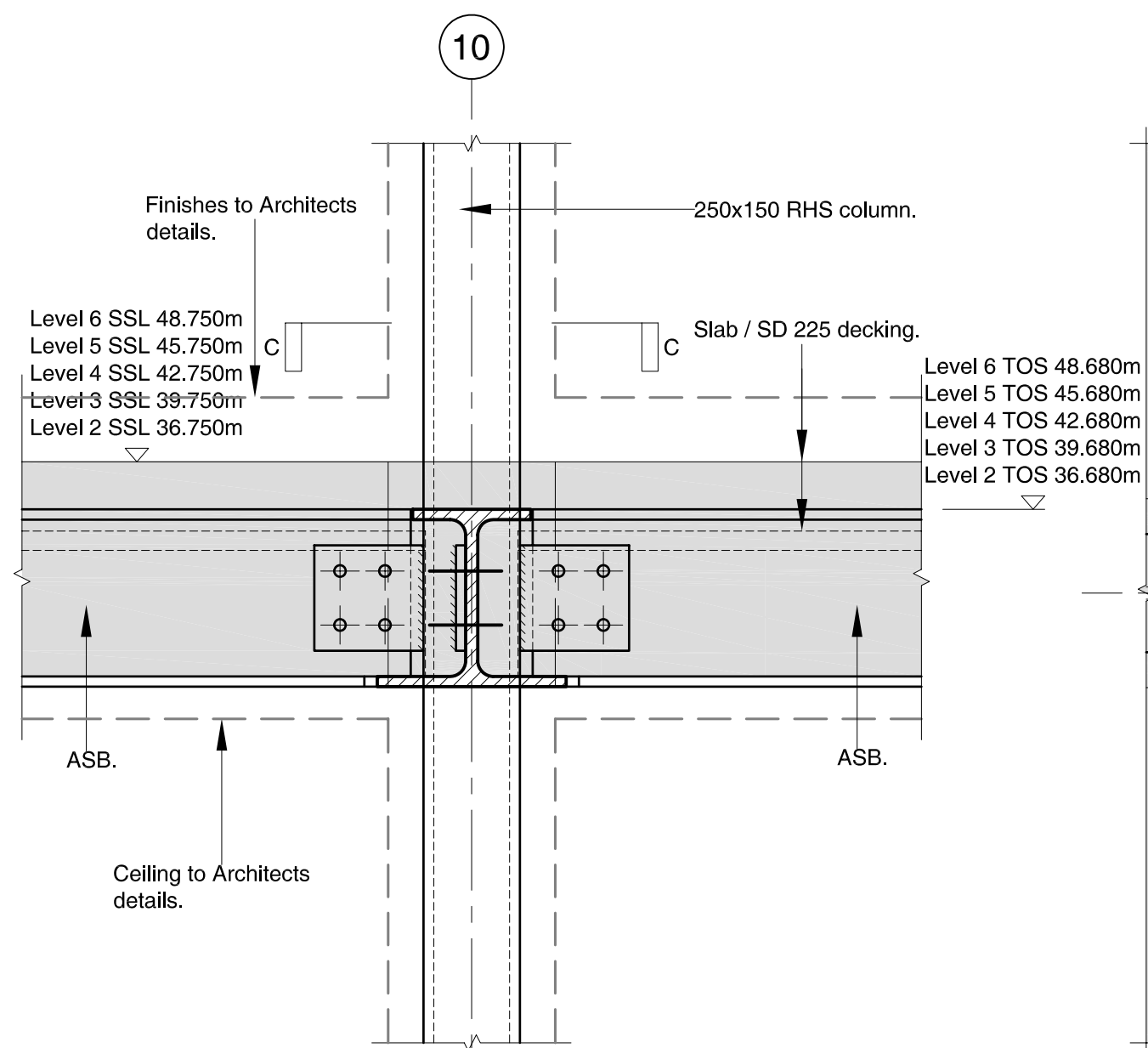
Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
1-5 Burton Place.

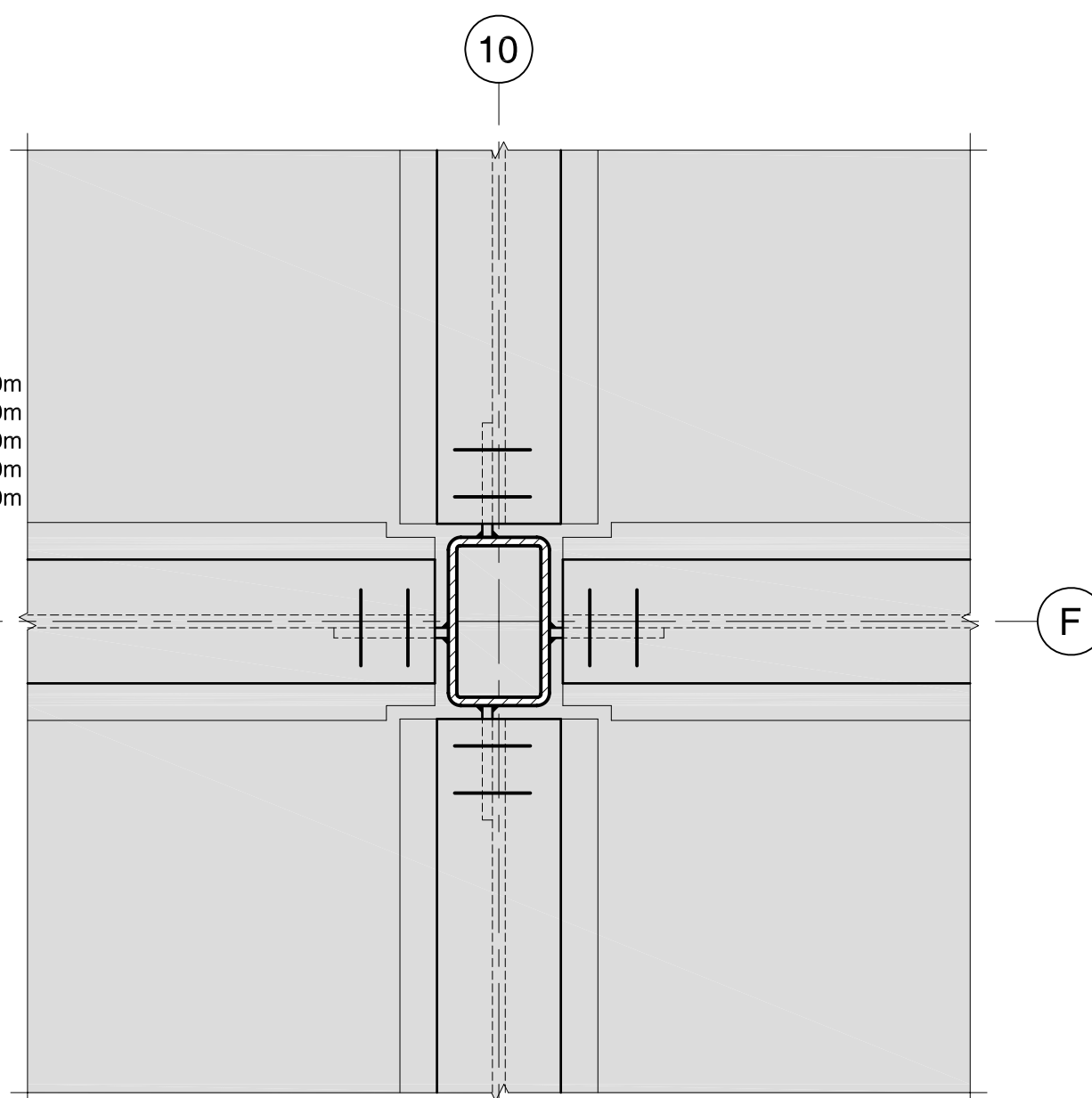
Title:
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Sections,
Atrium 2.

Job No:	103-01	Orig No:	116	Rev:	C
Scale:	1:50 @ A1	Date:	07.02	Drawn:	TP

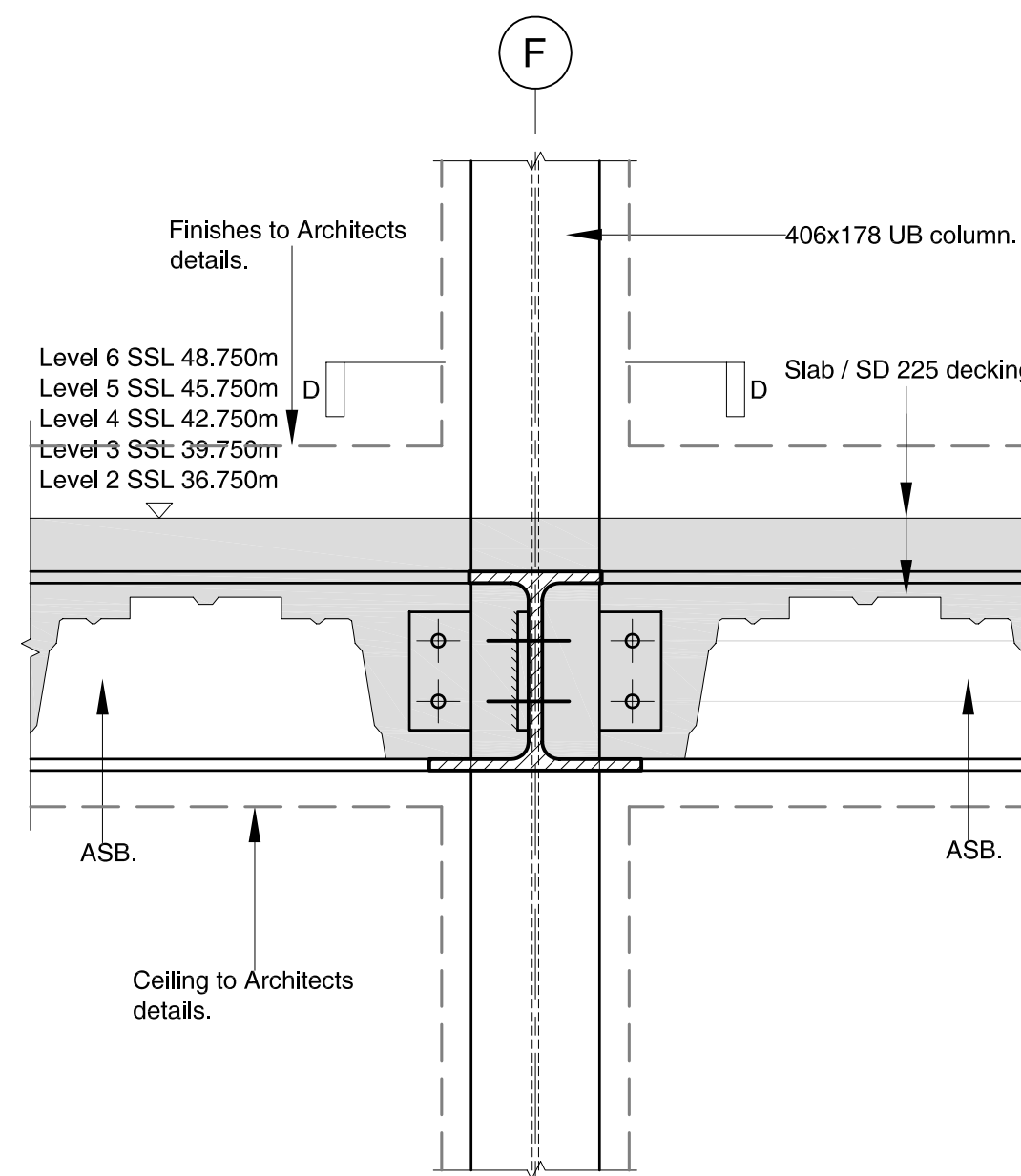




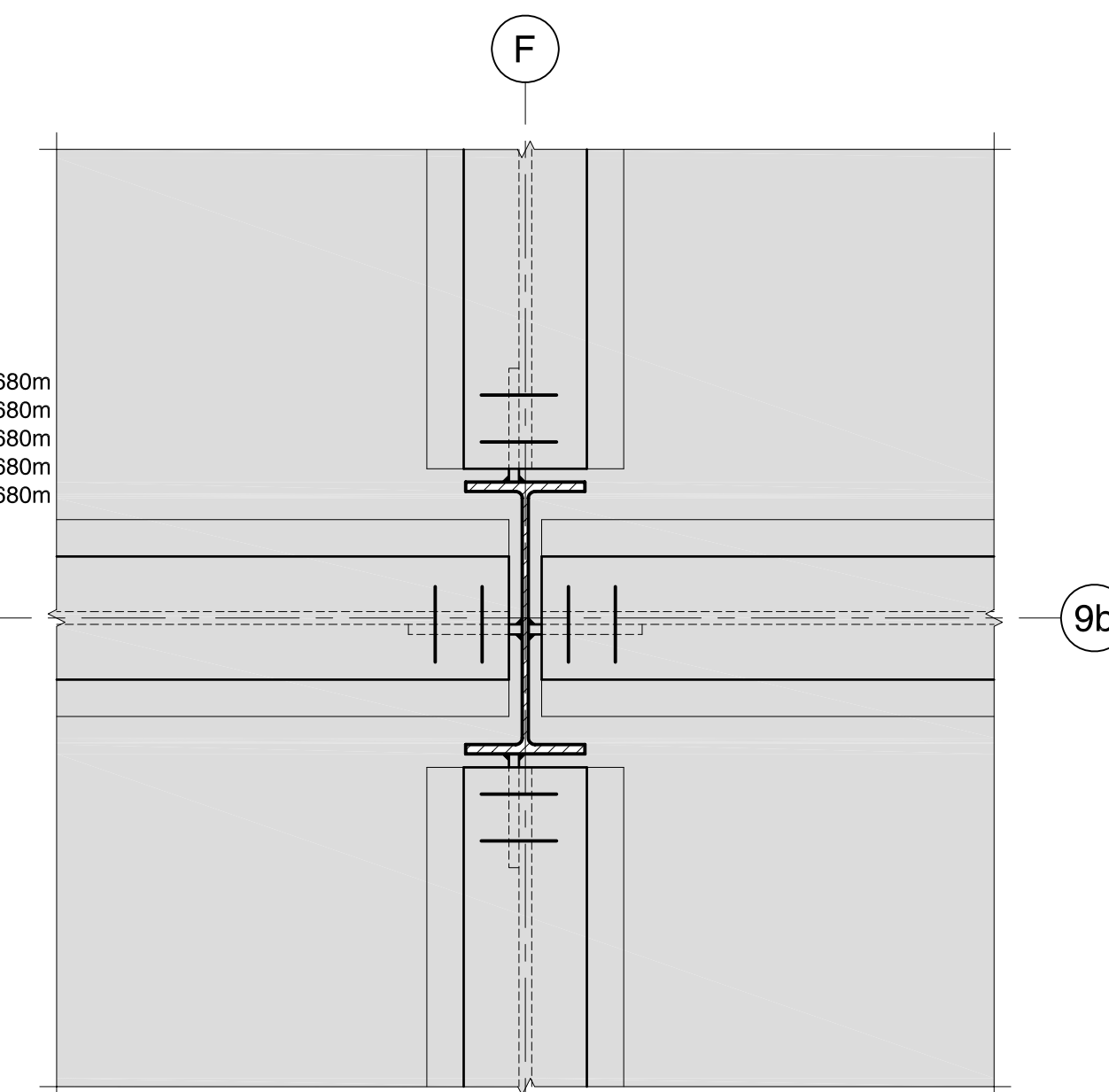
DETAIL G1 (Level 2 to 5)



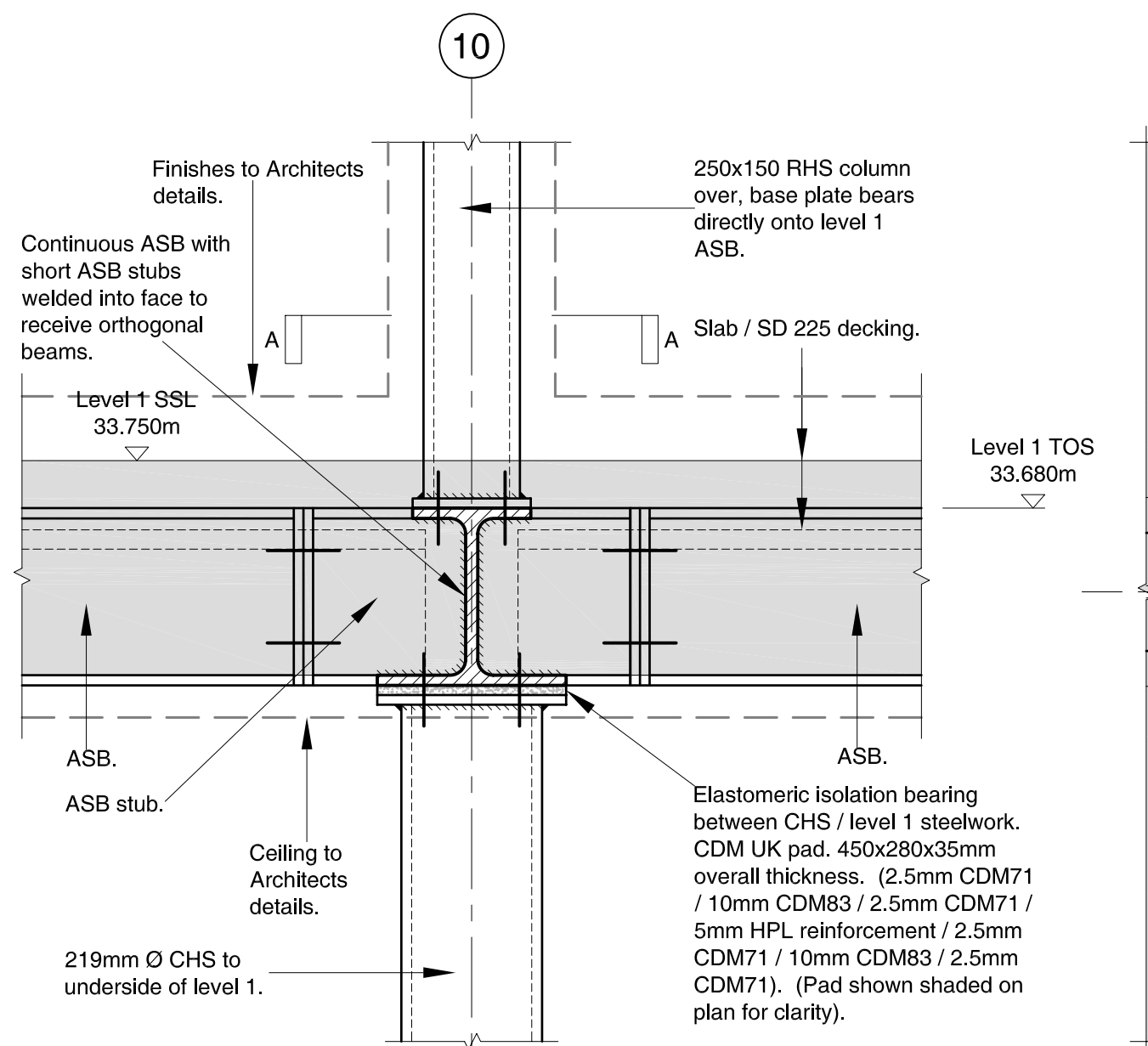
PLAN C-C



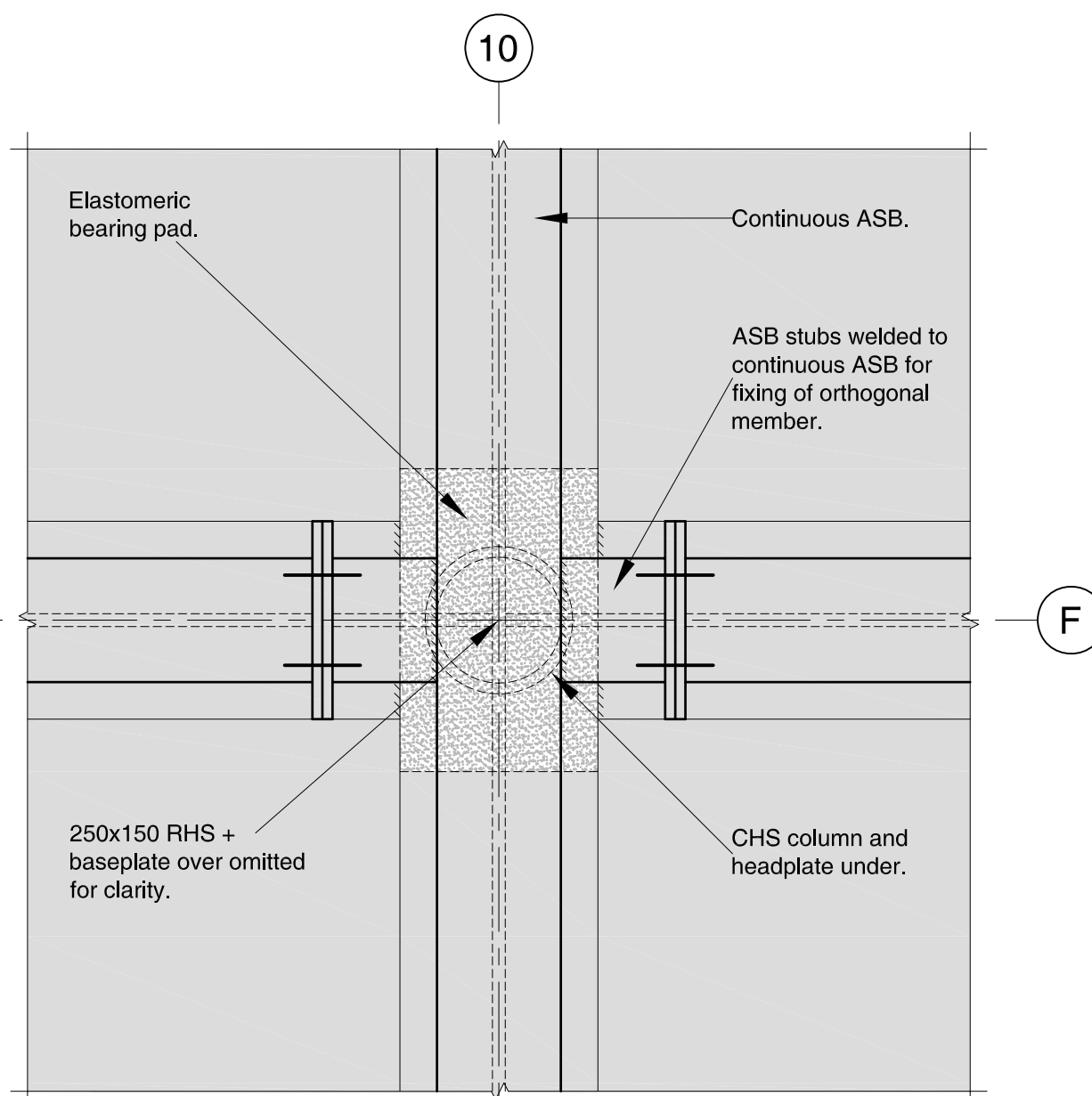
DETAIL G2 (Level 2 to 5)



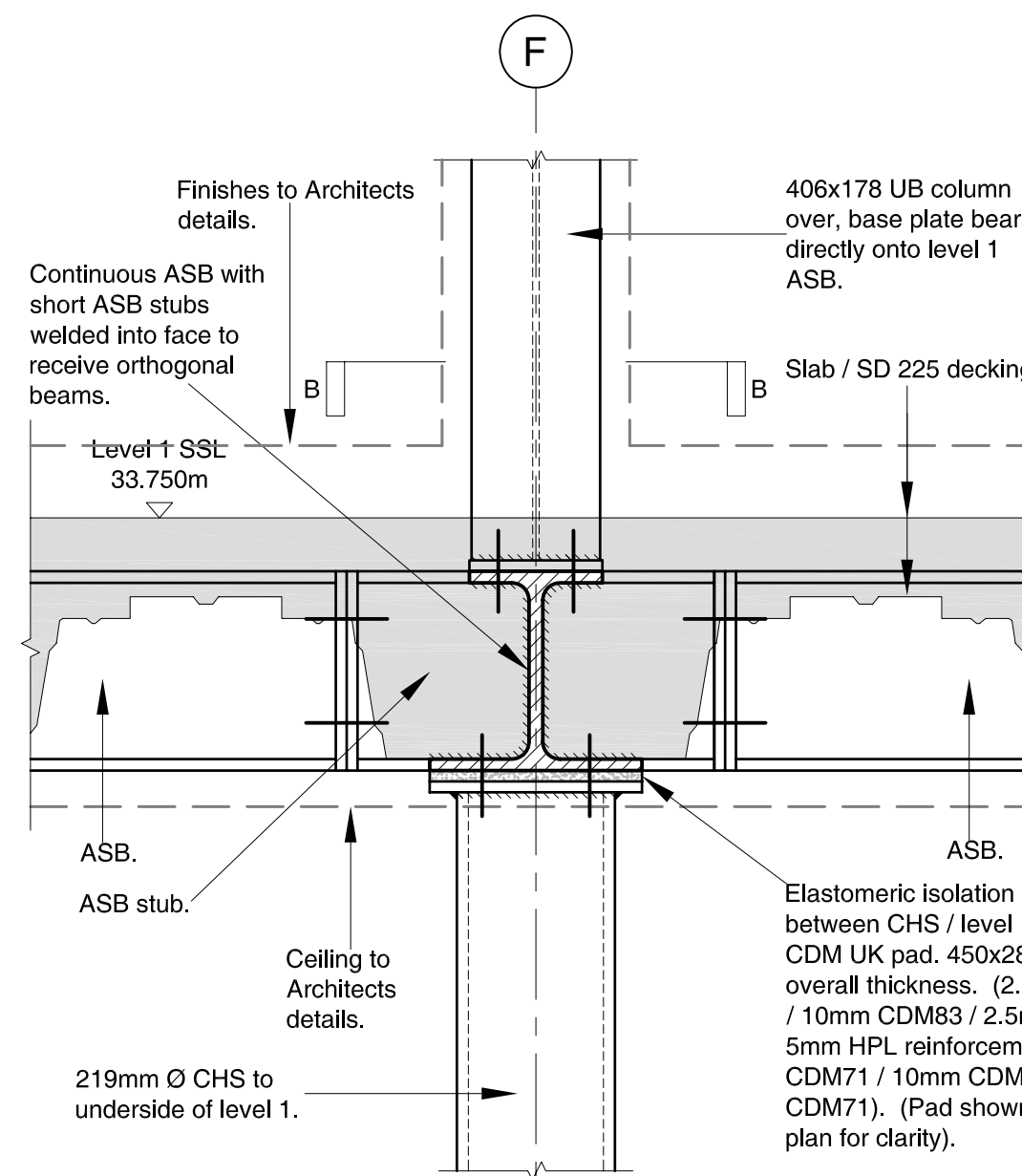
PLAN D-D



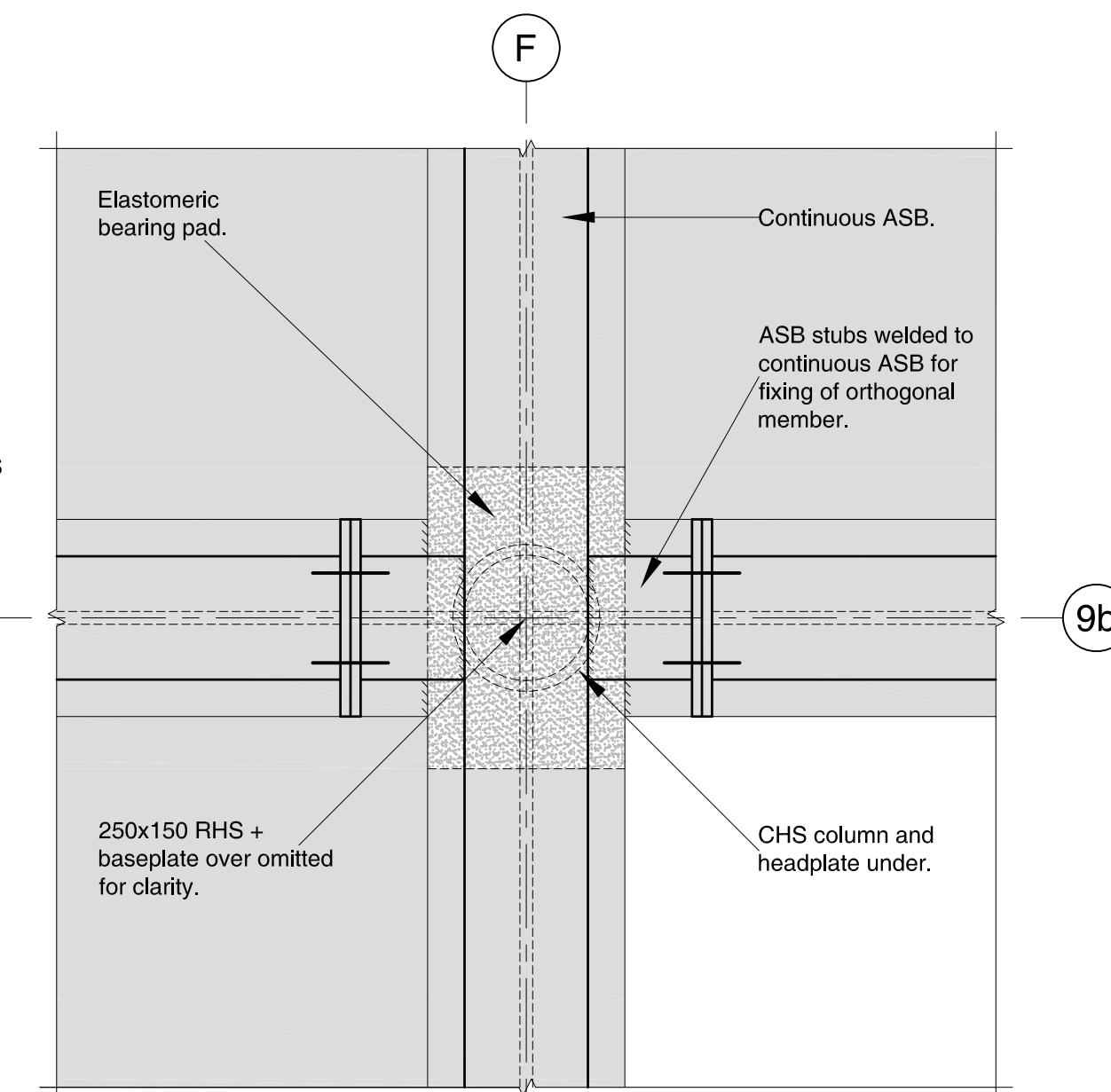
DETAIL G1 (Level 1)



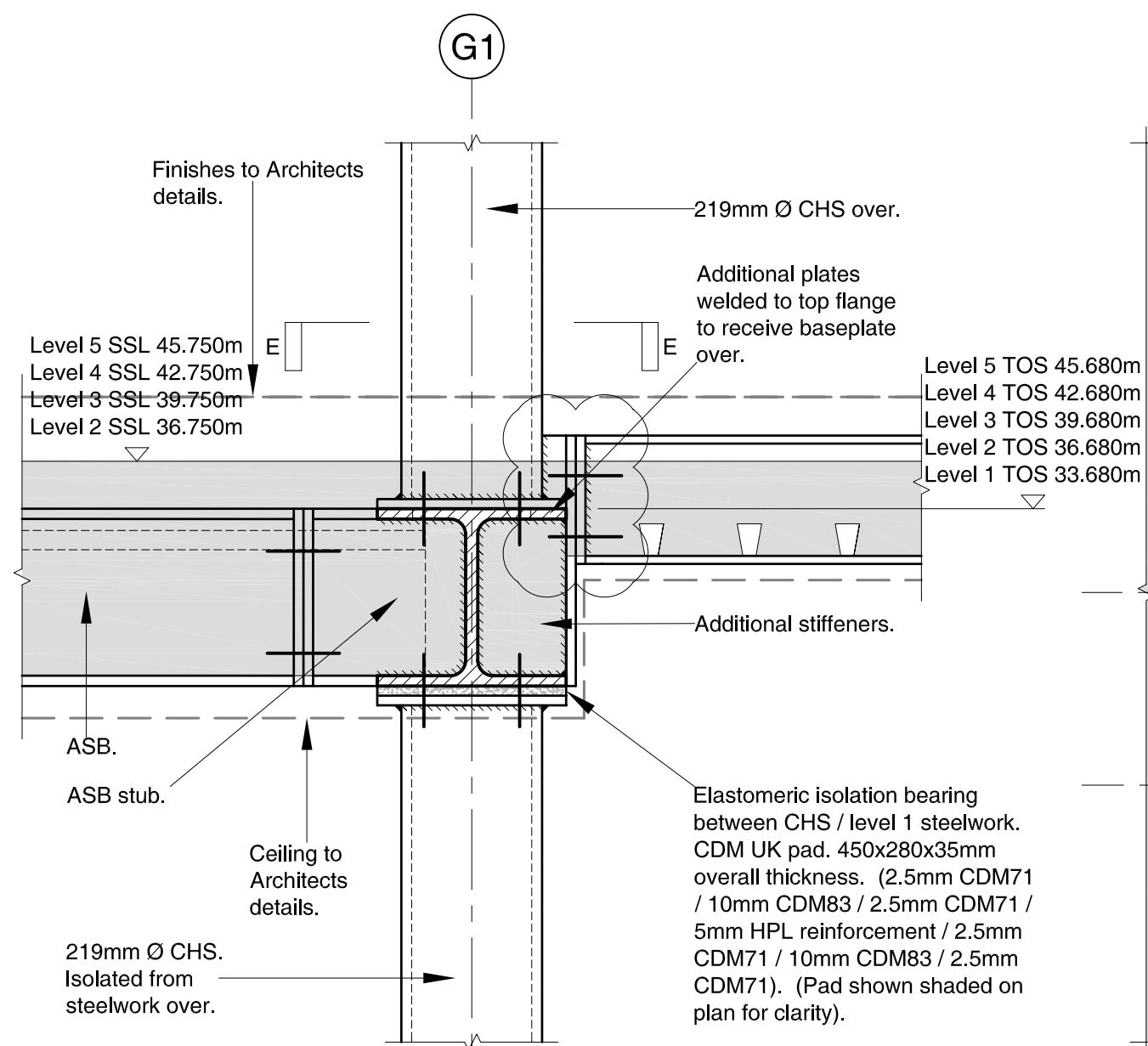
PLAN A-A



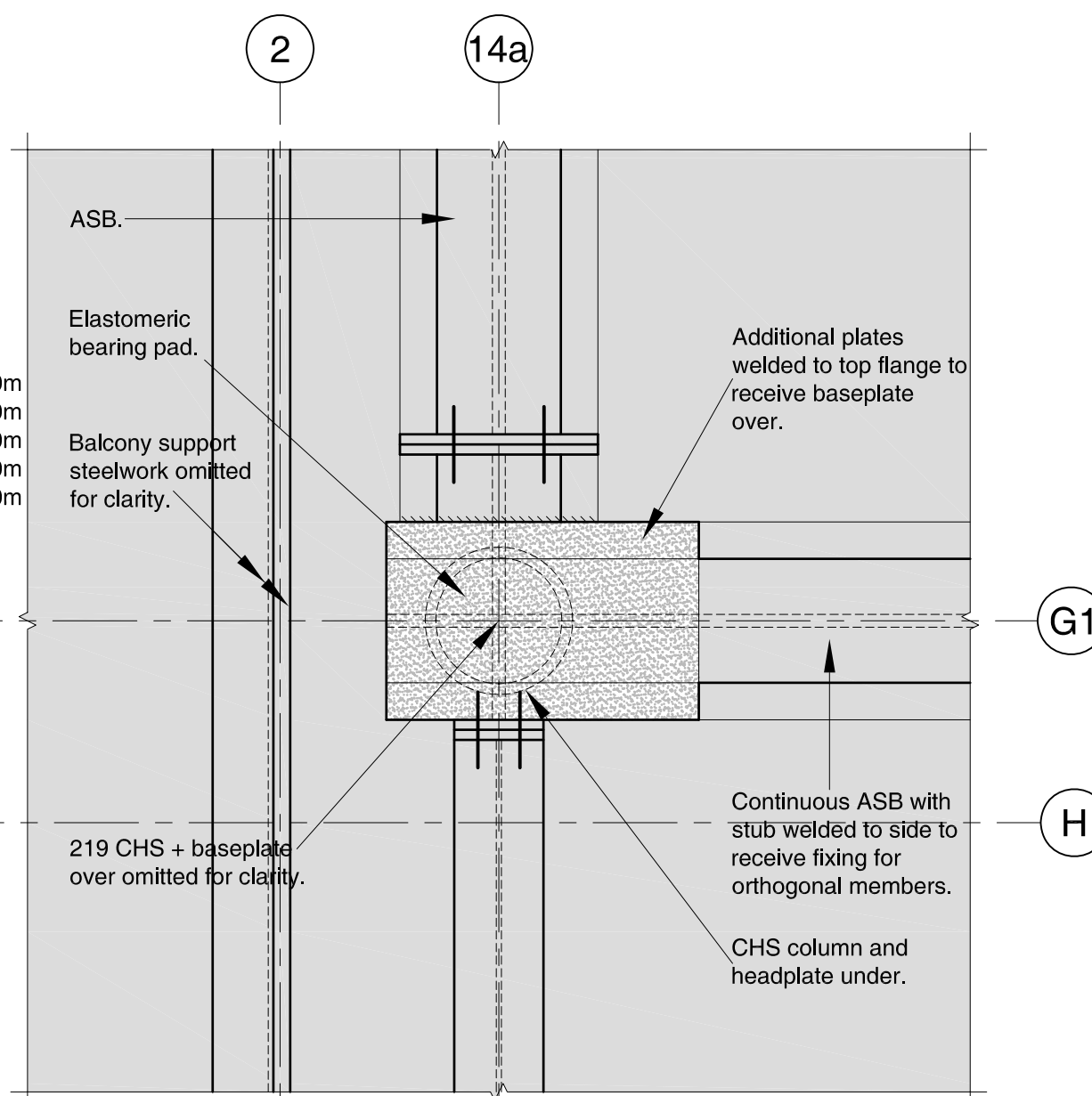
DETAIL G2 (Level 1)



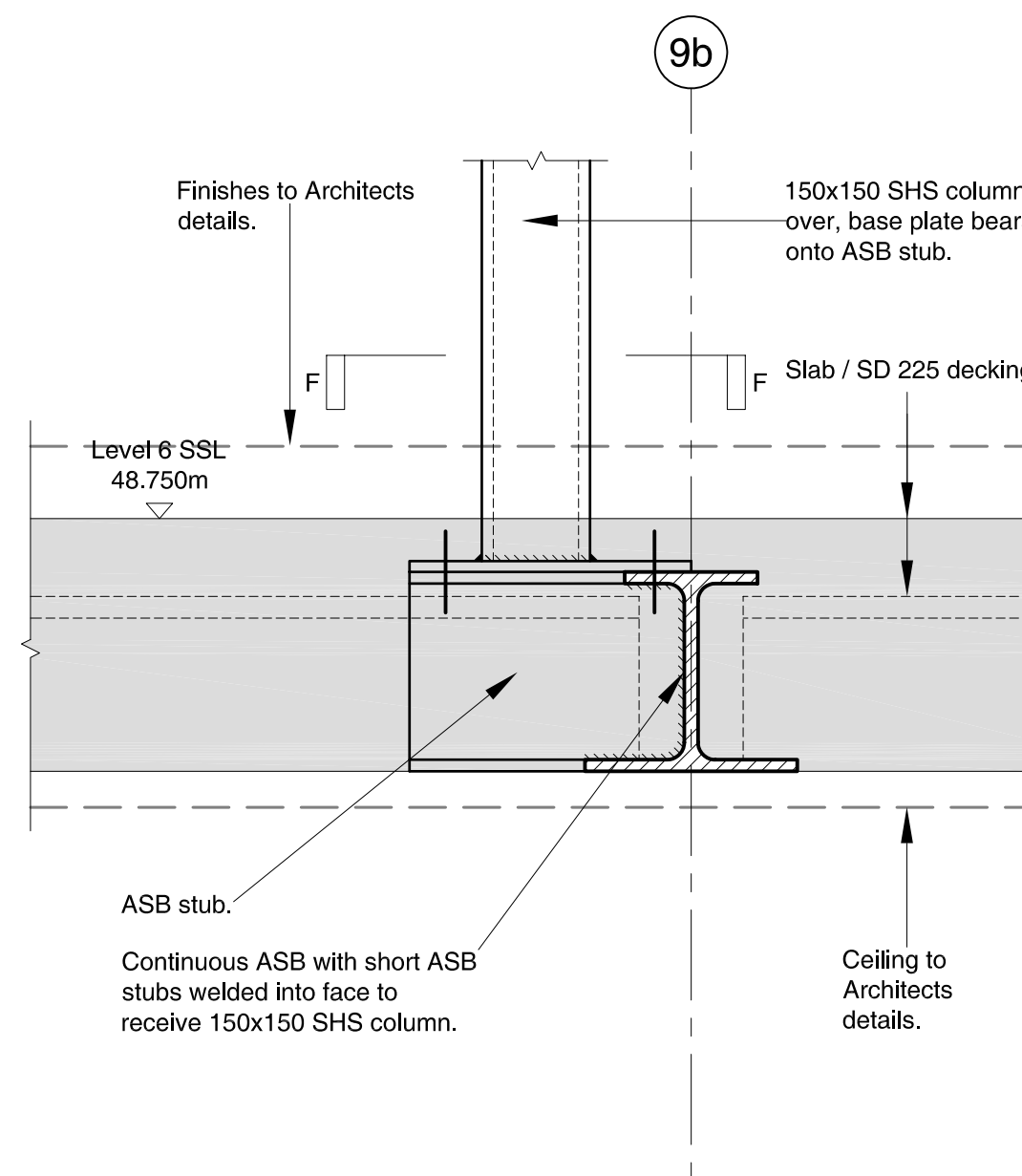
PLAN B-B



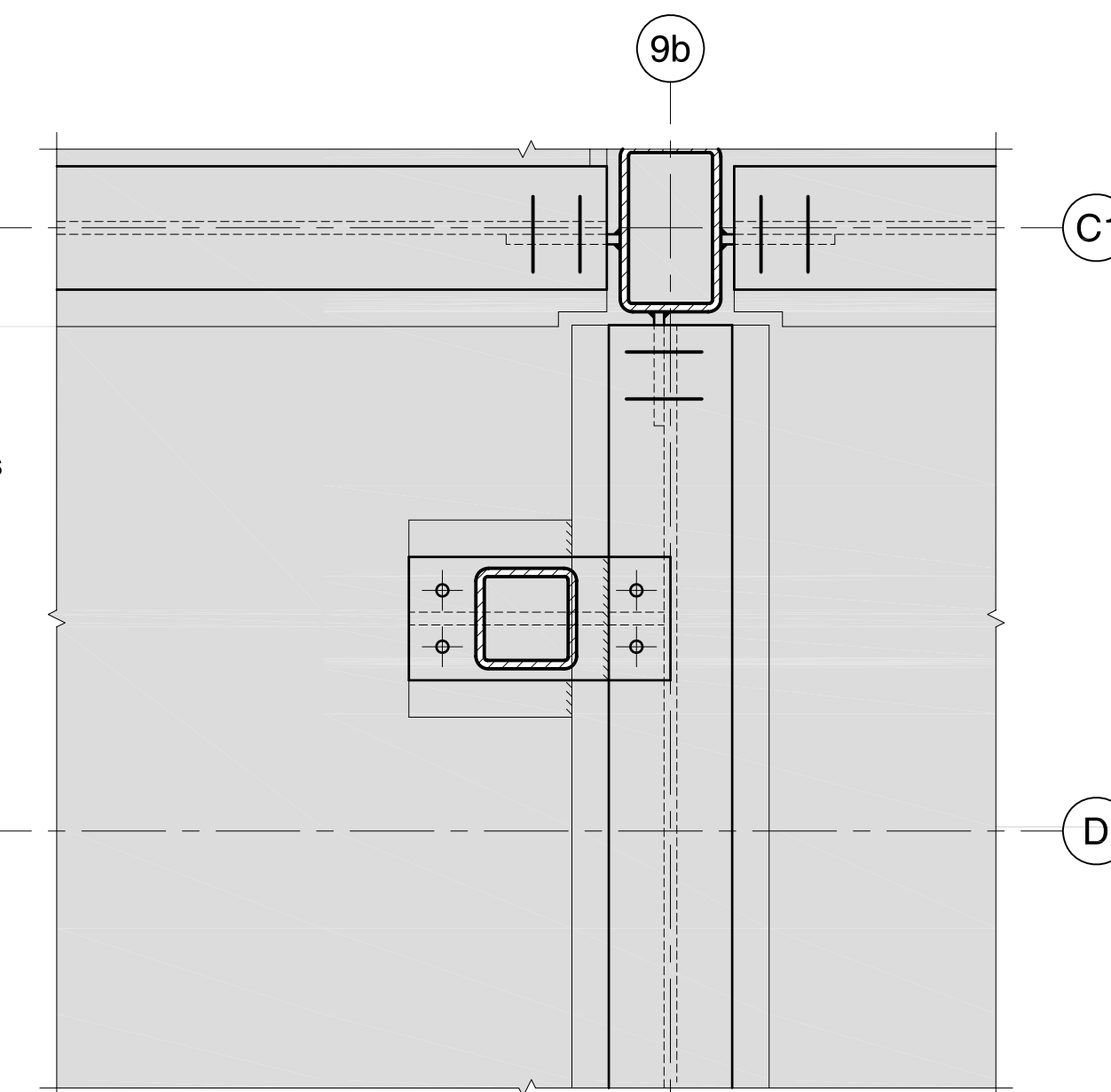
DETAIL G3 (Level 1 to 5)



PLAN E-E



DETAIL G4 (Level 6)



PLAN F-F

1. This drawing is to be read in conjunction with all architects and engineers drawings and specifications.
2. For general notes refer to drawing no. 103-01-21.

FOR INFORMATION

02.05.07	Issued for information and inclusion in health and safety file.	C	TP	SJW
07.01.04	Issued to TFS for information.	C	TP	SJW
03.10.03	Steelwork updated.	C	TP	SJW
13.08.03	TOS levels updated.	B	TP	SJW
01.08.03	Issued for construction.	A	TP	SJW
18.07.03	Issued for information, Detail G4 added.	A	TP	SJW
04.07.03	Issued for information and comment.	-	TP	SJW
Date:	Issue:	Rev:	Revised:	Checked:

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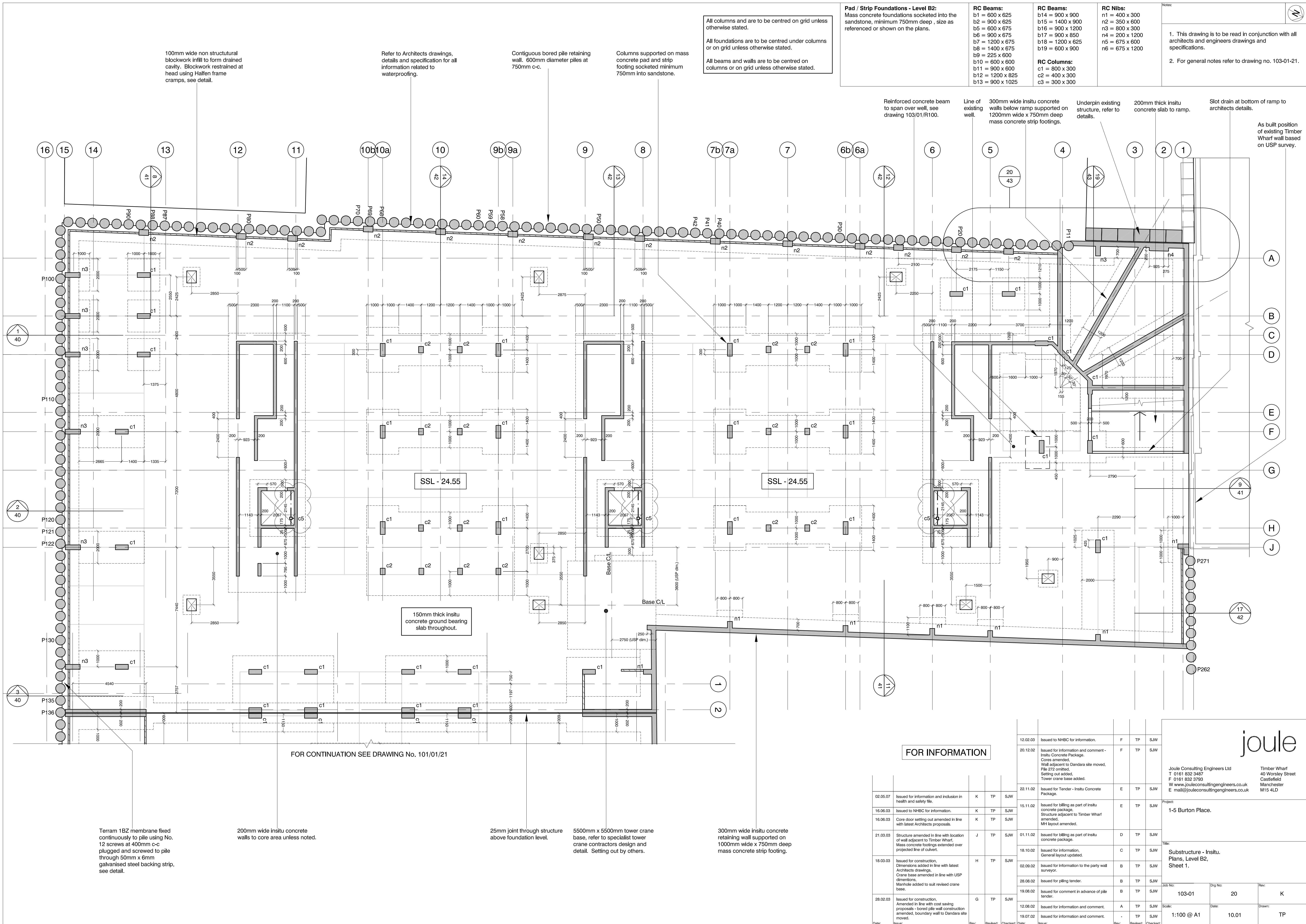
Joule Consulting Engineers Ltd
T 0161 832 3487
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W www.jouleconsultingengineers.co.uk
E mail@jouleconsultingengineers.co.uk

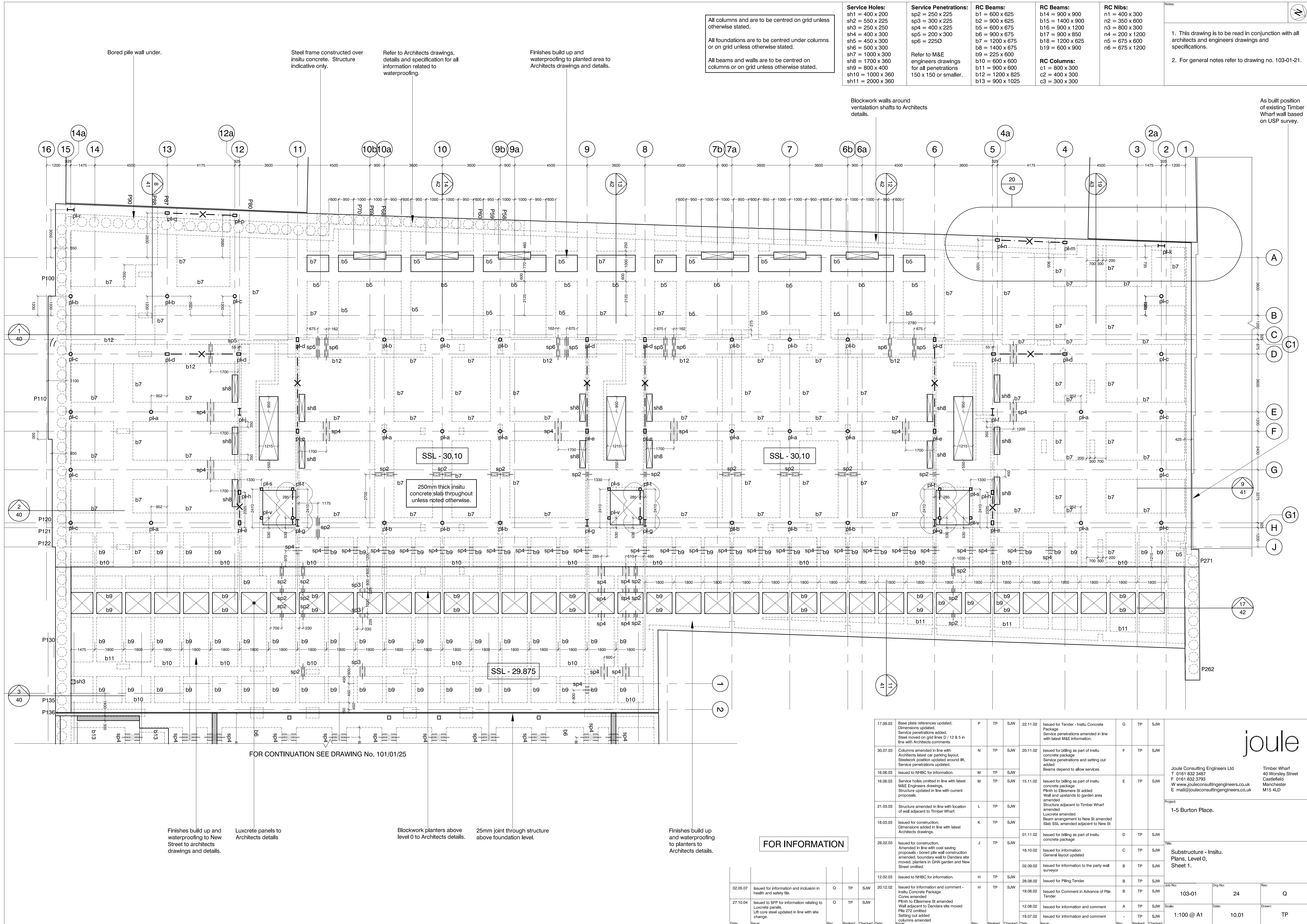
Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
1-5 Burton Place.

Title:
GHA Building,
Superstructure,
Detailed Sections.

Job No:	103-01	Orig No:	125	Rev:	C
Scale:	1:10 @ A1	Date:	05.03	Drawn:	TP







Photograph 1 - Typical Photograph of Water Ingress



Photograph 2 - Typical Photograph of Surface Corrosion to Gridline C



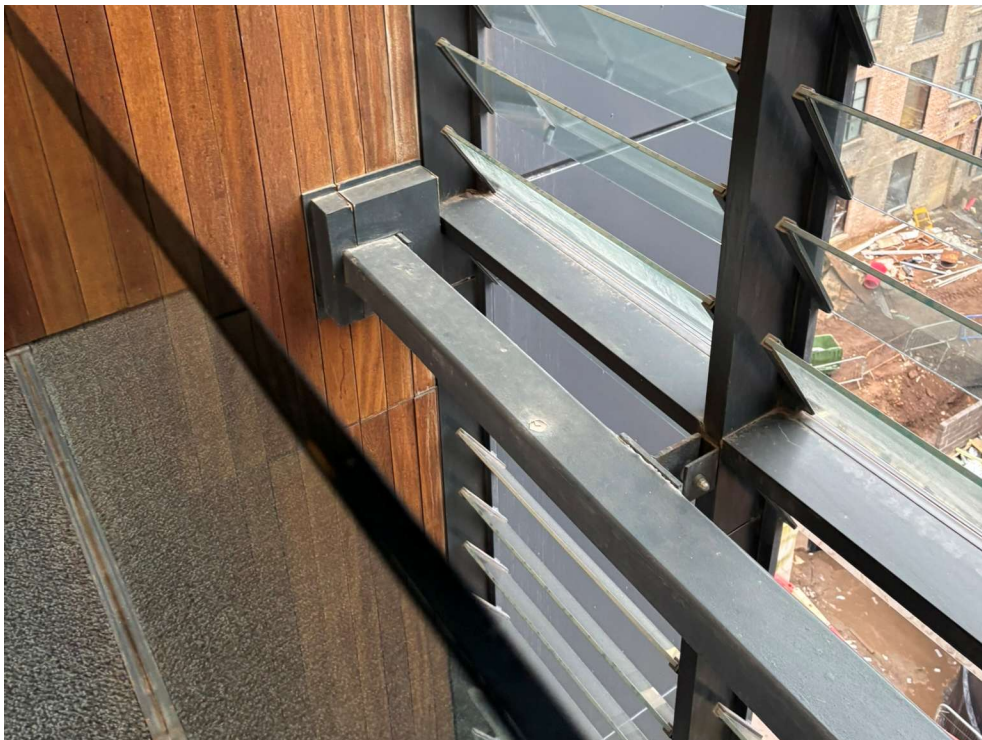
Photograph 3 - Typical Photograph of Water Ingress



Photograph 4 - Typical Photograph of Water Ingress



Photograph 5 - Typical Photograph of Water Ingress



Photograph 6 - Typical Photograph of Surface Corrosion to Gridline C



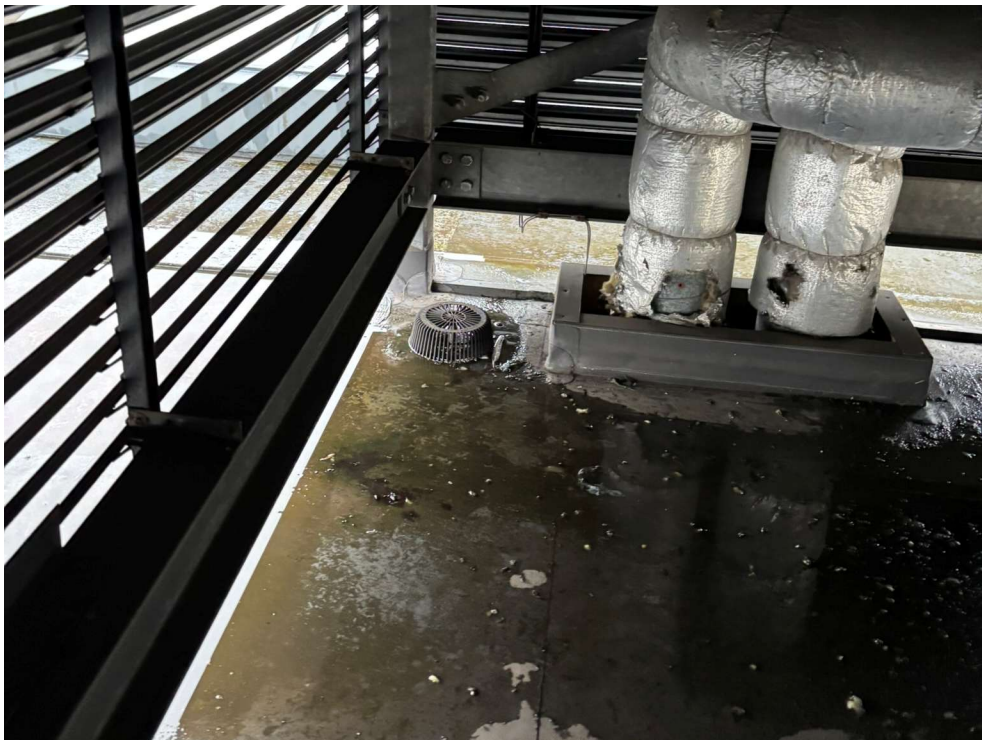
Photograph 7 - Water Ingress Within The Ground Floor



Photograph 8 - Corrosion To Column Base Plate



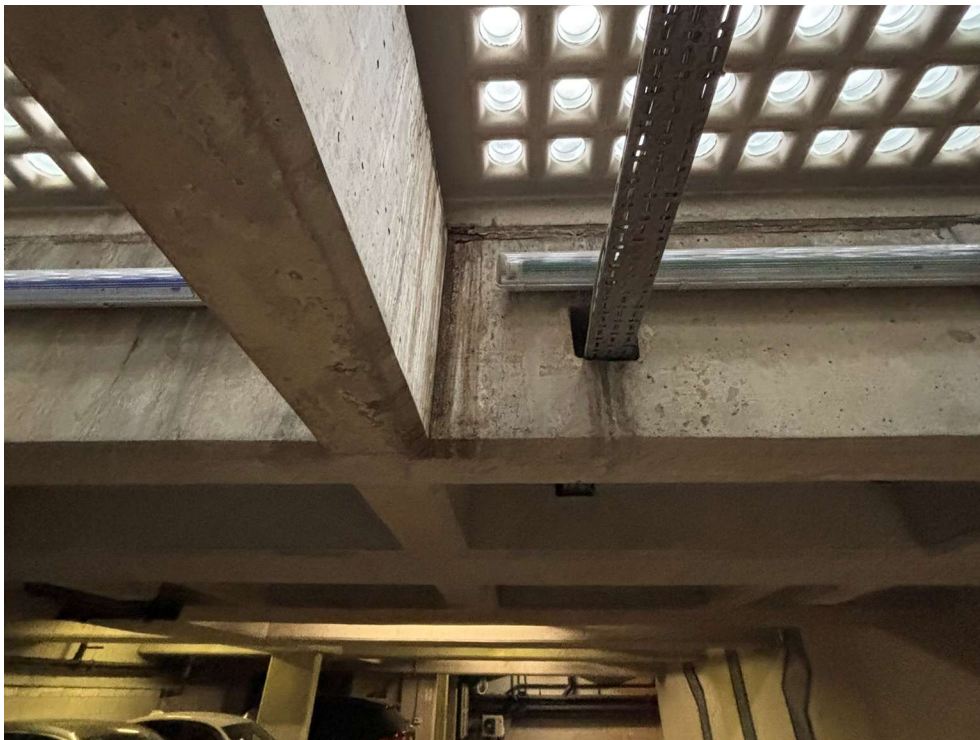
Photograph 9 - Corrosion To The Raised Access Floor Leg Supports



Photograph 10 - Ponding Water At Roof Level



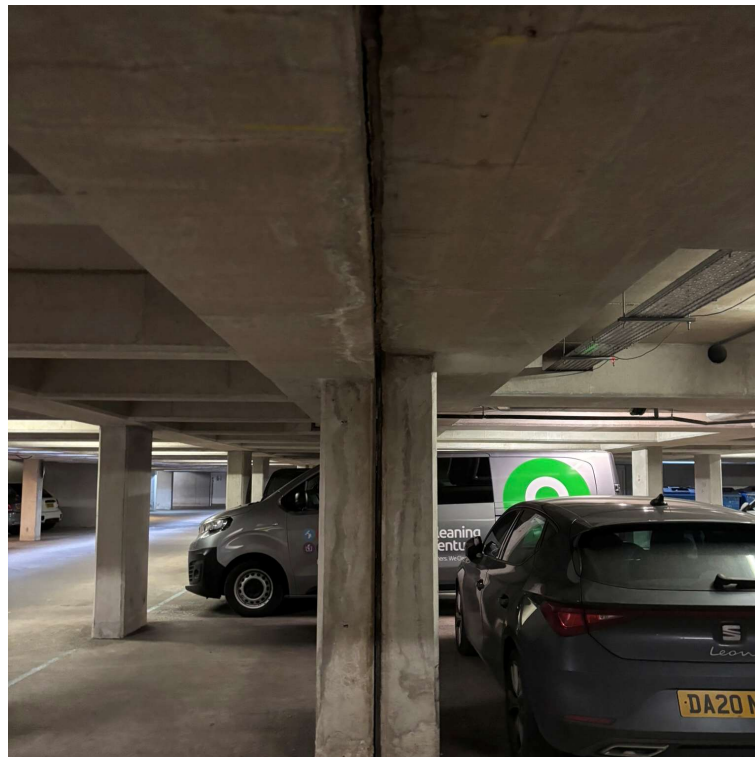
Photograph 11 - Ponding Water At Roof Level



Photograph 12 - Water Ingress Within Basement Areas External to the Main Building Footprint at the Transition Between In-Situ Deck and Natural Light Floor Construction.



Photograph 13 - Water Ingress Within Basement Areas External to the Main Building Footprint at the Transition Between In-Situ Deck and Natural Light Floor Construction.



Photograph 14 - Failed movement joint between Burton Place and MOHO with voids allowing water ingress



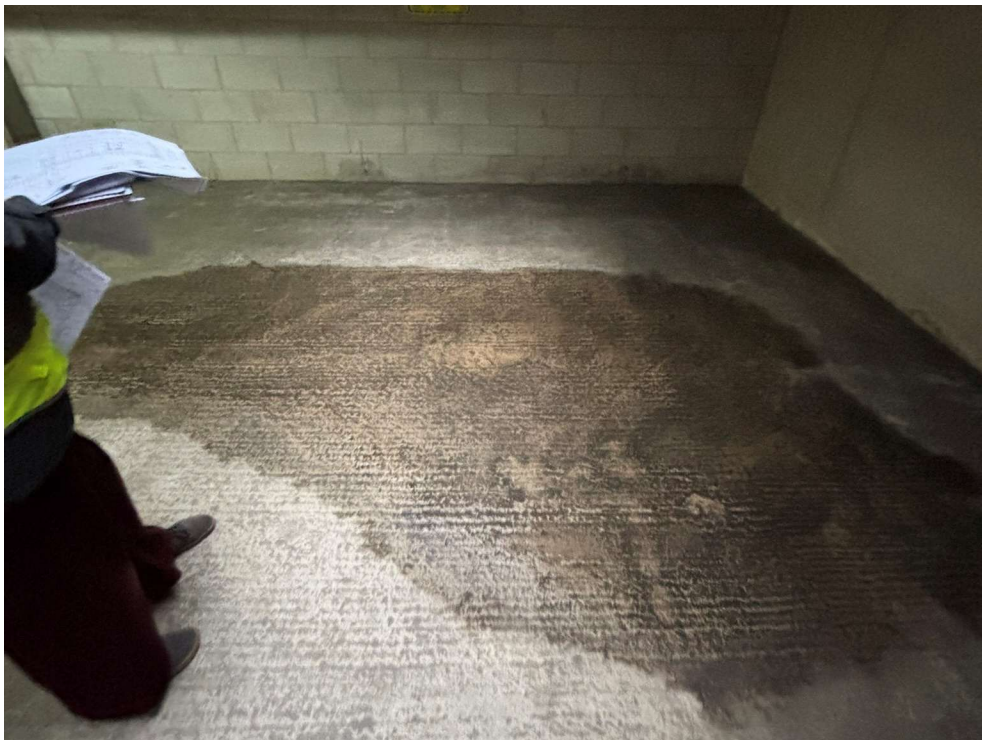
Photograph 15 - Hairline Cracking To Basement Concrete Beams Local To Service Penetrations



Photograph 16 - Hairline Shrinkage Cracking To Soffit Of In-Situ Reinforced Concrete Basement Floor Plate



Photograph 17 - Hairline Shrinkage Cracking To Soffit Of In-Situ Reinforced Concrete Basement Floor Plate



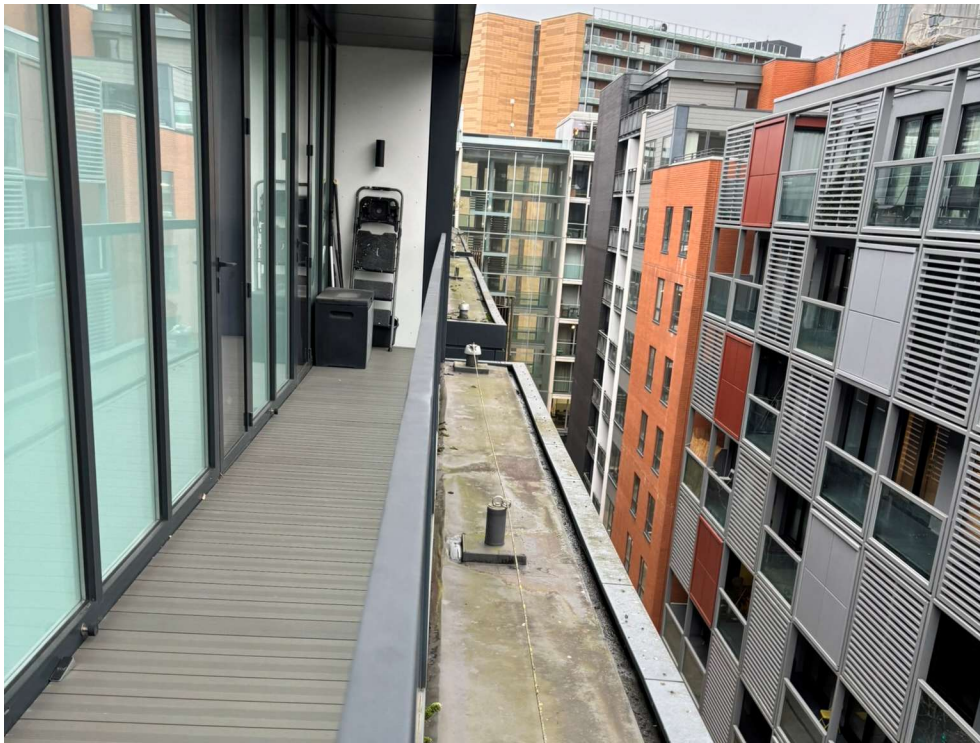
Photograph 18 - Water Ponding - Basement Level 1 Between Gridline J and 1



Photograph 19 - Missing Fixings To Cladding At Roof Level Gridline D



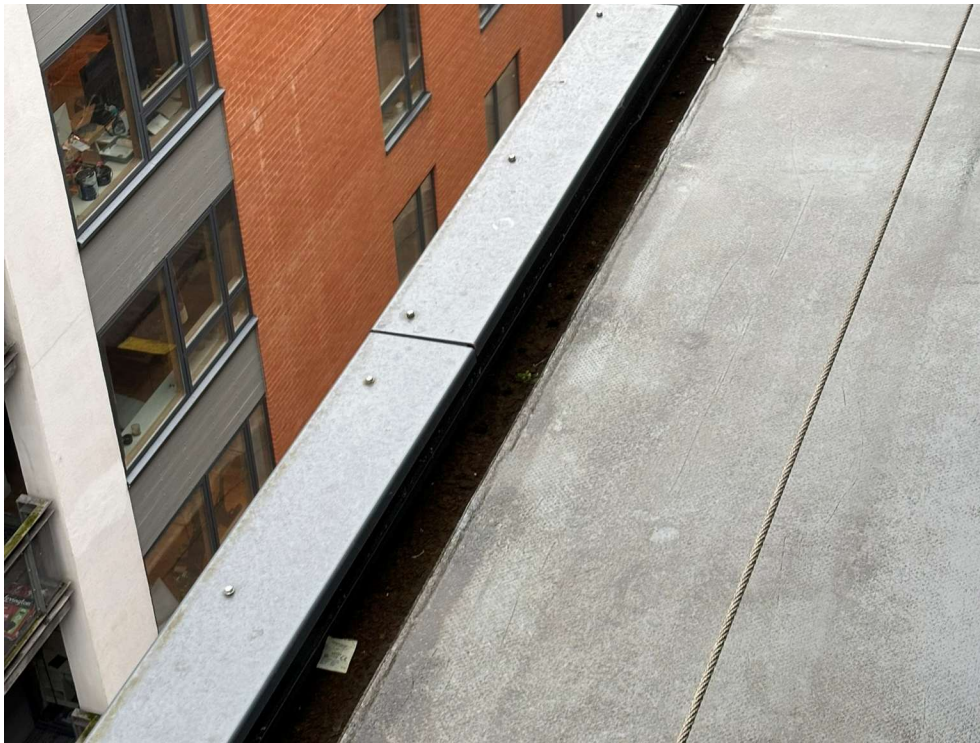
Photograph 20 – Deflection to Roof Gridline 15



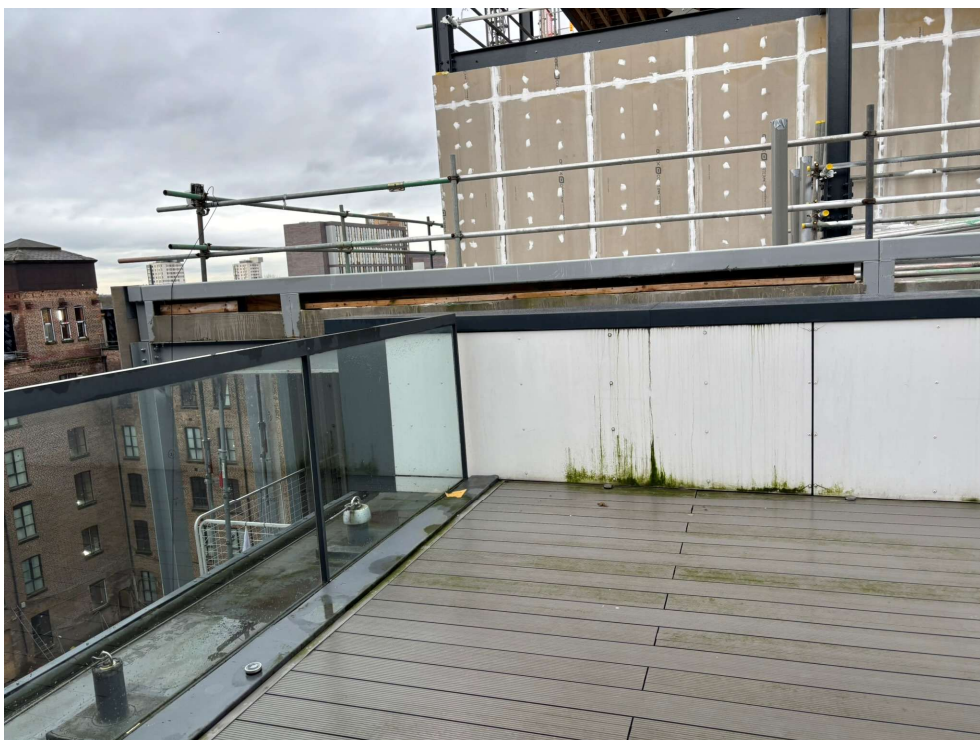
Photograph 21 – Moss Growth to Roof Finish at Level 7



Photograph 22 - Gap Between External Finishes Level 6 Gridline 7D



Photograph 23 - Standing Water To Gutting Level 7 Roof



Photograph 24 - Moss Growth to Parapet