2.2.8 As Built Development Specification

PANATTONI

BASE SPECIFICATION

For

PROPOSED DEVELOPMENT

Unit 3, Panattoni Park, Wingates, Bolton

Ref:

Unit3,BoltonWingates.BaseSpec

9th August 2023, version 7

1.0 Introduction

1.01 Project

The works as indicated on the drawings comprise the design and construction of a single storey warehouse/production unit of 46,940 square feet total gross internal area (comprising warehouse of 43,810 square feet gross internal area, having a clear height to underside of haunch of 12 metres, first floor office accommodation of 3,130 square feet gross internal area. The works include all associated site and external works including hardstandings, car parking, hard and soft landscaping, services and drainage.

1.02 Specified Items

Where reference is made in this specification to specific products or manufacturers, alternatives of equal quality and performance may be substituted subject to prior written approval of the Employer, Fund and Tenant.

1.03 Standards

All elements of the works, materials and workmanship will be designed and constructed in accordance with all relevant 'Standards' current at the time of commencement of the works, not confined to those scheduled below:

a) 18th Edition of the IET Wiring Regulations with amendments (BS 7671:2018);
b) Health and Safety at Work Act;
c) Water supply regulations;
d) The Gas Safety Regulation;
e) The Clean Air Acts;
f) The Local Authority Building Regulations and subsequent amendments thereto, subject only to the relaxations sanctioned by the Department of the Environment;
g) Specific requirements of the Utility Supply Local Authorities and Local Planning Authorities;
h) The British Standards and Codes of Practice;
i) The requirements of the Building Control Officer; or approved inspector
j) CIBSE Guides including Technical Memorandums;
k) The Factories Act;
l) Local Authority Byelaws;
m) The Electricity Supply Act;
n) Construction (Design and Management) Regulations (CDM) 2015;
o) HVCA Ductwork Standard DW144;
p) Equality Act 2010.
q) Joint code of practise for fire prevention on construction sites
r) Material and/or product manufacturer recommendations

1.04 Drawings

- 12737-AEW-03-ZZ-DR-A-0503-P11-Proposed Site Plan
- 12737-AEW-03-00-DR-A-0510-P06-Proposed Ground Floor Plan

- 12737-AEW-03-00-DR-A-0511-P04-Proposed Office Plan
- 12737-AEW-03-RF-DR-A-0512-P05-Proposed Roof Plan
- 12737-AEW-03-XX-DR-A-0513-P06-Proposed Building Sections
- 12737-AEW-03-XX-DR-A-0514-P05-Proposed Elevations Sheet 1
- 12737-AEW-03-XX-DR-A-0515-P06-Proposed Elevations Sheet 2
- Signage Supports; R-SKD-TT-12 Rev 1

1.05 Exclusions

a) All fire fighting equipment, sprinkler installations, hose reels, smoke ventilators, hand held extinguishers, and any other fire fighting equipment as a requirement of the Local Authority Building Regulations and/or Bye Laws, the Fire Officer, or the specific requirements of the tenant's insurer.

b) Mechanical, heating, electrical, lighting and fire alarm installations within the warehouse/production unit.

c) Intruder alarm, CCTV, access control, telephone and data systems.

d) Any external signage.

e) Supply and meter agreements for permanent supplies (to be provided by Tenant).

f) Canteen/kitchen catering equipment, servery and fittings.

g) Furniture, furnishings, blind fittings, lockers, shelving, process machinery of any type, racking, skips, vehicle wash equipment, fuel facility.

h) Any other item which has not been expressly detailed in this document.

1.06 BREEAM

The contractor will procure BREEAM "Excellent" certification for the development on a "shell and core" basis. The contractor will not without the prior approval of the Employer assume or take credits which impose restrictions or obligations on the owner or future occupiers.

1.07 Energy Performance

The target Energy Performance Certificate (EPC) CO_2 Index rating for the building shall be A+ for both the offices and warehouse.

The building will be modelled sufficiently and accurately by a Registered EPC Assessor using appropriate industry software to produce the EPC and supporting Recommendation Report.

This will be based on a non 24-hour operation and will also be on the assumption that LED lighting will be installed throughout the warehouse along with notional warehouse heating.

Dynamic energy modelling will be used to demonstrate sufficient solar PV can be installed to cover the annual base build electrical load (excluding tenant operations, warehouse lighting and warehouse heating). Dynamic modelling to target whole building energy intensity of 45kWh/m2/yr.

1.08 Fire strategy

The Fire Strategy will form part of the Contractor design, will be submitted to the Employer for approval, will comply with the requirements of Building Regulations, be approved by Building Control / Approved Inspector, and be included in the Health & Safety File at completion.

1.09 Spares

As a minimum the following shall be provided –

- one box of each of type of carpet tile, ceramic floor tile, skirting tile, wall tile and suspended ceiling tile used within the buildings.
- one full unopened tin of each type of paint used within the buildings.
- 12No. LED lamps (GE, Philips, Osram, Sylvania or equal and approved) - or complete fittings if lamp is integrated and non-replaceable - of each type used within office areas.
- 2no LED lamps (GE, Philips, Osram, Sylvania or equal and approved) - or complete fittings if lamp is integrated and non-replaceable - of each type used within reception, stairways, circulation/corridors, toilets, kitchens, plantrooms and risers.

A schedule of the above shall be provided and the materials will be provided and neatly stored at completion in a location to be agreed with the Employer.

1.10 Maintenance Requirements

Any item requiring periodic maintenance of five years or less shall be positioned to allow safe access for servicing staff. Items requiring all round access to be provided with a service gantry or similar to provide safe means of access.

All plant installed to be provided with clear safe access to areas requiring servicing.

2.0 Substructure

2.01 Geotechnical Report

A Borehole/Trial Pit Site Investigation including contamination testing will be undertaken by the Main Contractor and the recommendations/results used in the subsequent substructure and foundation design. Investigation and contamination testing is to be in accordance CLR11 (Environment Agency, 2004a), BS5930:2015 Code of Practice for Ground Investigations and BS 10175:2011+A22017 Investigations of Potentially Contaminated Sites – Code of Practice (BSI, 2011) and guidance on land contamination reports issued by the Environmental Agency (EA) (2010a).

2.02 Site Clearance

The entire site to be covered by the new building and pavings will be cleared of all undergrowth, buildings, hardstandings and the like, and the site reduced in level to ground floor formation level.

Site clearance, where necessary, will be carried out including removing to Contractor's tip off site. The formation level will be graded, trimmed and compacted prior to laying the hardcore bed.

All clearance works to be fully coordinated with the proposed ecology mitigation measures including any allowance for the attendance of an ecologist to oversee the clearance works.

2.03 Earthworks

Excavation will be carried out to formation level over the area of the building and external pavement , as shown on the drawings. Any unsuitable material at formation level will be replaced or treated to the satisfaction of the Structural Engineer.

2.04 Ground Improvement

Any necessary ground improvement works shall be carried out in full accordance with the requirements of the Structural Engineer and to the approval of Building Control.

Maximum permissible ground settlement for slabs is as follows;

- Maximum permissible ground settlement: 25mm
- Maximum permissible differential settlement: 20mm over a 10m length

2.05 Sub-base Aggregate

Aggregate for pavement/slab sub-bases shall be Highways Agency type 1 or type 2 material in accordance with the Specification for Highway Works clauses 803 or 804 and in accordance with the Structural engineer's requirements.

Use of IBAA will not be permitted.

All necessary earthworks and filling will be carried out from the subsoil contours to the formation levels of the building in material approved by the Structural Engineer.

2.06 Concrete Foundations

The whole of the substructure work will be carried out to the Structural Engineer's design and approved by the Local Authority. Concrete work will comply with BS EN 1992 'The Structural Use of Concrete' and BS 8004 'Code of Practise for Foundations'

Traditional concrete stanchion bases, retaining walls, and strip footings to the sizes indicated on the Structural Engineer's Schedules, in 35N/mm^2 28 day strength OPC concrete or such other concrete as specified by the Structural Engineer, including all necessary reinforcement and supplying and fixing of all holding down bolts, as required.

2.07 Ground Floor Slab

A reinforced concrete ground slab minimum design thickness 175 mm with a power floated finish will be provided to all ground floor areas within the building. The slab will be designed in accordance with the recommendations of TR34 (2013) 4th Edition, for a maximum loading of 50kN/m^2 and the rack loadings stipulated in the following table placed in a back to back situation (with centre line base plates 100mm x 100mm size, placed a minimum 300mm apart and a minimum distance 150 mm away from floor joints) anywhere on the floor.

Clear Height to Underside Haunch	Rack Leg Load
10.0 metres	5.00 tonnes
12.0 metres	7.00 tonnes
15.0 metres	9.00 tonnes
18.0 metres	11.00 tonnes

Rack leg loading is based on 10kN per 1.75m of clear height.

Where joints are provided in the construction of the floor, they should be generally detailed in accordance with TR34 4th Edition (2013) and all associated amendments and designed so that no vertical movement occurs across the joint. Where possible the number of joints should be kept to a minimum.

The Contractor will prepare floor slab joint layout for the Employer's approval. Generally within the main warehouse area joints perpendicular to the dock elevation(s) will be on

column lines and at 4m centres between columns. All to be submitted for the approval of the Engineer and Employer.

Trafficked day joints shall be reinforced with 10mm minimum thickness arris protection e.g. Permaban Alpha Joint, Isedio Armour Joint or an equal and approved alternative. The load transfer mechanism must be capable of dealing with joint openings up to 30mm. Joints shall be set out having regard to planned saw cut positions such that no joint rail ends within 600mm of a saw cut.

Loadings based on a rack height of 1.75 m and 1.0 tonne pallet loads.

The concrete is to be in accordance with BS EN206 and have a minimum compressive strength of 35N/mm^2 at 28. The concrete will have a minimum cement content of 325kg/m^3 of a maximum cement content of 450kg/m^3 with a maximum water cement ratio of 0.50. The concrete shall be designed to have a maximum slump of 75 mm due to water. Any water reducing admixture used in the concrete mix shall be a recognized product suitable for use in industrial concrete floor slabs and shall be used in accordance with the supplier's recommendations.

Prior to construction of the slab, the proposed concrete mix is to be tested to show that its coefficient of drying shrinkage is less than 0.045%. Tests are to be in accordance with BS EN 1367 pt 4.

The ground floor slab will be constructed so that the top surface tolerances comply with FM2 as defined in Concrete Society Technical Report TR34 (2013) 4th Edition, for free movement areas of the slab. The floor is to be surveyed to prove its acceptance within fourteen days of construction.

The ground floor slab wearing surface shall have a minimum abrasion resistance of AR1 in accordance with BS 8204 part 2 tables 3 & 4 or TR34 (2013) 4th Edition. One abrasion test is to be carried out for each 2000m^2 of slab or part thereof, in accordance with BS 8204 to confirm that appropriate abrasion resistance has been achieved.

After the final power floating operation, the floor slab is to be sprayed with an acrylic based, curing sealing and hardening membrane, with a curing efficiency of 90%. The floor shall not be trafficked by any vehicles for a minimum of four days following the sealing operation. Fully laden vehicles will not be allowed on the floor until the concrete has reached its design strength.

The ground slab is to be constructed on a 1200 gauge PIFA polythene damp proof membrane laid on a layer of hardcore with a minimum thickness as stipulated on the engineer's drawings. No floor insulation is required unless necessary to satisfy Building Regulations.

Where protective measures for methane and carbon dioxide ground gases are required these will be design in accordance with BS 8485 : 2015.

The hardcore is to be laid to the specific minimum thickness in layers not less than 100 mm thick and compacted using a 10 tonne dead weight roller with a minimum of 4 passes

in each direction perpendicular to each other. Where necessary, the hardcore layer can be blinded with a fine material to close the surface, sand must not be used. The surface tolerance of the hardcore will be +0 mm and –25 mm.

Prior to concreting the slab, all roof and wall sheeting and loading doors must be fixed to provide protection from wind and rain. If due to programme restraints this cannot be achieved, then temporary sheeting must be used to seal all openings.

All joints are to be sealed prior to practical completion with Arbomeric MP20 Sealant.

All efforts should be made in the construction and detailing of the floor to reduce the possibility of random cracking. If cracks do occur, they are to be pressure grouted with a low viscosity epoxy mortar if they are wider than 0.8 mm.

The office ground floor slab to be designed to take an imposed loading of 5kN/m^2 with a surface tolerance and finish appropriate to the specified floor finishes. Undercroft areas to be designed for 15kn/m^2 with a surface tolerance and finish to match warehouse slab.

2.08 Ground Beams

Ground beams will be insitu or precast concrete, or galvanised steel channels to Structural Engineer's details.

Where steelwork used below or at ground level in lieu of concrete ground beams, such steelwork shall be to have suitable treatment to suit its location.

2.09 External Steps

Where applicable the external steps to the dock level area will be constructed in pre-cast concrete or galvanised steel, with a slip resistant finish. Handrails and balustrading will be provided in circular hollow, hot dipped galvanised mild steel sections. Steel staircases shall be provided with drilled drainage holes to prevent standing water.

2.10 Retaining Walls

Pre-cast retaining walls including dock leveller pits and tailgate slots will be provided to the dock area of the building all to the Structural Engineer's details.

External retaining walls to the sides of the dock access will be also of fair faced concrete all to the Structural Engineer's details.

Dock leveller pits bridging biscuits, where used, are to be manufactured from C50 reinforced concrete and have a minimum loading of 50Kn/m2.

Armco or similar barrier galvanised mild steel and handrailing is to be provided adjacent to the retaining wall to level access ramps, to prevent HGV damage and to protect personnel from failing. The barrier uprights are to be surface fixed to the concrete.

All other retaining structures, which form part of the earthworks to the site, are to be fully in accordance with the Structural Engineer's details and comply with planning approvals.

3.0 Warehouse/Productions Superstructure

3.01 Steel Frame

The steel frame will be a portal frame with a minimum clear height to underside of haunch of 12m, designed in accordance with BS 5950: Part 2: 2000 with dead and superimposed loading and wind loading to BS6399, and all relevant codes of practice in force at the time of construction and generally to the satisfaction of the Building Regulations Authority. Steel sections to BS4: Part 1: 2005 for weldable structural steel. All work will be carried out in compliance with the current edition of the National Structural Steelwork Specification.

Bracing is to be CHS in walls, and RHS in the roof, and is to be kept free from open areas/ internal stanchions, door, window openings and the like.

The structural frame and purlins will be capable of supporting a service loading arising from mechanical and electrical installation plant, equipment and fittings of 0.25kN/m^2 over the whole area of the roof. The roof pulins will be designed to accommodate a maximum loading of 0.37kN/m2 (to potentially accommodate the future installation of roof mounted PV panels, subject to engineering review at that time to assess actual service loads). Future PV panels will not be installed within 1.5m of either side of valley or eaves gutters as this area will be reserved for siphonic drainage and future sprinkler mains loadings.

The office floor will be designed for a superimposed loading of 4.0kN/m^2 and an additional loading of 1.0kN/m^2 for partitions.

All columns will be designed with pinned or fixed bases to suit the most economical steel and foundation design, fixed bases required for Fire Collapse by Building Regulations, where the bolts and baseplates will be partially fixed in accordance with the "Steel Construction Institute" guidance SC1-P-087, unless otherwise agreed with the Engineer.

The steelwork will be designed and constructed to allow the building envelope to achieve compliance to Part L2A of the Building Regulations. In particular, a substantial steelwork member will be provided in hipped roof areas to directly support the roof sheets. All purlins and rails will be fixed in accordance with manufacturer's recommendations and will have a minimum thickness of 1.45 mm to assist a positive cladding fixing. All sheeting rails within 2.0m of FFL to be installed 'toes down' to prevent build up of debris.

All steelwork will shot blasted to BS 7079, second quality, before painting with one coat of epoxy 2 pack high build zinc phosphate with a satin finish to a nominal dry film thickness of 75 microns to give 10 years life to first maintenance, finished colour to be RAL7035 light grey. Cold formed sections will be manufactured from hot dipped galvanised coil to BS EN10147: 2000 and BS EN10143: 2006. Where steelwork is to be encased in masonry, it will receive two coats of bituminous paint. Where remedial works are required to webs, flanges, beams, columns or other steelwork that is visible in the completed building the whole area of the affected steelwork will be coated to provide a uniform appearance.

3.02 Fire Protection

Where protection of steel stanchions and frames is necessary, this will be carried out internally in 100 mm thick concrete blockwork or intumescent paint treatment, all to the satisfaction of the Building Inspector and as required by the Building Regulations.

3.03 Roofing

The roof will be the Twin-Therm® Chronus® Ready (patent pending) roof system utilising nominal 0.7mm thick Colorcoat HPS200 Ultra® coated steel external sheets supported by the Confidex® Guarantee of up to 40 years and fixed as per the system requirements. The roof, inclusive of Therma-light rooflights will be included within the CA Group Complete Assurance Guarantee, which provides a meaningful guarantee for all components within the Twin-Therm® roof and wall assemblies (not just the external coating) for a period of 25 years (rainwater goods maximum 25 years).

The CA 17 1000L liner panel will be minimum 0.4mm thick with the internal finish to be Colorcoat High Reflect (30µm) to the exposed face of the cladding lining panel.

The roof and wall cladding systems are tested in accordance with LPS 1181 to achieve a minimum grade 'EXT-B' certification, certificate reference LPCB 443a. The internal lining to the main roof will be Class 0 rating for surface spread of flame as tested to BS 476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

Therma-quilt glass fibre insulation has been specifically designed and tested in accordance with BS EN 1609:2013 to minimise moisture retention, which is critical when used in buildings with specialised internal environments. Therma-quilt is Euroclass A1 (non-combustible) for reaction to fire when tested and assessed in accordance with BS EN 13501-1:2018 and to achieve a minimum designed thermal U-value of 0.18W/m²K (240mm thick).

The minimum designed roof pitch will be 4.5° (3.0° after deflection) for pitched roof designs. Where a Twin-Therm® Quantum or Griffon curved roof design is required, the roof system will be designed to ensure the external sheet end laps (including inplane rooflights) are to be minimum 4.0° design (2.5° after deflection) installed as per the system manufacturers recommendations. For project specific design roof pitch, refer to project drawings.

The roof system will be covered by the relevant independent Agrément Certification, current at date of installation and inclusive of all specification requirements.
Full system installation training is to be provided for all installation operatives, supervisors and site managers delivered by the system manufacturer to ensure compliance with all aspects of the cladding system parameters and product guarantees' limitations. System manufacturer to co-ordinate visits with installer and main contractor at key stages of the construction to support correct installation of the gutters, roof system and wall cladding.

The roof and wall cladding system manufacturer will undertake all relevant project wind load and snow drift analysis in accordance with BS EN 1991-1-4:2005+A1:2010 for the cladding (unless provided by clients structural engineers) and confirm all relevant cladding system structural requirements, including external profiled sheet parameters, fixing centres, spacer system and bracket spacings.

The roof cladding system will incorporate the Twin-Therm® Chronus® Ready (patent pending) design to facilitate internal temperatures as low as 0°C when the rooflight cavity is filled with Therma-quilt insulation.

The roof cladding is be delivered with Confidex Sustain® which offsets unavoidable CO_2 emissions where a pre-finished steel cladding system is adopted. This is inclusive of the components such as fixings and insulation and is measured from cradle to cradle.

In line with the CA Group Complete Assurance guarantee, periodic inspections of the building envelope must be conducted at regular intervals throughout the guarantee period of the systems, the frequency of which will depend upon the materials and components specified. The building envelope supplier (CA Group) will, as part of its agreement, undertake these inspections on behalf of Panattoni and provide comprehensive inspection reports for the guaranteed life of the building, subject to the necessary access being made available.

Rooflights

The rooflight assemblies will be triple skinned GRP, with a 2.44kg/lm (CE24) inner and a 1.83kg/lm (CE18E) 'Quick Release' outer skin, with a separate intermediate core and all relevant components to achieve a U-value of 1.30W/m²K. Rooflights will be provided to approximately 15% of the floor area, installed as per the system manufacturer's recommendations.

The internal rooflight lining will be Class 1 and external rooflight Class 3 rating for surface spread of flame as tested to BS476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

The installed roof and rooflight systems are to be minimum Class B Non-Fragile for a period of 25 years, tested in accordance with the HSE materials standard ACR[M]001:2014 *"Test for Non-Fragility of Profiled Sheeted and Large Element Roofing Assemblies (fifth edition)"*. The system will be tested for all spans up to a maximum of 1800mm. This only applies to tested roof assemblies where all of the roof components are supplied by the system provider. Annex 'C' from the HSE Document ACR(CP)001:2016 Rev 5 "*Recommended Practice for work on Profiled sheeted Roofs"* is to be completedand submitted by Contractor as part Employer..

Detail work to ridge, eaves, hip and verge will be in accordance with the manufacturer's recommendations and standard approved design details. On pitched roof designs Cranked Ridge liner panels should be installed. Internal flat ridge flashings are not acceptable.

Roof Access

Method of safe access from ground level to roof level will be defined in the Health and Safety file to an identified point to comply with the requirements of the Construction (Design and Management) Regulation 2015. This shall be a permanent access route.

A permanent Surespan SRHP/S20 Superior Roof Hatch with complete Sureguard handrailing will be provided. The roof hatch is to be orientated to allow safe exit from the access.

Where possible, access is to the roof hatch is to be via ships ladder rather than cat ladder. Where a cat ladder provides access to the roof hatch a landing will be provided below the access hatch such that the hatch can be opened/ closed from the landing without use of the ladder. Ladders should be securely fixed to structural elements and free from ovement when climbed. Unauthorised use of access ladders to be prevented by lockable ladder clamp or similar.

On roofs without complete perimeter parapet providing necessary edge fall protection a horizontal safety line fall arrest system will be provided to allow safe roof access and maintenance to all roof areas, including two sets of harnesses and lanyards.
The life line system utilised must be tested on the complete Twin-Therm system build-up with all relevant system depths, fixings and sealants adopted in the test (for a list of compatible systems please contact CA Group Technical Department).
The roof hatch is to be orientated to allow safe exit from the access ladder and co-ordinated with horizontal safety line system.

3.04 Rainwater Goods

The rainwater from the roof will be collected via a 1.2mm thick nominal pre-galvanised steel boundary wall and valley gutters, complete with 1.2mm PVC pre-laminated membrane. Manufactured by CA Building Products the Caskade Premier range is to have a minimum 25 year guarantee to match the roof system. Gutters to be factory insulated using rigid 50mm thick rock fibre insulation.

Gutters and outlets will be designed as a gravity drainage system to BS EN 12056:2000 using project specific information to determine rainfall rate. Weir outlets will be provided with positions to be approved. Gutter calculations are to be undertaken on every project. The rainwater pipes, sized to suit project specific requirements will be connected to the storm drainage system and fitted with a rodding eye access plate at the base and discharging via a slow bend in the drain.

The rainwater from the main warehouse structure will be taken from the gutters by a siphonic drainage system.

The drainage system shall be designed and constructed to comply with BS EN12056-3:2000 and the following design criteria;

- The geographical location of the building;

- A building design life of 25 years;
- A 'Category 3' risk protection.

All pipework to be installed above the portal haunch level to maintain minimum clear height as stated in sections 1.01 & 3.01 of this specification. Internal rainwater pipes are to be located within the web of the steel and suitably protected to prevent against accidental damage.

All components of the system shall be in accordance with any relevant British or European standards.

All rainwater pipework within office areas shall be insulated for acoustic and thermal requirements.

Both primary and secondary siphonic systems will be provided, with both being connected to the storm drainage system. The primary system shall drain 50% of the design rainfall intensity and the secondary system shall drain the balance.

The rainwater outlets will be distributed evenly along the total gutter length with quantity and size to suit siphonic design. Discharge locations to be agreed with the Client/Architect. Secondary eaves downpipes intermittently spaced along the eaves are not acceptable.

The external drainage will be designed with regard to the peak flows from the primary siphonic system and connection between the siphonic system and the underground pipework will provide a break at atmospheric pressure.

Siphonic pipework shall be firmly attached to an engineered continuous railing system, using appropriate pipe clamps it shall be securely fastened back to the main structure at a maximum of 2m centres, to provide adequate and proper restraint against thermal movement. Additional bracing will be provided within 100mm of the closest edge of the pipework, end branch connections and where required. All outlet tail pipes are to be suitably insulated.

Indicative weir outlets will be provided to the ends of valley gutters and at 50m intervals on perimeter gutters to provide advance warning of blockage of the siphonic system. This requirement applies to both single and dual pipe systems.

Unless agreed both primary and secondary siphonic systems will be provided, with both being connected to the storm drainage system. If the project requires the secondary system to discharge to hard paved areas external to the building, the main contractor shall provide suitable protection to any parts of the building or landscaping that might be damaged by the flow of water from the secondary system.

3.05 Wall Cladding

Twin-Therm Chronus

Where indicated on the architect's drawings the wall cladding will be the Twin-Therm® Chronus® Ready (patent pending) wall system utilising either Colorcoat HPS200 Ultra® or Colorcoat Prisma® coated steel external sheets (gauge 0.5/0.7mm thick nominal subject to orientation and/or colour) supported by the Confidex® Guarantee of up to 40 years and fixed as per the system requirements. The wall systems are to provide a manufacturer's warranty for the entire installation for a period of 25 years.

Profile choice, colour arrangement, orientation and layout of panels to be as agreed with Planning Authority to suit the approved elevational treatment. Refer to drawings for project specific information.

The CA 17 1000L liner panel will be minimum 0.4mm thick with the internal finish to be Colorcoat High Reflect (30µm) to the exposed face of the cladding lining panel.

Therma-quilt glass fibre insulation has been specifically designed and tested in accordance with BS EN 1609:2013 to minimise moisture retention, which is critical when used in buildings with specialised internal environments. Therma-quilt is Euroclass A1 (non-combustible) for reaction to fire when tested and assessed in accordance with BS EN 13501-1:2018 and to achieve a minimum designed thermal U-value of 0.26W/m²K (160mm thick).

The wall cladding systems are tested in accordance with LPS 1181 to achieve a minimum grade 'EXT-B' certification, certificate reference LPCB 443a. The internal lining to the main roof will be Class O rating for surface spread of flame as tested to BS 476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

The wall systems will be covered by the relevant independent Agrément Certification.

The wall cladding system will incorporate the Twin-Therm® Chronus (Chill Store) design to facilitate internal temperatures as low as 0°C; this fixing and sealing method is an enhancement over the standard Twin-Therm® cladding design allowing a greater range of internal temperature operation

Twin-Therm Wall Cladding incorporating CA 300 MR Microrib Profile

Where indicated on the architect's drawings the cladding will be the CA Group Twin-Therm® Chronus® Ready (Patent Pending) CA 300MR (microrib) Wall system utilising either Colorcoat HPS200 Ultra® or Colorcoat Prisma® coated steel external sheets, 0.7mm thick nominal supported by the Confidex® Guarantee of up to 40 years and fixed as per the system requirements. The wall systems are to provide a manufacturer's warranty for the entire installation for a period of 25 years.

Colour arrangement and layout of panels to be as agreed with Planning Authority to suit the approved elevational treatment. Refer to drawings for project specific information.

The CA 17 1000L liner panel will be minimum 0.4mm thick with the internal finish to be Colorcoat High Reflect (30µm) white to the exposed face of the cladding lining panel.

Therma-quilt glass fibre insulation has been specifically designed and tested in accordance with BS EN 1609:2013 to minimise moisture retention, which is critical when used in buildings with specialised internal environments. Therma-quilt is Euroclass A1 (non-combustible) for reaction to fire when tested and assessed in accordance with BS EN 13501-1:2018 and to achieve a minimum designed thermal U-value of 0.26W/m²K (160mm thick).

The wall cladding systems are tested in accordance with LPS 1181 to achieve a minimum grade 'EXT-B' certification, certificate reference LPCB 443a. The internal lining to the main roof will be Class O rating for surface spread of flame as tested to BS 476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

The wall systems will be covered by the relevant independent Agrément Certification.

All flashings and details to be provided in accordance with the Architects requirements and the drawings.

Where required, under Building Regulations, to provide a fire protection to an external wall, then the construction will be upgraded to a firewall status as required by Twin-Therm® system.

The wall cladding system will incorporate the Twin-Therm® Chronus (Chill Store) design to facilitate internal temperatures as low as 0°C; this fixing and sealing method is an enhancement over the standard Twin-Therm® cladding design allowing a greater range of internal temperature operation

External cladding to be designed with no ledges wherever possible; if ledges are required, bird spikes must be installed.

3.06 Signage Support

Where indicated on the drawings signage supports to be provided in accordance with CA Building Products drawing R-SKD-TT-12 Rev 1.

3.07 Air-Tightness

An air-tightness test is to be carried out by the Main Contractor prior to the Client obtaining access. This test is to be carried out by BSRIA Limited and must confirm to all current legislative requirements and Building Regulations. The Main Contractor is to allow for all works in association with this test as required by BSRIA90.

The air test should, as a minimum, comply with BS EN 13829:2001 and be to a minimum requirement of;

- 1.5m^3/hr/m^2 @ 50Pa for buildings os 100,000sqft GIA or greater,
- 2. 5m^3/hr/m^2 @ 50Pa on buildings under 100,000 sq ft GIA.

A copy of the resultant report is to be provided to the Client.

Any defects, etc., highlighted by the test are to be rectified by the Main Contractor prior to practical completion.

When attending site to carry out the air-tightness test, BSRIA Limited are to bring with them all equipment to carry out a smoke test, thus aiding the rectification of any defects. This test, if required, can be carried out on the same day as the air-tightness test, therefore, causing minimum disruption to progress on site. This test is to be carried out whether or not required by the Building Control Officer.

3.08 Independent Cladding Inspector

One of the independent cladding inspectors listed below will be appointed to carry out inspections at appropriate stages during the installation of and at completion of the cladding.

Any defects or deviations from the requirements of this Specification are to be rectified as soon as possible and in any event prior to Practical Completion.

Charnwood Roofing, Cladding & Building Specialists
8 Chambers Close
Markfield
Leicestershire
LE67 9NB
Principal: (Lewis) Spencer Jones
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3.09 Reinforced Concrete Dock Surrounds

To docking areas a concrete precast walling system will be required. Wall to be fully insulated to meet 0.27W/m^2K as required under current Building Regulations. The wall will provide support for both dock doors and dock shelters with steel door track supports only being required above panels. Holes for traffic lights and other electrical installations will be provided if required. Dock surround units to be manufactured from C50 reinforced concrete. The height of the wall panels will be to suit Hormann DTS-G 4500mm high dock shelter to all dock locations.

3.10 Level Access Doors

The external level access doors indicated on the drawings will be as manufactured by Hörmann UK Ltd, reference SPU F42, and are to be A445 electrically operated insulated, sectional panel, vertical lift doors with spring support beam by door supplier at low level for ease of maintenance and 25 mm thermal movement provision on door tracks. Size 4000 mm wide x 4800 mm high (structural size 4120 mm wide x 4875 mm high) with 3 no neutral acrylic double-glazed vision panels in the 3rd door section. Also fitted with sliding bolts electrically interlocked and anti-fall devices.

The doors will be of composite construction comprising galvanized steel sheet inner and outer faces with nominal 42 mm x 625 mm deep laminated door panels with micro rib profile to give optimum 'U' value of 0.4W/m^2K.

Doors have been tested to European standard pr EN 12424 class 3 for high wind resistance offering a minimum 700 N/m^2.

Panel joints have been tested to European standard pr EN 12425 class 3 offering 70PA resistance to water ingress.

For personnel safety the door panels have an integral finger pinch protection on both sides built in at each moving joint. The bottom edge has a safe edge which will stop the door and return 150 mm in case of meeting an obstruction.

Door tracks and moving components at the jambs are to be fully encased with side-track covers. Both of the above comply with new directives to eliminate crushing, shearing and cutting risks to personnel from the door.

The surface finish to the external face of the doors will be RAL 9007 Mid Grey with internal finish of RAL 9002 off white.

Service and Maintenance

A three year parts and labour warranty with 2 service visits per year will be provided for all industrial door equipment, without any charge to the end user. Service and warranty to commence once the tenant moves into the building.

3.11 Dock Access Doors and Equipment

Dock Access Doors

Where shown on the drawings as manufactured by Hörmann reference SPU F42 and are to be WA300 electrically operated, insulated, sectional panel, vertical lift doors with spring support beam by door supplier at low level for ease of maintenance and 25 mm thermal movement provision on door tracks. Size 2860 mm wide x 3000 mm high (structural size 3000 mm wide x 3070 mm high) with 2 no neutral acrylic double-glazed vision panels in the 3rd door section. Also fitted with sliding bolts electrically interlocked & anti-fall devices.

The doors will be of composite construction comprising galvanized steel sheet inner and outer faces with nominal 42 mm x 600 mm deep laminated door panels with micro rib profile to give optimum 'U' value of 0.4W/m²K.

Doors have been tested to European standard pr EN 12424 class 3 for high wind resistance offering a minimum 700N/m².

Panel joints have been tested to European standard pr EN 12425 class 3 offering 70PA resistance to water ingress.

For personnel safety the door panels have an integral finger pinch protection on both sides built in at each moving joint. The bottom edge has a safe edge which will stop the door and return 150 mm in case of meeting an obstruction.

Door tracks and moving components at the jambs are to be fully encased with side-track covers. Both of the above comply with new directives to eliminate crushing, shearing and cutting risks to personnel from the door.

The surface finish to the external face of the doors will be RAL 9007 Mid Grey with internal finish of RAL 9002 off white.

Dock Levellers

Each dock access door location will be fitted a Hörmann HLS-2-FR-20-35 fully hydraulic dock leveller of 6000 kg single axle load capacity 3500 mm x 2000 mm x 600 mm deep with 1000mm telescopic lip, platform to be 8/10 mm steel thickness complete with an EPDM rubber draught seal and 'T' type adjustable integral pit frame for suspended type dock levellers. Finish to be RAL 9017 Black Dock levellers operation to be interlocked with doors

Dock Doors and Dock Levellers to be operated from a combined single control panel.

Dock height to be 1200mm.

Doors and dock levellers to be CE Marked to meet European Directives.

Tailgate slots will be provided to all dock levellers.

Dock Shelters

The dock access door locations will be fitted with Hörmann type DTSS heavy duty scissor type retractable dock shelter with crash resistant side frames with front side flaps reinforced, 1200 mm deep top flap and self adjusting top frame with rain channel for drainage purposes. Size 3500 mm wide x 3500 mm high x 600 mm projection. The external building line (external face of cladding) should be 100 mm – 125 mm set back behind the face of the front retaining wall.

Below each door location, two moulded rubber bumpers (450 mm x 250 mm x 100 mm) will be bolted to concrete dock with 15 mm thick steel front plates to the front of the buffer to give 115 mm projection.

LED Traffic Lights

External long life LED type red and green traffic lights with either 100 mm diameter or 'arrow head' shaped lenses, bulbs will be a minimum of 18 watts. Maximum projection 55 mm to ensure protection by dock bumpers. Lights to be positioned to provide clear unobstructed visibility to vehicles on dock.

Service and Maintenance

A three year parts and labour warranty with 2 service visits per year will be provided for all dock door equipment, without any charge to the end user. Service and warranty to commence once the tenant moves into the building.

Dock Spotlights

Hormann LED lamp on a galvanised swivel bracket mounted to the door guides, complete with movement restrictor to prevent contact with door.

3.12 Fire Exit Doors

The personnel fire escape doors will be galvanised mild steel in steel frames including ironmongery appropriate to location and use, and site applied paint finish to an approved colour. Door assembly is to achieve the required thermal performance. Door threshold to be designed to prevent ingress of water.

Fire exit stairs within the dock pit will be provided with bollard protection. Bollards will be a FlexCore product or similar.

3.13 Fire Precautions

The requirements of all relevant and current legislation at the time the works will be undertaken, including compliance with the Building Regulations, Local Authority Inspector and/or Approved Inspector and the Fire Precautions Act will be incorporated, as indicated on the production information drawings, in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings and all associated signs and notices.

Signs and notices will comply with Associated Signs and BS 5499: 2000 (or the equivalent standard at the time of the works) 'Fire Safety Signs, Notices and Graphic Symbols, Specification for fire safety signs'.

Any other requirements of the Local Authority Building Control Department or Approved Inspector with regard to provision of Sprinkler installations, smoke ventilators, hose reels, heat sensors, extinguishers and other firefighting equipment are specifically excluded.

4.0 Office Superstructure

4.01 Structure

The office block structural frame will be constructed in structural steelwork as shown on the Structural Engineer's drawings. The frame will be designed in accordance with BS 5950: Part 2: 2000 with dead and superimposed loading and wind loading to BS6399, and all relevant codes of practice in force at the time of construction and generally to the satisfaction of the Building Regulations Authority. Steel sections to BS4: Part 1: 2005 for weldable structural steel. All work will be carried out in compliance with the current edition of the National Structural Steelwork Specification.

The frame will be fire protected to achieve a fire resistance as required under the Building Regulations. Supporting structure to compartment wall between the offices, warehouse and production areas will provide minimum 2 hours fire resistance. All generally in accordance with clauses 3.01 and 3.02.

A dedicated office plant deck will be provided located in the warehouse, either cantilevered from the office/warehouse compartment wall (min 6m clearance to underside of structure) or located above the internal offices.

Wherever possible cat ladders are to be avoided to access the plant deck. When offices are 'inboard' – continue office stairs up to plant deck on top of internal offices. Where the offices are 'outboard' and cantilevered from the compartment wall, ensure the plant deck is located so access can be achieved from the office staircase.

4.02 Roofing

All as Clause 3.03 except that rooflights will not be provided.

4.03 Rainwater Goods

The rainwater from the roof will be collected via a 1.2mm thick nominal pre-galvanised steel boundary wall gutters, complete with 1.2mm PVC pre-laminated membrane. Manufactured by CA Building Products the Caskade Premier range is to have a minimum 25 year guarantee to match the roof system. All external gutters to be single skin, otherwise factory insulated using rigid 50mm thick rock fibre insulation.

All external gutters to be complete with 3mm polyester powder coated aluminium, secretly fixed fascia soffit and capping. Rainwater pipes to be similarly coated.

Gutters and outlets will be designed as a gravity drainage system to BS EN 12056:2000 using project specific information to determine rainfall rate, refer to section 3.04 for design criteria.

All gutters to be located at external perimeters where practicable or suitable access to be provided for maintenance purposes.

4.04 External Walls

Twin-Therm Chronus

Where indicated on the architect's drawings the wall cladding will be the Twin-Therm® Chronus® Ready (patent pending) wall system utilising either Colorcoat HPS200 Ultra® or Colorcoat Prisma® coated steel external sheets (gauge 0.5/0.7mm thick nominal subject to orientation and/or colour) supported by the Confidex® Guarantee of up to 40 years and fixed as per the system requirements. The wall systems are to provide a manufacturer's warranty for the entire installation for a period of 25 years.

Profile choice, colour arrangement, orientation and layout of panels to be as agreed with Planning Authority to suit the approved elevational treatment. Refer to drawings for project specific information.

The CA 17 1000L liner panel will be minimum 0.4mm thick with the internal finish to be Colorcoat High Reflect (30µm) to the exposed face of the cladding lining panel.

Therma-quilt glass fibre insulation has been specifically designed and tested in accordance with BS EN 1609:2013 to minimise moisture retention, which is critical when used in buildings with specialised internal environments. Therma-quilt is Euroclass A1 (non-combustible) for reaction to fire when tested and assessed in accordance with BS EN 13501-1:2018 and to achieve a minimum designed thermal U-value of 0.26W/m²K (160mm thick).

The wall cladding systems are tested in accordance with LPS 1181 to achieve a minimum grade 'EXT-B' certification, certificate reference LPCB 443a. The internal lining to the main roof will be Class O rating for surface spread of flame as tested to BS 476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

The wall systems will be covered by the relevant independent Agrément Certification.]

Twin-Therm Wall Cladding incorporating CA 300 MR Microrib Profile

Where indicated on the architect's drawings the cladding will be the CA Group Twin-Therm® Chronus® Ready (Patent Pending) CA 300MR (microrib) Wall system utilising either Colorcoat HPS200 Ultra® or Colorcoat Prisma® coated steel external sheets, 0.7mm thick nominal supported by the Confidex® Guarantee of up to 40 years and fixed as per the system requirements. The wall systems are to provide a manufacturer's warranty for the entire installation for a period of 25 years.

Colour arrangement and layout of panels to be as agreed with Planning Authority to suit the approved elevational treatment. Refer to drawings for project specific information.

The CA 17 1000L liner panel will be minimum 0.4mm thick with the internal finish to be Colorcoat High Reflect (30µm) white to the exposed face of the cladding lining panel.

Therma-quilt glass fibre insulation has been specifically designed and tested in accordance with BS EN 1609:2013 to minimise moisture retention, which is critical when used in buildings with specialised internal environments. Therma-quilt is Euroclass A1 (non-combustible) for reaction to fire when tested and assessed in accordance with BS EN 13501-1:2018 and to achieve a minimum designed thermal U-value of 0.26W/m²K (160mm thick).

The wall cladding systems are tested in accordance with LPS 1181 to achieve a minimum grade 'EXT-B' certification, certificate reference LPCB 443a. The internal lining to the main roof will be Class O rating for surface spread of flame as tested to BS 476 Part 7:1997. In accordance with the latest test standards all liner fillers to be flame retardant.

The wall systems will be covered by the relevant independent Agrément Certification.

All flashings and details to be provided in accordance with the Architects requirements and the drawings.

Where required, under Building Regulations, to provide a fire protection to an external wall, then the construction will be upgraded to a firewall status as required by Twin-Therm® system.

External cladding to be designed with no ledges wherever possible; if ledges are required, bird spikes must be installed. To include services / signage / branding fixed to the building.

4.05 Curtain Walling/Windows

The curtain walling and glazing system shown to the office elevations will utilise recycled aluminium (minimum 35% by volume) and will be by Schuco, unless otherwise approved, fully thermally broken system comprising polyester powder coated aluminium mullions and transoms complete with factory sealed double glazed units with glazed and insulated spandrel panels, where necessary.

Glazing will be in 6 mm Antisun (colour to be agreed) on clear glass outer pane or similar approved, 16 mm argon filled space and 6 mm 'low e' clear inner pane to achieve a U value of 1.5W/m²K. Spandrel panels, where necessary, will be in ultra warm Permawall or similar, insulated panels.

Opening windows on the basis of 1 in 3 glazed units (excluding the curtain walling) will be generally 'top hung' with lockable handles. Tilt and turn to be considered in locations where no other means of access for maintenance and cleaning. All windows to be in compliance with the CDM Regulations relating to access for cleaning and maintenance of windows and curtain walling all in accordance with British Standards recommendations.

Where applicable Brise Soleil will be integrated with the curtain walling and will be powder coated aluminium.

Windows should be installed with tidy joints between the interface with cladding sheeting rails, where the EDPM is exposed this should be covered by a flashing.

4.06 External Doors

The front entrance door and all office external doors and frames will be manufactured in Kawneer Glostal or Schuco polyester powder colour coated aluminium sections with concealed overhead door closers. All doors will be glazed to the recommendation of BS 952 and BS CP 6262 in laminated or safety glass to match windows and curtain walling.

A letter plate is to be provided in or adjacent to the main entrance doors.

Main entrance doors will be manually operated with a push plate automatic override to meet all relevant accessibility guidance.

4.07 Upper Floor Construction

The upper floors of the offices to be constructed in prestressed concrete floor units or insitu concrete designed in accordance with BS 8110 and BS 6399: Part 1 to carry a superimposed load of 4.00kN/m^2, with an additional 1.00kN/m^2 for lightweight partitions. Or 7.5 kn/m^2 for plant room loading (if located within or above offices).

The units will be grouted in position and sealed to receive proprietary raised floor.

Areas not specified with a raised floor will have a minimum 50 mm thick fine concrete screed laid over the floor and include a layer of D49 structural fabric reinforcement. The top surface of the screed will be trowelled to receive floor finishes.

4.08 Internal Walls

Internal dividing, core area and partition walls to be built solid in recycled aggregate (minimum 50% by volume) concrete blockwork to BS 6073: Part 1 laid in cement and keyed for plaster. The thickness of the walls are to be as designed by the Structural Engineer and will be built in blocks of minimum crushing strength 3.5kN/m^2 or as otherwise detailed by the Structural Engineer. Alternatively walls to be constructed in proprietary stud partitioning using high density board such as Lafarge Megadeko or similar.

Where shown on the drawings, compartment walls between the offices, warehouse and production areas will provide minimum 1 hour fire resistance. Any door or window openings within the wall will be to the degree of fire protection as required to satisfy Building Regulations.

Compartment walls between the offices, warehouse and production area will be built in Rockwool filled composite panels such as Firemaster Extra minimum 150mm thick. The warehouse elevation is to be protected for its full width with Armco barrier.

The fabric of the compartment between the offices, warehouse and production areas will be insulated as required under current building regulations.

Internal lintels across all wall openings will be 'Catnic' or similar prefabricated steel to BS 5977: Part 2 or prestressed precast concrete.

Partitions generally throughout the other office areas to be proprietary, high density board and partition system such as Lafarge Megadeko or similar.

4.09 Staircase

The primary staircase and landing serving the upper floor offices will be designed and constructed in precast concrete to the Structural Engineer's details.

Balustrades will be formed in circular brushed stainless steel hollow section with matching handrails.

American light oak stringers will be provided to the exposed edge of the staircases, landings and as a skirting detail to adjacent walls.

The primary staircase walls are to be dry lined and fixed independently to the floor slab to prevent deterioration due to thermal movement.

The secondary / escape stair will be constructed in steel in accordance with Building Regulations.

4.10 Ceilings

Generally throughout the offices, staircases, landings, circulation and ancillary areas, Armstrong Dune eVo 600 mm x 600 mm Tegular tiles in lay-in grid system with a stove enamelled finish on wire hangers;

Within office areas perimeter bulkhead details should be used as necessary to avoid suspended ceiling stepping in and out of windows, around columns and so on;

Toilet areas will have Armstrong Dune Plus DB 600mm x 600 mm or similar moisture resistant tiles in lay-in grid system, with Dulux Absolute White vinyl matt emulsion painted moisture-resistant plasterboard ceiling above the WC cubicles and wash basins so that light fittings can be centralised rather than constrained in the grid.

Minimum 400mm wide and 100mm deep Dulux Absolute White vinyl matt emulsion painted plasterboard/MF flat bulkhead to be provide to head of feature wall in Reception area to accommodate feature 'wall wash' lighting to feature wall.

A 25/50 mm Dulux Black BS00E53 painted shadow edge trim will be included to all office, staircases, landings and circulation areas.

The suspended ceiling system is to be earth bonded in accordance with IEE regulations and the suspended ceiling manufacturers recommendations;

The floor to ceiling height to the office, circulation and ancillary areas will be 2.70 m and 2.40 m in the toilet areas. A consistent level floor will be provided throughout all areas.

Ceilings must have a minimum void of 250mm, complete with necessary cavity barriers, and a minimum depth under beams of 100mm.

Ceilings to reception area, stairwells, lobbies or small rooms to be suitably clipped and incorporate suitable means of accommodating fluctuations in wind pressure. Solid plastered ceilings to be considered as an alternative. Where the ground to first floor structure allows for a 6m clear height undercroft the selection of the ceiling height within the reception will be designed to coordinate with the 2nd half landing height & bulkheads, spandrel panels in the curtain walling will be designed to coordinate this.

The 'roof' structure over the ground floor office is to be designed for service loadings of 0.25KN/m2 and maintenance loads only of 0.6KN/m2 or 0.9KN isolated point loads.

4.11 Wall Finishes

All internal walls unless otherwise specified throughout the offices, staircases, landings, circulation and ancillary areas will be plastered/dry lined and fully sealed and then painted with one mist coat and two coats Dulux Trade Diamond Matt emulsion paint BS4800 22B15 'Swansdown'.

Reception Area:

Feature Walls: 600mmx300mmx9mm ceramic tiles Johnson Tiles Arich Range 'Graphite Slate'.
Feature tiled wall generally to be kept clear of any fixtures/fittings.
Skirting Tiles: 600mmx95mmx9mm ceramic tiles Johnson Tiles Arich Range 'Graphite Natural'.

Toilet Areas:

Main Wall Tiles: 300mmx200mmx9mm Johnson Tiles Polar Range CLAS1A White Satin laid horizontally;
Feature Wall Tiles: 300mmx200mmx9mm Johnson Tiles County Range Natural Grey Satin.
Skirting Tiles: 200mmx100mm Johnson Tiles Kerastar Granite (Natural).

Cleaners Room:

Main Wall Tiles: 300mmx200mmx9mm Johnson Tiles Polar Range CLAS1A 'White Satin' laid horizontally;
Skirting Tiles: 200mmx100mm Johnson Tiles Kerastar Granite (Natural).

Tea Point/Kitchenette/Team Room:

Minimum 400mm high complete ceramic tiled splashback above all worktops comprising minimum two rows 200mm x 200mm x 6.5mm Johnsons Tiles

"Prismatics" Range in White Gloss, with proprietary white gloss or brushed stainless steel trims to all edges.

Office undercoft area –

The floor slab to the office undercroft area will be to the same specification as Clause 2.07 of this Specification save that the floor loading will be 15kN/m^2 rather than 50kN/m^2.

4.12 Floor Finishes

Generally throughout the office areas a raised access floor medium grade system as Hewitson RMG600 or similar, to MOB Construction and installation standards to provide a minimum 150 mm clear void. The standard medium grade 600 mm x 600 mm panels to receive carpet tile covering. The raised access floor to be earth bonded in accordance with IEE Regulations and the raised floor manufacturer's recommendations.

Main entrance areas, reception areas, staircases, landings, cleaners cupboards, toilet areas and lobbies, any kitchenettes and tea points/rooms, will be power floated concrete or screed finish to receive carpet tile, vinyl or ceramic floor coverings.

Generally throughout the Offices unless specified otherwise Interface Transformation 'Fern' 1628010 carpet tiles.

Main entrance and reception area(s):

600mmx600mmx11mm ceramic floor tiles Johnson Tiles Minerals Range 'Limestone Grip';

Skirtings – 600mmx95mmx9mm round-top ceramic skirting tiles Johnson Tiles Arich Range 'Graphite Natural' to match floor.

Office areas, staircases, landings and circulation areas:

Interface Transformation 'Fern' 1628010 carpet tiles.

Office toilets, ancillary lobbies, and cleaner's store room:

200mmx200mmx8.3mm ceramic floor tiles Johnson Tiles Kerastar Granite (Natural);

Shower and cleaner's store floors to be 200mmx200mmx8.3mm Johnson Tiles Kerastar Granite Rocktop slip-resistant floor tiles.

Skirtings 200mmx100mm Johnson Tiles Kerastar Granite (Natural).

Kitchenettes/Tea Points/Tea Rooms:

200mmx200mmx8.3mm ceramic floor tiles Johnson Tiles Kerastar Graphite Rocktop

4.13 Doors and Joinery

Internal doors throughout the offices will be solid core flush doors with non-tropical American light oak hardwood veneers and concealed lipped. Frames and architraves to

be hardwood, to match door veneers. The source of all hardwoods to be incorporated within the works is to be disclosed and approved and shall be procured from well managed and regulated sources.

Where required by the Building Control Officer, doors will have an appropriate fire rating and be fitted with intumescent strips, smoke seals, door closers and vision panels of size 150 mm x 750 mm in accordance with BS 8300 and Approved Documents B and M.

Ironmongery will be appropriate to the location of the door and will be Grade 316 stainless steel door furniture with ancillary fittings.

Locks will be suited as follows:

- Master key to all doors;
- Submaster key to all ground floor doors;
- Submaster key to all first floor doors.
- Submaster key to all 2nd floor doors

The ironmongery will be from the FID line obtained from the following stockists:

Tuscan Hardware
Unit 2 Alder Mill Business Park
Sheepy Road
Atherstone
North Warwickshire
CV9 3AH

Tel: 01827 711 200
Fax: 01827 711 144

Mobile: 07810 526146
Contact: Paul Mason

Toilet IPS panels and cubicles will be manufactured by Venesta Cubicle Systems Limited or similar and approved:

Cubicle Panels-	solid grade laminate Polyrey NO57 Noisetier Brun
Cubicle Doors –	solid grade laminate Polyrey NO57 Noisetier Brun
IPS Back Panel /Shadow Gap –	solid grade laminate Polyrey GO59 Gris Orage Dark Grey
IPS Panels to WCs and Urinals -	solid grade laminate Polyrey NO57 Noisetier Brun
IPS Panels to Vanity Unit -	solid grade laminate Polyrey GO59 Gris Orage Dark Grey
Vanity Unit Top -	solid grade laminate Polyrey G003 Gris Perle Light Grey

All access panels within the WC areas will be hinged and lockable.

4.14 Fire Precautions

The requirements of the Building Control Officer will be incorporated, as indicated on the drawings, in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings and all associated signs and notices.

Signs and notices will comply with Associated Signs and BS 5499: 2000 'Fire Safety Signs, Notices and Graphic Symbols'.

Any other requirements or recommendations of the Local Authority Building Control Department, incorporating the Fire Prevention Officer with regard to provision of hose reels, sprinkler systems, heat sensors, smoke ventilators, extinguishers and other fire fighting equipment are specifically excluded.

4.15 Finishings General

In the main entrance lobby area to the full width of the reception area a matwell and frame consisting of an aluminium frame fixed into the concrete sub floor will be provided together with a barrier mat or good quality proprietary mat consisting of aluminium runners and brushes – Forbo Nuway Tuftiguard Classic closed construction double wiper Grey Buffed Rubber or equal approved.

Internal cill boards to be hardwood veneered MDF board or similar complete with biscuit joints.

Ex 100 mm x 25 mm hardwood to match the door veneer, splayed skirtings for clear finishing will be provided throughout except where ceramic or vinyl skirtings have been specified.

750 mm x 400 mm (minimum size) mirrors with concealed fixings to the walls above the wash hand basins in all toilet areas.

Toilet roll holders and coat hooks will be provided in each toilet cubicle.

4.16 Plumbing and Sanitary Ware

All toilet areas and cleaner's store will have Armitage Shanks or similar white vitreous china sanitary wear. All horizontal and waste pipework within toilet areas are to be concealed with suitable maintenance access.

Armitage Shanks 'Back to Wall' WC suites or similar will be provided with plastic seat and cover and dual flush plastic cistern located behind plastic laminate covered boxing and shall be complete with overflow indication, cisterns shall be 6/3 litre dual flushing.

Armitage Shanks china single bowl urinals with concealed traps and cistern within IPS panel system will be provided with matching high level cistern and stainless steel flush pipes and fittings.

Washbasins to toilets will be 585 mm x 420 mm Armitage Shanks self rimming basins or similar with push taps with aerated outlet will be fitted into plastic laminate covered blockboard vanity units. Captive basin wastes to be utilised.

Cleaner's sink, with bucket stand, will be provided with hot and cold water services.

A toilet compartment will be provided for the use of disabled persons, all in accordance with the Building Regulations (Doc M). The disabled alarm shall be provided adjacent to the toilet and will be both visual and audible.

4.17 Kitchenette/Tea Point/Tea Room

The Kitchenette/Tea Point/Tea Room areas will be fitted with Howden Joinery Co. Greenwich range or similar base units with worktops over and wall cupboards. A single drainer stainless steel sink top with mixer taps will be provided. Within the main offices the layout should incorporate suitable space for refrigerator and dishwasher under worktop including the provision of associated MCWS and drainage.

4.18 Passenger Lift

The lift to facilitate disabled access to the upper floors will be a ten person/800kg capacity hydraulic or electric traction passenger lift to meet the requirements of EN 81-20 : 2014, EN 81-50: 2014 and Part M2 Building Regulations for disabled access.

Each landing will have stainless steel lift entrance doors and surround. Stainless steel push button controls will be located adjacent to the lift entrance doors. Should the building layout be such that fire resistant landing doors are required to the lift, the doors will meet the fire resistance required by the Local Authority. Jamb protection by way of an American oak hardwood lining will be provided to the lift opening on all floors.

The lift car will have plan dimensions of 1350 mm x 1400 mm deep, constructed of steel and complete with stainless steel car doors tiled floor, joints and finish coordinated to match the reception, stainless steel walls, stainless steel ceiling and full height rear mirror. A full set of car controls incorporating floor selection buttons will be fitted at a height to comply with Part M2 Building Regulations.

The electrical contractor shall supply and install a local distribution board suitable for the size of lift and shall carryout lighting to the lift motor room. It shall be the lift manufacturer's responsibility to connect to this board for all necessary supplies and lighting to the lift shaft.

The lift shall be a Monoform or equal and approved motor roomless type.

Lift to be provided with autodialler connected to GSM Unit programmed to call the lift manufacturer's emergency helpline via the mobile phone network.

5.0 External Works

5.01 Service Yard Area

The service yard and associated access areas will be excavated to the required formation level, trimmed and compacted with a layer of frost resistant type 1 to the engineer's details blinded with fine chippings or clinker ash.

Sand or rock sand will not be acceptable material for finishing the hardcore layer.

Where the slabs are constructed in phases, the compacted hardcore layer must be constructed at least 1m beyond the relevant shutter lines to ensure that infill bays can be adequately compacted and finished.

The surface tolerances to the sub-base layer should be +5 mm or –30 mm.

A minimum 190 mm thick bed of concrete will be laid on 1000 gauge polythene or similar using an entrained concrete with a minimum cube strength of 40N/mm^2 at 28 days, reinforced with one layer of structural fabric to the engineer's details.

Bay sizes and all longitudinal, contraction, induced expansion and isolation joints will be formed in accordance with the recommendations of the structural engineer. All external joints to be sealed at Practical Completion. Joints to be re inspected at 12 month defects inspection and if necessary resealed. The slabs will be laid to maximum falls of 1:30 (except for localised access ramps which shall be no greater than 1:20) and minimum falls of 1:80 with the gradients generally sloping away from the building. At level access doors the first 15m shall be laid at maximum fall away from building or 1 in 60.

The surface of the concrete is to be finished using a serrated float or wire brush, to provide grooves parallel to the slope of the pavement, with 100 mm trowelled margins adjacent to the shutters.

The surface tolerance for the concrete pavement should be ±10 mm.

As soon as excess moisture has evaporated from the surface of the concrete a resin curing compound should be sprayed uniformly over the still plastic concrete. During hot sunny periods a curing compound containing a suspension of fine particles of Aluminium or other white pigment should be used.

During adverse weather conditions including hot sunny periods, winds in excess of 10 mph, and rain, the slabs should be protected with suitable tents of polythene or similar, in addition to the curing compound.

Solvent-based acrylic white line marking will be used to demarcate HGV dock bays and parking bays.

Bollard protection will be provided externally to the warehouse level access doors. Bollards will be a FlexCore product or similar.

Drainage channels with steel gratings will not be used in areas of the service yard where they can be trafficked by turning vehicles. Slot drains (Gatic, or equal and approved) will be provided.

5.02 Car Parks

a) 80 mm thick coloured concrete block paving to car parking areas laid 90^0 herringbone, laid on a maximum 50 mm bed of sand, on a minimum 300 mm hardcore bed, well vibrated with joints filled with dry washed sand (all in accordance with the manufacturer's recommendations and Engineers details)

b) Macadam surfacing to, roadways serving and within the car park areas, where indicated on the drawings, will be laid on a prepared hardcore bed minimum 150 mm thick with a minimum 100 mm consolidated thickness of two course bituminous macadam, consisting of a minimum 75 mm base course with a minimum 25 mm wearing course. (All as Engineers details)

c) White linings to car parking circulation areas will be to a total width of 75 mm.

d) Car parking spaces will be of a size 2.4 m x 4.8 m minimum and the road width between bays will be 6.0 m minimum.

e) Car parking spaces will be delineated by the use of white block paviors

f) Disabled car parking spaces will be to a size of 3.6 m x 6 m and 5% of the total number of spaces or to meet current legislation. Symbols to disabled car parking spaces will be suitably executed using white blocks.

g) A manually operated car park barrier will be provided at the car park entrance and exit. Ducts will be provided from the building to each barrier for future installation of access control / comms, ducts to be PVC rigi-duct with smooth interior, spare ducts will be left clear with draw cords.

5.03 Kerbs

Where indicated, 254 mm x 127 mm half battered precast concrete kerbs to BS EN 1340: 2003 bedded onto a 325 mm x 150 mm concrete base and haunches with concrete will be laid. Dropped kerbs to be provided at pedestrian cross overs and cycle routes (all as Engineers details)

5.04 Footpaths

Footpaths will be excavated to formation level, trimmed and compacted and provided with a minimum 100 mm thick stone hardcore base blinded with fine stone sand or clinker ash and finishes as:

a) 60 mm thick contrast colour concrete block paving, to the office elevations and entrances will be laid on a maximum 50 mm bed of sand, well vibrated, with joints filled with dry wash sand;

b) 50 mm thick precast concrete paving slabs to ancillary paths and margins around the warehouse (where indicated on drawings) will be laid on a maximum 50 mm sand lime bed, well vibrated, with joints filled with dry wash sand.

c) Maintenance paths around the warehouse building and any fire tender access will be constructed in accordance with the Engineer's details.

5.05 Landscaping

The soft landscape scheme is to be designed and constructed by Whiting Landscape Limited during the earliest planting season.

Whiting Landscape Limited
Wildmore Lane
Bromsgrove
Worcestershire
B61 0RG

Tel: 01527 836292

The scheme prepared will include design, ground cultivation, compost, planting, forest bark and twelve months maintenance.

The scheme prepared will obtain the approval of the Planning Authority.

Topsoil, to be provided by the contractor, will be approved by Whiting Landscape Limited and will be a minimum of 150 mm thick to turfed areas, 450 mm thick to shrubs and planting beds and 1.00m^3 to tree pits.

Any reinstatement of existing landscaping will be designed and approved by Whiting Landscape Limited.

An external watering point positioned to suit the landscaping design will be provided in accordance with clause 7.04.

5.06 Drainage

a) General

Connections from the site boundary to main foul and surface water sewers will be made in accordance with the requirements of the Local Authority.

The drainage system generally will be in accordance with:

BS 65 Specified for Vitrified Clay Pipes, Fittings and Joints;
BS EN 12056 – 3: 2000 Code of Practice for Drainage of Roofs and Paved Areas;
BS EN 752 – 1-4 Code of Practice for Building Drainage.

b) Pipework

Foul and surface water drainage will be constructed to the details shown on the drainage drawings, using ESVC Hepseal and Supersleve Pipes to BS 65, Hepsleve Pipes to BS 65, concrete pipes, plastic pipes or similar approved on Class B granular stone bed. Drainage pipework internal to the building areas will have a concrete bed and surround.

Where required, pipework will be protected in accordance with the 'Simplified Tables of External Loads on Buried Pipelines'.

All necessary bends, junctions and other fittings required to complete the work will be provided. Flexible joint collars will be provided to drainage pipework when leaving the building areas.

c) Manholes

Manholes will be constructed to the depths required using either precast concrete rings and heavy duty cover slabs or in Class B engineering brickwork. The bases of manholes will incorporate all necessary clayware channels and junction fittings and will be benched in fine granolithic concrete.

Galvanised step irons will be included in the walls of manholes and the manhole covers will be of galvanised steel or cast iron of an appropriate load bearing capacity. Where manholes are located in concrete block paving areas the manhole covers will be recessed 'inset' covers orientated to suit block paving layout, and block paving will be bedded in a sand/cement mix to avoid waterlogging in the manhole cover.

Where manholes have connections from the siphonic drainage system the covers will be vented to the Engineer's details.

d) Gullies

Gullies to forecourt and car park areas will generally be precast concrete road gullies 150 mm outlet, trapped with rodding eye to BS 5911 fitted with heavy duty cast iron gully grate and frame to BS EN 124 - 1.

e) Petrol Interceptors

An alarmed petrol/oil interceptor, required by the Environment Agency, will be installed and ventilated to serve the surface water drainage system to external paved areas. Alarm panels to be located in gatehouses, where applicable, or reception.

f) **Future Welfare Drainage**

Within the ground floor office area or undercroft area 100mm diameter foul drainage "pop-ups" will be provided as indicated on the Architect's drawings and to the Engineer's details. The pop-ups will be capped at finished floor level in undercroft area or below raised access floor in ground floor offices and the details will allow for the easy connection of future plastic soil stacks by an occupier.

5.07 Ramps

Where ramps are required to be provided for access into the building for disabled persons or for trolley access, these will be designed in accordance with BS 8300 and surfaced as shown on the drawings, complete with handrails as applicable.

5.08 Gatehouse

Not used.

5.09 Fencing

Where indicated on the site layout drawing to the perimeter of the service yards 2.40 m high palisade fencing, complete with a pair of manually operated lockable gates and necessary pedestrian gates will be provided. Fences to be suitably set back from vehicular areas to reduce risk of accidental impact.

Fencing and finished ground levels to be co-ordinated such that maximum gap beneath fence is 100mm.

5.10 Cycle Shelter and Storage

Sheltered cycle storage is to be provided for staff and visitors as indicated on the drawings and in accordance with BREEAM requirements. Suitable access to be provided from car park access road. Cycle shelter to be a Falco Quarter, or equal and approved, in galvanised finish.

5.11 Smoking Shelter

To be provided by the Occupier / within the CAT B specification if they require it.

5.12 Electric Vehicle Charging

2 nr. spaces will be served with Electric Vehicle charging points, pedestals to be 16A / 3.6k rated QUANTUMEV EVQR0120 duel charging pedestals, or equal approved.

5.13 BWIC Future Electric Vehicle Charging

In addition to any EV chargers identified on the architects drawings, builders work in connection with the future installation of additional electric vehicle charging points within the car park will be provided comprising of suitable underground ductwork infrastructure with drawcords from the building to the full perimeter of the car park in location(s) to be agreed. Ducts to be PVC rigi-duct with smooth interior, ducts to be left clear with draw-cords.

5.14 Estate Road and New Site Access

A new site access off the existing estate road will be constructed into the site. Any alterations to the estate road will need to be completed to adoptable standards of highway construction (but will not be offered up for adoption).

6.0 External Services

The Mechanical and Electrical Contractor shall carry out all necessary calculations and liaison with Utility Authorities and Shippers in order to obtain necessary supplies for the continuation of the works and the subsequent operation of the entire premises.

Meters shall be ordered by the Main Contractor.

All meters shall be capable of being monitored by a future BMS system.

6.01 Electric

An incoming electric service duct will be provided for the Electricity Distribution Network Operator (DNO) to lay in LV main to supply the required capacity. The contractor is to include for the required LV tails and cables from the meter point of the public supply (at the substation) to the building.

The contractor shall include ducts from the DNO substation or boundary intake position to the building to suit the incoming LV tails requirement, but where this is unknown, they will allow 7no 100mm dia power ducts & 1no 100mm dia data duct to local DNO specificational requirements with suitable floor cutout termination beneath the main LV panel in the building.

6.02 Gas

The contractor will include trenching and a private gas main from an agreed location on the site boundary to the building gas intake position, along with steel upstand pipe arrangement. The private gas main to is to capped-off at the site boundary and clearly demarcated at ground level. The private gas main will be sized to service a gas load of 550kW at 30mbar (3000Pa) indicated above.

A spare duct is also to be provided from the intake position to the location of the capped off supply on the site boundary. Duct to be 100mm dia PVC rigi-duct with smooth interior, left clear with drawcord.

6.03 Water

A metered domestic water supply will be provided from the site boundary/public supply to serve the building based on a flow rate of 0.2 l/s.

A dedicated client pulse meter will be provided capable of being monitored from a BMS, the meter shall be complete with high flow and duration alarms to an alarm panel located at reception.

The Contractor is to provide a duct from the external water meter to the building. Ducts to be PVC rigi-duct with smooth interior. All ducts will be left clear with drawcords.

A hydrant main shall be provided if required to satisfy building control including any necessary hydrants.

6.04 External Ducts

2 ducts will be provided from the site boundary to a designated intake point to serve the communications requirements of BT. 2 no additional duct systems shall be provided for use by others. Each set of ducts will enter the building and pass below ground to provide a system to cater for the future.

2 no vacant ducts not less than 100Ø will be provided from the corners of the building to external locations within the soft landscaping to suit the required wire ways of a possible future CCTV installation and external signage provision. (see also any requirements for gatehouse if applicable)

1 no 100Ø duct shall be provided from the building to any remote utility meter.

2 no 100Ø shall be provided from the building to any pumping stations, interceptors or other items requiring power/monitoring which are remote from the building.

Ducts to be PVC rigi-duct with smooth interior. All ducts will be left clear with drawcords.

7.0 Mechanical Services

7.01 General

The mechanical services works will be designed and installed in compliance with the recommendations of the CIBSE Guide, current British Standards and Codes of Practice, Building Control Officer's requirements, Clean Air Act, Gas Safety Regulations, Local Water Board requirements and Health and Safety at Work Act.

All mechanical services installations within the warehouse other than on the plant deck are to be above the minimum clear haunch height.

The plant deck is to provide a minimum 6m high clearance, and the underslinging of services is not permitted where they would encroach upon this clearance.

Any office ductwork or services on the warehouse side of the office/warehouse division wall are to be minimised, be above 6m AFFL, and be carefully co-ordinated, in order to minimise intrusion upon warehouse space and operations.

7.02 Protection of services

Service entry points, meters, pipework and control panels within the warehouse area are to be protected from vehicle impact by suitable Armco barriers or bollards.

The Contractor is to submit a proposed Internal Protection drawing for approval by the Employer.

7.03 Design Conditions

The following design parameters shall be employed in the carrying out of all design works.

External

Winter	As per CIBSE Guide A table 2.5 for external temperatures not exceeded for more than 0.4% of year (use the 99.6% not exceeded column).
Summer	Based on Geographical location. As per CIBSE Guide A table 2.6 for external temperatures not exceeded for more than 0.4% of year (use the 99.6% not exceeded column).

Internal

Office and Hub Office:

Winter	$21^0C \pm 2^0C$
Summer	$23^0C \pm 2^0C$

Toilets	$19^0C \pm 2^0C$
Stairs	$18^0C \pm 2^0C$
Frost	$12^0C \pm 2^0C$

Occupancy

Offices	1 person/7.5m^2
Meeting Rooms	1 person/4.5m^2

Ventilation

Offices	12L/S/person
Toilets	10Ac.Hr extract
Tea Rooms & Kitchenettes	10Ac.Hr extract

Infiltration

Offices	1 Ac/Hr

Noise Criteria

Offices	40 – 45 dB Laeq 20
Toilets	45 – 50 dB Laeq 20
Plant Room	NR50
External	NR65 at 1m

Domestic Water Services Pipework Sizing

Flow Velocity:	Small Bore Pipework: <1.0m/s 15-50mm Pipework: 0.75 – 1.15m/s >50mm Pipework: 1.25m/s – 3.0ms
Pressure Drop:	Calculated according to the available head on the system and as required to give correct flow at terminal outlets and the avoidance of below atmospheric pressure conditions in return circuits

Where applicable the mechanical services design will be developed, and the equipment will be sized, to accommodate future fit-out of the undercroft with a combination of welfare / lockers / canteen facilities. Pipework and ductwork will be formatted to allow for the easy addition of such facilities by the occupier.

7.04 Main Office Heating and Cooling

Variable refrigerant flow (VRF) / Variable Refrigerant Volume (VRV) systems incorporating heat recovery will be afforded throughout the office areas. Where heating and cooling demand is low or the area is small, local split / multi split direct expansion refrigeration systems will be accepted. Minimum efficiencies shal;;l be as follows;

Heating SCOP : 3.50
Cooling SEER : 5.00

The systems will be designed and certified to meet the requirements of the Building Regulations Part L nondomestic building services compliance guide and to satisfy the buildings minimum EPC requirements and achieve a PASS in Part L 2021 without the use of solar PV panels.

Ceiling concealed fan coil unit's c/w plenum boxes will be utilised throughout. Supply ductwork from the fan coil units will be thermally insulated to BS 5422: 2009 and incorporate vapour barriers. The ducts will connect to swirl diffusers complete with multiblade volume control dampers and plenum boxes.

Return air to the fan coil units will be via similar diffusers to those used for the supply with blacked out boxes so the services within the ceiling void cannot be viewed through the diffuser.

Gravity condensate drains will be installed for each indoor unit.

Control of each indoor unit shall be by means of air temperature sensors located within the occupied space.

Compressors and condensing fans shall be speed controlled using inbuit inverters or similar. COP and EER shall be as high as possible to facilitate part L2 compliance. Equipment and systems are to comply with F-Gas regulations.

The VRV/F system shall be designed at 100% diversity of indoor/outdoor units

The branch connection boxes shall include minimum 25% spare connection points to provide for future changes to the system eg subdivision of the offices.

Toilets and ancillary/welfare areas, staircases, landings shall utilise an air-source heat pump 'hydrobox' solution (minimum efficiency: 3.50) that will feed LTHW radiators in these areas sized to low ater operating temperatures as per Part L 2021. In disabled toilets LST (low surface temperature) radoators from the same 'hydrobox' system shall be utilised.

7.05 Domestic Water Services

A mains cold water service will be extended from the intake point of the offices to serve all tanks,the tearoom and the plant deck.

All outlets will be directly mains fed with all control devices, including back siphonage, as required to comply with water regulations.

No water storage will be provided.

Distribution pipework will be extended to serve all draw off points in the toilets, all pipework within voids will be thermally insulated to BS 5422 where pipework is exposed

within fully tiled toilet areas it will have a chrome plated finish with matching fittings and brackets.

A Grey water (rainwater storage) system shall be employed to serve the cisterns within the main office. It shall be distributed using HEP_20 pipework or equal and approved. System capacity shall be based on 24 hours storage with full capacity make up.

Domestic hot water to the toilets, cleaners sink and tearoom will be provided by an energy efficient air to water source heat pump (minimum 2.5) serving a pre-plumbed Solar Hot Water Cylinder. The cylinder will be matched to a monobloc air source heat pump, for example a Mitsubishi Electric FTC5 unit connected to a PUHZ type unit. Solar collectors and associated controls will be installed to provide an additional source of energy for producing hot water the array will be matched to the size of the proposed cylinder installation. The cylinder shall incorporate an electric immersion heater element for legionella prevention and emergency back-up modes.

Automatic timed operation will be afforded the generator and hot water service circulating pump serving flow and return copper pipework extending to all draw offs.

2 no MCWS will be provided for vending machines on each floor (terminated within raised access floor). Location to be agreed.

Pressure boosters will be provided as appropriate.

The complete system shall be sterilised and tested as required for a fully portable system and the prevention of Legionella regulations.

A single external watering point will be provided, comprising a WRC approved outlet complete with hose union tap and internal double check valve. The supply shall be taken from the metered MCWS and shall be compliant with the relevant water byelaws.

7.06 Ventilation

A mechanical ventilation system will be provided to the open plan offices.

Generally, the system will comprise a supply air handling unit with fresh air intake, filter (F5), LPHW heater battery, supply air fan, galvanised ductwork to DW144, attenuators and proprietary ceiling diffusers appropriate to the location and ceiling type (within lay-in grid ceilings full-tile replacement louvred face ceiling diffusers are to be used – Gilberts Series DG or equivalent).

A mechanical supply and extract ventilation system will be provided to the male and female toilets and cleaner's room comprising grilles, galvanised ductwork, crosstalk attenuators and twin fan extract unit with discharge through roof. A system of supply fresh air will be arranged to the lobby areas of the toilets and transferred into the toilets via an undercut door or via air transfer grilles as approved, to provide a degree of make-up air.

The kitchenette and lift motor room (where applicable) shall be served by separate extract ventilation systems; the kitchenette system will be operated by interconn ection with the lighting circuits, whilst the lift motor room will operate from a room thermostat. The lift motor room system shall be sized to meet the lift manufacturer's requirements, a shaft vent shall be provided.

Air intakes will be positioned at least 20m from sources of pollution and 10m from outlets.

7.07 Controls

A central control panel will be provided within the plant room.

The Mechanical Control Panel will monitor and control the offices, ventilation, domestic hot and cold water systems, solar hot water heating system, rainwater harvesting tank. The control panel shall contain intelligent controllers and shall be from the same manufacturer.

A panel mounted centralised controller will be installed on the panel to control and monitor all heating and cooling equipment.All plant will have controls of a suitable type to allow for the future connection of BMS system (BMS provided by others).
The building will have electronic controls including an optimiser for the heating system.
A remote panel with buzzer, mute switch and indicator lamp will be provided within the reception area to indicate any main mechanical plant failure.

All lamps shall be LED type located on the mechanical control panel and shall enable a Lamp test to take place.

A panel mounted touch screen controller shall be provided allowing interfacing with the BMS controllers located within the mechanical control panel and shall be networked to other outstations within the building. This shall provide the following features:

- Viewing of inputs, outputs, alarms and plots
- Adjustment of Set Points
- View metering and logged data
- Facility for Graphic pages detailing system schematics for main plant should there be a requirement.
- Relay output for external alarm sounders

7.08 Meters

Meters will facilitate 2 types of measurement, utility and usage.

utility meters must provide a calibration led or a pulse output. Sub meters for usage measurement can be with a pulse output for the energy or a modbus output (RS 485: 2 wires) allowing measurement of energy or power.

The gas and water meters must provide the necessary equipment to have a pulse output.

Typical usage for gas is:

- heating

Typical usages for water are:

- total consumption
- split by tenants

Pulse output specifications:

In order to support any kind of emitters the pulse width must be greater or equal than 100ms.

The maximal closed state load resistor is defined as Rc = 1kΩ
The minimal open state load resistor is defined as Ro = 1MΩ

Meters available in 3 different versions, Indoor, Outdoor and ATEX Outdoor, sensors with pulse input capability for Reed contact pulse transmitters (dry contact).

The metering provided shall satisfy the following BREEAM Credit:

Title	Credit Reference
Energy Monitoring	Ene 02

7.09 Services Pipework

Pipework and fittings associated with the mechanical services installation will be as follows:

Pipework

Heating	Mapress Press Fit System or Black mild steel heavy weight to BS EN 10255 : 2004.
Gas internal	Black mild steel medium weight to EN 10255 : 2004.
Mains cold water, hot water and cold services	Light gauge copper half hard temper to BS EN 1057 : 2006 + A1 : 2010.
Mains cold water external	Blue polyethylene medium density to EN 12201-1 : 2003, BS EN 12201-2 : 2003 and BS EN 12201-5 : 2003.
Gas external	Yellow polyethylene high density type SDRII Series

below ground to BGC/PL2: Part 1.

Overflows and Unplasticised polyvinyl chloride to BS 3505 : 1986 Class D drains (white where exposed).

Grey water Unplasticised Polyvinyl Chloride to BS 3505 Class D.

Fittings

Heating and gas Screwed black banded malleable iron to BS 143 and BS 1256 : 2000.

Mains water, Capillary or compression fittings to EN 1254-1 : 1998, BS EN 1254-2 : 1998::
hot and cold services Type A. All fluxes soluble in water. All fittings lead free.

Gas and mains water external Heat fusion welded joints below ground.

Overflows & drain lines Unplasticised polyethylene chloride to BS EN 1452-1: 2009, BS EN 1452-2: 2009, BS EN 1452-3: 2009, BS EN 1452-4: 2009 and BS EN 1452-5: 2009 solvent welded.

Alternative materials/methods may be offered for approval.

7.10 Not used

7.11 Testing and Commissioning

All services will be tested and commissioned in accordance with CIBSE technical memoranda and guides. The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and CIBSE Guidance.

Services shall be left fully operational.

8.0 Electrical Services

8.01 Testing and Commissioning

The electrical services work will be designed and installed in compliance and the recommendations of the 18th Edition of the IET Wiring Regulations Regulations (BS 7671 : 2018) plus amendments, current relevant British Standards and Codes of Practice, Building Control Officers' requirements, the Electricity Supply Regulations and Healthand Safety at Work Act.

8.02 Electricity Supply

The electricity supply to the building will be drawn from the DNO supply network and will be metered at LV (or HV if a HV supply) with a capacity in the order of 550KVA.

LV Incoming supplies (upto 275Kva) will be located at a meter service cutout location inside the building. For supplies above 275Kva the supply will be drawn from the outgoing metered terminals inside the DNO HV/LV distribution sub-station. The contractor is to include to install tails from the relevant position for this building. On supplies larger than 275Kva, the contractor is to include to install tails from the DNO boundary sub-station location.

8.03 LV Panel and Distribution Boards

The LV panel and distribution boards will be in accordance with BS EN 61439-1: 2009 and BS EN 61439-2: 2009, Form 4 separation Type 3, suitable for the supply capacity and be complete with necessary MCCB's and MCB's together with 4 spare 3 phase 100A ways or 25% allowance whichever is the greater. An additional breaker will be provided to serve future fit-out of the undercroft area.

The office distribution boards shall be in accordance with BS EN 61439-1: 2009 and BS EN 61439-2: 2009 and be complete with necessary MCCB's and MCB's together with 25% allowance for spare ways. The location of the office distribution boards plus associated containment is to be agreed prior to installation and in all cases will be located within a suitably sized cupboard.

8.04 Sub Main Cables and Cables

Sub main cables will be provided from the LV panel board to sub distribution boards and busbar trunking feed points, extended in XLPE/SWA/LSF copper cables to BS 5467 : 2016. All distribution systems will be continually rated and designed in accordance with BS 7671: 2018 – 18th Edition IET Wiring Regulations

Sub main cables will be supported on proprietary ladder rack and/or hot dipped galvanised steel medium return flange tray all secured on purpose made unistrut metal brackets at intervals not more than two metres. All cables will be evenly spaced and securely clipped to the cable tray and identified where necessary with cable markers.

8.05 System of Wiring

The lighting and power installation to the offices and ancillary areas will, in general, be carried out in LSF/LSF insulated cable run within ceiling voids and where necessary into galvanised steel trunking/conduit to provide a rewireable system that is concealed and flush with plug in roses at termination points for final connection to fittings.

The use of modular wiring systems for the office lighting will be acceptable.

External lighting supplies will be extended in XLPE/SWA/LSF cables run in ducts as necessary.

To the warehouse area the power installations serving the dock doors and levellers will generally be carried out with XLPE/SWA/PVC/LSF cables to distribution boards, high level bus bar to doors and docks with tap-offs to suit.

8.06 Lighting Installations

The lighting will comprise the following:

Offices / Hub offices / Gatehouses	600 mm x 600 mm square LED recessed lay-in modular luminaries with LG7 compliant low brightness diffusers to achieve a limiting glare rating of 19 and average illuminance level of 500 lux at 850 mm above floor level with uniformity not less than 0.60. Marshalling boxes shall be used so that 2 spare ways are available in each 8 gang box. Luminaire as per Luxonic Broadlighter or equal and approved.
Circulation/Corridor	LED recessed down lights with spill ring to give an average illuminance level of 100 lux at floor level with a uniformity not less than 0.40. In front of the lift shall be an average illuminance of 200 lux at floor level.

	Luminaire as per Luxonic VLED or equal and approved.
Stairs	LED down lighters and LED wall mounted type luminaires to give an average illuminance level of 150lux at floor level with a uniformity not less than 0.40. Luminaire as per Luxonic A1 or equal and approved.
Cleaners Store	LED recessed down lights to give an average illuminance level of 200 lux at floor level. Luminaire as per Luxonic VLED or equal and approved.
Plantrooms/Risers	LED batten type luminaires with suitable IP rating to give an average illuminance level of 200lux at floor level. Layout shall take into account plant equipment. Luminaire as per Luxonic Corrist or equal and approved.
Toilets	LED recessed downlights with spill ring to give an average illuminance level of 200 lux at floor level with a uniformity not less than 0.40, supplementary LED GU10 spotlights shall be provided to the mirrors. Luminaires shall be provided in each individual toilet if fully enclosed. Luminaires as per Luxonic VLED & Micro C or equal and approved.
Reception/Main Entrance	LED recessed down lights with spill ring to give an average illuminance of 300lux at floor level with a uniformity not less than 0.40. Supplementary LED GU10 spotlights to be provided evenly spaced at not less than 600mm centres to bulkhead above feature wall to provide “wall wash” lighting to feature wall.

Emergency Lighting	LED Self-contained non-maintenance three hour emergency luminaries to all fire exits, corridors, toilets, staircases both internal and external, reception and to the office areas all in accordance with Fire Officers' requirements and BS 5266: 1 : 2016 and 2.22 emergency lighting will be integrated into the main lighting fittings or standalone LED luminaires. All emergency lighting will be provided with test key switches adjacent to distribution boards. Luminaires as per Luxonic ADS, Sinz & LED EM-T or equal and approved.
External Lighting	LED floodlights to building periphery and on columns to provide a minimum average of 30 lux with 40% uniformity within service yard as per BS EN 13201-2: 2015, Table 2 Class C1. Car Parking Areas from 4 – 6 metre high columns with LED road lantern to provide an average of 10 lux with a uniformity of 0.25, all controlled by photocells/timeswitch. Local increase to 50 lux at the staff entrances and loading bay area. Walkways exclusively for pedestrians shall be 5 lux average with 0.25 uniformity. Luminaires as per Holophane D-Series or Kingfisher Italo. External luminaires to be Dark-Sky compliant and designed in accordance with CIBSE LG6. All lamp columns adjacent to service yards/ access roads to be set back from kerbs or protected by bollards / Armco type barriers. All lamp columns in car parks to be located in landscaped areas or alternatively protected by a bollard. Where light fittings are fixed to the building exterior, locations and finishes of mounting plates, brackets etc. are to be co-ordinated with and matched to cladding to ensure satisfactory appearance.
Lighting Control	All internal lighting shall be controlled via PIR's with a maximum of 6 fitting/PIR. Daylight override

shall be provided to the main offices consisting of perimeter zones to the windows 4m deep by 6m long maximum with adjustable level sensing to provide dimming to 10% of maximum

Manual controls shall be provided within all plantrooms

All luminaires shall be manufactured and tested in full compliance with BS EN 60598. All LED modules for general lighting shall comply with BS EN 62031: 2008+A2: 2015 and BS EN 62717: 2017. All LED products shall have longevity of at least L70 @ 50,000 hours (20% lumen depreciation), tested to LM80 and TM21 calculation process. Failure rate expectancy shall be less than 10% at 50,000 hours.

8.07 Power Installations

Electrical power supplies will be provided generally as follows:

Signs	2 no 20 amp SP supplies to external signs using PVC/SWA/PVC cable in duct. Supplies controlled by time switch in office entrance lobby;
Mechanical Service	All power and control supplies associated with mechanical services comprising fans, pumps, etc. Local isolation to be provided to all items of equipment;
BT	1 no 13 amp SP spur for incoming BT supply. This supply together with earth to a dedicated feed from main LV panel;
Main & Hub Office Areas	Within the suspended cavity floor a bus bar trunking system with 3 metre long flexible connections to three compartment recessed floor outlet boxes, to be provided on the basis on 1 no floor outlet box per 10 m^2 floor area; Floor boxes will incorporate 1 no twin switched socket outlet, 1 no twin blank plate for telecom, 1 no twin blank plate for data; No allowance has been made for telephone or data cabling. All telephone and data cabling to be installed by future occupier;
Stairways	1 no single SO at ground and first floor;

Reception/Lobby Area	1 no flush Floor box suitable for the floor finish (position to be agreed with the Employer) will incorporate 1 no twin switched socket outlet, 1 no twin blank plate for telecom, 1 no twin blank plate for data;
Corridors	1 no single SO per section of corridor;
Tea Room	2 no twin SO over worktop. 2 no single SO below worktop;
Toilets	FCU (1 per 4 hand basins) per cubicles for hand dryer (by others) in each toilet area. 1 no alarm pull cord and sounder to each disabled toilet;
Other Offices/Ancillary	1 no twin SO per 10 lineal metres wall girth (minimum 1 no per room/area);
Warehouse doors and Levellers	TP & N supplies to doors; TP & N Suppliers to levellers.

8.08 Fire Alarms

A fire alarm system will be provided to the offices of the fully automatic and fully addressable analogue type, all in accordance with the requirements of BS 5839 and the Building Control Officer. The equipment will incorporate a flush fitting brushed-stainless steel finished main fire alarm panel located in the reception area, location to be agreed, break glass manual contacts on all escapes to provide a complete system with zones being arranged to generally suit the Client's requirements. A repeater panel will be provided in the gatehouse. Spare zones will be provided to permit the future addition of warehouse areas. Sounders will be provided throughout the offices to accord with the standard. The system will be wired in red firetuff or equal cable extended in a concealed manner in the main offices. As a minimum a P1 system shall be installed.

8.09 Lightning Protection

The Contractor will calculate the LPS (structural and electronic) grade/level of protection required via risk assessment method. The building shall be suitably zoned (LPZ) as detailed within BS EN 62305, with surge suppression installed as to reflect such requirements.

Full system to be retested 9 months after Practical Completion and any necessary remedial works undertaken.

8.10 Metering

Sub meters shall be provided as per the building regulations but not less than the following:

- Office Lighting;
- Office Small Power;
- M & E Plant;
- Operational Areas;
- Ancillary Areas.

8.11 Bonding and Earthing

All necessary bonding and earthing in compliance with the requirements of the 18th Edition of the IET Wiring Regulations (BS 7671 : 2018) will be provided with particular note to incoming gas and water services.

8.12 Testing and Commissioning

The complete electrical installations will be tested and commissioned to give correct working. A Completion Certificate in conformance with NICEIC, record drawings, protective device charts and details of installed plant and equipment will be incorporated into an Operating and Maintenance Manual.

The Contractor shall nominate a suitable person to monitor the commissioning on behalf of the client in accordance with BSRIA and IET Wiring Regs.

A draft copy will be provided two working weeks prior to Practical Completion and two copies at Practical Completion.

8.13 Photovoltaic System

The Contractor shall employ a Microgeneration Certification Scheme (MCS) certified Photovoltaic (PV) specialist to design, supply, install, test and commission a complete grid-connected PV system, having minimum yield of 122,000kWh/annum.

The PV system shall include PV support structure, PV modules, all necessary DC side cabling and equipment, all necessary AC side cabling and equipment, all necessary cable support and containment systems, all necessary isolators, protective devices, and controls, inverters with output metering, connection of the PV systems to the lightning protection system if necessary, G99 relay protection, building export metering and all other equipment necessary for connection and export to the electricity network.
The PV modules are to be mounted on the roof and shall be co-ordinated with the rooflight layout.

The PV support structure shall be proprietary stainless steel and or aluminium frames with stainless steel fixings. The support structure and method of fixing to the roof is to

be approved by C A Group and shall be designed & installed so as to not adversely affect the performance of and warranties for the roof cladding system. The complete mounting system shall be designed to withstand all dead, imposed and uplift loads for the location. Building structural calculations shall be undertaken to verify the imposed loads on the roof structure.

Tier 1 components (PV modules and inverters) shall be used with a minimum performance warranty of 25 years on PV modules and 10 years product warranty. The PV modules must be certified/listed on the MCS product database. Inverters should be the quick change type so that a replacement could be fitted with minimal downtime to the system. The inverters shall be G99 compliant for use in the UK and are to be located adjacent to the main LV panel at an agreed location, albeit they shall be IP65 rated as standard.

For consumer use inverter output metering and graphical display unit shall be provided to display -

- Energy delivered by the PV system (kWh)
- Instantaneous power output (kW)
- CO2 saving (kg CO2 / annum)

OFGEM approved building export metering shall be provided in accordance with MCS Metering Guidance.

The PV system shall comply with the requirements of G99, and the Contractor and PV specialist shall undertake all necessary applications, notifications, commissioning requirements and liaison with the DNO for connection and export to the DNO electricity network.

The Contractor shall ensure that the complete PV installation integrates with the main building design and is co-ordinated with the main electrical installation works.

9.0 Health and Safety Files/Operating and Maintenance Manuals

The Operating and Maintenance Manuals are to include the Health & Safety File in accordance with the Construction Design & Management Regulations along with all the information required for the operation, maintenance, refurbishment, decommissioning and demolition of the works.

The manuals should be complete and accurate, fully indexed, (electronic versions should be interative and searchable), and organised into volumes –

1. General – incl H&S File
2. Building Fabric
3. External Works
4. Mechanical
5. Electrical

The Manuals content should include the following:

- Project Description, Scope and Design Principles
- Pre-Construction Information
- H&S File
- Ground Investigation, Remediation and Residual Hazards
- Statutory And Underground Services Information
- Statutory Approvals (incl Applications and Approved Documents)
- Contract Directory
- Document Registers
- For each and every discipline / element / works package –
    - Scope of works / description of system(s), plant and equipment
    - Suppliers and Manufacturers Directory
    - Manufacturers Information
    - As-built Drawings
    - Testing and Commissioning results and certificates
    - Operation
    - Maintenance Procedures and Planned Maintenance Schedule
    - Spares information
    - Guarantees and Warranties
    - Replacement strategy
    - Demolition, decommissioning or disposal information

A draft electronic copy is to be made available a minimum of two working weeks prior to Practical Completion.

The final H&S File and Manuals will be provided within two weeks following Completion and shall be provided in an agreed electronic soft copy format and two no. complete hard copies delivered to and stored safely in the completed building in location to be agreed.

QR codes will be provided to each element of the project linking to documentation, service and maintenance records.

9.1 Building Log Book

The Building Log Book shall be provided in accordance with Building Regulations and to CIBSE TM31 Guidance incorporating all requirements of the BREEAM assessment.