OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 15: Climate Change
Appendix 15.5: Carbon Management Plan

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Rev 05

On behalf of
Oxfordshire Railfreight Limited

Prepared by TetraTech
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1 Introduction

1.1 Overview

1.1.1 This appendix to Chapter 15: Climate Change forms the Carbon Management Plan for the Oxfordshire Strategic Rail Freight Interchange (OxSRFI, hereafter referred to as the 'Proposed Development'). It sets out how the Applicant will minimise greenhouse gas (GHG) emissions throughout the lifecycle of the Proposed Development, including from embodied carbon associated with construction materials and activities, and operational emissions associated with building energy use, repair and maintenance, and transport movements.

1.1.2 When considering current guidance and standards, the core objectives of this Carbon Management Plan are as follows:

- To outline the foundations for a strategy through the design evolution of the Proposed Development to embed GHG reduction principles across all delivery stages.
- To reduce the whole life carbon footprint of the Proposed Development as low as reasonably practicable by applying the carbon reduction hierarchy, to promote innovation and carbon reductions.
- To identify GHG hotspots to inform design evolution.
- The appointed Principal Contractor(s), informed by this Carbon Management Plan, will be required to actively identify and pursue carbon reduction opportunities and mitigate carbon risks through all reasonable means as part of the Proposed Development.

1.2 Scope

1.2.1 This Carbon Management Plan illustrates the design considerations made by the Applicant to date to reduce GHG emissions, along with further opportunities which will be considered through the next stages of the Proposed Development's lifecycle.

1.2.2 The Carbon Management Plan has regard to the requirements of the National Networks National Policy Statement (Department for Transport, 2024), which states:

'Having regard to current knowledge, a carbon management plan should be produced as part of the Development Consent Order submission and include:

- *Whole Life Carbon assessment for the project*
- *an explanation of the steps that have been taken to drive down the carbon impacts of the project*
- *how construction and operational emissions and, where applicable, emissions from maintenance activities, have been reduced as much as possible using the carbon reduction hierarchy (e.g., as set out in PAS2080) (recognising that in the case of road projects while the developer can estimate the likely emissions from road traffic, it is not solely responsible for controlling them)*
- *whether and how any residual carbon emissions will be (voluntarily) offset or removed using a recognised framework (any offsetting of emissions should not be included in the Whole Life Carbon Assessment headline figures)*
- *where there are residual emissions, the level of emissions and the impact of those on any relevant statutory carbon budgets'*

1.2.3 The GHGs considered in this Carbon Management Plan are those in the 'Kyoto basket' of global warming gases expressed as their CO_2-equivalent (CO_2e) global warming potential (GWP), listed within Annex A of the Kyoto Protocol (an international treaty to limit and reduce

GHGs). This is denoted by CO_2e units in emissions factors and calculation results. GWPs used are typically the 100-year factors in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (IPCC, 2021) or as otherwise defined for national reporting under the United Nations Framework Convention on Climate Change.

1.2.4 This Carbon Management Plan considers GHG emissions from the Applicant's own direct and indirect activities (Scope 1 and 2 GHG emissions), and indirect emissions from its value chain (Scope 3) activities of suppliers and occupiers. These emissions are not separated out by defined scopes (Scopes 1, 2 or 3) in the Plan. Roles and responsibilities are set out in Section 1.5, which sets out the Applicant's ability to directly reduce emissions or engage with its value chain to indirectly reduce emissions.

1.2.5 GHG emission reduction measures have been considered in the context of a Life Cycle Assessment (LCA) approach, broken down into the following LCA phases in line with RICS (2024) guidance:

- Materials and construction (A1-A5).
- Operations and maintenance (B1-B8).

1.2.6 Decommissioning emissions (LCA stages C1-C4) have been excluded from the scope of this Carbon Management Plan. Given the Proposed Development is intended to be operational indefinitely, subject to viability and market conditions, the decommissioning stage is not considered (as set out in Chapter 1: Introduction of the ES). Furthermore, there would likely be negligible end-of-life emissions associated with plant use on site, disassembly activities and material transport, given the anticipated decarbonisation of the construction industry in line with UK net zero goals. Materials used to construct the Proposed Development will be recycled at the end of their lifetime wherever possible, through the specification of recyclable and recycled materials for the buildings and infrastructure. This not only prevents materials from being sent to landfill, but also reduces the need for extraction of primary materials. Material which cannot be recycled might be incinerated or used to produce energy from waste. Decommissioning management items are therefore not addressed further.

1.3 Guidance and Standards

1.3.1 The following standards and guidance have been used to inform the preparation of this Carbon Management Plan:

- PAS 2080 – Carbon Management in Buildings and Infrastructure (BSI, 2023).
- Institute of Sustainability and Environment Professionals (ISEP) (formally Institute of Environmental Management and Assessment, IEMA) Guide: Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2022).

PAS 2080

1.3.2 There are multiple technical requirements in the PAS 2080:2023 technical standard when considering GHG reduction in logistics and infrastructure projects. Key considerations include:

- Following the PAS 2080 carbon reduction hierarchy (set out in Figure 1.1, below), which includes the following:
  - **Avoid**: *align the outcomes of the project and/or programme of work with the net zero transition at the system level and evaluate the basic need at the asset and/or network level. This may include exploring alternative means for satisfying the need*

for whole life performance while not constructing a new asset / network or reusing / retrofitting / repurposing existing ones (e.g. do not build).

- **Switch**: *assess alternative solutions and then adopt one that reduces whole life emissions through alternative scope, design approach, materials, technologies for operational carbon reduction, among others, while satisfying the whole life performance requirements. This may also include employing innovative models that optimize the balance between capital, resource use, operational and user efficiency of an asset / network* (e.g. implement fabric efficiency improvements to enable reduced operational emissions).
- **Improve**: *identify and adopt solutions and techniques that improve the use of resources and design life of an asset/network, including applying circular economy principles to assess materials / products in terms of their potential for reuse or recycling after end of life. This includes efficiency measures for the use stage of an asset / network, and is not limited to material resources and other design and construction efficiencies. In identifying appropriate low-carbon solutions, priority should be given to solutions that promote network and system decarbonization as far as possible* (e.g. use lower carbon, recyclable alternatives, such as low carbon concrete and recycled steel).

- Implementing a carbon management process to help an organisation meet the requirements of PAS 2080 when delivering assets and/or programmes of work.
- Quantifying, assessing and reporting a scheme's carbon emissions to inform scheme development and overall asset management.
- Engaging with other value chain members, as early as possible, in a collaborative way to identify whole life low carbon solutions, including the selection of relevant low carbon materials and products, design solutions and construction methods.
- Defining the specific carbon management actions to be undertaken, and the key strategies and approaches to implement the culture and behaviour changes necessary for delivering carbon reduction, specifically:
  - collaborative working across the value chain;
  - implementing the carbon reduction hierarchy when identifying potential opportunities to reduce carbon; and
  - raising major carbon challenges to design development and construction planning, where key carbon risks are identified.

1.3.3 This Carbon Management Plan follows a data collection and analysis methodology which adheres to the requirements of the PAS 2080 standard. The Plan assesses carbon use for the whole lifecycle of the Proposed Development and promotes embodied carbon management and seeks to achieve carbon reductions.

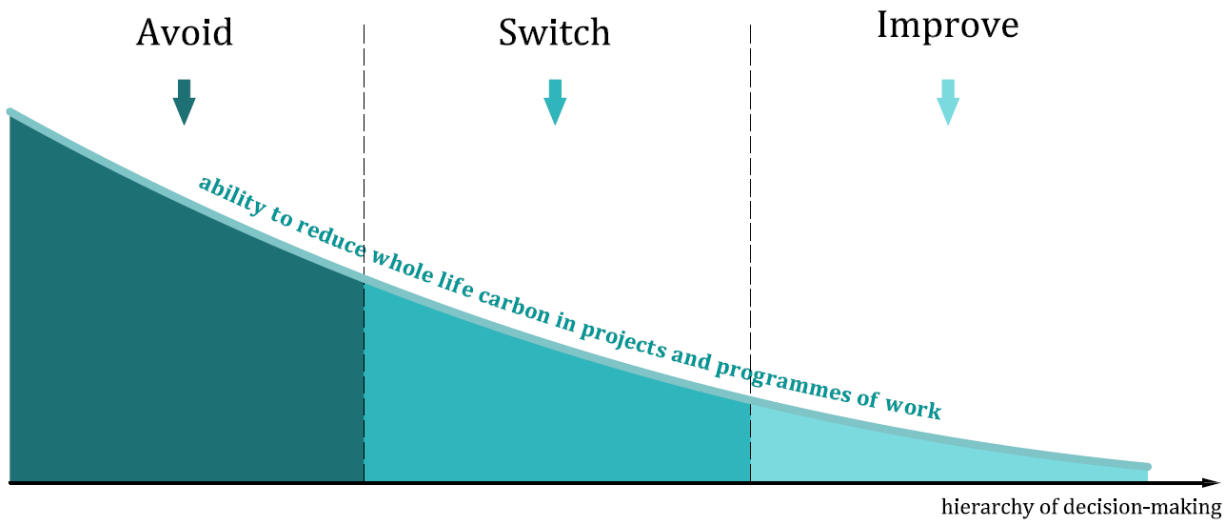


Figure 1.1: The PAS 2080 Carbon Reduction Hierarchy. Reproduced from Figure 5 of BSI (2023)

ISEP Guidance on Greenhouse Gas Emissions and Evaluating their Significance

1.3.4 The ability to reduce whole life GHG emissions in projects reduces as the design and implementation of a project progresses. This makes it important that emissions reduction measures are considered from the outset or at the earliest practical point of design.

1.3.5 The need to ensure that GHG mitigation measures are implemented does not end at the pre-application, Environmental Impact Assessment (EIA) stage, but extends after consent has been granted for a project, and remains throughout the project lifetime.

1.3.6 The ISEP GHG Management Hierarchy provides a priority for reducing GHG emissions: eliminate, reduce, substitute and compensate. The ISEP GHG in EIA Guidance (IEMA, 2022) provides a variation of these steps for practitioners in EIA to follow to identify opportunities that direct GHG mitigation action for a project:

- *'Do not build: evaluate the basic need for the proposed project and explore alternative approaches to achieve the desired outcome/s;*
- *Build less: realise potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required;*
- *Design clever: apply low carbon solutions (including technologies, materials and products) to minimise resource consumption and embodied carbon during the construction, operation, user's use of the project, and at end-of-life;*
- *Construct efficiently: use techniques (e.g., during construction and operation) that reduce resource consumption and associated GHG emissions over the life cycle of the project; and*
- *Offset and remove emissions: as a complementary strategy to the above, adopt off-site or on-site means to offset and/or sequester GHG emissions to compensate for GHG emissions arising from the project.'*

1.4 Mountpark's Commitments and Policies

1.4.1 If approved the Proposed Development will be delivered by Mountpark Properties Limited ("Mountpark") – a leading developer with a proven track record in delivering high quality logistics developments across the UK / Ireland and Europe. As such, Mountpark's commitments and policies outlined within this Section and appended to this Plan would apply to the delivery of the Proposed Development, and are therefore embedded within the Applicant's sustainability requirements and objectives.

1.4.2 Responsible Development is Mountpark's guiding principle; their Responsible Development Guidelines (Mountpark, 2025, see Appendix A) details how Responsible Development influences and directs their business activities, and forms part of a broader framework of policies, procedures and governance.

1.4.3 Of particular relevance to Mountpark's actions regarding carbon reductions, are the following commitments and associated actions:

- Commitment: to review site selection and the development impact on the environment.
    - Actions: when considering sites a number of factors are assessed, including opportunities for on-site use of renewable energy.
- Commitment: to be thoughtful about our building design and specifications.
    - Actions: building design and specification is a priority for every project. Mountpark's specification is reviewed regularly in order to embed continuous improvements. This includes, but is not limited to, the roof design being 100% photovoltaic (PV) ready (of usable space), roof vents for natural ventilation, energy and water management initiatives. Electric vehicle charging spaces are also provided.
- Commitment: to follow responsible procurement practices.
    - Actions: Mountpark are aware of the construction site impacts on carbon emissions, water and energy usage and aim to monitor, review and continuously reduce all these impacts. Mountpark endeavour to optimise, where possible, the use of local suppliers and labour resources on projects, thus reducing travel for material deliveries and works to site. The construction delivery teams recognise and encourage the specification and procurement of responsibly sourced products and review and maintain through constant engagement with the supply chain to reduce the impact on the environment.
- Commitment: to improve the energy, waste and water efficiency practices.
    - Actions: Mountpark promote water efficiency through real-time monitoring of water consumption patterns, enabling the identification of inefficiencies and prompt addressing of leaks. Mountpark are aiming to improve the air tightness of buildings as well as reducing waste to landfill.
- Commitment: to review the building materials used within our developments.
    - Actions: Mountpark challenge their supply chain to reduce carbon throughout the construction process. To reinforce this, Mountpark have implemented a Sustainable Procurement Plan, which will be provided as part of our tender process so that they work with like-minded businesses also focused on improving the overall impact of the development.
- Commitment: to strive for reduced embodied carbon in construction across our developments.

  - Actions: Mountpark is committed to delivering quality, efficient, and attractive working environments with an overall aim of reducing embodied carbon in construction.

- Commitment: to assist customers in reducing their operational carbon.
  - Actions: Many of Mountpark's developments are designed to assist reducing energy demand and consumption and use on-site renewable energy. By providing clean energy and water usage, the occupier is able to monitor and manage the manner in which carbon can be reduced during the operational stage.
- Commitment: to achieve a sustainability certification (where available) for every eligible new development.
  - Actions: seek and deploy innovative designs to BREEAM Standards, with a focus on achieving 'Excellent' and targeting 'Outstanding'. Mountpark also endeavour to achieve 'A' and targeting 'A+' Energy Performance Certificates and to be 'Well-Ready', where possible. Further, Mountpark continue to monitor published sustainability frameworks/guidelines closely to help inform their approach.

1.4.4 In addition to these overarching commitments, Mountpark has set the following sustainability requirements for its development projects:

- Aim to deliver development projects with an embodied carbon intensity of less than 350 $kgCO_2e/m^2$.
- Deliver all office spaces without gas as a space heating fuel. Variable Refrigerant Flow (VRF) heat recovery systems and electric heating systems will be used. Domestic hot water will be provided by air source heat pumps with electric immersion heater support.
- 20% of car parking spaces shall be provided with Electric Vehicle Charging (EVC) points (this will be exceeded for the Proposed Development with 25% targeted, see Table 2.4).
- All new buildings will be capable of taking 100% PV coverage on the available roof space, with appropriate generation and export metering.

1.4.5 Supporting policies include the Mountpark's Sustainable Procurement Plan UK & Ireland (Appendix B), which will be implemented for the Proposed Development. Key actions detailed include the following:

- Prioritisation of local procurement of materials from suppliers within 30 km of the site where feasible.
- Use of Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) certified timber or similar accreditation. All other material procurement will favour suppliers with ISO 14001 accreditation as a minimum.
- Environmental Product Declarations (EPDs) will be sought, with a target of 15 no. to be issued per scheme (or unit).
- Integrated Life Cycle Cost and Carbon assessments will be undertaken at the technical design stage. The appointed contractor will look to inform optioneering, alternative design options to provide comparison in terms of both cost and embodied carbon, based on alternative material choices and / or construction methods.
- Materials achieving an A or A+ rating according to the BRE Green Guide to Specification will be the preference for material procurement.
- Material robustness is a key consideration, with material selection to include robust construction/vehicle impact protection methods where possible, the use of robust dry lining where applicable, and the specification of robust internal fit out materials (such as easily washable floor finishes and tiles).

- Materials with a high volume of recycled content will be chosen where feasible (i.e. concrete products with a high volume of recycled aggregates, use of recycled stone for the sub-base of external works, use of grasscrete within parking areas to reduce asphalt use). The Applicant includes within their specification that high grade aggregates within concrete foundations and slabs shall target to have a minimum 25% recycled / secondary content.
- Waste minimisation actions will be implemented in line with a Site Waste Management Plan (SWMP), with all efforts to be made for the delivery of materials with no / minimal / re-usable packaging.

1.5 Roles and Responsibilities

Construction

1.5.1 The Applicant will be responsible for appointing the Principal Contractor, briefing the Principal Contractor on the Applicant's sustainability requirements, and providing the Principal Contractor with documentation needed to understand and adhere to the detailed requirements of the Applicant's sustainability objectives. Documentation detailing the Applicant's requirements and expectations includes, but is not limited to:

- This Carbon Management Plan
- Mountpark's Responsible Development Guidelines (Appendix A)
- Mountpark's Sustainable Procurement Plan (Appendix B)
- Mountpark's Example Developer's Specification[1] (Appendix C)

1.5.2 In order to encourage carbon reductions within the supply chain, the Applicant will issue the Sustainable Procurement Plan, which includes a checklist to monitor action against plan requirements, when tendering for Principal Contractors.

1.5.3 The Principal Contractor will be responsible for the delivery of the construction of the Proposed Development in accordance with the aims of this Carbon Management Plan and the Applicant's sustainability requirements. The Principal Contractor will also:

- Ensure all sub-contractors are briefed on the aims of the Carbon Management Plan and sustainability requirements as relevant, and will coordinate the works of each sub-contractor.
- Communicate carbon reduction targets with sub-contractors and material suppliers.
- Engage with sub-contractors and material suppliers to evaluate feasibility of emission reduction measures.
- Include, where appropriate, low carbon procurement criteria to support the selection of material suppliers and sub-contractors who can deliver low carbon solutions.

1.5.4 Contractors will be expected to apply value engineering and incorporate all mitigation measures listed in Section 2.1 below where feasible, to meet the Applicant's sustainability requirements, including achieving building emission intensity limits set out in paragraph 1.4.4.

[1] An example Developer's Specification for a project recently completed by Mountpark has been appended, which the Proposed Development will align with where relevant (i.e. accounting for national differences in certification schemes, e.g. Building Energy Rating Certificates (Republic of Ireland) and Energy Performance Certificate (UK)).

Operation and Maintenance

1.5.5 The Applicant will explore the inclusion of green clauses within tenant leases, where possible. Occupants will then be responsible for complying with such green lease clauses as set out within their lease agreements. Such clauses may include (subject to feasibility and tenant agreement) commitments by the tenant to ensure efficient use of energy within the buildings, and prioritising the use of renewable energy; and commitments by the Applicant to enable utility consumption monitoring, and provide a tenant forum to review and agree targets and strategies to improve environmental performance.

1.5.6 The Applicant will also be responsible for the implementation of the Framework Travel Plan and providing occupants with sufficient information to make best use of the sustainable transport measures implemented as part of the Proposed Development.

1.6 Methodology

1.6.1 An initial Whole Life Carbon Assessment (WLCA) was undertaken for the Proposed Development, which covered all material emissions sources from construction (A1-A5) and operation and maintenance (B1-B8). Detailed methodology and results, alongside key assumptions and limitations with regards to the calculation of emissions, are set out in Chapter 15: Climate Change and the accompanying appendices. Construction, and operation and maintenance GHG reduction opportunities are set out in Section 2.1 and 2.2 below respectively.

1.6.2 The WLCA includes core design measures committed to as part of the Proposed Development, in line with the approach to assessment of effects in Chapter 15: Climate Change.

1.6.3 The results of the WLCA identified carbon hotspots for the Proposed Development (see Table 2.2 and Table 2.5), which informed a “longlist” of potential further construction and operation emission reduction measures presented to the Applicant’s project and design team at a series of design workshops. This longlist was subsequently developed into a shortlist of feasible design and process measures to be carried out by contractors, where feasible. The shortlist is further detailed below in Sections 2.1 and 2.2 for inclusion/consideration by contractors and other responsible parties where feasible, and is considered “further mitigation” for the purposes of assessment of effects in Chapter 15: Climate Change.

1.6.4 As outlined within Section 1.3, GHG reduction opportunities identified below follow the PAS 2080 Carbon Reduction Hierarchy (i.e. avoid, switch and improve), as shown in Figure 1.1. Finally, having considered and implemented the above steps, offsetting should be considered as a final point of emissions reduction. It should be noted that the Applicant is not targeting the offsetting of emissions at present, given their focus remains on reducing, as far as feasible, emissions associated with the construction and operation of the Proposed Development.

2 Emissions Reduction Measures

2.1 Construction Reduction Measures

2.1.1 The majority of construction-related emissions are projected to arise from the 'embodied carbon' within materials used to construct the buildings, strategic rail freight interchange (SRFI), highways and associated infrastructure. Other construction-related emissions arise from site activities, including transport of materials to site and plant use on site.

2.1.2 Table 2.2 below sets out the construction emissions from the initial WLCA (accounting for the embedded design measures in Table 2.1).

Table 2.1: Embedded Design Measures - Construction

Emissions Source	Design Measure	Secured within the ES
Earthworks and Infrastructure	The Proposed Development design will minimise the need for slope stabilisation by designing shallow (1 in 3 or shallower) slopes where practicable. Where required, retaining walls will be constructed, using rock sourced from the site where feasible and practicable.	Design approach document (DAD) / project description
	A cut/fill balance will be achieved to minimise the volume of material moved on or off-site.	DAD / project description
Construction Activity	Off-site construction solutions or products will be explored where feasible, which will reduce on-site construction waste and reduce vehicle movements as part of the construction process.	Construction Environment Management Plan (CEMP)
	Construction materials should be sourced locally where practicable, to minimise the impact of transportation.	CEMP
	Vehicles used in road deliveries of materials, equipment and waste arisings on- and off-site would be loaded to full capacity to minimise the number of journeys associated with the transport of these items.	CEMP
	All machinery and plant would be procured to adhere with emissions standards prevailing at the time and should be maintained in good repair to remain fuel efficient.	CEMP
	Fuel procurement for onsite vehicles and plant will be reviewed, with biodiesel/hydrotreated vegetable oil (HVO) / electricity / hydrogen used preferentially where feasible. Where HVO is procured, sustainable procurement practices will apply to ensure fuel obtained is not derived from virgin oil food crops, and is instead from waste feedstocks. Appropriate certification will be provided by contractors to confirm the use of sustainably sourced HVO (i.e. sourcing from Renewable Fuel Assurance Scheme (RFAS) approved suppliers, and obtaining Renewable Fuel Declarations (RFD)).	CEMP
	When not in use, vehicles and plant machinery involved in site operations would be switched off to further reduce fuel consumption.	CEMP
	Where possible, local waste management facilities would be used to dispose of all waste arisings, to reduce distance travelled and associated emissions.	CEMP

Emissions Source	Design Measure	Secured within the ES
	The volume of waste generated would be minimised, and resource efficiency maximised, by applying the principles of the waste hierarchy throughout the construction period. Waste storage should be employed, with on- and off-site segregation to maximise recycling potential for materials.	Site Waste Management Plan (SWMP)
	Equipment and machinery requiring electricity would only be switched on when required for use. Procedures should be implemented to ensure that staff adhere to good energy management practices, e.g. through turning off lights, computers and heating/air conditioning units when leaving buildings.	CEMP
	Plant efficiency measures such as the use of telematics and/or real-time operator feedback, alongside automatic control for idling, acceleration, and braking; hybrid excavators with energy recovery on the swing system; and GPS precision control for areas/levels/slopes during earth movement to reduce idling time while marking out areas, and to avoid reworking areas, should be considered.	CEMP
	The number of materials used to construct the Proposed Development will be reduced to enable a reduction in different waste types (to be detailed within a SWMP that will be prepared as part of the construction stage).	SWMP
	Materials will be specified which are durable and able to withstand storage, handling and installation, thereby reducing associated waste (to be detailed within the SWMP).	SWMP
	The design of the Proposed Development will allow for standard manufactured material dimensions, to reduce variables and off-cuts (to be detailed within the SWMP).	SWMP
	Accurate estimates of materials required will be produced prior to construction, in order to reduce the percentage of material ordered and reduce associated waste (to be detailed within the SWMP).	SWMP

Table 2.2: Initial WLCA Results - Construction

Project Element	Emissions (tCO_2e)	Percentage of construction stage emissions (%)
Main Site		
Rail terminal	23,178	4%
Warehousing	469,150	78%
Construction transport and site activities	54,669	9%
Highways Works		
Highways works	18,904	3%
Construction transport and site activities	26,338	4%
Land use change	8,771	1%
Total	**601,011**	

2.1.3 Further emissions reduction measures have been identified in line with the process set out in Section 1.6 above to reduce the Proposed Development's emissions (set out in Table 2.2). These further measures are listed in Table 2.3.

2.1.4 It is anticipated that not all of the further reduction measures will be implemented across the Proposed Development, due to impact on cost, delivery programme and local availability of materials. As such, in line with Section 1.5, the Principal Contractor will be responsible for targeting the Applicant's sustainability requirements (including the building emission intensity limits of 350 $kgCO_2e/m^2$) by engaging with the value chain and applying value engineering, incorporating further reduction measures where feasible. Specific responsibilities for contractors, in line with PAS 2080, are to:

- Communicate carbon reduction targets with sub-contractors and material suppliers.
- Engage with sub-contractors and material suppliers to evaluate the feasibility of the emission reduction measures below.
- Include, where appropriate, low carbon procurement criteria to support the selection of material suppliers and sub-contractors who can deliver low carbon solutions.

2.1.5 It should be noted that emission reduction measures for the Highway Works are constrained by National Highways requirements for road design. As such, whilst the range of measures in Table 2.3 will be explored where relevant to highways infrastructure, any specific measures must align with the National Highways design requirements in the "Manual of Contract Documents for Highway Works" (National Highways, 2024) at the time of construction. Any updates made by National Highways to their design requirements will be kept under review; the Applicant aims to use lower carbon materials where they become available for use on the strategic road network.

Table 2.3: Further Reduction Measures - Construction

Emissions Source	Reduction Measure
Building Embodied Carbon	Use of recycled steel in building structure, including structural steel and steel rebar, where feasible.
	Use of low carbon steel (i.e. produced from an electric arc furnace) in building structure where feasible.
	Use of low carbon concrete in building structure where feasible. For example, low to medium strength grade concrete could include recycled cement binders, or ground granulated blast furnace slag (GGBS) as a cement replacement. The Applicant includes within their specification that high grade aggregates within concrete foundations and slabs shall target to have a minimum 25% recycled / secondary content where feasible.
	Materials specified will be suitable for the lifespan of the building where appropriate, with material robustness a key consideration, reducing replacement of materials where feasible.
Infrastructure and Road Materials Embodied Carbon	Warm mix asphalt will be used as preference across the Proposed Development where feasible.
	Low carbon concrete and recycled steel will be used where feasible.
	Reduce material consumption (i.e. where feasible, kerbs and pavements will be reduced and provided on one side of internal roads, in particular in areas where there is no frontage and within staff parking areas).
	Where feasible swales will be provided alongside roads, in place of underground drainage structures.

Emissions Source	Reduction Measure
	Permeable paving / eco grids / grasscrete will be considered for use in parking areas and footways. These would be used in place of concrete or asphalt surfaced areas.
	Recycled plastic pipework for drainage infrastructure will be used in place of pre-cast concrete options where feasible.
	Use of recycled materials within asphalt for parking areas where feasible.
	Recycled plastic content would be considered as a bitumen replacement for internal roads and pavements.
	Recycled aggregates, if locally sourced, would be considered for use across the Proposed Development.
Construction Activity	Use of renewable energy (including on-site renewables) within the construction site compound.

2.2 Operation and Maintenance Reduction Measures

2.2.1 The majority of operation and maintenance emissions are projected to arise from the energy use of buildings, and vehicular transport to and from the Proposed Development. Additional emissions arise from the use of energy and materials during periodic maintenance and repair of the Proposed Development.

2.2.2 Table 2.5 below sets out the operational emissions from the initial WLCA (accounting for the embedded design measures in Table 2.4[2]).

2.2.3 It should be noted that the purpose of the Proposed Development is to enable the increased transport of freight by rail, thereby enabling the avoidance of long haul HGV movements which result in greater associated emissions. This is not discussed further within this Carbon Management Plan, given the focus is on reducing GHG emissions from the Proposed Development and its associated activities. Further detail regarding the emissions avoided by the increased provision of rail freight is detailed at Chapter 15: Climate Change and supporting Appendix 15.2: Greenhouse Gas Technical Appendix.

Table 2.4: Embedded Design Measures - Operation and Maintenance

Category	Design Measure	Secured within the ES
Be lean – reduce energy demand through fabric efficiency	Building fabric elements and glazing specifications improved beyond the Building Regulation requirements. Specific thermal U-values for roof and external wall insulation, glazing and doors are set out in Appendix 15.4: Energy Strategy.	Appendix 15.4: Energy Strategy
	Energy efficient LED lighting specified throughout the development, where practicable these will be controlled via Passive Infrared (PIR) sensors. Lighting specifications are set out in the Developer's Specification and Appendix 15.4: Energy Strategy.	Developer's Specification and Appendix 15.4: Energy Strategy

[2] The energy hierarchy – "be lean", "be clean" and "be green" has been considered during design of the Proposed Development buildings, in order to minimise building energy demand and maximise use of decarbonised energy sources. Targeted building fabric and building service efficiencies are provided in the Developer's Specification. Further details on the application of the energy hierarchy can be found in **Appendix 15.4 Energy Strategy**.

Category	Design Measure	Secured within the ES
	Reduced air permeability compared to maximum required standards. Specific air-tightness values are set out in the Developer's Specification and Appendix 15.4: Energy Strategy.	Developer's Specification and Appendix 15.4: Energy Strategy
	Specification of efficient heating, ventilation and cooling (HVAC) services and control systems which includes the installation of localised Air Source Heat Pumps for each Main Site office space (warehouse spaces will be untreated). Mechanical equipment specifications are set out in the Developer's Specification and Appendix 15.4: Energy Strategy.	Developer's Specification and Appendix 15.4: Energy Strategy
	Buildings will target Energy Performance Certificate (EPC) 'A+' rating.	Developer's Specification
Be green – use of low or zero carbon technologies	Installation of approximately 5,774 kWp of solar PV on available roof space of warehouse units.	DAD / project description
	In addition to the PV installed from the outset, the structural design of the warehouse units allows for 100% of usable roof areas to be covered by solar PV to enable the buildings to be 'future-proofed' should there be additional demand for renewable energy on-site and where there is capacity within the grid to accommodate such additional generated renewable electricity.	DAD / project description
	25% car parking spaces will be provided with EVC points, remaining car parking spaces will be fitted with passive EV charging infrastructure in line with local Oxfordshire County Council policy requirements. The inclusion of this infrastructure ensures the Proposed Development is future-proofed against the potential future emerging demand.	DAD / project description
	The Proposed Development will include enabling infrastructure to ensure HGV charge points could be installed in line with demand and developing technologies. The inclusion of this infrastructure ensures the Proposed Development is future-proofed against the potential future emerging demand.	Carbon Management Plan
	No gas will be used for space heating within office spaces. Air source heat pumps, or most appropriate alternative heat source, have been specified to deliver space heating and hot water (the warehouse areas will be untreated).	Developer's Specification and Appendix 15.4: Energy Strategy
Landscaping	As part of the landscaping design, areas of new woodland planting within the Proposed Development are proposed. The landscape planting would sequester carbon over the Proposed Development's lifetime as the woodland matures.	DAD / project description
Refrigerant	Leak detection on R32 gases will be installed on the Variable Refrigerant Flow (VRF) system.	Developer's Specification
	The Applicant will review lower carbon refrigerants for use in the Proposed Development where they are commercially available, proven and viable.	Carbon Management Plan

Table 2.5: Initial WLCA Results - Operation

Project Element	Emissions per year (tCO_2e)	Percentage of total emissions (%)
Main Site		
Maintenance, refurbishment and repair	1,965	1%
Energy consumption	4,594	2%
Transport movements	182,807	85%
Rail freight movements	26,833	12%
Carbon sequestration through landscape planting	-198	< -1%
Highways works		
Maintenance, refurbishment and repair	196	<1%
Transport movements	negligible	
Land use change	131	<1%
Total	**216,329***	

*Total excludes avoided emissions associated with the modal shift from road to rail.

2.2.4 Further emissions reduction measures have been identified in line with the process set out in Section 1.6 above to reduce the Proposed Development's emissions (set out in Table 2.5). These further measures are listed in Table 2.6.

Table 2.6: Further Reduction Measures – Operation and Maintenance

Emissions Source	Reduction Measure
Operational Energy Use	The Applicant will explore the inclusion of green clauses within tenant leases, where possible. Occupants will then be responsible for complying with such green lease clauses as set out within their lease agreements. Such clauses may include (subject to feasibility and tenant agreement) commitments by the tenant to ensure efficient use of energy within the buildings, and prioritising the use of renewable energy; and commitments by the Applicant to enable utility consumption monitoring, and provide a tenant forum to review and agree targets and strategies to improve environmental performance.
Operational Transport	A Framework Travel Plan along with a Public Transport Strategy is submitted as part of the DCO Application (ES Appendix 3.2). The Framework Travel Plan identifies the range of measures to be implemented or considered through future occupier Travel Plans to enhance the accessibility of the Main Site by public transport, cycling and walking. Site-wide measures proposed (to be secured via legal obligation) include a significant investment in new or improved bus services to connect the site to nearby communities and destinations. Further details can be found in Chapter 3: Transport.

2.3 Carbon Removals and Offsetting

2.3.1 The design of the Proposed Development includes landscape planting, including areas of woodland, grassland, native species buffer planting, native scrub, hedgerow planting, and pond habits. Of these, only woodland planting is considered to materially result in carbon

storage, and as such is the only item considered here. When managed sustainably, woodland acts as a "carbon sink", sequestering or removing CO_2 from the atmosphere over time. As such, the landscape planting will reduce total lifetime emissions associated with the Proposed Development.

2.3.2 The Applicant and its contractors will follow the below principles to ensure that the planted woodland will maximise its potential to sequester carbon over the lifetime of the Proposed Development and maximise the climate resilience of the planting:

- Designing and managing the woodland creation in line with a recognised scheme or standard (e.g. the Woodland Carbon Code and the UK Forestry Standard);
- Considering local biodiversity priority species and habitats that are at risk from climate change, and providing such habitat within the landscape planting where feasible;
- Including within the planting mix species that are resilient to changing climatic conditions. For example, broad leaf plants and plants that are more adaptable to arid areas to account for possible periods of drought;
- Consider incorporating planting within and between buildings as a way of providing natural solar shading; and
- A commitment to the monitoring and maintenance of landscaping and habitat creation to assist in its establishment and continues to function in changing conditions.

2.3.3 The Applicant is not targeting the offsetting of emissions at present, given their focus remains on reducing, as far as feasible, emissions associated with the construction and operation of the Proposed Development.

2.4 Monitoring and Next Steps

2.4.1 The climate change assessment presented within Chapter 15: Climate Change has detailed the initial quantification of GHG emissions associated with the early design considerations of the Proposed Development.

2.4.2 To ensure the Applicant's sustainability requirements as set out in Section 2 are followed throughout the detailed design, construction and operation of the Proposed Development, the following monitoring actions will be undertaken by the Principal Contractor, agreed within tender documents:

- Further Life Cycle Assessments (LCAs) will be undertaken during the iterative detailed design process and at practical completion by the Principal Contractor who will keep records of any Environmental Product Declarations (EPDs).
- The Principal Contractor will keep records of the low-carbon design options chosen throughout the detailed design and construction phases of the Proposed Development (detailed in Table 2.3).
- The Principal Contractor will monitor and review energy and fuel consumption throughout the construction period with a view to reduce such consumption where feasible.
- The Principal Contractor will hold monthly progress meetings with the Applicant throughout the construction of the Proposed Development.
- The Principal Contractor will provide a monthly progress report, which will disclose performance against agreed targets.

- The Principal Contractor shall commission and pay for the nominated energy assessor (to be approved by the Applicant) to complete a post occupancy energy review. This will:
  - Report energy consumption for the first 12 months of normal occupancy for all relevant end uses.
  - Report energy consumption for the first 12 months, broken down into monthly intervals, for all relevant end uses.
  - Compare reported energy consumption figures with the design stage targets.
  - Identify cause of discrepancies and the remediation actions required.
- The landlord and future occupants will keep records of yearly building energy consumption.
- The Applicant will monitor the implementation of the Travel Plan, as detailed in Table 2.6.

2.4.3 This document will be periodically reviewed, and will be updated should the Applicant's sustainability policies change.

References

British Standards Institute (2023). PAS 2080: Carbon management in buildings and infrastructure.

Department for Transport (2024). National Networks National Policy Statement. Available: [redacted]

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IPCC (2021). AR6 Climate Change 2021: The Physical Science Basis. Available: [redacted]/. Accessed June 2025

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Appendix A Mountpark's Responsible Development Guidelines

Mountpark

Responsible Development Guidelines

September 2025



mountpark

Introduction

Responsible development is Mountpark's guiding principle and underpins the ethos of our business. This document sets out our guidelines and details how responsible development influences and directs our business activities. This document is a statement of our general intent only, and forms part of a broader framework of policies, procedures, and governance which we have in place.

Mountpark's Responsible Development Guidelines align with our strategic objectives to optimise value and provide customers and partners with the utmost quality of service. The commitments and actions behind these guidelines and how the business may incorporate its sustainability initiatives at all levels of the company and its investment operations are summarised below.

Mountpark's Responsible Development Guidelines

These guidelines complement and support Mountpark's mission statement which is 'to deliver strategic and efficient space by staying close to what matters to our customers, our people, and the communities we serve.' Our ambition has always been to be a responsible owner - socially, economically and environmentally, which explains our desire to construct in a responsible manner that is sustainable and complements our corporate objectives. The desire to learn and continually improve also plays a prominent role in our business ethos. It is also why we have created an internal sustainability team focused on understanding, recommending and implementing sustainability initiatives which align with our Responsible Development Guidelines.

We are committed to achieving sustainability-related certifications in all eligible developments by being thoughtful about, among other things: (i) building design and specifications, (ii) implementing better energy, waste, and water efficiency practices, and (iii) striving for biodiversity enhancement. We look to a circular economy and where possible, follow responsible procurement practices and make positive social contributions. We believe embedding these practices into our business can be achieved in parallel with continuing our business case of creating innovative, market-leading, and valued developments. Our focus on responsible development also influences how we behave as a responsible owner, contributing to the path for a more sustainable future. Mountpark takes pride in building relationships with customers, employees, local authorities, service provider partners, and investors.

Health and wellbeing is also at the heart of all of our developments, and is a conscious principle when designing buildings, amenity space and the surrounding environment. That is why we are creating running tracks or exercise areas that foster new habits; or creating roof terraces or areas where staff can relax on their breaks. Sustainability is a conscious principle at Mountpark which is evidenced by our investment in land to develop biodiverse woodlands which encourage new habitats and enhance biodiversity,

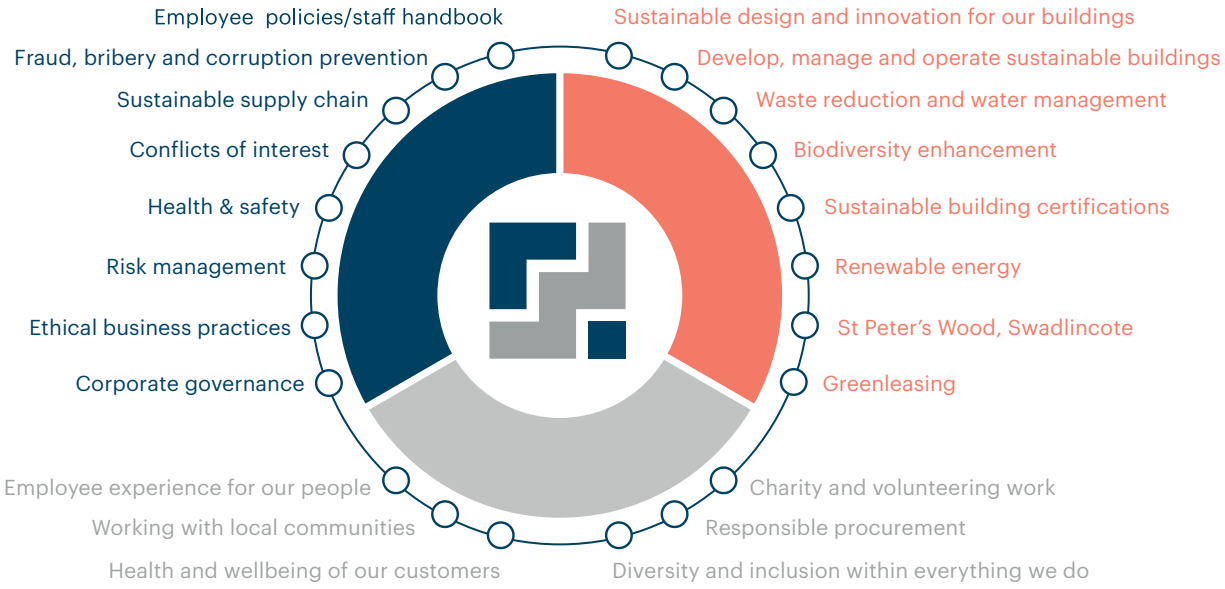
Mountpark looks to be a good neighbour within the local communities where it develops by having open and honest engagement with stakeholders, and providing amenity/recreational space, where possible. We also support local charities in meaningful ways. We have hosted wellness and career days at a number of our construction sites, helping our workers handle stress and discover employment opportunities offered in construction.

At Mountpark, we strive to support an open-minded, professional, and inclusive work place that provides a work-life balance and an environment that is conducive to physical and mental health well-being.

Mountpark focuses on responsible development while avoiding absolute statements and targets that could limit our investment parameters or potentially mislead any stakeholders. We will continue to identify and refine our overall strategy as initiatives evolve.

Mountpark's Responsible Development Guidelines

Based on these guidelines, the key focus for us are in the areas highlighted in the chart below. While these factors inform our investment decision making, they are considered in totality and will not dictate or limit our investment strategies.



Oversight and Implementation

Managing Directors have direct oversight of Mountpark's Responsible Development Guidelines and are supported and implemented by Senior Management. Our sustainability team ensures that responsible development is then ingrained throughout the business on a day to day basis as well as meeting regularly to discuss new ideas and ensure implementation. As stated above, these guidelines are not absolute and will continue to evolve as we continue to identify and refine our strategy moving forward. This document will therefore be reviewed and updated as appropriate.

The Development Process: Our Commitments and Actions

Our Commitment:

To continue to review site selection and the development impact on the environment.

Our Actions:

When considering sites, we assess a number of different factors in order to ascertain suitability. These include, but are not limited to, on-site and adjacent land uses, existing landscape features, biodiversity, transport infrastructure and accessibility, air quality, noise pollution and the opportunities for on-site use of renewable energy.

Our Commitment:

To focus on masterplans that prioritise and promote wellbeing and community.

Our Actions:

Our detailed masterplanning process is fundamental to the success of our business. We seek to learn from the existing landscape and take inspiration from its natural features, water courses and existing greenery as positive contributions to green and blue infrastructure. We also look to incorporate central amenity areas to include walking/cycling routes, trim trails, outdoor gym equipment, picnic areas – creating a sense of community.

Our Commitment:

To target biodiversity net gain on each of our developments.

Our Actions:

We look to do this through the use of native plants in order to support local wildlife, composting areas within our landscaping and providing a range of insect habitats on-site. Our designs look to learn from the existing landscapes and take inspiration from their natural features as well as integrating natural solutions such as sustainable drainage strategies. Our overall goal is to form healthy places for people and nature.

Our Commitment:

To engage with the local community surrounding our development schemes.

Our Actions:

Support and collaborate with the local communities where we are developing and operating through initiatives such as optimising the use of local labour where possible and exploring opportunities for internships/apprenticeships.

We will continue to be a respectful and approachable neighbour.

Our Commitment:

To be thoughtful about our building design and specifications.

Our Actions:

Building design and specification is a priority for every project. Our specification is reviewed regularly whilst we look at ways to improve our product. This includes, but is not limited to, the roof design being 100% PV ready, full height glazing to offices, ribbon glazing above marshalling areas, roof vents for natural ventilation, energy and water management initiatives, hydration points, break out space and wellbeing considerations. Where possible, we also include electric vehicle charging spaces alongside bike charging/storing facilities.

Our Commitment:

To follow responsible procurement practices.

Our Actions:

We are aware of the construction site impacts on carbon emissions, water and energy usage and aim to monitor, review, and continuously reduce all of these impacts. Mountpark endeavour to optimise, where possible, the use of local suppliers and labour resources on projects thus reducing travel for material deliveries and the workers on site. We also ensure that anti-modern slavery language is included in all contracts. The construction delivery teams recognise and encourage the specification and procurement of responsibly sourced products and review and maintain through constant engagement with the supply chain to reduce the impact on the environment.

Our Commitment:

To improve the energy, waste, and water efficiency practices.

Our Actions:

Promoting water efficiency through real-time monitoring of water consumption patterns, enabling us to identify inefficiencies and address leaks promptly. We are aiming to improve the air tightness of our buildings as well as reducing waste to landfill.

Our Commitment:

To review the building materials used within our developments.

Our Actions:

We challenge our supply chain to reduce carbon throughout the construction process. To reinforce this, we have implemented a Sustainable Procurement Plan, which will be provided as part of our tender process so that we work with like-minded businesses that are also focused on improving the overall impact of the development.

Our Commitment:

To strive for reduced embodied carbon in construction across our developments.

Our Actions:

Mountpark is committed to delivering high-quality, highly efficient, and attractive working environments. We aim to meet the increasingly high levels of environmental performance expected by key stakeholders with an overall aim of reducing embodied carbon in construction.

Our Commitment:

To assist our customers in reducing their operational carbon.

Our Actions:

Many of our developments are designed to reduce energy demand and consumption and increase on-site renewable energy. By providing clear energy and water usage, the customer is able to monitor and manage the manner in which carbon can be reduced during the operational stage.

Our Commitment:

To achieve a sustainability certification (where available) for every eligible new development.

Our Actions:

Seek and deploy innovative designs to BREEAM Standards, with a focus on achieving 'Excellent' and targeting 'Outstanding'. We also endeavour to achieve 'A' and targeting 'A+ / A1 'Energy Performance Certificates and to be 'Well-Ready', where possible. Further, we continue to monitor published sustainable frameworks/guidelines (i.e. EU Taxonomy) closely to help inform our approach.

Our Commitment:

To educate, assist, and monitor with regards to building functionality and performance.

Our Actions:

Monitor energy, waste, and efficiency practices during operation. Incorporate soft landings, which involve the occupier through the design (where applicable), through to training and education of the completed asset, providing tutorials, training videos, and informational guides. Continue the use of QR codes to provide instant product information. Conduct post-occupancy evaluation and interviews to help ensure the quality of our products meets expectations.

Our Commitment:

To prioritise the wellbeing of our customers and their employees.

Our Actions:

Wellbeing is ingrained in every step of our development process – whether it be the masterplanning process, the design and specification of our buildings or the collaboration with our customers once they have taken occupation. Many of our developments include biodiverse woodlands, running tracks/walking routes and break out areas/roof terraces which give staff a place to relax on their breaks. We also offer our customers an amenity grant to create facilities which benefit and improve the welfare of their employees.

We look to achieve 'WELL-Ready', where possible, which demonstrates our commitment to the wellbeing of customers and their employees. This is achieved by incorporating the pre-requisite requirements of the WELL Building Standard Shell and Core criteria into our building specifications for use across all developments.

Corporate: Our Commitments and Actions as a Business

Our Commitment:

To ensure we (as a business and as individuals) operate in a way that is representative of our mission statement and core values at all times.

Our mission statement is 'to deliver strategic and efficient space by staying close to what matters to our customers, our people, and the communities we serve.' Our core values are:

- **We always strive to do the right thing, with honesty and integrity**
- **We are committed and diligent, exceeding expectations wherever possible**
- **We are approachable and enjoy working collaboratively**

Our Actions:

Our employees were actively involved in determining our company mission statement and core values. The Managing Directors felt that our employees involvement in the process was important and would ensure awareness and accountability from all levels of the business moving forward.

Our Commitment:

To value our people and create a culture where our people can enjoy their work.

Our Actions:

We work with our employees to provide a challenging, dynamic, inclusive, and diverse work environment that supports their professional development, as well as promoting a good work-life balance that prioritises overall health and wellness.

Our Commitment:

To meet or exceed governance standards for similarly situated companies.

Our Actions:

Managing Directors help to ensure that Mountpark is operating to high ethical standards as set out within its Staff Handbook, which promotes a culture of diversity, equity, integrity and professionalism. We work hard to earn the trust of all of our key stakeholders by being committed to strong governance and ensuring compliance, accountability, transparency and disclosure.

Our Commitment:

To continue to strengthen relationships with customers, employees, local authorities, service provider partners, and investors.

Our Actions:

We pride ourselves on building and nurturing long term relationships with all of the above. These relationships are built upon behaviours driven by our mission statement and core values. They are also embedded within our brand pillars:

- We are innovative in design and strive to deliver sustainable environments
- We deeply consider the wellbeing of people who occupy our spaces
- We work in expert teams who are highly focused on details
- We build valuable, long-standing relationships
- Value, respect and support our people and our partners

Our Commitment:

To ensure our sustainability team continues to prioritise implementing and evolving our commitments within the company's Responsible Development Guidelines.

Our Actions:

The sustainability team has been launched to help evaluate our approach generally and apply and integrate sustainability initiatives into Mountpark where they are compatible with our particular investment strategies. The team is responsible for overseeing implementation, monitoring and reporting as well as the cohesive communication and collaboration strategies that promote our efforts both internally and externally. Senior members of the committee provide progress and recommendations to the Board for final approval and integration.

Our Commitment:

To improve energy, waste, and water efficiency practices within our offices.

Our Actions:

We continue to look at ways of improving these practices within our offices. We have made significant improvements with initiatives such as; using recyclable and recycled products and signing up to recycling collection companies. We are actively looking at ways of improving these practices even further to ensure that we are reducing waste and improving water management as much as possible.

Our Commitment:

To ensure compliance and risk management throughout the business.

Our Actions:

Our comprehensive compliance framework is designed to address the complexities of the business and regulatory landscape in which we operate. We strive for the highest legal and ethical standards and expect all employees to uphold this commitment. This includes ensuring that we have the appropriate policy in place for Cyber Use and Security as well as Health and Safety both at a corporate and asset level.

Our Commitment:

To continue to work with charities on both a local and national level.

Our Actions:

We support local charities in meaningful ways. We have hosted wellness and career days at a number of our construction sites, helping our workers relieve stresses on their mind and body, and helping potential employees find out about the opportunities offered by a career in construction. There are also a number of national charities that we have supported as a business for many years by organising annual fundraising events.

Our Commitment:

To take action in order to benefit the environment, nature and local communities.

Our Actions:

We decided that instead of buying land to develop on, we would buy land and create a 53 acre biodiverse woodland in Swadlincote, Derbyshire. Working in partnership with the National Forest Company and Forestry Commission, this scheme provides real-time data that can help us understand the role that woodlands play in enhancing our environment and biodiversity.

To date, we have planted close to 30,000 new trees and laid over 1,100 metres of all-ability access routes. This outdoor classroom encourages hands-on learning for children of every age as well as providing the local community with a high quality outdoor recreational space. We are also working with local walking and wildlife groups as well as offering local schools/colleges the opportunity to use the woodland as their very own classroom.

In Conclusion

Our ambition has always been to be a responsible owner - socially, economically and environmentally, which explains our desire to construct in a responsible manner that is sustainable and complements our corporate objectives. The desire to learn and continually do more, plays a prominent role in our business.

We believe we have already made great progress towards our commitments around environmental, social and governance factors and will continue to prioritise them within our business. These guidelines will continue to evolve and adapt to the ever-changing environmental, social and governance landscape as we look to continually improve the work we are doing.

Mountpark focuses on responsible development while avoiding absolute statements and targets which could limit our investment parameters or could potentially mislead any stakeholders. As ever, our mission and core values will dictate the way in which we work and the level of service we provide as we continue to strengthen both existing and new relationships with all of our key stakeholders in order to drive growth across the business.

Sustainability-related goals are aspirational and not guarantees or promises that any mentioned assertions will be met. Recipients should bear in mind that there are distinctions and regional variations in the meanings, interpretations, and use of terminology throughout. There is no guarantee that Mountpark will have or create a positive impact, that consideration of sustainability factors will enhance long-term value or meet any sustainability-related goals.

Certain statements in this report that are not historical facts are forward-looking statements. These forward-looking statements are based on current expectations, estimates and projections about the industry and markets in which we operate. Words such as "goal," "commits," "expects," "anticipates," "intends," "plans," "believes," "seeks," and "estimates," including variations of such words and similar expressions, are intended to identify such forward-looking statements, which generally are not historical in nature. All statements that address operating performance, progress toward goals, events or developments that we expect or anticipate will occur in the future are forward-looking statements. These statements are not guarantees of future performance and involve certain risks, uncertainties and assumptions that are difficult to predict. Although we believe the expectations reflected in any forward-looking statements are based on reasonable assumptions, we can give no assurance that our expectations will be attained, and therefore actual outcomes and results may differ materially from what is expressed or forecasted in such forward-looking statements.

Appendix B Mountpark's Sustainable Procurement Plan

Mountpark
Sustainable Procurement Plan

September 2025

mountpark

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1.0 Introduction

1.1 Sustainable Procurement Plan

Mountpark recognise and encourage the specification and procurement of responsibly sourced construction products. This is reviewed and maintained through engagement with the supply chain and working with the team to look at ways of reducing the impact on the environment.

Working with our Contractors and Project Managers Mountpark look to optimise, where possible, the use of local suppliers and labour resources to the project concerned thus reducing travel for materials deliveries and the workers on site. We also ensure that anti-modern slavery language is included in all contracts.

1.2 Project Description

Insert a summary about the scheme noting number of units, areas, and location.

Include a paragraph that notes the BREEAM target for this scheme.

Insert Location Plan with Proposed Site Plan (Masterplan)

2.0 Resourcing of Materials

2.1 Use of Local Materials

A factor in the selection of our Contractors and the Supply Chain will be based on the ability to procure materials from suppliers within 30km of the site.

Monitoring

Contractors during the Tender stage are to provide a list of their named supply chain partners and the distance of their closest office or depot to site.

2.2 Use of Responsibly Resourced Materials

Mountpark will only allow Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) certified timber or similar accredited, all other materials procurement will favour suppliers with ISO 14001 accreditation as a minimum.

Actioned (Y/N)

3.0 Declarations

3.1 Environmental Product Declarations

An Environmental Product Declaration (EPD) is a report that details the environmental performance or impact of a product or material over its lifetime.

Within the construction industry, EPDs support carbon emission reduction by making it possible to compare the impacts of different materials and products, to allow you to select the most sustainable option.

Monitoring

As a minimum 15no. EPD's are to be issued per scheme (or unit). The EPD needs to meet one of the requirements below to satisfy the BRE:

- Issued or registered by an ISO 14025 compliant programme operator.
- For products covered by construction product regulations, the EPD must have been generated using product category rules based on either BS EN 15804 or ISO 21930.

3.2 Volatile Organic Compounds (VOC's)

Volatile Organic Compounds (VOC's) are emitted as gases from certain solids or liquids. They include a variety of chemicals, some of which may have short and long-term health effects.

Monitoring

Mountpark encourages the use of low VOC's within its developments, as a standard Mountpark require Contractors to comply with a BREEAM compliant Air Quality Plan (IAQ) as per the BREEAM credit Hea02.

4.0 Audits

4.1 Pre-Demolition Audit (Where Applicable)

The results of the PDA must be included within site waste minimisation and management plans, as well as Construction Environment Management Plans (CEMP), where appropriate. Quantitative monitoring of the outcomes for the waste identified must be carried out throughout the construction process.

The pre-demolition audit must cover the below items:

1. Identification and quantification of the key materials where present on the project
2. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy
3. Opportunities for reuse and recycling within the same development
4. Identification of local recyclers for recycling of materials
5. Identification of overall recycling targets where appropriate
6. Identification of reuse targets where appropriate
7. Identification of overall landfill diversion rate for all key materials.

Monitoring

Pre-demolition audit must be carried out at concept design stage in accordance with BREEAM Wst01. Pre-Demolition Audit document to be filled out prior to award of contract.

5.0 Life Cycle Carbon & Cost Assessments

Actioned (Y/N)

Life Cycle Costing (LCC) is a prediction of a buildings cost throughout its lifetime. The aim is to show how the design, construction and operation has been improved upon from concept through to completion.

Integrated LCC and Carbon assessments quantify carbon dioxide emissions associated with the development to inform optioneering processes, and to allow assessment of the cost of potential carbon offsetting, whilst also considering the cost implications of the construction, operation and end-of-life impacts of the design and materials specification.

As the cost of operating and maintaining a building increases over time and is a significant contributor when compared to the original capital cost of construction, the LCC assessment can be integrated with a LCC analysis, to better understand how decisions made with respect to decarbonisation might impact on the cost of a building operation and maintenance. LCC analysis must be carried out, as a minimum, in line with the requirements of 'Standardised method of life cycle costing for construction procurement' PD 156865: 2008.

Alternative design options are then provided for comparison in terms of both cost and embodied carbon, based on alternative material choices and / or construction methods.

Actioned (Y/N)

5.1 Concept Stage

Mountpark will undertake integrated Life Cycle Carbon and Life Cycle Cost Assessments (LCC). The Contractor is required to familiarise themselves with the requirements and recommendations of these reports, which will be provided as part of the Tender information. Recommendations must be discussed and documented through meeting minutes, with reasons for adoption or derogation from the requirements provided as formal evidence. All derogations should be agreed with Mountpark.

A Whole Life Carbon assessment inline with RICS methodology will also be provided and should be used to inform building design decisions.

5.2 Technical Stage

The Contractor is required to revisit the planning stage Life Cycle Carbon and Life Cycle Cost assessments at the Technical Design Stage, as part of the formal BREEAM assessment under credits Man02 and Mat01. Recommendations must be discussed and documented through meeting minutes, all derogations should be agreed with Mountpark.

Life Cycle Cost Assessments, to be carried out by the Main Contractor at Technical Design Stage must be in line with PD 156865: 2008. The component level LCC must include (where present):

- Envelope
- Services
- Finishes
- External spaces

Life Cycle Carbon Assessments carried out at Technical Stage must be in accordance with the relevant BREEAM Mat01 requirements using IMPACT compliant software, in accordance with relevant standards.

The Whole Life Carbon assessment should also be updated to ensure alignment and consistency.

Actioned (Y/N)

Monitoring

Compliance with Mountpark LCC and LCA requirements will be confirmed via the formal assessment of BREEAM credits MAN02 and MAT01 in accordance with the BREEAM Pre-Assessment Tracker provided as part of the Tender Documentation.

An As built Whole Life Carbon report should also be provided to confirm targets have been met or bettered.

6.0 Materials

6.1 Low Embodied Impact

We seek to use timber and locally sourced materials with high recycled content. Materials achieving an A or A+ rating according to the BRE's Green Guide to Specification will always be our preference.

Monitoring

Monitoring for Embodied Impacts will be in accordance with the requirements described in Section 5 - Life Cycle Carbon & Cost Assessments, above.

6.2 Durable Materials

Materials robustness is a key consideration, and Mountpark seeks to promote the following on our projects:

- Material selection to include robust construction / vehicle impact protection methods where possible.
- Internally, the use of robust dry lining, such as severe duty plasterboard where applicable.
- The use of hard wearing and easily washable floor finishes.
- Toilet and shower area specifications to include ceramic tiles and IPS panels (if appropriate).

Monitoring

The Contractor is to provide during the technical design stage a detailed finishes schedule for agreement prior to installation. They are also required to achieve the BREEAM credit Mat05.

6.3 Low Impact Refrigerants

Currently, typical refrigerants used in building cooling systems are major greenhouse gases that are many times more potent than carbon dioxide in their contribution to global warming and climate change. These have been dramatically improved over the years, from R22 which had a GWP of 1810 to the latest gases such as R32 with a GWP of 675. Although released in much smaller quantities they are, nevertheless, a significant contributor to increasing global temperatures. There are more efficient refrigerants currently in research, but are not yet commercially available, such as ammonia and CO2.

Actioned (Y/N)

Monitoring

Mountpark require at least one credit to be obtained under BREEAM POL01, with the following requirements evidenced as part of the BREEAM assessment for the project:

1) All systems with electric compressors comply with the requirements of BS EN 378:2016 (parts 2 & 3). Refrigeration systems containing ammonia comply with the Institute of Refrigeration Ammonia Refrigeration Systems code of practice.

2) Systems using refrigerants have a DELC of ≤1000kgCO_2-eq/kW cooling and heating capacity, demonstrated according to the BREEAM methodology and evidencing requirements.

7.0 Recycled Materials

7.1 High Recycled Content

Concrete products with a high volume of recycled aggregate will be used where applicable. For external works where practical the use of recycled stone for the sub-base should be implemented where applicable . We encourage the use of grasscrete over asphalt within car parking areas (where appropriate) to reduce the amount of asphalt used on our developments and to promote permeable and more 'green' spaces.

Monitoring

This will be in accordance with the national Site Waste Management Plan (SWMP) legislation and Mountpark specification. In addition, all Mountpark projects are required to achieve the following BREEAM credits, evidenced as part of the formal assessment process:

- MAT06 - Material Efficiency
- WST01 - Construction Waste Management: All available credits, including exemplary performance.
- WST06 - Design for disassembly and adaptability

7.2 Aggregates (UK Only)

Mountpark includes within their specification that high grade aggregates within concrete foundations and slabs shall target to have a minimum 25% recycled / Secondary content. Granular fills and capping shall have 75% recycled / secondary content. The use of Incinerator Bottom Ash Aggregate (IBAA) is not permitted on Mountpark developments.

Monitoring

Mountpark require as a minimum the BREEAM credit Wst02 to be achieved.

7.3 Waste Minimisation and Recycling

A Site Waste Management Plan (SWMP) will be required from the Contractor, in line with the SWMP Regulations, for the overall development and will require each appointed Sub-Contractor to work within the requirements of this plan.

All waste on site will be stored for transfer to a licensed waste handler, who will be required to provide recycling rate statistics for the site. All efforts are to be made for the delivery of materials with no / minimal / re-useable packaging.

Actioned (Y/N)

Monitoring

In accordance with the Site Waste Management Plan (SWMP) legislation and Mountpark specification. In addition, all Mountpark projects are required to achieve the following BREEAM credits, evidenced as part of the formal assessment process:

- MAT06 - Material Efficiency
- WST01 - Construction Waste Management: All available credits, including exemplary performance.
- WST06 - Design for disassembly and adaptability

8.0 Review Process

8.1 Sustainable Procurement Plan Review

Mountpark will review this plan on a project-by-project basis and more widely against current industry best practice on a 24 monthly basis. It is also aligned with Mountpark's Responsible Development Guidelines, Modern Slavery Policy and related practices

Appendix C Mountpark's Example Developer's Specification


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AFFINIUS®
CAPITAL

Grange Castle West – Unit 2

Developers Specification

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Revision	**Reason for Revision**	**Date**	**Prepared/ Checked**
00	Mountpark Standard [Ireland]	09 August 2023	LA/ GA/ WG/ JA/ RH/ RW
01	Update for Unit 2 [Tender Version]	19 December 2023	LA / WG
02	Update for Contract	29 July 2024	LA / WG
03	Update for Contract	14 August 2024	LA / WG
04	Update for Contract	14 August 2024	LA / WG/ MG
05	Update for Contract	14 August 2024	LA / WG/ MG
06	Update for Contract	21 August 2024	LA / WG
07	Specification Update	23 January 2025	BG / WG
08	Specification MEP Update	5 May 2025	BG / RH / WG
09	Specification Update	8 August 2025	BG / WG
10	Specification Update - Staircase	14 October 2025	TSL / BG
11	Specification Update – Boundary Post	10 November 2025	BG
12	Specification Update – As built	9 December 2025	BG
13	Specification Update As Built – entrance door amends	27 February 2026	AW

1. GENERAL DESCRIPTION

1.1. Scope of Works

1.1.1. The Works as a minimum indicated on the drawings comprise the construction of a single storey warehouse distribution unit of approximately 197,761 sq. ft gross external area, including an office block and ancillary space as per the JSA area schedule. Externally all works as shown including general hardstanding, service areas, car-parking, landscaping, mains services and drainage.

1.2. Standards

1.2.1. All elements of the works, materials and workmanship shall be designed and constructed in accordance with the latest editions and/ or compliance with the following "Standards" (or their Irish/European Union equivalents) where relevant, applicable, and current at the date of the Building Contract: -

a. The Eurocodes and Codes of Practice as updated with Eurocodes
b. The Building Control (Amendment) Regulations 2014 (S.I. No.9 of 2014)
c. The BCAR/ Building Regulations 1997-2017 and associated Technical Guidance Documents and current amendments thereto
d. Local Acts of Parliament and Local Authority Byelaws and/or regulations
e. Requirements of the Building Control Officer / Assigned Certifier
f. The Fire Officers requirements
g. Fire Safety Certificate (FSC)
h. NZEB (nearly zero emission building standard)
i. Specific requirements of the Utility Supplies, Local Authorities and Local Planning authorities
j. Construction (Design and Management) CDM Regulations
k. Safety, Health and Welfare at Work Act 2005
l. Safety, Health and Welfare at Work (Construction) Regulations 2013
m. Health and Safety Authority
n. Health and Safety at Work Act/ Requirements of the Health and Safety Executive
o. Local Acts of Parliament and Local Authority Byelaws and/or regulations
p. Air quality Standards Regulations
q. The Factories Act and all amendments
r. Disabled Access Certificate (DAC)
s. The Clean Air Act
t. The Factories Act
u. The Gas Safety (Installation and Use) Regulations
v. Good practice in the selection of Construction Materials. (1997 – Ove Arup and Partners)
w. The Water Industry Act
x. The Water Services Act
y. The Environmental Protection Act / Protection of the Environment Act
z. CIBSE Guides including technical memorandums.

aa. Equality Act 2010
bb. BREEAM for Base Build only - Outstanding
cc. Environmental Health, Petroleum and Highway Officers requirements
dd. Workplace Regulations
ee. The Sewer Sector Guidance Document by Water UK
ff. BSRIA
gg. Construction Stage Fire Risk Assessment (HSG168)
hh. All timber shall be FSC certified.
ii. Party Wall Act
jj. IET Wiring Regulations/ National Rules for Electrical Installations I.S. 10101:2020
kk. Uisce Eireann Code of Practice for Water and Wastewater Infrastructure.
ll. Uisce Eireann Water and Wastewater Standard Details
mm. Freight Transport Association Guidelines 'Designing for Deliveries'
nn. SCI P346 Best Practice for the Specification of metal cladding and secondary steelwork
oo. TR34 / TR66 / TR75
pp. Guidance on Industrial Membrane Lined Gutters (Published 04/03/2022)
qq. RISC Authority: Need to Know Guide RE1 Battery energy storage systems: commercial lithium-ion battery installations (Version 1 Published 2022)
rr. Wall and roof 25-year guarantee to include but not limited to rooflights, gutters roof hatches, AOVs, man-safe, fixings for PVs, sealants, rooflights, flashings and fabrications, any roof penetrations etc.
ss. BS 7671 – Requirements for electrical installations.
tt. Electricity Supply Regulations.
uu. Requirements of the Electricity Board.
vv. The Electricity at Work Regulations.
ww. Chartered Institution of Building Services Technical Memoranda and Application Guides.
xx. The Control of Pollution Act.
yy. COSHH (Control of Substances Hazardous to Health) Regulations.
zz. BSRIA Technical Memoranda and manuals.
aaa. The ECTI National Rules for Electrical Installations.
bbb. Transport Infrastructure Ireland – Specification for (Road) Work
ccc. The ICE Manual for Geotechnical Engineering (2012)
ddd. BS 7533-101:2021 (Pavements)
eee. BS 7533-13:2004 (Permeable Pavements)

1.2.2. All materials used in the Works are to be of good, sound, and suitable quality of their respective kinds. Samples are to be submitted for approval without charge. Each sample submitted shall be identified and retained on the site until completion and used as the standard for all subsequent deliveries of materials or goods of the same types. Except where otherwise described and applicable, the materials are to comply with the latest appropriate Irish and European Standard Specification.

1.2.3. The following areas, as a minimum, shall be 'benchmarked' with client approval required prior to proceeding on site: -

a. External slabs
b. Internal finishes, including joinery, lighting setting out and tiling
c. Penetrations/ fire stopping.
d. Subsoil preparation to landscaped areas.

1.2.4. For products and materials specified to British and European Standards (as appropriate), a Certificate of Compliance from the manufacturers shall be obtained and recorded by the contractor and issued to the Assigned Certifier as required. For Irish installations, all materials shall be complete with CE Certificates (& associated Declarations of Performance) and appropriate Warranties.

1.2.5. Workmanship throughout shall be in accordance with good building practice and comply with the standards formulated by the various BS, Codes of Practices and Irish and European Standards.

1.3. Compliance of the Building Envelope

1.3.1. The building is to be tested to comply with Building Regulations Airtight Testing I.S. EN 13829:2000 - Thermal Performance of Buildings – Determination of Air Permeability of Building, the whole building envelope shall achieve a maximum air permeability of 2.0m3/hr/m²@50Pa. Appropriate test certificates to be provided at building handover.

1.3.2. A BER Certificate shall be provided with an 'A1' Rating. The Certification will clearly note the property type i.e. Base Build Shell & Core.

1.4. Drawings

1.4.1. This Specification is to be read in conjunction with the drawings which, together, shall form the basis of the Building Contract.

1.5. Fire Strategy

1.5.1. A fire strategy shall be prepared based upon the agreed layouts. Fire boundaries shall be constructed to suit the development and to be based upon a standalone/ independent building in line with the Fire Officers requirements and Fire Safety Certificate.

1.6. Exclusions

1.6.1. All firefighting equipment (to include extinguishers, sprinklers, sprinkler tanks and associated equipment, hydrant, smoke vents and handheld equipment), other than those required by Building Regulations/ FSC requirements and/or Bye Laws or the Fire Officer for the Base Build/Developer works.

1.6.2. Active CCTV, telephone, and active data systems. Active equipment including all data and voice installation data cabling, face plates cabinets and patch panels.

1.6.3. Furniture, reception desk, furnishings, lockers, shelving, process machinery and plant of any type, guidewires, racking, skips, fuel installation, conveyors or any other item which has not been expressly detailed in this document.

1.6.4. Specialist floor finishes.

1.6.5. Specific requirements of the end user(s) insurer.
1.6.6. Overhead gantry/lifting mechanisms.
1.6.7. Diverse power and communications supply.
1.6.8. Bird deterrent and control systems.
1.6.9. Fuel tanks and all associated works.
1.6.10. Security Alarm Systems.
1.6.11. Pedestrian barriers, turnstiles, or associated access systems.
1.6.12. Vehicle wash equipment and all associated works.
1.6.13. Canteen/ kitchen catering equipment, servery, and fittings.
1.6.14. Any external signage other than required to suit Building Regulations, or as shown on the Architects drawings.
1.6.15. Mechanical heating/cooling/ventilation and electrical installations within the warehouse / distribution unit (except where required by Building Control and to dock levellers, doors, roof vents, etc or detailed elsewhere within this document)
1.6.16. UPS / stand by generators.
1.6.17. Accommodation works and welfare areas within the warehouse area.
1.6.18. Allowance for future CHP or gas storage.
1.6.19. Recycling/refuse areas/storage – with the exception of statutory requirements or if required by BREEAM.
1.6.20. Allowance for future extension of the building.
1.6.21. Enhanced loadings to the structural frame.
1.6.22. Redcare provision.
1.6.23. Pest/ vermin/ rodent control

1.7. Deleterious Materials

1.7.1. Any substances which at the date of this specification are generally known to be deleterious in the particular circumstances in which they are specified for use to health and safety and/or the durability of any buildings or any other structures or services are not to be used.
1.7.2. Any substances not in accordance with Eurocodes and Codes of Practice where such exist or good building practice at the time of Specification are not to be used.
1.7.3. The use of IBAA aggregate (Incinerator Bottom Ash Aggregate) is not permitted.
1.7.4. In conjunction with the above, no substances or materials which are not in accordance with the guidance for good practice in selection of material as set out in the publication entitled "Good practice in the selection of Construction Materials" issued by Ove Arup and Partners are to be used.
1.7.5. The use of aggregate containing Pyrite is not permitted. Construction methodology must be in accordance with The ICE Manual for Geotechnical Engineering (2012) in pyritic areas.
1.7.6. The use of aluminium composite panels is not permitted.
1.7.7. Contractor to confirm no Lead or Asbestos used and the use of mercury is limited.

1.8. Specified Items

1.8.1. Where reference is made in this document to specific products or manufacturers, alternative or similar quality and performance may be substituted subject to prior reasonable written approval of the Employer and Future Occupier.
1.8.2. All descriptions are based on standard RAL references.

1.9. Design Standards

1.9.1. The works are to achieve a fully co-ordinated functional and aesthetically pleasing appearance. Additionally, all works shall be designed and installed to facilitate ease of inspection, testing, commissioning, and maintenance. In all instances, the design and selection of materials shall reflect the location of the development.

1.9.2. The structural details for foundations, superstructures, underground services, and the like shall all be in accordance with the statutory regulation requirements and details provided by the Consulting Structural Engineer. Due allowance shall be made for the protection of the works throughout the structural elements of the building.

1.9.3. Mechanical Services shall comply with the recommendations of CIBSE and the relevant European Standards to include design procurement, supply, installation, testing and commissioning by specialist subcontractor. Works shall be carried out in full consultation with the statutory Gas and Water Authorities together with Environmental Health and Fire Officers Regulations.

1.9.4. The Electrical equipment and cable installations shall be provided in accordance with the current European Standards, Codes of Practice, CIBSE Recommendations to include design procurement, supply, installation, testing and commissioning by specialist subcontractor. Works shall be carried out in full consultation with the statutory Electrical Authorities together with Environmental Health and Fire Officer Regulations.

1.9.5. Design Drawings, details and calculations shall take into account that all plant installation recognises a maintenance and replacement strategy and shall be provided in advance of the relevant section of the works proceeding on site and these are to be in full compliance with the agreed performance specification and drawings.

1.9.6. All insulation materials shall be sourced in accordance with either BES 6001:2014 and/or an independently certified EMS i.e. EMAS or ISO 14001

1.9.7. Where practical, all signs shall be pictorial.

1.9.8. The position of utilities i.e., transformers, gas incomer, LV panel etc., shall be located and protected to avoid damage.

1.9.9. Consideration shall be given to traffic routes around the development to ensure there is adequate space for vehicles to manoeuvre.

1.9.10. All building materials used, including those for insulation, lining, internal partitioning etc. are to be, as far as practicable, non-combustible.

1.9.11. All services and utility supplies shall be installed with the ability to be safely and remotely fully isolated.

1.9.12. All M&E controls shall be on an open protocol basis.

1.9.13. Easements or wayleaves associated with all incoming and existing or diverted services are to be positioned outside of the Plot demise, where reasonable and practicable. Width and location of easements or wayleaves are to be agreed in advance.

1.9.14. A minimum of 12 EPDs are required.

1.10. Spares

1.10.1. As a minimum:

a. 5 boxes - carpet tiles,
b. 5 boxes - wall tiles
c. 5 boxes - floor tiles

d. 5 boxes of each suspended ceiling tiles
e. 20 litres of each paint colour
f. 10% of integrated light fittings (of each type)

Shall be handed over at practical completion.

1.11. Design Life Period

1.11.1. Materials (where applicable) shall be selected to attain the design life periods categorised in accordance with BS ISO 15686 part 1.

1.11.2. Durations exclude aesthetics and indicate the manufacturers estimate and not the warranty period. All life spans are subject to the appropriate repair and maintenance regimes and exclude components and availability of spare parts.

2. SUB-STRUCTURES

2.1. Geotechnical Report

2.1.1. A Borehole / Trial Pit Site Investigation including contamination analysis and CLEA assessment shall be undertaken by the Geotechnical and Environmental Engineer and the recommendations / results used in the subsequent substructure, foundations, and external works design. Interpretation and application of the SI results and recommendations is at the Contractor/ Engineers risk.

2.1.2. In the event of the site being classed as contaminated then a remediation strategy shall be agreed with the Environmental Agency and the Local Authority prior to commencement of any work on site.

2.1.3. On completion of the works, a validation report shall be produced by a recognised Environmental Consultant or remediation contractor on behalf of the main contractor confirming that the works have been carried out and completed in accordance with the remediation strategy.

2.2. Site Clearance

2.2.1. The site shall be cleared of all undergrowth, hardstanding and the like, and the site to be covered by the new buildings and paving's reduced in level to formation. The demolition / removal of existing hardstanding and structures is to include, where applicable, the removal of asbestos, invasive species and the like by a licensed contractor, the protection, diversion and/or disconnection / termination / removal of all mains services, existing drainage systems and the like, the decommissioning and underground obstructions, tanks and structures, the removal of existing floor slabs, hardstanding, foundations bases, obstructions, tanks and structures and the like.

2.2.2. Site clearance, where necessary, shall be carried out including removing to Contractor's tip off site (suitably licensed as required). The formation level shall be graded, trimmed, and compacted prior to laying the hardcore bed.

2.2.3. An amount of soil shall remain on site (if available) and shall be certified suitable for use and be landscaped. All remaining soil shall be confirmed as clean and uncontaminated and disposed from site or suitable licence shall be obtained to dispose of material if classified as contaminated.

2.3. Earthworks

2.3.1. Excavation shall be carried out to formation level over the area of the site and external works, as shown on the drawings.

2.3.2. The whole of the substructure work shall be carried out to the Structural Engineer's design and approved by Building Control (and comply with all current Building Regulations and Design Codes).

2.3.3. The Contractor's Structural Engineer shall be required to verify in writing that at least 30% of excavations have been inspected prior to commencement of the construction of the foundations, and that they are satisfied with the overall construction of all cut and fill works, and substructures. All testing to be validated by a third-party consultant for cut to fill works.

2.4. Ground Improvement

2.4.1. Any necessary ground improvement works shall be carried out by specialist Sub-Contractors in full accordance with the requirements of the Structural Engineer and to the approval of Building Control (and comply with all current Building Regulations and Design Codes).

2.4.2. If necessary, at the discretion and in accordance with the Structural Engineer's recommendations, the area beneath the proposed buildings shall be improved using a vibro flotation/dynamic compaction/piling technique, carried out by a suitably experienced, specialist sub-contractor, in accordance with the ICE Specification and to the satisfaction of the Structural Engineer with all foundations designed to suit any ground improvement technique necessary. L/500 deformation to be designed for in the floor slab.

2.5. Hardcore

2.5.1. The hardcore shall be a crushed rock or similar material to be approved by the Structural Engineer and shall be graded in accordance with Clause 808 subbase and Class 6N structural fill material in accordance with Tables 6/1 & Table 6/2 and placed in accordance with Table 6/4 of the TII Specification for Road Works.

2.5.2. Where the material is to be used for fill under concrete floors and footpaths and all areas within a minimum of 500mm off the external face of external walls and concrete foundations and structures it shall comply with the example specification for unbound granular fill for use under concrete floors and footpaths as prescribed in Annex E – Guidance for specifying aggregates for unbound granular fill(hardcore) for use under concrete floors and footpaths of SR21:2014 + A1:2016 'Guidance on the use of IS EN 13242:2002 + A1:2007 – Aggregates of unbound and hydraulically bound materials for use in civil engineering work and road construction.

2.5.3. Attention is drawn to the particular requirements in relation to the allowable limits for oxidisable sulphides in the specification for the hardcore materials.

2.5.4. All imported materials (or materials site won and used on site) shall be validated to ensure their geotechnical and chemical suitability for the works. Materials imported shall comply with all relevant Waste Management Regulations.

2.6. Foundations

2.6.1. Bases, retaining walls, ground beams and strip footings to the sizes indicated on the Structural Engineer's drawings shall be of concrete in accordance with IS EN 206 based upon exposure conditions identified in the relevant Soil Investigation report as specified by the Structural Engineer, including all necessary reinforcement, all to comply with 'The Structural Use of Concrete' unless specified otherwise with stanchion holding down bolts cast in.

2.6.2. The proposed foundations / ground floor slab will have the capacity to act as the foundation for any future concrete perimeter walling.

2.7. Works below DPC

2.7.1. To the perimeter of the building concrete edge beams spanning between bases shall be provided and shall form the external finish between DPC and the external ground level. Alternately a galvanised hot rolled 'box' section steel fixed to the frame may be used but to the warehouse only.

2.8. Ground Floor Slab

2.8.1. The main warehouse slab shall be a reinforced concrete ground floor slab, with a minimum design thickness of 175mm (to allow for future grinding to suit VNA requirements) and with a power floated finish. The slab shall be designed in accordance with the recommendations of TR34, for a maximum uniform distributed loading of 50 kN/m² to all areas unless stated otherwise and a rack leg loading of 10 tonnes placed in a back-to-back situation (with centre line base plates placed a minimum distance 150mm away from floor joints) anywhere on the floor.

2.8.2. All reasonable endeavours shall be made to provide aggregates that are free of lignite.

2.8.3. Loadings based on a rack height of 1.75m level and 1.0 tonne pallet loads based on 100mm x 100mm base plates set at a minimum back-to-back distance of 300mm.

2.8.4. Where joints are provided in the construction of the floor, they shall be generally detailed in accordance with TR34 and designed so that no differential vertical movement occurs across the joint. Where possible the number of joints shall be kept to a minimum and their location shall be co-ordinated with racking layouts, where these are available. Isedio Armour joint or similar approved with 10mm steel plate arris edge protection shall be cast into the slab to the day movement joints, also to the level access door thresholds with the outside edge set 3.0mm lower.

2.8.5. Joint layouts to be submitted for approval prior to installation.

2.8.6. The mesh reinforcement is to be set 75mm below the finished surface to allow the future installation of a wire guided MHE system. (Excluding crack restraint mesh at columns and to dock leveller locations.)

2.8.7. The concrete is to be in accordance with IS EN 206 and to have a minimum compressive strength of 40N/mm² at 28 days. The concrete shall have minimum cement content of 325 kg/m³ and a maximum water cement ratio of 0.55 (or such other concrete as specified, or approved, by the Structural Engineer). The use of super-plasticisers shall be permitted. 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 European Standards.

2.8.8. The ground floor slab shall be constructed so that the top surface is within the construction tolerances as defined in TR34 FM2 for free movement areas of the slab. The floor is to be surveyed by an independent company to prove its acceptance within fourteen days of construction.

2.8.9. The ground floor slab-wearing surface shall have a minimum abrasion resistance of AR1 in accordance with table 2 of BS 8204. One abrasion test is to be carried out for each 4,000m² of slab or part thereof to confirm that appropriate abrasion resistance has been achieved in accordance with the relevant standard.

2.8.10. After the final power floating operation, the floor slab shall be sprayed with an approved water-based curing and sealing agent with a curing efficiency of 90%. The floor shall not be trafficked for a minimum of four days following the sealing operation. The contractor is not permitted to use plastics as a protection or to aid curing.

2.8.11. The ground floor slab shall be constructed on a minimum 1200-gauge polythene damp proof membrane, taped, if necessary, laid on a layer of well blended and compacted hardcore with a minimum thickness as stipulated on the Structural Engineer's drawings and achieving necessary CBR and MSR k value, all to be confirmed by testing. Gas protection shall be provided, as required, and shall meet the requirements of the Structural Engineer and the approval of the Local Authority Planning and Building Control. Insulation shall be laid beneath the slab and/or to the perimeter of the slab to suit the requirements of Building Control/ Building Regulations.

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

2.8.13. The joints are to be sealed prior to practical completion or early access whichever is sooner (unless otherwise advised) with a suitable product having a (shore hardness of 50 and M.A.F. of 35%). The steel formed joints are to remain unsealed.

2.8.14. The sealant is designed to be a permanent application and inspected at the end of the defects period under the building contract and rectified as required. Beyond the rectification period the inspection and maintenance of the sealant shall be the responsibility of the Tenant/Building User. All inspection, maintenance and cleaning operations are to be carried out in accordance with the recommendations of TR34.

2.8.15. All efforts shall be made in the construction and detailing of the floor to reduce the possibility of random cracking generally and diagonal cracking at dock locations. If cracks do occur, they are to be grouted with a gravity fed low viscosity epoxy mortar if they are wider than 0.8mm or affect serviceability.

2.8.16. The office floor slabs, where they are outboard of the warehouse are to be designed to take an imposed loading of 4.0kN/m2, with an additional 1kN/m2 for lightweight partitions with a minimum 150mm slab thickness.

2.8.17. The FFL of the office is to align with the warehouse FFL.

2.8.18. The ground floor slab shall be insulated to achieve a 'U' value to suit comply with NZEB. Where the slab is of a size not to warrant insulation, the perimeter of the slab shall be detailed to prevent cold bridging.

2.8.19. Radon protection measures shall be provided to the ground floor slab.

2.9. Dock Leveller and Retaining Walls

2.9.1. Pre-cast, fair-faced retaining walls 1.250m (FFL to service yard), door surrounds and dock leveller pits with tailgate slots and holes for future combi lock installation & HGV charging shall be provided to the dock area of the building in accordance with the Architect's drawings, all to the Structural Engineer's details.

2.9.2. The external steps to the dock level areas shall be constructed in galvanised mild steel with a slip resistant finish. Handrails and balustrading shall be provided in circular hollow, hot dipped galvanised mild steel sections.

2.9.3. 1.2m high protection bollards shall be provided (GRD200) manufactured by MPM protections or similar and shall be surface fixed.

2.10. Vehicle Protection

2.10.1. Armco or similar barrier galvanised mild steel and handrailing shall be provided to prevent damage to the buildings and to form safe walkways.

3. EXTERNAL ENVELOPE

3.1. Steel Frame

3.1.1. The steel frame shall be a portal frame with equal spans and a minimum clear height to underside of haunch of 15 m.

3.1.2. Designed in accordance with IS EN 1993: (Eurocode 3) Design of steel structures with dead plus super loading and wind loading to EN 1991: (Eurocode 1) Actions on Structures. The buildings shall be designed with an adopted ground roughness suitable to the location and all relevant Codes of Practice applicable to the contract in force at the time of erection and in compliance with the Building Regulations. Bracing is to be kept free from open floor areas, internal stanchions, doors, window openings and the like. Cross bracing connections to be kept above the finished slab level. Valley columns are to be positioned on a 'hit and miss' basis. The bottom two cladding rails are to be toe down.

3.1.3. The frame shall be capable of supporting a maximum general superimposed service loading arising from mechanical and electrical installation plant, equipment, and fittings (and potential sprinkler installations) of 0.25kN/m² over the complete area of the roof. The roof shall also be designed to additionally carry imposed loads 0.15 kN/m2 of potential PV arrays over the total area.

3.1.4. All steelwork shall be shot blasted to ISO 8501-1 and receive a factory applied coat of high build zinc (grey) phosphate to a nominal DFT to suit atmospheric corrosively Category C2. Galvanised surfaces of purlins and sheeting rails shall be left uncoated.

3.1.5. 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 shall be coated to provide an agreed uniform appearance.

3.1.6. All steelwork below ground shall be coated with Glassflake, providing a minimum 20 years guarantee against corrosion. Guarantee to be provided by the Contractor.

3.1.7. The steel frame shall be designed to meet the following standards:

a. all cold rolled steel work shall have the standard manufacturers galvanised finish to BS EN 10143 (2006) or better.
b. all frame bolts are to be zinc plated or galvanised finish.
c. the roof and wind loads shall include allowance for drifting snow on the valley of the structure and against parapets if provided.
d. all doors shall be fully framed in steelwork with the exception of where precast concrete panels are incorporated including all frame extensions necessary to support sectional door fittings and canopies.
e. sag rods and tension wires shall be free from distortion and properly adjusted.
f. the structure must be capable of carrying signage in at least four locations, of which details shall be forwarded at a later date; signage locations shall be kept clear of weir overflows.
g. exposed steelwork within the reception to be agreed.

h. No vertical siphonic drops by steel cross bracing.
i. Steelwork is to provide all vertical & horizontal secondary support.

3.1.8. The secondary support steel purlins / channels should be set at a maximum span and have minimum steel gauge as follows:

a. 3.3 Roofing – Maximum Span 2000mm / Minimum Steel Gauge 1.50mm
b. 3.6 Vertical Cladding - Maximum Span 3000mm / Minimum Steel Gauge 1.50mm
c. 4.2 Roofing – Maximum Span 2000mm / Minimum Steel Gauge 2.00mm
d. 4.4 External Walls - Maximum Span 2000mm / Minimum Steel Gauge 1.50mm

3.2. Fire Protection

3.2.1. Where protection of the frame is necessary, intumescent paint to be applied as per manufacturer requirements with compatible topcoat to match the main frame colour, all as required by the Building Regulations. All protected frame sections shall be clearly marked with labelling of contrasting colour (TBC) to identify fire protected boundary. The fire protection system shall be specified suitable in areas liable to impact damage.

3.3. Roofing

3.3.1. Roofing and cladding system shall be designed and installed to consider the prevailing wind conditions.

3.3.2. The roof shall be the KS1000RW Insulated Quadcore Roof System or similar approved utilising the XL Forté external coating system with a 40-year non-maintenance warranty (inland environment). This is supported by the Kingspan 25 Year Quadcore 'Lifetime' Assured Warranty and installed as per the manufacturer's requirements. The internal face of the panel shall be a CleanSafe 15 standard white liner internal coating.

3.3.3. The structural and thermal performance of the roof, rooflights, roof access hatch, man-safe, PV fixings, AOVs and insulated gutters shall be included in the Kingspan Quadcore 'Lifetime' Assured Warranty for a period of 25 years.

3.3.4. The roof system, rooflights and rainwater goods are to be included within the warranty for the entire installation for a period of 25 years. Minimum Grade 304 Austenitic stainless steel fixings are only to be used, recommended suppliers Ejot and SFS.

3.3.5. The system shall be installed by a contractor trained by the Kingspan Field Services (KFS) team. Before commencement of any works, KFS shall provide commentary to the working drawings and arrange site visits to check that the installation is in accordance with Kingspan's recommendations.

3.3.6. The KS1000RW Insulated Roof System shall be Factory Mutual (FM) Global FM 4880 – Class 1 Internal Wall & Ceiling Panels Without Height Restriction, FM 4882 –Class1 Systems for Smoke Sensitive Occupancies and FM 4471 – Class 1 Roof Panel Systems.

3.3.7. The KS1000RW Quadcore Roof Panels shall be classified B-s1, d0, when tested on the internal face of the product, according to the European Reaction to Fire classification system (Euro classes) BS EN 13501–1: 2007+A1: 2009 and the external face is to be rated Broof(t4) to BS EN 13501-5: 2016. The internal lining to the rooflights shall be rated Class 1 for surface spread of flame as tested to B.S. 476 Part 7:1997.

3.3.8. The insulation to be Quadcore to achieve the designed thermal U-value.

3.3.9. The minimum designed roof pitch will be 6.0° (4.5° after deflection).

3.3.10. The rooflight assemblies shall be triple skinned GRP with a separate intermediate core and all relevant components. Rooflights shall be provided to approximately 10% of the floor area, installed as per the system manufacturer's recommendations and shall include a neat appearance on the edge/side detail. Exposed insulation should be closed off from view. Rooflights to comply with Building Regulations for Fire Safety and are tested to BS 476 Parts 3. 7, and where appropriate Part 6.

3.3.11. The installed Roof System is to be minimum Class B Non-Fragile for a period of 25 years, tested in accordance with the HSE materials standard ACR(M)001:2019 (Sixth Edition-amended May 2020)'. The system shall be tested for all spans up to a maximum of 3000mm.

3.3.12. Detail work to ridge, eaves, hip, and verge shall be in accordance with the manufacturer's recommendations and standard approved design details.

3.3.13. The disposition of roof lights over the warehouse/production area shall be as even as possible, subject to constraints imposed by any applicable Fire and Boundary Conditions.

3.3.14. No roof lights are to be installed in the roof area directly above the main office accommodation.

3.3.15. Any roof light disposition shown on the drawings is notional only and may be varied by the Roofing Sub-Contractor, subject to approval, prior to construction so as to achieve the most economical and practical layout, provided that the disposition is fully in accordance with the requirements of the Building Regulations.

3.3.16. Air Opening Vents (AOV) shall be installed in locations as required to comply with IS EN12101-2 European standards. AOV shall be Kingspan Fumetica-S Double Flap Ventilators or similar approved. AOV lids are to be insulated to prevent condensation.

3.3.17. AOV's shall be controlled on a zoned basis via a control panel. The panel will provide a 72-hour uninterruptable power supply. A separate fireman override switch shall be provided. All to be designed in accordance with the Fire Officers requirements, and in consideration of a future sprinkler installation. The status of the AOVs shall be monitored and displayed on the BMS panel. The operation of the AOV in the event of a Fire Alarm shall be manually controlled as contained within the site "Cause and Effect" strategy.

3.3.18. AOVs to be openable on a zone basis to ventilate the warehouse, to limit summer overheating and to close based on weather sensors. The design of the AOVs shall ensure that when operated for

summertime ventilation only, their opening is limited or restrained, in order to reduce the risk of wind damage.

3.3.19. All penetrations through the roof shall be carried out by a Kingspan approved contractor. The use of Dektite's or similar shall not be permitted.

3.3.20. A glazed canopy to the staff entrance to the warehouse shall be provided.

3.4. Roof Access

3.4.1. A permanent roof access hatch, ships ladder (ladder access to be capable of being locked off) and horizontal lifeline system (to be Soter II Horizontal Lifeline System by SFS Group Fastening Technology Ltd or similar) shall be provided to allow safe roof access and maintenance to all roof areas (unless parapet wall provides compliant edge protection), including two sets of harnesses and lanyards.

3.5. Rainwater Goods

3.5.1. The rainwater from the roof shall be collected in Factory Manufactured Insulated Gutters with a 0.6mm thick pre-galvanised mild steel external face which includes a 1.2mm PVC pre-laminated membrane, and a 0.7mm thick PE15'Bright White' liner from Kingspan or similar, to ensure a minimum 25 year Quadcore 'Lifetime' Assured Warranty to match the roof.

3.5.2. The Factory Manufactured Insulated Gutters shall be certified to 'BSI Metal Guttering Standard BS 9101:2017'.

3.5.3. The roof drainage system shall be designed and constructed to comply with BS EN 12056-3:2000, BS 8490:2007 and the following criteria:

a. The geographical location of the building
b. A building design life of 25 years and Safety Factor Category 3 to be applied.

3.5.4. The system shall be designed for a rainfall intensity which is the greater of either the amount properly calculated in accordance with the above or 0.056 l/s/m2.

3.5.5. All pipework shall be installed above the portal haunch level to maintain minimum clear height as stated in Clause 3.1.1 and insulated in office areas.

3.5.6. Siphonic pipework shall be firmly attached to an engineered continuous railing system, using appropriate pipe clamps at a maximum of 2m centres and at the ends of the pipework sections, to provide adequate and proper restraint against thermal movement of the pipe. The hanger rods from the rail system shall be clamped to the purlins using an L-bracket to the web of the purlin. Additional bracing shall be provided at branch connections and where required. Tailpipes shall be supported from the structure in all cases and railed where lengths exceed 1.0m.

3.5.7. The railing system shall be fixed within 100mm of the closest edge of the pipework and shall be securely fastened back to the main structure at every rafter crossing and appropriate intervals when crossing the building.

3.5.8. Both primary and secondary Siphonic systems shall be provided. The primary system shall drain 50% of the design rainfall intensity and the secondary system shall drain the balance.

3.5.9. The minimum pipe diameter used in all installations shall be 63mm OD/57mm ID. This may require the use of orifice plates at outlets to ensure system balance.

3.5.10. The primary system shall be connected to the storm drainage system. The secondary system shall discharge to hardstanding areas external to the building. Suitable protection shall be provided to all parts of the building or landscaping and personnel that might be damaged by the flow of water from the secondary system.

3.5.11. The secondary system rainwater outlets shall be evenly distributed along the total gutter length and secondary discharge points shall be located at either end of the gutter. Discharge locations to be agreed with the Employer/Architect, with brushed concrete outlet pads installed at each location. Secondary eaves downpipes intermittently spaced along the eaves shall not be permitted.

3.5.12. The external drainage shall be designed for peak flows from the primary Siphonic system and connection point between the Siphonic system and the underground pipework shall provide break chamber fully vented to atmospheric pressure. Vented manholes shall not be permitted in areas of pedestrian use i.e., entrances and car parking.

3.5.13. 600mm wide x 50 mm deep (or similar sized) high level tell tail indicators shall be provided and set above the gutter base at a minimum of 50m centres.

3.5.14. Internal syphonic down pipes are to be located within the web of the steel and suitably protected against accidental damage and away from electrical equipment.

3.5.15. Gutter calculations shall be provided to demonstrate the systems operation with the capacity of the gutter, taking into account the combined flow when the primary and secondary outlets share the same gutter length.

3.6. Vertical Cladding

3.6.1. The cladding shall be KS1000RW Quadcore or similar Insulated Wall System utilising either XL Forté or Spectrum external coating system with up to a 40 year Non Maintenance warranty (XL = 40 years / Spectrum = 30 years - inland environment). This is supported by the Kingspan 25 Year Quadcore 'Lifetime' Assured Warranty and is to be installed as per the manufacturers' requirements. The internal face of the panel shall be a CleanSafe 15 standard white liner internal coating.

3.6.2. Profile as per Architects drawings, colour arrangement, orientation and layout of panels to suit the approved elevational treatment. Refer to drawings for project specific information.

3.6.3. The wall system is to be included within the warranty for the entire installation for a period of 25 years. Minimum Grade 304 Austenitic stainless-steel fixings are only to be used, recommended suppliers Ejot and SFS

3.6.4. The structural and thermal performance of the wall are to be included in the Kingspan Quadcore 'Lifetime' Assured Warranty for a period of 25 years.

3.6.5. The system will be installed by a contractor trained by the Kingspan Field Services (KFS) team. Before commencement of any works KFS will provide commentary to the working drawings and arrange site visits to check that the installation is in accordance with Kingspan's recommendations.

3.6.6. The KS1000RW Insulated Quadcore Wall System will be Factory Mutual (FM) Global FM 4880 – Class 1 Internal Wall & Ceiling Panels Without Height Restriction, FM 4882 –Class1 Systems for Smoke Sensitive Occupancies and FM 4881 – Class 1 External Walls.

3.6.7. The KS1000RW Quadcore Wall Panels are classified B-s1, d0, when tested on the internal face of the product, according to the European Reaction to Fire classification system (Euroclasses) BS EN 13501–1: 2007+A1: 2009.

3.6.8. The insulation to be Quadcore to achieve the designed thermal U-value.

3.6.9. Where required under the Building Regulations, enhanced fire protection will be provided to the external wall cladding and steelwork to meet firewall status.

3.6.10. As shown on the Architects drawings, clear double glazing will be provided in the vertical cladding.

3.6.11. All windows and doors will be fully integrated with a fully tested fenestration system with Insulated Panel joint or by flashing details in accordance with Kingspan's recommendations.

3.7. Louvres

3.7.1. Aluminium louvres shall be provided as shown on the drawings. Louvres shall receive a polyester powder coated finish and be acoustically treated as required, complete with bird mesh. Unused sections of louvres shall be suitably blanked off internally with insulated panels. Suitable allowance shall be made within the structure for future office fit out.

3.8. Access Doors

3.8.1. The external level access doors indicated on the drawings shall be manufactured by Stertil® or similar approved ref Thermadoor™ model 680 and shall be electrically operated (with manual hand-chain override facility), Vertical lift doors with low level springs for ease of maintenance. The 80mm thick rigid panels to be manufactured from two skins of galvanised steel, (0.5mm thick) infilled with expanded polyurethane foam. A continuous thermal break shall be provided between inner and outer skins. EPDM seals to be fitted to the top, bottom, and sides of the door to prevent rain penetration and minimise draughts. Size 4000mm wide x 5000mm high (Note structural steel size 4140mm wide x 5070mm high if insulated cladding returns around door jambs/soffit to reduce cold bridging),

configured with 2nr rows of panoramic quadruple glazed vision sections with each row split into 5nr equal panes across full door width. Doors to be complete with sliding shoot bolts electrically interlocked and anti-fall safety devices.

3.8.2. UKCA marked along with Compliance for BS EN 12424 Class 4 for high wind resistance offering a minimum 700 N/m2 and BS EN 12425 Class 3 offering 70PA resistance to water ingress and BS EN 12453:2017+A1:2021 (requirement for safety in use of power) and BS EN 12604: 2017+A1:2020 (mechanical aspects).

3.8.3. 1.2m high protection bollards shall be provided (GRD200) manufactured by MPM protections or similar and shall be surface fixed both externally and internally to each level access door jamb.

3.9. Dock Access Doors and Equipment

3.9.1. The dock access doors and equipment indicated on the drawings will be manufactured by Stertil®, or similar approved and will be electrically operated, insulated (with manual hand-chain override facility), Vertical lift doors Thermadoor™ model 680 with low level springs for ease of maintenance. The 80mm thick rigid panels to be manufactured from two skins of galvanised steel, infilled with expanded polyurethane foam. A continuous thermal break is to be provided between inner and outer skins. EPDM seals to be fitted to the top, bottom, and sides of the door to prevent rain penetration and minimise draughts. Manufactured door size 2960mm wide x 3000mm high (Note where installed onto pre-cast concrete dock wall; structural clear opening size 2860mm wide x 3000mm high) doors to Euro Dock locations to be fitted with 3500mm high dock doors. All dock access positions are to be configured with 2nr rows of panoramic quadruple glazed vision sections with each row split into 4nr equal panes across full door width. Doors complete with anti-lift automatic locking and anti-fall safety devices.

3.9.2. UKCA marked along with Compliance for BS EN 12424 Class 4 for high wind resistance offering a minimum 700 N/m2 and BS EN 12425 Class 3 offering 70PA resistance to water ingress and BS EN 12453:2017+A1:2021 (requirement for safety in use of power) and BS EN 12604: 2017+A1:2020 (mechanical aspects).

3.9.3. To each dock access door location will be fitted with a Stertil® or similar approved model ref SF2520 2500mm long x 2000mm wide x 600mm deep fully hydraulic dock leveller with 450mm long self-cleaning OPEN HINGE swing lip (not piano hinge) with lifetime guarantee for heavy duty use. (Model XF4020 4000mm long x 2000mm wide x 815mm deep fully hydraulic dock leveller with 1000mm long 3-piece segmented lip with 175mm auto retracting side fingers and minimum 360mm under lip clearance, to Euro Dock positions). Rated capacity 6000kg single axle loading (100% to be calculated on front axle, e.g., 3000kg on each of the front wheels acting over two 150mm x 150mm contact areas at 1m lateral centre distance) with 10mm thick 1-PIECE top plate, lip and 'reinforcement cross beams manufactured from FE- 510D high tensile steel. Automatically operated galvanised TWIN

cross traffic safety support legs with rubber shock absorbers to reduce noise which support the unit and a fully rated load without reliance on lip saddles/catchers, in the cross-traffic position, Full width galvanised rear hinge, and gapless design.

3.9.4. Operating range of 300mm above dock and 300mm below dock (Model XF4020 with operating range +410mm / -380mm). Panic stop facility to prevent freefall in the event of vehicle pull away. Emergency stop. Full range safety toe guards, all fully compliant to EC directive EN1398 and adjustable integral galvanised pit frame for suspended type dock levellers in conjunction with pre-cast tail lift arrangement. Deck and lip finish gloss RAL 9011 Black with sub-frame and curb angles hot dipped galvanised finish.

3.9.5. Perimeter brush seals to reduce draughts and interlock safety device to prevent dock leveller from operation when door is in the closed position along with dock interlock to prevent closure of dock door until the dock leveller has been parked.

3.9.6. To each dock access door location will be fitted a Stertil® or similar approved reference WE574 heavy duty galvanised steel frame collapsible dock shelter 3400mm wide x 3600mm high x 550mm projection from building line (WIS 303-22-17NS Inflatable Combi-Seal to Euro Dock positions; 3500mm wide x 4500mm high x 1015mm deep including HD gantry support brackets, bottom side corner pads and integral Water Blocker™ to inflatable head). Manufactured using 3mm thick (3500gm/m2) PVC front flaps and top section of the shelter designed to assist rainwater drainage. Based on 1250mm dock height vehicle sealing range will be 3750mm (h) x 4450mm (h). (Multi-dock WIS-303-22-17NS Inflatable shelters to provide vehicle sealing range 3450mm (h) x 5200mm (h)).

3.9.7. Fitted to each Euro Dock access door position shall be a Stertil® WIS303-22-17 combination inflatable shelter to cover an overall vehicle sealing range of 5200mm down to 3450mm high, fixed frame 40mm goosewing grey insulated construction with integrated inflatable head bag and side curtains. The 2300mm drop head bag is to be manufactured from heavy-duty Cordura material, 1200 denier with an extremely high tear resistance which has a polypropylene and polyurethane coating and the side curtains to be manufactured using 3mm PVC material to give resistance to the elements and withstand abrasive actions and remain colourfast in extremes of environment. Heavy duty galvanised steel support brackets are to be incorporated at dock level to support a shelter size of 3500mm wide x 4500mm high x 1015mm projection based on a 1250mm dock height. Leading edge of inflatable head bag to be fitted with waterblocker™ to provide additional sealing to roof of trailers in addition to bottom side corner pads to reduce air ingress at trailer sides when docked.

3.9.8. External (Arrowhead) type 24v DC 100mm dia red and green LED traffic light. 140mm W x 270mm H x 50mm D resin encased to IP680. To be fitted between each dock shelter on reversing driver's side, compliant to BS 873 standard. Mimic/repeater lights to be incorporated into SMC composite controller.

3.9.9. For illumination to inside of trailers an internal angle poise Stertil® FlexLED™ angle poised LED dock light finished in high visibility yellow with transformer to reduce from 240V supply and high impact flexible neck. Bulb type to be 60o LED long life 40,000 LWS with low energy 20w and 2000 lumen at 4000K colour.

3.9.10. Below each dock leveller position are to be fitted a pair of energy absorbing Polyethylene low friction PE450 Stertil® or similar approved dock bumpers (not plain rubber bumpers) incorporating rubber shock absorbers to reduce collision damage. Bumper size: 220mm W x 554mm H x 140mm D fitted with special front plates to be manufactured using high molecular Black polyethylene which can simply be rotated onsite and interchanged to give four times the life of each buffer. All fixing to be located in rear plate to ensure uninterrupted flat surface, and removable bottom section are to be provided. Bumpers are to be bolted to 10mm thick steel rear mounting plates with top return plate over the front PC retaining wall with pins/Tangs for casting into the finished internal floor slab for added strength and edge of dock protection (Bumpers must not be fitted to sockets alone In pre-cast wall and must be in combination with backing plate). Overall arrangement to be 150mm thick and a minimum of 250mm lip projection in front of the bumper face is required (minimum of 800mm lip projection to Euro Docks)

Bumper configuration to suit Euro Dock positions are to be as above but with longer PE750 Stertil® or similar approved dock bumper size; 220mm W x 815mm H x 140mm D. One bumper to be positioned +200mm above dock using an above dock bracket with the opposite fitted flush with dock height. Fixings alone into cast in sockets will not be accepted, must be in conjunction with steel backing plate.

3.9.11. Below each dock access door, bolted to the external slab, one pair of "Low Profile" 2633mm long x 170mm dia x 220mm high galvanised tubular steel wheel guides with FLARED entrance for ease of parking.

3.9.12. Dock and level access doors shall be numbered sequentially both internally and externally. Numbering to be approved by Employer.

3.9.13. Dock equipment and level access doors are to be supplied complete with an inclusive 2-year maintenance agreement including extended warranty for the same period from tenant occupancy. An extension option for the occupier to extend the warranty of the equipment for up to 5-years from occupancy must be available at the end of the 2-year inclusive period.

3.10. Fire Exit Doors

3.10.1. Fire exit warehouse doors and frames to be Stertil® Thermaguard™ or similar (to be approved by Employer) Steel galvanised 60mm thick single-leaf doors with 110mm thick perforated frame with secure astragal to be flush hung in a steel galvanised single rebated frame on four stainless steel dog bolt butt hinges. Complete with 12.5mm stainless steel threshold with integral neoprene seal

and seals to remaining three sides, medium duty friction stay, internal (fire escape only) 2-point security panic bar and accompanying fire exit signage on both faces. (Note threshold to be installed to provide a low profile in accordance with Building Regulations Approved Document M and BS8300:2009 to provide escape for disabled people).

3.10.2. Doors and frames designed as installed to achieve a minimum U-value as NZEB. Colour to be from manufacturers RAL or BS standard colour range, or in accordance with elevation drawings (Employer decision).

3.10.3. Fire escape doors are to provide min clear opening of 850mm measured from projecting ironmongery of open door to opposite frame jamb in accordance with Building Regulations Approved Documents B2 Fire and M Access, to provide escape for disabled people. (Note: clear width may need to be increased subject to design for means of escape in accordance with Building Regulations Approved Documents B2);

3.10.4. 1100mm high galvanised steel tubular barriers shall be provided externally outside doors as required by Building Regulations, painted to match external doors.

3.10.5. The number and location of fire exit doors shall take into consideration the racking layout, where this is available.

3.10.6. The fire escape door nearest to the office elevation is to include a glazed canopy and is to be configured for external personnel access utilising an escape sash lock with lever handles lockable with double euro cylinder deadlock.

3.11. Fire Compartment Wall

3.11.1. The wall separating the Warehouse and Offices shall be constructed in 'whitewall' structural panelling. The system shall achieve fire resistance / stopping as well as acoustic rating to suit Building Control. The warehouse is not heated as such the wall and office ceiling shall be insulated to comply with the requirements of local regulations, standards and for compliance with the SBEM requirements of the building.

3.12. Fire Precautions

3.12.1. The requirements of the Fire Safety Certificate, Local Fire Prevention Officer and Building Regulations shall be incorporated in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings, all associated signs and notices and hydrants, as a minimum.

3.12.2. Signs and notices shall comply with Associated Signs and European 'Fire Safety Signs, Notices and Graphic Symbols'.

3.12.3. Any other requirements of the Fire Prevention Officer or The Building Control Body with regard to provision of sprinkler installations, smoke vents, hose reels, heat sensors, extinguishers and other

firefighting equipment are specifically excluded, unless required within the developer's base build works and/or required by the Standards Section 1.2.

3.12.4. All hydrants as required, to be tested prior to Practical Completion, and clearly marked as water hydrants.

4. OFFICE SUPERSTRUCTURE

4.1. Structure

4.1.1. The office frame shall be constructed in structural steelwork as shown on the drawings. The frame designed to IS EN 1993 (Eurocode 3) Design of Steel Structures shall be fire protected to achieve a fire resistance as required under the Fire Safety Certificate. All generally in accordance with Clauses 3.1 and 3.2.

4.1.2. Open office areas to be column free.

4.1.3. A galvanised steel viewing platform shall be provided to include tubular welded handrails and rubber flooring.

4.2. Roofing

4.2.1. The office roof will be the Kingspan QuadCore Topdek Single Ply Membrane Roof Panel KS 1000 TD insulated roof system utilising a high-performance PVC single ply membrane from Armour plan (IKO). No rooflights will be provided. This will be supported by the Kingspan 25 Year Quadcore 'Lifetime' Assured Warranty and installed as per the manufacturer's requirements. The internal face of the panel shall be a CLEAN safe 15 standard white liner internal coating with a Class O surface spread of flame rating as tested to BS 476: Part 6 2009 and Part 7: 1997. The roof will pass all the requirements Factory Mutual (FM) Global, FM 4880 – Class 1 Internal Wall & Ceiling Panels Without Height Restriction and FM 4471 – Class 1 Roof Panel Systems.

4.3. Rainwater Goods

4.3.1. All as clause 3.5.

4.4. External Walls

4.4.1. The cladding KS900MR Architectural Insulated Quadcore Wall System will be certified Factory Mutual (FM) Global FM 4880 – Class 1 Internal Wall & Ceiling Panels Without Height Restriction, FM 4882 –Class1 Systems for Smoke Sensitive Occupancies and FM 4881 – Class 1 External Walls, utilising either XL Forté or Spectrum external coating system with up to a 40 year non-Maintenance warranty (XL = 40 years / Spectrum = 30 years - inland environment). This is supported by the Kingspan 25 Year Quadcore 'Lifetime' Assured Warranty and installed as per the manufacturers' requirements. The internal face of the panel shall be a CleanSafe 15 standard white liner internal coating.

4.4.2. Panel module (900mm), colour arrangement, horizontal or vertical orientation and layout of panels to suit the approved elevational treatment.

4.4.3. For horizontally laid panels, the vertical joint will be a Kingspan Option A Top Hat with insert and all corners will be formed with a factory manufactured cranked / folded panel. No visible fixings to panels or flashings will be acceptable.

4.4.4. Structural and thermal performance of the wall are to be included in the Kingspan Quadcore 'Lifetime' Assured Warranty for a period of 25 years.

4.4.5. The system will be installed by a contractor trained by the Kingspan Field Services (KFS) team. Before commencement of any works KFS will provide commentary to the working drawings and arrange site visits to check that the installation is in accordance with Kingspan's recommendations.

4.4.6. The KS900MR Quadcore Wall Panels are classified B-s1, d0, when tested on the internal face of the product, according to the European Reaction to Fire classification system (Euro classes) BS EN 13501–1: 2007+A1: 2009

4.4.7. The insulation to be Quadcore to achieve a thermal U-value as required by the standards.

4.4.8. Where required enhanced fire protection will be provided to the external wall cladding and steelwork to meet firewall status.

4.4.9. All windows and doors will be either fully integrated with a fully tested fenestration system with the KS900MMP Architectural Insulated Panel joint or by flashing details in accordance with Kingspan's recommendations.

4.4.10. Flashings and cill joints shall be co-ordinated with the glazing mullions and the cladding joints.

4.4.11. The entrance portico will be formed in 3mm polyester powder coated aluminium with secret fixings and include LED perimeter 'rope' lighting.

4.5. Curtain Walling/Windows

4.5.1. The curtain walling and glazing systems shown shall be integral with the cladding system. The full perimeter to include air seal (EPDM) and shall be 'Schuco' or similar 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.

4.5.2. Glazing shall be in a minimum 6mm Sunguard SN 70/35 (neutral) on clear glass outer pane, air space/ cavity (argon filled if necessary) and a minimum 6mm clear low inner pane. Spandrel panels, where necessary, shall be in ultra-warm Permawall or similar, insulated panels. In all instances glazing shall be designed to recognise all safety and acoustic constraints necessary and heat soaked to all toughened panes

4.5.3. The curtain walling and windows shall be restricted in accordance with the Building Regulations.

4.5.4. To prevent unnecessary solar gain, solar shading shall be provided, as necessary.

4.5.5. Opening lights with lockable handles and restrictive locking shall be uniformly distributed to the curtain walling/window area.

4.5.6. Double glazing units (thermally broken) and infill panels (with thermal check) shall be fitted to facilitate replacement externally.

4.6. External Doors

4.6.1. The front entrance and all office external doors and frames shall be fully glazed, manufactured in the same system as the curtain walling. Power assisted overhead door closers and full height brushed stainless steel handles shall be provided to the main entrance pass door complete with an automatic locking revolving door (to include security night shutters and drainage to the drum) by Boon Edam (Tourniket range or similar and approved).

4.6.2. The door ironmongery is to have maximum security locking points and all doors to include conduits to allow for future security control and to be separately suited keys. Fire escape ironmongery to be pad handles.

4.7. Internal Walls

4.7.1. Partitions generally throughout the office areas shall be of a proprietary system to include metal stud partitions with impact resistant plasterboard facings. Moisture resistant boards shall be used in areas subject to moisture.

4.8. Fire Precautions

4.8.1. The requirements of the Fire Safety Certificate, Local Fire Prevention Officer and Building Regulations shall be incorporated in respect of means of escape, fire resisting doors and partitions, fire exit doors and fittings, all associated signs and notices and hydrants, as a minimum.

4.8.2. Signs and notices shall comply with Associated Signs and European 'Fire Safety Signs, Notices, and Graphic Symbols.'

4.8.3. Any other requirements or recommendations of the Fire Prevention Officer or The Building Control Body with regard to provision of hose reels, sprinkler systems, heat sensors, smoke ventilators, extinguishers and other firefighting equipment are specifically excluded, unless required within the developer's base build works and/or required by the Standards Section 1.2.

4.9. Lift Installation

4.9.1. The lift(s) to facilitate disabled access to the office upper floor shall be the Kone Monospace 300DX 8-person electric traction passenger lift for disabled access or similar approved, contact paul.prescott@kone.com.

4.9.2. Each landing shall have stainless steel [Flemish Linen, textured steel] lift entrance doors and surrounds. [satin, brushed] stainless steel push-button controls shall 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 shall meet the fire resistance required by Building Control.

4.9.3. The lift car shall be constructed of steel and complete with stainless steel car doors [Flemish Linen, textured steel], tiled floor (to match ground floor lift entrance corridor), decorative laminate walls [whitened Ash antimicrobial], [Cottongrass White painted] steel finished ceiling with long life LED lighting and 3/4 -height rear mirror. A full set of car controls incorporating floor selection buttons shall be fitted at a height to comply with the Building Regulations.

4.9.4. Lift drapes and hooks shall be provided.

4.10. Upper Floor Construction

4.10.1. The upper levels of the offices shall be constructed (and insulated as required) in in-situ concrete on permanent metal decking to carry a superimposed load of 4.0 kN/m², with an additional 1.00 kN/m² for lightweight partitions and 7.50KN/m² for plant room loading (top level). A minimum 60-minute fire resistance shall be achieved.

4.10.2. Suspended floors are to be cast to surface regularity SR3 in accordance with BS 8204-2.

4.10.3. The floors shall be cast to receive a proprietary raised floor to office areas. The floor is to receive a dust inhibitor prior to receiving the proprietary raised floor system.

4.11. Staircases

4.11.1. The main staircase and intermediate landings shall be constructed in reinforced concrete or site-fabricated mild steel, in accordance with the Structural Engineer's details and relevant statutory regulations.

4.11.2. Balustrades shall be formed using a structural metal frame, lined with moisture-resistant plasterboard, incorporating a plywood backing to the internal face for rigidity. A solid timber capping, stained black, with oak beading, shall be provided to the top of the balustrade. A powder-coated black metal handrail supported by handrail brackets shall be installed. The staircase soffit shall be underdrawn with moisture-resistant plasterboard, finished with a high-quality paint in RAL 1014. All works shall comply with current Building Regulations.

4.11.3. The main entrance staircase shall be fitted with solid timber treads, overlaid with carpet (to match office area), with flexible PVC extrusion treads nosing. Secondary concrete staircases, where provided, shall be finished with commercial-grade carpet, including stair nosings and edge trims.

4.11.4. All exposed structural steel elements associated with the staircases shall receive a factory-applied shot blast finish, followed by a full paint system: one coat of primer, two undercoats, and two topcoats, all to the manufacturer's recommendations and agreed colour specification.

4.11.5. Galvanised metal staircases shall be provided to access the viewing gallery and plant deck, complete with a lockable access gate. The staircase shall include anti-slip treads and comply with all relevant health and safety standards.

5. FINISHES - OFFICE

5.1. Ceilings

5.1.1. Suspended ceilings shall be provided as follows:

a. Throughout the offices and ancillary areas, Armstrong "Microlook Dune eVo" 600 x 600mm Tegular full tiles in lay-in grid system with a stove enamelled finish on wire hangers inside an MF perimeter border. The transition between the MF perimeter and the eVo tiles shall be (a full tile with no cut edges to all office areas) created using Armstrong Axiom Transition trim, code T3208G. Perimeter detail formed using a standard 32 x 19mm edge trim

b. To the reception area and the reception lobby a feature plasterboard ceiling with inset feature lighting. Painted with one mist coat and two full coats of cleanable matt emulsion paint, Diamond by Dulux Scuffshield or similar, colours to be agreed.

c. Toilets shall be plasterboard with inset feature lighting.

d. The floor to ceiling heights shall be 2.7m to the offices and 2.4m to toilet areas.

e. All ceilings shall have a minimum void of 250mm complete with all necessary cavity barriers and a minimum depth under beams of 100mm. The use of castellated beams shall be permitted to the Structural Engineer's approval.

f. Plant areas (if within the office) and service riser shall have no ceilings.

5.2. Wall Finishes

5.2.1. All internal walls unless specified otherwise throughout the offices, ancillary and circulation areas shall be plastered/dry lined and fully sealed and then painted with one mist coat and two full coats of cleanable matt emulsion paint, Dulux Scuffshield matt or similar, colours to be agreed.

5.2.2. All walls to the office toilets and lobbies shall be painted as above.

5.2.3. Plant areas (if within the office) and service riser walls shall have no wall finishes.

5.2.4. Shower rooms to be fully tiled (600 x 300mm)

5.3. Floor Finishes

5.3.1. Throughout all areas a raised access floor medium grade system of Kingspan RMG600 or similar to MOB Construction (PSA MOB PF2 PS/SPU) and installation standards to provide a minimum 150mm clear void, to receive carpet tile covering. The raised access floor to be earth bonded in accordance with IEE regulations and the raised floor manufacturers recommendations.

5.3.2. Main entrance reception and circulation areas to receive 900mm x 900mm ceramic tiles with a stainless-steel trim to the tiled skirting.

5.3.3. Generally, throughout the office, lobby, and circulation areas, unless specified otherwise, a Carbon Neutral Flooring such as Huego Interface Ice Breaker carpet tile 500x500mm or similar carpet floor tile coverings shall be provided.

5.3.4. The office toilets, cleaner's cupboard, kitchenette, and general shower facilities shall be tiled with 600 x 300mm ceramic floor tiles with matching proprietary skirtings and stainless-steel trim.

5.3.5. Plant Areas shall receive a coloured epoxy floor finish with bund and gully to wet areas.

5.3.6. Non-slip rubberised flooring will be provided to the viewing gallery.

5.4. Doors and Joinery

5.4.1. Internal doors throughout the offices shall be solid core flush with non-tropical hardwood veneers (to be agreed) and concealed lipping's all around. Frames and architraves shall be matt paint decorated MDF softwood. The source of all hardwoods to be incorporated within the works is to be disclosed and approved. Paint grade doors to be provided to secondary uses (locations to be agreed).

5.4.2. Oversized doors to be provided to office main circulation doors.

5.4.3. Where required, doors shall have an appropriate fire rating and be fitted with intumescent strips, smoke seals, door closers and clear vision panels of size to meet Building Regulations.

5.4.4. All doors, excluding toilets, shall be provided with wireways and access plates to allow future door access controls to be fitted.

5.4.5. Ironmongery shall be appropriate to the location of the door and shall be (square in appearance) approved heavy gauge satin or brushed stainless steel door furniture with ancillary fittings, including door stops and kick-plates to push side only.

5.4.6. Locks shall be individually keyed under master key. (No locking facility is to be provided to toilets and fire exit doors). Locks shall be suited as follows:

a. Master Key to all doors (including external)

b. Sub-master key to all office doors

c. Sub-master key to all maintenance area doors

5.4.7. All services within toilets and compartments shall be concealed and accessible via removeable wood grain effect partitions.

5.4.8. Vanity units shall be Corian topped with matching upstand to rear all with chamfered edges.

5.4.9. Door locking facilities, toilet roll holders and coat hooks shall be provided in each toilet in blacks steel finish.

5.5. Finishes General

5.5.1. In the main entrance lobby area to the full width of the reception area barrier matting Nuway Tuftiguard or similar shall be provided.

5.5.2. Matt paint decorated MDF skirtings and architraves shall be provided throughout except where ceramic skirtings have been specified.

5.5.3. Full width x full height recessed mirrors with concealed fixings to the walls above the wash hand basins.

5.5.4. 2000mm x 600mm wide wall mounted mirror in toilet/ shower areas.

5.5.5. In the bulkhead a recessed pattress shall be provided for future blinds at window heads.

5.6. Plumbing and Sanitary Ware

5.6.1. All toilet, shower areas and cleaners store shall have Armitage Shanks or similar white vitreous china sanitary ware. All horizontal and waste pipework within toilet areas is to be concealed with suitable maintenance access to an approved IPS system.

5.6.2. Armitage Shanks 'Back to Wall' WC suites or similar shall be provided with soft close plastic seat and cover and dual flush plastic cistern located behind the IPS system.

5.6.3. Washbasins shall have self-rimming basins with mixer taps and integral 'flip' plug operation. Taps to be 'intelligent' hands free, with low flow rates and water flow delay time for efficiency of water usage

5.6.4. The following flow rates shall be provided: -

a. Taps (Wash hand basins/Kitchenettes, Hydration Points) – maximum water flow of 6 litres/min

b. Showers – maximum water flow of 8 litres/min.

c. WC's – Flow rates of 4.5l/m for a full flush and 3l/m for a part flush.

5.6.5. Shower rooms to include shallow trays, glazed screen, recessed toiletries shelf and benching with clothes hooks above.

5.6.6. Cleaners sink, with bucket stand, shall be provided with non-concussive hot and cold-water services and set within a shelved white IPS system.

5.6.7. A toilet/ shower room shall be provided all in accordance with the Building Regulations (Doc M). Wall tile colour or IPS panels shall be selected to differentiate the sanitary ware from the walls. All handrails to be stainless steel. The door is to open inwards with the ability to open outwards if required.

5.6.8. All exposed pipework shall be kept to an absolute minimum and where exposed shall be chrome plated copper tube with matching brackets.

5.6.9. Foul drainage 'pop-up' to be provided to the corner of the warehouse slab, locations to be agreed with the Employer's Agent. The use of air admittance values is to be avoided with the foul drainage venting externally to atmosphere.

5.6.10. Two water filling points, suitable for the purposes of drinking (i.e. water fountains) and bottle refilling shall be provided in a location to be agreed with by the Employer (wall mounted TBC). Complete with mains drainage connections. 'Intelligent' hands free sensors shall be included. The Employer may require these water points may be located within the warehouse area; therefore due allowance shall be made to accommodate this within the contract allowances.

5.6.11. Where toilets, showers, kitchenettes, and cleaners' stores are constructed with raised access floors, water leak detection shall be provided. This shall be served via multi-zone panels located in the services riser, with remote visual and audible representation within the reception's feature recess. In addition, the leak detection system is to be linked to the BMS monitoring system.

5.7. Kitchenette

5.7.1. The Kitchenette areas will be fitted with commercial quality base units, worktops, wall cupboards and glazed splashback. A light coloured double drainer composite sink top with mixer taps with energy efficient integrated fridges and dishwashers. A Zip Hydro Tap or similar approved shall be provided to provide for boiling and chilled filtered water. The kitchenette is to be designed in accordance with the Building Regulations.

6. EXTERNAL WORKS

6.1. Service Yard Area

6.1.1. The service yard areas and associated areas shall be paved with minimum (to include all minus constructions tolerances) 190mm jointed reinforced concrete to the Structural Engineers design on a min 1000-gauge polythene or similar with a minimum cube strength of 40N/mm² at 28 days, reinforced to the engineers details. All in accordance with the requirements of TR66. Falls to be a minimum 1 in 80 and a maximum of 1 in 40 (except for level access doors and localised access ramps) with a consistent brush finish surface running perpendicular to the bay with 100mm trowelled margins.

6.1.2. All reasonable endeavours shall be made to provide aggregates that are free of lignite.

6.1.3. Falls to loading docks shall be constructed such that a docked vehicle is horizontal from the building.

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

6.1.5. As soon as excess moisture has evaporated from the surface of the concrete a water-based curing compound shall be sprayed uniformly over the concrete. During hot sunny period, a curing compound containing a suspension of fine particles of Aluminium or other white pigment shall be used. During adverse weather conditions slabs shall be protected.

6.1.6. Drainage channels with steel gratings or precast covers shall not be used in areas of the service yard where they can be trafficked by turning vehicles.

6.1.7. Bay sizes and all longitudinal, contraction, expansion and isolation joints shall be formed in accordance with the recommendations of the Structural Engineer. All concrete up to and around manhole covers or the like shall be designed to avoid cracking. All joints shall be sealed with a two-part polysulphide sealant. All covers shall be set where practical mid bay and away from joints. Sawn joints, shall be cut parallel to brush marks.

6.1.8. Armco or similar protective barriers and bollards shall be provided in the service yard and associated access to protect vulnerable areas of the building and plant areas from vehicular or similar impact damage.

6.1.9. Service Yard line markings shall be provided to designate docking, parking bays and general movement/pedestrian walkways in yellow MMA paint to maximise life span.

6.1.10. Lorry stops shall be provided to service yard parking areas to avoid damage to the building, fencing or the like. The fence to the service yard is to be set back from the kerb face with a gravel infill.

6.1.11. Vehicle tracking to be carried out to verify the external works design and demonstrate the manoeuvrability of HGVs, fire tenders and refuse vehicles around the service yard and into & out of the docking positions and level access doors.

6.1.12. Grasscrete (or similar agreed reinforced grass system) and fire tender access shall be included for as shown on the architect's drawings complete with demarcation.

6.2. Car Parks

6.2.1. The car parking areas indicated on the site plan will be a combination of stone mastic asphalt/asphaltic concrete surface course/base course access roads and permeable paving parking spaces designed and constructed to the following standards, requirements and to include: -

a. To be capable of taking refuse vehicle loads and to include sufficient turning facilities.

b. A minimum 200mm stone mastic asphalt car park access road is to be laid on a minimum 150mm thick Clause 804 granular material Type B sub-base on Class 6F2 capping layer on Class 1A or Class 2C approved fill material. In permeable carpark areas a minimum 120mm permeable asphalt is to be laid on a minimum 150mm thick cement bound 4-20mm material on minimum 150mm thick 4-40mm material, both to IS EN 13242:2002, on Class 6F2 capping layer on Class 1A or Class 2C approved fill material.

c. Parking spaces shall be a minimum of 2.5m x 5.0m (with the exception of disabled parking bays).

d. All directional arrows, disabled spaces, and other traffic markings shall be provided in white thermoplastic paint to a width of 75mm.

e. A minimum 20% car parking spaces shall be provided with vandal resistant Electrical Vehicle Charging (EVC) points along including 2 No 22kW rapid points.

- Each EVC shall have standardised connectors compatible with various electric vehicle models, specifically EV-Plug Type 2.
- The EVP shall have dynamic charging capabilities adjusting the charging rate based on the vehicle's battery status.
- Dynamic load management (via cloud based technology) shall be provided, allowing efficient power distribution amongst all chargers to prevent exceeding the building's maximum import capacity.
- Connectivity shall be provided such as Ethernet, GSM, or other suitable technologies, to enable on site, remote monitoring, diagnostics, and software updates through the BMS.
- The EVC's must adhere to the Open ChargePoint Protocol (OCPP v1.6) and integrate a card reader with various payment methods, including contactless payments, mobile apps, and RFID cards compliant with ISO/IEC 14443A/Mifare (13.65MHz).
- In addition, the EVC system shall be provided in compliance with international standards and regulations for electric vehicle charging infrastructure, such as IEC 61851 (1) (22) with compliance with ETCI, EN, mandatory.

f. Ducting shall be provided to allow future EV installation by others.

g. 90mm x 670mm Rhino RTSQ8 Heavy Duty Square Steel Powder Coated Telescopic Bollards or similar are to be provided to secure the vehicular access points.

6.3. Kerbs

6.3.1. Where indicated, 254 x 127mm half-battered precast concrete kerbs to IS EN 1340 bedded onto a 325 x 150mm concrete base and haunches with concrete shall be laid. Kerbs at main entrance and goods vehicle turning and manoeuvring areas to be trief type kerbs on foundations with haunches.

6.4. Footpaths

6.4.1. Footpaths as shown on the Architects drawing shall include a

a. minimum 100mm thick stone hardcore base blinded with fine stone sand
b. contrasting colour tegular block paviours to the office elevations and entrances.
c. Ancillary footpaths to be permeable tarmac. Refer to landscape architect's drawings for finishes.
d. The following standards will apply:
- BS 7533-101:2021 (Pavements)
- BS 7533-13:2004 (Permeable Pavements)

6.5. Landscaping

6.5.1. The landscape scheme (refer to landscaping drawings) is to be completed by an approved landscape contractor during the construction programme. The approved landscape contractor will deliver the works in accordance with the landscape drawings and specifications and will maintain the entirety of the works for 18 months following completion of all landscape works.

6.5.2. All building waste, stones and rubble will be removed, subsoil graded to contours shown prior to laying of topsoil. All subsoil areas to be compacted (to a depth of min. 600mm) to ensure free drainage and graded prior to laying of topsoil. All grass areas to receive a min 150mm topsoil, evenly spread and rotavated, stones removed, raked, and finely graded, prepared, and turfed or seeded. Minimum 450mm topsoil will be provided for all shrub and planting beds and tree pits. Tree pits to be excavated to min. 1m cube and backfilled with 600mm subsoil and 400mm topsoil and as per landscape architect's drawings and details.

6.5.3. Detailed planting designs and schedules that have been agreed with the Local Authority, will be planted in accordance with the landscape drawings and specifications, with min 75mm bark mulching (to ornamental shrub and groundcover areas areas). Planting will be irrigated during dry periods and weeded by hand to ensure successful establishment. Trees will be staked and supported as detailed on landscape drawings and specifications.

6.5.4. Tree guards shall be provided and are to be biodegradable and/or natural material tree guards as part of the proposed landscape scheme.

6.5.5. Eighteen-month establishment maintenance of trees, shrubs and landscaped areas will be provided by the appointed landscape contractor responsible for the implementation works. Maintenance services will include the replacement of all plants dead and dying within the establishment maintenance period. All planting will be well maintained and adequately watered during the maintenance period. Chemical herbicides, fungicides and pesticides are never to be used during the implementation or maintenance works. Chemical fertilisers are not to be used. Biological fertilisers and soil improvers are to be used to provide the required topsoil quality.

6.5.6. Sufficient external watering points will be provided, evenly distributed to allow for hosepipe connections around the building in locations to be agreed, notwithstanding compliance with BREEAM and the standards in this specification.

6.5.7. All underground services, manhole and service pits are to be located in hard paved areas wherever possible and fully aligned with pavement design. Recessed covers to be used in all paved areas. Service covers to be fully co-ordinated to ensure suitable access is available within landscaped areas and that the landscape design is not interrupted.

6.5.8. The following standards will apply:

- BS 3882: 2015 (Topsoil)
- BS 3936-1 (Nursery Stock)
- BS 4428 (Landscape Operations)

6.5.9. Existing trees identified shall be protected as required during the construction period.

6.6. Drainage

6.6.1. General

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

6.6.2. Pipework

a. Foul and surface water drainage shall be constructed to the details shown on the drainage drawings, using a suitable product. Pipes to or similar approved on Class B granular stone bed. Drainage pipework internal to the building areas shall have a concrete bed and surround.

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

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

6.6.3. Manholes

a. Manholes shall be constructed to the depths required using either plastic, precast concrete rings and heavy-duty cover slabs or in Class B engineering brickwork as agreed by the Structural Engineer. The bases of manholes shall incorporate all necessary clayware channels junction fittings and shall be benched in fine granolithic concrete or pre-formed easi-base.
b. Galvanised step irons or ladders as required shall be included in the walls of manholes and the manhole covers shall be of galvanised steel or cast iron of an appropriate load bearing capacity. Manhole covers are to be set on engineering brickwork 2-4 courses above the concrete biscuit.
c. Manual penstock valve(s) shall be provided.
d. Manhole covers to be marked for identification purposes. Manhole covers to be co-ordinated with the landscaping and kerbing layouts/ joints.
e. Manholes are to be reviewed by the engineer prior to the installation of covers.

6.6.4. Gullies / Channels

a. Gullies to service yard, future sprinkler tanks and car park areas shall be plastic or precast concrete road gullies 150mm outlet, trapped with rodding eye fitted with heavy duty case iron gully gate and frame.
b. Kerb channel drainage and/or channels shall be incorporated in car park areas and slot drainage to service yard areas as per the engineers' details shall be provided.

6.6.5. Petrol Interceptors

a. A petrol/oil interceptor to meet the requirements of the Local Authority/ Environment Agency shall be installed and ventilated (signed in a landscaped area) to serve the surface water drainage system to external paved areas and include for an alarm feed to reception and a future BMS.

6.6.6. Foul Pumping Stations

b. On site, Foul pumping stations, if provided, shall be installed with a combination of local alarms, audio/visual indication in the feature recess in Reception and general alert on the BMS.

6.6.7. A CCTV survey (memory stick) and associated Structural Engineers report of all drainage shall be undertaken prior to Practical Completion and shall confirm clean and fully intact drainage runs and benching.

6.6.8. Headwalls to be designed to complement the wider landscape scheme.

6.7. Ramps

6.7.1. Where ramps are required to be provided for access into the building for disabled persons or for trolley access, these will comply with the requirements of the Disability Access certificate.

6.8. Fencing / Ducting

6.8.1. 2.40m high weldmesh type fencing (polyester power coated colour black) shall be provided to the perimeter of the service yards and shall include locked gates access as per the drawings (complete with ducting for future access control). All fixing of the fencing panels is to be on the service yard side.

6.8.2. Heavy duty 2.4m high locked gates to be provided at the entrance to the site as shown. Pedestrian locked gates to be provided adjacent to the main entrance and yard. All gate locking shall include anti vandalism boxings. Suited locks shall be provided to all gates. Gaps to the base of the gates shall not exceed 150mm.

6.8.3. The boundary of each plot where not fenced shall be defined as per architect drawings. Boundary mark posts (pressure treated, planed timber, 150mm square overall length, 1m with pyramid point top. Minimum 600mm above ground), to be provided.

6.8.4. Ducts suitable for an access control system are to be provided to the secure side of each gate, linked back to the main office area.

6.8.5. Ducts linking into the office shall be provided to allow a future perimeter CCTV installation.

6.8.6. Ducting shall be provided from each corner of the warehouse beneath the adjacent hardstanding and co-ordinated with the soft landscaping for future use e.g., CCTV etc.

6.8.7. Armco barrier to protect any external plant and vulnerable areas shall be provided.

6.9. Cycle Station

6.9.1. A cycle station shall be provided to an approved specification to compliment the elevations.

6.9.2. 2 electric bike charging points to be provided within the cycle station spaces. Refer to drawings.

6.9.3. A free standing (securely fixed to the ground with vandal proof fixings) bicycle repair station, shall be provided.

6.9.4. The bicycle repair station, shall be of sturdy construction, pre-treated to prevent corrosion and PPC [black], incorporating a full set of tools (secured to the repair station with PVC coated cables) and integrated pump with dual valves (Presta & Schrader values) and pressure gauge.

6.10. Totem Signage

6.10.1. Non-illuminated totem signage shall be provided to the entrance of the car parks and service yards, locations, and graphics shall be agreed with the Employer.

7. EXTERNAL SERVICES

7.1. Electric

7.1.1. The maximum import capacity of the building is 499KVA, metered at LV (low voltage). An ESB Substation with adjacent consumer LV Switch-room will be located and configured in agreement with the ESB as shown on the drawings. A commercial shipper shall be appointed at the earliest opportunity, in agreement with the Employer, in order to obtain an energy meter

7.1.2. A local LV earthing array shall be provided to achieve an earth resistivity of 1.0 Ohm or less.

7.2. Gas

7.2.1. A gas supply shall be provided with a capacity of 75 m³/hr.

7.2.2. The supply shall be valved and capped off externally for the future occupier. An external GRP meter kiosk with a compliant concrete base, shall be provided to accommodate the gas meter, if required by the future occupier.

7.2.3. All pipework installed shall be to the requirements of the Gas Networks Ireland Guidelines for Designers and Builders Industrial and Commercial Sites. The gas supply and all distribution pipework shall comply with the following Applicable Standards for Industrial Installations:

- I.S. 329 – Code of Practise for Distribution Gas Mains (Gas Networks Ireland)
- SR 12007-5 - Gas Infrastructure – Pipelines for maximum operating pressure up to and including 16 bar
- I.S. EN 1776 – Gas Supply Systems – Natural Gas Measuring Stations
- I.S. EN 12327 – Gas Pressure Testing, Commissioning and Decommissioning Procedures
- EN15001-2 and I.S. /EN 15001-2
- I.S. 820 – Non-Domestic Gas Installations

7.2.4. All builders work in connection with the gas installation including trenching and backfilling shall be included.

7.3. Water

7.3.1. A metered domestic water supply shall be provided from the site boundary/public supply to serve the building requirements of 0.40 litres per second.

7.3.2. The infrastructure shall be sized to accommodate 1.0 l/s but based on the applied for supply as noted above, subject to the availability from Irish Water.

7.3.3. A suitable un-metered fire main to include storage, if required, shall be provided to serve the fire hydrant and to also provide as a tank in-feed supply for the sprinkler tanks (by others) to be located as indicated on the site layout plan.

7.3.4. All builders work in connection with the water installation, including trenching, shall be included.

7.3.5. A leak detection system shall be provided at the boundary line and building demise.

7.4. Communications

7.4.1. Primary (and diverse where available) Eir ducts shall be provided from the site boundary to a suitable intake point(s) to serve communications requirements.

7.4.2. Primary and diverse Virgin Media/alternative service provider ducts shall be provided from the site boundary to diverse intake points to serve alternative communication requirements where available in the road system.

7.4.3. Two 90mm diameter ducts to be provided from each corner of the warehouse beneath the adjacent hardstanding and co-ordinated with the soft landscaping for future use. Each set of ducts shall be capped and cut off at finished floor level in a neat line and labelled. All ducts shall be left clear with draw-cords.

7.4.4. Smart energy metering shall be provided in accordance with Building Regulations and BREEAM requirements and shall enable a minimum of 90% of the building's energy end uses to be identified, and the relevant functions shall be metered separately, i.e., office areas, warehouse, canteen, etc.

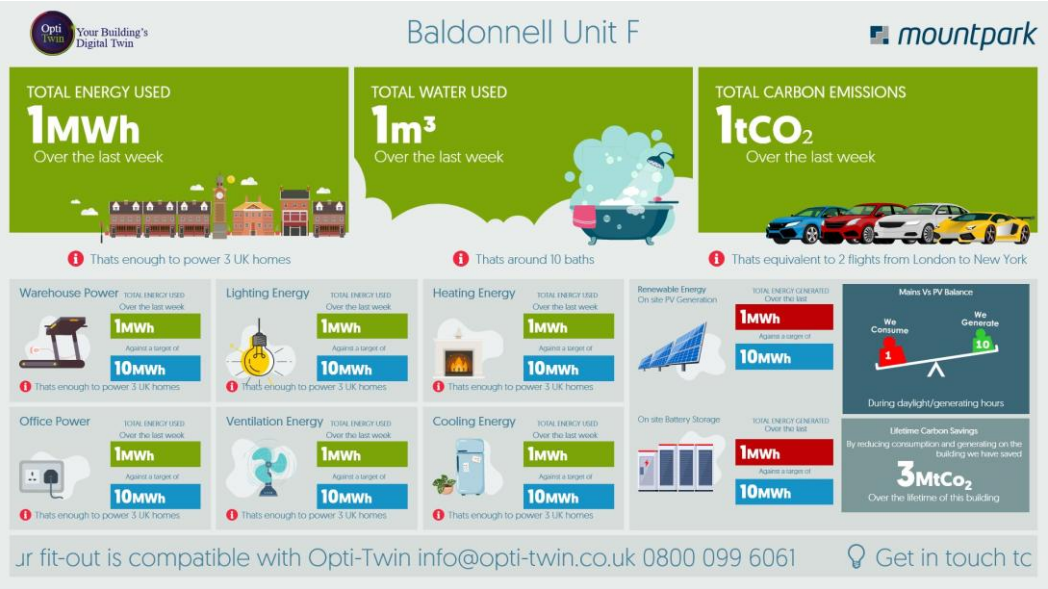
7.4.5. The end use categories shall include.

a. Space heating
b. Domestic hot water heating
c. Cooling
d. Ventilation
e. Pumps
f. Lighting
g. Small Power
h. Warehouse Power
i. Renewable and low carbon systems
j. Controls
k. Other major energy consuming systems, refer to BREEAM guidance

7.4.6. In order to assist the building user to actively engage in minimising operational carbon emissions and energy usage in the building, an Energy Display Screen shall be provided in Reception. As a minimum the cloud enabled 50-inch LED display will inform the tenant and guests alike of how the building is using electricity and water etc., based on the specified metering, and to incentivise them with prompts as to how consumption could be reduced.

7.4.7. The display shall be in a user-friendly format from https://live.opti-twin.co.uk (contact Jon Gill jon@opti-twin.co.uk) in accordance with the below example. The software is provided by Opti Twin

and shall be subscribed to for 12 months post PC.



7.4.8. In order to facilitate the data collection, the energy meters are to be connected, using the Modbus Communication Protocol, to form a separate network of interlinked energy meters covering the building(s), downstream of the primary fiscal meters. This method typically allows up to 100 devices to be connected into a single Ethernet Gateway which in-turn connects to a local data point. The Modbus network shall connect to a meter gateway – Modbus to IP Network convertor, from where the data shall be exported to either, depending on end user Client / Developer requirements, either

a. to / via the Building Management System
b. Modbus central energy monitoring control panel

The building controls system will have an interface designed to allow remote collection to the nominated Energy Monitoring supplier's cloud-based platform

Communication protocol is MQTT

7.4.9. GSM lift line to suit manufacturer's recommendations.

8. MECHANICAL SERVICES

8.1. General

8.1.1. The mechanical services works shall be designed and installed in compliance with all standards set out within this specification.

8.1.2. Any ductwork fixed to the compartment wall is to be considered (and avoided where possible) and designed such that a neat and tidy appearance is offered.

8.1.3. All high-level services shall be located above the clear haunch height of the warehouse. Where required, services crossing the warehouse shall follow the line of the portal frame.

8.1.4. All plant/services to be clearly labelled. Enhanced labelling shall be provided where remote interference is of significance such as, fire alarm power supply, fireman's dock door override switches etc.

8.2. Design Conditions

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

a. External:
   - i. Winter - to suit CIBSE weather data
   - ii. Summer - to suit CIBSE weather data

b. Internal
   - i. Office/Reception areas Winter - 21°C ± 2°C
   - ii. Office/Reception areas Summer - 24°C ± 2°C
   - iii. Cleaner's store - Unheated
   - iv. Toilets - 18°C ± 2°C
   - v. Office areas - 1 Person/7.5m²

c. Ventilation
   - i. Office areas - 12L/S/Person
   - ii. Toilets - 10 Ac. Hr Extract
   - iii. Cleaner's store - 10 Ac. Hr Extract

d. Infiltration
   - i. Office areas - As CIBSE

e. Noise Criteria
   - i. Offices - NR38
   - ii. Toilets - NR45
   - iii. Plant Room - NR50
   - iv. External - To suit local authority constraints.

8.3. Heating Source

8.3.1. The office areas/reception shall be heated, and comfort cooled by Variable Refrigerant Flow (VRF) heat recovery systems or a hybrid VRF system by Mitsubishi Electric or Daikin, The Contractor must provide detailed technical submissions for either system, demonstrating compliance and suitability for the intended application. All proposed systems must comply with current local regulations, including but not limited to F-Gas regulations, and achieve the performance criteria outlined in the relevant sections of this specification. The choice of refrigerant shall consist of the lowest commercially available GWP ensuring it remains equal to or lower than R-32. Heating and comfort cooling shall be provided by the use of horizontal fan coil units located in the ceiling voids and shall deliver treated air into the occupied space through ceiling mounted high-induction swirl diffusers. Air will return to the fan coil units through dedicated square extract air grilles. Each fan coil unit will have its respective control sensor located on the rear face of the return air grille. Fan coil unit system design shall maximise the benefit of heat recovery by combining perimeter mounted FCU's with internal units.

8.3.2. Reference shall be made to the British Council of Offices (BCO) in regards zoning of the fan coil units. Each fan coil unit shall typically serve a 25-30m2 (notionally 6m wide by 4.5m deep) perimeter zone and an internal zone of 50-70m2.

8.3.3. The main reception shall be heated and cooled by the use of a fan coil unit mounted in the ground floor ceiling void just off reception. A discrete sensor shall control the output of the unit, with adjustment via an adjustable controller mounted within the reception's feature recess.

8.3.4. Each fan coil unit shall be centrally controlled as part of a group controller location to be agreed. The internal units shall be fitted with filters that can be removed for cleaning or replacement. Access to the units shall be predominantly through removable ceiling tiles or maintenance hatches where this is not possible.

8.3.5. Condensate shall be taken away from the fan coil units through gravity to foul drainage and pumped where not possible.

8.3.6. An external condenser compound shall be provided, to serve both the base build condensers and future occupiers fitout. The discharge condensate from the condenser, shall discharge to a gravel margin, if acceptable.

8.3.7. The office toilet core areas shall be heated and cooled by the use of void mounted fan coil units. Mechanical extract shall be provided to each toilet cubicle, cleaners cupboard and kitchenette, with static transfer ducts enabling treated air to circulate through each cubicle. Door transfer grilles will not be acceptable

8.4. Ancillary Areas/Cores

8.4.1. Heating to ancillary areas (excluding toilet, entrances or areas defined elsewhere within the specification) such as escape stairs shall be provided by wall mounted decorative electric convector heaters or ceiling mounted electric radiant panels with thermostatic control and a separate digital 7-day time clock, to control operation of the heaters.

8.5. Warehouse Area

8.5.1. Roof mounted natural louvred opening vents (refer to section 3).

8.5.2. Foul drainage 'pop-up' to be provided to corner of the warehouse slab. Locations to be agreed. The use of air admittance valves is to be avoided with the foul drainage venting externally to air.

8.6. Domestic Water Services

8.6.1. A mains cold water service shall be extended from the intake point to the building.

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

8.6.3. All pipework shall be concealed or within voids, where possible and shall be thermally insulated to BS.5422:2009. Where pipework is exposed within toilet areas it shall have a chrome plated finish with matching fittings and brackets.

8.6.4. Domestic hot water shall be provided by air source heat pumps complete with electric immersion heater support.

8.6.5. The complete system shall be sterilised and tested as required for a fully potable system and in line with the prevention of Legionella.

8.6.6. To support legionella control all relevant systems shall be in accordance with the following standards in addition to note elsewhere within this specification

a. All the current CIBSE Design Guides and Technical Memoranda.
b. CIBSE Commissioning Codes.
c. CIBSE Guide M – Maintenance Engineering & Management.
d. CIBSE TM/13 – Minimising the risk of Legionnaires disease.
e. HSE ACOP L8 – Legionnaires Disease – The Control of Legionella bacteria in water systems

8.6.7. Thermostatic mixing of both hot and cold-water supplies shall be required where needed to be in accordance with Building Regulations and DAC.

8.6.8. Potable mains/cold-water storage tanks shall be supplied and installed in accordance with BS8558, BS EN 806 and Irish Water requirements. Tanks shall be format 30 and come with tank dividers for the purpose of maintenance, lids, access hatches, screened vents and overflows, drip trays, drain-off outlets, and valves. Water outlets shall be installed at bottom opposite ends of inlets to ensure water turn-over.

8.6.9. Water booster pump sets shall be installed on raised concrete plinths on anti-vibration mounts.

8.6.10. Water quality report shall be required from local Authority to be obtained to confirm water quality and contaminant levels.

8.6.11. Where the local water supply is determined to be Hard, the Contractor shall install a Hy-Mag or equivalent electromagnetic water conditioner. The installation shall be installed in accordance with the manufacturer's instructions and water regulations. This is to mitigate the effects of limescale buildup within the system, ensuring optimal performance and longevity of water-using appliances and piping.

8.7. Ventilation

8.7.1. The office areas shall be served by high efficiency heat recovery units (Lossnay or similar approved) having a minimum efficiency of 73% and minimum SPF of 1.6W/l/s. CO2 levels within the office areas, shall be monitored and controlled via wall mounted sensors, to ensure the optimum amount of fresh air is provided to suit the occupancy levels within the space. CO2 sensors shall be provided that shall automatically slow the MVHR fans down to improve system efficiency. The wall mounted sensors shall contain illuminated indication giving guidance as to Good, Fair and Poor space conditions in respect to CO2 levels. Filter grades are to be F7/M5.

8.7.2. The fresh air supply shall be directed to the rear of the fan coil units and return air paths shall be directed from each space via return air grilles.

8.7.3. An Indoor Air Quality Plan shall be produced that covers Particulate Matter, Organic matter, and Inorganic Matter. All void mounted MVHR units shall be provided with high efficiency air filters to BS EN ISO 16890 – ePM1, as a minimum.

8.7.4. Ventilation systems to ensure Carbon Dioxide levels are kept below 800ppm. Prior to occupancy the HVAC system will be Commissioned and balanced.

8.7.5. A further high efficiency heat recovery unit shall be provided, incorporating an electric heater battery, to serve the toilets/showers/kitchenette and cleaners cupboard. The system shall comprise grilles, galvanised ductwork, and crosstalk attenuators. Air shall be extracted from the toilets, showers, kitchenette, and cleaner's cupboard, with heated fresh air being delivered to the lobby areas of the toilets. Door transfer grilles are not acceptable, therefore void mounted air transfer ducts complete with air valves, shall be provided.

8.8. Automatic Controls

8.8.1. A proprietary standalone, digital web based BMS control system with the means for future connectivity to an external website, shall be provided in a location to be agreed and managed as a minimum the following systems:

a. Optimum start and timed off provisions
b. Ventilation – Timed start/stop, filter dirty, fan failure

c. Toilet Extract – Timed start/stop, fan selection, trip
d. Water Heater – Start
e. Pressurisation Alarm (if required)
f. Lamp Test
g. Petrol interceptor
h. PV/ batteries
i. Leak detection for all water systems within site boundary
j. EV chargers
k. AOVs/ Smoke vents
l. Any other service as required

8.8.2. A remote panel with buzzer, mute switch and indicator lamp shall be provided within the reception area (if applicable) to indicate any main mechanical plant failure.

8.8.3. All plant shall have suitable controls and capability to connect to a future automatic BMS controls installation by others.

8.9. Services Pipework

8.9.1. Pipework

a. Heating - Black mild steel heavy weight to BS EN 10255:2004 incorporating Amendment 1:2007
b. Gas Internal - Black mild steel heavy weight to BS EN 10255:2004 incorporating Amendment 1:2007
c. Mains Cold and Hot water services - Light gauge copper half hard temper to BS EN 1057
d. Mains Cold Water external - blue polyethylene medium density to BS EN 12201. Barrier pipework to be provided dependent upon ground conditions.
e. Gas external below ground - yellow polyethylene high density type SDRII Series 5 to BGC/PL2: Part1
f. Overflows and Drains - Unplasticized polyvinyl chloride to BS EN 1452 (white where exposed)
g. Refrigeration - Copper tube BS EN 12735-1.
h. The use of proprietary fittings such as Geberit's Mapress range, can be considered, for domestic services only and subject to agreement.
i. HVRF – Multilayer pipework PEX-b ISO 21003 WRAS Approved pre insulated with LDPE, or equal and approved

9. ELECTRICAL SERVICES

9.1. General

9.1.1. The electrical services work shall be designed and installed in compliance with all standards set out within this specification, and the National Rules and for Electrical Installations I.S.10101:2020 and Associated documents, including all relevant Irish, European and British Standards, Electricity Supply Regulations and the National Health and Safety Work Act.

9.1.2. All high-level services shall be located above the clear haunch height of the warehouse and set at the underside of the roof line, with routes around the external wall line or following the portal frame.

9.1.3. All services fixed to the compartment wall are to be considered and designed such that a neat and tidy appearance is offered.

9.1.4. All services to be clearly labelled.

9.2. Electricity Supply

9.2.1. An ESB Substation with a consumer LV Switch-room shall be located and configured in agreement with the ESB as shown on the drawings. The LV sub-main cabling shall be extended from the main off-loader panel located in the external switchroom to the main distribution board located in the warehouse. This supply shall initially be at LV although all cabling and associated switchgear shall be capable of distributing at MV at a later date. From this point, electrical power shall be distributed to the main building panel board(s).

9.2.2. Metering shall be at LV with the meter located in the consumer side of the Substation. The meter shall be a smart meter with 3G connectivity.

9.2.3. As noted under clause 7.1.1, an authorised capacity of 499kVA shall be procured, however the site shall be designed and sized based on a future potential incoming supply of 1mVA. The contractor shall allow for the supply and installation of all necessary cabling, earthing, main switch board and equipment, to provide for this future increased capacity.

9.2.4. The Substation shall be located so as to minimise, as far as possible, excessive lengths of LV (Low Voltage) cable.

9.2.5. The Substation construction and accessibility shall be in accordance with ESB Standard Requirements.

9.3. LV Panel Board and Distribution Board

9.3.1. The Main Off-Loader located in the external switchroom and the Main Electrical Distribution Board located in the warehouse shall be sized to accommodate on the building maximum import capacity.

9.3.2. The LV main & sub-main panel board and distribution board(s) shall be in accordance with BS EN 61439, Form 4 separation type 2, suitable for the supply capacity and be complete with necessary

MCCB's and MCB's together with a 25% allowance for spare ways. An automatic changeover facility shall be provided in the main panel to allow a generator to be connected to provide full load support. Accessible panel within cladding to enable connection of a temporary standby generator.

9.3.3. The LV Main & Sub-Main panel board(s) shall incorporate panel mounted sub meters (check meters) for all incoming/outgoing supplies in accordance with BS EN 62053 requirements. The meters shall have dual modbus output capability to facilitate the future connection to a BMS and energy monitoring and management system. As a minimum, these meters shall monitor the following:

a. Power to the warehouse
b. Incoming water to the office/ warehouse.
c. LV power to the Offices/ warehouse.
d. Lighting to the offices/ warehouse.
e. Mechanical power to the offices/ warehouse.
f. Spare connection for future process supply to the warehouse
g. Spare connection for the future lighting to the warehouse
h. Photovoltaic energy generated
i. Reception Energy Display Screen

9.4. Sub-Main Cables and Cables

9.4.1. Sub-main cables shall be provided from the LV panel board to sub distribution boards and busbar trunking feed points, extended in XLPE/LSF/SWA/LSF copper cables to EN 50575 and The European Construction Products Regulation (CPR). All distribution systems shall be continually rated and designed in accordance with National Rules for Electrical Installations I.S. 10101:2020.

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

9.5. System of Wiring

9.5.1. The lighting power installation to the offices and ancillary areas shall, in general, be carried out in double insulated lsf cable in accordance with I.S. 10101 run within ceiling voids supported in accordance with the manufacturer's requirements, and clear of the suspended ceiling and where necessary in galvanised steel trunking/conduit to provide a rewireable system that is concealed and flush with plug in roses/lighting control modules at termination points for final connection to fittings.

9.5.2. The use of modular wiring systems for the office lighting shall be acceptable. These shall be supported in accordance with the manufacturer's requirements, and clear of the suspended ceiling.

9.5.3. External lighting supplies shall be extended in XLPE/LSF/SWA/LSF cables run in ducts, as necessary. Consideration and coordination with external landscaping designs for ducting locations.

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

9.6. Lighting Installations

9.6.1. The lighting shall comprise of LED fittings, manufactured by Thorn, Whitecroft, Ansell, Dextra, Kingfisher, Thorlux and Holophane, alternatives will be considered subject to Employer approval *(5-year minimum manufacturer replacement including all parts and replacement labour on fittings)*.

9.6.2. Internal lighting design including lux levels and uniformity, shall be provided prior to installation.

9.6.3. All lighting shall be LED and comprise the following to (zones and switching to be agreed):

- Offices General — 600 x 600mm² LED recessed high frequency lay-in modular luminaries with low brightness diffusers consistent with LG7 to give an average of 400 lux at 750mm above floor level with a uniformity not less than 0.60. To be switched via PIR and to include daylight detection.
- Toilets — LED recessed down lights to give an average illumination level of 100 lux at floor level, PIR controlled. All accessible spaces to be minimum 200 lux at floor level.
- Ancillary — All non-plant areas shall be PIR controlled. Manual switching control shall be provided to all plant areas. Where provided, viewing galleries not used as an escape route, shall be controlled via absence detection switching.
- Reception/Main Entrance/Stairs — LED feature lighting to give an enhanced effect. Generally, to give an average illuminance of 200 lux (dimmable).
- Emergency Lighting — Emergency lighting fittings with integral 3-hour battery/inverters shall be provided to all fire exits, corridors, toilets, reception etc in accordance with Fire Officers' requirements and I.S. 3217 Emergency lighting. Emergency lighting shall also be installed to all service risers. Emergency lighting shall be tested via key switch.
- External Lighting — External lighting shall be in line with BS 5489-1:2013 and BS IS EN 12464-2:2014 .External lighting strategy shall be in line with Table 2 of the ILP Guidance notes for the reduction

of obtrusive light, 2011. Illuminated advertisements to be in compliance with ILP PLG05.

LED lighting shall be provided to the building periphery as Thorlux or similar approved and shall offer a full cloud based control system as Thorlux's Smartscan, including remote management for energy efficiency, full lighting control, fault detection, and with scalability for large areas or future expansion. Any subscription costs for cloud-based management hosting are to be included for a period of not less than 20 years. Any additional costs are to be fully disclosed and shall be included. Each luminaire shall incorporate dimming facilities providing for daylight dimming and also dimming during low activity, reverting back to full brightness in the event of motion detection. Via the cloud based controls, all external lighting shall be automatically switched off between 23:00 and 07:00.

The external lighting system shall be provided on columns up to 10 metres high to provide an average of 20 lux and 40% uniformity within service yards. Car parking and road areas from 4-5m high columns with suitable lantern to provide an average of 10 lux, 25% uniformity and a minimum of 5 lux at kerb lines. Local increase to 50 lux average to the staff entrances and loading bay areas to provide a uniformity of 40%. An Isolux drawing shall be provided for all external lighting prior to installation. Lighting to adoptable standards to the access road off a landlord's supply/meter. Building mounted lighting to match the cladding, or an approved alternative colour. Each fitting shall have a minimum life expectancy of 100,000 hours (L90/B10).

Feature lighting shall be provided to the office elevations landscaping and roof terrace.

External wall cladding mounted lights shall have purpose made light brackets for both horizontal and vertical sheet applications.

9.6.4. Daylighting report for BREEAM to be updated to confirm at least 55% of the space receives at least 300 lux, 28 fc of sunlight for at least 50% of operating hours each year and no more than 10% of the area can receive more than 1,000 lux, 93 fc for 250 hours each year.

Power Installation

9.6.5. Electrical power supplies shall be provided generally as follows:

• Building Mounted Signage	2 No. 20amp single phase supplies to future building mounted signs using XLPE/LSF/SWA/LSF cable in containment. Supplies controlled by time switch in a service riser (at a location to be agreed). Circuit serving external items to be RCBO/RCD protected.
• Mechanical Services	All power and control supplies associated with mechanical services (refer to mechanical section). Local isolation to be provided to all items of equipment.
• Comms (Telco/ EIR)	1 No. 13 amp SP spur for incoming Eir supply. This supply together with earth to a dedicated feed from main LV panel.
• Main Office Areas	Within the suspended cavity floor a bus bar trunking system (maximum 3m distance from perimeter wall or 6m from adjacent bus bar) with 3-metre-long flexible connections to three compartment recessed floor outlet boxes, to be provided on the basis/region of 1 No. floor outlet box per 10m² floor area or greater to suite typical grid arrangements and adjacent plaster walls (photocopier etc locations) with a design capacity of 25w/m². Floor boxes shall incorporate 2 No. twin switched socket outlet (high integrity earth type) – To BS7671, 2 No. blank plate for telecom, 2 No. blank plate for data.
• Reception	Include 2 No floor boxes to the office floor void.
• Toilets/Showers	1 No. Fused Connection Unit (FCU) for hand dryer in each area. 1 No. alarm pull cord and sounder to disabled toilets. 1 no. FCU and hair dryer (1.5kW) to each shower.

• Kitchenette	Twin Switched Socket Outlet (SSO) brushed chrome over and white PVC under the worktops. Numbers to be agreed.
• Cleaners Sockets	1 No. single SSO per every ten metres wall girth (minimum 1 No. per room/area). Cleaners socket to be on a separate circuit and on the perimeter wall. Including stairways and corridors.
• Warehouse doors	Three Phase & Neutral (TP&N) supplies to doors served via distribution board(s) within the warehouse.
• Lift	TP & N supply.

9.7. Fire Alarms

9.7.1. 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 IS:3218:2013 Code of Practice for Fire detection and Alarm Systems for buildings and the Building Control Officer. An aspirating smoke detection system shall be installed within the main warehouse and shall be VESDA or similar approved. The equipment will incorporate a main fire alarm panel located in the reception area, break glass manual contacts on all escapes to provide a complete system with zones being arranged to suit the Client's requirements. The warehouse shall also be fitted with a manual system, comprising of manual call points and beacons as required

9.7.2. Spare zones shall be provided to permit the future addition of areas. Sounders shall be provided throughout the offices to accord with the standard. The system shall be wired in red Firetuf, or equal cable extended in a concealed manner in the Main Offices. As a minimum the principles of a L1 system shall be installed. Note: Redcare is not provided.

9.7.3. Sounders, beacons, and detectors shall be a combined unit in white, to all toilet areas.

9.7.4. Linear heat detection (LHD) shall be installed along critical PV system pathways, including DC cable trays, combiner boxes, and inverter enclosures, to provide continuous temperature monitoring. The LHD system shall trigger an alarm upon exceeding a pre-set temperature threshold, providing early fire hazard detection. The LHD system shall be fully integrated with the site's fire alarm system and Building Management System (BMS) for immediate alarm notification and remote monitoring. In addition, a fire alarm interface shall be provided to the photovoltaic (PV) G10 control panel. This interface shall activate a shunt trip mechanism integrated within the main PV breaker in the LV panel and a shunt relay at the inverter to ensure complete isolation of both the AC and DC sides of the system.

9.8. Lightning Protection

9.8.1. A lightning protection system shall be provided to the building in accordance with BS EN 62305, with plastic test points to suit loadings.

9.9. Solar Photovoltaic and Battery Storage System

9.9.1. A solar PV array with a size in line with the NZEB shall be provided complete with a Tesla battery or similar storage system (sized at 50% of the PV capacity - including provision of linear heat detection (refer to clause 9.7.4). The system shall be designed to enable additional panels and batteries to be added. Display screens shall be provided in reception to indicate the current yields and CO_2 savings in combination with the energy display (refer to section 7.4).

9.9.2. The batteries are to be left, following testing and commissioning, set up on a 10% trickle charge basis. The contractor and specialist shall allow to meet with the Occupier post PC to ensure the

system set up has been optimised to suit the Occupier. Electricity generation and battery performance data shall be remotely accessible by the Client and the Occupier.

9.9.3. Battery storage to be positioned a minimum of 10m from building and should include all necessary protection. In addition, both the battery and PV supply shall incorporate a fire alarm interface (FAI) ensuring that the battery and PV array are isolated from the grid system during a fire condition.

9.9.4. Pre & post installation roof inspections to be carried out. Solar contractor to ensure that both the roof structure including both secondary and primary steel can accommodate the additional loadings.

9.9.5. Solar mounting clamps and/or brackets shall fix through the side of the crown of the roof profile. EPDM gaskets between clamp and profiles. Any exposed fixing holes must have a fastener installed.

9.9.6. Stainless steel fixings must be used, and no impact drivers are to be used.

9.9.7. Cable trays and ancillary items shall also be mounted off the roof using the same mounting system as the solar modules.

9.9.8. Solar panels shall be a minimum of 500mm clear down the sides of the rooflights and 300mm each side of sheet end laps. A minimum of 500mm away from ridges, verges, and penetrations.

9.9.9. All inverters are to be contained within a fire compartment.

9.9.10. A G10 control panel shall be provided, equipped with a grid protection relay to monitor and manage the interface between the photovoltaic system and the mains electricity grid. The G10 panel shall ensure disconnection of the PV system in the event of grid instability, faults, or during scheduled maintenance, in compliance with applicable grid connection and safety standards. The panel shall also incorporate a fire alarm interface connected to the fire alarm system, enabling coordinated system shutdown. This interface shall activate a shunt trip mechanism integrated within the main PV breaker in the LV panel and a shunt relay at the inverter to ensure complete isolation of both the AC and DC sides of the system.

9.9.11. PV optimisers shall be included with module-level power management capabilities, designed to maximise energy yield under conditions such as shading or variable panel orientations. The optimisers shall include advanced safety features to automatically shut down DC voltage generation upon inverter isolation. Additionally, the optimisers shall enable performance monitoring at the individual module level.

9.10. Automated External Defibrillator

9.10.1. One wall mounted Automated External Defibrillator *(AED)* shall be provided to the warehouse area, all installations shall comply with the latest Resuscitation Council UK guidance or local equivalent.

10. ENERGY EFFICIENCY

10.1.1. In order to assist the building user to actively engage in minimising the operational carbon emissions and water usage, a fully informative LED display shall be provided, mounted in reception, to inform the user and guests alike of how the building is using both electricity and water. This display shall

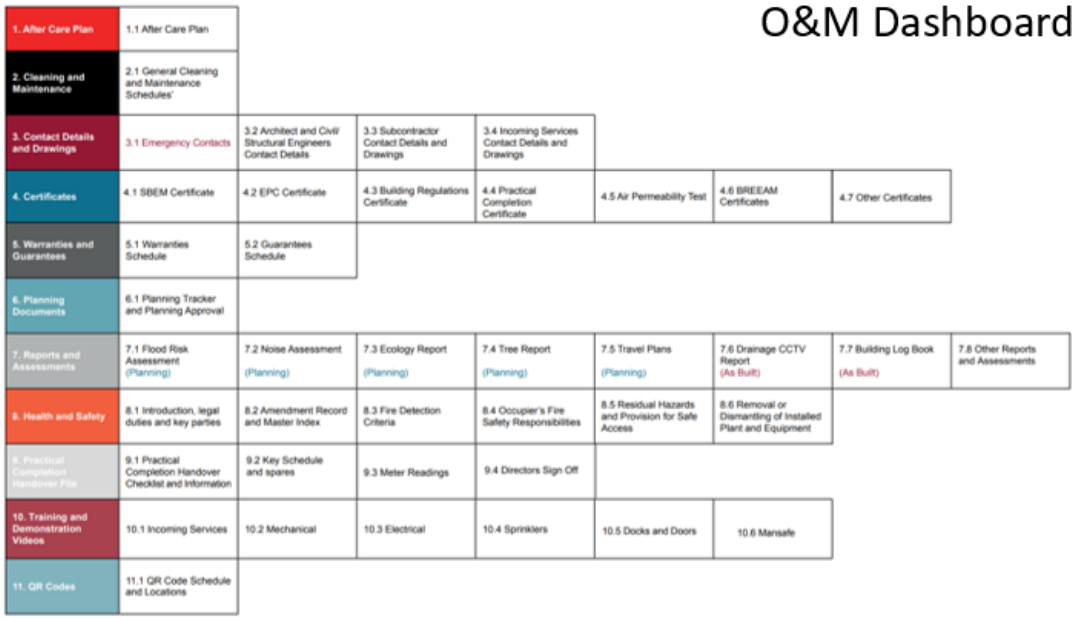
be a user friendly and simple visual indication of how energy is being consumed and to help express the impact of the energy / water usage and how reductions should be considered.

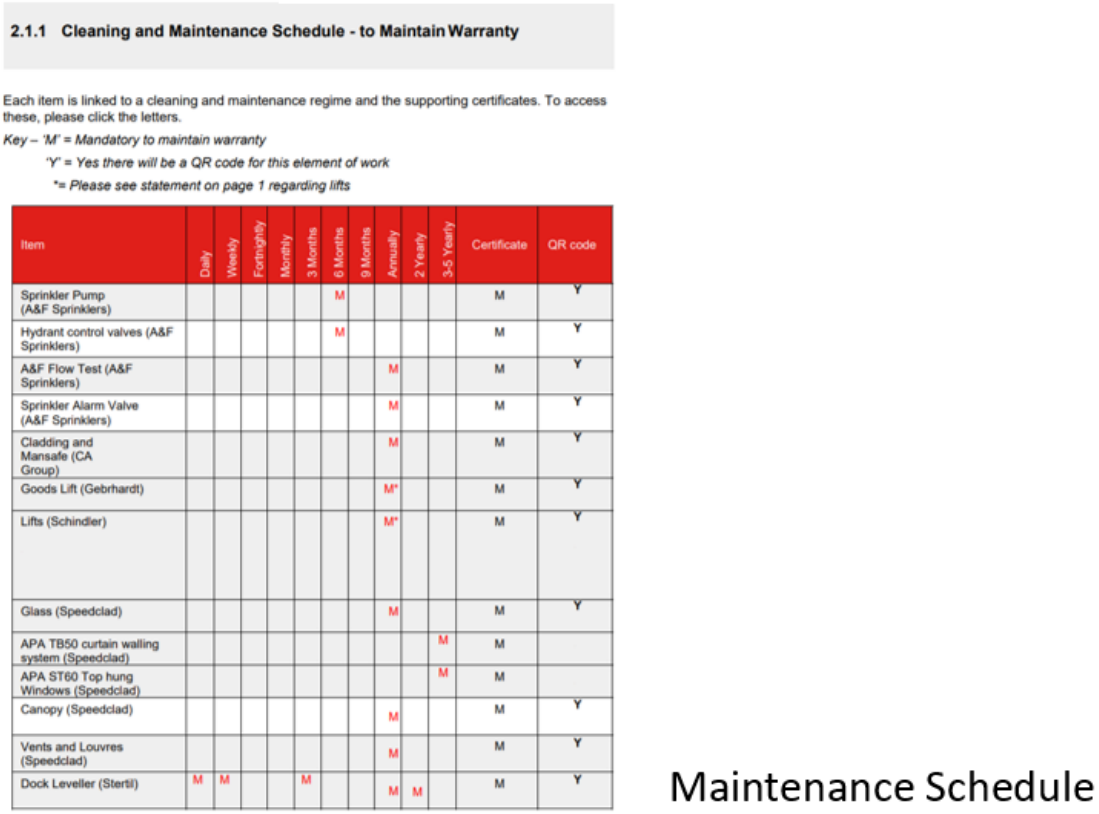
10.1.2. When preparing the documentation for BRIRL and BER, it is crucial to include the Gross Internal Floor Area (GIA) for both the office and warehouse sections. This incorporation is vital for the accurate allocation of renewable energy resources and aligns with the guidelines specified in the National Calculation Methodology (NCM).

10.1.3. When evaluating the shell fit-out, lighting should be adjusted to meet the current regulations as stated in Approved Document Part L.

11. OPERATION AND MAINTENANCE MANUALS, INCORPORATING HEALTH & SAFETY FILE

11.1.1. The Operation and Maintenance manuals shall incorporate an operating & maintenance dashboard and a Maintenance Schedule. These shall be provided in the format and presentation identified below tailored by prior agreement to suit the development. The Contractors Instructions for producing the manuals shall be followed and any queries raised.





2.1.1 Cleaning and Maintenance Schedule - to Maintain Warranty

Each item is linked to a cleaning and maintenance regime and the supporting certificates. To access these, please click the letters.

Key – 'M' = Mandatory to maintain warranty

'Y' = Yes there will be a QR code for this element of work

**= Please see statement on page 1 regarding lifts*

Item	Daily	Weekly	Fortnightly	Monthly	3 Months	6 Months	9 Months	Annually	2 Yearly	3-5 Yearly	Certificate	QR code
Sprinkler Pump (A&F Sprinklers)						M					M	Y
Hydrant control valves (A&F Sprinklers)						M					M	Y
A&F Flow Test (A&F Sprinklers)								M			M	Y
Sprinkler Alarm Valve (A&F Sprinklers)								M			M	Y
Cladding and Mansafe (CA Group)								M			M	Y
Goods Lift (Gebrhardt)								M*			M	Y
Lifts (Schindler)								M*			M	Y
Glass (Speedclad)								M			M	Y
APA TB50 curtain walling system (Speedclad)										M	M	
APA ST60 Top hung Windows (Speedclad)										M	M	
Canopy (Speedclad)								M			M	Y
Vents and Louvres (Speedclad)								M			M	Y
Dock Leveller (Stertil)	M	M			M			M	M		M	Y

Maintenance Schedule

11.1.2. QR codes shall be set up for each mandatory maintenance element of the project linking to online documentation, service, and maintenance records. The O+Ms is to be hosted by the Contractor until handed over at PC.

11.1.3. The O+M dashboard and the maintenance schedule are to contain hyperlinks that take the user through to the relevant sections of the O+Ms. All subcontract O+M manuals are to be 'benchmarked' for ease of use.

11.1.4. Two working weeks prior to practical completion a sufficiently complete draft copy of the operating and maintenance manuals shall be issued.

11.1.5. On Practical Completion, the files shall be supplied on a laptop with a memory stick back-up, including but not limited to:

a. Occupier Aftercare Plan:

i. Specific manufacturers information.
ii. Maintenance calendar.
iii. Links to maintenance procedures, basic training and operating, manufacture details.
iv. Training videos and demonstrations as required for any tenants.

b. As built specification.
c. As built drawings (AutoCAD and PDF).
d. Test certificates, including, building control, commissioning, BREEAM, etc.
e. All relevant information for the safe maintenance of the project.
f. Equipment asset register.
g. Planning file.
h. Landlord areas, where multi-unit, are to be presented in a separate set of O+Ms on a separate memory stick.

11.1.6. Director sign off is required for Practical Completion, such that the Director in Charge has verified the adequate content of the O&Ms for handover.

11.1.7. Sub-contractor sign off shall be provided across all O+M packages to guarantee a true and accurate record of what is provided to enable the development and/or facility to be safely operated and maintained during its operational use.

12. COMMISSIONING

12.1. Commissioning and User Instruction

12.1.1. All services shall be tested and commissioned, fully operational and suitably cleaned prior to practical completion, in accordance with CIBSE technical memoranda and guides.

12.1.2. All engineering systems shall be fully commissioned prior to Practical Completion and handover.

12.1.3. Commissioning shall comprise the process of transforming an installed system or item of plant from a state of static completion into full working order, including all necessary measuring, balancing, regulation, and adjustments.

12.1.4. All recommendations of appropriate IEE Regulations and CIBSE/ BSRIA commissioning codes shall be complied with.

12.1.5. All plant, systems and equipment shall be fully commissioned before being offered to the Employer's Representative as being practically complete.

12.1.6. Commissioning shall be carried out by personnel specialising in such activities.

12.1.7. In the course of agreeing the programme of work, a detailed method statement for each commissioning activity shall be submitted to the Employer's Representative for approval, 8 weeks prior to practical completion.

12.1.8. All commissioning records shall be approved by the Employer's Representative before being included in the completions record documents.

12.1.9. Commissioning records shall include details of initial and final readings of all measurements taken, together with all relevant information to confirm that the installations have been set to work within the operating tolerances specified or otherwise laid down in the commissioning codes.

12.1.10. When the Employer's Representative has confirmed that the works have been commissioned and before the works are offered as being practically complete, full instructions shall be given to the Employer's operatives on the correct, safe, and efficient operation and maintenance of all associated systems, plant, and equipment.

12.1.11. Adequate time shall be allocated to enable the various stake holder's operatives to understand the complexities of the systems and to learn the necessary procedures for their operation and maintenance.

12.1.12. User instruction shall include an appraisal of all activities recommended in the Operating and Maintenance Manuals.

12.1.13. User instruction shall include an appraisal of the as fitted drawings.

12.1.14. Evidence of user instruction shall be provided to the Employer's Representative in the form of summaries of topics covered and dates of instruction. The summaries of instruction shall include a record of the person(s) instructed and the confirmatory signature of one of these under instruction.

12.1.15. Thermal comfort report to include performance verification, long-term thermal data or a thermal comfort survey with specific satisfaction thresholds.

12.1.16. Acoustician to be appointed during detailed design to manage background noise levels.

12.2. Maintenance during the Defects Liability Period

12.2.1. In addition to attending to defects throughout the liability period the Contractor shall provide all required maintenance associated with the Engineering Services. Maintenance shall be carried out in line with manufacturer's recommendations and relevant standards.

12.3. Soft Landings

12.3.1. The principles of BSRIA's 'Soft Landings Framework' and 'Pit stopping' which is the associated 'reality' checking process of the installed engineering systems shall be followed.

12.3.2. The Soft Landings Framework acknowledges that often well-designed buildings do not realise their potential due to the inadequacies of the commissioning and particularly the handover process resulting in poor performance in use. Since this was launched in 2009 it has been recognised that the drive to 'zero carbon' brings inherent risks and that talented teams often still deliver buildings which perform badly both in terms of their energy use and, more fundamentally, as places to live, work or perform.

12.3.3. Understanding the causes of this performance gap between design and reality is essential to cutting carbon in the built environment.

12.3.4. The reasons for this gap are many, ranging from poor design, construction, and installation to inadequate or overly complex control and inadequate training of the building users. The main thread which weaves its way through from early design to building use is a failure to manage innovation.

12.3.5. Recognising these inherent risks associated with innovation is the first step; the second step is managing these risks. The 'Pit stopping' Framework encourages the review of decisions (pit stops) by a wider range of interested parties beyond the conventional Client and Design Team bringing together a range of skills and viewpoints, particularly those of the building users - staff, visitors, customers etc.

12.4. Seasonal Commissioning

12.4.1. Commissioning shall be carried out by arrangement with the various stake holders in line with the current Building Regulations, BSRIA and CIBSE guidelines.

12.4.2. The following commissioning procedures shall be carried out:

a. Commissioning of air and water systems shall be carried out when all control devices are installed, wired and functional.
b. In addition to air and water flow results, commissioning results shall include physical measurements of room temperatures, off coil temperatures and other key parameters as appropriate.
c. The BMS/ controls installation shall be running in auto with satisfactory internal conditions prior to handover.
d. All BMS schematics and graphics are fully installed and functional to user interface before handover.
e. The occupier shall be fully trained in the operation of the system.

12.4.3. The following seasonal commissioning responsibilities shall be undertaken over a minimum 12-month period, once the building becomes occupied:

a. Testing of all building services under full load conditions, i.e., heating equipment in mid-winter, cooling/ ventilation equipment in mid-summer, and under part load conditions (spring/ autumn);
b. Testing shall also be carried out during periods of extreme (high or low) occupancy.
c. Interviews with building occupants (where they are affected by the complex services) shall be undertaken to identify problems or concerns regarding the effectiveness of the systems.
d. Re-commissioning of systems (following any work needed to serve revised loads) and incorporate any revisions in operating procedures into the O&M manuals.
e. Review thermal comfort, ventilation, and lighting, at three-, six- and nine-month intervals after initial occupation, either by measurement or occupant feedback.
f. Take all reasonable steps to re-commission systems following the review and incorporate any relevant revisions in operating procedures into the O&M manuals.

12.4.4. Reference shall be made to the requirements of the Soft Landings Framework: for better briefing, design, handover and building performance in-use (BSRIA BG 4/ 2009) and BREEAM and Soft Landings: an interpretation note for clients and designers (BG 28/ 2011).

12.5. Post Occupancy Energy Review

12.5.1. The Contractor shall commission and pay for the nominated energy assessor (Employer to approve i.e. Ramboll or similar approved) to report on the actual energy consumption after 12 months occupancy compared to the design predictions and targets set out in the design stage operational energy modelling.

12.5.2. The post occupancy energy review will: -

a. Report energy consumption for the first 12 months of normal occupancy for all relevant end uses
b. Report energy consumption for the first 12 months, broken down into monthly intervals, for all relevant end uses
c. Compare reported energy consumption figures with the design stage targets
d. Identify cause of discrepancies and the remediation actions required

12.5.3. The energy model data will be submitted to the BRE and retained by the building owner.