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Circular Economy Statement

City House, Sutton

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Version	Date	Produced By	Checked By
Draft for client issue	15/12/23	A.Dhesi	H. Cormick
Final report for external issue	02/02/24	A.Dhesi	H. Cormick, C. Behar

Executive summary

Executive summary

The proposed City House development has been appraised according to the 'London Plan Circular Economy Statement Guidance' (2022). Based on a OneClick LCA 'Building Circularity' analysis on the early-stage bill of materials (BOM), Expedition Engineering's pre-demolition audit, RGP's site waste management plan and Macar's operational waste management plan, the proposed development is expected to achieve each of the policy requirements set out by the GLA and summarised in Table 1.

Table 1: City House circular economy targets and projected outcomes

City House Circular Economy Targets		
Material Classification	**Target**	**Projected Outcome**
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	≥95% (estimation)
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	≥95% (estimation)
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	≥95% (estimation)
Municipal waste	Minimum 65% recycling rate by 2030.	Achievable (estimation)
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	≥24% (estimation)

Expedition Engineering's pre-demolition audit and an appraisal of the early-stage BOM has provided evidence to support the projected achievement of 95% diversion from landfill of all demolition, excavation and construction waste materials. Expected recycled content rates and cost information from WRAP and OneClick LCA informed the 'recycled content by value' calculation (page 21). RGP's site waste management plan, summarised on page 23, outlines the anticipated waste streams arising from the demolition, excavation and construction activities at the City House site and their anticipated disposal routes. Macar's operational waste management plan (Appendix B) provides evidence that the proposed development will provide sufficient municipal waste management provision to target 65% recycling by 2030. The end-of-life strategy (Section 7) suggests pre-construction design decisions which can improve the opportunities available for materials recovery, reuse and recycling at the end of the expected 60-year lifetime of City House.

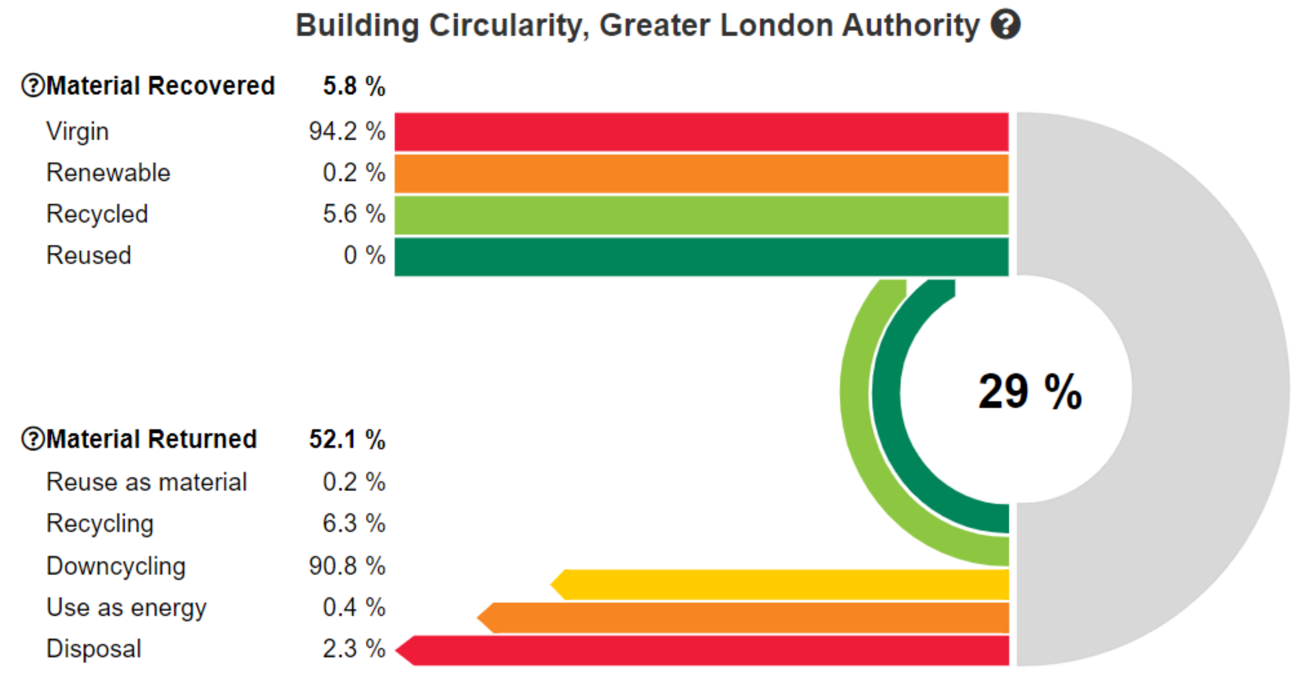


Figure 1:: City House results summary from the Building Circularity, GLA tool in OneClick LCA

"The Building Circularity score represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of Materials Recovered (representing use of circular materials in the project) and Materials Returned (representing how effectively materials are returned, instead of disposed of or downgraded in value)." - OneClick LCA Building Circularity Tool

1/ Introduction

Introduction
Introduction and policy context

Introduction

Business as usual in the built environment is based on a linear economy. Raw materials are extracted, products are manufactured, structures are built, a building is inhabited and eventually demolished, with most of the material disposed of as waste.

In a circular economy, waste is no longer disposed of because it ceases to be treated as 'waste'. Instead, it becomes a resource for future product manufacture through recycling, and future construction processes through reuse. The utilisation of materials beyond their first service life at their highest possible value reduces the reliance on raw material extraction for development of the built environment. Not only does this protect ecosystems, save energy and reduce carbon emissions - circular economy design principles for construction can deliver co-benefits including supply chain efficiencies and potential cost savings.

Embedding circular economy principles in construction development projects requires ambition, collaboration and deep technical expertise. As governments around the world begin to implement more stringent requirements for waste reduction through efficient and effective resource use, being at the forefront of circular economy construction has become a key strategy for many developers.

This Circular Economy Statement has been prepared by Useful Projects, on behalf of Macar Developments (the applicant), to support the application for planning for the City House development in the London Borough of Sutton. The Statement interrogates the design for the proposed development through a circular economy lens. It outlines how circularity has already been considered throughout the design process and provides realistic and practical opportunities to implement further circularity initiatives as the project develops.

Policy context

London Plan policy SI 7: *reducing waste and supporting the circular economy* (*CE*) requires planning applicants to submit evidence that their proposals promote CE outcomes and aim to generate net-zero waste. All planning applications referred to the Mayor of London must include a Circular Economy Statement accompanying the CE template spreadsheet provided on the London Plan guidance website.

The purpose of the Circular Economy Statement is to set ambitious yet realistic targets to maximise resource conservation, materials re-use and recycling, and waste reduction, tailored to the proposed development.

Increasing provision of Circular Economy Statements in planning applications is intended to:

- promote a more circular economy which improves resource efficiency and innovation to keep products and materials at their highest value for as long as possible.
- encourage waste minimisation and prevention by re-using materials and reducing resource use in the manufacture and distribution of building products.
- ensure zero recyclable waste goes to landfill by 2026.
- meet or exceed municipal waste recycling target rate of 65% by 2030.
- meet or exceed construction and demolition waste re-use/recycling/recovery target rate of 95%.

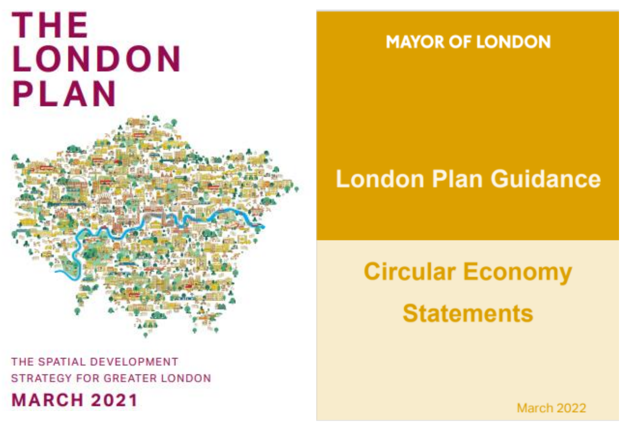


Figure 2: Key policy documents – London Plan and Circular Economy Statement Guidance

Introduction
Project overview

The proposed City House development is a residential-led development in Sutton, South London comprising a split-level single massing building of 5 and 13 storeys with a commercial ground floor. The development is located adjacent to Sutton Baptist Church, a grade II* listed building and sits on the corner of two A-roads, Carshalton Road and Sutton Park Road. There is an existing 4 storey commercial building located on the site as well as a car park.

Table 2: Proposed development provision overview

Total provision	6,900m^2 GIA Split level single massing of 5 and 13 storeys
Residential	6,645m^2 GIA 70 units
Commercial	255m^2 GIA
Infrastructure and public realm	580m^2 hard landscaping 340m^2 soft landscaping 2 Blue Badge car parking spaces 113 cycle parking spaces

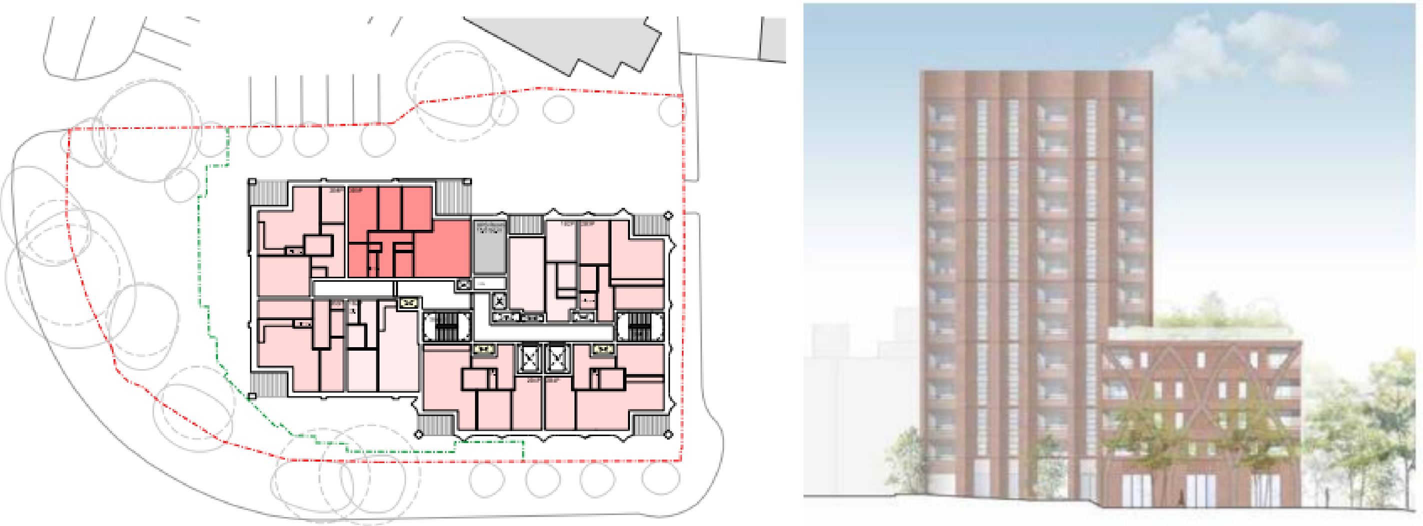


Figure 3: Typical floor plan and elevation of the proposed City House development (c/o Wimhurst Pelleriti)

The bill of materials (BOM) used in the creation of this Circular Economy Statement and Useful Project's Whole Life Carbon Statement has been based on early-stage designs as provided by the design team; material and product specifications have not yet been finalised, therefore generic specifications have been used for material quantity and embodied carbon calculations.

Table 3: City House proposed Bill of Materials summary

Building element	Design features
Substructure	• Steel-reinforced concrete pile foundations below a concrete ground floor slab
Superstructure	• 225mm thick steel-reinforced concrete slabs (including flat roof slab) • Steel-reinforced rigid concrete frame with bolt-on metal balconies • Stud-framed plasterboard internal and partition walls with acoustic lining, painted plaster finish • 'Stairmaster' staircases
Façade	• Precast concrete panels with brick façade finish • Double glazed aluminium frame windows • Metsec frame with 70-100mm mineral wool insulation
Interior finishes	• Suspended ceiling systems, painted plasterboard finish • Oak veneer internal doors with timber painted frames and stainless steel ironmongery • Engineered wood flooring to main living areas, tiled flooring to bathrooms and ensuites, carpets to bedrooms
FFE	• General allowance made for FFE
MEP	• Mitsubishi CAHV-R450 YA air-source heat pump • ARBE AF-PVW thermal store • Danfoss Flatstation 7 heat interface unit • MRXBOX ECO2AB mechanical ventilation with heat recovery • Lifts (2)
External works	• Permeable block paving for vehicular access • Permeable flag paving for entrances • Grasscrete parking spaces • Resin-bound aggregate footpaths • Safety rubber surfaced play area • Artificial grass areas • SUDS attenuation (plastic crates) at ground level (integrated within above build-ups)

Introduction
Methodology and key assumptions

Methodology

This circular economy statement has been prepared by Useful Projects in accordance with the requirements of the '*London Plan Guidance – Circular Economy Statements'* (*2022*) as outlined on page 6.

The circular economy targets outlined on page 9 have been extracted from the '*London Plan'*(*2022*) and the *'Sutton Council Local Plan'*(*2021*). These were confirmed with the design team at a workshop delivered by Useful Projects in July 2023.

The '*London Plan Guidance – Circular Economy Statements*' (*2022*) has been used to inform the circular economy design approach recommendations for the existing structure and new development as described on pages 12-17. Further consultation with Wimhurst Pelleriti, Macar, Webb Yates and Integration informed the circular economy opportunities for each building layer.

Summaries of Expedition Engineering's pre-demolition audit (page 13) and Macar's operational waste management plan (page 25) have been included to supplement the conclusions of this circular economy statement, and to ensure consistency of approach across the planning documentation.

The primary evidence informing the circular economy statement is the Greater London Authority's (GLA) circular economy template (Appendix A), required for submission with all planning applications referable to the Mayor of London. The Bill of Materials (BOM) included in the template was generated alongside the whole-life carbon (WLC) calculation described in Useful Project's WLC statement using the '*Building Circularity, GLA*' tool within the OneClick LCA application, and reflects the latest cost plan aligned to the submitted application. The BOM informing the circular economy template contents was produced by the design team and contains generic early-stage information on projected build-ups across external works, structural elements, mechanical, electrical and plumbing (MEP) and architectural finishes.

Following the receipt of the Bill of Materials covering MEP services, external works, structural elements and architectural finishes, material quantities and specifications were entered in OneClick LCA. Generic, industry standard rates were applied as follows, as detailed specification had not yet been defined. Construction waste rates and expected service lifetimes for each unique material were applied according to the Royal Institute of Chartered Surveyors' (RICS) '*Professional standard: whole life carbon assessment for the built environment*' and approximate recycled content for each unique material were applied according to the Waste and Resources Action Programme (WRAP) *'Guide to the recycled content of mainstream construction products'*.

Key Assumptions

Supplier-specific materials and products have not yet been specified – representative EPDs selected for the OneClick modelling process provide a reasonable approximation for the bill of materials at this stage.

A general allowance was provided for fittings, furnishings and equipment (FFE) in QSetc's cost plan. The representative FFE for each of the 70 residential units in the proposed development was used to create a generic bill of materials (BOM) for use in both Useful Project's Whole Life Carbon Statement and this Circular Economy Statement. The itemised BOM can be found in Appendix A.

The 'recycled content by value' calculation informing the summary on page 21 was generated using material costs generated by OneClick LCA, and standard industry recycled content metrics from the Waste and Resources Action Programme's (WRAP) *'Guide to the recycled content of mainstream construction products'* (*2008*).

Introduction
Circular economy targets

Opposite is a summary of the key sustainability performance requirements that all developments referable to the mayor are required to meet in line with the London Plan and the Sutton Council Local Plan.

A circular economy workshop was delivered by Useful Projects in July 2023, during which Macar Developments agreed to target the specified outcomes in-line with the GLA recommendations.

The following Circular Economy Statement sections apply the London Plan decision-making framework to the City House site's existing structure and proposed development, identifying the appropriate circular economy principles to be implemented during later design stages.

Upon selection of an appropriate circular economy design approach, the proposed development is appraised against the targets opposite, with challenges and opportunities for their fulfilment outlined. The validation route towards providing evidence that each of the targets can be met as the development progresses are outlined opposite.

Table 4: City House circular economy targets and validation

City House Circular Economy Targets	
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.
Municipal waste	Minimum 65% recycling rate by 2030.
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.

City House Circular Economy Target Validation	
Demolition waste materials (non-hazardous)	Expected demolition waste profiled in Expedition Engineering's pre-demolition audit with strategies identified to maximise diversion from landfill.
Excavation waste materials	Expected excavation waste and diversion from landfill strategy outlined in Section 5.
Construction waste materials	Expected construction waste profiled in the BOM (Appendix A) with strategies identified to maximise diversion from landfill.
Municipal waste	Proposals for adequate waste management provision to meet municipal waste targets outlined in Section 6.
Recycled content	Early-stage bill of materials analysed for recycled content by value on page 21.

2/ Circular economy design approach

Circular economy design approach
Selection methodology

The decision-making trees presented on the following pages have been reproduced from the *'London Plan Circular Economy Statements Guidance'* (2022).

Existing structure

The decision-making tree on page 12 is designed to support decisions around buildings already present on site. The preferred outcome for an existing structure from a circular economy perspective is retention, retrofit and reuse, in which the structure is adapted into the new development. Where this is deemed unfeasible, partial structural retention should be targeted.

If the existing structure cannot be retained (e.g. due to degradation of materials or safety concerns), disassembly and reuse of components is preferred to demolition and recycling. Complete disassembly often requires 'design for disassembly' approaches to have been embedded during the original construction, but significant amounts of material may still be recoverable using 'smart demolition' techniques.

Opportunities for circular materials reuse following demolition are covered in Expedition Engineering's pre-demolition audit, summarised on page 13.

New development

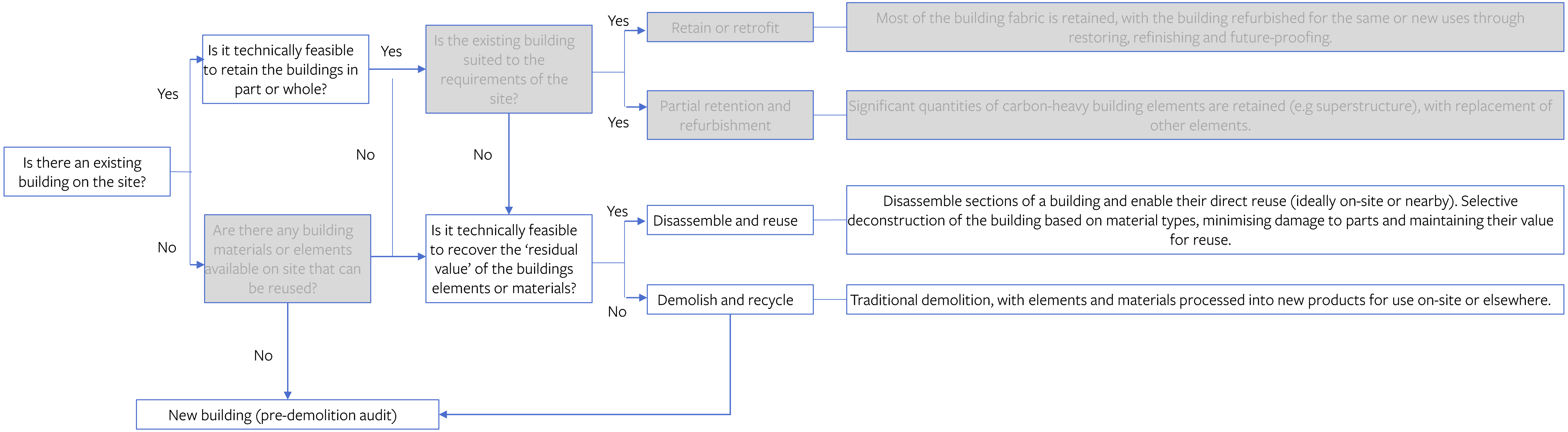
The decision-making tree on page 14 enables the identification of appropriate circular economy design strategies to be applied to the design of the proposed new development The London Plan requires all new developments to be designed with future adaptability for lifespan extension and designed for deconstruction to enable materials recovery and reuse.

The decision framework is applied for each 'layer' of the proposed building design to select applicable circular economy design approaches. Opportunities for implementing the selected approaches in line with the agreed targets are outlined on pages 16-17.

Figure 4: Proposed City House building elevation (image c/o Wimhurst Pelleriti)

Circular economy design approach
Decision-making tree for existing structures/buildings

The City House site contains an existing four-storey office building. Based on Expedition Engineering's pre-demolition audit (summarised on page 13), it has been proposed that the building is unsuited for the requirements of the site. Full or partial retention has therefore been excluded as an option, and the existing structure will be demolished and replaced in its entirety. Opportunities for potential disassembly and reuse are described on page 13.



Circular economy design approach
Pre-demolition audit summary

The site of the proposed City House development contains an existing four-storey office building constructed in the mid 1990s. Expedition Engineering's pre-demolition audit summarises the materiality and structural specification of the building based on photographic records from site visits and the original architectural drawings. It is proposed to demolish and replace the existing City House building in its entirety. An estimate bill of quantities for the existing City House site is provided opposite, summarised from the audit. The pre-demolition audit provides further information on the distribution of these materials throughout the structure, and comments on their perceived condition.

Best-practise demolition waste segregation will be followed to maximise diversion from landfill. On-site waste segregation is expected, overseen by a licensed contractor to an appropriately licensed waste destination to ensure the 95% diversion from landfill target is met. The following segregated skips are expected: clean timber; plasterboard; carpet; plastic; mild steel; nonferrous, asphalt (inert); residual mixed demolition waste. The recycling rates provided in the table opposite should be targeted, reported against and ideally exceeded during the demolition of the existing City House.

The primary circular economy opportunity identified in the pre-demolition audit is the soft-strip of the existing building to be scheduled prior to demolition. Furniture, internal finishes and mechanical/electrical plant components will be extracted, assessed for potential on-site reuse or off-site resale/recycling and stored during the demolition phase. Furniture recovered during soft strip is proposed for donation to local charities such as Emmaus or the British Heart Foundation. Concrete paving tiles could be recovered and utilised in external works for the new development. Roof tiles and existing brick facades could be recovered through scaffolded access for manual removal. All materials recovered for proposed on-site reuse or donation should be handled with care, cleaned, sorted and stored on-site, which is expected to add to programme timeline and cost. O'Donovan's Re-use Hub, Globechain and Community Wood Recycling are identified as options for local materials reuse centres and marketplaces, but direct engagement with end-users is proposed as a preferable option to maximise recovery and reuse. These opportunities will be further explored with the appointed demolition contractor and pursued where feasible.

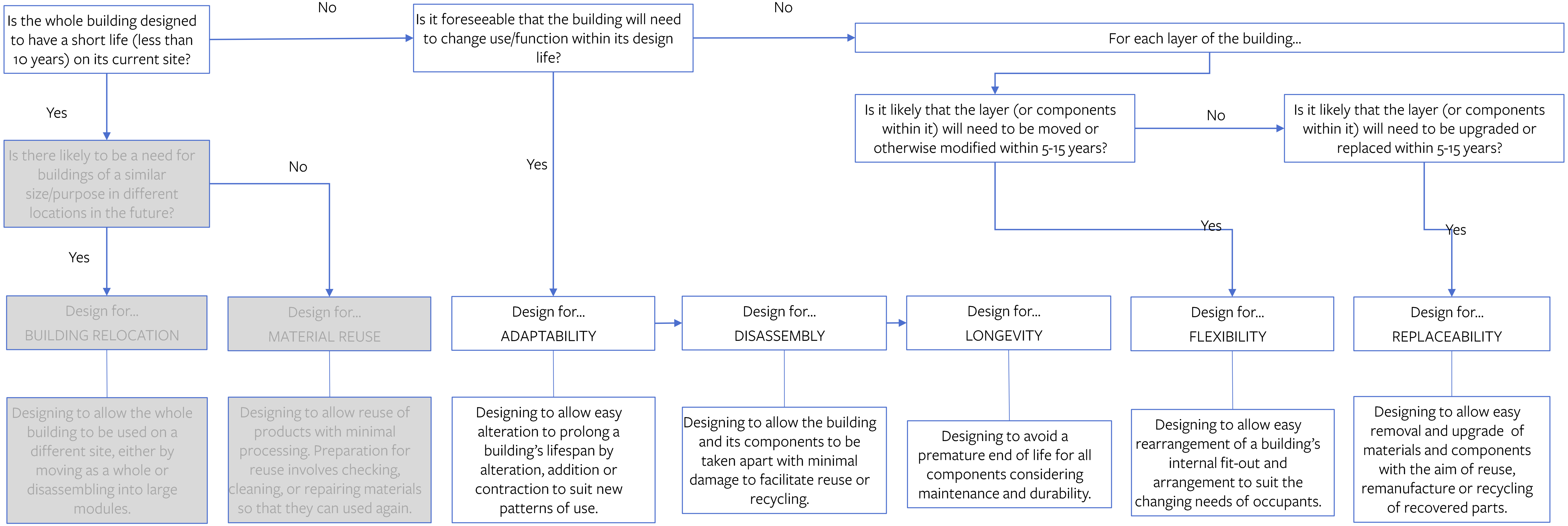
More ambitious circular economy opportunities were identified in the pre-demolition audit concerning the reuse of valuable materials in the existing structure. Large structural steel beams in the frame of the building are perceived to be in good condition and could be accessed for recovery and reuse through alterations to the projected demolition programme. Due to the relatively small quantity of structural steel available and the anticipated programme extensions associated with safe recovery, condition assessment, storage and resale of the steel, this strategy is not being pursued further.

Table 5: Existing building material inventory summary

Material	Quantity	Typical Recycling Rate
Insitu concrete	175 m^3	59%
Steel reinforcement	9 t	100%
Structural steel	70.5 t	100%
Precast concrete	233 m^3	59%
Glass	10 t	100%
Aluminium	6 t	100%
Blockwork	110 m^3	100%
Brickwork	70 m^3	80%
Timber	15 m^3	81%
Roof tiles	300 m^2	100%
Vinyl	60 m^2	0%
Plasterboard	830 m^2	95%
Aggregate	80 m^3	100%

Circular economy design approach
Decision-making tree for new structures/buildings

The proposed City House development has an expected service life of at least 60 years; building relocation and early-stage materials reuse have therefore been excluded from the circular economy strategy. It is foreseeable that there may be a need for future retrofit or functional adaptation of the building, so the strategy seeks to enable adaptability, disassembly and longevity. Flexibility and adaptability principles have been applied to each building layer on pages 16-17.



Circular economy design approach
Summary

The circular economy design approaches described below have been summarised from the '*London Plan Guidance – Circular Economy Statements (2022)*' . Pages 16-17 contain a review of the circular economy opportunities and challenges for each of the proposed City House building layers depicted opposite.

Building in layers

The building in layers concept presents buildings as a complex 'system of systems', comprised of layers with differing lifespans. By considering each layer as an independent system, and ensuring the overarching design allows independence between layers, component-specific design strategies can be applied to maximise opportunities for circularity.

Designing out waste

Designing to avoid unnecessary use of materials and maximal re-use and recycling of materials at the end of the building lifespan.

Designing for longevity

Designing to avoid a premature end of life for all components considering maintenance and durability.

Designing for adaptability/flexibility

Designing to allow easy alteration to prolong a building's lifespan by alteration, addition or contraction to suit new patterns of use. Designing to allow easy rearrangement of a building's internal fit-out and arrangement to suit the changing needs of occupants.

Designing for disassembly

Designing to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling.

Use of materials which can be reused or recycled

Designing to enable reuse of products with minimal processing. Preparation for reuse involves checking, cleaning, or repairing materials so that they can used again.

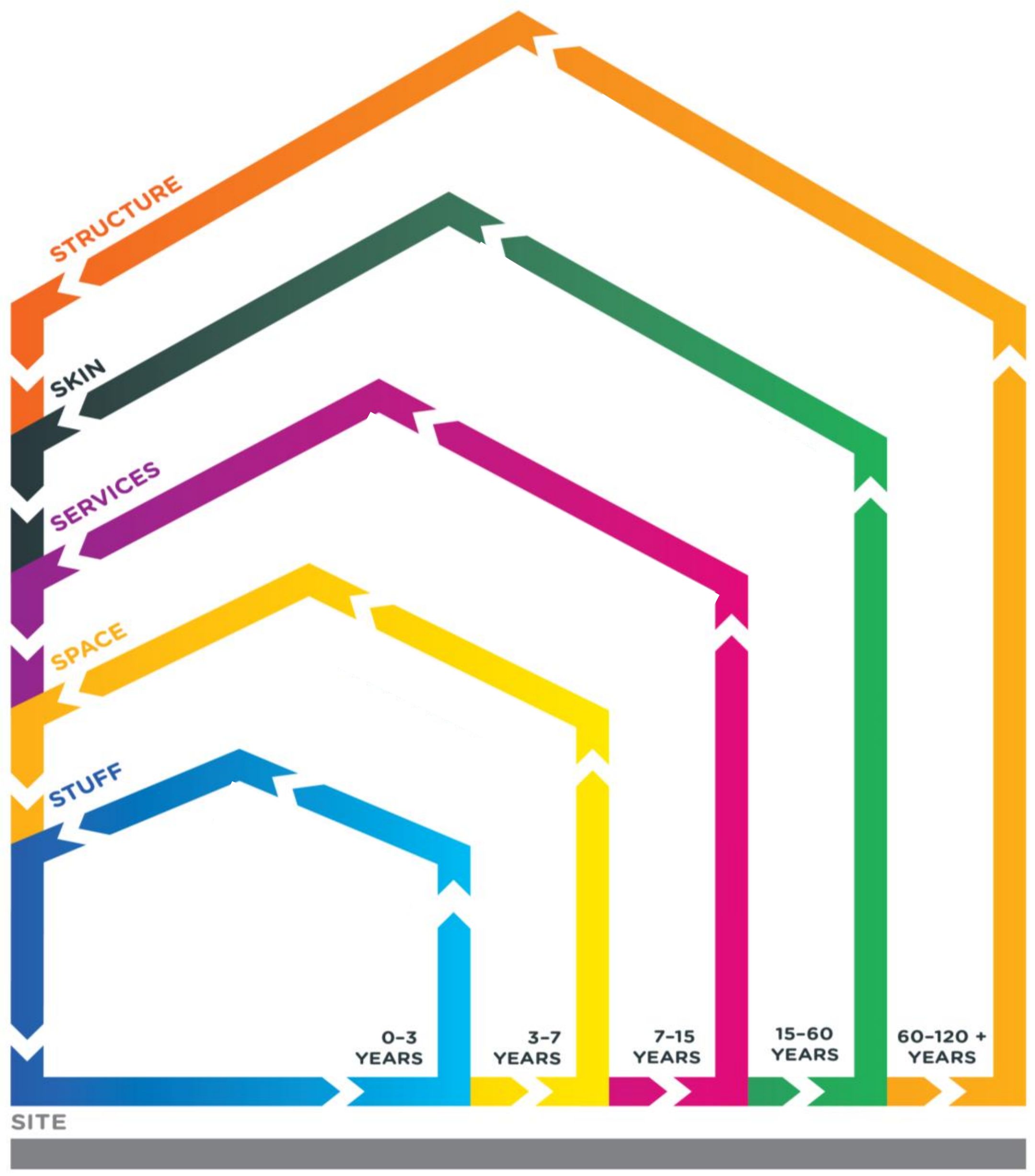


Figure 5: Building in layers (c/o Stewart Brand and Frank Duffy, 1994)

Circular economy design approach
By building layer

The following tables describe each of the building layers from the 'building in layers' model and apply the circular economy principles described on page 15 to identify challenges and opportunities for the proposed City House development. The 'opportunities taken forward' section contains design principles which have been confirmed by the design team and are reflected in the early-stage bill of materials (BOM, Appendix A). 'Opportunities to explore in later stages' develops more ambitious circular economy opportunities for significant resource optimisation and will be pursued where possible with the relevant contractors in later stages of design and implementation.

Table 6: Site layer circular economy design approach

Site	
What's included?	Below ground infrastructure, roads and pavement, soft landscaping
Responsibility	Civil engineer
Lifespan	Building lifespan – 60+ years
Challenges	• Large quantities of low grade, heavy materials • Below ground infrastructure inaccessible for repair/replacement without ripping up finishing layers • Soft landscaping requires significant and specialist maintenance
Opportunities taken forward	• Reuse site won materials for site levelling • Work with existing site levels to minimise cut / fill • Retain existing trees where possible • Utilise shallow drainage features to minimise cut • Minimise hardstanding areas • Use of paving flags in road buildups to enable below-ground infrastructure repairs and future disassembly and reuse
Opportunities to explore in later stages	• Specify paving buildups to be made from site-won crushed aggregate • Utilise existing materials / utilities / drainage from the current City House site • Incorporate above-ground sustainable drainage systems

Table 7: Structure layer circular economy design approach

Structure	
What's included?	Building foundations and structural frame
Responsibility	Structural engineer
Lifespan	Building lifespan – 60+ years
Challenges	• Changing user needs – growing families, work from home, ageing in place • Buildings not designed to be extendable vertically or horizontally, or to change internal layouts in future • Inefficient structural design leading to excessive material use
Opportunities taken forward	• Long life, loose fit, low carbon design scheme • Alternative materials feasibility study for structural frame • Optimised grid spacing for material efficiency • Design out basements and transfer slabs • Compact building form to reduce material intensity
Opportunities to explore in later stages	• Tighten specifications around waste for wet trades • Explore alternative to flat slabs (waffle slab) • Design floor structures to enable future service changes

Table 8: Space layer circular economy design approach

Space	
What's included?	Internal walls and partitions, internal finishes, fixed fittings and furniture
Responsibility	Building owner and end users
Lifespan	5-10 years
Challenges	• Short, frequent replacement cycles due to wear, occupancy changes, style trends
Opportunities taken forward	• Minimal finishes and avoid over-specifying prior to tenant agreement • Design floor plans for future flexibility of layout • Use of modular SFS systems for internal walls and suspended ceilings
Opportunities to be explored in later stages	• Specify recyclable or biogenic material palette • Utilise standard component sizes and specifications to minimise manufacturing waste

Circular economy design approach
By building layer

Table 9: Services layer circular economy design approach

Services	
What's included?	Internal and building mounted mechanical, electrical and plumbing services
Responsibility	Services
Lifespan	15-30 years
Challenges	• Services often inaccessible for repair or replacement • Plant room size often insufficient for future upgrades
Opportunities taken forward	• Design plant room layout with consideration of future upgrade and repair needs, space, loading and access requirements
Opportunities to be explored in later stages	• Consider recyclability of pipe materials • Explore modular MEP products such as utility cupboards and bathroom fit-out • Heat recovery from cooling processes

Table 10: Stuff layer circular economy design approach

Stuff	
What's included?	Removeable fittings and furniture, owner/tenant possessions
Responsibility	Building owner and end users
Lifespan	<5 – 10 years
Challenges	• Occupiers own possessions used infrequently that could be shared • Short, frequent replacement cycles due to wear, occupancy changes, style trends
Opportunities taken forward	• On-site central location for WEEE and other waste collection • Specify high-quality, durable appliances
Opportunities to be explored in later stages	• Establish dedicated space and services to support a sharing economy

Table 11: Skin layer circular economy design approach

Skin	
What's included?	External façade including windows and doors
Responsibility	Architect
Lifespan	30+ years
Challenges	• Weathered façade leading to visual and performance issues • Welded connections between the skin and structural layer
Opportunities taken forward	• Selection of durable materials • Design aesthetics to be 'timeless' to avoid early replacement
Opportunities to be explored in later stages	• Incorporate reclaimed materials (e.g. bricks) in the façade • Separation of the skin from structural layer, enabling replacement without disturbing the underlying structure • Design window openings for ease of replacement without damage to cladding • Use of soft mortars (e.g. lime) to enable future materials recovery

The preceding tables identify key circular economy opportunities for each building layer in the proposed City House development. Each of the circular economy design strategies outlined on page 15 have been applied to the current design: **building in layers** (the separation of the proposed development into discrete sections where resource optimisation principles can be applied); **designing out waste** (reuse of site-won material for landscaping); **designing for longevity** (selection of durable materials); **designing for adaptability/flexibility** (designing plant room layout for future upgrade and repair); **designing for disassembly** (use of paving flags for future disassembly and reuse); **use of reusable/recyclable materials** (use of modular SFS systems for internal walls and suspended ceilings).

The following section contains an analysis of the early-stage bill of materials (BOM, Appendix A) in response to the circular economy opportunities identified above. Proposed materials and quantities have been appraised to provide evidence towards the justification and expected achievement of the circular economy targets outlined on page 9.

3/ Bill of materials: results and analysis

Bill of Materials
Proposed construction material quantity by building element

The table opposite summarises the quantities (mass) of construction material required for each building element in the proposed City House development scheme as per the BOM.

50% of the total material mass for the proposed development is in the substructure, primarily comprising insitu concrete and steel reinforcement.

The superstructure comprises a further 42% of the total mass of construction materials, including insitu and precast concrete, steel reinforcement, double glazed aluminium framed windows and the external walls including brick façade, metal stud framing, cement particleboard, intermediary layers (e.g vapour control) and insulation materials such as mineral wool.

The remaining 8% of construction materials by mass are primarily concentrated in internal finishes and external works. These categories include a much broader range of materials – the itemised bill of materials (BOM) can be found in Appendix A.

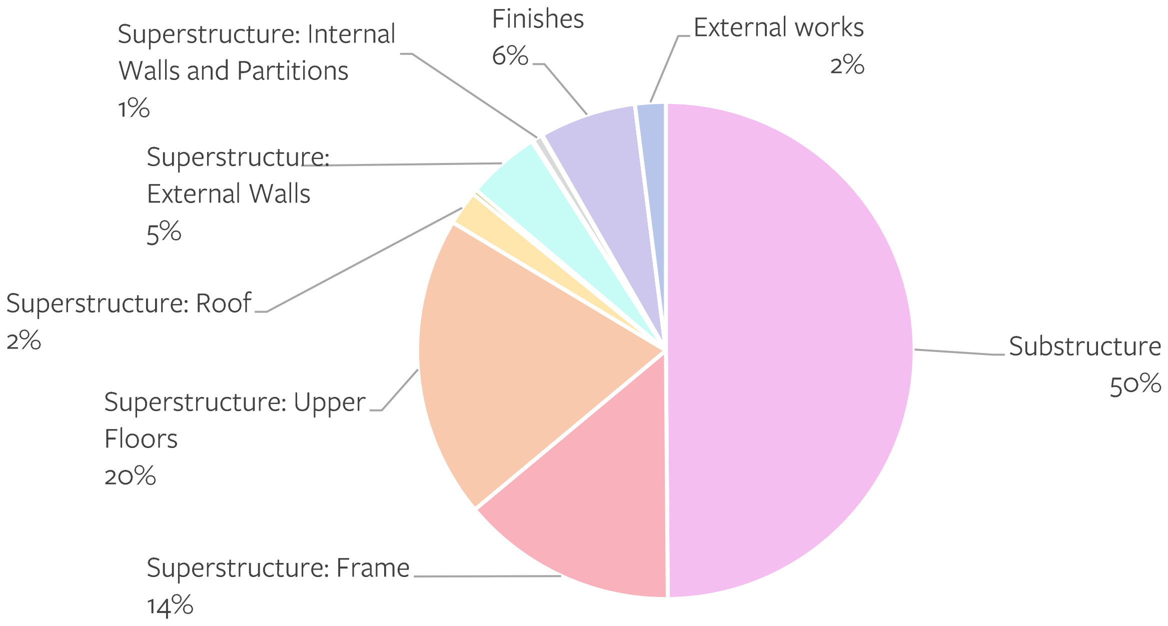


Figure 6: City House proposed material quantities by building element

Table 12: City House proposed material quantities by building element

Building Element	Material quantity (kg)	Material intensity (kg/m² GIA)
Substructure	11,113,919	1611
Superstructure: Frame	3,133,647	454
Superstructure: Upper Floors	4,382,246	635
Superstructure: Roof	596,871	87
Superstructure: Stairs and Ramps	70,000	10
Superstructure: External Walls	963,028	140
Superstructure: Windows and External Doors	22,934	3
Superstructure: Internal Walls and Partitions	136,520	20
Superstructure: Internal Doors	15,169	2
Finishes	1,402,373	203
Fittings, furnishings & equipment	71,299	10
Services (MEP)	12,815	2
Prefabricated Buildings and Building Units	0	0
Work to Existing Building	0	0
External works	444,052	64
Total	**22,364,873**	**3,421**

Bill of Materials
Proposed construction material quantity by key material group

The table opposite summarises the composition and typical end-of-life scenarios for the key material groups included in the bill of materials (BOM) for the proposed City House development.

Concrete (insitu and precast) makes up 82% of construction material by mass.

Due to the use of a generic specification recommended for early-stage modelling (UK C32/40 with 25% GGBS replacement), the concrete is primarily classified as virgin material. A concrete specification including recycled aggregate, or a greater proportion of cement replacement would increase the recovered material percentage for concrete. Since the typical end of life scenario for concrete is crushing (i.e downcycling), the circularity score provided by OneClick LCA's Building Circularity tool is relatively low (25%) for concrete.

Most of the remaining materials included in the BOM for the proposed City House development are split between bricks and ceramics, gypsum-based materials and earth masses and asphalt. The gypsum-based material category (including plasterboard) receives a higher circularity score due to typically higher recycled content and recyclability metrics. Earth masses score low for circularity since the typical end-of-life scenario is disposal.

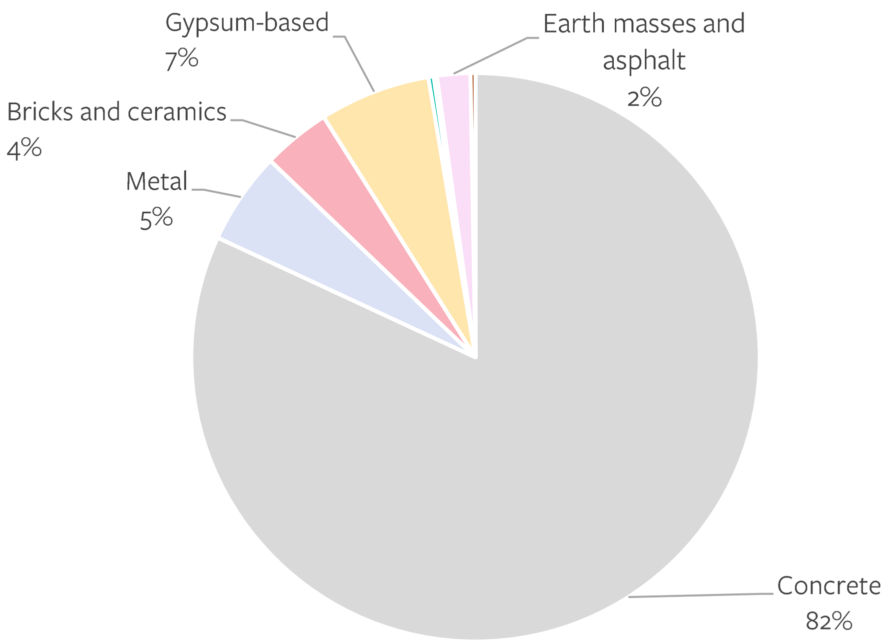


Figure 7: City House proposed material quantities by key material group

Table 13: City House proposed material quantities by key material group

Material group	Total quantity (tonnes)	Virgin material (%)	Recovered material (%)	Disposal (%)	Down-cycled or used as energy (%)	Recycling and reuse as material (%)	Circularity (%)
Concrete	18,251	99.95	0.05	0	100	0	25.02
Metal	1,169	6.21	93.79	0	0	100	96.89
Bricks and ceramics	863	100	0	0	100	0	25
Gypsum-based	1,405	92.09	7.91	4.75	79.93	15.32	31.6
Insulation	68	81.25	18.75	80.46	19.54	0	14.26
Wood and biogenic	41	0	100	0	100	0	75
Earth masses and asphalt	421	98.08	1.92	90.39	0	9.61	5.76
Other materials	147	75.78	24.22	0	63.58	36.41	46.21

Bill of Materials
Proposed construction material quantity by virgin/recycled (value)

The table opposite summarises the expected composition of materials included in each of the building elements of the proposed City House development, split by virgin and recycled material by value.

Based on the generic Environmental Product Declarations (EPD) used to represent the early-stage bill of materials (BOM) and applying the RICS WLC guidance industry standard waste rates, 20% by value of the total material required for the new development will be made up of recycled content, meeting the GLA's policy requirement.

The best performing building elements for recycled content are the internal walls and partitions (45% recycled content by value), the frame and upper floors of the superstructure (40% recycled content by value). The internal walls and partitions element receives a high recycled content metric due to the extensive use of metal stud framing and metal suspended ceiling systems, both of which have high recycled content in typical EPDs. The superstructure has high recycled content by value due to the large amount of steel reinforcement (rebar) which typically has very high recycled content (>97%). Mechanical, electrical and plumbing (MEP) services and fittings, furnishings and equipment (FFE) have been excluded from this analysis due to a lack of detailed cost information at early stage.

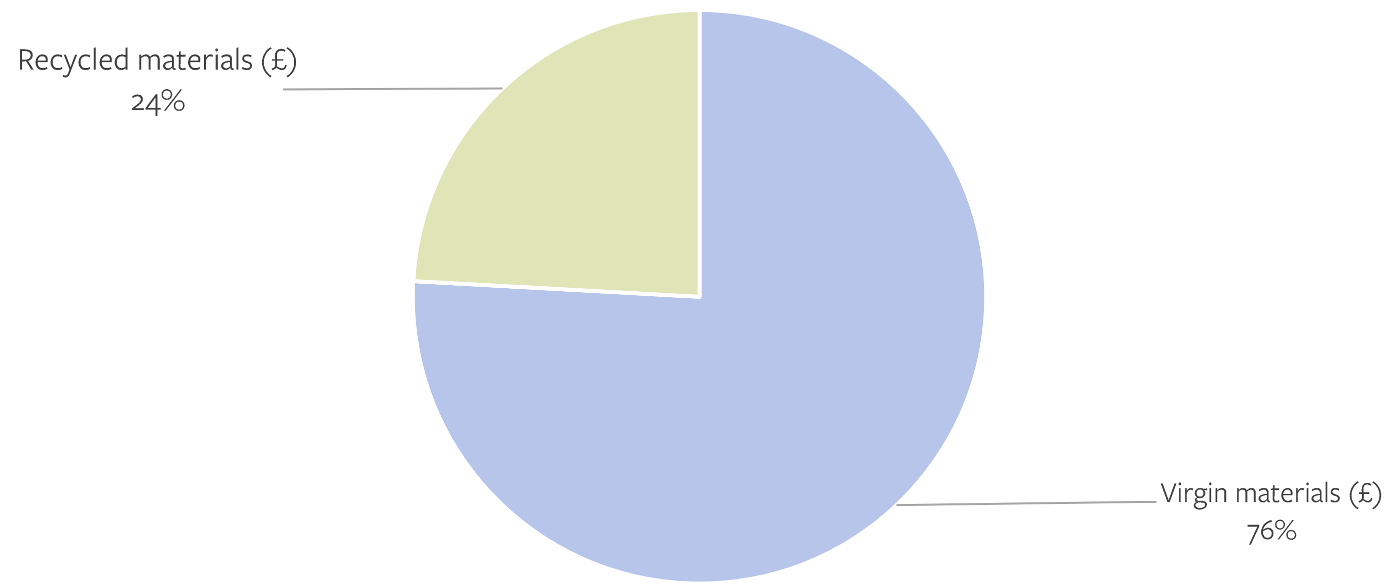


Figure 8: City House proposed material quantities by virgin/recycled (value)

Table 13: City House proposed material quantities by virgin/recycled (value)

Building element	Total cost of materials (£)	Recycled content by value (£)	Recycled content by value (%)
Substructure	912,955	347,532	38%
Superstructure: Frame	265,884	107,040	40%
Superstructure: Upper Floors	368,338	145,963	40%
Superstructure: Roof	108,465	17,250	16%
Superstructure: Stairs and Ramps	9,510	476	5%
Superstructure: External Walls	294,300	16,379	6%
Superstructure: Windows and External Doors	247,408	0	0%
Superstructure: Internal Walls and Partitions	47,078	21,323	45%
Superstructure: Internal Doors	50,956	14	0%
Finishes	484,194	30,949	6%
Fittings, furnishings & equipment	Excluded	N/A	N/A
Services (MEP)	Excluded	N/A	N/A
Prefabricated Buildings and Building Units	0	0	0%
Work to Existing Building	0	0	0%
External works	26,513	1,807	7%
Total	**2,815,600**	**688,732**	**24%**

4/ Site waste management plan

Site waste management plan
Anticipated waste streams and end-of-life scenarios

The table opposite summarises the quantities of expected material arising from the demolition of the existing City House and excavation and construction works for the proposed development. The demolition waste has been estimated from Expedition Engineering's pre-demolition audit, the construction waste has been estimated from the early-stage bill of materials and the RICS WLC guidance standard waste rates, and the expected excavation waste was provided by Webb Yates.

Best-practise waste segregation during demolition and construction will be followed to maximise diversion from landfill. On-site waste segregation is expected, overseen by a licensed contractor to an appropriately licensed waste destination. The following segregated skips are expected: clean timber; plasterboard; carpet; plastic; mild steel; nonferrous, asphalt (inert); residual mixed demolition waste. 95% diversion from landfill can be achieved through early collaboration with the appointed waste contractor to understand optimal segregation strategies, demolition technique and construction schedule. Based on the projections of the OneClick Building Circularity model used for this assessment, 95% diversion from landfill can be achieved for the anticipated construction waste arising from the City House development construction based on the typical end-of-life scenarios for the construction materials (as summarised in the chart below).

Efforts will be taken to balance cut and fill at the City House site to minimise excavation waste. Due to constricted site dimensions, a small imbalance of around 200m³ excavation waste is expected, which can be diverted from landfill through employment of a specialist excavation waste contractor guaranteeing 95% beneficial reuse.

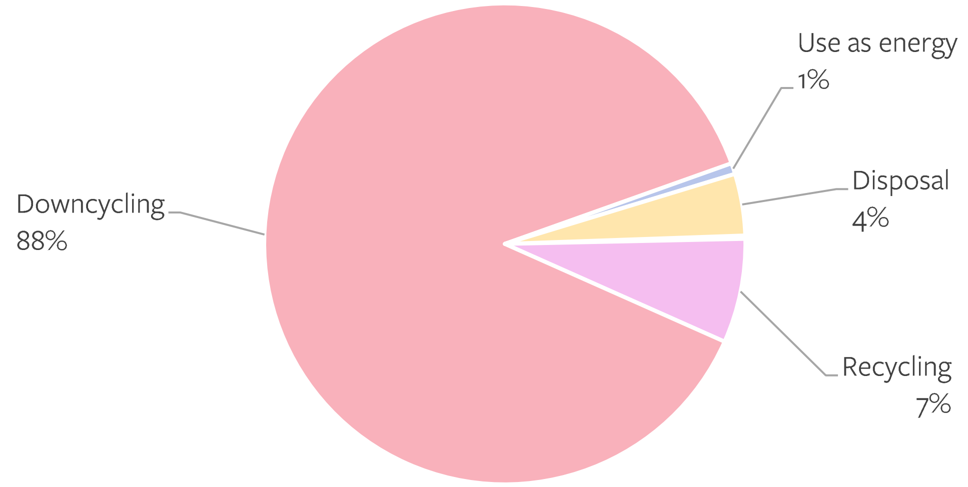


Figure 9: Expected end-of-life scenarios for construction waste arising from the proposed City House development

Table 14: Anticipated demolition, excavation and construction waste streams from the proposed City House development

Material	EWC	Demolition Waste (tonnes)	Excavation waste (tonnes)	Construction Waste (tonnes)
Concrete insitu	17.01.01	420		992
Concrete precast	17.01.01	555		4
Structural steel	17.04.05	71		56
Mixed metals	17.04.07	0		0.6
Asphalt	17.03.02	0		1
Tiles and ceramics	17.01.03	11		2
Glass	17.02.02	10		0.2
Plasterboard	17.08.02	7		11
Aluminium	17.04.02	6		0
Blockwork	17.01.07	157		0
Vinyl	17.02.03	0.5		1
Plywood (Timber)	17.02.01	9		6
Aggregate	17.05	128		37
Brickwork	17.01.02	0		50
Plastics	17.02.03	0		3
Non-hazardous insulation	17.06.04	0		4
Hazardous material (paint)	17.09.03	0		0.0002
Soil and stones	17.05.04	0	404	0
Total		**1375**	**404**	**1168**

5/ Operational waste management plan

Operational waste management plan
Municipal waste storage and collection

Municipal refuse generated from the redeveloped City House site is expected to be collected via the existing shared service road.

Bin storage requirements have been set out according to the 'London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance (2023)', which indicates that total waste capacity for communal storage is calculated as 30 litres per unit plus 70 litres per bedroom. The waste capacity requirements for the residential developments in the proposed City House development are outlined below.

30l x 70 units = 2,100 litres + 70l x 133 bedrooms = 9,310 litres Total = 11,410 litres

Of which, the waste storage capacity should be delivered through the provision of:

- 4 x 1100l Euro Bin for Mixed Waste
- 10 x 360l Wheeled Bin for Paper and Card
- 2 x 1100l Euro Bin for Dry Mixed Recycling
- 5 x 240l Wheeled Bin for Food Waste

Based on the ground floor site plan (Figure 10), the residential element of the City House site will be provided with a dedicated residential refuse storage area to accommodate the above waste storage capacity. A separate commercial refuse storage area is included in the ground floor site layout plan suitable to accommodate 663 litres of waste storage.

Domestic and commercial refuse collection will be carried out by a London Borough of Sutton refuse vehicle. Residents and staff will be required to transfer waste and recycling from their units to the shared waste storage areas prior to collection. The commercial unit will be required to store all waste in the dedicated commercial waste storage area and not use the residential waste storage space at any time. The route between the bin storage areas and the service road used for refuse collection will be step-free and clear of obstruction to ensure the movement of bins is unimpeded.

The City House site waste management team will be responsible for the management of waste, refuse collection and implementation, enforcement and review of measures and procedures. This includes ensuring that all waste is placed inside the designated containers for collection, including any refuse placed on top of or around the bins. Upon first occupation, information regarding waste management procedures and recycling facilities will be provided to residents and staff.

Bins will be labelled clearly to differentiate between general waste, recycling, paper/card and food waste storage. The site waste management team will be responsible for the procurement, upkeep and replacement where necessary of bins to the standards outlined in 'The London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Management Planning Guidance (2023). The site management team will carry out regular inspections of the bin storage areas.

Refuse stores will be designed for accessibility, enabling residents, staff and refuse collectors to enter the storage spaces from the front face with adequate clearance around the bins to allow ease of access and safe movement of refuse containers. The storage areas will be clearly identifiable through signage on doors and walls, distinguishing between the residential and commercial waste storage areas. Appropriate lighting will be provided in and around the storage areas with a proximity detection system or a time delay button. The storage area will have impermeable hardstanding floor suitable for regular cleaning, with a designed slope to enable drainage.

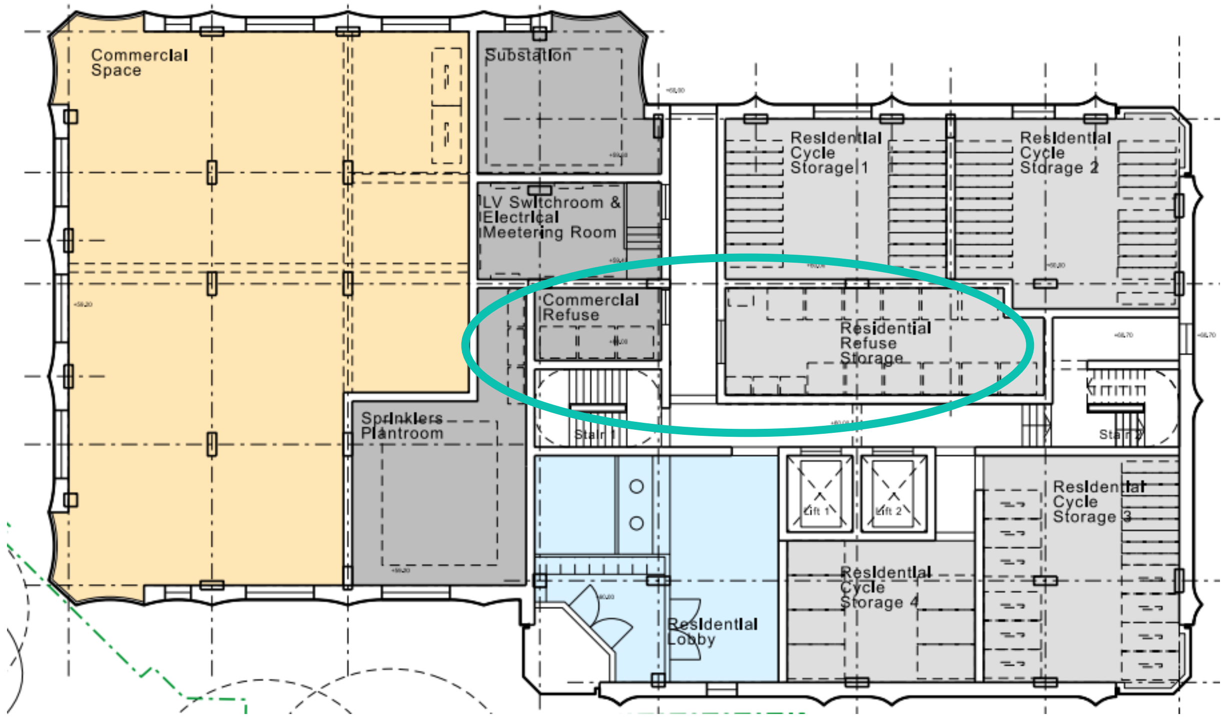


Figure 10: Proposed City House ground floor floorplan, with commercial and residential refuse storage highlighted

6/ End of life strategy

End of life strategy
Early-stage decisions to retain material value

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Built assets will eventually reach an end-of-life stage, through degradation of specific components and layers or through obsolescence of the whole structure. Designing for disassembly enhances the opportunity to recover and reuse materials during decommissioning, enabling the continued utilisation of building materials at high value. The metal stud partition framing systems and suspended ceiling systems proposed for City House feature mechanical fixtures which allow deconstruction for reuse or recycling.

While future waste processing technologies and infrastructure are unknown, there are design decisions that can be taken now to realise a better end of life outcome of the building in future. For City House, these include:

- Maintaining high quality as-built and building asset information that will be passed on to future owners and updated when any refurbishment works are undertaken
- Designing accessible plant spaces that enable repair and refurbishment without needing to demolish surrounding layers
- Designing mechanical fixings of key components such as metal stud partitions and suspended ceiling systems to enable disassembly, repair and upgrade
- Avoiding wet finishes that can't be deconstructed eg. block walls with cement mortar
- Avoiding composite materials such as brick slip façade which are difficult to separate at end of life

Towards the end of the 60-year projected service life of the proposed City House development, further end-of-life planning will be undertaken to consider the recovery, reuse and recycling potential of the building and its constituent materials. Ideally the structure will be retained and retrofitted to an adapted purpose with maximal materials value retention.

Figure 11: Proposed City House conceptual sketch (c/o Wimhurst Pelleriti)

7/ Conclusions

Conclusions

The proposed development at City House, Sutton, has been analysed and reported against according to the London Plan's Circular Economy Statement Guidance (2022). Based on an early-stage bill of materials (BOM) provided by the design teams and covering external works, structural elements, mechanical, electrical and plumbing (MEP) and architectural components, a Building Circularity model was built in OneClick LCA. This model has informed the information entered in the GLA Circular Economy Template (Appendix A) and the analysis in the preceding sections.

The proposed development at City House is projected to exceed all circular economy targets described in Table 15.

Provision of an operational waste management plan in accordance with the requirements of the 'London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance' (2023) is expected to justify the target of 65% municipal waste recycling by 2030. Appointment of a licenced waste management contractor to meet industry good-practise diversion from landfill rates is expected to justify the 95% diversion from landfill targets across demolition, excavation and construction waste materials.

Based on the early stage BOM, the proposed development will exceed the GLA's policy requirement for 20% recycled/reused material by value by 4%. Since the BOM is an early-stage representation, and due to the use of generic environmental product declarations (EPD) in the creation of the OneClick Building Circularity model, specifying materials with increased reused/recycled content is an opportunity to further exceed the GLA target and exhibit pioneering circular economy practice.

Circular economy strategies have been identified according to the 'building in layers' approach, which separates the proposed City House development into discrete sections for targeted resource efficiency optimisation while retaining a consideration of the entire structure. Various strategies have been taken forward in the design proposal, including reuse of site-won material for site levelling, designing out basements and transfer slabs, and selection of durable, modular and repairable materials where possible. Opportunities for more ambitious circular economy design strategies have been put forward in this report and during workshops with the design team, including reuse of valuable materials from the existing City House structure, use of site-won aggregate in hard landscaping buildups, and the increased use of biogenic materials. These opportunities will be explored at later design stages and pursued where possible.

Following a successful planning application, the City House development will be required to further report on the outcome of the circular economy targets and strategies outlined in this report.

Upon commencement of RIBA Stage 6 and no more than three months post-construction, a circular economy statement is required to demonstrate the successful achievement of the circular economy targets outlined in Table 15. This will require an update of the GLA circular economy template with actual material quantities during construction, actual recycling and waste reporting and an accompanying written report describing key achievements and lessons learnt.

Table 15: City House circular economy targets and projected outcomes

City House Circular Economy Targets		
Material Classification	**Target**	**Projected Outcome**
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	≥95% (estimation)
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	≥95% (estimation)
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	≥95% (estimation)
Municipal waste	Minimum 65% recycling rate by 2030.	Achievable (estimation)
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	≥24% (estimation)

Appendix A/ GLA circular economy template

GLA circular economy template

The GLA circular economy template has been submitted alongside planning documentation has been submitted alongside the planning documentation for the proposed City House development.

The itemised early-stage bill of materials (BOM) for the development, which informed both the circular economy and whole life carbon statements produced by Useful Project's has been included here as supplementary material to the preceding report.

The BOM has been constructed from materials and design information received from the City House design team and the QSetc cost plan. It is likely that this BOM is not fully representative of the materials required for the full construction of the proposed City House development (e.g no pipes/ductwork considered for MEP services, and the included FF&E is a generic specification meant to represent a typical apartment according to the cost plan). This Circular Economy statement will be updated upon construction to represent the as-built bill of materials.

The GLA CE template contains further information on construction waste rates, service lifetimes and end-of-life scenarios incorporated in the Building Circularity model which informed this report.

Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) (kg/m² GIA)
Demolition: Toxic/Hazardous/Contaminated Material Treatment	-	**0**	**0**
Major Demolition Works	-	**0**	**0**
Temporary Support to Adjacent Structures	-	**0**	**0**
Specialist Ground Works	-	**0**	**0**
Substructure	-	**11,113,919**	**1,611**
Substructure	Concrete C32/40 (25% GGBS)	10,488,919	1,520
	Steel Reinforcement (Rebar)	625,000	91
Superstructure: Frame	-	**3,133,647**	**454**
Superstructure: Frame	Concrete C32/40 (25% GGBS)	2,941,147	426
	Steel Reinforcement (Rebar)	192,500	28
Superstructure: Upper Floors	-	**4,382,246**	**635**
Superstructure: Upper Floors	Concrete C32/40 (25% GGBS)	4,119,746	597
	Steel Reinforcement (Rebar)	262,500	38
Superstructure: Roof	-	**500,828**	**73**
Superstructure: Roof	Concrete C32/40 (25% GGBS)	470,828	68
	Steel Reinforcement (Rebar)	30,000	4
Superstructure: Stairs and Ramps	-	**70,000**	**10**
Superstructure: Stairs and Ramps	Precast Concrete Slab (Hollow Core)	70,000	10
Superstructure: External Walls	-	**1,059,071**	**153**
Superstructure: External Walls	Plasterboard	30,003	4
	Vapour Control Layer	548	0
	Cement Particleboard	57,785	8
	Breather Membrane	548	0
	Rockwool Rainscreen	30,558	4
	Brick	835,252	121
	Precast Concrete Paving Slabs	83,660	12
	Greenguard GG3300 Insulation	6,180	1
	Geotextile Membrane	222	0
	Liquid Applied Waterproofing	5,981	1
	Metal Stud Framing	8,334	1
Superstructure: Windows and External Doors	-	**22,934**	**3**
Superstructure: Windows and External Doors	Double Glazed Windows and Aluminium Frame	22,934	3
Superstructure: Internal Walls and Partitions	-	**136,520**	**20**
Superstructure: Internal Walls and Partitions	Plasterboard	125,297	18
	Metal Stud Framing	11,223	2
Superstructure: Internal Doors	-	**15,169**	**2**
Superstructure: Internal Doors	Timber (doors)	15,169	2
Finishes	Skim Paint	66,713	10
	Rockwool	20,238	3
	Separating Layer	7,052	1
	Sand/Cement Screed	1,123,251	163
	Kingspan K103 Insulation	3,704	1
	Damp-proof Membrane	1,474	0
	Metal Furrings for Suspended Ceiling	39,371	6
	Plasterboard	59,948	9
	Ceramic Tile	27,400	4
	Cross Laminted Timber Flooring	40,528	6
	Nylon Carpet Tiles	12,692	2
	Acrylic Paint	2	0
Fittings, furnishings & equipment (FFE)	-	**73,757**	**11**
Fittings, furnishings & equipment (FFE)	Wardrobe	53,914	8
	Kitchen cabinet	9,610	1
	Porcelain WC	2,768	0
	Ceramic washbasin	2,405	0
	Shower enclosure	3,700	1
	Heated towel rail	1,360	0
Services (MEP)	-	**12,816**	**2**
Services (MEP)	Lift	10,068	1
	Heat interface unit	1,354	0
	Air source heat pump	177	0
	Thermal store	213	0
	Mechanical ventilation system	1,004	0
Prefabricated Buildings and Building Units	-	**0**	**0**
Work to Existing Building	-	**0**	**0**
External works	-	**444,053**	**64**
External works	Precast Concrete Paving Blocks	1,238	0
	Sand Laying Course	11,041	2
	Sub-base Aggregate	270,720	39
	Geotextile Membrane	81	0
	Grasscrete	18,000	3
	Resin-bound Aggregate Surfacing	7,753	1
	Asphalt Binder Course	32,737	5
	Loose Pebble Aggregate	1,751	0
	Surecell Cellular Reinforcement Structure	596	0
	Granite Dust	12,758	2
	Poured Rubber Surfacing	1,872	0
	Wonder Yarn Artificial Grass	238	0
	ForceField Foam Drainage Pad	625	0
	Soil	84,645	12

Appendix B/ Pre-demolition audit

1972 City House, Sutton

Pre-Demolition Audit

Rev 02

Issue	Date	Reason for Issue	Author	Checked	Approved
01	20/12/2023	Information	K Sutherland H Cormick C Fundrey (Tilley & Barrett) D Jameson (Tilley & Barrett)	M Mathew	M Mathew
02	31/01/2024	For planning	K Sutherland	M Mathew	M Mathew

Contents

1 Introduction

Expedition Engineering Ltd has been appointed to provide engineering and sustainability advice for the redevelopment of City House, Sutton.

The current redevelopment proposals involve demolishing and replacing an existing commercial building on the site. As a matter of both good practice in the context of the climate emergency and material scarcity, and because the redevelopment proposals are referable to the Greater London Authority (GLA), it is necessary to carry out a pre-demolition audit in accordance with GLA guidance.

Expedition have undertaken this audit with input from specialist demolition contractor Tilley & Barrett. It contains a detailed inventory of the materials that it is anticipated will arise from the deconstruction of any existing buildings on the site and assesses their potential for reuse.

The pre-demolition audit is part of a wider suite of documents whose aim is to maximise the reuse of buildings and materials at their highest level in accordance with the reuse hierarchy, minimise waste, and embed circular design principles in the proposed development. These are:

	Purpose	**By**
Pre-redevelopment audit	The basis of a decision to demolish rather than refurbish	Macar / Expedition
Pre-demolition audit	The inventory of materials that will arise from deconstruction and how they will be managed	Expedition
Site waste management plan (SWMP)	Waste management arrangements in construction	RGP
Operational waste management plan (OWMP)	Waste management arrangements in operations	RGP
Circular Economy (CE) Strategy	To be prepared based on the conclusion of the above documents	Useful Projects
Specification for Deconstruction	To be prepared based on the CE strategy	Others (TBC)

This audit is based on information from the following sources:

- AJPL Architects General Arrangement drawings 190/761/11 to 15 and 26 dated June 1995
- AJPL Architects Site and landscape drawings 190/761/ 34 to 36, 38,39 dated Sept 1995
- An external and internal walkaround carried out on 14 November 2023

Further description of these sources of information is provided in section 1.2.

1.1 Limitations

This audit is based on the limited information described above. Limited record drawings have been made available and no intrusive investigations carried out.

1.1.1 Health and safety

Whilst this audit describes the assumed outline sequence of deconstruction works, the demolition contractor is to be wholly responsible for safe sequencing and working methods and may not rely on this audit with regard to the condition, safety and stability of the existing structure, or the presence or otherwise of deleterious materials.

Given the age of the building it should be assumed that some asbestos containing materials (ACMs) may be found. An asbestos Refurbishment/Demolition survey as defined by the HSE must be carried out, and the findings taken into account in the planning of any deconstruction works.

1.1.2 Cost

This audit is a record of the materials that may be found in the existing building and does not consider what course of action is likely to be most economically advantageous to the client.

Whilst Expedition and demolition partners Tilley and Barrett have provided context on likely economic benefits and possibilities in the de-construction of the building, no information contained within or implied by this audit may be relied upon to form the basis of any commercial decisions by future contracting parties.

It should be recognised that the best practice demolition and reclamation methods described in this report may become more or less costly according to the prevailing market conditions at the time of deconstruction. Advice must be sought from a cost consultant at the appropriate time to determine the optimal course of action.

Similarly, the demolition contractor is wholly responsible for satisfying themselves as to the most appropriate demolition method, quantities of materials arising and the time and cost associated with deconstructing the existing building in accordance with the commitments made in the circular economy strategy.

Attempts to increase the recovery and circularity of existing materials may be accompanied by cost and programme implications. These factors must be managed as part of the deconstruction tender and contract.

1.2 Audit methodology

The audit methodology is in alignment with the GLA London Plan policy SI 7 circular economy statements guidance (March 2022) section 4.6. Further, the audit is aligned to the BREEAM New Construction Wst 01 pre-demolition audit requirements and the BRE pre-redevelopment audits Code of Practice (July 2017) requirements.

The pre-demolition audit was carried out by Expedition Engineering with input from specialist demolition contractor Tilley & Barrett. The material inventory was populated by both parties based on the following sources of information:

1.2.1 Superficial inspection

An external and internal walkaround was conducted by Expedition and Tilley & Barrett on 14 November 2023.

1.2.2 Photographic records.

Photographic records from the site walkaround in November 2023 were used.

In addition, photographs from the Google Maps entry for City House Sutton were also reviewed: https://maps.app.goo.gl/6Lvs5RnLLhWwo3NZ8

1.2.3 Survey drawings

AJPL Architect's general arrangement drawings 190/761/11 through to 15 and 26, dated June 1995, contain internal layouts of the building and elevations and are assumed to date from the original construction scheme. Some structural arrangements and dimensions can be surmised or interpreted from these drawings but they do not contain any material or technical information.

AJPL Architects site and landscape drawings 190/761/ 34 through to 36, 38,39 dated Sept 1995 contain external levels and some construction details but exclude superstructure, i.e., there are no roof levels, extents or other features.

1.2.4 Technical record drawings

Archive record drawing searches were not requested from LB Sutton

1.2.5 Intrusive investigations

Internal access was available during the site walkaround and it was possible to view into roof spaces and ceiling voids. No intrusive investigations were carried out. No trial pit or other below ground investigations were carried out to understand likely substructure and foundation details.

1.2.6 Embodied carbon calculation methodology

In order to measure the loss of embodied carbon in the existing building, the inventory assesses the embodied carbon of replacing each material with equivalent new materials. Generic embodied carbon factors (ECFs) from the iStructE and ICE databases have been used and cover upfront emissions only (A1-A5).

2 Existing site and buildings

2.1.1 Site description

City House, Sutton is a four-storey office building constructed in the mid 1990s. The total GIA is estimated at 1117m^2, broken down as below:

Ground floor	255m^2	Main entrance lobby and offices
1st floor	334m^2	Lift and stair lobby and offices
2nd floor	334m^2	Lift and stair lobby and offices.
3rd floor/ loft	194m^2	Lift overrun and loft storage and offices (restricted headroom)

The building appears to be predominantly precast concrete slab and loadbearing blockwork. No signs of distress, corrosion or spalling were observed externally, indicating that the structure is likely to be generally in good condition.

The pitched roof is formed with a number of hips and valleys to suit the winged plan form. The structure is traditional timber raftered construction on loadbearing block walls with a timber post and beam arrangement to support the ridge lines. Over the stairwell and lift core a dormer creates a raised roof line over the lift overrun.

Downstanding steel beams span the main office spaces and support the precast concrete floor decks. The beams and decks are set out in a winged plan form. The steel beams do not form part of a frame and instead bear directly onto the blockwork walls and sit within the ceiling void.

Typically, the floor construction was visible in ceiling voids as precast concrete slab (assumed hollowcore). The exception to this was over the approx. 70m^2 external carport at ground floor where an in-situ concrete slab was visible with substantial downstanding beams and brick clad concrete (assumed) columns.

External walls were found to be cavity construction with a brickwork external façade and blockwork internal loadbearing leaf. Generally, brickwork appears to be self supporting at ground/ foundation level with no visible horizontal movement joints but is assumed to be supported on brick support angles at first floor around the perimeter of the external carport.

Columns supporting the porch roofs at the side entrances were of unknown construction but are assumed to be over clad steel column sections possibly concrete encased.

The roof is clad in slate-like tiles which appear to be synthetic.

A full height single glazed curtain wall façade system forms the external wall to the stairwell. The stairs are assumed in-situ cast reinforced concrete.

Substructure and foundation details are not known. Based on the anticipated ground conditions and in the absence of more definitive information, it is anticipated the substructure will consist of in-situ floor slabs spanning between piled foundations. Pile caps and ground beams are also assumed to be present, though this is yet to be confirmed.

Photographs are provided in Appendix A.

2.1.2 Pre-redevelopment audit outcomes

The existing building is of sound construction and appears in good condition. It is well suited to its current use and occupation as a series of tenanted office spaces with shared facilities. The structure is of simple loadbearing blockwork and precast concrete deck and while it could offer some scope to make alterations to internal plans, it is less well suited to modifications to the envelope and facades. Wider windows and the addition of balconies will be harder to achieve due to all external walls being loadbearing.

Floor areas in each wing are generous and could offer flexibility for alternative layouts if units are restricted to two per floor (ie one per wing). Subdivisions of the floor spaces will require some additional compartmentation for fire and acoustics and may require the addition of external fire escapes. While conversion of the building is feasible structurally it would offer diminished value architecturally and a lower quality of life for any occupants.

The simple construction of the building limits the ability to extend the form vertically (ie adding additional floors) due to the limits of the load bearing walls and foundations. Any new construction would need to be independent and would be constrained by the existing building if retained. A new build form that was built over the top of the existing would have higher carbon impact outcomes due to the additional structural constraints this would cause.

While demolition option is not sought it is the best solution for this site. Mitigation of carbon impacts should be fully explored through careful consideration of circular economy principles in the deconstruction and recycling of all building materials.

Table 1 offers an assessment of the existing building performance for its current use.

Table 1: Pre-redevelopment Audit Outcomes

Criteria	**Existing building performance**	**Score**
Floor to ceiling heights	Floor to ceiling heights in the range for 2.5 – 2.7 m. Below recommended for commercial buildings (BCO 2019). Good for residential conversion.	Moderate
Structural grid	The open plan office floor plan generally offers a 9 m clear span on plan.	Good
Condition of structure	The structure appears to be in good condition. No evidence of water ingress at key junctions in the envelope. Note: a condition survey has not been undertaken.	Good
Condition of façade	The masonry façades appear to be in good condition. The double-glazed window unit glass, gaskets and aluminium frames appear in good condition from initial walk around – no surveys have been undertaken	Good
Accessibility	The existing building has 1 core with functioning elevator with access to all floors. Level access on ground floor and accessible WCs exist. The single core may limit the potential to convert floor layouts to multi-units on any floor level. No alternative studies have been undertaken.	Moderate

Fire	The existing structure is protected by fireboarding. Compartmentation and other fire strategies unknown. The single core acting as a fire escape route will limit the extent of new layouts to serve more than 2 units per floor. Alternative external fire escape routes could be introduced but would impact external elevations and spaces.	Low
Internal flexibility	The simple building form and relatively high design loading for commercial use lends itself well to being internally flexible. The winged shape on plan offers scope for good daylighting for alternative interior floor layouts. While the approx. 280m2 footprint at each level is generous the issues of compartmentalising for fire escape routes will limit the options of subdividing the space into smaller units. Relatively small window openings restrict views out but could be enlarged to offer more generous daylight	Moderate
Services	Existing servicing strategy unknown. While the mechanical and electrical services appear to be functioning, they are 30 years old and therefore approaching the end of their service life.	Moderate
Heritage significance	The building holds no heritage significance.	Low

2.1.3 Proposed new development

The proposed new development (as per Wimhurst Pelleriti drawing set 30 November 2023) is for a new, 6,900m^2 residential development with commercial ground floor over a 750m^2 footprint. Proposed massing consists of a single form at two heights – one 5 storey and one 13 storey. Externally, it includes a landscaped public realm at ground level and an accessible terrace on the 5th storey roof area.

2.1.1 Extent of proposed demolition

It is proposed to demolish and replace the existing City House building in its entirety.

3 Material inventory

Table 2 summarises the material inventory including reporting on materiality, condition and quantity against which the opportunities for reclamation can be assessed.

Table 2: Material inventory summary

BUILDING ELEMENT	MATERIAL	DESCRIPTION	QUANTITY

SUBSTRUCTURE	Concrete	Concrete piled foundations, in situ reinforced ground beams and in situ reinforced ground floor slab. Condition unknown – assumed good.	150 m3
	Reinforcement	Encased in concrete	22.5 t
SUPERSTRUCTURE	Concrete	Concrete insitu reinforced columns and first floor slab and downstand beams. Condition unknown – assumed good.	25 m3
	Reinforcement	Encased in concrete	4.5 t
	Steel	Steel beams, secondary framing. Curtain walling framing. Condition unknown – appears good where visible.	38 t
	Precast concrete	Precast concrete suspended slabs to upper floors. Condition – appears good where visible from below	200m3
	Glass	Window glazing. Condition unknown – assumed good.	10t
	Aluminium	Aluminium window frames. Condition unknown – assumed good.	6 t
	Blockwork	Load bearing blockwork and blockwork partitions and internal walls. Condition unknown – assumed good.	110 m3
	Brickwork	Facing bricks to all elevations. Condition good	70m3
	Timber	Raftered roof construction. Condition unknown – assumed good	15m3
FINISHES	Roof Tiles	Pitched roof with non slate tiles. Condition unknown – assumed fair	300 m2
	Vinyl	Vinyl tiling to kitchen and WC areas. Condition unknown – assumed good.	60 m2
	Steel	Raised metal deck flooring. Condition unknown – assumed good.	38 t
	Plasterboard	Suspended ceiling to entrance and office areas at ground, first and second floors. Plasterboard ceiling to 3rd floor. Condition good.	830 m2
FFE	*Unknown*		
BUILDING SERVICES AND MEP	*Unknown*		
EXTERNAL WORKS	Pre-cast concrete	Paving slabs to footpaths and hardstanding of ACU enclosure, paviours to carpark area. Condition fair to good.	33m3

Aggregate	Perimeter footpath and carpark subbase. Condition unknown – assumed good.	80m3
Steel	Lighting bollards	15no.
Steel	Perimeter fencing and automatic gates	6.5t.

4 Typical demolition methodology

4.1 Assumed demolition sequencing

It is understood that the selected demolition contractor will be appointed as principal contractor for the demolition works and will take responsibility for safety and security at the site during demolition. The demolition sequencing described here should serve as a baseline against which the demolition specification can refer, however it is acknowledged that there are numerous ways of deconstructing a building, all at the discretion of the appointed contractor. The recovery rates stated here reflect what is understood to be achievable following the assumed sequencing.

Due to the proximity of public access footpaths and the high traffic road intersection at the North West corner of the site and along the North and West boundaries, stability and collapse radius in this area will be a primary safety consideration. The demolition contractor will be responsible for a full structural survey to minimise risk of uncontrolled collapse. Due to the proximity of residential housing to the West of the site, best practice dust and noise minimisation strategies will be employed including use of mobile atomisers and decibel monitoring.

A soft strip will be carried out to remove internal finishing materials and the existing mechanical and electrical plant. Core materials for removal during soft strip will include (but are not limited to): timber, plasterboard, ceiling tiles, carpet tiles, vinyl and plastics, mild steel, plumbing and electrical cables. To maximise opportunities for on-site reuse and resale to secondary markets, the quality of materials salvaged during soft strip must not be degraded significantly during their removal, segregation, and storage. Extra care should be taken when stripping fittings and fixtures, especially those mechanical and electrical plant which may have higher potential reuse and resale value. To minimise extensions to deconstruction timelines and cost implications, materials identified as having higher reuse potential will be preferentially segregated and packaged.

Following soft strip, high reach demolition excavators will begin fragmentising structural concrete elements. Following reduction in structure height, the remaining structural elements will be demolished in sequence. Temporary support structures will be used to ensure stability throughout the deconstruction process.

To achieve recovery for reuse of roof tiles, roof timbers, precast concrete slabs, steel beams and external brickwork would require floor by floor demolition, scaffold and cranage methodology. Additional costs for this, more careful demolition could potentially be offset by sale of recovered steel. The value of using a track crane versus a long reach for recovery should be reviewed. The floor by floor methodology would require a longer programme.

4.1 Recovery rates

The recycling of scrap metal and inert demolition materials yields the highest recycling rates, due to the inherent recyclability of these materials, with waste management contractors in London frequently reporting recycling rates at or near to 100%. As these materials typically constitute the bulk of waste generated by full demolition projects, it is not uncommon for such projects to achieve overall diversion rates of 95% to 100% from landfill for the demolition phase.

For other waste streams, the degree of segregation, wherever practical, significantly contributes to achieving high recycling rates. The waste transfer stations referenced are equipped with advanced sorting and recycling facilities, enabling them to routinely achieve good recycling rates for various waste fractions generated during demolition and construction projects. Any remaining waste is usually either sent to landfills or processed as refuse-derived fuel (RDF).

The recycling rate for materials that are more challenging to recycle, such as wood, carpet, insulation, polystyrene, canteen waste, and residual waste resulting from the sorting of mixed skips, can vary widely. From experience, the recycling rate for non-metal and non-inert waste streams can range from 65% to 98%, contingent on the specific materials or the contents of the mixed waste streams being sent offsite and the remaining sent for energy recovery and a very small percentage (if any) sent to landfill.

Table 3: Typical good practice recovery rates by EWC

Material	EWC	Reuse %	Recycle %	Incinerate %	Landfill %
Concrete insitu	17.01.01		100%		
Concrete precast	17.01.01		100%		
Structural steel	17.04.05		100%		
Mixed metals	17.04.07		100%		
Asphalt	17.03.02		100%		
Tiles and ceramics	17.01.03		100%		
Glass	17.02.02		100%		
Plasterboard	17.08.02		95-100%	0-5% (or landfill depending on WTS)	
Aluminium	17.04.02		100%		
Blockwork	17.01.07		100%		
Vinyl	17.02.03			100%	
Plywood	17.02.01		90%	*depending on WTS – some	10%

				100% incineration	
Aggregate	17.05		100%		

4.2 On site waste processing

In order to achieve the waste recovery potential, on site segregation would be expected. Dedicated storage on hard standing with appropriate signage and sorting processes need to be in place to ensure segregation is upheld on site. Waste must be collected and disposed of by a licenced contractor to an appropriately licenced waste destination in accordance with the Duty of Care and all other relevant environmental legislation.

Materials are segregated both manually and mechanically and loaded in general to 40 yard skips and removed to waste recycling yards where further segregation and treatment is undertaken. A demolition excavator with rotating sorting attachments is generally selected to process, segregate and load to appointed skips. As a minimum, the following segregated skips would be expected:

- Clean timber
- Plasterboard
- Carpet
- Plastic
- Mild Steel
- Nonferrous all types
- Asphalt (if inert)
- Residual general / mixed demolition waste

Considering the age of the buildings, mid 1990's, which was after the introduction of regulation on asbestos (but before out right banning in 1999) it is likely that no asbestos was used in this construction. This should be verified on site by a qualified surveyor and a full R&D asbestos survey will be required to identify all asbestos in the building. If any is found allow for appropriate removal and management to hazardous materials. If no COSHH register is available any such items will need to be tested and classified prior to removal offsite, which will also determine the most appropriate waste management route.

4.2.1 Concrete crushing

The demolition footprint for the site is large enough to facilitate onsite crushing of inert material arisings and reuse of site-won material onsite for future backfilling and engineering purposes. The arising concrete and hardcore will be removed by excavator and dump truck to a centrally located crushing stockpile, exposing the former ground floor slabs of the City House offices.

The slabs once exposed will be broken by use of hydraulic breaker and where possible excavated to reduce noise and vibration. Again, all material will be broken down and processed into manageable sections that will pass through the crusher successfully without blocking or jamming the jaws.

Foundations will be removed in sequence with the slab removal, as required split trenches will be excavated to undermine the foundations/pile caps and broken out by hydraulic breaker moving all arising to a centrally located stockpile ready for crushing. A crusher will be introduced to site once there is adequate material to provide continuous production from delivery to demobilisation.

4.3 Potential waste routes

The following waste routes can be expected by the appointed demolition contractor using typical good practice waste management practices.

Table 4: Typical recovery routes

BUILDING ELEMENT	MATERIAL	POTENTIAL WASTE ROUTES		QUANTITY
SUBSTRUCTURE	Concrete	Low – downcycled	All recovered concrete can be processed and crushed for onsite recycling or removal from site to secondary recycling yard for crushing to a 6f2-Type 1 Aggregate.	150 m3
	Reinforcement	Medium – recycled	All reinforcing bar is recycled through appointed Scrap Metal Yard	22.5 t
SUPERSTRUCTURE	Concrete	Low – downcycled	All recovered concrete can be processed and crushed for onsite recycling or removal from site to secondary recycling yard for crushing to a 6f2-Type 1 Aggregate.	25 m3
	Reinforcement	Medium – recycled	All reinforcing bar is recycled through appointed Scrap Metal Yard	4.5 t
	Steel	Medium – recycled	Given the relatively low quantum of steel to be recovered and the cost associated with recovery methodologies, reuse potential is deemed low. Steel elements are long but few and would require additional cranage to achieve careful recovery. Recycling through appointed Scrap Metal Yard is widely available	38 t

	Precast concrete	Low - downcycled	Broken by high reach excavator and dropped to the ground for processing and crushing for onsite recycling or removal from site to secondary recycling yard for crushing to a 6f2-type 1 Aggregate	200m3
	Glass	Medium – recycled	Glass is infinitely recyclable when segregated correctly.	10 t
	Aluminium	Medium – recycled	Aluminium is recycled through appointed Scrap Metal Yard	6 t
	Blockwork	Low – downcycled	Blockwork demolition by excavator, stockpiled for crushing and reuse onsite for engineering purposes.	110 m3
	Brickwork	Low- downcycled	Brickwork demolition by excavator, stockpiled for crushing and reuse on site for engineering purposes	70m3
	Timber	Low - incineration	Timber demolition by mini excavator at roof level	15m3
FINISHES	Roof tiles	Low -downcycled	Typically demolished and loaded to stockpile for crushing	300 m2
	Vinyl	Low - incineration	Low deconstructability due to adhesive applied.	60 m2
	Steel	Medium – recycled	Steel raised floors deconstructed and stored for salvage/ resell. Metal cladding and suspended ceiling grids demolishes in soft strip and recycled through appointed Scrap Metal Yard	38 t
	Plasterboard	Medum - recycled	Typically demolished and segregated for recycling.	830 m2
FFE	Ceramic	Low – recycled	Typically demolished and segregated for recycling	Not quantified
BUILDING SERVICES AND MEP	Metals	Low – downcycled	Typically demolished and segregated for recycling	Not quantified

EXTERNAL WORKS	Pre-cast concrete	Low – downcycled	Typically broken up with excavator and loaded to stockpile for crushing	33m3
	Aggregate	Medium – recycled	Removed by excavator and removed to stockpile for crushing / processing onsite with inert demolition arisings	80m3
	Asphalt and tar	Medium – recycled	Removal by excavator and segregated for recycling	0 t
	Steel bollards	Medium – recycled	Depending on connections – unbolt base connections to go for scrap	15no.
	Steel fencing and automatic gates	Medium – recycled	Depending on connections - unbolt / hot cut bolts or break out if in concrete pads to go for scrap.	6.5t.

4.4 Potential offsite receptors

Once onsite applications for material arisings have been exhausted, the London Waste Map is a useful tool to identify suitable waste contractors local to the project, with the view to also keep resources localised in London: https://apps.london.gov.uk/waste/.

Identification of local waste management contractors has also been considered to reduce distance travelled and associated carbon emissions for the development's waste removal and to support the wider sustainability strategy.

Table 5: Local waste processors

MIXED METAL	European Metal Recycling (EMR) Merton	4 miles. Scrap metal recycling.
INERT DEMOLITION MATERIAL	Sipson Combined Inert Landfill Hillingdon	4 miles. Recycling and disposal of inert waste.
SEGREGATED DELETERIOUS MATERIALS (SOFT STRIP)	UK and European Construction ltd Merton	4 miles. Waste Transfer Station.
	Raven Recycling Sutton	2 miles. Waste Transfer Station.
	Hydro Cleansing Ltd Sutton	2 miles. Waste transfer Station.
	Henry Woods Waste Management	3 miles. Waste transfer Station.

	Croydon	
WELFARE / OFFICE WASTE	First Mile	Waste transfer – commercial waste offering various recycling options for paper, cardboard, mixed dry recycling, batteries etc.

5 Circular economy opportunities

5.1 Identification of high value materials

Circular economy opportunities, those that go beyond typical ‘business as usual’ practice, have been identified based on classification of site materials, their embodied carbon content, condition, deconstructability, reclamation potential and value in the secondary marketplace. These opportunities are likely to fall outside the scope of typical demolition methodology (Section 4.1) and would therefore require close engagement with the demolition contractor to implement. Key considerations for the adoption of best practice material recovery strategies include: extensions to demolition timelines and costs; health and safety; materials segregation and assessment; storage and transport logistics; offsite brokers and secondary materials marketplaces.

Below is a summary table showing the estimated total embodied carbon of the building (excluding MEP and FFE). Selected materials that could be salvaged either by reuse or recycling are listed with their potential savings in embodied carbon (based on 100% recoverability). Together these are equivalent to 23% of the estimated total embodied carbon of the building.

Table 6: Summary of estimated total embodied carbon of the building

Total embodied carbon in building	878	Tonnes $CO^{2}e$
Approx embodied carbon in steel floor beams	70	Tonnes $CO^{2}e$
Approx embodied carbon in precast concrete decks	21	Tonnes $CO^{2}e$
Approx embodied carbon in steel raised modular floor decks	51	Tonnes $CO^{2}e$
Approx embodied carbon in roof tiles	52	Tonnes $CO^{2}e$
Approx embodied carbon in timber rafters/joists	14	Tonnes $CO^{2}e$

5.2 Opportunity 1: Offsite reuse of steel beams

Substantial steel beams (12No overall) are visible in the ceiling voids, with high recovery potential following further structural investigation. The condition of the beams has not been assessed but is assumed to be good based on the general condition of the structure. The length of each steel beam (8 to 10 metres) make resale and reuse very favourable but will require special cranage methodology for removal and long bed truck for transport from site. Due to the relatively low quantities of steel available, engagement with steel recovery services is required to determine minimum quantities for collection.

Cleveland Steel and European Metal Recycling (EMR) accept reclaimed structural steel for reuse following circular economy principles. Collaboration between Cleveland Steel / EMR would be required prior to demolition for identification of steel sections for recovery and implementation of removal strategies to minimise damage to valuable steel. The beams appear to be simply supported on bearings into the blockwork and potentially will require little preparation or cutting ahead of lifting from position and are therefore favourable for a damage free recovery. Careful removal of the precast concrete slabs sitting on the beams would be required to ensure best outcomes for steel beam recovery.

The recovery of steel beams at City House would not typically be considered due to the need for high level cranage for safe removal and low volume of steel for recovery. Alterations to the demolition process to facilitate recovery of the beams (including extended temporary works, health and safety considerations and more careful removal and storage of steel) is expected to add to the programme timeline with concomitant cost increases. These costs could outweigh the recovery value for the demolition contractor, but provision of the steel beams to the secondary reuse market would contribute significantly to circular economy commitments and is considered the most sustainable approach to structural steel disposal.

5.3 Opportunity 2: Onsite reuse of precast concrete slabs

Precast concrete slabs at upper floor levels of the structure are visible in the ceiling voids and considered to be recoverable by the demolition contractor but would not be recovered according to the typical demolition process An evaluation of potential on-site reuse applications for the concrete slab panels such as reuse as floor panels on the ground floor of the new centre or in the landscape can provide justification for salvage. Recovery of the concrete slabs (including extended temporary works, health and safety consideration and more careful removal of the slabs) is expected to add to the programme timeline.

Provision of on site storage would be required if the slabs are proposed for reuse in the next development.

5.4 Other items for potential reuse

Furniture recovered during soft strip can be donated to local charities such as Emmaus or the British Heart Foundation. Condition assessment of furniture during soft strip will provide justification for careful handling and storage.

Concrete paving tiles can be easily recovered and incorporated in the new external works as an alternative to crushing.

Existing roof tiles and timber rafters can be recovered but would require scaffolded access to allow manual removal.

Existing brick facades could be considered for recovery by lowering to the slab at each level as demolition progresses down the building. This would require scaffolding to all elevations for access and safety. Bricks could be cleaned and sorted on site before palleting for removal by crane. This would expect to add to the programme to allow for temporary protection and processing on stie.

5.5 London material re-use platforms

The secondary materials marketplace is growing in London through hubs, platforms and community initiatives:

O’Donovan’s Re-use Hub accepts pallets, wood, doors and furniture for repurposing.

Globechain is an online platform for listing of reclaimed materials for free.

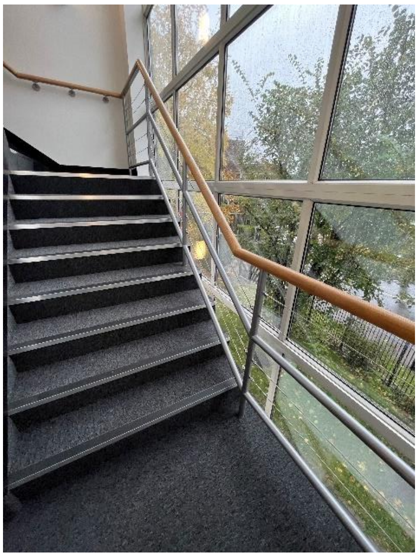
Community Wood Recycling is a social enterprise collecting waste wood for resale.

Direct engagement with end-users or resellers is the preferred approach, since off-site storage of materials in alternative facilities can lead to valuable materials sitting in storage and ultimately being disposed of through conventional waste streams with heightened carbon footprint due to extra handling and transport. Early engagement, collaboration and planning with third-parties is essential to facilitate maximal materials recovery and reuse.

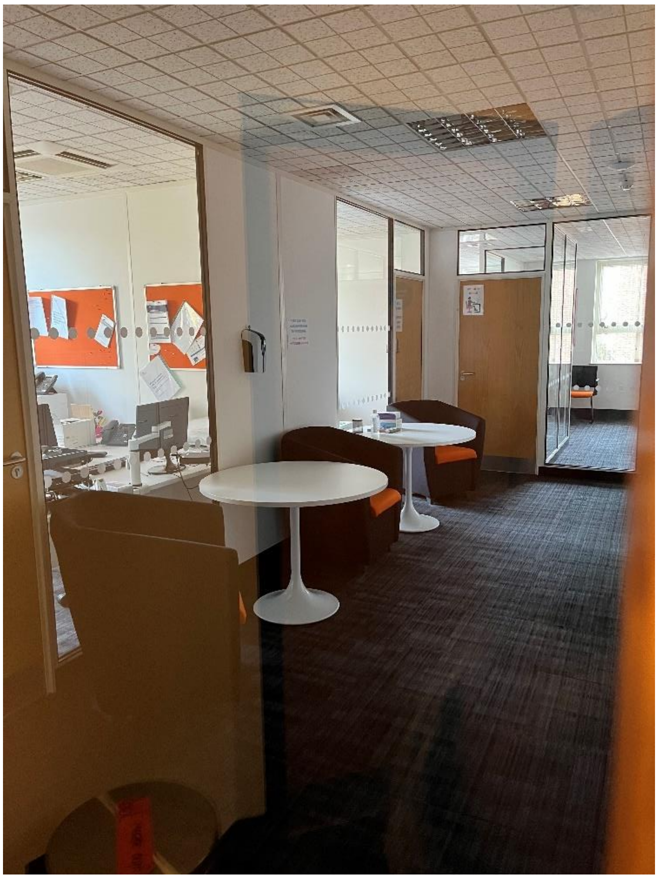
Appendix A – Selected photographs

1.1		External façade - view from main road
1.2		External façade – main entrance

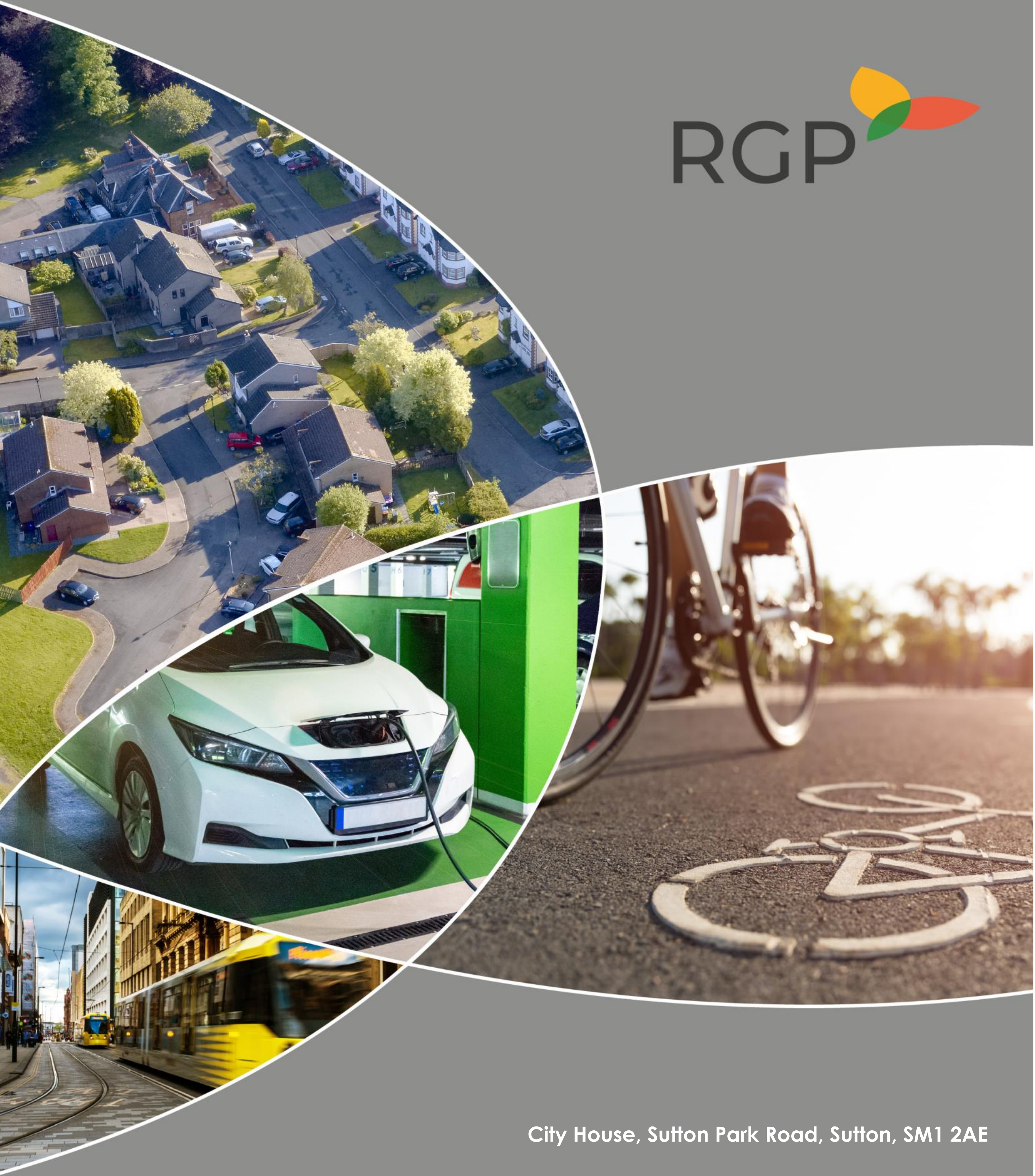
1.3		In situ concrete frame and slab to carport
1.4		Pitched rafter roof timbers
1.5		Timber post to support roof ridgeline

1.6		Fire door and frame 3rd floor
1.7	 	Internal and external view of stairwell
1.8		View of fireboard clad downstand beam in ceiling void

1.9		View of end of downstand beam supported directly on internal block wall (to back of lift lobby)
1.10		Ceiling at first floor with fancoil unit

1.11		Glazed internal partitions to offices

Appendix C/ Operational waste management plan



RGP

City House, Sutton Park Road, Sutton, SM1 2AE

WASTE MANAGEMENT PLAN

for Proposed Mixed Use Development
on behalf of Macar Developments
2022/6805/WMP05
December 2023

www.rgp.co.uk

DOCUMENT CONTROL

Project:	City House, Sutton Park Road, Sutton, SM1 2AE for Proposed Mixed Use Development
Report Type:	Waste Management Plan
Client:	Macar Developments
Reference:	2022/6805/WMP05

Document Checking

Author:	WT	Date:	12/12/23
Checked by:	WT	Date:	18/12/23
Approved by:	CMB	Date:	21/12/23

DOCUMENT STATUS

Issue	Date	Status	Issued by
1.	22/12/23	Draft	WT
2.			
3.			
4.			
5.			
6.			

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DRAWINGS

APPENDICES

1 INTRODUCTION

1.1.1 RGP is instructed by Macar Developments to provide highway and transport planning advice in relation to a proposed mixed-use development at City House, Sutton Park Road, Sutton. The site lies within the London Borough of Sutton (LBS).

1.1.2 The site is located on the eastern side of the one-way section of the A232 gyratory within the town centre of Sutton and currently comprises an office building with a total floor area of approximately 700 sqm. Vehicular access to the site is provided from the eastern side of the A232 Sutton Park Road via a shared service road with the adjacent Morrisons, over which the applicant has suitable rights of access.

1.1.3 The development proposals comprise the redevelopment of the site in order to re-provide circa 255 sqm of office space at ground floor level and 70 residential flats, including a mix of 1-3 bedroom units, on the upper floors. A copy of the latest proposed site plan is attached hereto at **Appendix A**.

1.1.4 The proposed development would be car-free (except for 2 disabled spaces), owing to the site's highly accessible location via public transport (PTAL 6a), its town centre location and reflective of the London Plan (2021) parking standards. Cycle parking would also be provided on the site, in accordance with London Plan 2021 standards and LCDS.

1.1.5 A dedicated delivery bay would be provided on the site, allowing sufficient turning space on the site to accommodate a typical goods online delivery van. It is anticipated that refuse collection would continue to be undertaken from the shared service road, which would be no different from the existing and established arrangement for City House, thereby allowing all delivery and servicing vehicles to enter and egress the site in a forward gear to avoid any impact on Sutton Park Road.

1.1.6 A separate Transport Assessment, Travel Plan, Delivery & Servicing Management Plan and Outline Demolition/Construction Logistics Plan have also been prepared by RGP as part of the planning application and these reports should therefore be read in conjunction with this report.

1.1.7 This Waste Management Plan identifies the refuse storage and collection arrangements associated with the proposed development once operational and sets out measures for the management of waste at the site to ensure waste is collected safely.

2 SITE DESCRIPTION

2.1.1 The location of the site in the context of the surrounding area is illustrated on **Figure 2.1** below. As shown, the site lies within the town centre of Sutton where a wide range of commercial uses and high street retailers can be found.

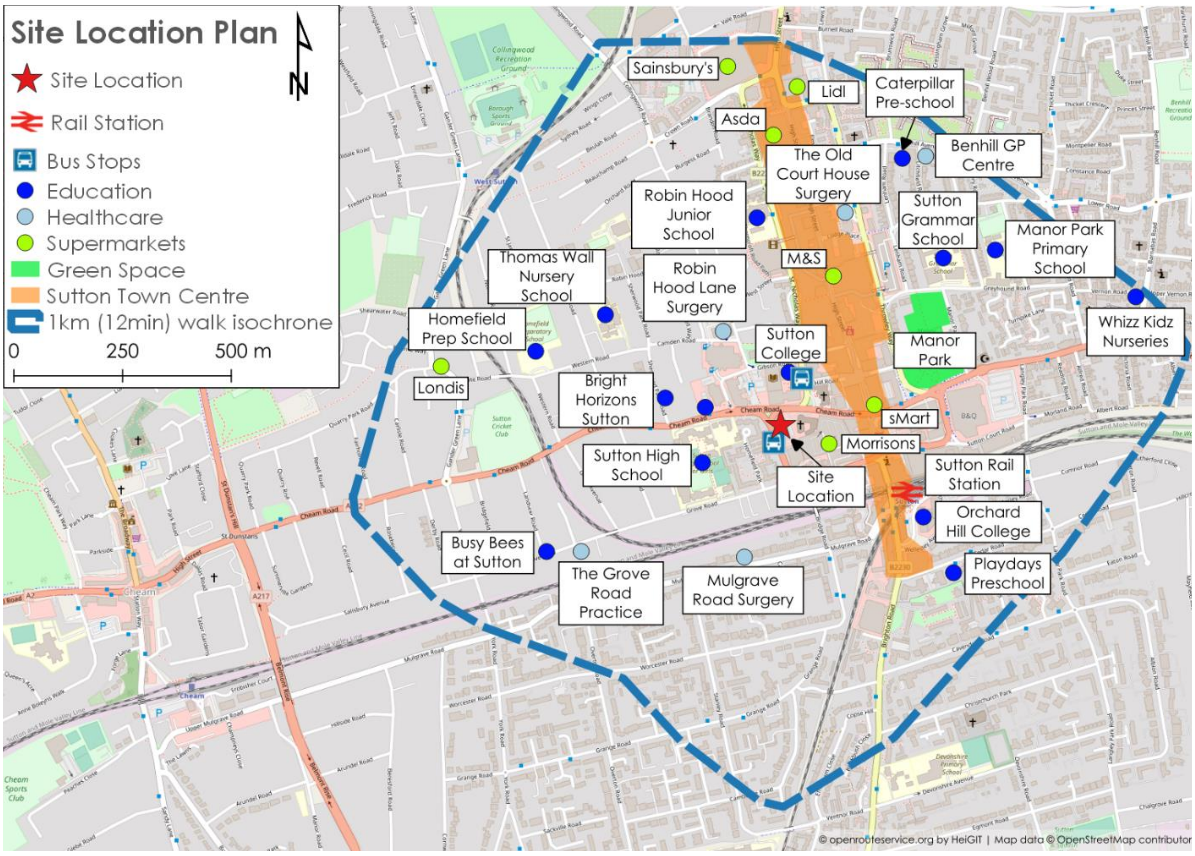


Figure 2.1: Site Location

2.1.2 The site is bound by the A232 Sutton Park Road which loops around the eastern and northern boundary of the site, Sutton Baptist Church on its eastern side and the shared service road with Morrisons to the south of the site.

2.1.3 Vehicular access to the site is provided from the eastern side of the A232 Sutton Park Road. The service road serves two loading bays associated with the Morrisons supermarket as well as gated entrance to City House, as shown in **photograph 1** later in this report. The applicant has suitable rights of access over the access road.

2.1.4 There are also two additional points of pedestrian access from the site's northern boundary with the A232, providing a good level of permeability across the site.

2.1.5 The A232 Sutton Park Road forms part of Transport for London's Red Route Network (TLRN) with double red line markings located along both sides of the carriageway which prohibit stopping at any time.

2.1.6 The A232 Sutton Park Road provides a one-way route which operates in a clockwise direction through the town centre of Sutton. At the north-western corner of the site, the A232 gyratory meets via a signalised junction, facilitating access west towards the A217 and Cheam.

3 EXISTING SERVICING ARRANGEMENTS

3.1 Existing Office Use

3.1.1 The site entrance is currently gated and it is understood that most delivery and servicing activity associated with the existing site currently takes place from the shared service road outside the site frontage. Some smaller transit type deliveries can be undertaken on the site once permitted through the telecom system, although in practice most vehicles currently wait on the service road.

3.1.2 All refuse collection is undertaken from the shared service road currently.

3.2 Morrisons

3.2.1 As discussed, the service road is shared with the adjacent Morrisons supermarket which benefits from two roller shutter service bays whereby vehicles currently reverse off Sutton Park Road into the service yard and into part of the building for servicing needs.

3.2.2 As illustrated in **photograph 1** below, from RGP's on-site observations and based on the applicant's day to day observations of Morrisons delivery activity, the southern loading bay (right) is utilised for all day-to-day delivery and servicing needs whilst the northern bay (left) is used for the storage of bins and goods only. This was also confirmed as part of a traffic survey undertaken of the loading bays, as detailed in depth within the TA and DSMP to accompany this application.

Photograph 1: Service Yard

4 PROPOSED SERVICING ARRANGEMENTS

4.1 Overview

4.1.1 As part of the proposals a dedicated delivery bay would be provided on the site to enable a typical goods online delivery van to access the site in a forward gear, turn around on the site and egress the site in a forward gear, as illustrated on **Drawing 2022/6805/001** attached.

4.1.2 Refuse collection for the site would continue to be undertaken on the service yard outside the site frontage in the same manner as the existing and established servicing arrangement for City House. A refuse vehicle would simply service the development in the same way it would service the office use currently.

4.1.3 As detailed within the TA and DSMP, the proposed development would offer a reduction in terms of the level of delivery and servicing activity taking place on the shared service road and a significant betterment in terms of the potential impact on and the relationship with the Morrisons servicing needs.

4.1.4 Only refuse collection and very infrequent larger deliveries (which are not typical of residential developments) would take place on the service yard.

4.1.5 **Drawing 2022/6805/002**, attached hereto, provides a swept path assessment of a large 10.7m refuse vehicle which is used by LBS, demonstrating that an LBS refuse vehicle can turn around on the service yard safely and conveniently, even during the rare occasions when the Morrisons loading bays are occupied by two vehicles. As indicated by the survey, during some occasions vehicles were observed to park side by side on the service yard which is reflected on the attached drawing as a worst case scenario. It also confirms that a refuse vehicle and a car can pass one another simultaneously at the site access safely.

4.2 Residential Waste Requirements

4.2.1 The bin storage requirements associated with the residential development have been considered based on the requirements set out within the '*The London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance (2023)*'.

4.2.2 This WMP considers these standards which indicate that the total waste capacity for communal storage should be calculated as 30 litres per unit plus 70 litres per bedroom. The split of this waste should be as follows:

Waste	40%	1100L Euro Bin
Paper & Card	30%	360L Wheeled Bin
Dry Mixed Recycling	20%	1100 L Euro Bin
Food Waste	10%	240L Wheeled Bin

4.2.3 As such, the requirements for the residential units are as follows:

- 30l x 70 units = 2,100 litres
- 70l x 133 bedrooms = 9,310 litres
- **Total = 11,410 litres**

Waste	4	1100L Euro Bin
Paper & Card	10	360L Wheeled Bin
Dry Mixed Recycling	2	1100 L Euro Bin
Food Waste	5	240L Wheeled Bin

4.2.4 As shown on the ground floor site plan at **Appendix A** (an extract of which is shown in green in **Figure 3.1** below), the residential element would be provided with a dedicated bin store, suitable to accommodate the required storage provision outlined above.

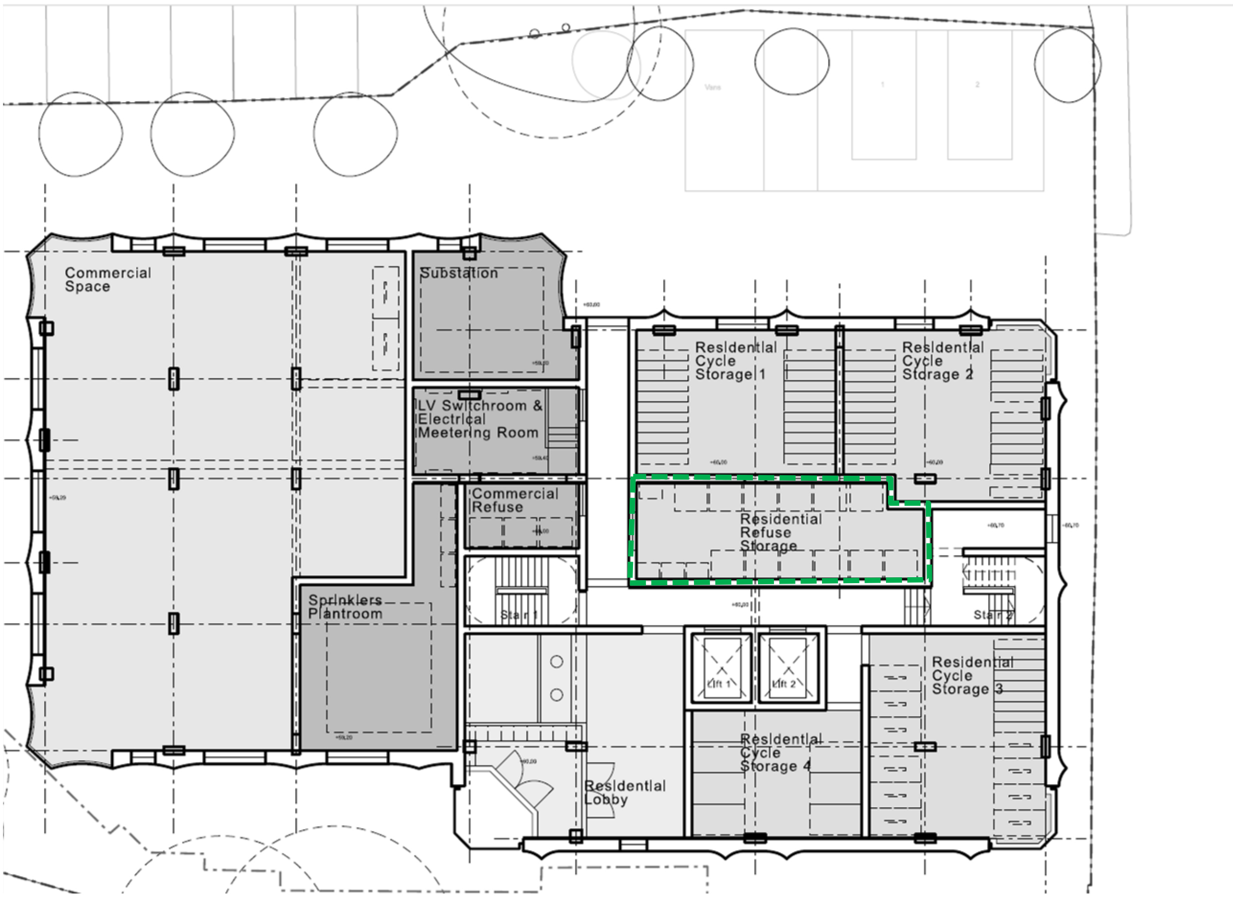


Figure 3.1: Proposed Residential Bin Store

4.3 Commercial Waste Requirements

4.3.1 The bin storage requirements associated with the commercial unit have been considered based on the office requirements set out within the Sutton and Kingston document. **Figure 3.2** below summarises the commercial waste storage requirements.

Sutton and Kingston Recycling and Waste Technical Planning Guidance		
Use	Waste Storage Capacities	Requirements based on floor area (255 sqm)
Office	2600 litres per 1000m2 of gross floor space. 50% capacity retained for recycling	= 663 litres (weekly)

Figure 3.2: Proposed Commercial Unit Refuse Storage

4.3.2 Based on the above calculations, the proposed commercial unit could generate up to 663 litres of waste per week, equivalent to 2 x 2 360 bins or 1 Eurobin for example.

4.3.3 As shown on the ground floor site layout plan at **Appendix A** (an extract of which is shown in orange in **Figure 3.3** below), a dedicated bin store would be provided for the commercial unit, separate from the residential bin store, suitable to accommodate at least 663 litres of waste.

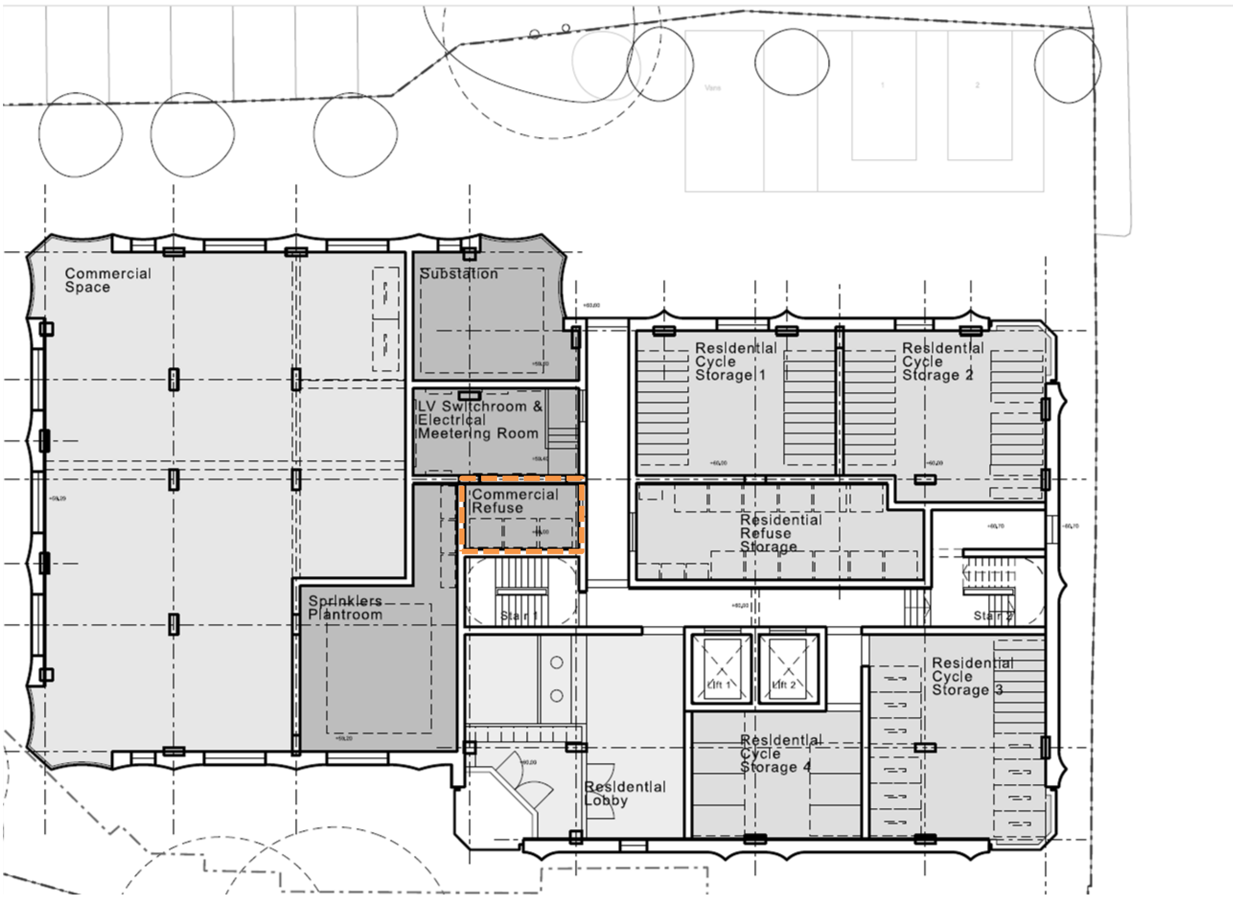
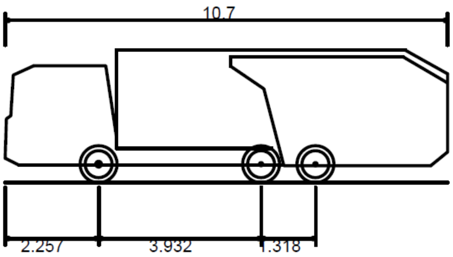


Figure 3.3: Proposed Bin Store (Commercial)

5 REFUSE VEHICLE AND COLLECTION POINT

5.1.1 Domestic and commercial refuse collection for the site would be undertaken using an LBS refuse vehicle, or similar, as set out within the '*The London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance (2023)*'. These dimensions are illustrated below.



Phoenix 2-20W (with Elite 2 6x2 RS chassis)

Overall Length	10.700m
Overall Width	2.590m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.340m

5.1.2 Residents / staff would be responsible for bringing waste and recyclable material from their units to the waste storage rooms provided, either via the stairs or lifts provided.

5.1.3 The route between the bin storage areas and public highway would be step-free and clear of any obstructions or other features to ensure the movement of bins is not impeded. The bin collection strategy would be managed by site management on collection days.

5.1.4 The commercial unit shall only use the bin store provided and shall not use the residential bin stores at any time.

6 WASTE AND REFUSE MANAGEMENT

6.1.1 The site management team would be responsible for the management of waste and refuse collection at the site and would be responsible for implementing, enforcing and reviewing these measures and procedures accordingly.

6.1.2 The bins would be clearly identified to indicate general waste, recyclable containers and food waste for simple collection and use by residents. The site management team would be responsible for ensuring the manufacturing quality, branding and labelling meet required standards, as set out within the '*The London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance (2023)*.

6.1.3 The refuse stores would be designed to ensure residents, staff or refuse collectors are able to access the stores independently from the front face, with appropriate clearance provided in front of each bin and between bins to ensure they can be accessed and moved safely.

6.1.4 The storage areas for refuse will be clearly identifiable to all residents, staff and refuse collectors through the use of appropriate signage on doors or walls within the vicinity of the bin stores. The bins within the stores would also be signed for their appropriate use (i.e. landfill / recycling / food waste).

6.1.5 The site management team will also be responsible for ensuring that all waste is placed into the containers for collection, including materials that have been placed beside or on top of bins, or waste that has overflowed from the containers.

6.1.6 Appropriate lighting will be provided within the refuse stores, either through a proximity detection system or on a time delay button to prevent lights being left on. The bin storage area would also have a suitable impermeable hard standing ground covering which can be cleaned easily and the slope of the floor would be designed to enable it to drain properly and completely.

6.1.7 Information would be provided to residents and staff of the commercial unit upon first occupation detailing the on-site refuse collection arrangements and the recycling facilities available.

6.1.8 The site management team would undertake regular checks of the bin storage provision to ensure they are fit for purpose and any damaged bins beyond repair replaced.

7 SUMMARY AND CONCLUSIONS

7.1.1 This Waste Management Plan (WMP) has been prepared by RGP to support a proposed mixed use development at City House, Sutton Park Road, Sutton, SM1 2AE.

7.1.2 This report sets out a number of clearly defined procedures relating to the waste collection and management associated with the proposed mixed use development at the above site. This report demonstrates the following:

(i) Refuse collection would be undertaken from the shared service yard, consistent with the existing arrangement for the site;

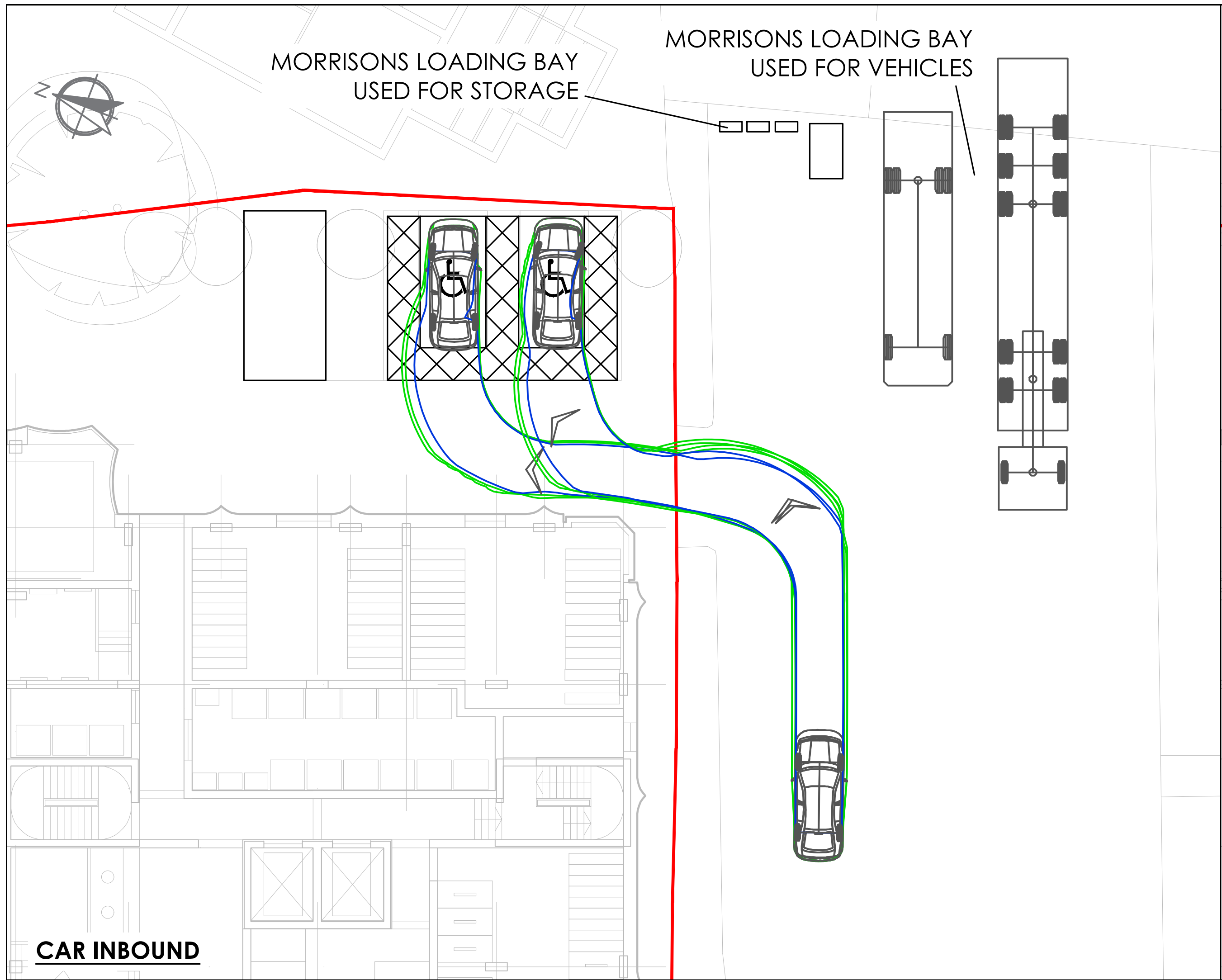
(ii) The proposals have been demonstrated in the TA and DSMP to offer a reduction in activity on the service yard post development and a betterment in terms of safety for the Morrisons operation;

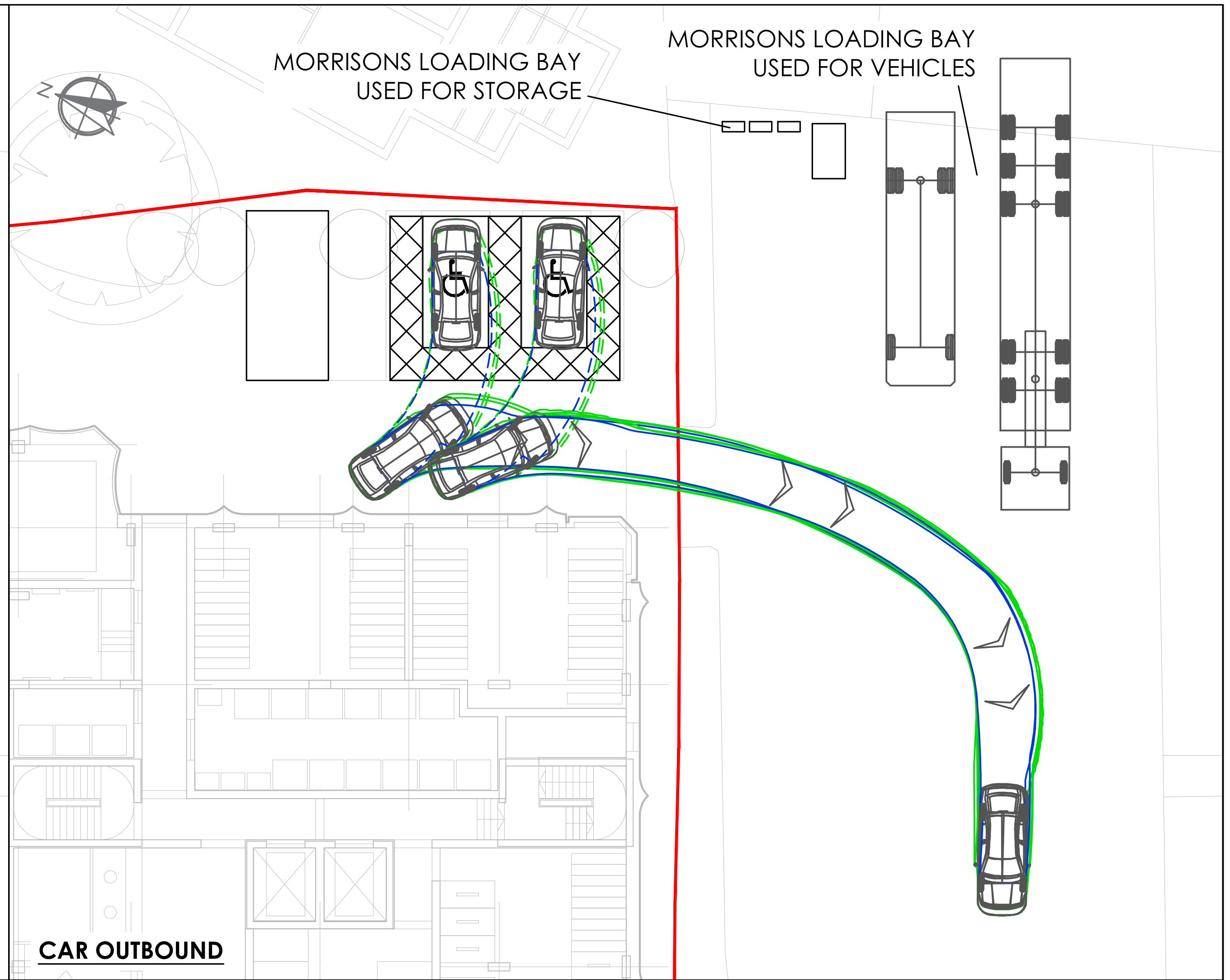
(iii) The proposals would provide appropriate bin storage provision in line with The London Borough of Sutton and The Royal Borough of Kingston – Recycling & Waste Planning Guidance (2023);

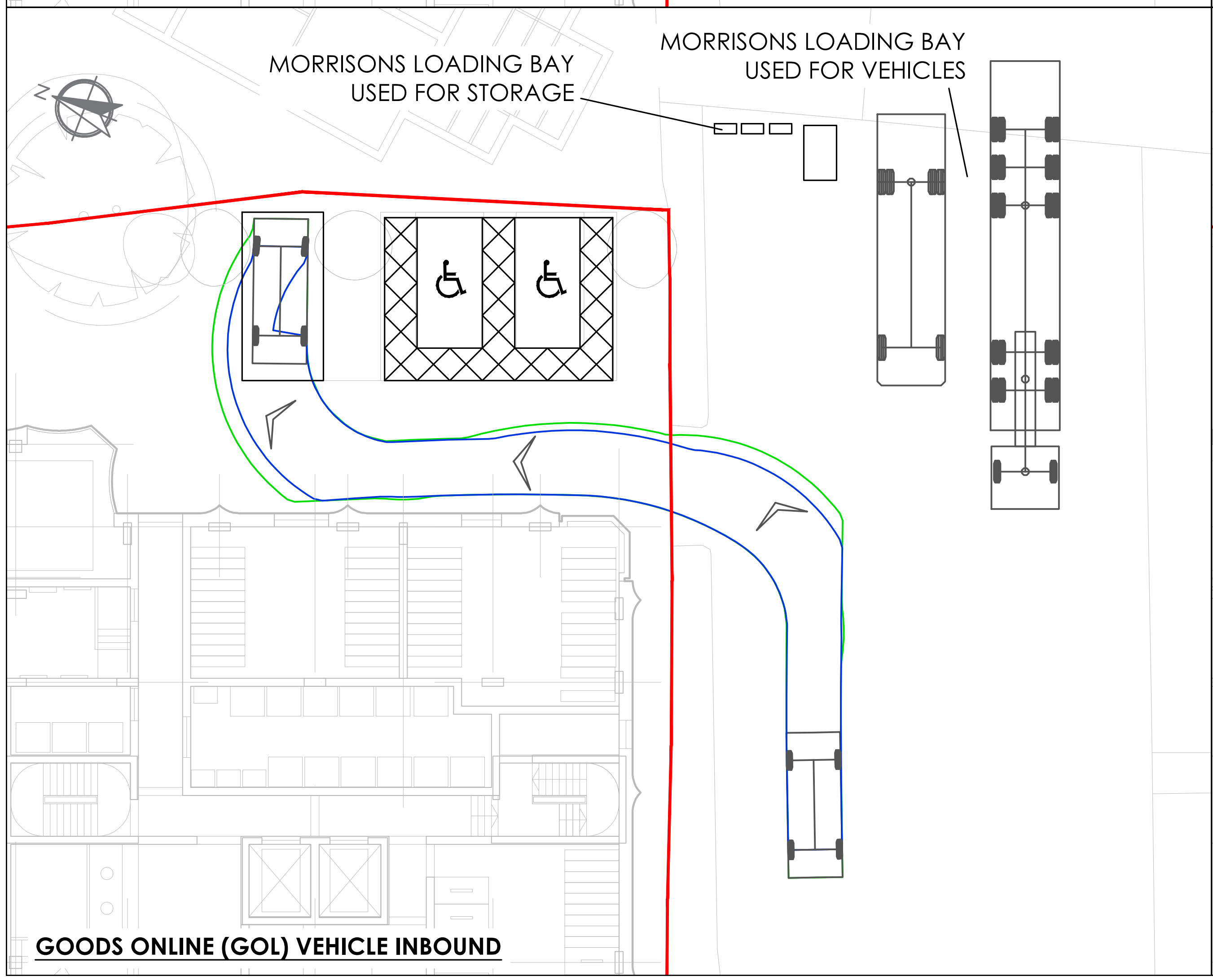
(iv) The waste collection strategy would be managed by the site management team;

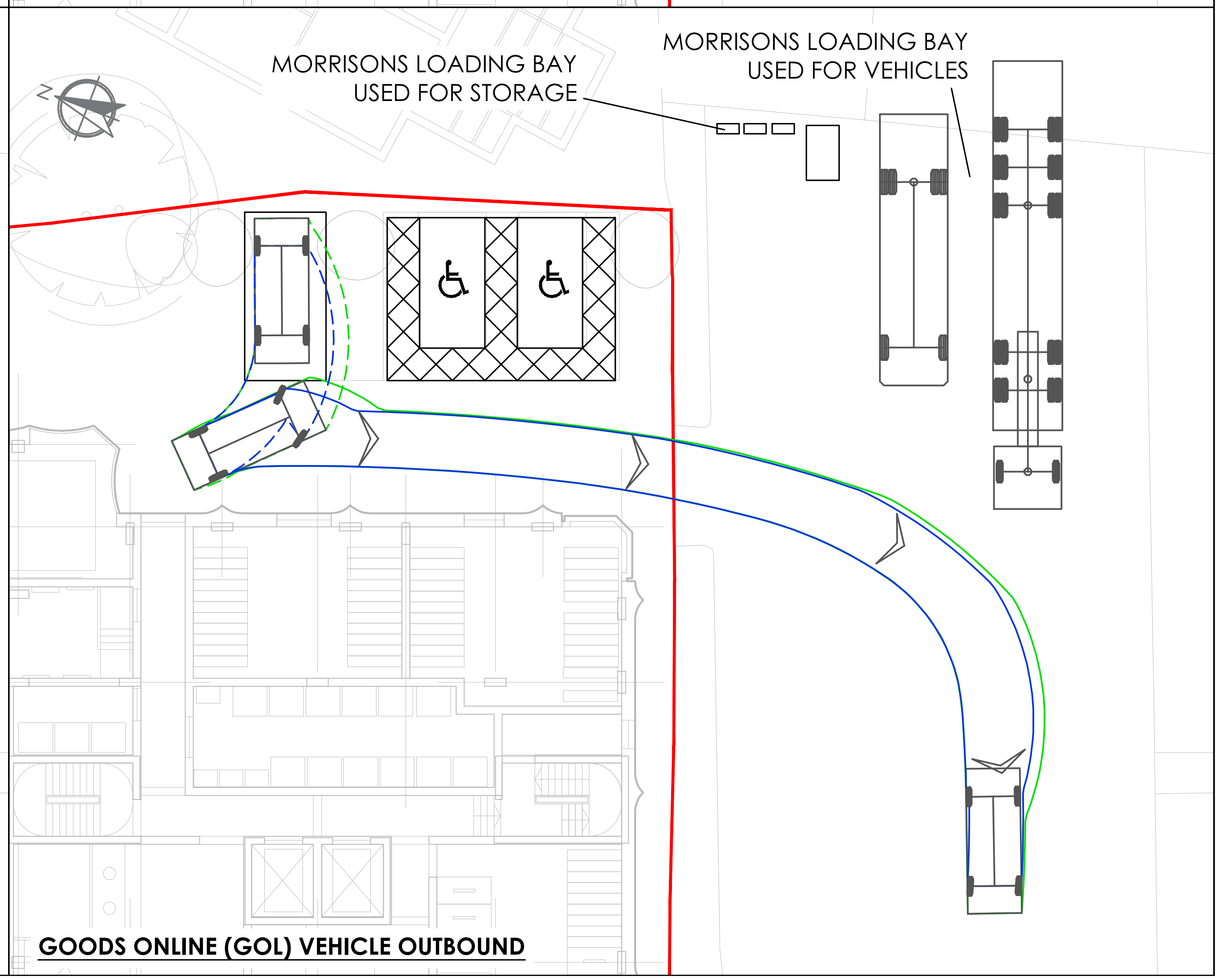
(v) A number of waste management measures will be implemented at the site, with additional and appropriate measures introduced in the future by the site management company in response to demand / need over time.

DRAWINGS





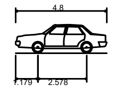




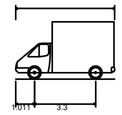
NOTES

This drawing has been prepared for the purpose of planning discussions and does not constitute a detailed design drawing, or construction drawing. A Design Hazard Inventory has been prepared by RGP setting out the hazards which have been designed out. This is available upon request.

SITE BOUNDARY



Standard Car (4.8m)	
Overall Length	4.800m
Overall Width	1.769m
Overall Body Height	1.488m
Min Body Ground Clearance	0.249m
Max Track Width	1.713m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	5.100m



GOL Delivery Vehicle	
Overall Length	5.339m
Overall Width	1.986m
Overall Body Height	3.085m
Min Body Ground Clearance	0.338m
Track Width	1.986m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	6.400m

RESIDUAL HAZARDS

In addition to the hazards/risks normally associated with the type of work detailed on this drawing, please note the following residual hazards:

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement.

Rev.	Drawn	Comments	Date
P5	DLH	DETAIL AMENDMENT	15/12/23
P4	DLH	LAYOUT UPDATED	11/12/23
P3	DLH	LAYOUT UPDATED	01/11/22
P2	DLH	LAYOUT UPDATED	21/10/22
P1	DLH	FIRST ISSUE	06/09/22

RGP
Transport Planning and Infrastructure Design Consultants
Shackleford Suite, Mill Pool House, Mill Lane, Godalming, GU7 1EY
1-2 Paris Garden, London, SE1 8ND
Tel: 01483 861681 / 020 7078 9662 www.rgp.co.uk

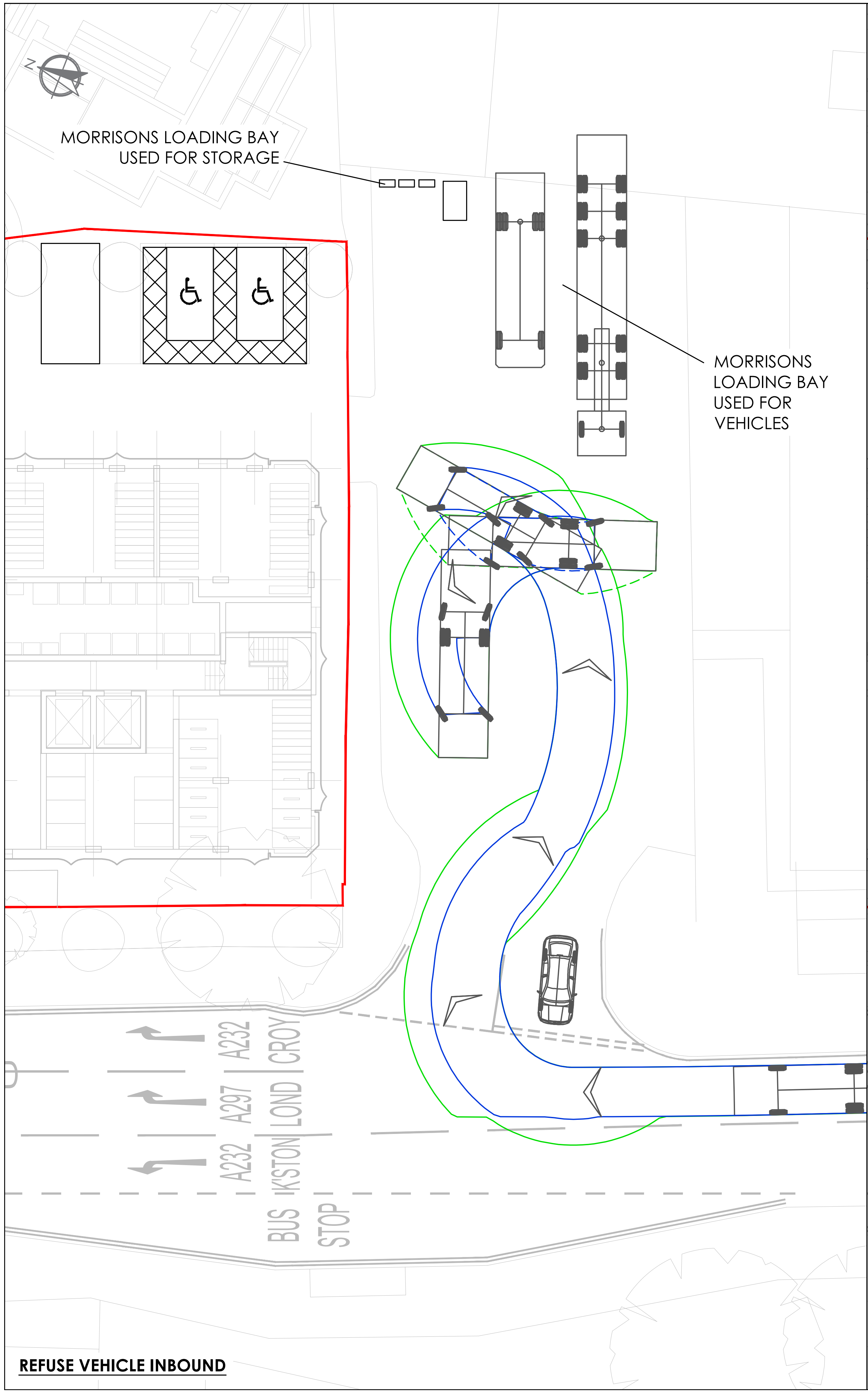
Client
Macor Developments

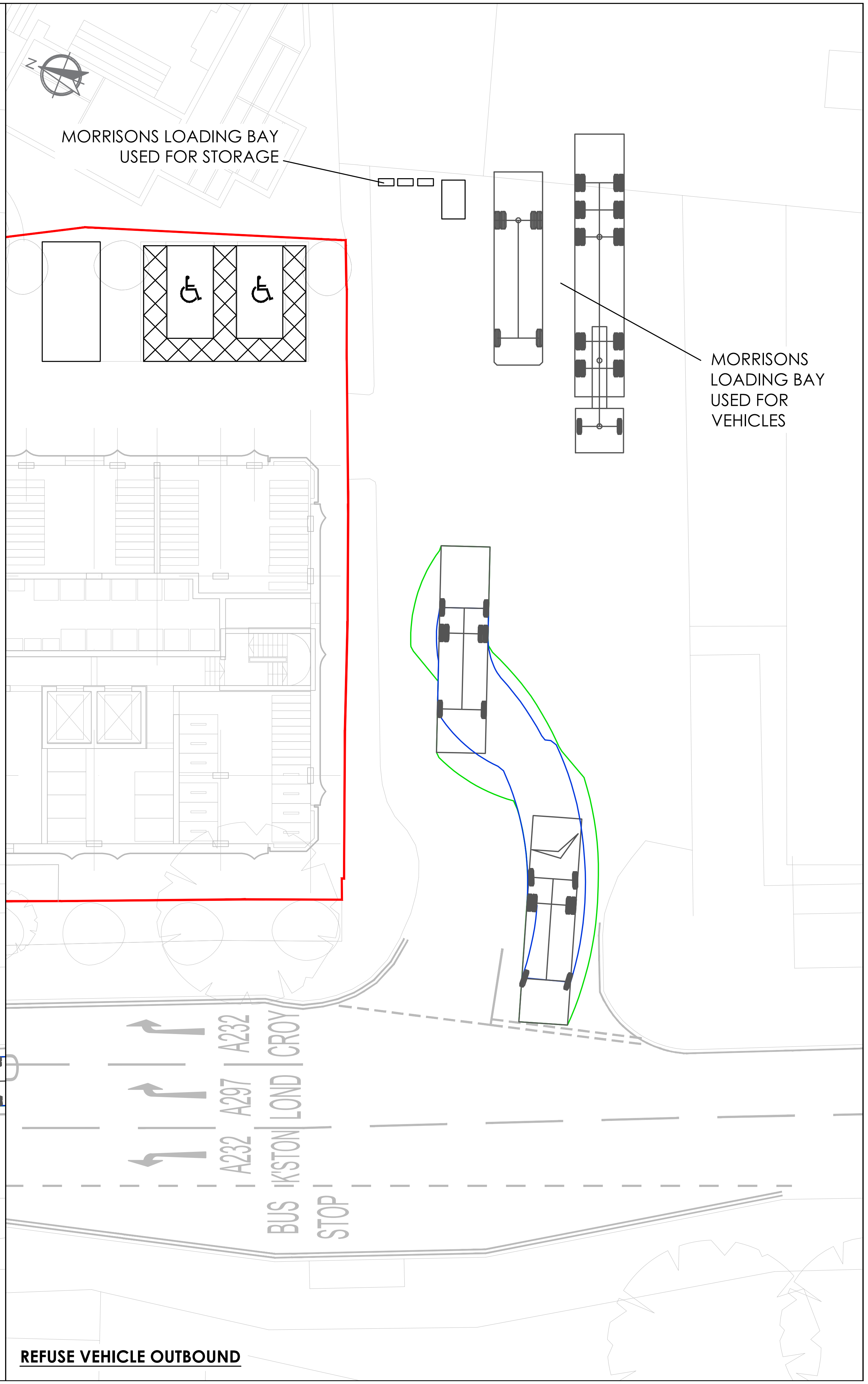
Project
City House,
Sutton Park Road

Drawing Title
Swept Path Analysis

Drawing No.	Rev.
2022/6805/001	P5

Scale	Drawn By	Checked By	
As shown	DLH	WTT	A3





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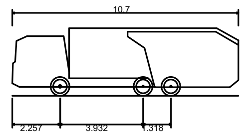
SITE BOUNDARY



Phoenix 2-20W (with Elite 2 6x2 RS chassis)

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Rev.	Drawn	Comments	Date
P3	DLH	DETAIL AMENDMENT	15/12/22
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RGP
Transport Planning and Infrastructure Design Consultants
Shackleford Suite, Mill Pool House, Mill Lane, Godalming, GU7 1EY
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Tel: 01483 861681 / 020 7078 9662 www.rgp.co.uk

Client: Macor Developments

Project: City House, Sutton Park Road

Drawing Title: Swept Path Analysis - Refuse Vehicle

Drawing No.: 2022/6805/002

Rev.: P3

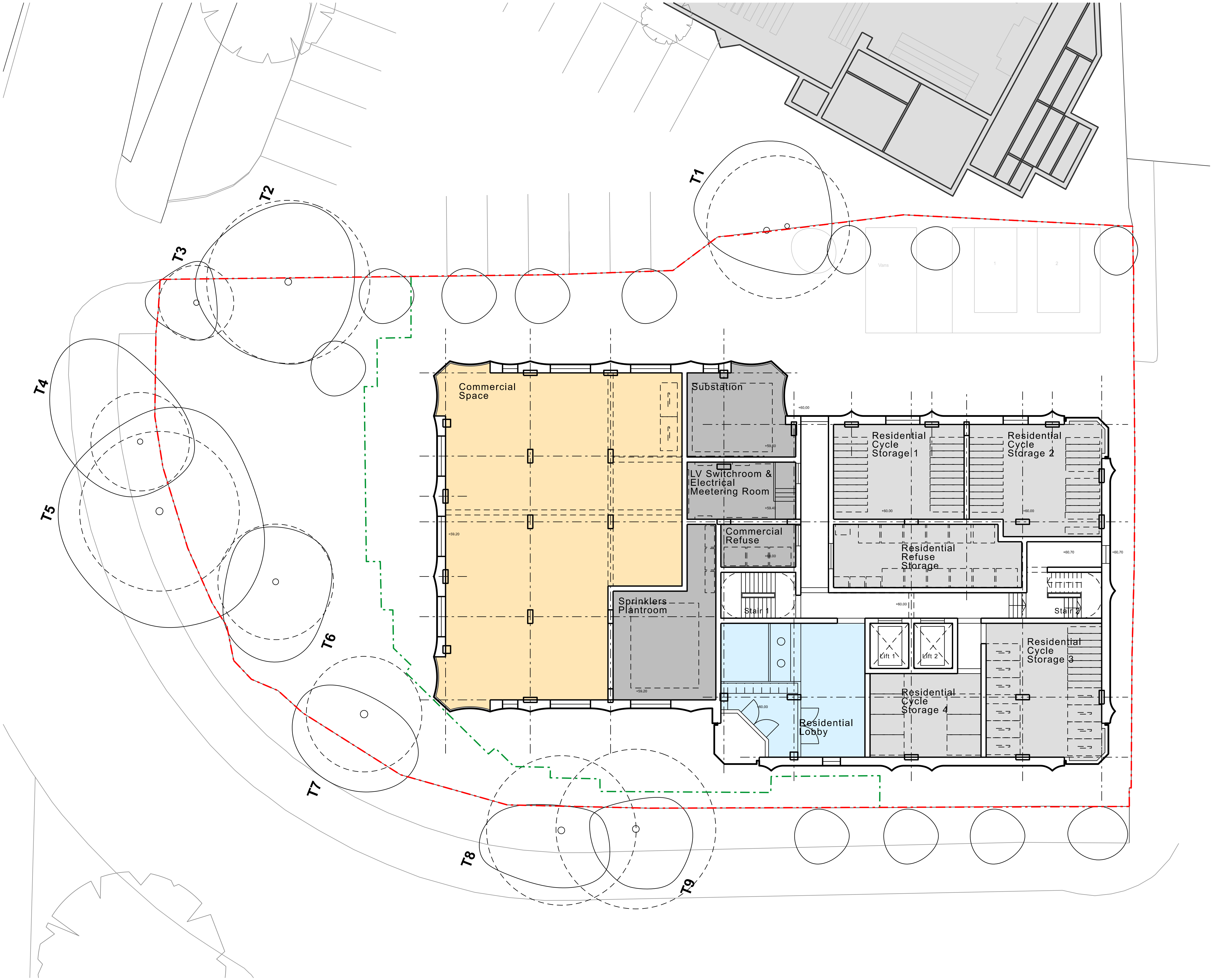
Scale: 1:250

Drawn By: DLH

Checked By: WTT

A3

APPENDIX A



0 1m 5m

N

Revision	Date	Description

Do not scale-off this drawing. Wimshurst Pelleriti take no responsibility for any dimensions obtained by measuring or scaling from this drawing and no reliance may be placed on such dimensions.If no dimension is given, it is the responsibility of the recipient to ascertain the dimension specifically from the Architect or by site measurement.

The sizing of all structural and service elements must always be checked against the relevant engineers drawings. No reliance should be placed upon sizing information shown on this drawing.

Project

City House, Sutton

Sutton Park Road, SM1 2AE

Drawing Title

Ground Floor
Proposed
Schematic Plan

Drawing Number	**Revision**
WP-0816-A-0171-P-GF	-

Scale @ A3	**Revision Date**
1:200	30 Nov 2023

Drawing Purpose

INFORMATION ONLY

WIMSHURST PELLERITI

The Mews,
6 Putney Common, SW15 1HL

0208 780 2206
info@wp.uk.com
wimshurst-pelleriti.com

RGP

RGP – Transport Planning and Infrastructure Design Consultants

enquiries@rgp.co.uk

www.rgp.co.uk

Surrey Office Shackleford Suite, Mill Pool House, Mill Lane, Godalming, Surrey GU7 1EY T: 01483 861 681

London Office 1-2 Paris Garden, London, SE1 8ND T: 020 7078 9662

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part of the Useful Simple Trust

Thank you.

Hayley Cormick
hayley.c@usefulprojects.co.uk
Marietta Gontikaki
marietta.g@usefulprojects.co.uk
Alexander Dhesi
alex.d@usefulprojects.co.uk

usefulprojects.co.uk