CAPEL MANOR COLLEGE, MOTTINGHAM

Circular Economy Statement

Capel Manor College,
Mottingham
Circular Economy Statement
V4
21st December 2022

rpsgroup.com

Quality Management

Version	Status	Authored by	Reviewed by	Approved by	Review date
V0	Draft Report – Outline Planning	AV	SM	AV	01/09/2021
V1	Detailed Report – Full Planning	AV	SM	AV	07/12/2021
V2	Detailed Report – Full Planning	AV	SM	AV	13/10/2022
V3	Detailed Report – Full Planning	AV	SM	AV	04/11/2022
V4	Detailed Report – Full Planning	AV	SM	AV	21/12/2022

Approval for issue

Akshatha Veerendra 21 December 2022

Prepared by:

RPS

Akshatha Veerendra
Associate (Sustainability, Energy & Wellbeing)

20 Farringdon Street
London, EC4A 4AB

Prepared for:

Capel Manor College, Mottingham

EXECUTIVE SUMMARY

A Circular Economy Statement has been carried out for the proposed development at Capel Manor College, Mottingham Ln, Bromley, London SE12 9AW.

The overall development consists of 2 separate blocks, each with two storeys and their associated soft and hard landscaping.

The proposed project features a new ‘‘Welcome Block’’, a two-storey building with a GIA of 669m^2 and comprises of Dog Grooming facilities, a Floristry Classroom, Floristry Cold Store, Reception, Teaching space, Lab preparation, teaching space, toilets and plant.

The project also proposes the construction of another building named `’Linear Block’’, a two-storey building comprising of a Social space, Kitchen, Teaching Space, Staff Offices, Quiet Room, Counselling, Horticulture Studio, Workshops, toilets and plants, to occupy the area of the site currently housing a number of small rooms.

This report outlines the scheme and assesses likely materials, waste and other elements associated with the works. The report concludes with potential amendments which can be made to the proposed development in order to reduce the carbon emissions over the project lifecycle and increase building circularity.

This Detailed Circular Economy report forms part of the planning submission to Bromley council

1.1 Summary of approach, key commitments, and targets

This report aims to assess the circular economy principles of the ‘Welcome Block’ and the ‘Linear Block’ resulting from its construction, building use and end of life and disposal. This assessment has been completed using OneClick LCA software which reflects guidance provided in *Mayor of London Circular Economy Statement Guidance, Draft for consultation, October 2020* and *RICS Whole life carbon assessment for the built environment, 1st edition, November 2017.*

The aim of the assessment is to assess the building circularity. Choosing products with an increased recycled content will reduce the need for virgin materials and the emissions associated with their extraction and processing. In addition, a building which is designed to be durable and adaptable can result in the need for fewer materials and it can prolong the lifetime of the building if future uses have been considered. The key commitments, targets, default values and assumptions used in assessing the circularity of the building are included in section two to four of the report. As the project progresses and more definitive materials information is confirmed, the One Click Tool can be updated for a new building circularity score.

Contents

Tables

Figures

Appendices

2 INTRODUCTION

RPS Consulting Services Ltd was commissioned by Capel Manor College to undertake a Circular economy analysis and produce a report for a proposed development at Capel Manor College, Mottingham Ln, Bromley, London SE12 9AW.

The proposed development comprises two new buildings, each consisting of two floors. This report will form part of the planning submission to Bromley council.

This report outlines the scheme and assesses likely materials, waste and carbon emissions associated with the works. The report identifies the measures that have been considered with potential amendments that can be made to the proposed development in order to reduce the carbon emissions over the project lifecycle.

The circular economy statement must be carried out at pre-application, full application stage and submit an update at the detailed stages.

This Circular Economy Statement comprises:

- A scheme overview
- A review of the current strategy and goals
- A summary of results and recommendations.

2.1 Description of Development

2.1.1 The proposed project features a new ‘‘Welcome Block’’, a two-storey building and comprises Dog Grooming facilities, a Floristry Classroom, Floristry Cold Store, Reception, Teaching space, Lab preparation, teaching space, toilets and plant. The project also proposes the construction of another building ‘Linear Block’, a two-storey building with a GIA of 607m^2 comprising of a Social space, Kitchen, Teaching Space, Staff Offices, Quiet Room, Counselling, Horticulture Studio, Workshops, toilets and plants, to occupy the area of the site currently housing a number of small rooms, as shown in the picture below. The site is located at Capel Manor College, Mottingham Ln, Bromley, London SE12 9AW.

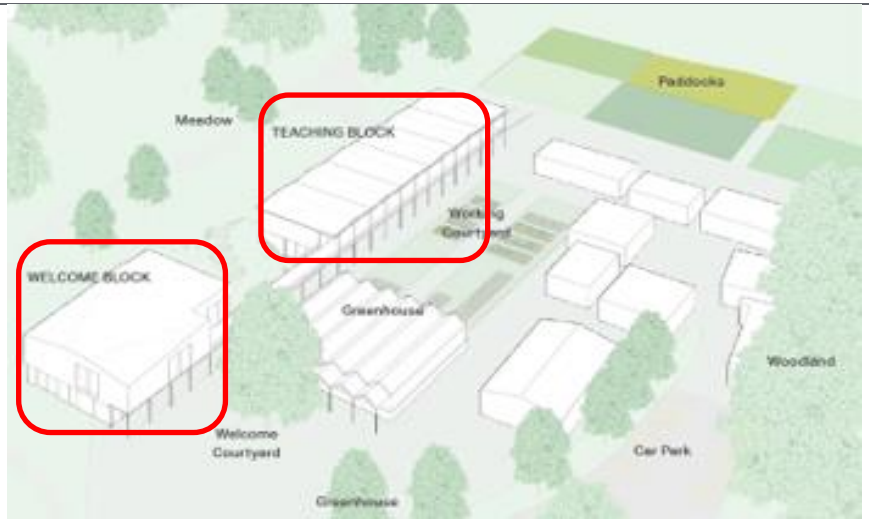


Figure 1: Proposed development: 'Welcome Block' and 'Linear Block' at Capel Manor

2.1.2 This report covers the circular economy statement for the new construction of the 'Welcome Block' and the 'Linear Block'.

2.2 Summary of Method

2.2.1 Circular Economy Statement aims to incorporate Circular Economy measures into all aspects of the construction stages, throughout the building use and to its end of life and disposal. As shown in the figure below, circular economy stands in contrast to the current linear system, where materials are mined, manufactured, used and thrown away. The 'Take, Make, Dispose' model, or 'linear' economy, has fuelled rapid growth but is inherently unsustainable in the long term where resources are finite.

2.2.2 This assessment has been completed using OneClick software and also reflects guidance provided in *the Mayor of London Circular Economy Statement Guidance, Draft for consultation, October 2020* and *RICS Whole life carbon assessment for the built environment, 1st edition, November 2017*.

Figure 2: Circular Economy

2.3 Method Statement (Key outcomes from meetings)

2.3.1 The methodology has been developed based on guidance provided *Mayor of London Circular Economy Statement Guidance, Draft for consultation, October 2020* and *RICS Whole life carbon assessment for the built environment, 1st edition, November 2017* and through the use of OneClick software.

2.3.2 The Circular Economy Statement should include input from the developer and their consultants including the design team and contractor(s), suppliers, facility managers, waste managers and end users (where possible). To compile the requisite information, initial workshop meetings have been held (Step 1 and Step 2) which included the planners, architects, and sustainability consultants to discuss how the team prefers to approach the application of circular economy principles into the project brief and also to advise them on procurement and construction process.

2.3.3 This Circular Economy Statement is required by the client to make informed decisions on which materials to use in order to reduce the waste and carbon emissions of the buildings. As this is not the final statement (Step 3) it contains less details but provides a summary of steps taken to date and notes any important further steps that are planned i.e., additional follow up workshops, calculations, research and updates to the report. The final Statement (Step 3) needs to be produced at RIBA Stage (4-7).

2.4 Data sources

2.4.1 The following table provides guidance on the data sources to be used, where available, in order to achieve the highest quality and accuracy possible for the building circularity. For this analysis we have followed the recommended order of preference as outlined below. If at a later date, more detailed information is provided, the calculations can be updated to provide a more accurate analysis and result.

Table 1: Order of preference for information (where available)

Order of preference (subject to availability)	Floor areas	Material quantities
1	BIM model	Material delivery records
2	Bill of quantities or cost plan	BIM model
3	Consultants' drawings	Bill of quantities or cost plan
		Estimations from consultants' drawings

2.5 Assumptions and Scenarios

2.5.1 Project design life

The reference study period is set at 60 years as it is assumed this is how long the building will last (building design life). Some building elements have a service life the same as the building design life, e.g., 60 years, however where it is deemed necessary the service of life of an element is adjusted by the software to suit the material or product. If at a later stage, further details are provided on the estimated service life of building elements then the service life can be adjusted accordingly.

2.5.2 Construction site impacts

The construction site impacts have been calculated based on average site impacts in a temperate climate (North) based on project value per £1 million (RICS 2020). This is the most appropriate assumption in the absence of detailed site data.

2.5.3 Input figures into One Click Software

For Recycled, Renewable, Reused, Waste DFD, DFA, EOL - The default figures have been used where there was no detailed information, however this is to be updated as the project progresses.

2.3.4 As outlined in the Design and Access Statement and other documents accompanying the planning application the project is targeting a BREEAM 'Excellent' rating. This includes the main credits related to Circular Economy requirements i.e., materials and waste credits. This approach is summarised in the following section 'Circular Economy Aspirations'.

2.3.5 The diagram on this page shows the extensive group of stakeholders and consultants that have come together to develop this proposal for the Mottingham campus.

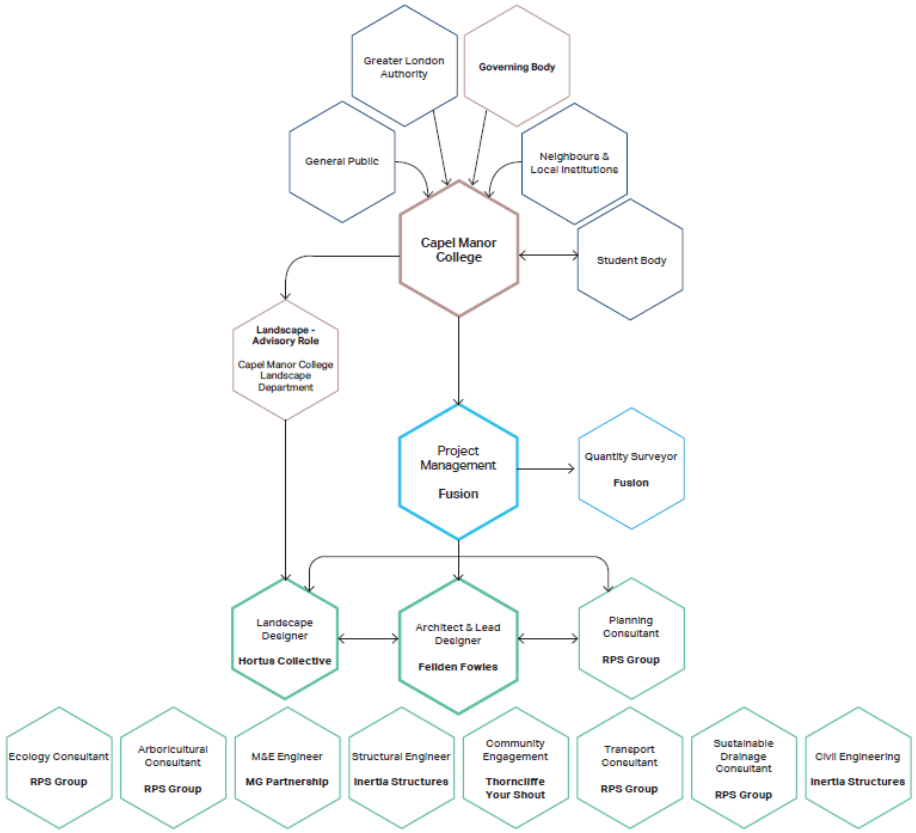


Figure 3: Group of stakeholders and consultants involved in Decision making

2.5.4 End of life scenarios

The end-of-life scenarios use default values provided in the OneClick software. The scenarios account for de-construction, demolition, transport of the materials to the waste processing site at the end of their life, waste processing for reuse, recycled and/ or recycling, waste disposal and recovery potential.

2.6 Circular Economy Aspirations

2.6.1 The project brief aspires to reuse and remake from the site materials or opt for recycled elements over new materials with high embodied carbon. This could include reusing building rubble in the design of the hard surfaces of soil substrates or ensuring effective closed loop composting on-site.

2.6.2 The Design and Access statement by Feilden Fowles includes the building relocation and removal, hard material strategy for hard surfaces, environmental and landscape strategy which all contribute to sustainable development. The fabric to be removed will be carefully selected based on its quality, usefulness along with factoring in which areas of the site can be most helpful in creating a pleasant and spacious masterplan.

2.6.3 The project follows the circular economy core principles and aims to source materials responsibly, undertake Site Waste Management plan which aims to achieve the waste targets complying with GLA requirements for both construction and demolition. The project brief also aspires to design out waste and design for durability and resilience. There will be sufficient space and bins allocated for the waste storage and segregation of operational waste.

2.6.4 The proposals put forward in this project will create high-quality landscape and architectural interventions within the existing site. With carefully considered landscapes and buildings that replace existing structures and hard landscaping where possible. This provides the college with vastly improved teaching landscapes and facilities. The principles, programme and functional adjacencies have been developed alongside the college and optimise a passive environmental strategy, including natural light, ventilation, views to the landscape along with passive supervision and observation. A synergy between the buildings and landscape provides a seamless flow from outdoor to indoor learning.

3 CIRCULAR ECONOMY GOALS AND STRATEGIC APPROACH

3.1.1 This section provides a detailed description of how circular economy principles will be implemented; this includes specific measures to conserve resources, eliminate waste and manage waste sustainably. The project team met early in the design process to discuss the sustainability strategy, goals and aspirations for the project; the outcomes from these discussions have been incorporated into reports such as Design and Access statement and Site Waste Management Plan. This process included a consideration of the circular economy strategy for the project, as guided by the relevant section of BREEAM. The Strategic Approach Table can be found in Table 2 below.

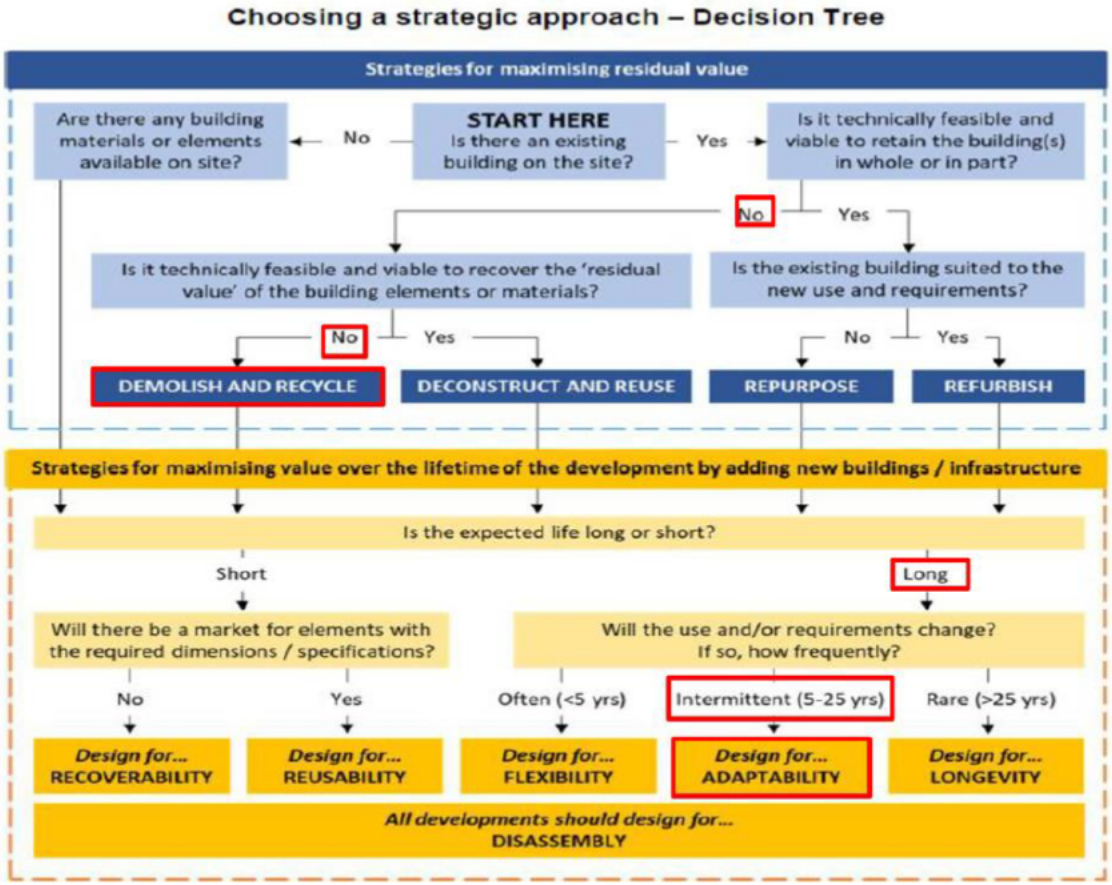


Figure 4: Circular Economy Strategic Approach Decision Tree

4 STRATEGIC APPROACH (SUPPORTING NARRATIVE)

4.1.1 As per the decision tree above (figure 4) there is an existing building on site, however the building is not technically feasible to retain in part or full. It is technically not viable or feasible to recover the residual value of the building life and materials. The plan is to demolish the existing building and recycle where possible. The strategy for maximizing value over the lifetime of the development by adding new buildings is long term. The use and requirements is assumed to change intermittently (5-25 years) Design for Adaptability.

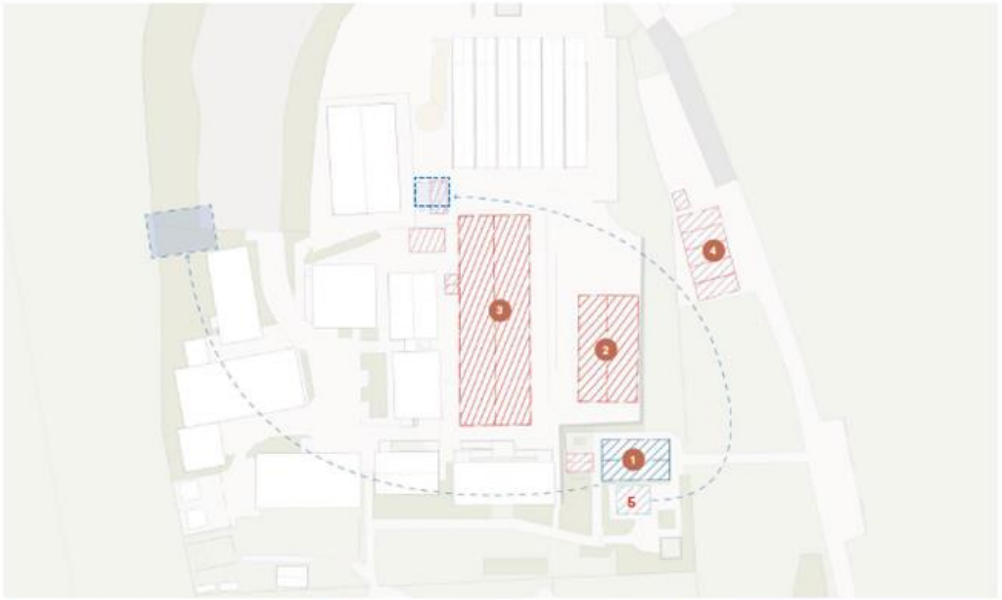
4.1.2 Existing Building

4.1.3 Page 59 of the Design and Access Statement includes information about the existing building. The fabric to be removed has been carefully selected based on its quality, usefulness along with factoring in which areas of the site can be most helpful in creating a pleasant and spacious masterplan.

4.1.4 The major existing building is a large greenhouse/glasshouse and is purely glass with a lightweight steel frame, thus this is impossible to refurbish and upgrade to new building regs standards. The existing buildings are portacabin/demountable structures as detailed in the Design and Access Statement that do not conform to current Building Regulations and provided incredibly poor teaching environments. There is no merit to their retention. Any attempt to refurbish them to modern Building Regulations would be costly and would not align to the college's (and the GLA's) aims of providing high quality architecture and teaching environments nor can they be integrated into the proposals to increase the density of the built footprints, due to the single-use nature of portacabins.

4.1.5 As shown below, one demountable classroom (2) will be removed, along with a large storage shed (1) and the large central greenhouse (3), that is no longer fit for purpose and in disrepair. A number of smaller, more temporary structures will also be removed, all of which are small sheds, greenhouses, or in the case of (4) a row of metal containers.

4.1.6 In essence the two buildings that are due to demolished are: The central glasshouse, which is currently unusable due to its state of repair. A demountable classroom structure that does not conform to any modern building standards.



5.0 ARCHITECTURAL PROPOSALS

5.1 BUILDING RELOCATION & REMOVAL

The fabric to be removed has been carefully selected based on its quality, usefulness along with factoring in which areas of the site can be most helpful in creating a pleasant and spacious masterplan.

As shown, one demountable classroom (2) will be removed, along with a large storage shed (1) and the large central greenhouse (3), that is no longer fit for purpose and in disrepair.

A number of smaller, more temporary structures will also be removed, all of which are small sheds, greenhouses, or in the case of (4) a row of metal containers.


1


2


3


4

Capel Manor College - Mottingham Campus Development - Design & Access Statement

Feilden Fowles Architects & Hortus Collective 59/91

5 CIRCULAR ECONOMY COMMITMENTS

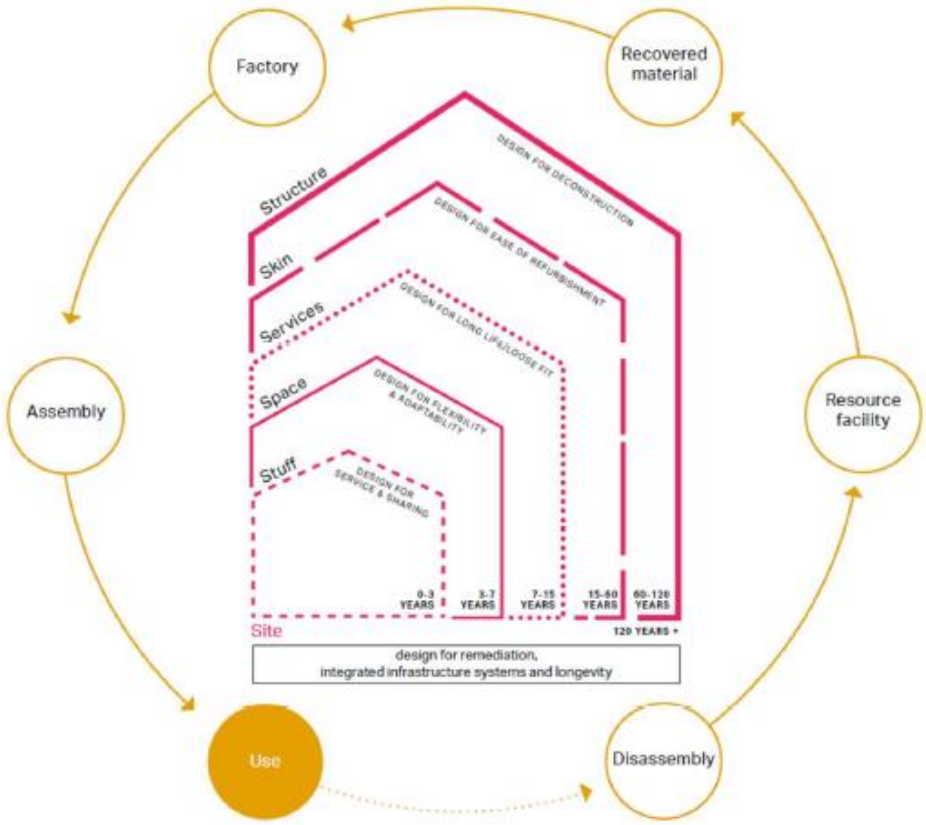


Figure 1 - 'Building in layers diagram', diagram courtesy of Useful Projects

Figure 5: Building in Layers Diagram

Table 2: Strategic approach summary– Circular Economy Statement Table 1 GLA

Aspect	Aspect Phase/Building/ Area	Steering Approach	Explanation	Target	Supporting Analysis/Studies
Circular economy approach for the new development	Whole Development	Sustainable Procurement	All materials will be sustainably sourced which is also part of the BREEAM requirements	100% of timber and timber-based products used on the project are 'Legal' and 'Sustainable' as per the UK Government's Timber Procurement Policy (TPP). Other materials will aim for certifications such as ISO14001, BES6001 etc	Design and Access Statement
		Construction Waste	Measures to be implemented to manage and reduce construction waste.	95% diversion from landfill at end of life (GLA target) Policy SI 7 Reducing waste and supporting the circular economy	Site Waste Management Plan
Circular economy approach for the existing site	Existing building structures	Maximise recovery, reuse and recycling of demolition waste	Please refer to appendix XXX email from James Cummins (GLA) which confirms that given the nature of this scheme and quality of the existing buildings on site, it's accepted that this requirement is not as relevant in this instance and the assessment we have undertaken.	95% diversion from landfill (The higher value out of the GLA target and BREEAM target). Policy SI 7 Reducing waste and supporting the circular economy	Site Waste Management Plan
Circular economy approach for municipal waste during operation	Whole development	Storage and segregation of operational waste	Waste will be managed as per the Bromley councils waste policy. On-site bin store to accommodate sufficient storage for both recyclable and landfill waste.	Waste will be managed as per the Bromley councils waste policy.	Design and Access Statement Site Waste Management Plan

-

Table 3: Key Commitments Summarised

	Site	Sub-structure	Super structure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Counter Actions +	Plans to Prove + Quantify
	SECTION A: CONSERVE RESOURCES											
Minimising the quantities of materials used	New materials are used only where required. Materials will be reused where possible	Utilise materials with a high recycled content.	Utilise materials with a high recycled content.	Materials will be reviewed	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	Aim is to minimize quantities of materials used	Contractors/Client to work with the manufacturers to source materials which have low environmental impact	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment
Minimising the quantities of other resources used (energy, water, land)	Design and Access statement includes the strategy for other resources	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	Low energy and water saving fittings will be used.	To be reviewed as project progresses	To be reviewed as project progresses	Contractor to minimise water and energy used on site.	Aim is to minimize quantities of other resources used	Contractors/Client to work with the manufacturers to source materials which have low environmental impact	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment
Specifying and sourcing materials responsibly and sustainably	Materials with Environmental Product Declarations (EPDs) to be used.	To be reviewed as project progresses	To be reviewed as project progresses	Materials with Environmental Product Declarations (EPDs) to be used.	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses		Contractors/Client to work with the manufacturers to source materials which have low environmental impact	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment

	SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE)											
Designing for reusability / recoverability / longevity / adaptability / flexibility	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed with contractor as project progresses	To be reviewed as project progresses	Contractors to ensure the waste targets are complied with	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment
Designing out construction, excavation, industrial and municipal waste arising	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed with contractor as project progresses	Construction waste targets will be met for GLA and BREEAM pre-assessment	Contractors to ensure the waste targets are complied with	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment
	SECTION C: MANAGE WASTE											
Demolition waste (how waste from demolition of the layers will be managed)		Contractor will be encouraged to identify reuse and high value recycling streams	Contractor will be encouraged to identify reuse and high value recycling streams	To be reviewed as project progresses	To be reviewed as project progresses	Contractor will be encouraged to identify reuse and high value recycling streams	A survey will be undertaken to assess the materials to be demolished	To be reviewed as project progresses	Demolition waste will either be reused or recycled to avoid sending to landfill where possible	Contractors to ensure the waste targets are complied with	As included in the conclusion recommendations of the report	Design and Access Statement Whole Life Cycle Carbon Assessment
Excavation waste (how waste from excavation will be managed)	Where applicable excavation would be managed as per the GLA requirement									Contractors to ensure the waste targets are complied with		Design and Access Statement

Construction waste (how waste arising from construction of the layers will be reused or recycled)	To be reviewed as project progresses		Contractor to liaise with suppliers regarding take back of waste and unused materials	To be reviewed as project progresses		To be reviewed as project progresses	To be reviewed as project progresses	To be reviewed as project progresses	Construction waste targets will be met for GLA and BREEAM pre-assessment	Contractors to ensure the waste targets are complied with	As included in the conclusion recommendations of the report	Waste Management Strategy Whole Life Cycle Carbon Assessment
Municipal and industrial waste (how the design will support operational waste management)	Waste Management Strategy will include details of how the waste will be stored, segregated, and recycled as per Bromley councils waste requirements											

5.1 Key Circular Economy Commitments

5.1.1 Consideration has been given to key circular economy commitments that go beyond standard practice using table and figure 4 (building in layers) above and to facilitate circular economy workshops to ensure that all opportunities have been considered for each layer of the building.

5.1.2 As this is a design and build project and contractor appointment is to be confirmed the project team are well prepared to make sure the all the building layers (building materials) to be procured are carefully selected and that aligns with the building circularity and life cycle assessment being carried out.

5.1.3 Some of the commitments that are not standard practice is that the project team will consider energy efficiency, material efficiency and sustainability of products into consideration for product selections.

5.1.4 A Site Waste Management Plan will be produced once the contractor is appointed

5.1.5 There is a target to divert 95% of construction waste and 95% of the demolition/excavation waste from going into the landfill.

5.1.6 13.3m3 (or 11.1 tonnes) of waste per 100m2 of GIA; potentially aspiring for a target of 7.5 m3 (or 6.5 tonnes) of waste per 100m2 GIA

5.1.7 Project team will aim to organise circular economy workshops to share knowledge and answer any queries project team may have. This is to encourage leadership and champions in circular economy and ensure these discussions and ideas are put into practice.

5.1.8 At detailed design further meetings are to be held to discuss the various building layers and how circular economy commitments to be undertaken. This will help the contractors and project team to understand what needs to be included and assessed to make sure the demolition, excavation and waste targets are met.

5.1.9 With regards to building design, Cross laminated Timber (CLT) is used on this project as opposed to traditional construction practice. Cross laminated timber, or CLT, represents the latest of these innovations. CLT solid-engineered wood panels are transforming construction, offering the beauty of wood with durability and toughness that can stand the test of time. Additionally, it is highly resilient to fire, earthquakes, and even explosions.

5.1.10 The advantage of using CLT is its relatively low environmental impact. Wood is a sustainable resource, so CLT is an excellent, environmentally friendly alternative to other commonly used building materials. And, because it's easy to install, using cross laminated timber can also reduce waste as well. The strength, versatility, and reduced environmental impact of CLT could improve the build of this project. The table has been reviewed for coherence and to ensure that all commitments are accompanied by a specific delivery strategy.

5.2 Reporting forms for numerical targets and commitments:

Table 4: Bill of Materials – Also included in the One Click appendix

Layers	Building Element Category	Material Type	Material Quantity (kg) Module A	Material intensity (kg/m2 Gross Internal Area - Module A	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information
STRUCTURE	Substructure	Standard concrete slab foundations have been included in the assessment.	343,718kg	257	Min. 20% ambition	0	0	97	Feilden Fowles Architectural Outline Specification
	Super Structure								Whole Life Cycle Carbon Assessment
	Super Structure Frame	Included as part of the external wall build up			Min. 20% ambition				

Layers	Building Element Category	Material Type	Material Quantity (kg) Module A	Material intensity (kg/m2 Gross Internal Area - Module A	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information
	Super Structure - Upper floors incl. balconies	The upper floor build up is as detailed in the outline specification. There are no balconies.	317,676kg	238	Min. 20% ambition			203	Feilden Fowles Architectural Outline Whole Life Cycle Carbon Assessment
	Super Structure - Roof	The roof build up is as detailed in the outline specification.	105,848 kg	79	Min. 20% ambition	0	0		
	Super Structure - External Walls	CLT	150,828kg	113	Min. 20% ambition			23	
	Super Structure - Stairs and ramps	The staircase and lift shafts for both buildings are assumed to be a concrete assembly.	886kg	1	Min. 20% ambition	TBC	TBC	1	
	Super Structure - External Windows and doors		8,047kg	6	Min. 20% ambition	TBC	TBC	5	

Layers	Building Element Category	Material Type	Material Quantity (kg) Module A	Material intensity (kg/m2 Gross Internal Area - Module A	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information
SHELL/SKIN	Wall finishes	External wall (internal side) Interior painted finish for the fireboard under 1.2m as in the Outline Specification. Fire retardant coating to CLT above 1.2m	135,209kg	101	Min. 20% ambition	0	0	45	Feilden Fowles Architectural Outline Specification Whole Life Cycle Carbon Assessment
	Finishes		20,409kg	15	Min. 20% ambition			15	
SPACE	Super Structure - Internal Walls and Partitions	The internal partitions have been included as detailed in the outline specification. The wall finish is not included here, see wall finishes below.	135,209kg	101	Min. 20% ambition	TBC	TBC	45	Feilden Fowles Architectural Outline Specification Whole Life Cycle Carbon Assessment
	Fittings, furnishings & equipment (FFE)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Services (MEP)		351.6	0.26				0.26	

Layers	Building Element Category	Material Type	Material Quantity (kg) Module A	Material intensity (kg/m2 Gross Internal Area - Module A	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information
	Prefabricated Buildings and Building Units	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Work to Existing Building	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	External works		393,145.72	294.08			174.57	91.4	

N/A= Not applicable or available for this project

5.2.1 Some of the layers available in the GLA template for CES are not relevant for this project and hence included as N/A as above. If there are any further changes as the project progresses, then the table 4 will be updated.

5.3 Recycling and Waste Reporting

Table 5: Recycling and Waste Reporting (GLA Appendix D)

CATEGORY	TOTAL ESTIMATE Quantity	OF WHICH			SOURCE OF INFORMATION
	t/m2 Gross Internal Area (GIA)	% Recycled	% Reused or recycled offsite	% Not reused or recycled max 5%	
Excavation waste	Estimated as 4.38 t/m2 GIA of excavation waste In line with the Bromley council's and GLA waste policies	95% beneficial use of excavation waste	TBC	5%	Waste Management Strategy – Please refer to Construction and Logistics Plan for initial information. This section is in progress as contractor needs to be appointed.
Demolition waste	Estimated as 3.3 t/m2 GIA of demolition waste In line with the Bromley council's and GLA waste policies, 95% of waste will be targeted to divert from landfill	95% demolition waste targeted to divert from landfill 95% Text	TBC	5%	
Construction Waste	≤6.5 tonnes of waste per 100m²	95%	TBC	5%	
	t/annum	% Reused on or off site	% Recycled or composted, on or off site	% Not reused or recycled: % To landfill / % To other management (e.g. incineration)	
Municipal Waste	In line with the Bromley council's and GLA waste policies Estimated as 2.5 t/m2	65% by 2030	If applicable	Max. 35% and no recyclable or compostable waste	
Industrial waste (If Applicable)	N/A	N/A	N/A	N/A	

5.4 Circular economy narrative (Circular economy principles)

5.4.1 At all stages of preparing a circular economy statement, the waste hierarchy has been followed to ensure that design measures to avoid and reduce waste are prioritised.

5.4.2 Principle 1 - Conserve resources and source sustainably

1.1 Minimise the quantities of materials used

The Design and Access statement confirms that where possible, the project brief has aimed to reduce new building materials by reusing and remaking from the site materials or opting for recycled elements over new materials with high embodied carbon. This could include reusing building rubble in the design of the hard surfaces of soil substrates or ensuring effective closed loop composting on-site.

1.2 Minimise the quantities of other resources used

Both buildings have been designed to make the most of passive environmental strategies where possible. Sustainable mechanical strategies are used to supplement the passive strategies, where additional capacity is required. A high degree of airtightness will be achieved in both buildings, to ensure the internal environment can be closely managed and limit heat losses. Rooftop PVs are located on the roofs of both buildings, to provide a source of renewable energy to the site

1.3 Specify and source materials and other resources responsibly and sustainably

Where possible materials will be reused and recycled. Large areas of the campus are covered in impermeable hard surfacing and there is an opportunity to reduce this and or use this for water collection as part of a wider SUD's and biodiversity strategy.

5.4.3 Principle 2 - Design to eliminate waste (and for ease of maintenance)

2.1 Design for longevity, adaptability or flexibility and reusability or recoverability

The design process includes a realistic assessment of the ability of the development to accommodate change, how frequently it will be reconfigured or remodelled, and to avoid a premature end of life for all components.

2.2 Design out construction, demolition, excavation and municipal waste arising

The project brief aims to design out waste by optimising materials, reclaiming and reusing. Construction materials will be responsibly procured and stored where possible and also minimizing packaging.

5.4.4 Principle 3. Manage waste sustainably and at the highest value

3.1 Manage demolition waste – Not applicable given the nature of this project. Please refer to appendices (Email from GLA)

3.2 Manage excavation waste

Any excavation waste if applicable will be reused where practicable. This will be prioritised instead of sending waste to landfill.

3.3 Manage construction waste

A Site waste management plan (SWMP) will be produced which will aim to comply with the London Plan and BREEAM targets. The SWMP will include Non-hazardous waste materials, including demolition and excavation waste, accurate data records on waste arisings and waste management routes. It will meet or improve upon the waste benchmarks.

3.4 Manage municipal waste (and industrial waste, if applicable)

The Waste Management Strategy will include details of how the waste will be stored, segregated, and recycled as per Bromley councils waste requirements.

6 THE END-OF-LIFE STRATEGY

The end-of-life strategy looks at the required service life of the building. The project has currently used the technical service life of the asset. Product replacements and maintenance are calculated for this period.

Primary structure of the building is Cross laminated Timber (CLT). All the connections can be dissembled and be taken off site at the end of life. Reuse of CLT panels will be investigated to comply with circular economy requirements.

By default, materials will have assigned an end-of-life process. These processes are based on the material type, therefore, there will be differences in the end-of-life processes depending on what material options we have used.

As the needs of building users change over time, the building layout and use may also need to be adapted. By including reusable and possibly moveable internal walls, the need for refurbishment and replacement in the future decreases. The use of moveable furniture in the rooms can also help reduce the need to change layouts and purchase new materials which increases the building circularity.

The end-of-life scenarios has used the default values provided in the **OneClick software i.e., 60 years.** The scenarios account for de-construction, demolition, transport of the materials to the waste processing site at the end of their life, waste processing for reuse, recycled and/ or recycling, waste disposal and recovery potential.

Building Information will be stored to facilitate end of life strategy, disassembly, future reuse, waste avoidance, and waste reduction. Design for the implementation of disassembly and reuse will be updated as the project progresses.

As included in the GLA spreadsheet

MATERIAL QUANTITY AND END OF LIFE SCENARIOS	Product and Construction Stage (Module A)		Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' scenarios (Module C)	Benefits and loads beyond the system boundary (Module D)	
Building element category	Material type	Material quantity (kg)			Estimated reusable materials (kg)	Estimated recyclable materials (kg)
Note/example	Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete	65000 kg	For all primary building systems (structure, substructure, envelope, MEP	Declare 'end of life' scenario as per project's Circular Economy Statement, and used in the WLC assessment to	0 kg	25 kg

		e.g. Reinforcement	5000 kg	services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	produce Module C results	2 kg	8 kg
		e.g. Formwork	250 kg			0 kg	0 kg
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment	Not applicable, please refer to Circular Economy statement appendix G	0		60	0 kg	0 kg
0.2	Major Demolition Works	Not applicable, please refer to Circular Economy statement appendix G	0		60	0 kg	0 kg
0.3	Temporary Support to Adjacent Structures	Not applicable, please refer to Circular Economy statement appendix G	0		60	0 kg	0 kg
0.4	Specialist Ground Works	Not applicable, please refer to Circular Economy statement appendix G	0		60	0 kg	0 kg
1	Substructure	Basic foundation up to 5m of bedrock depth, for m2 GFA, Reinforced ground slab 300 mm, gravel fill 600 mm	343718	60	60	0 kg	0 kg
2.1	Superstructure: Frame	Included as part of the external wall build up	0	60	60	0 kg	0 kg
2.2	Superstructure: Upper Floors	The upper floor build up is as detailed in the outline specification.	317676	60	60	0 kg	907 kg
2.3	Superstructure: Roof	The roof build up is as detailed in the outline specification	105848	60	60	0 kg	6,350 kg
2.4	Superstructure: Stairs and Ramps	Solid Timber Panels (Cross-Laminated Timber, CLT) (Stora Enso)	886	60	60	0 kg	0 kg
2.5	Superstructure: External Walls	The external walls have been entered using the outline specification and information received through	150828	60	60	0 kg	3,629 kg

		correspondence with the design team.					
2.6	Superstructure: Windows and External Doors	The windows are as described in the outline specification and window quote from Velfac.	8047	40	40	0 kg	907 kg
2.7	Superstructure: Internal Walls and Partitions	The internal partitions have been included as detailed in the outline specification.	135209	60	60	0 kg	19,051 kg
2.8	Superstructure: Internal Doors	Interior wooden door leaf, solid core, painted, 926x2040x60 mm, 56.18 kg/unit, 3 hinges and lock included, 35dB sound reduction, PL (JELDWEN Sverige AB)	3933	40	40	0 kg	1,814 kg
3	Finishes	Waterborne matte paints (SIPEV) -Interior paint coating, French average, DONNEE PAR DEFAUT (DED) -Fire retardant coating, 1.3-1.4 kg/m3,fire resistance rating (UL 263): 240min, HENSOTHERM 490 KS (Rudolf Hensel) -PVC wall cladding, 2.0 -2.5 mm, 1.40-1.46 kg/m3, Altro Whiterock Americas, Altro Puraguard, AltroWhiterock Textured (Altro) -Ceramic wall tile, 6 mm, average density 2000 kg/m3 (Mosa)	20409	10	10	0 kg	2,722 kg
4	Fittings, furnishings & equipment (FFE)	It is yet to be confirmed if the FF&E will be client supply	0	12	12	0 kg	0 kg
5	Services (MEP)	ASHP units as confirmed in correspondence with design team.	352	22	22	0 kg	0 kg
6	Prefabricated Buildings and Building Units	There are not prefabricated building units for this project	0	Not applicable	Not applicable	0 kg	0 kg
7	Work to Existing Building	There are no existing buildings in the scope of this life cycle assessment	0	Not applicable	Not applicable	0 kg	0 kg
8	External works	All new external hard landscaping works have been taken from the Landscape General Arrangement	393146	30	30	0 kg	0 kg

Refrigerants		**Refrigerant name**	**Initial Charge(kg)**	**Annual leakage rate %**	**Refrigerant GWP ($kgCO_2e/kg$)**	**End of Life recovery rate %**		
a	Refrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology	R32	2	5	675	97		
b	Refrigerants Type 2 (if applicable) - please see CIBSE TM65 for methodology	R32	4	5	675	97		
c	Refrigerants Type 3 (if applicable) - please see CIBSE TM65 for methodology	n/a	n/a	n/a	n/a	n/a		
		TOTAL	1,480,058 kg				0 kg	35,380 kg
		Material intensity (kg/m2 GIA)	1,160 kg/m2 GIA				0 kg/m2 GIA	28 kg/m2 GIA

7 OPERATIONAL WASTE

7.1.1 All products and services have environmental impacts, from the extraction of raw materials for production to manufacture, distribution, use and disposal. Following the Waste Hierarchy will lead to the most resource-efficient and environmentally sound choice on waste management. Therefore waste will be managed in accordance with the waste hierarchy as shown below.

Figure 6: Waste hierarchy (most favourable option on top)

7.1.2 During the construction phase of the development low levels of waste production will be targeted. A Waste Management Plan will be developed and implemented during the construction phase in order to meet local authority waste requirements.

7.1.3 The Operational waste the proposed development is expected to generate is in line with the council requirements. The amount of non-hazardous waste generated on site would be minimised in line with best practice levels.

7.1.4 Waste would be appropriately disposed of within the correct landfill facility. The waste management plan would additionally outline the procedures to follow for the appropriate removal and disposal of any hazardous waste.

7.1.5 Where possible on site, the recycling and re-use of the existing building and construction materials will be considered in order to minimise construction waste associated with the proposed development. In addition, consideration has been given to the operational waste of the site, hence waste facilities will be provided, in line with the guidance and advice set out in the Council's Refuse and Recycling Storage Requirements.

7.1.6 Waste Storage

7.1.7 The site will be designed to provide adequate, flexible, and easily accessible storage space for waste and recycling segregation and storage facilities in a designated area. The refuse storage facilities are in accordance with Council standards.

7.1.8 The operational waste will be monitored according to the scheduled waste collections and reported by the site facilities management. There is a commitment to meet or exceed the municipal waste recycling target of 65 per cent by 2030.

7.1.9 Volumes of Mixed Dry Recycling (at least card, paper, mixed plastics, metals, glass), Food waste and Landfill will be monitored either in terms of number of bin lifts per type in period or through waste providers records. The data will be reported to the Governing Body and KPI's will be set to improve recycling and reduce landfill.

7.1.10 Waste Bins and Collection

- Mixed dry recycling 250 litre bin. X. 3. Emptied weekly
- General waste 250 litre bin. X 3 Emptied weekly

Food waste

- Food waste collection will be included as confirmed by David Scott, Executive Director Estates & Facilities (please refer to the email from David Scott in the appendices)

Food Waste Bins 240 litre bin. X 2 Emptied weekly

7.1.11 Measures – Consolidated, Smart Logistics, Community Led Waste Minimization

7.1.12 Measures such as consolidated, smart logistics and community-led waste minimisation schemes is being explored for maximum waste reduction and recovery. There is Bromley community led waste minimisation networks which the college can network with and use the facilities available.

7.1.13 Bromley Environment Network (BEN) was founded to support Bromley community groups working together to protect and improve our environment. BEN aims to bring community groups in the borough of Bromley together to inspire and support residents, the Council and other community stakeholders to work collaboratively to make our borough a greener, healthier and more sustainable place to live, both now and in the future.

7.1.14 The Hub from Greener and Cleaner, is a community-powered space run by local people wanting to support their community with greener and cleaner more sustainable living. This will encourage all to discover the first steps you can take, learn more about how to look after our environment and be empowered for change.

8 PRE-DEMOLITION AND EXCAVATION WASTE

8.1.1 Please refer to the Appendices – Email from James Cummins from GLA dated 16 November 2022 13:57 and email dated 11/01/2023 which clearly states that given the nature of this scheme and quality of the existing buildings on site, it's accepted that this requirement is not as relevant in this instance and the assessment RPS has undertaken is sufficient.

8.1.2 As mentioned in section 4 Strategic approach above the existing building fabric to be removed has been carefully selected based on its quality, usefulness along with factoring in which areas of the site can be most helpful in creating a pleasant and spacious masterplan. The current buildings are unusable due to its state of repair. The building structure does not conform to any modern building standards and provide incredibly poor teaching environments which do not align to the college's (and the GLA's) aims of providing high quality architecture and teaching environments nor can they be integrated into the proposals to increase the density of the built footprints, due to the single-use nature of portacabins.

Estimated Pre-demolition Waste

8.1.3 Total Estimated pre-demolition waste = **3.3 tonnes/m^2**

Activity	Type of waste	t/m^2 Gross Internal Area (GIA)	Planned Action
Demolition	Glass	0.05	In line with the Bromley council's and GLA waste policies, 95% of waste will be targeted to divert from landfill where possible
Demolition	Lightweight steel frame	0.10	
Demolition	Metal Containers	0.75	
Demolition	Concrete	2.4	

8.1.4 Total Estimated excavation waste = **4.38 tonnes/m2**

Welcome Block – 784m3 @ 1.3tonnes/m3 = 1,019.20 tonnes. 1,019.20t / 669m2 = 1.52 tonnes / m2.

Linear Block – 1361m3 @ 1.3tonnes/m3 = 1,769.30 tonnes. 1,769.30 / 619m2 = 2.86 tonnes / m2.

9 SITE WASTE / RESOURCE MANAGEMENT PLAN

9.1.1 The contractor appointments are in progress and Site waste management plan is to be produced once they have sufficient information.

10 PLANS FOR IMPLEMENTATION

10.1.1 RPS is working very closely with the project team and the architect to make sure project specific plan included in the Construction Management and Logistics Plan is implemented as the project progresses.

10.1.2 At this stage (10/12/2022) no demolition has commenced, however given the nature of this project a pre-demolition audit is not applicable as confirmed by GLA (refer to appendices)

10.1.3 Further workshops have been scheduled to implement specific plans for achieving short – medium term targets and commitments and the programme/method for achieving longer term targets.

10.1.4 This report will be reviewed throughout all project stages, alongside the following corresponding reports:

- Design and Access Statement
- Construction Management Plan
- Site Waste Management Plan when produced
- Progress will be reported against each of the key circular economy commitments
- Feilden Fowles Architectural Outline Specification
- Whole Life Cycle Carbon Assessment

10.1.5 As the project progresses this section will be updated on how short- and medium-term targets or commitments will be implemented, monitored and reported.

10.1.6 Performance against key measures and targets will be secured. In particular with respect to the policy targets for the following: demolition waste, excavation waste, construction waste, reused and recycled content, and operational waste. Waste will be monitored and recorded either through BRE's smart waste tool or excel records and presented as graphs/pie charts and updated as and when new data is gathered.Volumes of Mixed Dry Recycling, Food and Landfill will be monitored either in terms of number of bin lifts per type in period or through waste providers records. The data will be reported to the Governing Body and KPI's will be set to improve recycling and reduce landfill.

10.1.7 All the responsibilities, timescales, method of implementation is being considered during project discussions and as included in the Construction and Logistics Management Plan section 2.14 Waste Actions

10.1.8 The project will aim to demonstrate that it has identified specific, achievable targets and committed to their delivery. Actual performance against these targets will be submitted at practical completion.

10.1.9 For longer-term targets, we will provide a description of the method(s) that will be used to ensure they are met, and a programme of key milestones (e.g. completion, monitoring intervals, and so on).

11 POST COMPLETION REPORT

11.1.1 As per GLA's requirements a Post Completion Report will be submitted to the relevant local authority and the GLA at ce&wastestatement@london.gov.uk.

11.1.2 The Post Completion Report will set out the predicted and actual performance against all numerical targets.

11.1.3 It will provide updated versions of Tables 1 and 2, the Recycling and Waste Reporting form and Bill of Materials.

12 EXCAVATED - MATERIALS OPTIONS ASSESSMENT

12.1.1 The 4.38 tonnes/m2 GIA in excavation waste is a summation of relevant excavation quantities which are provided as part of the Planning Application. The quantities are currently estimated based on the current project stage design.

12.1.2 Total Estimated excavation waste = 4.38 tonnes/m2 GIA

- Welcome Block – 784m3 @ 1.3tonnes/m3 = 1,019.20 tonnes. 1,019.20t / 669m2 = 1.52 tonnes / m2.
- Linear Block – 1361m3 @ 1.3tonnes/m3 = 1,769.30 tonnes. 1,769.30 / 619m2 = 2.86 tonnes / m2.

13 SCENARIO MODELLING DEMONSTRATING ADAPTABILITY

13.1.1 Please refer to Appendix H – Adaptability Scenario Modelling

13.1.2 A study has been carried out by the architect to demonstrate adaptability outlining the design principles behind the proposed scheme. Then provided scenarios demonstrating how the buildings can accommodate smaller rooms and then larger rooms. For both blocks.

13.1.3 Some of the adaptability in the design demonstrated includes:

- Internal partitions - Lightweight timber stud construction allowing for their simple removal in future if required.
- Limiting internal loadbearing walls and columns
- Adaptability in the future to accommodate subdivision of spaces
- Creation of larger open room plans if required in the future

14 LEAN DESIGN OPTIONS APPRAISAL

14.1.1 Please refer to Appendix – I Lean Design Options Appraisal

14.1.2 A Lean Design Options Appraisal has been undertaken by the design team as included in the Appendix I which demonstrates efficient use of materials to reduce environmental impact. The possibility of using the existing building has been explored however each appraisal has showed that it was not feasible. Therefore, the new buildings have been proposed with circular economy principles incorporated into the design. Spaces have been designed after many discussions with client and to make sure it allows multiple flexible use rather than for a single fixed purpose. Other lean design options explored are the site layout, number of buildings, sub and super structure and early engagement of CLT and Glulam contractor.

15 NATIONAL, REGIONAL AND LOCAL POLICIES

Various national, regional and local planning and dedicated sustainability policy documents promote the themes of sustainable development which are summarised below. This section details the relevant policies applicable to the proposed site and which form the basis of our Circular Economy statement.

15.1 National Level Policies

National Sustainability Policy

15.1.1 The National Planning Policy Framework (NPPF) was revised on 20 July 2021 and sets out the government's planning policies for England and how these are expected to be applied. This replaces the NPPF published in February 2019, July 2018 and the first NPPF published in March 2012.

15.1.2 The NPPF set out the Government's planning policies for England and how these are expected to be applied. The NPPF is designed to make the planning system less complex and more accessible; to protect the environment and promote sustainable growth. It provides a framework within which local people and their respective councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

15.1.3 At the heart of the NPPF is a presumption in favour of sustainable development (paragraph 11). The three dimensions of sustainable development can be defined as the economic, social and environmental.

15.1.4 The NPPF aims to strengthen local decision making, with the use of decision-taking in a positive way, as a means of fostering the delivery of sustainable development.

Finally, the NPPF (paragraph 16) also highlights that plans should be prepared with the objective of contributing to the achievement of sustainable development and in a way that is aspirational but deliverable.

15.2 Regional Level Policies

London Plan 2021 – (Adopted March 2021)

15.2.1 Under the legislation establishing the Greater London Authority (GLA), the Mayor is required to publish a Spatial Development Strategy (SDS) and keep it under review. The SDS is known as the London Plan. As the overall strategic plan for London, it sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years.

15.2.2 Policy S17 Reducing waste and supporting the circular economy

15.2.3 Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible

2) encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products

3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026

4) meet or exceed the municipal waste recycling target of 65 per cent by 2030163

5) meet or exceed the targets for each of the following waste and material streams: construction and demolition – 95 per cent reuse/recycling/recovery excavation – 95 per cent beneficial use

6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

15.2.4 B Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

1) how all materials arising from demolition and remediation works will be re-used and/or recycled

2) how the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life

3) opportunities for managing as much waste as possible on site

4) adequate and easily accessible storage space and collection systems to support recycling and re-use

5) how much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy

6) how performance will be monitored and reported.

15.2.5 C Development Plans that apply circular economy principles and set local lower thresholds for the application of Circular Economy Statements for development proposals are supported.

15.3 Local Level Policies – London Borough of Bromley

Local Sustainability Policy

London Borough of Bromley Local Plan (Adopted January 2019)

15.3.1 Bromley's Local Plan was adopted on 16th January 2019. It was examined under the 2012 National Planning Policy Framework (NPPF) and the transition period of the 2018 NPPF. The Local Plan sets out the planning policies, site allocations and land designations Borough-wide and is the central document in the Borough's Development Plan. Other Development Plan documents comprise the Bromley Town Centre Area Action Plan, and Supplementary Planning Documents; currently Planning Obligations and Affordable Housing and the London Plan (2016). The London Plan forms part of the Development Plan for each of the London local planning authorities.

Policy 112 - Planning for Sustainable Waste Management

2.1.1 The Council will support sustainable waste management by:

- Implementing the waste hierarchy in its approach to future waste management.
- Allocating the strategic waste management sites of Waldo Road, Churchfields and Cookham Road and safeguarding them for waste uses only.
- Working in collaboration with the London Boroughs of Bexley, Greenwich, Southwark, Lewisham and City of London to make optimum use of waste management capacity in the south east London sub region.
- Meeting the London Plan waste apportionment targets

2.1.2 The waste hierarchy shows the preferred options for managing waste – the most important solution being to reduce that waste in the first place, the least desirable being disposal of that waste, for example, to landfill.

Figure 7: Waste Hierarchy

16 REPORTING OUTCOMES

16.1.1 This section outlines the reporting outcomes and how the building circularity can be increased. The recommendations below provide an overview to show where changes can be considered across the project.

16.1.2 This report needs to be updated at the post planning/building completion stage and the targets and outcomes achieved. This needs to include an update for Table 1 and 2 above, the recycling and waste reporting form and bill of materials. The report also needs to include supporting documentation such as evidence of audits, drawings and photos etc.

16.1.3 Structural options

The structure can influence the building circularity. Consideration has been given to the internal walls and partitions. Timber structures have been used which often reduces the embodied carbon impact and increases the building circularity. The superstructure of both buildings is primarily constructed from Cross Laminated Timber (CLT) panels and Glulam columns/beams. The CLT and glulam elements are engineered timber products with good structural properties and low environmental impact.

16.1.4 Recycled, Renewable or Reused contents

The recycled, renewable or reused percentage is the share of either recycled, renewable or reused materials in the product by mass. This information does not influence the LCA results but is used to document material circularity. Some products have the recycled, renewable or reused percentage defined with a default value which have been used.

Using recycled materials often results in increased circularity due to the reduced need for raw materials and their processing. Setting a minimum level of recycled content as required by GLA (minimum 20%) for building elements can help increase building circularity score, for example stipulating the use of recycled binders for concrete and other materials with high recycled content.

16.1.5 Design for Disassembly (DfD) and Design for Adaptability (DfA)

To improve the building circularity, the material installation has considered light weight internal walls which can be moved if required in the future. Where possible, the project can also consider Design for Disassembly practices such as using dismountable fasteners instead of glue or if it allows otherwise non-destructive removal of the material. With DfA we should consider the material is adaptable for future adaptions of the use of the building.

16.1.6 End of Life processes

By default, materials will have assigned an end-of-life process. These processes are based on the material type, therefore, there will be differences in the end-of-life processes depending on what material options we have used. As the needs of building users change over time, the building layout and use may also need to be adapted. By including reusable and possibly moveable internal walls, the need for refurbishment and replacement in the future decreases. The use of moveable furniture in the rooms can also help reduce the need to change layouts and purchase new materials which increases the building circularity.

16.1.7 Avoid elements with limited value

To increase the building circularity we need to ensure only necessary materials are used. For example, if there are cladding materials or partitions that are mainly used for aesthetic purposes and do not provide acoustic or fire protection, these elements will be assessed and potentially omitted or reduced. Floor and wall finishes are another example of building elements which are not always required. In some cases, they help increase the durability of the building, but if the project allows, consideration will be given to removing these finishes e.g., floor finishes could be removed to provide a polished concrete floor.

17 CONCLUSIONS

17.1.1 RPS Consulting Services Ltd was commissioned by Fusion Project Management to undertake a Circular Economy Statement for the proposed new construction of the ‘‘Welcome Block’’ and ‘‘Linear Block’’ at Capel Manor College, Mottingham Ln, Bromley, London SE12 9AW.

As included in the Appendix A results of this report and the figure below, the Building Circularity score i.e., 29% is the average from the materials recovered added up to the materials returned.

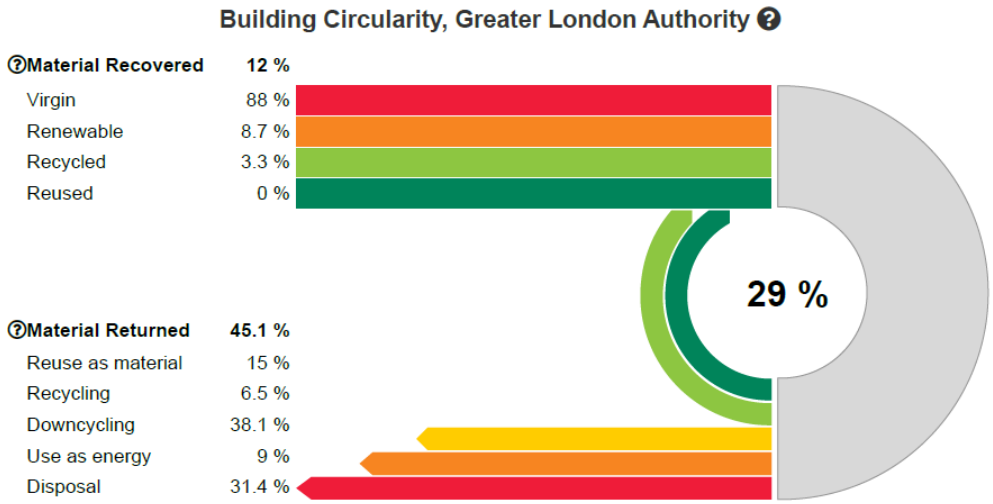


Figure 8: Building Circularity Results

17.1.2 Building Circularity - Materials Recovered 12 %

As shown in the figure above the results confirms the recovered materials, and how much of these materials are either virgin materials, materials that are renewable, recycled or reused materials. The amounts represented here come from the percentages that are given to each section in the building material query

17.1.3 Building Circularity - Material Returned 45.1 %

As shown in the figure above, the results confirm the returned materials. 15% of materials could be reused as materials, some materials were recycled or used as energy. The remaining materials were either down-cycled or disposed of.

17.1.4 Building Circularity - Key Material Groups

The figure below confirms the different material groups used in this project. Similar material types are grouped, and it shows how each of these material groups contribute to the building circularity score. It also confirms the circularity score of each of the groups of materials. It shows that of the different types of concretes to be used, 99.95% were virgin materials, and 0.05% came from recovered sources. Concrete usually is down-cycled into aggregate, and as can be seen in the graph downcycling and use as energy is 100%. Since the downcycling score counts as 50% in the materials returned score, it can be seen that the circularity score of concrete in this project is 25.03%. The highest circularity score of materials is metals and wood/Biogenic and the materials with the lowest circularity score is insulation of the values input into our One Click tool.

Building Circularity - Key Material Groups

Result category	Total kg	Virgin %	Materials Recovered %	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %	Materials returned %	Circularity %	
Concrete	392,719.9	99.95	0.05		100		50	25.03	Details
Metal	41,098.99	39.58	60.42			100	100	80.21	Details
Bricks and ceramics	7,682.98	100	0		100		50	25	Details
Gypsum-based	185,630.89	97.14	2.86		81.75	18.25	59.13	30.99	Details
Insulation	64,328.75	81.74	18.26	100				9.13	Details
Glass	3,300	100	0			100	100	50	Details
Wood and biogenic	111,903.65	1.79	98.21		100		50	74.11	Details
Earth masses and asphalt	434,854.15	100	0	73.17		26.83	26.83	13.42	Details
Other materials	24,053.28	85.25	14.75	81.93	16.78	1.29	9.68	12.22	Details

Figure 9: Key Materials Groups

17.1.5 In addition to the recommendations in the report and measures outlined above, a building which is designed with durability and adaptability in mind can result in the need for fewer materials and can prolong the lifetime of the building. The default values and assumptions used in assessing the circularity of the building are included in section 2 above. As the project progresses and more definitive materials information is confirmed, the One Click Tool can be updated for a new building circularity score.

Appendix A
One Click - Circular Economy Results

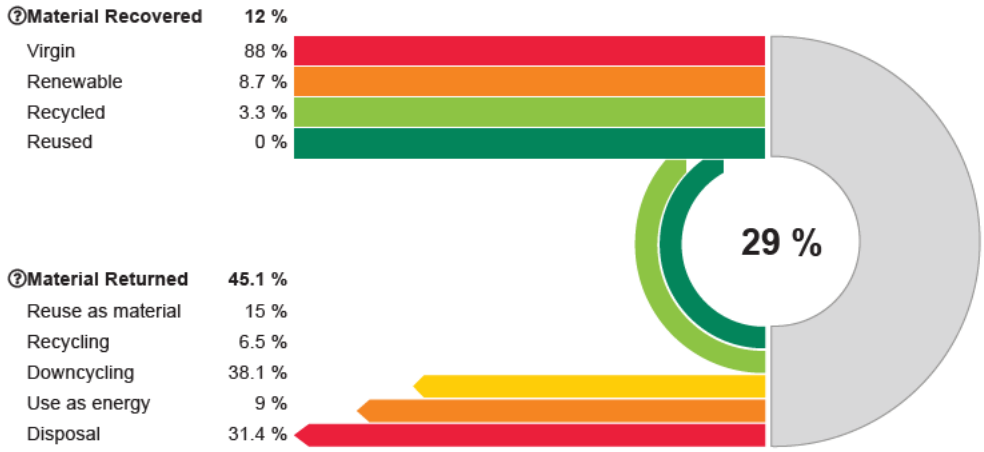
CES Linear Block and Welcome Block V2 - Building Circularity, Greater London Authority

Project basic information

Result report: CES Linear Block and Welcome Block V2

Project	Capel Manor College Mottingham (Welcome and Linear Blocks) - CES Linear Block and Welcome Block V2
User	Samantha May - 20/51/2023
Tool	Building Circularity, Greater London Authority
Details	Material efficiency and circular economy - for BREEAM MAT 06, GLA and GRI G4 reporting as well as other purposes
General information	
Type	Educational buildings
Country	United Kingdom
Address	Mottingham Ln, London SE12 9AW
Gross Floor Area (m&sup2)	1276
Number of above ground floors	2
Frame type	timber
Certifications pursued	BREEAM UK New Construction 2018
Project number / code	HLEU 81059
Investor / final client	Capel Manor College
Year of construction (if refurbishment, original build year)	2021
Building function(s) distribution	Educational
Technical, functional and qualitative properties	The proposed project features a new 'Welcome Block', a two-storey building with an area of 669m2 and comprises of Dog Grooming facilities, a Floristry Classroom, Floristry Cold Store, Reception, Teaching space, Lab preparation, teaching space, toilets and plant. The project also proposes the construction of another building named Linear Block, a two-storey building with an area of 607m2 comprising of a Social space, Kitchen, Teaching Space, Staff Offices, Quiet Room, Counselling, Horticulture Studio, Workshops, toilets and plants, to occupy the area of the site currently housing a number of small rooms, as shown in the picture below. The site is located at Capel Manor College, Mottingham Ln, Bromley, London SE12 9AW.

Building Circularity, Greater London Authority



Some of the used data is incompatible with the calculation tool. Please ensure that the data quality requirements are met Building materials.

Results

Bill of materials

Download Results Summary

Result category	Material quantity kg	Material intensity kg/m² Gross Internal Area	Recycled content by value %	Reused content by value %	Estimated reusable materials kg/m²	Estimated recyclable materials kg/m²	
1 Substructure	343,718 3	257.11	17.01	0		96 65	Details
2.1 Superstructure: Frame							Hide empty
2 2 Superstructure: Upper Floors	317,675.59	237 63	8.56	0		203 27	Details
2 3 Superstructure: Roof	105,848.26	79.18	29.96	0			Details
2.4 Superstructure: Stairs and Ramps	886	0 66	90	0		0 66	Details
2 5 Superstructure: External Walls	150,828.07	112 82	0.8	0		23.14	Details
2 6 Superstructure: Windows and External doors	8,046.84	6 02	0	0		5 28	Details
2.7 Superstructure: Internal Walls and Partitions	141,949.96	106.18	17.61	0		50.5	Details
2 8 Superstructure: Internal doors	3,932 6	2 94	0	0			Details
3 Finishes	20,409.29	15 27	48.36	0		14 58	Details
4 Fittings, furnishings & equipments							Hide empty
5 Services (MEP)	351 6	0 26	0	0		0 26	Details
6 Prefabricated buildings and building units							Hide empty
7 Work to existing building							Hide empty
8 External works	393,145.72	294 08	0	0	174.57	91.4	Details
0 Unclassified / Other							Hide empty
Total	1,486,792.24	1,112.14	9.99	0	174.57	485.75	Details

Building Circularity - Materials Recovered

Result category	Total kg	Virgin kg	Renewable kg	Recycled kg	Reused kg	
Construction Materials	830,718.44	675,177.12	114,320 58	41,220.74	0	Details
Earth masses, asphalt and stones	434,854.15	434,854.15	0	0	0	Details
Construction site - material wastage	70,891 28	49,030.21	18,034 92	3,826.16	0	Details
Material replacement and refurbishment	220,522.48	210,633.34	3,017.3	6,871.84	0	Details
Total	1,556,986 35	1,369,694.81	135,372.8	51,918.74	0	Details

Building Circularity - Materials Returned

Result category	Reuse as material kg	Recycling kg	Downcycling kg	Use as energy kg	Disposal kg	
Construction Materials		78,588.73	552,154.15	115,940.02	84,035.53	Details
Earth masses, asphalt and stones	116,690.4				318,163.75	Details
Construction site - material wastage	0	8,055 92	37,422.17	18,250.08	7,163.12	Details
Material replacement and refurbishment	116,690.4	14,798.12	3,845 04	6,383.26	78,805.66	Details
Total	233,380 8	101,442.77	593,421 36	140,573.36	488,168.06	Details

Building Circularity - Key Material Groups

Result category	Total kg	Virgin %	Materials Recovered %	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %	Materials returned %	Circularity %	
Concrete	392,719 9	99.95	0 05		100		50	25 03	Details
Metal	41,098.99	39.58	60.42			100	100	80 21	Details
Bricks and ceramics	7,682.98	100	0		100		50	25	Details
Gypsum-based	185,630.89	97.14	2 86		81.75	18 25	59.13	30 99	Details
Insulation	64,328.75	81.74	18 26	100				9.13	Details
Glass	3,300	100	0			100	100	50	Details
Wood and biogenic	111,903.65	1.79	98 21		100		50	74.11	Details
Earth masses and asphalt	434,854.15	100	0	73.17		26 83	26.83	13.42	Details
Other materials	24,053.28	85.25	14.75	81 93	16.78	1 29	9.68	12 22	Details

Transport carbon intensity

Transport carbon intensity values are based on the transport figures from associated LCA tool. They are not rendered in the input forms of the circular economy tool to maintain the tool readable. Use these data for HQE Performance Economie Circulaire for example.

Result category	Global warming kg CO_2e	Payload distance tkm	
Transport	7,647.18	114,880.14	Details

+ Materials using Design for Disassembly principles

+ Materials using Design for Adaptability principles

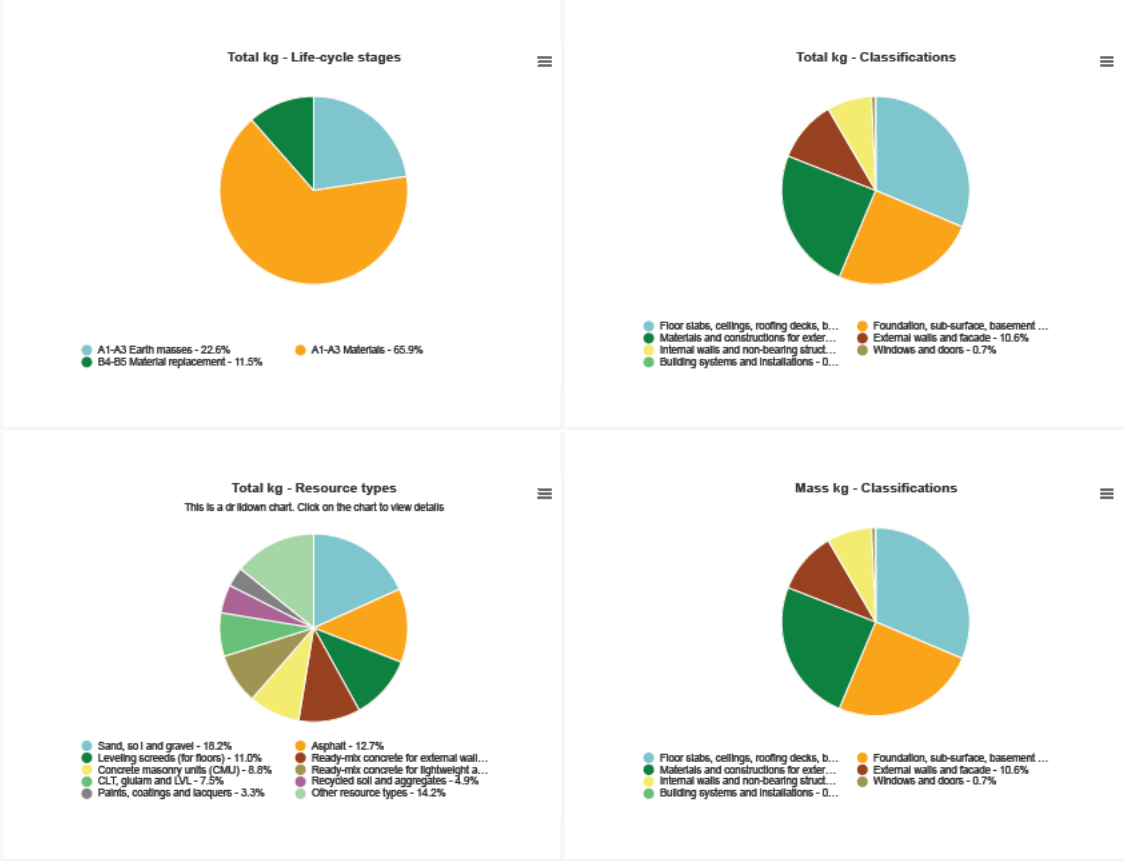
Most contributing materials

Graphs

Overview Bubble Sankey Treemap Life-cycle stages Classifications All graphs

Life-cycle overview of Total

Pie Bar Column Treemap



Show data table ☐Total kg - Life-cycle stages ☐Total kg - Classifications ☐Total kg - Resource types ☐Mass kg - Classifications

Total kg - Life-cycle stages

Item	Value	Unit	Percentage %
A1-A3 Earth masses	430,000	kg	22 63 %
A1-A3 Materials	1,300,000	kg	65.9 %
B4-B5 Material replacement	220,000	kg	11.48 %

Total kg - Classifications

Item	Value	Unit	Percentage %
Floor slabs, ceilings, roofing decks, beams and roof	860,000	kg	31 36 %
Foundation, sub-surface, basement and retaining walls	690,000	kg	24 98 %
Materials and constructions for external areas	680,000	kg	24 62 %
External walls and facade	290,000	kg	10 65 %
Internal walls and non-bearing structures	210,000	kg	7.7 %
Windows and doors	18,000	kg	0 67 %
Building systems and installations	470	kg	0 02 %

Total kg - Resource types

Item	Value	Unit	Percentage %
Sand, soil and gravel	500,000	kg	18 25 %
Asphalt	350,000	kg	12.72 %
Leveling screeds (for floors)	300,000	kg	11.0 %
Ready-mix concrete for external walls and floors	290,000	kg	10 61 %
Concrete masonry units (CMU)	240,000	kg	8 83 %
Ready-mix concrete for lightweight applications (domestic and auxiliary)	240,000	kg	8 69 %
CLT, glulam and LVL	210,000	kg	7 51 %
Recycled soil and aggregates	130,000	kg	4 87 %
Paints, coatings and lacquers	92,000	kg	3 34 %
Other resource types	390,000	kg	14.19 %

Data sources

Mass kg - Classifications

Item	Value	Unit	Percentage %
Floor slabs, ceilings, roofing decks, beams and roof	860,000	kg	31 36 %
Foundation, sub-surface, basement and retaining walls	690,000	kg	24 98 %
Materials and constructions for external areas	680,000	kg	24 62 %
External walls and facade	290,000	kg	10 65 %
Internal walls and non-bearing structures	210,000	kg	7.7 %
Windows and doors	18,000	kg	0 67 %
Building systems and installations	470	kg	0 02 %

Appendix B
Stage 3 Outline Specification

FEILDEN
FOWLES

CAPEL MANOR COLLEGE – MOTTINGHAM CAMPUS
Stage 3 Outline Specification – ISSUED FOR PLANNING
Feilden Fowles Architects

13.12.21	Issued for planning
08.04.21	Draft issued for stage 3 costing

Item No.	Description	

1.0	**PRELIMINARIES & NOTES**	
1.1	**Please note this is a RIBA Stage 3 Draft outline specification for the Mottingham campus buildings. All clauses are subject to Stage 4 design development and Design Team coordination. In addition, all drawings, schedules and documents referred to herewithin are subject to Stage 4 design development and Design Team coordination.**	
1.2	This specification is to be read in conjunction with the following documents; - Architect's Stage 3 GA, drawings and reports - Structural Engineer's Stage 3 information - M&E Engineer's Stage 3 information - Landscape Architect's Stage 3 information - Site investigation reports & surveys	
1.3	**Outline of works proposed** Creation of two new buildings and partial renovation of existing glass house, to create specialist teaching facilities and supporting spaces for Capel Manor College. Creation of landscaped areas on the entrance approach, between the buildings and new central courtyard. The two new buildings are connected by an elevated walkway Welcome Block – reception area and office; central atrium space; social spaces, learning resource area; WCs; exotic animal enclosures and teaching space; dog grooming facilities; meeting rooms; seminar rooms; counselling rooms; staff room and office. Linear Block – student social space; kitchen facilities; WCs; science laboratories and prep space; 4no. basic teaching classrooms Glasshouse – floristry display space and shop; aquatics display space; cold store	
1.4	**Mock ups & Samples** Include allowances for mock ups and samples for the following (as a minimum); - 1no. mock up showing a section of external façade to include: timber cladding; concrete base; all key connections and junctions, dimensions TBC - Product and production samples for finishes in all work packages to ensure compliance and to inspect visual appearance. Extent to be determined as project progresses	

2.0	**DEMOLITION / ALTERATION / ENABLING WORKS**	
2.1	**Demolition** - Central Glasshouse to be removed - Palisade Fence to be removed and retained on site	Sitewide
2.2	**Enabling Works** - Demountable Classrooms M18/M19 to be relocated on site - Secure Store to be relocated on site - Various small structures to be relocated on site - Landscape Architect's specification, S.E specification and M&E specification for details	Sitewide

3.0	**SUBSTRUCTURE**	
3.1	- Refer to Structural Engineer's documents, drawings and specification for foundations.	

Item No.	Description	
	- Ground floor build-ups to achieve U-value specified by M&E Engineer	
3.2	**Foundations** - Concrete footings, slabs and retaining walls to SE design & specification - Include for all service penetrations, fully sealed, through external walls - Refer to MEP engineer's drawings and specifications for details and penetrations	
3.2.1	150mm concrete upstand to be formed as part of slab, under all CLT walls.	Both Buildings
3.3	**Floor Build-Ups**	
3.3.1	To achieve U-value of 0.18 W/m²K - Slab to SE design - Allow for RIW above slab waterproofing membrane. - Allow for 200mm Foamglass board S3 - Separating membrane - 75mm floating screed - Floor finishes vary	Both Buildings
3.4	**Service Corridor** -External floor of service corridor to have wide gully against retaining wall, to collect water from the retaining wall. -Raked concrete finish, falling towards gully and away from building. -150mm tall thresholds to all doors onto corridoor.	Linear Block

4.0	**SUPERSTRUCTURE** To SE's design & specification (Refer to Structural Engineer's drawings)	
4.1	**Structural Framing**	
4.1.1	Timber Structural Elements – Glulam and CLT - To SE Design - Timber to receive protective sealer coating within factory - All fixings to be stainless steel externally and plugged with matching timber pellets where visible. - All fixings to be plugged with matching timber pellets where visible.	Both Buildings
4.1.2	Top face of all CLT decks to receive Siga Wetguard 200 SA membrane within factory. Joints to be sealed on site, immediately after installation of each element.	Both Buildings
4.1.3	All CLT walls sitting on concrete base to have end grain suitably sealed	Both Buildings
4.1.4	All visual timber elements will be visually graded to exceed BS5756 TH1 grade and BS1186-3 Class 1 A grade	Both Buildings
4.1.5	All internally exposed timbers allow for 2no. coats of Envirograf QVFR and 1no. top coat to achieve Class 1 Surface Spread of Flame under BS476-7:1997.	Both Buildings
4.1.6	All externally exposed timbers allow for 2no. coats of Osmo UV Protection Oil Extra.	Both Buildings
4.1.7	All external beams to be sealed with 2no. Osmo End Grain Sealing Wax and covered with profiled metal trim, powder coated to match windows	Both Buildings
4.2	**Main Internal Stair** - Folded steel profile stair and stringers. - Perforated risers - Solid goings. Steel plate base with timber tread fixed on top - Underside of stair and landings to be exposed - PPC finish, RAL colour TBC - Allow for contrasting brass nosings. - Solid metal balustrades, fixed to stringer, and finished to match stair. - Rounded timber handrail fixed to balustrades.	Welcome Block

5.0	**EXTERNAL WALLS / ROOFS**	

Item No.	Description	
5.1	**External Walls** - External walls (& thermal insulation generally) to achieve U-values and air tightness values specified by M&E engineer - Read in conjunction with GA drawings	
5.1.1	**External Wall Type 1** – General across both blocks To achieve U-value of 0.25 W/m²K IN - Internal finish varies - refer to wall finishes drawing. - 25mm batten zone - CLT wall - Metal rainscreen bracket and angle system including thermal break pad - Rockwool Rainscreen Duo Slab - Tyvek Supro Breather Membrane – taped and sealed - 50mm cavity - Lower level – bespoke precast concrete elements – *details below* - Upper level – timber cladding– *details below* OUT Bespoke precast concrete currently being explored: - Would be a set of standardised elements across all buildings - Mix to using high levels of cement replacement products – *such as GGBS or LC3* - Darker finish required, through the use of pigments. - These are non-load bearing elements, to be used as a cladding, on the outer leaf. Timber cladding options currently being explored: 1. Iroko – unfinished hardwood – *no warranty, 50-60 predicted lifespan* 2. Accoya – modified softwood - *with 50 year warranty* 3. Norclad – modified softwood - *30 year warranty* 4. Keybony – modified softwood – *30 year warranty* 5. Waney Edge – pressure treated softwood – *30 year warranty*	Both Buildings
5.1.2	**External Wall Type 2** – Service corridor, eastern side of Linear block at ground floor only To achieve U-value of 0.25 W/m²K IN - Internal finish varies - refer to wall finishes drawing. - 25mm batten zone - CLT wall - Tyvek Supro Breather Membrane – taped and sealed - Rockwool Rainscreen Duo Slab - 50mm cavity - Masterblock EnviroBlock, site painted finish OUT	Linear Block
5.2	**ROOF COVERINGS** - To achieve U-values and air tightness values specified by M&E engineer - Read in conjunction with GA drawings	
5.2.1	**Main Roof Areas** To provides U-value of 0.18 W/m² IN - Troldtekt A2 Acoustic board (between beams) - 25mm Rockwool Flexi Slab (between beams) - CLT roof deck - Bauder SA Bonding Primer, - BauderTEC KSD Mica Vapour Barrier, - Mineral wool based rigid tapered insulation laid to falls - BauderROCK	Both Buildings

Item No.	Description	
	Insulation or similar - Reinforced Bitumen Membrane - BauderTEC KSO SN Cap Sheet, BauderTEC KSA DUO Underlayer, - Roof finishing – Bauder Xero Flor XF301 sedum blanket - Vegetation blanket. Mainly Sedum with some moss and grasses - Bauder AL40 Sedum blanket edge trim, fitted around all perimeters and protrusions. Bauder Xero Flor organic fertiliser. - Allow for bespoke moss / fern planting – to specialist design OUT - Roof edges generally – Custom aluminium coping in bronze metallic powder coated finish to match glazing cover caps. - Allow for 20 year guarantee to be provided for roof membrane (including consequential damage and loss)	
5.2.2	**Main Roof Areas – Welcome Block** Allowance to be made of potential brown and blue roof areas	Welcome Block
5.2.3	**Overhangs** No u-value requirement, as external space below IN - Timber preservative treatment – Osmo or similar - CLT roof deck - Tapered timber firring and plywood sheathing – to create uninsulated roof falls. - Bauder SA Bonding Primer, - BauderTEC KSD Mica Vapour Barrier, - Reinforced Bitumen Membrane - BauderTEC KSO SN Cap Sheet, BauderTEC KSA DUO Underlayer, OUT - Roof edges generally – Custom aluminium coping in bronze metallic powder coated finish to match glazing cover caps. - Allow for 20 year guarantee to be provided for roof membrane (including consequential damage and loss)	Linear Block
5.2.4	**Rainwater Goods – Welcome Block** - Allow for concealed rainwater goods to M&E performance specification and detailing (allow for Geberit HDPE) - Allow for acoustic treatment to fixing brackets for all internal down pipes. - Allow for acoustic insulation to containment or pipe as standard. - Outlet - Fixfast Paradrain or similar	Welcome Block
5.2.5	**Rainwater Goods – Linear Block** - Allow for exposed rainwater goods to M&E performance specification and detailing (allow for Lindab Magestic Galvanised Steel) - Allow for matching fixing brackets and rodding access.	Linear Block
5.2.6	**Fall Restraint System** Proprietary mansafe type fall restraint system to allow maintenance access to roof areas - latchways or similar	Both Buildings

6.0	**WINDOWS/ EXTERNAL DOORS / HATCHES** - To be read in conjunction with GA drawings - All windows / shutters / external doors to achieve U-values, air tightness and acoustic values specified by M&E engineer / Acoustic Engineer - Generally, U-value 1.5 W/m2k overall including frame and edge effect - Air permeability 3 m3/hour per m2 at 50pa Contractor to make allowance for testing air tightness frequently during construction – allow for air tightness consultant - All windows / shutters / external doors to meet Secure By Design standards	
6.1	**External Doors / Windows**	Both Buildings

Item No.	Description	
	Refer to GAs Throughout: - Allow for intelligent window membranes, sealants and seals to all sides of window units to achieve required air tightness value as specified by the M&E engineer and acoustic requirements - Allow for internal removable beads (Note that all frames are to be concealed within wall construction) - Allow for high quality ironmongery (Allgood or similar), to match frames o Lever handles to doors and windows generally o 2m long pull handles to all main entrance doors. o Matching door stops - Trickle ventilation: to M&E requirements - M&E specification o Electromagnetic locking linked to fire alarm and detection system, access control system to M&E specification - Background trickle ventilation as required by M&E design and in coordination with FF - Allow for concrete cills to GF windows - All doors and windows much be 'secure by design' compliant (PAS 24 or equal approved)	
6.1.1	**Velfac 200 Windows** - Used throughout, refer to GA drawings - Mixture of fixed and opening casements - Varying sizes, refer to GA drawings - Lockable restrictors on all openable windows - RAL finish. - Metal cill trays to match frames - To meet Secure By Design standards - Clear opening requirements to meet M&E specification	Both Buildings
6.1.2	**Velfac Aluminium Doors** - Used throughout, refer to GA drawings - Double doors, varying sizes, refer to GA drawings - Level thresholds - Locks to be key on both sides of barrel; all keyed alike - RAL finish. - Anti finger traps to hardware required - Main doors into buildings to have automated opening – Dorma ED250 or equivalent	Both Buildings
6.1.3	**Metal External Doors** – *Plant Rooms* - Hag Armourdoor AD05 or equivalent – steel security door and ironmongery.	Both Buildings
6.1.4	**Main Entrance Doors and Doors to Welcome Courtyard** - High quality sliding door system – Schuco ADS.65.HD doors in RAL finish or equivalent - Level thresholds - Locks to be key on both sides of barrel; all keyed alike - RAL finish. - Anti-finger traps to hardware required - To have automated opening – Dorma ED250 or equivalent Allow for concealed outer frame Electromagnetic locking linked to fire alarm and detection system, access control system to M&E specification	Welcome Block
6.1.5	**Clerestory Windows** - Used for clearstory of Welcome Block atrium - Mixture of fixed and opening casements - RAL finish. - Metal cill trays to match frames - To meet Secure By Design standards - Clear opening requirements to meet M&E specification - To be controlled buy BMS controlled actuators	Welcome Block

Item No.	Description	
	- Manufacturer: Flowcrete - Product: Isocrete K screed - Finish: Peran Comfort	
7.1.4	**Floor Type 04** *Welcome Block – FF – seminar rooms, staff rooms, counselling rooms* *Linear Block – FF – classrooms, store rooms* Supplier: JHS - Product reference: Tretford Roll - Construction: ribbed; 80% Goat Hair, 15% Nylon, 5% Viscose; jute backing - Size: roll, 2m wide - Colour: TBC	Both Buildings
7.1.5	**Floor Type 05** *Linear Block – GF - kitchen* - Linoleum; allow for 3mm Altro Stronghold 30 and underlay or similar approved - Allow for Topshield2 protective treatment to floor finish - Allow for coved skirtings - Allow for floating screed substrate	Linear Block
7.1.6	**Entrance Mat** - Allow for Forbo Nuway Tuftiguard HD Classic 12mm with bamboo inserts, at all external doors - Allow for brass edging detail to coir entrance matting Allow for tanking and drainage of mat well	Both Buildings
7.2	**Wall Finishes**	
7.2.1	**Wall Type 01** *Throughout for CLT walls* Below 1.2m: - 25mm batten zone for services - 12.5mm Fermacell gypsum fibreboard - Joints and holes to be filled and sanded - Painted finish - 25x50mm solid larch timber capping piece Above 1.2m: - Exposed CLT - Allow for 2no. coats of Envirograf QVFR and 1no. top coat to achieve Class 1 Surface Spread of Flame under BS476-7:1997.	Both Buildings
7.2.2	**Wall Type 02** *Science labs, stores, lobbies* Below 1.2m: - 25mm batten zone for services - 12.5mm Fermacell gypsum fibreboard - Joints and holes to be filled and sanded - Painted finish - 25x50mm solid larch timber capping piece Above 1.2m: - 12.5mm standard plasterboard - Skim finish and painted	Both Buildings
7.2.3	**Wall Type 03** *WCs throughout* Below 1.2m: - Tile backer board - Johnson Tiles – Prismatics – square – white satin	Both Buildings

Item No.	Description	
6.1.6	**Vivarium Glazing** - Specialist vivarium glazing to be allowed for, to external walls of exotics room. - To match specification of Enfield facility	Welcome Block
6.1.7	**Glazing** 4(16)4(16)4 - 4mm pane of Saint Gobain Planitherm total+ inner pane, low e Face 3/5, Planiclear laminated external pane, Argon filled - G value of maximum 0.36 - Light transmittance of minimum 70% - Thermal: To achieve U-value of maximum 1.1 W/m^2/K (glazing and frame) - Low E coatings; solar control glass to M&E engineer specification Additional requirements - to meet secure by design standards	Both Buildings
6.2	**Other Openings**	
6.2.1	**Roof Access – Welcome Block** Allow for access via retractable ladder and metal roof hatch, from within first floor rooms. In three sperate locations. -	Welcome Block
6.2.2	**Roof Access – Linear Block** Allow for access via retractable ladder and metal roof hatch, from within first floor rooms. In three sperate locations.	Linear Block
6.2.2	**Fire curtain to kitchen servery** (to be coordinated with M&E specification) - 1 no. fire curtain between kitchen and social space - Head box to be concealed in ceiling. Side channels to be concealed in columns. - 30 minute fire rating - Coopers Firemaster or similar - Provide Total Fail Safe	Linear Block

7.0	**INTERNAL FINISHES**	
7.1	**Floor Finishes**	
7.1.1	**Floor Type 01** *Welcome Block – GF – all areas; excluding exotics, dog grooming and plant room* *Welcome Block - FF – atrium walkway, lobby, WCs and LRC* *Linear Block – GF -* Poured sustainable polished concrete with exposed aggregates, with recycled content/crushed site demolitions. - Supplier: www.lazenby.co.uk - Product reference: Custom screed/aggregate mixes to be confirmed, with aggregate to be exposed with shot blasting or using retardant. - Aggregate size: Range: 2-5mm to 8-16mm at path edges. - Colour: TBC - Thickness: 100mm -	Both Buildings
7.1.2	**Floor Type 02** *Welcome Block – GF – exotics and dog grooming* *Linear Block – GF – science labs and prep, WCs* *Linear Block – FF – classroom lobbies* - Linoleum; allow for min. 2.5mm Forbo Marmoleum and underlay or similar approved - Allow for Topshield2 protective treatment to floor finish - Allow for coved skirtings - Allow for floating screed substrate	Both Buildings
7.1.3	**Floor Type 03** *Welcome Block – GF – plant room* *Linear Block – GF – plant room* *Linear Block – FF – plant room* High strength, semi-dry cementitious screed incorporating proprietary additives	Both Buildings

Item No.	Description	
	- Metal trim Above 1.2m - Painted Plasterboard	
7.2.4	**Wall Type 04** *Kitchen* - Plasterboard backing - Altro Whiterock Hygienic Wall System - Bonded using AltroFix adhesive - Welded seams and thermoformed joints - Flush joint with coved floor skirting	Linear Block
7.2.5	**Skirtings** - Typical allow 200mm high timber surface mounted painted skirting, with concealed fixings - Concrete floor condition - allow shadow gap joints to floor, skirting, door jambs and window frames	Both Buildings
7.2.6	**Exposed Services** - To be galvanised metal	Both Buildings
7.2.7	**Pinboards** - Allow for 2no. 2m x1m 'Forbo Bulletin Board pinboard linoleum' with timber framing in each classroom	Linear Block
7.3	**Ceiling Finishes**	
7.3.1	**Ceiling Type 01** *Throughout for CLT decks* Between glulam beams allow for: - Troldtekt A2 Acoustic board (between beams) - 25mm battens filled with Rockwool Flexi Slab (between beams)	Both Buildings
7.3.2	**Ceiling Type 02** *WCs* - 2 no. layers British Gypsum 12.5mm plasterboard with skim finish - Supported by British Gypsum MF ceiling	Both Buildings
7.3.3	**Ceiling Type 03** *Kitchen* - Supplier: Armstrong or equivalent - 'Kitchen Zone' lay-in panels - 'Prelude' suspended system	Linear Block
7.3.4	**Ceiling Type 04** *Science labs and prep* - Supplier: Armstrong or equivalent - 'Clean Room FL' lay-in panels - 'Clean Room' suspended system	Linear Block
7.3.5	Allow for acoustic enhancements to satisfy AD:E.	Both Buildings

8.0	**INTERNAL PARTITIONS / DOORS/ SCREENS / STAIRS**	
8.1	**Internal partitions**	
8.1.1	- Refer to Structural Engineers drawings for locations of all load bearing partitions	
8.1.2	**Non Load-Bearing Partitions** - Gypframe 48 S 50 C studs - 2no. 15mm Gyproc WallBoard with multi finish skim, on each side - 25mm Isover Acoustic Partition Roll, between studs	Both Buildings

Item No.	Description	

8.2	**Internal Doors**	
8.2.1	**Standard Internal Doorset** Refer to GA drawings for number and locations - Assumed to be FD30 rated - Solid core construction with Ash veneer. - Clear glazed panel to maximum size possible - Solid Ash frame with suitable intumescent seals and fire rated ironmongery	Both Buildings
8.2.2	Ironmongery - Ironmongery to be FSB from Allgood or similar approved in bronze finish - All staff areas to have access control to M&E specification - Bathroom and WC doors to have indicator bolts and emergency escape controls - Provide kick plates and push plates to all communal doors. - Allow for concealed bearing butt hinges (min. 3 no. per door), latch, mortice locks and door stops, finishes TBC - Allow for concealed door closers for fire-doors as required by Building Regulations - Provide butt hinges throughout - Provide door stops throughout - Make allowance for Master suited locks throughout on back of house / staff doors - Where required provide fire rated ironmongery, concealed door closers and intumescent strips and lock / hinge pads for fire-doors as required by Building Regulations	Both Buildings

9.0	**FITTINGS & FURNISHINGS** – *(Capel Manor College to confirm which FF&E items are to be client supply)*	
9.2	**Blinds**	
9.2.1	- Allow for concealed vertical roller blinds, with side guides and manual control, to all glazing. - High-level clerestory in Welcome Block will require remote electric operation.	Both Buildings
9.3	**Platform Lifts** - 2no. fully enclosed internal platform lifts. - Gartec, Stannah or equivalent. *Client to advise on whether they have a preferred/existing supplier, used on their other campus'*	Both Buildings
9.4	**Furniture (client to confirm whether FF&E will be client supply)**	Both Buildings
9.5	**Kitchen** - Design and specification to be confirmed by a kitchen specialist	Linear Block
9.6	**Science Labs and Prep Room** - Design and specification to be confirmed by a specialist science laboratory designer	Linear Block

9.4	**Sanitary Fittings**	
9.4.1	**WCs / Staff WC** Generally, allow for sanitary appliances; Duravit 'Happy D' range or similar. Each room to include: - Wash hand basin, wall mounted and exposed chrome trap - Crosswater Mike Pro Wall-Mounted Basin Mixer - WC, wall hung. - Concealed cistern, Geberit or similar - Full height mirror with secret fixings - Clothing hooks, toilet roll holder, toilet brush to match	Both Buildings
9.4.2	**Accessible WC** - Assume 'Doc M'- 'Concept' pack by Ideal Standard or similar approved. - Crosswater Mike Pro Wall-Mounted Basin Mixer - Assume level threshold and tiled floor to all shower rooms throughout.	Both Buildings

Item No.	Description	
	- Mix to using high levels of cement replacement products – *such as GGBS or LC3* - Brass nosings and non-slip treads Other: - Handrail – metal supports with rounded timber handrail - Soffit – Rockwool insulation with Fireboard lining	
12.3	**Fire escape stair** - Folded steel profile stair and stringers. - Perforated risers. Solid goings. - Underside of stair and landings to be exposed - Galvanized and then PPC finish, RAL colour TBC - Solid metal balustrades, fixed to stringer, and finished to match stair.	Welcome Block
12.4	**Water fountains** - Allow for 6no. external water fountains, evenly spread around site. - Locations and spec TBC	Both Buildings
12.5	**External Signage** Allow for statutory, way finding and information signage, as a minimum	Sitewide
12.6	**External Lighting** Refer to M&E specification /drawings	Sitewide
12.7	**Soft Landscaping** Refer to landscape architect drawings/specification	Sitewide
12.8	**Hard Landscaping** Refer to landscape architect drawings/specification	Sitewide
12.9	**Security Requirements** CCTV Cameras and Access Controls - Refer to M&E information - Fitting and mounting to be confirmed at Stage 4	Sitewide

Item No.	Description	
	- Allow for: - Height adjustable changing bench - Tracking hoist system - Brushed stainless steel drop down hand rails - Privacy curtain - Wide tear off paper roll (to cover the bench) - Large waste bin for disposable pads	
9.5	**Signage & Manifestation**	
9.5.1	**Signage** - Allocate an allowance for statutory, way finding and information signage - Allow for associated emergency signage	Both Buildings
9.5.2	**Manifestation** - Allow for bespoke manifestation to all glazed doors and internal screens to comply with AD:N - Architect to submit design & setting out proposals	Both Buildings
9.5.3	**Access and Safety Equipment** - Latchways fall restraint system to cover lower / upper / back of house roofs. - Removable ship ladder to access upper roof. Include permanent fixing points on façade	Both Buildings

10.0	**MECHANICAL AND ELECTRICAL SERVICES & DRAINAGE**	
10.1	**Mechanical & electrical Services**	
10.1.1	- Refer to M&E Engineer's drawings and specification for M&E services - All setting out of visual services to be agreed with architect	
10.2	Please refer to Civil Engineer's drawings and specification for: Surface drainage - Allow for slot drainage to building perimeter and entrance thresholds generally. Layouts and typical details to Landscape Architects proposals - Allow for stainless steel grilles, cover plates or slots as a minimum. wInspection Chambers and Manhole covers - Invert levels to Civil Engineer's information to be coordinated with Architect and Landscape Consultant. Assume flush concealed covers to all manholes	

11.0	**LIGHTING**	
11.1	**Lighting** - M&E engineer to confirm requirements	
11.1.1	**Visual Services Generally** - Setting out of fittings to be confirmed at Stage 4 - Allow for mechanical extraction grille, plaster-in flush to soffit or wall to kitchen - Assume colour matched to finished surface	Both Buildings
11.1.2	**Heating / Ventilation** - Refer to M&E information for performance requirements and associated servicing - Setting out and visual finish as per Architects requirements	Both Buildings

12.0	**EXTERNAL WORKS**	
12.1	**External Walkway** - Decking - EnviroBuild Hyperion Composite Decking - Substructure – EnviroBuild lumber and pedestal system. - Structural deck below – falls to be created and waterproof tanking applied. - Balustrade – metal balustrade and handrail, PPC to RAL - Soffit below – solid timber soffit panels, with Osmo finish	Sitewide
12.2	**External Staircase** *(from courtyard to meadow)* Structure: - Bespoke precast concrete stair	Linear Block

Appendix C
Circular Economy and LCA Workshop Meeting Minutes

Circular Economy and LCA Workshop - MEETING MINUTES

Subject:	Capel Manor College, Mottingham
Job number:	HLEU81199
Date/Time:	6th December 2021 at 10:00 to 11:00 am
Venue:	Teams Video Meeting

Attendees:	Akshatha Veerendra	RPS Group (RPS)
	Samantha May	RPS Group (RPS)
	Jake Tubb	RPS Group (RPS) - Planning
	Ben Higham	Fielden Fowles – Architect
Absent (apologies):	Mark Buxton	RPS Group (RPS)
	Alex Mozaffari	RPS Group (RPS)

No.	Matters Arising	Action
1.	**Introduction**	
	Confirm all attendees	All
	Project Appointments Confirmed and PO in place	-
	Project Timelines Jack and Mark have been updating team	Jack/Mark
	Circular Economy Requirements - CES requirements has been sent and awaiting further information - As discussed Ben to send any additional inputs for building materials	Ben Fielden Fowles
	Sample prompts used during workshop to help fill in Table 2 Key Commitments in CES report	All

No.	Matters Arising	Action

Type	Prompt challenges	Example counter-actions
Commercial	Higher initial capital costs/ investor or lender concerns.	Ensure value-engineering is not solely driven by lowest capital cost
Logistical	Slower/ supply delays / site features / space constraints / storage	Schedule around slower work (off the 'critical path'), identify vacant sites.
Technical	A lack of research & development, innovation,	Undertake precedent searches, accelerated RD&I, modelling, prototypes.
	precedents, testing, certainty or confidence.	
Legal	Inappropriate contracts / too much risk / too little reward.	Review contracts, clauses, insurance (e.g. Integrated Project Insurance).
Social	Wrong culture, attitudes, systems/processes. Safety or health concerns	Increase awareness of the brief, mandates, incentives, H&S team roles.
Political	Unsupported or incompatible with policy / regulations / standards	Seek work-arounds, highlight barriers, recommend amendments.
Environmental	Noise, vibration, dust, vehicle movements or congestion	Implement different working hours, screens, covers and reverse logistics.

	Building elements/materials – As discussed, refer to outline spec, further details to be sent	Ben
	Challenges Project at early stage – contractor not appointed As discussed and Sam/Aks working to resolve – make assumptions for project design life, transport distances, Construction site impacts, End of life scenarios, Operational energy and water use	Aks/Sam
	One Click Project has been set up and information is being added	Aks/Sam
	Any Other Business Sam and Aks to discuss the strategy further. CES to align with LCA	NOTE
	Circulation	

No.	Matters Arising	Action

	Martha Rawlinson	_____	

Circular Economy and LCA Workshop - MEETING MINUTES

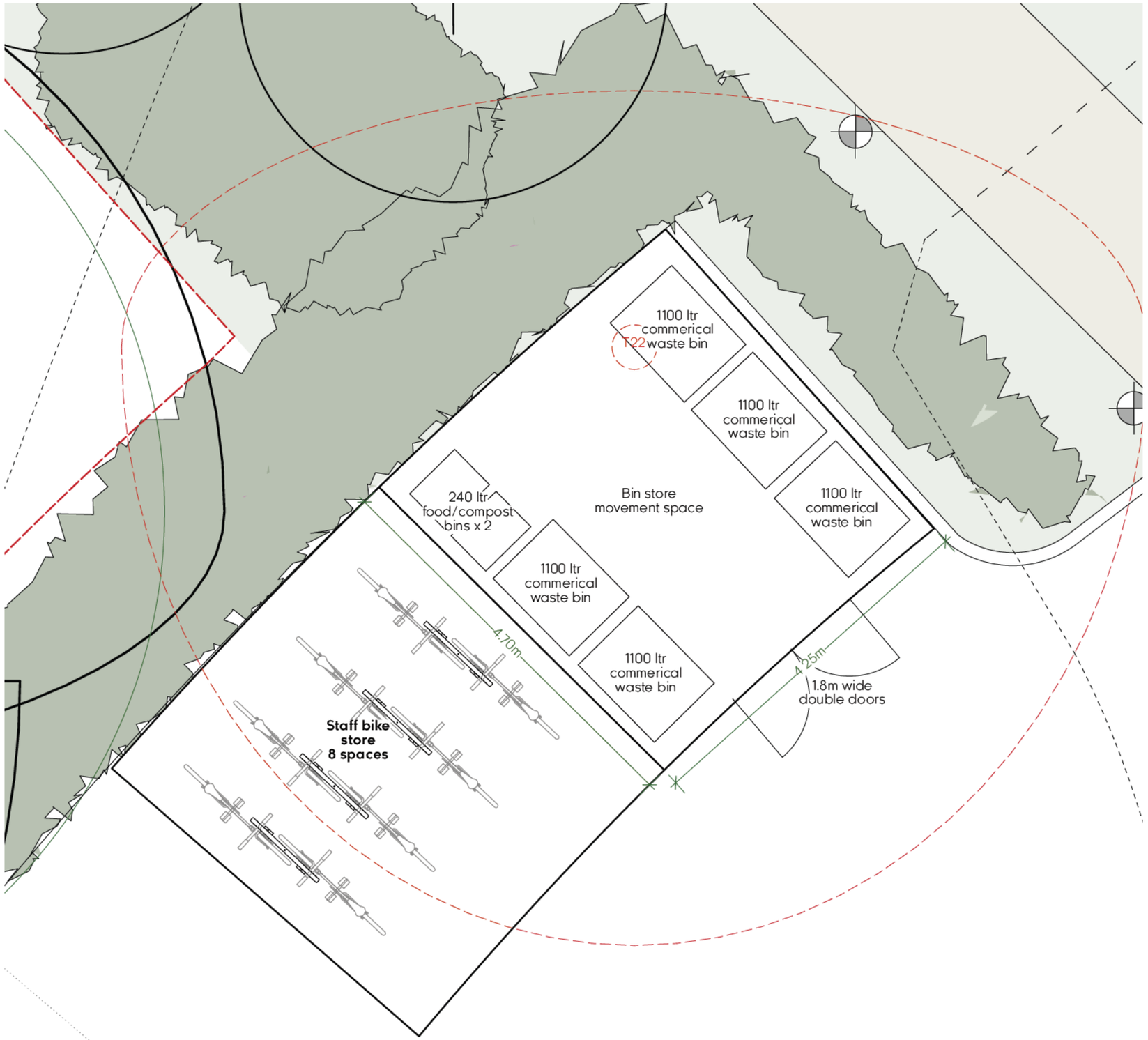
Subject:	Capel Manor College, Mottingham
Job number:	HLEU81199
Date/Time:	13th October 2022 at 9:00 to 10:00 am
Venue:	Teams Meeting

Attendees:	Akshatha Veerendra	RPS Group (RPS)
	Samantha May	RPS Group (RPS)
	Ben Higham	Fielden Fowles - Architect
	Mark Buxton	RPS Group (RPS) – Planner
Absent (apologies):	Mark Buxton	RPS Group (RPS)
	Nolan Smith	Fushion

No.	Matters Arising	Action
1.	**Introduction**	
	Confirm all attendees	All
	Project Discussion Design and Build Contract so initial details/information available, however detailed information and reports will be available as the project progresses	
	GLA Spreadsheet GLA feedback received and reports available to be gathered to respond to GLA comments. Aks and Sam to work on responding to the comments	Ben/Mark Aks/Sam
	Pre demolition and Waste Management Plan As contractors not appointed to be sent to GLA in due course	Mark/Nolan
	Operational Waste data	

No.	Matters Arising	Action
	Mark has requested this data, Nolan to send aks	Nolan
	Energy Comments have been sent by Ana, however team will check and respond to make sure everything is clear	Energy Team
	Any Other Business Sam and Aks to discuss the strategy further to align with LCA	NOTE
	Circulation	
	Martha Rawlinson	

Appendix D
Floor plan – Waste Bins



Rev	Description	Date
R1	240 litre bins added	20.12.22

Hortus Collective

 www.hortuscollective.co.uk

Project
Capel Manor College, Mottingham Campus

Drawing
Bin Store Plan

Scale	Date	Drawn	Checked	Status
1:50 @ A3	**11.11.22**	**MR**	**MR**	**Planning**

Drawing Number
CMC-MOT-L104

Revision
R1

Appendix E
Food waste

Akshatha Veerendra

Aks

Please see below the college answer to item 5

Regards

Nolan

Nolan Smith
Director | FUSION

Nolan,

In regard to the question below:

1. The number of bins does not indicate any allocation for separate food waste collection. The Applicant should clarify and confirm that the Proposed Development supports the separate collection of food waste.

I can confirm that the College is happy to implement this requirement to accommodate the needs of the new refectory.

Kind regards

David

David Scott
Executive Director Estates & Facilities

Appendix F
Community Waste Minimisation Network

Bromley Environment Network (BEN)

Bromley Environment Network (BEN) was founded to support Bromley community groups working together to protect and improve our environment.

Our mission and values

We aim to bring community groups in the borough of Bromley together to inspire and support residents, the Council and other community stakeholders to work collaboratively to make our borough a greener, healthier and more sustainable place to live, both now and in the future.

We are

Member-led: we exist to bring interested groups together and our activity is guided by our members.

Collaborative: we will achieve more if we work together. Our aim is to build connections and relationships, and share information, because we believe that by working together we can achieve more.

Enterprising: we are resourceful and ambitious in everything we do, supporting our members and partners to build meaningful change.

Our main areas of focus include clean air initiatives, trees and biodiversity, energy, Transport and road usage, consumption and waste.

Join us

Membership of BEN is open to all types of community organisations interested in collaborating to reduce the borough's environmental impact and create a greener, healthier and more sustainable place to live.
You could be, but not limited to, one of these kinds of groups:

- residents associations,
- schools,
- PTAs,
- faith groups,
- sports groups,
- book groups,
- local business associations
- any other community stakeholder in Bromley.

Any such group is welcome to request to join BEN, stating their contact details, geographical coverage of their group (if any), and areas of particular interest.

Founding members

Our founding members, listed below, cover a wide range of interests. We welcome more community groups to join us.

Bromley YouthStrike4Climate (BYS4C)

Copers Cope Area Residents Association (CCARA)

Friends of Chislehurst Recreation Ground

Palace Estate Residents Association

The Hub from Greener and Cleaner, is a community-powered space run by local people wanting to support their community with greener and cleaner more sustainable living.

A very welcoming place; you can discover the first steps you can take, learn more about how to look after our environment and be empowered for change. From questions

meaningful changes to fight climate change, reduce their carbon footprint and above all, not feel alone doing so.

The Hub is based on the upper mall of The Glades, next door to Waterstones and opposite The Entertainer.

Monday – 10am-6pm

Tuesday – Closed

Wednesday – Closed

Thursday – 10am-6pm

Friday – 10am-6pm

Saturday – 10am-6pm

Sunday – 11am-5pm

What's on

The Hub is an exciting space for people to come and learn more about how we can make a positive difference from the comfort of our homes, schools, businesses and wider communities, all whilst improving wellbeing and reducing costs.

Regular mending and puncture repair workshops take place every week as well as a wide range of workshops, crafts and talks. Keep up to date with all the events – there are lots!

November 14, 2022 @ 12:00

November 17, 2022 @ 4:00

November 18, 2022 @ 3:00

The Hub hosts Bromley's Library of Things. The Library of Things helps residents to save money and reduce waste by affordably renting out a mine of useful equipment from PA systems to carpet cleaners and drills. Borrow top quality household items rather than buying them saving you money and space – win win!

3 easy steps:

1. Register 2. Reserve 3. Collect

All items are checked and maintained once a week by our friendly engineer.

Contact:

info@greenerandcleaner.co.uk

Appendix G
Pre-demolition – Email from GLA

Akshatha Veerendra

Hi Mark,

Good afternoon.

Yes given the nature of this scheme and quality of the existing buildings on site, it's accepted that this requirement is not as relevant in this instance and the assessment you have undertaken below is sufficient.

Please include the information below in the next memo response. I will also flag to the WLC team that I have provided a response in relation to item 6 in this case.

Many thanks,

James

James Cummins

Strategic Planner, Development Management, Planning

GREATER**LONDON**AUTHORITY

James,

We will respond more fully on the outstanding Energy, WLCA and CES issues shortly, but I wanted to address the issue of pre-demolition requirements as a priority.

We are advised by our energy/sustainability team that Item 6 of the WLCA memo requires that pre-demolition information needs to include an audit of any existing buildings, structures or hard surfaces being considered for demolition. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications.

However, it is noted that the wording in the memo is as follows (with our emphasis added) *"Confirm that options for retaining the existing buildings and structures have been fully explored before considering substantial demolition* ***(if applicable)****"*

In the particular circumstances of this project, the buildings to be removed/demolished are of a prefabricated nature, including a glasshouse which is no longer fit for purpose. Seeking to refurbish/re-use these buildings is simply not feasible, although any redundant materials (e.g. glass/metal)will be recycled wherever it is practicable to do so.

I attach extracts from the submitted Design & Access Statement which includes photographs of the buildings/structures currently on site, and the Officer's Report to Development Control Committee, which sets out on pages 6-8 of the PDF the buildings to be demolished/relocated as a result of these proposals. Hopefully this helps to clarify why this particular GLA requirement is not directly applicable in this case.

I would be grateful if you could confirm acknowledgement of this email.

Kind Regards

Mark

Mark Buxton
Director - Planning
RPS | Consulting UK & Ireland

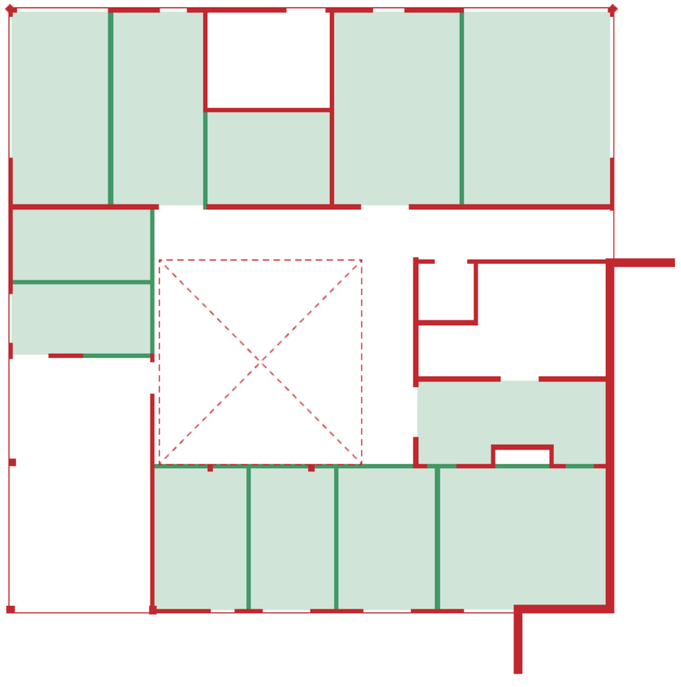
Thanks for the confirmation James.

Kind Regards

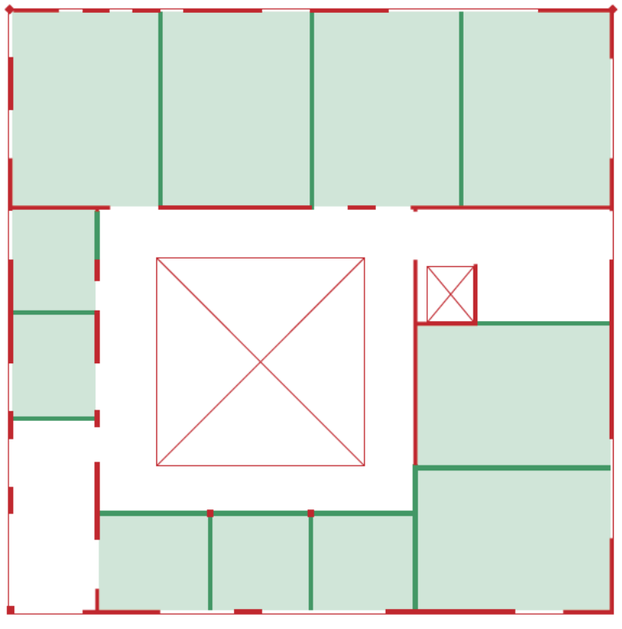
Mark

Mark Buxton
Director - Planning
RPS | Consulting UK & Ireland

Appendix H
Adaptability Scenario Modelling



WELCOME BLOCK - FUTURE SCENARIO A - GROUND FLOOR



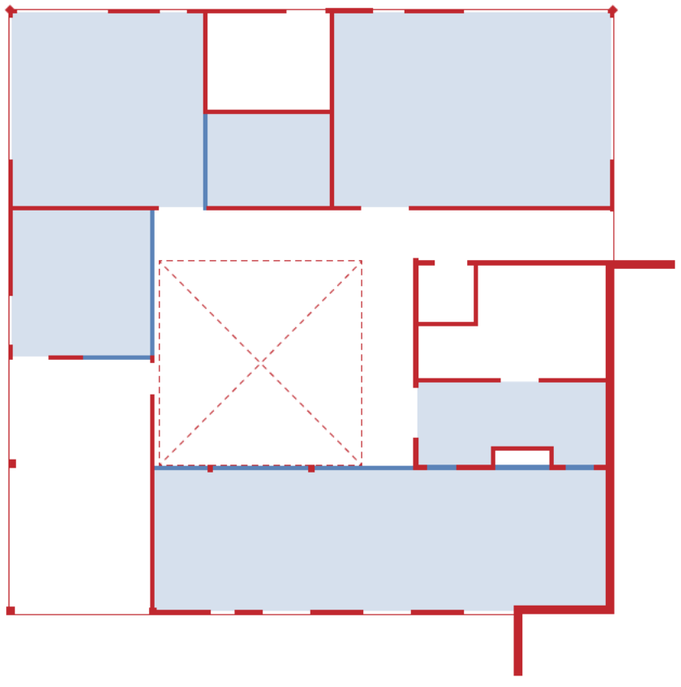
WELCOME BLOCK - FUTURE SCENARIO A - FIRST FLOOR

1.3 FUTURE SCENARIO A – SUBDIVISION OF SPACES

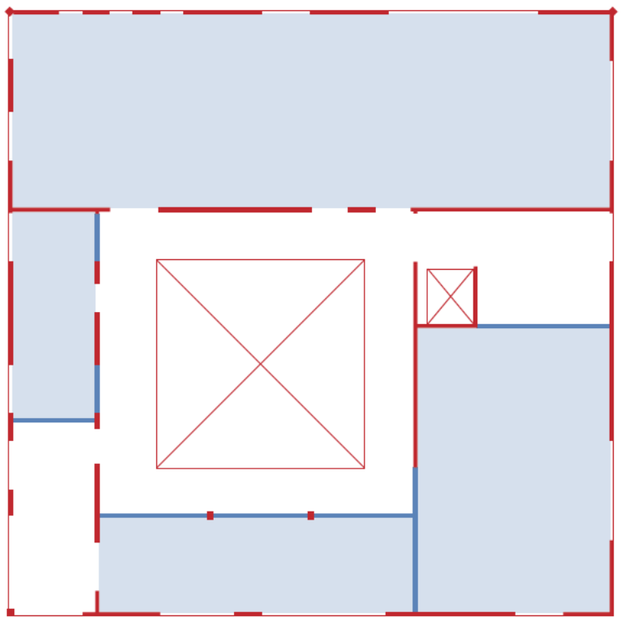
The diagrams to the left show the flexibility and adaptability of the proposed structure to accommodate a theoretical future subdivision of the spaces, to create smaller rooms within the building.

These examples are just one possible arrangement. Variations and developments of these layouts could easily be accommodated to best suit future requirements.

Potential new non-load bearing partitions are shown in dark green, with the newly created room in light green.



WELCOME BLOCK - FUTURE SCENARIO B - GROUND FLOOR



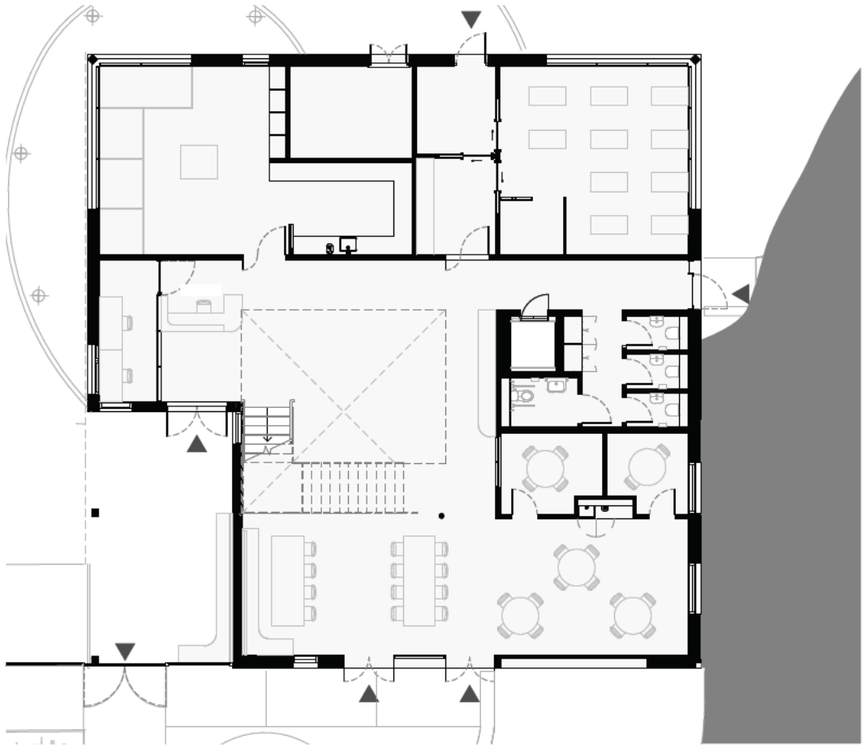
WELCOME BLOCK - FUTURE SCENARIO B - FIRST FLOOR

1.4 FUTURE SCENARIO B – ENLARGEMENT OF SPACES

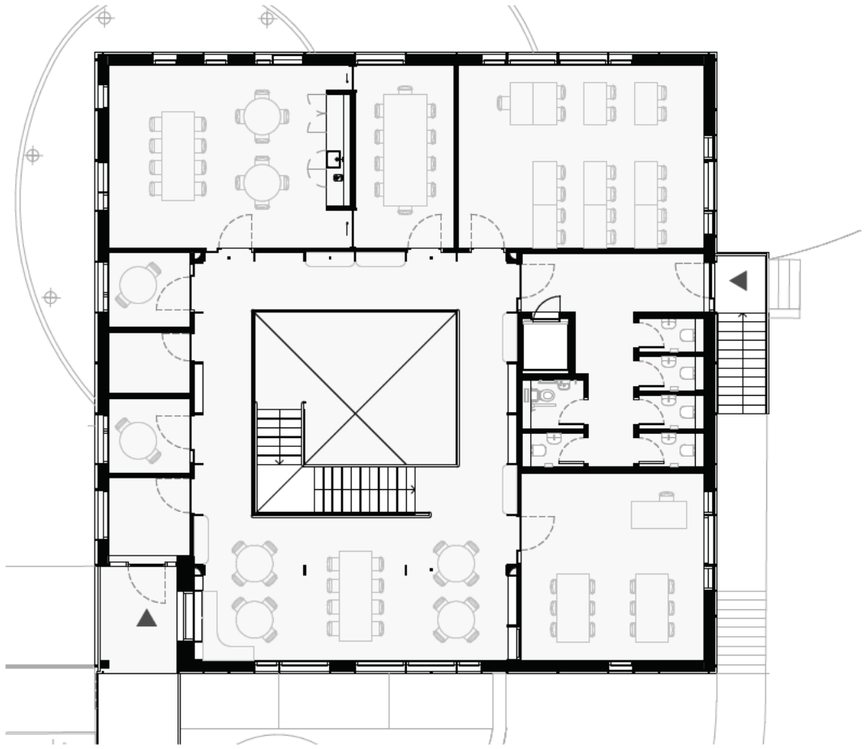
Conversely, the diagrams on bottom half of the page show how the removal of non-load bearing internal partitions can create larger rooms and spaces, from the proposed arrangements. Allowing larger open-plan rooms to be created if required in the future.

Potential new non-load bearing partitions are shown in dark blue, with the newly created room in light blue.

Again, variations and developments of these layouts could easily be accommodated to best suit future requirements. As well as combinations between Scenario A and B.



WELCOME BLOCK - PROPOSED LAYOUTS - GROUND FLOOR



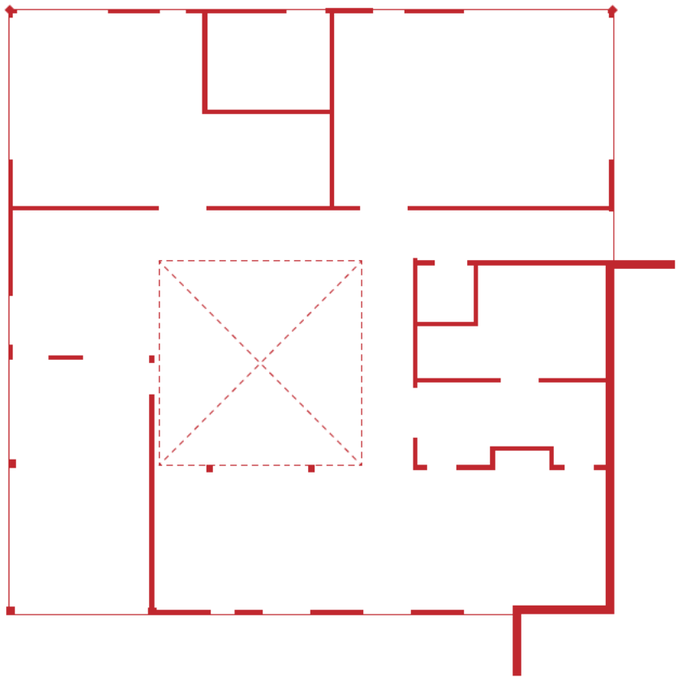
WELCOME BLOCK - PROPOSED LAYOUTS - FIRST FLOOR

1.1 PROPOSED LAYOUTS

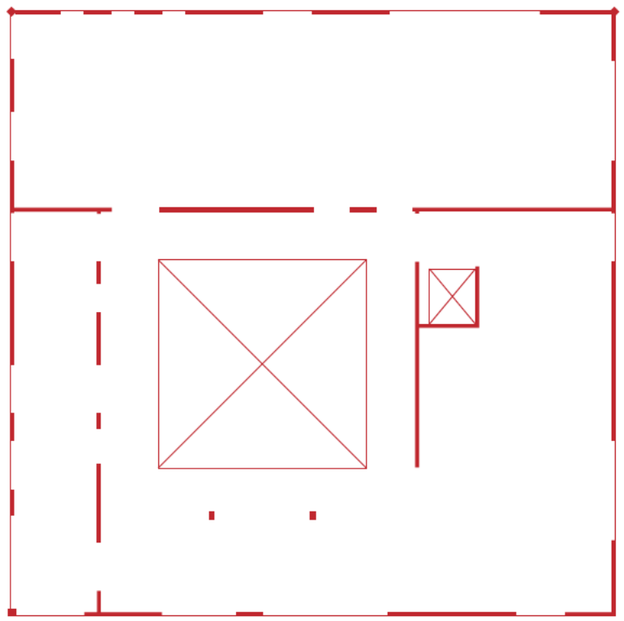
From the outset of the design process the Welcome Block has been carefully considered and designed to allow flexible. Both during the design development of the scheme and with future uses of the building firmly.

The diagrams at the top of this page show the internal layouts as currently proposed. Showing all proposed internal walls, however these are a mixture of load-bearing and non-load bearing.

All non-load bearing partitions, with the exception of the plant room, will be made from lightweight timber stud construction. Allowing for their simple removal, if required in the future.



WELCOME BLOCK - PROPOSED STRUCTURE - GROUND FLOOR



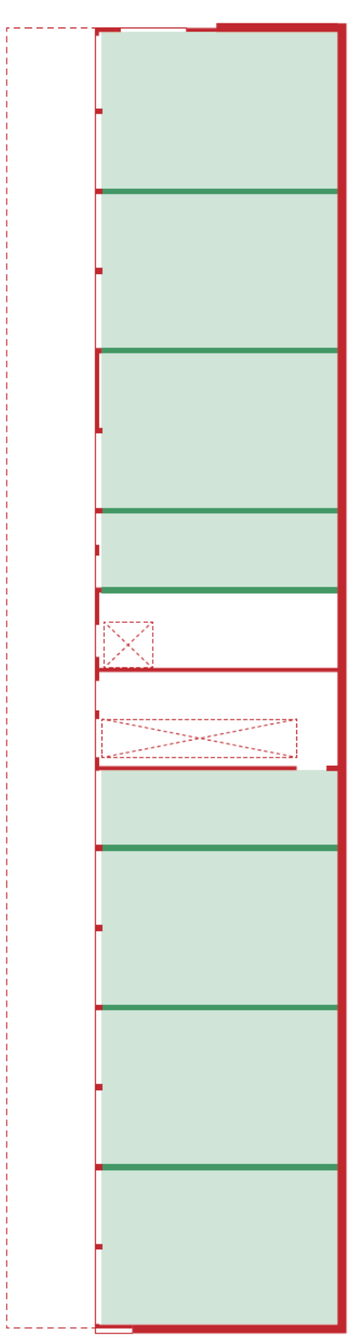
WELCOME BLOCK - PROPOSED STRUCTURE - FIRST FLOOR

1.2 PRIMARY STRUCTURE

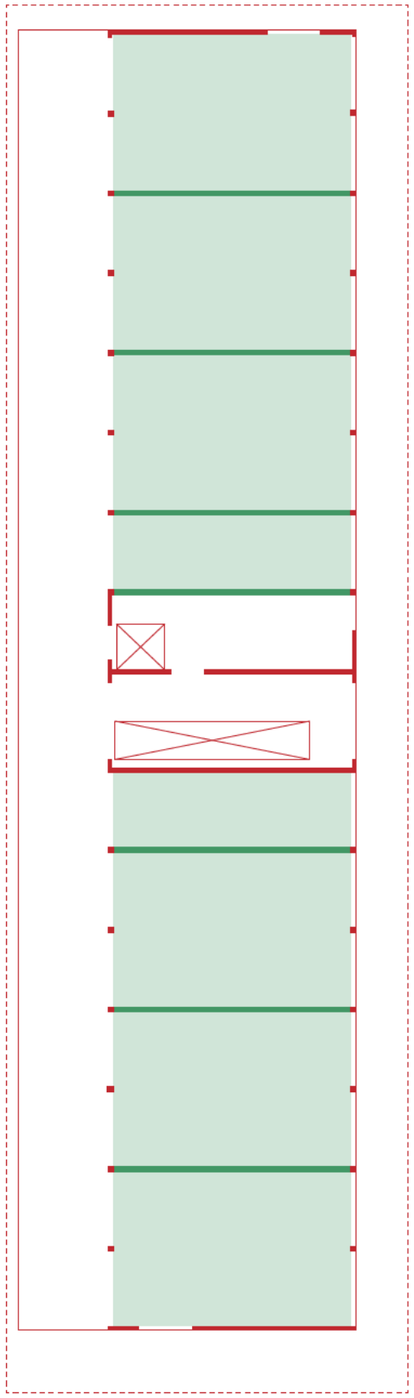
The diagrams opposite show (in red) only the primary structure of the proposed scheme.

Wherever possible the proposals have limited internal load-bearing walls and columns. Prioritising and maximise floor/roof spans from the central atrium to the external walls.

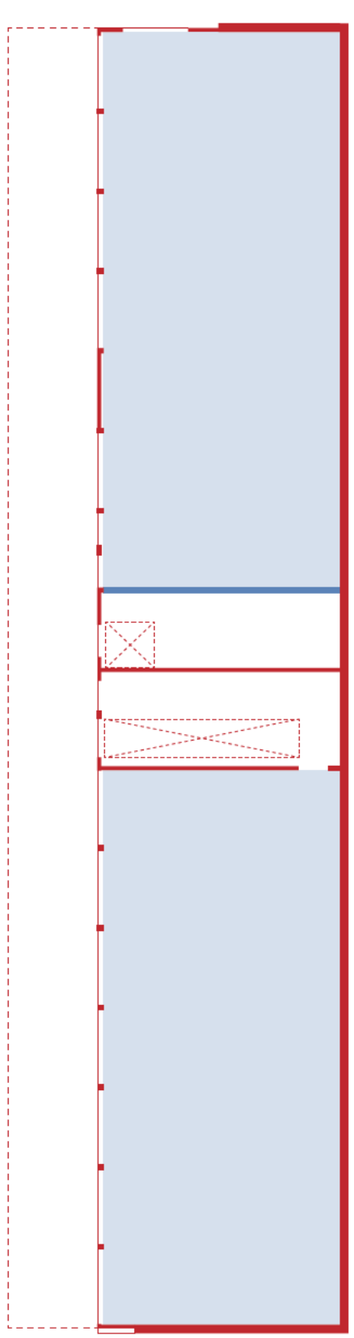
Consideration to the positioning and spacing of windows also allows for future subdivision of the spaces to be accommodated.



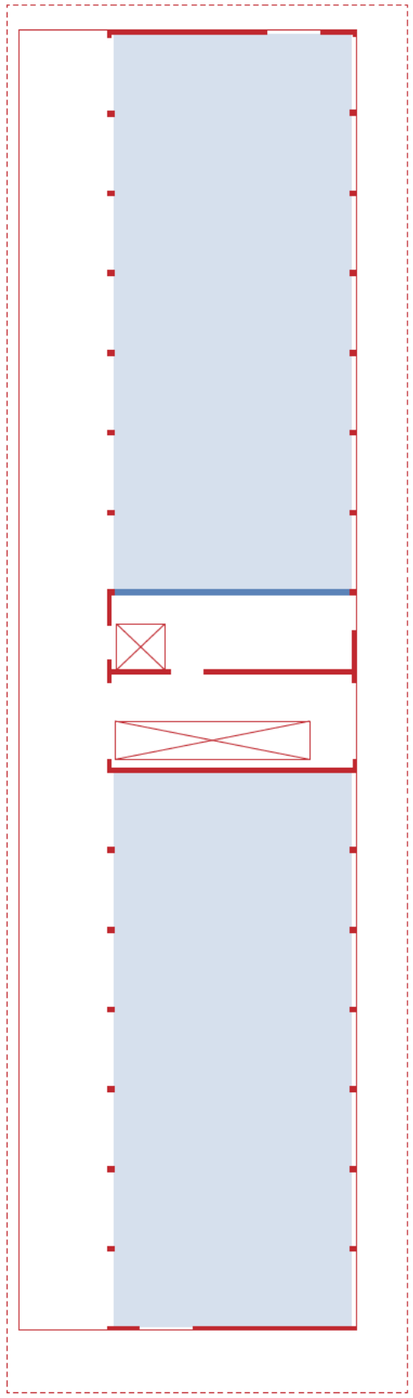
LINEAR BLOCK - SCENARIO A
- GROUND FLOOR



LINEAR BLOCK - SCENARIO A
- FIRST FLOOR



LINEAR BLOCK - SCENARIO B
- GROUND FLOOR



LINEAR BLOCK - SCENARIO B
- FIRST FLOOR

2.3 FUTURE SCENARIO A – SUBDIVISION OF SPACES

The diagrams on the left side of the page show the flexibility and adaptability of the proposed structure to accommodate a theoretical future subdivision of the spaces, to create smaller rooms within the building.

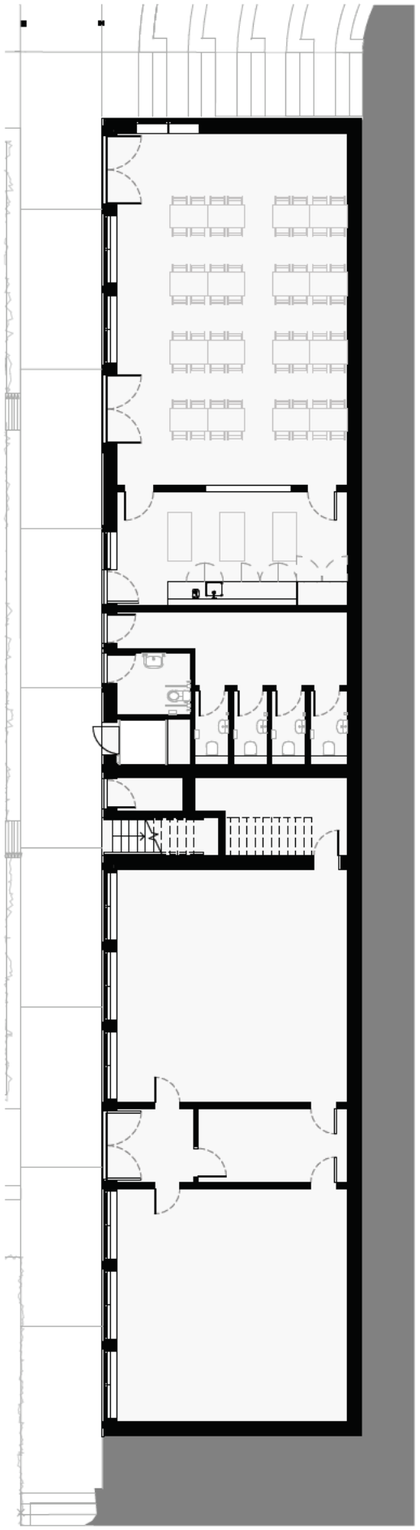
Potential new non-load bearing partitions are shown in dark green, with the newly created room in light green.

2.4 FUTURE SCENARIO B – ENLARGEMENT OF SPACES

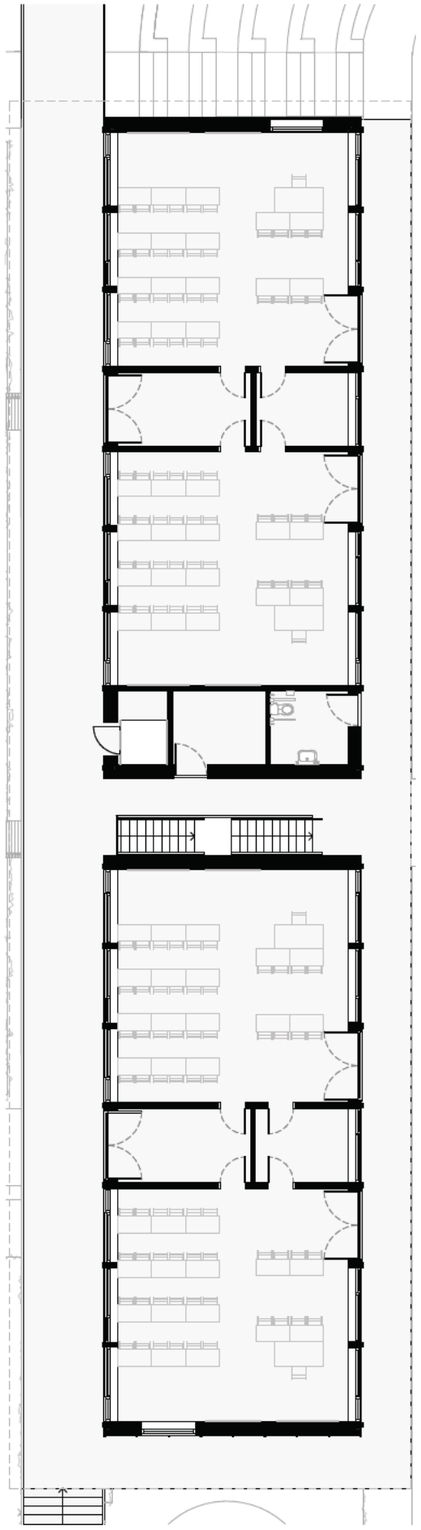
Conversely, the diagrams on the right half of the page show how the removal of non-load bearing internal partitions can create larger rooms and spaces, from the proposed arrangements. Allowing larger open-plan rooms to be created if required in the future.

Potential new non-load bearing partitions are shown in dark blue, with the newly created room in light blue.

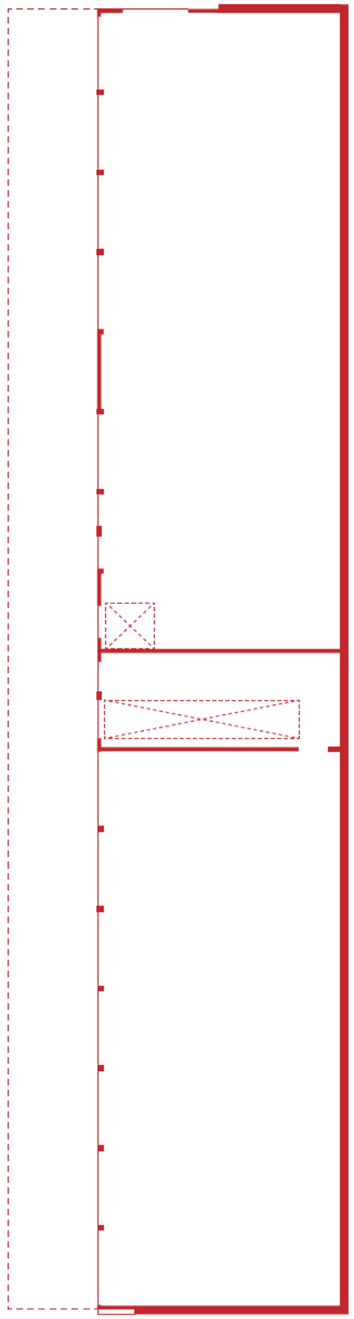
Again, variations and developments of these layouts could easily be accommodated to best suit future requirements. As well as combinations between Scenario A and B.



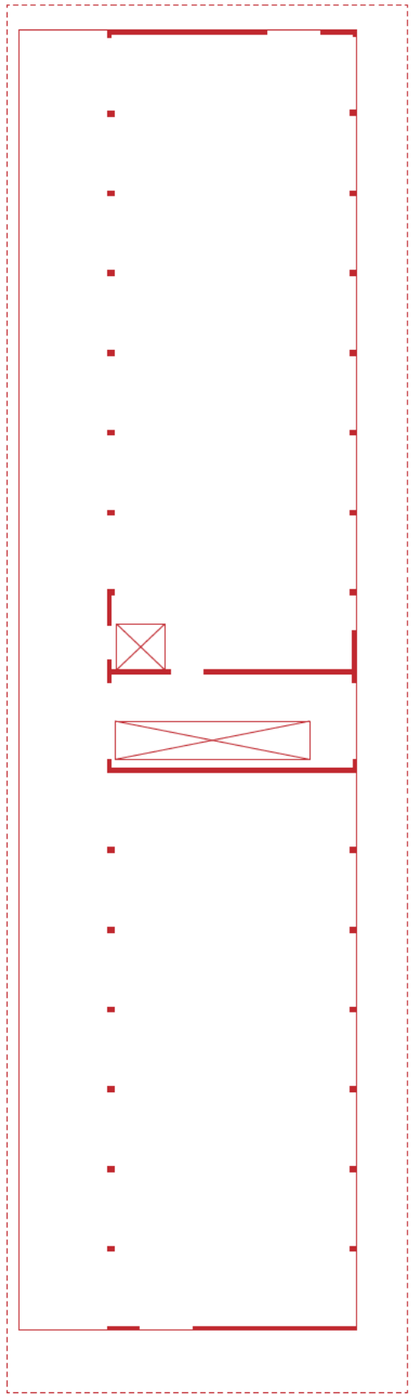
LINEAR BLOCK - PROPOSED LAYOUTS - GROUND FLOOR



LINEAR BLOCK - PROPOSED LAYOUTS - FIRST FLOOR



LINEAR BLOCK - PROPOSED STRUCTURE - GROUND FLOOR



LINEAR BLOCK - PROPOSED STRUCTURE - FIRST FLOOR

2.0 LINEAR BLOCK

2.1 PROPOSED LAYOUTS

From the outset of the design process the Welcome Block has been carefully considered and designed to allow flexible. Both during the design development of the scheme and with future uses of the building firmly.

The diagrams at the top of this page show the internal layouts as currently proposed. Showing all proposed internal walls, however these are a mixture of load-bearing and non-load bearing.

All non-load bearing partitions, with the exception of the plant room, will be made from lightweight timber stud construction. Allowing for their simple removal, if required in the future.

2.2 PRIMARY STRUCTURE

The diagrams on the right side of the page (in red) only the primary structure of the proposed scheme.

The width of the building has been designed to allow of simple, single-spans to be utilised. Resulting in no internal walls, apart from around the vertical circulation. Column spacing has been optimised to provide a structural grid that can create a range of room sizes.

Consideration to the positioning and columns also allows for future subdivision of the spaces to be accommodated.

Appendix I
Lean Design Options Appraisal

1.1 NOT TO BUILD

The project manager and design team have been working with Capel Manor College since 2017 to assess their existing education facilities in South London. In that time various sites and options have been explored to allow the college to provide the modern and specialised teaching facilities they require. However, each appraisal showed that the only option was for new or extended facilities to be required and it was unfeasible to not construct new facilities.

1.2 UTILISING EXISTING BUILDINGS

From the outset, it was clear that upgrading the existing structures on the Mottingham site was not viable. The demountable and temporary structures on the site are not suitable for upgrading and simply don't meet the specialist facilities required by the college.

Without any suitable existing buildings on the site, it was necessary to propose new buildings. These new buildings would need to be considered and developed with circular principles in mind

1.3 DETAILED BRIEFING DEVELOPMENT

Detailed briefing exercises with the client were undertaken throughout the design development. To ensure the room, spaces and facilities, located within the proposals would be used efficiently. Special attention was made to providing spaces that can be used for multiple uses and minimising the underutilisation of spaces and rooms. Highly specialised and single-use facilities have been kept to a minimum.

1.4 SITE LAYOUT AND NUMBER OF BUILDINGS

Early and extensive design exercises were undertaken to develop and establish the location and number of buildings the site could accommodate.
The sensitive planning context, especially around Metropolitan Open Land and the ecology, fed into these exercises.

Options exploring the use of a single large building, to house all of the accommodation, were explored but deemed unsuitable due to their massing and overbearing effect on the rest of the site.

Two independent buildings were developed to be the most appropriate for both the site and the requirements of the client. Although physically separate, both buildings share structural, architectural and servicing strategies.

1.5 SUBSTRUCTURE

Geotechnical surveys have shown the ground conditions on the site are complex and particular attention has been needed to the presence of contaminated ground, made ground, a high water table, and the requirement for gas protection.

Mass concrete trench footings were explored but a high-water table would make this option complicated and would require dewatering of the site to cast, resulting in large volumes of contaminated spoil requiring removal from the site.

Ground-bearing slabs were also explored but are unsuitable over made ground, so were discounted.

A piled foundation solution offered the best solution for the site and mitigated the constraints encountered by the ground conditions.

1.6 SUPERSTRUCTURE

Early consideration was given to the utilisation of steel and concrete for the superstructure of both buildings. However, were discounted due to the higher embodied carbon of those materials, alongside the size and height of the proposed buildings that did not necessitate their use.

A structural strategy of utilising a Glulam and CLT superstructure was chosen and developed by the team. The Circular Economy benefits of this strategy were also considered as a deciding factor.

Detailed development of the structural grid sizing, spacing and spans was undertaken in order to optimise the structure and avoid oversizing of elements. This approach then allowed the building layouts to be developed to align with those structural principles and efficiencies.

1.7 EARLY CONTRACTOR ENGAGEMENT

A CLT and Glulam contractor was engaged from an early stage in the design process. Their input allowed for the development of the structural design, building layout and positioning of openings, to be optimised with the sizing and thickness of standardised elements.

1.8 BUILDING LAYOUTS

The floor loadings of the spaces were considered during the development of the building layouts. Rooms and spaces that require higher floor loadings have been located on the ground floor of each building, in order to avoid the need for additional and enlarged structural elements within the superstructure.