5 Interior Strategy
5.1 Concept

The interior design concept aims to celebrate the difference between the scientific research work in the lab areas and the desk based work in the write up spaces. The typical floor layout are such that the write-up spaces look out onto greenery. This influenced the idea of bringing the outside in, to create a greenery-inspired, welcoming interior with reference to the home and the idea of working at the “kitchen table” in the own house.

Write-up:
Rich colour palette, inspired by the greenery outside, natural material, soft fabrics and various breakout spaces, from big collaborative tables to smaller sofa areas, cocoon seating and closed meeting rooms.

Lab spaces:
The very clinical, white, clean, lab space celebrates the modernity and future of research and stands in complete contrast to the write-up space.

Lab space

– Clear simple colour palette, high quality fit-out, showcasing a modern and innovative lab environment.

Write-up

– Greenery-inspired colour and material palette. Warm colours, rich textures with welcoming open plan work and breakout areas.

5 Interior Strategy
5.1 Concept
5.1.1 Write-up

DESK
SEATING

MEETING
ROOM

BREAKOUT /
KITCHEN TABLE

PI
OFFICE

QUIET WORKING /
ALCOVE

BREAKOUT
SOFA

HOT DESKING /
STOOL SEATING

TEA
POINTS

5 Interior Strategy
5.1 Concept
5.1.2 Write-up

5 Interior Strategy
5.2 Colour palette

5 Interior Strategy
5.3 Typical floor
5.3.1 Lab to Write-up

Lab space
- Lab visible through wall openings, creating an interaction and visible connection with the write-up space.

Write-up
- Open plan working area with storage, meeting tables and breakout spaces all surrounded by natural materials and plants.

5 Interior Strategy
5.3 Typical floor
5.3.2 Storage

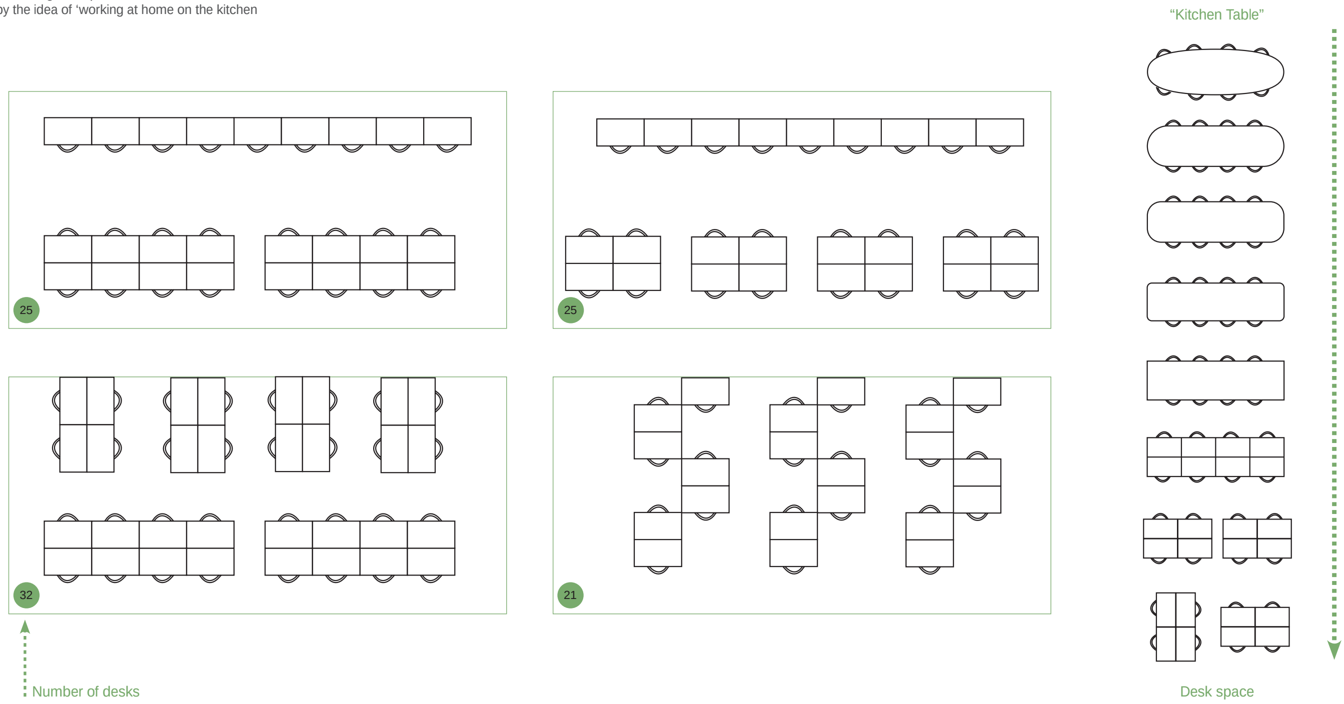
- Playful and interactive storage solutions that include various types of shelves, spaces for plants and lockable cupboards.
- Storage units to be part of the spacial organisation, creating a feature along the open plan desks and creating visual dividers within the space.





5 Interior Strategy
5.3 Typical floor
5.3.3 Desk layout

- Various layout solutions for open plan desk organisation.
- Depending on user group, number of desks needed, location and floor level, the space can be arranged differently, creating more personal work environments inspired by the idea of 'working at home on the kitchen table'.



5 Interior Strategy
5.4 Space type
5.4.1 Open plan desk

- Spacious and light filled working environment, featuring different desk layouts, natural materials and storage units to visually separate the space within.
- Colours to be applied to furniture, floor, feature details like light wires, task lamps, ironmongery and signage.
- Textures, tones and finishes to reflect a warm domestic interior, that feels inviting and personal.

5 Interior Strategy
5.4 Space type
5.4.2 Meeting room

- Closed meeting room for private meetings, group catch-ups and presentations.
- Large feature table with colourful and comfortable chairs creating a formal yet inviting space for different users.
- Lighting and finishes to reflect the overall concept of a welcoming, warm and domestic atmosphere.

5 Interior Strategy
5.4 Space type
5.4.3 Breakout “Kitchen Table”

– ‘Kitchen table’ as central element of interior design strategy.
– Long table can be used for meetings, hot desking, informal catch-ups ad as a central breakout space.





5 Interior Strategy
5.4 Space type
5.4.4 PI Office

- Cellular PI offices to pick up the identity of the write-up spaces.
- Offering a private work atmosphere with natural light, comfortable seating, warm colours with good quality materials and finishes.

6 Laboratory Design

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.1 West Laboratories - Schedule of Accommodation

London Institute of Medical Sciences
Medical Research Council (MRC)

abell nepp
23 Feb 2018

SCHEDULE OF ACCOMMODATION

AREA SUMMARY (PRIMARY & SHARED SECONDARY)	2016 Brief (Rev 1.3 - 24 Oct 2016)	**STAGE 1 - REVISED BRIEF** (Oct 2017)	**STAGE 2 - CURRENT BRIEF** (Dec 2017)	**STAGE 2 - AS DRAWN** (Feb 2018)	
	Total: 2,959 nsm	**Total: 3,596 nsm**	**Total: 2,771 nsm**	**Total: 2,686 nsm**	
PRIMARY LABORATORIES	Subtotal: 1,408 nsm	Subtotal: 1,620 nsm	Subtotal: 1,105 nsm	Subtotal: 1,000 nsm	
SHARED LAB SUPPORT	Subtotal: 816 nsm	Subtotal: 1,065 nsm	Subtotal: 785 nsm	Subtotal: 840 nsm	
SPECIALIST LAB SUPPORT	Subtotal: 100 nsm	Subtotal: 160 nsm	Subtotal: 160 nsm	Subtotal: 160 nsm	
CENTRAL SUPPORT	Subtotal: 135 nsm	Subtotal: 135 nsm	Subtotal: 171 nsm	Subtotal: 108 nsm	
TECHNOLOGY HUBS	500 nsm	616 nsm	550 nsm	578 nsm	

OCCUPANCIES					
PIs / Groups	**49**	**45**	**31**	**28**	
Wet Lab Researchers	**490**	**405**	**275**	**250**	
	MRC wet (315 + 35 Pis) / 9 ICL wet (76) / 409 wet researchers	40 MRC/ICL wet (360 + 20 PIs) / 380 wet researchers	27 MRC/ICL wet (243 + 12 PIs) / 255 wet researchers	25 MRC/ICL wet (223 + 12 PIs) / 235 wet researchers	
	5 dry groups (45 + 5 PIs)	5 dry groups (23 + 2 PIs)	4 dry groups (18 + 2 PIs)	3 dry groups (13 + 2 PIs)	
	(assumed no wet lab use)	25 dry 'wet lab users'	20 dry 'wet lab users'	15 dry 'wet lab users'	

	Occ	Rate	Unit	Qty	Area	Occ	Rate	Unit	Qty	Area	Occ	Rate	Unit	Qty	Area	Occ	Rate	Unit	Qty	Area	Notes
PRIMARY RESEARCH SPACE																					
PRIMARY LABORATORIES					**Subtotal: 1,408 nsm**					**Subtotal: 1,620 nsm**					**Subtotal: 1,105 nsm**					**Subtotal: 1,000 nsm**	
Open Plan Shared Laboratories	88	4	352	4	1,408 nsm	81	4	324	5	1,620 nsm	55	4	221	5	1,105 nsm	50	4	200	5	1,000 nsm	
SECONDARY RESEARCH SPACE																					
SHARED LAB SUPPORT					**Subtotal: 816 nsm**					**Subtotal: 1,065 nsm**					**Subtotal: 785 nsm**					**Subtotal: 840 nsm**	
Cleaner's Store			10	4	40 nsm			10	5	50 nsm			10	5	50 nsm			5	10	50 nsm	increase to 5 floors from original brief
Designated Radioisotope Lab			10	2	20 nsm			10	2	20 nsm			10	2	20 nsm			10	2	20 nsm	
Cold Lab			10	4	40 nsm			10	5	50 nsm			10	5	50 nsm			10	5	50 nsm	1 per floor
Equipment Room			40	4	160 nsm			40	5	200 nsm			29	5	145 nsm			60	1	60 nsm	no allocation levels 2- 3. Large central
Equipment Zone			0	0	-			0	0	-			0	0	-			10	10	100 nsm	2 per floor
Local Freezer Store / Bay			24	4	96 nsm			45	5	225 nsm			24	5	120 nsm			16	10	160 nsm	2 per floor
Tissue Culture (medium)			20	6	120 nsm			20	6	120 nsm			20	4	80 nsm			20	14	280 nsm	3 per floor (not level 2). 2 MSCs each
Tissue Culture (large)			40	7	280 nsm			40	7	280 nsm			40	5	200 nsm			0	0	-	inclusive of ICL figures
Darkenable Room			10	2	20 nsm			10	2	20 nsm			10	2	20 nsm			10	3	30 nsm	1 every second floor
Cleaner's Store Cupboard			10	4	40 nsm			10	5	50 nsm			5	10	50 nsm			4	10	40 nsm	2 per floor
Waste / Consumables			0	0	-			10	5	50 nsm			10	5	50 nsm			10	5	50 nsm	3 per floor

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.2 Wet Laboratory Design Summary

WORM SUITE													
Controlled Temperature Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed following user briefing
Imaging Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed following user briefing
YEAST SUITE													
Controlled Temperature Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed following user briefing
Imaging/Darkenable Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed. Shared on floor
Growing Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed following user briefing
Dust Room	0	0	-	10	1	10 nsm	10	1	10 nsm	10	1	10 nsm	assumed following user briefing
CENTRAL SUPPORT SUITES			**Subtotal: 135 nsm**			**Subtotal: 135 nsm**			**Subtotal: 171 nsm**			**Subtotal: 108 nsm**	
Central Freezer Store	0	0	-	0	0	-	60	1	60 nsm	0	1	-	allocation increase to fit 60 freezers
Liquid Nitrogen Store	50	1	50 nsm	50	1	50 nsm	50	1	50 nsm	50	1	50 nsm	to hold 200,000 samples
Central Wash-up	60	1	60 nsm	60	1	60 nsm	43	1	43 nsm	38	1	38 nsm	
Media Kitchen	25	1	25 nsm	25	1	25 nsm	18	1	18 nsm	20	1	20 nsm	

Laboratory Design

The wet laboratories are distributed across five floors. The Technical Hubs are integrated amongst these five floors. In conjunction with the CBS on Level 2 and CryoEM Suite on the Ground Floor, they form the laboratory elements of the building. The facilities are designed to provide biological containment to the requirements of ACDP Containment Level 2 (CL2). The new building for the London Institute of Medical Sciences aims to integrate wet and dry research and reduce any associated physical and operational barriers. The wet laboratories are therefore utilised by both types of groups and scientists as a shared flexible space, rather than 'owned' or 'dedicated' labs.

With increasing data workload and use of specialist equipment in the lab, researchers are spending less time in the wet laboratories. During Stage 2, we held various discussions with the User Group which established that direct access from write-up/office area to labs was necessary for ease of monitoring the automated equipment and experiments. Each lab therefore has direct access to the open-plan write-up, as well as glazed walls between the two rooms/functions for monitoring.

At this stage, the open-plan primary laboratories have been designed with flexibility in mind, whereby groups can expand and contract to fit comfortably fit larger and smaller groups within the space. This also allows for some hot-desking as required, especially with many visiting researchers assisting existing groups. There are operational challenges with this however that need to be addressed in the upcoming RIBA Stage 3, including the allocation of space to research groups.

The wet labs have been designed as biological labs and have not been tested to demonstrate other uses such as chemistry modules. If requested by the Client, this option could be explored at the next stage.

There is a mix of open and enclosed laboratory spaces to allow other types of flexible use of space. The open lab clusters have been designed to enable benching to be removed completely or partially, providing flexibility for the placement of equipment. The proposal is currently assuming moveable/mobile benching throughout the typical lab floors with bench-mounted shelving and integrated service droppers. Shelving is adaptable to allow large bench-top equipment. Shelving design is to be developed at the next stage to enable large floor mounted equipment to be placed beneath, in the absence of benching.

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.2 Wet Laboratory Design Summary

Wet Laboratory Open Bay Clusters

The wet laboratories are comprised of two open bay laboratory clusters per floor with adjacent write-up, and enclosed support areas, referred to as secondary support. Each open bay cluster is based on a notional population of 27 workplaces for researchers supporting three Principal Investigators. In practice, this population density varies due to size of the PI's research team, type of 'wet' research performed and the equipment required.

The 'open lab' is based on a module of three 3.3m x 9.9m lab bays. This size provides flexibility for groups to diminish and expand as research and funding changes, but without creating autonomous working or causing too much disruption.

The 3.3m lab bay is optimal for biology labs as it provides a 1.5m wide aisle between reasonably deep benches. This is in comparison to 3.1m - 3.2m wide bays that restrict the depth of bench tops and 3.6m bays that would support fume cupboards on each side of an aisle as used in a chemistry lab.

Wet Laboratories - Typical Lab Module

Each floor will contain a minimum of two tissue culture rooms, a cold room, freezer and equipment bays, and a consumables store. Levels 3 and 5 will each have a radiation designated room and darkenable room. The remainder of the rooms are somewhat flexible depending on where groups are located within the building. Some groups can utilise one bay for example where an additional imaging or CTR is required. Otherwise, these bays can be clustered to create a freezer or equipment room. Supplies are received from the basement level via the goods lift and dumbwaiter to the right.

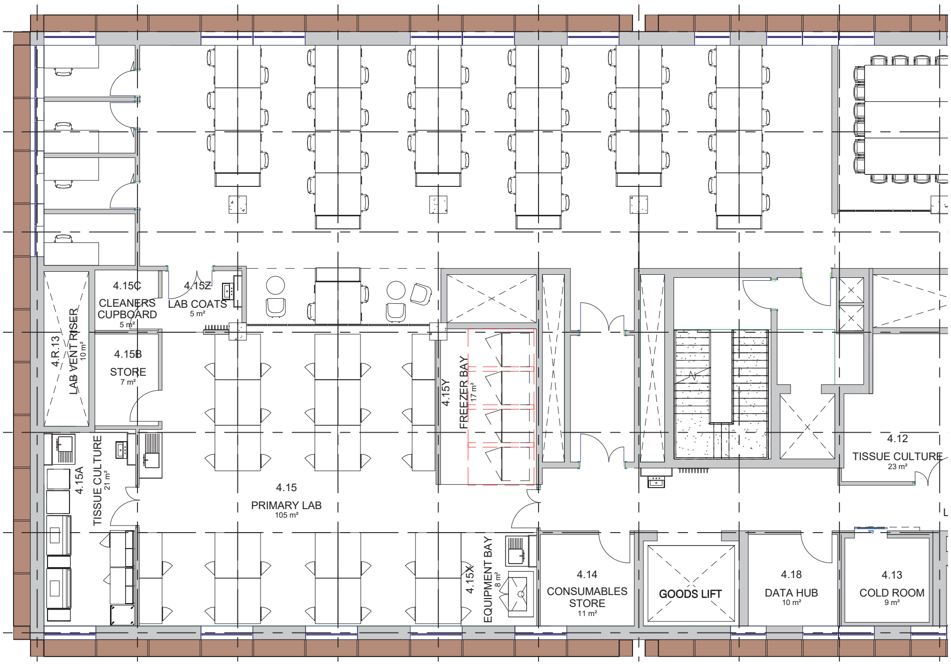
Wet Laboratories - Secondary Support

Due to the nature of the site and impact on the shape of the building, the open lab clusters are separated by a block of secondary support space. The enclosed rooms are designed for specialist activities and equipment that require controlled environments (e.g. tissue culture, controlled temperature rooms, darkenable rooms) or where noisy or heat producing equipment can be isolated from the open lab.

Located between the general wet labs, these rooms present opportunities for the sharing of equipment or common processes between the open bay teams.

The cold labs and controlled temperature rooms will be prefabricated rooms recessed into the slab to provide a level floor, and are equipped with a sliding door.

The equipment 'wall' on each side of each open lab cluster encourages laboratory efficiency by consolidating freezer storage, sinks, fume cupboard/MSCs and other equipment. This enables the island benches to be highly flexible with less 'fixed' services needed; possibly only power and data.

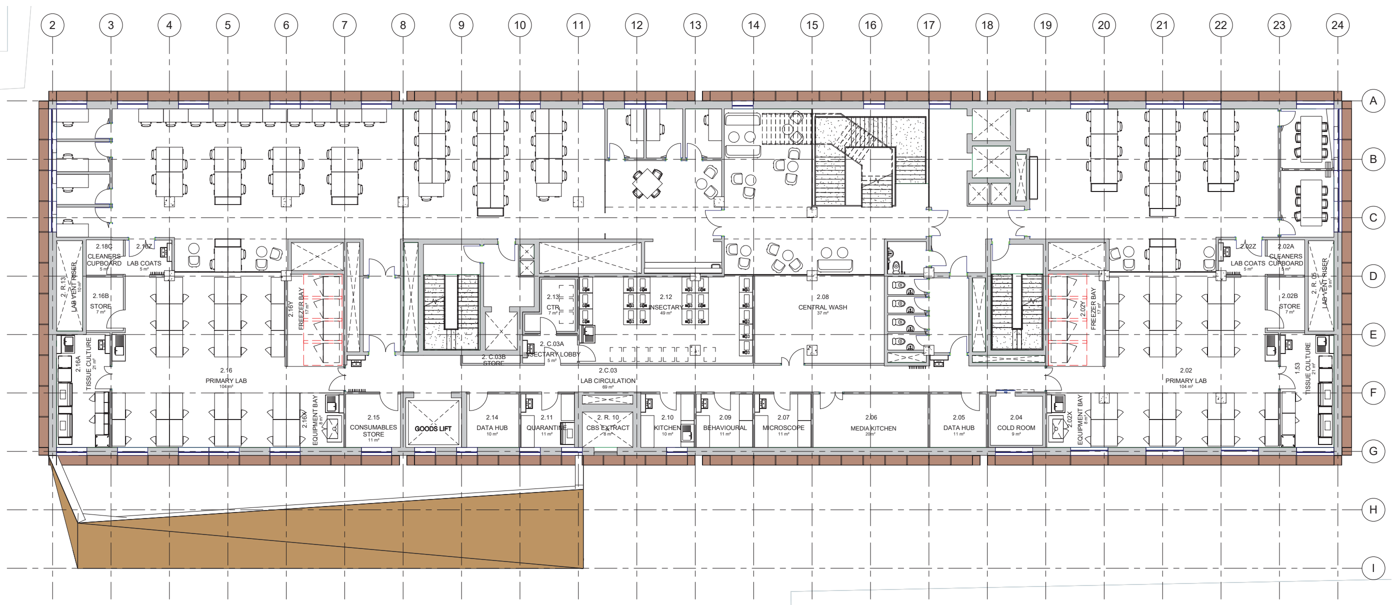


6 Laboratory Design

6.1 Laboratory Planning Parameters & Constraints

6.1.3 Laboratory Zoning

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.4 2nd Floor



MINIMUM SCIENCE REQUIREMENTS:

- ✗ 60sqm Tissue Culture
- ✓ 24sqm Freezer
- ✓ 10sqm Cold Room
- ✗* 29sqm Equipment Room
- ✓ 10sqm Consumables Store

FLOOR SCIENCE VARIATIONS:

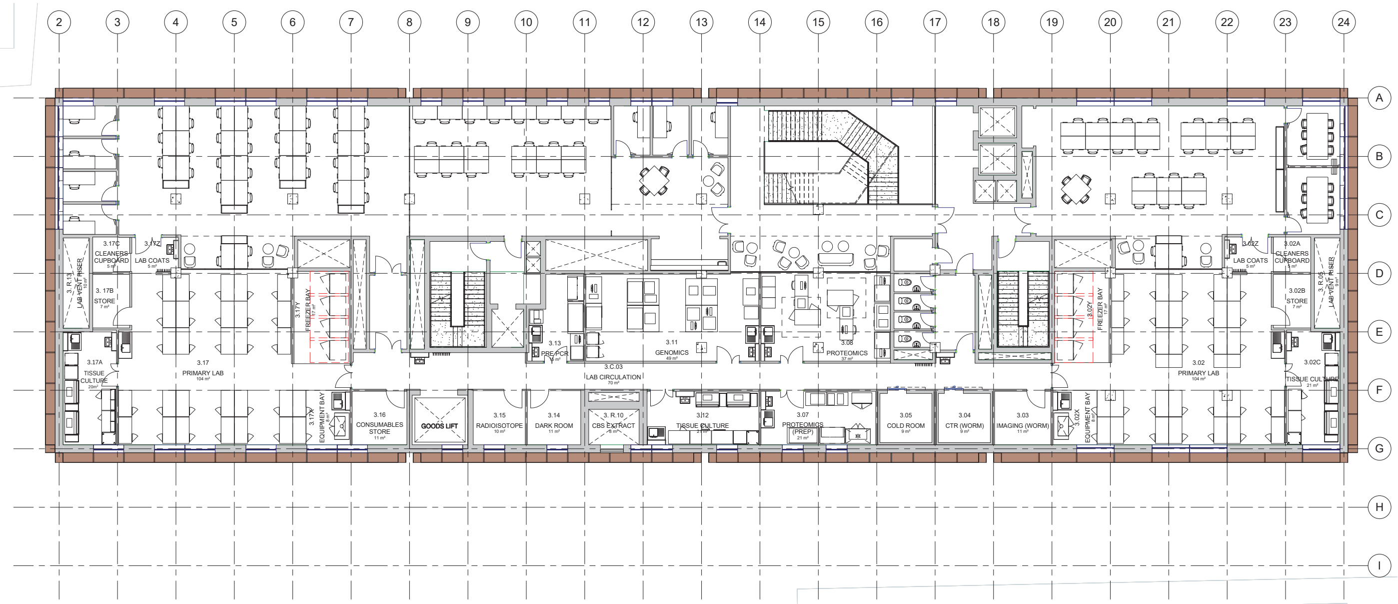
- ✓ 110sqm Drosophila Suite
- ✗ 75sqm Central Wash / Media

OTHER SPACE REQUIREMENTS:

- ✓ 10sqm CBS Extract
- ✓ 20sqm Data Hub

** only 20sqm equipment bay is provided at this level. Shared Equipment Rooms provided at upper levels.*

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.5 3rd Floor



MINIMUM SCIENCE REQUIREMENTS:

✓	60sqm	Tissue Culture
✓	24sqm	Freezer
✓	10sqm	Cold Room
✗*	29sqm	Equipment Room
✓	10sqm	Consumables Store

FLOOR SCIENCE VARIATIONS:

✓	63sqm	Proteomics
✓	53sqm	Genomics / Pre-PCR
✓	10sqm	Radioisotope Room
✓	10sqm	Darkenable Room
✓	10sqm	Imaging Room (Worm)
✓	10sqm	CTR (Worm)

OTHER SPACE REQUIREMENTS:

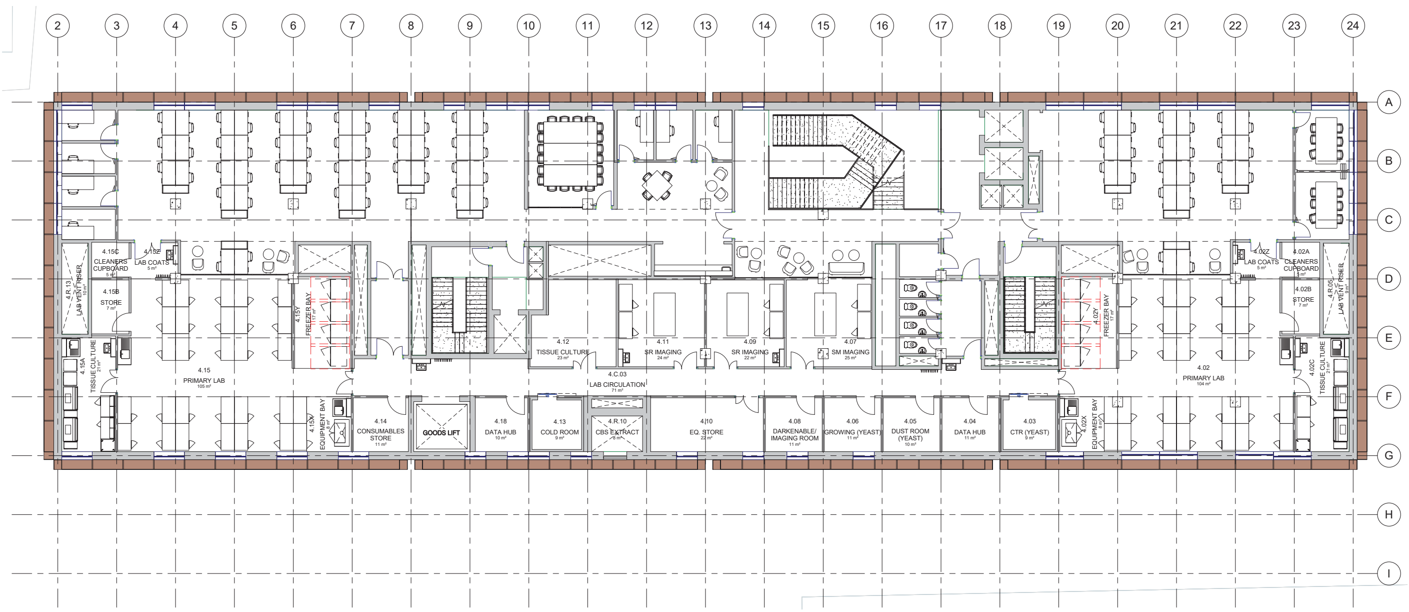
✓	10sqm	CBS Extract

** only 20sqm equipment bay is provided at this level. Shared Equipment Rooms provided at upper levels.*

6 Laboratory Design

6.1 Laboratory Planning Parameters & Constraints

6.1.6 4th Floor



MINIMUM SCIENCE REQUIREMENTS:

- ✓ 60sqm Tissue Culture
- ✓ 24sqm Freezer
- ✓ 10sqm Cold Room
- ✓ 29sqm Equipment Room
- ✓ 10sqm Consumables Store

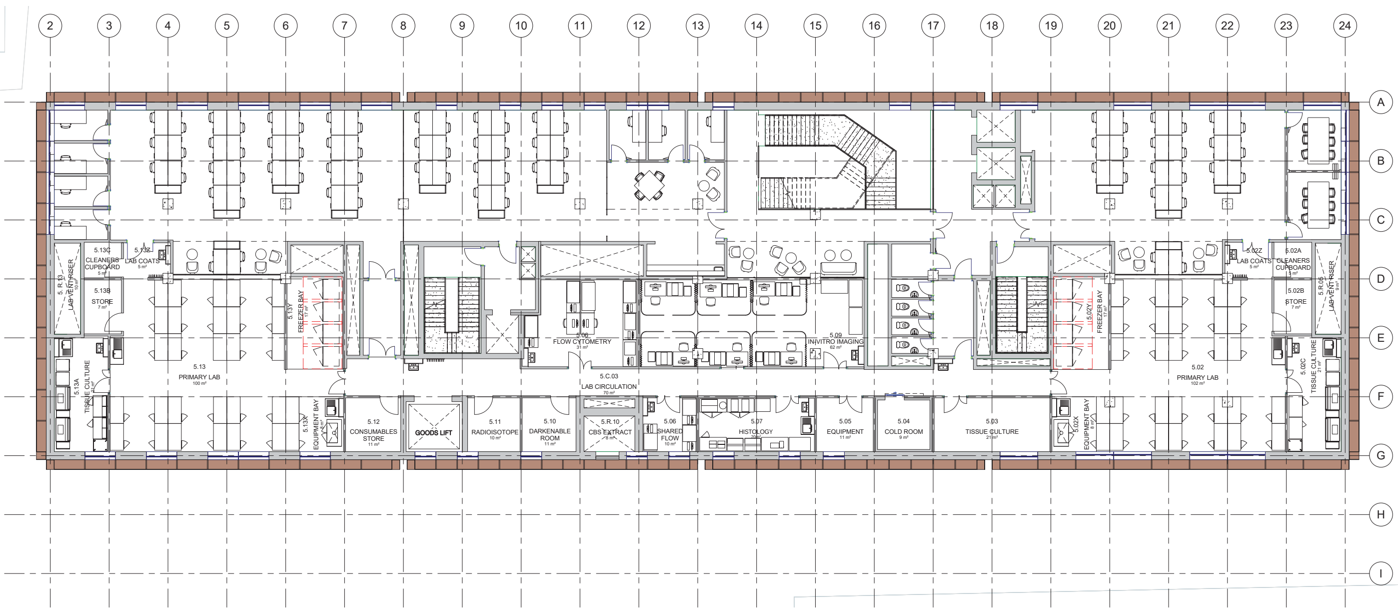
FLOOR SCIENCE VARIATIONS:

- ✓ 40sqm Super Resolution Imaging
- ✓ 20sqm Single Molecule Imaging
- ✓ 10sqm Growing Room (Yeast)
- ✓ 10sqm Dust Room (Yeast)
- ✓ 10sqm Imaging Room (Yeast)
- ✓ 10sqm CTR (Yeast)

OTHER SPACE REQUIREMENTS:

- ✓ 10sqm CBS Extract
- ✓ 20sqm Data Hub

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.7 5th Floor



MINIMUM SCIENCE REQUIREMENTS:

✓	60sqm	Tissue Culture
✓	24sqm	Freezer
✓	10sqm	Cold Room
✓	29sqm	Equipment Room
✓	10sqm	Consumables Store

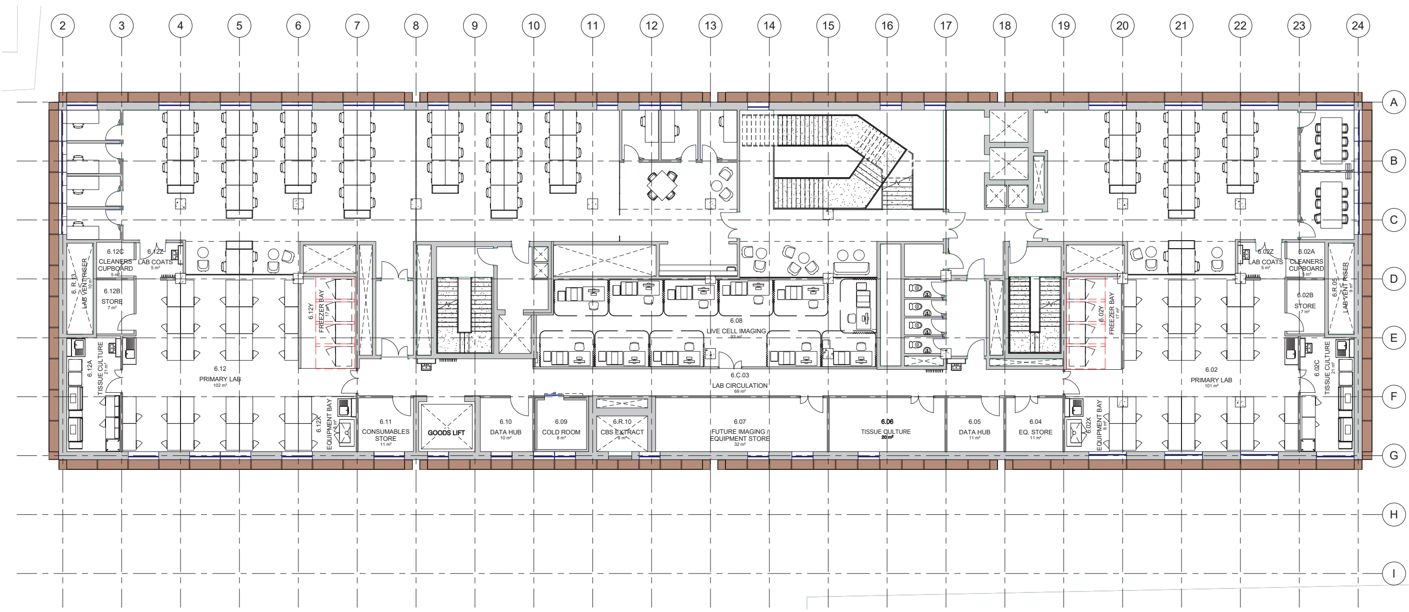
FLOOR SCIENCE VARIATIONS:

✓	60sqm	In-Vitro Imaging (Confocal)
✓	20sqm	Histology
✓	40sqm	Flow Cytometry
✓	10sqm	Radioisotope Room
✓	10sqm	Darkenable Room

OTHER SPACE REQUIREMENTS:

✓	10sqm	CBS Extract

6 Laboratory Design
6.1 Laboratory Planning Parameters & Constraints
6.1.8 6th Floor



MINIMUM SCIENCE REQUIREMENTS:

- ✓ 60sqm Tissue Culture
- ✓ 24sqm Freezer
- ✓ 10sqm Cold Room
- ✓ 29sqm Equipment Room
- ✓ 10sqm Consumables Store

FLOOR SCIENCE VARIATIONS:

- ✓ 110sqm In-Vitro Imaging (Live Cell)

OTHER SPACE REQUIREMENTS:

- ✓ 10sqm CBS Extract
- ✓ 20sqm Data Hub

7 Landscape Design

7 Landscape Design
7.1 Precedent Studies

The potential to landscape is limited due to the site restrictions on the Hammersmith Hospital Campus however creating a place will also have a big impact due to the limited landscaped space currently.

Precedents show some initial ideas for the landscaped public space surrounding the LMS Institute.

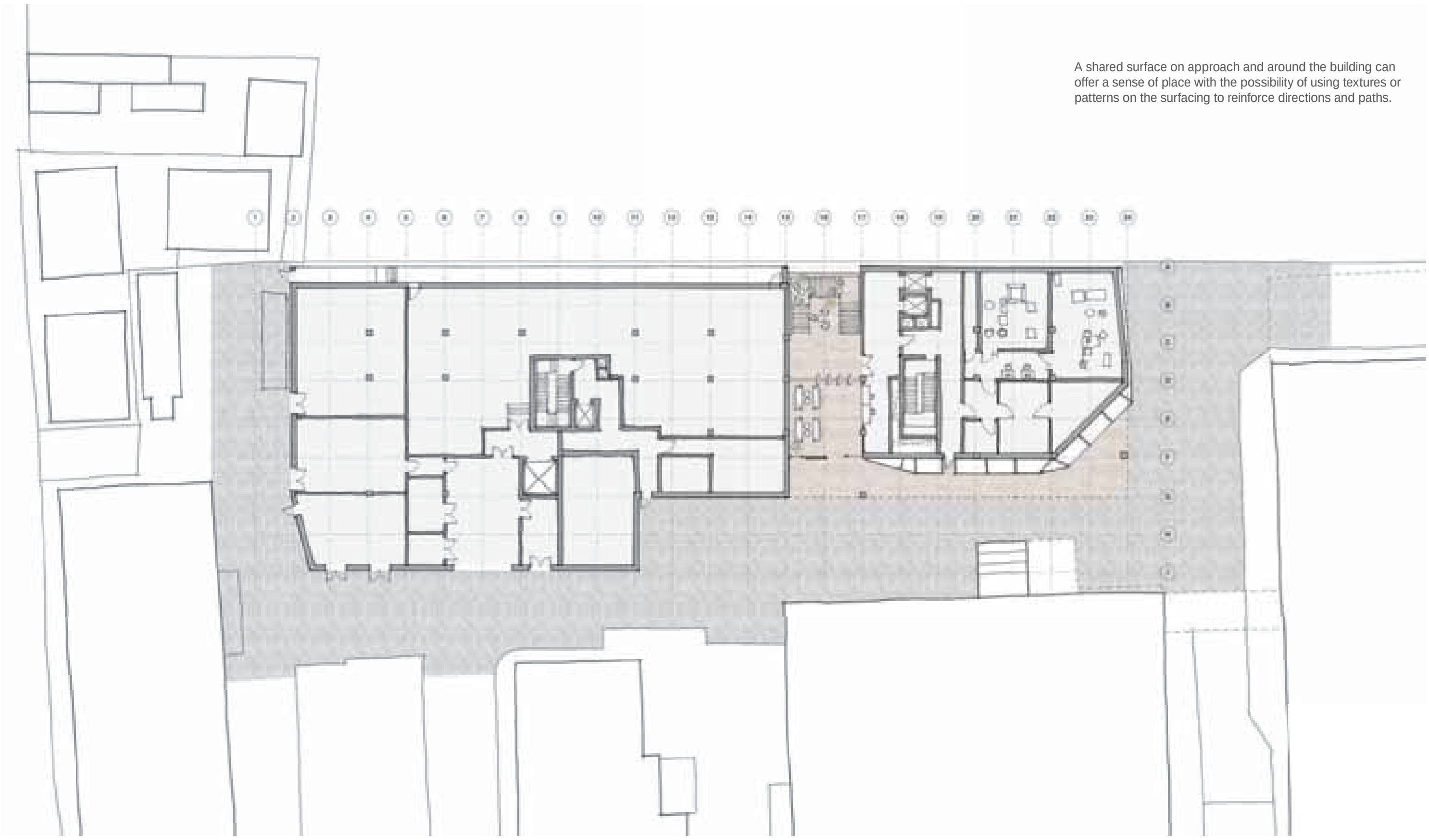

Directional Stripes


Text & Totems


Pattern


Artwork

7 Landscape Design
7.2 Design Intent & Landscape Scope

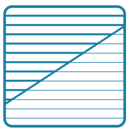


A shared surface on approach and around the building can offer a sense of place with the possibility of using textures or patterns on the surfacing to reinforce directions and paths.

7 Landscape Design
7.3 Design Moves







Simple palette of textures to delineate shared surfaces

Living plant beds to soften the harsh environment

Integrated seating arrangement to encourage user engagement

Tactile materials reflecting building materiality

Wayfinding totems located throughout the campus


A
B
C
D
E
F
G
H
I

8 Engineering

8 Engineering
8.1 Stage 2 Summary

1.1 Introduction
The Stage 2 Engineering report is included in Appendix XX. The engineering design has been developed alongside the architectural and laboratory planning design to meet the needs of the brief, and broadly follows the strategies set out in the RIBA Stage 1 report. Key focus at this stage has been on co-ordination of the main structural elements with architecture and MEP, developing details of the MEP systems and on informing space planning based on vibration, acoustic and ground engineering studies.

Further to the user consultation carried out during RIBA Stage 1, ongoing reviews and meetings have been held regularly in Stage 2, particularly with respect to the MEP engineering design elements where we have engaged heavily with both ICL and MRC's teams to review the contents of technical design notes. These design notes form the basis of the Stage 2 report from an MEP perspective and have been updated to take note of comments made by all parties.

It is important to note that whilst significant effort has been put into developing a co-ordinated scheme, the design is at RIBA Stage 2 level and therefore when costing, appropriate allowance shall be made for design development as further information becomes available to the team.

1.2 Key Risks
The project risk register details the major risks which have been identified within the design at present, however it is worth reiterating some of the most important ones relating to engineering as there is potential for large variations to cost and impact on programme should any or all of these materialise. The items which we would like to make particular note of are:

Utilities
- The power strategy is decided but yet to be confirmed as achievable by UKPN. Timing of the funding is also key and remains a risk until the UKPN quote is confirmed
- We do not yet have confirmation that the ICHT substation will be removed
- Connection to district heating is confirmed but details are not available at present
- MRC have advised that the lease includes for gas to the site, however the only drawing we have identifies a Ø100 connection which we believe to be too small and it is likely a Ø200 connection will be needed, potentially with space for governors
- MRC have advised that the lease includes for water to the site, however we do not have details of the pipe size
- Further investigations are required to confirm whether the Burlington Danes fire pumps are of suitable design to serve LMS; if not, a solution for on-site sprinkler tanks and pumps will be required
- We are not yet in receipt of the ICHT utilities information; this impacts on the certainty of service diversions and SUDS location

Site Access & Associated Design Constraints
- Preliminary studies show that it will be difficult for a UKPN vehicle to access the site substation locations which may lead to difficulties in power negotiations
- Access for other vehicles dictates it is likely to be necessary to modify the steps outside the Wolfson Building, although this provides an excellent opportunity to enhance the public realm
- Location of a column on the corner of the building is likely to disrupt the vehicle tracking; as such, it has been necessary to add complexity to the structural and MEP design by introducing backspans to the cantilevered southwestern edge of the building; the additional cost introduced to both the structure and the MEP design due to the large numbers of offsets and transitions required is liable to be significant and may also impact on the floor to ceiling height in this area
- Future replacement of large plant such as generators and/or chillers will require crane access. It may be necessary to achieve this from the school playground which will need agreement

Sustainability
- The district heating carbon factor is unknown and has been requested from ICHT. Should this not be suitably low, we risk not meeting the planning obligation for the building CO_2 emissions to be 35% below Part L baseline – a figure which we are in the process of determining the preliminary figures for. If this is the case, the options are to add more low carbon technology (which may be a challenge) or to pay the LBHF levy, which is liable to be financially undesirable

Architecturally Significant Equipment & Controlled Rooms
- At present, with the exception of the most significant imaging equipment, details of equipment including MEP interfaces are not yet available and positions not yet resolved. Early confirmation of this will be key to the success of the Stage 3 design

Existing Slab
- Although it was originally assumed that the site would be underlain by a 300mm thick concrete floor slab with localised thickenings at footing locations, recent ground investigation suggests the site to be underlain by multiple floor slabs, sub-basements, and associated retaining walls. The total thickness of concrete obstructions varied between 0.3 and 1.8m, with the average value being of the order of 1.5m. Furthermore, the full extents of the subterranean Cyclotron structures are not clear at present; further investigations are planned to confirm the exact extents of these

1.3 Next Steps
The main items which need to be addressed for RIBA stage 3 are those identified above, particularly clarity around the utilities required as these often have long lead in periods. It is anticipated that the majority of risk items will need to be resolved by the commencement of the stage in order to ensure the design progresses in line with programme. There is some further co-ordination work to be developed between the team with respect to the GA drawings, most notably with respect to identifying specific users and groups to populate the spaces as this will drive some of the engineering design.
It is also proposed that wind tunnel testing will be carried out in order to determine the required flue heights for fume extract as well as to verify the proposed air intake positions for our own building. This will require confirmation of fume cupboard quantities including any future expansion.

9 Fire & Acoustics

9 Fire & Acoustics
9.1 Stage 2 Summary

9.1.1 Fire Engineering Summary

Design Framework

In order to comply with the statutory functional life safety requirements of the Building Regulations 2010 it is proposed that the building be designed in accordance with BS 9999:2017 Fire safety in design, management and use of buildings - Code of practice. It is proposed that, due to the reasonably low design occupancy, the building operate a simultaneous evacuation strategy; that is, all floors evacuate simultaneously upon activation of the alarm system.

Fire Supression System

The height of the topmost occupied storey above fire-fire-fighter access level is in excess of 30 m and consequently it should be sprinkler protected. The sprinkler protection system should be designed to BS EN 12845, note sharing of tanks to be discussed and agreed with BCO although precedence is in place. On the CBS level it may be worth considering pre-action sprinklers for the safety of the animals. Such a system remains dry until detection. This should restrict losses to equipment and ensure safety of animals in the case of accidental discharge.

Means of Warning & Escape

The building predominantly consists of office spaces and research labs. Consequently, an A2 risk profile (awake and familiar occupants with a medium fire growth rate) has been assumed, which is reduced to A1 due to the provision of sprinklers as is allowed for in BS 9999. The seminar room on the Seventh floor might be used for events where the occupants are not familiar with the building. However, these people will be accompanied by people familiar with the building. It is, therefore, not deemed necessary to fire separate the seminar room from the rest of the building.

For an A2 risk profile the minimum level of fire detection and fire alarm system is a Type M system. However, it is recommended that a type L1 Fire Alarm and Detection be provided. This uplift in alarm and detection system means that the required exit widths and stair widths can be reduced and travel distances can be extended as per BS 9999.

Since the risk profile for the building is A2 reduced to A1, the travel distance limits are 26 m in a single direction and 65 m in multiple directions. However, as previously mentioned, upon provision of an automatic fire alarm and detection system these limits can be extended by 15% to 29.9 m and 74.7 m, respectively.

The design occupancy of the building has been stated as approximately 370 people. Assuming an A2 risk profile reduced to A1 due to the provision of sprinklers, an exit width of 3.3 mm/person, 4 exits into the fire-fighting shafts, one exit to be discounted, and all exit widths are less than 1050 mm, the horizontal exit capacity is 454 people. The vertical stair capacity is 7 people considering that there are two stairs serving 7 floors (not including ground); that is 224 people per floor assuming an even distribution of occupants. If the occupants are unevenly distributed the capacity of the stair must not be exceeded. Based on the above the proposed capacity is considered reasonable.

Internal Fire Spread (Structure)

Since the height of the top occupied storey above fire-fighter access level is in excess of 30 m, all loadbearing element of structure should be provided with a fire resistance period of 120 minutes.

Compartmentation is required to contain a fire, protect the occupants of the building while they escape and protect fire-fighters as they undertake their operations. Different parts of the building will require different levels of fire resistance. The following list summarises the key areas and the fire resistance they should achieve:

- compartment floors - 120 minutes (REI);
- life safety systems - 120 minutes (EI);
- high risk rooms (plant, store etc.) - 60 minutes (EI);
- fire-fighting cores - 120 minutes (REI); and
- separation to the atrium void - 120 minutes (EI).

Note: R - Loadbearing, E - Integrity and I – Insulation.

Within the building there is a space passing through the compartment floors which is subsequently considered an atrium in BS 9999. Assuming an A occupancy characteristic, the height of top floor slab is in excess of 30 m and simultaneous evacuation, the following provisions should be in place to protect atrium space:

- the atrium should be enclosed with fire resisting and smoke retarding construction on all floors;
- sprinkler protection should be provided within floors adjoining the atrium;
- a mechanical smoke clearance system (6 Air changes/hour) should be provided;
- the contents of atrium base should be controlled; and,
- inlet air should be provided at ground floor level.

External Fire Spread

The East elevation is within 1 m of the boundary and consequently it should be 100% protected. Therefore any unprotected areas would be provided with 120 minutes fire resistance (integrity and insulation) from both sides. An agreement may be possible to ensure there is no construction within a notional boundary, however, this should be discussed and agreed with all stakeholders. The North elevation in the ground floor plant area, can remain unprotected provided compartments do not exceed 10 m wide unless there is a gas store directly adjacent to the room, in which case the façade should be 100% protected. No calculations have been completed for the other elevations, where they are adjacent to a road the notional boundary can be taken as the centre of said road.

Fire Service Access & Facilities

Since the floor area exceeds 900 sq m, two fire-fighting shafts should be provided. These fire-fighting shafts should include a fire-fighting stair, fire-fighting lift and a fire-fighting lobby with a dry riser. As described above, the fire-fighting shafts should achieve 120 minutes fire resistance. This level of protection should be extended to the final exit route connecting the bottom of the stair to external. The distance from external to the stair/lift should be within 18 m. Also, access to the dry rising mains should be provided to within 18 m of the fire appliance parking position. The access route for the fire vehicle should be capable of carrying 14 tonnes as per LFB requirements and it should be noted that a single direction of fire vehicle access beyond 20m will require a turning circle/head.

9.1.2 Vibration & Acoustics Summary

Acoustics

The Stage 2 acoustics report is contained in Section 6 of the Stage 2 engineering report. The section covers:

– Design basis considerations in including Local Authority policies and BREEAM
– Results of an environmental noise survey
– Commentary of acoustic provisions for imaging and other noise sensitive facilities
– Requirements for acoustic rating of the building envelope
– Commentary on internal floors, partitions, glazing and doors
– Requirements for the control of external plant noise
– Commentary on internal acoustic finishes

The environmental noise survey shows the site to be fairly quiet with the highest noise levels found on the western side due to plant noise (short term LAeq of up to 54 dBA) and the passing of vehicles (up to 73 dB LAFmax). As a result, the sound insulation requirements of the building envelope for the majority of spaces are not particularly onerous and can be achieved with typical façade system and the simples of double glazed constructions for any windows. Enhanced provision of sound insulation is required for the Cryo EM Suite, including glazing with a minimum acoustic rating of Rw + Ctr 32 dB (exemplified by a glazing build-up such as SGG 6/12/6.4 (Stadip Silence)).

The Stage 2 acoustic assessment indicates that the external noise from plant must be limited to LAr,T 36 dB(A) / 32 dB(A) during daytime and night-time periods, respectively. These are stringent limits due to the low background noise in the vicinity of the nearest NSRs (medical ward buildings to the south-west).

The assessment provides advice on typical build-ups for internal partitions and for acoustic finishes to control reverberant sound.

Looking forward, the acoustic issues that will be developed during RIBA 3 include coordination with the architectural team on the build-up of the building envelope, glazing and internal partitioning and coordination with the building services engineers on the control of internal and external services noise. Materiality of acoustic finishes to ceiling and wall will also be developed.

Vibration

The Stage 2 vibration report is contained in Section 7 of the Stage 2 engineering report. The section covers:

– The design basis for vibration sensitive imaging facilities
– The results of a survey of ground vibration at the site
– The conclusions from the ground-vibration survey are:
– The Cryo electron manufacturers' requirements for ground-borne vibration are met at frequencies above 5Hz at all locations within the site boundary.;
– Road traffic passing immediately adjacent to the site boundary caused the highest levels of recorded vibration; and
– Plant from locations outside of the site boundary does not cause significant vibration within the boundary.
– The exceedance of vibration limits due to vehicle traffic can be dealt with in three ways:
– Re-surface the local roads and ensure that they are founded on substructure that is isolated from the substructure of the new LMS building; OR
– Isolate the floor slabs in the Cryo electron microscope rooms; OR
– Mount the Cryo electron microscopes on active vibration mountings (the iVIS system for the Glacios and the IVI system for the Krios).

However, noting that the vibration mitigation is required at frequencies below 5 Hz, the isolation of the floor slabs would only be effective using air-springs which bring about increased complexity, cost and maintenance requirements. Therefore either controlling the vibration at source with the careful design (and maintenance) of the roadway or purchasing active vibration mounts are preferable alternatives. At this stage, it is proposed that road re-surfacing is included in the scheme which should assist with both this as well as improving the external appearance; refer to the architectural report for details.

Notwithstanding this, the pragmatic approach is to defer the decision on any further works until the new ground-borne slab is in place and repeat the survey. It is highly likely that the relatively minor exceedance of the vibration limits at frequencies below 5Hz currently seen on site will be mitigated by the new slab on ground with its superior stiffness and damping.

Looking forward, the vibration issues that will be developed during RIBA 3 include coordination with the architectural team on the requirements for the roadway and for the layout and design of the imaging facilities (with particular focus on the Cryo-electron microscope suite).

10 Planning

10 Planning
10.1 Planning Summary

Planning Summary
Information regarding the progress of planning can be attained upon request of Land Use Consultants.

Minutes/ feedback from pre-application meetings with The Greater London Authority, Transport for London and the London Borough of Hammersmith and Fulham are available on Huddle within the Planning folder.

The current submission date for the Full Planning Application of the London Institute of Medical Sciences is currently estimated to be the beginning of June.

11 Programme & Procurement

11 Programme and Procurement
10.1 Programme and Procurement Summary

Programme and Procurement Summary
During RIBA Stage 2, the project team met to discuss the procurement of a Main Contractor to carry out the construction of the new LMS building (from 2019 to 2021).

Market intelligence gathered by T&T from a number of major UK Main Contractors with a proven track record in the Scientific Research sector indicated:

- A general reluctance around Single Stage D&B
- A preference for a two-stage D&B approach

A Collaborative Programming Session was held on 25th January 2018. Main Contractor procurement was discussed. The current consensus of the project team is to procure the Main Contractor through a two-stage competitive tendering process.

Rigorous pre-qualification of potential Main Contractors will therefore be implemented by T&T and the MRC, to seek appointment of a Main Contractor under a Pre-Construction Services Agreement (PCSA) in June 2018.

The PCSA will allow:

- Contractor input into programme, design & logistics
- Early market testing/ engagement of specialist contractors
- Contractor input to design team meetings
- Focussed sessions on key technical areas
- Buildability workshops
- Contractor buy-in to Cost Plan
- Agreement to work package procurement schedule & agreement of sub-contractors and suppliers
- Change management of developing design
- Increasing cost certainty
- The project team and tendering Main Contractor to jointly demonstrate progress against design, schedule, the approved cost plan and risks during the second stage.

Tender pack at First Stage:
- Scope
- RIBA Stage 3 Design
- Programme milestones
- Cost plan template

Tender return at First Stage:
- Prelims, o/h and profit
- Method statements
- Pre-construction fees
- Procurement plan
- Resource plan
- References

During RIBA Stage 4, early release of key packages with sufficient information to enable a Main Contractor to price in competition will be progressed by the design team.