



# Design Standards

A document for Consultants, Contractors and Staff working  
at Bournemouth University

2018 V 1.3

# Document History

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# 1 Introduction

Bournemouth University (BU) aims to provide a safe, healthy, accessible and functional environment for all students and staff. This Design Standards document has been prepared by BU to set out its standard requirements for design and construction in building and engineering works. It applies to all new-build and refurbishment works within BU's portfolio of properties, controlling quality in the production of designs, specifications and the subsequent performance of buildings.

The Design Standards document is written for employees of BU, architects and external consultants and contractors. The purpose of the Design Standards is to act as a briefing document to give designers an overview of the design requirements, constraints and challenges presented by BU's specialist needs.

This document helps to identify those aspects of design where BU has particular requirements and to highlight areas requiring special design care and to enable designers and contractors to have overall understanding of BU specific requirements and expectations. It has been developed to ensure that all future projects are designed with consistent parameters and principles.

It is not the intention of the Design Standards document to reiterate the recommendations and requirements of relevant legislation and published design guidance. The Design Standards aim to discuss strategic matters and does not provide an exhaustive treatment of statutory or best practice design and compliance requirements; its primary purpose is to establish a starting point for design briefs. It is the responsibility of readers and duty holders to ensure subsequent designs are complete, compliant and able to meet the final approved brief when measured in use.

It is assumed that the designer is familiar with all relevant published design guidance and legislation.

## 1.1 Relevant BU Policies

**1.1.1** The Design Standards document should be read in conjunction with the detailed brief issued by BU for each specific project and the following BU policies included in Appendix1:

- Sustainable Construction Policy
- Sustainability Policy
- Energy & Water Policy
- Biodiversity Policy
- Sustainable Procurement Policy
- CCTV Policy
- Cooperation with other Employers and Contractors Policy

## 1.2 Derogations

- 1.2.1** On receipt of the Project Brief, it is the designer's responsibility to assess the project requirements against those set out in the Design Standards document.
- 1.2.2** The designer shall submit details of proposed derogations, together with justification, in writing to the BU Project Manager as early as reasonably possible.
- 1.2.3** Derogations from the Design Standards must be subject to review and approval before the completion of RIBA Stage 4 (Technical Design).
- 1.2.4** Acceptance may only be assumed on receipt of authorisation issued by the BU Project Manager.
- 1.2.5** It is noted that in the case of building refurbishment, it may not always be practicable to achieve some of the standards included in this Design Standards brief. In such circumstances, the designer shall provide details as to which specific aspect cannot be achieved, and propose an alternative solution, to be approved by BU Project Manager.

## 1.3 Revisions

- 1.3.1** This document will be subject to periodic review and the latest and current version will be available on the university website.
- 1.3.2** Bournemouth University construction contracts will specify the current Design Standards version number. Contractors and consultants will not be required to comply with the terms of later versions unless instructed through formal contract variation.

## 2 Space Standards

This document clarifies the expected standards and BU's preferences to the designer. The information is provided to ensure that, along with any specific legislative design requirements, the facilities are fit for BU's purpose.

The following five criteria assist stakeholders to consider whether design proposals are suitable:

- Does it work for the primary purpose of design?
- Is it inclusive and universally accessible?
- Does it fit?
- Is it fair, reasonable and fit for purpose?
- Can we afford it?

These criteria provide a framework for design intent, to support good decision making as consistently as possible across projects. They apply with equal importance and in any campus space in which staff are working. It is the responsibility of project sponsors to balance them, project by project. Metrics for office and teaching spaces are provided in the sections below to help designers and project sponsors determine the 'does it fit?' criteria.

### 2.1 Office Spaces

#### 2.1.1 Principles of Office Space Design

Rather than setting prescriptive expectations around cellular or shared office provision, design can be flexible to meet user needs by applying the five criteria in section 2.9 consistently within an agreed space metric. These criteria and metrics are applicable equally to new build or refurbishment developments.

#### 2.1.2 Office Space Metrics

The metrics to calculate a space budget for office design are provided below. Construction outcomes will deviate slightly from project to project because of the individual design needs of each development but should be as close to the multipliers as possible. Designs driven by these metrics will be subject to test via the five criteria principles at Section 2 above.

Descriptor	Space Multiplier (m2)
Cellular office (Dean/Director to include a meeting space)	14.00
Cellular office (All other roles)	8.00
Shared office, per FTE	5.00
Uplift for welfare per desk in shared office	0.70 – 1.00
Uplift for storage per desk in shared office	0.30 – 0.50

### **2.1.3 Detailed Design Considerations**

Current design considerations for office spaces at Bournemouth University include:

#### **2.1.3.1 Environment, Comfort and Security**

- BU commits to providing a high quality working environment to support the health and wellbeing of staff, complying with and where appropriate exceeding compliance obligations relevant to its operations. In office environments, this will include consideration of heating, ventilation and acoustics.
- BU aims to maintain working time heated space temperatures of between 19-21 degrees centigrade as described in the BU Energy and Water Policy.
- BU will use controllable, managed access systems (e.g. SALTO) to balance security of people and data with flexibility of access, as guided through engagement with users.

#### **2.1.3.2 Furniture and Fit**

- Where shared offices are specified it should be presumed that each work position will be based on a rectangular-shaped desk unless otherwise advised.
- It is recognised that some individuals will have different requirements and additional items of furniture will be required to enable them to function effectively.
- Desks should be positioned to take best advantage of the available natural light but taking into account DSE recommendations.
- Desk positions should consider artificial lighting, heating and ventilation to provide both individual and wider group comfort and avoid localised discomfort (not directly under cold air ducts for example).
- Layouts for staff working in shared offices should ensure that sufficient 'local' secure personal storage space is provided close to an individual's work position. This would primarily be to accommodate frequently accessed files, reference books, teaching resources etc.
- Storage of coats, hats, umbrellas and/or general resource facilities such as printers, copiers, fax machines etc., should be generally located in central positions. Areas furthest from natural daylight should be considered for these facilities.
- Main circulation areas through shared offices should be arranged to minimise disturbance to work positions.
- Space for internal planting containers should be considered to assist with environmental control and help prevent 'sterile' spaces.



### 2.1.3.3 Privacy and Noise

- In shared spaces, sufficient space should be provided between different work positions to enable privacy screens to be used where requested. 'Desk up' privacy screens are preferred between desks. If use of a floor standing screen system between desks is agreed with BU an allowance of up to 50mm should be allowed for the width of the privacy screen system when planning furniture layouts.
- A small interview/meeting room should be provided adjacent to shared offices to accommodate up to 4 people. Such rooms are to enable private issues to be discussed and also avoid meetings occurring in the shared area which disturb other staff in the room. Such rooms should also be fitted with data and power outlets to provide a 'quiet' work area. N.B. More than one meeting room may be required in larger shared offices.
- Appropriate AV solutions should be incorporated into general meeting spaces.
- In order to meet the operational needs of Faculties and Professional Services, it may also be necessary to provide interview rooms for use by staff in shared offices.

### 2.1.3.4 Other

- Staff working areas should have access to a locally managed refreshment facility near to the point of work. Within this facility, BU will provide hot water provision for drinks, a sink for washing up, cupboards for storage of cutlery/crockery, a small work surface and a fridge. Project specific consideration should be given to provision of microwave and dishwasher.
- Project by project consideration will be given to a seating/dining area adjacent to the refreshment point, dependent on ease of access to this type of facility within the wider campus. By exception, the Staff Centre at Talbot has a BU-managed catering offer rather than a locally managed refreshment facility.
- Consideration should be given to signage, decoration and branding, in agreement with BU Estates and Marketing & Communications, to create meaningful identity within office spaces.

### 2.1.4 Office Space Specification Items

- Open plan offices - for indicative space standards for open plan offices, see BU drawings OFFICES-EST-1&2.
- Meeting rooms - for indicative space standards for meeting rooms, see BU drawings MR-EST-1E & 2E.
- For AV requirements for meeting rooms see BU drawing AV-EST-1A.
- Privacy screens - preferred ranges of privacy screens are the Origin + range (floor-standing or desk-up).

## 2.2 Teaching Rooms

### 2.2.1 Principles of Teaching Room Design

- 2.2.1.1 Teaching rooms, and particularly lecture theatres, are preferred at ground level where space permits. Otherwise a location as close as possible to the ground floor is required to minimise the movement of high student numbers to/from upper levels. It is preferred that, where more than one teaching room or lecture theatre is required, the rooms are grouped together.
- 2.2.1.2 Where proposed designs are based on irregular shaped rooms or rooms with curved walls, the space allocation may need to be increased as necessary to ensure that the proposed occupancy and room function are achieved. Budget and/or overall building area restrictions may determine the viability of designing irregular room shapes (if in doubt, test against five criteria at section 2.9 above).
- 2.2.1.3 Lecture theatres should have an adequate foyer area/gathering space and corridors/circulation space serving teaching rooms should be wide enough to minimise congestion at 'change-over' periods.
- 2.2.1.4 The avoidance of sound transfer from teaching rooms/lecture theatres to adjoining rooms and areas is of primary importance and must be fully considered in the design.
- 2.2.1.5 Artificial lighting within lecture theatres is to be designed for flexibility of usage.
- 2.2.1.6 Lecture theatres of rectangular proportions are preferred with the seats facing the shorter length. Layouts with obtuse angles of view to the screen are to be avoided. Where levels permit, tiered floors with one row of seats per tier are preferred. Where headroom is restricted, two rows of seats per tier will be considered, possibly when combined with staggered seating centres.
- 2.2.1.7 Lecture theatres are to generally be fitted with a suitably durable, fixed seating/writing surface system. Specific projects may arise where a retractable seating/tier system is required. The solution for retractable furniture must factor in ease and time to set up, as teaching time loss between uses must be avoided. These will be identified at the project briefing stage. Fixed, flip-up seating with a continuous writing surface is preferred. Lift-out, folding writing tablets should not be used.
- 2.2.1.8 Rooms fitted with fixed seating are to also be provided with permanent wheelchair spaces in accordance with BS 8300. This will include the provision of mobile writing surfaces for wheelchair users. These are to be designed to ensure that wheelchair users can readily manoeuvre the writing surface without assistance from others.
- 2.2.1.9 Power sockets to include USB charging points, lecture theatres preferably to include 1 power socket for every two seats.

### 2.2.2 Teaching Room Metrics

- 2.2.2.1 The minimum target space allowances based on regular, square or rectangular shaped rooms are:
- Standard teaching rooms with tables in rows - 2.0m<sup>2</sup> per person;
  - Standard teaching rooms with tables in 'U' shape – 2.25m<sup>2</sup> per person;

- Agile teaching rooms – 2.5m<sup>2</sup> per person;
- Standard Lecture Theatres – 1.1m<sup>2</sup> per person
- Combined lecture theatre / small performance spaces – to be agreed on project specific basis

### **2.2.3 Teaching Rooms Specification Items**

#### **2.2.3.1 Teaching Rooms**

- For the generic design specification for teaching room design criteria, see BU Drawing TR/EST/1.
- For the generic design specification for provision of audio-visual infrastructure and equipment within teaching rooms, see BU Drawings AV/EST/1&2.

#### **2.2.3.2 Lecture Theatres**

- The preferred lecture theatre seating supplier is CPS, the 'Cadet C9' seating system being the preferred model, incorporating continuous writing surfaces. Other seating systems of a similar design, quality and durability will be considered. Seating is to be finished in a 'Camira 24/7' fabric.
- Other seating systems will be considered where continuous, fixed writing surfaces do not suit the particular functions of the lecture theatre, e.g. where also used for small performances etc.
- For AV requirements to lecture theatres see BU generic drawing AV/EST/3.

## 3 General Design Requirements

### 3.1 Cladding and Roofs

- 3.1.1** Flat roofs are to be of high performance materials designed with appropriate falls to prevent ponding. Any flat roofing membrane / system used is to come with an underwritten, insurance-backed manufacturer's guarantee of at least 20 years. Accessibility for maintenance of flat roofs is of high importance. Green roofs are to be considered as part of the sustainability design.
- 3.1.2** Fascia, soffits, rainwater goods etc., are to have a low maintenance finish.
- 3.1.3** Internal rainwater pipes are to be avoided where practical.
- 3.1.4** Boarded walkways are to be provided within pitched roofs at the point of the highest headroom, with engineering services running adjacent. There will be adequate lighting for maintenance purposes. All pipework in roof spaces will be adequately insulated with particular attention being paid to ventilated roof spaces and the occurrence of pipe installations at or close to eaves.
- 3.1.5** Roof plant rooms are to be accessed via permanent stairways. Roof spaces are to be accessed via trap doors with permanent loft ladders, operable from both the area below and the roof space itself. Cat ladders (with hoop protection) are to be provided for access to roofs; where these go down to the ground they will be anti-climb and lockable.
- 3.1.6** Single access points to roof plant rooms are to be avoided subject to specific room assessment.
- 3.1.7** All tanks and air conditioning plants etc. are to be contained within roof plant rooms and within the confines of a conventional roof construction. Water tanks are to have leak detection systems installed and connected to the Building Management System.
- 3.1.8** All surfaces within plant rooms will be sealed and painted.
- 3.1.9** All roof plants should have adequate drainage in case of plant leaking.
- 3.1.10** Adequate lightning protection will be provided by a specialist company where required.
- 3.1.11** Roof design shall allow for fixed external or internal access by stairwell, protected edges and walkways. Fall arrest systems may be considered on any roof design where external access is required and suitable protection is not achievable. Adoption of specific systems is to be agreed with maintenance and specific training will be provided as part of the handover procedure.
- 3.1.12** Where rain screen cladding, render or external insulation systems are specified the specification needs to comply with the most up to date, strictest requirements developed post Grenfell Tower case. Such systems need to be approved by the BU Fire Officer at the feasibility stage.

## 3.2 Linings/Partitions

- 3.2.1** Both for ease of future relocation, and for environmental reasons, any partition system used preferably to be readily demountable and suitable for re-use. Gyproc style partitions do not meet these requirements and will generally not be acceptable unless the project specifics prevent the use of a demountable system. In these circumstances agreement is to be obtained from BU at the design stage.
- 3.2.2** Any solid partition system used is to inherently have a minimum fire resistance of 30 minutes, and offer integral door sets, with options for glazed window units and screens, including a fire-resisting version. NB: See section 6.5.8 for further fire safety requirements for partition systems
- 3.2.3** The minimum sound reduction index for any partition system is to be 43dB (RW1). For teaching spaces, specific acoustic advice will be sought. However, a minimum of 54db should be specified where teaching rooms are adjacent other teaching spaces or offices.
- 3.2.4** Any partitioning system used is to be capable of providing integral 'window' units with the option of integral blinds.
- 3.2.5** Partitions are to be painted using a water based paint with a low VOC in white and/or BU feature colour(s). See also 3.5.
- 3.2.6** Suitable framing and fixings are to be incorporated within partitions where fixtures and fittings are to be fixed to partitions e.g. shelving, LCD screens.
- 3.2.7** Soundseal compressible acoustic seal tape or similar approved is to be provided at the abutment of new partitions to existing partitions, walls, columns and suspended ceilings and the like and to be of appropriate width.
- 3.2.8** Any penetrations through a partition due to ducts, trunking, cables, backboxes and the like, if unavoidable, are to be detailed to ensure sound reduction levels are maintained and fire safety is not impaired where the partition acts as fire resisting structure.
- 3.2.9** It is preferred that partition systems extend to the underside of the suspended ceiling level for ease of future repositioning. Where this is not possible, BU is to be notified in advance of completing any detailed design work.

*For cavity barrier requirements see section 6.5.*

- 3.2.10** Where specialist sound insulation requirements are needed to certain facilities, i.e. audio studios, partitions may need to extend to the underside of the structural soffit to obtain the necessary sound insulation standards. Specialist advice will be required.

### 3.3 Windows and Doors

- 3.3.1** External windows and doors are preferred in powder coated aluminium. Minimum U value of 1.6 W/(m<sup>2</sup>.K) in accordance with current Building Regulations Part L 2010 with 2016 amendments. However consideration should be made within design to provide improved U values to meet 1.2 W/(m<sup>2</sup>.K) and by triple glazing and to achieve up to 1.0 W/(m<sup>2</sup>.K)
- 3.3.2** Windows are to be fitted with lockable restrictors to limit the extent of opening to not more than 100mm.
- 3.3.3** Inaccessible windows and all windows above fourth floor level are to be cleanable from inside unless a cradle installation is provided. This may involve special release mechanisms to normally fixed windows and anchor points internally.
- 3.3.4** Where windows are exposed to prolonged, direct sunlight, 'Brise Soleil' are to be used to minimise solar gain. Consideration will be given to incorporation of specialist glazing which reduces solar gain. Window film will be considered as a secondary option.
- 3.3.5** Where a development incorporates major access from areas external to the buildings, a draught lobby will be incorporated to minimise heat loss and improve thermal comfort for reception workers. This will be with automatic doors either side as a minimum. Alternatively, door entry systems incorporating revolving doors may be considered.
- 3.3.6** Safety glazing will be used in all vulnerable areas. Windows should be beaded internally for security purposes, with self-lock cockspur type handles.
- 3.3.7** All internal doors are to be commercial quality, solid core flush style with hard wood veneer and lipping. Doors to all high usage areas are to also have a softwood perimeter frame behind the lipping for durability. Unframed chipboard slab constructions are not acceptable. Door sets are to be obtained from a reputable UK door manufacturer, which has its own third party fire test evidence for its fire rated door ranges.
- 3.3.8** Doors and frames are to be supplied as a door set, either forming part of the proposed partition system, or approved for use in other wall and partition types. Door sets are to comply with current CE marking requirements where applicable. Use of door assemblies will only be considered in smaller refurbishment projects, on non-fire rated doors, where existing construction prevents the use of a door set.

*For additional requirements where doors are fire resisting see sections 6.5.12 – 22*

- 3.3.9** Doors are to be of suitable width and height for the furniture and equipment that is to be located in the rooms served by the door(s). This may also include doors on access routes. Doors to all usable rooms / circulation spaces are to be minimum 926mm wide, or at least one door 926mm wide on double doors.

**3.3.10** The preferred range of veneers for internal doors is dependent on the building. Below is a summary of current finishes by building:

Lansdowne Campus	
Bournemouth House	Ash
Studland House	Ash
Royal London House	Ash
Executive Business Centre	Light Oak
Melbury House	Beech
Talbot Campus	
Poole House	Ash
Dorset House	Light Oak
Sir Michael Cobham Library	Maple
Kimmeridge House	Light Oak
Weymouth House	Light Oak
Christchurch House	Light Oak
Tolpuddle Annexe 1	Beech
Tolpuddle Annexe 2	Ash
Tolpuddle Annexe 3	Beech
Talbot House	Sapele
The Student Centre	American White Oak
The Fusion Building	Light Oak

- 3.3.11** All doors supplied are to meet the requirements of the BU Sustainability Policy (see Appendix 1). New doors must be party to an FSC Chain of Custody or equivalent certification scheme and be provided with a complete paper trail for verification.
- 3.3.12** Vision panels are generally preferred within all internal doors. For BU vision panel style, see BU Drawing Preferred Internal Door Types BU/ID/Sk1. Other vision panel styles may be considered subject to agreement with BU.
- 3.3.13** The required force to open any door is not to exceed Part M requirements. Where door closers are fitted, cam action closers are preferred.
- 3.3.14** All doors used on a project must be from the same manufacturer and batch to avoid potential differences in veneer characteristics.
- 3.3.15** Doors are to be spaced at least 100mm from the hinged edge to any adjacent perpendicular walls, where possible. This is to permit full 90 degree door opening with the selected door furniture.
- 3.3.16** All doors are to have a floor-mounted doorstop to avoid damage to adjacent walls and partitions.

## 3.4 Door Ironmongery

*For fire safety requirements of door ironmongery see Section 6.5.*

- 3.4.1** All single axis hinges are to comply with EN 1935 and be CE marked. They are also to have been successfully third party tested to EN 1634-1 or BS 476: Part 22 to enable use on fire doors, and be manufactured from grade CS4 rolled steel.
- 3.4.2** Hinges are to be Category of Use '3' and Durability 'Grade 7' in the product classification codes, and be low friction bearing type tested and approved for high usage locations. Additionally the hinge grade is to suit the proposed door mass, including ironmongery – grade 13 is preferred. Minimum 10 year performance guarantee.
- 3.4.3** Hinge finish to be compatible with lever finish.
- 3.4.4** Circular section 'D' style door levers with circular cover plates in satin stainless steel are preferred. Levers to meet the recommendations of BS 8300.
- 3.4.5** All levers are to comply with EN 1906. They are also to have been successfully, third party tested to EN 1634-1 (or BS 476: Part 22) and EN 179 to enable use on fire doors and / or escape doors.
- 3.4.6** Levers are to be Category of Use '3' and Durability 'Grade 7' in the product classification codes. Minimum 10 year performance guarantee is required.
- 3.4.7** Latch / lock sets are to comply with EN 12209 and be CE marked. They are also to have been successfully third party tested to EN 1634-1 or BS 476: Part 22.
- 3.4.8** Where escape sash locks are specified they are also to have been successfully third party tested to EN 179. Escape sash locks and levers are to be procured as a 'lockset' comprising lockcase and operating levers tested as a combination. An appropriate Declaration of Performance certificate will be required to demonstrate compliance with EN 179, Emergency Exit Devices. As a minimum requirement, escape sash locks are to be provided to all occupied rooms and facilities such as shared offices, meeting rooms, seminar rooms, computer suites and the like where a panic situation is not anticipated. Other facilities are to be considered on a project specific basis. NB normal sash locks with cylinders fitted with a thumb-turn internally are not an acceptable alternative to an escape sash lock and are not to be specified on any doors providing escape.
- 3.4.9** Latch / locks are to be Category of Use minimum 'Grade 3' in the product classification codes.
- 3.4.10** Latch / lock sets to also comply with BS 8300 with regard to distance between the centres of the lever spindle and the lock.
- 3.4.11** Latch / lock sets are to have minimum 60mm backset. Circular escutcheon plates are preferred, finish to match levers. Minimum 10 year performance guarantee.



- 3.4.12** NB The level of security required on doors by the end users is to be agreed at the design stage in consultation with the Soft Facilities Management team. Mechanical key pad locks are not to be fitted to any doors in addition to a sash lock. Where access control to rooms is required the following options are to be considered whereby the internal lever overrides the latch or latch/lock to ensure single action escape from the room :-
- 3.4.13** A mechanical keypad fitting incorporating integral levers complying with EN 179 & BS 8607, which is also approved for use on fire rated doors.
- 3.4.14** A solenoid escape sash lock / lever set sold as a tested combination, linked to a SALTO or similar access control system (to BU requirements). The solenoid lockset is to comply with EN 179 and also be approved for use on fire rated doors.
- 3.4.15** A Declaration of Performance certificate will be required to demonstrate compliance with EN 179 for any solution.

*For further requirements where doors are fire rated see Section 6.*

*For SALTO access control requirements see section 5.2.*

- 3.4.16** Where it is foreseen that a panic situation could arise i.e. on locked doors on escape routes, and users may not be familiar with the door device, panic exit hardware CE marked to EN 1125, is to be fitted to provide effective escape through the doorway with minimum effort.
- 3.4.17** Cylinders are to be from ASSA '4800 series - Euro profile' cylinder type. Suiting details and the number of keys to be provided to be agreed with BU Estates Facilities Management.

*For master key requirements see section 5.2*

- 3.4.18** Cylinders are to be supplied by:

Croma Locksmiths & Security Solutions  
827/829 Wimborne Road  
Moordown, Bournemouth  
Dorset, BH9 2BE  
Tel: 01202 526090

- 3.4.19** Standard door closers are to comply with EN 1154 and be CE marked. They are also to have been successfully third party tested to EN 1634-1 or BS 476: Part 22.
- 3.4.20** Door closers are to generally be 'Grade 3' Category of Use in the classification code. Power size to suit proposed door size and mass (including door ironmongery), and any fire test requirements for use on fire doors. Minimum 10 year performance guarantee required.
- 3.4.21** Cam action door closers are preferred to firstly provide easier opening to all users, and secondly to be less prone to vandalism.
- 3.4.22** For electrically powered hold open or swing free closer requirements see section 6.

- 3.4.23** Door operators / hydraulic closers are to be low energy and be fully adjustable, tested and certified to at least 1,000,000 cycles.
- 3.4.24** Door operators to be supplied by ADSA (Automatic Door Suppliers Association) registered members, and be installed in accordance with the ADSA code of practice.
- 3.4.25** Kick plates are to be fitted on all doors to student facilities (residential and non-residential buildings), doors on circulation routes and other rooms where impact damage may be an issue. The kick plate is to extend for the clear width of the door between door stops, and generally be a minimum of 200mm high. Final height of the kick plate is dependent on the anticipated source of potential impact damage and may need to be increased e.g. from kitchen trolley use.
- 3.4.26** Kick plate material to be satin stainless steel or scratch resistant clear Perspex.
- 3.4.27** Electrically controlled exit systems on escape routes :
- Any door on an escape route which is electrically locked, or has to be electrically unlocked, is to be fitted with electrical hardware that complies with standard BS EN 13637.
  - The testing to this standard applies to the whole system i.e. the initiating element, the blocking element and the controlling element. Use of substitute components not forming part of the tested system will not be compliant, and must not be used.
  - Panic or non-panic anticipated usage must be considered and correct solutions applied. Any component products used that fall under the scope of EN179 or EN1125 must still be CE certified to these standards.
  - Any electromechanically operated locks and striking plates forming part of the proposed system are to comply with EN14846.
  - Products for installation on fire doors must be third party fire tested to EN 1634 for door sets of the type specified.
  - Documentation to demonstrate compliance is to be supplied to BU for any electrically controlled exit system proposed, to confirm system compliance to EN13637 (and EN179, EN1125, EN14846 and EN1634 as appropriate).
  - Electrically controlled exit systems are to be installed only by competent persons who, as a minimum standard, have been trained and certified by the manufacturer of the proposed system.

## 3.5 Surface Finishes

- 3.5.1** Wall surfaces will generally be painted 'Diamond White' (must be durable to wet cleaning). BU feature colours in Diamond matt or silk emulsion. Choice of wall finishes will reflect the use of each room.
- 3.5.2** NB: Where graphics are to be applied to wall surfaces the background decoration requirements are to be checked with the BU Technical Officer.

- 3.5.3** Ceiling finishes in new builds will be suspended ceiling panels. Suspended ceiling panels will not have concealed fixings. Open grid or recessed grids will be used.
- 3.5.4** Floor finishes will be carpet tiles, vinyl sheet or linoleum. Vinyl will be slip-resistant in all WC's and kitchen areas by 'Tarkett' or 'Polyflor'. Floor finishes with a recycled content are to be considered.
- 3.5.5** The recommendations of BS 8300 with regard to the contrast in colour of stair treads and nosings for the visually impaired will be incorporated in the design.
- 3.5.6** The design team will refer to the Assistant Facilities Manager for agreement that proposed design solutions can be maintained by current cleaning processes.

## 3.6 Furniture/Fittings

### General Fittings

- 3.6.1** Window blinds, as a minimum, are to be specified for all southerly facing windows and all areas where a Display Screen Equipment risk assessment defines the need for blinds to resolve issues of daylight focusing on computer screens and teaching rooms.
- 3.6.2** Consideration is to be given to accessibility and inclusivity in the design and specification of fixtures, loose furniture and equipment (e.g. counter heights, requirements for height adjustable furniture, wheelchair accessibility and routes etc.) and decisions recorded within the project Equality Analysis.
- 3.6.3** Hat and coat hooks fitted to timber backboards will be provided in all offices, teaching rooms and toilets; where this is not practical, the use of loose furniture is acceptable.
- 3.6.4** Notice boards in corridors are to be glass fronted and lockable and are to match with BU's branding requirements
- 3.6.5** Whiteboards, screens and projector brackets will be supplied by BU's IT Services Audio Visual team.
- 3.6.6** All adjustable shelving will be fixed on white 'SPUR' or equivalent brackets and uprights. Wherever possible the use of free standing shelving is to be considered.
- 3.6.7** Worktops will be balanced and covered in laminated Formica or equivalent and must be deep enough to accommodate the specified appliances, including appropriate services zones, so that they do not project forward off the front worktop edge. The designer will take account of any resulting impact on room layout and useable floor area.
- 3.6.8** Internal bins to be as follows:
  - Office
    - Separate mixed recycling bin
    - Separate white paper bin (cardboard)
  - Kitchen
    - Separate mixed recycling bin
    - Separate food waste bin
  - Circulation/catered space

- Dual mixed recycling and food waste bin (Leaffield Envirobin 110 Meridian)
- Separate liquid/cup bin (either Leaffield or Glasdon Eco Nexus 85 depending on location)

### **Sanitary Fittings**

- 3.6.9** For new build developments BU's preference is to provide unisex / non-gender specific WC cubicles as this is the most inclusive solution. For refurbishment projects the solution should be reviewed on a project by project basis and agreed with the Project Manager. Where showers and changing facilities are provided, a gender neutral shower and changing facility should be provided adjacent to male/ female provision. For shower facilities requirements see section 8.5.5.
- 3.6.10** Where possible, male/female/unisex accessible WCs are to be grouped together to minimise the drainage and plumbing infrastructure requirements.
- 3.6.11** The layout of all WC accommodation is to be designed to ensure that privacy is not compromised. Entrance doors should be suitably screened or lobbied from the facilities within the WC to prevent loss of privacy from the adjacent access area.
- 3.6.12** New WC accommodation should be easily accessible from the main circulation routes of the building.
- 3.6.13** In order to release prime external wall space for higher priority facilities, it is generally preferred that WC accommodation will be 'internal', and be artificially lit and ventilated.
- 3.6.14** Consideration should be given to the provision of a cleaner's store where new WC facilities are planned. These should be located at each floor level and should incorporate a suitable cleaner's sink and power where identified by BU Facilities Management.
- 3.6.15** Pre-fabricated WC/Bathroom 'pods' will be considered within student accommodation projects.
- 3.6.16** New WC facilities are to be adequately signed using standard pictograms used by BU. Door signs are to incorporate tactile details for the visually-impaired.
- 3.6.17** If the provision of male / female toilets has been agreed in relation to a new build development or major refurbishment, at least one designated gender neutral toilet should be provided adjacent other WCs on the ground floor.
- 3.6.18** Preferred minimum clear widths for cubicles are 800mm for male WCs and 900mm for female WCs (to allow adequate room for sanitary dispenser and bin).
- 3.6.19** Concealed pipe work and drainage fittings are required with appropriate access arrangements for maintenance/repair.
- 3.6.20** Counter style basins, preferably fully recessed, or semi-recessed where space is more restricted, are required.
- 3.6.21** All surfaces specified to WC accommodation are to be easily cleanable, durable and resistant to water and cleaning products.

- 3.6.22** General lighting to WC accommodation is to incorporate LED technology as the preferred fitting. Lighting controls will be presence and daylight linked.
- 3.6.23** Emergency lighting will be integral with the light fittings provided or specified and be maintained type.
- 3.6.24** Where appropriate it is recommended to consider the use of Propelair toilets - <http://www.propelair.com/homepage/>
- 3.6.25** Passive infra-red (PIR) water saving devices are to be incorporated into urinal installations. BU's preferred system is the 'Flushmatic' by Dart Valley Systems – [www.dartvalley.co.uk](http://www.dartvalley.co.uk)
- 3.6.26** All sanitary ware specified is generally to be ceramic, with readily available replacements, colour white. N.B. stainless steel sanitary ware is to be used in higher risk areas such as student social facilities, e.g. The Old Fire Station. Water capacity of cisterns is to comply with regulations and offer a dual flush capacity. Existing drainage to be investigated to ensure any reduction in waste water does not cause blockages in the future.
- 3.6.27** Cubicle and IPS systems are to consist of a laminate-faced system with 2100mm overall height and 100mm floor clearance. N.B. any areas subject to contact with water etc., other than cleaning, are to have solid grade laminate. All cubicles to have coat hooks fitted on the back of the door. Cubicle doors to be fitted with metal indicator style bolts with emergency release facilities. Final details and colours will be agreed with BU on a project by project basis.
- 3.6.28** Sanitary product dispensers, sanitary bins etc., are to be provided by BU's sanitation contractor. Toilet paper dispensers and soap dispensers are provided free of charge by BU's cleaning contractor. NB soap dispensers are to be located within the splash back zone around basin areas.
- 3.6.29** Fully recessed basins to be fitted within laminate-faced, bull-nosed vanity unit/concealed plumbing system from same range as cubicle/IPS system. Semi-recessed basins will be accepted where space does not permit fully recessed. Vanity unit will incorporate either a post-formed or loose apron to suit basin profile with an integral post-formed upstand, minimum 75mm high. A splash back zone is to be provided above sufficient height to form a surround to the soap dispenser fittings. Final details and colours will be agreed with BU on a project by project basis.
- 3.6.30** Wall cladding systems such as 'Acrovyn' or 'Whiterock' are the preferred splash-back materials. Final extent and colour(s) of wall cladding within WC accommodation will be agreed with BU on a project by project basis.
- 3.6.31** Suspended ceiling systems will have white non-fissured insert tiles of the appropriate standard for the anticipated levels of humidity.
- 3.6.32** Mirror(s) will be provided for length of vanity unit.
- 3.6.33** Infra-red sensor-operated automatic water saving mixer taps are preferred complete with mains power supply.

- 3.6.34** Electric hand driers will be provided on basis of one hand drier for up to two basins, two hand driers for 3-4 basins. In the interests of energy conservation, hand driers will be operated by placing hands underneath unit and not by push button or timer unit. Maximum output 900 watts, ANDA Model: 437217 from <http://www.anda.co.uk/products/hand-dryers/fast-dryer-polished-stainless-steel>.
- 3.6.35** Splash backs are to be provided around and beneath hand driers
- 3.6.36** Heavy duty vinyl sheet safety flooring is to be provided in WC accommodation. Preferred ranges used previously are the Tarkett Safetred 'Universal' or 'Spectrum' ranges, or Polysafe 'Astral' or 'Corona' ranges. Welded seams and coved upstands are to be used as part of the floor finish installation. Vinyl sheet to be fitted before WC pans fitted. Colour to be agreed with BU on project by project basis.
- 3.6.37** A good quality silicone sealant is to be used for sealing junctions prone to water ingress within WCs, e.g. between WC pans and vinyl sheet flooring, at junction of urinal bowls to wall/panel surface. Colour white generally.
- 3.6.38** Heating to WC accommodation should preferably be via radiators or convectors linked to the central heating system of the building. Where such a system is not available, other methods of space heating are to be proposed in consultation with the BU Energy Officer.
- 3.6.39** Ventilation to be provided to all WC accommodation in accordance with statutory requirements, linked into the lighting PIR system to activate.
- 3.6.40** Where possible, showers should draw from the building's current hot water system. If this is not the case, the preference is for low-flow shower systems with flow-rate limited to less than 9 litres/minute at 3 bar pressure.
- 3.6.41** Heated towel rails should draw from the building's current hot water system. If this is not possible, the preference is for a rail with a maximum rating of 1kW, thermostatic controls, installed either with internal or 7-day fused spur timer switch with similar specifications to the 'TimeGuard FST17a'. <http://www.timeguard.com/products/time/trade-time-controllers/>
- 3.6.42** Main entrance doors to WC accommodation are to be lockable to enable general access to be prevented in the event of either planned or emergency maintenance. Cylinders are to be suited to the BU Maintenance suite. For other cylinder requirements see sections 3.4.17 and 3.4.18-20 inclusive.

#### **Loose Furniture**

- 3.6.43** Loose furniture items are typically procured through BU's preferred supplier. This is to be considered as part of the interior design strategy. Procurement of loose furniture will be carried out by the BU Commissioning Officer.
- 3.6.44** For details of standard furniture approved for use by BU, see Appendix 2: BOF Bespoke Catalogue for BU.

#### **Catering and Kitchen Fittings**

- 3.6.45** Staff kitchenettes/ refreshment areas should be designed for wheelchair accessibility and include a height adjustable sink and worktop, for example layout see Appendix 11.

- 3.6.46** All white goods to be AAA+ energy rated
- 3.6.47** All kitchens will be designed to the current CIBSE Guides, including the Guide to Energy Efficiency in Commercial Kitchens (TM 50). Designers should work in collaboration with BU's contract caterer and Head of Facilities Management to agree the design for back and front of house commercial kitchens.
- 3.6.48** BU has a preference for gas supplied equipment in commercial catering kitchens.
- 3.6.49** Commercial catering facilities will be separately metered for recharge purposes.
- 3.6.50** Staff beverage bays should be provided on each floor where staff are located and fitted with a hot water beverage dispenser rated at no more than 2.2kW and with an internal reservoir no larger than 2.5 litres. These will be fitted with a 7-day fused spur timer switch with similar specification to the 'TimeGuardFST17a' unless internal timer clocks are provided within the product.
- 3.6.51** Any installation of vending machines should have energy saving controls to the same specification as the Vending Miser products –  
<http://www.europaymentsystems.co.uk/vendingmiser/index.html>
- 3.6.53** Water dispensers to be recessed, integrated, including drainage, preferably [Halsey Taylor HTHB-LR-Hydroboost In-Wall Bottle Filler](#) or similar approved.

## 3.7 Acoustic Design

- 3.7.1** The overarching objective is to provide acoustic conditions within each room, which are compatible with its intended purpose.

Care must be taken in the design to avoid problems of noise nuisance from sources both within the building and externally. Certain areas, e.g. quiet/office areas above, below or adjacent to teaching areas, particularly those with audio-visual facilities, are particularly sensitive to noise interference and require specific consideration of the sound insulation. This also applies between teaching areas.

*See also section 3.2 for minimum sound reduction index values for any partition systems used.*

**3.7.2 Key acoustic requirements to be considered are as follows:**

- Sound insulation between rooms
- Noise entering the building from outside
- Room acoustics
- Noise from building services

**3.7.3 Sound insulation between rooms - airborne sound between rooms**

The table below lists various types of room according to their function, along with the required level of airborne sound insulation. Where a wall separates two rooms with different functions, the standard of sound insulation to be applied will be the higher of the two.

Type(s) of Room	Min Value of DnT (Tmfmax)
Academic staff and admin offices, meeting rooms	45dB (43dB for demountable partitions)
Cafeterias, coffee bars etc.	45dB
Lecture theatres up to 100 seats , seminar rooms and tutorial rooms, audio visual and video conference rooms	45dB
Halls and rooms for music and other live performances	55dB
Large lecture theatres	50dB
Library circulation	40dB
Library study areas	45dB
Recording studios	60dB*
Rooms intended for examination, confidential interviews, psychotherapy, etc.	50dB*
Science laboratories, art and design studios, graphics workshops	40dB
Sports halls and gymnasias	50dB
Workshops	45dB*

*\* Denotes that requirements can vary considerably and need to be agreed on project-by-project basis with specialist input.*

### 3.7.4 Sound Insulation between Rooms and Circulation Spaces

Structure	Minimum value of Rw
Partition separating a teaching space or office from a circulation	40dB
Door within the above partition, rated as a complete door set	30dB
Partition separating a teaching space for specialised purposes (such as music or media production) from a circulation area	45dB
Door within the above partition, rated as a complete door set	35dB

- 3.7.4.1 Specialist acoustic design input might be required if a teaching room or other noise sensitive room opens into a busy atrium or through corridor, or in the case of large lecture theatres with a waiting/ social area immediately outside their doors.



**3.7.5 Noise from Outside**

Type(s) of Room	Maximum value of LAeq, 30 minutes
Academic staff and admin offices, meeting rooms	40dB
Cafeterias, coffee bars etc.	45dB
Lecture theatres up to 100 seats , seminar rooms and tutorial rooms, audio visual and video conference rooms	35dB
Entrance halls, corridors, stairwells, atria and circulation spaces	45dB
Halls and rooms for music and other live performances	30dB
Large lecture theatres	30dB
Library circulation	40dB
Library study areas	35dB
Recording studios	25dB
Rooms intended for examination, confidential interviews, psychotherapy, etc.	35dB
Science laboratories, art and design studios, graphics workshops	35dB
Sports halls and gymnasias	40dB
Workshops	40dB

**3.7.6 Reverberation**

Type(s) of Room	Maximum value of Tmf
Academic staff and admin offices, meeting rooms	1.0s
Cafeterias, coffee bars etc.	1.0s
Lecture theatres up to 100 seats , seminar rooms and tutorial rooms, audio visual and video conference rooms	0.8s
Entrance halls, corridors, stairwells, atria and circulation spaces	1.0s
Halls and rooms for music and other live performances	1.2s
Large lecture theatres	1.0s
Library circulation	1.0s
Library study areas	0.8s
Recording studios	0.6s

Rooms intended for examination, confidential interviews, psychotherapy, etc.	0.6s
Science laboratories, art and design studios, graphics workshops	0.8s
Sports halls and gymnasias	1.5s
Workshops	1.0s

### 3.7.7 Noise from building services

Type(s) of Room	Maximum value of T <sub>mf</sub>
Academic staff and admin offices, meeting rooms	NR35
Cafeterias, coffee bars etc.	NR40
Lecture theatres up to 100 seats, seminar rooms and tutorial rooms, audio visual and video conference rooms	NR30
Entrance halls, corridors, stairwells, atria and circulation spaces	NR40
Halls and rooms for music and other live performances	NR30
Large lecture theatres	NR30
Library circulation	NR35
Library study areas	NR30
Recording studios	NR30
Rooms intended for examination, confidential interviews, psychotherapy, etc.	NR35
Science laboratories, art and design studios, graphics workshops	NR30
Sports halls and gymnasias	NR35
Workshops	NR35

**3.7.8** Consideration should be made for exam periods when programming building works with noisy operations in consultation with BU Space Planning Manager.

## 3.8 Health and Safety

- 3.8.1** A designer's decisions can affect the health and safety of all those involved in constructing or remodelling a building, as well as those who use, maintain, refurbish and eventually demolish it. At all times during all design phases when preparing or modifying designs, these should be carried out to ensure that any health and safety risks are eliminated, reduced or controlled for all identifiable, or foreseeable risks that may arise during the construction, through to use and maintenance of the building right through to final disposal.
- 3.8.2** BU as the client will ensure suitable arrangements are in place to manage the project by ensuring relevant information is prepared and provided to the principle contractor and or designers. BU will allow/provide adequate time/resources to ensure that all projects progress safely without creating risk so as to maintain health and safety at all times.
- 3.8.3** All designers need to be assessed during the procurement stages of a project to demonstrate they have the health and safety skills, knowledge and experience (SKE), and where they are an organisation, the organisational capability, to carry out the work they are being appointed for. The level of SKE required should be proportionate to the complexity of the project and the range and nature of the risks involved.
- 3.8.4** All design works for new build and refurbishments and minor projects will be carried out so as to comply with the requirements of the Construction (Design and Management) Regulations 2015 (CDM 2015).
- 3.8.5** All new works will be designed and delivered by ensuring that the University's directive 'CDM 2015 Pre-Construction Health and Safety Information - (see Appendix 9) is adhered to. All contractors are to comply with this document and embrace the information provided to develop their Construction Phase Plan in order to minimise any risk to the Health and Safety of contractors, staff, students the general public and the environment from all construction and maintenance activities.
- 3.8.6** All designers and all others engaged with the preparation, modification of designs for a building, product or system relating to construction works will 'risk assess' any such change in relation to any health and safety implications. They will provide timely information at all stages during the design process or changes, from conception to completion to the appointed BU Project Manager and if required the BU Health and Safety Officer.
- 3.8.7** On completion of a project all as built O&M's will be updated and provide information of any specific health and safety issues that the client needs to be aware of. The project 'safety file' will also be provided at handover to the client for their retention.

## 3.9 Durability and Maintenance

- 3.9.1** Materials and components must be selected for durability and low maintenance characteristics in order to avoid excessive cost and disturbance associated with repair and maintenance work.

- 3.9.2** Main structural elements should have a minimum design life of 60 years and secondary elements 30 years.
- 3.9.3** On above ground works to existing buildings all outlets, downpipes gullies and drains are to be capable of being jetted through by provision of adequate access points.
- 3.9.4** Consideration will be given to easy maintenance of all external wall finishes. Painted and rendered wall finishes at high level or in inaccessible positions should be avoided.
- 3.9.5** Life cycle calculations should be considered during the feasibility stage to define whole-life cost of the proposed facility.
- 3.9.6** For capital projects above £2m Whole Life Costing appraisal should be considered including running and disposal costs, as well as the initial purchase price.

## 3.10 Accessibility

- 3.10.1** These requirements are written with the assumption that statutory obligations and codes of practice are met, or where appropriate exceeded (Building Regulations 2010, Approved Document M – Access to and Use of Buildings, BS 8300-1:2018 Design of an accessible and inclusive built environment, Health & Safety at Work Act, and compliance with the Equality Act 2010). This guidance is to highlight BU's additional requirements over and above these minimum standards.
- 3.10.2** BU wishes to continually improve the accessibility of our premises and facilities across the university's estate, leading to the ultimate goal of a campus of equal opportunity that is accessible to all. BU recognises that people are different in their needs and in the way they use the built environment and that these differences should be accommodated through informed and thoughtful design.
- 3.10.3** BU's aim is to create and support an inclusive campus where people feel integrated with the BU community in such a way that individual choice is respected, and where the diversity of individuals is recognised as a valuable and contributing factor.
- 3.10.4** In order to continuously improve the campus environment BU aims to incorporate best practice in inclusive design. There are two compatible sets of principles to follow. First, the concept of Universal Design: The BU campus environment is to be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability. Design the environment (or any building, product, or service in that environment) to meet the needs of all people who wish to use it. Further details on the UD principles listed below are available here: <https://projects.ncsu.edu/www/ncsu/design/sod5/cud/>

### **The Universal Design principles are:**

- Equitable Use - The design shall be useful and marketable to people with diverse abilities.
- Flexibility in Use - the design shall accommodate a wide range of individual preferences and abilities.

- Simple and Intuitive Use - Use of the design shall be easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Perceptible Information - The design shall communicate necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Tolerance for Error - The design shall minimise hazards and the adverse consequences of accidental or unintended actions.
- Low Physical Effort - the design shall be sufficient such that it can be used efficiently and comfortably and with a minimum of fatigue.
- Size and Space for Approach and Use - appropriate size and space must be provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Similarly, the leaders in this space in the UK are Design Council Cabi. <https://www.designcouncil.org.uk/what-we-do/built-environment>

They define inclusive design as:

- Welcoming to everyone
- Responsive to people's needs
- Intuitive to use
- Flexible
- Offer choice when a single design solution cannot meet all user needs
- Convenient so they can be used without undue effort or special separation and so that they maximise independence

From this, there are five inclusive design principles that BU aims to follow. Inclusive design:

1. Places people at the heart of the design process.
2. Acknowledges diversity and difference.
3. Offers choice where a single design solution cannot accommodate all users.
4. Provides for flexibility in use.
5. Provides buildings and environments that are convenient and enjoyable to use for everyone.

Further details are available

here: <https://www.designcouncil.org.uk/sites/default/files/asset/document/the-principles-of-inclusive-design.pdf>

- 3.10.5** BU Estates, through timely consultation with staff and students, and particularly those who are disabled will, wherever reasonably practicable, adhere to the principles of Universal Design throughout its estate development programs.
- 3.10.6** In order to monitor and manage the accessibility aspects of BU estates development the capital projects governance and approval process requires Equality Analysis to be submitted for review and approval at each project approval gateway. For details of the BU Equality Analysis template, see Appendix 3.

- 3.10.7** To support project teams and designers with most up to date advice on inclusive design solutions going over and above the statutory, minimum standards, BU entered into contract with Business Disability Forum (BDF).
- 3.10.8** In partnership with BDF BU developed an Audit Checklist to assist in capital projects accessibility assessment, for details of the checklist see Appendix 4.
- 3.10.9** If required, on a project-by-project basis, BU can obtain advice on current practice of other members or on interpreting principles and standards. BDF advisors can review other elements of building design or point to other specialist advice (internally in BDF or the Centre for Accessible Environments: <https://cae.org.uk/>)

### 3.11 Adaptability

- 3.11.1** The design will allow for future alteration and adaptation to be carried out without excessive cost or disruption. Consideration should be given to the following issues where appropriate:
- Minimum provision of new load-bearing walls – framed construction is generally more flexible.
  - Use of demountable or lightweight partitioning if other constraints allow - See also sections 3.2 and 6.5
  - Floor loading capacity to allow for future changes.
  - Routing of building services – it is preferred to use ceiling voids with drops to terminal points. Avoid routes within floor slabs where possible.
  - Innovative design, whilst generally encouraged by BU, should not restrict future adaptations.

### 3.12 Drawings

#### Working Drawings

- 3.12.1** The BU Project Manager is to be provided with copies of all working drawings, schedules and specifications issued. Pdf format copies generally acceptable unless requested otherwise.
- 3.12.2** Floor plans for working drawings are to be plotted to a scale of not less than 1:100.

### **Drawings for Room Numbering Proposals**

**3.12.3** As soon as floor layout plans are frozen, and the proposed use of all rooms and balance spaces (corridors, lobbies, plant rooms, WCs etc.) have been confirmed on the plans, a set of .DWG format floor plans are to be issued to the Architectural Section of Estates Development, via the BU Project Manager, in AutoCAD 2013 format, to enable BU to confirm the room and balance space numbering proposals. These are to be incorporated into the project construction data. Any layout changes made after preparation of the room numbering proposals are to be referred back to BU Estates.

### **As Built Drawings**

**3.12.4** At project handover stage designers (architectural, structural, MEP etc.) will be required to provide electronic copies of all construction drawings, schedules and specifications to 'as-built' status (or 'as intended' for BIM models), to BU Estates Development, Architectural Section. This applies to all new build and refurbishment projects, and is in addition to any plans etc. supplied to the BU Fire Safety Officer, or provided within the O&M Manuals.

**3.12.5** 2D drawings are to be supplied in DWG and PDF formats and be based on survey dimensions to finished surfaces. DWG files are to be supplied in AutoCAD 2013 version. PDF files are to be supplied in a version no older than v.7.0. 3D models are to be supplied to suit Revit LT 2017. These are to be issued to the BU Project Manager by project handover. Files are to either be provided on DVDs or via an alternative, permanently accessible storage system, subject to agreement with BU.

**3.12.6** A set of 'as intended' DWG format floor plans are to be issued to the BU Project Manager in an agreed AutoCAD version at a pre-handover date specified by BU. The plans are to include details of fire strategy and seminar room furniture layouts. This is essential to enable provisional updates to the BU CAD records to be completed before project handover, so that BU fire safety and evacuation plans etc. will be available in time for occupation of the building.

**3.12.7** As built drawings are to be prepared using a suitable layer convention i.e. one that separates out the various building elements and services i.e. to BS 1192:2007 unless agreed otherwise between BU and the design team. They are also to be presented with individual layout tabs, with non-applicable layers turned off, to clearly show the following details:

- a) The general wall / partition layout showing finished wall thicknesses, doors and window positions and fixtures and fittings etc.
- b) The fully co-ordinated fire strategy i.e. in accordance with section 6.2.
- c) The suspended ceiling and lighting layout including emergency fittings.
- d) Furniture layout details when provided as part of the contract.

### 3.13 Building Information Modelling (BIM)

- 3.13.1** New building projects shall adopt the principles of Building Information Modelling, Level 2 as a minimum.
- 3.13.2** Design information is to be shared through a common file format in order to make a federated BIM model, and to carry out interrogative checks on it.
- 3.13.3** BIM model is to be used both to improve building systems coordination and to improve project understanding by all stakeholders through instant visualisation.
- 3.13.4** The requirement for the federated model to be linked with COBIE data (Construction Operations Building Information Exchange) is to be agreed on project-by-project basis.
- 3.13.5** BIM design information to be compatible with Revit LT 2017, Navisworks Simulate 2017 & Autodesk Architecture 2015.



## 4 Mechanical, Electrical and Public Health Requirements

### 4.1 Mechanical systems – Primary Design Considerations

- 4.1.1** Mechanical Installations for all projects will be designed and installed to provide a maximum of flexibility for existing and future installations. Where refurbishments are planned, consideration of the existing system is essential and adaptations should be carried out to existing systems as appropriate.
- 4.1.2** All new builds will incorporate utility metering for all services and be fully integrated into the existing BU Automatic Meter Reader (AMR) system including the Graphic User Interface (GUI). Proposals will be passed to the BU Energy Officer.
- 4.1.3** Designers will specify that all installed duct work and pipe work will be suitably supported, particularly above suspended ceilings/ceilings and walls.
- 4.1.4** All supply ductwork, pipework, heating valves and flanges will be insulated in accordance with the BU Energy Officer's requirements.
- 4.1.5** As part of the fire strategy, any mechanical penetrations to fire barriers, compartments and fire resisting structures must be suitably sealed or have fire or fire / smoke dampers as appropriate. Certification of compliance is to be provided within the Handover Documents.

*See section 5.5 for further requirements.*

- 4.1.6** Hot and cold water and heating services will be segregated to ensure no heat gain between services; this will generally be eliminated due to all pipework being fully insulated.
- 4.1.7** Any design will take into account energy efficiency, (see Section L below), and heat gain from solar or equipment sources.
- 4.1.8** The design will incorporate appropriate controls for heating, comfort cooling and other energy using processes. The controls will be compatible with and connected to the current BU BMS system including the GUI. This is based on a 'Trend 963' system and uses a web GUI viewing system, thus allowing central control of all services in terms of temperature, times of use and flexibility of use, i.e. localised control of temperature. Level of control will be classified in accordance with BS15232
- 4.1.9** Where plant is to be retro-fitted to an existing flat roof, consideration is needed for fire protection of unprotected steel beams to protect against disproportionate collapse. If not, fire protected engineers calculations will be required to prove stability.

## 4.2 Air Conditioning (Comfort Cooling)

### 4.2.1 General requirements

- 4.2.1.1 Designers shall review the recommendations within the universities TM44 - A/C inspections for any refurbishment works and include within the scope of the project.
- 4.2.1.2 Designers will ensure that any areas which have separate heating and cooling facilities have a physical link between the heating and cooling controls. Allowance will be made for a dead band of +/-3C between heating and cooling outlets for each desk position.
- 4.2.1.3 Inverter units are to be used when installing single split systems. These systems will be connected to a central controller as required.
- 4.2.1.4 All new A/C systems to contain F-Gases of less than or equal to 2000 GWP
- 4.2.1.5 Heat pump units are suggested for 24-hour access areas; this is to allow the heating to be switched off during holiday periods and outside normal working hours.
- 4.2.1.6 If multiple units are required, VRF/VRV heat recovery units must be considered. It is required that all systems are connected to the BU BMS using the most up to date version of central controls.

#### **Central controllers will have the following:**

- Web access for remote adjustment
- Low and high temperature limits
- Time schedule
- Prohibited settings if required
- Control of individual units
- Local room controllers (set via the central controller) will have the following:
  - Limited temperature adjustment (between +20°C - +24°C adjustable)
  - ON / OFF enabled
  - Fan speed adjustment
  - Mode adjustment where applicable

(Mitsubishi 'AG150' is an example of a suitable central controller).

- 4.2.1.7 Comms/server rooms will always have their own independent unit and connection to a VRF/VRV will be avoided.

#### **4.2.2 Ceiling-mounted Fan Coil Units (FCUs)**

- 4.2.2.1 Where a design requires the installation of ceiling mounted heated/cooled air flow, the unit's designers are to specifically consider the effects of draughts on working areas.
- 4.2.2.2 In connecting fan coils or similar units, allowance should be made for flexible connections to the ceiling diffuser to enable future modification for partitioning changes.
- 4.2.2.3 All FCU's will have full individual control through the university's 'Trend 963' BMS.

#### **4.2.3 Commissioning**

- 4.2.3.1 Designers must ensure that documentation provided to installers has full detail to ensure that the services can be commissioned in accordance with the full CIBSE requirements.
- 4.2.3.2 Local air conditioning units are only to be specified with the specific approval of the Maintenance Manager and BU Energy Officer.
- 4.2.3.3 Designs will consider and confirm details of commissioning and handover procedures to be incorporated into the project programme. Designers will specify commissioning of all services in accordance with full CIBSE recommendations.

### **4.3 Heating Systems**

- 4.3.1 All natural gas heating boilers must meet minimum efficiency requirements in accordance to regulations and BU's preference is for a minimum efficiency (based on Gross Calorific Value) of 88%. However, due allowance may be given to the maintenance requirements associated with small bore heat exchangers, specified make to be agreed with BU's M&E and Design Team.
- 4.3.2 Boiler temperature set points will be set to the following:-
  - Minimum + 60°C
  - Maximum + 70°C
- 4.3.3 When replacement of any major component is required to the heating system the efficiency and effectiveness of the system as a whole must be re-evaluated to ensure that heating is provided as efficiently as feasibly possible. This must include end user controls.
- 4.3.4 Ground Source Heat Pumps and Combined Heat and Power systems are to be considered for each new building/heating system.
- 4.3.5 All over-door heaters will be connected to the wet heating system. These must always be connected to a constant temperature (CT) circuit. Controls will be fully controllable through BU's BMS with local on/off override switches. Electric over-door heaters will not be used unless there is no suitable wet heating plant or a constant temperature circuit within the building.

#### **4.3.6 Pipe work**

- 4.3.6.1 BU's preference is for quality PVC/plastic pipe work for drainage above ground. Hot and cold should be run in copper or suitable PVC/plastic, however stainless steel press fit installations will be considered on project by project basis. All heating/hot water pipe work must be fully insulated including all valves and flanges.
- 4.3.6.2 Where pipes/ducts pass through Fire Cavity Barriers/sound proof walls, designers will specify the details of the seal, to meet Approved Document B, mastic sealant to meet the fire resistance testing to EN 1366-3 EI 120, and any passive fire resistance - fire stop products to meet BS 476.
- 4.3.6.3 Drainage pipe work will be specified to minimum flow capacity to ensure additional capacity is available for future additions to the system.
- 4.3.6.4 Pipe work and ductwork supports will be fitted for all new pipe/duct work; preference is given to fixed tube supports. Pipes and ducts will be securely attached to supports. Under no circumstances will pipes or ducts be allowed to lay on suspended ceilings.
- 4.3.6.5 In refurbishment/minor works projects, where existing pipe/duct work cables are found to be unsupported within the area of the project, due allowance will be made for supporting existing pipe/duct work.
- 4.3.6.6 Drainage systems will be so designed to ensure ease of maintenance and access for clearance of blockages.

#### **4.3.7 Heating pumps**

All heating pumps will be operated and controlled using variable speed drives. Fixed speed motors will not be accepted. Rebuilding/rewinding of motors will not be allowed due to efficiency losses, in which case more efficient replacement motors must be used.

#### **4.3.8 Heating Controls**

- 4.3.8.1 Heating controls will be based on 'Trend 963' software, which is hosted on BU's internal server. Access is available through any BU-networked computer. Viewing is via a GUI web based system provided by NEXT Controls Limited.
- 4.3.8.2 All buildings are to incorporate full connection to the building management system (BMS) including the GUI.
- 4.3.8.3 All new equipment must be 'Trend' or equivalent 'Trend' compatible hardware which must seamlessly work with 'Trend 963' software to control and monitor as a minimum:
  - Full time clock control
  - Hot water systems

- Space heating systems
- Boiler plants
- Gas supply status (Inc. metering)
- Electrical supply status (Inc. metering)
- Air conditioning systems (if installed)
- Monitor and control the boilers
- Control, enable and disable all pumps
- Monitor comms room and data centre temperatures
- Monitor internal and external air temperatures
- Set, control and monitor flow and return temperatures on all hot water and heating circuits
- Give critical alarms (Inc. emails)
- Set, monitor and control boiler and cylinder water temperatures
- Lock out and give critical alarm warning when dilution fan flue/fan running system fails (Inc. comms fail)
- Monitor and activate frost protection and fabric protection systems
- Monitor and control summer/winter settings, night setback, optimum start up and cool down
- Full control of Air Handling Units (AHU)
- Full building floor layout with room ID

#### 4.3.9 Design Temperatures

	Heating**	Cooling
Based on External -3°C	Maximum	Minimum
Teaching Rooms	+21°C	+24°C*
Seminar Rooms	+21°C	+24°C*
Lecture theatres	+21°C	+24°C*
Break out Space	+21°C	+24°C*
Social Space	+21°C	+24°C*
Offices	+21°C	+24°C*
Laboratories	+21°C	+24°C*
Communications Rooms	+21°C	+24°C*
Residential Accommodation	+22°C	N/A

4.3.9.1 Comfort and cooling only to be specified where there is a specific operational requirement and to be agreed with the Project Manager and the BU Energy Officer.

4.3.9.2 A dead band of +/- 3°C is required between heating and cooling.

4.3.9.3 N.B Where comfort cooling is installed, there is a specific requirement for controls to be installed to ensure that heating and cooling equipment is not able to operate at the same time. All equipment must be connected to the BU BMS.

\*\* The Fuel & Electricity (heating) (control) Order 1974 No.: 2160

\*\* The Fuel & Electricity (heating) (control) (amendment) Order 1980 No.: 1013

#### **4.3.10 Radiators**

Steel radiators are preferred. Radiators and radiant panels will be fitted with thermostatic valves with lockable covers set to a maximum room temperature of +22°C.

#### **4.3.11 Hot and Cold Water Services**

Hot water services will be designed to incorporate circulating services to ensure that no \*dead legs are incorporated in design. Particular consideration is required in designing services to rooms which have minimal use such as First Aid rooms to ensure that the circulating main is close to the take off point for hot and cold water. Water temperatures are set as follows:

- Hot water +55°C minimum +62°C maximum
- Cold water +5°C minimum +20°C maximum

In undertaking refurbishments, particular care is required to ensure that dead legs are not created in the process of adapting existing services.

Consideration should be given to implementation of grey and black water recycling systems.

#### **4.3.12 Comfort cooling condensate drain**

Designers are reminded of the need to locate split air conditioned units in a location where effective drainage can be achieved for condensate flow from a/c unit. Externally, consideration should be taken into account for heat pump units as condensate could freeze during winter periods, creating a slip hazard.

### **4.4 Ventilation/Air Handling Unit (AHU) Systems**

4.4.1 Full mechanical ventilation systems will only be considered where natural ventilation is proven to be inadequate or required by regulation.

4.4.2 All ventilation/AHU plant will be fully connected and controlled through BU's BMS. All fan motors will be operated using variable speed drives (VSD) and will automatically adjust to meet demands with regard to both temperature and Co2. Fixed speed VSD's will not be acceptable. All fans to be EC fans.

- 4.4.3** Heat recovery systems will be installed as standard and all fresh supply air will be tempered using hot water coils. Electric heater batteries will not be accepted for any ventilation/ AHU unless proven to be the only option.
- 4.4.4** Sustainable and free cooling methods should be considered. Thermal storage and night cooling are typical examples. Other options are evaporative cooling, preferably by Menerga which BU currently uses with great success.
- 4.4.5** Mechanical cooling will only be considered subject to overheating analysis proving that other methods are unsuitable. Typically, areas must exceed +28°C for more than 120 hours per year (occupied) or if the average internal to external temperature difference continuously exceeds 5°C during the summer periods.
- 4.4.6** All ventilation/AHU's systems will be connected and fully controlled through the BU's BMS.
- 4.4.7** Ventilation for specialist laboratories etc. should be designed specifically for that use and be mindful of the surrounding areas in discharging fumes etc. Laboratory design should be informed by S-Lab (<http://www.effectivelab.org.uk/about-s-lab.html>).

## **4.5 Electrical Power/Lighting Systems**

### **Primary Design Considerations**

- 4.5.1** Electrical installations for all projects will be designed and installed to provide a maximum of flexibility for existing and future installations. All new-builds will incorporate metering compatible with and fully connected including GUI's to BU's existing BMS and AMR system. Installations will incorporate a minimum of 25% spare capacity for distribution boards and associate supply cabling/cable supports.
- 4.5.2** Designers will specify that all installed cabling will be suitably supported and metal clipped above suspended ceilings and throughout cable routes in accordance with BS5839.
- 4.5.3** Electrical services will be segregated from IT and Fire alarm circuits
- 4.5.4** Designers are particularly reminded of the need to consider Energy Conservation. Low/mains voltage halogen spotlights will not be used.
- 4.5.5** The design will incorporate appropriate controls for lighting including both absence detection and daylight sensors, heating, comfort cooling and other energy using processes. The controls will be compatible and fully connected to BU's current BMS system, which is based on the 'Trend 963' system and GUI.
- 4.5.6** Designers will consider and confirm details of the commissioning and handover procedures to be incorporated in the project programme.
- 4.5.7** Designers are to ensure that appropriate lightning protection is installed for all projects undertaken. N.B BU has some difficulty in achieving acceptable provisions for earthing - specialist design is specifically required at all locations.
- 4.5.8** Designers will ensure that loading on electrical distribution boards is suitably balanced between phases.

## Specification Items

- 4.5.9** BU requires standardisation of the equipment installed in all new works. The following details represent BU's preference for electrical equipment:

Distribution Boards	Merlin / Schneider.
Dado Cable Trunking	3 section white plastic 'MK Prestige Plus'
Wiring accessories	MK Logic Plus' or similar 'Hager, BG, Click, Schneider' Not Crabtree.
Internal luminaries	Recessed LED lamps.
External luminaries	Lamp type LED, including colour rendering and style, ensuring minimal light pollution to neighbouring properties.
Emergency Lighting	Illuminated LED Fire Exit signs will be 3hr Maintained. All other luminaires will be 3hr Non-Maintained.
Sockets	All sockets within teaching and breakout areas are to include USB outlets
Street Lighting	Consideration must be made with regard cost and continued manufacturers support (at least 5 years) with regard to spares and replacement of specified fittings. 'Thorn' fittings are not to be specified. Options are to be approved by the Maintenance Manager.

- 4.5.10** Specialist Plant and Equipment will be specified by the designer prior to tender and not selected by the successful tenderer. Any distribution boards are to be enclosed within integral locking casing.

BU has standardised on particular manufacturer's equipment for the following services:

Fire Alarms	Systems are to be fully open protocol and comply with BS5839. Contractor/installer to be BAFE accredited. Software and firmware to be provided to Client at hand over.
Security Systems	See section 5.2
CCTV	See section 5.2
BMS	TREND 963

Designers are required to incorporate this information into their specification.

## 4.5.11 Designer's Survey

Design staff wishing to undertake surveys will provide BU's Project Manager with a minimum of 2 working days' notice of requirement to inspect existing services with details of requirements.



### **Installation Details**

- 4.5.12** Specified cabling will be appropriate in type and capacity for load being supplied; due allowance will be made for supporting cables and the environments and heat gain throughout the cable route.
- 4.5.13** Due allowance will be made for floor trunking to desks which are located away from wall mounted socket outlets. The use of extension cables is not acceptable.
- 4.5.14** Cable supports will be fitted for all new cabling; preference is given to wire basket supports. Cables will be securely attached to supports. Under no circumstances will cables be allowed to lay on suspended ceilings. Supports are to be installed with at least an additional 25% capacity for future projects.
- 4.5.15** N.B.: In refurbishment/minor works projects, where existing cables are found to be unsupported within the area of the project, due allowance will be made for supporting cables. Metal clips will be used.
- 4.5.16** Where cables are passing through fire resisting construction / soundproof walls, designers will define the format of the seal of the cabling through it. See also sections 6.5.44 – 6.5.46.
- 4.5.17** Loading of electrical phases - designers will ensure that loading on electrical distribution boards is suitably balanced between phases.

### **General Requirements for electrical Services**

- 4.5.18** Due allowance will be made in the building design for suitable electrical risers, intake rooms and electrical distribution cupboards.
- 4.5.19** The areas allocated will be suitable to allow maintenance/removal and adaptation of the installed equipment and will have sufficient space to allow suitable expansion of the existing equipment by a minimum of at least 25%. Locks to electrical areas to be Salto locks.
- 4.5.20** Areas will be easily available with access from floor level, i.e. access from main staircases and not by the use of Cat ladders or such like.
- 4.5.21** Suitable statutory signage will be designated as part of the design process.

### **Power Points and data sockets**

- 4.5.22** As a minimum, allowance will be made for 2 No. twin socket (inc. USB) outlets and 1 No. IT data point for each desk position.
- 4.5.23** Designers will specifically confirm details of requirements with the BU Project Manager.
- 4.5.24** N.B. Telephony is provided by VOIP system therefore PC and telephone only require 1 No. data socket per work station.
- 4.5.25** See also BU Design guide for offices – Section 2.1, and generic specification drawings reference OFFICES-EST-1&2.
- 4.5.26** Photocopier / fax/ printer stations - allowance will be made for a separate socket outlet and associated IT data and/or telephone points for each machine.

### **Room standard details**

**4.5.27** For meeting rooms see BU's generic specification drawings reference MR/EST/1E&2E & AV/EST/1A.

**4.5.28** For Lecture Theatres, Seminar and Teaching Rooms see BU's generic specification drawings reference AV-EST-1A, AV-EST-3B & AV-EST-4B.

**4.5.29** For PC Labs see BU's generic specification drawing reference PCLAB/1G

### Lighting

**4.5.30** In line with BU's aspiration to standardise equipment, lighting will primarily be comprised of the following:

**a) Internal:**

- LED lighting or approved alternative
- All forms of Halogen lamps including low voltage will not be allowed. 'Metal Halide' or similar must not be used.

**b) External**

- External lighting is to be LED type with controls that provide photocell activation. Motion sensors and dimming facility are to be incorporated where applicable. Lighting, where used in conjunction with CCTV, should be adequate for security purposes

Note: More energy efficient options, if proven, will always be considered.

### Lux Levels

**4.5.31** Designers will design to the following lux levels which should be treated as a maximum:

Seminar Rooms	300 Lux
Teaching Rooms	300 Lux
Lecture theatres	300 Lux
Laboratories	500 Lux
General Offices	300 Lux
Specialist design offices	500 – 750 Lux
Toilets	150 Lux
Corridors	100 Lux
Emergency Lighting	1 Lux
External Lighting	30 Lux average – 10 Lux minimum

### Lighting controls – Internal

**4.5.32** Areas with external windows that provide natural daylight will be controlled by daylight dimming controls set to the required Lux levels as stated above. (3.5.31)

**4.5.33** All rooms will be installed with motion/absence sensors and local retractive switches (including dimmable if required). This will allow the end user the option of control over their lighting requirements.

- 4.5.34** Areas that have projectors or screens will be separately switched from the remaining area so that the users can view projection screens without glare/reflection.
- 4.5.35** Open plan areas will have zoned controls (no greater than 10m<sup>2</sup> per zone).
- 4.5.36** Local zone switching should be considered for end user control and must be clearly labelled regarding the area concerned.
- 4.5.37** Corridor and WC areas will be on motion/microwave sensors with no local switching. Serious consideration should be given to introducing/utilising natural daylight where possible. This should not just be limited to windows, but technologies such as sun pipes must be considered. If this is achievable, Lux level sensors must be fitted to switch off lighting and set at the levels stated above. (3.5.33)
- 4.5.38** Areas that require specific controls (sports/libraries/laboratories) - central controls are to be provided and connected to BU's BMS. This will ensure that lighting is not left switched on out of hours. This should be considered if local sensors are not possible.
- 4.5.39** Lighting controls are to be open protocol and not rely on a computer head unit for support and programming, 'FlexConnector' system or similar are preferred. To be approved by Maintenance Manager.

#### **Lighting controls - External**

- 4.5.40** External lighting will be, as a minimum, controlled by using photocells. Time-clock control is preferred to be via the BMS, but local time-clock will be acceptable and photo cells are preferred to be in individual fittings.

## **4.6 Building Management System (BMS)**

- 4.6.1** In major buildings, unless specified otherwise, all buildings will incorporate the 'Trend' or equivalent hardware compatible with 'Trend 963' to control and monitor the following:
  - Hot water system
  - Space heating system
  - Boiler plant
  - Gas supply status to boiler plant
  - Electrical supply status to boiler plant
  - Air conditioning system (if installed)
  - In particular, the system will –
  - Monitor and control the boiler flow switch
  - Enable and disable pumps
  - Control room temperatures
  - Monitor inside and external air temperatures
  - Set, control and monitor flow and return temperatures on domestic hot water and heating circuits
  - Give critical alarms for boiler lock outs, gas and electrical failures
  - Set, monitor and control boiler and cylinder water temperatures

## BU Design Standards

- Lock out and give critical alarm warning when dilution fan flue/fan running system fail
- Monitor and activate frost protection systems
- Monitor and control Summer/Winter settings, night setback, optimum start up etc.

## 5 Specialist Installations

### 5.1 Lifts

- 5.1.1** Lifts are to be designed and installed in conjunction with the BU Standard Lift Specification Document (A copy of BU Standard Lift Specification can be found at Appendix 10).
- 5.1.2** For new buildings and major extensions over single storey, a minimum of two lifts are to be provided as standard. Service lifts are to be considered where the use of the building has a definite need for such facility. Where plant rooms are located above the main accommodation floors, one lift should be capable of serving plant room level.
- 5.1.3** Lift cars are to incorporate the means to fix padded protective covers for use during transit of goods or building works within the building. A set of protective covers are to be provided as part of new lift installations.
- 5.1.4** Lifts are to be designed to achieve 2 credits as specified in BREEAM Ene 06 Energy Efficient Transportation Systems.
- 5.1.5** All lifts are to be separately metered for energy consumption and fully connected to BU's AMR including the GUI. This will also include all metering for energy regeneration.

### 5.2 Security and Access Control

#### 5.2.1 Security Methodology

The BU university environment is provided as an accessible, inclusive environment however there remains a requirement to ensure that student, staff and visitor's personal safety is maintained. This presents a challenge to both designers and Estates Facilities Management practitioners.

BU security policy deploys a number of security functions to provide a safe environment, notably;

- Physical Security
- Access Control to designated buildings and areas (external and internal)
- Manned Security Patrols (out of office hours)
- Closed Circuit Television Image Capture
- Intruder Alarms
- Reception Points

## **5.2.2 General Design Considerations**

5.2.2.1 The involvement of the Estates Soft Services Manager or their designated representative must be included at an appropriate point in all new design or refurbishment project design processes to ensure appropriate security measures are incorporated. The Soft Services Manager will oversee consultation with the local Architectural Liaison Officer through the Dorset Police Crime Prevention Team.

### **5.2.2.2 Secured by Design**

Specifically, all new works will incorporate the 'Secured by Design' criteria in its design.

### **5.2.2.3 Threat Risk Assessments**

A project specific Threat Assessment should be undertaken as part of the design process to identify specific security requirements.

### **5.2.2.4 University Specific Areas of Note**

In addition to generic design requirements, specific measures may need considered for areas containing specific high value or high risk assets, notably;

- Laboratory Facilities
- Media Studios

These measures could include additional access control, CCTV, suited locking, intruder, secure fenestration, secure doors etc. Specific requirements are derived from the project specific threat assessment.

## **5.2.3 Site Perimeter Security**

Specific requirements for site perimeter security would be derived from the project specific threat assessment (5.2.2.3). Consideration should be given to measures that protect the university's assets in line with the CPNI's principles of deter, detect and delay, but do not detract from the core purpose of the building and the ethos of the university or the need for accessibility and inclusiveness.

These measures can include street furniture, discrete vehicle barriers etc.

## **5.2.4 Legislation of Note Specific to Security and Access Control**

- General Data Protection Regulations 2018 (GDPR)
- National Security Inspectorate NACOSS Gold Accreditation or BSIA.
- The requirements of BS EN 50132-7 - European Standard for CCTV Systems (referred to hereafter as BS 50132);
- The requirements of BS IEC 62676-4 - Video surveillance systems for use in security applications Part 4: Application guidelines
- The National Security Inspectorate Code of Practice for the Design, Installation and Maintenance of CCTV Systems (NCP 104, Issue 2)
- BU Security Policy

### **5.2.5 Access Control**

- 5.2.5.1 Access control to the BU estate is provided either by manual locking through the installation of ASSA strike locks, or through the provision of electronic access controls (SALTO). This section should be cross referenced with Section 3.4 (Ironmongery).
- 5.2.5.2 The use of digi-locks must be avoided as part of any refurbishment or new build.
- 5.2.5.3 Specification for locking provision must be incorporated as part of the detailed design brief with consideration to the number of users, requirements for access audit trail and the provisions of the GDPR.
- 5.2.5.4 As per 5.2.2.1 it is important that the Soft Services Manager or their representative is involved as part of the detailed design stage to advise on the appropriateness of access control solutions.
- 5.2.5.5 The provision of manual and electronic access control to the same door should be avoided.
- 5.2.5.6 Any proposed access control hardware or equipment that involves fitting to a door set are to be specified, or checked, by a qualified member of the Guild of Architectural Ironmongers to ensure that the products have the necessary Construction Product Regulation CE marking / third party fire certification, as appropriate to the location, construction and function of the door set. Documentary evidence (Declaration of Performance certificates and/or appropriate fire test certification) for such access control products is to be supplied to BU prior to any order being placed.
- 5.2.5.7 Access control equipment is to only be installed by approved installers, who have undertaken training regarding EN 13637.

#### **Manual Access Control**

- 5.2.5.8 The university's chosen supplier of manual locking devices is ASSA Abloy (product range 4800). This section must be cross referenced with Section A.6 Ironmongery.
- 5.2.5.9 Key requirements will vary according to the project however the requirements as stated in 1.1.3.8 must refer to section A.6 for details of BU's suited ironmongery section.
- 5.2.5.10 All locks installed must be suited in common with the existing ASSA BU Suiting system, to include the following:
  - 2 no. master keys. for Estates access control
  - 3 no. sub masters for cleaning contractors

A maximum of 1 no. key per occupant per room will be required however the need for the production of these keys for individual doors should be agreed between the end user and Estates.

Where locks are being fitted to IT Server Rooms these need to be provided to the IT specific suited – S16.

- 5.2.5.11 Reference should be made to the Soft Services Manager or their representative concerning the availability of suited locking sets from vacated properties.

### **Electronic Access Control**

- 5.2.5.12 BU's chosen access control system is SALTO. The provision of the SALTO devices should be co-ordinated through the Soft Services Manager or their representative.
- 5.2.5.13 Specific consideration in the location of SALTO should be given to the provision of On Line or Off Line devices
- 5.2.5.14 All maintenance doors must be fitted with SALTO devices as opposed to manual locking systems
- 5.2.5.15 SALTO Online locking devices require IP Network Points. Reference should be made to the IT department (see 1.1.9). All Salto related data must be routed through supported BU networks and data stored within the IT Services facility.

### **5.2.6 CCTV**

#### **5.2.6.1 Digital Internet Protocol Based System**

Bournemouth University utilises an IP based CCTV system - Valerus system from Vicon. All added systems and cameras are to be compatible with, and enhance this system.

#### **5.2.6.2 Location of Data Storage**

All footage is to be recorded by the Valerus Application Server and stored on one of three NVRs all located in the Jurassic House Data Centre.

#### **5.2.6.3 Control Rooms**

This footage should only be accessed through a secure login on PCs with the Valerus system installed. These PCs are to be situated in secure control rooms.

#### **5.2.6.4 Access to Control Rooms**

These control rooms are to be only accessible through a Salto Door Access system that audit trails any and all authorised access.

The access is managed by referral to BUs Strategic Security Documents and the procedures within these documents are controlled by the Estates department.

#### **5.2.6.5 Camera Locations (Privacy Impact Statements)**

Location of new CCTV cameras should be at first confirmed by a privacy impact assessment. These are to be carried out by BU Soft Services Management.

#### **5.2.6.6 Remote Monitoring**

Request for a remote monitoring facility by departments should be confirmed by BU Soft Services Management.

#### **5.2.6.7 Additions to the Existing CCTV System**

In existing buildings, alterations to the existing control system should be carried out by the current maintenance contractor for security systems.



### **5.2.7 Intruder Alarms**

Intruder alarms are to be provided to ground floors only unless specifically requested by the project. Consideration is to be given to their installation at:

- Points of student/staff interaction (Student Welfare).
- Public facing interaction points.
- All areas where cash transactions take place.

### **5.2.8 Physical Security**

Reference to physical security would be made with the Threat Assessment Exercise. Specific reference should be made to the CPNI.

### **5.2.9 Information Security**

Where design works specifically include the protection of data, reference must be made to the BU Information Security Manager

### **5.2.10 Reception Points**

- 5.2.10.1 New reception areas should have adequate space for all FM activities as required, such as key issue and storage.
- 5.2.10.2 Any CCTV monitors should be located away from public viewable areas to avoid unauthorised viewing.
- 5.2.10.3 Reception desks are to have panic buttons fitted as standard that are linked into BU's 222 emergency response system.
- 5.2.10.4 Where appropriate the double push method of activation is to be incorporated.

### **5.2.11 Involvement of BU I.T. Department**

CCTV should be a digital based system, with the ability to connect to the existing system and enabled by the BU IT Network. Data sockets are to be provided on a secure IP address.

### **5.2.12 Building Information Management Security**

In order to ensure information relating to building security is managed throughout any construction project reference must be made to PAS 1192-5.

## **5.3 Fire Alarms**

- 5.3.1** Fire Alarms are to be designed, installed/modified and commissioned by a BAFE registered Fire Alarm Company.
- 5.3.2** Fire Alarm systems are to be fully open protocol and designed in accordance with BS5839 Classification L2.

- 5.3.3** The Software and Firmware for the system is to be provided to Bournemouth University Maintenance Department for inclusion on a Facilities Assistant maintenance laptop and ongoing maintenance regime.
- 5.3.4** Each building/fire panel is to have a Deaf Messaging Service installed. The current system is 'Fireco DMS'.
- 5.3.5** Each building/fire panel is to have a dedicated phone line installed for 'Redcare' 24/7 line monitoring.
- 5.3.6** Fire alarms are to be directly connected to the Poole House reception at Talbot Campus, either independently or utilising the existing 'Tyco' TXG display system.

## 5.4 IT Cabling Infrastructure

### 5.4.1 Communications Room Standards

- 5.4.1.1 Each building shall have a main communications room (comms room) where network equipment will be located. This will connect diversely to the main Bournemouth University Campus Network through optical fibre cabling. External BT telephony services must also terminate in the main comms room.
- 5.4.1.2 Each additional comms room within a building must connect to the main comms room via internal multi-mode (OM4) and single-mode (OS2) grade fibre cabling, preferably diversely from each other.
- 5.4.1.3 A 25-pair voice cable must be provided between the main comms room and additional comms rooms within the building.
- 5.4.1.4 24 Cat6A infrastructure cables must be installed between the main comms rooms and additional comms rooms unless the distance would exceed the maximum permitted length.
- 5.4.1.5 Network Racks are 800mmx800mmx2070mm (WxDxH) and must either be flat-pack and built within the comms room or the comms room door sized to allow delivery and installation of a built rack.
- 5.4.1.6 Preferred Rack model: Excel 542-4288-WDBF-BK-FP
- 5.4.1.7 All network racks must be earthed and comply with BS6701:2010, connected to a TGB (Telecoms Grounding Busbar).
- 5.4.1.8 A working area of 1000mm should be allowed around 3 sides of a network rack in a single rack configuration.
- 5.4.1.9 Each network rack must have a 32Amp supply terminated as a commando socket above the rack at ceiling level. This supply is wired via the UPS installed in each comms room.
- 5.4.1.10 An UPS and telephone placed within the comms room will require a double-network socket to be mounted near them.
- 5.4.1.11 No wet services (including soil) pipework should run though or terminate in the comms room.

- 5.4.1.12 A double power socket should be mounted on the wall in each comms room that is not dependant on the UPS power supply within the room.
- 5.4.1.13 Good lighting is required (400-500 lux) within the comms room and should be automatic (PIR-based).
- 5.4.1.14 Final comms room layouts and proposed designed need to be agreed and signed off by Bournemouth University's Network Manager.

## **5.4.2 Infrastructure Cabling Standards**

- 5.4.2.1 All network cabling must be Cat6A.
- 5.4.2.2 Grey or charcoal faceplates must be used to ensure compliance with Part-M of the Building Regulations or a suitable alternative (high-contrast) colour if the surrounding surface is grey/charcoal.
- 5.4.2.3 Floor boxes must include a 3M coil of cable to allow re-positioning of the floor box and the Cat6A cables should be run in Flexible Copex from the point they leave the tray-work to the floor box.
- 5.4.2.4 All network socket labels must be printed and not hand-written. A socket labelling scheme will be provided by the IT department per-project.
- 5.4.2.5 Any network sockets exterior to the building must be protected with lightning protection.
- 5.4.2.6 The following standards should be adhered to (or their updated equivalents) for cabling installations:
  - BS EN 50173 (Specifically 50173-1:2011, 50173-2:2007+A1 2010, 50173-6)
  - BS EN 50174 (Specifically 50174-1:2009 + A1:2011, 50174-2:2009 + A1:2011)
  - BS EN 50310
  - BS 6701:2010 (Section 5-2.2.4 Earthing)
  - BS 7671:2008 + A1:2011
- 5.4.2.7 Infrastructure cabling runs of more than 30m should incorporate pull points or pull boxes.
- 5.4.2.8 Socket Back Boxes must be a minimum of 47mm in order to maintain the bend radius for Cat6A cabling. Flat shutters must be used to facilitate this.
- 5.4.2.9 Containment must allow for the bend radius of Cat6A cabling (31mm for Excel cabling).
- 5.4.2.10 Excel CAT6A U/FTP cabling has a diameter of 6.7mm and a cross sectional area of 35.2 mm<sup>2</sup> for reference
- 5.4.2.11 Containment must also allow for future cabling installations. An estimated growth of 30% should be accommodated for.
- 5.4.2.12 All infrastructure cabling must not exceed 90 metres in length.

## 5.5 Audio Visual Equipment

### 5.5.1 Type 1 Rooms – Meeting rooms

Small spaces with High Definition large format LCD displays as the primary display. These rooms have a local PC and a wireless presentation device that allows users to display their laptop, tablet, or phone on the display wirelessly without the need for cables or adaptors. The equipment for this room is housed in a bespoke wall mounted desk and is controlled using a push button control system. This control system also allows remote monitoring and control of the equipment from the service desk and 2nd line IT support, it also detects when the room is no longer in use and shuts down the equipment automatically. Centrally bookable rooms will be fitted with Crestron room scheduling system requiring a back box fitted in the wall (size to be confirmed with IT ahead of fitting) mounted at light switch height and a single data socket in the ceiling with a data cable fed from the socket to the back box.

#### Equipment:

- PC (optional)
- Wireless Presentation device
- Large format LCD display with inbuilt speakers
- BU branded wall mounted desk (only required if PC is needed)
- Push button control panel with occupancy sensor
- Wireless keyboard and mouse
- Webcam for web conferencing and lecture capture/streaming
- Enamel whiteboard
- Crestron Room Scheduling system

### 5.5.2 Type 2 Rooms – Seminar spaces

Standard teaching spaces with full HD projection and displays. These rooms have a local PC with a touch screen, laptop input, document camera, and a wireless presentation device that allows users to display their laptop, tablet, or phone on the projector wirelessly without the need for cables or adaptors. The equipment for this room is housed in a bespoke branded teaching station and is controlled using a push button control system. This control system also allows remote monitoring and control of the equipment from the service desk and 2nd line IT support, it also detects when the room is no longer in use and shuts down the equipment automatically. The rooms also have document cameras, which replace the OHPs and tough enamel Whiteboards. Centrally bookable rooms will be fitted with Crestron room scheduling system requiring a back box fitted in the wall (size to be confirmed with IT ahead of fitting) mounted at light switch height and a single data socket in the ceiling with a data cable fed from the socket to the back box.

**Equipment:**

- Teaching PC with touch screen monitor
- Wireless Presentation device
- HD laptop input
- Document camera
- Full HD projector
- High contrast fixed frame wide screen projector screen
- BU branded teaching station
- Push button control panel with occupancy sensor
- Webcam for web conferencing and lecture capture/streaming
- Stereo audio system with wall mounted speakers
- Enamel whiteboards
- Crestron Room Scheduling system

### **5.5.3 Type 3 Rooms - Lecture Theatres**

Large teaching spaces with fixed seating and full HD projection and displays. These rooms have a local PC, Blu-Ray player, laptop input, document camera, and a wireless presentation device that allows users to display their laptop, tablet, or phone on the projector wirelessly without the need for cables or adaptors. The room has a full 5.1 surround sound system for high quality media playback, and is powered by energy star rated amplifiers. Due to the size of these rooms a microphone system is provided consisting of 'hand held' and 'clip on' digital microphones which are stored on charging stations on the desk.

The equipment for this room is housed in a large teaching station and is controlled using a touch screen control system. This control system also allows remote monitoring and control of the equipment from the service desk and 2nd line IT support, it also detects when the room is no longer in use and shuts down the equipment automatically. Lecture theatres should have user controlled lighting pre-sets to be accessed through the main control system provisioned in the main AV equipment. The rooms also have document cameras, which replace the OHPs and tough enamel Whiteboards. The rooms are also fitted with IR hearing reinforcement systems for users with hearing loss. Centrally bookable rooms will be fitted with Crestron room scheduling system requiring a back box fitted in the wall (size to be confirmed with IT ahead of fitting) mounted at light switch height and a single data socket in the ceiling with a data cable fed from the socket to the back box.

**Equipment:**

- Teaching PC with touch screen monitor
- Blu-Ray player

- Wireless Presentation device
- HD laptop input
- Document camera
- Full HD large format laser projector
- High contrast fixed frame wide screen projector screen
- Large BU branded teaching station
- Touch screen control panel with occupancy sensor
- Ceiling mounted camera for web conferencing and lecture capture/streaming
- Digital microphone system with amp and ceiling speakers
- 5.1 Surround sound audio system with energy efficient amplifiers
- IR hearing reinforcement system
- Enamel whiteboards
- Crestron room scheduling system

#### **5.5.4 Type 4 Rooms – Agile learning spaces**

These are rooms that can be used with multiple teaching methods and can be reconfigured on the fly for different classes and events. The rooms are based on the Type 2 rooms with extras to enable them to be more flexible. The front of the room has the local PC, laptop input, document camera, and a wireless presentation device housed in the standard branded teaching station. This is displayed using the same projector and screen that other Type 2 rooms use. These rooms also have a number of standalone teaching stations located around the room on mobile collaboration desks with housing for the equipment and displays. These mobile stations can display what the main projector in the room is displaying as well as being truly stand alone with their own local PC and laptop inputs. Using these in conjunction with the wireless presentation device installed in the front of the room these rooms become truly flexible in how they can be used. Centrally bookable rooms will be fitted with Crestron room scheduling system requiring a backbox fitted in the wall (size to be confirmed with IT ahead of fitting) mounted at light switch height and a single data socket in the ceiling with a data cable fed from the socket to the back box.

##### **Equipment:**

- Teaching PC with touch screen monitor
- Wireless Presentation device
- HD laptop input
- Document camera

- Full HD projector
- High contrast fixed frame wide screen projector screen
- BU branded teaching station
- Push button control panel with occupancy sensor
- Webcam for web conferencing and lecture capture/streaming
- Stereo audio system with wall mounted speakers
- Mobile collaboration bench with housing (number depending on room size)
- Large format LCD display with inbuilt speakers
- Local PC
- Laptop input
- Push button control panel with occupancy sensor
- Enamel whiteboards
- Crestron Room Scheduling system

#### **5.5.5 Digital Signage Screens**

These are digital displays that show marketing material designed and managed by M&C. These usually take the form of a 46" LED screen wall mounted in corridors or congregation areas, they are fixed using security rated wall mounts with a small amount of tilt functionality to prevent glare. In certain circumstances the display can be a large video wall or a non-traditional display. In all circumstances the displays are fed from OneLan digital signage players which are a small solid state Linux client that is mounted behind the screen. The displays are all set to automatically turn off at night and back on in the morning to save power.

##### **Equipment:**

- Large format display, size and type depends on project requirements
- Security rated mount
- OneLan digital signage player

## 6 Fire Officers Recommendations

BU's intent is to fulfil our legal responsibilities ensuring the safety of our students, staff and buildings. These standards apply to all refurbishment and new build projects. Statutory legislation will always have primacy in any potential design conflict. Any conflicts between the design and current legislation/design guidance must be brought to BU's attention.

### 6.1 Architectural Design – Consultant / Fire Engineer Guidance

- 6.1.1** Fire strategy and fire engineered solutions at initial building design stages are to take into account not only current legislation/design guidance but also the use and function of the building.
- 6.1.2** Careful consideration must be given to the on-going management of the building when completed and the design shall reflect ease of fire and safety management. This is to ensure that the fire strategy does not provide unacceptable and unworkable management conditions on occupation by BU.
- 6.1.3** It is unacceptable to:
  - Introduce complex or inappropriate measures for the sake of aesthetics or convenience to the design that become unmanageable in fire safety terms on occupation by BU.
  - Provide features with sole reliance on fire safety management, to resolve issues in the design of the building on occupation by BU.
- 6.1.4** Consultants shall discuss at the initial stages of the design with the BU Fire Officer, the overall site planning and design criteria to ensure the new building will interface with existing buildings procedures and strategies.
- 6.1.5** Refurbishment projects should include an overview of the existing fire strategy in the area as well as adjoining premises and building interfaces etc.

### 6.2 Fire Strategy Document

- 6.2.1** A Fire Safety Strategy document must be produced for new projects (refurbishments should consider impacts with any existing Fire Safety Strategy for the building(s) in question).
- 6.2.2** The document should include the following sections:
  - 1. A general description of the building including occupancy levels
  - 2. Risk profile (as detailed in BS9999) including occupancy characteristics and fire growth rate.
  - 3. Means of warning and escape:
    - a. Evacuation strategy



- b. Fire Detection systems
  - c. Emergency Lighting systems
  - d. Any additional fire suppression systems
  - e. Details on travel distances both horizontal and vertical
  - f. Exit width, escape corridors and staircase width calculations
  - g. Escape provisions for people with additional needs
4. Fire Service access and facilities for fire fighting
5. Design of the building structure:
  - a. Wall and ceiling linings
  - b. Fire resistance of elements of structure
  - c. Minimum fire resisting performance requirements
  - d. Protection to escape routes both internally and externally
  - e. Fire Doors
  - f. Protection of opening, fire stopping and any concealed spaces.
  - g. External wall construction - surface spread of flame
  - h. Space separation between any neighbouring buildings
6. Fire Safety Management
  - a. Management Level and requirements

*Note - The above list is not intended to be exhaustive*

- 6.2.3** The fire strategy for the new building / projects must be a 'dynamic document' to reflect alterations and changes to the design of the building throughout its construction, right through to practical completion and occupation by BU.
- 6.2.4** Should consultants / fire engineers be employed then they need to tender their services on this basis and not just for Building Regulation Approval.
- 6.2.5** The strategy document will be used both as the basis of the building's Fire Risk Assessment and Fire Safety Management when occupied under the Regulatory Reform (Fire Safety) Order 2005 and also as a reference document and benchmark in respect fire safety regulatory compliance throughout the building's life.
- 6.2.6** The fire strategy document is to be finalised and reviewed at handover of building project and updated where necessary. It is recommended that both the design and general fire strategy be discussed with the Local Authority Fire Brigade, Building Control Officers and BU project team. This is to ensure that design concept will not present problems at handover, which may affect the project completion outcome or delay completion.

## 6.3 Fire Safety Plans

The BU Fire Officer is to be provided with fire plans for inclusion in the building's Fire Safety Manual – this includes all refurbishments and new buildings.

These drawings should detail the floor and basic general layout information and should hold 'layers' of information that can be selected for clarity and should include:

- Building fire compartmentation indicating fire walls and their fire rating, fire doors and their fire rating, fire shutters and curtains with fire rating,

- Disabled refuges and communication points,
- Fire alarm devices including call points, detectors (smoke or heat) and sounders; marked up with zone and device details,
- Fire dampers, smoke ventilation and control points,
- Emergency lighting units,
- Fire hydrants, dry risers and fire extinguishers,
- Details of engineered solutions or systems provided and any constraints or actions required if layouts changed,
- Where the project involves the alteration / refurbishment of an existing building, clearly identify the area of works within the floor plan,
- A suitable key to enable clear identification between existing and proposed fire safety elements,
- A scale bar,
- Any other relevant information,

Note: Drawing information and layers that are superfluous to the fire strategy e.g. general dimensions / notes / hatching, furniture etc. are to be omitted from the fire plans for clarity.

## **6.4 Documentation and plans required by the BU Fire Safety Officer from the Principle Contractor and Lead Consultant / Architect**

On completion of the project a copy of final 'as built' drawings must be provided marked up as 'Fire Strategy Drawings' or similar, produced in AutoCAD with contents as above.

Documents:

- A copy of the full fire strategy and any accompanying documents.
- All fire safety documents including approvals from building control and fire brigade as reference documents
- A copy of the fire alarm zone information and zone chart
- A copy of any other documents that may be required by Building Control.

## **6.5 Passive Protection Requirements**

- 6.5.1** Materials and goods, where specified, are to be obtained from a particular third party accredited manufacturer or supplier and are to be installed strictly in accordance with the manufacturer's system and instructions. Substituting items within a system that could affect the fire performance of the building and jeopardising a manufacturer's warranty will not be tolerated.

- 6.5.2** Installations of materials and components must only be carried out by trained and certified installers who are underwritten by BRE / LPCD or similar approved third party accreditation. Installation certificates to be provided on completion of works. Any works undertaken must be subject to audit by the third party accreditation body. Evidence must be provided to prove that the third party certification is relevant to the element of work taking place.
- 6.5.3** Unless otherwise agreed all passive fire protection works are to be labelled, recorded and marked on drawings by each third party accredited installer appointed.
- 6.5.4** Installations must be in accordance with the fire ratings, in terms of both integrity and insulation, as stated on the buildings fire strategy drawings unless otherwise agreed.
- 6.5.5** Other than the product specific training and approvals as specified elsewhere, all installers of passive fire protection materials and components including dry lined walls must provide evidence of relevant qualifications (to NVQ Level 2 as a minimum).
- 6.5.6** The main contractor will arrange for periodic site inspections during the building programme to confirm installed fire compliance of all passive fire protection systems. Such inspections are to be carried out by the supplier or accreditation body as applicable.
- 6.5.7** Prior to completion and handover of a project the contractor has a legal obligation, and will be required, to provide a comprehensive Fire Safety Manual as part of the O&M documentation. This will include full specification details, Certificates of Conformity, installation certificates, maintenance details, marked up drawings and schedules in both hard and digital formats of all passive fire protection components and elements to fully comply with the requirements of Building Regulation 38. Without full provision of this documentation the BU Fire Safety Officer will be unable to risk assess the building under the requirements of the Regulatory Reform Fire Safety Order 2005, and this could have significant contractual and cost implications.

## **Partitions**

- 6.5.8** Any solid panelled plasterboard partition system used within the university is to inherently provide a minimum of 30 minutes fire resistance, with the capability of providing 60 minutes fire resistance where necessary. Options are to be available to enable 30 and 60 minute fire resisting glazed units and door sets to be incorporated where required all to have been successfully third party tested to BS 476: Part 22 or EN equivalent.
- 6.5.9** Any fire rated partition system, including glazed fire screens, must be installed in accordance with the manufacturer's fire tested details, and preferably be underwritten by third party accreditation with LPCB or equivalent certificate of conformity.
- 6.5.10** Specific periods of fire resistance are to be agreed with the BU Fire Safety Officer as part of the proposed fire strategy for the project. This is because the proposals will need to adhere to the BU Fire Strategy for Business Continuity as well as the Building Regulations.

**6.5.11** It should be noted that for alteration / refurbishment projects to existing university buildings, a number of demountable and other partition systems have been used. If it is not possible to demonstrate compliance with the current fire safety requirements by continuing to use these products, consideration is to be given to replacing the partitions with a system that has the necessary third party fire test accreditation, including door sets and glazed panels.

See also Section 3.2 for other requirements for partition systems.

## **Fire Doors and Frames**

**6.5.12** All fire door assemblies must be procured as CE marked, fire door sets from one supplier unless those responsible for specifying or procuring fire doors can provide evidence that everything assembled will be fully compatible and a complete third party certified paper trail can be compiled.

**6.5.13** All internal door sets that are specifically to be fire rated shall be third party certified assemblies and as such must either be plugged in accordance with the BM TRADA Q Mark assurance scheme or carry the BWF Certifire label identifying fire rating and approval for vision panels. All door sets to comply with EN 1634 Part 1 or BS 476 Part 22. Cascaded evidence from non-primary test evidence sources will not be accepted.

**6.5.14** Vision panels are required to be Building Regulation and Equality Act compliant. For the BU preferred vision panel style, see BU Drawing Preferred Internal Door Types BU/ID/Sk1. Other vision panel styles may be considered subject to agreement with BU.

**6.5.15** The fixing of fire doors must be in strict accordance with the manufacturer's instructions and test evidence. Installation can only be undertaken by those in a third party accredited scheme such as LPS 1271. Installers and installations must be underwritten by a third party certificate of conformity, which will be required by BU at project handover.

**6.5.16** Fire doors forming and protecting refuge areas will have either smoke seal provision or a very small bottom edge gap (no more than 3mm) to protect the refuge area from smoke penetration beneath the door

**6.5.17** Intumescent strips and smoke seals should be provided on fire doors in accordance with Approved Document B (Fire safety) – Volume 2 - Buildings other than dwelling houses (2006 Edition incorporating the 2010 and 2013 amendments)

**6.5.18** Smoke seals should be of the 'brush' type for extra durability.

**6.5.19** Any glazed vision panels in doors (and any glazed panels forming part of the surrounding partitions may require glass that gives fire resistance (insulation and integrity)) to ensure that transfer of heat to the refuge area does not jeopardise the lives of anyone sheltering in the refuge.

**6.5.20** Where timber fire door frames are specified they must be kiln dried. The minimum density for FD30 frames will be 500kg/m<sup>3</sup>, either softwood or hardwood. For new FD60 door sets the minimum density required is 650kg/m<sup>3</sup> and the timber must be hardwood.

**6.5.21** All fire door sets need to have proven fire compliance and achieve the fire rating stipulated in the fire strategy to ensure the university fulfils its obligations under the Regulatory Reform Fire Safety Order (2005).

**6.5.22** Where doors are not required to be fire-resisting standard for mandatory reasons, intumescent strips/smoke seals and door closers are not to be fitted as a general rule. Any exceptions to this will be agreed on a project specific basis.

For general door requirements see section 3.3.

### **Ironmongery requirements for use on Fire Rated and / or Escape Doors**

**6.5.23** All ironmongery to be used on fire rated doors must have successfully completed a third party fire test to EN 1634-1 or BS 476 Part 22.

**6.5.24** The following ironmongery must also be selected to the appropriate performance standard to suit the intended application, as defined in the following European hardware standards:

- Single Axis Hinges : BS EN 1935 (hEN)
- Controlled Closing Devices : BS EN 1154 (hEN)
- Door Co-Ordinator Devices : BS EN 1158 (hEN)
- Electronically Powered Hold Open Devices : BS EN 1155 (hEN)
- Mechanically Operated Locks, Latches and Locking Plates : BS EN 12209 (hEN)
- Electromechanically Operated Locks, and Striking Plates : BS EN 14846
- Emergency Exit Devices : BS EN 179 (hEN)
- Panic Exit Devices : BS EN 1125 (hEN)
- Electrically operated exit systems on escape routes : BS EN 13637
- Lever Handles and Knob Furniture : BS EN 1906
- Cylinders for locks : BS EN 1303
- Door and Window Bolts : BS EN 12051
- Pull Handles : BS 8424

**6.5.25** In accordance with the Construction Product Regulation, items in 6.5.24 marked (hEN) must also be CE marked where used on fire rated doors or doors on escape routes.

**6.5.26** Any access control locks used on fire rated doors are to have been successfully third party tested to EN 1634-1 or BS 476: Part 22 to suit the required period of fire resistance. For occupied rooms, where a panic situation is not foreseen, the lock and lever set must also be CE marked to EN 179 as a tested combination.

**6.5.27** The level of security required to each room by the end users is to be agreed at the design stage. Mechanical keypad locks are not to be fitted in addition to a sash lock. Where access control is required the following options, CE marked to EN 179, are to be considered whereby the internal lever over-rides the latch or latch/lock to ensure single action escape from the room:

1. An escape sash lock / lever set, with euro profile cylinder to enable key controlled access to room, all approved for use on fire door sets of the type specified.
2. A mechanical keypad fitting incorporating integral levers complying with EN 179 and BS 8607, which is also approved for use on fire rated doors.
3. A solenoid escape sash lock / lever set sold as a tested combination, linked to an access control system (to BU requirements). The solenoid lockset and levers are to be approved for use on fire rated door sets of the type specified. NB supporting documentation will be required from the door supplier confirming that the proposed solenoid lock kit is approved for use on their fire rated door sets.
4. A card reading, wireless (battery operated) escape sash lock and lever / escutcheon set, sold as a tested combination, forming part of an access control network. Latch only or latch + dead lock options to be available to suit operational requirements of each room. The lock/levers and escutcheons are to be approved for use on fire rated door sets of the type specified. Supporting documentary evidence of the certification will be required.

*For access control system requirements see section 5.2.*

**6.5.28** A Declaration of Performance certificate, demonstrating compliance with EN 179 will be required for any of the above solutions proposed.

**6.5.29** Intumescent gaskets etc are to be fitted in accordance with the lock or door manufacturer's specification.

*For SALTO access control requirements see section 5.2*

**6.5.30** All hardware intended for use on fire doors and escape doors must fully comply with the requirements of Approved Document B (Fire Safety) Volume 2, latest edition.

**6.5.31** Solutions that follow the guidance detailed in the Door & Hardware Federation & Guild of Architectural Ironmongers Code of Practice: Hardware for Fire & Escape Doors (latest edition) will be deemed to satisfy current best practice and Building Regulation requirements.

**6.5.32** Ironmongery must be selected to the appropriate performance standard to suit the intended application, as defined in the current European hardware standards detailed in 6.5.24.

**6.5.33** The fixing of ironmongery to fire and escape doors must be in strict accordance with the manufacturer's instructions and test evidence. Installation can only be undertaken by those in a Third Party Accredited scheme such as LPS 1271. Installers and installations must be underwritten by a Third Party Certificate of Conformity, which will be required by BU at project handover.

*See also section 3.4 for other door ironmongery details*

### **Fire Resisting Roller Shutters**

- 6.5.34** Fire shutters must be tested to BS 476 Part 22 or the equivalent EN standard and manufactured under the remit of third party accreditation. Installation can only be undertaken by a third party accredited installer, BRE/LPCB or equivalent. Upon completion an LPCB Certificate of Conformity and audited paper trail detailing the installation together with maintenance requirements for the shutters are to be provided.

### **Cavity Barriers**

- 6.5.35** A coated batt system, approved for use in the intended location / construction, is preferred. The system is to comply with BS 476: Part 22 or EN equivalent. Where ceiling voids, or similar locations without a stable base to support a coated batt system, require cavity barrier sub-division, coated batts are not to be used. A foil faced, mesh reinforced, mineral wool barrier, or similar system fixed and suspended from the structural soffit, is to be used. Details of the proposed system are to be submitted to the BU Fire Safety Officer for approval at the design stage.
- 6.5.36** Cavity barriers must be installed strictly in compliance with manufacturer's details; adequately fixed and sealed to replicate their fire test. All service penetrations are to be addressed.
- 6.5.37** Installation of cavity barriers can only be undertaken by members of a third party accredited scheme specifically covering cavity barrier installation, and works are to be underwritten by a third party certificate of conformity, which will be required by BU at project handover. third party accreditation for penetration sealing and / or linear gap sealing alone will not be acceptable for cavity barrier installation work.

### **Junction of Fire Walls to Roof Structure**

- 6.5.38** Locations where the roof interfaces with fire walls, the roof detail must comply with Approval Document B B3 Diagram 30 to ensure that fire cannot spread from one fire compartment to another. The architect or principle contractor must provide information on how this will be achieved before commencement of work.

### **Junction of Floor Slabs to Curtain Wall Systems**

- 6.5.39** In locations where floor slabs abut curtain wall systems, a bespoke fire stopping system is to be used to fill the gap, that is capable of dealing with the thermal movement of the curtain walling e.g. Firetherm Intubatt 3 or equal and approved. The main contractor or curtain wall system installer will need to confirm proposed details of who will carry out this work, and how the gap will be fire stopped to the BU Project Manager or appointed Fire Safety Consultant at tender stage.

### **Fire Stopping**

- 6.5.40** Installation companies carrying out fire stopping work must be able to prove competence in the selection of products to ensure correct sealing of all ad-hoc service penetrations, gaps and other penetrations contained within the project. third party accreditation for penetration sealing and linear gap sealing is required. Works are to be underwritten by a third party certificate of conformity, which will be required by BU at project handover.

**6.5.41** In particular, urethane foams must not be used for fire stopping unless there is test evidence to prove that it is being used correctly.

**6.5.42** Fire dampers and intumescent collars must be adequately, mechanically fixed to the structure of the building as fire tested to BS 476 or EN equivalent to ensure they are held in place, for the period of fire resistance specified, if a fire occurs.

**Power / IT Points, Light Switches etc.**

**6.5.43** The fire resistance of such outlets and switches installed in demountable or dry lined partition systems must be adequately addressed by the installation of fire rated boxes or putty pads. The method for reinstating the fire resistance must be advised prior to commencement of electrical installations.

**Cables and Cable Supports**

**6.5.44** Cables; there is a tendency for cables (including IT cables) to be run and installed throughout buildings in densities that cannot be effectively fire sealed. This is a design issue that needs to be addressed within project proposals to limit the density. The use of fire tested transit sleeves fitted through the fire resisting structure, are to be considered. These are to be pre-installed before cabling in sufficient numbers to suit the anticipated number of cables.

**6.5.45** Cables to be supported in accordance with BS 5839 Part 1 or equal and approved, which precludes the use of plastic tie clips, cable ties or trunking where these products are the sole means of cable support.

**6.5.46** Electrical trunking boxes are to be internally fire stopped where passing through fire resisting structure. Installations are to also provide convenient access for future inspections.

**Intumescent Paint to Protect Structural Steelwork**

**6.5.47** Intumescent paint must only be applied by contractors in a third party accredited scheme such as LPS 1531 to ensure that steels are suitably prepared prior to application, primer compatibility and coatings are applied within the right temperature and humidity conditions and with the correct loadings per spray application, with recoats applied within time constraints as instructed, to ensure the paint satisfactorily adheres to the steels and can be guaranteed to perform in a fire as intended. Standards of workmanship cannot otherwise be adequately assessed after painting. A complete 'paper trail' will be required to prove that any ad-hoc variables have been correctly applied.



## 6.6 Means of Escape

- 6.6.1** The means of escape for all proposals are to be agreed with the BU Fire Safety Officer as part of the fire strategy for the project.
- 6.6.2** Cross-corridor doors are to be self-closing but held open under normal circumstances. The closing device is to be linked to the fire alarm system and enable the door to close upon activation of the fire alarm by way of detector or manual call point, power failure or component failure. Electro-magnetic hold-open closers are preferred – with concealed power supply. Smoke detectors are to be fitted within the corridors at the recommended spacing. A local test facility is to be provided for each door. Appropriate notices are to be provided for each face of each door fitted.
- 6.6.3** Hold-open devices to fire doors leading onto stair enclosures will only be considered if they comply with the above clause.
- 6.6.4** Any notice boards fitted in corridors are to be covered by glass or Perspex to a Class O surface of flame rating.
- 6.6.5** The communications system for all wheelchair refuges in refurbishment projects is to mirror any existing refuge communications system within the building.
- 6.6.6** For new buildings the proposed refuge communications system is to be agreed, and shall meet current legislative requirements.
- 6.6.7** Fire Action and Refuge notices will be supplied by BU Estates (Technical Officer).
- 6.6.8** All fire escape signage, including refuges, within student accommodation is to be tamper-proof.
- 6.6.9** Evacuation chair provision is to be considered for all new build and refurbishment projects. The final number and location of evacuation chairs is to be agreed with BU for each project. Existing evacuation chairs are manufactured by Paraid.
- 6.6.10** New buildings should be linked to the existing pager operated system for alerting those with hearing impairments.
- 6.6.11** Wheelchair refuges must not be located in lift lobbies.

## 6.7 Fire Alarm Systems

- 6.7.1** Where new premises are constructed, or major alterations take place in existing premises, the fire alarm provided will be an addressable system, conforming to the current British Standards.
- 6.7.2** On the Talbot Campus, all fire alarm signals will be transmitted to the Reception at Poole House.
- 6.7.3** Other buildings off Talbot Campus will be risk assessed individually, with major premises being fitted with an autodial link to an agreed Reception centre.
- 6.7.4** Fire alarms provided for our residential premises will be to an L1 standard.

- 6.7.5** The fire alarm for an office or teaching facility will be to an L3 standard. The modifications will include additional automatic fire detection in critical areas and any other enhancement deemed necessary by risk assessment.
- 6.7.6** Single-point smoke detectors with a ten-year battery life are provided for each student bedroom in residences provided by BU.
- 6.7.7** Fire alarm sounders are to be avoided within the vicinity of wheelchair refuges and the refuge intercom master control unit. This is to ensure that the use of the refuge intercom system is not impaired by alarm sounder noise and to avoid distress to anybody waiting within a refuge during a fire escape situation.

## 6.8 Emergency Lighting

- 6.8.1** Emergency lighting systems throughout BU premises will conform to the current British Standard.
- 6.8.2** Non-maintained emergency lighting will be provided throughout the corridors and within large rooms of BU.
- 6.8.3** Non-maintained illuminated exit notices will be provided above exit doors and above intermediate doors leading to the final exits.
- 6.8.4** Maintained emergency lighting, to include illuminated exit notices, will be provided in windowless accommodation, lecture theatres and especially licensed areas. This requirement will include the corridors both to and from those licensed areas, to any final exit door used from that area.

## 6.9 Fire Extinguishers

- 6.9.1** A uniform fire extinguisher has been agreed, which consists of one P50 Foam Fire extinguisher which is certified as safe to use on Class A Class B and electrical fires (up to 1000v).
- 6.9.2** The fire extinguishers will be located on the escape route from a floor, adjacent to an exit, in uniform positions throughout the premises.
- 6.9.3** Specific additional fire extinguishers will be risk-related specified and located by risk assessment.
- 6.9.4** Commercial kitchens will be individually assessed. Fire suppression systems are generally expected in these areas.
- 6.9.5** Extinguishers are to be obtained from [SafeLincs.co.uk](http://SafeLincs.co.uk) to maintain consistency of provision and maintenance.

## 7 Soft Landings

### 7.1 Introduction

All BU capital projects are to be managed in line with the soft landings building delivery process which runs through the project, from inception to completion and beyond, to ensure all decisions made during the project are based on improving operational performance of the building and meeting the end users expectations.

### 7.2 Stakeholder Engagement

- 7.2.1** Throughout the project delivery, at key RIBA stages the Estates Project Manager is required to arrange on-going consultation workshops between the design team (and later contractor) and BU stakeholders to explain and update on design development and construction progress and receive feedback particularly in relation to systems that will be taken over by stakeholders. This approach enables proactive resolution of any conflicts that may arise with the design philosophy.
- 7.2.2** The progress of the soft landings process needs to be recorded in the BU Soft Landings Log (see Appendix 5).
- 7.2.3** Below is an indicative soft landings stakeholders' engagement matrix, to be adjusted on project-by-project basis:

	RIBA Work Stage 1	RIBA Work Stage 2-4	RIBA Work Stage 5-6	RIBA Work Stage 7	RIBA Work Stage 7
	Soft Landings Stage 1- Inception and Briefing	Soft Landings Stage 2 - Design Development	Soft Landings Stage 3 - Pre-Handover	Soft landing stage 4 - Initial Aftercare	Soft landing stage 5 - Long-term Aftercare
BU Fire Officer	X	X	X		
Head of FM	X	X	X		
Head of Strategic Planning	X	X	X		
Transport Manager	X	X	X		
End User Representative	X	X	X	X	
Carbon Programme Manager	X	X	X	X	X
Head of Maintenance		X	X		
FM Manager		X	X	X	
Assistant FM Manager		X	X	X	
Space Manager		X	X	X	
IT & AV Managers		X	X	X	
Comms Manager		X	X		

Architectural Officer		X	X		
Technical Services Manager		X	X	X	X
H&S Officer			X	X	X
Energy Officer			X	X	X
Commissioning Officer			X		
Equality And Diversity Adviser		X	X	X	

## 7.3 Lessons Learned

- 7.3.1** The implementation of the soft landings process ties into the strong emphasis that the university places on the lessons learned procedure. A responsibility to provide continuous feedback into a central Lessons Learned Database is placed on all designers, members of the project team and university stakeholders.
- 7.3.2** Lessons learned are to be submitted to the Project Manager, who will decide on how the information will be recorded dependent on the size and nature of the project.
- 7.3.3** Lessons learned will be fed into a central Lessons Learned Register maintained by BU Estates.
- 7.3.4** Where appropriate, lessons learned will be fed into future revisions of the Design Standards document.

## 7.4 Commissioning of Services and Equipment

- 7.4.1** BU recognises that the design aspirations for any development work can be realised or lost at the testing and commissioning stage. Testing and commissioning often takes place during the final stages of a project when time pressures are greatest, potentially resulting in systems that perform poorly when in use.
- 7.4.2** The project team has to ensure that sufficient time for commissioning is built into the development schedule and explicitly ring-fenced from acceleration or re-sequencing.
- 7.4.3** System performance shall be measured in use to ensure the agreed design parameters are met and where they are not, to gain an understanding of how to make improvements for the future and to adjust final invoice values accordingly.
- 7.4.4** A bespoke commissioning protocol shall be produced, basing its detail on existing best practice commissioning codes and guides (e.g. CIBSE and/or BSRIA).

- 7.4.5** For a major capital project over £5 million an independent commissioning agent will be appointed by the contractor as early in the design process as possible, to follow the design and construction throughout the project, reporting on a regular basis on issues that could affect the reliable and efficient running of building services and the subsequent impacts on comfort and safety. The commissioning agents will then fully test and approve the systems and monitor performance during the first year of occupation. Commissioning reports shall be issued at handover and 12 months later.
- 7.4.6** For any new build capital project, a minimum 1-year of seasonal commissioning will be a requirement of the brief. Depending on the scale of the project the seasonal commissioning duration might be extended to 3 years, this will be assessed on a project-by-project basis with the BU Sustainability Team.
- 7.4.7** Depending on the scale of the project Estates will consider appointing an independent Validation Engineer to verify commissioning results provided by contractor at completion.

## **7.5 Inspection of works and handover**

- 7.5.1** Prior to handover, all test documentation shall be presented to the BU Project manager for comments and approval. Following approval, all drawings, plans and BIM files shall be completed and presented as stated in the contract documentation within 2 months of the commissioning date.
- 7.5.2** Retentions will not be released until all contractual obligations have been met. Record drawings shall meet the BU's CAD specifications as set out in 3.12 of this Design Guide.
- 7.5.3** For details of the BU Handover Procedure see Appendix 6.

## **7.6 Training**

- 7.6.1** Allowance is to be made for training university staff in the operation of all key systems prior to handover.
- 7.6.2** Attendance at the training sessions to be defined by the Project Manager and FM team.
- 7.6.3** Names of those attending the training sessions to be recorded.

## **7.7 Standard Health and Safety File and O&M Format**

### **Introduction**

- 7.7.1** The Operating and Maintenance Manual (O&M) is to be a comprehensive information source and guide for owners and users of the completed works. It should provide an overview of the main design principles and describe key components and systems to enable proper understanding, efficient and safe operation and maintenance.

- 7.7.2** Contractor is to provide the O&M information and the Principal Designer is to provide the Health and Safety file. BU requires both parties to liaise, co-ordinate and work together with the project manager.
- 7.7.3** The contractor is to ensure that a summary sheet is provided at the beginning of each section to enable BU's Facilities department to have a quick reference for key information. The contents of the summary sheets are to be agreed with the Project Manager prior to submission.
- 7.7.4** Contractor is to prepare a complete draft on site, review and complete as the work progresses and submit in good time ahead of completion to review and agree remaining actions with the Project Manager
- 7.7.5** The O&M is to be produced by the contractor and must be completed no later than four weeks before completion, to include following sections.
- 7.7.6** Final copies of the manual to include 1x hard copy and 1x electronic copy. The electronic version to be in searchable PDF format.

### **Content**

- 7.7.7** A standard content of the Operating and Maintenance Manual (O&M) will include the following:
- Part 1: General
  - Part 2: Fabric
  - Part 3: Services
  - Part 4: The Health and Safety File, prepared by the contractor for approval by Principal Designer.

#### **7.7.8 Part 1: General**

- Index: list the constituent parts of the manual, together with their location in the document.
- Description of the buildings and facilities.
- Ownership and tenancy, where relevant.
- Health and Safety information - other than that specifically required by the Construction (Design and Management) Regulations.
- Names and addresses and contact details of all significant consultants, contractors, subcontractors, suppliers and manufacturers.
- Overall design criteria.
- Environmental performance requirements.
- Relevant authorities, consents and approvals.
- Third party certification, such as those made by "competent" persons in accordance with the Building Regulations.
- Operational requirements and constraints of a general nature
- Maintenance contracts and contractors.
- Fire safety strategy for the buildings and the site. Include drawings showing emergency escape and fire appliance routes, fire resisting doors location of emergency alarm and fire fighting systems, services, shut off valves switches, etc.

- Emergency procedures and contact details in case of emergency.
- Description and location of other key documents.

#### **7.7.9 Part 2: Building Fabric**

Detailed design criteria, including:

- Floor and roof loadings
- Durability of individual components and elements
- Loading restrictions
- Insulation values
- Fire ratings
- Other relevant performance requirements

Construction of the building:

- A detailed description of methods and materials used.
- As-built drawings recording the construction, together with an index.
- Information and guidance concerning repair, renovation or demolition / deconstruction.
- Periodic building maintenance guide chart.
- Inspection reports.
- Manufacturer's instructions index, including relevant COSHH data sheets and recommendations for cleaning, repair and maintenance of components.
- Fixtures, fittings and components schedule and index.
- Guarantees, warranties and maintenance agreements - obtain from manufacturers, suppliers and sub-contractors.

Test certificates and reports required in the specification or in accordance with legislation, including:

- Air permeability.
- Resistance to passage of sound.
- Continuity of insulation.
- Electricity and Gas safety.

#### **7.7.10 Part 3: Building Services**

Detailed design criteria and description of the systems, including:

- Services capacity, loadings and restrictions.
- Services instructions.
- Services log sheets.
- Manufacturers' instruction manuals and leaflets index.
- Fixtures, fittings and component schedule index.
- Detailed description of methods and materials used.

As-built drawings for each system recording the construction, together with an index, including:

- Diagrammatic drawings indicating principal items of plant, equipment and fittings.
- Record drawings showing overall installation.
- Schedules of plant, equipment, valves, etc. describing location, design performance and unique identification cross referenced to the record drawings.
- Identification of services - a legend for colour coded services.

Product details, including for each item of plant and equipment:

- Name, address and contact details of the manufacturer.
- Catalogue number or reference.
- Manufacturer's technical literature, including detailed operating and maintenance instructions.
- Information and guidance concerning dismantling, repair, renovation or decommissioning.

A description of the operation of each system, including:

- Starting up, operation and shutting down.
- Control sequences.
- Procedures for seasonal changeover.
- Procedures for diagnostics, troubleshooting and fault finding.
- Guarantees, warranties and maintenance agreements - obtain from manufacturers, suppliers and sub-contractors.

Commissioning records and test certificates list for each item of plant, equipment, valves, etc. used in the installations - including:

- Electrical circuit tests.
- Corrosion tests.
- Type tests.
- Work tests.
- Start and commissioning tests.
- Equipment settings: Schedules of fixed and variable equipment settings established during commissioning.
- Preventative maintenance: Recommendations for frequency and procedures to be adopted to ensure efficient operation of the systems.
- Lubrication: Schedules of all lubricated items.
- Consumables: A list of all consumable items and their source.
- Spares: A list of recommended spares to be kept in stock, being those items subject to wear and tear or deterioration and which may involve an extended delivery time when replacements are required.
- Emergency procedures for all systems, significant items of plant and equipment.
- Annual maintenance summary chart.



#### **7.7.11 Part 4: The Health and Safety File**

- Residual hazards and how they have been dealt with.
- Hazardous materials used.
- Information regarding the removal or dismantling of installed plant and equipment.
- Health and safety information about equipment provided for cleaning or maintaining the structure.
- The nature, location and markings of significant services.
- Information and as-built drawings of the structure, its plant and equipment.
- A coherent written and illustrated strategy for cleaning and maintenance paying particular attention to tasks that will require working at height e.g. works in the atrium
- Submit to: Project Manager.
- Provision of the Health and Safety Files shall be a condition precedent of giving Completion of the works. The file shall be submitted in hard copy (1 no) and electronically in a searchable format.

#### **7.7.12 Compilation and Review**

- Prepare all information for contractor designed or performance specified work including as- built drawings.
- Obtain or prepare all other information to be included in the manual.
- Submit a complete draft. Amend in the light of any comments and resubmit. Do not proceed with production of the final copies until authorised.

#### **7.7.13 Presentation of Building O&M**

- Final copies of the manual to include 1x hard copy and 1x electronic copy. The electronic version to be in searchable PDF format.
- Paper Format: A4 size, plastics covered, loose leaf, ring binders with hard covers, each indexed, divided and appropriately cover and spine titled.
- Selected drawings needed to illustrate or locate items mentioned in the O&M: where larger than A4, to be folded and accommodated in the binders so that they may be unfolded without being detached from the rings.
- As-built drawings: The main sets may form annexes to the O&M.
- Copy of all operating and maintenance manuals, technical literature, test certificates for mechanical, electrical and fire alarm installation, record drawings and as built prior to the Project Manager certifying completion of the works.

## 8 External Works and Landscaping

### 8.1 External Drainage

- 8.1.1** External drainage pipes to be made from vitrified clay (VC), or concrete for larger diameter pipes. High density or high performance polyethylene (HDPE or HPPE) pipes may also be used.
- 8.1.2** Due to the nature of the discharge, foul drains should be designed to minimise blockages. Minimum pipe sizes and gradients are recommended in BS EN 752:2008 (Drain and Sewer Systems Outside Buildings) to achieve self-cleansing. Conversely, pipe gradients should only be as steep as is necessary, in order to minimise the depths of drainage run. Where it is not possible to achieve self-cleansing velocities provision should be made for rodding or jetting to unblock pipes.
- 8.1.3** Foul drains man holes are to be marked Red, storm drain manholes are to be marked blue in accordance with PPG1.
- 8.1.4** Where a pumped drainage system is required, storage/attenuation tanks and pumping stations should be sized to provide resilience to pump failure and power outages, taking into account the peak flow rate and daily profile of discharges from the building. It is recommended to specify a spare pump to reduce the requirement for emergency storage.
- 8.1.5** All pumped drainage systems to be connected to BU BMS.

### 8.2 Surface water management

- 8.2.1** Where practicable Sustainable Drainage Solutions (SuDS) should be used for surface water drainage to:
  - Manage surface water as close to the source as possible
  - Align closer with the natural condition of the site
  - Reduce unnecessary discharges to the public sewer
  - Minimise flooding in downstream watercourses
- 8.2.2** Where appropriate, infiltration techniques, by which surface water is allowed to discharge by percolating the ground, should be used.

### 8.3 Roads, Footpaths and Paving

The form of the road along with vehicle speeds, road widths and parking all contribute to how the public realm functions and feels.

### 8.3.1 Access Roads Design

The following criteria should be considered as part of the design of any new road design that is intended to be an access road for the university or the main future bus route:

- Carriageway to be as narrow as practical to encourage reduced traffic speeds and maximise the area of public realm for pedestrians.
- Speed tables should be avoided or minimised if this will be a bus route.
- Kerbs to be granite with 100mm high face with drop kerbs where appropriate for pedestrian crossings.
- Pedestrian crossings should be zebra crossings where possible to further help control speeds and give pedestrians priority when crossing.
- The carriageway material should be black asphalt to clearly depict it as a road and to contrast to the internal shared space environment.
- Where possible, recycled materials should be considered.

### 8.3.2 Footpath design

- Footpaths are to be as uncluttered and as open as possible to facilitate pedestrian movement.
- Design must take into account 'desire lines' and/or account for their potential through appropriate barriers (planting/hard landscaping, for example) in order to preserve soft landscaping/grass areas.
- Pavements are to be a minimum of 2m wide to allow two wheelchairs or pushchairs to pass one another comfortably.
- In principle paving surfaces are to have a minimum 2% crossfall to appropriate and regular gully drainage points.
- Longitudinal gradients to be less than 1:21 and have a landing for every 500mm rise where possible, or follow existing site topography and where practicable slopes will be provided in lieu of steps. Where steps are necessary they will be a positive feature of the design and comply with the current standards for inclusive design.
- Ramps and associated railings should be carefully integrated within the public realm and with adjacent buildings.
- The back edge of footways are to be kept reasonably free of obstructions to help cane users use this edge for reference and navigation.
- Tactile paving to be used to denote crossings however provision should be kept to a minimum. The appropriate colour is to be used relevant to the status of the pedestrian crossing.
- Street clutter, such as pole-mounted signs, utility boxes, litter bins, bollards and guard railing, reduces the available width of footways and is a particular hazard for visually impaired people. The amount of clutter should be minimised with remaining items located in a street furniture zone out of the pedestrian flow.

### 8.3.3 Footpath materials and elements:

- All paving materials must have the correct physical properties conducive to an urban environment.
- Materials used need to be available, cost effective and maintainable.
- All surfaces must be built suitable for a vehicle to mount even if deemed to be pedestrian only surface.
- There must be a substantial stockpile of material retained for future repairs. Materials with natural pigments are favoured over those with colour additives so that they can be matched easier in the future.
- Areas with different functions are to have suitable variation in colour to depict their use and aid the visually impaired.
- Gaps in drainage gully gratings are to be suitable for pedestrians, with a restricted size opening.
- To reduce excavations and disposal from site existing sub bases should be re used where possible providing they achieve the desired CBR rating.
- No paving units are to be cut smaller than 1/3 their specified size.
- Where laid flexibly, units to be butt jointed with silica sand brushed into joints.

### 8.3.4 Paving Palette

#### 8.3.4.1 University Street

- Uniform paving materials along length
- Product: Conservation Textured Concrete
- Paving Ref: FL8562500
- Size: 600mm x 450mm x 63mm
- Colour: Silver grey or Buff
- Supplier: Marshalls Laying: Stretcher bond. Laid flexibly on 50mm sand laying course over 150mm
- Type 1 to formation levels. Units butt jointed with silica sand brushed into joints.

#### 8.3.4.2 Hard open spaces

- Inserts of natural stone
- Local natural stone:
  - Purbeck Limestone and Dorset Limestone (Suttle Natural stone quarry, Dorset)
  - Forest marble stone (Stalbridge quarry, Somerset)
- Size: 600x400x75mm thick
- Colour: natural
- Supplier: local supplier to be sourced
- Laying: in bands perpendicular across nodal space (location dependant). Laid rigid on a concrete base with mortar bedding and joints.

#### 8.3.4.3 Architecturally related paths - building project related

- Product: Mistral Textured Granite Aggregate Sett Paving.
- Size: 210 x 160 x 80mm, 160 x 160 x 80mm, 240 x 160 x 80mm
- Colour: Different tones of grey
- Supplier: Marshalls
- Laying: Stretcher bond. Laid flexibly on 50mm sand laying course over 150mm Type 1 to formation levels. Units butt jointed with silica sand brushed into joints.

#### 8.3.4.4 Carriageways

- Used on internal link roads
- Carriageways to all streets are to be a typical asphalt construction in accordance with current adoptable standards. This will provide good durability and ease of maintenance.
- Line markings:
- White lining, narrow primrose lining and diagrams to be applied using thermoplastics in line with Highways Agency standard specification.

#### 8.3.4.5 Tactile Paving

- Product: Textured concrete blister tactile paving Ref: FL6103000
- Size: 400mm x 400mm x 65mm thick
- Colour: Buff (or other appropriate colour)
- Supplier: Marshalls
- Laying: Stack bond. Laid on 50mm sand laying course over 150mm Type 1 to formation levels.

#### 8.3.4.6 Kerbs

- Product: Granite kerb with fine picked finish to exposed surfaces and sawn ends with matching transition, drop and radius kerbs. Dropped kerbs necessary by pedestrian crossings and road crossings. All exposed corners to have bullnose.
- Size: 145 x 255 x 915 mm
- Colour: Silver grey
- Supplier: Marshalls

#### 8.3.4.7 Gully Grates

- Gully Grates for roads:
  - Product: Victoria Mesh Grating
  - Size: 440 x 440mm grate. Grate to have square grid grating holes 33 x 39mm to ensure it is pedestrian friendly.
  - Colour: Black
  - Supplier: PAM or equal
  - Laying: minimum uniform cuts around frame, as per manufacturers' specification.

- Gully Grates for pedestrian area:
  - Product: L2902 Grating
  - Size: 200 x 200 x 77dmm grate
  - Colour: Stainless steel
  - Supplier: Wade International or equal

## 8.4 Street Furniture

Street furniture must be composed of a coordinated palette of elements that are positioned in a rational way to ensure easy pedestrian movement, create uncluttered spaces and respond to the function of the space. The palette of street furniture should include the following items: seats, bins, bollards, cycle stands. Opportunities for activity spaces (like outdoor gyms areas, fitness and trim trail, table tennis) should be considered. Equality/accessibility aspects are to be fully considered. Design should eliminate or reduce opportunity for misuse (skateboards or similar) and vandalism.

- Furniture is to be robust, affordable and maintainable.
- Furniture is to create a coordinated palette achieved through a simple and elegant form, the use of steel, timber and concrete and all metal work painted RAL 7016.
- All street furniture (including bollard, light poles, seating, signs, and bins) are to be root mounted.
- Paving units should be laid carefully around footings with as few cuts to pavers as possible and a maximum joint of 10mm between furniture and paving units.
- The position of furniture should be aligned where possible to maintain pedestrian flows and prevent the open spaces from appearing cluttered.
- Seating should be provided at intervals along routes, in places where people want to sit or in clusters at nodes and open spaces. Seating should be provided in a range of spaces such as in the sun, in the shade, in groups, alone, close to activity or somewhat removed from activity.
- Seating should be inviting and comfortable.
- A range of seating should be provided including seats with back and arm rests, benches and blocks.
- Litter bins should be located in areas of high demand.
- Litter bins need to be neutral and elegant in design, robust, durable and difficult to scratch, of an appropriate capacity and easily emptied.
- Smoking areas should be reviewed on project by project basis and appropriate ashtrays will be supplied if required.
- The use of bollards should be avoided. Where necessary they should be Zenith (ZEN701S) from Furnitubes.
- Cycle stands need to be functional and easy to use and installed in groups near to building entrances in addition to the main cycle compounds.
- Cycle stands to be Sheffield style and coated with a polyurethane coating to prevent scratches, painted in RAL 7016
- All timber used in furniture to be FSC approved.

### **8.4.1 Street furniture palette**

#### **8.4.1.1 Benches**

- Product: Iroko Bench with Shafton Legs and anti-skate steel angles
- Size: Length: 2340mm. Width: 475mm. Height: 450mm; Dims of Iroko Slats 75mmx50mm
- Colour: Timber top, powder coated
- Galvanised steel, RAL 7016
- Supplier: Bailey Streetscene
- BU prefers inclusion of back and arm rests to benches to provide enhanced accessibility.

#### **8.4.1.2 Picnic Tables**

- Product: Iroko picnic set with Shafton Legs and anti-skate steel angles
- Benches 2340mm Long x width 475mm x height 420mm / Iroko wood slats
- Table Length x 2340mm x width x 600mm x Height 745mm, Dims of Iroko Slats 75mmx50mm;
- Colour: Timber top, powder coated
- Attached to Frame on Ends. Galvanised Finish, Surface Mounted
- Supplier: Bailey Streetscene

#### **8.4.1.3 Recycling Bins**

- Product: Product: SEPR 8 with Lucifer Cigarette Bin; 2 apertures (mixed recycling and food waste)
- Size: 1100mm high x 620 wide x 575mm deep
- Colour: Stainless Steel
- Supplier: Broxap

#### **8.4.1.4 Cycle Stands**

- Product: Sheffield cycle stand
- Colour: RAL 7016, polymethane scratch resistant coating
- Supplier: Broxap

#### **8.4.1.5 Bollards:**

- Product: Zenith (ZEN701S)
- Size: 900mm height
- Colour: Stainless steel
- Supplier: Furnitubes

## 8.4.2 Lighting

Lighting is an integral part of the open spaces, enhancing them, adding to their ambiance, increasing their time of use and contributing to their sense of comfort and safety.

- Light columns are to be spaced along streets to create uniform light levels that meet current British Standards lux requirements for carriageways and footpaths.
- Light column metal work is to be painted in RAL 7016.
- Feature lighting to be minimised and only used to highlight the entrances or art within the campus.
- Lighting systems should be carefully designed to set the standard, avoiding clashes with the CCTV systems and also trees' location.
- When possible the adoption of a LED technology would be preferable and advisable.

### 8.4.2.1 Street Lights to vehicle areas

- Product: Rio 450
- Size: For mounting at 6-8 metres
- Colour: RAL 7016
- Supplier: DW Windsor Lighting

### 8.4.2.2 Lighting to University Street **(this item is currently under review)**

- Product: Pyros - LED 25W 50° Flood
- Size: Mounted on 6m column, mounting heights 4-6m
- Colour: RAL 7016
- Supplier: Targetti

### 8.4.2.3 Lighting to pedestrian paths

- Product: Urba 59W LED
- Size: Post top mounted on 5m column
- Colour: RAL 7016
- Supplier: Thorn
- Trees and Planting

## 8.4.3 General recommendations

- It is required to vary the types of character of planting depending on the type and use of a space, in order to create a hierarchy between the spaces and assist wayfinding.
- Cross referencing the Biodiversity Policy, the existing areas of planting with ecological values should be integrated into the new green open spaces. Native species to be chosen for trees and shrub planting, a target of 75% native is



suggested. The remaining selection should add further colour, texture and seasonal variation, ensuring spring and autumn flowering.

- Plants that attract wildlife and encourage biodiversity with high nectar content, fruit or berries should be included in the selection. Meadows to be cut twice a year to retain its meadow character, grass paths and spaces to be mowed out into the meadows.
- The majority of planting to be low maintenance in both wild and mowed areas. Ornamental, higher maintenance planting within feature open spaces, such as entrances or nodes.
- Trees are to be planted in groups, straight lines should be avoided.
- Trees to be located between underground services and in positions to ensure clear sightlines for motorists and CCTV cameras.
- Tree surrounds to be porous resin bonded gravel, colour to match paving and to be laid flush with adjacent surfaces.
- Trees to be staked below ground with an underground guying system.
- Street trees are to be planted within root barriers to protect services and minimise disruption to paving.
- Trees to be planted between November and March.
- Grass slopes to be no steeper than 1:3.
- Tree species and supplier to be approved prior to ordering and planting, English provenance preferable.
- Trees to be planted with a minimum girth of 30 - 35cm.
- Ideally tree pits are to be a minimum of 2m<sup>3</sup>. If necessary, tree pits do not need to be square.
- Water points should be provided.
- Sustainable Drainage Systems (SUDS) to be incorporated in appropriate locations across the Campus.

#### 8.4.4 Meadows and mowed lawn

Meadow planting, Heathland Wildflower mix, 80% grasses and mowed lawn, 20% Heathland Wildflower mix.

Meadow planting palette to include the following:

- *Phleum pratense*-Timothy
- *Festuca rubra* - Creeping red fescue
- *Agrostis capillaris* - Common bent
- *Prunella vulgaris* – Selfheal
- *Trifolium pratense* - Red clover
- *Centaurea nigra* - Common knapweed
- *Lotus corniculatus* - Birdsfoot trefoil
- Mowed lawn and spring bulbs (Narcissus)
- *Prunus avium* - Wild cherry
- *Quercus robur* - Pedunculate oak

#### 8.4.5 Planting buffers

Mature trees, shrubs, ground covers, native species and hedgerow species that encourage wildlife and biodiversity, to include the following:

- *Corylus avellana* – Hazel
- *Prunus spinosa* – Blackthorn
- *Ribes alpinum* - Mountain currant
- *Sambucus nigra* – Elder
- *Crataegus monogyna* – Hawthorn
- *Fagus sylvatica* – Beech
- *Malus sylvestris* - Crab apple
- *Betula pendula* - Silver birch

#### 8.4.6 Streetscapes

Native trees, framing streets, creating character and reducing scale. Swales and swale planting run along the streets collecting rain water. The palette to include the following:

- *Sorbus aucuparia* – Rowan
- *Tilia cordata* - Small leaved lime
- *Tilia platyphyllos* - Large leaved lime
- *Acer campestre* - Field maple

#### 8.4.7 Ornamental planting

Decorative planting that frame seating areas and entrances and create visual interest. The visual connection between spaces is to be maintained with clear views through the planting with a mix of native and non-native plants, feature trees and multi-stem solitary shrubs. Rain gardens can collect rain water runoff. The palette to include the following:

- *Achillea millefolium* - Common yarrow
- *Bergenia cordifolia* - Heart leaf bergenia
- *Lavandula angustifolia* – Lavender
- *Polygonum affine* - Knot weed
- *Thymus vulgaris* – Thyme
- *Betula pendula* - Silver birch
- *Sorbus aucuparia* – Rowan
- *Pinus sylvestris* – Pine
- *Quercus robur* 'Fastigiata

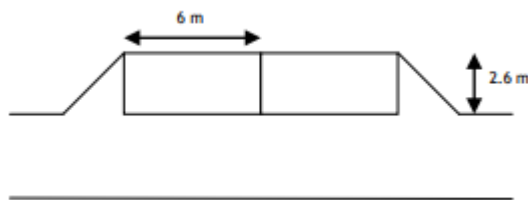
## 8.5 Travel and Transport

### 8.5.1 General parking bay dimensions:

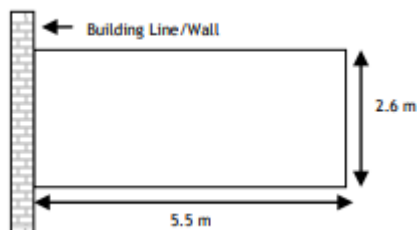
- National minimum bay dimensions are 4.8m by 2.4m, but where possible the Bournemouth Borough Council parking standards should be delivered:
- Bournemouth Borough Council minimum standards are:
  - Standard bays - 5m by 2.6m for standard parking spaces



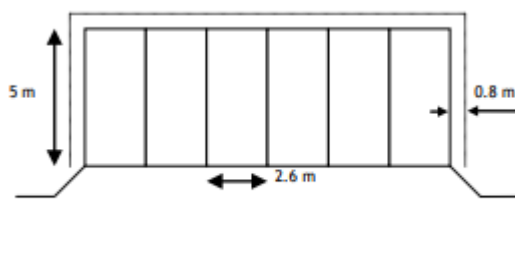
- Parallel bays – 6m x 2.6m



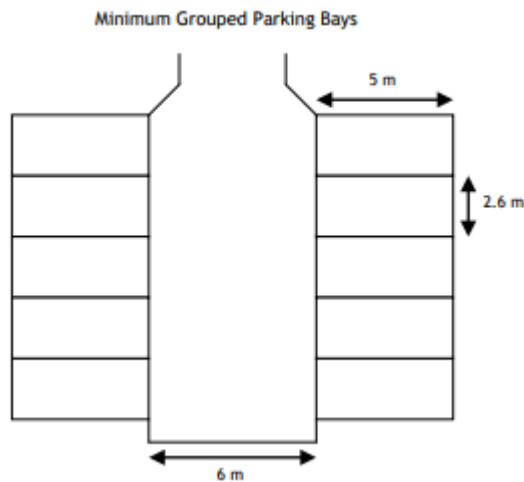
- Bays next to a wall/footway –



- Perpendicular bays – a 0.8m overspill is required.



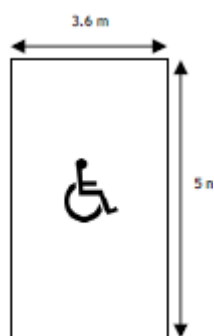
5. Grouped parking bays – a minimum isle width of 6m is required (7m recommended for larger car parking areas).



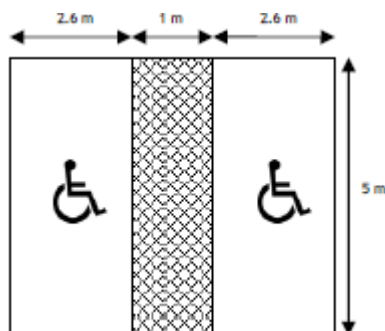
6. Different layouts – the detailed layout of car parking will be site-specific.

### 8.5.2 Accessible parking bay standards

- The current minimum provision of parking on campus is defined as 2% of total spaces + 6 spaces.
- Moving forward this standard should increase to 5% of total site parking capacity.
- Standard accessibility bay dimensions – 5m by 3.6m



- Space between perpendicular accessibility bays – 5m x 2.6m with a minimum gap of 1m
- Accessibility bays must be located within 50m of the destination with appropriate level access the entire distance



### 8.5.3 Lift share spaces

- Any new car park or reconfiguration of an existing car park should consider an appropriate allocation of lift share bays to encourage lift share as a sustainable travel option.

### 8.5.4 Motorcycle and powered two wheeler parking standards

- Generally, motorcycle parking bays are not marked out for individual machines, allowing flexible and efficient use of limited space.
- If dedicated bays are installed, they should be marked out 1.4m wide by 3m in length in order to allow riders to mount/dismount from the side.
- Motorcycle parking areas should have limited gradients in order to facilitate manoeuvrability and to ensure the motorcycle is unlikely to topple over. Surfaces should offer good grip for feet and tyres.
- Parking areas must have a firm surface capable of supporting the weight of a motorcycle through its stand. The footprint of the stand might typically measure 10cm<sup>2</sup> and carry a load of 10kg per cm<sup>2</sup>. The surface of the parking area must be capable of withstanding penetration by the stand.
- Sufficient space and visibility for riders is required to allow manoeuvring without undue risk of collision with other road users. Parking should not be positioned so that riders are tempted to use footways to access it.
- Provision should be made in which to secure motor cycles where possible. Where motorcycle parking provision is for a small number of bays or small area box, a ground level anchor point below the surface, with a loop allowing the user's own lock to be passed through.
- For areas with a larger quantity of spaces in a parallel arrangement, a raised horizontal bar should be provided at a height of approximately 400- 600 mm and requires the user to use their own lock. Horizontal bars should be welded or fixed with tamper proof bolts.

## Active Travel

### 8.5.5 Shower facilities

- In order to support the BU Travel Plan to encourage greater active travel participation, the university will seek to add showers upon refurbishments of all buildings and particularly upgrades to toilets/bathrooms for existing buildings.
- All new buildings will include shower facilities. The quantity of shower provision will depend on the size and purpose of the building.
- Shower/changing facilities will include the following:
  1. A hair dryer
  2. Towel rails
  3. Clothes hooks
  4. Changing benches
  5. Sufficient number and sized lockers in close proximity to the shower
  6. A mirror
- For larger shower/changing facilities it is required to provide a drying solution for wet towels and cloths.

### 8.5.6 Sustainable travel locker facilities

- Any additional lockers used for active travel should meet the following criteria as standard, in order to maintain the provision of high quality active travel facilities on campus:
  1. Laminate solid grade laminate lockers with an aluminium carcass e.g. [Marathon Laminate wet area lockers](#)
  2. Offer a minimum width of 400mm and depth of 500mm
  3. A height of 1830mm, with a mix of 2, 3 and 4 tier lockers depending the space available.
  4. Double coat hooks fitted to 2 tier lockers
  5. Lockers should be fitted with BU Salto locker lock controls as specified in 7.4.5.

### 8.5.7 Card access locker locks

- In order to facilitate efficient management and allocation of active travel lockers, the university will fit any new lockers with card access locks compatible with BU's card access system. The current spec for locker locks is:
  1. SALXS4L9 Salto XS4 locker lock
  2. SAL10PL Salto XS4 10mm locker distance plate (required to install on a laminate locker)

### **8.5.8 Short stay cycle storage**

- A toast rack of Sheffield stands with a minimum of 1000mm space between stands and 1000mm from building boundaries to the centre line of the Sheffield stand.

### **8.5.9 Visitor cycle parking standards:**

1. Visitor parking will be covered, with an aspiration to have PV roofing where appropriate and where budgets allow.
2. Visitor parking will have CCTV coverage
3. Visitor parking will have signage with a campus map next to it and clear way finding in close proximity
4. Cycle racks will be provided by Sheffield racks – galvanised steel
5. A covered canopy should be high enough to allow for two tier storage if growth dictates increased capacity
6. The canopy should be 5mm PETg UV Clear View cladding and Galvanized steel to BS EN ISO 1461:2009 or a bespoke design in keeping with surrounding buildings
7. There will be capacity for at least 20 bicycles or offer an appropriate cycle quantum for the project

### **8.5.10 Secure Cycle Parking Standards:**

- Located in a convenient and accessible location, with a segregated cycle paths/safe cycle access leading to the facility where possible
- Covered, with PVC roofing where appropriate and where budgets allow
- Well lit (LED lighting)
- Will have at least one pump, repair stand and D lock storage facility located within the compound
- Will have card security access (SALTO) fitted as standard
- Fitted with self-closing doors that are secure, but when accessed by cyclists can be opened using reasonable effort with one arm
- Offer provision to display relevant cycle information and signage
- Electric bike recharging facility where appropriate and when budgets allow
- Design will allow for easy cleaning and maintenance
- Sufficient room to allow for two-tier storage solutions. A minimum of ceiling height of 2700mm and compound width of 4070mm
- Cycle compounds as a minimum should be fitted with two rows of Sheffield stand toast racks as specified in in the free standing short stay cycle parking section. The following dimensions should be considered:
  1. 4500mm width to accommodate a 2500mm space from the centre point of each Sheffield stand to allow cyclists to manoeuvre their cycle into the parking space, and 1000mm clearance from the centre point of each stand to the boundary of the cycle compound

2. The two-tier rack is a space efficient cycle parking system with good usability. The required dimensions for two tier cycle racks are:
  - Minimum ceiling height required 2700mm
  - Minimum space in front of rack required 1500mm
  - Depth 1800mm
  - Rack spacing 400mm

Cyclists using non-standard types of cycles should not be excluded from using cycle infrastructure. Non-standard cycles require the careful design of facilities to make sure that their greater width and turning space requirements can be accommodated. There are many types of non-standard cycles, including:

- Cycles with trailers for children or deliveries
- Tricycles
- Tandems with two or more seats
- Inclusive cycles designed for disabled people e.g. quadricycles and hand cycles
- Recumbent cycles
- Cargo bikes (for carrying goods or children)
- Small-wheeled foldable cycles

#### **8.5.11 Electric charging points:**

- Fast charging points Mode 3, with type 2 charging sockets, should be specified for fleet vehicles (dual point 32amp 7.2kw charging option).
- Dependent on the location and requirements, the following options should be considered:
  1. [Pedestal](#)
  2. [Wall mounted](#)
- Units should be secure, with a key switch option
- Units to be located in permit holder car parks or for use by the general public will require a pay as you go solution.
- All units should be installed with an appropriate meter, to allow BU to monitor usage and cost.

#### **8.5.12 Pay and Display machines**

BU car parks which can be accessed by members of the public should be fitted with a pay and display machine if considered appropriate. The pay and display machine should offer the following key features:

- Structure – anti-corrosive, 2.5mm Stainless Steel casework
- Ground mounted pedestal
- Solar powered with performance adapted to the configuration to enable easy, low cost installation with the ability to re-locate with minimal effort and cost



## BU Design Standards

- Offer a capacitive key pad to offer number plate capture and customisation on demand (allow up to 5 alternative tariffs e.g. Gym user discount)
- Cashless payment only through contactless or chip and pin card payment
- Ticket printing in standard format 60 x 70mm, with a capacity up to 3500 tickets
- Communications – 3G modem with roaming SIM
- Environment, the machine will be more than 95% recyclable (ISO22628)
- Be able to integrate with an ANPR back office
- Anti-Drill locking mechanisms
- LED lighting of customer interface area
- Full illumination of customer interface zones
- No third-party Payment Service Provider required.
- Web interface with cross platform, including mobile support
- The ability to link to and support the university's parking enforcement and management system.

The [IPS MS1](#) machine is an example of a machine, which would fit the standards.

## **9 Signage and Branding**

### **9.1 Statutory Signage**

- 9.1.1** Fire Action and Refuge notices will be supplied by BU Estates (Projects Officer).
- 9.1.2** Other statutory signage shall be provided by the contractor in accordance with Building Regulations and the fire strategy within the building.
- 9.1.3** All fire escape signage, including refuges, within student accommodation is to be tamper-proof.

### **9.2 Wayfinding**

- 9.2.1** The internal and external way finding signage must be fully integrated with the design and in accordance with the BU signage guide. A copy can be found at Appendix 7.
- 9.2.2** All statutory and waste management signage must also be fully integrated into the building design by the design team.

### **9.3 BU Branding Standards**

- 9.3.1** Signage, decoration and branding, in agreement with BU Marketing & Communications, to create meaningful identity within the buildings. A copy of the BU Branding Guide can be found at Appendix 8.
- 9.3.2** Where graphics are to be applied to wall surfaces the background decoration requirements are to be checked with the BU Projects Officer.