UWE Estates and Facilities Design Guide

Chapter 5: Fabric & Structural Design

UWE Bristol | University of the West of England

SOUTH WEST BUILT ENVIRONMENT AWARDS 2017
CLIENT OF THE YEAR
WINNER

Green Gown Awards International
Winner

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5.1 Change Control

Version Number	Date of Issue	Chapter Ref	Brief Description of Change(s)
1.5	01/05/19		Various updates throughout all detailed in 2019 version
1.6	NOV 2019		Various updates throughout all detailed in 2019 version
2021	JAN2021	5.5.4	Inclusion of the requirement to have details on the external fabric of the building in respect of fire safety and fire spread
2021	JAN2021	5.7	Added to bullet points: "Minimise waste on and off site – monitored, measured, reported to Sustainability Team". "Make use of reused or recycled content in construction materials, fixtures and fittings." "This includes sacrificial materials such as hoarding."
2021	JAN2021	5.8.4	Added: "Solar gain should be minimised using external fittings in preference to internal."
2021	JAN2021	5.8.5	Added: "Entrance doors should have lobbies to prevent wind/draughts, suitable for predicted pedestrian traffic, and designed accordingly to function in high flow periods."

5.2 Introduction

Each project will have specific requirements, limitations, challenges, and opportunities that affect a project's cultural, environmental, technological, and aesthetic contexts.
The client faculty or service will have their own vision of the end result. Whilst wanting to satisfy those expectations, practical issues and design or construction constraints may require those initial concepts to be reviewed and revised. To provide confidence and mitigate surprises, the Designer will arrange regular meetings with the stakeholders to communicate progress and explain and discuss design development.

This Design Guide must be followed. UWE will consider alternative products if the change is considered to be for the better and provides acceptable life cycle costs and resiliency, including ease of maintenance and availability of replacement components. The derogation process must be used to manage the process.

The UWE is a progressive University and welcomes the use of new technology after the balance of risks and benefits have been established and evaluated.

5.2.1 Designing for flexible use

To provide flexible space, Designers should anticipate future changes in use and internal layout but not at the expense of appearance, acoustics, thermal capacity or stability. The requirement for flexible spaces will obviously influence the structural form, and lead to the use of non-load bearing internal walls where practicable.

There will need to be ample accessible service routes to accommodate future alterations or expansion of services as technology and teaching techniques evolve. Raised floors and/or generous supply of floor ducts is to be included with all projects to avoid trailing leads and to assist with future alterations and flexibility of room layout.

5.3 Furniture and furnishings

The Faculty/Client will lead in the selection of furniture and furnishings. The package may be removed in all or part from the building contract in order for the client to manage. The Designer will liaise with the client accordingly and provide advice and practical guidance as necessary. All furniture and furnishings must be specified to be fire retardant and fully compliant with the Furniture and Furnishings (Fire) (Safety) Regulations.

As per Chapter 1 of this Design Guide, the choice of furniture and furnishings impacts on the student experience, influences how flexible and accessible space is and alters perception of the space. There will be variation in furniture/furnishings in social and learning spaces.

Designers must ensure internal spaces have flexibility to accommodate a choice of furniture arrangements to suit a range of users. There should be a choice of seat, bench and desk/workstation heights (including sinks and fittings), with and without arms/backrests and visually contrasted from room finishes. Sink fittings are to be operable by someone with reduced manual dexterity. Experience has shown that the colour of furniture needs to be considered alongside the colour/quality of lighting: The light can radically alter perception of furniture colour.

Tables, desks and seating to be movable and designed to enable disabled users to sit with colleagues, particularly in canteen/refectory areas and common rooms. Some seating should be more enclosed, providing more privacy or a quieter area.

Furniture in offices should strive for more conformity, and the UWE preference is for 1600mmx800mm straight desks with under-desk pedestals. The inclusion of sit/stand workstations helps make the environment more widely accessible.

5.4 Accessibility of Student Accommodation

All the principles set out here, and in the rest of the Design Guide, are equally applicable to student accommodation. Specific requirements are needed to ensure that accommodation is accessible:

- A suitable number of rooms should be accessible or can be readily remodelled as accessible accommodation. Generally, this should represent 5% of the bedrooms, but will be influenced by the Equality Impact Analysis. For ease of access these will normally only be provided at ground floor level.
- These rooms will need to be large enough to accommodate assistive equipment and personal assistants and have level access ensuite shower rooms.
- Shared use wheelchair accessible kitchens will be required in these flats.
- Residents will be able to manage the temperature of their own rooms.
- Accessible bedrooms and ensuite ceilings are to be capable of supporting a tracked hoist, with pre-fitted fused spur power point at high level. These may be retrofitted at a future date. The consequential structural requirements are discussed later.
- Vibrating pillow/mattress and visual/audible fire alarms may be required in bedrooms. This will be determined by the Personal Emergency Evacuation Plan (PEEP). Please see the electrical engineering chapter for more details.

5.5 Structural details

5.5.1 Structural engineering

It is imperative that during the feasibility stage for alterations to an existing building consideration is given to how potential structural changes may affect the stability of a building. The level of complexity must be taken into account when assessing the level of professional competency required to undertake the structural survey and subsequent design. Engaging appropriate professionals at the earliest opportunity is paramount. The entire feasibility of a project could be decided on the outcome of their investigation.

5.5.2 Imposed Loads and Performance

In general, loading will be in accordance with the appropriate current standards. Flexibility in use is a key requirement. Open plan areas should be designed with the capacity to accommodate additional partition walls which may be required in the future and that office space may change to meeting rooms etc. UWE therefore encourages a large grid and as large as possible finished floor to finished ceiling height commensurate with a reasonable cost.

With office accommodation, floors should be designed so that filing cabinets can be positioned mid span, away from external walls.

If permitted within Town and Country Planning rules, and where structurally/economically feasible, additional capacity should be considered so that it is possible to increase the height of the building by subsequently adding additional storeys.

Student accommodation designated for current or future disabled students and disabled toilet facilities are to be appropriately designed (in terms of ceiling height and structure) for the fitting of personal hoists (or retro-fitting if there is no current demand). Ceiling fixing for hoists is preferred to the use of a steel gantry.

The structural capacity of roofs should allow for the opportunity to add reasonably foreseeable additional plant without having to undertake subsequent structural work.

Structural information must be incorporated within the handover documents. Typically this is in the form of the 'key structural principles' section of the health and safety file with cross-referencing to relevant drawings.

Ground floor circulation spaces should be capable of supporting and storing mobile plant with the safe loading details clearly identified within the handover documents (e.g. a floor loading diagram within the access and maintenance strategy).

5.5.3 Foundations

A ground investigation report is a prerequisite to any detailed foundation design. Sustainability and holistic thinking should come to the fore; for example, sustainable design options such as ground source heat pumps could be incorporated.

Consideration must also be given to temporary measures to stabilise ground when excavating around existing buildings, and bridging details around services.

Where reasonably practicable, foundations are to be designed to accommodate additional storeys which could be added in the future.

Lift pits are to be suitably designed to prevent any ingress of ground water entering the pit or adversely affecting the lift shaft components. Suitable detailing during foundation design is preferred to subsequent tanking remedies.

5.5.4 Structural Form

The design team will produce a report on the options for the superstructure which will be based on the recommended foundation design solution. A further report will be required once the option has been decided, detailing load paths and mechanisms. The report will form part of the building design documentation required.

Details must be provided on the external fabric of the building in respect of fire retardant specification, fire safety and fire spread. This must be reviewed by the UWE H&S Team.

The University is not adverse to the use of prefabricated elements such as bathroom pods, for example. However, evidence will be required to demonstrate how quality will be assured in the off-site manufacturing process. Furthermore, future maintenance/replacement of these pods would need to be carefully considered and explained in access and maintenance strategies.

Use of pre- and post- tensioned and cantilevered elements should be the subject of a risk evaluation (within a design risk register) to ensure that future adaptations/demolitions can be undertaken safely.

5.5.5 Timber Frame

Due to the risk of fire, a risk evaluation within the design risk register is required for any proposed timber framed structures on UWE sites.

5.6 Circulation Principles

5.6.1 Building Entrances

- See comments on external doors, later.

- Ensure that entry control communication units are visual as well as audible and can be accessed from both a standing and seated position.
- Avoid separate entrances for disabled users. In practice, this prevents the installation of revolving doors and a separate disabled entrance. Instead, designers could create a small lobby with 2 doors which everyone can use.
- Doors must not have 'weatherbars' since they create a barrier to wheelchairs and can be a trip hazard.

5.6.2 Reception

- Ensure Reception desks are accessible to all users, including operation by disabled members of staff. This is often and simply achieved by providing a seated working position for reception staff and level access to desks.
- Where possible, avoid providing a separate lowered section at one end and design a counter accessible to all.
- Provide enhanced lighting, acoustic treatment and hearing enhancement system to counter area.

5.6.3 Steps and stairs

- Upstands shall be used on the side edges of steps where there are gaps between the step and the wall – to prevent sticks and crutches from slipping off the step or materials falling.
- If possible steps shall be removed from the design (except for protected stairs between floors). Steps with associated ramps are acceptable (please note that steps may aid the mobility of those using leg prostheses for whom ramps can be problematic).
- All steps need handrails on both sides.
- The contrast strip shall be on the nosing of the step (not before it).
- Stair risers shall be solid (no open staircases).
- Glass must not be used for the tread or riser of stairs. Great care shall be used when considering the use of glass for the sides of stairways.
- Consideration shall be given to recessed lighting of steps (lighting is discussed elsewhere)
- Although students at UWE are adults, the facilities are open to the general public who may be accompanied by young children. The design of the stair guarding should reflect this. Approved Document Part K section 1.1.19 refers.

5.6.4 Horizontal circulation

- Where feasible, width of corridors should permit wheelchair users passing in two directions. Consider chamfering or angling corners to facilitate wheelchair user turning and to enable deaf or hard of hearing users to see others approaching.
- Corridor doors will be fitted with hold open devices in preference to power assisted opening devices. 30N is the maximum allowable force to open a door.
- Doors should not have weatherbars. They create a barrier to wheelchairs and can be a trip hazard.

- Avoid use of digital keypads: UWE normally requires swipe card access (see the security strategy in Chapter 3).

5.6.5 Vertical circulation

- For short rises and ease of maintenance, ramps are preferable to lifts, if gradients are shallow and lengths are not excessive or circuitous.
- Install passenger lifts larger than the minimum 1100mm x 1400mm in Part M wherever possible, to facilitate wheelchair turning within the lift.
- Fold-down stairclimber platform lifts are not recommended as they can obstruct the clear width of stairs and compromise means of escape.
- Freestanding enclosed vertical platform lifts to be not less than Part M 1100mm x 1400mm minimum size, with power assisted doors. The lift must be able to take the load imposed by motorised mobility aids.
- Enclosed platform lift controls to have single press button operation, so that users are not required to keep continuous pressure on the button for the full extent of travel.
- All lifts should be operable independently without requiring staff assistance. These should be evacuation lifts where possible: See the electrical engineering chapter for more details.
- It is important that push button devices are positioned in close and sensible proximity to the door they operate. Individuals cannot be expected to dash from the button to the door.

5.7 Sustainable Material Selection

In addition to selecting materials to fit the brief and, as are outlined elsewhere in this document, designers shall also take account of the sustainability impact of the materials selected. This entails taking a life cycle perspective regarding the choice of material, i.e. from cradle to end-of-life or preferably cradle-to-cradle which includes considering the reuse of the material.

To support our sustainability commitments, UWE requires designers to follow the principles below:

- Consider the source of materials – locally sourced generally being preferable
- Consider the reputational risks associated with extraction activities
- Consider the embodied carbon of materials selected
- Minimise waste on and off site – monitored, measured, reported to Sustainability Team.
- Plan for the reuse of materials produced as part of the construction phase
- Make use of reused or recycled content in construction materials, fixtures and fittings.
- Use materials with ease of repair, maintenance and end-of-life dismantling in mind
- Minimise the use of toxic and/or polluting materials in the design
- Be able to report environmental impact, recycled content and embodied carbon of materials
- Materials supply to comply with all applicable legislation throughout its supply chain

Materials should be sourced/produced under internationally acceptable environmental, social and ethical guidelines and standards (for example, FSC for timber). This includes sacrificial materials such as hoarding.

UWE encourages all designers to use A rated materials/products from the BRE Green Guide to Specification wherever reasonably practicable, and in addition to use materials in accordance with the RICS SKA HE assessment tool.

UWE advocates the use of high density polyethylene (HDPE) over PVC, apart from in the case of underground ducts. The designer will need to consider an array of factors to select/specify the appropriate material for underground pipework.

The supply chain will ideally evidence conformance to ISO14001, EMAS or equivalent.

To support our sustainability commitments, UWE requires designers to specify materials that are robust to the wear and tear of an institutional facility. Frenchay is an exposed site and masonry must have good resistance to moisture, frost and not be susceptible to staining.

The cost and risks of maintenance and cleaning must be considered. Pre-finished materials are preferred to materials which require painting or other ongoing cyclical maintenance activities.

Apart from aesthetic reasons, materials selected for the external fabric should not be prone to premature fading when continually exposed to the elements (timber and copper are obvious exceptions). Materials should be resistant to premature degrading as a result of exposure. Likewise, all exposed elements should be easily cleanable.

5.8 Building fabric and envelope

Building segregation must be considered at design stage, such as keeping teaching spaces and offices in separate zones to enable areas to be zoned off during holidays. This also extends to fire stopping (detailed in section 3.9) and compartmentation, which must be an integral consideration of the design and installed as early as possible. Retrospective fire stopping can leave a poor aesthetic finish and means the building has been vulnerable to fire spread for much if not all of the Construction Phase.

The performance at all junctions and intersections will be maintained. All openings within the envelope are to be compatible visually and technically with the external walls.

Further guidance on the use of insulation materials is given in the LPC Design Guide for the Fire Protection of Buildings 2000.

UWE have standardised upon certified approved fire stopping projects as supplied by Quelfire or Rockwool.

Consideration must be assigned to design out future pest control problems, regarding vermin as well as pigeons, etc. Projects and Contracts over £2.5M should employ a specialist Pest Control Consultant.
At Concept Design stage (RIBA Stage 2) consideration is to be given to the possibility of birds roosting/perching/nesting on flat ledges, cills, openings etc and the consequential impact on cleaning and maintenance, and also the health and safety impact from faeces, feathers, parasites etc. Steps are to be taken to eliminate flat ledges, cills, openings etc or provide anti-bird measures at Developed Design stage (RIBA Stage 3). Such anti-bird measures must be easily accessed for maintenance and cleaning i.e. not require MEWP, scaffolding etc.

5.8.1 External Envelope

The materials selected for the envelope must be robust, readily available, and preferably obtainable locally with a minimum life span of 60 years and not subject to early surface deterioration. This is especially relevant when selecting a facing brick. Plastic coated products are to be avoided unless the durability of the coating has been proven and is protected by a sound warranty.

The British Standard BS9999 and in particular Clause 35 on External fire spread and building separation must be followed. This applies to the standalone building, as well as the separation distances between adjacent buildings.

5.8.2 Roof (including rooflights)

The roof structure shall be designed and installed in accordance with the wind loadings and exposure conditions and particularly at Frenchay Campus which is particularly exposed. Weather tightness, high insulation and vapour control performance will be maintained across all roofs, including interfaces with external walls.

Wherever possible, designs should prevent the need for access onto roofs. If routine access is required to a roof a fixed means of access **must** be provided. UWE's preference is that access should be via a stairway (e.g. extension of the stair core) rather than ladder. Level, stable routes should be provided over roofs (e.g. a walkway of suitable construction fitted on to a profiled roof system).

Locks should only be operable by designated, off-suite keys.

Permanent fixed guarding is the preferred edge protection.
Fall arrest equipment is not to be used on roofs at UWE.

A detailed risk evaluation is required in the following circumstances:

- Access is to be via a ladder rather than stairs
- Fall restraint system is required. If so, the installation must be a Latchways system, or equal approved, and positioned so that it requires the use of a 1500mm lanyard, it must be compliant with Part L, it must be accompanied by a calculation package, design life must be not less than

25 years, all components should be stainless steel and installers must be approved by the system supplier.
- Access to the roof is via a trapdoor/ opening roof light.

Roof drainage is to be designed in accordance with BS 12056-3:2000.

5.8.3 Roof lights

Roofs which are partially or entirely glazed should be designed to prevent breakages or a fall.

UWE will never commission or accept a walk-on glazed roof. While accepting they are technically feasible, UWE will not allow them.

Upstands, non-fragile surfaces and, where necessary, handrails should be used to prevent people inadvertently walking or falling onto (and falling through) glazed roofing. Signage and demarcation of designated routes may be used to supplement the preceding measures.

Designs should minimise the need to clean gutters and rainwater goods and glazing to roofs. The access and maintenance strategy should explain how this will be done.

Designers must consider maintenance access to control gear and operators for roof lights or vents. As explained in the Chapter 2, these should be accessible from a place of safety (e.g. on a protected roof, with no risk of falls). The access & maintenance strategy (described in Chapter 2) must explain how glazing panels will be replaced in the event of breakage.

When replacing slate roofs or installing a new slate roof, subject to Listed Building Consent and general Planning conditions, consideration should be given to the use of artificial products with high levels of recycled content. This may be specifically relevant to the Glenside campus.

5.8.4 Windows

Windows are to be pre finished with no need for subsequent cyclical maintenance such as painting/staining or sealing. UPVC window systems must be avoided.

The design of the windows should permit cleaning of the external glass to be undertaken from within the room if possible, or by pole fed systems externally. The window cleaning methodology is to be included in the access and maintenance strategy.

In mechanically ventilated buildings, opening windows are to be restricted to 150mm max. In naturally ventilated buildings windows this shall be 300mm max. If there will be vulnerable users (e.g. a nursery), the opening must be 100mm max. Ironmongery to be robust, suitable for institutional use and subsequently available for the recommended life of the window.

Silicone is only to be used as a secondary form of sealant, not the primary form of weatherproofing.

It should be possible to reach and operate the control of openable windows, skylights or ventilators in a safe manner (i.e. people are not at risk of falling). Where this is not possible due to an obstacle or excess height, tele-flex or similar control gear is to be provided. Where there is a danger of falling from height, tamper-proof devices should be provided to prevent the windows opening too far.

No window, skylight or ventilator shall be positioned in a location that is likely to expose any person to a risk to their health or safety when opened. Open windows, skylight or ventilators should not project into an area where persons are likely to collide with them. The bottom edge of opening windows should normally be at least 800mm above floor level, unless there is a barrier to prevent falls.

Manifestation, preferably in etched glass, to be used wherever there is a risk of collision of persons or where modesty may be compromised. For example, floor-to-ceiling external windows or glass balconies could potentially pose a threat to the dignity of someone wearing a skirt or shorts.

The function of the room is to be considered at the design stage to facilitate the appropriate level of privacy. Permanent obscured glazing should be used rather that retrofitted films.

Daylight glare to be controllable by blinds.
Solar gain should be minimised using external fittings in preference to internal

5.8.4.1 Large glazed panels

Glazed panels should be sized to allow replacement to be undertaken using simple manual handling techniques with simple mechanical lifting aids. The need for the use of cranes, even 'spider' mini-cranes, to replace panels should be avoided wherever possible. If a designer believes (on balancing the competing design considerations) large panels are the best design solution, it must be discussed with the Principal Designer and recorded in the 'design risk register'. The access and maintenance strategy should also detail how this operation would be carried out.

5.8.5 External Doors

Robust external doors will be provided to all entrances and means of escape locations. Additional doors will be required to plant rooms and refuse areas. Typically, main entrances will be double doors, fully glazed, automated (operated by sensors and push button controls) and have level access wherever possible. Buttons must be in close proximity to the doors.
Entrance doors should have lobbies to prevent wind/draughts, suitable for predicted pedestrian traffic, and designed accordingly to function in high flow periods.

Doors on a maintenance route must be wide and high enough to accommodate any necessary mobile plant which has been considered necessary for subsequent maintenance activities.

Access control (card reader system) to be fitted to enable doors to be secured as and when needed, such as out of hours. Chapter 3 explains the UWE security strategy and also refer to Chapter 8 for the IT infrastructure needed to support the strategy. Note on automated doors, if there is a fire alarm or electrical failure, exit from the building is by pushing through doors. However without power nor access, entering the building is not possible if there are no door handles fitted externally to the doors.
Fittings and ironmongery are to be of a high quality, robust stainless steel. Lock cylinders to be euro-profile on UWE Kaba master Suite.

PVCU external doors must be avoided. Where doors are fully glazed, the door is to have a mid rail to resist twisting and reduce subsequent re-glazing costs. The rail at the door head is to have a minimum depth of 150mm.

Doors must not have weatherbars as they create a barrier to wheelchairs, trolleys etc. and can be a trip hazard.

The factory applied colour to steel or aluminium doors is to be resistant to fading, this particularly applies to the UWE red.

5.8.6 External Finishes

5.8.6.1 Cladding

Cladding to be lightweight with high thermal performance and good aesthetic appearance. The chosen finish should mitigate solar gain and consideration should be given to the careful use of colours.

The cladding system is to be integral with the glazing system with a minimum 40 year lifespan. The system is to be suitable for exposed conditions with stainless steel fixings.

Silicone is only to be used as a secondary, and never the primary, form of sealant.

In order to facilitate construction and replacement, cladding panels must be in unit sizes to allow easy handling using readily available plant/equipment and trade skills. The need for a crane during subsequent replacement of any parts should be avoided wherever possible. If a designer believes (on balancing the competing design considerations) large panels are the best design solution, it must be discussed with the Principal Designer and recorded in the 'design risk register'. The methodology must be included in the access and maintenance strategy within the health and safety file.

The design of the system should consider independent removal of individual panels to allow for maintenance and replacement of damage and insertion of additional openings for new windows etc., or to allow working access for future refurbishments of upper floors.

If may be foreseeable that during the life of the building, high level access will be required on the external façade of a clad building. An access and maintenance strategy and design risk evaluation (contained within the 'design risk register') shall confirm what access is required and what access equipment is to be used.

If timber cladding is to be used, designers must consider the flammability of the cladding and ensure designs and specifications limit the risk or extent of loss due to fire.

BS9999 offers further information about the management of the fire risk posed by timber cladding.

5.8.6.2 Curtain Walling

Curtain walling to be of good aesthetic appearance with passive measures to reduce solar gain if necessary (such as brise soleil, overhangs) and specialist glazing. Transoms and mullions to give clear sight lines and be integral to system used.

The design should comply with the recommendations of the Centre for Window and Cladding Technology (CWCT) 'Standard for systemised building envelopes.' with particular regard to;

- Internal and external environment
- Air permeability
- Thermal performance
- Access and safety
- Design life

5.8.6.3 Render

Render to be to current British Standards and be fully bonded to substrate with a good appearance and colours to be sympathetic to surroundings. The render is to be self-coloured. The surface is not to attract dirt and debris and is to be easily cleanable with low pressure water.

Detailing of adjacent cills, capping, flashings etc., to prevent moisture penetration. Roof overhangs to be of sufficient dimensions to avoid "drip" staining.

Where external wall insulation is to be utilised the protective render is to be self-coloured, sufficiently robust to resist light impact damage and when damage has occurred, easily repaired without the need for specialist equipment or expertise. In the long term, the system should allow over painting.

5.8.7 Rainwater Goods

UWE prefers the use of cast aluminium or iron rainwater goods. If, on balancing different design considerations, plastic is preferred, high density polyethylene (HDPE) is preferred over PVC.

5.9 Internal Finishes

5.9.1 General Provision

- Robust durable finishes appropriate to each functional space.
- For renovation projects, consider the building's character and existing finishes. All material patches should blend as closely as possible. Some buildings on campus have an existing palette that must be matched. Coordinate with the UWE PM.
- All specified materials must demonstrate suitability for use in an institutional setting, with similar regularity of cleaning and maintenance.
- Colour-through homogeneous materials are preferred.
- Avoid material(s) that require routine sealing or significant specialized maintenance.
- O&M documents must clearly identify and note all finishes, including extent of coverage.
- Stencil fire rating above ceiling at all fire-rated walls, in 150mm high letters at 6m centers.
- All finishes must complete curing & drying (off-gassing) prior to Substantial Completion

5.9.2 Internal Walls & Doors

Internal walls shall be designed and constructed so that they provide a secure and stable partition between areas and spaces throughout the campus. The type and nature of any internal wall will have to be discussed and agreed by UWE Estates prior to construction, and this will be based on the general location, use of the room / area and the possible need for future flexibility.

Where block work is to be used, blocks should not weigh more than 20kg to reduce manual handling risks during construction or subsequent alterations. A risk evaluation (contained within the 'design risk register') is required if a designer wishes to specify blocks in excess of this weight.

Consideration to be given when constructing new stud partitions to incorporate additional support battens for the UWE Toprail support system, or radiators etc. When constructing corridor walls, fire resistance, durability, robustness and good sound resistance is essential. If masonry corridor walls cannot be provided (it is the UWE preference that corridor walls are masonry), 9.5 mm plywood can be included behind the plasterboard to provide added resistance against penetration damage.

Where doors form part of a fire compartment they must fully comply with the requirements of BS9999 and provide equal protection to that of the surrounding walls. UWE aims to minimise the number of automated doors to an absolute minimum, and only install hold-open devices where necessary. Where

required, corridor and main circulation doors are to have hold open devices linked to and released on fire alarm activation. 'Dorgard' door hold open devices are not to be used. Use magnet holdback devices directly connected to the fire alarm system.
30N is the maximum allowable force to open a door.

Door closures should be deliberately flexible to allow the closing speed to be suitable for the environment in which it operates. Guidance in BS1154 suggests a smooth closure from 90 degrees to fully closed within a time of between 3 and 7 seconds.

Doors must not have weatherbars. They create a barrier to wheelchairs, trolleys etc. and can be a trip hazard.
Timber doors are to be self-finished to negate the need for subsequent redecorating. The head rail is to have a minimum depth of 150mm.

Fittings & ironmongery are to be of a high quality finish, robust stainless steel.
Locks to be of a suitable profile to fit UWE Kaba 20 cylinders.

Where doors (or gates/shutters etc.) are powered they must 'fail safe'. The electrical design guide provides details of the required interface with the fire alarm system.

Fire doors in corridors and circulation spaces can be held open with magnetic hold back devices which release automatically when the fire alarm is activated. If doors need to be closed, powered doors are the preferred solution for full accessibility. However low resistance closers can be utilised subject to an accessibility audit, and 30N is the maximum allowable force to open a door. UWE is willing to trial free-swing door closure devices following an evaluation of cost/risk vs benefits.

All fire doors and frames are to be manufactured and installed as a single unit and appropriately certified before hand over.

If half-height internal walls are used (typically used to demark zones or functional areas in robotic or engineering buildings), they should either be short enough that someone in a wheelchair can look over or vision panels etc. should be positioned at appropriate points.

5.9.2.1 Physical Locks

Physical key locks are used across UWE. UWE deploy a system of suited locks in order to manage and maintain suitable access. Any locks being installed must be agreed with the Security Systems Team to ensure the correct suite is being used. See the Chapter on IT infrastructure for information about door access control. **NOTE** fire exit and emergency escape doors should not be physically locked.

Physical locks are to be installed, as a minimum, on the following doors:

- Offices

- Cleaners' cupboards
- Lecture Theatres
- Plant rooms
- Comms rooms
- Workshops
- Laboratories
- Other rooms as discussed and agreed with occupying clients and dependant on site specific use

5.9.3 Plasterboard

- Plasterboard must not be used on ceilings without UWE's express permission (as it has historically concealed pipework etc.)
- If it is permitted, adequate access provisions shall be made.
- Where pipes and cables are boxed in access must be provided.
- Plasterboard should meet WRAP requirement for recycled content.
- Plasterboard wall linings are not deemed suitable for high trafficked locations (i.e corridors), communal areas (i.e. social spaces) or student accommodation. Plasterboard wall linings should be assessed for suitability, but restricted to teaching, learning or office areas, unless otherwise authorized by UWE Estates.
- Consideration should be made for ply-backed detailing or alternatively the use of wall-board.
- Wet areas and/or tile backer board:
    - Use cement backer board for tile.
    - Paper-faced moisture resistant gypsum board panels are not permitted.

5.9.4 Tiles

5.9.4.1 Floor Tiles

- Cross-fall finished floor to floor drains.
- Maintain adequate substrate to prevent lifting of tiles due to thermal dynamic movement by hidden services.
- Glazed or polished tiles are prohibited.

5.9.4.2 Wall Tiles

- Colour contrasts to comply with BS 8300 (see visual contrast, elsewhere).
- Ceramic floor and wall tiles should not be used in wet areas (including kitchens, laundries and academic areas requiring high levels of hygiene). Instead, UWE prefers the use of vinyl safety flooring and flexible vinyl systems. The solution can also include a vinyl ceiling finish (see below).

5.9.5 Suspended Ceilings

- Ceilings should be designed to be easily accessible for maintenance and other access requirements, such as future technology installations. The depth of void must be adequate to accommodate integrated light fittings and the layout of the grid must align with M&E design.
- Ceilings within a wet, humid or hygienic environment including areas that require regular cleaning will have a product selected to suit the conditions. This can include interlocking vinyl planks.
- Tile size (unless planks) generally will be 600 x 600 with painted perimeter shadow batten.

5.9.5.1 Voids created by suspended ceilings

The void created by a suspended ceiling should be 600mm minimum deep under flat structural soffits in order to accommodate services. This distance can be reduced depending on the nature of services with the void: Mechanical and electrical designs must be co-ordinated with the fabric/structural design to inform these decisions.

5.9.6 Flooring

- UWE can provide approved flooring systems and products for specific locations and uses.
- In general, flooring (both internal and external) shall be non-slip (even when wet).
- Floor tiles must be of a suitable size so as NOT to introduce manual handling issues for installation, maintenance, and replacement Contractors.
- Flooring must comply with general provisions in BS8300.
- Flooring shall not "turn up" the wall more than 150mm without a colour change.
- Building entrance: Primary & secondary walk off barrier matting with metal trim as applicable.
- Lift floors: Rubber tiles, classified under EN 685 for heavy use (standards 23, 32 and 41).
- Wet laboratories: Use chemical resistant flooring (also see comments in 'specialist areas', below).
- Stair Treads & Risers: Colour contrasts to comply with current guidance.

5.9.6.1 Specialist areas

Due to the diverse range of activities undertaken at UWE, there will inevitably be circumstances when standard flooring solutions are inappropriate. Examples: In one workshop there was the potential for freshly welded metal or droplets of molten metal to come into contact with the floor. Potentially, some substances may be handled which require or prohibit the use of very specific floor finishes.

The following UWE project processes will help the team to arrive at a considered and suitable solution:

- The project brief will establish anticipated teaching activities. The implications for design and specification must be established through discussion (e.g. the weight, temperature or physio-chemical properties of materials or substances etc. that may come into contact with the floor).
- Flooring solutions should be identified that meet the demands/constraints.
- Technical data and samples of bespoke products should be obtained and discussed with the client and cleaning services. The faculty may need to adopt specific management arrangements for the floor, leading to changes in risk assessments or standard operating procedures.

- Potentially, there may be a mixture of bespoke floor finishes through a technical area. The reasoning behind the various selections may be lost over time and eventually activities may change, meaning that the chosen floor surfaces become inappropriate. Handover documentation should explain why the various, bespoke floor surfaces were chosen. This might be conveyed in a simple, annotated plan included in the O&M information.

The HSE slip assessment tool (http://www.hse.gov.uk/slips/sat/index.htm) should be used if there is doubt about the ability of a bespoke product to reasonably prevent slips and provides information that can help influence cleaning regimes or faculty operating procedures.

5.9.6.2 Raised floors

No raised floors at UWE must be classified as light under the MOB PF2 PS standard (or BSEN 12825 Class 1 and 2). The majority of office and teaching spaces will be MOB PF2 PS medium standard (or BSEN 12825 Class 3 and above). Circulation spaces may need to be MOB PF2 PS heavy standard (or raised floors may be inappropriate) depending on the anticipated loads. See 'imposed loads and performance' earlier. Any raised floor should be a minimum distance of 250mm from floor finish to structural floor to allow for services.

5.9.6.3 Prohibited flooring materials

- Specialty flooring: bamboo, cork and laminate.
- Wood flooring, except at gymnasiums and certain other specialised functions.
- Masonry flooring: Not permitted if it has significant fill and/or requires routine sealing or significant specialized maintenance.

5.9.6.4 Carpeting

For offices, circulation spaces and lecture rooms carpet tiles are the preferred option.

- Any existing carpeting removed for renovation must be recycled where possible. Justification must be provided for non-compliance.
- Construction; Solution dyed, bleach proof nylon construction. The use of polypropylene pile carpet is to be avoided.
- Minimum manufacturer's warranty for wear, edge ravel, tuft bind, delamination and static control:
    - Barrier matting: 5 years
    - Offices, teaching rooms and other areas: 10 years.
- UWE wishes to avoid staining around drinking fountains due to leaks and spills (as shown to the right). The choice of fountain and selection of floor covering should limit these unsightly stains.

5.9.7 Painting

- Manufacturers, products and colour ranges are to be restricted to the UWE palate.
- The UWE will consider the use of water based undercoat and gloss finishes where appropriate.

5.9.7.1 Teaching Walls

In teaching spaces, teaching walls (i.e. the walls on which images will be projected etc.) must be 00NN 16/000 – Grey. This helps to accentuate the screen and is of great benefit to students with certain cognitive and visual impairments.

5.9.8 Vision Access/visual contrasts

- The need for contrasting colours between floors and walls and doors; stair treads and risers; doors and handles; walls with switches/sockets etc. is well established.
- While the UWE standard specifications support effective contrast, it is incumbent on designers to review colour contrast of adjoining materials and seek advice if in doubt.
- Busy, highly patterned surfaces to be avoided.
- Columns can be at risk of 'blending in' to the background and may need manifestations to ensure they are visually distinct.

5.9.9 Acoustics

- Provide appropriate acoustic absorbing surfaces to teaching and meeting spaces and in particular to reception, refectory, assembly and sports/leisure areas where there are hard surfaces that cause reverberation issues.
- Ensure adequate sound resistance of structure for acoustic separation, particularly between teaching spaces, interview rooms, residential accommodation and performance areas.

5.9.10 Fixtures and Fittings

- UWE buildings will require 'Toprail' flexible wall furniture system in teaching rooms, offices and specific corridor locations (to solid or suitably reinforced stud partition walls only).
- Notice boards located within corridors or escape routes are to be enclosed.
- Specialist fixtures and fittings for science laboratories, computer laboratories, engineering workshops etc. will be specified separately according to building/room use. However, designers are invited to bring their expertise forward and suggest solutions.

5.10 Provision for storage, deliveries and movement of materials

Through consultation with stakeholders, design teams must establish the storage and delivery requirements. Lack of storage is a frequent source of frustration. Different faculties and services have different requirements. In some cases, storage (e.g. for hazardous substances) must be secure and have a range of other controls and precautions (e.g. alarms, general or forced ventilation etc.).

In relation to deliveries, the access and maintenance strategy should set out where and how materials will be delivered to the building. Design teams will need to consider:

- Catering supplies
- Teaching materials
- Stationery supplies and office equipment (including desks and photocopiers)
- Materials required for routine maintenance and life cycle redecoration/refurbishment

Such considerations are likely to inform the size of lifts and specification of doors (such as double leaf or leaf-and-a-half) especially into plant areas, on main access routes etc.

5.11 Catering design

An attractive, varied and efficient catering experience supports many of UWE's overarching priorities, as set out in Strategy 2030 and other strategic policies. Specifically, it promotes (amongst other things):

- Positive student experience
- Wellbeing of staff and students
- Inclusivity by meeting varying dietary needs and requirements

- Value for money (e.g. through more efficient services or by designing catering facilities that can be changed to respond quickly and cheaply to changing food trends)

It is critical that Hospitality and Catering are engaged early enough to have a meaningful input into design. They should therefore be involved by at least the start of RIBA stage 3 (developed design). Hospitality and Catering will assess catering needs for the new or refurbished space, ensuring this fits into the overarching catering strategy for the campus then preparing more detailed specifications for the design team.
The project brief (and budget) should clarify who is responsible for providing plates, cutlery, trays, cooking utensils etc.

5.11.1 Lessons learned

There are numerous examples of designs which have not met the needs of Catering and Hospitality. They typically occur because catering and hospitality are not consulted early enough or because the principles in this design guide are not followed. Examples include:

- Imposing limited space, which cannot accommodate the equipment or activities which catering services require to provide the services required by the end users.
- Not installing water supplies, drainage and/or extraction which prevents a catering facility being upgraded to meet changing requirements
- Inadequate power supplies, equipment needs are compromised by an insufficient power grid. Expansion proves very expensive to provide retrospectively.
- Improper brief, unclear final outcome leads to a project failing to meet stakeholders' requirements or last minute fixes that add expense or do not provide the required service.

5.11.2 Production Kitchens

This section of the design guide relates to deli/café/bar and vending operations. While many of the general principles in this section will hold true for production kitchens (e.g. the need for adequate storage), production kitchens are significantly larger, complex, busy spaces with a diverse array of catering equipment and activities.

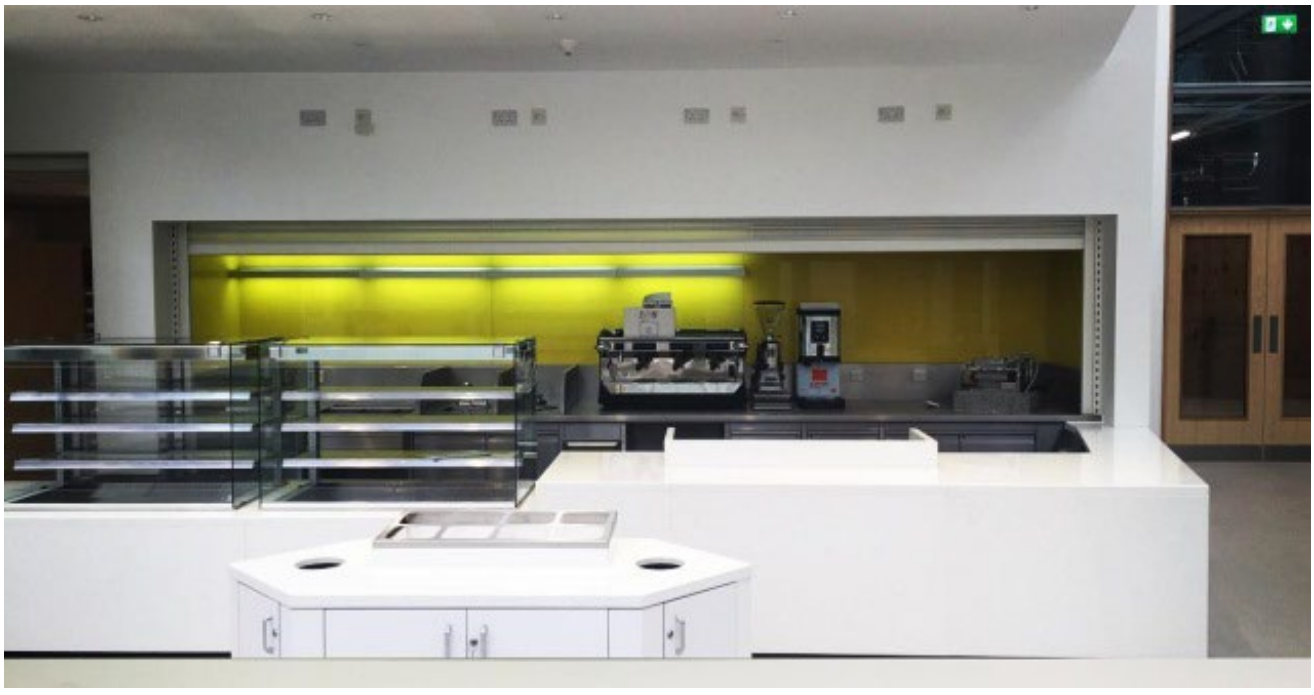
Much more detailed analysis will be required to determine what represents 'adequate' storage or washing facilities, for example. There is a need for very high standards of co-ordination between mechanical and electrical services, incorporation of numerous safety devices (e.g. emergency cut off devices) and liaison with other UWE stakeholders (e.g. the UWE Fire Advisor).

It should be noted that kitchens should be capable of accommodating duplicated appliances to cater for specific dietary requirements.

5.11.3 Deli/Café/Bar Style Operation

The guideline will enable the main aspects of design to be considered in developing a brief for the design of the style of catering operation.
Considerations will be given to:-

- Design
- General layout and room specifications
- Service Style
- Mechanical and Electrical to include IT and phone lines
- General Service Requirements
- Finishes



5.11.3.1 Design

The design of a modern retail Deli/Cafe catering outlet should only be undertaken by a specialist catering Design Company with experience in delivering a "Turnkey" package.

A detailed brief can be provided by the client utilising this guideline as starting point.

This process ensures that the design is Client-based with a full understanding of the commercial aspects and technical issues demanded from the proposed outlet.

The Outlets should be so designed to create a modern bright space with the emphasis on a de-skilled or semi-skilled food production, and able to offer a range of quality light meals, snacks, sandwiches and beverages. Consideration to design if location to be licensed for the sale of alcohol.

5.11.3.2 General Layout and Room Specifications

The operation will ideally be a self-sufficient unit but could be partly supplied via a larger local central catering operation.

Stores for back up stock would be required as will modular refrigeration & freezer units.
Ventilated dry storage should be provided with adequate shelving space for holding stock equivalent to 30 days.

Modular cold storage units would ideally be divided into three areas, High risk storage, low risk storage and freezer storage. This facilitates the implementation of the food handling elements of the food safety act.

Depending on style an area would also be required for the Chef Manager to receive goods and to conduct cashing up. This would normally be sited close to the entry point for goods.

There will only be a limited use of crockery with disposables being used in the main. A dishwasher system however maybe required for the washing of crockery and utensils and this should be sited within an area away from food preparation areas.

This operation will produce waste and therefore, consideration should be given to separating food waste from waste that can be recycled.

Waste areas should be identified as under counter and external recyclable waste bins. External enclosed bin areas should be considered within the design or have a holding facility away from food preparation areas whereby waste can be stored prior to being taken to main waste storage areas.

A separate lockable COSHH cupboard with shelving and Belfast bucket sinks should be provided for cleaning and chemicals.

5.11.3.3 Kitchen Design

The operation is dependent upon a minimum of food being prepared on site and therefore the space required is relevant to the operation. However, sufficient space should be given to produce food in a safe and organised manner maintaining separate areas for high and low risk food preparation.

The operation should allow raw and cooked foods to be prepared in separate areas, having dedicated refrigeration, sinks and prep benches for those areas.

Cooking equipment should be adequate for use, with the extra ability to meet demands for increased business. Low intensity food production methods are advised for Deli/Cafe/Bar style food operation refrigeration and oven and frying equipment to be selected for purpose of design. Extraction fan to be fit for purpose of selected equipment.
A balance of equipment power requirements should be achieved with a view to having a mix of gas and electrical cooking equipment. Additional electrical power to be available for any future additional equipment needed.

Separate sinks are required for food use and cleaning use. Adequate hand wash sinks are required. Sinks to be accessible to users with reduced dexterity.

The catering environment to be temperature controlled with adequate fresh air make up and if feasible adequate natural light.

All finishes within the service area should be of an impervious nature and cleanable with the ability to be regularly sanitized.

The position of pest control measures will need to be discussed/agreed with the current contractor and considered in the design.

The potential need for duplicated appliances to cater for specific dietary requirements must be established early on: This will have significant implications for space requirements, as well as services.

5.11.3.4 Service Style

Operation is relatively low skilled with the emphasis being placed upon low intensity food production. The main service counter would be approximately 6 metres in length with a back counter around the same. Again this would depend on location and space available.

Space should be given to chilled ambient, hot, option and retail space for grab and go.

The design elements of the flow of customers should be considered to reduce dwell time and queuing issues. This may affect the type of coffee machines utilised which could be self-service, barista style or bean to cup.

Consideration should be given to the careful management of staffing levels required to operate the food service points. Staff should be able to migrate between counters during quieter periods. Staff should be adequately trained in all areas of food production and service.

The food service counters should include:

- Limited hot section Chilled Deli and salad section Hot Snacks
- Grab and go, with easy access to tills for speed of service to include-cold drinks sandwiches and boxed salads etc.
- Quality coffee and hot beverage offer on back or front counter
- Each area of the counter outlet will serve and display from either hot (dry heated solid tops) or cold (chilled self-selection and served) units. This could be of a mobile nature for use elsewhere or fixed as part of the shop fitting.
- Space on the counter and their approaches should provide for the merchandising of trading up items. Each outlet will require power and data connections to operate POS systems and widescreen confirmation of service times and menu offerings
- Easy access or dispense of free drinking water to be available in all food service outlets

5.11.3.5 Finishes

Consideration should be taken in applying the selection of kitchen finishes in order to ensure compliance with health and safety and the food safety act.

- Ceramic floor and wall tiles are not permitted.
- Ceiling finishes should have a plastic faced cleanable tile on a white corrosion resistant grid. A 600mm2 grid is advisable. Light fittings should be enclosed vapour proof fittings with diffusers fitted in to the ceiling grid.
- Floors should be anti-slip vinyl or quartz screed with 120-150mm coved edges.
- Wall finishes should be of a cleanable and impervious nature vinyl sheeting with an integral biocide is advised.
- Doors should be manufactured with cleanable laminate surfaces.
- All paint surfaces should be either low VOC Matt or eggshell.
- Food server counters should be manufactured in stainless steel with decorative polymer counter tops or granite, and have decorative laminates to the front facing elevations. Any joins to be finished in impervious materials that are suitable for the area.
- Impulse space should be designed in to the counter along with an element of retail.
- Back counters should be manufactured in stainless steel with stainless steel work surfaces.

5.11.3.6 Seating area

- Social spaces should have a variety of seating which would suit the varied dining styles offered.
- The mix of seating ideally would include fixed seating, breakfast bars and soft seating areas.
- The colour scheme should be so designed as to create a bright and airy environment with the use of neutral tones accented with stronger feature colours.

- Flooring to be cleanable and possibly include some carpeted areas where soft seating is present.
- The use of audio visual facilities should be utilised within the space for information purposes, therefore data cables would be required in those areas.
- As discussed elsewhere, small power should be supplied.
- More generally, the seating area can be used as a social or breakout areas and may need to accommodate televisions, marketing screens etc. These requirements will be established in the initial brief and may necessitate the provision of power, data etc. which should be allowed for within the project and co-ordinated into the overall design.

5.11.4 Vending Operation

5.11.4.1 General

The intention of this guideline is to seek to provide a modern efficient Vending Service.
This guideline will enable the main aspects of design to be considered in developing a brief for the design of a Vending Operation.

Vending can be used to capture sales in areas of significant footfall or designed to provide an additional out of hours service to back up retail catering operations.

It can be used to provide a service in remotely located areas away from the main Catering operations. Vending machines have changed significantly in recent years and can be used to supply a range of hot and cold food and drinks. There may need to be mains water, small power and potentially drainage. Consideration will therefore need to be given to -

- Mechanical and Electrical requirements
- Design
- General Service Requirements

5.11.4.2 Design

The design of a retail Vending Operation should only be undertaken by a specialist in Supplying Vending or a catering design company with experience in delivering such a service.

A detailed brief can be provided by the client utilising this guideline as basis on which to commence the design process.

This process ensures that the design is client based with a full understanding of the commercial aspects and technical issues demanded from the proposed outlet. The Outlets should be so designed to create a discreet vending operation which is carefully sited and fits well within a given social space.

A Vending operation will require the use of a remote storage facility sufficiently large enough to hold back up stock particularly where the supply of chilled drinks are required through vending. Space is also required for storage of hot beverage product and drinks cups.

It may be that chilled back up space is required where sandwiches and chilled snacks are held in situations where the vending machines are stocked more than once per day.

The stores should be adequately lit and well ventilated. Dry storage should be provided with adequate space for holding stock equivalent to 3-5 days.

All stock is subject to the requirements of the Food Safety Act.
Vending produces waste and therefore, consideration should be given the provision of separating wet waste from waste that can be recycled. To this effect consider the use of waste and recycling units adjacent to the vending area. As mentioned above, drainage may need to be considered.

5.11.4.3 General Service Requirements

The University Health and Safety Team should be consulted at an early stage of the design process to ensure that the vending is not sited so to cause any restriction or hazard in public spaces and will satisfy statutory regulations.

Social spaces may be adjacent to the vending and consideration should be given to a variety of seating which would suit the operation.

Vending is often best placed within a shop fitted housing which can be designed and built to complement the local scheme.

Consider the use of anti-slip flooring to the area immediately in front of the vending machines due to the potential slip hazard created by spillage.

5.11.5 Tea Points

Tea points are required within large office areas and will be a minimum area of $4m^2$ and will consist of Vinyl flooring, overhead and under counter storage, sink, fridge dishwasher and fridge.