THE UNIVERSITY of EDINBURGH
Estates Department

Estates Design Guideline No. 10

Building Fabric

Important Comment on Estates Design Guidelines, Assets & Standards

These Design Guidelines, Assets and Standards and the associated suite of documents have been produced in order to furnish external design consultants and contractors with guidance on required University standards for inclusion within their proposed project design.

These guidelines are to be used as supplementary information during project design stage, and as such, detail the minimum standards expected from the University Estates Department.

Please note, these guidelines do not absolve the project design team including, sub-consultants and sub-contractors of their legal and contractual obligations under, design liability, statutory regulations and health and safety legislation.

EDG (Assets & Standards) No. 10 Building Fabric Approval Procedure	
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric Lead: Building Surveyor	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric - Equality Check Lead: Building Services Group Manager	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric check and approval – Director of Estates Operations	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric approval by EMG and Health and Safety Committee	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric approval by Estates Committee	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric sign off by Duty Holder	Name Signed Off Date
Estates Design Guidelines (Assets & Standards) No. 10 Building Fabric Future review date Sign off by Building Surveyor	Name Signed Off Date

Version Control for Estates Design Guidelines (Assets & Standards) No. 10 – Building Fabric

Version	Date	Nature of Revision	Author	Approved by	Signed
1.0	27th February 2020	First Issue	DC		

Contents

1.0 Introduction

The UoE Design Guidelines (as a whole), have been developed for employees of the UoE, Design Teams, Architects, Engineers, Project Managers, external consultants and contractors. This documentation has been developed to enable Design Teams and Contractors to have a broad understanding of the principles that the University of Edinburgh will require to be adopted for any future developments.

The guide is primarily designed to be used in conjunction with Royal Institute of British Architects (RIBA) stages. The actual extent and scope of the design guide to be incorporated for any future development will be based upon the specific project requirements.

The UoE Design Guidelines 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, support the consultation process and outline existing assets and standards. It is the responsibility of Design Team readers/duty holders to ensure subsequent designs are complete, compliant and able to meet the final approved brief when measured in use.

1.1 Important Notice – Essential Prior Reading

It is essential for readers of this document to first refer to Design Guideline No.1 entitled *"Estates Design Guidelines (Assets & Standards) Introduction and Application"*, which serves to provide the principles and overview with vital information and context that will apply to all projects.

1.2 Purpose of the University of Edinburgh Estates Design Guidelines (Assets and Standards)

The purpose of the Estates Guidelines is to act as a briefing document to give designers an overview of the minimum design requirements, constraints and challenges presented by the University of Edinburgh's particular needs. It applies to all new-build, refurbishment, minor works and change of use projects, including property leased by the University, controlling quality in the production of designs, specifications and the subsequent performance of buildings, developed to a consistently high standard and ensuring continuity throughout the University Estate.

The University of Edinburgh encourages innovation; however, all project Design Teams should ensure that their proposed projects have end user considerations and ease of maintenance at its core.

The use of the University of Edinburgh Estates Guidelines, Assets and Standards will not take the place of, or remove, any of the professional responsibility from Design Teams and Contractors to fully comply with the requirements within this document. Given the complex, diverse and growing estate, not all eventualities can be fully defined within this document.

Should any projects deviate from these guidelines, a technical submittal outlining the deviation, reason why and impact to the University maintenance strategy should be prepared and forwarded to the nominated University project representative for liaison with the Building Services Group (BSG).

A review of this deviation shall be carried out by the BSG; a final decision on the deviation shall be communicated to the appropriate design/construction team.

1.3 Interpretation of UoE Estates Design Guidelines, Assets and Standards

The Estates Design Guidelines, Assets and Standards are required to be issued with all project contractual documentation in order to inform project design and construction teams of expected standards to ensure quality continuity across its Estate.

Glossary of Terms:

1.3.1 Enforced Requirements

The use of the word(s) ‘shall’, ‘are required’, ‘is required’ ‘must’ or ‘will’ denotes a requirement that is non- negotiable and shall be used as the basis for designs, technical submissions and/or activities. If such a statement conflicts with a statutory obligation then a technical submittal shall be issued to the University project representative for liaison with the BSG for their final decision regarding compliance with the documentation.

1.3.2 Requirements Needing Confirmation

The use of the word ‘may’ denotes a negotiable requirement or indication of a solution, where innovation and further calculation, design and discussion may be required to arrive at an optimised solution.

1.3.3 Quality

The Design Guide aims to arrive at the University of Edinburgh’s highest design aspirations and standards. It may be that, at the University of Edinburgh’s sole discretion, solutions are value managed and then value engineered during subsequent design iterations. Design Teams and Contractors are encouraged to consider where value management and subsequent value engineering may result in an improved financial performance should funding constraints occur. All mechanical and electrical value management and value engineering exercises carried out shall be forwarded to the BSG for review.

1.3.4 Assets and standards

The Design Guidelines endeavours to set out Assets and Standards that will maximise the benefits realisation for the UoE to achieve its strategic objectives and maximise value for money. This will involve coordinated and optimised planning in conjunction with Procurement, robust asset selection with particular reference to existing legacy assets and standards on the University Estate, for reasons of utilisation and continuity of maintenance, replacement of parts, renewal and ultimate disposal.

1.3.5 Currency of Third Party Documents

Where superseded standards and regulatory documents are referred to in the text, the reader shall apply current revisions and amendments to their project. Should there be any ambiguity, the BSG should be contacted for clarity.

1.3.6 Proof

Where the word ‘proof’ is used, e.g. ‘proof is required’, a written report or installation certificate must be produced for approval depending on context.

1.4 Review Design Data Process (RDD)

All proposed designs shall be submitted to the Project Manager, respective Estates Teams and Building Services Group for review and comments, the response will be categorised as follows:

A. Design Team to acknowledge comments and continue to develop the design to the next stage.

B. Design Team to acknowledge comments and update the design in accordance with comments and resubmit for consideration before proceeding to the next stage.

C. Design Team to acknowledge comments and completely review and update the design in accordance to the agreed design principles and resubmit for consideration before proceeding to the next stage.

In addition to the above, the UoE may request specific technical submission to support the RDD and may include the request setting out with proof, e.g. calculations, drawings, etc.

The purpose of the RDD is to ensure designs meet the strategic requirements of the UoE and do not compromise the future operations and maintenance provision. The obligations owed by external architects, consultants and contractors to UoE and their liabilities to UoE is not in any way diminished or otherwise reduced by the RDD.

1.5 The Obligations Owed

By external Design Teams, consultants and contractors to University of Edinburgh and their liabilities to University of Edinburgh is not in any way diminished or otherwise reduced by the approval process. University of Edinburgh is not taking over the roles and duties of the external Design Teams, consultants and contractors who will remain legally responsible for the design and/or works carried out by them or on behalf of their staff, agents, sub- consultants and/or sub-contractors.

1.6 Version Control and Updates

The Estates Design Guidelines, Assets and Standards will be updated annually. The anticipated date of issue being January each calendar year. This is subject to change.

The version number will, using 2018 as an example, move from 2018 V1.0 at the end of January to 2019 V1.0 for the following year. The picture or colour of front cover of each new version will be changed to simplify referencing.

Any new or amended content is highlighted in yellow so readers can easily identify changes from previous versions. If there are no further revisions, a guidance note will accompany the issue.

1.7 Purpose of UoE Design Guideline Number 10

The University of Edinburgh Estates Department is responsible for the repair, maintenance and development of the building fabric of University buildings, hard landscaped areas and supporting building infrastructure for the whole of the University's operational estate.

The purpose of this document is to provide guidance to Design Teams and Contractors on the specification and installation of building fabric elements and components for all buildings; that are owned, operated and maintained by the University Estates Department.

The principles referred to in this document have been influenced by maintenance and operational requirements, the resources available within the University Estates Department are finite and limited, and therefore for efficiency and effectiveness gains , there is a need to standardise building elements throughout the circa 850000 m2 of building stock.

The Design and Contractor Teams must familiarise themselves with the requirements of the documents, they are expected to comply with their contents and shall provide relevant information at the various work stages to the Estates Department to enable future operation and maintenance to be carried out.

1.8 Standards, Assets & Responsibilities

All building elements, plant and equipment shall be designed and installed in accordance with the appropriate current: British Standard or European equivalent, Codes of Practice, relevant Statutory Instruments and Regulations, and University Health & Safety Policy.

Building fabric choices shall take into consideration value for money, here defined as 'the optimum combination of whole life cost and quality (or fitness for purpose to meet the users' requirement).' The Design Team must consider the choice of materials not only within the context of a project but through the life of maintaining the building. All parties in the supply chain shall provide reliable data on operational costs of products including maintenance and highlight elements, which will be prohibitive to maintain in the long term. I.e. a living wall with a disproportional annual maintenance cost compared to the benefits to be realised.

The University of Edinburgh Estates Department is working towards implementing sustainable building practices on all its building projects (Please reference Design Guidelines No. 11). Issues, which the Design Team will be expected to address, include energy efficiency and specification of materials for whole life cycle, i.e. sourcing through to recycling and ultimate demolition.

All proposed new buildings and refurbishment of existing buildings shall be designed to allow easy and safe access for cleaning and routine maintenance regimes including window cleaning, roof maintenance, façade cleaning and gutter and drain clearance.

Materials must be suitable and sufficient in respect of performance, robustness and fitness for purpose, together with compliance with current legislation, including to the supply installation and bringing into service processes. All major fabric elements must have an Agrément Certificate or equivalent. Bespoke or special building elements such as windows made using a non-standard system type, which has not been tested and certified will **not** be acceptable.

Building elements, which require specialist, annual, monthly, or weekly maintenance or inspection programmes from day one such as inflatable (PTFE) roofs or oversized doors, shall be avoided and any consideration dispensed with during early design stages.

Nothing contained within this document shall override the requirements of the M&E Design Guidelines or any other guidelines listed in the Appendices. Where conflicts are noted between this Guideline and or any of the other Design Guidelines, they should be brought to the attention of the Building Services Group Manager.

1.9 Principles

It is a requirement that all buildings and their systems shall be designed in such a way that they can be inspected, maintained and repaired with minimum disruption to building users. The Design Team must develop a maintenance and access strategy early in the design process of the project, which demonstrates that client long term objectives are being met and they are not creating maintenance issues and unnecessary costs further down the line.

The Design Team shall consider the following issues:

- Building fabric elements including walls, roof coverings, window types, sanitary installations, floor finishes, ceilings etc.
- The future maintenance of the building and surrounding area to anticipate and comply with the requirements of the CDM regulations.
- Information on routine and regular maintenance, e.g. cleaning regimes for floor finishes, testing/inspection of other fabric items.
- Accessibility and egress from the building and its environs.
- Resilience of critical facilities and infrastructure on the estate from fire, flood, vandalism and unauthorised access
- Information on replacement methodologies for key items such as glazing, curtain walling etc., that will potentially have a significant impact on end users and Estates.
- Access information for maintenance regimes, e.g. access plans for roof maintenance and window cleaning, access to high-level elements such as lights, brise soleil, electric blinds in atria etc.
- Asset information, including the expected life of building fabric elements, fixtures /fittings and equipment
- Information on insurance backed warranties / guarantees for particular products, and data on operational costs for products over the life cycle of the building.
- Information on acceptable loadings for internal and exterior parts of a building e.g. live/dead floor loads, axle/wheel loads to external hard standings to facilitate maintenance and building operations e.g. events, asset replacement
- Asset information will be collected at the end of the project and the Contractor will be required to complete a spreadsheet with asset and life cycle information for the fabric elements. The spreadsheet template is available in the Asset Definitions document; please see Asset Management Guidelines No. 16.

- Information on future use, potential for expansion and flexibility of the building, e.g. provision for new plant and equipment, and designed in elements that allow for flexibility, extensions/additions and changes to be made in the future.

The University, as a property owner and the custodian of a large and diverse estate, in evitably has some buildings built or refurbished using asbestos containing materials. The Estates Health and Safety Management Team must be consulted as early as possible on all projects and items of work.

In the event of value management/engineering or requests for changes by the Contractor during the course of a contract, any proposed changes are to be documented, discussed and agreed with the Project Manager and in consultation with The Building Services Group.

Fabric Design Guidelines: Clarification/Deviation/Exception must be notified and signed off, please see Estates Guidelines No. 1 Introduction and Application.

Any proposed refurbishment work on existing historic premises shall be preceded by a thorough consultation process with the Estates Department Conservation Manager.

2.0 Building Fabric Elements

2.1 Roofs

2.1.1 Flat Roofs

Flat roofing systems are to be designed for a minimum life expectancy of 25 years, complete with a manufacturer warranty (and insurance backed guarantee where required) and be installed by an approved/authorised system installer for the product specified.

Numerous flat systems are available on the market, and the design and their specification and quality of the product must be very carefully considered by the Design Team, as the impact of failure may be significant. Materials can vary in quality, and each specific covering has a variety of specifications such as thickness, material type, reinforcement etc. These elements shall **all** be taken into account when specifying the roof material, particularly in relation to factors such as location, exposure, falls, drainage strategy, access for maintenance/inspection, robustness, as well as the possibility of damage during the installation and maintenance of plant/equipment etc.

Materials for all proposed roofs must be considered at the earliest stage in the design of any building, given the impact this may have on the roof structure for loadings, screeds, falls, drainage, roof make-up etc. The specification of Roofs' shall also be considered in the collective sense with all factors being considered e.g. structure, deck, screeds, insulation, vapour barriers, finishes, and additions such as walkways, parapet, edge protection etc. working overall to provide an efficient ,effective, long lasting, weatherproof and maintainable envelope to the building.

Flat roof finishes such as single ply membrane; liquid plastic, metal sheet roofs or fibre-reinforced bitumen will generally be considered acceptable. Design, specification and installation must follow and comply strictly in accordance with manufacturers' written instructions, and all applicable warranty/guarantee conditions. Installation must be carried out by manufacturer approved/authorised contractors.

Flat roofs are particularly vulnerable to mechanical damage (if left exposed), single ply membranes may **not** be appropriate for roof areas where there will be regular foot traffic. Exposed roofs can prove to be extremely slippery in wet and/or cold weather and therefore properly designed walkways must be provided to plant areas and all areas where regular foot traffic is anticipated, to suit the terrain and associated edge protection detail. Long-term protection to the membrane shall be provided as a matter of course, installed to suit the roof terrain, gradient and exposure i.e. Matting Systems or walkway systems with handrails.

Where the design includes flat roofs, the siting of plant directly on the flat roof shall be avoided, plant shall ideally be sited within plant room areas. Where plant must be sited directly on the exterior of the roof, it shall be seated on properly designed metal cradle systems with appropriate footings (e.g. Big Foot system) which elevate the plant above the surface, protect the roof covering, and allow for future replacement or repair of the roof covering without the removal of plant. The design of such systems shall anticipate future potential alterations or additions to buildings/plant/equipment in mind.

Penetrations through roof coverings e.g. flue or vent outlets, must be carefully detailed with purpose built flashing kits, to be installed in accordance with manufacturers written instructions, to ensure the roof is wind and water tight, and that any composite roofing insulation materials cannot be ignited by hot flue gasses.

Designers must note that flat roofs are susceptible to damage during construction, and they must be protected adequately during this stage. In addition, upon completion of the roofing works the installing contractor must provide a full condition and dilapidation report of the installation to be handed over to the Project Manager and the UoE Clerk of Works. Repairs on roofs during construction must be avoided, and should any be carried out prior to handover then these must be authorised/approved by the system supplier and must not affect any warranties/guarantees.

Roofs should also be thoroughly water tested in order to ensure that they are watertight prior to handover.

Flat roof applications to HV sub-stations, LV switch rooms and IT rooms shall be avoided (where possible) given the risk of membrane failure or blockage to drainage systems that may result in water ingress to these business critical facilities /equipment rooms. Ideally, this type of building should have pitched or mono pitched-roofs with an easily accessible externally located drainage system complete with overflows and secondary drainage outlets/overflows. Green roofs on these areas must be avoided.

2.1.2 Pitched Roofs

The supply and installation of pitched roofs must follow manufacturer's written instructions, and all applicable warranty conditions. Minimum and maximum pitches for the specification of the roof covering must be strictly adhered to. Ongoing maintenance of items such as roof lights, services, rainwater goods, solar panels etc. must be demonstrated at design stage and taken into account when designing pitched roofs.

2.1.3 Structure

The roof structure shall be designed and installed to take account of the building orientation, wind loadings, snow loadings and prevailing exposure conditions. Full account must be taken of the extent and location of plant/equipment that will be sited on the roof and how it is to be screened, in addition to any anticipated future extensions or additions to these systems and provision of structural support and suitably weathered connections.

In the event that any proposed additional plant or equipment is being considered for installation on an existing roof structure, this must be checked and authorised by an appropriately qualified structural engineer.

2.1.4 Roof Drainage

The specification of rainwater and grey water harvesting must be avoided. The design of roof drainage shall be based on simple gravity systems to reduce ongoing maintenance. Syphonic roof systems, which operate at full capacity, when roof water is collected and the water is sucked by syphonic action down into a drain at high velocity, carries more risk and maintenance and shall therefore be avoided where possible.

Drainage from roofs is a critical element of a building and requires careful specification, design and implementation on site. Zero-fall flat roofs, gutters and drainage gullies must be avoided given their propensity to retain water. The location and number of outlets must be carefully considered, ensuring that gutters are free draining and the likelihood of standing water is minimised. Ideally, rainwater outlets on flat roofs and valleys shall be recessed within the roof build-up to aid effective discharge. Strong consideration must be given to the over-provision of rainwater outlets and overflows on roofs to future-proof the building in respect of projections of increased rainfall due to the effects of climate change.

Drainage outlet covers must be fitted to all rainwater outlets on roofs to limit debris build-up within the system. Installation of plant/services such as AHU's, PV's etc. shall be carefully sited to avoid limiting access to maintain drainage outlets.

Drainage systems to roofs must also incorporate an emergency overflows (ideally at each end of a drainage gully), with the discharge sited and designed, where it will not cause damage to the fabric of the building, but can be noticed thus indicating potential unseen issues from low level.

The roof drainage system should be thoroughly water tested in order to ensure that it is watertight and operational prior to handover.

2.1.5 Gutters & Downpipes

Gutters and Downpipes must be adequately sized and generally constructed in aluminium, steel, HDPE or cast iron, complete with complimentary fixing bracketing and an agreed factory paint finish which has been chosen to eliminate the need for future maintenance and painting. Except for on small scale projects, UPVC gutters and downpipes should be avoided.

Where possible, the design of valley gutters between pitched roofs should be avoided, however where they cannot be avoided, they must be adequately designed, detailed and sized to allow for safe maintenance access. The use of valley gutters to locate services (e.g. condensers) shall be avoided unless there is easy and safe maintenance access to them. Emergency overflows must be provided to all valley gutters.

In areas where there will be regular vehicular traffic, the bottom section of all downpipes must be strong enough to resist impact damage e.g. cast iron, cast aluminium or be provided with appropriate impact protection to prevent mechanical damage.

Externally located downpipes are preferable to internal downpipes, and they must be fitted with access points for maintenance. Any internal downpipe installations which cannot be reasonably avoided must allow for easy and safe access for maintenance with multiple maintenance access points provided. They must not incorporate any horizontal runs and shall be detailed to avoid condensation build-up and excessive noise.

The running of any wet systems e.g. drainage through HV sub-stations, LV switch room, lift shafts, communication and server rooms, and other business critical areas **must** be avoided.

2.1.6 Access to Roofs

Wherever possible, restricted access to roofs shall be provided from within the building via a staircase or roof level plantroom. The Estates Department are keen to restrict access to roof areas to non-estates staff, unless the roof areas have been specifically designed for general use e.g. an accessible roof terrace. Accordingly, all roof access doors are to be fitted with **Euro Profile** (ideally, ASSA Abloy) cylinders, which will be changed at handover by the Estates Department to Estates suited locks (e.g. 1-2 Key). Consideration shall be given to the provision of thumb-turns on the exterior of roof access doors, taking into account the security of the building e.g. not on low-level, easily accessible roofs. All roof access doors are to be provided with suitable and sufficient restraining, securing facilities and mechanical assistance to cope with prevailing winds.

Adequate roof lighting shall also be provided where maintenance of plant is required, with switches located at the access point to the roof or activated by strategically located microwave PIR devices.

Any element on a roof requiring routine or periodic maintenance shall have the provision of easy and safe access. The provision of safe access must be provided to all parts of the roof where routine maintenance activities, such as roof and gutter clearance, inspection, plant maintenance/ servicing, window/roof light cleaning etc. is required. Discrete parapets or edge protection systems (both of the required height) are to be provided to all areas of the roof where maintenance activities are expected to take place.

Where easy and safe access is not achievable, then cable/rail based safety systems may be considered, but only **as a last resort**. The rationale for the UoE position is due to the additional maintenance, PPE, competency and training burden this places on the University. The provision for such safety systems **must** be carefully considered through consultation with the Design Team, in conjunction with Estates Health and Safety. Any proposed cable/rail based safety systems must be specified and designed to meet the safe access requirements of the areas, which they are serving. Any installed cable/rail based safety systems **must** be provided with a test and inspection certificate at handover along with any ancillary items, as specified by the system manufacturer. The specification of anchor points e.g. for the use of abseiling, **must** be avoided, again due to their additional maintenance, PPE, training burden, and the inherent risk to operatives.

Level, stable routes must be provided over roofs where maintenance and inspection activities are expected to take place (e.g. a walkway of suitable construction fitted on to a profiled roof system or rubberised treads on membrane flat roofs). Access points onto roofs, particularly off ladders or raised platforms, shall be level, free of standing water, and have sufficient space for operatives to gain secure and safe footing e.g. you will not be stepping off an access ladder directly into a narrow gutter with standing water in it.

Care and attention shall also be taken to ensure designs do not incorporate features that will assist with easy unauthorised roof access, e.g. adjoining lower level walls, gates, fences or other climbing aids. Where low-level roof access cannot be designed out appropriately, it may be necessary to limit the extent or type of windows, roof lights, vents, or other penetrations/openings that may increase the likelihood of unauthorised access to the interior of the building.

2.1.7 Glazed Roofs

Roofs, which are partially or entirely glazed shall be designed to prevent the need for authorised roof access operatives to walk upon them or work within 2.5m of them. They shall be designed in accordance with Centre for Window and Cladding Technology (CWCT) Technical Guidance notes 66 - 69. Warning signs and demarcations shall prevent operatives walking on to these roofs. If operatives are to walk or work within 2.5m of a glazed roof then guardrails (or similar) shall be deployed to prevent them stepping onto the glazing. A detailed risk assessment is required if the design requires operatives to walk, or work on a glazed roof, and consultation with Estates H&S will be required. Designs shall address and minimise the need to clean glazing to roofs e.g. the use of self-cleaning glass.

Glazed roofs should be thoroughly water tested in order to ensure that they are watertight prior to handover.

2.1.8 Fragile Roofs

Ideally, fragile elements on roofs shall not be used i.e. eliminated or avoided during the design process. The provision for safe access and maintenance must be made where fragile coverings or elements on roofs are specified. Clearly identifiable visible warning signage e.g. “Danger Fragile Roof” must be placed to clearly identify where fragile roof coverings or elements are located, and these areas should be protected with appropriate barrier systems.

2.1.9 Fire Safety on Roofs

Adequate means of escape must be provided, together with the provision of emergency lighting, sounders, flashing beacons, VADS and signage, to provide warning in the event of a fire condition within the building below.

2.1.10 Chimneys

Any existing flues e.g. fireplaces in existing premises, which are no longer required, that have been purposely designed are to be blocked up and shall be fitted with roof level cowls and internal ventilation grilles to prevent condensation build up and access for birds and vermin.

Existing chimneys shall be appropriately capped, to prevent water ingress e.g. cowls Suitable and sufficient checks must be carried out on existing chimney pots, coping stones and chimney heads to ensure that they are in sound condition and safely secured and bedded.

2.1.11 Parapet Walls & Copings

Unfortunately, there have been a number of recent health and safety incidents, which have included failures of parapets, copings and external walls. Designers shall pay careful attention to the technical design and detail of the construction of parapets and copings.

In refurbishment projects of existing buildings, particular attention must be paid to the condition of any existing parapets, balustrades and copings. These elements must be thoroughly checked, and where possible, shall be anchored to the wall head to limit the risk of future detachment.

2.1.12 Birds & Vermin

The Design Team shall ensure the design does not have ledges for rainwater and snow build up and inadvertently provides a resting place for birds. The Design Team must eliminate the foreseeable risk of pest infestation and the potential for disease from guano. In particular, they shall take steps to ensure that the design does not provide sheltered roosting sites for feral pigeons, vermin or gulls e.g. sheltered ledges, ventilation intake areas, or access into the building via service penetrations Underfloor service penetrations shall also be carefully designed to eliminate vermin access to these areas.

2.1.13 Lightening Protection systems

Lightening protection systems shall be designed BS EN 62305, inspected and maintained in accordance with - Protection against lightening parts 1, 2, 3 & 4. Any proposed new installation or modification shall be undertaken following a comprehensive risk assessment, and installed giving due regard to the levels and types of protection and access required for maintenance. The proposed lightening protection installation is to be co-ordinated with the architectural detailing of the building.

Please reference Electrical Services Design Guidelines – No. 6.

2.2 Walls & Cladding Systems

2.2.1 Cladding Systems

Proposed cladding systems shall be considered along with the glazing system and look for a minimum 40 year lifespan complete with appropriate guarantees/warranties.

In order to facilitate construction and replacement, cladding panels shall be in standard unit sizes to allow easy handling using readily available plant/equipment and trade skills.

The design of the system shall consider independent removal of individual panels to allow for maintenance and replacement of any damaged sections, and insertion of additional openings for new windows, service penetrations, vents etc., or to allow working access for future refurbishments of upper floors.

It may be foreseeable that during the life of the building, high-level access will be required on the external façade of a clad building. If so, the cladding design shall specifically allow for maintenance access equipment to be tied in. If this is not possible then a detailed design risk evaluation is required to detail how high level access can be safely achieved with standard available plant/equipment, which do not require advanced technical skills to erect/use.

2.2.2 Curtain Walling

Curtain walling is to be of good aesthetic appearance, with specialist glazing and systems used to avoid solar gain and maximise insulation of the building envelope.

Transoms and mullions shall be designed to give clear sight lines and be integral to the system used.

The design shall reference to the Centre for Window and Cladding Technology (CWCT) when specifying curtain walling. The CWCT 'Standard for systemised building envelopes' gives a framework for specifying building envelopes and provides a 'Specifiers checklist' showing information that will change from project to project. This includes:

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

http://www.cwct.co.uk/specification/home.htm

Curtain walling systems should be thoroughly water tested in order to ensure that they are watertight and effectively draining (where needed) prior to handover.

2.3 Rain Screen Cladding Systems

Generally, these are a lightweight wall construction on an aluminium frame with insulation and internal plasterboard or similar linings. Given the environment and outside elements these will be subject to, the robustness of the technical construction and fixing details must be considered with extreme care and with full stakeholder involvement. The design risk assessment must include the impact of a cladding panel detaching away from the building fabric. The Design Team are encouraged to visit reference sites to inspect for weathering, colour, orientation and gather any information on lessons learnt.

As the need for energy efficiency grows, more innovative ways to insulate and upgrade performance have resulted in a wide variety of systems and materials being used to clad buildings. This has potentially resulted in an increase of the specification and application of more potentially combustible materials to facades. Unfortunately, a number of significant fires have demonstrated the potential risks with the design, specification and application of these systems and the need for strict adherence to design standards, installation standards and on site workmanship by competent and experienced resources.

Guidelines for the use of such systems that are to be considered:

1. The use of a non-combustible insulation material or a cladding system proven to perform in a similar manner must be detailed and specified, such as mineral fibre/wool, stone wool, lamella, or other appropriately fire-rated products. Limited use of combustible claddings such as timber may be acceptable subject to the application of fire treatment coatings, individual circumstances, with consideration included in the Fire Protection Engineer report and recommendations, and following consultation with the FSU (Fire Safety Unit).

2. With specific reference to the Report of the Review Panel on Building Standards (Fire Safety) in Scotland, the following recommended parameters are to be adhered to:
    a) Any building with a storey at over 11m above the ground should require A2 or better;
    b) All entertainment and assembly buildings, residential care homes and hospitals of any height should also only be A2 or better;
    c) BS8414 (and BR135) would remain as an alternative method of providing evidence to show compliance.
3. A robust external cladding material at ground floor levels is to be used e.g. metal, stone, brick, terracotta and other materials with a high mechanical impact resistance may be acceptable.
4. Appropriately designed and specified fire stopping barriers **must** be included within the cavities, usually, falling in line with fire compartmentation lines as a minimum requirement. The design detail must be carefully considered: such as window/door openings, eaves, wallheads etc. The installation detail of these important elements and their interfaces must be closely monitored and inspected during the construction phase, by all parties.
5. The construction details of external walls needs to be considered in relation to how easy it will be to repair, replaced and how quickly (and easily) fire potentially will spread up the outer face of the building. In the latter case internal fire barriers, or other fire restriction features, are likely to be required at specific intervals along the wall.
6. The Design Team must commission Fire Protection modelling, whose purpose is to illustrate and predict the spread of smoke and heat from fires. I.e. computational fluid dynamics (CFD) to create fire models that can, when expertly used, applied in the design process and assist the understanding of a key stakeholders, as a powerful design and safety tools. The output of this exercise must be included in the RIBA stage reports and provided to the Fire Protection Engineer and FSU for consideration and comments.

2.3.1 Render Systems

Render Systems shall be designed and installed to current British Standards and be fully bonded to the substrate with a good appearance and colours to be sympathetic to the surroundings. The choice of render colours must consider UV degradation, orientation, staining and fading in the long term. White and other light colours shall be avoided due to the impact of weathering and staining in the medium to long term. The Design Team are encouraged to visit reference sites to inspect for weathering, colour and orientation and gather any information on lessons learnt. The outcomes of these visits shall be provided to the Project Manager and noted within relevant Stage reports.

Careful detailing of adjacent cills, cappings, flashings etc., must be carried out to prevent moisture penetration including capillary action. Overhangs (e.g. roofs, sills, parapets etc.) are to be of sufficient dimensions to avoid “drip” staining down an elevation and impact and back splashing on cills and ledges beneath.

The Design Team must commission Fire modelling for the render system, which is primarily used to predict the spread of smoke and heat from fires. I.e. computational fluid dynamics (CFD) to create fire models that can, when expertly used, be powerful design and safety tools. The output of this exercise must be provided to the Fire Protection Engineer and FSU for consideration and comments.

2.3.2 Green Roofs and Walls

The design consideration of green roofs and walls requires a confident and realistic assessment of the risks and ongoing maintenance burden and associated costs to be submitted to the Estates Department, for specific comments, as they will be responsible for the ongoing maintenance.

Green Roof and Walls, if not properly maintained, may dry out significantly, without the provision of an effective irrigation system or watering procedure. Whilst the plants used in green roof design are generally succulents, the issue of limited maintenance may result in other vegetation of a less succulent nature growing on the roofs. In periods of sustained dry weather, these type of plants offer a greater fire risk, if readily available roof or wall access exists.

The running of any irrigation or drainage systems from Green Roofs or Living Walls through nearby HV sub-stations, LV switch rooms, communications / server rooms and other business critical areas **must** be avoided.

Specification of green roofs must be carefully considered from a fire risk perspective, in particular, low level roofs which may be easily accessed. Firebreaks and fire stopping cavity barriers will need to be carefully considered and specified on green walls and roofs. These are likely to be required around penetrations/openings, and at specific intervals on roofs and walls.

In order to minimise such risks, it is essential that specialist green roof/wall designers and providers are consulted with respect to a suitable and sufficient design to eliminate these risks, as well as providing indicative operational and annual maintenance costs, together with a provision for in-house maintenance staff to be trained.

Green roofs above HV/LV rooms, IT rooms, and any other business critical areas **must** be avoided.

For further information, please reference Landscaping Guide No. 14.

2.3.3 Panellised Timber Construction

Engineered Cross Laminated Timber is an increasingly popular technology, which potentially offers a far more robust solution than conventional open-panel timber frame construction. Such systems consist of large solid panels of engineered and laminated timber members. With the more traditional timber frame construction (generally lightweight frame of slender timber members), these are considered to have a greater potential for a significant loss in a fire scenario, than with that of cross-laminated engineered timber panels. I.e. Glulam.

The Design Team are encouraged to visit reference site to inspect for weathering, colour and orientation and gather any information on lessons learnt.

Where Timber Frame design and construction is being considered or combustible/timber cladding is to be used, details must be included in the respective RIBA stage reports, supported with Fire Protection Engineering considerations and principles, and any proposal will be subject to consultation with the FSU

2.3.4 Timber cladding

Specification of timber cladding to buildings must be carefully considered, particularly from a fire risk perspective.

Whilst it is not possible to address all design proposals in respect of the use of timber, the following points shall be observed:

1. Ideally, timber cladding shall be at high level only with the lowest point being no less than 3m from ground level;
2. In general, there shall be no overhanging eaves adjacent to the timber cladding into which a fire can spread. Where eaves exist above the cladding area, they must be appropriately fire stopped;
3. There must be no storage of waste e.g. skips, bins, bin stores etc. in the vicinity of the cladding;
4. The application of timber cladding as a finish must be considered with respect to surface spread of flame from adjacent buildings and consultation and approval must be sought via the appointed Fire Protection Engineer;
5. Any timber cladding system shall be applied to a non-combustible background and insulation;
6. The Design Team must commission Fire modelling, which is used to predict the spread of smoke and heat from fires. I.e. computational fluid dynamics (CFD) to create fire models that can, when expertly used, be powerful design and safety tools. The output of this exercise must be provided to the Fire Protection Engineer and FSU for consideration and comments.

2.3.5 Retrofitting of Wall/Cladding Systems

Refurbishment projects of a relatively large scale can often involve upgrade works to the external envelope of the building, with external cladding systems such as rain-screen and external insulated finishing systems being designed and specified for retro-fitting. The Design Risk Assessment must capture, when specifying such systems to ensure that these to do not adversely contribute to the fire load of the building, increase the vulnerability in terms of external fire spread, or introduce substantial combustible elements to the building fabric.

The Design Team are encouraged to visit reference site to inspect for weathering, colour and orientation and gather any information on lessons learnt.

2.3.6 Insulation

There are many types and methods of insulation ranging from insulation between masonry cavity walls, insulated panels, to exposed external insulation. Each type of insulation, and its location within the proposed construction will need to be carefully considered, and it is possible that the application of an insulation material or product may be appropriate in some circumstances, but not in others.

In general, non-combustible insulation shall be used e.g. Rock mineral fibre type, stone wool, slag wool or manmade mineral wool/fibre. In respect of these materials, rock mineral fibre and glass wool are inherently non-combustible, do not contribute to fire growth and will be appropriate for many applications. The density of rock mineral fibre products will need to be selected by proven certificated fire performance for the particular application, noting structure and weight.

In general, the substantial construction of the wall will assist in the greater flexibility as to the appropriate types of insulation that may be considered, however this will also depend on how the cavities are closed e.g. around doors and windows. Where there is a lightweight wall construction, then non-combustible insulation will generally be preferred. Also for this type of construction, additional cavity fire barriers may be required to mitigate fire risk

The specification of insulation materials needs to be carefully considered in all areas of a building, particularly in relation to fire risk. Site installation, workmanship and detailing will be critical in all cases.

2.3.7 Balconies & Solar Screening

The provision of balconies and/or solar screening must not impede maintenance activities e.g. use of a water fed pole equipment for window cleaning. Restricted access to balconies must be carefully considered and it is likely that this will be limited to estates personnel only.

2.3.8 Fire Escape/External Access Stairs

The consideration for external fire escape stairs shall be avoided where possible; the University prefers internal means of escape provision.

Where external escape or access stairs are specified or existing external stairs are re-furbished, these shall be provided with the following:

- tactile surfaces
- covered weather protection
- visible nosing’s
- escape signage
- general lighting (as required if used as maintenance or general access/egress)emergency lighting

Any new escape/access stairs shall be of a galvanised metal structure requiring minimal maintenance and with handrails of sufficient height to prevent falls. In addition, weather protection to prevailing winds and snow shall be strongly considered, along with any associated security provision to prevent unauthorised access to these areas, and areas they serve.

2.3.9 External decoration

Decorative finishes that require regular ongoing maintenance e.g. painted timber doors, shall be eliminated where reasonably possible and practicable, given the obvious maintenance burden that this places on the University to maintain finishes for the life of the building. Factory applied finishes that require minimal ongoing maintenance are preferable.

2.4 Windows & Doors

2.4.1 Windows

The design and specification of non-standard window types which have **not** been fully tested and certified will **not** be permitted. Laminated or toughened glass shall be used.

The weight, size and shape of glazed units, together with maintenance access shall be properly considered given that units will likely require replacement throughout the life of a building.

Generally, factory built and finished assemblies of window fittings and complementary finishes shall be specified to simplify the construction process and minimise on-going maintenance costs.

Window openings shall provide adequate ventilation and be designed to suit their location on a façade e.g. inward opening windows in very deep reveals will only provide limited natural ventilation.

No window, skylight or ventilator, which is capable of being opened, closed, or adjusted shall be designed in a manner likely to expose the person performing such operation to any risk to their health, safety and welfare. It shall be possible to reach and operate the control of openable windows, skylight or ventilators in a safe manner. Careful consideration is to be given to the design, specification and robustness of window opening mechanisms. Ideally, these shall be secure, easy to operate, and avoid clashing with likely desk/furniture positions. Manually operated window opening devices can be provided where appropriate e.g. winders for high level or clerestory windows.

Automated window opening devices must be located to allow safe and easy access to maintain or replace them.

Integral purpose designed safety restrictors shall be fitted to all openable windows to allow a maximum of 100mm opening in Accommodation buildings The provision of safety restrictors in other building types/functions shall be risk assessed by the Design Team in conformance with BS8213-1:2004.

The specification of uPVC windows shall be avoided, with the preference for powder coated aluminium windows.

Trickle ventilation is to be fitted on windows as per the Technical Standards.

If replacement windows or secondary glazing is being considered for existing buildings, especially listed buildings with historic significance, then it is essential that consultation is carried out with the Estates Department Conservation Manager.

2.4.2 Solar Screening & Blinds

The function and layout of the rooms/areas is to be considered at the design stage to facilitate the appropriate level of privacy and solar control. Permanent obscured glazing shall be used rather than retrofitted films e.g. to toilets or changing areas.

Where new windows are proposed, the appropriate glazing shall be selected to avoid the need to retrospectively fit solar control films. If required, solar control films shall be carefully specified, to ensure that there is no adverse effect on the glazing system e.g. thermal stress. Internally applied film is preferred from a maintenance perspective.

South facing windows shall consider solar shading e.g. Brise solei used to deflect the sun.

Glazing is to be K Glass or equivalent, solar reflective and insulating to maximise daylight without glare. Manifestations are to be added to any large glazing areas, which are at floor level and adjacent to circulation areas to prevent accidents.

2.4.3 Window/Glazing Performance

Provide independent certifications that all components comply with specified performance requirements:

- Replacement window installations to BS 8213-4
- Wood windows to BS 644
- Steel windows to BS 6510
- Aluminium windows to BS 4873

Where possible, all windows are to be manufactured to the 'Secured by Design' standard BS 7950.

Windows are to be designed and constructed to meet the requirements of the appropriate current British Standard and are to be, at least double-glazed, thermally broken and hermetically sealed to meet the specification and test requirements of BS5713.

The glazing is to provide a sealed weather tight unit, fully integrated into the façade system and are to be beaded internally for security and ease of replacement.

2.4.4 Maintenance & Cleaning of Windows/Glazing

Where possible, the window/glazing design is to allow for cleaning to be carried out safely from inside the building.

Designs that allow windows/glazing to be cleaned from ground level e.g. using pole fed systems can also be considered. A detailed design risk evaluation is required if cleaning requires the use of mobile elevated work platforms (MEWP’s), in which case sufficient hardstanding’s are required to accommodate the working platforms. This must also be fully recorded within a Maintenance and Access Strategy for the building, prepared by the design team.

The use of anchor bolts for maintenance/cleaning of windows, or other items, are **not** permitted as they add to the maintenance burden. Other access systems such as sliding ladders/stairs and moveable platforms are also **not** permitted.

2.4.5 Building Acoustics

Building acoustics is the science of controlling noise in buildings. This includes the minimisation of noise transmission from one space to another and the control of the characteristics of sound within spaces themselves.

Building acoustics are an important consideration in the design, operation and construction of most buildings, and can have a significant impact on health and wellbeing, communication and productivity. For university environments and spaces such as concert halls, recording studios, lecture theatres, seminar rooms, social spaces and administration areas, the quality of sound and its intelligibility are very important to the delivery of academic programmes and events.

The Building design team shall note that acoustics can be influenced by:

- The geometry and volume of a space
- The sound absorption, transmission and reflection characteristics of surfaces enclosing the space and within the space
- The sound absorption, transmission and reflection characteristics of materials separating spaces
- The generation of sound inside or outside the space
- Airborne sound transmission
- Impact noise
- Noise from the external environment e.g. rain on roof coverings
- Reverberation time.

2.4.6 Doors/Hatches

External doors must be robust and provided to all entrances/exits, means of escape and plant rooms, stores etc. Ideally, doors shall be of robust metal construction with a factory applied paint finish. Doors to the exterior of critical areas such as Energy Centres and HV rooms should be considered for the installation of secure metal doors to LPS 1175 Level 3 or 4 standard.In general, main entrances will be double doors, glazed, automated and have level access wherever possible.

Careful consideration shall be given to threshold details. Where external doors are level with the exterior hardscape, adequate drainage and falls will be required to ensure that there are no problems with water ingress.

Refer to Inclusive Design No. 12 and Fire Safety Design Guidelines No. 9

For fire resisting doors, the application of intumescent paper/pads to hinges, locks and closers is required, along with intumescent brush strips and seals, fire resistant glazing, and the fitting of appropriate ironmongery such as self-closers. These must all be specified to match the required fire rating of the door. These must be supplied as Doorsets, rather than individual components or Door assemblies.

Internal doors will provide safe and effective access through all internal spaces and escape routes. Doors are to comply with all current Building Regulations/Technical Standards and the requirements of BS8300.

Oversized and non-standard doors shall be avoided wherever possible. Such doors have an ongoing maintenance cost from building handover due to the need for regular adjustments. Such doors also present considerable problems for disabled users.

2.4.7 Automatic Doors

Automatic Doors shall conform with BS 7036-0:2014 Power operated pedestrian door sets.

Safety sensors are to be designed, specified and installed to automatic doors to detect any objects in the operating field, stop the motion of the door, and return it to its original position.

Doors with automatic operators are to be fitted with full height finger guards.

Motion sensors for opening the doors on approach may be required to meet the specific requirements of BS 8300, subject to nuisance opening considerations.

A mechanical break out facility must be included in the specification, which allows doors to be opened manually in an emergency.

Where doors (or gates/shutters etc.) are powered they must 'fail safe', with the exception of some circumstances such as BRF's and specialist research facilities. In these circumstances, there shall be full consultation between the Design Team, building users and the FSU.

Please reference Fire Safety Design Guidelines No. 9 for further details.

2.4.8 Door Ironmongery (handles, handle sets, plates, closers, fire closers, etc.)

Fittings and ironmongery are to be of a high quality, robust stainless steel or anodised Aluminium.

The choice of ironmongery is to be consistent with that already fitted across the University estate. The University has spent a considerable amount of time and effort developing a full specification within a **University of Edinburgh Estates guide to the application of ASSA ABLOY** ironmongery and this document will be made available to Design Teams and Contractors on request.

Generally all door furniture is to specified and fitted in accordance with:

- Door furniture - BS EN 1906
- Hinges - BS EN 1935
- Door closers - BS EN 1154 / 1155
- Locks & latches - BS EN 12209
- Cylinders - BS EN 1303
- Door bolts - BS EN 12051

- Panic hardware - BS EN 1125 / 179
- Padlocks - BS EN 12320
- CE marking
- BS 8300
- BS 9999
- BS 8214
- Scottish Technical Standards
- Manufacturers written instructions

Bolt through handles are required for doors to ensure that ironmongery such as drop handles are robustly fixed to the door leaf.

Door hinges shall be robust, self-lubricating type, with the appropriate number fitted given the size/weight/specification/use/fire rating of the door. Hinges must be fire rated on all fire doors and provided with intumescent pads.

Closers are preferably parallel closer type rather than face-fixed, as this limits opportunities for closer arms to be disconnected, particularly in accommodation buildings.

Push plates shall be suitable and sufficient and fitted to the stile of the door to mitigate finger marks and body grease build up complete with permanent labelling

Ironmongery such as kick-plates, door edge protectors and door protection panels shall be suitable and sufficient and fitted to doors where impact damage is likely to occur e.g. back of house areas, delivery corridors, mid-corridor doors in engineering departments etc.

2.4.9 Locks, Locking Systems & Suiting

As with general door ironmongery, the University has spent a significant amount of time and effort developing a full specification document for the Estate with ASSA Abloy and this will be made available to Design Teams and Contractors on request.

Common locking suites exist across the University campus (Accommodation buildings suite and Academic buildings suite) and specific suites are also used for differing types of rooms such as:

- Plant rooms, service risers and roof access points
- Server/Communications Rooms
- HV rooms
- Cleaners cupboards

Door Schedule Information to be provided by the Design Team

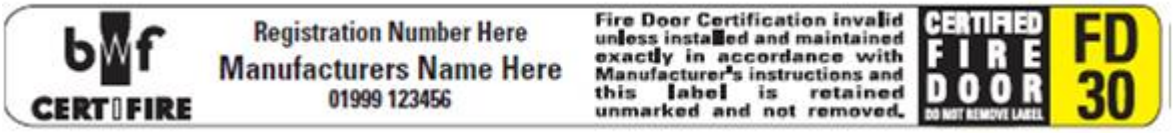
A full door schedule (plus location drawings) must be provided for the building that details the following information:

- Door code (to be determined by Design Team)

- Location e.g. Floor level and Room number
- Door type e.g. FD60S Fire door
- Door manufacturer
- Door finish e.g. light oak veneer
- Details of any fittings such as glazing (specification to be confirmed)
- Door size (Height, width and thickness)
- Details of all ironmongery fitted (manufacturers specification for each item)
- Detail of lock suiting e.g. Cleaners Cupboard
- Details of framing

All doors designed to be resistant to fire, **must** be fitted with a BWF-CERTIFIRE (or equal and approved) label that provides traceability through the supply chain, ensuring the manufacturer can always be contacted if further information on the fire door is required. Certified fire doors must be installed/fitted by manufacturer approved contractors.

The Scheme has a variety of labels to suit the ratings and requirements of different jobs. Labels such as these shall **NOT** be removed from the door.



The label displays the member's name and phone number, and, where applicable, the certification number, a unique serial number and the door's fire rating.

Mechanical manually operated keypad locks must be avoided for both internal and external doors.

2.4.10 Shafts & Service Risers/Voids

Thumb turns shall be fitted on all riser/shaft door locking systems in order that operatives/staff do not get locked in accessible risers. Ideally, these shall be fitted with a Euro Cylinder (ASSA Abloy, or equal and approved) on the outside face of the door for secure locking (complete with cylinder pull), which UoE Estates Department will change to a 1-2 key for maintenance staff access prior to occupation.

Where doors or access hatches form part of a fire compartment they shall fully conform with the requirements of BS9999 and provide equal protection to the surrounding walls/compartmentation.

2.4.11 Door Access Control

Access control to building is via staff card access, generally fitted to enable doors to be secured as and when needed, such as out of hours.

The system comprises about a hundred access controllers connected to a host computer across the university data network, and monitoring software used at two security control rooms staffed by University Security.

All doors and alarms are configured with a unique identity and are programmed according to users' requirements. 'Events' (*e.g.* alarm activations, forced entry etc.) are configured in the system and displayed on the monitoring screen, enabling appropriate action to be taken when they are activated.

Some of the features of the system are:

- Automatic unlocking of relevant access control doors when a fire alarm activates
- Monitoring electrical supplies powering doors, controllers etc.
- Activation of a sounder if a door is held open too long
- Locking and unlocking doors at specified times
- Two-factor authentication: requiring a card to be presented and a PIN to be entered
- Automatic recognition of new cards following overnight data transfer from Card Services
- Local 'Door Managers' able to control who has access

The application of these locking systems must be done in full consultation with the FSU given the possibility of failure and restricting egress from a building in the event of an emergency. Consultation must also be held with IT, Security and building users.

Please reference IT Infrastructure Standards – May 2019 – V2.1

If the traditional hard-wired access control system proves to be prohibitive to the benefits to be realised, then local standalone wireless connected systems such as SALTO may be considered subject to consultation with Building Users, IT Services, Security and the FSU.

The system parameters must cover the following:

- Differentiate easily who has access and when to such different places as offices, residences, laboratories, libraries, athletic and cultural facilities, common areas, etc.;
- Distinguish access not just by physical location, but also by duration, easily managing access for short-term guests (i.e., conference attendees), contract and temporary workers, as well as staff and students;
- Integrate access control along with other campus services (i.e., cashless vending, canteens, library systems, transportation) all on one credential;
- System flexibility permits the easy change of access plans thereby facilitating the individual programming of certain installations for conferences, sport and cultural events, etc.;
- In emergency situations, the local lockdown feature allows authorised users to put SALTO electronic locks into stand-alone lockdown mode.

The Design Team shall follow the requirements set out in section 2.9.18 – 21 of the Non-Domestic Technical Standards in relation to the provision of any locking mechanism's (including the appropriate overrides) and their application throughout a building.

2.4.12 Tank Rooms and Service Voids

Design Teams must ensure that when designing building areas that they do not inadvertently create Confined Spaces or Restricted Spaces**,** especially in service areas which will add to the operational maintenance burden.

Safe access and any necessary access to equipment must be provided within tank rooms and voids, in order to allow routine maintenance and inspection to be carried out effectively. This shall include fixed walkways with handrails, fixed ladders etc. where required to facilitate safe access to carry out necessary servicing and maintenance.

Adequate means of escape must be provided, together with the provision of emergency lighting, sounders, flashing beacons, VADS and signage etc., to provide warning in the event of a fire condition within the building.

2.4.13 Lift Pits/Shafts

Lift pits shall generally be tanked, along with the provision of a sump (where necessary) and drainage outlets (fitted with non-return valves). Lift shaft wall surfaces shall be sealed and painted white, in order to prevent dust ingress to lift motor gear and lift door gear, complete with whole vertical shaft lighting for maintenance.

Please refer to Lift Guidelines No. 7 and Fire Safety Guidelines No. 9.

2.5 Ceilings

2.5.1 Ceilings

In some buildings, it is possible to omit a 'finished' ceiling completely and simply expose the structural and mechanical components of the building to the interior (commonly known as defurbishment). This offers the advantages of economy and ease of access for maintenance, and can also assist the thermal mass of the building. The thermal mass of exposed ceilings can be further exploited by the installation of heating or cooling elements such as chilled beams.

All ceiling types shall be designed and installed to be easily accessible for maintenance, with the use of purpose made service access hatches as required.

2.5.2 Suspended Ceilings

Ceiling systems and components generally to BS EN 13964.

Suspended ceilings would normally be a 600 x 600 mm lay in grid type, with any larger size tiles being carefully chosen to allow easy removal for maintenance, ideally by a single operative. Tile sizes over 600 x 1200 mm can be difficult to remove and handle, particularly at height. Consideration shall be given to ceiling tile materials which are resistant to the intake of moisture and liquids, as well as regular removal and reinstatement. Design of the ceiling grid needs to take into account access required to services above, and clearance for integrated light fittings and other services.
The layout of the grid must align with the lighting design, choice of luminaries and mechanical and electrical services design. Co-ordination between disciplines and execution by the installation contractors is key.

Concealed grids and ceiling plank systems with limited access shall be avoided unless there is a specific design requirement to be met.

Suspended ceilings must be suspended from elements such as beams, floor slabs, underside of structural decks etc., and not from containment, ducting, conduit etc. Where suspended ceilings are being fitted within traditional buildings with lath and plaster ceilings above, the ceiling fixings/hangers shall be fitted into a solid substrate e.g. a joist. Existing plaster ceilings shall be removed where possible as this reduces the risk of plaster becoming detached and falling on to the top of the suspended ceiling at a later point.

Laboratory areas, clean rooms, kitchens and humid areas will require careful assessment to ensure that an appropriate tile such as Armstrong Bioguard, Hygiene or Hydroboard is specified to suit the environment and any specific user or statutory requirements.

Suspended ceilings must be installed in full conformance with manufacturers written instructions.

2.5.3 Plasterboard Ceilings

When used at ceilings or soffits, access panels shall be provided at regular spacing where required for access and maintenance of services/equipment within any void. Access hatches must be fire rated construction when used in fire rated ceilings or walls. The fire rating must match the required compartment ceiling/wall rating.

Plasterboard ceilings must be designed, specified and installed in full conformance with manufacturers written instructions e.g. The White Book.

2.5.4 Acoustic Ceilings

Acoustic ceilings tend to be made from fibrous materials that absorb sound energy, unlike plaster and gypsum ceilings. They do not necessarily reduce the transmission of sound between spaces, rather they reduce the amount that reflects back into the space and so can be used to tailor the acoustic character of a space.

Where acoustic privacy is required, heavier ceiling materials such as plaster or gypsum board are more effective.

In order to resist fire spread, materials complying with Euroclasses A and B of BS EN 13501 shall be used as a guide when selecting acoustic materials. The function of the room shall be carefully considered in order that an appropriate acoustic solution is achieved.

2.6 Walls & Partitions

Internal walls shall be designed and constructed so they provide a secure and stable partition, between areas and spaces within buildings. Selection of internal walls shall be based on the general location, structural floor loading, fire compartmentation, inclusive design and proposed use of the room / area.
Partition walls can be solid, typically constructed from brick or blockwork, or can be a framed construction. Framed partition walls are sometimes referred to as stud walls, and can be constructed from a timber, steel or aluminium frames clad with boarding such as plasterboard, timber, metal or fibreboard. Partition walls may also be glazed.

They may be purpose-designed and constructed or may be modular systems, and can incorporate openings, windows, doors, ducting, pipework, sockets, wiring, skirting, architraves and so on.

Frame constructions may include insulation to prevent the passage of sound or fire between adjacent spaces. It is important therefore that the top and bottom of the wall are properly sealed against the floor and ceiling, and where a raised floor or suspended ceiling is present, it is important to consider the potential for 'flanking' through the voids above and below. Where partitions are being sited on raised access floors, cross talk must be avoided between rooms with the use of appropriate acoustic insulation to the floor void.

As they are non-load bearing, partition walls can provide good flexibility, particularly if they are lightweight, framed systems, as wall positions can be changed relatively easily and inexpensively without impacting on the overall structure of a building.

Movable partition systems include:

- Pipe and drape systems with telescopic or fixed horizontal and vertical components that create a removable panel system;
- Free-standing screens;
- Folding partitions;
- Sliding partitions with tracks attached to the floor and ceiling.

Movable partitions are commonly found in exhibition spaces, conference, hotels, and offices.

The specification of movable partition walls will depend on the requirements for weight, cost, speed of installation, availability of materials, longevity, durability, flexibility, ease of reconfiguration, sound and fire insulation and surface finish. The Design Team must make the provision for staff training to be carried out prior to handover, as they will be potentially involved with opening and closing operations.

All partitions must be designed, specified and installed in full conformance with manufacturers written instructions e.g. The White Book.

Partitions may also be required to provide a secondary structural role, and additional support for items such as TV screens, AV equipment, and any other fixtures/fittings that may require it. Timber sheeting or framing behind the plasterboard may be required, or consideration for the load to be transferred to the floor.
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In addition, consideration is to be given when constructing new stud partitions that incorporate access for and maintenance or services/equipment within any void. Access hatches must be fire rated construction when used in fire rated ceilings or walls and fire rating to match the compartment wall.

Plasterboard wall linings may not be suitable for high trafficked locations (i.e. corridors), communal areas (i.e. social spaces) or student accommodation.

Consideration shall be made for ply-backed detailing or alternatively the use of wall-board.

2.6.1 Tiles

Floor Tiles:

- Porcelain tile is recommended;
- Cross-fall finished floor to any floor drains;
- Maintain adequate substrate to prevent lifting of tiles due to thermal dynamic movement of hidden services;
- Glazed or polished tiles shall be avoided.

Wall Tiles:

- Colour contrasts to conform with current inclusive design standards.

Wet areas and/or tile backer board:

- Use cement backer board for tiles;
- Avoid paper-faced moisture resistant gypsum board panels.

2.6.2 Painting

Paint and decorative systems shall provide a suitable and sufficient finish in the environment, taking into account wear and tear, scuffing, e.g. high pedestrian traffic.

Fire retardant paints are to be used for escape stairs and corridors.

Paint or decorative systems shall be selected and applied in accordance with BS 6150 'Code of Practice for painting of buildings'.

Items to be taken into account include:

a) Timber

DECORATIVE SYSTEMS

Decorative systems shall be compatible with the surface to be decorated, which may be:

- bare timber
- stained timber
- primed timber
- preservative treated timber
- naturally durable species.

PAINT SYSTEMS - Paint systems for timber shall be either:

- at least one priming coat, one undercoat and one finishing coat, or
- proprietary systems in accordance with manufacturers' recommendations.

PRESERVATIVE TREATMENT - Painting or staining of external timber is required to provide protection and stability even if the timber is preservative treated, unless the preservative treatment manufacturer confirms otherwise.

STAIN SYSTEMS - Stain systems for timber shall be either:

- a 2 coat system, or in accordance with manufacturers' recommendations

MOISTURE CONTENT- Wood with moisture content above 18% is not suitable for priming/painting.

b) Masonry and Rendering

Paint or decorative finishes shall not be applied to external brickwork or render where the finish could trap moisture in the construction causing frost damage or sulphate attack or other detrimental effects. This applies particularly to bricks which have no upper limit on their soluble salt content. The brick manufacturer's written agreement to the application of any finish shall be obtained in such cases.

Paint systems for external brickwork or render, including proprietary surface preparations, shall be appropriate for the substrate in accordance with the manufacturer's recommendations.

Where the decorative system is part of the weather resistance of the rendering, it shall be assessed in accordance with manufacturer’s recommendations.

Walls in heavy duty areas requiring cleaning shall be finished with acrylic eggshell, washable matt or similar products.

Colour contrasts shall be considered by the designer to accommodate the requirements of the BS8300.

c) Metal

STRUCTURAL STEEL

Guidance on the protection of structural steel is given in BS EN ISO 12944 'Paints and varnishes. Corrosion protection of steel structures by protective paint systems' and BS EN ISO 14713 'Protection against corrosion of iron and steel in structures'.

Internal and external steel which has not been galvanized shall be protected with at least two coats of zinc phosphate primer and a suitable decorative finish, where required.

Internal and external steel which has been galvanized to a rate of at least 450g/m2 is acceptable without further protection. Steel galvanized to a rate of less than 450g/m2 shall be protected with at least two coats of zinc phosphate primer and a suitable decorative finish, where required.

Where steelwork is to be protected by intumescent paint for fire resistance, the manufacturer's recommendations shall be followed. Relevant certification must be provided as part of the handover documentation (this will need to be provided to the Local Authority as part of the Completion of the works).

GUTTERS - Insides of metal gutters (other than aluminium) shall be painted with a suitable protective paint.

NON-FERROUS PIPEWORK - Copper pipes, etc. shall be painted with the normal decorative finishes. All exposed radiator pipework to be painted, unless otherwise instructed by the Architect.

d) Plaster and Plasterboard - Plaster and plasterboard surfaces shall be prepared in accordance with manufacturers' directions for:
    - plastic compound finishes
    - wallpapers
    - emulsion paints, etc.

e) Proprietary building boards - Paint systems shall be either:
    - at least one priming coat, one undercoat and one finishing coat, or
    - proprietary systems in accordance with manufacturers' recommendations.

Other finishes shall be applied in accordance with manufacturers' recommendations.
Standards generally to BS 6150 2006

2.6.3 Skirting's, Architraves and Facings

Skirting's, Architraves and Facings must be designed and specified in accordance to heritage and conservation detail of the building (if applicable), please consult with the Estates Conservation manager as required.

MDF should be avoided, and water resistant HDF or solid timber used.

Cove skirting's with open ends must be sealed with silicone. Skirting boards must be sealed to vinyl/tiled flooring with a silicone bead, with type and colour as specified by the Architect.

Avoid the use of metal and rubberised skirtings and facings.

2.7 Floor Coverings

Consultations shall be held with the University cleaning and maintenance teams in respect of proposed flooring coverings and finishes, which should include precedent tours of existing installations on campus and/or lessons learned from previous projects.

Carpet should not be specified in toilet, kitchen, cafeteria or restaurant areas, or as wall or ceiling finishes. Installation of carpet creates significant cleaning problems in these types of areas, and therefore appropriate floor finishes would include vinyl, lino or commercial vinyl finishes, e.g. Karndean or Amtico (or equal and approved) shall be considered.

Vinyl flooring must be sealed to skirting boards at junctions. The Architectural Design Team shall specify the type and colour of sealant to be used as required
Laboratory finishes shall be in accordance with recommended practice e.g. continuous finishes with seamless finishes e.g. Sika Liquid Plastics. (or equal and approved) Wet laboratories: Use chemical resistant flooring.

Plant Rooms shall be tanked/bunded /sealed and drained where required, Leak detection shall be considered to warn of potential ingress of water into specialist areas e.g. HV/LV rooms, communication rooms, or other business critical facilities. Where installed, this should be interfaced with the BMS system to provide off-site warning of an issue.

Timber floors must be carefully specified and installed. Appropriate allowance for expansion and contraction must be made. Timber floors shall be avoided in high traffic areas due to the ongoing maintenance burden that it places on the University. Ideally, these shall be limited to sports/ dance halls.

Prior to laying of all flooring, any sub-bases or screeds must be fully cured. All flooring shall be laid in strict accordance with manufacturer's installation instructions.

Maintenance and cleaning regimes **must** be included in the O&M manual.

Building Entrances: Provide primary and secondary walk off carpet with metal trim as applicable.

Lift floors: Rubber tile; e.g. Altro Mondopave (or equal and approved) - **Please reference Lift Design Guidelines No. 7.**

For all flooring installations, reference shall be made to the "HSE Assessing the slip resistance of flooring" technical information sheet.

Masonry flooring: Not permitted if it has significant fill and/or requires routine sealing or significant specialized maintenance.

Flooring materials not permitted:

- Specialty flooring: bamboo, cork and laminate
- Wood flooring, except at gymnasiums and certain other specialized functions.

Stair Treads & Risers: Colour contrasts and nosings/edgings must be provided to conform with current inclusive design standards.

Carpeting:

- Any existing carpeting removed for renovation must be recycled where ever possible.
- Preferred Construction; Solution dyed, bleach proof nylon construction. The use of polypropylene pile carpet is prohibited.
- Minimum manufacturer's warranty covering: wear, edge ravel, tuft bind, delamination and static control.
- Barrier matting should have a minimum life of 5 years.
- Offices, teaching rooms and other area should have a minimum life of 10 years.
- Ideally carpet tiles shall be used rather than broadloom as this allows for isolated replacement to be carried out.

Vinyl to be used in common areas, stairs, kitchens, tea points, bathrooms, some corridors/stairs, back of house areas etc., as required by anticipated traffic, room function, wear and tear and required cleaning regime.

Tiles to be used in high traffic areas such as reception areas, entrance foyers, changing/showering facilities, toilets etc.

Barrier matting to be provided at main entrances, and finished level with adjacent floor finishes.

All floor coverings must be installed in full conformance with manufacturers written instructions.

2.8 Kitchen Fittings

Units generally to be manufactured to BS 6222-2 and -3, and BS EN 14749. Units shall be robust and appropriate for the use/function of the building and area served.

Kitchen base kick-plates must be sealed to vinyl/tiled floor coverings. Kitchen worktops must be sealed to splashbacks as well as to the sink (inner face as well as underside of lip). Both shall be finished with silicone sealant, colour and type to be specified by the architect.

All large-scale catering kitchen installations must have the provision for grease traps installed. It is anticipated that these types of catering installations will be of stainless steel construction.

Consultation will be required with the nominated catering provider.

2.8.1 Tea Points

Tea Point facilities must **not** be provided on means of escape.

Cooking facilities must **not** be provided in tea points, however microwaves are acceptable.

Instant hot water facilities (non-tap variety, due to ongoing issues with misuse and maintenance costs) shall be fitted, in preference to the provision of kettles. This should be considered with building users.

Tea Point/Kitchen base kick-plates must be sealed to vinyl floor coverings with silicone sealant, type and colour as specified by the architect.

2.9 General Fixtures i.e. Toilet Cubicles, IPS Panelling etc.

Toilet cubicles, vanity units and IPS panelling shall be manufactured from High Pressure Laminate (HPL) such as self-coloured Trespa, or equal and approved.

The design and installation of toilet cubicles shall be considered carefully, in respect of suitable and sufficient space, with access for all, complete with all required hanging fitments. Hinges for cubicle doors must be suitable and sufficient for the weight of the door and custom hinges shall not be specified, due to cost and ongoing maintenance burdens.
Laboratory benches and similar to be manufactured from 22 mm Trespa (or equal and approved) solid laminate on metal frames.
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Laboratory under bench and wall furniture generally to be manufactured from – carcass Melamine faced chipboard/MDF, doors Laminate faced chipboard/MDF. All base material surfaces must be sealed and bonded.

The location of large laboratory installations e.g benches, fume hoods etc. must not impede access to service risers and access panels. Consideration must also be given to future access to ceiling voids where key services may require access via a ladder or pop-up platform.

2.9.1 Sanitary Appliances and Fittings

The specification of special or unusual sanitary fittings shall be avoided. It can be difficult and time-consuming to obtain spare parts, particularly where they have been sourced from abroad. Designers must remember that items such as toilet seats will need to be replaced a number of times in the life cycle of a bathroom.

Toilet seats are to be heavyweight thermoplastic used to make modern seats rigid, durable, easy to clean, scratch resistant and warm to the touch, with consideration of anti-bacterial materials to ensure that the toilet seat is hygienic, complete with stainless steel hinges and a soft close mechanism (where appropriate).

Designers must be mindful of the difficulty of accessing cisterns and general plumbing where concealed systems have been specified. Access panels shall be sized to allow removal by one person, or ideally, hinged (not vertically) and fitted with budget/key locks (this mitigates the need to completely remove panels which can be awkward). Fixings such as Keku clips are acceptable on easily accessible panels such as mid and low level heights.

Fully concealed systems can also conceal leaks. Designers and Contractors shall be particularly careful when designing and installing concealed plumbing systems.

Existing drainage systems shall be subjected to a CCTV camera survey to ensure that they are suitable and sufficient to facilitate any additional/new connections. This will also help to eliminate issues where existing drainage systems may already be damaged or restricted, and due to the potential of increased flow, future issues may arise. CCTV surveys shall also be carried out on completion of all drainage and construction works to prove that the systems are fully functioning and clear of any construction debris prior to handover.

Generally sanitary ware shall be manufactured by Armitage Shanks/Ideal Standard, or equal and approved.

Basin taps shall be single lever monobloc taps. Sensor taps are not a preferred solution due to cost and ongoing maintenance.

Please reference Mechanical Guide No. 4

All waste pipework from sanitary ware is to have mechanical and not welded fittings. Pop-up waste outlets must be avoided.

Isolating valves are to be fitted to all outlets, or group of outlets.

All redundant pipework and equipment is to be removed during refurbishment works, save for circumstances within Listed Buildings where this approach shall be carefully considered. Consultation with the Estates Conservation Manager shall be carried out in these circumstances.

Mains isolating valves serving a project area shall be refurbished or renewed as required.

Access for future maintenance of services must be provided for in the design of systems and waste systems shall have appropriate access points for cleaning and rodding.

2.9.2 Baths

Generally these are not provided across the estate. Where fitted, these shall be provided with an over bath shower and appropriate wet wall system.

2.9.3 Showers

Wherever possible, shower facilities shall be provided in every building.

Shower facilities which are suitable for use by persons with physical disabilities shall also be provided where possible.

Showers can be connected directly from domestic hot and cold water supplies via a simple to operate well marked thermostatic mixer, to provide the correct temperature for the end user. Electric showers may be acceptable in small domestic scale situations, and installations where point of use hot water units are applied. All copper pipe work connections shall be compression fittings, push fit connections will not be accepted.

Please reference Mechanical Guide No. 4

Shower pod units are preferable for single person areas e.g. accommodation. Shower pods must be easily maintainable and provided with effective service access to controls, pipework, valves and drainage outlets. Items such as doors shall be easily sourced and replaced on short lead times. Where Shower Pods are not specified, careful consideration must be given to ensure that shower areas are watertight and require minimal ongoing maintenance. Details in these applications are critical, along with the specification of materials and finishes that are compatible with each other e.g. drainage systems with membrane or tanking systems.

Shower areas for communal use must be carefully considered given elements such as compatibility with other products e.g. drainage system and waterproofing system, substrates, interfaces/details, movement, high usage etc. to mitigate building defects/failures which may affect the operation of the facility in the future.

In a building where there is no provision for a central hot water facility, there may be a requirement for the provision of thermostatically controlled showers. These shall be robust, non-domestic standard.

Shower trays shall be double lipped with an upstand provided that can be tiled over to minimise the risk of water leakage.

2.9.4 Sinks

Trough type sinks are preferable in order to minimise the risk of legionella from unused supply outlets. Two troughs per communal facility shall be used as a minimum for resilience e.g. drain blockage or tap failure. Splashbacks are to be provided to all sinks. Sinks shall be silicone sealed to splashbacks and vanity units, specification and colour to be determined by the architect.

2.9.5 WC's

Wall mounted cantilever WC's shall not be used as they are prone to damage from misuse. Items such as toilet seats must be easily replaced and sourced.

2.9.6 Urinals

Urinals shall be designed with divisions/ modesty partitions between units.

Automated flushing systems e.g. Cistermisers shall be fitted. Urinal troughs can be considered, however in larger building facilities, multiple troughs or outlets shall be considered in the event of blockages which can take them out of service.

2.9.7 Accessible and Ambulant WC Facilities

Under the Equality Act 2010, all organisations have a duty to provide accessible goods and services. The provision of accessible and ambulant toilet facilities is a fundamental and crucial part of inclusive service delivery and their design and management warrant careful attention. All accessible and ambulant toilet facilities are to be designed and constructed in conformance with BS8300.

An accessible toilet is designed to meet the majority of needs of independent wheelchair users and people with mobility impairments, as well as the additional requirements of people with bowel and bladder conditions. It also helps people with other physical conditions such as impaired dexterity and grip, balance and other conditions where physical support from grab rails and the presence of an emergency alarm is helpful.

Fittings that are subject to loads such as grab rails must be fitted onto appropriately reinforced substrates e.g. double lined plywood plates and/or additional timber supports.

The design process shall note the following:

- Accessible toilets shall never be used for miscellaneous storage.
- Lighting that is triggered by movement can be dangerous in an accessible toilet, as a disabled user may not have sufficient movement ability to trigger the lights if they go out.
- Boxing in of pipes etc., and the addition of vanity units around basins can compromise important reach and spatial needs.

The provision of Changing Places toilets shall be considered for new and refurbished buildings.

Please reference the Inclusive Design Guidelines No. 12.

2.9.8 Baby Changing Facilities

Wherever possible it is good practice design, to consider the needs of parents and babies in any toilet location. It is essential to remember that these facilities shall be provided not only in ladies washroom areas, but within gent's areas as well, to meet the needs of fathers and male carers.

Fittings that are subject to loads, such as fold down baby changing facilities, must be fitted onto appropriately reinforced substrates e.g. double lined plywood plates and/or additional timber supports.

2.9.9 Hand Dryers

Where hand dryers are specified, these shall be fitted with an appropriately sized stainless steel or acrylic backings e.g. Rockwall (or equal and approved), or on tiled substrates. Specialised hand dryers that incorporate washing facilities, hand dryers, towel dispensers or litter bins shall be avoided.

2.9.10 Foul Drainage

Foul drainage shall be gravity discharged wherever possible. Pumped systems may be considered only in exceptional circumstances. If pumps are installed, they shall be installed in pairs to allow for servicing, standby operation, and have adequate failure warning provisions linked to the building BMS system.

2.9.11 Multi Faith Washing Facilities for ablutions before prayer

In general high grade porcelain purpose design facilities which will match the existing sanitary sinks and WC's shall be used. The facility shall be complete with a moveable seat, which is comfortable to use by everyone, including elders and less abled persons, along with safe and comfortable washing facilities i.e. WUDU or equivalent.

2.10 Wayfinding and Signage

Please refer to Wayfinding and Signage Guidelines No. 13.

2.11 Landscaping and External Areas

External areas and hardstandings provide key access and egress routes to and from buildings, and due care and attention must be given to the design of these elements to ensure that accessibility is a primary consideration. These areas shall be designed in accordance with BS8300.

Whilst not specifically building related, refurbishment works often incorporate external landscaping schemes. During the design process caution must be exercised to ensure that security strategies are not unduly compromised, for example, by the removal of security fencing, or the introduction of landscaping features that may allow easy roof access for intruders or secluded routes or features that may impinge user safety.

Such landscaping schemes may also present the opportunity to improve flood resilience of the building, particularly in respect of pluvial flooding, where large expanses of hard surfacing exist around the building. Checks as to the adequacy of the existing drainage system shall be carried out and where necessary, additional drainage channels, attenuation facilities, bund walls, or adjusted ground levels introduced.

Please reference to Landscaping Guidelines No. 14.

2.12 Operations and Maintenance Access

The building design shall allow sufficient space and routes of access for vehicles, to operate safely and efficiently during the maintenance and day to day operation of the building. Designers shall undertake tracking studies and confirm that vehicles have sufficient clearance space, head room, ground loadings etc.

The University has a preference that maintenance vehicles are able to access relevant areas without the need to reverse, although may accept this in designated loading areas. A detailed risk assessment is required if such vehicles need to reverse across pedestrian areas, with the exception of designs that require vehicles to reverse across heavily used pedestrian areas, which is not acceptable.

A full access and maintenance strategy must be provided for the building that provides information and drawings that show the plant/equipment to be used along with areas where the plant/equipment can be located. Relevant information such as maximum axle loadings and types of plant/equipment to be used e.g. MEWP's, must be provided for external hardstanding's, along with floor loadings and details of the requirements for equipment such as scissor lifts/pop-up's for maintenance of internal areas.

Demarcation, guarding and lighting of areas used for vehicle operations (e.g. loading, service yard, roadways, or drop-off areas) shall meet statutory requirements (especially the Workplace (Health, Safety and Welfare) Regulations) and relevant HSE guidance.

2.12.1 Access for regular Maintenance and Plant Replacement

Building elements which require specialist annual, monthly, or weekly maintenance, or inspection programmes from day one such as inflatable roofs or oversized doors, shall be avoided.

Access to plant and technical areas shall be accessed internally or externally via circulation areas. Access through areas of activity shall be avoided. Sufficient space shall be allowed around plant to allow for maintenance, removal and replacement as required for all maintenance operations. Safe access arrangements will need to be provided for all maintenance tasks.

2.12.2 Cleaning Facilities Provision

Consultation must be held with the Estates Soft Services Department in respect of the provision and location of cleaning facilities during the design stage of all refurbishments and new build projects.

Consideration shall be given to the provision of cleaner's cupboards and facilities on each floor of a building, at regular intervals across floorplates. Network (IT or Power) equipment must not be located within cleaners facilities, these items shall be located in dedicated service risers/cupboards or plantrooms.

Items that shall be included:

- Standard heavy duty cleaners sink (Belfast type) with bucket grating and splashback. The base of sink should be positioned 36cm from the floor.
- Tap positions should allow for filling of cleaners' buckets positioned on sink grating.
- Hot and cold water supply, where possible point of use water heaters should be avoided. If water heaters are sited in cupboards they must not present a risk to users.
- Cleaners cupboards, only if storing cleaning chemicals must be risk assessed to determine if extract ventilation is required to prevent the accumulation of fumes or vapours. Where required, extract ventilation providing approximately 5 air changes per hour is recommended.
- New cupboards will have three shelves positioned above the sink. Existing refurbishments will have three shelves where space allows.
- Cupboard must also be large enough to accommodate; floor vacuum, floor polisher, supplies of toilet paper and cleaning materials, wet floor signs, buckets, mops, brooms and other small pieces of cleaning equipment (storage provision to be agreed with Estates Soft Services)
- Cupboard must be lockable (cleaners key suiting, with thumb-turn on internal leaf)
- Adequate lighting.
- No electric sockets, unless RCD protected

Provision of Cleaning Supervisors Offices and elements such as staff storage, lockers, welfare and changing facilities must be agreed with the Estates Soft Services Department.

2.13 Drainage & Flood Risk Mitigation

Following a number of major flood events in recent years, there is an ever increasing awareness of the consequences of flooding and the effects of climate change.

Consequences can include:

- The need to ensure the safety of students and staff if a flood occurs
- Parts of the building or campus cannot be used whilst building/s are dried out and repaired.
- Loss of critical services such as electrical supplies, IT etc. to buildings or campuses
- Loss of irreplaceable research, coursework, equipment and resources
- Inconvenience of relocating all or part of the facility to alternative location(s) requiring alternative transport arrangements and likely impact on the education provision
- Temporary facilities may be required on site, or alternative temporary sites and accommodation sourced.

It is therefore vital that when new buildings are planned or refurbishments undertaken, the risk of flooding is minimised.

The Flood Risk Management (Scotland) Act 2009 was enacted on June 16, 2009.
The Act has been commenced in stages, allowing for a smooth transition to the new legislation. The Act introduces a more sustainable and modern approach to flood risk management, suited to the needs of the 21st century and to the impact of climate change.

It also creates a more joined up and coordinated process to manage flood risk at a national and local level.

Specific measures within the Flood Risk Management (Scotland) Act 2009 include:

- A framework for coordination and cooperation between all organisations involved in flood risk management
- Assessment of flood risk and preparation of flood risk management plans
- New responsibilities for SEPA, Scottish Water and local authorities in relation to flood risk management
- A revised, streamlined process for flood protection schemes
- New methods to enable stakeholders and the public to contribute to managing flood risk, and
- A single enforcement authority for the safe operation of Scotland's reservoirs.

Design Teams must also ensure that all proposals have been carefully assessed in respect of Flood Risk Management as required by the above legislation, and that they have also taken cognisance of issues/risks arising during the design and operational life of the building such as:

- Avoiding running wet pipework through, or adjacent to critical facilities e.g. HV rooms, LV rooms, communication/server rooms, critical storage facilities etc.
- Provision of items such as flood doors/barriers to critical facilities (where required due to site topography, areas of specific flood risk etc.)
- Provision of specific bunds, drains and pumps enclosing high risk items of plant e.g. water tanks
- Provision of drainage outlets/channels in plant rooms (as required for areas with wet services installations), fitted with appropriate non-return valves
- Installation of leak detection equipment to critical areas such as HV/LV rooms (interfaced with BMS systems to generate alarms in flood conditions).
- Provision of an increased number of drainage outlets/overflows to key areas such as roofs.

2.14 Fire Service Access

For Fire Service Access, please refer to Fire Safety Guidelines No. 9.

2.15 Secured by Design

Secured by Design (SBD) is a police initiative owned by the Association of Chief Police Officers (ACPO). Secured by Design provides several guidance documents that aim to reduce crime in our built environment. ACPO SBD, the managing body that oversees the Secured by Design initiatives periodically amends the various SBD guides in response to research and police experience. A sensible and practical level of security, which will not adversely affect the efficient running of the University, is essential to a successful teaching and learning environment.

The Design Team are encouraged to consider the overarching principles of Secured by Design and apply them to the University environment if appropriate, working in conjunction with Security Services, IT Services and the Building Services Group.

2.16 Extensions to Existing Buildings

When a design incorporates or introduces a lower level building constructed against the side of a taller structure, access problems may be introduced to the façade of the taller building.

If access is likely to be needed to the higher element/elevation (e.g. window/gutter cleaning) a detailed design risk evaluation shall be produced to consider how access will be safely achieved and maintained.

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