BUILDOFFSITE PROPERTY ASSURANCE SCHEME (BOPAS)

BOPAS Standard

A Risk-Based Competency Assessment Process for MMC Providers.

Version 11.0 issued March 2025

BOPAS
Buildoffsite Property Assurance Scheme

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Participating organisations

The following organisations participated in the original development of this standard which has been further developed and refined as a result of a number of years of application within the offsite sector:

BEIS: Department for Business, Energy and Industrial Strategy

CIRIA: Construction Industry Research and Information Association

RICS: Royal Institution of Chartered Surveyors

Buildoffsite: Industry wide campaigning organisation

UK Finance: Principal Lenders

BSA: Building Societies Association

BLP Technical Services (UK) Ltd

LRQA: Assurance Provider

Review and amendment

This standard will be subject to review on a regular basis. The review will incorporate feedback from client organisations, Scheme Assessors and industry and will aim to counter adverse trends as they are identified which impact the quality and integrity of offsite systems, through additional scheme control measures as may be applicable. Each revision will be identified in decimal format with the integer providing the issue number and the decimal number signifying the revision number i.e. Issue 1.3 indicating issue 1 with 3 amendments. Details of the amendments will also be provided.

Comments of a technical or editorial nature are welcomed and such comments should be directed to the email address detailed under Technical Queries within the contact page at the beginning of this document.

Users of this document should ensure that they have access to the latest issue incorporating all current amendments. The current version will be available for download from the BOPAS website. This is version 11.0, issued in March 2025 incorporating LRQA provision of the BOPAS Durability assessment.

Introduction and Purpose

The purpose of this standard is to define the criteria against which MMC Providers seeking BOPAS accreditation, may be assessed.

BOPAS has been jointly developed by Buildoffsite, the Royal Institution of Chartered Surveyors, LRQA, BLP and the principal lenders.

The founding purpose of BOPAS was to provide assurance to the lending community that 'innovatively' constructed properties, against which they may be required to lend, will be sufficiently durable as to be readily saleable throughout the duration of two mortgage terms which may equate to a minimum of 60 years and that the structural integrity will not intrinsically have a negative impact on the mortgage security during that term.

The Assurance Scheme comprises:

- The scopes of design, manufacture, installation and or project management, within the offsite context, are assessed against best practice as defined by this standard, verification of this aspect is performed by LRQA
- A durability assessment of 60 to 100 years of the construction system is performed by LRQA
- A web-based database detailing status of accreditation of designers, manufacturers and installers and their construction systems. The website also includes details of the construction systems of properties manufactured and constructed under the BOPAS scheme.

The process assessment is risk based, designed to benchmark Modern Methods of Construction (MMC) Providers against best practice in terms of competency, methodology and risk management and is intended to serve as a vehicle for standardisation across the offsite sector of the construction industry. As such, compliance with this standard is intended to enable MMC Providers to be recognised for the quality and structural integrity of their construction systems and their commitment to best practice in the provision of the scopes of work for which they are accredited.

The scheme provides assurance of the safe and competent delivery of offsite products and systems conforming to contract durability and integrity. This is achieved through compliance with the requirements detailed in this standard spanning systems, processes and procedures, and handover interfaces, from design through offsite manufacture and construction/assembly to client handover. All operational elements being tested against the arrangements for sustaining quality, and system durability through the application of control measures to mitigate all such construction system and delivery risks.

Assessment of all scopes of offsite activity represents an evaluation of the MMC Providers approach towards competency, configuration, and procurement management together with the tools and techniques used for risk identification and control.

Accreditation under the BOPAS scheme requires satisfactory assessment against this standard for both process best practice and construction system durability and integrity.

An overview of the application process and route to accreditation is detailed in Appendix 3 of this standard.

1.1 Consultation

The organisations that have been consulted in the development of the scheme are as follows:

BEIS: Department for Business, Energy and Industrial Strategy

BSA: Building Societies Association

BLP Technical Services

Buildoffsite: Industry wide campaigning organisation

CIRIA: Construction Industry Research and Information Association

CML: Council of Mortgage lenders

LRQA: Assurance provider

RICS: Royal Institution of Chartered Surveyors

1.2 Definitions

Accreditation – See Appendix 1 for details of the accreditation process and the arrangements covering the granting of accreditation.

Accreditation Body – The organisation which undertakes the assessment of MMC Provider in accordance with this standard and has been approved for doing so by the Lender Steering Group.

Accreditation Certificate – A certificate awarded to an Offsite Provider by the Accreditation Body for a scope of work assessed under the scheme.

Accreditation Period – BOPAS accreditation validity is for a term of three years.

Accredited MMC Provider – Any organisation which has been assessed in accordance with this standard, as competent in the provision of services for which they have been accredited and has been issued with a valid and current Certificate of Accreditation.

Approved Technology – An offsite manufactured product, component or system that has successfully assessed by LRQA to achieve a minimum of 60-100 year durability.

Associated Technology – An Approved Technology which is linked to a particular MMC Provider.

Assessment – Objective and detailed evaluation of an MMC Provider and their associated construction system.

BOPAS + Accreditation – Recognition of BOPAS accredited MMC Providers who are progressing the digital transition through digitisation to digital transformation.

Competent Person – Offsite Providers are required to assign Competent Persons performing the roles of dispositioning Authority, Quality, Health and Safety and Environmental Management. Designation shall be on the basis of skills, knowledge and experience in the assigned discipline.

Configuration Baseline – Approved project configuration information that establishes the characteristics of Offsite works at a point in time that serves as reference for activities throughout the design, manufacture, and construction life cycle.

Configuration Management – The principles as defined in BS 10007:2017 – 'Guidelines for Configuration Management'.

DFM – Design for manufacture – to design a part, assembly, or entire system in such a way that it makes the cost, quality, and delivery time optimal for the manufacturer.

Digitisation – Converting analogue and disconnected data into a connected digital form and connecting sources of information to work for business more effectively and efficiently.

Digitalisation – The application of digital technologies to transform a business model delivering new opportunities e.g. product tracking, digital twin, golden thread.

Digital Transformation – The creation of new business applications and business models e.g. 3D printing, custom manufacturing, Internet of Things and Platform design for DFMA.

Dispositioning Authority – Person (or a group of persons) assigned responsibility and authority to make decisions for verifying that change to offsite work specification is necessary, the consequences of the change is acceptable, that the change is documented and that implementation plans are satisfactory.

Durability Assessment – The assessment of the ability of a building system,component or element to perform its intended function for a specified period of time.

Fire Stopping – A material provided to maintain efficacy and fire performance of joints in fire resisting elements.

Functionality – The ability of a completed installation to operate as required by the relevant standard(s).

Maturity Model – A diagrammatic representation of the performance of the MMC Provider numerically defining preparedness or extent of progression towards digitisation of systems and processes from the base line of 4 at which accreditation is achieved to an ultimate fully automated system potentially attracting a score of 9.

Maintainability – The ability of a component or element to be readily maintained or repaired, following damage or failure taking account of accessibility and ease and duration of repair processes.

Milestones – Schedules agreed for the closure of gaps identified during an assessment, or the achievement of targets agreed at the accreditation stage, to demonstrate continuous improvement throughout the accreditation validity period.

MMC manufacturer – An organisation which produces assembled offsite components either as a final product or as a part assembled sub-assembly.

MMC Provider – An organisation performing activities within the offsite sector.

Nonconformity – The identified absence of, or a failure to implement or maintain one or more of the minimum criteria against which accreditation may be granted. The nonconformity will be classified as either a major or minor nonconformity as defined in Section 1.5.

Project Management – The scope under which an MMC Provider may be accredited for a function when they do not carry out directly any one/none of the core offsite activities (Design, Manufacture or Construction) but manage and control the work carried out by other accredited MMC Providers to ensure compliance with this standard.

Qualified Supervisor – Person(s) appointed by the Offsite Provider with responsibility for ensuring at all relevant levels, within the work process, that work is completed to time, quality, specification etc. Minimum qualifications for Qualified Supervisors are defined Section 4.3.7.

Quality Deficiency – reportable defects communicated to the offsite Provider post-handover by the homeowner/occupier.

Reportable Defects – Defects that are identified post handover to the home owner /occupier which meet certain criteria – typical list of criteria detailed in Appendix 6.

Registered Office – The MMC Provider's office, and/or manufacturing facility, from which offsite services are provided. Assessed delivery may be identified on the Accreditation Certificate.

Scheme – The requirements of BOPAS as defined within this standard.

Supplier – Any organisation engaged to supply services or products but excluding MMC manufacturers (see above) who produce and supply an assembled offsite product.

Technology – See Associated Technology and Approved Technology above.

Weather Tightness – Performance in respect of permeability, water tightness and wind resistance.

Work – The performance of offsite and onsite activities.

1.3 Standard abbreviations

CDM	Construction (Design and Management)
DFMA	Design for Manufacture and Assembly
HSE	Health and Safety Executive
HSWA	Health and Safety at Work Act
PPE	Personal Protective Equipment
BIM	Building Information Management
DFMEA	Design Failure Mode Effect Analysis

1.4 Mandatory and non-mandatory terms

In this document the following terms have the stated meanings.

Shall: Indicates a mandatory requirement

Should: Indicates a strong preference and is used to denote best practice

May: Indicates an option which is not mandatory.

1.5 Definitions of major and minor nonconformities

Major nonconformities occur where there is:

- Objective evidence which demonstrates that an element from the scheme designated a mandatory requirement has not been documented or implemented or maintained
- Repetitive failures (product quality or systems) or multiple minor nonconformities in a single category
- Significant numbers of minor nonconformities
- Action not taken to close previously identified minor nonconformities within agreed timescales or to meet the milestone goals set at the time of accreditation
- Use of unsafe working practices, and
- Performing work which is outside the registered scope(s).

Minor Nonconformities occur where there is:

- Objective evidence that there is a weak element within the management system, procedure or control for the effective implementation and maintenance of the scheme requirements
- Isolated cases of non-conformance to procedures
- Isolated instances of failure to comply with Health & Safety procedures
- Isolated instances of failure to comply with good safety/working practice
- Limited shortfalls in established documented management and Health & Safety systems, and
- Failure in observing customer care protocols.

1.6 Other finding grading definitions

- Scopes for Improvement are raised when the assessment identifies an aspect of the MMC Provider's operation where, whilst scheme compliant, there is potential for improvement
- LRQA Prompts are observations made where the assessment identifies a potential weakness which the Accreditation Body may wish to fully examine at their next assessment visit.

2. Responsibilities

General:

Accreditation is a demonstration that an MMC Provider has developed a validated construction system, supported by a delivery system that conforms to best practice which will assure consistent and competent delivery against client requirements.

An essential feature of the approval process is the assurance that procedures and practices, against which approval has been awarded, are consistently applied and maintained by the MMC Provider. This assurance is maintained, throughout the 3-year accreditation period, by way of a surveillance visit programme.

To support and maintain the accreditation process to the highest standards, the stakeholders must adhere to the responsibilities outlined below.

2.1 MMC Provider responsibilities

Accredited MMC providers shall:

- Maintain an effective management structure which can consistently deliver accredited scopes of work in conformity with this standard
- Clearly define the scope of the services they provide
- Be proactive in monitoring the quality of work without reliance on the Accreditation Body or their client
- Arrange with the Accreditation Body for visits to be performed in accordance with the agreed surveillance programme
- Manufacture of BOPAS approved designs only and all proposed variations to be notified to LRQA together with details of any proposed material substitutions
- Ensure non-conformances identified by the Accreditation Body are closed-out within the agreed time scales
- Notify the Accreditation Body of the following:
  - Changes to key personnel
  - Changes to ownership
  - Changes to offsite manufacturing processes
  - Receipt of HSE notices.

2.2 Accreditation Body responsibilities

The Accreditation Body shall:

- Conduct assessments against the scheme requirements in a technically competent and objective manner
- Adopt a pragmatic but rigorous and consistent approach to the maintenance of scheme standards
- Respect MMC Providers' business constraints
- Ensure any information accessed in respect of MMC Providers' commercial business interests are treated in confidence
- Produce a comprehensive report on each MMC Provider assessed
- Produce a report detailing the durability of the assessed offsite construction system and defining the limitations of the scope of approval
- Maintain a publicly available register of accredited MMC providers and their construction systems.

3. Scopes of accreditation

BOPAS accreditation may be gained in the following MMC related scopes:

- Design
- Manufacture
- Construction
- Project management (of Design, Manufacture and/or Construction).

To achieve accreditation for each scope, MMC Providers shall demonstrate that all relevant processes and procedures required for the effective, efficient and safe delivery are fully implemented and that all staff and subcontractors employed are competent to undertake their assigned roles and are working to comprehensive and fully documented methodologies.

In order that a property may be registered under the BOPAS scheme then its design, manufacture and site construction shall all have been carried out or project managed by BOPAS accredited MMC Providers within their relevant scopes.

The options available under the Manufacture scope for the use of Approved Technologies are as follows:

- An MMC manufacturing facility may hold the Manufacture scope in its own right and have its own BOPAS website entry for its Approved Technology.
- An MMC Provider may have an exclusive business agreement with a specific manufacturing facility to produce offsite components, in this case the MMC Provider must hold the Project Management (Manufacture) scope, the manufacturing facility will be included in the MMC Provider's assessment by LRQA to ensure scheme requirements are satisfied, and the Technology must be assessed and approved. BOPAS accreditation certificates issued to the MMC Provider, in this scenario, will include the manufacturing facility details. The manufacturer will also be included in the surveillance visit schedule and the intended use of another, non-accredited manufacturing facility by the accredited MMC Provider must be notified to LRQA prior to use and may require additional assessment.
- An MMC Provider may gain accreditation for an MMC product or component to be installed in an accredited construction system. Under these circumstances the product/component will be subject to durability assessment, gap analysis and full implementation audit of the product design process and manufacture only.

3.1 Design

This scope covers the design based upon MMC principles of sub-assemblies, structures, and buildings. MMC Providers responsible for design shall have defined configuration control arrangements.

Whilst accreditation to BIM is not within the terms of reference of the scheme, nevertheless BIM is playing a progressively more important role within MMC design, as such, as part of the design scope of assessment, MMC providers may be assessed as to their status in relation to ISO 19650 standard and BOPAS^{+}.

Manufacture

This scope covers the manufacture and offsite assembly of components, structures and sub-assemblies which will form part of the completed structure. Accreditation to this scope assumes a successful durability assessment of the design system against which manufacturing is undertaken.

3.2 Construction

This scope covers the onsite construction and assembly of delivered components, structures and sub-assemblies which will form part of the completed building(s).

3.3 Project management

This scope is for MMC Providers who do not carry out one or more of the functions of design, manufacture or construction, themselves, in which case they shall be required to gain the scope of project management for the each of the functions they are subcontracting. This requirements will apply whether they are subcontracting to a BOPAS accredited provider or otherwise.

The project management function shall have configuration control arrangements defined and have nominated a Competent Person(s) whose technical expertise spans all scopes relevant offsite activities. Adequate monitoring and control of the design, manufacturing, and construction process (as relevant to the scope held) shall be implemented.

3.4 BOPAS^{+}

This scope of BOPAS accreditation is an extension of the existing BOPAS accreditation and was developed in recognition of the digital transition that the MMC sector is undertaking. This is a natural transition towards more efficient and collaborative ways of working but has also been prompted by the momentum developed by the BIM protocol and government legislation and associated initiatives which require transparency and traceability which is facilitated most readily by digitalisation.

BOPAS^{+} aims to monitor BOPAS accredited MMC Providers on their journey from the development of digital strategic objectives, through to the achievement of digitisation, digitalisation or digital transformation whichever is the defined destination on their digital road map.

Once a BOPAS accredited MMC Provider has embarked on BOPAS^{+} their position on that journey is marked by a numerical scoring system which takes into account defined schedules as much as it does actual achievement, recognising that at best, most MMC Providers are either planning or having just embarked upon their digitisation road map and on that basis will only achieve the BOPAS^{+} threshold of 4 if defined schedules are taken into account.

BOPAS^{+} recognises that the digital journey does not only involve specialist digital teams but permeates the whole organisation and consequently it evaluates all the aspects of the business for digital readiness that falls within the assessment format of the current BOPAS scheme so that ongoing BOPAS^{+} assessments can be readily undertaken as part of the scheduled BOPAS surveillance visits.

The key issues subject to assessment under BOPAS^{+} are detailed in Appendix 2 and the attained numerical scores are presented in the form of a radar map which is posted on the BOPAS website under the BOPAS accredited MMC Providers scopes of accreditation.

4. BOPAS Scheme requirements

4.1 Organisation and structure

The MMC Provider shall establish and maintain:

- A clear statement of the Company Vision and Strategies, with top level objectives to achieve them, communicated to all levels enabling employees to understand their contribution to the business output and performance
- A documented organisation structure (organogram) with defined roles and reporting lines supported by end to end process flow charts
- Management practices and culture, from the top down, which encourages compliance with best practices in the preservation of health safety and the environment, and a spirit of openness and continuous improvement
- Business leaders who are engaged with the workforce and show a thorough understanding of their roles in achieving business success as evidenced by business continuity plans
- Expectations of personal behaviour which support the company values, promulgated, and adopted at all levels
- A defined GDPR policy which incorporates as a minimum cyber essentials certification
- BOPAS strategic planning process defined detailing communication protocols
- Insurance cover appropriate to the scope of work and project value
- Compliance with current CDM regulations.

Processes shall be established to ensure that appropriate Health, Safety and Environmental performance is measured against agreed standards to reveal shortfalls and target improvements.

4.1.1 Human resources

The MMC Provider shall have a documented HR procedure detailing recruitment, selection, interview, and appointment criteria.

Job descriptions, detailing responsibilities and minimum/ essential competency requirements shall be issued to all staff whose role materially contributes to the delivery of work directly related to the scopes of accreditation held. Job descriptions should also detail responsibilities for each role with respect to Health, Safety, Environment and Quality.

Recruitment procedures shall include details of how the following are to be obtained and recorded:

- Verification of qualifications and references from previous employers
- Results of any psychometric or trade tests (if appropriate)
- Results of medical assessments (where appropriate).
- Numerically scored results of interviews

4.1.2 General competency requirements

MMC Providers shall ensure that all personnel are suitably qualified and experienced and meet both the general and role specific competency requirements defined in this standard.

Where the activities of a role materially contribute to the processes involved in the delivery of an offsite product or service, the MMC Provider shall:

- Have a documented process for evaluating competency and document minimum competency requirements comprising training, experience, and qualifications
- A suitably Competent Person shall assess competencies and review ongoing competencies at least annually. All competency reviews shall be documented and recorded
- Ensure that the minimum competencies, detailed in the job descriptions are satisfied, and that staff are trained and qualified for the work they carry out
- Ensure that role holders perform competently and maintain sufficient current, valid, credible, and authentic evidence to demonstrate competence to do the assigned work
- Establish a training programme which is designed and developed to close any competency gaps
- Ensure that any role holders who have yet to be assessed as fully competent to do a particular task are adequately supervised and supported
- Define, at an individual or generic role level, all limits of authority both in terms of management and variation against design
- Maintain a robust process to ensure that the renewal of time limited qualifications is completed before the expiry of validity
- Ensure that any grievance and disciplinary issues are dealt with effectively and with minimal adverse impact on the business or employee relations.

Role specific competencies shall be presented in a matrix form which reflects job description requirements detailing the minimum requirements for each role and the actual competency held by each individual within that role.

The minimum competency levels as defined within the matrix shall be supported by a documented competency evaluation process.

4.1.3 Training

MMC Providers shall ensure that personnel who materially contribute to the delivery of any aspect of an MMC project receive appropriate training and development. This may be through formal or structured job-based training and shall be documented.

Personnel undertaking new roles or activities shall receive induction training.

The development of training plans should take into account medium term (minimum 9 months) resource requirements and envisaged technological changes.

Records shall be kept of all training given and qualifications held.

4.1.4 Use of temporary staff

Where staff are employed on a temporary basis, competence should be determined for the tasks they are required to undertake, and the level of supervision provided should be commensurate with the assessed competence. They shall also receive technical and safety briefings before work commences.

4.1.5 Design

Designers should be able to provide evidence of competence in undertaking the tasks assigned to them, familiarity with the product being designed and knowledge/ understanding of the design process.

A formal designer approval process should be established and documented which defines the scope of design and the bounds of authority to complete and approve designs.

Completed designs and changes to existing designs shall be approved by a nominated Competent Person. Formal qualifications for the competent person should, as a minimum, be Chartered membership of an appropriate Professional institute.

Where the design function is devolved into a number of sections the design procedures shall document the respective competent persons and scope of approval.

4.1.6 Competent Person in manufacture and construction

A nominated Competent Person working in a design or project management role shall be assigned oversight and configuration management responsibility across the project life cycle. In the event that this is not the case, for instance when the design function is performed by a separate entity, then the manufacturing and construction function shall appoint a Competent Person to be responsible for assessing the impact of variations to design and obtaining the approval of the Competent Person responsible for the design function. Nominated Competent Persons shall meet the requirements detailed in Section 5.3 and be capable of understanding the impact variations will have on the project as a whole, in terms of time, quality and cost and take responsibility for communicating the change to project stakeholders.

4.1.7 Qualified supervisor

Offsite Providers undertaking manufacturing, construction and/or assembly work activities shall appoint competent qualified supervisors with specific responsibility, on a day to day basis, for the safety, integrity, and quality of work.

Qualified supervisors should have at least five years' experience of operating in the manufacturing and/ or construction activity for which they have responsibility and additionally hold a formal qualification to a minimum of NVQ Level 3.

4.1.8 Administration

Although formal qualifications are not generally required for administrative posts, measures of performance should be in place which ensure that the quality of the administration service is satisfactory and complies with the requirements specified for the work being done.

4.1.9 Project management

Project Managers shall have the technical competency to manage the subcontract relationship and interface with all the project functions to ensure compliance with specification.

Project managers shall appoint a Competent Person meeting the requirements of Section 4.1.6 who can demonstrate a level of technical competence that spans all offsite service activities thereby ensuring effective project management through maintaining an informed oversight of the contractual chain of activities being managed.

Qualified Supervisors shall be appointed to support the project management function.

Qualified Supervisors shall meet the competency requirements as detailed above for that role. Should the Qualified Supervisor not meet all the competency requirements then the nominated Competent Person shall supervise his duties, including those of technical audit until such times as competency shortfall is closed and sign off as competent is completed.

5. Configuration Management

5.1 Configuration baseline and change control

Upon initial issue of design and construction information, a configuration baseline should be established and all subsequent changes to the design subject to configuration management in accordance with BS ISO 10007:2017.

5.2 Configuration management process

The configuration management process should:

- Include a build sequence walkthrough
- Identify critical design criteria, such as dimensional accuracy and check that these criteria are satisfied during the manufacture and construction stage procedures
- Ensure that designs are developed in a coordinated manner and are suitably tested and clash detection performed using appropriate software, unless a risk assessment identifies that the structure/project is not sufficiently complex to justify this requirement
- Ensure that all design changes and variations are clash detected using, as a minimum, the tools used for checking the original design and approved by the Competent Person
- Regularly review potential configuration issues, with increasing levels of granularity as design progresses towards production.

5.3 Competent person roles and responsibilities

MMC Providers shall appoint a Competent Person(s) to control and direct configuration processes and act as the Dispositioning Authority evaluating associated with new designs /components and changes to existing designs.

Competent Persons may be employees of the MMC Provider or employed on a consultancy basis.

Should the latter apply then their responsibilities must be clearly defined within their contract of employment.

Where MMC Providers carry out work relating to more than one scope the nominated Competent Person should span the range of accredited scopes.

Competent Persons should be able to demonstrate the following level of competency:

- As a minimum hold Chartered status with an appropriate professional institute
- Comprehensive regulatory knowledge
- Extensive company specific product knowledge.

The Competent Person shall ensure that:

- The MMC manufacturer has the required process capabilities to consistently achieve tolerances dimensions identified as critical
- Critical dimensions set at the design stage, are checked during and post manufacture to ensure compliance
- A formal handover takes place between design and manufacturing and between manufacturing and construction and construction and groundworks, which shall include verification of dimensional accuracy
- Formal handover checks, covering specification compliance and dimensional accuracy, are completed when elements of design or manufacture are subcontracted
- Where aspects of design are delegated to a professional service provider, such as an independent structural engineer, the service contract shall specify minimum competency requirements and checks shall be made to ensure that those doing the work have the required competency levels.

6. Risk management

MMC Providers shall establish and maintain procedures for the ongoing identification and assessment of business, contract, project and activity risks, and the identification and implementation of necessary control measures, which shall be appropriate to the level of risk under consideration. These controls shall apply, in addition to contract or project specific risks, to more generic processes, people, equipment or suppliers that are critical to the continuity of the business, and mitigation against the risk of disruption or loss.

Finance and other resources should be allocated in project budgets for the mitigation of such defined risks.

To maintain a broad awareness of business and project risks, a risk register shall be maintained and regularly reviewed. The global or board level risk register should identify risks to the achievement of strategic objectives.

Individual project/contract risk registers shall be established and identify and mitigate risks specific to each project/contract and include as necessary risks/lessons learned from previous projects/contracts.

MMC Providers risk identification, evaluation and mitigation processes should be documented, and the associated control measures appropriately communicated throughout the organisation.

The methodology for risk identification and assessment shall:

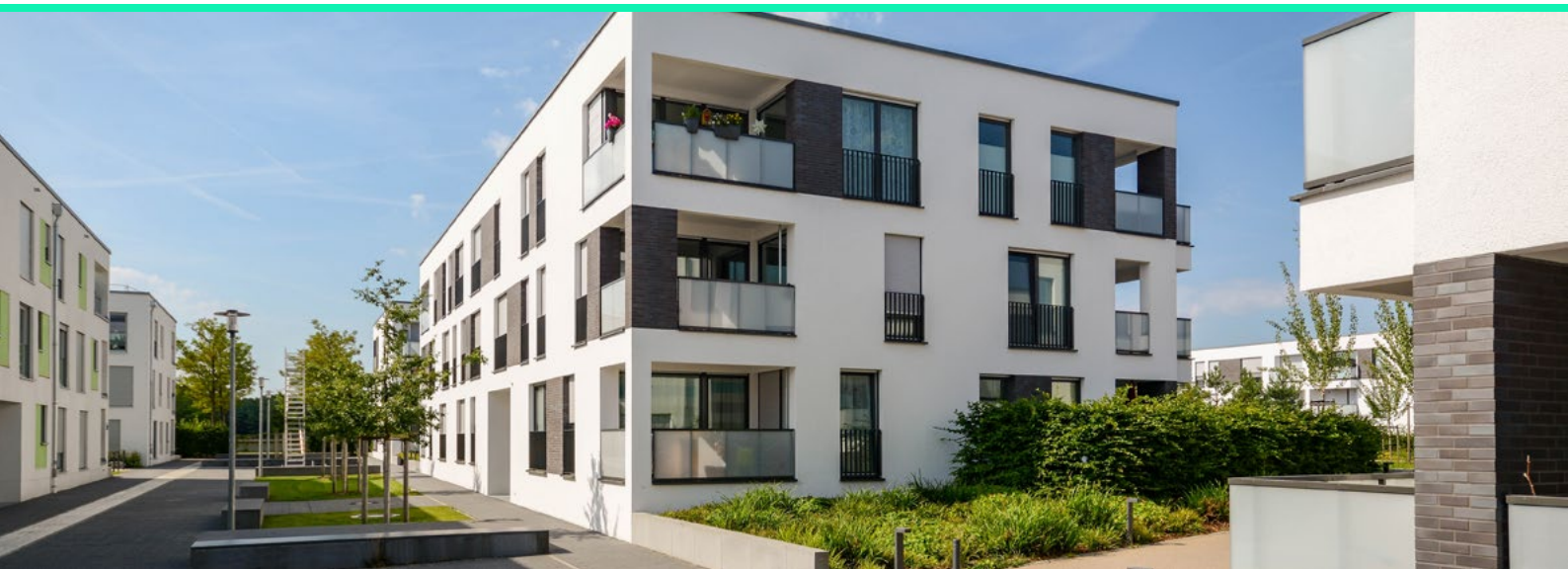
- Be defined with respect to its scope, nature, and timing to ensure it is proactive rather than reactive
- Be subject to ongoing review
- Use a standardised assessment framework
- Provide for the classification of risks
- Identify those risks that are to be avoided, eliminated, transferred, or controlled by management processes
- Be consistent and updated, based upon the MMC Provider's operating experience
- Provide for the monitoring of required actions to ensure effectiveness and timeliness of implementation
- A risk escalation process shall be established from project/business risk register to global risk register as the severity of the risk dictates
- Ensure that risks related to the use of subcontractors and suppliers are identified, evaluated and as appropriate, mitigated
- Capture lessons learned from previous projects/contracts and used to inform risk evaluation going forward.

Risk assessments shall consider the probability and consequences of events and should include:

- Physical failure risks, such as manufacturing plant failures, incidental damage, malicious damage (e.g. during storage, on site etc.)
- Design, specification, procurement, transport, construction, inspection, and maintenance risks as appropriate
- Emergency events such as fire, adverse weather, flood, storm etc.
- Factors outside the Service Provider's control, such as failures in externally supplied materials and services, key sub-contractors etc.
- Resource risks such as inability to recruit appropriately trained and qualified personnel or loss of numerous staff as a result of flu, or other, pandemics
- Moisture ingress risks which shall be addressed in the form of moisture control risk management process spanning design concept to weather proofing on site.

The results of risk assessments, and associated control measures provide input into mitigating risks in:

- The determination of the design, specification, procurement, transport, construction, inspection, and maintenance of products
- Identification of adequate resources including staff levels and sub-contractors
- Identification of training needs and skills.



7. Scope specific process control

7.1 Design

Effective control of the design function shall be demonstrated through the application of all appropriate legislation including building regulations, national and international technical standards etc. Designers will be required to demonstrate a track record in the types of projects being undertaken. Minimum qualifications for designers are defined in Section 4.

The design process shall cover the complete design life cycle from engagement by the client and formal capture of client requirements to the completion of the design and handover of drawings and specifications to those responsible for manufacture and assembly.

The design should be produced and managed in a collaborative and coordinated manner using best practice and principles as defined in ISO 19650.

Design best practice is demonstrated when the design process deploys 'Design for Manufacture & Assembly' (DFMA) in Building Design principles. This should ensure that designers take adequate account of the planned build rhythm for the project before considering assembly and manufacture factors.

On completion of a design, comprehensive details, including drawings and specifications, shall be provided to those responsible for manufacturing and construction and for the control of these activities from a project management perspective. These shall include details of any assumptions which have been made in preparing the design which could impact on manufacturing, assembly, and construction activities, such as lifting arrangements.

Where a design incorporates features or technology not previously deployed, then a risk analysis of the proposal shall be undertaken and acted upon before the design is completed.

A process shall be available for scheduling design work which ensures that adequate numbers of experienced/ trained staff are allocated to achieve the defined programme.

A Competent Person shall be nominated by the design function and the person so appointed shall meet the requirements defined in Section 4.3.

Competence of design staff shall be regularly assessed, and designs reviewed and authorised in accordance with the associated competency matrix and authorisation procedures.

Multi-disciplinary inputs, such as architectural, structural, mechanical, and electrical elements, shall be co-ordinated and controlled through the configuration management process. Where there are multiple inputs into a design the Competent Person shall take responsibility for co-ordinating and approving the federated design.

Where standardised designs are used procedures shall state how variations to standard designs are to be approved.

7.2 MMC Manufacture

MMC Providers undertaking manufacture and assembly shall have a process in place for the control and scheduling of the manufacturing process. This shall include procedures for the handover of work from the designer or project manager to the manufacturing function including:

- Handover meetings
- Client specifications
- Manufacturing drawings and material specifications and required delivery schedules.

Manufacturing procedures should preclude any form of manufacture before a design freeze is declared

A process shall be established which ensures that adequate numbers of competent staff are allocated to achieve the defined production schedule.

All staff employed in the manufacturing activity shall be adequately trained and experienced as detailed within the competency framework.

The methodology of work scheduling shall be defined (i.e. tee cards, white boards, software such as MS Project etc.).

Quality control procedures shall be established to ensure that all elements of the assembly are manufactured to the correct specifications. Any variations to specification should be documented and approved by the nominated Competent Person.

Appropriate oversight/liaison by the design function shall be established to ensure correct interpretation of design and effective feedback on any problems with the design, from a manufacturing perspective.

Manufacturing specifications shall be clearly defined, and the associated test plans should have defined acceptance criteria set by those responsible for design or configuration management. All test results shall be recorded against the set acceptance criteria and be signed off by the Competent Person.

Acceptance test data and final sign off /release documentation shall accompany manufactured units and components to the location where they are incorporated into sub-assemblies or the final construction. Where sign off cannot be achieved due to outstanding nonconformities, when the unit leaves the factory gates, then a process shall be established for close out and sign off by inspectors from the manufacturing facility when remedial action completed at the site.

All staff engaged on manufacture and offsite assembly shall be adequately trained and experienced and their competencies regularly reviewed. They shall meet the requirements specified in Section 4.1.2 and as detailed in the competency framework.

Comprehensive installation instructions shall be provided to facilitate onsite construction and assembly. This should include identification of components such that they are cross referenced to assembly drawings etc.

7.3 Construction

Before commencing onsite assembly activities, MMC Providers shall ensure that all work completed by substructure contractors (groundworkers) in preparing the site and providing foundations, accords with the design and should involve a formal handover and verification of compliance.

Where transportation of assembled units to site, have been outsourced the following checks shall be made:

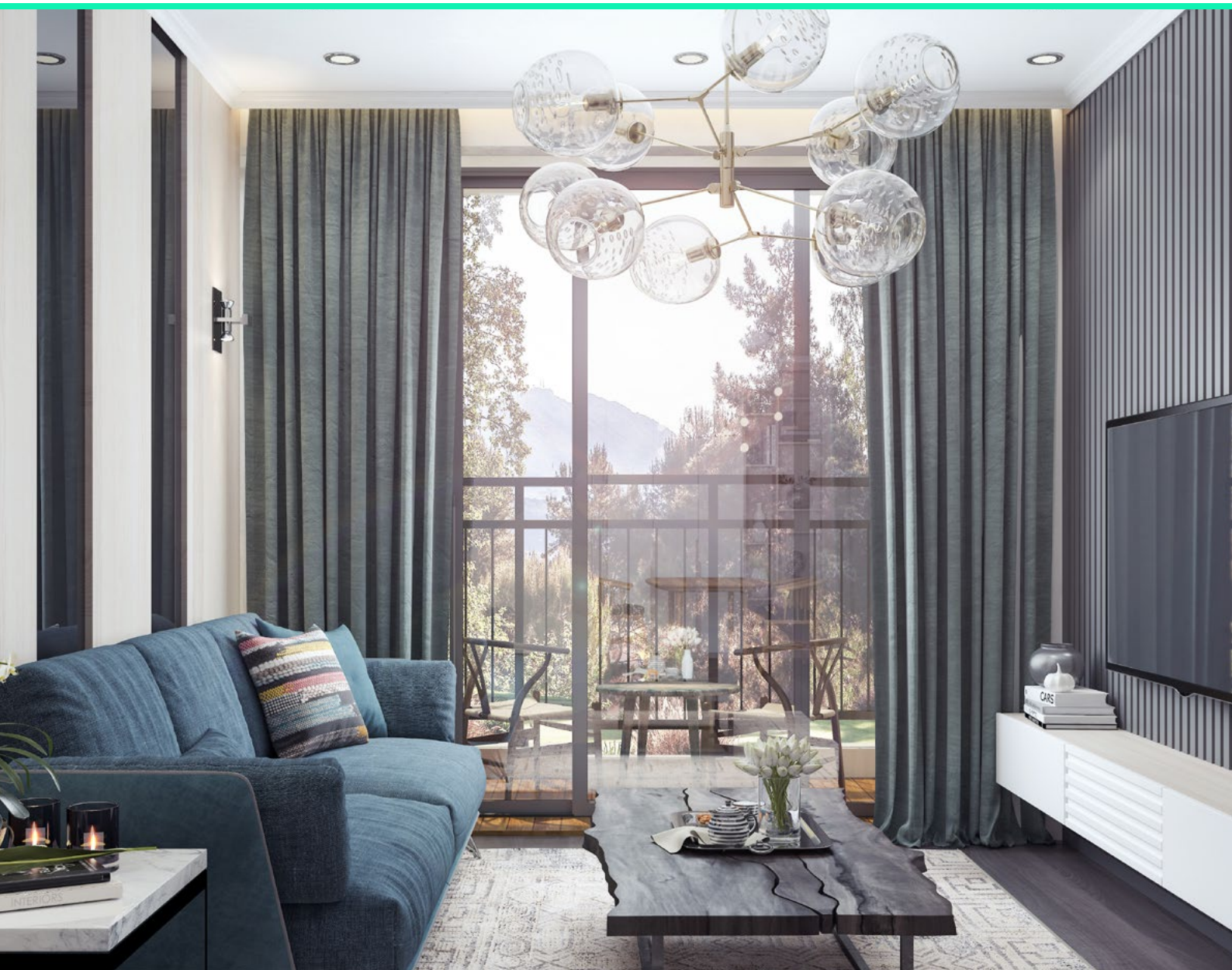
- The delivery programme accords with the construction schedule
- Detailed route planning procedures have been followed by those responsible for arranging transport including a risk assessment
- Suitable loading, unloading and load securing arrangements have been established and approved by the Competent Person.

MMC Providers undertaking construction and onsite assembly shall have a process in place for ensuring all assemblies, materials etc. received on site, are to the correct design, specification and are accompanied by the relevant release documentation from the manufacturer and shall have a procedure for the reporting non-conforming product and subsequent corrective action. Adequate storage facilities shall be available on site to ensure that assemblies, components, and materials are able to be stored to prevent damage and water ingress.

Inspection of assemblies, components and materials should only be undertaken by suitable qualified and trained personnel.

A process shall be established for the control and scheduling of the construction and assembly process. This shall include procedures for the handover of work from the manufacturing function to the construction function including:

- Handover meetings
- Client specifications
- Construction drawings, assembly instructions, material specifications and a fastening schedule
- Signed off inspection and test plans.



Those responsible for controlling and directing construction and onsite assembly work shall review site construction method statements and risk assessments including subcontractors to ensure they are current, relevant to the project and signed off. The resultant agreed method of assembly shall be briefed to the onsite construction team and an inspection plan established which ensures compliance with the planned assembly method.

Unless a risk assessment identifies that the project is not sufficiently complex to justify otherwise, those responsible for directing construction and onsite assembly work shall prepare a detailed setting out plan. This plan shall identify critical dimensions and other setting out requirements and ensure that the required on-site checks are competently performed using precise surveying techniques.

All staff engaged on construction and onsite assembly work shall be trained and experienced and their competencies regularly reviewed. They shall meet the requirements specified in Section 4.2 and those detailed within the competency framework.

The construction schedule shall be aligned to a resourcing plan to ensure that the schedule is readily achievable. The staff shall be subject to induction training and toolbox talks and records of these briefings maintained.

Qualified site supervisors shall be appointed to oversee construction and onsite assembly work.

Fire stopping shall be performed by qualified operatives working to certified procedures and all such stopping shall be subject to 100% photographic records.

A documented site variation/deviation procedure shall be available. Site variations/deviations shall only be agreed by the Competent Person responsible for the design to ensure continued compliance with the client's specifications/ configuration management requirements.

On completion, the constructed works shall be formally handed over to the client along with required CDM maintenance information and relevant product data. Any items requiring rectification through snagging should be formally agreed and a remedial programme implemented.

7.4 Project management

Project Management function shall have processes, procedures, and technical competencies in place to effectively manage the subcontract relationships, the quality of the work performed and ensure that work is programmed to meet client requirements. They shall have effective channels of communication and change control arrangements and ensure that effective interfaces are maintained within the contractual chain incorporating, as applicable, clients, developers, designers, manufacturers, and constructors.

The project management function shall take responsibility for ensuring compliance with scheme requirements throughout the project cycle. In the case of the Project Management (Construction) scope this shall involve the permanent presence on site of an appropriately competent site representative.

Procedures shall clearly define Project Management activities and take responsibility for Configuration Management across all work activities throughout the project life cycle.

The competence of persons engaged on project management activities shall be regularly assessed and meet the requirements specified in Section 4.3.9.

Adequate numbers of experienced/ trained staff to oversee each project and achieve the defined schedules shall be demonstrated and each project shall have an appointed Competent Person to control and direct configuration activities.

In all cases an effective level of management, monitoring, audit, and control of the work activities shall be established and maintained.

Materials, goods, and services shall only be procured from approved suppliers/ sub-contractors. A list of all approved suppliers/sub-contractors shall be maintained and made available to all relevant staff.

Procedures detailing the process for introducing new suppliers/sub-contractors onto the approved list shall be established. The procedures shall also detail the assessment/audit process to verify the suitability of existing suppliers/ sub-contractors. The level of assessment/ audit should be based upon the criticality of the supplier/sub-contractor as determined by a risk-based approach.

Where the procurement function identifies that materials, goods and services can only be procured from a single source supplier, then this shall be highlighted within the management process for inclusion, as appropriate, in the risk register and risk mitigation measures established.

Both offsite and on-site storage shall be available which is both secure and weatherproof.

Appropriate instructions shall be available to all staff responsible for storage detailing the requirements for storing and handling on and off-site components, assemblies etc. Schedules of goods received and assembled components placed into storage should be kept to ensure traceability.

8. Procurement transport and storage

8.1 Sub-contracting arrangements

MMC Providers may use suppliers and sub-contractors to provide any part of the works for which accreditation is held, however under such circumstances the work must be undertaken by:

- An MMC Provider who has accreditation covering the service provision
- A supplier whose products do not require to be supplied to design tolerances that impact on the overall configuration of the finished assembly. Examples would be fasteners, timber, boards etc.
- A supplier producing standard products, such as sanitary ware or doors, whose own quality controls are sufficient to demonstrate compliance with the dimensional accuracy required by the design
- A specialist subcontractor in the performance of the following activities:
  - Transport (done in accordance with Section 8.3)
  - Craneage
  - Scaffolding.
- Specialist technical services (such as structural design) where suitable controls have been established which ensure that outputs fully comply with the specification and that the work is performed or approved by a Chartered Engineer
- Labour only provision, where the workforce provided by the subcontractor are integrated into the management and H&S systems of the MMC Provider who assumes management control for the work undertaken.

8.2 Groundworkers

Foundation excavation and installation together with trench excavations and reinstatement may be carried out by ground workers. This is recognised as custom and practice and is acceptable provided the following procedure is implemented:

- Provision to the groundworks contractor of the specification for excavations and the laying of foundations
- The specification shall be cross referenced in the contract with the principal onsite contractor or developer
- The specification for any ground works shall be presented to the Site Manager at the pre-start site meeting and this shall be documented
- An audit regime is implemented by a Qualified Supervisor to ensure that the ground workers adhere to the specification. Records of these audits shall be maintained.

8.3 Transport

The work scheduling procedure shall include a process for ensuring that part completed and completed assemblies are transported to subcontractors /construction sites in a timely fashion to ensure continuity of manufacture/construction.

When arranging transport, an examination of the proposed route including checking bridge height clearance, loading restrictions and any access restrictions at the delivery site shall be completed. A risk assessment of the route and access constraints shall be established and where necessary mitigation measures established.

The craneage contractor shall be required to submit lifting plans and risk assessments detailing ground conditions, wind conditions and loading limitations which shall be subject to review and approval by the assigned competent person.

Where units are to be stored in transit, or onsite prior to erection, a procedure shall cover the storage arrangements, ensuring that the units are kept secure and dry and handling related issues are addressed.

The transportation shall only be undertaken by appropriately trained and qualified personnel who will be provided with specific instructions regarding loading, attachment during transport, off-loading and any temporary storage requirements.

A procedure shall be established for the verification of unit conditions prior to departure from the manufacturing facility and the condition upon arrival at site.

9. Performance, monitoring and improvement

9.1 Equipment

An appropriate maintenance and calibration process shall be implemented for all machinery, tools, and equipment in operation within the manufacturing and construction processes. Records of maintenance, calibration and inspection of this equipment shall be maintained.

Suitable Personal Protective Equipment (PPE) shall be provided to those engaged on offsite and onsite work.

9.2 Process performance

MMC providers shall monitor their compliance with technical and scheme requirements, and they should apply a process of continuous operational improvement to their processes and work procedures.

Process improvement should be applied to:

- Operational performance
- Process control, including product and service quality
- Supply chain management.

Key performance indicators shall be established and maintained for measurement of performance for the above key parameters.

Performance trends should be routinely analysed and whenever performance falls short of defined targets root cause analysis should be undertaken and an action plan initiated. End customer satisfaction or feedback shall be included in the performance measures.

9.3 Contract document and record control

Contract Control

MMC Providers shall establish and maintain procedures detailing the process(s) for handling enquiries from clients. These procedures shall, as a minimum, detail the following:

- Enquiry and tender process
- Capturing client requirements and all changes
- Effective interface arrangements between departments e.g. Sales, Design, Manufacturing, Construction, Project Management etc.
- Effective interface with the client including meetings, contract review, site visits etc.
- Ongoing contract review process
- Contract completion process and lessons learned review capture.

9.4 Document, drawing and data control

Procedures shall be established for controlling all documents, data and information required by this standard to ensure that such information:

- Can be located and accessed by authorised personnel
- Periodically reviewed, revised as necessary, and approved by authorised personnel
- Is current and available at all locations where operations essential to the effective functioning of the management system are performed
- When obsolete are promptly removed from all points of issue and points of use
- Retained for legal, knowledge preservation when archived
- Is protected from loss or damage and, if in electronic format, are adequately backed up and recoverable
- Records are legible, identifiable, and traceable to the activities involved.

9.4.1 Project records

Project records shall be maintained detailing:

- Client requirements
- Contract variations
- Approval authorisations
- Interface handovers (e.g. from design to manufacturing and manufacturing to construction)
- Production, process, and product records
- Inspection, maintenance, and calibration records
- Training and competency records
- Contractor and supplier information
- Audit results and any resulting corrective actions
- Customer complaints
- Project product data golden thread compliance.

9.4.2 Project completion

On project completion the MMC Provider shall issue appropriate construction and utility services installation certificates, as constructed design drawings, schedules, and reports in accordance with the relevant standards for all the work carried out. They shall also provide to their clients all records required for compliance to CDM requirements etc.

Instructions manual for following trades and final occupants/ owners shall be included with details of the Approved Technology and any limitations or precautions required to maintain its integrity.

Following trades compliance with the instruction manual shall be subject to audit by the MMC Provider should he serve as the principal contractor, or arrangements be made with the principal contractor to carry out that audit on the MMC Providers behalf. In either instance the completed audit should be available for review.

A schedule of customer complaints shall be maintained together with close out actions and timeframes.

The term 'snagging' is widely used within the construction sector, as a means of understating the variations to specification and defects, the term is acceptable under the BOPAS process to the point of handover to client/homeowner.

Issues identified by the client/ homeowner, post hand over, shall be classified as Quality Deficiencies which shall serve, together with timeliness of close out, as key performance indicators and trends will be examined during surveillance visits.

The client/homeowner handover pack should take the form of a hard copy supplemented by a more durable media such as a DVD or access to a portal and should include details of the construction system and as built schematics in respect of electrical systems and plumbing, a list of 'do's and don'ts' in relation to wall fixtures and modifications to the property.

The handover pack should also include a list of defects which may be classed as quality deficiencies and therefore reportable and legitimately recorded within the KPI system. (Reference Appendix 3 for generic list of reportable defects).

9.5 Audit

To ensure compliance with in-house processes and procedures and client requirements, an audit programme shall be established. Audits shall include verification of compliance with:

- Quality and technical procedures
- Health, safety, and environmental procedures
- Design and client specifications and dimensional requirements
- CDM Regulations.

Audit programmes shall be risk based, i.e. targeted at those areas deemed to be of highest risk, based upon operational experience and audit results and include defined critical activities undertaken by suppliers and sub-contractors.

Audits should be conducted by personnel whose roles are independent of the production.

The responsibility and authority for the initiation and completion of any corrective and preventative actions arising from non-conformances, identified during audit, shall be defined. The audit function shall follow up close out actions and document.

10. Insurance

MMC Providers shall demonstrate that they have adequate insurance cover which is related to their defined scope of work and should include Public Liability, Third Party Liability, Professional Indemnity and Contractor all Risk cover, as applicable to the scope of work, as well as business continuity insurance or as mitigated within the risk management process.

Property listing on the BOPAS website

Properties which have been designed manufactured and constructed compliant with the BOPAS scheme may be listed on the BOPAS website subject to the following information being made available:

- Copy of the building control certificate
- Copy of warranty Provider certificate of acceptance
- Full details of address including house name/number and post code
- Confirmation of construction system
- Details of the BOPAS accredited designer/manufacturer/installer

Appendix 1

A1.1 Accreditation process overview

Upon satisfactory assessment of all the scopes of work for which approval is sought, BOPAS accreditation will be awarded. The accreditation certificate will be presented with details of the MMC Provider, the construction system, and the scopes of accreditation. The accredited MMC Provider details as posted on the BOPAS website will be updated to reflect the current status in way of colour coding.

A1.2 Approval process

A1.2.1 Gap analysis

To assist MMC Providers, preparing for assessment, a gap analysis is undertaken. The gap analysis represents a cost- effective means of establishing an overview of the context of the business, the culture of the assessed organisation and an awareness of current status with regards to compliance with scheme requirements. The gap analysis involves one-to-one interviews with staff pivotal to the scopes of work for which accreditation is sought.

There is no requirement to present documentary evidence at this stage and in that regard, it represents an auditee friendly process. Feedback is provided at the conclusion of the assessment and this is followed by a detailed report. The validity of the gap analysis shall be 12 months, following which, if progression to accreditation assessment has not been undertaken, then a further gap analysis will be required before the accreditation assessment can be undertaken.

A1.2.2 Accreditation Assessment

Once non conformities classified as 'major' during the gap analysis, have been closed out then the MMC Provider may contact LRQA to arrange for the Accreditation Assessment to take place.

The accreditation assessment represents a standard, evidence-based audit format, a systematic evaluation of organisational structure, processes, procedures, and competencies that combine to deliver the scopes of work for which accreditation is sought. A key focus will be integrated risk management processes and management of interfaces between scopes of work for instance design to manufacture and manufacture to construction, to ensure consistent compliance with best practice as defined within this standard.

Following standard audit protocol, verbal feedback of the outcome of the assessment will be provided to the MMC Provider at the conclusion of the assessment, detailing and classifying findings in accordance with this standard. A comprehensive report will follow and if there are no major nonconformities identified then the recommendation from the assessor should be that accreditation be granted. If major nonconformities are identified, then they will be required to be verified as closed out before accreditation can be granted.

BOPAS accreditation, once granted, is valid for a 3-year term, during which a surveillance programme will be undertaken.

A1.3 Surveillance programme

Upon BOPAS Accreditation, a surveillance programme is agreed which will be scheduled over the 3 year validity period, the purpose of which is to ensure that the processes, procedures, competencies and activities against which accreditation was initially granted, are maintained and further developed, to demonstrate continuous improvement.

Additional surveillance visits over those agreed may be required if, during the surveillance visit programme, major nonconformities are identified, requiring verified close out or if complaints from client organisations are received which are of a nature that warrant urgent investigation. All such additional visits will be at cost to the MMC Provider.

Surveillance visit programme

Each scope of accreditation shall be subject to audit, as a minimum annually, with the first surveillance visit held within six months of accreditation and typically at 6 monthly intervals thereafter, however the frequency of the surveillance visits will be determined based upon a risk assessment performed by the BOPAS Assessor at the conclusion of the accreditation assessment.

Should a shortfall in standards be identified during the course of the surveillance programme, depending upon the severity of the shortfall then accreditation may be suspended or a revised surveillance programme established which may involve more frequent visits until, confidence as to the reinstatement of standards, has been achieved.

Surveillance visit

Where a surveillance visit is cancelled with less than 1 weeks' notice, an abortive visit charge based on the standard charge for a surveillance visit will be made. Where work activities appropriate to the scopes of accreditation held, are not being carried out as scheduled on the day of the surveillance visit, then an additional visit may be required and an additional fee, commensurate with that visit chargeable.

A1.4 Investigations and removal of accreditation

Accreditation shall be subject to cancellation or amendment if the Offsite Provider:

- Is found to have made false claims within the application/during the assessment and accreditation process which are considered to impact on the integrity of the MMC Providers operations
- Does not implement within the agreed time scales remedial actions needed to rectify a major or series of minor non-conformances to the satisfaction of the accreditation body
- Implements corrective action which is subsequently found to have been inadequate to prevent a reoccurrence of recently identified major non-conformances
- Is found to continually fail to maintain safe systems of working and has working practices which result in their workforce or others being exposed to danger or serious risk of injury through the use of faulty workmanship/ working practice and faulty materials or materials not conforming to recognised standards
- Becomes bankrupt or insolvent
- Claims to have been accredited for work, not included at the time in their scopes of approval
- Undertakes work below the standard required and demonstrates a lack of commitment to achieve the required standard or is unable to continue to comply with the criteria set out in this standard
- Makes use of the Scheme and /or logo in a manner which, in the opinion of the Accreditation Body, is likely to bring the scheme into disrepute
- Does not perform the scope of work for which accreditation was granted for a period exceeding 6 months whereupon accreditation will revert to 'blue' status
- Notifies the accreditation body that they no longer wish to be accredited for scopes of work.

The MMC Provider will be notified in writing of the intention to cancel accreditation detailing the reasons for such action. Normally, unless the nature of the non-conformance merits immediate action or is a reoccurrence of a recently closed non-conformance, the process will be undertaken in two stages. Stage one – the MMC Provider will be notified that their accreditation is being suspended and given a limited time to address the non-conformances giving rise to the suspension. If the non-conformances are not satisfactorily addressed during the allotted period and steps are not taken to prevent a reoccurrence, BOPAS Accreditation will be cancelled.

Once accreditation has been withdrawn then the MMC Provider will be required to re-apply and be subject to the full re-assessment process, to regain BOPAS Accreditation status.

A1.5 Appeals, complaints and disputes concerning accreditation

If the MMC Provider wishes to object to action taken, including withdrawal/ suspension of accreditation, they shall, within twenty-one days of receipt of the notification, give notice in writing to of their objections setting out clearly the grounds for an appeal.

Any such appeal will be assessed by a panel comprising BOPAS partners but independent of those involved in the evaluation or the decision to withdraw/suspend.

The results of the review will be communicated to the MMC Provider in writing, clearly detailing the basis for the decision.

If the appeals process finds the accreditation withdrawal to be the correct course of action, then re-instatement of the MMC Providers would entail a full re-evaluation.

A1.6 Re-certification

At the end of the three-year accreditation period a reassessment covering all required scopes of accreditation shall be undertaken.

The scale of this reassessment will be risk based, taking into account the performance during the period of accreditation. If the performance has been satisfactory with no major nonconformities identified within the surveillance programme and evidence of continuous improvement, then re-assessment will represent a limited scope, focusing on perceived areas of weakness.

Upon satisfactory completion of the reassessment then BOPAS Accreditation will be awarded for a further 3-year term subject to the agreement and implementation of the surveillance programme.

A1.7 Renaming an Accredited MMC Provider

In the event that an accredited MMC Provider is to be renamed as a result of acquisition or similar reason then a letter is required from a director level stating the following:

- The reason for the change
- Confirming that all procedures and processes will remain valid and implemented
- All staff pivotal to the accredited scopes remain unchanged
- Key competencies remain unchanged

Upon receipt of the letter LRQA subject to satisfactory review and acceptance of the basis for the name change, LRQA will confirm the administrative fee for the BOPAS website name changes and arrange for a surveillance visit within 3 months of th date of receipt of the letter, in order to verify the statements therein.

Appendix 2

BOPAS+

The BOPAS scheme, since its launch in 2013 has been incrementally updated to introduce additional requirements and controls to mitigate risks to the offsite sector as they arise, however post Grenfell legislation and the Net zero initiative are focusing on transparency, traceability and collaboration within the construction industry which in turn is driving digitisation.

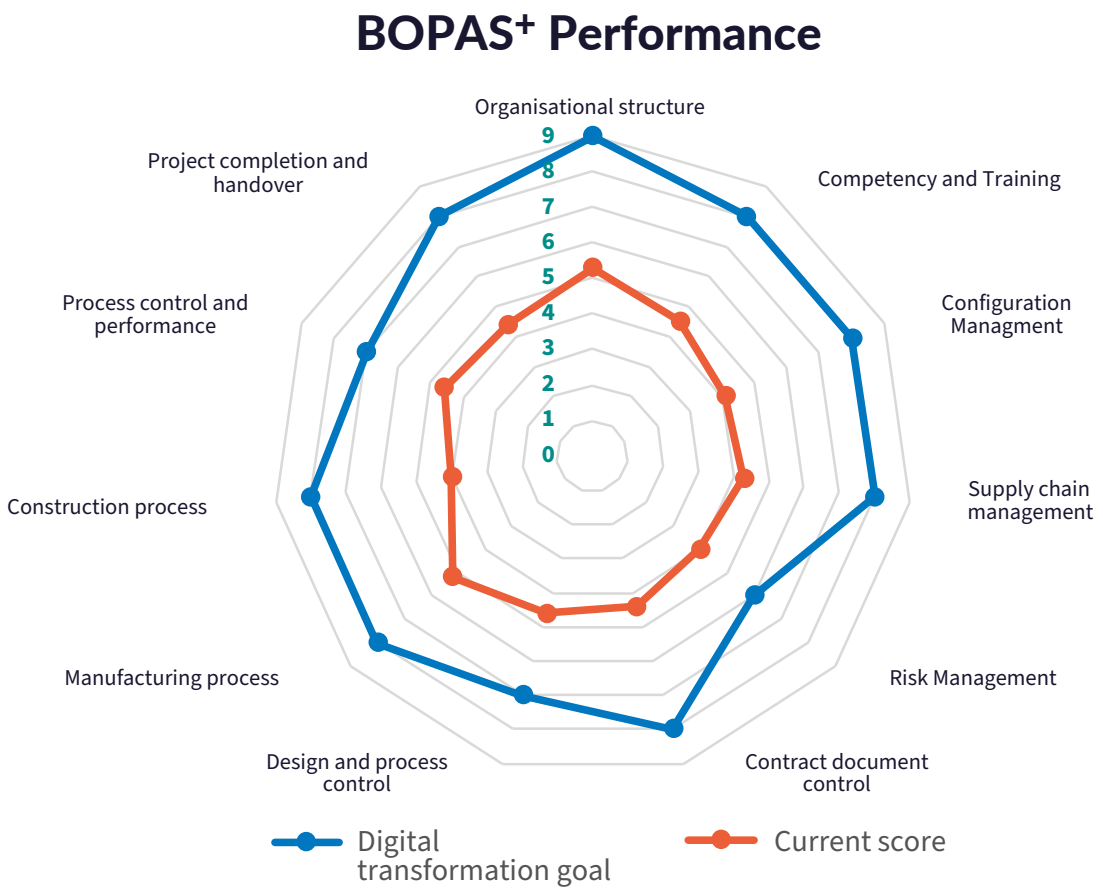
BOPAS+ was developed in recognition of the need for the MMC sector to make the digital transition and to evaluate BOPAS accredited organisations as to the extent to which they have progressed digitisation through digitalisation to digital transformation or the extent to which they have planned and scheduled its introduction.

BOPAS+ provides for a numerical scoring system from 4 to a maximum of 9 and the threshold of 4 is assigned to offsite providers who have a documented plan, sign off by the Board and associated investment programme.

Scoring spans all areas currently covered by BOPAS and can therefore be readily integrated into the current scheme once an Offsite Provider has successfully completed the BOPAS+ assessment and achieved the threshold score of 4 in all sectors of the business.

The digitisation maturity model will be presented in the form of a radar map detailing the scores achieved and will appear on the BOPAS website against the MMC Provider concerned. An example of the radar map is provided below.

Once accredited against BOPAS+, the standard surveillance programme will be maintained to evaluate ongoing progression on the route to digital transformation and the scores will be revised accordingly. The maturity model on the website will be updated post surveillance visits, providing a record of continuous improvement.



BOPAS+ Requirements
The principles

Organisational structure

Formal data strategy

- There is evidence of informed Board support for the digitisation/ digitalisation/ Digital transformation programme
- Strategy group and workshops – output a plan to collect manage and analyse data
- Stakeholder and consumer mapping completed en route to development of definitive digital model

Research and improvements planned

- Digital improvement programme planned for implementation within the next 6 months/12 months/3 years
- Evidence that there are assigned responsibilities for the ongoing awareness of future legislation, current best practice within the sector

Capex and OPEX. Planning and management line of sight

- The strategic objectives incorporate a route to digital transformation and customisation
- The budget aligns to the strategic objectives
- The strategic objectives align to the operating plan
- Frequent feedback loop from short term operating plans to the strategic objectives

Competency management

Digital team competency

- Alignment of digital team competency with the BOPAS/BIM competency map/ compliance with CIC 'setting the bar' competency requirements / PAS 8671 draft

Develop and manage HR planning policies and strategies

- Route to digitisation programme mapped out defining skills recruitment programme and schedule
- Programme review is current, with skills and competency gaps defined
- Timescales for closure of gaps on route defined
- Evidence of close out of competency gaps aligned to strategy schedule provided.

Training and developmental plan

Understanding digital technology and the training needs

- Training and competency evaluation completed to establish extent and nature of training required by operatives and management to fulfil the next stage of digital progression

Enterprise wide knowledge management capability

- Succession planning established
- Knowledge capture arrangements established
- Mentoring and supervisory processes documented to ensure competent and consistent delivery of service/product.

Configuration management

Data/information status

- Data has been demonstrated to be: Structured, Secure, Verified, Interoperable (ISO 23386:2020) Dynamic

Data security and resilience

- Evidence provided that data is:
  - Secure
  - Resilient
  - Authentication is robust
  - Data is encrypted in transit/at rest
  - API documentation when 3rd party hosting

Meta data

- Evidence of meta data collection and analysis to support business decision making – from clients and 3rd party hosts

Digital governance model - integrated systems coordination

- Line of sight between digital strategy through conceptual data model, logical data model, physical data model and enterprise data model
- Defined responsibilities for model roll out and currency

Integrated asset management strategy

- Line of sight between asset management, strategies, policies, and maintenance programmes

Evidence of parametric objects/families integral to design

- Intelligent objects with integral graphical information that may be interrogated

Product breakdown structure

- Product/system breakdown structure completed

All sources of data are interlinked

- ERP, CRM, data bases, local hard drives, emails websites, 3rd party sites, financial data bases, manufacturing performance etc.

Data collection methodology

- Effective data gathering process established

New Product introduction

- Documented process implemented to incorporate the 6 stages of NPI – define, Feasibility, assessment, develop, validate, implement, Evaluate
- The process has resulted in evidence based successful outcomes

Critical item

There is an understanding of FMEA, its relevance and application

Supply chain

Integrated supply chain management

- The integrated management system has been established within the supply chain comprising:
- Relationship Integration
- Measurement Integration
- Technology Planning Integration
- Material and Service Supplier Integration
- Internal Operations Integration
- Customer Integration

KPI Evidence of improvement in collaboration, JIT, production flexibility and less waste identified

Evidence that all suppliers using collaborative tools – BIM appointed parties

- A collaborative culture has been established within the supply chain
- This has been supported by the adoption throughout the supply chain of compatible collaborative tools

Source selection process through Bill of Materials

- Key component and system selection is based upon quality design flexibility, cost availability,
- BOM procurement process is fully automated
- Effective Cost forecasting accounting reporting

Contract and document control

Evidence of exchange information requirement

- Responsibilities defined for translation of EIR to post contract BEP/MIDP and TIDP defined

Document control and project record methodology

Data management capability

- Website fed directly from PIM through API
- Enquiries handled through the CRM system
- Certificates downloaded from verified website with change history
- Evidence of data informed decisions from such sources as meta data from marketing/website feedback/3rd party object host
- All sources of data storage known and documented – may include ERP, website, local hard drives, CRM, server files, calculation tools, databases held by 3rd parties

Design and process control

Digital competence (prefabrication and preassembly):

- Evidence of the following 3D virtual modelling; Clash detection and avoidance; Fly through capability; Provides a single point of reference for master data

Extent of model application

- Documentation, including drawings are derived directly from the 3D model

Evidence of CDE

- Single source of project information established and accessed by all stakeholders

Offsite manufacturing process and competence

Manufacturing Execution Systems (MES)

- Real time data checks, automatic enforcement of specification and rules and device/unit traceability established
- Evidence of improved product and process quality

Extent to which the 3D model is used to facilitate manufacturing/construction sequencing

- Evidence provided that the model has been used to support the development of the project plan
- The output provided for a visual display of construction timelines
- Evidence that critical parameters measurements are subject to secondary documented check

Construction/onsite assembly process and competence

Measure the extent of which the model is developed to integrate with the project construction phase

- The model is developed to fully/ partially integrate with the project construction phase

Lean processes incorporated within on-site systems

- The evaluation is documented as relating to the following lean principles which do not benefit the client and for which payment not received; defects, waiting time, inventory, transportation, overproduction, motion

Project completion and handover

Asset information model

- Effective handover incorporating the as built 3 D model of the project

Stakeholder communications

- The handover strategy has been developed and documented

Production handover

- Evidence of as built record of construction to support the facilities management
- The as built are included in the Homeowner pack/portal
- The requirements of the golden thread of safety information has been adhered to within the handover processes and is aligned to BIM soft landings.

Appendix 3
Reportable defects post handover

Item	Issue	Comment	Reportable
Appliance Electrical	Failure	Contact manufacturer and follow warranty advice	No
Appliances Electrical	Damage	Homeowners responsibility	No
Blockages	Waste/drains/traps	Contact customer care (blockages caused by Owner at owners cost)	Yes
Cracks to bricks and mortar	<5mm	Minor cracking due to shrinkage is normal and to be expected in new homes	No
Cracks to bricks and mortar	>5mm	Contact customer care	Yes
Radiators	Not warm enough	If after bleeding not resolved contact customer care	Yes
Central heating	Failure	Contact customer care	Yes
Central heating	Leaking pipes radiators	Contact customer care	Yes
Central heating	Noisy		Yes
Chips and scratches	Glass/cabinets/work surfaces etc	Homeowners responsibility	No
Condensation		Normal and due to drying out process	No
Cracks to dry lining, ceiling and internal paintwork	<2mm	Cracks due to shrinkage is normal	No
Cracks to dry lining, ceiling and internal paintwork	>2mm		Yes
Doors	Lock/latch adjustment Door catching, Door warping and easement		Yes
Electrical	Transformer, circuits, sockets and switches		Yes
Electrical	Supply failure	Contact energy supplier	No
Grouting	Cracking		Yes
Nail/screw pops			Yes
Silicon sealant and mastic	Internal cracking		Yes
Structural defects			Yes
Water services	Leaking pipes		Yes
Windows	Frames and furniture		Yes
Wood		Minor separations, shrinkage and warping normal	No

Appendix 4
Website details

Technology Details

A Service Providers' entry on the website shall be graded as:

- **Blue** – when the company and technology is under Assessment
- **Green** – when full accreditation has been gained including assessment by LRQA and the associated technology approved by BLP
- **Gold** – when BOPAS+ has been awarded.

The addition of potential MMC Providers at Blue can be made as soon as the assessment has commenced; at this stage website entry is optional but requires the submission to LRQA of company and construction system details.

The transition to Green (Approved) status will only be made following successful completion of both the process and the construction system assessments and acceptance of a surveillance visit programme.

Appendix 5
Technical Review Procedure – Durability and Maintenance Assessment

A5.1 Information Required

Based on one or more reference buildings:

- Drawings
- Specification
- Physical, chemical and performance data of any innovative components and products used
- Structural calculations
- Test data.

The data should enable LRQA to define the boundaries of the assessment, what comprises the 'core' of the off-site system, building type, size, variation of finishes, claddings, expected use, location, contract specific components.

And confirm:

- Structural performance
- Interface design and detailing
- Resistance to key agents of degradation (corrosion of metals, decay of timber, etc.)
- Risk of interstitial and surface condensation
- Resistance to weathering, wind, rain, radiation
- Resistance to thermal and moisture movement
- Expected durability and maintenance requirements
- Quality control processes (e.g. factory controls, transport, storage, installation, feedback, dealing with faults and change mechanisms)
- Installation process: e.g. training, installation manual, qualifications.
- Fire resistance
- Thermal
- Acoustic
- Life cycle costing.

A5.2 Methodology

The process is iterative, and will include:

a) Request for and receipt of technical information from the Service Provider

b) Desk study

c) Initial report

d) Factory visit where applicable (this may be linked with or carried out as part of the factory assessment)

e) Site visit where required

f) Contact with technical staff to resolve and clarify queries

g) Draft report

h) Approval of Technology.

Depending on information there will be iterations of the report and contact with staff, factory and site until all issues are resolved. The final report may be issued with recommendations. Essential recommendations must be resolved to conclude the process.

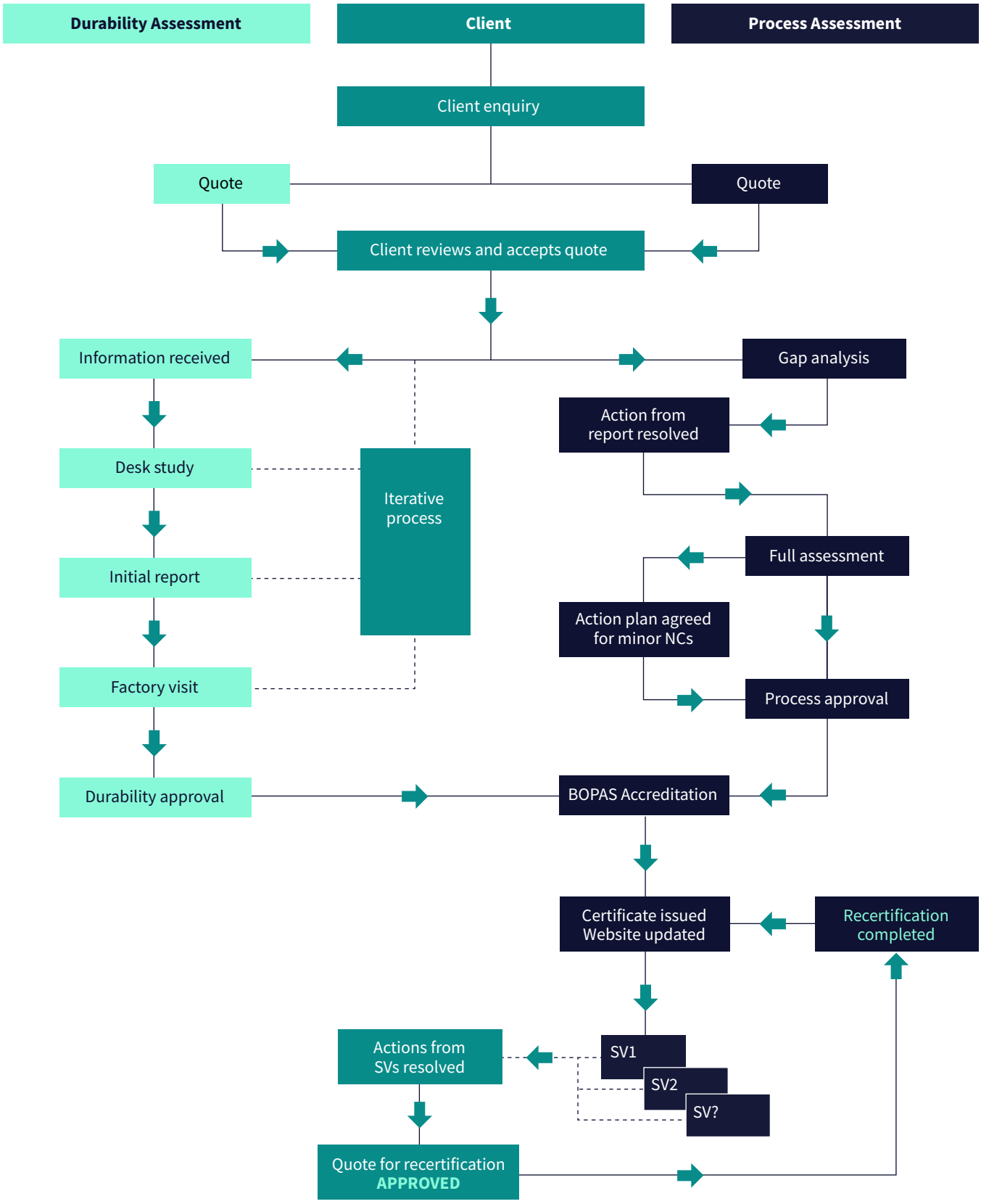
The assessment will be carried out based on current industry knowledge and accepted design, good practice and current understanding of building science and materials.

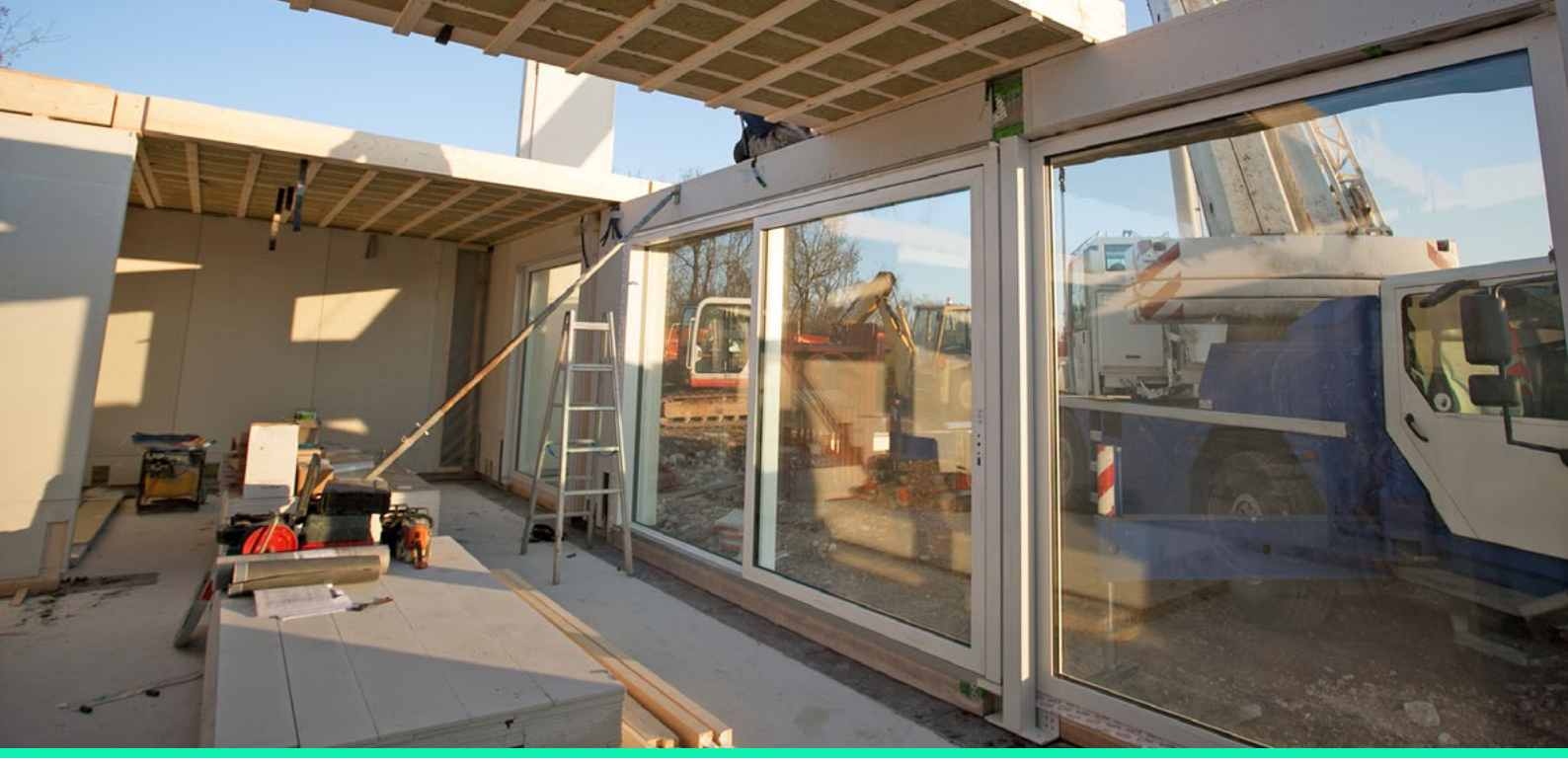
Where design or materials are innovative or used in an innovative manner, LRQA will make an assessment based on first principles, drawing upon industry and manufacturer's technical expertise and test data to reach an opinion. Where there is insufficient information testing may be required to confirm performance.

Validity of the durability assessment:

- The durability assessment is valid while building system is manufactured without substantive changes. Where substantive changes are made LRQA must be informed so that a further review can be made.

Appendix 6
Application Process Flowchart





Appendix 7
Moisture Control Plan Requirements

Each moisture control plan should be project specific and based upon a Design Failure Mode Effect Analysis (DFMEA) and a Process Failure Mode Effect Analysis (PFMEA).

The output from the analyses should address as a minimum the following:

- The frequency with which incoming panels/raw sourced wood are monitored for moisture content (< 15%)
- Remedial process defined for incoming wood based products with moisture content >15%
- Define need or otherwise for kitchens and bathrooms to include a waterproof membrane on floors and behind tiling and high risk areas such as showers
- Define the process by which membranes are fixed and lapped particularly at corners of modules
- Define the basis upon which the end grain of CLT is protected as applicable
- Water proofing layer to be applied in the factory prior to despatch
- Design to facilitate windows replacement without damaging the waterproof membrane
- Ensure effective protection of panels/ modules during transit
- A moisture management plan for site shall be developed:
- Moisture levels of modules/panels shall be tested at a defined frequency and location prior to the application of cladding and roofing systems
- Design shall ensure gaps between modules and relative movement between modules is accommodated by the waterproofing membrane to prevent damage and water ingress.
- The extent, nature and applicability of all water proofing methods, systems and product warranties validities shall be confirmed and understood.

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