

UNIVERSITY COLLEGE CORK

Establishment of a Multi Supplier
Framework of Construction
Consultancy Services for Small &
Minor Projects for the Buildings &
Estates Office, UCC

Capital Projects Office

Schedule of Stage Services for
Mechanical & Electrical Engineering



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Document Revisions

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1.0 INTRODUCTION

This Schedule of Services has been developed to ensure that University College Cork (hereinafter called UCC) service requirements for the completion of the commission are clearly understood by the service provider and is mutually agreed between UCC and the service provider.

The schedule has been developed in a generic format to facilitate its use for all UCC capital developments and while the schedule has been developed to be a comprehensive statement of the service requirements of UCC the service provider must ensure that all necessary actions normally required for the completion of the commission are included for in their proposal.

Any conflicts between this Schedule of Services and the partially complete Schedules A & B or any other information issued by UCC should be immediately brought to the attention of Capital Projects Office.

The Capital Projects Office Design Team Procedures apply to all to all design team members, regardless of whether they are part of a single point design team, an integrated design team or directly procured by UCC.

Where the commission relates to a single point design team appointment, the term Integrated Design Team Lead (IDTL) shall be replaced with Design Team Lead, and Integrated Design Team (IDT) with Single Point Design Team.

This document is to be read in conjunction with the following documentation:

- UCC's Capital Projects Office Design Team Procedures,

1.1 CLIENT

For this commission the client is "*University College Cork*"

1.2 CONTRACTUAL ARRANGEMENTS

For this commission the client shall appoint single point design team and Section 1.2.2 below applies.

1.2.1 Integrated Design Team (IDT)

The Client shall appoint an integrated design team ("the Design Team") comprising of the following principal service providers (PSP).

- Architect and associated specialist skills providers
- Civil & Structural Engineer and associated specialist skills providers
- Mechanical and Electrical Engineer and associated specialist skills providers
- Project Supervisor Design Process.

A principal service providers may be requested to provide a specialist skills provider (SSP), as described in the Suitability Assessment Questionnaire and ITT. A PSP may provide these services as in-house or

engage the services of an external consultant. Where an external consultant is used to provide these services, then the PSP shall enter into a sub-consultancy agreement with their respective specialist service. These agreements are to be furnished to UCC prior to completion of Stage 1. A Collateral Warranty will be completed between the Employer and all sub consultants using model form 2.3 latest revision.

UCC reserves the right to withhold payment of services until the executed Collateral Warranty and Sub-consultant agreements have been received by UCC.

In most cases, the Architect will be nominated as the integrated design team lead (IDTL), however for civil engineering projects, the Civil & Structural Engineer may be nominated as the design team lead and will be clearly defined in the Definitive Project Brief.

Each member of the Integrated Design Team shall enter into a direct contract with the Client under their respective Conditions of Engagement, but all parties shall operate as an Integrated Design Team, collaborating and coordinating their services in accordance with these integrated design team procedures, the relevant schedule of services and all other contract documents.

The IDTL shall also be responsible for coordinating and integrating the work of any other consultants appointed directly by the Employer who are not members of the Integrated Design Team, including but not limited to:

- Quantity Surveyor,
- Carbon Co-ordinator,
- Energy Efficient Designer; or
- Any other such consultants engaged by the Client for the Project.

The IDTL's role in managing these additional consultants shall include:

- Programme and Interface Management: Ensuring alignment of deliverables and design information with the Integrated Design Team,
- Information Coordination: Incorporating their outputs into the overall design and documentation; and
- Communication Management: Acting as the primary point of coordination between such consultants and the Integrated Design Team.

The Integrated Design Team shall collectively adopt and implement an Integrated Working Protocol, covering:

- Agreed procedures for design coordination,
- Common Data Environment (BIM),

- Risk management processes,
- Collaborative decision-making and reporting structures; and
- Regular coordination meetings.

Each integrated design team member remains responsible for the performance of their own services under their Conditions of Engagement, including compliance with Building Control (Amendment) Regulations 2014 and all statutory obligations.

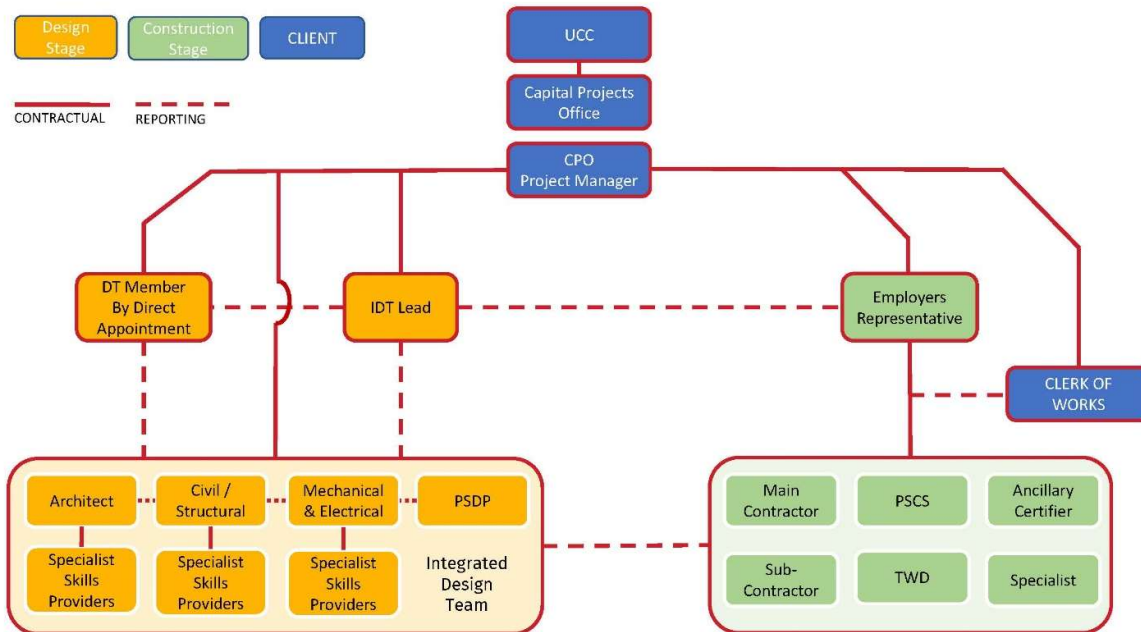


Figure 1.2.1 Integrated Design Team Reporting Structure

1.2.2 Single Point Design (SPDT)

The employer will enter into a contract with the Design Team Leader who is identified as the Architect for this project. The Architect will enter into a sub consultancy agreement with the other consultants i.e. Civil & Structural Engineer, Mechanical & Electrical Engineer, Quantity Surveyor, PSDP, ER, Design Certifier, Assigned Certifier etc.

These agreements are to be furnished to UCC prior to completion of Stage 1. A Collateral Warranty will be completed between the Employer and all sub consultants using model form 2.3 latest revision.

UCC reserves the right to withhold payment of services until the executed Collateral Warranty and Sub-consultant agreements have been received by UCC.

Where identified in the Definitive Project Brief, some disciplines may not form part of the single source provider and shall be procured by direct appointment by UCC. In this instance the Design Team Lead and all other design team members shall accept this discipline as an active member of the overall Design Team.

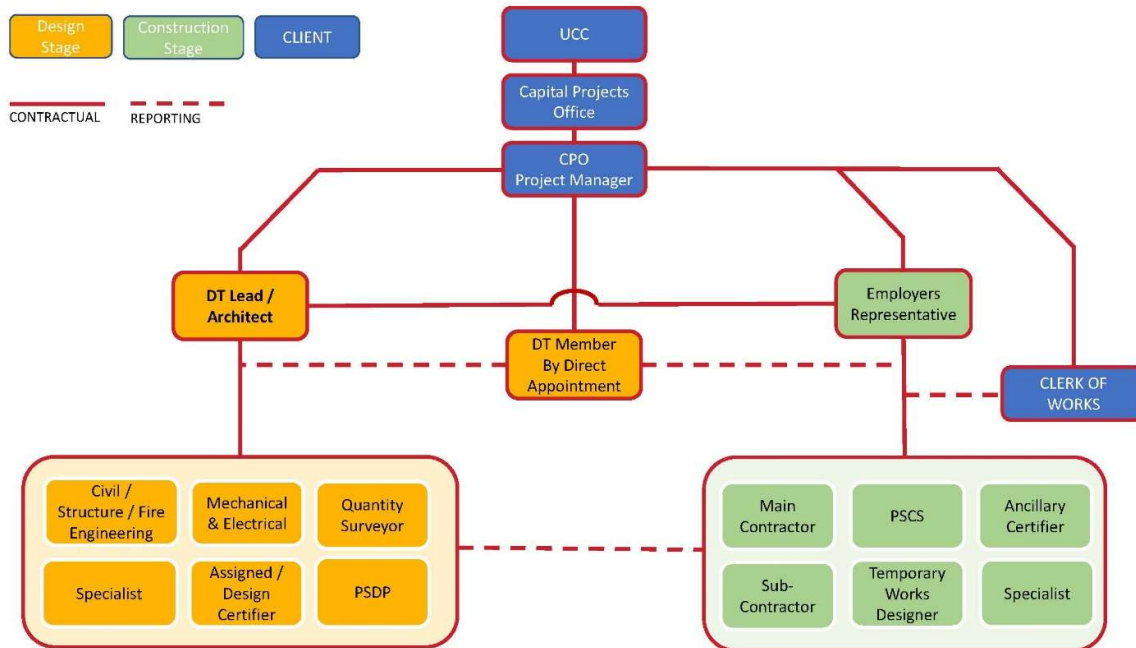


Figure 1.2.2 Single Point Design Team Reporting Structure

1.3 THE SCOPE OF SERVICES

The terms of engagement for design team members are the Office of Government Procurement Standard Conditions of Engagement current at the time of the appointment. (available at <https://constructionprocurement.gov.ie/standard-conditions-of-engagement/>)

The scope of services is as set out in this document and is to be read in conjunction with all other schedule of services for each discipline.

The scope of service includes all work required to design and construct the project in a competent and professional manner (whether expressly stated or not); prepare all documentation and reports required by these procedures; obtain all necessary approvals whether UCC or statutory approvals, all in accordance with the above documents or as otherwise modified by the briefing information. All work required to comply with the Building Control (Amendment) Regulations 2014 is included in the scope of service, including the roles of Design Certifier and Assigned Certifier to be carried out by the Design Team Leader

Consultation with UCC and UCC's end users is an on-going process during the stages and is included as part of the Service. In particular, the service includes for repeat submissions (where required), meetings and such other communications as may be needed to complete the Project or Stage.

The design team is responsible for the printing, reproducing or purchasing of all documents, drawings, maps, photographs and other records for the proper performance of the service.

Delays caused by the main contractor resulting in prolongation of the contract are not a cause for additional fees in accordance with the Conditions of Engagement.

1.4 BUILDING SERVICES.

The building services referred to in this Schedule are generally, but not limited to the design, specifications, certifications and sign off from the following:

- Building Regulations Technical Guidance Documents,
- Safety, Health and Welfare Act 2005,
- Safety, Health & Welfare at Work (Construction) Regulations 2006,
- EN 81-20 and 81-50 Vertical transport,
- CIBSE Guides, Codes and Technical Memoranda,
- Local Authority / County Council Bylaws,
- Fire Officers Recommendations,
- Relevant BS & EN Standards,
- I.S. 426:2014 – Energy Efficiency Regulations,
- IS10101 – National Rules for Electrical Installations,
- I.S. 3218:2013 - Fire detection and alarm systems for buildings,
- I.S. 3217:2013 - Emergency Lighting Standard,
- UCC SOP's,
- Room Data Sheets,
- ISO 7396-1 Medical Gas Pipeline Systems,
- HTM Guidance Documents,
- HBN 13 Sterile Services Department,
- BEMS, Building Energy Management Systems,
- Distribution mains (power, gas and communications etc) for any Building Services but excluding associated civil works,
- Assist the Design Team on Drainage Systems above ground only (in conjunction with below ground drainage Design by Structural Engineer),
- Advise the Design Team on mechanical systems for rainwater harvesting and building irrigation systems,
- Acoustic and vibration performance specification of mechanical and electrical equipment,
- Incoming Statutory/Utilities supplies, (in conjunction with Structural Engineer),
- In conjunction with other members of the Design team, provide input into formation of Security strategy,
- Refuse Collection and/or disposal system including compactors to capacities specified by the Client or others. (The development of a Waste Disposal Strategy for the building is not included),

- Engineering services to security installations and systems designed by others,
- Engineering services to window cleaning and equipment supplies,
- Lifts, Hoists and Escalators,
- Engineering Services to food Preparation, Cooking and Serving Equipment in Restaurants, Cafes or other Food Preparation areas,
- Fire Detection and Alarm Services (including fireman's voice communication and remote control),
- Smoke Control in consultation with Fire Safety Engineer and Architect,
- Fire Suppression Systems,
- Fire Protection Services,
- Sprinkler systems,
- IS 291 - Fire Extinguisher,
- IS 3218 – L1 Fire Alarm Systems,
- Electrical Sub-stations and interface with utilities,
- Lightning Protection Systems to EN62305 standard,
- Earthing,
- Clean Earthing in Comms Room,
- Surge Protection Systems EN62305 standard,
- Standby Generation & Associated Controls if required,
- Uninterrupted Power Supplies,
- Electrical Distribution Services,
- Electric Lighting and Power Installations, including Lighting Fittings (in conjunction with the Architect),
- Street/External Lighting, taking cognisance of UCC's Biodiversity Plan & 'Dark Sky Policy',
- Lighting Control Systems,
- Emergency Lighting Systems,
- Emergency Lighting Systems, both internal and external to the building on emergency escape routes and assembly locations,
- Façade Lighting,
- Smoke extract systems,
- Clock Installations,
- Data and Voice Cabling Systems,
- Services to Cable, Radio and Television Infrastructure in Conjunction with UCC Audio Visual Unit,

- Services and Design of Passive Elements Telephone Equipment and Distribution Services including Services in conjunction with (UCC) Specialist IT/Data/Telecommunications Department),
- Services to Information Technology and Data (in conjunction with UCC Computer Centre). Integration and Co-Ordination to be responsibility of the Building Services Engineers in Consultation with Sub-Contractors,
- Access Control,
- Services to and via Elements of Security and Access Control Systems,
- Public Address, Personnel Location and Call Services,
- Audio Visual Media Services,
- Voice Alarm and intercom systems,
- Disabled toilet alarm systems,
- Disabled refuge communications systems,
- Leak Detection Systems,
- Heating, Ventilation, Air Conditioning and associated Mechanical and Electrical Services,
- Mechanical Ventilation Services,
- Cold Water Services,
 - MWS - Mains Water Services,
 - CWS - Cold Water Services,
 - Potable Water Services,
 - RO Water,
 - DI Water; and
 - ECA Water.
- Hot Water Services,
- Public Health and Plumbing Services including incoming Services and Water (Legionella),
- Humidification / Dehumidification Systems,
- Generating Plant Installations,
- Space Heating Installations,
- Boiler Plants and Auxiliaries,
- Exhaust Gas Treatment and Flues,
- Fuel Gas Incoming Supply and Distribution,
- Calorifier Plant,
- Chiller Plant & associated pipework,
- Refrigeration installations and Cold Stores, if required,

- Steam Services and Condensate return services, as required,
- Heat loss calculations to facilitate Thermal Insulation design; and
- M&E Labelling and Signage.

1.5 BREEAM

The BREEAM rating for the project is as per that stated in the Definitive Project Brief, if no such rating is provided, then a BREEAM “Excellent” building shall be provided.

The Lead consultant for the delivery of BREEAM shall be the Mechanical and Electrical Consultant; however both the architect and civil & structural engineers shall have significant input into the BREEAM process and shall assist the M&E consultant (or any agent engaged by the M&E Consultant with respect to BREEAM) in all aspects of delivering a BREEAM “Excellent” building throughout all stages of the project.

The Lead M&E Consultant shall include for all services, specialist or otherwise to deliver a BREEAM "excellent" building, including design, inspection, testing and commissioning throughout all stages of the project, including producing any reports necessary.

This will include but not limited to:

- A qualified Advisory Professional (AP) as defined in “BREEAM Professionals – A guide to Understanding their Roles”,
- Specialist Commissioning Manager,
- Seasonal Commissioning,
- Sustainability Champion for Design and Monitoring Progress,
- All necessary reports required to provide a BREEAM “Excellent” building; and
- All team members involved in the delivery of BREEAM i.e. Mechanical and Electrical Consultant; Architect and Civil & Structural Engineers shall jointly complete a Gap Analysis prior to the team’s tender submission to ensure all required services associated with the delivery of BREEAM are covered in the overall Fee bid.

Any additional fee claims for services, reports or otherwise related to the delivery of a BREEAM rated building will not be considered, and all consultants are reminded to ensure that they have fully included for the delivery of a BREEAM rated building as part of their tender price.

1.6 WHOLE LIFE CYCLE COSTING

The scope of services includes the provision of comprehensive Whole Life Cycle Costing (WLCC) data and analysis for all major M&E systems throughout all project stages in accordance with the Capital Works Management Framework (CWMF), the International Cost Management Standard (ICMS 3), and the Public Spending Code. This includes:

- Strategic WLCC assessment to inform M&E system selection (Stage 1)

- Component-level WLCC analysis for value management (Stage 2a)
- Final WLCC report and tender evaluation support (Stage 2b)
- WLCC monitoring during construction (Stage 4)
- Operations and Maintenance WLCC Manual at handover (Stage 5)

The M&E Consultant shall work collaboratively with the Quantity Surveyor and Carbon Co-ordinator to ensure integrated WLCC analysis and reporting throughout the project lifecycle. All WLCC data shall be provided in formats compatible with Arm 5 & ICMS 3 and the CWMF Cost and Carbon Template.

2.0 PROJECT MANAGEMENT AND CO-ORDINATION

2.1 DESIGN TEAM LEADER

The design team leader is the Architect, unless otherwise noted in the Definitive Project Brief.

The following duties apply to the Design Team Leader (for all Stages) in addition to the duties relevant to his/her professional discipline:

- Overall Management / Co-ordination of Project Stages and Programme including ensuring that any information, communications and/or Stage Submissions are channelled through the Design Team Leader.
- Chair and record Design Team Meetings, Site Meetings, third party and stakeholder meetings as necessary.
- Prepare and submit monthly reports on progress, quality, cost and Health & Safety in relation to the development with the assistance of the other Design Team members in such form as UCC may reasonably require.
- Ensure that the Design Team comply with UCC procedures and SOP's as they may apply to building design and construction to include fully co-ordinated plans, room data sheets and elevations of all rooms.
- Develop and provided fully co-ordinated room data sheets for each room to the level of detail as outlined in examples provided in Appendix A, Room data sheets are to identify and locate all fixture and fittings placed on the walls, floors, ceilings and reflected ceiling plans, but also all fixed and loose furniture. In addition, all M&E equipment within ceiling and wall voids are to be indicated ensuring that access hatches are located such that all necessary plant that needs to be maintained can be easily accessed. The room data sheets are to be extracted from the fully co-ordinated federated BIM model, where BIM is a requirement of the project.
- The Design Team Leader is responsible for reviewing all documentation (from whatever source or discipline), carrying out a quality check on that information and ensuring that all drawings and documents are co-ordinated between the disciplines.
- The Design Team Leader must also ensure effective communications between the relevant DT disciplines, and, where such communications or responses are not effective, implement corrective action including (if required) UCC notification.
- In addition, the Design Team Leader is required to act as Design Certifier and Assigned Certifier in accordance with the requirements of the Building Control (Amendment) Regulations 2014 and the associated Code of Practice for Inspecting and Certifying Buildings and Works.
- The Design Team Leader shall monitor and review the progress of the project in line with the approved project program and budget and shall report any divergences, with recommendations to mitigate any further deviations to the employer. The design team leader in conjunction with design team members shall ensure that inflation is accounted for in their design and budget management.

- The Design Team Leader shall monitor and review the progress and performance of its design team and report any divergences, with recommendations to mitigate any further deviations to the employer.
- The Design Team Leader is also responsible for ensuring compliance with UCC's Schedule of Services, for all disciplines. Refer to the following Schedule of Services for the following roles:
 - Civil & Structural Engineering Services.
 - Fire Engineering Services.
 - Mechanical & Electrical Engineering Services.
 - Quantity Surveying Services.
 - Project Supervisor Design Process (PSDP).
 - Employers Representative.
 - Information Manager (BIM Only).
 - Planning Consultant (Project Specific).
 - Other Specialist Service Providers (refer to DPB).
- For the construction period the Design Team Leader will act as UCC's representative in line with schedules A & B of the Standard Conditions of Engagement. The Design Team Lead must ensure that the completed design meets the budgetary requirements. The Design Team Lead must ensure that the completed design of the project fulfils the programme requirements.

2.2 OTHER DESIGN TEAM MEMBERS

The other Design Team members are responsible for all work (relevant to their discipline) required to design and construct the project in a competent and professional manner (whether expressly stated or not).

The other disciplines are required to co-operate with each other and the Design Team Leader and provide (in a timely manner) all information and documentation needed to permit the other disciplines to complete their work.

All Design Team members are also required to review, quality control and co-ordinate all information and Stage documentation with other DT members and ensure compliance with each discipline's UCC's Schedule of Services.

In addition, all Design Team members (with the exception of the Quantity Surveyor), including any sub-consultants that may be employed and relied upon for elements of the design, will be required to provide ancillary certificates for the elements of work for which they are responsible in accordance with the requirements of the Building Control (Amendment) Regulations 2014.

A member of the team will be required to fulfil the role of Employers Representative (ER) for the project in accordance with the requirements of the CWMF. The role of the ER is a dedicated role and the individual must not have any other function (design or otherwise) for the project. The ER can be independent of the other members of the design team i.e. a separate individual or company or can be

chosen from within one of the participating team members. The role of ER should be fulfilled by the same candidate for stages i to v.

2.3 WHOLE LIFE CYCLE COSTING CO-ORDINATION RESPONSIBILITIES.

- Provide timely M&E component data to the Quantity Surveyor for WLCC analysis at each project stage in accordance with the detailed requirements set out in Sections 3.1.12, 3.2.4, 3.3.6, 3.5.7, and 3.6.2.
- Participate in WLCC coordination meetings with the Quantity Surveyor and Carbon Co-ordinator at key project milestones:
 - End of Stage 1 (Strategic WLCC Assessment),
 - Mid Stage 2a (Component-level WLCC development),
 - End of Stage 2a (WLCC Analysis Report review),
 - Mid Stage 2b (Final WLCC Report preparation),
 - End of Stage 2b (Pre-Tender WLCC finalization),
 - Post-tender (WLCC update based on accepted tender),
 - Monthly during Stage 4 (WLCC monitoring); and
 - Pre-handover (Final WLCC documentation review).
- Review and validate Quantity Surveyor's WLCC reports for M&E accuracy (costs provided by M&E consultant in the first instance) including:
 - Verification of M&E component costs, design lives, and replacement costs,
 - Verification of energy consumption and cost projections,
 - Verification of maintenance cost estimates,
 - Verification of embodied and operational carbon data; and
 - Prompt notification of any errors or discrepancies.
- Coordinate with Carbon Co-ordinator throughout all stages on:
 - M&E embodied carbon data provision (EPDs, carbon factors),
 - M&E operational carbon projections (energy consumption and fuel types),
 - Low carbon M&E material and system options,
 - Whole life carbon optimization strategies,
 - Population of CC1 Template (M&E sections); and
 - Carbon reporting requirements.
- Provide M&E data in formats specified by Quantity Surveyor and Carbon Co-ordinator:
 - ICMS 3 cost breakdown structure,
 - CC1 Template compatible format,

- NPV calculation inputs with clear assumptions,
 - Energy modelling outputs compatible with WLCC cashflow modelling; and
 - Component asset registers compatible with CAFM systems (COBie, IFC, etc.).
- Maintain clear audit trail of all M&E WLCC data provided:
- Document all assumptions and their sources,
 - Retain all manufacturer quotations and data sheets,
 - Retain all calculation files (energy models, spreadsheets, etc.); and
 - Provide copies to Quantity Surveyor and UCC upon request.

3.0 STAGE SERVICES

3.1 STAGE 1 – PRELIMINARY DESIGN

3.1.1 Co-ordination of the Project Stage.

- Assist in co-ordinating design team members and provide all information as necessary for stage completion.
- Assist in reviewing, quality control and co-ordinating all information and stage documentation with other Design Team [DT] members and ensure compliance with UCC's Design Team Procedures.
- Design Team Lead in conjunction with DT members to discuss and outline the principles of integrating the Building Services within the building structure and finishes, including agreement on distribution routes for service runs, "soft spots" and cross over zones within the building.
- Provide the UCC appointed Project Manager with sufficient notice for all UCC required approvals, decisions on matters that require any action by UCC, and where appropriate, assist UCC by providing recommendations and options.
- Within one month of appointment, the design team lead shall prepare and submit to UCC a detailed and comprehensive **Responsibility Matrix**, (with contributions from all design team members) which will identify all significant individual and collective responsibilities for the safe and efficient delivery of the project.
- Prepare and co-ordinate all drawings in a software format this is compatible and allows the Design Team or UCC to provide clean drawings without additional cost.
- Allow for responding to all UCC queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.

3.1.2 Design Team Meetings and UCC Consultation

- Allow for fortnightly (more if required) UCC consultations meetings (by Senior or Director) on site including travel time & expenses:
 - initial consultation to review brief and programme or work,
 - prior to developing sketch designs; and
 - to discuss and agree draft report.
- Allow for fortnightly Design Team Meetings on site to coincide with UCC meetings.
- Allow for at least 3+ brainstorming sessions with the Design Team and UCC.
- Allow for all other meeting as required in the UCC Meeting Matrix.
- Include for repeat consultation as above for all material changes to the design or Stage 1 report (other than substantive UCC changes to brief).

- Allow for 10No. design consultation meetings with the UCC and the End-User groups. A summary Charette exercise will be required. UCC and the End-Users will need a reasonably extensive initial design critique approach in this consultation.

3.1.3 Review Brief

- Validate all briefing and supplementary information (from whatever source) including Health and Safety Risk Assessment and Project Viability Assessment.
- Where the project involves expansion or refurbishment of an existing building(s), carry out a full and detailed review of all relevant existing information that UCC makes available to the design team. All information in relation to the existing building is to be verified by visual inspection for accuracy.
- The visual inspection should also be carried out in all attic void spaces, above all suspended ceiling, if applicable and in basement & roof plantroom.

3.1.4 Site Investigation

- In conjunction with the Civil / Structural and Fire Engineer, input into the preparation of the Geotechnical Site Investigation to determine the suitability of the site for a geothermal heating and cooling system.

3.1.5 Surveys

- In conjunction with the Design Team Lead, identify areas of opening up to establish the following:
 - Depth of Existing services zones within existing buildings,
 - Identifying and trace of all existing mechanical and electrical services,
 - Identifying suitable routes for all new mechanical and electrical services and ensuring that there is adequate space within the service zone to facilitate same,
 - Liaise with the Design Team to identify a strategy with respect to existing fire compartments where it is proposed to pass mechanical and electrical routes through,
 - Liaise with the Design Team to identify a strategy with respect to protected structures and structures of conservation importance where it is proposed to pass mechanical and electrical routes through; and
 - Identify all mechanical and electrical services that will be made redundant as a result of the works.
- Survey the existing mechanical and electrical installation where refurbishments are to take place to ensure that sufficient information on existing services is available to allow for accurate detailed design.
- Assess the capacity of the existing system to accommodate the design where refurbishments are to take place.

- In conjunction with the Civil, Structural and Fire Engineer, input into the preparation of the below ground utility survey to accurately establish the location and depth of all existing utility services.
- Assist the Civil, Structural and Fire Engineer in locating the site services externally below ground level and ensuring that the utility services provide separation distances are maintained.
- Allow for a full walkdown / Tracing of existing services assisted by UCC's Engineering Services Department.

3.1.6 Undertake a Suitability Assessment of Site & Location(s)

- Prepare and provide written evaluation of all possible locations on site (with evaluation criteria clearly indicated and applied to all the options)

3.1.7 Evaluation of Existing Building(s)

- Where the project includes the evaluation / assessment of one or more existing building(s), or where a Schedule of Alterations to existing Accommodation and/or a provisional Schedule of essential Remedial Works is provided with the brief, the Design Team must make a careful evaluation/detailed inspection and viability assessment of those existing building(s) identified in the Brief and in particular the elements requiring remedial works.
- The scope of works to the existing building should be the minimum required to comply with current regulations and to provide a safe, durable educational facility.
- Compile detailed accurate information of the existing building(s) and their systems and include for all relevant surveys and recommendations and procurement of any opening up works required (refer section 3.1.5 Surveys).
- Where project involves expansion or refurbishment of existing buildings, carry out a full and detailed review of all relevant existing documentation that UCC makes available to the design team. Undertake as necessary any opening up works to verify the content of this information and to ensure the design is a true reflection of the existing mechanical and electrical services to the building. UCC reserves the right to recoup additional costs (including consequential costs) arising during the construction stage from the Design Team failure to verify existing information from the Design Team and/or their Professional Indemnity insurance.

3.1.8 Local Authority & Third-Party Consultation

- Liaise with all utility services providers to establish all services within the site and the surrounding areas.
- Assess the power requirements of the building(s) and liaise with the utility supplier for local available power. In the event of local power not being readily available, liaise with the utility provider on behalf of UCC to ensure adequate supply is provided to meet the requirement of the building(s).
- The M&E Consultant shall submit the Load Schedule and submission details to UCC's Engineering Maintenance and Utilities Department for approval prior to any power supply application to ESB Networks.

- Liaise with all utility services providers to establish existing capacity and any spare capacity to meet the needs of the proposed building(s).
- Consult with all third parties, including all adjoining landowners and those with easements across the site, on matters of principal in connection with the civil structural design of the project and negotiating all necessary consents.
- Advise UCC on any agreements, leases and consents necessary for the installation, removal and / or relocation of their services and for the provision of supplies.
- Assist in negotiating all approvals, agreements, leases and necessary consents with the statutory undertakers.
- Prepare any special drawings, or technical information for use of UCC or as required in connection with the approvals and consents or for negotiations with adjoining owners, public authorities, licensing authorities, financing bodies and others and in relation to land dedications and road widening schemes.
- Assist UCC to ensure that advance orders are placed with local and statutory authorities and utility service providers as necessary so that completion of the design is not reasonably delayed.

3.1.9 Benchmarking Visits

- Identify relevant similar projects in conjunction with the UCC's appointed Project Manager and visit with UCC as required to develop a fuller understanding of the UCC's and the End-Users requirements.
- Allow for a 2-3 day mainland Europe for a design benchmarking trip to view similar buildings / facilities. Please note that the Design Team lead will determine which disciplines will attend the benchmarking trip with all costs incurred to be included with the Form of Tender & Schedule Price. The Design Team led is to also include all associate travel and accommodation costs for three UCC personnel.

3.1.10 Preliminary Sketch Designs

- Develop the brief through full engagement with UCC's project manager, all identified end-user, relevant stakeholders and other DT members.
- Develop a flexible phasing strategy for the implementation of the development.
- Assist with the preparation of feasibility reports and all other necessary works.
- Analyse and develop UCC's & End-Users requirements. Carry out studies as may be necessary to determine the feasibility of the UCC and End Users Requirements. Advise on and analyse UCC's & End-Users internal requirements to ensure a properly functioning building for UCC & End-Users current business operations and intended / potential future use.
- Undertake the mechanical and electrical design of the development with sustainability and maintainability as the key drivers.
- Develop initial proposals and alternative options for UCC's consideration.

- Identify the most appropriate locations for services.
- Collaborate with Design Team (DT) members in considering, investigation and reporting the available range of options affecting:
 - Built form, including size, shape, orientation, sub-division, shading, weather and noise protection etc.
 - Construction Standards, including glazing ratios, thermal and noise insulation, thermal capacity, natural and artificial illumination, ventilation.
 - Building services and components including heating, hot water, cooling, ventilation, lighting, communications, lift or transportation equipment and public health systems, their operation relationships, methods of control and means of energy supply, distribution and recovery.
- Prepare preliminary sketch design (in consultation with other DT members). Assess and record cost implications (in consultation with QS). Carry out H&S risk assessment.
- Assist the DT lead in ensuring that the completed design of the project fulfils the programme requirements.
- Repeat above design process indefinitely (other than for substantive UCC changes to brief) until design meets UCC's Brief and schedule of services requirements.
- Value Engineering if required to keep the project within approved budget in consultation with UCC representatives without compromising on performance.
- Identify specialist's sub-consultancy packages.
- Phasing
 - Where phasing is a requirement of the project, develop a feasibility study for all phases of the development, including a priority list of works for all phases; and
 - Allow for all enabling works packages.
- Assist in recommending project execution strategy, involving phasing, programme, form of contract and method of contract procurement to provide satisfactory completion of the development at or below the approved cost limit and within the approved time periods identified.
- Advise on all contractual matters that arise during this stage.
- Assist the Architect in developing a constructability report with the assistance of the other Design Team members and present to the UCC.
 - Review with UCC alternative design and construction approaches and cost implications and include within Stage 1 report.
- Undertake Designers Assessment of Risk with respect to the Health and Safety Construction Regulations.
- Carry out benchmarking studies on specific Building Services Engineering elements of the design.

- Ensure the Mechanical and Electrical design conforms to the requirements of UCC Standard Operating Procedures.
- Prepare any application in achieving grant funding for sustainability on behalf of UCC.
- Workshop Design Review meetings with UCC's Engineering Maintenance Department.

3.1.11 Cost Management

- Assist in the preparation of an order of magnitude cost to define the design scope in line with funding.
- Identify and cost all abnormal works:
 - Review, mitigate and fully justify each item and its cost in consultation with other D.T. members.
- Provide schedule of changes, if required to ensure that the design is within the approved Cost Plan and on Programme.
- Assist in cost checking of the Design against the cost plan and provide all necessary information.
- Assist the DT Lead / Quantity Surveyor to prepare monthly report on progress, quality, cost (in conjunction with QS for both Capital and Life Cycle Costs) and health and safety in relation to the project with the assistance of the other DT members in such form as UCC may reasonably require.
- Provide detailed M&E cost breakdown to Quantity Surveyor in format compatible with ICMS 3 structure, including but not limited to:
 - Substructure services,
 - Superstructure services,
 - Internal finishes (M&E related),
 - Fittings, furnishings and equipment (M&E related),
 - Services (by major system: HVAC, electrical, plumbing, fire protection, communications, transport systems),
 - External works services; and
 - Facilitate contractor obligations (M&E related).

3.1.12 Whole life Cycle Costing

- Collaborate with the Quantity Surveyor and Carbon Co-ordinator to establish strategic WLCC parameters for all major M&E systems and options under consideration.
- Provide high-level data for all major M&E systems option comparison including:
 - Indicative capital costs for each system option,
 - Estimated design life for major plant and equipment (e.g., boilers: 25 years, chillers: 25 years, AHUs: 20 years, lighting: 15 years),

- Preliminary energy consumption estimates (kWh/m² GIA per annum) for each option,
- Indicative maintenance regime (reactive vs. planned preventative); and
- Replacement cycle assumptions for major components.
- Identify key WLCC drivers for all major M&E systems including:
 - System complexity vs. maintainability trade-offs,
 - Energy performance standards (NZEB, Passive House, etc.),
 - Equipment accessibility for maintenance,
 - Standardization vs. bespoke solutions; and
 - Renewable energy integration costs and benefits.
- Provide preliminary energy modelling data including:
 - Estimated annual energy demand by fuel type (electricity, renewables),
 - Heating and cooling load calculations,
 - Preliminary carbon emissions (kgCO₂/m² per annum); and
 - Peak demand projections.
- Support the Quantity Surveyor in developing the WLCC Strategic Assessment Report by providing:
 - M&E system option comparison matrix with WLCC implications,
 - Key assumptions for M&E component life cycles,
 - Energy cost projections at current rates; and
 - Maintenance cost estimates as percentage of capital cost.
- Identify M&E-specific sustainability measures with WLCC implications:
 - Renewable energy systems (PV, solar thermal, ground source heat pumps, biomass),
 - Energy recovery systems (heat recovery, thermal wheels),
 - High-efficiency plant vs. standard specification,
 - Building Management System (BMS) sophistication levels; and
 - LED vs. alternative lighting systems.
- Provide data sources and benchmarking information:
 - Similar project energy consumption data (kWh/m² per annum),
 - Industry standard maintenance costs (CIBSE TM44, manufacturer data),
 - Equipment replacement costs from suppliers/manufacturers; and
 - Energy tariff assumptions and escalation rates.
- Assist in preparing WLCC sensitivity analysis for all major M&E systems:
 - Impact of ±25% energy price escalation,

- Impact of $\pm 15\%$ maintenance cost escalation; and
- Impact of $\pm 20\%$ component design life variation.
- Calculate key M&E ratios for WLCC assessment:
 - M&E capital cost as % of total project cost,
 - Estimated M&E operating cost per m² GIA per annum,
 - Estimated M&E energy cost per m² GIA per annum; and
 - M&E maintenance cost as % of M&E capital cost.
- Document all assumptions, exclusions, and limitations in WLCC data provision for Stage 1.
- The M&E Consultant shall support the Carbon Co-ordinator throughout this stage with M&E-specific reporting requirements associated with Whole Life Carbon and Life Cycle Costing in line with the Requirements of ICMS.

3.1.13 Risk Register

- Within one month of the appointment, the design team lead shall prepare a detailed and comprehensive **Risk Management Plan**, (with contributions from all design team members) which will identify all significant risks associated with the project, analyse / rate the risks, set out proposals to manage the risks and set out plans to review the risks.
- The Design Team lead shall assist UCC in developing appropriate risk management strategies for dealing with and managing risk throughout all stages of the project. The Risk Management Plan shall examine all risks that could affect the projects safety, cost, programme or quality. Each risk is to be rated and scored, assigned an owner and provided with a mitigation strategy to minimise its impact on the project. The Risk Management Plan shall be updated on a two-monthly basis or at shorter intervals as determined by UCC should the project needs dictate shorter intervals.

3.1.14 Health & Safety

- Ensure that the mechanical and electrical design fully complies with the requirements of the Safety, Health and Welfare at Work (SHWW) (Construction) Regulations 2006. The SHWW (General Applications) Regulations 2007, SI 299 of 2007 and the SHWW Work Act 2005, compliance with the SHWW (Construction) Regulations 2013 and any other relevant Health, Safety and Welfare Legislation in force at the time of the commission.
- Update the Designers Assessments of Risk for this stage and submit to the appointed PSDP.
- Take account of the UCC's Health & Safety Building in Use questionnaire.
- Take account of UCC's Standard Operation Procedure 18 in determining the buildability of the project and ensure that all tendering contractors are aware of their obligations under SOP 18, and all other UCC Standard Operating Procedures.

3.1.15 Stage 1 Report (including repeat submissions as required)

- Mechanical and Electrical Input into the Stage 1 Report.

- Assist the Design Team Led to fulfil his duties in co-ordination and preparation of the Stage 1 Report.
- Signed Stage Completion Certificate.

3.1.16 Pre-Stage 1 Stakeholder Meeting

- Attend Pre-Stage 1 Stakeholder Meeting in University College Cork, or an alternative local as chosen by UCC.
- Repeat for each revised Stage 1 submission (if required) resulting from non-compliance by the Design Team as a group with area and cost limits, (excludes substantive UCC changes to the brief).

3.2 STAGE 2A – DEVELOPED DESIGN

3.2.1 Co-ordination of Project Stage

- Assist the Design Team Leader to ensure co-operation of Design Team to provide all information necessary for Project Stage.
- Assist the Design Team Leader in reviewing, quality control and co-ordinating all information and Stage documentation with other DT member and ensure compliance with this design team procedures and scope of services.
- Review any implications for the proposed design arising from any Building Control Amendments, transition periods or proposed future amendments.
- Provide the UCC appointed Project Manager with sufficient notice for all UCC required approvals, decisions on matters that require any action by UCC, and where appropriate, assist UCC by providing recommendations and options.
- Assist the DT lead and ensure integration of designs of the other members of the Design Team.
- Prepare and co-ordinate all drawings in a software format this is compatible and allows the Design Team or UCC to provide clean drawings without additional cost.
- Allow for responding to all UCC queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.

3.2.2 Developed Sketch Design

- Develop the mechanical and electrical design scheme from Stage 1 approval (and agreed amendments) and UCC requirements with sustainability and maintainability as the key drivers.
- Assess H&S hazards and risks for developed Sketch Scheme.
- Assist the Architect in developing a basis of design document in a format agreed with UCC.
- Assist the Architect in preparing a Procurement Strategy for all Works Contractors.
- In conjunction with UCC's Project Manager (if appointed) and other design team members, obtain any agreements, leases, consents for the installation, removal and / or relocation of their service and for the provision of supplies.
- Where part of brief, develop proposals for work to existing buildings within the area and cost limits agreed.
- Meet with user groups and other stakeholder's as necessary to fine tune and sign off on the design as it progresses.
- Assist the DT lead in the preparation of a constructability report.
- Assess and prepare schedule of power, heating and cooling loads as applicable and agree insulation standards with the Design Team for the proposed works only. Review and update as necessary the considerations affecting the selection of energy sources.

- Advise on the integration of Building Engineering Services within commissioning or selection of the furniture and fittings for the project.
- Allow for phased hand overs and enabling work packages.
- Preparation of a quality assessment.
- Provide schedule of changes, if required, to ensure that the design is within the approved Cost Plan and on Programme.
- Review the design and location of Plant, equipment, electrical containment and ventilation systems with UCC Engineering Services Department to ensure future maintenance can be carried out safely and efficiently.
- Assist in cost checking of Design against Cost Plan and provide all necessary information to allow Quantity Surveyor to complete accurate Cost Plan.
- Advise on all contractual matters arising from this stage.
- Location of Fire Extinguishers needs to be “designed” {i.e. not left to the Vendor of Extinguishers to figure out} & both the design and the equipment needs to comply with IS 291.
- Meet with UCC End-Users groups as necessary to fine tune and sign off on the design as it progresses.
- Value Engineering if required to keep the project within approved budget. Any value engineering decisions shall be taken in conjunction with UCC representatives without comprising on performance.
- Assist in updating and maintaining the Risk Register.
- Assist the DT Lead in preparing the Procurement Strategy Report for Works Contractors.
- An IES 3D-Modeling and Energy Simulation / Dynamic Thermal Simulation Modelling (3D – IES Modelling) shall be carried out on the M&E design which will enable the end user to assess every aspect of thermal performance, from annual energy consumption and carbon emissions down to individual surface temperatures. The result of this modelling is to be submitted to UCC in report format upon completion of this Stage.
- Ensure that the IES 3D-Modeling and Energy Simulation outputs are provided in a format compatible with the Quantity Surveyor's WLCC cashflow modelling, including:
 - Annual energy consumption by fuel type and end use,
 - Monthly energy profiles,
 - Peak demand projections,
 - Carbon emissions (operational); and
 - Projected energy costs over 30-year analysis period with NPV calculations.

3.2.3 Statutory Approvals

- Consult and negotiate with Statutory Authorities as required for all statutory submissions.

- Assist in preparing multiple applications for planning permission if reasonably required by UCC to facilitate the planning process, provided that such applications shall constitute only revisions of the original design.
- Prepare Public Lighting Impact Study for inclusion within the planning application.
- All statutory approvals are part of the scope of services. Where external expertise (e.g. Fire Specialists, Landscape Architect etc) is considered necessary by the Architect, the procurement and payment of that specialist (sub-consultant) is deemed to be included in the Design Team Fee.
- Assisting in the preparation and submitting of Mechanical & Electrical documentation for the Statutory Approval Applications including but not limited to:
 - Planning Permission, including all subsequent Further Information Requests,
 - Fire Safety Certificate Application as prepared by the Fire Engineering Consultant, and all subsequent amendments and revisions; and
 - Any other statutory consents as deemed necessary.
- Obtain any agreements, leases and consents necessary for the installation, removal and / or relocation of their services and for the provision of supplies.
- In the case of a Strategic Housing Development Application direct to An Bord Pleanála, all necessary documentations to ensure a positive outcome.
- In conjunction with UCC and the Design Team, assist to prepare, submit and process Planning Appeals, if required, but excluding participation in Public Hearings.

The Design Team lead is to note that UCC is entitled under Article 157(1) of the Planning and Development Regulations 2001 to an exemption from the planning application fees.

3.2.4 Whole Life Cycle Costing

- Refine the WLCC analysis based on the developed M&E design and support the Quantity Surveyor in component-level WLCC modelling.
- Provide detailed component-level data for all major M&E systems and equipment:
 - **A. HVAC Systems:**
 - Boilers/heat pumps: capital cost, design life (years), thermal efficiency (%), annual maintenance cost, replacement cost at end of life,
 - Chillers: capital cost, design life (years), COP/EER, annual maintenance cost, refrigerant type and GWP,
 - Air Handling Units: capital cost, design life (years), SFP (W/l/s), filter replacement frequency and cost,
 - Terminal units (FCUs, radiators, underfloor heating): capital cost, design life, maintenance requirements,
 - Controls and BMS: capital cost, design life, software licensing costs, maintenance contracts; and

- Pipework and ductwork: capital cost, design life, insulation specification and thermal performance.
- **B. Electrical Systems:**
 - Transformers and switchgear: capital cost, design life (years), efficiency (%), maintenance regime,
 - Distribution boards and cabling: capital cost, design life (years),
 - Lighting systems: capital cost per luminaire type, design life (hours), efficacy (lm/W), replacement cost,
 - Lighting controls: capital cost, design life, maintenance requirements,
 - Emergency lighting: capital cost, design life, battery replacement frequency and cost; and
 - Renewable energy systems (PV, wind): capital cost, design life, maintenance costs, degradation rates, feed-in tariff assumptions.
- **C. Public Health & Plumbing:**
 - Hot and cold-water systems: capital cost, design life, pump efficiency, legionella control costs,
 - Drainage systems: capital cost, design life, maintenance requirements; and
 - Rainwater harvesting/greywater systems: capital cost, design life, treatment costs, water savings (m³ per annum).
- **D. Fire Protection:**
 - Fire detection and alarm at systems level: capital cost, design life, maintenance contracts, detector replacement cycles.
 - Sprinkler systems: capital cost, design life, testing and maintenance costs.
 - Smoke control systems: capital cost, design life, maintenance costs.
- **E. Communications & Security:**
 - Structured cabling: capital cost, design life, technology refresh cycles,
 - Access control at systems level: capital cost, design life, licensing costs; and
 - CCTV: capital cost, design life, storage costs, maintenance contracts.
- **F. Vertical Transportation:**
 - Lifts/escalators: capital cost, design life, annual maintenance contract costs, modernization costs.
- Conduct detailed Energy Modelling Integration using IES or equivalent:

- Complete Building Energy Rating (BER) analysis at developed design stage,
- Model energy consumption for each major M&E system option under consideration,
- Calculate 30-year energy cost projection with the following assumptions:
 - Base year energy tariffs (electricity: €/kWh, gas: €/kWh),
 - Annual energy price escalation rate (recommend 3% real); and
 - Discount rate as per Public Spending Code.
- Consider future carbon pricing/taxation scenarios (€/tCO₂),
- Provide monthly energy consumption profiles for operational budgeting ;and
- Calculate Net Present Value (NPV) of energy costs over analysis period.
- Develop Replacement Schedules showing:
 - Year-by-year replacement requirements over analysis period (typically 50 years for buildings),
 - Capital cost of each replacement (inflated to year of replacement),
 - NPV of all replacement costs; and
 - Critical plant replacement coordination requirements.
- Integrate Value Management and WLCC Analysis:
 - For each significant design decision, provide WLCC option analysis comparing:
 - Option A vs Option B: capital cost differential, NPV of operating cost differential, NPV of maintenance cost differential, total WLCC differential.
 - Examples of key decisions:
 - High-efficiency boilers vs. standard efficiency,
 - LED lighting vs. alternative technologies,
 - Variable speed drives vs. fixed speed pumps/fans,
 - Sophisticated BMS vs. basic controls,
 - Natural ventilation vs. mechanical ventilation; and
 - Renewable energy system sizing options.
 - Recommend optimum WLCC solution for each decision.
- Provide data to Quantity Surveyor in format compatible with ICMS 3 / CC1 Template structure:
 - Services (breakdown by ICMS 3 sub-categories),

- Embodied carbon data for all major M&E components (kgCO₂e),
- Operational carbon projections (kgCO₂e per annum); and
- Whole life carbon totals (embodied + operational over analysis period).
- Support the Quantity Surveyor in preparing the WLCC Analysis Report (Stage 2a) by providing:
 - Complete M&E component-level cost breakdown with design lives,
 - Energy model results and 30-year projections with NPV,
 - Maintenance schedule with NPV calculations for all major M&E systems,
 - Value management option analyses with WLCC comparisons,
 - Updated M&E assumptions register; and
 - Sensitivity analysis on key M&E variables (energy prices, component lives, maintenance costs).
- Document all data sources including:
 - Manufacturer's published maintenance schedules and warranty periods,
 - CIBSE TM44 Inspection of Air Conditioning Systems,
 - CIBSE Guide M: Maintenance Engineering and Management,
 - Manufacturer's quotations for equipment and lifecycle costs,
 - Industry benchmarks (BCIS, CIBSE, SCSI data); and
 - Energy modelling software and calculation methodology.
- Calculate and report key M&E WLCC metrics:
 - M&E WLCC to M&E capital cost ratio,
 - M&E operating cost per m² GIA per annum (broken down by energy, maintenance, replacement sinking fund),
 - M&E energy cost per m² GIA per annum,
 - M&E maintenance cost as % of M&E capital cost; and
 - M&E carbon intensity (kgCO₂/m² per annum).

- The M&E Consultant shall support the Carbon Co-ordinator throughout this stage with M&E-specific reporting requirements associated with Whole Life Carbon and Life Cycle Costing in line with the Requirements of ICMS.

3.2.5 Design Team Meetings / UCC Consultation

- Allow for minimum 2No. UCC consultation meetings (more if required) on site including travel time & expenses.
- Allow for fortnightly meetings Design Team Meetings on site to coincide with UCC meetings.
- prior to preparation of Stage 2a Report:
 - to discuss and agree draft report.
- Workshop Design Review meetings with UCC's Engineering Maintenance Department at 25% & 50% design completion.
- The Design Team are to allow for several workshop meetings with UCC's ICT department in order to incorporate the ICT and Comms requirements within the construction tender documentation and liaise with UCC's appointed Project Manager to ensure efficient co-ordination on site and sizing of the dedicated rooms.
- Include for repeat consultation as above for all material changes to the design or Stage 2a report (excludes substantive UCC changes to brief).
- Allow for any other meetings as denoted in the meeting matrix and the Definitive Project Brief.

3.2.6 Health & Safety

- Ensure that the civil, structural and fire design fully complies with the requirements of the Safety, Health and Welfare at Work (SHWW) (Construction) Regulations 2006. The SHWW (General Applications) Regulations 2007, SI 299 of 2007 and the SHWW Work Act 2005, compliance with the SHWW (Construction) Regulations 2013 and any other relevant Health, Safety and Welfare Legislation in force at the time of the commission.
- Update the Designers Assessments of Risk for this stage and submit to the appointed PSDP.
- Take account of the UCC's Health & Safety Building in Use questionnaire.
- Take account of UCC's Standard Operation Procedure 18 in determining the buildability of the project and ensure that all tendering contractors are aware of their obligations under SOP 18, and all other UCC Standard Operating Procedures.

3.2.7 Stage 2a Report

- Civil, structural and fire engineering input into the Stage 2a Report including the preparation of the Executive Summary.
- Prepare Assist the Design Team Lead to fulfil his duties in co-ordination and preparation of the Stage 2a Report.
- Include for amendments (other than for substantive UCC changes to brief) to comply with cost and area limits, and UCC's stated requirements, re-printing and re-submission as required.

- Signed Stage Completion Certificate.

3.2.8 Design Stage Review Meeting

- Attend Design Stage review meeting on UCC Campus and allow for repeat Design Stage Review Meeting resulting from non-compliance.

3.3 STAGE 2B – DETAILED DESIGN

3.3.1 Co-ordination of the Project Stage

- Co-operate with Design Team Leader and provide all information necessary for the Project Stage.
- Assist in reviewing, quality control and co-ordinating all information and Stage documentation with other DT member and ensure compliance with this design team procedures and scope of services.
- Provide the UCC appointed Project Manager with sufficient notice for all UCC required approvals, decisions on matters that require any action by UCC, and where appropriate, assist UCC by providing recommendations and options.
- Assist the DT lead and ensure integration of designs of the other members of the Design Team.
- Prepare and co-ordinate all drawings in a software format this is compatible and allows the Design Team or UCC to provide clean drawings without additional cost.
- Where works form part of an existing building, allow for a full walkdown / tracing of existing services assisted by UCC's Engineering Services Department to ensure that the detailed design can be accommodated within the service zone provided.
- Allow for responding to all UCC queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.

3.3.2 Design Team Meetings / UCC Consultation

- Allow for fortnightly meetings (more if required) UCC consultations (by Senior or Director) on site including travel time & expenses:
 - initial consultation to review brief and programme or work,
 - prior to developing sketch designs; and
 - to discuss and agree draft report.
- Allow for fortnightly meetings Design Team Meetings on site to coincide with UCC meetings.
- Workshop Design Review meetings with UCC's Engineering Services and Utilities Departments at 75% and 95% completion and any subsequent meetings required to ensure that the design meets UCC's Engineering Maintenance Departments requirements.
- The Design Team are to allow for several workshop meetings with UCC's ICT department in order to incorporate the ICT and Comms requirements within the construction tender documentation and liaise with UCC's appointed Project Manager to ensure efficient co-ordination on site and sizing of the dedicated rooms.
- Include for repeat consultation as above for all material changes to the design or Stage 2b report (other than substantive UCC changes to the project brief).
- Health and Safety Building In Use Design Workshop.
- Allow for any other meetings as denoted in the meeting matrix and the Definitive Project Brief.

3.3.3 Statutory Approvals

- Consult with Statutory Authorities as required for all statutory Permissions and associated conditions.
- Consult with Statutory Authorities as required for all statutory Permissions.
- Prepare and submit all statutory Approval applications.
- All statutory approvals are part of the scope of service. Where external expertise (e.g. Fire Specialists, Landscape Architect etc) is considered necessary by the Architect, the procurement and payment of that specialist (as a sub-consultant) is deemed to be included in the Architect's fee.
- Prepare and submit reports on Statutory Approval decisions (with recommendations) to UCC.
- Include for amendments to documentation and re-submission of revised applications for above (where reasons for refusal should reasonably have been anticipated).
- Allow for preparation and issue of supporting information required by Architect for Planning / DAC appeal.
- Allow for preparation and issue of information required for Fire Certificate appeal.

3.3.4 Detailed Design

- Develop scheme as Stage 2a approval (and agreed amendments), including any amendments arising from Statutory Approvals including thorough pre-planning of the building, services and external works.
- Ensure that mechanical and electrical building services design complies with the Building Regulations, Relevant standards, Codes of Practice, recognised best practice and EU Directives and all other Relevant Documents.
- Where the project has an exceptional level of complexity, obtain agreement from UCC to use appropriate specialists, if not already included as part of the brief.
- Detail and specify fully all elements, including compliance with the requirements of the Building Control (Amendments) Regulations 2014 and the Code of Practice for Inspecting and Certifying Buildings and Works.
- Prepare Preliminary Inspection Plan in compliance with the Building Control (Amendment) Regulations 2014 and the associated Code of Practice for Inspecting and Certifying Buildings and Works for inclusion in the Works Requirements. (Assigned Certifier (Design Team Leader) in consultation with full Design Team).
- Review costs, through design and selection of materials ensure project is within approved budget. Prepare Works Requirements (Tender Documents) and including any additional requirements for compliance with the Building Control (Amendment) Regulations 2014 and the associated Code of Practice for Inspecting and Certifying Buildings and Works.

- Production of Clash Detection Reports using an approved clash detection software on a monthly basis (BIM projects only). Assist the DT lead in the production of reflected ceiling plans for all areas.
- Comply with UCC procedures and Standard Operating Procedures as they may apply to building design and construction to include fully co-ordinated plans, room data sheets and elevations of all rooms.
- Ensure that the Mechanical and Electrical design fully complies with the Building Control Act and the Irish Building Regulations.
- Provide fully co-ordinated mechanical and electrical tender drawings, such that any mechanical and electrical sub-contractor can produce shop drawings.
- Provide a full acoustic performance specification for the mechanical elements of plant and other equipment required for the design to be constructed in accordance with the specification.
- Prepare all layout drawings indicating all Building Engineering Services on a point by point basis for the proposed works.
- Ensure that the provisions of SI 151 of 2011 (Triple E Register) are incorporated as appropriate into the services design. (www.seai.ie).
- Ensure IP Based systems required throughout.
- Provide a Preliminary Building Energy Rating (BER) for the development.
- Assist the Architect in preparing a Procurement Strategy for all Works Contractors.
- Develop a comprehensive quality system to include:
 - Official sign-off by M&E consultant on each system,
 - Official sign-off by M&E consultant on 'as built' drawings,
 - Ensure that a comprehensive operations manual is prepared for Client for each system,
 - Ensure that a comprehensive maintenance manual is prepared for Client for each system; and
 - Ensure BMS meets Client's requirements and is seamlessly integrated into existing systems in the case of refurbishment.
- Produce dynamic thermal simulation model to validate suitability of ventilation mode for office areas, etc.
- Develop fully detailed commissioning plan at tender stage to be used and implemented by contractors on project.
- Develop fully detailed sequence of operations and functional description for BMS for inclusion in tender documents and supervise implementation in the course of construction contracts.
- Location of Fire Extinguishers needs to be "designed" {i.e. not left to the Vendor of Extinguishers to figure out} & both the design and the equipment needs to comply with IS 291.
- Access Control & CCTV – All contractors / designers involved in the design, provision and maintenance of access control / security / CCTV / systems must be licensed by the Private

Security Authority. Please ensure that the ONLY licensed contractors / designers / are used on all UCC projects and that this requirement forms part of the Works Requirements.

- Review the design and location of Plant, equipment, electrical containment and ventilation systems with UCC Engineering Services Department to ensure future maintenance can be carried out safely and efficiently.
- Advise on the integration of Building Engineering Services within commissioning or selection of the furniture and fittings for the project.
- Ensure that Mechanical and Electrical design fully complies with the Buildings for Everyone (Inclusion, Access and Use) and Part 3 of the Disability Act 2005. Please note that it is UCC's policy to go beyond the minimum requirements of Part M of the Building Regulations with respect to disability access.
- Obtain all necessary licences and permissions from Utility providers in timely manner so as not to affect the delivery programme.
- Assist the architect in landscaping design where appropriate.
- Ensure that the building specification and design comply with the performance criteria / brief as detailed by UCC and the End-Users. Design and Specifications to demonstrate clarity to allow for ease of approval of contractor submittals post tender.
- Co-ordinate with the Civil & Structural Design Team members on any civil structural requirements that may be required on the construction of access chambers, manholes, builders' openings etc.
- Input into the Constructability Plan and as part of the constructability review and provide any drawings as necessary.
- Take account of all building tolerances, both vertically and horizontally to ensure that the building can be safely constructed and ensure that the architect has made an allowance for these tolerances within their design.
- Identify the need for advance pre-tender action or pre-ordering of materials or equipment and seek UCC approval to proposals, including preparation of tender lists in conjunction with the appointed UCC Project Manager and other design team members for early action.
- Undertake the Mechanical and Electrical contractor / specialist / novated / reserved specialists' procurement and tender process including assessment of SAQ, MEAT evaluation, report and recommendations and Tender Q & A.
- Prepare tender documents for Mechanical and Electrical novated / reserved specialist contractors or novated suppliers, where appropriate.
- Assist with the preparation of a pre-tender estimate in relation to the Mechanical and Electrical costs. If necessary and in conjunction with other DT members produce a list of revisions that may be made to tender documents to achieve tenders within approved cost limits.
- Assist the QS in Bill of Quantities preparation in accordance with ARM 5 incorporating all the requirements of Circular 01/16 including Mechanical and Electrical BoQ preparation.

- Ensure the M&E BoQ is structured in accordance with ARM 5 & ICMS 3 and incorporates all requirements for WLCC tracking including:
 - Clear identification of all M&E components with design lives,
 - Separate identification of high efficiency vs. standard equipment options,
 - Energy performance data requirements in item descriptions,
 - Maintenance regime specifications,
 - Warranty period requirements; and
 - Embodied carbon data requirements.
- Assist in the prequalification stage for the main contractor procurement.
- Assist in the prequalification and tender of Novated / Reserved Specialists.
- Assess all PPQ and submissions and determine whether each applicant meets the minimum standard, and if so, jointly mark with the (QS) each qualifying applicant.
- Attend interview at PQQ stage.
- Attend all Tender Walk-downs with respect to Mechanical and Electrical design.
- Assist the DT lead in submitting the provisional pre-qualification report to UCC.
- Assist in updating and maintaining the Risk Register.
- Revise all design documentation resulting from any value engineering to bring the project in line with the approved budget. Any value engineering decisions shall be taken in conjunction with UCC representatives without comprising on performance.
- Undertake a Building Energy Audit in line with the SEAI Energy Audit Handbook SI 426.
- Prepared detailed schedule re training for Client in conjunction with UCC Facilities Manager for inclusion in tender documentation and attendance by relevant lead electrical / mechanical engineer at relevant training sessions (site training element included as part of the schedule of services).
- Assist the DT Lead in preparing the Procurement Strategy Report for Works Contractors.
- In collaboration with the Carbon Co-ordinator and Quantity Surveyor:
 - Validate the detailed M&E inventory using ICMS 3 compatible BOQ structure,
 - Identify and specify low carbon M&E materials and equipment options with performance requirements,
 - Provide accurate Whole Life Cycle Costing data for all major M&E systems using BOQ breakdown,
 - Ensure Whole Life Cycle costs for all major M&E systems meet specified targets and form part of contractual performance requirements in tender documents; and
 - Populate M&E sections of CC1 Template (Cost and Carbon) with verified data.

3.3.5 WHOLE LIFE CYCLE COSTING

- Finalize WLCC analysis for tender evaluation and establish contractual performance requirements based on detailed M&E design.
- Validate Component Specifications and WLCC Data:
 - Confirm all major specified M&E products, systems, and equipment.
 - Obtain and provide to Quantity Surveyor:
 - Manufacturer's warranty documentation (standard warranty periods, extended warranty costs),
 - Manufacturer's maintenance data (recommended service intervals, spare parts lists, labour hour estimates),
 - Design life certifications or industry standard life expectancies,
 - Energy performance certifications (Energy Related Products (ErP) labels, seasonal efficiency data); and
 - Embodied carbon data (Environmental Product Declarations where available).
 - Verify design life assumptions against manufacturer data and industry standards; and
 - Confirm replacement costs with suppliers and manufacturers (provide quotations or budgetary estimates).
- Integrate M&E WLCC Data with ICMS 3 / CC1 Template:
 - Align M&E WLCC analysis with CWMF cost and carbon template structure,
 - Populate CC1 Template (M&E sections) with:
 - Capital costs by ICMS 3 category (3.3.1 to 3.3.14 Services sub-categories),
 - Embodied carbon by ICMS 3 category (kgCO₂e),
 - Annual operating costs by ICMS 3 category (energy, maintenance),
 - Operational carbon by ICMS 3 category (kgCO₂e per annum); and
 - Replacement costs by ICMS 3 category with timing (years).
 - Ensure compatibility with Quantity Surveyor's overall ICMS 3 cost plan.
- Develop Detailed Year-by-Year Cashflow Projection for major M&E Systems:
 - Year 0: Capital costs by system
 - Years 1-50 (or project-specific analysis period):
 - Annual energy costs by fuel type (inflated and discounted to NPV),
 - Annual maintenance costs by system (inflated and discounted to NPV),
 - Component replacement costs in year of replacement (inflated and discounted to NPV),
 - Total annual M&E WLCC (inflated and discounted to NPV); and

- Coordinate with Quantity Surveyor to integrate M&E cashflow into overall project WLCC model.
- Undertake Risk and Sensitivity Analysis for M&E WLCC:
 - Test key M&E assumptions including:
 - Energy price escalation: Base case (e.g., 3%), Low case (1%), High case (5%),
 - Maintenance cost escalation: Base case (e.g., 2.5%), $\pm 15\%$ range,
 - Discount rate: 3%, 4% (base), 5%,
 - Component life: Base case (manufacturer data), -20% (pessimistic), +20% (optimistic),
 - Energy consumption: Base case (modelled), $\pm 10\%$ (performance gap allowance); and
 - Carbon pricing: Base case (current trajectory), High case (aggressive policy).
 - Quantify NPV impact of each sensitivity variable,
 - Identify critical variables with highest impact on WLCC; and
 - Recommend risk mitigation strategies (extended warranties, maintenance contracts, energy performance guarantees).
- Prepare Performance Specification for all major M&E Systems (if applicable):
 - Where output-based or performance contracting is proposed, develop:
 - Guaranteed maximum energy consumption (kWh/m^2 per annum),
 - Guaranteed minimum system efficiencies (boilers, chillers, lighting efficacy, etc.),
 - Guaranteed maximum maintenance costs ($\text{€}/\text{m}^2$ per annum),
 - Performance monitoring and verification requirements; and
 - Remediation obligations if performance targets not met.
 - Incorporate performance requirements into tender documentation.
- Prepare and submit to the Quantity Surveyor the Final M&E WLCC Report including:
 - Executive Summary of M&E WLCC findings and recommendations,
 - Complete NPV calculations for all major M&E systems aligned with ICMS 3 structure,
 - Year-by-year cashflow projection for all major M&E systems (50 years or as agreed),
 - Performance specification (if applicable) with guaranteed maxima/minima,
 - Risk and sensitivity analysis with quantified NPV impacts,
 - Validation register: all assumptions, data sources, and their verification status,
 - Comparison with Stage 1 strategic assessment (variance analysis and explanations); and

- Recommendations for WLCC optimization opportunities in tender evaluation.
- Support Quantity Surveyor in incorporating M&E WLCC requirements into Tender Documentation:
 - Review Works Requirements to ensure WLCC data requirements are specified.
 - Ensure tenderers are required to provide:
 - Detailed product data sheets with design lives,
 - Manufacturer's warranty and maintenance documentation,
 - Energy performance data and certifications,
 - Embodied carbon data (EPDs where available); and
 - Confirmation of compliance with WLCC assumptions in tender documents.
 - Ensure Bill of Quantities is structured to facilitate WLCC tracking,
 - Ensure specification includes requirements for:
 - As-built energy modelling and BER,
 - Commissioning and performance testing to verify design intent,
 - O&M manual format compatible with WLCC tracking; and
 - Integration with BIM/CAFM systems for asset register.
- Develop M&E-Specific WLCC Evaluation Criteria for Tender Assessment (coordinate with Quantity Surveyor):
 - Quality sub-criteria that impact WLCC:
 - Equipment efficiency ratings (weighted scoring),
 - Design life vs. specified minimum (weighted scoring),
 - Warranty periods offered (weighted scoring),
 - Maintenance regime and costs (weighted scoring); and
 - Track record of reliability (weighted scoring).
 - Methodology for adjusting tender prices based on WLCC differentials; and
 - Template for tenderer WLCC submissions.
- Calculate Final M&E WLCC Metrics:
 - Total M&E WLCC (NPV) = Capital + Energy (NPV) + Maintenance (NPV) + Replacement (NPV),
 - M&E WLCC to M&E capital cost ratio,
 - M&E operating cost per m² GIA per annum (current prices and NPV),
 - M&E energy cost per m² GIA per annum (current prices and NPV),
 - M&E maintenance cost as % of M&E capital cost,

- M&E whole life carbon (embodied + 50 years operational) in tCO₂e and per m² GIA; and
- M&E carbon intensity (kgCO₂/m² per annum operational).
- Document and justify all deviations from Stage 2a WLCC assumptions and update accordingly.
- The M&E Consultant shall support the Carbon Co-ordinator throughout this stage with M&E-specific reporting requirements associated with Whole Life Carbon and Life Cycle Costing in line with the Requirements of ICMS.

3.3.6 Health & Safety

- Ensure that the mechanical and electrical design fully complies with the requirements of the Safety, Health and Welfare at Work (SHWW) (Construction) Regulations 2006. The SHWW (General Applications) Regulations 2007, SI 299 of 2007 and the SHWW Work Act 2005, compliance with the SHWW (Construction) Regulations 2013 and any other relevant Health, Safety and Welfare Legislation in force at the time of the commission.
- Update the Designers Assessments of Risk for this stage and submit to the appointed PSDP.
- Assess H&S hazards and risk for detailed design. Determine appropriate level of risk transfer.
- Take cognisance of the UCC Building in Use Safety Questionnaire; complete and submit to UCC upon conclusion of Stage 2b.

3.3.7 Stage 2b Report.

- Liaise with other DT members during preparation of Bill of Quantities.
- Manage and co-ordinate assembly of Tender Package(s) (Using appropriate Public Works Contract).
- Assist the Design Team lead in co-ordinating, project managing and overseeing the preparation of the Stage 2b Report.
- Include for amendments to comply with UCC guidelines, cost and area limits, and UCC's stated requirements (other than for substantive UCC changes to brief), re-printing, re-submission and meetings with UCC all as required.
- Signed Stage Completion Certificate.

3.4 STAGE 3 TENDER ACTION

3.4.1 Co-ordination of the Project Stage

- Co-operate with design team leader and provide all information necessary for Project Stage.
- Assist in reviewing quality control and co-ordinating all information and stage documentation with other Design Team members and ensure compliance with the Design Team Procedures.
- Prepare and co-ordinate all drawings in a software format this is compatible and allows the Design Team or UCC to provide clean drawings without additional cost.
- Allow for responding to all UCC queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.

3.4.2 Tender Action

- Prepare a full set of fully coordinated civil, structural and fire tender documents for the main contract and any sub-contracts.
- In conjunction with other design team members prepare production information, including drawings, schedules and specifications of materials and workmanship; provide information for Bills of Quantities; complete and in sufficient detail to enable a contractor to prepare a tender.
- Assist the Quantity Surveyor in the preparation of Mechanical and Electrical Elements of the Bill of Quantities with regard to circular 16/01.
- Make allowance within the specification for sample taking and carrying out tests of materials, components, techniques and workmanship in relation to the Civil, Structural and Fire Engineering works.
- Ensure that all sub-contractor obligations under the Building Control (Amendment) form part of the tender documentation.
- Allow for printing tender documents (hard copy) for the chosen CWMF Tender procedure (open or restricted).
- Allow for assembly of documents on CD or in electronic format. Include for one electronic copy for record purposes and one (or more as required) for validation and signature by apparently successful Contractor.
- Undertake the contractor / specialist / novated / reserved specialists procurement process in line with the Design Team Procedures and the Capital Works Management Framework.
- Assist the Quantity Surveyor in the preparation of the Pre-Tender Estimate in the provision of all necessary Mechanical and Electrical information, schedules and drawings etc.
- Assist in advising on evaluation criteria for assessment of Most Economical Advantageous Tender (MEAT).
- Actively participate in MEAT evaluation of contractors.

- If necessary and in conjunction with other design team members produce a list of revisions that may be made to tender documents to achieve tenders within the approved cost limit, for approval by UCC.
- Advise on the suitability of any proposed sub-contractor to carry out the works and comment on preparation of formal sub-contract documentation relating to accepted tenders for carrying out the works or any part thereof.
- The Architect as Design Team Lead has overall responsibility for the delivery of the project within budget throughout all phases of the project. If the pre-tender estimate exceeds the budget, the design team is collectively responsible for all Value Engineering to align to Pre-Tender estimate within the approved budget. Any Value Engineering decisions required to keep the project within approved budget shall be undertaken in consultation with UCC representatives without compromising on performance.
- Assist the Design Team Lead in issuing Tender documents to UCC to allow (Main Contractors and, where applicable, Reserved Specialists, Loose Furniture), be uploaded onto the E-Tenders /OJEU web portal.
- Ensure compliance with European procurement directives and National Procurement guidelines.
- Deal with matters arising during the tender period including Questions and Answers and ensure any communications with any tender is through the Quantity Surveyor confirmed in writing and sent to all other Consultants and UCC. Please note that the response to Tender on the E-Tenders web portal is to be via UCC's appointed Project Manager.
- Attend site walk downs with contractors during the tender period as required.
- Assist the DT lead to examine and appraise tenders. In consultation with the Quantity Surveyor, prepare a financial check on the Mechanical and Electrical elements of the Tenders under consideration.
- Review Tender Submissions in consultation with QS and other DT members allowing for all work required including all communication and meetings with Tenderers.
- Attend interviews as required.
- Assist the Lead Consultant in the Tender Clarification process.
- Assist in updating and maintaining the risk register.
- Assist in the preparation of a preliminary Tender Report. (QS with input from other DT members).
- Review tender documentation to ensure all M&E WLCC requirements are clearly specified:
 - Verify Works Requirements include performance specifications for energy consumption, efficiency, and maintainability.
 - Confirm BOQ structure facilitates WLCC data capture.
 - Ensure M&E specification requires provision of:
 - Manufacturer's maintenance schedules and manuals,
 - Equipment design lives and warranty documentation,

- Energy performance data and BER inputs,
 - Embodied carbon data (EPDs) where available,
 - As-built energy modelling data; and
 - Integration requirements for BIM/CAFM asset register.
- Respond to tenderer queries on M&E WLCC requirements:
- Clarify energy performance specifications,
 - Clarify design life requirements,
 - Clarify maintenance data requirements,
 - Clarify any performance guarantees or contracting arrangements; and
 - Coordinate all responses with Quantity Surveyor.
- Review tender submissions for M&E WLCC compliance:
- Verify all required product data sheets have been submitted,
 - Check equipment design lives against specified minima,
 - Verify energy performance data against specifications,
 - Check warranty offers against requirements,
 - Assess maintenance regime proposals and costs,
 - Verify embodied carbon data where provided; and
 - Identify any WLCC risks or non-compliances.
- Support Quantity Surveyor in WLCC-Based Tender Evaluation:
- For each compliant tenderer, assess WLCC implications of proposed M&E equipment:
 - Calculate NPV differential vs. base case for any equipment substitutions,
 - Assess impact on energy consumption and costs,
 - Assess impact on maintenance costs,
 - Assess impact on replacement timing and costs; and
 - Assess impact on whole life carbon.
 - Provide technical scoring for WLCC-related quality criteria:
 - Equipment efficiency ratings,
 - Design life vs. specified minimum,
 - Warranty periods offered,
 - Maintenance regime quality,
 - Reliability track record; and
 - Sustainability credentials.

- Recommend adjustments to tender prices based on WLCC differentials (e.g., lower efficiency equipment may have lower capital cost, but higher NPV when energy costs considered).
- Assist in tender clarification meetings on M&E WLCC matters:
 - Seek clarification on equipment specifications and their WLCC implications,
 - Discuss maintenance proposals and costs,
 - Confirm ability to meet energy performance targets; and
 - Confirm compliance with WLCC data provision requirements post-tender.
- Update M&E WLCC model based on preferred tender:
 - Revise WLCC assumptions based on actual equipment proposed,
 - Recalculate NPV of all major M&E systems,
 - Update year-by-year cashflow projection,
 - Identify any variances from Stage 2b WLCC analysis; and
 - Provide updated M&E WLCC data to Quantity Surveyor for inclusion in Tender Report.

3.4.3 Tender Report

- Assist in the preparation of the Tender Report. Liaise with QS and other DT members during preparation of Tender Report.
- Include for all necessary clarification meetings with the apparently successful tenderer.
- Stage Completion Certificate signed by all Parties.
- Comply with the CWMF guidelines on the procurement of reserved specialists (if used).

3.4.4 Design Team Meetings/UCC Consultation (On site)

- Allow for fortnightly meetings (more if required) UCC consultations (by Senior or Director) on site including travel time & expenses.
- Allow for fortnightly meetings Design Team Meetings on site to coincide with UCC meetings.
- Allow meeting prior to submission of Tender Report.
- Allow for any other meetings as denoted in the meeting matrix and Definitive Project Brief.

3.4.5 Appointment of Contractor

- Allow for all work associated with Notification Letters and pursuing necessary clarifications/ documentation. (Repeat as required until suitable Contractor appointed.) (DT Lead with co-operation and assistance of other DT members).
- Assist in the issuing of Alcatel letter to apparently unsuccessful tenderers and de-brief in connection with UCC as required including requirements of Remedies Directive. Allow for all

work associated with Issue of Letter of Approval. (Design Team Lead with co-operation and assistance of other DT members).

3.5 STAGE 4 CONSTRUCTION

3.5.1 Commencement Notice (Architect as Design Certifier & Assigned Certifier)

- Assist the Design and / or Assigned Certifier in the preparation of the mechanical and electrical input on the documentation required for inclusion with the Commencement Notice in compliance with the Building Control (Amendment) Regulations 2014 and lodge with Building Control Authority.

3.5.2 Co-ordination of Project Stage

- Co-operate with Design Team Leader and provide all information necessary for Project Stage. Review, quality control and co-ordinate all information required with other DT members and ensure compliance with UCC's Design Team Procedures.
- Assist ER/QS with a comprehensive Risk Assessment for UCC at various stages on all contractual claims & items referred to conciliation in accordance with CWMF guidelines.
- Ensure that the building specification and design comply with the performance criteria / brief as detailed by UCC and the End-Users. Design and Specifications to demonstrate clarity to allow for ease of approval of contractor submittals post tender.
- Ensure that all mechanical & electrical, submittals are co-ordinated within the overall building fabric and that any plant or machinery proposed that differs to the Works Requirements are capable of being received within the allocated space provided.
- Ensure that all Mechanical & Electrical, elements are in keeping with the aesthetics and the agreed Look and Feel concept for the building.
- Review and ensure that all Mechanical & Electrical Submittals are in accordance with the Works Requirements.
- Assist in updating and maintaining the risk register.
- Ensure continuous clash detection reporting on a monthly basis.
- Ensure continuous WLCC monitoring and reporting:
 - Track all M&E changes against WLCC baseline,
 - Conduct WLCC impact assessments for all VE proposals and variations,
 - Report WLCC status monthly to Design Team Leader and Quantity Surveyor; and
 - Maintain as-built M&E WLCC model.
- Allow for detailed design and administration of any UCC and End-User changes during the construction period and in conjunction with QS advise on potential cost implications.
- Obtain for information / monitoring purposes copies of the Equipment Procurement Status Reports supplied by the specialists' contractors to the Contractor, which are used by the Contractor for schedule control. Pass to DT lead / other DT members as necessary / required.

- It is the Mechanical and Electrical Consultants responsibility to ensure co-ordinated shop drawings.
- Ensure co-ordinated mechanical and electrical shop drawings are produced and approved for site installation in a timely fashion to ensure that the contract programme is not impacted.
- Inspect and approve Building Services Engineering Samples.
- Assist the Quantity Surveyor to prepare and issue regular detailed financial reviews / progress reports showing projected final account figures for the Building Engineering Services installations for incorporation into the overall cost reports for the project.
- Co-ordinate Tie-Ins and planned shutdowns with the main contractor, sub-contractors and UCC's Engineering Maintenance Department to minimise the impact on existing buildings and services.
- Review with other DT members, UCC Project Manager, UCC Engineering Services and Utilities Departments and any sub-contractor the proposed commissioning procedures.
- Answer any requests for information (RFIs) in a timely fashion.
- Review and approve mechanical and electrical submissions from the contractor against design intent and specifications. Consult with the UCC representative prior to approving any significant deviations from the original design specification.
- Review 'for construction' design with UCC stakeholders, highlighting any changes from the tender stage drawings.
- Print, reproduce or purchase all documents, drawings, maps, photographs and other records necessary for the proper performance of the Services.
- Prepare and co-ordinate all mechanical and electrical drawings in a software format this is compatible and allows the Design Team or UCC to provide clean drawings without additional cost.
- Allow for responding to all employer queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.

3.5.3 Employer's Representative

- Allow for all work associated with assisting the Employer's Representative to undertake their duties under the contract.
- Provide to the ER & UCC a detailed analysis, valuation and recommendation in relation to all mechanical and electrical engineering notification of claims as received from the contractor.
- Assist the ER in ongoing construction cost control, processing claims within time limits in Clause 10.5 of the Contract.
- Allow for all additional work including contract prolongation (other than for Contract prolongation consequent to Contractor liquidation).
- Allow for attending the Project Board meeting where required for the duration of the construction stage and following on any actions as required.

3.5.4 Contract Administration

- Allow for all work (relevant to professional discipline) necessary for the effective administration of the Contract, including close co-operation communication and information exchange between DT members.
- Advise on all contractual matters arising.
- Allow for responding to all contractor queries within the time limitations of the contract and where required sooner as to mitigate against time delay.
- Assist to determine where possible, any dispute or difference relating to the works, which may arise between UCC and the Contractor and / or sub-contractor. Assist to make decisions where possible on delays, request for extensions of time and the consequences of acceleration or disruption.
- Assist in the evaluation, negotiation and settlement of any contractual claims.
- Assist to negotiate delay /disruption claims on a contract if such claims arise.
- In conjunction with the Quantity Surveyor advise the DT Lead and UCC of potential change orders that will produce a saving.
- Assist the Quantity Surveyor to provide the ER with interim valuations and assist the Quantity Surveyor to issue payment recommendations in respect of the services installation reference Clause 11 of the contract.
- Assist the ER in developing & managing a contract correspondence log.

3.5.5 Site Inspections and Meetings

- Allow for Director/Senior visiting site once a fortnight including travel time & expenses.
- Allow for concurrent Site Meetings at least twice a month and UCC consultation meetings as required by UCC.
- Allow for Mechanical and Electrical Co-ordination meetings on site once a fortnight.
- Monitor and inspect the works as being executed by the Contractor on site to ensure that the Development is proceeding in accordance with the terms of the specification. Make further periodic inspections to the site, as appropriate, to the stage of construction as may be necessary to inspect the progress and the quality for the work.
- Produce a quality schedule, update and review with contractor fortnightly.
- Instruct sample taking and carrying out tests of materials, components, techniques and workmanship in relation to the Civil, Structural and Fire Engineering works and examine the conduct and results of such tests whether on or off site.
- Inspect and certify the works as described in the Code of Practice for Inspecting and Certifying Buildings and Works relative to civil / structural / fire engineering.
- Undertake weekly detailed review of the project during construction, generating a quality control report for contractors to be updated on a fortnightly basis and reviewed at the fortnightly quality review meeting with contractor and as required with the relevant sub-contractor.

- Assist the Design Team lead in issuing to UCC in conjunction with the fortnightly walk-down a report covering quality and progress.
- Attend all monthly cost control meetings with main contractor, specialists and direct contractors.
- Prepare detailed list of samples and long lead items for approval. Note dates by which these are to be submitted by the contractor in order to maintain project schedule. Track dates and report to UCC at progress meeting.
- Attend workshop meetings between all relevant parties to address and mitigate Project Risk Register.
- Witness / Inspect the testing of all mechanical and electrical systems, include for inspection prior to closing of walls, ceiling, voids spaces, etc.
- Witness / Oversee all commissioning and testing of systems and approve for inspection / demonstration by UCC Engineering Maintenance & Utility Departments.

3.5.6 Building Control (Amendment) Regulations 2013

- Undertake and perform its duties and obligations in acting as the Civil / Structural / Fire Ancillary Certifier in accordance with the Code of Practice for Inspecting and Certifying Buildings and Works.
- Inspect the works as described in the Inspection Notification Framework and the Code of Practice for Inspecting and Certifying Buildings and Works relative to civil / structural / fire engineering.
- Allow for all works in assisting the Design and Assigned Certifier in undertaking their duties in accordance with the Code of Practice for Inspecting and Certifying Buildings and Works.

3.5.7 Whole Life Cycle Costing

- Monitor construction phase to ensure as-built condition aligns with WLCC assumptions and protect whole life value.
- Monitor and Assess Value Engineering Proposals:
 - For any contractor VE proposal affecting major M&E systems:
 - Conduct full WLCC impact assessment including:
 - Capital cost differential,
 - NPV of energy cost differential,
 - NPV of maintenance cost differential,
 - NPV of replacement cost differential,
 - Total WLCC impact (NPV); and

- Whole life carbon impact (embodied + operational).
- Assess impact on energy performance targets and BER,
- Assess impact on system reliability and maintainability,
- Assess impact on warranty and design life; and
- Provide written recommendation to Design Team Leader, Employer's Representative and UCC.
- Require WLCC analysis from contractor for any material M&E substitutions,
- Reject or recommend rejection of proposals that compromise whole life performance, even if capital cost saving is offered; and
- Maintain register of all M&E VE proposals with WLCC assessments.
- Validate Installed all major M&E Systems Against WLCC Assumptions:
 - Confirm specified M&E products and equipment have been installed:
 - Check manufacturer, model numbers, and ratings against approved submittals,
 - Verify efficiency ratings (boilers, chillers, lighting efficacy, etc.); and
 - Verify control strategies and BMS programming align with energy model assumptions.
 - Review and approve warranty documentation:
 - Confirm warranty periods meet or exceed tender requirements,
 - Ensure warranty documentation is comprehensive and transferred to UCC; and
 - Confirm extended warranty arrangements if specified.
 - Ensure maintenance manuals are comprehensive and WLCC-compatible:
 - Verify maintenance schedules align with WLCC assumptions,
 - Check spare parts lists and availability,
 - Confirm maintenance task descriptions and labour hour estimates; and
 - Ensure format is compatible with UCC's CAFM/asset management systems.
- Update M&E WLCC Model for Approved Changes:

- Maintain as-built M&E WLCC model reflecting all approved changes during construction,
 - Track cumulative WLCC impact of all changes (VE, client variations, etc.),
 - Recalculate final NPV of all major M&E systems based on as-built condition,
 - Update year-by-year cashflow projection,
 - Update whole life carbon calculation; and
 - Report monthly to Quantity Surveyor on WLCC status vs. baseline.
- Commission and verify all major M&E Systems for WLCC Performance:
- Witness commissioning and testing of all major M&E systems with focus on:
 - Energy performance verification (pump/fan power, boiler/chiller efficiency, lighting power density, etc.),
 - Control system operation and setpoints; and
 - Energy sub-metering installation and functionality.
 - Review commissioning reports and test results against design assumptions,
 - Identify any performance gaps and require remediation; and
 - Coordinate seasonal commissioning requirements for WLCC verification.
- Coordinate with Quantity Surveyor on M&E WLCC Reporting:
- Provide monthly updates on M&E WLCC status for inclusion in Quantity Surveyor's cost reports,
 - Highlight any M&E WLCC risks or issues requiring UCC attention; and
 - Support Quantity Surveyor in assessing financial impact of M&E-related claims or delays.
- The M&E Consultant shall support the Carbon Co-ordinator throughout this stage with M&E-specific reporting requirements associated with Whole Life Carbon and Life Cycle Costing in line with the Requirements of ICMS.

3.5.8 Contract Prolongation

- Allow for all additional work, contract administration, site visits and site meetings arising from first 3 months of contract prolongation (other than for substantive UCC changes to brief or Contract prolongation consequent to Contractor liquidation).

3.5.9 Project Reviews

- Prepare and submit a Project Review to UCC together with each Interim Certificate. (DT Lead jointly with QS and input from other DT members as required).

3.5.10 Dispute Management Procedure

- Comply with the requirements of the Public Works Contract procedures for dispute management and any other procedural requirements imposed by the appointed Conciliator.

3.5.11 Conciliation and Arbitration

- Allow for maintaining up-to-date project files. [Excluding case preparation; associated research; assembly, printing and issue of documents required, and attendance at hearings.

3.5.12 Contractor Liquidation/Termination

- Allow for cost of administering termination of Contractor (including application of all relevant contract clauses). [Excludes preparation of detailed schedule of work completed to date and all other work associated with termination/liquidation.

3.6 STAGE 5 HAND OVER AND FINAL ACCOUNT

3.6.1 Co-ordination of Project Stage.

- Co-operate with Design Team Leader and provide all information necessary for Project Stage. Review, quality control and co-ordinate all information required with other DT members and ensure compliance with UCC's Design Team Procedures.
- Attend all meetings post substantial completion to close out all outstanding issues.
- Prepare detailed snag list as required to meet the programme and to ensure that all substantial snags are addressed prior to Practical Completion.
- Assist in the evaluation, negotiation and settlement of any contractual claims or delay and compensation events in relation to the Building Services installation.
- Assist the PSDP in the compilation of the Safety File, in line with UCC's Digital Project Manual (DPM).
- Allow for responding to all employer queries within 2 days of being requested or sooner if required to maintain contract programme or for urgent matters.
- Allow for all necessary training of UCC Engineering Maintenance Department personnel on the use and operation of all Building Service installations.
- Labelling to be in accordance with UCC policy.
- Co-ordinate and attend demonstration of mechanical and electrical to UCC stakeholders.
- Manage the mechanical and electrical snag lists including the incorporation of any client identified snags prior to any client demonstrations.

3.6.2 Substantial Completion.

- Assist the Design Team Lead in co-ordinating, project managing, and overseeing the preparation and delivery of the building information pack for UCC at handover.
- Allow for phased handover and multiple substantial completion certificates.
- Undertake a post completion Building Energy Audit in line with the SEAI Energy Audit Handbook.
- With respect to the Mechanical and Electrical Engineering.
 - Provide comprehensive sets of the latest issue of construction drawings and specifications to UCC. Liaise with and assist the PSDP in assembly of information / documents for Safety File.,
 - Ensure that all Operation and Maintenance Manuals are in line with the UCC DPM,
 - Provide a full building asset register for the works done, i.e. equipment models and their KW rating, list of emergency lights / fire extinguishers etc as part of the project handover and tag same,
 - Provide a Building Energy Rating (BER) for the as constructed development,
 - Complete a Display Energy Certificate (DEC) for the development,

- Provide detailed as-built P & ID schematics as part of the handover file,
- Issue design certificates for Emergency Lighting and fire alarms systems in accordance with IS 3217 and IS 3218 respectively,
- Consult with the PSDP regarding Contractor provision of information for the Safety File prior to issue of Substantial Completion. Meet UCC on handover and explain operation of the building. Allow for supplementary visits as required,
- As handover approaches, provide final issue drawings, calculations and specifications to the Assigned Certifier, co-ordinate with Tender Documents and confirm compliance of completed design with the Building Regulations; provide Certificates of Compliance Design and Inspection at completion,
- Co-ordinate and submit to the Building Control Authority all necessary documentation as required by the Building Control (Amendment) Regulations 2014 and the associated Code of Practice for Inspecting and Certifying Buildings and Works, including Certificates of Compliance on Completion from all statutory and specialist certifiers and backup and ancillary certificates & tests as scheduled in previous submissions to the Building Control Authority,
- Assist the Assigned Certifier to manage and resolve any issues arising with the Building Control Authority in relation to validation of the Certificate of Compliance Completion. Assist the Assigned Certifier to issue the Certificate of Substantial Completion,
- On anticipated date of Substantial Completion together with other DT members inspect the works and ensure all outstanding items are complete and advise UCC in writing on the suitability of the Works to be considered as ready to receive a Certificate of Substantial Completion,
- Witness / Oversee all commissioning and testing of systems and approve for inspection / demonstration by UCC Engineering Maintenance & Utility Departments,
- Following completion hold weekly review meetings with the contractor to ensure that snags are addressed in a timely manner,
- Prepare Defects list in consultation with the Contractor and UCC,
- Take account of and manage any UCC snag list,
- Submit a BIM as constructed Model,
- Assist the PSDP in compiling the Safety File / UCC Digital Project Manual,
- Advise on all contractual matters that arise at this stage, and
- Review all as-built documentation for accuracy prior to inclusion in the Safety File.

3.6.3 Final Account

- Assist in the Preparation of the Draft Final Account Summary.

- Allow for all work necessary in agreement of Final Account with Contractor and UCC and attending meetings as required (including travel and expenses) and preparation of Final Account Report as per the Design Team Procedures.
- Assist in the preparation and submitting of the Final Account Report (supplement) on completion of the Defects Period.

3.6.4 Defects Period

- Assist the ER in confirming the defects liability period.
- Allow for all works necessary to administer defects liability period including site visits as required.
- In conjunction with other DT members, monitor the Projects Defects Liability Period. Compile a list of defects of work, one month before the end of the Defects Liability Period and issue co-ordinated Project Teams defects list to the contractor.
- Instruct the contractor via the ER on any urgent defects which require immediate attention.
- Assist UCC in the occupation phase of the phase of the project, particularly in relation to any unforeseen difficulties in relation to the function or operation.

3.6.5 Post Handover WLCC Support

- Provide post-handover support during the first 12 months of operation to verify WLCC assumptions:
 - Review actual energy consumption data against predictions,
 - Review actual maintenance costs against WLCC assumptions,
 - Investigate and explain any significant variances,
 - Recommend adjustments to maintenance schedules if required; and
 - Update WLCC model if actual performance differs materially from predictions.
- Assist UCC in establishing WLCC monitoring and reporting procedures:
 - Define key performance indicators (KPIs) for ongoing WLCC tracking,
 - Recommend frequency and format for WLCC reporting (annual recommended),
 - Provide template for annual WLCC performance report,
 - Provide guidance on integrating WLCC into annual budget planning; and
 - Provide guidance on long-term replacement sinking fund establishment.
- Support any disputes or warranty claims related to M&E system performance:
 - Provide expert assessment of whether systems are performing as specified,
 - Quantify WLCC impact of any performance deficiencies; and
 - Support UCC in pursuing warranty claims or remediation.

3.7 ADDITIONAL SERVICES

3.7.1 Planning Appeal

- Amendments to documentation (including the preparation and issue of supporting information by all disciplines) and the submission of revised applications for Statutory Approvals (where reasons for refusal should reasonably have been anticipated) are deemed to be part of the schedule of services. Reasonable additional fees for other UCC approved appeals will apply. (The appropriate tendered hourly rate will apply for attending hearings).

3.7.2 Conciliation and Arbitration

- Reasonable additional costs for case preparation and the assembly and printing of documents for conciliation and/or Arbitration hearings will apply in accordance with Clause 11 of the Conditions of Engagement. The appropriate tendered hourly rate will apply for attending hearings. Maintenance of current and up-to-date project files in accordance with good practice is part of Stage Services.