Project Execution Plan (PEP)

[Project Title]
PMP T09
Project Number: MAJ 0000
<table>
<thead>
<tr>
<th>Revision</th>
<th>Updates</th>
<th>Sign Off</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Issue</td>
<td>Prepared By:</td>
<td>Checked By:</td>
<td>Authorised By</td>
</tr>
<tr>
<td>Revision A</td>
<td>Prepared By:</td>
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<tr>
<td>Revision B</td>
<td>Prepared By:</td>
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<td>Revision C</td>
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<td>Revision D</td>
<td>Prepared By:</td>
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<td>Revision E</td>
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<td>Revision G</td>
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<td>Revision H</td>
<td>Prepared By:</td>
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</tbody>
</table>
Introduction

2.1 Introduction

This Project Execution provides a clear and concise summary of the [Project Name] project for all parties involved in its delivery both internally within the University and externally.

It provides a baseline position statement about the project as it enters the Detailed Design stage, against which progress can be monitored and a clear audit trail through to final handover and post occupancy review.

2.2 Objective of Document

The purpose of this document is to initially identify the parameters and the priorities of the [Project Name] project. In addition this document will form the basis for the monitoring, evaluation & co-ordination of the various actions and procedures throughout the life of the project.

In particular the report will act as:

1. A channel conveying the nature and reason for decisions and subsequent instructions.
2. Method for establishing priorities and resolving issues
3. A record of decisions, information gathered, agreements, revisions and as a reference document.
4. A basis for assessing the resources required to compile the project within the stipulated cost, time and quality standards.

2.3 Restrictions and Confidentiality

Contact with representatives from television, radio, newspapers, magazines can only be entered into with the express approval of the Project Manager who will consult with the Client. Publishing of material in relation to the project must likewise be approved by the Project Manager/Client.
Scope of Project

3.1 Project Aspirations

“To deliver a ................
Comment / Statement prepared by Space Planning

3.2 Description of Project

This project consists ................
Comment / Statement prepared by Space Planning

3.3 Project Objectives

The project objectives are to:
• ......
• ......
• ......

3.4 Scope of Uncertainties

The delivery of the objectives listed above are constrained by the following e.g.:-
• .....  
• .....  
• .....  

3.5 Authority Levels
4.1 Outline Cost Plan

The current budget for the [Project Name] is £________. A Summary of the budget is noted below, for full breakdown please refer to Appendix A – Cost Plan

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>New Build</td>
<td></td>
</tr>
<tr>
<td>Project Costs</td>
<td></td>
</tr>
<tr>
<td>Design Team Fees</td>
<td></td>
</tr>
<tr>
<td>VAT</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Cost Reporting

The QS will prepare monthly cost reports which will include the cost plan, updated final cost estimate, change control register (CCR), cash flow, risk register and any Value engineering proposals/agreements.

**Taxation** - The Client’s accounting period is 1st August to 31st July and payments to the year end must relate to certificates received.

4.3 Cost Planning / Cost Control

Any changes above £1,000 must be authorised by the Client:

(a) Details of the variation including drawing information where available to assist in describing the issue.
(b) An indication of the extent to which the variation is critical to the success of the project.
(c) Details of proposed savings and the effect of the savings on the project.
(d) Reason for proposed change.

An Instruction Schedule will be maintained reflecting the issue of Client change Orders and Architect’s Instructions initiated into the scheme. Variations will be collated into all cost summaries. Please refer to change management procedure below.

**Contingency Levels:**

Contingency levels must be reviewed at regular intervals. The contingency is not available to accommodate specification changes, amendments to the Client’s requirements or Architect’s instructions issued as a result of omissions or errors.

**Claims and Disputes:**

Details of all anticipated claims must be reported to the Project Manager and an assessment included within the Cost Report.

**Records:**

The Quantity Surveyor will keep and maintain the following details:

1. Effect of Architect’s Instructions on Construction and Programme.
2. Information Required
   (i) Details
   (ii) Date

3. Information Provided
   (i) Details
   (ii) Date

**Interim Payments:**

Valuations will be undertaken on a monthly cycle with valuation dates to be agreed with the Contractor.

The Quantity Surveyor will prepare valuations in accordance with the Contract and issue recommendations to the Architect who will issue the Interim Certificate(s).

The Contractor will be required to present authenticated receipts. Work not in accordance with the contract works will not be reflected in the Interim Payments or Final Account. VAT will be included at the prevailing rate on all interim payments and on the final account.

**Approvals:**

The client's approval must be obtained before proceeding to the next stage of the development process.

4.4 Change Control Procedure

See separate Change Control Procedure document. (Appendix H)

4.5 Value Management (VE / LCC)

A value engineering appraisal of the project proposals should be carried out at a suitable time during the development of the design. It is envisaged that two one day workshops should be executed prior to completion of Stage D design.

The project manager should report the findings and recommendations of the appraisal to the Project Sponsor and implement any decisions subsequently agreed.
5.1 Risk Analysis and Management

Responsibility for risk analysis and management should be established at the start of the project. A workshop will be undertaken in order to do this. This will normally be led by the QS.

The process of analysing and managing risk involves two distinct phases which are reflected in the title of this section, namely:

**Risk Analysis**

Risk analysis can be sub-divided into two factors being firstly the identification of qualitative analysis of risk and secondly the subsequent quantitative analysis of the risk factors so identified.

An initial qualitative analysis of risk is essential as it brings considerable benefit in terms of understanding the project and its problems irrespective of whether or not a quantitative analysis is carried out; and

**Risk Management**

It is essential that the management of risk is not considered as a once and for all activity as it should be applied continuously throughout the life of the project. The results of risk management are most useful at the key decision points for the client.
Planning and Programme Strategy

6.1 Master Programme / Key Date
The master project programme / development programme will be prepared by the Project Manager in conjunction with the Design Team and latterly the Contractor.
Programmes will be required to be prepared to provide guidance on:

<table>
<thead>
<tr>
<th>Programme</th>
<th>Prepared by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Strategy</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Master Programme</td>
<td>Project Manager</td>
</tr>
<tr>
<td>Design and Procurement Programme</td>
<td>Project Manager &amp; Architect</td>
</tr>
<tr>
<td>Construction Work Programme</td>
<td>Contractor</td>
</tr>
<tr>
<td>Commissioning Programme</td>
<td>Contractor</td>
</tr>
</tbody>
</table>

The planned key dates are summarised below, a more detailed programme is contained within Appendix B

<table>
<thead>
<tr>
<th>Section of Work</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of Outline Brief</td>
<td></td>
</tr>
<tr>
<td>Appointment of Design Team</td>
<td></td>
</tr>
<tr>
<td>Site Start Date</td>
<td></td>
</tr>
<tr>
<td>Construction Completed</td>
<td></td>
</tr>
<tr>
<td>Project Completed</td>
<td></td>
</tr>
</tbody>
</table>

A Master Project programme will be prepared by the Project Manager in conjunction with the Design team which will indicate the main activities, target dates and approvals that are required for the Project.
The Programme will be updated and re-issued to accommodate amendments to the Project Plan following agreement with the Client.
The Master Project programme will encompass the construction period which will be agreed with the Contractor.

6.2 Strategic Programme
The programme will be derived from the Project Brief and clarify key requirements and provide the structure of the Project Master Programme.
The programme will provide all disciplines with a basis of assessing the nature and scope of the project.

6.3 Design and Procurement Programme
The programme will integrate the design and procurement elements to reflect interdependencies of design, procurement and construction requirements together with approval periods, sample/mock-up production and off-site manufacturing requirements where necessary.

The Design Team are required to prepare Drawing and Specification Schedules for the production information documentation. The lead consultant is responsible for monitoring the design of the scheme against the Master Programme.

6.4 Construction and Commissioning Programme

In consultation with the Design Team and the Client, the preferred Contractor will produce a Construction Works Programme and Commissioning Programme.
Procurement

7.1 Consultant Procurement Strategy
The procurement of the Consultant Design Team will use the current University of Strathclyde Design Team Framework.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Name</th>
<th>Date Appointed</th>
<th>Appointment Letter Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect (IDT)</td>
<td></td>
<td></td>
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<tr>
<td>QS</td>
<td></td>
<td></td>
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<tr>
<td>CDM Coordinator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BREEAM</td>
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<td></td>
<td></td>
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<tr>
<td>Other 1</td>
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<td></td>
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<tr>
<td>Other 2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.2 Construction Stage Procurement Strategy
The procurement of the Contractor will use the current University of Strathclyde Medium / Major Contractor Framework.

This project contains the following key criteria that require to be resolved by the procurement strategy adopted e.g.

- 
- 

Note – the selection of a procurement route should be via a risk matrix considering the benefits/liabilities of each alternative procurement route. A matrix based upon the Scottish Executive’s Client Pack is included for guidance within these procedures.

<table>
<thead>
<tr>
<th>Contractor Name</th>
<th>Tender Issued</th>
<th>Tenders Returned</th>
<th>Date Appointed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

7.3 Specialist Consultant Procurement
The procurement of the ………..
8.1 Project Participants Directory
A register containing the contact details of all the appointed project stakeholders has been prepared. For further details refer to Appendix – E Project Directory.

8.2 Project Structure
A project structure diagram showing the relationships between the various project stakeholders has been prepared. For further details refer to Appendix – D Project Structure.

8.3 Co-ordination with Client

Correspondence:
Generally all correspondence to and from the client must be in accordance with section 11.5 Communications and Reporting. It must also be copied to the Project Manager at all times and to other members of the Project Team when required.

Minutes & Meetings:
All meetings, whether informal or formal, must have an agenda and either minutes or action points taken and issued within three working days. Minutes are for record purposes only and all meeting attendees are responsible for taking note of their own actions.

Contractor’s Progress Reports:
A synopsis of the Contractor’s Report will be included within the Project Manager’s monthly Progress Report. Format to be agreed with the relevant contractor.

Client Approvals:
Client approvals to be processed by the Project Manager.

Change Control Procedure:
To be issued under separate cover.

Documentation Issued to Client:
Documents for the Client’s consideration and approval will be issued by the Project Manager.

Information provided by the Client:
Client’s information will be supplied to the Project Manager for distribution.

8.4 Design Management of the Project

Designing: Key Design Issues:
- Design information should be produced in accordance with agreed drawing release schedules to achieve the requirements of the master programme.
- Drawings must be critically assessed in order to ensure buildability within the specified construction programme and design will be value engineered in accordance with the project’s cost and quality criteria.

The Designers will be responsible for:
- Ensuring that design information is effectively and efficiently coordinated between the projects participants with a design responsibility.
• Ensuring that sufficient drawing information with adequate detail of design information is provided to allow the procurement of the works in accordance with the procurement strategy and to allow the execution of pre-construction and construction work as per the agreed information release schedule.

Drawing information - the drawing format should be A0 (where required) A1, A3 and A4. Drawings should be issued via e-mail in the format DWG/DXF. Please note if drawings are getting forwarded to the client they should be emailed in the format Jpegs.

8.5 Communications and Reporting

Written:
All forms of correspondence should include the following information:
Date, Originator, Addressee, Project Title, Topic and also;
Distribution: - Parties receiving copies to be highlighted.

Channels of Communication: -
Each item of correspondence should refer to a single topic or a selection of related matters. Correspondence for The University of Strathclyde from members of the project team and correspondence between members of the project team should be copied and circulated to the Project Manager.

Instructions:
• All instructions must be in writing with the recipient confirming receipt also in writing.
• Correspondence should be conveyed by post or by hand or by facsimile transmission. Hand delivered correspondence should be recorded by the issuing of a receipt by the recipient firm. Facsimile transmission reports must be retained.
• Claims: All correspondence associated with claims and disputes must be circulated to the Project Manager and the Project Team

Information Required
Any requests for information and subsequent responses should be addressed via an information request proforma. The pro-forma should be issued to the appropriate team member with a copy issued at all times to the Project Manager.

Verbal:
The Project Manager must be advised of all relevant discussions where the issues under discussion have an effect on the scope of work, cost and programme.

The details must be conveyed in writing to the Project Manager for inclusion within the project records and in order that a definitive instruction on the matter under consideration can be agreed and issued.

Verbal Conversation should be noted in the diary and file notes made where relevant/

Filing:
All consultants must keep full and complete records of all correspondence relating to the project.

Meetings:
(See 2.2 Co-ordination with Client)

Reporting:
The following reports should be presented on an A4 format portrait with each page being numbered.
The reporting arrangements for the project are summarised as follows:-

<table>
<thead>
<tr>
<th>Report</th>
<th>Prepared by</th>
<th>Submitted to</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Managers Report</td>
<td>Estates Project Manager (with input from Design Team and Contractor as relevant)</td>
<td>Estates Head of Project Management</td>
<td>Fortnightly</td>
</tr>
<tr>
<td>(Estates Management Database)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Progress Report – Pre Construction</td>
<td>IDT</td>
<td>Estates Project Manager</td>
<td>Monthly</td>
</tr>
<tr>
<td>Stage C Report</td>
<td>Design Team</td>
<td>Estates Project Manager</td>
<td>-For Review</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Updated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Final version</td>
</tr>
<tr>
<td>Stage D report</td>
<td>Design Team</td>
<td>Estates Project Manager</td>
<td>-For Review</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Updated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-Final version</td>
</tr>
<tr>
<td>Progress Report – During Construction</td>
<td>Contractor</td>
<td>Estates Project Manager</td>
<td>Monthly</td>
</tr>
<tr>
<td>Cost Report</td>
<td>Project Quantity surveyor</td>
<td>Estates Project Manager</td>
<td>Monthly</td>
</tr>
<tr>
<td>Quality / Workmanship</td>
<td>Clerk of Works</td>
<td>Estates Project Manager / Design Team / External Project Manager</td>
<td>Weekly</td>
</tr>
<tr>
<td>University Committees</td>
<td>Estates Project Manager</td>
<td>Estates Committee (to be defined)</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Post Occupancy Evaluation</td>
<td>Project Controller/Project Managers</td>
<td>Estates Committee (to be defined)</td>
<td>Once Only</td>
</tr>
</tbody>
</table>
Quality Control Procedures

9.1 Quality Plan

The Project Manager will, in conjunction with the Design Team and Contractor, establish a Project Quality Plan to ensure a clear understanding of the required quality and performance standards both from the Design Team and the Contractor.

9.2 Pre-Construction Period

Information requirements will be clarified between the Contractors and the Client’s representatives.

It is essential that the contractors are fully aware of requirements in respect of the scope, nature and quality of the drawing information and specification details required, certificates and testing and quality of workmanship in order that they can provide evidence of their suitability given the requirements of the project.

Tender documentation will include provisions relating to control mechanisms for the testing, inspecting, reporting and recording of the quality of work.

Contractors must submit in writing the proposed methods by which compliance with the specified requirements will be achieved.

Samples of components and workmanship should be obtained prior to work commencing on site.

The Quality Plan will incorporate comments and procedures in relation to:

1. The scope and nature of the work.
2. Details of Project Participants.
3. Responsibilities for the construction supervision and quality control.
4. Records and retention periods.
5. Schedule of Reviews.
6. Project specific procedures.
7. Key Target Dates.

9.3 Construction Period

Programme and Procurement Schedule:

Programme and Procurement Schedule will be produced which will identify the contractor’s intended work patterns for the contract.

Tender Documentation:

Tender Documentation will include descriptions in relation to scope of work, specification, workmanship, quality assurance and programme.

Safety Legislation:

All equipment to be used in the project must meet safety legislation requirements and have the necessary safety certificates. Equipment must be subject to appropriate controls and properly calibrated. The Contractor will be responsible for ensuring that all sub-contractors comply with this requirement.

It should be particularly noted that where an item of equipment’s safety certificate expires the equipment must be removed from the site or made inoperative.

Workmanship Standards and Supervision:
In order to achieve the appropriate workmanship standards reference and adherence should be made to Industry Standards for procurement, testing and commissioning.

Sub-contractors and suppliers should be subject to stringent management to ensure compliance with workmanship standards. Work should therefore be supervised and inspected by suitably qualified staff.

Progress will be reviewed at regular progress meetings with remedial action instructed where appropriate. These measures will also include quality audits.

**Inspection and Testing:**

Inspection and testing will be initiated by experienced members of the Project Team and remedial action taken when required.

Remedial work to prefabricated components will be allowed only with the prior approval of the Project Manager.

Records will be maintained of all inspections and tests which must all be witnessed by the main Contractor and where appropriate by the Services Consultant. Standards and Codes of Practice by which the inspection and testing procedures will be measured are to be included within the Contract Documentation.

**Selection of Contractors:**

Sub-contractors and suppliers will be selected on criteria which include their proven ability to protect and handle materials.

Method Statements should also be requested from sub-contractors and suppliers where required.
Health, Safety and Environment

10.1 Health and Safety
The University is committed to providing a ..........
The University of Strathclyde should ensure that its obligations under the Health & Safety at Work Act and in particular the CDM Regulations are carried out.

10.2 Site Safety
Site Address:

Client's Site Obligations:
The University of Strathclyde should ensure that its obligations under the Health & Safety at Work Act and in particular the CDM Regulations are carried out.

Contractor's Site Obligations:
The Principal Contractor must ensure compliance with CDM Regulations and all relevant Health and Safety legislation.

10.3 Building Occupier Safety
Not Applicable.

10.4 CDM Co-ordination
The University of Strathclyde will appoint a CDM Coordinator under the Construction Design & Management Regulations.

A pre-construction Health & Safety Plan will be prepared. Prior to commencement of the main contract works the Principal Contractor will develop the Health & Safety Plan. The CDM Coordinator will confirm that this has been sufficiently developed before works can commence.

10.5 Site Organisation
Access:
Personnel: All visitors to the site must report to the site office with the route being clearly delineated and clear of hazards. Underfoot conditions must be suitable for pedestrians.
Vehicle: Suitable access should be provided by the Contractor for heavy goods vehicles, heavy plant and machinery, cranage and skips etc.
Statutory Requirements: All statutory requirements must be adhered to and all hardstandings must be regularly cleaned.

Storage:
The Contractor must provide adequate site storage for materials on site.

Site Facilities:
Temporary Screens:
Full hoarding will be provided with an appropriate viewing locations for the public to safely monitor the works.

Name Board:
The Contractor will provide, maintain and take down a name board to display the title of the contract, the names of the Employer, Employer's representatives and the Contractor.

Use of Car Parks:
Car Parking will be managed and controlled by the main contractor.

10.6 Site Regulations and Security

Security:
Access to site will be managed and controlled by the main contractor. The main contractor will ensure the security of the site at all times. Security of the adjacent ………………………. must not be compromised by the works.

Work out with normal working hours will require to be sanctioned and monitored by the Project Manager and will be strictly controlled by The University of Strathclyde.

10.7 Environmental Standards

The Project Design Team and Principal Contractor must ensure compliance with the University standards in relation to the Environment and Sustainability. The Project stakeholders should refer to the Estates Management Sustainability Policy.

The effect of any environmental hazards will be addressed through the consideration of the treatment and disposal of waste materials.

Contract documents should include clauses to accommodate the requirements of the project.

Waste control methods should be assessed and agreed with the trade contractors with consideration being given to:

- Waste transport
- Containerisation
- Specialist collection
- Storage areas
- Site cleaning
- Access/egress route selection
Commissioning and Acceptance

11.1 Project Completion Procedures

All Commissioning and Testing should be undertaken after the Construction work has been completed and cleaned within each phase.

Responsibility:

The Main Contractor shall be responsible for the testing and commissioning of the Mechanical services.

The Architect / Clerk of Works will where appropriate witness testing to ensure the results are satisfactory to allow commissioning to commence.

Certificates:

The test and inspection certificates shall be signed by the Architect / Clerk of Works and the Main Contractor once the test and inspection is considered satisfactory.

Codes:

All wires shall be inspected, tested and commissioned in accordance with all relevant British Standard specifications, codes of practice and tender documents.

Commissioning:

The Main Contractor will ensure that the mechanical and electrical services are brought to a fully operational status.

Performance Test:

The Main Contractor will demonstrate to the Architect the appropriate commissioning tests and on satisfactory completion the tests results will be signed-off by the Main Contractor and Architect/Clerk of Works.

Following completion of the services commissioning, testing and system proving together with Environmental Tests will be undertaken by the Main Contractor.

The tests will thereafter be required to be undertaken in the presence of the Architect with the test results being signed-off by the Architect.

Defects List:

Details of outstanding defects will be prepared by the Architect for action by the Main Contractor.

Records:

Complete and comprehensive records of the installation tests and commissioning must be maintained by the Contractor.

The tests will be undertaken in the presence of the Employer’s representative(s).
**Pre-Handover Test:**
The Main Contractor and Employer’s representatives shall attend a Site meeting to undertake final acceptance tests of all mechanical and electrical engineering services.

Where the final acceptance test does not meet the acceptable level of performance established in the performance test the service will be required to be reset and tested,

The system must be operated for a period of two weeks during which the system's performance will be monitored, recorded and compared with the performance criteria specified in the contract documentation.

The item(s) listed on the defects list will be checked to ensure completion.

**Guarantees and Penalties:**

**Approvals:**

**Statutory:**

**Insurance:**

**Specialist Services:**

**Performance Test:**

The testing and commissioning must be in accordance with current British Standards and must be undertaken in the presence of the Architect / Clerk of Works and must be completed to the satisfaction of the Employer’s representative(s).

The installation must meet the requirements of all applicable statutory legislation.

**Client’s Maintenance Department:**

The Client’s commissioning officer may be required to be in attendance.

**Commissioning Programme:**

A master commissioning programme will be prepared for each service together with detailed programmes indicating the commissioning stages and their requisite time duration and the dates when the service will be available. The programmes will reflect the nature of the construction programme, the appropriate method statements.

**11.2 Operating and Maintenance Manuals**

The production of Operating and Maintenance Manuals should be the clear responsibility of the Contractors. The Contractor should refer to the Estates Management Handover procedure document which highlights the format these manuals will take.

The requirement to produce such manuals will be a contractual requirement of all trade contractors. Their submittals will incorporate:

Trade literature describing the materials used in the installation.

Details of suppliers.

Recommendations for maintenance of all materials used in the installation.

Details of any special plant required for maintenance or installation of materials.

Details of any special methods of access for replacing materials.
Commissioning and Acceptance

Details of cleaning requirements.
Details of any design approvals by consultant designers.
Specific Health and Safety requirements.

The responsibility for ensuring that the sub-contractors produce this information is vested in the contractor. In certifying Substantial Completion the Contract Administrator will need to be satisfied that this documentation is available.

The copyright in connection with all such documentation should rest with The University of Strathclyde.

11.3 Record Drawings

The Contractor should refer to Section 7 - As Built / Installed Drawings of the Estates Management Project Handover Guidance document.

11.4 Commissioning Data

General

All the works shall be inspected, tested and commissioned in accordance with all the relevant British Standard Specifications and Code of Practice and the details given in the Specification and/or as indicated on the drawing.

All installations shall be inspected and tested in sections as the work proceeds and on completion as composite systems. All costs shall be included in the Tender for arranging and providing all necessary attendance.

The tender shall include all allowances for ensuring that the full intention and purpose of the relevant procedures outlined in the section are made known to all office personnel and site operatives, as well as manufacturers and Specialist Sub-Contractors as subsequent commissioning and testing duties are greatly dependent on initial site care and attention to storage of materials and installation. The duties outlined shall be taken as a guide to the standard of care and attention the Services Consultant will require during all aspects of the work and everything which follows good and sound current practice shall be included.

Scope

The Inspection, Testing and Commissioning shall include testing, setting to work, regulation, environmental and capacity testing, and the preparation of all associated documentation related to the handover of the whole of the installed Engineering services as defined in the specification, to the satisfaction of the Architect.

Stage 1 - Testing, Post-Installation/Pre-Commissioning Inspections of Engineering Services

All these activities shall be carried out by the Main Contractor and with respect to inspection activities shall only be offered for acceptance when the work is complete.

The Architect / Clerk of Works will witness as appropriate in conjunction with the Main Contractor all testing, installation and pre-commission inspections to ensure the completed installations have reached a state of static completion and are in a safe and satisfactory condition to enable commissioning to commence.

Each test and inspection certificate shall be signed by the Architect and the Main Contractor to confirm the particular test/inspection has been carried out satisfactorily.

Stage 2 - Commissioning

This involves the advancement of the engineering services from static completion to a fully operational state including setting to work, and components performance testing.

Stage 3 - Performance Testing
When each Stage 2 commissioning activity has been successfully carried out, random tests shall be repeated in the presence of the Architect to witness and confirm acceptance of the results achieved. Each commissioning test shall be signed by all parties witnessing the test.

A list of outstanding defects on the systems/equipment will be prepared by the Architect and a copy given to the Main Contractor to action without delay.

**Stage 4 - Testing Prior to Handover**

Immediately prior to handover of the completed works the Employer’s representative will attend the site, and together with the Architect and Consulting Engineer and the Main Contractor, to witness final acceptance tests of all the engineering services.

It is intended, generally, to carry out random checks only in the installations being proposed for handover and comparing the results obtained with those achieved during Stage 3 Performance Testing.

In the event that the random checks are inconsistent with the Stage 3 tests and design data, the service/system in question shall be reset and re-tested in its entirety.

At the same time a thorough check will be made to ensure all the items raised on the various defects lists have been cleared to the satisfaction of the Architect/Consulting Engineer.

**Clients, User/Maintenance Representative**

The Architect/Consulting Engineer will monitor and witness all or some of the testing and commissioning activities. All allowances shall be included for liaising with this representative in addition to the other disciplines involved in the works.

**Commissioning Programme**

The Main Contractor shall prepare and submit a preliminary commissioning programme indicating the activities, manning levels and time periods required for commissioning the installations. The Commissioning Programme shall be in the form of a suite of programmes produced on a service by service basis with each particular programme referenced to a more general, overall master programme. Each programme shall indicate the stages of commissioning (1, 2, 3 and 4) and building completion and taking into account the construction programme.

The suite of preliminary programmes will be reviewed by the Architect and Consulting Engineer and after discussion and appropriate adjustment shall form the basis of the final commissioning programmes.

The commissioning programme shall take full account of the method Statements and be inter-related with the construction programme to achieve complete commissioning before handover.

The Main Contractor shall monitor the progress of commissioning and related activities against the agreed commissioning programme and revise and update the programme every two weeks or as necessary to suit the progress of the works.

The commissioning programmes and all subsequent revisions to the programme shall be submitted to the Architect and Consulting Engineer for comment.

A final programme shall be produced at least one month prior to the commencement of the commissioning tests and examinations for each phase of work. The programme shall indicate test starting and finishing times, number of Commissioning Engineers engaged and dates of events such as availability of power, heat and light.

### 11.5 Practical Completion and Handover

**Inspections, Snagging and Defects List**
Commissioning and Acceptance

Regular site inspections will be carried out by the IDT / Clerk of Works. For each phase of the contract, defects will be noted and defects lists will be issued promptly by the Architect if required. The contractor will be given a reasonable time to remedy defects and the progress will be closely monitored by the Architect. A few weeks prior to the anticipated handover of the building the Architect will carry out a complete inspection of the building and all of its services and finishes. A full snagging list will be prepared and issued by the Architect and the Main Contractor will be required to make good all the noted defects before the building will be accepted.

Notwithstanding the generality of the above the Main Contractor should take cognisance of his obligations to prepare initial snagging lists as defined in the tender documents.

Certificate of Practical Completion
The certificate of practical completion for any phases of the works will be issued by the Architect who will examine the entire building and will only issue the certificate of practical completion when he is satisfied that:

1. All defects have been remedied.
2. The building is fully functional.
3. All services are in working order and fully commissioned.
4. The maintainers and users have been fully trained in the operation of all services installations.
5. All building and services manuals have been handed to the user (after approval by the Project Manager).
6. All as built drawings have been issued.
7. All Health and Safety Documentation under CDM Regulations will be provided.
8. Completed Collateral Warranties
9. Occupation Certificate

Details of the requirements for the above will be contained in the contract documents.

Other Certificates, Approvals and Licenses
The contract documents will ask for a number of certificates to be issued e.g. Certificate of Electrical Compliance. Copies of these certificates will be held by the Architect and handed to the client at handover stage. The building will not be accepted by the Architect unless all of the necessary certificates have been obtained.

Building Manuals/As Built Drawings
Contract documents will ask for the production of manuals and as built drawings by handover. The Contractor should refer to the Estates Management Handover procedure document which highlights the format these manuals and as built drawings will take.

The Architect will receive these documents and check the contents. Any amendment or additions necessary will be instructed by the Architect who will withhold payment from the Contractor until satisfactory documents or sets of drawings are supplied.

Final Clean
The Main Contractor will be responsible for clearing away and removing all his own debris and surplus materials and will be responsible for the supervision of this work.

The Main Contractor on completion of his site clearance will arrange for specialist cleaning contractors to carry out a final clean of the building prior to occupation by the user.

Access for Contractor
Access for essential work will probably be required from time to time during the defects liability stage. Such access will be arranged by The University of Strathclyde in order to agree the most suitable times and dates for access. Under no circumstances will the contractor be permitted to visit the site after occupation unless by prior arrangement.

**Spares**

Some of the contract documents will include for list of essential spares to be provided at handover. The spares will be supplied with full instructions included prior to handover.

**Completion Date / Sectional Completion/Partial Possession**

The contract documents will clearly indicate the completion dates and what conditions will apply with regard to sectional completion or partial possession.

**Final Account**

The Final Accounts of the work will be agreed between the Main Contractor and the Quantity Surveyor and submitted to the Project Manager for approval. A time limit for production of the final accounts will be specified in the documents.

**Instruction of Staff**

The Main Contractor shall organise instruction of Employer’s staff and will liaise and co-ordinate with the Employer all the associated activities.

It will be the responsibility of the Main Contractor to provide attendance for the operation of plant and equipment and to provide instruction by specialist Sub-Contractors and specialist suppliers. All personnel shall be fully qualified and conversant with the operational and maintenance procedures of all plant and composite systems.

All installations shall be demonstrated in full working order unless it is agreed otherwise. Particular specialist items of plant or equipment can be satisfactorily demonstrated in isolation from the complete system.

The instruction may be undertaken in two distinctly separate stages, the first for operational and maintenance activities related to complete systems and the second for demonstration to staff to make them aware of general system principles and to explain the influence and operation of any controls or equipment.

**Certification**

The Architect/Consulting Engineer are to ensure that the following certificates are completed by the Main Contractor and provided to the Project Manager prior to handover, these are:

- Fire alarm, automatic fire detection, emergency lighting systems and smoke control systems.
- Emergency Lighting Certificate
- Electrical Compliance Certificate.

On satisfactory completion of the Testing and Commissioning the Project Manager will recommend acceptance of the installation to the Architect for him to issue the Certificate of Practical Completion.

Include the provision of duplicate certificates of test and including the examination report of motors and suspension ropes for lifts.

Before the final tests are witnessed by the Architect, such checks and assessments should be conducted to ensure that when the final tests are conducted they can be carried out with reasonable anticipation that the requirements of the Contract will be met and the final tests can be concluded without interruption and postponement.
Commissioning and Acceptance

Should the tests fail to demonstrate that the plant and equipment is properly installed and/or functioning, the Architect shall decide whether such failure is due to incorrect or faulty work by the Main Contractor, (including in this context, as defined, all his Sub-Contractors and Suppliers) in which case the Main Contractor shall forthwith carry out, at his own expense, such remedial measures and/or re-commissioning and adjustments as may be required. The Main Contractor shall then again report to the Architect for further demonstrations to be witnessed. The Architect’s opinion as to what constitutes a satisfactory performance demonstration shall be final, providing the Architect’s requirements are considered fair and reasonable.

Specialist Equipment

The testing and commissioning of all specialist equipment, associated pipework installations and electrical wiring circuits shall be carried out in accordance with the foregoing procedures.

Wherever equipment contains electrical control gear the manufacturer shall be engaged to test and demonstrate the equipment, unless specifically stated otherwise elsewhere.

All items of equipment shall be tested and demonstrated as required, to the satisfaction of the Architect/Consulting Engineer who will witness the testing and on completion of successful testing and demonstration will issue an Acceptance of Operation certificate.

All allowances shall be included for given seven days notice in writing to the Architect and Consulting Engineer prior to the date on which the testing and demonstration is to take place.

All items of equipment shall be left in correct working order, to the satisfaction of the Architect and Consulting Engineer, on completion of the contract.

At some future date following the handover of the contract, arrangements shall be made for a second visit to site by qualified demonstrators who shall be fully conversant with the operation and maintenance of the equipment. Arrangements in writing shall be made with the Employer for this visit to take place.

The duties of the demonstrators shall be to operate and demonstrate the equipment in fully working order, and to make the Employer’s operative fully conversant with the operation and maintenance of all the specialist equipment provided within this contract.

11.6 Client Matter

Post Contract Activities

Instructions to Employer’s Staff

The Contractor will ensure fully qualified personnel are provided for instruction on the operational and maintenance procedures for all services.

The instructions will provide for:

(i) The operating mechanics of the systems, controls and equipment.

(ii) The maintenance requirements of the systems.

The Client should maintain an initial defects register for the Contractor to address immediately.

Inspections:

All defects noted following regular inspections of the works will be issued without delay by the Architect to the Main Contractor. Prior to the handover of the work, a full inspection will be undertaken and a snagging list prepared by the Architect for remedial action to be undertaken by the Contractor.

Cleaning:
The Contractor will be responsible for removing all debris and surplus material. Specialist cleaning contractors may be required to complete final clean.

**Meter Readings:**
Electrical/Gas consumption by the Contractor during the currency of the works will be by metered supply to the contractor.

**Completion Date:** To be agreed.

**Sectional Completion/Partial Possession:** Not required.

**Final Account:**
The final account will be produced and agreed in accordance with contract documents

### 11.7 Defects Liability & Final Completion

The Project Manager will co-ordinate with the Architect an inspection of the works and collate a list of defects discovered following the issue of the Certificate of Practical Completion. This should be compiled in conjunction with the operators of the property.

The Main Contractor will prepare a programme for the completion of the works contained in the final defects list. This will be in consultation with the Client and Project Manager.

The Architect, following confirmation from the Main Contractor that the post-practical completion defects have been completed, will in conjunction with the Project Manager, the Consultants inspect the work and when completed to the satisfaction of the Employer’s representatives issue the final certificate to the Employer and Quantity Surveyor.

The Quantity Surveyor on receipt of the Final Certificate will refer the final account to the Project Manager and the Client and will issue the final valuation certificate to the Project Manager for distribution.

The Quantity Surveyor will prepare a final statement of cost for the development and issue the statement to the Project Manager
12.1 Post Occupancy Evaluation

The University of Strathclyde is committed to learning from all its projects and providing feedback to improving the quality of future works both at Strathclyde University and elsewhere. The Resident Architect represents the Scottish Association of University Directors of Estates on the RIBA Higher Education Design Quality Forum for which POE’s is encouraged as good practice.

The Resident Architect is a trained facilitator of such forums and they should allow for a representative’s one day attendance about a year after this project is completed on site to attend and participate in such a forum. This forum will include representatives from all Service Providers, contractors and University personnel as appropriate. The Resident Architect will make all the necessary arrangements. Further information on RIBA HEDQF and specifically POE’s can be found on the web at

## Roles and Responsibilities

### Project Manager (Estates Management)

Estates Management will require that an integrated Project Team is formed to implement the delivery of this complex and challenging project.

An Estates Management Project Manager will be appointed to lead the Project Team whose duties will cover the following:

- Preparation of the Project Execution Plan including risk register development, change control mechanisms and the Project Implementation Programme.
- Management and co-ordination of the Project Team and liaison with University Stakeholders.
- Monitoring progress, ensure that the project scope can be delivered on time and to budget including overall financial reporting and providing regular reports.
- Managing the procurement of the project including Client Directs.

### Integrated Project Team

A full list of the duties of the project Team are included in their relevant appointment documents. Briefly the major duties of the Project Team are as listed below.

### Architect

- Receive a detailed briefing from the Client.
- Prepare a schedule of accommodation and room date sheets.
- Carry out feasibility study.
- Prepare outline and detailed designs.
- Apply for all necessary permissions.
- Ensure the design complies with the requirements of CDM.
- Prepare detailed tender information and advise on the selection of contractors.
- Monitor the construction and carry out Contract administration duties.
- Monitor the construction and ensure that work is of the correct quality and liaise with Clerk of Works.
- Resolution of defects and final inspection.
- Prepare snagging list and issue certificate of Practical Completion.
- Resolution of defects and final inspection.
## Appendix – C Roles and Responsibilities

### CDM Coordinator
- Undertake all services required of the CDM Coordinator under the (Design and Management Regulations 1994).
- Ensure designers consider Health and Safety in the development of their designs and obtain risk assessments.
- Prepare the Pre Construction Health and Safety Plan.
- Review the Contractors Health and Safety Plan.
- Notify the Health and Safety Executive of the proposed development works and the appointment of the Principal Contractor.
- Collate the Health and Safety File and the O & M Manuals.

### Structural Engineer
- Undertake structural surveys including geotechnical and topographic surveys.
- Assist in the preparation of feasibility studies and the development of an outline scheme design.
- Develop on the basis of the space plan an integrated structural solution that supports the services strategy and provides a cost effective solution.
- Ensure the design complies with the requirements of CDM.
- Prepare a detailed design co-ordinated with all other disciplines.
- Prepare detailed tender information and advise on the selection of contractors.
- Monitor the construction and ensure that work is of the correct quality in liaison.
- Develop the detailed design and co-ordinate the overall design.
- Prepare detailed tender information and advise on the selection of Contractors.
- Ensure the design complies with the requirements of CDM Regulations in full.
- Monitor the construction and ensure that work is of the correct quality and liaise with Clerk of Works.
- Prepare snagging lists, resolution of defects and final inspections.

### Cost Manager
- Prepare and maintain an elemental cost plan and projects spend profile.
- Monitor and manage change control during the course of the project.
- Value Engineering – advise on construction economies and consideration of a balanced design and optimal selection of materials.
- Develop and maintain a risk register.
Appendix – C Roles and Responsibilities

- Advise on the most appropriate form of procurement route and the selection of tenders.
- Prepare contract documents and report on tenders.
- Prepare monthly valuations and out-turn cost forecasts.
- Agree the Final Account with the Contractor.

**Services Engineer**

- Visit the site and carry out and advise on the requirements for details of existing services and undertake detailed surveys of the same.
- Assist in the preparation of feasibility studies and the development of outline scheme designs.
- Develop on the basis of the space plan an integrated services solution that supports the space plan in line with the services strategy for the building/zone.
- Consider and advise on the whole cost, sustainability running and utility costs.
- Ensure the design complies with the requirement of CDM.
- Prepare detailed design co-ordinated with all other disciplines.
- Prepare detailed tender information and advise on the selection of contractors.
- Visit site and ensure that the services co-ordination is effectively managed.
- Monitor the construction and ensure that work is of the correct quality in liaison with the Clerk of Works.
- Develop in conjunction with the Contractor a detailed testing and commissioning programme.
- Monitor the construction and ensure that work is of the correct quality and liaise with Clerk of Works.
- Prepare snagging lists, resolution of defects and final inspections

**Contractor**

The Contractor’s duties will be fully described in detail by the tender documents and the relevant Building Contractor. The Contractor forms the crucial implementation role in the integrated team and must be regarded as a professional member of that team.

Briefly the Contractor’s role is as follows:-

- Development of a safe method of construction in line with Health and Safety legislation and University’s Local Rules.
- Review of the design and the provision of buildability advice.
- Development of detailed final design for major components, manufacturing details and components.
- Planning, managing and delivery of the physical construction.
- Providing an integrated supply chain including specialise suppliers and contractors.
- Programme management, including managing the design team production timescales.
- Quality control.
- Interface with client departments and users.
- Cost monitoring advise and assistance.
- Final testing and commissioning.
- Snagging and defects management.

**Clerk of Works**

The University employs a dedicated Clerk of Works service who report directly the University’s Project Controller and also form a significant part of the Integrated Project Team.

Their role is as follows:-

- Liaising with Contractors on access, safe working arrangements, agreeing method statements, footpath closures etc.
- Monitoring and recording progress with the works.
- Monitoring and reporting defects to the Contract Administrator.
- Liaising with the Design Team and Contractor and resolving technical queries.
- Liaising with the users regarding operational matters and resolving these in conjunction with the Project Manager.
- Issuing hot works permits, roof access permits etc. in accordance with University’s Local Rules.
- Monitoring, testing and commissioning is carried out in accordance with the agreed performance standards.
- Carrying out defect/snagging inspections and advising the Project Manager whether the project is suitable for Handover to the user.
- Reviewing and confirming that the defects have been successfully resolved.
## Appendix – E  Project Directory

<table>
<thead>
<tr>
<th>Client / End User</th>
<th>Contact:</th>
</tr>
</thead>
</table>
| The University of Strathclyde  
McCance Building  
16 Richmond Street  
Glasgow  
G1 1XQ | |
| Estates Management | |
| Estates Building  
181 St James’ Road  
Glasgow  
G4 0NT | Pat Hoy  
Depute Director  
0141 548 2600  
p.hoy@strath.ac.uk |
| | Fraser Bell  
Head Of Project Management  
0141 548 4350  
fraser.bell@strath.ac.uk |
| | Ross Simpson  
Head Of Building Services  
0141 548 4593  
ross.simpson@strath.ac.uk |
| | Mark Lindsey  
Contracts Surveyor  
0141 548 2112  
m.lindsay@strath.ac.uk |
| | Eleanor Magenis  
Head of Space Planning  
0141 548 4695  
e.magenis@strath.ac.uk |
| Architect | |
| Building Services Engineer | |
| Structural Engineer | |
| Quantity Surveyor | Contact: |
## Appendix – E Project Directory

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Phone</th>
<th>Email</th>
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<tbody>
<tr>
<td><strong>CDM Coordinator</strong></td>
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<tr>
<td><strong>BREEAM Assessor</strong></td>
<td>Faber Maunsell</td>
<td></td>
<td>Mariana Trusson</td>
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<tr>
<td></td>
<td>42 Colinton Road</td>
<td></td>
<td>0131 313 7600</td>
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<tr>
<td></td>
<td>Edinburgh</td>
<td></td>
<td><a href="mailto:Mariana.Trusson@fabermaunsell.com">Mariana.Trusson@fabermaunsell.com</a></td>
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<td></td>
<td>EH10 5BT</td>
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<tr>
<td><strong>Sustainability Advisor</strong></td>
<td>Gaia Research</td>
<td></td>
<td>Sandy Haliday -</td>
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<tr>
<td></td>
<td>The Monastery</td>
<td></td>
<td>0131 558 7227</td>
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<td></td>
<td>Hart Street Lane</td>
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<td><a href="mailto:sandy@qaiagroup.org">sandy@qaiagroup.org</a></td>
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<td><strong>Sustainability Advisor (Ecol)</strong></td>
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<tr>
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Appendix – F Risk Register

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Appendix – G Co-ordination with Client

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Appendix – H Change Control

Body text
Appendix – I Meeting Strategy