Training Qualifications UK

Qualification Specification

TQUK Level 3 Diploma in Design, Engineer, Construct! The Digital Built Environment (RQF)

Qualification Number: 603/1993/8

Version 6

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Summary of changes

The following table provides a summary of the changes that have been made to the qualification specification since the publication of the previous version.

Version number	Summary of changes
Version 4, September 2023	In Unit 5 (L/615/8838), learning outcome 2 has been amended to the following new wording: "Understand cost analysis and financial control.

Introduction

Welcome to TQUK

Training Qualifications UK (TQUK) is an Awarding Organisation recognised by the Office of Qualifications and Examinations Regulation (Ofqual) in England and CCEA Regulation in Northern Ireland.

TQUK offers qualifications which are regulated by Ofqual and, in some cases, by CCEA Regulation. All regulated TQUK qualifications sit on the Regulated Qualifications Framework (RQF) and are listed on the Register of Regulated Qualifications.

Our qualifications are designed to support and encourage learners to develop their knowledge and skills. This development may result in progression into employment or career development in the workplace. Our qualifications also allow learners to progress onto further qualifications. Please visit our website for news of our new and coming soon developments.

Centre Recognition

To offer a TQUK qualification, a centre must be recognised by TQUK.

The TQUK centre recognition process requires a centre to have in place a number of policies and procedures to protect the learners undertaking a TQUK qualification and the integrity of TQUK's qualifications. These policies and procedures will also support a recognised centre's quality systems and help support the centre to meet the qualification approval criteria.

Recognised centres must seek approval for each qualification they wish to offer.

The approval process requires centres to demonstrate that they have sufficient resources, including; suitably qualified and occupationally competent staff to deliver, assess and quality assure the qualification and access to appropriate support in the form of specialist resources. Qualification approval must be confirmed before any assessment of learners takes place.

Qualification Specifications

Each qualification TQUK offers is supported by a specification that includes all the information required by a centre to deliver the qualification. Information in the specification includes unit information, learning outcomes, and how the qualification is assessed.

The aim of the qualification specification is to guide a centre through the process of delivering the qualification.

Please read it alongside the TQUK Centre Handbook. Details of TQUK's procedures and policies can be found on our website.

Qualification specifications can also be found on our website. If you have any further questions, please contact TQUK.

Centres must ensure they are using the most recent version of the qualification specification for planning and delivery purposes.

Reproduction of this document

Centres may reproduce the qualification specification for internal use only but are not permitted to make any changes or manipulate the content in any form.

Centres must ensure they use the most up-to-date pdf version of the specification.

Use of TQUK Logo, Name and Qualifications

TQUK is a professional organisation and the use of its name and logo is restricted. TQUK's name may only be used by recognised centres to promote TQUK qualifications. Recognised centres may use the logo for promotional materials such as corporate/business letterheads, pages of the centre's website relating to TQUK qualifications, printed brochures, leaflets, or exhibition stands.

When using TQUK's logo, there must be no changes or amendments made to it, in terms of colour, size, border or shading. The logo must only be used in a way that easily identifies it as TQUK's logo. Any representation of TQUK's logo must be a true representation of the logo.

It is the responsibility of the centre to monitor the use and marketing of TQUK's logos and qualifications on their own materials as well as on those of any re-sellers or third parties they may use. TQUK must be made aware of centre relationships with re-sellers of TQUK qualifications. TQUK must be made aware of any additional websites where the centre intends to use TQUK's name and/or logo. If this information is changed, TQUK should be notified immediately. TQUK is required to monitor centres' websites and materials to ensure that learners are not being misled.

If a centre ceases to be/surrenders recognition as a TQUK centre, it must immediately discontinue the use of TQUK's logo, name, and qualifications from all websites and documents.

The Qualification

The TQUK Level 3 Diploma in Design Engineer Construct! The Digital Built Environment (RQF) is regulated by Ofqual.

The qualification was developed in association with Class Of Your Own® Limited (COYO).

COYO has licensed the Intellectual Property Rights in the Design Engineer Construct! Learning Programme to TQUK, on an exclusive basis, for incorporation into the TQUK DEC qualifications.

In development, this qualification was supported by:

Industry	Professional Bodies and Specialist Organisations	Further and Higher Educational Establishments
The qualification is formally supported by the following industry bodies; leaders in the Built Environment sector and represent some of the UK's most respected companies. These include:	The qualification is formally supported by professional bodies and specialist organisations including:	This qualification is formally supported by leading universities including:
• Mott MacDonald • Topcon Positioning Systems • Laing O'Rourke • Willmott Dixon • Arup • BAM • Balfour Beatty • Bentley Systems	• Royal Institution of Chartered Surveyors • Chartered Institute of Building • Chartered Institution of Civil Engineering Surveyors • UK BIM Alliance	• Newcastle • Heriot-Watt (incl. Edinburgh, Dubai & Malaysia campus) • Dundee • London South Bank • Westminster • Salford • Northumbria

The TQUK Level 3 Diploma in Design Engineer Construct! The Digital Built Environment (RQF) has been tariffed by UCAS and attracts the following points:

Grade	Points
A*	56
A	48
B	40
C	32
D	24
E	16

The results of the TQUK Level 3 Certificate in Design, Engineer, Construct! The Digital Built Environment (RQF), and the TQUK Level 3 Diploma in Design, Engineer, Construct! The Digital Built Environment (RQF), are not reported to UCAS through Awarding Body Linkage (ABL). This does not reflect the validity of the qualification. HEPs will need to ask applicants to provide evidence of achievement.

Qualification Purpose

Design Engineer Construct! Level 3 is an advanced programme for learners looking to increase their knowledge of professional practice in the Built Environment and provides an excellent opportunity to advance knowledge gained at Level 2 and extend the knowledge and skills required to progress to the professional workplace and/or university.

Learners develop, design, deliver and evaluate a fit-for-purpose, functional building that can be based on their interpretation of a 'real' project brief. Their building should be highly sustainable and inclusive and enable learners to demonstrate advanced knowledge and use a range of industry processes and digital skills.

The qualification fosters the knowledge and skills required to define, develop, deliver and evaluate a digital construction project from concept to handover. It encourages learners to focus on the impact on the end user, the wider community and the environment, setting standards for resource efficiency, and committing to sustainable procurement. Learners will understand the need for accurate technical information regarding the proposed site, and the constraints and challenges a site can present.

Building types they might consider include:

- an office block
- a housing project e.g. for the elderly, sheltered accommodation
- an outdoor activity centre
- a mixed-use development e.g. apartments and integrated café
- a school for special educational needs
- a neo-natal unit.

Learners can use an existing site as the 'building site' location of their building and/or use web-based mapping programmes and other technology platforms to access a range of industry-specific site information.

Learners are empowered to take ownership of their project, focusing on a justifiable need for the end users they have identified.

Where possible, we recommend learners are given access to professional volunteers e.g. through the Class Of Your Own 'Adopt A School' scheme and Professional Body outreach programmes.

The Design Engineer Construct!® Learning Programme (now commonly known as DEC) has gained a solid reputation as "the most innovative, challenging and relevant curriculum development in recent years", championed by respected leaders, and referenced in numerous national reports.

Aligning with the Sustainable Development Goals, the themes of social, environmental and economic sustainability run throughout Design Engineer Construct! programmes and learners discover how to minimise their own and their community's impact on the planet through role play and project-based learning. They understand the value of inclusivity and diversity, designing for a world where everyone matters.

Entry Requirements

There are no specific entry requirements, however, learners should have a minimum of Level 2 literacy and numeracy skills. We recommend that learners have achieved a minimum GCSE Mathematics grade 4 (C) or equivalent. This qualification is suitable for learners aged 16 years and above.

Centres should ensure that any learner registered on a TQUK qualification undertakes an initial assessment to ensure they have the ability to complete the course in full. The outcomes of the process inform:

- Early judgements about the learner
- The focus and level of learning
- The skills and needs that will be developed and supported.

A review of a learner's prior achievements, well-managed interviews and diagnostic tests are all suitable forms of initial assessment.

Progression

This qualification will provide an opportunity to progress into higher education or employment in the Built Environment. It provides access to a wide range of career pathways, including Architecture and Architectural Technology, Geospatial and Property Surveying, Quantity Surveying and Cost Management, Information Management, Civil, Structural and Building Services Engineering and Construction Project Management.

The qualification complements other subject areas at Level 3, such as mathematics, physics, engineering, computer science, art, geography, business studies and design technologies to broaden the curriculum. Past students have also combined with art and humanities subjects – we recommend consulting with employers and universities for specific progression requirements. With a range of transferable knowledge and skills, learners can also access wider industry opportunities, for example in the town planning, creative and digital, financial, and legal sectors.

Structure

Learners must successfully complete all six mandatory units to achieve the qualification.

Title	Unit ref.	Level	Guided learning hours	Credit value
Defining a sustainable construction project	A/615/8835	3	60	10
Developing a sustainable construction project	F/615/8836	3	60	10
Investigate design, structural and service aspects of a sustainable construction project	R/616/9176	3	60	10
Deliver design, structural and services aspects of a sustainable construction project	D/616/9178	3	60	10

Lifecycle and financial planning for a sustainable construction project	L/615/8838	3	60	10
Evaluating and documenting a sustainable construction project	R/615/8839	3	60	10

Guided Learning Hours

These hours are made up of all contact time, guidance or supervision of a learner by a teacher, supervisor, tutor, trainer or other appropriate provider of education or training.

GLH for this qualification is 360 hours.

Directed study requirements

Learners are expected to study and complete aspects of their assessment portfolio in their own time. This additional time is expected to be approximately 240 hours over the cycle of the programme.

Total Qualification Time

This is an estimate of the total length of time it is expected that a learner will typically take to achieve and demonstrate the level of attainment necessary for the award of the qualification i.e. to achieve all learning outcomes.

Total Qualification Time is comprised of GLH and an estimate of the number of hours a learner is likely to spend in preparation, study or any other learning including assessment which takes place as directed by, but not under the supervision of, a lecturer, supervisor or tutor. The credit value for a qualification, where given, is determined by TQT, as one credit corresponds to 10 hours of learning.

The Total Qualification Time for this qualification is 600 hours.

Assessment

It is essential that all learners are assessed in English unless the qualification specification specifically states that another language may be accepted. This ruling also applies to all learner evidence presented for external quality assurance purposes.

The recognised centre is required to have one or more delivery sites which offer facilities to support the programme of learning and assessment. These must comply with health and safety regulations and have in place appropriate access arrangements. All training and/or assessment sites must include the following facilities:

- A practical space to be used for learning and assessment activities. This should offer multimedia facilities such as a data projector and laptop, flipchart and pens.
- Architectural model-making facilities (card, foam board)

- A high specification* IT suite and IT hardware (minimum requirements will be advised to each Centre
- Industry standard design software such as, Autodesk, Bentley.

The use of industry-standard software is a critical element of the programme and prepares learners for working life in a modern, digital industry. Training is available through Class Of Your Own and advised to each Centre.

The qualification is assessed by a combination of an:

- Internally assessed and externally moderated portfolio (50%)
- Externally set and externally marked examination (50%).

The externally set and marked exams will take place on a date published in advance by TQUK. Dates for submission of work for standardisation and moderation will be published alongside dates for the exams.

The externally set and externally marked examination requires learners to sit the exam in conditions as set out in the TQUK Exam and Invigilation Procedure in the TQUK Centre Handbook. The exam will test learners on the knowledge assessment criteria identified in the unit tables. Where an assessment criterion has been identified as 'knowledge' the exam will test the general knowledge of a learner on this topic whereas the portfolio will show the application of this knowledge in a specific context.

The qualification is graded with grades A*/A/B/C/D/E. The overall grade for the qualification is calculated using a points-based system. A point score is awarded for each assessment component (exam and portfolio), before being weighted, combined and translated into a grade.

Internal assessment portfolio marking

Allocating learning outcome marks

The internal assessor will mark the portfolio assessment criteria in accordance with the clear levels of attainment contained in the assessment matrix found at the end of this specification. Each learning outcome is allocated a mark based on the average of marks achieved for the assessment criteria within that learning outcome. Each assessment criterion is eligible to achieve between 1 – 6 marks. A 0 (zero) will be allocated when the evidence presented does not meet the minimum requirements.

The overall unit score is then aggregated by adding the total learning outcome score:

Unit marking scale							
Unit Points	**Fail**	**E**	**D**	**C**	**B**	**A**	**A***
Unit 1 combined score (X3 tasks)	0	3	6	9	12	15	17
Unit 2 combined score (X3 tasks)	0	3	6	9	12	15	17
Unit 3 combined score (X3 tasks)	0	3	6	9	12	15	17
Unit 4 combined score (X3 tasks)	0	3	6	9	12	15	16
Unit 5 combined score (X3 tasks)	0	3	6	9	12	15	16
Unit 6 combined score (X3 tasks)	**0**	**3**	**6**	**9**	**12**	**15**	**16**

Portfolio Mark and Grade

The unit points are then added together to create an overall grade for the portfolio for submission to TQUK.

Portfolio marking scale							
Combined unit score	0-17	18-35	36-53	54-71	72-89	90-98	99-108
Portfolio Grade	Fail	E	D	C	B	A	A*

The learner attainment record is designed in a way to lead the assessors through this process. The portfolio points are then submitted to TQUK.

For a learner to gain an overall pass on the portfolio aspect, they must achieve a minimum pass on each unit of the portfolio.

All portfolios should be submitted as a single PDF file. If learners have completed work in a visual format, teachers should keep a record and add this to the learner's portfolios once they have been submitted and before submitting them to TQUK. Therefore all physical work should be scanned and added to the portfolio before submission.

External exam marking

The TQUK external assessors are required to mark the exam in accordance with the pre-standardised mark scheme. All papers are then subject to the application of grade boundaries in order to maintain comparable standards over time.

Learners are eligible to achieve up to a maximum of 120 marks per paper.

Points scale							
Marks	0	Variable marking					120
Grade	Fail	E	D	C	B	A	A*

Calculating the qualification grade

The mark from the exam is converted into a mark out of 108 to align with the overall portfolio mark.

The portfolio and exam points are then weighted as follows:

- 50% Portfolio: Points X 0.5 to weight the portfolio score
- 50% Exam: Points X 0.5 to weight the exam score.

Weighted points are added to produce a Final Points Score. These points are used to determine the overall grade for the qualification. As the exam grade is based on a variable scale, with grade boundaries changing annually, final grading calculations are dynamic and may be subject to change.

All assessments are required to have a minimum of a pass awarded in order for the learner to achieve a final grade. Learners who do not reach a minimum of a pass for all assessments will not be awarded the qualification.

Special Consideration requirements

The recognised centre is required to ensure all learners who are disadvantaged, and are unable to complete the full learning programme due to emotional or physical difficulties, or were subject to any adverse circumstances during their registration are made aware of and able to access and request special considerations in accordance with the *TQUK Access Arrangements Policy*.

Re-assessment requirements

Externally assessed examination

External reassessment requires learners to retake the examination on a date specified by TQUK. Exam dates will be published in September for the following year.

Centres will be required to pay an additional reassessment fee per learner. Details of re-assessment fees can be found in our resit and resubmission fees document located at www.tquk.org/design-engineer-construct/.

Internally assessed portfolio

Portfolio reassessment requires learners to submit new evidence for units. New evidence must be presented in line with specified awarding windows. Learners who submit a portfolio with new evidence will always be part of the cohort sample.

Centres will be required to pay an additional reassessment fee per learner. Details of reassessment fees can be found in our resit and resubmission fees document located at www.tquk.org/design-engineer-construct/.

Course Delivery

Pre-Course Information

All learners should be given appropriate pre-course information regarding any TQUK qualifications. The information should explain the qualification, the fee, the form of the assessment and any entry requirements or resources needed to undertake the qualification.

Initial Assessment

Centres should ensure that any learner registered on a TQUK qualification undertakes some form of initial assessment. The initial assessment should be used to inform a teacher/trainer of the level of the learner's current knowledge and/or skills and any additional specific support requirements the learner may need.

The initial assessment can be undertaken by a teacher/trainer in any form suitable for the qualification to be undertaken by the learner/s. It is the centre's responsibility to make available forms of initial assessment that are valid, applicable, and relevant to TQUK qualifications.

Teaching resources

All teaching materials and additional resources used to support the delivery of this qualification must be age-appropriate. Centres must ensure when developing or sourcing delivery materials that careful consideration is given to the safeguarding and wellbeing of their learners in line with the centre's policies and procedures.

Learner Registration

Once approved to offer a qualification, centres must follow TQUK's procedures for registering learners. Learner registration is at the discretion of the centre and in line with equality legislation and health and safety requirements.

Centres must register learners before any assessment can take place.

Class Of Your Own and TQUK will track the achievements of learners, and their progress into further and higher education, or employment to ensure the qualification remains relevant and valued by industry and educational bodies. COYO will collect this data on behalf of TQUK from school and college administration teams. Upon registering learners will be asked for their permission for this data to be shared between COYO and TQUK.

Tutor, Assessor and Internal Quality Assurer Requirements

All members of staff involved with the qualification (assessing or IQA) will need to be occupationally competent in the subject area being delivered. This could be evidenced by a combination of:

- A higher level qualification in the same subject area as the qualification approval request
- Experience of the delivery/assessment/IQA of the qualification requested
- Work experience in the subject area of the qualification.

Staff members will also be expected to have a working knowledge of the requirements of the qualification and a thorough knowledge and understanding of the role of tutors/assessors and internal quality assurance. They are also expected to undertake continuous professional development (CPD) to ensure they remain up to date with work practices and developments associated with the qualifications they assessor or quality assure.

Tutor

Tutors or trainers who deliver a TQUK qualification must possess a teaching qualification appropriate for the level of qualification they deliver. This can include:

- Further and Adult Education Teacher's Certificate
- Cert Ed/PGCE/Bed/MEd
- PTLLS/CTLLS/DTLLS
- Level 3 Award/Level 4 Certificate/Level 5 Diploma in Education and Training.

Assessor

Staff who assess a TQUK qualification must possess an assessing qualification appropriate for the level of qualification they are delivering or be working towards a relevant qualification and have their assessment decisions countersigned by a qualified assessor. This can include:

- Level 3 Award in Assessing Competence in the Work Environment
- Level 3 Award in Assessing Vocationally Related Achievement
- Level 3 Award in Understanding the Principles and Practices of Assessment
- Level 3 Certificate in Assessing Vocational Achievement
- A1 or D32/D33.

Specific requirements for assessors may be indicated in the assessment strategy/principles identified in individual unit specifications.

Internal Quality Assurer

Centre staff who undertake the role of an Internal Quality Assurer (IQA) for TQUK qualifications must possess or be working towards a relevant qualification and have their quality assurance decisions countersigned by a qualified internal quality assurer. This could include:

- Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice
- Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice
- V1 qualification (internal quality assurance of the assessment process)
- D34 qualification (internally verify NVQ assessments and processes).

It is best practice that those who quality assure qualifications also hold one of the assessing qualifications outlined above. IQAs must follow the principles set out in Learning and Development NOS 11 - Internally monitor and maintain the quality of assessment.

External Quality Assurance

External Quality Assurance will be undertaken by TQUK to ensure that centres are satisfying TQUK quality assurance compliance with the requirements associated with their TQUK recognised centre status and formal written agreement. This will consist of physical activities and remote reviews.

Useful Websites

Office of Qualifications and Examinations Regulation

Register of Regulated Qualifications

For further details regarding approval, please refer to the following websites:

Regulated Qualifications Framework (RQF) in England (and includes vocational qualifications in Northern Ireland)

Scottish Credit and Qualifications Framework (SCQF)

Education and Skills Funding Agency (ESFA) and Learning Aim Reference Service (LARS)

Insight

For more information on Design Engineer Construct! and Class Of Your Own, please visit:

Design Engineer Construct!

Class Of Your Own

A full list of useful links is available through Class Of Your Own's teaching resources and the 'DEC School' eLearning platform. All Centres will be invited to use 'DEC School' as their central resource for learning and teaching support.

Mandatory Units

Title:		Defining a sustainable construction project	
Unit reference number:		F/615/8822	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		Assessment criteria The learner can:	
1.	Be able to research and convey the project remit.	1.1	Identify a significant construction project for in-depth study.
		1.2	Communicate the vision for the project.
		1.3	Set the scene for the project in the context of the existing environment.
		1.4	Set the scene for the project in the context of the end user.
		1.5 (K)	Write a mission statement for the project.
2.	Be able to set standards for sustainability in a construction project.	2.1 (K)	Define commitments to positively impact the local community and the local environment.
		2.2 (K)	Define and explain commitments to energy and water efficiency, and carbon reduction.
		2.3 (K)	Define commitments to minimise construction waste.
		2.4 (K)	Define and explain commitments to ethical sourcing of materials and responsible procurement.
		2.5 (K)	Define and explain sustainability monitoring and reporting procedures for the lifecycle of the project.
3.	Be able to define site information required at pre-design phase.	3.1 (K)	Identify the importance of site analysis and the roles of professional consultants in pre-design phase.

		3.2 (K)	Determine what topographical information is required and outline appropriate, effective ways to collect accurate data for a particular site.
		3.3 (K)	Identify information required to produce a geotechnical report and relate to the specified project.
		3.4 (K)	Identify information required to produce an ecological study and relate to the specified project.
		3.5 (K)	Identify information required to produce a hydrology study and relate to the specified project.

Assessment Guidance:

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: Learners will select an appropriate project either through an existing genuine architectural competition or by identifying a building that they believe is needed in their own town.

1.2: Learners should articulate their high-level, aspirational ambitions for their project what it will achieve when it is completed in the context of the people who will use it, the environment in which it sits and the sustainable objectives it will realise.

1.3: Learners should discuss the existing built environment and infrastructure, describe the current social, economic and environmental situation and the general aesthetics and 'feel' of the area, what it means to the people who live and work, and indeed what it means to them personally.

1.4: Learners will provide a profile of the end user of their building project, detailing anticipated wishes and demands. They may choose to research end users in similar facilities both physically and operationally.

1.5: Learners will determine clear values, objectives and outcomes for their project, ideally working as a team to identify key themes, for example, purpose, environmental impact, design excellence, sustainability, and economic contribution. Learners might gain inspiration by exploring the mission statements of leading architecture, engineering and construction companies.

2.1: Learners will produce a statement that outlines their commitment to positively impact the local community and the local environment not only in terms of the building itself and its entire lifecycle, but also through the ethos, behaviour and passion of the entire project team in caring for the community and protecting the environment in the immediate vicinity of the project. This should be based on referenced research evidence.

2.2: Learners will produce a statement that outlines their commitment to energy and water efficiency, and to reduce carbon emissions throughout the entire lifecycle of the building, and also through the ethos, behaviour and passion of the entire project team. This should be based on referenced research evidence.

2.3: Learners will produce a statement which outlines their commitment to waste minimisation throughout the entire lifecycle of the building, and also through the ethos, behaviour and passion of the entire project team

2.4: Learners will produce a statement that outlines their commitment to ethical sourcing and responsible procurement throughout the entire lifecycle of the building, and also through the ethos, behaviour and passion of the entire project team.

2.5: Learners should explore existing industry procedures to produce a methodology. Valuable guidance can be found by registering with BREEAM, an internationally recognised measure and mark of a building's sustainable qualities, and certified buildings are immediately identifiable as having been planned, designed, constructed and operated in accordance with best practice sustainability principles.

3.1: Learners will understand the importance of an adequate site investigation and describe who and what is involved, and why it is carried out. They will outline the risks involved in gathering insufficient or inadequate data.

3.2: Learners will understand the role of the topographical surveyor in providing accurate survey data. They will explore the limitations of everyday mapping information in providing accurate geotechnical data and how technology has advanced the methods of surveying. Learners will compare methodologies and technologies and will determine appropriate above ground survey methods for their project including laser scanning, satellite-based positioning systems (GPS/GNSS), electronic distance measurement (total station), Geographical Information Systems (GIS) and ground penetrating radar (GPR) for below ground utility mapping. Learners will define appropriate vertical/horizontal accuracy and understand the need for precision to establish boundaries, elevation for flood plain data, positioning of trees, water courses and other natural features, existing buildings and manmade features, and also the need to discover existing utilities running through and adjacent to the site. They will explore the limitations of surveying tools, for example, GPS requires good satellite geometry and visibility. Tree canopies and dense, built-up areas can render GPS methods ineffective.

3.3: Learners will understand the role of the geotechnical surveyor in providing accurate ground condition information regarding soil and geologic conditions on and below the surface. They will understand the process of site analysis through desk study, survey and reporting.

3.4: Learners will understand the role of the ecology professional in providing accurate information regarding vegetation and wildlife and their habitats in the local area. They will understand the process of site analysis through desk study, survey and reporting.

3.5: Learners will understand the role of the hydrology professional in providing accurate information regarding the quality, position and flow of watercourses in the local area. They will understand the process of site analysis through desk study, survey and reporting

Amplification:

(K) – This symbol refers to **Knowledge,** which indicates that the **Assessment Criteria** will also be measured by an **External Synoptic Exam.**

Title:		Developing a sustainable construction project	
Unit reference number:		F/615/8836	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		Assessment criteria The learner can:	
1.	Be able to prepare a design brief and take steps to appoint an effective design team.	1.1 (K)	Explain the purpose of a design brief.
		1.2 (K)	Describe the role and responsibility of the client in a construction project.
		1.3 (K)	Prepare the design brief for a specific construction project and receive critical feedback for client sign-off.
		1.4 (K)	Formalise the appointment of an Integrated Project Team.
		1.5 (K)	Produce an organogram outlining professionals and their roles at each phase of the project.
2.	Be able to use building information modelling techniques for concept design.	2.1	Create preliminary concept designs based on the design brief.
		2.2 (K)	Assess concept designs for space requirements, circulation and accessibility.
		2.3 (K)	Assess concept design to produce preliminary cost and lifecycle cost prediction.
		2.4 (K)	Perform energy analysis relative to form, orientation, weather, surfaces and glazing.
		2.5	Present information for the whole project lifecycle and provide validation for chosen model.
3.	Be able to prepare information and resources needed to support a planning application.	3.1 (K)	Explain the planning process for a specific construction project.
		3.2 (K)	Make use of current legislation and guidance.
		3.3 (K)	Prepare a planning feasibility study for a specific construction project.

		3.4 (K)	Describe what is meant by the term 'undesirable precedent' in planning decisions and provide an example of such.
		3.5	Formulate justification and present evidence for the approval of a specific project.

Assessment Guidance:

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: The learner will explain what a design brief is and what purpose a design brief serves within a construction project.

1.2: The Client plays a major role in any construction project and has a wide range of responsibilities including ensuring that all appointees are competent and that suitable managers are appointed to oversee the project.

1.3: Learners will prepare an effective, jargon-free design brief that conveys a client's vision, their goals and their priorities and provides an accurate account of the project's deliverables. The brief should refer to a budget estimate and realistic timeline and should confirm the main point of contact and decision maker(s). Operational management must be a key part of the brief. Learners will present to an audience which will act as clients in the development. The learner must present with conviction and confidence and make appropriate adjustments on receiving critical feedback.

1.4: Learners should describe the engagement of an efficient, multidisciplinary team focusing on their ability to work together in a collaborative digital environment driven by the benefits of Building Information Modelling.

1.5: Learners will outline key members of the Project Team with specific reference to the role of the Information Manager.

2.1: Learners will produce a number of concept design options extracting key information from the design brief. They will understand the benefits of conceptual modelling as a critical stage of building design such as enabling the communication of ideas and supporting early stage analysis for building life cycle sustainability and cost.

2.2: Learners will determine how their concept design maximises efficient and effective space use for those who will use it and how it facilitates the safe, convenient movement of people, both able-bodied and disabled. They should define spatial requirements for a range of occupant activities and equipment and consider how the positioning of elements such as corridors, lifts, escalators, and staircases contribute to the optimisation of the flow of people through a building. They should be encouraged to explore the size of rooms and areas with a specific purpose.

2.3: Learners will produce high-level estimates based on number of occupants and area or volume on a standard £/m2 and £/m3 basis according to the type of project they have designed. Whilst this is a function that can be quickly carried out using industry software, learners should understand the methodology behind calculation, the risks involved in estimation, and the impact of lifecycle costing on sustainability.

2.4: Learners will produce a high-level analysis of overall energy use. They will provide a solar study taking into account the shading effects of surrounding buildings where applicable and

recommending ways to maximise solar gain. They will explore the effects of making changes to form and orientation to maximise energy efficiency and make comparisons. Whilst this is a function that can be quickly carried out using industry software, learners should understand the methodology behind the calculation, the risks involved in estimation, and the impact of analysis on sustainability.

2.5: Learners will present an effective, efficient concept model that is most aligned with the project design brief, life cycle objectives and vision.

3.1: The 'National Planning Policy Framework' sets out planning policies for England and how they are expected to be applied. It provides guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications. It is important that learners understand the need to involve the wider community in the process and the introduction of the 'Localism Act' and the new 'Neighbourhood Planning' framework empowers communities to have their say regarding development in their neighbourhoods. If a construction project is classed as a 'major development' it is crucial that the community is involved at an early stage. Relevant aspects of national, regional and neighbourhood planning should be identified and used to justify the need for the project.

3.2: Learners will align significant legislation to their specific project. They should be aware of a number of acts and codes of practice from Level 2 including Tree Preservation Orders (TPOs) and the Wildlife and Countryside Act 1981. The Disabled Persons Act 1981 ensures that the needs of disabled persons are provided for in any development schemes. The Equality Act 2010 ensures that local planning policies need to take into account the particular needs of women, young people and children, older people, ethnic minorities, children and disabled people. The Party Wall Act 1996 prevents and resolves disputes in relation to party walls (walls of adjoining dwellings e.g. semi-detached houses and terraces), boundary walls and excavations near neighbouring buildings. Right to Light - a private, legally enforceable easement or right to a minimum level of natural illumination through a 'defined aperture', usually a window opening. Planning applications must also be decided in accordance with the Local Development Framework (LDF).

3.3: Learners will create a feasibility study outlining how their proposal will conform and respond to particular areas of policy and legislation.

3.4: Learners will explain the term 'undesirable precedent' in the context of building design and its impact on planning law/codes of practice. A large number of case studies can be found on the internet and learners should provide an appropriate example aligned to their project.

3.5: Learners will explain the planning process and identify the documentation required for an application, including the following: - Ownership certificate, fees, drawings, and application form. In addition, a design and access statement should be produced and justified to access the full marks available.

Amplification:

(K) – This symbol refers to **Knowledge,** which indicates that the **Assessment Criteria** will also be measured by an **External Synoptic Exam.**

Title:		Investigate design, structural and services aspects of a sustainable construction project	
Unit reference number:		R/616/9176	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		Assessment criteria The learner can:	
1.	Be able to deliver a project.	1.1 (K)	Analyse relevant architectural precedents.
		1.2 (K)	Explore specific materials and their properties, and justify material choices.
		1.3	Gather information using charts and tables to inform the sizes of rooms and spaces.
		1.4 (K)	Generate schedules of accommodation.
		1.5	Analyse the information and justify choice.
2.	Gather and analyse information to develop the structural elements.	2.1 (K)	Explore different structures within the built environment: frame, shell, mass.
		2.2 (K)	Explore how forces affect structural elements: tension, compression, shear, torsion and bending.
		2.3 (K)	Gather information about different structural materials and compare their properties.
		2.4	Use charts and tables to define loading scenario.
		2.5 (K)	Analyse the information and make choices as to the type of structure and materials most suitable.
3.	Gather and analyse information to develop the building services elements.	3.1 (K)	Explore what is meant by occupant comfort and how it can be measured.
		3.2 (K)	Gather information from case studies related to aspects of building services heating, ventilation and lighting.
		3.3 (K)	Use tables and charts to define lighting levels, temperatures and air exchange rate.

		3.4 (K)	Apply science and maths and use industry-standard software to calculate the need for different building services.
		3.5 (K)	Analyse the information and make choices as to the appropriate technologies to use.

Assessment Guidance:

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: Learners will identify relevant precedents in terms of function and location and analyse to highlight features that could inspire and inform the architecture of their proposals.

1.2: Materials should be selected in terms of their aesthetics, sustainability, cost and performance. Learners will create a table that compares the materials and presents the data. Compare U values, cost and aesthetics.

1.3: Learners will refine the function and occupancy of each space, and use data from guidelines to calculate the area and height of spaces and rooms using correct units. Learners can measure the sizes of comparable rooms within the school building and use these to inform their designs.

1.4: Learners will produce a schedule of accommodation that can be used to inform and test the architectural model.

1.5: Learners will explain how their building meets their design brief.

2.1: This criteria presents students with the ideal opportunity to meet with their industry partners to explore buildings in the real world, where different structural forms have been used.

2.2: Learners will create a simple structural model (spaghetti and marshmallows work well) and record what happens when different loads are applied.

2.3: Learners will compare the properties of reinforced concrete, steel, aluminium, brick and modern manufactured materials e.g. SIPs. Learners will compare their structural properties, e.g. concrete is strong in compression, and steel is strong in tension.

2.4: Learners will research the dead loads of different materials and the imposed loads of different activities that will take place in your building.

2.5: Learners will use the research to make choices about the type of structure they think is most appropriate, and which materials they would use for the different elements.

3.1: Learners will research the different aspects of occupant comfort; thermal, visual, air quality and acoustic. Learners will explain how they can be measured (metrics) and achieved through the provision of building services.

3.2: Learners will research best practice in building services and identify strategies and technologies that could be applied.

3.3: Learners will collect data to define the recommended lighting levels (lux), temperatures and air exchange rates for the building types.

3.4: Learners will benefit from real-life examples presented by industry partners, this could include:

- Heat loss calculations using U Values
- Lighting calculation using free software such as Dialux
- Water consumption using online software
- Fire exits using information from building regulations Part B

3.5: Learners will use the research to explain choices that will improve occupant comfort and be energy efficient.

Amplification:

(K) – This symbol refers to Knowledge, which indicates that the Assessment Criteria will also be measured by an External Synoptic Exam.

Title:		Deliver design, structural and services aspects of a sustainable construction project	
Unit reference number:		D/616/9178	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		**Assessment criteria** The learner can:	
1.	Use building information modelling techniques to develop the design.	1.1	Generate a 3D model using material and component libraries.
		1.2	Generate floor plans and schedules.
		1.3	Communicate the design using 3D views and renders.
		1.4	Present the digital model to critical experts.
		1.5	Address errors, clashes and omissions and make modifications as a result of feedback.
2.	Use building information modelling techniques to develop structural elements of a building project.	2.1	Generate a structural plan or grid that identifies the main structural elements: foundations, structural walls, slabs, beams and columns.
		2.2	Create a 3D structural model using component libraries.
		2.3	Apply science and maths to calculate elements of the structure.
		2.4	Present the digital model to critical experts.
		2.5	Address errors, clashes and omissions and make modifications as a result of feedback.
3.	Use building information modelling techniques to develop building services elements of a building project.	3.1	Generate annotated floor plans that define recommended levels for lighting ventilation and heating.
		3.2	Model and test aspects of building services to demonstrate how recommendations for services can be met.
		3.3	Use energy software to test the energy efficiency and recommend improvements.
		3.4	Present the digital model to critical experts.
		3.5	Address errors, clashes and omissions and make modifications as a result of feedback.
Assessment Guidance:			

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: Learners will create a 3D digital model. Level of required detail: External and internal walls (with materials), doors and windows, floors and roof; rooms and spaces should be identified to allow schedules to be generated; furniture and other components can be added to demonstrate the scale and organisation of spaces.

1.2: Learners will use 3D modelling software to produce floor plans and room/space schedules.

1.3: Learners will create different 3D views of the building (external and internal) to show the design of the building and particular features.

1.4: Learners will create a presentation to explain how the building evolved, the accommodation it provides, and the materials used. Learners will present the building to critical experts, these could be your industry link, ambassadors from local universities or colleges, or your client. Learners will record any feedback (see section 1.5).

1.5: Learners will record the feedback from their presentation and update the model. Learners will explain the changes that have been made.

2.1: Learners will annotate a floor plan and use relevant software to create a structural grid. The grid should show key elements such as column spacing and locations.

2.2: Learners will use 3D modelling software to create a structural model. If the building design is too complex, a simpler example could be included, or a single part of the proposal could be modelled.

2.3: Learners will explore scientific and mathematical concepts relating to bending moments, cantilevers, forces and loads. An example would be the deflection caused by a load(s) on a beam.

2.4: Learners will create a presentation to explain their choices of structure and materials. They may also want to include the loading data (gathered in section 3) so that a Structural Engineer could then perform a more detailed analysis. Learners will present the building to critical experts, these could be your industry links, ambassadors from local universities or colleges, or your client. Record any feedback (see section 2.5).

2.5: Learners will record the feedback from their presentation and update the model. Learners will explain the changes that have been made.

3.1: Learners will create annotated floor plans with a key to illustrate the different lighting, temperature and ventilation recommendations.

3.2: Software libraries can be used to add plumbing, lighting, ventilation etc. to the model. It is not necessary to include all services. Alternatively, specialist software such as Dialux for lighting could be used to model and test.

3.3: Energy analysis software can be used to model energy use. The energy insight can be particularly useful to test different improvements and measure the impact.

3.4: Learners will create a presentation to explain their choices for heating, lighting and ventilating their building. They may also want to include the recommended levels so that a Building Services Engineer could then perform a more detailed analysis.

3.5: Learners will record the feedback from their presentation and update the model. Learners will explain the changes that have been made.

Amplification:

(K) – This symbol refers to **Knowledge,** which indicates that the **Assessment Criteria** will also be measured by an **External Synoptic Exam.**

Title:		Lifecycle and financial planning for a sustainable construction project	
Unit reference number:		L/615/8838	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		**Assessment criteria** The learner can:	
1.	Be able to use building information modelling techniques to support the operational management of a building project.	1.1 **(K)**	Explain the role of BIM in the operation, management and maintenance of a sustainable building project throughout its lifecycle.
		1.2 **(K)**	Devise an appropriate handover process from the construction team to the end user.
		1.3 **(K)**	Set targets for whole-life energy performance, water consumption, waste reduction, operation and maintenance costs.
		1.4 **(K)**	Analyse the impact of post-occupancy behaviour on the lifecycle of a building.
		1.5 **(K)**	Describe the benefits of early engagement of the Facilities Manager and the client/end user in the design process.
2.	Understand cost analysis and financial control.	2.1 **(K)**	Explain the role of BIM in the financial management of a building project.
		2.2 **(K)**	Produce a cost model based on the project timeline.
		2.3 **(K)**	Identify points of accountability for keeping the project to budget.
		2.4 **(K)**	Explain the consequences of weaknesses in financial control.
		2.5 **(K)**	Devise policies for sustainable procurement to establish audit trails.
3.	Be able to produce a budget for a complex building project.	3.1 **(K)**	Compile an accurate list of capital costs.
		3.2 **(K)**	Provide an annual projection for recurrent fixed costs.
		3.3 **(K)**	Provide an annual projection for recurrent variable costs.
		3.4 **(K)**	Provide a sensitivity analysis based on possible variations in costs.

		3.5 **(K)**	Present and negotiate variations to the design within budget constraints.

Assessment Guidance:

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: Learners will describe the benefits of developing and maintaining lifecycle data to support the effective, efficient operation, management and maintenance of a building. Data defines the precise location and condition of systems, equipment and objects found in a building (for example lighting, air conditioning, electrical and plumbing systems, fire protection, IT, furniture), and relationships between one component and another. They should understand how information is created and updated throughout the design and construction phase, and how it can be monitored and constantly refreshed throughout the building's lifetime to provide an up-to-date, real-time 'as built' model.

1.2: Learners will further develop knowledge gained in Level 1 and 2 qualifications regarding effective end-user behaviour and should devise an effective strategy for end-user handover to promote the optimum operational performance of a building.

1.3: Learners will produce and validate a clear set of targets for their building focusing on energy use, water consumption, waste reduction and operation and maintenance costs. Learners should consider local, national and global policies and protocols, and research existing local case studies to determine how targets are set, measured and reported, and their effectiveness over time.

1.4: Learners should discuss quantitative and qualitative end user/ operator data and how this information can provide a measurement of the success (or failure) of a building project. Learners should discuss the analysis of data to inform the design process and real-life building performance prediction. Learners should be able to explain what Post Occupancy Evaluation is and why it is important.

1.5: Learners will discuss the role of the Facilities Manager and the client/end user in early-stage building design in contributing key knowledge and experience in the use, operation and maintenance of a building.

2.1: Learners will understand the role and effectiveness of BIM in producing accurate building project cost information including cost plans, bills of quantities and estimates. They should discuss accuracy, time and cost savings, financial transparency, and the ability to update cost information automatically when making modifications to the building model. The term data drops relates to information sharing at different points in the project. This relates to 2.2.

2.2: Learners will generate a detailed cost plan from their building model in line with the original budget and timeline objectives.

2.3: Learners will identify key project stages, associated costs and the roles responsible for their impact on the budget and final project cost.

2.4: Learners will understand the impact of poor financial management and reporting and should discuss the bank account and reconciliation, assets and liabilities, cash flow, invoicing, supply chain management, resolution of errors, resource prediction and allocation.

2.5: Learners will establish procedures for sustainable procurement which provides a clear audit trail and promotes responsible sourcing based on whole life costing principles. They should consider

social, economic and environmental impact and compliance with environmental legislation and regulation.

3.1: Learners will provide a definition of capital costs for a construction project and compile a list referenced to their building project. Capital costs include expenses related to the initial establishment of a building and include land purchase, planning and feasibility studies, architectural and engineering design, construction (including materials, equipment and labour), construction management, insurance, tax, inspections and testing, equipment and furnishings not included in the building (such as site office furniture and IT).

3.2: Learners will provide a definition of fixed costs for a construction project and provide an annual projection for recurrent fixed costs referenced to their building project. Recurrent fixed costs are regular, anticipated costs and are independent of the output or activity level. They include permanent office utilities, permanent staff wages, bank interest, and leasing costs.

3.3: Learners will provide a definition of variable costs for a construction project and provide an annual projection for recurrent variable costs referenced to their building project. Recurrent variable costs are irregular, often unanticipated costs that change during the project's lifecycle. They include temporary site labour, subcontractors, materials and equipment and fuel.

3.4: With an emphasis on sustainability and energy efficiency, learners will carry out a sensitivity analysis, testing the cost-effective potential of a building project throughout its lifecycle by modifying a number of design objects within the model.

3.5: Learners will present and validate design recommendations to a professional audience. They will use the outcomes of the dialogue to make variations that optimise their designs within the constraints of the budget.

Amplification:

(K) – This symbol refers to **Knowledge,** which indicates that the **Assessment Criteria** will also be measured by an **External Synoptic Exam.**

Title:		Evaluating and documenting a sustainable construction project	
Unit reference number:		R/615/8839	
Level:		3	
Credit value:		10	
Guided learning hours:		60	
Learning outcomes The learner will:		**Assessment criteria** The learner can:	
1.	Be able to make objective comparisons between construction methods.	1.1 **(K)**	Compare construction methods on the basis of aesthetics and appropriateness to design intent.
		1.2 **(K)**	Compare construction methods on the basis of cost.
		1.3 **(K)**	Compare construction methods on the basis of sustainability.
		1.4 **(K)**	Compare construction methods on the basis of endurance and reliability.
		1.5 **(K)**	Compare construction methods on the basis of reduction of operating costs.
2.	Be able to communicate outcomes from professional perspectives.	2.1	Explain the strengths and weaknesses of the design from a facilities management perspective.
		2.2	Explain the strengths and weaknesses of the design from an architectural perspective.
		2.3	Explain the strengths and weaknesses of the design from a structural engineering perspective.
		2.4	Explain the strengths and weaknesses of the design from a building services engineering perspective.
		2.5	Explain the strengths and weaknesses of the design from an end user perspective.
3.	Be able to deliver a presentation of a summary report to a critical audience.	3.1	Support a presentation with appropriate digital technologies.
		3.2	Compare the client brief to the finished project and communicate to an appropriate audience.
		3.3	Compare social, economic and environmental outcomes with planned intentions.
		3.4	Assess and validate the project's major strengths and weaknesses with supporting evidence.
		3.5	Make clear judgements about the success of the project and lessons learned for the future.

Assessment Guidance:

All assessment criteria will be expected to be evidenced in the learner's portfolio.

1.1: Learners will consider a range of construction techniques and make comparisons based on aesthetics. The end user and/or client will have a personal view of what is aesthetically pleasing (i.e. a delightful/beautiful building) and perhaps here the learner could collaborate with peers or seek the comments of a professional visitor. Design intent was established in the formulation of a design brief in Unit 1, and again, learners should conform to the brief when evaluating construction methods. Learners should present evaluations in a written report. They will come to specific conclusions and present these as judgements that are supported by the evidence.

1.2: Based on research undertaken throughout the course, learners should present evaluations in a written report in their portfolios that presents the evidence and comparisons in an understandable format. They will come to specific conclusions and present these as judgements that are supported by the evidence.

1.3: Based on research undertaken throughout the course, learners should present evaluations in a written report in their portfolios that presents the evidence and comparisons in a clear, understandable format. They will come to specific conclusions and present these as judgements that are supported by the evidence Evaluation should look at sustainability, economic, and social impacts on various 'green systems' such as green roofing.

1.4: Based on research undertaken throughout the course, learners should present evaluations in a written report in their portfolios that presents the evidence and comparisons in a clearly understandable format. They will come to specific conclusions and present these as judgements that are supported by the evidence.

1.5: Based on research undertaken throughout the course, learners should present evaluations in a written report in their portfolios that presents the evidence and comparisons in a clearly understandable format. They will come to specific conclusions and present these as judgements that are supported by the evidence.

2.1 – 2.5: Based on research undertaken throughout the course, learners should present evaluations in a written report. Guidance and evaluation may be sought through collaboration with peers and/or from a visiting professional.

2.5: Learners are particularly encouraged to present their design to a group of end users who operate in a similar existing facility.

3.1: Learners will use appropriate digital technologies and processes to support their presentation. They should provide an assessment (and make recommendations where appropriate) of the selected technology they have adopted in terms of functionality, ease of use, reliability, flexibility, accuracy, responsiveness, availability of appropriate tools, how realistic, visualisation capability, speed, collaboration opportunity, interoperability, import/export functionality, compatibility with existing hardware.

3.2: Learners will present a project summary to a group of professionals. They should focus on key elements of the design brief and provide an honest evaluation of their ability to adhere to the brief.

3.3: Learners will present a project summary to a group of professionals. They should focus on key elements of their commitments to sustainability outlined in Unit 1 and provide an honest evaluation of their ability to confirm these commitments.

3.4: Learners will present a project summary to a group of professionals. They should focus on key strengths and weaknesses and provide an honest evaluation. Strengths could focus on a number of areas, for example, a learner might comment on a particular sustainable feature, or an ability to demonstrate innovative design solutions for a particular purpose. Conversely, a learner may feel their technical ability restricts creativity, or they lack the confidence to present their project in an articulate, informed manner.

3.5: Learners will present a project summary to a group of professionals. They should focus on providing an honest evaluation of their experience, their aptitude for certain skills and the lessons they have learned, or still need to learn, for the next project they undertake. They should comment on their aspirations for the future, and how they see their place in the industry.

Amplification:

(K) – This symbol refers to **Knowledge,** which indicates that the **Assessment Criteria** will be measured by an **External Synoptic Exam.**

Maths of Design, Engineer Construct! The Digital Built Environment

At Level 3, learners will be expected to have an understanding of the following maths concepts:

- Addition
- Subtraction
- Multiplication
- Division
- Rounding
- Fractions and simplifying fractions
- Percentages and increases/decreases by percentage
- Ratios and working to scale
- Perimeters and circumferences
- Area of shapes – Squares, rectangles (Area = width * length), triangles (Area = ½*b*h), circles (ΠR^2)
- Area of rooms through subtraction and/or addition
- Pythagoras – $c^2 = a^2 + b^2$

- Learners will be expected to have an understanding of basic arithmetic skills to support the calculation of various costs including:
    - Addition, subtraction, multiplication, division, estimation, rounding and percentage calculations of various budget costs reported in £ and £/m2.
- Learners will be able to apply their maths knowledge to understand lighting and energy requirements and use this to compare efficiency including:
    - Use of calculations to compare and contrast different options for lighting and energy requirements based on cost, and room size.
    - Use of the following formulas to calculate lighting requirements:
        - Lumens = lux x area.
        - Bulbs required = lumens required / lumens of the light bulb.
- Learners will have an understanding of how the volume and area of various building components are calculated or in situations concerning the functional requirement of a building and relative room sizes:
    - Common building elements include floors, walls and roofs.
    - Elements may take the shape of triangles, squares, circles, rectangles and trapeziums.
    - Calculation of various room sizes.
    - Calculation of volume of common building elements e.g.
        - Cube/Rectangle = length * width * height
        - Triangle = 0.5 * b * h * length
        - Cylinders = $\pi r^2 * h$

Additionally, learners will be expected to demonstrate the following maths knowledge and skills within the portfolio component:

- Learners will be able to apply their maths skills to understand the calculation of area and volume within a building, along with being able to apply these calculations with consideration to contexts costings including:
    - Application of level 2 concepts of area and volume of shapes in combination or reduction e.g. a room and a roof or a roof with a window.
    - Combine costs and areas to make accurate costing calculations.
- Learners will be able to assess concept design to produce preliminary cost and lifecycle cost prediction including:
    - Application of maths skills to scenarios involving measurements in £/m^2 and £/ m^3.

- Learners will understand how to calculate heat loss for various periods of time and materials using U-Values.
    - Surface Heat Loss (W) = U Value (W/m^2 C) x Wall Area (m^2) x ΔT (C).
    - Compare and contrast different insulation materials to identify the most efficient.
- Learners will understand and be able to apply knowledge relating to bending moments, cantilevers, forces and loads including:
    - Dead Load (kN) = Volume (m^3) * unit weight (kN/m^3).
    - Live Load (kN) = Area of Floor (m^2) * Uniformly distributed load (kN/m^2).
    - Density (kg/m3) = mass (kg) / volume (m^3).
    - Moment (Nm) = Force (N) x Distance (m), plus the application of the formula in various scenarios including clockwise moments, anticlockwise moments and balance.
    - Resolve forces acting at angles into their horizontal and vertical component using trigonometry - Sin a = opp/hyp Cos a = adj/hyp.
- Learners will be able to apply maths skills in the context of a project budget and capital costs, fixed costs and variable costs.
    - Learners must understand how capital, fixed and variable costs are defined.
    - This understanding will then be able to be applied to contexts allowing for the calculation of budgets with consideration to other contingencies in a project such as professional wages.
- Learners will be able to apply their maths knowledge and skills to scenarios where construction methods are being compared including:
    - Calculation and selection of optimal construction method and sourcing when presented in context.

Standard units

Learners may be required to convert units within the same measurement type. **When providing answers to exam questions, learners should state units.**

Measurement	Standard Unit	Conversions
Money	Pound, £	N/A
Length	Metre, m	Millimetre (mm) and Kilometre (KM)
Mass	Kilogram, kg	Gram (g)
Temperature	Celsius, (°C)	Kelvin, K
Power	Watts, W	Kilowatts, K
Force	Newton, N	Kilonewton (kN)
Light	Lumens, Lux	
Sound	Decibels, db	

All maths skills and knowledge listed may be assessed in the external set and marked component.

Unit 1: Section 1: Be able to research and convey the project remit				
	0	1-2	3-4	5-6
1.1: Identify a significant construction project for in-depth study.	No evidence submitted or fails to meet the minimum requirement.	Brief outline of the project.	Some explanation of the need for the project.	The need for the project has been justified and evidenced.
1.2: Communicate the vision for the project.	No evidence submitted or fails to meet minimum requirement.	Simple vision outlined.	Vision outlined with some points explained.	Clear vision with illustrated and explained positive impacts.
1.3: Set the scene for the project in the context of the existing environment.	No evidence submitted or fails to meet minimum requirement.	Simple maps and 'street view' images with little explanation of the area.	A more detailed description of the existing environment, transport, and demographics.	Further detail provided with photos of the existing environment and explanation of how this could impact on the project.
1.4: Set the scene for the project in the context of the end user.	No evidence submitted or fails to meet minimum requirement.	Obvious end users such as customers or residents have been identified.	Simple explanations of a wider range of end users.	Detailed explanation of the needs of users from different contexts, employees, maintenance as well as more obvious customers.
1.5: Write a mission statement for the project.	No evidence submitted or fails to meet minimum requirement.	Generic mission statement.	Mission statement is specific to the project.	Mission statement is concise but specific to the project with clear criteria.

Unit 1: Section 2: Be able to set standards for sustainability in a construction project				
	0	1-2	3-4	5-6
2.1: Define commitments to positively impact on the local community and the local environment.	No evidence submitted or fails to meet minimum requirement.	Limited impacts identified.	Range of impacts identified.	Specific examples to the project are explained.
2.2: Define and explain commitments to energy and water efficiency, and carbon reduction.	No evidence submitted or fails to meet minimum requirement.	Limited impacts identified.	Range of impacts identified.	Specific examples to the project are explained.
2.3: Define commitments to minimise construction waste.	No evidence submitted or fails to meet minimum requirement.	Limited impacts identified.	Range of impacts identified.	Specific examples to the project are explained.
2.4: Define and explain commitments to ethical sourcing of materials and responsible procurement.	No evidence submitted or fails to meet minimum requirement.	Limited impacts identified.	Range of impacts identified.	Specific examples to the project are explained.
2.5: Define and explain sustainability monitoring and reporting procedures for the lifecycle of the project.	No evidence submitted or fails to meet minimum requirement.	Limited description of monitoring or reporting.	Some description of different methods of monitoring and reporting.	Explanation of BREEAM or other measures and examples of activities at different points in the lifecycle.

Unit 1: Section 3: Be able to define site information required at pre-design phase				
	0	1-2	3-4	5-6
3.1: Identify the importance of site analysis and the roles of professional consultants in pre-design phase.	No evidence submitted or fails to meet minimum requirement.	Brief description of the need for site analysis.	Some explanation of the need for site analysis and the professionals involved.	Explanation of stages of survey (desk study, walk over and detailed survey) and increasing level of detail and expertise.
3.2: Determine what topographical information is required and outline appropriate, effective ways to collect accurate data for a particular site.	No evidence submitted or fails to meet minimum requirement.	Description of what a topographical survey is.	Some awareness of different methods of capturing data.	Comparison of the different methods of collecting data leading to the most appropriate method being selected for their site.
3.3: Identify information required to produce a geotechnical report and relate to the specified project.	No evidence submitted or fails to meet minimum requirement.	General explanation of geotechnical data.	Map or visit but with limited analysis.	Site-specific Geotechnical data gathered and analysed for the site.
3.4: Identify information required to produce an ecological study and relate to the specified project.	No evidence submitted or fails to meet minimum requirement.	A general explanation of ecological data.	Map or visit but with limited analysis.	Site-specific Ecological data gathered and analysed.
3.5: Identify information required to produce a hydrology study and relate to the specified project.	No evidence submitted or fails to meet minimum requirement.	General explanation of hydrology data.	Map or visit but with limited analysis.	Site-specific Hydrology data gathered and analysed.

Unit 2: Section 1: Be able to prepare a design brief and take steps to appoint an effective design team				
	0	1-2	3-4	5-6
1.1 Explain the purpose of a design brief.	No evidence submitted or fails to meet minimum requirement.	Brief description of a design brief.	Some description of a design brief. Touches on its purpose.	Detailed description of a design brief. The purpose of the design brief is explained clearly.
1.2 Describe the role and responsibility of the client in a construction project	No evidence submitted or fails to meet minimum requirement.	Brief outline of the role of a client	Some description of a client's role and responsibilities	Detailed description of a client's role and responsibilities
1.3 Prepare the design brief for a specific construction project and receive critical feedback for client sign-off	No evidence submitted or fails to meet minimum requirement.	Simple design brief with few measurable criteria	A design brief that includes a budget, timescale and deliverables	Detailed design brief that includes a budget, timescale and deliverables. Evidence of feedback.

1.4 Formalise the appointment of an Integrated Project Team	No evidence submitted or fails to meet minimum requirement.	An outline of BIM and its benefits	A description of BIM and how the process could be applied to their project mentions PAS119:2 and EIR	A detailed explanation of BIM and how can be applied to their project includes details of what would be included in an EIR
1.5 Produce an organogram outlining professionals and their roles at each phase of the project	No evidence submitted or fails to meet minimum requirement.	A simple organogram	A more detailed organogram and an explanation of its use	An organogram that spans the whole project timeline and an explanation of its use.

Unit 2: Section 2: Be able to use building information modelling techniques for concept design				
	0	1-2	3-4	5-6
2.1: Create preliminary concept designs based on the design brief.	No evidence submitted or fails to meet minimum requirement.	A single concept that meets the brief.	More than one concept with annotation that describes how it meets the brief.	A range of different concept designs that are annotated to explain how they meet the brief.
2.2: Assess concept designs for space requirements, circulation and accessibility.	No evidence submitted or fails to meet minimum requirement.	Different spaces are identified.	Spaces are identified and different layouts explored (e.g. bubble diagrams).	Spaces are identified and different layouts explored (e.g. bubble diagrams) and evaluated.
2.3: Assess concept design to produce preliminary cost and lifecycle cost prediction.	No evidence submitted or fails to meet minimum requirement.	Benchmark cost calculated.	Benchmark costs for different concepts are calculated using rates.	Benchmark costs for different concepts are calculated using rates for building type and compared.
2.4: Perform energy analysis relative to form, orientation, weather, surfaces and glazing.	No evidence submitted or fails to meet minimum requirement.	Solar or energy analysis of the concept.	Solar or energy analysis of different concept designs.	Solar and energy analysis of different concept designs with evaluation.
2.5: Present information for whole project lifecycle and provide validation for chosen model.	No evidence submitted or fails to meet minimum requirement.	Explanation of why the concept is suitable.	Comparison of concepts and explanation of why the chosen concept is the most suitable.	Chosen concept is justified by comparing the criteria from 2.1-2.4

Unit 2: Section 3: Be able to prepare information and resources needed to support a planning application				
	0	1-2	3-4	5-6
3.1: Explain the planning process for a specific construction project.	No evidence submitted or fails to meet minimum requirement	Brief description of the planning process.	Explanation of national and local planning policy and the documents needed for a planning application.	Explanation of national and local planning policy and a detailed explanation of a relevant planning application.
3.2: Make use of current legislation and guidance.	No evidence submitted or fails to meet minimum requirement.	At least 3 different pieces of relevant legislation explained.	At least 3 pieces of relevant legislation described and related to their project.	At least 3 pieces of essential legislation applied to their development and justified in detail.
3.3: Prepare a planning feasibility study for a specific construction project.	No evidence submitted or fails to meet minimum requirement.	A simple explanation of the feasibility of the project.	Explanation of how the project will benefit the area and meet planning policy (local or national).	A detailed explanation of the benefits that the project will bring with reference to relevant planning and legislation.
3.4: Describe what is meant by the term 'undesirable precedent' in planning decisions and provide an example of such.	No evidence submitted or fails to meet minimum requirement.	Brief description of an undesirable precedent.	Undesirable precedent described and a relevant example explained.	Example of undesirable precedent with a balanced explanation of the reason it is undesirable.
3.5: Formulate justification and present evidence for the approval of a specific project.	No evidence submitted or fails to meet minimum requirement.	A simple explanation of why their project should be built.	Planning application, including an explanation of why their project should be built.	A complete and fully justified planning application for their project.

Unit 3: Section 1: Gather and analyse information to develop the design				
	0	1-2	3-4	5-6
1.1: Analyse relevant architectural precedents.	No evidence submitted or fails to meet minimum requirement.	Images of different buildings were collected with a brief description.	A number of different relevant precedents are described in detail.	A range of relevant local, national and international precedents were analysed.
1.2: Explore specific materials and their properties, and justify material choices.	No evidence submitted or fails to meet minimum requirement.	Brief description of materials with some evaluation and comparison.	Different material choices were explored and compared.	Materials for different building elements were explored and evaluated in terms of sustainability, performance, aesthetics and cost.
1.3: Gather information using charts and tables to inform the sizes of rooms and spaces.	No evidence submitted or fails to meet minimum requirement.	Some relevant data collected.	Most size data collected and presented.	All relevant room and space sizes researched using charts, tables and own measurements.
1.4: Generate schedules of accommodation.	No evidence submitted or fails to meet	A simple schedule generated.	Numbers and sizes of rooms.	Detailed schedule generated using the data from 1.3.

	minimum requirement.			
1.5: Analyse the information and justify choice.	No evidence submitted or fails to meet minimum requirement.	Explained choices and decisions.	Choices are justified using research.	Different options are analysed, and most suitable choice is justified.

Unit 3: Section 2: Gather and analyse information to develop the structural elements				
	0	1-2	3-4	5-6
2.1: Explore different structures within the built environment: frame, shell, and mass.	No evidence submitted or fails to meet minimum requirement.	Images of different structures have been collected and labelled.	Different structures examined, and their type defined.	A number of different structures have been analysed and their type and materials explained.
2.2: Explore how forces affect structural elements: tension, compression, shear, torsion and bending.	No evidence submitted or fails to meet minimum requirement.	Basic definitions of forces.	Definition of forces and Basic explanations of how loads affect structures.	Modelling exercises that lead to explanations of the different forces on the elements of a structure.
2.3: Gather information about different structural materials and compare their properties.	No evidence submitted or fails to meet minimum requirement.	Most obvious structural materials (steel, concrete and timber) materials compared.	A broader range of structural materials compared, and their strengths and weaknesses identified.	A broad range of structural materials compared in terms of a range of factors such as performance, availability, and fire resistance.
2.4: Use charts and tables to define loading scenario	No evidence submitted or fails to meet minimum requirement.	Types of loads defined, and limited data provided.	Types of loads defined and loading data provided for dead and live loads	Types of loads defined, and comprehensive data collected for dead, live, snow and wind based on the building use.
2.5: Analyse the information and make choices as to the type of structure and materials that are most suitable	No evidence submitted or fails to meet minimum requirement.	The materials for structural elements have been chosen and explained.	A range of materials for elements have been compared.	Different types of structures and materials have been compared and choices have been justified.

Unit 3: Section 3: Gather and analyse information to develop the building services elements				
	0	1-2	3-4	5-6
3.1: Explore what is meant by occupant comfort and how it can be measured.	No evidence submitted or fails to meet minimum requirement.	A brief explanation of what is meant by occupant comfort.	The 4 areas of occupant comfort have been explained.	4 areas of occupant comfort defined, and the methods of measuring explained.
3.2: Gather information from case studies related to aspects of buildings services heating,	No evidence submitted or fails to meet minimum requirement.	A simple case study explaining how building services are used.	More than one case study used to inform different options for heating,	Several case studies used to provide information about the different options for

ventilation and lighting.			ventilation and lighting.	heating ventilation and lighting.
3.3: Use tables and charts to define lighting levels, temperatures and air exchange rate	No evidence submitted or fails to meet minimum requirement.	Values defined for overall lighting, temperature and air exchange rate.	Values defined for overall lighting, temperature and air exchange rate related to the use of the building.	Values defined for lighting, temperature and air exchange rate related to the use of different zones/areas.
3.4: Apply science and maths and use industry-standard software to calculate the need for different building services.	No evidence submitted or fails to meet minimum requirement.	Software has been used to model and test one aspect of building services.	Software and calculations have been used to model and test different building services.	Software and calculations have been used to model test and compare different building services.
3.5: Analyse the information and make choices as to the appropriate technologies to use.	No evidence submitted or fails to meet minimum requirement.	The methods of heating lighting and ventilating the building have been explained.	Different methods of heating lighting and ventilating the building have been compared.	Different methods of heating lighting and ventilating the building have been compared and choices have been justified.

Unit 4: Section 1: Use building information modelling techniques to develop the design				
	0	1-2	3-4	5-6
1.1: Generate a 3D model using material and component libraries.	No evidence submitted or fails to meet minimum requirement.	3D model created.	A 3D model with materials and components for libraries.	A complex 3D model with materials and components from libraries and other sources.
1.2: Generate floor plans and schedules.	No evidence submitted or fails to meet minimum requirement.	A floor plan and schedule of accommodation.	Detailed floor plans and a schedule of accommodation.	Formally presented floor plans and schedules of accommodation.
1.3: Communicate the design using 3D views and renders.	No evidence submitted or fails to meet minimum requirement.	Simple 3D views and renders.	Internal and external renders that show main features of the building.	Internal and external renders created to communicate all significant features of the building.
1.4: Present the digital model to critical experts.	No evidence submitted or fails to meet minimum requirement.	Simple presentation of the proposal.	Presentation of the proposal with a range of 2D and 3D images.	Detailed presentation using 2D and 3D images and an explanation of how the building developed.
1.5: Address errors, clashes and omissions and make modifications as a result of feedback.	No evidence submitted or fails to meet minimum requirement.	Feedback used to make modifications to the model.	Errors explained and feedback used to make modifications.	Explanation of modifications made as a result of feedback and identification of omissions and errors.

Unit 4: Section 2: Use building information modelling techniques to develop structural elements of a building project				
	0	1-2	3-4	5-6
2.1: Generate a structural plan or grid that identifies the main structural elements: foundations, structural walls, slabs, beams and columns.	No evidence submitted or fails to meet minimum requirement.	Structural plan created and main elements labelled.	Structural grid created and all elements labelled.	Structural grid created and all elements labelled and presented as a formal drawing.
2.2: Create a 3D structural model using component libraries.	No evidence submitted or fails to meet minimum requirement.	Simple structural model with beams and columns.	A more complex structural model with beams, columns, and slab foundations.	Detailed structural model with beams, columns, and slab foundations. This should include dimensions.
2.3: Apply science and maths to calculate elements of a structure.	No evidence submitted or fails to meet minimum requirement.	Create an example of deflection on a loaded beam.	Compare the deflections of beams from different loads or materials.	Relate research to choices made in their project, using the deflections of beams from different loads and materials to inform this.
2.4: Present the digital model to critical experts.	No evidence submitted or fails to meet minimum requirement.	Simple presentation of the proposal.	Presentation of the proposal with a range of 2D and 3D images.	Detailed presentation using 2D and 3D images and an explanation of how the structure developed.
2.5: Address errors, clashes and omissions and make modifications as a result of feedback.	No evidence submitted or fails to meet minimum requirement.	Feedback used to make modifications to the model.	Errors explained and feedback used to make modifications.	Explanation of modifications made as a result of feedback and identification of omissions and errors.

Unit 4: Section 3: Use building information modelling techniques to develop building services elements of a building project				
	0	1-2	3-4	5-6
3.1: Generate annotated floor plans that define recommended levels for lighting ventilation and heating.	No evidence submitted or fails to meet minimum requirement.	Data from 3.3.1 used to annotate floor plans for one service	Data from 3.3.1 used to annotate floor plans for two services	Data from 3.3.1 used to annotate floor plans for all services
3.2: Model and test aspects of building services to demonstrate how recommendations for services can be met.	No evidence submitted or fails to meet minimum requirement.	Services such as lighting and plumbing added to the model.	Different proposals for services are modelled and tested.	Different proposals for multiple services were modelled and tested.
3.3: Use energy software to test the energy efficiency and recommend improvements.	No evidence submitted or fails to meet minimum requirement.	Simple energy analysis with improvements proposed.	Energy analysis with different aspects tested and proposed.	Energy analysis with multiple aspects tested and compared.
3.4: Present the digital model to critical experts.	No evidence submitted or fails to meet	Simple presentation of a	Presentation of the proposal for	Detailed presentation of the

	minimum requirement.	proposal for basic services.	a range of services.	proposals for different services.
3.5: Address errors, clashes and omissions and make modifications as a result of feedback.	No evidence submitted or fails to meet minimum requirement.	Feedback used to make modifications to the model.	Errors explained and feedback used to make modifications.	Explanation of modifications made as a result of feedback and identification of omissions and errors.

Unit 5: Section 1: Be able to use building information modelling techniques to support the operational management of a building project				
	0	1-2	3-4	5-6
1.1: Explain the role of BIM in the operation, management and maintenance of a sustainable building project throughout its lifecycle.	No evidence submitted or fails to meet minimum requirement.	A simple explanation of BIM for FM (Facilities Management).	In relation to the life cycle of a structure explain how FM (Facilities Management) is applied and the role of BIM.	In relation to the life cycle of a structure explain how BIM can be used by the FM (Facilities Management) team in operation, management and maintenance.
1.2: Devise an appropriate handover process from the construction team to the end user.	No evidence submitted or fails to meet minimum requirement.	Description of the handover process.	Explanation of the handover process and the deliverables.	Detailed explanation of the handover process, assets and deliverables.
1.3: Set targets for whole-life energy performance, water consumption, waste reduction, operation and maintenance costs.	No evidence submitted or fails to meet minimum requirement.	Targets generated from energy model.	Targets generated from energy model and other sources such as BREEAM.	Detailed explanation of targets generated from energy model and other sources such as BREEAM.
1.4: Analyse the impact of post-occupancy behaviour on the lifecycle of a building.	No evidence submitted or fails to meet minimum requirement.	Definition of post-occupancy behaviour.	Explanation of the impact post occupancy behaviour.	Explanation of the impact post occupancy behaviour and methods to measure and monitor it suggested.
1.5: Explore the benefits of early engagement of the Facilities Manager and the client/end user in the design process.	No evidence submitted or fails to meet minimum requirement.	Description of the role of Facilities Manager in the design process.	Describe the benefits of early engagement with a facilities management team for the building.	Evaluate the benefits of early engagement with a facilities management team for the building. Responses must be illustrated with examples.

Unit 5: Section 2: Understand cost analysis and financial control				
	0	1-2	3-4	5-6
2.1: Explain the role of BIM in the financial management of a building project.	No evidence submitted or fails to meet minimum requirement.	Explanation of how BIM informs financial modelling.	Explanation of how BIM and data drops inform a financial model.	Detailed explanation of how BIM and accuracy of data inform a financial model.
2.2: Produce a cost model based on the project timeline.	No evidence submitted or fails to meet minimum requirement.	Identify costs throughout a project.	Identify the main costs in a project and map to a timeline.	Explain more specific costs, (labour, fees, planning, land and materials) based on the project timeline.
2.3: Identify points of accountability for keeping the project to budget.	No evidence submitted or fails to meet minimum requirement.	Key points identified.	Key points explained.	Key points explained along with levels of detail used in calculations.
2.4: Explain the consequences of weaknesses in financial control.	No evidence submitted or fails to meet minimum requirement.	Some consequences identified.	Consequences identified and measures to prevent suggested.	A range of consequences identified and an explanation of how they can be prevented.
2.5: Devise policies for sustainable procurement to establish audit trails.	No evidence submitted or fails to meet minimum requirement.	Definition of sustainable procurement.	Main aspects of sustainable procurement explained.	Relevant sustainable procurement strategies explained.

Unit 5: Section 3: Be able to produce a budget for a complex building project				
	0	1-2	3-4	5-6
3.1: Compile an accurate list of capital costs	No evidence submitted or fails to meet minimum requirement.	Major capital costs calculated.	Capital cost calculated using data.	Capital costs explained and calculated using data and tools.
3.2: Provide an annual projection for recurrent fixed costs	No evidence submitted or fails to meet minimum requirement.	Identification of main recurrent fixed costs.	Identification of main recurrent fixed costs with simple calculations.	Identification of main recurrent fixed costs with calculations based on data specific to their project.
3.3: Provide an annual projection for recurrent variable costs	No evidence submitted or fails to meet minimum requirement.	Identification of main recurrent variable costs.	Identification of main recurrent variable costs with simple calculations.	Identification of main recurrent variable costs with calculations based on data specific to their project.
3.4: Provide a sensitivity analysis based on possible variations in costs	No evidence submitted or fails to meet minimum requirement.	Simple calculation based on changes in cost.	Explanation of sensitivity analysis and a calculation comparing two costs.	Explanation of sensitivity analysis and a calculation comparing two costs and the impact on the budget.
3.5: Present and negotiate variations to the design within budget constraints	No evidence submitted or fails to meet minimum requirement.	Design variation presented and costing.	Design variations costings and compared.	A number of design variations costings and compared to the budget.

Unit 6: Section 1: Be able to make objective comparisons between construction methods				
	0	1-2	3-4	5-6
1.1: Compare construction methods on the basis of aesthetics and appropriateness to design intent.	No evidence submitted or fails to meet minimum requirement.	Difference in aesthetics illustrated.	Differences in aesthetics and appropriateness illustrated and compared.	Differences in aesthetics and appropriateness illustrated and compared in detail.
1.2: Compare construction methods on the basis of cost.	No evidence submitted or fails to meet minimum requirement.	Difference in general cost explained.	Difference in material and labour costs compared.	Difference in material, set-up, time and labour costs compared in detail.
1.3: Compare construction methods on the basis of sustainability.	No evidence submitted or fails to meet minimum requirement.	Difference in sustainability explained.	Different aspects of sustainability (materials, lifecycle, and energy use) compared.	Different aspects of sustainability (materials, lifecycle, and energy use) compared in detail.
1.4: Compare construction methods on the basis of endurance and Reliability.	No evidence submitted or fails to meet minimum requirement.	Difference in reliability and endurance explained.	Difference in reliability and endurance in relation to quality assurance and quality control explained.	Difference in reliability and endurance in relation to quality assurance and quality control explained in detail.
1.5: Compare construction methods on the basis of reduction of operating costs.	No evidence submitted or fails to meet minimum requirement.	Difference in reduction of operating costs explained.	Difference in reduction of operating costs explained and related to energy use.	Difference in reduction of operating costs explained and related to energy use and maintenance.

Unit 6: Section 2: Be able to communicate outcomes from professional perspectives				
	0	1-2	3-4	5-6
2.1: Explain the strengths and weaknesses of the design from a facilities management perspective.	No evidence submitted or fails to meet minimum requirement.	Most strengths and weaknesses identified.	Most strengths and weaknesses explained.	Most strengths and weaknesses explained and illustrated.
2.2: Explain the strengths and weaknesses of the design from an architectural perspective.	No evidence submitted or fails to meet minimum requirement.	Most strengths and weaknesses identified.	Most strengths and weaknesses explained.	Most strengths and weaknesses explained and illustrated.
2.3: Explain the strengths and weaknesses of the design from a structural engineering perspective.	No evidence submitted or fails to meet minimum requirement.	Most strengths and weaknesses identified.	Most strengths and weaknesses explained.	Most strengths and weaknesses explained and illustrated.
2.4: Explain the strengths and weaknesses of the design from a building services engineering perspective.	No evidence submitted or fails to meet minimum requirement.	Most strengths and weaknesses identified.	Most strengths and weaknesses explained.	Most strengths and weaknesses explained and illustrated.

2.5: Explain the strengths and weaknesses of the design from an end user perspective.	No evidence submitted or fails to meet minimum requirement.	Most strengths and weaknesses identified.	Most strengths and weaknesses explained.	Most strengths and weaknesses explained and illustrated.

Unit 6: Section 3: Be able to deliver a presentation of a summary report to a critical audience				
	0	1-2	3-4	5-6
3.1: Support a presentation with appropriate digital technologies.	No evidence submitted or fails to meet minimum requirement.	Presentation with a digital technology such as a walkthrough.	Presentation with a range of digital technologies and justification of choice.	Comprehensive presentation with appropriate range of digital technologies. Technologies should be justified within the context of their project.
3.2: Compare the client brief to the finished project and communicate to a professional audience.	No evidence submitted or fails to meet minimum requirement.	Simple comparison to original brief.	Comparison to original brief with some explanation of differences.	Comparison to original brief with justification of difference and explanation of benefits.
3.3: Compare social, economic and environmental outcomes with planned intentions.	No evidence submitted or fails to meet minimum requirement.	Simple comparison of social, economic and environmental outcomes.	Comparison of social, economic and environmental outcomes with intentions.	Comparison of social, economic and environmental outcomes with intentions and explanation of differences.
3.4: Assess and validate the project's major strengths and weaknesses with supporting evidence.	No evidence submitted or fails to meet minimum requirement.	Identification of strengths and weaknesses.	Identification and explanation of a range of the project's strengths and weaknesses.	Identification and explanation of a range of the project's and personal strengths and weaknesses.
3.5: Make clear judgements about the success of the project and lessons learned for the future.	No evidence submitted or fails to meet minimum requirement.	Brief description of successes and challenges.	Description of successes and challenges with an explanation of what they might do differently.	Description of successes and challenges with an explanation of what they have learned and what they might change on future projects.