

APPLIED



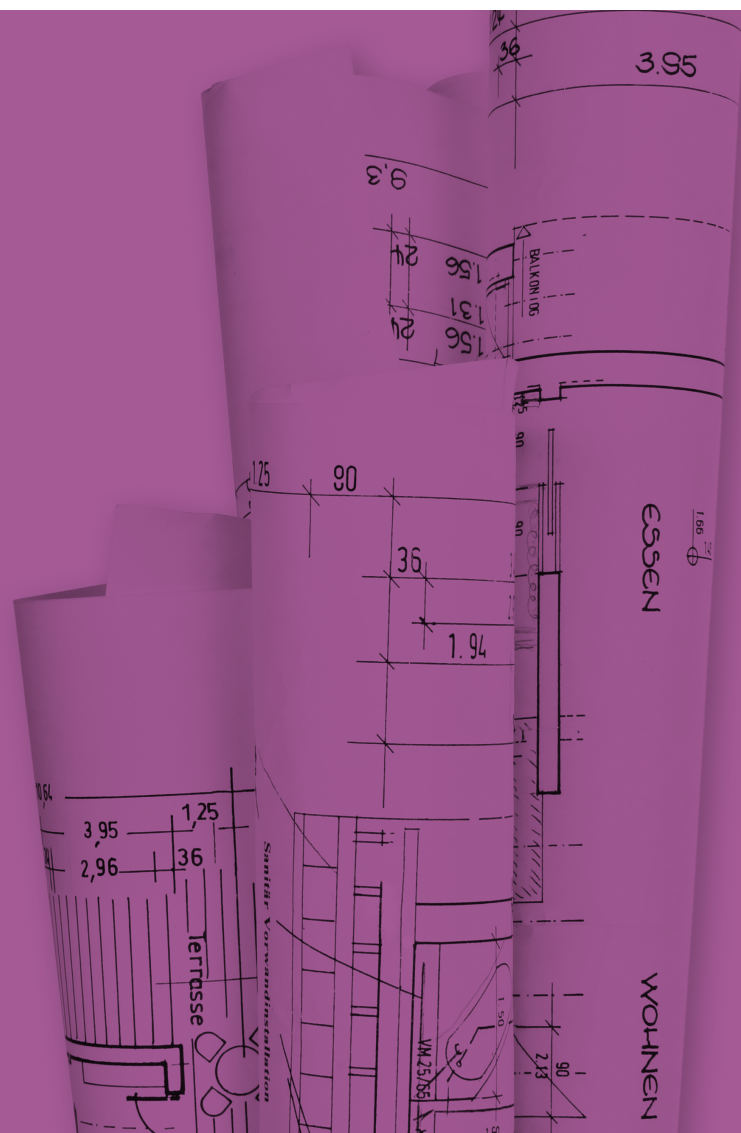
WJEC Level 3 Applied Diploma in
**PROFESSIONAL
CONSTRUCTION
PRACTICE**

REGULATED BY OFQUAL AND CCEA REGULATION
DESIGNATED BY QUALIFICATIONS WALES

SPECIFICATION

Teaching from 2017
For award from 2019

Version 2 September 2018



SUMMARY OF AMENDMENTS

Version	Description	Page number
2	Learners are allowed two resits of each external unit	96 and 98
	For internal assessment please consult WJEC's 'instructions for conducting controlled assessment'.	100
	Clarification of the 'near pass' rule	104
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WJEC Level 3 Applied Diploma in Professional Construction Practice

SPECIFICATION

For teaching from 2017 - Wales

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1. INTRODUCTION

1.1. Qualification title and code

This specification covers the following qualification:

WJEC Level 3 Applied Diploma in Professional Construction Practice

The Ofqual Qualification Number (listed on [The Register](#)) is: 603/0822/9

The Qualifications Wales. Designation Number (listed on [QiW](#)) is: C00/1178/1

1.2. About WJEC Applied Certificates and Diplomas

WJEC Applied Certificates and Diplomas are Level 3 qualifications that can be taught as standalone qualifications or alongside GCE AS and A Levels and other Level 3 qualifications as part of a programme of study.

They are designed to offer exciting and interesting experiences that focus learning for 16-19 year-old learners through applied learning i.e. the acquisition of knowledge and understanding in purposeful contexts linked to a sector or subject area.

Applied Certificates and Diplomas are characterised by:

- clearly structured content and straightforward assessment criteria
- opportunities for flexible teaching approaches
- regular teacher training courses
- high quality resources including teacher guides and digital resources
- questions and tasks designed to enable candidates to demonstrate what they know, understand and can do
- accessibility of materials
- direct access to subject specialists.

Available in the following subject areas and sizes, Applied Certificates and Diplomas support learners progressing to university:

	Certificate (180 GLH)	Diploma (360GLH)	Extended Diploma (720GLH)
Business (new for 2017)	✓	✓	
Criminology	✓	✓	
Environmental Science		✓	✓
Food Science and Nutrition	✓	✓	
Health and Social Care (England) (new for 2017)	✓	✓	
Medical Science	✓	✓	
Professional Construction Practice (new for 2017)		✓	
Statistical Problem Solving Using Software	✓		
Tourism (new for 2017)	✓	✓	

1.3. About the qualification

The construction sector is vital to any country for maintenance, improvement and growth of its infrastructure, buildings and engineering stock. A comprehension of institutional standards, procedures and business processes of the specialised disciplines that drive and administer the industry is relevant to all those who work or desire to be part of this established sector.

The WJEC Level 3 Applied Diploma in Professional Construction Practice is for England, Northern Ireland and Wales, designed to provide learners with a comprehensive framework of knowledge, understanding and promotion of applied skills that this multi-disciplined sector relies upon.

Studying this qualification will encourage research, prompt investigation and analysis of the aspects and impacts of the construction disciplines and their interrelationships through collaboration. This will give rise to an understanding of the diverse roles within the construction industry and yield transferable skills. The qualification will support learners' progression from level 1/2 particularly in subjects such as Design Technology, Construction, Engineering and Business Studies.

There are no formal entry requirements for this qualification, it is designed to be delivered over one or two years, and is likely to be studied by 16-19 year olds in schools or colleges alongside GCE A levels, as part of a programme of study with other Level 3 Vocational Qualifications or the Welsh Baccalaureate.

The main purpose of the WJEC Level 3 Applied Diploma in Professional Construction Practice is to support access routes to Degree courses, Higher National Vocational Qualifications, Modern Apprenticeships including 'Traineeships' and employment associated with:

- Architecture
- Structural and Temporary Works Engineering
- Architectural Technologist
- Construction Management
- Project Management
- Design Management
- Estate Management
- Quantity Surveying
- Building Surveying
- Mechanical & Electrical Management
- Engineering Services
- Construction related SME Services
- Supply Chain Management
- Document Control
- Client Representation
- Contract Administration.

1.4. Skills development and the Welsh Baccalaureate

The WJEC Level 3 Applied Diploma in Professional Construction Practice enables learners to gain essential employability skills that are valued by employers, further education and higher education including:

- literacy and numeracy
- digital literacy
- critical thinking and problem solving
- planning and organisation
- creativity and innovation
- personal effectiveness.

In Wales, these skills are formally assessed as part of the Skills Challenge Certificate (Welsh Baccalaureate).

1.5. Structure

The WJEC Level 3 Applied Diploma in Professional Construction Practice is made up of 4 units. All units are mandatory.

Unit number	Unit	Assessment	GLH	%
1	Design the Built Environment	Internally Assessed Controlled Assignment	72 GLH	20%
2	Create the Built Environment	External Examination	72 GLH	20%
3	Value and Use the Built Environment	External Examination	72 GLH	20%
4	BIM and Construction Projects*	Internally Assessed Controlled Assignment	144 GLH	40%
Key: * Synoptic				

1.6. Guided Learning Hours (GLH) and Total Qualification Time (TQT)

Each unit in the WJEC Level 3 Applied Diploma in Professional Construction Practice has been allocated a number of Guided Learning Hours (GLH). This is the number of guided learning hours that WJEC expects centres to provide to support learners to achieve a unit. Guided learning means activities such as classroom-based learning, tutorials and online learning, which is directly supervised by a teacher, tutor or invigilator. It also includes all forms of assessment which take place under the immediate guidance or supervision of a teacher, supervisor or invigilator.

The total number of GLH assigned to the WJEC Level 3 Applied Diploma in Professional Construction Practice is 360 hours.

In addition to the GLH, WJEC also specifies a total number of hours that it is expected learners will be required to undertake in order to complete the qualification: this is referred to as the Total Qualification Time (TQT). Activities which contribute to the TQT include independent and unsupervised research, unsupervised coursework, unsupervised e-learning and e-assessment and all guided learning.

The total number of TQT assigned to the WJEC Level 3 Applied Diploma in Professional Construction Practice is 540 hours.

2. UNITS

2.1. Unit format

Unit title

The unit title summarises in a concise manner the content of the unit.

Guided Learning Hours (GLH)

Guided Learning Hours represents only those hours in which a tutor is present and contributing to the learning process. In some organisations this is known as 'contact time'. This time includes lecturers, supervised practical periods and supervised study time.

Aim

The aim provides a brief and clear summary of the unit. It also indicates the applied purpose for the unit.

Unit overview

The overview gives a summary of the unit content. It sets the vocational context of the unit and highlights the purpose of the learning in the unit.

Skills development

This section outlines the specific essential employability skills that will be developed through the unit.

Assessment criteria

The assessment criteria specify the standard a learner is expected to meet to demonstrate that the learning outcomes of that unit have been achieved.

Unit content

The indicative content defines the breadth and depth of learning for an assessment criterion. It is expected that all the indicative content will be delivered during the programme of learning. It is not required to assess every aspect of the content when assessing the unit. Learners will be expected to apply the knowledge, understanding and skills acquired through the learning to the specifics of the assessment context. In some learning outcomes unit content is given as an example (e.g.). This is used to exemplify the content only and learners can use any examples that they are taught in their summative assessments.

For some assessment criteria, no content is specified. Centres can determine the content to be learned based on local circumstances.

Performance bands

These are used to determine the summative unit grade. Performance bands do **not** add additional requirements to the assessment criteria. Performance bands are used to determine the grade for a unit.

Assessment

Applied Diplomas are assessed through controlled internal assessment or external assessment. This section of the unit summarises assessment requirements.

Guidance for delivery

This gives the tutor some ideas on how to deliver the units in a vocational setting consistent with the philosophy of the qualification and intent of the unit. A minimum of three sample contexts are provided for each unit. The guidance also gives ideas of vocational settings for the unit and suggests possible contacts that could be made in the delivery of the learning.

Resources

This identifies useful resources to help in the delivery of the learning. Many of the resources listed are suitable for using with learners.

2.2. Unit 1

Unit title	Design the Built Environment
GLH	72

Aim

The aim of this unit is for learners to understand and appreciate; the various stages of the design and planning processes, the impact of health and safety on design and the provision of primary service utilities.

Overview

The built environment is made up of historic and contemporary buildings, the spaces between them including parks, streets, other open areas and the infrastructure that links these components together. The design of each building within this environment is a complex process that involves many people working through many stages. Good design will provide a built environment that promotes health, safety and well-being.

To provide and protect the quality of the built environment it is vital to ensure that the right development happens in the right place at the right time, to the benefit of communities and the economy. A complex system for the control of development has been created involving strategic planning at national and local levels and many other social, political and economic factors. This system must agree, on behalf of the community, to a development proposal before it can take place.

The design of the buildings that shape our environments must be influenced by many factors to promote the safety, health, comfort and productivity of occupants. These designs must be developed to minimise the risk of harm to those who have to build, use and maintain the building and ensure that the possibilities for reducing environmental impact and running costs of the building over its lifetime are maximised.

At the end of this unit you will have produced a concept design for a development proposal and gained knowledge and practical experience of the stages and key factors that influence the design of the built environment.

Skills development

It is envisaged that the study of this unit will generate opportunities for the development of skills. Examples of such opportunities are noted below.

Digital literacy and literacy and numeracy: in the carrying out of on-screen research into construction projects at the design stage and in the completion of bespoke formative exercises.

Planning and organising: in the consideration of the importance of planning and organising to construction organisations at the design stage.

Personal **planning and organising and personal effectiveness:** can be developed in order to assist students in their preparation for the unit assessment.

Creativity and innovation: in the consideration of alternative design solutions to given construction problems.

Learning outcomes, assessment criteria and taught content

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO1 Understand the various stages of the design process and the principles involved in taking a design through the complete design cycle	AC1.1 Analyse a client brief and develop a concept design solution and project strategies for a specific development proposal	The various stages of the design process, including; The project definition: - the client's strategic brief and other core project requirements - initial considerations for assembling the project team - the proposed project programme - feedback from previous projects The process of establishing and verifying the client's brief. Feasibility studies and site investigation. Concept design stage: - the development and refinement of ideas for the layout, form and appearance of the proposed development - drafting of relevant project strategies in accordance with the design programme - carrying out risk assessments including identification of the various design and other risks and how each risk will be managed, and the party responsible for managing each risk.	Strategic brief - options – extend, refurbish or build new - consideration of different sites - key project outcomes, such as improved productivity - core building requirements, such as function and scale Client's brief - project objectives, including quality objectives - project outcomes and accommodation schedule - sustainability aspirations (energy plan, ecology plan and design life) - project budget Feasibility study - test the client's brief on a specific site including scale, location and supporting infrastructures - consider outcomes from pre-planning consultations

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		Developed design stage: - production of updated and detailed proposals for layout, appearance, structural design, building services systems and outline specifications - update of cost information, Project Strategies and risk assessments in accordance with design programme. - conclude any Research and Development aspects - consider Construction and Health and Safety Strategies - make application for full planning permission Technical design stage. See AC1.4	Site investigation Specialist surveys or reports relating to a specific site, including: - dimensions, levels and suitability of access - aspect, prospect and orientation - existing structures and landscaping - site history and ground conditions Concept design Preliminary and refined design solutions including proposals for: - layout and external appearance - structural design - building services systems - outline specifications - preliminary cost information Project strategies The range of strategies developed in parallel with the Concept Design to support detailed design, for example: - acoustic strategy - fire engineering strategy, including protections and means of escape - maintenance and operational strategy - sustainability and technology strategies - handover strategy (soft landings) - building control strategy, including access to and use of building

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Construction strategy A strategy that considers specific aspects of the design that may affect the buildability, methodology or logistics of constructing a project, including: • craneage, site access and accommodation locations • supply chain and sources of materials • specific buildability items • installation of larger items of plant Health and safety strategy The strategy covering all aspects of health and safety on the project, including legislative requirements.
	AC1.2 Produce a project roles table and project execution plan for a specific development proposal	The different relationships in the process, including the client/agent responsible for representing the client during all stages of the project and making decisions on their behalf, and the professional design team. The Project Roles Table and Contractual Tree. Schedule of Services to be undertaken by a member of the design team, to be into their professional services contract.	Professional design team Architect, Project manager, Structural engineer, Services engineers (M and E), Quantity surveyor, Planning consultant. Project roles table A table that sets out the roles required on a project as well as defining the stages during which those roles are required and the parties responsible for carrying out the roles.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		Design responsibility matrix and information exchanges, including the formal issue of information for review and sign-off by the client at key stages of the project. Project Execution Plan including Technology and Communication Strategies and consideration of common standards to be used (PAS - publicly available standards frequently used to define project and design management processes in relation to the briefing, designing, constructing, maintaining, operating and use of a building).	Contractual Tree A diagram that clarifies the contractual relationship between the client and the parties undertaking the roles required on a project. Design responsibility matrix A development of the project roles table that sets out who is responsible for designing each aspect of the project and when. The design responsibility matrix is created at a strategic level and updated in response to the Concept Design. Project execution plan This is produced in collaboration between the project lead and lead designer, with contributions from other designers and members of the project team. The project execution plan sets out the processes and protocols to be used to develop the design. Technology strategy The strategy established at the outset of a project that sets out technologies, including Building Information Modelling (BIM, see unit 4) covering: specific software packages that each member of the project team will use

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• how information is to be communicated (FTP site or managed third party common data environment) • file formats in which information will be provided Communication strategy The strategy that sets out when the project team will meet, how they will communicate effectively and the protocols for issuing information between the various parties, both informally and at Information Exchanges.
	AC1.3 Advise on alternative procurement routes and make recommendations for the procurement of a contractor and sub-contractors for a specific development proposal	The technical and physical processes involved in realising the design, including the building contract and methods of procurement Arrangements for early offsite manufacturing and design input of specialists, including nomination and direct appointment of specialist sub-contractors	The building contract The contract between the client and the contractor for the construction of the project. In some instances, the building contract may contain design duties for specialist subcontractors and/or design team members. Procurement • traditional tendering compared with design and build arrangements • advantages of design and build including the early involvement of expertise regarding the programming, construction and health and safety strategies • advantages of traditional tendering with the design team appointed directly by the client

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC1.4 Draft a schedule of information to be produced by the design team during the technical design stage of a specific construction project	Technical design stage The design solution is translated into object based models, working drawings and specifications to permit its construction. Prepare and submit Building Regulations submission and any other third party submissions requiring consent.	Technical design Preparation of Technical Design in accordance with the Design Responsibility Matrix and Project Strategies to include all architectural, structural and building services information, drawings and calculations, specialist subcontractor design and specifications, in accordance with Design Programme. Working drawings and specifications Construction details, schedules of components and finishes, specialist drawings, standards specifications of materials and workmanship. Building Regulations Building Regulations approval can be obtained from the local authority Building Control Service by submitting a full plans application. An application deposited under this procedure needs to contain technical design information showing all construction details The local authority will check the details and consult any appropriate authorities (e.g. fire and sewerage). They must complete the procedure by issuing you with a decision within five weeks or, if you agree, a maximum of two months from the date of deposit.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			If the technical design complies with the Building Regulations, the authority will issue an approval notice. Otherwise they will request amendments or further details.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO2 Understand the purpose of the planning process and the various stages of the planning application process; and be able to evaluate the important factors that affect planning decisions	AC2.1 Apply knowledge of the planning process to a specific development proposal	Background knowledge The purpose of the planning process to ensure that the right development happens in the right place at the right time, to the benefit of communities and the economy. The legal framework for the control of development, arising from Town and County Planning Act; including the need for planning permission. Policies – national policies for strategic planning and national and local levels. Other social, political and economic factors that influence the planning process.	Purpose - to identify what development is needed and where - to identify areas that need to be protected or enhanced - to assess whether proposed development is suitable Control of development General development order and other statutory instruments; in particular: - the Town and Country Planning (Use Classes) Order - the Town and Country Planning (Applications) Regulations - the Planning (Listed Buildings and Conservation Areas) Regulations

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Policies National planning framework covering: • nationally significant infrastructure projects • localism and the duty of Authorities to cooperate • local plans as key documents • neighbourhood planning • presumption in favour of sustainable development • circulars and good practice guides Social Factors arising from the built environment and their effects on the health and wellbeing of individuals and communities, including: • noise pollution and air quality • housing design, availability and density • quality of amenity and work spaces Economic and political Public spending and construction programmes Support of new business and employment opportunities Protection of green space Prevention of over development.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC2.2 Advise on the planning application process in relation to a specific development proposal	The application process Pre-application consultations with planning authority as part of project feasibility study Type of applications Outline applications, used to find out, at an early stage, whether or not a proposal is likely to be approved by the planning authority, before any substantial costs are incurred, or full applications Authorities involved The Local Planning Authority Other authorities responsible for highways, access arrangements, conservation, environment etc. The importance of land ownership. Certificates and notices relating to land ownership. (It is not necessary to own the land to make an application to develop it, but the correct certificates and notices must be completed.) Application documentation, timescale and process, comprising application validation, consultations and determination. The decision notice The planning authority will issue the applicant with a decision notice, either refusing the application, or approving the application, with or without conditions.	Have an understanding of: Pre-application consultations - with planning officer of the local authority to consider project objectives and proposed outcomes in relation aspects of the local development plan, particularly land use and development density - with highway authority regarding access arrangements - with drainage authority and utility companies regarding supplies Outline applications Allows reserved matters - details about the proposal to be submitted at a later date. Reserved matters may include: - building appearance - means of access - landscaping proposals - site layout These details may be agreed following a “reserved matters” application at a later stage, this must be made within a statutory time limit. Full planning permission Application accompanied by all necessary details that, if approved would give permission to proceed and develop, subject to any conditions related to the permission.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		Appeals Applicants may appeal against a decision to refuse, or against conditions, or if the planning authority does not make a decision within the statutory time frame. Appeals are made to the Secretary of State and determined by a designated independent Planning Inspector.	Local Planning Authority Usually the local or district council. Applications being determined by a planning committee made up of local councillors, in consideration of recommendations of professional planning officers employed by the Authority, or by the senior planning officer under delegated powers. Certificates of ownership • Certificate A - sole Ownership and no agricultural tenants • Certificate B - shared Ownership (All other owners/agricultural tenants known) • Certificate C - shared Ownership (Some other owners/agricultural tenants known) • Certificate D - shared Ownership (None of the other owners/agricultural tenants known) For certificates B and C formal notice of the application must be served on the other owners and tenants. Application documentation • application form and correct fee • certificate of ownership • design and Access statement, if applicable • location plan confirming ownership(s) and site boundaries • design drawings (full applications)

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Consultations Representation for or against an application may be submitted by any interested party. The planning authority will invite representations by contacting: • other relevant authorities • the community council • neighbouring owners and from the general community by advertising the application online and in local newspapers.
	AC2.3 Evaluate factors that will affect planning decisions for a specific development proposal	Achieving planning permission Interpreting local planning requirements and developing a strategy to achieve an acceptable design solution. Identifying appropriate treatments of the design solution. Identifying possible contributions and community benefits. Consider possible planning obligations.	Local planning requirements Arising from the local development plan including: • the proposed use of the development • the likely impact on the surrounding area • the number, size, layout, siting and external appearance of buildings • the infrastructure available (e.g. roads and water supply) and proposed means of access • any landscaping requirements

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Appropriate treatments External building finishes and proportions appropriate to the locality, suitable surface treatments and landscaping. Contributions and community benefits Development has an impact on infrastructure such as roads, schools and open spaces. Development should contribute towards these infrastructures. Local planning authorities can put in place a Community Infrastructure Levy – a charge which new developments pay, based on the size and type of development. Planning obligations A developer may be asked by a local planning authority to enter into an obligation to undertake works, or provide additional funding for services. Any planning obligation must be: • necessary to make the development acceptable in planning terms • directly related to the development • fairly and reasonably related in scale and kind to the development

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC2.4 Identify actions required in response to conditions placed on planning permission for a specific development proposal	Ongoing planning obligations Purpose and nature of planning conditions. The need to ensure compliance with conditions attached to planning permissions. Implications of design changes post consent.	Conditions An alternative to outright refusal: The LPA may grant permission subject to conditions, for example, restricting use of the premises, or requiring specific approvals for aspects of the development, such as the materials to be used. The authority has to give reasons for the conditions. Enforcement arising from failure to comply with planning conditions. Establish if design changes require further application(s). Agree any changes of materials arising from availability with the planning authority.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO3 Understand the main health, safety and environmental factors influencing the design of the built environment	AC3.1 Report on health, safety and environmental factors that have influenced the concept design for a specific development	Ways of incorporating health, safety and environmental protection factors which ensure the safety, security and well-being of people using the built environment, including: • shelter – building envelope designed to be wind and rain proof • design for visual comfort – consider provision of daylight and views to the outside. Provide suitable lighting design to suit activities and avoid glare • thermal comfort – controllable heating and comfort cooling systems needed to maintain air temperatures to suitable levels to suit user activities. Control and/or use of solar gains • humidity – air conditioning and heat reclaim systems to maintain humidity levels and air quality • air quality – consider ventilation requirements, systems to achieve suitable number of air changes • acoustic comfort – design to insulate against external noise. Identify and isolate sources of internal noise • safe access – Separation of pedestrian and vehicular access routes • ancillary facilities – Separation of delivery traffic, provision for unloading and siting of refuse storage	Visual Comfort – lack of daylight/natural light can have a number of physiological and psychological effects on human health. A view outside satisfies the physiological need of the eye to change focus, and also provides awareness of the environment beyond the building. Lighting design – appropriate lighting design is necessary to avoid undue visual fatigue and discomfort. Flicker (associated with fluorescent lighting) and cause of headaches and eye strain. Thermal Comfort – being uncomfortably hot or cold can lead to adverse effects on performance, and extreme temperatures can lead to heat exhaustion or hypothermia. Humidity – high relative humidity can cause the proliferation of mould, leading to respiratory illness and allergies. Low humidity can cause dryness of the throat and eyes. Indoor air quality – exposure to air pollutants can have a significant detrimental impact on human health. Poor indoor air quality is likely to contribute to Sick Building Syndrome. Acoustic comfort – the potential effects of noise include hearing impairment, disturbance of sleep and rest, anxiety, stress, and general annoyance.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		security of site and building – prevention of unauthorised access. SQSS conducts a Security Needs Assessment (SNA) during concept design. The recommendations or solutions proposed by the SQSS are incorporated.	Safe access – dedicated cycle paths that provide direct access from the site entrance(s) to any cycle storage provided. Footpaths on-site provide direct access from the site entrance(s) to the building entrance(s). Drop-off areas off the access road and provide direct access to pedestrian footpaths. Dedicated pedestrian crossings. Suitable signposting and external lighting. Ancillary facilities – delivery areas not directly accessed through general parking areas and do not cross pedestrian and cyclist routes. Dedicated parking/waiting area for goods vehicles. Parking and turning areas designed to suit type of delivery vehicle. Dedicated space for the storage of refuse skips and pallets away from staff/visitor car. SQSS (Suitably Qualified Security Specialist) – appointed to develop a set of recommendations that aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC3.2 Prepare entries for the CDM health and safety file, as applicable to the concept design stage of a specific development project	Ways of responding to regulatory requirements for health, safety and environmental protection, including: Building regulations – set out minimum requirements for specific aspects of building design and construction in a series of approved documents, including Part A structure and Part B fire safety. The Construction (Design and Management) Regulations (CDM Regulations) – regulations place a duty on the client to appoint a competent principal designer and are intended to ensure that health and safety issues are properly considered during a project's development so that the risk of harm to those who have to build, use and maintain structures is reduced. Risk analysis – ways of conducting risk assessment and incorporating risk management in the design process. The CDM regulations require that as the design progresses, risks are identified and eliminated and residual risks are reduced and managed and that designers and contractors take account of the 'principles of prevention' in carrying out their duties.	Approved documents, for example - Part A: Structure – requires buildings to be designed, constructed or altered so as to be structurally safe and robust, and so as not to impair the structural stability of other buildings - Part B: Fire safety – covers all precautionary measures necessary to provide safety from fires or building occupants, persons in the vicinity of buildings, and firefighters. Requirements and guidance covers means of escape in cases of fire, fire detection and warning systems, the fire resistance of structural elements, fire separation, protection, compartmentation and isolation to prevent fire spread, control of flammable materials, and access and facilities for firefighting Principal designer – must be an individual that has the ability to influence the design and has responsibility for co-ordination of health and safety during the pre-construction phase.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		Method statements are widely used in construction as a means of controlling specific health and safety risks that have been identified following the preparation of a risk assessment) such as; lifting operations, demolition or dismantling, working at height (such as work on roofs), installing equipment, and the use of plant.	The role includes responsibility to: • inform the client of their duties under the regulations • plan, manage and monitor health and safety in the pre-construction phase, including; identifying, eliminating or controlling foreseeable risks • ensure members of the design team carry out their duties • help compile pre-construction information and provide it to designers and contractors • prepare the health and safety file and then review and revise the file as the project progresses • liaise with the principal contractor to help in the planning, managing, monitoring and co-ordination of the construction phase. • take into account the general principles of prevention • ensure that all persons working in relation to the pre-construction phase cooperate with the client and each other • check that designers have sufficient skills, knowledge, experience and (if they are an organisation) the organisational capability to carry out the work

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Principles of prevention include: • avoid risks where possible • evaluate those risks that cannot be avoided • put in place proportionate measures that control risks at source • replace the dangerous by the non-dangerous or the less dangerous • develop a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors relating to the working environment • give appropriate instructions to employees Method statement – helps manage the work and ensures that the necessary precautions have been communicated to those involved.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC3.3 Report on measures put forward to enhance environmental efficiency during the concept design stage of a specific development proposal	New developments must minimise energy consumption and maximise energy efficiency. This should be achieved through the sustainable design of buildings and by using sustainable building materials and construction techniques. Design teams should ensure that integrated passive design features are built into the design of new buildings from the earliest stages of the design process to maximise the possibilities for reducing environmental impact and running costs of the building over its lifetime. A BREEM assessment should be carried out with a target to achieve a rating of 'Excellent' with a minimum rating of 'Very Good' in cases where there are good and explicit reasons why an excellent rating could not be achieved.	Main elements of integrated passive design: • <i>Orientation:</i> making best use of high summer sun angles and low winter sun angles on southern exposures while minimising excessive solar gain on east and specifically west exposures from low year-round sun angles • <i>Glazing:</i> sizing, positioning and detailing windows to get the most benefit from the sun while avoiding overheating in summer and heat loss in winter • <i>Thermal Mass:</i> providing sufficiently exposed thermal mass to store heat from the sun in the winter and act as a heat sink for cooling in the summer. The benefits of thermal mass are often lost through excessive wall, ceiling and floor coverings • <i>Insulation:</i> specifying high levels of insulation to reduce unwanted heat loss or heat gains through the roof, walls, doors, windows and floors • <i>Natural Ventilation:</i> designing clear and robustly controlled air flows through buildings for daytime and night time cooling. Building air-tightness forms a critical component for achieving effective natural ventilation

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		BREEAM (Building Research Establishment's Environmental Assessment Method) – is the world's first sustainability rating scheme for the built environment promoting a strong focus on sustainability in building design, construction and use. BREEAM is now an international standard that is locally adapted, operated and applied through a network of international operators, assessors and industry professionals. Through its application and use BREEAM helps clients measure and reduce the environmental impacts of their buildings and in doing so create higher value, lower risk assets.	• Zoning: providing thoughtful zoning to allow different thermal requirements to be compartmentalised. Substantial savings can be achieved Aims of BREEAM: • to mitigate the life cycle impacts of buildings on the environment • to enable buildings to be recognised according to their environmental benefits • to provide a credible, environmental label for buildings • to stimulate demand and create value for sustainable buildings, building products and supply chains Objectives of BREEAM: • to provide market recognition of buildings with a low environmental impact • to ensure best environmental practice is incorporated in the planning, design, construction and operation of buildings and the wider built environment • to define a robust, cost effective performance standard surpassing that required by regulations

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• to challenge the market to provide innovative, cost effective solutions that minimise the environmental impact of buildings • to raise awareness amongst owners, occupants, designers and operators of the benefits and value of buildings with a reduced life cycle impact on the environment • to allow organisations to demonstrate progress towards corporate environmental objectives

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO4 Understand the provision of primary services utilities to the design of buildings in terms of the main features and basic operating principles	AC4.1 Include proposals for the provision of utilities within the concept design stage of a specific development proposal	How the provision, location, accessibility and maintenance of utilities influence the design process. Utilities are infrastructure services provided to consumers that are sometimes considered to be 'public' services, that is, they are supplied to the public and are important for the normal functioning of society. Utilities are generally considered to include: electricity, gas, water and sewage and communications services. They are sometimes distributed overhead but are usually underground.	Provision: - ensuring that utilities are supplied to developments is vitally important, not just for the completed development, but also for the construction process itself. Multiple connections may be required or the existing infrastructure may need to be extended or reinforced - the infrastructure necessary to supply utilities may be provided by the network operator, or increasingly, by an independent provider (to an agreed design that is then 'adopted' by the network operator). These organisations should be considered as stakeholders in the project and identified as third party dependencies that bring risks to the project Location – ensure that existing site information is obtained, and surveys carried out to determine the position, extent and capacity of existing services. Design process – calculate loads. Discuss requirements with providers and arrange early exchange of information and confirmation of ability to supply and identify routes for utilities.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC4.2 Include proposals for the internal distribution of utilities within the concept design stage of a specific development proposal	Design implications and how utilities are distributed within the built environment. That building services design must be integrated into the overall development proposal from a very early stage, particularly on complex building projects. The role of the building services engineer.	Design Implications: building services play a central role in contributing to the design of a building, not only in terms of overall strategies and standards to be achieved, but also in envelope design, weights, sizes and location of major plant and equipment, the position of vertical service risers, routes for the distribution of horizontal services, drainage, energy sources - ensuring that building services meet the standards set can involve the use of sophisticated simulation tools to predict the likely performance of buildings during the design stages, including the assessment and comparison of different options Integration of services – the detection of clashes between building services and other building components is a significant issue, not just in terms of the physical services themselves, but also access to allow the builders work in connection with those services. The use of 3D computer aided design (CAD) systems and building information modelling (BIM) should help reduce the occurrence of such problems.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Building services engineers – are central to the design and assessment of sustainable systems, assessing the life cycle of buildings and their component services to minimise the resources consumed and the impact on the environment during fabrication, construction, operation and dismantling.

Performance bands

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO1 Understand the various stages of the design process and the principles involved in taking a design through the complete design cycle	AC1.1 Analyse a client brief and develop a concept design solution and project strategies for a specific development proposal	Concept design proposals produced for layout and appearance in response to the client's strategic requirements.	Concept design proposals produced for layout and appearance, in response to the client's strategic requirements and including some project strategies to support detailed design.	Concept design and project strategies developed that demonstrate understanding of constraints and the client's strategic requirements.	Comprehensive concept design and a range of project strategies developed that demonstrate in depth analysis and review of constraints and the client's strategic requirements.
	AC1.2 Produce a project roles table and project execution plan for a specific development proposal	Project roles table and project execution plan produced that cover several aspects of the project.	Project roles table and project execution plan produced that cover most aspects of the project.	Comprehensive project roles table and project execution plan that includes technology and communication strategies and consideration of relevant common standards.	

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
	AC1.3 Advise on alternative procurement routes and make recommendations for the procurement of a contractor and sub-contractors for a specific development proposal	Report containing advice leading to recommendations for procurement.	Report containing clear advice leading to justified recommendations for procurement.		
	AC1.4 Draft a schedule of information to be produced by the design team during the technical design stage of a specific construction project	Information schedule covering some aspects of the technical design stage.	Information schedule covering most aspects of the technical design stage and Building Control application, with some reference to roles and responsibilities.	Information schedule covering most aspects of the technical design stage and Building Control application, cross referenced to roles and responsibilities.	

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO2 Understand the purpose of the planning process and the various stages of the planning application process; and be able to evaluate the important factors that affect planning decisions	AC2.1 Apply knowledge of the planning process to a specific development proposal	Report that describes the planning context for a specific development.	Report that analyses the planning context for a specific development.		
	AC2.2 Advise on the planning application process in relation to a specific development proposal	Report that describes the planning application process and the documentation involved.			
	AC2.3 Evaluate factors that will affect planning decisions for a specific development proposal	Report that describes factors that will affect planning decisions for a specific development proposal.	Report that explains the main factors that will affect planning decisions for a specific development proposal.	Report that evaluates main factors that will affect planning decisions recommends suitable actions.	
	AC2.4 Identify actions required in response to conditions placed on planning permission for a specific development proposal	Recommendations for actions required in response to conditions placed on planning permission.			

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO3 Understand the main health, safety and environmental factors influencing the design of the built environment	AC3.1 Report on health, safety and environmental factors that have influenced the concept design for a specific development	Descriptive report that identifies the health, safety and environmental factors that have influenced the concept design.	Detailed report that explains the health, safety and environmental factors that have influenced the concept design.		
	AC3.2 Prepare entries for the CDM health and safety file, as applicable to the concept design stage of a specific development project	Prepare entries for the CDM health and safety file, to identify design measures arising from Approved Document B, and other risks as applicable to the concept design stage.	Prepare entries for the CDM health and safety file, to explain design measures arising from Approved Document B, and identify other risks as applicable to the concept design stage.	Prepare entries for the CDM health and safety file, to consider alternative design measures arising from Approved Document B, and analyse other risks as applicable to the concept design stage.	
	AC3.3 Report on measures put forward to enhance environmental efficiency during the concept design stage of a specific development proposal	Descriptive report on measures put forward to enhance environmental efficiency during the concept design stage.	Detailed report that explains measures put forward to enhance environmental efficiency during the concept design stage.	Detailed report that explains alternative measures to enhance environmental efficiency during the concept design stage.	Detailed report that explains alternative measures to enhance environmental efficiency during the concept design stage, and relates the measures to BREEAM aims and objectives.

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO4 Understand the provision of primary service utilities to the design of buildings in terms of the main features and basic operating principles	AC4.1 Include proposals for the provision of utilities within the concept design stage of a specific development proposal	Concept design developed to include proposals for the provision of utilities identified in the client's brief.			
	AC4.2 Include proposals for the internal distribution of utilities within the concept design stage of a specific development proposal	Concept design developed to include proposals for plant and the internal distribution of utilities and services identified in the client's brief.	Concept design developed to identify specific clashes between building services, structures and other components.	Concept design developed to propose solutions to specific clashes between building services, structures and other components.	

Assessment summary

This unit is internally assessed and externally moderated. All assessments must be conducted under controlled assessment conditions. Controls have been determined for each stage of the assessment process: task setting, task taking and task marking.

Guidance for delivery

To understand the various stages of the design process and the principles involved in taking a design for a building project through the complete design cycle, centres need to encourage learners to actively investigate the built environment and the individual roles involved in its creation.

The delivery of this specification should involve learners in actively experiencing stages in the design process, justifying their design decisions and appreciating the contributions of other stakeholders. It is important that learners recognise that the knowledge and understanding they develop about the design of the built environment is vocationally relevant.

Making teaching vocationally relevant

It is important that learners recognise the knowledge and understanding they develop are vocationally relevant. There are a number of ways this can be achieved:

Example 1

Practical activities centred around a work-based scenario should be undertaken in the creation of a concept design for a specific construction project, with design strategies for specialist input.

Example 2

Published case studies or case histories can be used: for example, studying a case history of a sustainable development with an analysis of the integrated passive design measures taken.

Example 3

Work experience and other links with local employers can be established to provide the learners with vocationally relevant experiences, including suitable Health and Safety training to enable site visits.

Making contacts

Examples of organisations that may be approached to provide help include:

- design studios or contractors' offices – these could be visited to consider how the organisations are structured, the resources they employ, the work they carry out, and the communication methods/media employed
- building professionals can provide presentations; for example, a planning officer could talk about local development control, an architect could explain their role in the design process and illustrate design influences such as the local vernacular or energy use.

Resources

The internet should be treated as a central resource for this unit, including the following websites.

Careers and further training <http://www.citb.co.uk/careers-in-construction>

Stages in the design process <https://www.ribaplanofwork.com>

Planning system 'plain English guide to the planning system'
<https://www.gov.uk/government/uploads/system/uploads>

Building Regulations <https://www.gov.uk/government/collections/approved-documents>

Sustainability <http://constructingexcellence.org.uk/resources/sustainable-construction-checklist>

Environmental impact (BREEAM) <http://www.bre.co.uk>

Additional guidance can be found in the document Guidance for Teaching which accompanies this qualification.

2.3 Unit 2

Unit title	Create the Built Environment
GLH	72

Aim

The aim of this unit is for learners to understand and appreciate; the existing and developing processes required to construct a range of buildings including the use of project management and quality assurance. Consideration is also given to job roles within the industry, their interrelationship and career progression.

Overview

There is a diverse range of construction professional roles that have a shared common strand of design, operational and commercial acumen. The common objective to sustainably resource, construct and maintain the built environment relies on the specialised primary occupations of Architect, Engineer, Builder and Surveyor.

The advent of continually improving the institutional standards that govern the built environment and these same diverse roles place their own unique influences on the industry which is often in a state of cyclical change mirroring the economic peaks and troughs of prosperity followed by decline.

As such, construction professionals utilise dynamic and pre-emptive skills and strategies to ensure cost effective and timely delivery of buildings and infrastructure whilst evolving new techniques to help define their future in this competitive market to ensure positive qualitative outcomes.

The product of this approach is to safely deliver sustainable building and infrastructure stock that promotes modern structural and fabric solutions of the future whilst understanding the traditional processes that help them to reflect on lessons learnt from the past.

Skills Development

It is envisaged that the study of this unit will generate opportunities for the development of skills. Examples of such opportunities are noted below.

Digital literacy and literacy: in the carrying out of web-based research into organisations structures and the roles present within the construction Industry. The use of the general construction careers site, Go Construct could be used along with specific professional sites such as that of RIBA.

Digital literacy: can also be developed through the study and potential use of project management software.

Numeracy: in the consideration of quantitative aspects of risk management and project management.

Critical thinking and problem solving: in the consideration of project management and how the use of appropriate software can assist critical thinking and problem solving within the construction industry.

Personal **planning and organising and personal effectiveness:** can be developed in order to assist students in their preparation for the unit assessment.

Learning outcomes, assessment criteria and taught content

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO1 Understand main job roles and their relationship to each other within the built environment and explore typical career pathways, qualifications and progression	AC 1.1 Describe the inter-relationships of job roles within the built environment	Typical career pathways, qualifications and progression • types of Occupations • types of Role • level of responsibility • routes & methods to career progression • qualifications relevant to role & responsibilities • the occupational structure of organisations • nuances of craft, technical, supervisory and management job roles and responsibilities • key professional institutions governing professional practice Be able to assess and describe how the traditional private and public sectors procure and engage construction professional services.	The range of construction careers within the industry – have an understanding of the diversity of roles and responsibilities and how interdependencies help with career progression by shared experiences. The potential routes of career paths – have knowledge of likely career paths of stakeholders that represent the disciplines of the industry. Organisational structure is a traditional hierarchical arrangement – be able to recognise the hierarchy within an organisation or project team organogram and understand the varied levels of responsibility in relation to role of all key stakeholders. Understand the professional institutions role in governance of their relative field of expertise. The delivery of services and project delivery – have an understanding of the varying sizes and output of different organisations within the private and public sectors.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			The volume of work or services generated by an organisation – have an understanding of output and economies of scale of small, medium and large organisations.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO2 Identify and evaluate the construction processes required to construct the sub and superstructures of a range of buildings, including finishes and services	AC 2.1 Describe factors that influence the choice or the necessity to use a particular method of construction or technique	Construct the sub and superstructures of a range of buildings, including finishes and services • nature of traditional construction techniques • nature of Modern Methods of Construction • interrelationship of building elements; foundations, structure, envelope, finishes, M&E, FF&E & External Works. • key impacts on programme when considering types/method of construction • milestone dates of the programme	The approach to the manner in which a building is constructed is fundamental to a positive outcome – have knowledge of traditional and modern methods of construction. The benefits of selecting uniformly shaped structural components can significantly influence production timescales and fabric design – be able to assess and describe traditional and modern structural alternatives. Choice of methods and techniques can influence current and future approaches to methods of working – have an understanding of the benefits and limitations of materials and methods to continually improve. Checking the design and ‘works’ is vital to positive outcomes – have an understanding of the value of monitoring regularly during the design and construction stage. Site location and weather can impact on production – be able to explain when and how instances and scenarios effect outcomes.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC 2.2 Demonstrate the implications of these factors or decisions on the outcome, mindful of the constraints or benefits	Ramifications of decisions to choose alternative methods or techniques • impact on cost • impact on programme	Cause and effect of choices – have an understanding that there are consequences to construction planning and decision making that have an inevitable impact on the commercial and/or timeliness outcomes of a project.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO3 Identify and evaluate a range of project management tools and techniques	AC 3.1 Identify the elemental factors that influence the application of a broad and dynamic range of skills	Project management tools and techniques • key attributes of managing a project • managing people and getting the most from them • understanding limitations and spans of control • setting clear and realistic objectives • risk management • identifying opportunity • commercial Awareness • types of Programme (procurement/constriction/planning) • innovative processes and techniques (Lean)	Managing, motivating and coaching people and teams – have an understanding and draw comparisons of soft and hard skills whilst having an appreciation of behavioural sciences. Risk and opportunity – have knowledge of Identification of the skills required to influence and manage people to obtain positive outcomes in rapidly changing environments. Time management and prioritising – have an understanding of the influences of aggressive time constraints and challenging environments. Approach to circumstances and situations – have an understanding of how one's approach to different people with different skill sets can help influence positive outcomes for the stakeholders, individuals and teams (and vice versa). Smart programming and Cost Control – be able to explain how tools such as programming and cost control benefit team performance and positive project delivery.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC 3.2 Describe the techniques and practices applied to coheres and prepare for the contractual environment	Project management tools and techniques styles of leadership	Style of Leadership – be able to explain the unilateral benefit of applying management tools and techniques to circumstances and stakeholders.
	AC 3.3 Describe the relevance of recording relevant events for contractual purposes	Project management tools and techniques relevance of diarising plant and actual relevant events that organise, manage and reflect events	Record keeping – maintaining accurate records and diaries – be able to record accurate production levels and events for record purposes.
	AC.3.4 Produce tables that logically capture and record planned checking regimes	Project management tools and techniques professional approach to the checking of levels of quality of service and/or products	Approach to checks – all 'work' must be checked and conclusions recorded in a clear manner to enable approvals or further corrective measures to be taken.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO4 Identify and evaluate a range of quality assurance and project monitoring processes	AC 4.1 Describe the actions and mechanisms that can be put in place and applied to successfully deliver quality building stock	Quality assurance and project monitoring processes - the value of inspections and audits in the workplace - compliance processes and the relationship to timely completion and handover - the implications of poor/unchecked workmanship 'the relationship of 'hold points' to follow-on trades and activities - procurement of suitable labour, plant and materials in readiness for the construction phase - the nature and key features of the Supply Chain (local/UK based/ International)	'Snagging' the works – have an understanding of the traditional & modern snagging techniques and types of inspections periodically employed. 'Right first time' approaches – have knowledge of and capacity to identify the benefits of 'right first time'; approaches and the cost of poor workmanship in terms of commerciality and timeliness. When to 'snag' the works – be able to explain the benefits of monitoring regularly during the design and construction stage. 'Go see' – be able to explain the benefits of regular visual inspections (called 'go see' in lean), use of test and inspection plans, digital images, PC and tablets. Collaboration – be able to explain the benefits to all stakeholders prior to handover.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO5 Identify and evaluate the health, safety and environmental factors influencing the creation of the built environment	AC 5.1 Describe the high risk and high frequency accident activities and well planned and preventative safe systems of work help to mitigate negative outcomes	Health, safety and environmental factors influencing the creation of the built environment. - types of Duty Holders and their relationships to each other - implications of roles and responsibilities of stakeholders - reasoning behind the current legislation and applying statistical data to mitigate: - Fatal accidents - Non-Fatal accidents, incidents and near misses - the commercial implications of H&S costs on a project - appointing suitably resourced supply chain members to promote sustainable outcomes - the influence of BIM and modern methods of construction influence when assessing the H&S aspects of a project	Your number one production priority, vital to health, safety and environmental knowledge – Have an understanding of and be able to evaluate the statistics produced by the HSE, CITB & Wider Industry into incidents, accidents and near misses. The value of life and good health – Have an understanding of how precious health & life really is and the fragility of it, understand the cost of an accident. Safety Audits – Have a knowledge of why and how to monitor regularly during the design and construction stage. Reinforcing and broadcasting the cultural safety message – Be able to demonstrate the value to all stakeholders, but specifically supervisors and managers prior to commencing work.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC 5.2 Produce Risk Assessment and method statement tables to demonstrate an understanding of preventative control measures needed to mitigate accidents incidents and near misses	Elemental risk assessing and method statement content • types of risk assessment • types of method statements • meaning of factors that equate to the creation of a 'risk' • factors that make up control measures to nullify, eradicate or mitigate risk • creating a 'safe system of work'	Generating risk assessments and methods of statements (RAMs) – have an understanding of how to prepare a risk assessment and method statement and how to check same using a process map and/or check sheet.
	AC5.3 Describe why the control of temporary works is relevant to previous, current and future construction projects	Temporary works are manifest on most/all construction projects • what is meant by 'temporary work' • what constitutes temporary works design • what constitutes temporary works engineering	A conscious recollection of temporary works failures – have an understanding of previous temporary works failures and causation factors.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO6 Compare existing and developing processes used in the creation of the built environment and evaluate their impact	AC 6.1 Advise on suitable applied design solutions for the cost effective construction of building stock	Creation of the built environment and evaluate their impact - underpinned by 2.2 ranges of traditional and modern construction techniques - evaluation of suitable techniques that promote: 1. utilisation of BIM 2. give rise to Safer & Healthier workplaces 3. give rise to commercial betterment 4. procurement Programme betterment 5. project Programme betterment 6. positive outcomes for society - application of continual improvement on processes when 'lessons are learnt'	Impact of suitable design solutions – have an understanding of how good design can create realistic and safe working environments during construction processes. Application of the CDM regulations – have an understanding of the duties and legal responsibilities of the stakeholders in the design process. The value of high quality building stock and their life cycle – have an understanding of what is important to the buildings finished 'design', the construction phase 'workforce' and end 'users' maintenance regime such as working at height, prefabrication of building components or elemental 'off site' fabrication and how maintenance i.e. cleaning of windows and gutters/provision of M&E services are important.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC 6.2 Describe how clash detection can mitigate unproductive works and/or defects	Evaluation of suitable techniques that promote the utilisation of BIM	Application of Building information management and BIM – be able to explain the benefits of applying available and suitable processes to logical and timely delivery of a project that utilises the range of management tools and techniques available.

Assessment summary

This unit is externally assessed.

Guidance for delivery

The creation of the built environment is highly complex and involves many processes and people. Students need to understand these processes, the roles of the people who carry them out, the techniques they employ and the interrelationships that connects everything together. A clear emphasis on 'real' construction projects is essential to the delivery of this unit. In order to enhance student engagement, interesting (possibly local) current or historic construction projects should feature prominently in delivery.

Making teaching vocationally relevant

It is important that learners recognise the knowledge and understanding they develop are vocationally relevant. There are a number of ways this can be achieved:

Example 1

Practical activities centred around work-based scenarios could be undertaken in project management for a specific construction project.

Example 2

Published case studies or case histories can be used: for example, construction projects which use innovative design solutions.

Example 3

Links with local employers can be established to provide the learners with vocationally relevant experiences, including information on careers in the construction industry.

Making contacts

Examples of organisations that may be approached to provide help include:

- Contractors' offices or construction sites – these could be visited to help consider how organisations implement planning and project management decisions in real-life scenarios.
- Building professional can provide presentations; for example, a construction manager could talk about quality assurance and project monitoring processes applied to a particular construction project.

Resources

A key resource will be the learner's local built environment. Learners will need a detailed knowledge of construction theory, and textbooks and web-based resources will be valuable.

Books/resource packs

10th edition Building Construction Handbook, Chudly R& Greeno R.(1998 republished 2014, Routledge)

WJEC Level 3 Applied Diploma in Professional Construction Practice notes

Other resources

Construction and construction education-related websites will provide relevant information. These include:

Construction Industry Training Board: <http://www.citb.co.uk/>

The Chartered Institute of Building: <https://www.ciob.org/insight>

Royal Institute of British Architects: <https://www.architecture.com/Explore/Home.aspx>

Royal institute of Chartered Surveyors: <http://www.rics.org/uk/>

Institute of Civil Engineers: <https://www.ice.org.uk/>

Chartered Association of Building Engineers: <https://www.cbuilt.com/the-cabe/>

The Building Research Establishment: <https://www.bre.co.uk/sustainability>

The ODPM: <https://www.gov.uk/government/organisations/deputy-prime-ministers-office>

The BBC: <http://www.bbc.co.uk/news/business>

'Broadsheet' newspapers such as The Guardian, The Telegraph and the Financial Times, and e-magazines such as The Construction News;
<https://www.constructionnews.co.uk/>

Additional guidance can be found in the document Guidance for Teachers which accompanies this qualification.

2.4 Unit 3

Unit title	Value and Use the Built Environment
GLH	72

Aim

The aim of this unit is for learners to understand and appreciate; the engagement of stakeholders and communities in the development and use of the built environment. The protection of the environment and the physical structure in the use of the built environment will also be considered.

Overview

Stakeholder and community engagement is the participating audience that the modern construction professional is expected to educate, consult and maintain a constant dialog with to ensure the positive outcomes of all projects.

The high expectations of stakeholders is not just confined to clear channels of communications but also to the provision of 'greener' and more sustainable forms of energy to help reduce the carbon footprint that many individuals or organisations have publically agreed to reduce as part of their own personal or corporate ethos, vision and values.

This tapestry of expectation, communication, compliance and understanding of often highly complex and often innovative technologies must be conveyed by the design and delivery team to the clients/stakeholders in a timely and ordered manner. Ensuring both the immediate successful handover and future maintenance is achieved.

The institutional standards governing 'exemplar' government initiatives are considered to be the minimum standards by which building stock is now received by all sectors of the industry and set's the precedent for how they are maintained into the future.

Skills development

It is envisaged that the study of this unit will generate opportunities for the development of skills. Examples of such opportunities are noted below.

Literacy: may be developed through the consideration of case studies based on stakeholder engagement and enhanced through the inclusion of associated concepts, processes and terminology.

Critical thinking and problem solving: can be developed in the consideration of maintenance of the built environment. Innovation can also be developed in the consideration of potential solutions to sustainable energy sources.

Digital literacy: may be developed through the creation of diagrams and tables which help communicate stakeholder relationships.

Personal **planning and organising and personal effectiveness:** can be developed in order to assist students in their preparation for the unit assessment.

Learning outcomes, assessment criteria and taught content

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO1 Describe and evaluate ways of engaging stakeholders and communities, in the development and use of the built environment and the local infrastructure including transport	AC 1.1 Describe factors and mechanisms that have positive outcomes based on collaboration and respect for stakeholders	Evaluate ways of engaging stakeholders and communities in the development • impact of timely stakeholder engagement within a community during the project lifecycle • nature of the primary stakeholders and appreciation of their perspective • balancing stakeholder and community needs • meaningful alternative individual and community contributions to influential decision making	Stakeholder expectations – have an understanding of the relationships between the client, consultants, contractors and the potential users of the site/project in context of their expectations and performance (KPIs). Community perspectives – have an understanding that every stakeholder will have a motive for being part of the stakeholder group and have a vested interest in the project, consider this from their respective social, economic and/or political interest. Benefitting the community and stakeholders – be able to explain stakeholder interests during the RIBA plan of work and beyond. Stakeholder collaboration – have an understanding of the importance of collaboration and empathy with the wants and needs of other stakeholders.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO2 Identify ways of protecting and maintaining the environment during use of the built environment	AC2.1 Produce tables that reflect suitable design solutions preferable to innovative and alternative sustainable energy sources	Maintaining the environment during use of the built environment - types of measures employed to increase environmental protection and minimise wasted resources - types of energy and natural resource consumption reduction measures - key reduction tools to reduce emissions to air, land and water - the range of sustainable practices that optimise social, economic and environmental benefits - key infrastructure contributions to maintaining the built environment - the range of sustainable technologies and their contributions - types of short and long term community engagement - secure methods of protecting the built environment	Compliant designs and construction – - have an understanding of the levels of good practice, institutional standards, building regulations and other current institutional standards as a primary source of compliance - be able to investigate and demonstrate compliant and realistic design solutions and alternatives - have knowledge of the unilateral desire by stakeholders to reduce the consumption of water, gas, electricity, oil and the burning of fossil fuels thus mitigating depletion of the earth's natural resources, whilst promoting sustainable alternatives such as PV (solar), wind and other new emerging alternative energy technologies

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			An understanding of the BREEAM accreditation process – during both the design stage (refer to Institutional standards design stage assessment) and construction phase of the project (e.g. refer to management credits for BREEAM) – • be able to investigate the traditional, new and emerging technologies that influence how stakeholders plan and execute both the design and construction of the 'works' on projects • be able to investigate the range of stakeholders and emerging industries that influence the alternative solutions available on a global scale

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO3 Identify and evaluate ways of protecting the physical structure of the built environment	AC3.1 Produce diagrams and tables of understanding that depict the interrelationships of the wider stakeholders in context of the macro economy and impact on communities locally	Protecting the physical structure of the built environment - the range of principles and practices associated with social cohesion and prosperity that are driven by economic activity - the relationship of the construction industry and the broader economy - the influence of the construction industry on social objectives and community development - role of planning governance to the well-being of society - the influencing factors of the planning process and relationship to design process	The purpose of developments and the value placed upon them within a modern society - have an understanding of how developments are potentially funded to provide i.e. critical community asset such as a school or a speculative project such as a shopping centre or restaurant - have knowledge of modern mixed use developments and understand the meaning of capitol and running costs associated with this investment - be able to explain the contrasts between social responsibility, enlightened self-interest and social entrepreneurship - have knowledge of the 'purpose' of any development and how the planning process can influence form and function

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• be able to explain the value of the development, the direct and long term impact on people and communities in a broad cross section of society, i.e. 'Iceberg' basements in Kensington – Housing Associations within suburban and rural areas – Speculative Offices and bespoke within city centres • have an understanding of the diverse stakeholders that are integral to 'developments' within Britain and compare this to other countries to understand the potential and limitations of 'developing' • have an understanding of the importance of diversity in this process

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO4 Examine the basic principles of soft landings and how post occupancy evaluation can ensure the soft landings approach was considered and developed	AC4.1 Evaluate measures that when applied to project design, construction, handover and post construction can enhance the early stages of occupation by the building users and improve the habitation and on-going maintenance of the building	Soft landings and post occupancy evaluation - relevance of management on built assets that positively deliver social and economic benefits - range of public and private asset management provision - economic relevance of the contribution made by national and local asset management services - range of asset management services to enhance an asset's; - Lifespan - Commercial Viability - Social Utility Methods to enhance safety, well-being and comfort through positive asset management to benefit both individuals and communities.	Government soft landings (GSL) – be able to explain the ultimate objectives of GSL and the mechanisms deployed to achieve positive outcomes for clients and users. Government soft landings in context of time – have an understanding of GSL in context of the RIBA plan of work and beyond. Planned, preventative maintenance in practice – have an understanding of the processes, procedures and mechanisms that monitor and maintain positive commercial /environmental/value for money buildings.
	AC4.2 Describe measures that improve aftercare experience for stakeholders	The value of aftercare to stakeholders – Methods to enhance safety, well-being and comfort through positive asset management to benefit both individuals and communities.	The cost of poorly maintained building stock – be able to explain the past failures and cost of poorly maintained buildings and reasoning for a centralised record.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC4.3 Produce diagrams and tables that capture the expectations of clients anticipating receipt of the completed building and that of the contractor wishing to test and commission the building prior to handover	Government soft landings translated at project level – Methods of measuring the key performance indicators (KPIs) that steer a project to a positive outcome	Delivering GSL in a collaborative manner – be able to identify, understand and assess the responsibilities of the stakeholders and how they influence a positive GSL outcomes.

Assessment summary

This unit is externally assessed.

Guidance for delivery

The development of contemporary construction projects takes place in an environment of complementary and conflicting pressures. Students need to understand these pressures and how construction professionals address them. A consideration of 'real' developments ranging from successfully completed construction projects to those which have failed to materialise as a direct result of stakeholder pressure could significantly benefit student understanding. The concentration of high profile and local developments is likely to enhance student engagement.

Making teaching vocationally relevant

It is important that learners recognise the knowledge and understanding they develop are vocationally relevant. There are a number of ways this can be achieved:

Example 1

Undertake a visit to a local completed construction development and consider the inclusive aspects borne out of stakeholder contributions.

Example 2

Published case studies or case histories can be used: for example, construction projects which have created significant challenges with the local community.

Example 3

Consideration of exemplar government initiatives for minimum standards in building stock and how this manifests itself in local construction projects.

Making contacts

Examples of organisations that may be approached to provide help include:

- Contractors' offices or construction sites – these could be visited to consider how they achieve a reduced carbon footprint.
- Local planning offices – these can provide an insight into the consideration of stakeholder viewpoints at the planning stage.

Resources

A key resource will be the learner's local built environment. Learners will need a detailed knowledge of construction theory, and textbooks and web-based resources will be valuable.

Books/resource packs

10th edition Building Construction Handbook, Chudly R& Greeno R.(1998 republished 2014, Routledge)

WJEC Level 3 Applied Diploma in Professional Construction Practice notes

Other resources

Construction and construction education-related websites will provide relevant information. These include:

Construction Industry Training Board: <http://www.citb.co.uk/>

The Chartered Institute of Building: <https://www.ciob.org/insight>

Royal Institute of British Architects: <https://www.architecture.com/Explore/Home.aspx>

Royal institute of Chartered Surveyors: <http://www.rics.org/uk/>

Institute of Civil Engineers: <https://www.ice.org.uk/>

Chartered Association of Building Engineers: <https://www.cbuilde.com/the-cabe/>

The Building Research Establishment: <https://www.bre.co.uk/sustainability>

The ODPM: <https://www.gov.uk/government/organisations/deputy-prime-ministers-office>

The BBC: <http://www.bbc.co.uk/news/business>

'Broadsheet' newspapers such as The Guardian, The Telegraph and the Financial Times, and e-magazines such as The Construction News;
<https://www.constructionnews.co.uk/>

Additional guidance can be found in the document Guidance for Teaching which accompanies this qualification.

2.5 Unit 4

Unit title	BIM and Construction Projects
GLH	144

Aim

The aim of this unit is for learners to understand and appreciate; the application of Building Information Modelling in managing the design, creation and maintenance of built assets.

Overview

The design, construction and management of the built environment involves many people, possibly with differing and conflicting short term interests. The BIM approach seeks to remove conflicting interests on the basis that the longer term interests of all stakeholders are best served by close collaboration towards a common goal, achieved via a process that appreciates the contributions of all specialists and manages building information throughout the building life cycle.

BIM (Building Information Modelling) is the process of designing, constructing or operating a building using electronic object oriented information. It is technology based and relies on protocols for the storage and exchange of data. The ability of organisations in the construction supply chain to operate and exchange information on a building project, referred to as BIM maturity level, is critical and needs to be equal across the project team.

A BIM project is comprehensive. It starts with the specification of maturity level and definition of the Employers Information Requirements (EIR) progresses through the identification and appointment of a design and construction team, with suitable project and BIM experience and the production, exchange and refinement of BIM information throughout technical design, implementation, handover and management of the building in use.

The importance of the common data environment (CDE), used as a data repository throughout a BIM project and of the management of the contents of the CDE, as refined and clarified within a series of standards developed by industry and government to aid in the adoption of BIM, including the management of risk to data via a common security strategy.

At the end of this unit you will have produced BIM information for a development proposal and gained knowledge and practical experience of the principles and aims of BIM, of the collaborative processes involved and their potential for improvement of all aspects the built environment.

Skills development

It is envisaged that the study of this unit will generate opportunities for the development of skills. Examples of such opportunities are noted below.

Digital literacy: the nature of BIM generates a significant need for students to have a sound understanding of elements of digital technology. This will help develop digital literacy skills through the consideration of 3D environments, process simulations, Cad and PDF outputs, logistics, planning and end of life data. Students will also be expected to produce examples of 2D, 3D, 4D and 5D BIM information.

Planning and organising: BIM places a clear focus on these skills, and the consideration of BIM as applied to construction projects will provide significant development opportunities, especially through bespoke formative activities.

Personal **planning and organising and personal effectiveness:** can be developed in order to assist students in their preparation for the unit assessment.

Literacy and numeracy: in considering BIM, students will need to digest information from a significant number of sources and in different formats. The study of BIM case studies could generate many opportunities for the development of Literacy and Numeracy skills in real or realistic contexts.

Learning outcomes, assessment criteria and taught content

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO1 Understand the basic principles and benefits of BIM within the context of the built environment	AC1.1 Demonstrate an understanding of the basic principles of BIM	BIM Basic principles: • close teamwork and collaboration • clear and defined communications • the system is comprehensive • information is managed throughout the project lifecycle. • relevant to management of buildings in use (soft landings) The aim is that BIM consists of project information which is derived from a number of sources, including: • object based models • drawings such as PDF's or DWG's which are generated from the object based models • graphical and non-graphical information in the form of specifications, schedules and reports • facilities management requirements such as warranties, replacement and maintenance data	BIM (Building Information Modelling) – the process of designing, constructing or operating a building or infrastructure asset using electronic objected orientated information. Teamwork and collaboration – at commencement of any project it is critical to plan the process, ensure the team members have the capability and above all have the experience on projects in the way of teamwork. All members of a project team from client to contractor must understand what is to be achieved in totality, at key project stages and even on a weekly basis. Communications – the concept of clear and defined communication between team members on a construction project should be clearly defined. The introduction of BIM enables this collaborative process. Comprehensive – BIM relates to all stages of a project;

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		BIM essentially creates an information repository (common data environment) for a project with different team members and project participants inputting and outputting digital data at all times. It should enable all project stakeholders to visualise and share digital building models that can be easily understood by all members of a project team, as well as share and produce information that can be used and included throughout design, construction and operation.	• Design: Conceptual and detailed design of architecture, structure and mechanical electrical and plumbing in a 3D environment • Communication: Visualisation and analysis of 3D information within a building project • Simulation: This may include structural analysis, energy analysis, solar study, ventilation and light analysis and schedules from the model data • Documentation: This will include CAD Output or PDF, models, work schedules, costings and product information • Building processes such as construction, logistics and planning can be undertaken from BIM • Operation information including maintenance and asset management is a key area of BIM as all the information is collected and stored in a single place • End of life data including demolition and reuse

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Information is managed – BIM allows for key product and asset data to be embedded within all stages of a project and utilises a number of three-dimensional computer models that can be used for effective management of information through a project lifecycle. This can be achieved from early concept design through to operation and maintenance of a built asset and therefore can allow for a unified set of information to be delivered to the client at handover. Soft landings – the process of BIM is also relevant for design and construction for buildings in use. The main benefits for the purpose of GSL (Government Soft Landings) in regard to BIM are: • to provide a building that meets the end users need and required operational outcome • to enable end user involvement at early stages and throughout the project • to enable solutions to challenges involved in design that may affect ongoing maintenance and cost of operation

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			- to ensure that building performance is monitored up to 3 years post occupation and that there is a solution in place to remedy performance or use that is not achieved - use of the design and construction information and data to populate a Computer Aided Facilities Management solution (CAFM)
	AC1.2 Explain the benefits of BIM within the context of a specific development proposal	BIM as a process, can provide best value and savings on projects. The main benefits of BIM include: - better stakeholder understanding of projects. - conflict resolution and control during all stages of a project - construction process certainty - support Lean Construction Techniques - more accurate cost control as BIM allows calculation of values that exist in the virtual prototype of the building/site or structure prior to its completion - improved Coordination and Better Management resulting in project savings and reduced site issues and changes during construction - improved facilities management	Stakeholders – client, members of the design team, members of the construction team, suppliers, planners, end users, building managers, maintenance contractors, community members et al. Understanding of projects – images and visualisations that can be created at early stages of projects allow key project stakeholders to understand the built project prior to any construction being undertaken. Conflict resolution – BIM allows conflicts to be resolved via better coordinated information between all project stakeholders. Conflicts can be resolved prior to construction and therefore savings are achieved with the omission of construction site conflicts.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
		• BIM and sustainability: allows accurate climate data as well as informed building shape and orientation to be established at very early stages of a project • improved collaboration. BIM allows for better coordination of building elements as well as ensures all team members are working toward an end goal of creating efficient and sustainable buildings	Construction Process Certainty – building Information Models can be used to create accurate time line sequencing to ascertain project key milestones and dates with certainty. This process can be achieved prior to construction and therefore save on time and cost. Lean Construction Techniques – utilising BIM to discover material quantities and values can achieve leaner construction techniques by avoiding error in duplication of elements that may be ordered and delivered to site. Improved Cost control – Bills of Quantities can be achieved at all key stages of projects to ensure that accurate cost estimates can be produced and shared with the client. The process of BIM allows more accurate cost control by calculating values that exist in the virtual prototype of the building/site or structure prior to its completion. Improved Coordination and Better Management – coordination between all consultants on a project can be managed more efficiently using BIM by drawing together all information in a consolidated way to check that differing elements do not clash.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			Improved facilities management – information delivered to the client at handover and practical completion will be in a consolidated digital package that can subsequently be linked into a variety of Computer Aided Facilities Management software. The Digital data delivered at the completion of a project can also be used for renovation or future rework. BIM and sustainability – BIM can enable efficiencies on projects by allowing accurate data regarding the physical location of a site and its associated site conditions to be analysed and used to inform design. This allows for accurate climate data as well as informed building shape and orientation to be established at very early stages of a project.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO2 Understand the UK BIM Maturity Levels and use of COBie for information exchange	AC2.1 Describe and differentiate between the UK BIM Maturity Levels	The UK BIM Maturity model, which was devised in order to provide a clear demarcation of the varying levels of BIM implementation. These can be defined as maturity levels 0 to 3. The UK Government has concluded that the use of BIM (currently to level 2) is required on all Government funded projects. Level 2 summary: • development of information models over the course of a project • provision of an Employers Information Requirements (EIR) document with clear definition and decision points • Supplier & Supply chain capability assessment • provision of a BIM Execution Plan (BEP) including assigned roles, standards, methods, & procedures and a master information delivery matrix aligned with the project programme • provision of a Common Data Environment • compliance with identified standards (see LO4) Development of information models utilising database-based software, and analysis software.	BIM Maturity model – diagram outlining the levels of BIM maturity in regard to the ability of the construction supply chain to operate and exchange information on a building or infrastructure project. Maturity level definitions: BIM Level 0 – unmanaged computer aided design (CAD) including 2D drawings, and text with paper based or electronic exchange of information. BIM Level 1 – managed CAD, in a 2 or 3-dimensional format which would include such information as drawings in 2D format and information in 3D that may refer to visualisation or concept design models. Level 1 is also commonly described as ‘Lonely BIM’ as models are not shared between project team members.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			BIM Level 2 – managed 3D environment with data attached, but created in separate discipline-based models. These separate models are assembled to form a federated model, but do not lose their identity or integrity. Data may include construction sequencing (4D) and cost (5D) information. Level 2 consists of a series of domain and collaborative federated models, consisting of both 3D geometrical and non-graphical data, prepared by different parties during the project life-cycle within the context of a common data environment. The project participants provide defined, validated outputs via digital data transactions using proprietary information exchanges between various systems in a structured and reusable form. Level 02 provides a National framework for building projects from 2016. BIM Level 3 – a single collaborative, online, project model with construction sequencing, cost and project lifecycle information. This is sometimes referred to as ‘iBIM’ (integrated BIM). Level 3 is currently underway and will evolve in the coming years.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC2.2. Make COBie entries relevant to a specific development proposal	Standardised data exchanges. On a BIM project stakeholders may also be required to contribute to an object based model with as-built and product information or simply provide the as-built or product data via a COBie spreadsheet.	COBie (Construction Operation Building information exchange). COBie is a spreadsheet data schema and acts as a single source of information regarding all the data relating to the asset being designed, constructed and maintained on a BIM project. The requirement for COBie and the guidance for its use is outlined within BS1192.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO3 Produce basic BIM information for a building project and create information exchanges	AC3.1. Contribute to the EIR document for a specific construction project	BIM information – Employers Information Requirements (EIR) and the process of identifying information needed to carry out the project.	Employers Information Requirements – a key document to communicate to all project team members what information is required and when during the lifecycle of a project. This will ensure the process of BIM is achieved by creating a structured and clear set of requirements that the client will utilise at the final handover of the building.
	AC3.2. Produce examples of 2D, 3D, 4D and 5D BIM information for a specific construction project	BIM information – the scope of the information to be produced by the project team.	2D BIM Information Two dimensional drawings generated from line based software or from an object based modelling software in a variety of file formats. 3D BIM Information Three dimensional representations of a building and its components and objects. The 3D information can be used to convey design intent as well as visualisation and animation. It enables project stakeholders to visualise the building very early in the design process. 4D BIM Information Scheduling information or when an element will be built. With this information you can enable timely delivery of materials to site as well as accurately predict project construction time.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			5D BIM Information Estimating and cost aspects of the building. Each element within the building model has a cost associated with it. This allows for detailed analysis to be undertaken regarding project budgets and Bills of Quantities. 5D BIM also allows the delivery team to create accurate predictions regarding how much needs to be done at any given time in order to meet the construction targets. 6D BIM Information Building Lifecycle information and how the asset performs over the period of time during its lifecycle.
	AC3.3 Manage BIM Information via a Common Data Environment (CDE) (See AC4.2)	Managing the amount of information that will be transferred, translated and exchanged between all parties on a construction project is of critical importance in the BIM process. Information exchange is critical to a projects BIM success and therefore must be managed and monitored at all times on a building project. Individual information that is delivered and shared remains the responsibility of the author delivering that information and the CDE will be managed by a specific project resource defined by the client.	Common Data Environment (CDE) – the unique source of information for any given project used to collect, manage and disseminate all relevant approved documents in a managed process. Managed process – the process as defined by the Publically Available Specification (PAS) 1192-2 (see LO4) states that all information be managed and shared via a common repository or a 'Common Data Environment' (CDE). A CDE will therefore act as the single source of information for a project and be used to collect, manage and share all relevant project documents to all team members involved.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO4 Understand the relevance of the UK standards to be used and reviewed when working on a BIM project	AC4.1 Comply with relevant standards when producing and managing BIM information	Information management and how this has been refined and clarified within a series of standards developed by industry and government to aid in the adoption of BIM. Students should be aware of the standards and understand their relevance on a project lifecycle from conception to completion. The PAS 1192 suite outlines both the capital/delivery as well as operational phases of assets and ensures process, information requirements and stages of delivery of information are achieved for a project delivering to BIML2	Standards – the following website is an industry resource for current standards with reference to BIM: http://bimblog.bondbryan.com/standards/ In particular; • PAS1192:2 – specification for information management for the capital/delivery phase of construction projects using building information modelling • PAS1192:3 – specification for information management for the operational phase of assets using building information modelling. • BS1192 – collaborative production of architectural, engineering and construction information. Code of practice. • BS1192:4 – collaborative production of information. Part 4: Fulfilling employer's information exchange requirements using COBie – Code of Practice.

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC4.2 Organise a CDE for the storage and sharing of BIM information for a specific construction project	PAS 1192-2 which specifies a CDE may be used via an extranet, a project server or any file based retrieval system. Information within a CDE can have a variety of status levels assigned to it. This is generally divided into four main areas of the CDE with a sign-off process occurring for the information to then move from status to status.	Advantages of a CDE: - ownership of information remains with the originator, although it is shared and reused, only the originator shall change it - shared information reduces the time and cost in producing coordinated information any number of documents can be generated from different combinations of model files. Status levels: - Work in Progress - this area is used to hold information that is not yet approved for each organisation. - Shared - this is used to share information that has been checked, reviewed and approved and able to be shared with other organisations. - Published - this information will be that signed off by the client and or lead consultant (designer usually). - Archive - this area is used to record progress at critical project stages and any information that may have changed or been approved during the project

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
	AC4.3. Produce a strategy to reduce the risk of loss or disclosure of BIM information for a specific construction project	Security of digital information. This is of paramount importance. The PAS1192-5 standard was created to ensure these issues are addressed. The document focuses on the threat and risk of digital information. Security strategy – a strategy is required in line with the PAS1192-5 procedures to reduce the risk of loss or disclosure of information which could impact on the safety and security of users of the built asset and its services; the built asset itself and the benefits the built asset exists to deliver.	Threats to digital information include: • hostile reconnaissance • malicious attacks • loss or disclosure of Intellectual Property • loss or disclosure of commercially sensitive information • release of personally identifiable information • aggregation of data

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
LO5 Describe the basic terminology in relation to BIM, including roles, technology and processes of a BIM Project	AC5.1. Recommend BIM roles required for a specific construction project	The construction industry is becoming more and more specialised in the skills required to achieve building and management excellence. Roles in Construction have changed in their area of expertise and consist of standard defined roles and BIM related roles. These BIM roles can be divided between all areas of a design and build.	BIM Roles; • BIM Specialist – typically, an organisational role within a specific discipline, requiring developed BIM skills • BIM Manager – a project specific or organisational role that includes strategic implementation with limited technical skill • BIM Consultant – an external resource to a client or a consultant that delivers training and provides support on BIM implementation • BIM Coordinator – reviews all discipline models to ensure there are no discrepancies and clashes between differing building elements • BIM Technician – team member with detailed knowledge of BIM software and BIM Standards • Project Information Manager(PIM) – role appointed by the client – to be responsible for the common data environment • Digital Asset Manager – manages the digital information on the project including updating the Project Information Model

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• Task Team Information Manager – discipline specific requirement managing information deliverables, including format date and responsibilities • Security Manager – Appointed by the client to devise a strategy for managing data security risks on a project • GSL Champion – one who ensures that the Government soft landings process has been clearly defined and that all team members adhere to the user and client soft landings requirements for the built asset
	AC5.2 Recommend software required to carry out BIM processes for a specific construction project	The use of BIM technology and processes and that this is not limited to the production of a design model in 3D. It can be used on site to enhance the delivery of the asset, enhance health and safety, or used to apply logistical or programme information (4D) or cost data or quantity scheduling (5D).	Technology and processes; • BIM Authoring – the use of a particular software to create the digital 3 dimensional models that can be used as part of the authoring process between disciplines, • BIM Collaboration – collaboration can be achieved by the use of all authoring software discipline models and the process of 'federation' or bringing the models together in one system to check that the information does not clash or conflict between models

Learning outcome	Assessment criteria	Taught content	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• BIM Analysis – understanding how a building functions, in terms of its orientation, choice of materials and overall form can be a complex task. The use of analysis tools can allow for more information to be understood in terms of the projects sustainability and life • BIM Data Collection – capturing information that includes not only 3d geometry but information collated in spreadsheets or via COBie using proprietary software solutions that allow extraction of data from project models • BIM Cost Analysis – extracting accurate cost data at all stages of a project has become critical in achieving accurate costings on building projects. It also allows for the Value Engineering exercise to be undertaken with greater ease due to the ability to extract data from a variety of BIM elements produced in an authoring application

Learning outcome	Assessment criteria	Taught content:	Exemplification (in addition, see Guidance for Teaching)
<i>The learner will:</i>	<i>The learner can:</i>	<i>Learners must be taught the following content:</i>	
			• BIM Time-lining and Sequencing – the ability to produce an accurate picture of the construction process from either detailed object based model data or early concept model data is becoming critical in the way we can now understand the build process. It also allows site management and space review prior to any work being undertaken onsite • BIM Visualisation – whilst we understand how buildings function in terms of spatial arrangements once built, it is also now possible to understand a space prior to construction via the use of visualisation tools and animation • BIM Parametric Design – the ability to trial and test techniques within the design process via automated software is becoming more and more popular in the construction industry. By defining set rules, like floor to floor heights, structural integrity or solar gain the use of this type of software can automatically generate optimised solutions for building projects

Performance bands

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO1 Understand the basic principles and benefits of BIM within the context of the built environment	AC1.1 Demonstrate an understanding of the basic principles of BIM	Produce a design team brief to describe the basic principles of BIM.	Produce a design team brief to describe and relate the basic principles of BIM with the requirements of a specific project.	Produce a design team brief to explain and relate the basic principles and aims of BIM with the requirements of a specific project.	Produce a design team brief to explain and relate the basic principles and evaluate the aims of BIM against the requirements of a specific project.
	AC1.2 Explain the benefits of BIM within the context of a specific development proposal	Explain the main benefits of BIM with reference to the requirements of a specific project.	Explain the main benefits of BIM and evaluate the potential impact of BIM on a specific project.		

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO2 Understand the UK BIM Maturity Levels and use of COBie for information exchange	AC2.1 Describe and differentiate between the UK BIM Maturity Levels	A report that describes the UK BIM Maturity Levels.	A report that describes and differentiates between the UK BIM Maturity Levels.		
	AC2.2. Make COBie entries relevant to a specific development proposal	Make COBie entries relevant to a specific development proposal.	Make a range of COBie entries relevant to a specific development proposal explain the roles and responsibilities related to data management.		

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO3 Produce basic BIM information for a building project and create information exchanges	AC3.1 Contribute to the EIR document for a specific construction project	Make basic entries to an EIR to describe changes in requirements.	Make detailed entries to an EIR to describe changes in requirements.	Make detailed entries and amendments to an EIR to describe changes in requirements and identify entries to be provided by others.	
	AC3.2 Produce examples of 2D, 3D, 4D and 5D BIM information for a specific construction project	Produce some relevant examples of BIM information for a specific construction project.	Produce relevant examples of 2D, 3D, 4D and 5D BIM information for the technical design stage of a specific construction project.	Produce accurate, relevant examples of 2D, 3D, 4D and 5D BIM information for the design development and technical design stages of a specific construction project.	Produce a range of accurate, relevant and well-presented examples of 2D, 3D, 4D and 5D BIM information for the design development and technical design stages a specific construction project, justifying their selection.

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO4 Understand the relevance of the UK standards to be used and reviewed when working on a BIM project	AC4.1 Comply with relevant standards when producing and managing BIM information	Identify and comply with a range of relevant standards when producing and managing BIM information.	Identify and comply with a range of relevant standards when producing and managing BIM information and relate the standards to stages in the project life cycle.		
	AC4.2 Organise a CDE for the storage and sharing of BIM information for a specific construction project	Organise a CDE for the storage of BIM information for a specific construction project.	Organise a CDE for the storage and sharing of BIM information for a specific construction project.		
	AC4.3. Produce a strategy to reduce the risk of loss or disclosure of BIM information for a specific construction project	Produce a basic strategy to reduce the risk of loss of BIM information for a specific construction project.	Produce a detailed strategy to reduce the risk of loss or disclosure of BIM information for a specific construction project.		

Learning outcome	Assessment criteria	Band 1 1 – 4 marks	Band 2 5 – 8 marks	Band 3 9 – 12 marks	Band 4 13 – 16 marks
		Where there is no evidence or work is not worthy of credit – 0 marks			
LO5 Describe the basic terminology in relation to BIM, including roles, technology and processes of a BIM Project	AC5.1 Recommend BIM roles required for a specific construction project	Recommendations for the appointment of selected BIM specialists.	Recommendations for the appointment of selected BIM specialists, with justification of specialists selected.		
	AC5.2 Recommend software required to carry out BIM processes for a specific construction project	Recommendations for software for some BIM processes.	Recommendations for software for a range of BIM processes, relevant to a specific project.	Recommendations for software for a wide range of BIM processes, relevant to a specific project and identifying compatibility issues and hardware requirements.	

Assessment summary

This unit is internally assessed and externally moderated. All assessments must be conducted under controlled assessment conditions. Controls have been determined for each stage of the assessment process: task setting, task taking and task marking.

Guidance for delivery

The delivery of this specification should involve learners in actively experiencing stages in a BIM project, producing and sharing BIM information, managing a CDE and collaborating with others. It is important that learners recognise that the knowledge and understanding they develop about BIM processes, aims and principles is vocationally relevant.

Links with topic areas in unit 1 can be made, and are encouraged. For example, when making recommendations for the appointment of selected BIM specialists there are obvious areas to be explored such as the relationship between BIM specialists and traditional stakeholders; how quickly will the industry be able to utilise BIM technologies and where will the expertise come from?

Making teaching vocationally relevant

It is important that learners recognise the knowledge and understanding they develop are vocationally relevant. There are a number of ways this can be achieved:

Example 1

Practical activities centred around a work-based scenario could be undertaken in the creation of BIM information for a specific construction project and the management of input from specialists.

Example 2

Published case studies can be used: for example, studying business arguments for adopting BIM.

Example 3

Work experience and other links with local employers can be established to provide the learners with vocationally relevant experiences.

Making contacts

Examples of organisations that may be approached to provide help include:

- design studios or contractors' offices could be visited – to consider how these organisations are responding to BIM requirements and the communication methods/technologies employed
- building professional could be contacted to provide a presentation; for example, a BIM specialist could talk about the advantages flowing from BIM collaborations.

Resources

A key resource will be the learner's local built environment. Learners will need a detailed knowledge of construction theory, and textbooks and web-based resources will be valuable.

The internet should be treated as a central resource for this unit, including the following websites.

Resources and developments <http://www.bimtaskgroup.org>

Careers and further training <http://www.citb.co.uk/careers-in-construction>

BIM Case studies <http://www.citb.co.uk/about-us/what-we-do/growth-fund/types-of-projects-considered/bim>

Stages in the design process <https://www.ribaplanofwork.com>

Current relevant standards <http://bimblog.bondbryan.com/standards>

Additional guidance can be found in the document Guidance for Teaching which accompanies this qualification.

3. ASSESSMENT

The WJEC Level 3 Applied Diploma in Professional Construction Practice is assessed using a combination of internally assessed controlled assessments and external examinations.

3.1. External assessment

The following units will be externally assessed:

- **Unit 2: Create the Built Environment**
- **Unit 3: Value and Use the Built Environment**

Details of the external assessments are as follows:

Unit 2: Create the Built Environment

- 120-minute examination
- total of 80 marks
- short and extended answer questions, based on stimulus material and applied contexts for each question
- each paper will assess all learning outcomes and assessment criteria will be sampled in each series
- electronically assessed (e-assessment). A paper version will be available to centres which are unable to offer on-screen assessment.
- available in May/June of each year
- learners are allowed two resit opportunities; the highest grade will contribute towards the overall grade for the qualification
- WJEC will produce a mark scheme which will be used as the basis for marking the examination papers
- graded on a scale of A to E.

The assessment criteria (AC) will be covered within the mark allocation as follows:

Unit	Learning outcomes	Assessment criteria	Marks	%
2	LO1 Understand main job roles and their relationship to each other within the built environment and explore typical career pathways, qualifications and progression	AC 1.1 Describe the inter-relationships of job roles within the built environment	4 - 12	5 - 15

Unit	Learning outcomes	Assessment criteria	Marks	%
2	LO2 Identify and evaluate the construction processes required to construct the sub and superstructures of a range of buildings, including finishes and services	AC 2.1 Describe factors that influence the choice or the necessity to use a particular method of construction or technique	8 - 16	10 - 20
		AC 2.2 Demonstrate the implications of these factors or decisions on the outcome, mindful of the constraints or benefits		
	LO3 Identify and evaluate a range of project management tools and techniques	AC 3.1 Identify the elemental factors that influence the application of a broad and dynamic range of skills	8 - 16	10 - 20
		AC 3.2 Describe the techniques and practices applied to coheres and prepare for the contractual environment		
		AC 3.3 Describe the relevance of recording relevant events for contractual purposes		
		AC.3.4 Produce tables that logically capture and record planned checking regimes		
	LO4 Identify and evaluate a range of quality assurance and project monitoring processes	AC 4.1 Describe the actions and mechanisms that can be put in place and applied to successfully deliver quality building stock	8 - 16	10 - 20

Unit	Learning outcomes	Assessment criteria	Marks	%
	LO5 Identify and evaluate the health, safety and environmental factors influencing the creation of the built environment	AC 5.1 Describe the high risk and high frequency accident activities and well planned and preventative safe systems of work help to mitigate negative outcomes	16 - 24	20 - 30
		AC 5.2 Produce Risk Assessment and method statement tables to demonstrate an understanding of preventative control measures needed to mitigate accidents incidents and near misses		
		AC5.3 Describe why the control of temporary works is relevant to previous, current and future construction projects		
	LO6 Compare existing and developing processes used in the creation of the built environment and evaluate their impact	AC 6.1 Advise on suitable applied design solutions for the cost effective construction of building stock	12 - 20	15 - 25
		AC 6.2 Describe how clash detection can mitigate unproductive works and/or defects		

Unit 3: Value and Use the Built Environment

- 120-minute examination
- total of 80 marks
- short and extended answer questions, based on stimulus material and applied contexts
- each paper will assess all learning outcomes and assessment criteria will be sampled in each series
- electronically assessed (e-assessment). A paper version will be available to centres which are unable to offer on-screen assessment.
- available in May/June of each year
- learners are allowed two resit opportunities; the highest grade will contribute towards the overall grade for the qualification
- WJEC will produce a mark scheme which will be used as the basis for marking the examination papers
- graded: on a scale of A to E.

The assessment criteria (AC) will be covered within the mark allocation as follows:

Unit	Learning outcomes	Assessment criteria	Marks	%
3	LO1 Describe and evaluate ways of engaging stakeholders and communities in the development and use of the built environment and the local infrastructure including transport	AC 1.1 Describe factors and mechanisms that have positive outcomes based on collaboration and respect for stakeholders	12 - 20	15 - 25
	LO2 Identify ways of protecting and maintaining the environment during use of the built environment	AC2.1 Produce tables that reflect suitable design solutions, preferable to innovative and alternative sustainable energy sources	12 - 20	15 - 25
	LO3 Identify and evaluate ways of protecting the physical structure of the built environment	AC3.1 Produce diagrams and tables of understanding that depict the interrelationships of the wider stakeholders, in context of the macro economy and impact on communities locally.	12 - 20	15 - 25
	LO4 Examine the basic principles of soft landings and how post occupancy evaluation can ensure the soft landings approach was considered and developed	AC4.1 Evaluate measures that when applied to project design, construction, handover and post construction, can enhance the early stages of occupation by the building users and improve the habitation and on-going maintenance of the building	28 - 36	35 - 45
		AC4.2 Describe measures that improve aftercare experience for stakeholders		
		AC4.3 Produce diagrams and tables that capture the expectations of clients anticipating receipt of the completed building and that of the contractor wishing to test and commission the building prior to handover		

3.2. Internal assessment

The following units are internally assessed:

- **Unit 1: Design the Built Environment**
- **Unit 4: BIM and Construction Projects**

For internal assessment please consult 'WJEC's Instructions for conducting controlled assessment'. This document can be accessed through the WJEC website (www.wjec.co.uk). Each centre must ensure that internal assessment is conducted in accordance with these controls.

The following principles apply to the assessment of each internally assessed unit:

- units are assessed through summative controlled assessment (available electronically)
- controls for assessment of each internally assessed unit are provided in a model assignment
- each internally assessed unit must be assessed independently. Learners may produce a piece of evidence that contributes to the assessment criteria for more than one unit. This is acceptable provided it can be clearly attributed to a specified assessment criterion and has been produced under the appropriate controlled conditions for each unit
- all grades are awarded based on the number of marks attained in each assessment. Grade descriptors are provided for Grades A, C and E.

There are three stages of assessment that will be controlled:

- task setting
- task taking
- task marking.

Task setting

For internal assessment, WJEC has produced model assignments for each unit. Centres are, however, allowed to modify the assignment within specified parameters. This will allow centres to tailor the assessment to local needs. The model assignment has been written to ensure the following controls are in place.

- each unit is assessed through one assignment
- each assignment must have a brief that sets out an applied purpose. An applied purpose is a reason for completing the tasks that would benefit society, a community, organisation or company

- the assignment can specify a number of tasks but tasks must be coherent, i.e. show how the assessment requirements all contribute to the achievement of the applied purpose of the assignment
- the assignment must provide each learner with the opportunity to address all assessment criteria and all marks available
- the assignment must indicate the acceptable forms of evidence. These must conform to those forms set out in the model assignment
- where a centre has adapted the model assignment, there must be evidence of quality assuring its fitness for purpose, and this must be submitted to WJEC for accreditation. Sample documentation for this activity is available from WJEC.

Task taking

There are five areas of task taking that are controlled: time, resources, supervision, collaboration and resubmission.

Time

Each model assignment will specify the total amount of time available for summative assessment. Centres have the discretion for how that time is allocated to each task.

Resources

The assessor can determine which resources learners should be provided with to ensure fair and valid assessment takes place. Where specific resource controls must be in place, these will be stated in the model assignment.

Supervision

Learners must normally be supervised by an assessor whilst completing controlled assignment tasks. Model assignments will specify if supervision is not required. Centres must have systems in place to ensure learners cannot access the evidence they have been developing outside of supervised activities.

Authentication: supervision is in place to ensure the authenticity of evidence produced for summative assessment. Assessors should not provide input or guidance to learners during the controlled assessment time. This includes providing formative feedback on the evidence being produced. Assessors can provide guidance on the requirements of the task and remind learners of the assessment criteria and how they can be interpreted. Assessors must intervene where a health and safety hazard is observed.

Learners can review and redraft evidence independently within the time controls for the assessment.

Learners must sign a declaration to confirm that all evidence submitted for moderation is their own work and that any sources used have been acknowledged.

Assessors must sign a declaration to confirm that evidence submitted for moderation was completed under the controlled conditions set out in the model assignments.

Collaboration

The model assignment will indicate whether:

- group work must take place
- group work is forbidden
- centres can elect to complete tasks through group work.

Where group work takes place, the following principles must be applied.

1. Tasks should allow each member of the group to have full access to all assessment criteria and marks available.
2. Learners **must** provide an individual response as part of any task outcome.
3. Evidence of individual response may include written evidence (e.g. notes, evaluations, mind maps, etc.) and/or audio-visual evidence (e.g. recordings, photographs, drawings, designs, etc.).
4. Evidence must be clearly attributable to each individual member of the group.
5. Individual contributions must be clearly identified and noted on the accompanying authentication sheet which must be signed by both the teacher and the candidate.
6. Assessment of the individual must be based on the individual contribution to the evidence produced.
7. Learners' achievement must not be affected by the poor performance of other group members.
8. Learners' achievement must not benefit from the performance of other group members.

Resubmission

Learners may re-enter internally assessed units. The learner must submit a new assessment, completed within the same levels of control. They cannot improve previously submitted work.

Learners have one resit opportunity for each assessed unit.

Where an individual learner who has previously submitted group work for assessment wishes to resit an internally assessed unit, the candidate **must** choose one of the following options:

- create a new piece of work within the same group
- create a new piece of work within a new group
- create a new piece of work with non-assessed candidates
- create an individual piece of work.

The same levels of control for group work, as outlined above, will apply to candidates who choose to resit.

Task marking

All marking of evidence must be made against the assessment criteria marks available in each unit specification. Evidence marked must comply with the controlled requirements set out in the model assignment.

Written evidence must be annotated to show how it relates to the assessment criteria and marks available.

Performance evidence, for example, of giving a presentation, must be made on observation records. Observation records will include a description of learner performance as well as a summative statement on the quality of that performance. Where performance is observed by someone other than an assessor, the 'witness' must complete a witness statement.

Assessors will need to authenticate the statement either through scrutiny of supporting evidence and/or questioning of the learner and/or witness. If the statement is authenticated, it can be allowed to contribute to the evidence for assessment. Evidence of authentication will also need to be included.

Marking should only be undertaken by a designated assessor. An assessor should have appropriate expertise in the subject and level for a specified unit. The assessor is responsible for ensuring that:

- assessment is conducted under specified controlled conditions
- they are clear about the requirements of the learning outcomes, assessment criteria and marks available prior to commencing controlled assessment
- evidence presented for assessment is authentic
- assessment decisions are accurately recorded
- evidence is appropriately annotated
- observation records contain sufficient detail for objective corroboration of decisions
- judgements are only made against the assessment criteria and marks available.

3.3. Synoptic assessment

Synoptic assessment requires candidates to demonstrate that they can identify and use effectively in an integrated way an appropriate selection of techniques, concepts, theories and knowledge from across the whole vocational area, which are relevant to a key task.

Synoptic assessment in the WJEC Level 3 Applied Diploma in Professional Construction Practice is provided through Unit 4.

3.4. Centre assessment and standardisation

Centres are expected to standardise internal assessment decisions. This is the process by which centres ensure that all learners are judged to the same standard across different assessors, teaching groups and from year to year. Evidence of standardisation should be submitted with learner evidence.

Where more than one assessor is involved, the centre must appoint a Lead Assessor. The role of the Lead Assessor is to:

- document all activities
- ensure that the assignment presented to learners is fit for purpose and complies with all controls
- ensure all assessors have appropriate documentation in place to support fair and valid assessment decisions
- ensure all assessment activities are in accordance with the task taking controls for the unit
- sample assessment judgements at appropriate times to ensure the performance bands are correctly and consistently applied
- provide feedback to assessors
- provide support to assessors on interpretation of performance band requirement.

3.5. Grading, awarding and reporting

Grading

The overall grades for the WJEC Level 3 Applied Diploma in Professional Construction Practice will be recorded on a scale A* to E.

Results not attaining the minimum standard for the award will be reported as U (unclassified). Unit grades will be reported as a lower case letter a to e on results slips but not on certificates.

The Uniform Mark Scale (UMS) is used in unitised specifications as a device for reporting, recording and aggregating learners' unit assessment outcomes. The UMS is used so that candidates who achieve the same standard will have the same uniform mark, irrespective of when the unit was taken. Individual unit results and the overall subject award will be expressed as a uniform mark on a scale.

A "near pass" rule has been introduced for all **external units**. A candidate will achieve a pass (or higher) grade if they meet the following two requirements:

- i) Achieve the total UMS required at the relevant grade for the qualification
- ii) Obtained at least the minimum UMS for the relevant external units

Uniform marks correspond to unit grades as follows:

Unit weighting	Maximum Raw Mark	Maximum UMS Mark	A	B	C	D	E	N
Unit 1 (Internally assessed) 20%	128	80	64	56	48	40	32	
Unit 2 (Externally assessed) 20%	80	80	64	56	48	40	32	24
Unit 3 (Externally assessed) 20%	80	80	64	56	48	40	32	24
Unit 4 (Internally assessed) 40%	112	160	128	112	96	80	64	

To achieve an A, B, C, D or E grade, learners must obtain:

- the minimum UMS mark for the qualification grade (see **Table: UMS and qualification grade**);

and

- a minimum of a pass grade in **all units**.

For the Level 3 Diploma, a Grade A* will be awarded to candidates who have achieved a Grade A (320 uniform marks) in the overall qualification and at least 90% of the total uniform marks for Unit 4.

	Maximum Uniform Marks	A	B	C	D	E
Level 3 Applied Diploma	400	320	280	240	200	160

The following grade descriptors are provided to give a general indication of the standards of achievement likely to have been shown by learners awarded particular grades for assessment. The descriptors have not been written at either specification or unit level, and therefore must be interpreted in relation to the content specified in the specification: they are not designed to define that content. The grade awarded will depend on the number of marks awarded, these descriptors being intended to give a general indication of standards.

The grade descriptions therefore offer a general indicator of the required learning outcomes by illustrating the expectation of achievement at the A/B, C/D and E/U boundaries for the qualifications as a whole. Grade descriptions are designed to assist examiners in exercising their professional judgement at awarding meetings when setting grade boundaries. This judgement will reflect the quality of the candidates' work, informed by the available technical and statistical evidence. The grade awarded will depend in practice upon the extent to which the learner has met the assessment objectives overall. Shortcomings in some aspects of the examination may be balanced by better performance in others.

Teachers may find grade descriptions useful in understanding candidates' performance across qualifications as a whole but should use the marking criteria identified in the specification when assessing candidates' work.

E grade descriptor

Learners demonstrate basic knowledge of professional construction practice and have gained a basic understanding of the nature and purpose of the roles and level of collaboration involved. Learners apply limited knowledge, understanding and skills to design and implementation activities and issues. They collect information using given techniques and use a limited range of relevant information sources. They carry out limited analysis of the issues and challenges faced by clients, designers and contractors. Learners evaluate evidence to draw basic conclusions about relevant issues and challenges. Learners use written communication which is adequate to convey meaning but which may be expressed in a non-specialist way.

C grade descriptor

Learners demonstrate clear knowledge of professional construction practice and have gained a sound understanding of the nature and purpose of the roles and level of collaboration involved. Learners apply knowledge, understanding and skills to design and implementation activities and issues. They collect information independently and use a range of relevant information sources. They carry out some sound analysis of the issues and challenges faced by clients, designers and contractors. Learners evaluate evidence to draw basic conclusions about relevant issues and challenges. Learners use written communication which conveys meaning with some use of specialist vocabulary.

A Grade descriptor

Learners demonstrate a depth of knowledge of professional construction practice and demonstrate thorough understanding of the nature and purpose of the roles and level of collaboration involved. Learners apply knowledge, understanding and skills accurately and independently to a range of design and implementation activities and issues. Learners undertake research using a range of techniques and use a wide range of relevant information to analyse issues and challenges faced by clients, designers and contractors. Learners evaluate evidence to draw valid conclusions and make reasoned judgements about relevant issues and challenges. Learners use written communication which is well structured and clearly expressed, with appropriate specialist vocabulary.

Unit achievement is based on a learner's ability to meet the assessment criteria.

Reporting

Awarding and reporting of results for WJEC Level 3 takes place in August of each year.

A **Qualification Certificate**, issued at a later date, will confirm the

- title
- level
- grade of qualification.

4. TECHNICAL INFORMATION

4.1. Making entries

WJEC Applied Certificates and Diplomas are unitised qualifications which allow for an element of staged assessment.

The WJEC Level 3 Applied Diploma in Professional Construction Practice will be available for certification from June 2020. Thereafter, the qualification will be available for certification each June.

Centres planning to offer this qualification must be registered as an accredited WJEC centre. For details on the application and accreditation, centres should contact WJEC.

Candidates may resit internally assessed units **once only, and externally assessed units twice**. The best grade will be used for aggregation. If a candidate wishes to resit an internal unit more than once or an external unit more than twice, no results from units taken previously may be used in aggregating the new grade and all units in the qualification must be taken again.

Unit entry

Entry for individual units must be made by submitting the relevant unit. Entries must be submitted no later than 21 February each year.

Qualification entry

Learners will be entered for the qualification when entering for aggregation (cash-in). Aggregation does not take place automatically: it is necessary to enter the relevant code for aggregation to take place.

Entry codes

	Title	Entry codes	
		English-medium	Welsh-medium
Unit 1	Design the Built Environment	4903U1	4903N1
Unit 2	Create the Built Environment – Onscreen assessment	4903UA	4903NA
	Create the Built Environment – Paper based assessment	4903UB	4903NB
Unit 3	Value and Use the Built Environment – Onscreen assessment	4903UC	4903NC
	Value and Use the Built Environment – Paper based assessment	4903UD	4513ND
Unit 4	BIM and Construction Projects	4903U4	4903N4
Diploma in Professional Construction Practice Cash-in		4903QD	4903CD

The current edition of our *Entry Procedures and Coding Information* gives up-to-date entry procedures.

4.2. External moderation

The consistency of assessment practices and decisions across centres will be assured through external moderation of a sample of work for each unit entered.

WJEC will identify the candidates who are to be submitted in a sample for external moderation. The sample size will be according to the table below.

Total number of candidates entered for the unit	Sample size
1-99	10
100-199	15
Over 200	25

WJEC may request a larger sample or further samples if this is considered necessary.

Centres should ensure they keep all learner portfolios not sent to the moderator in their possession for two months after the closing date for sending samples for moderation. WJEC may require all portfolios for moderation and centres must be able to comply immediately with such a request.

Centres should submit a sample for **each unit** that includes:

- The controlled assignment brief used to set the assessment activity
- A controlled assessment activities sheet completed and signed by the assessor to confirm that the controls for the unit, including authenticity of evidence, have been applied
- Completed mark record sheets outlining which performance bands are met by the evidence
- All evidence produced by learners in completion of the controlled assessment, annotated appropriately by the assessor
- Moderators will review all evidence presented to ensure standards are aligned. Evidence will be judged against the following criteria:
 - Task setting – were tasks set within the controls set by WJEC in the model assignment?
 - Task taking – is there evidence that tasks were completed under the controlled conditions set out in the model assignment?
 - Performance bands – does the evidence support the assessor's judgement of the learner's work against national standards?
- Annotation – is the evidence produced by learners appropriately annotated?
- Authentication- is it clear that the evidence submitted was authentically produced by the learner?
- Standardisation – is there evidence of effective standardisation/internal quality assurance within the centre?

Timetable

Samples of work must be submitted for external moderation, and related mark sheets returned to WJEC by 15 May for the Summer series. Centres will need to ensure that internal submission dates are set sufficiently in advance of this to allow for authentication, assessment and standardisation.

Feedback

The outcome of moderation will be to either accept or amend a centre's assessment decisions. Guidance on actions needed before re-sitting of specified units at a subsequent moderation series will be also be provided.

Feedback will be provided through a centre moderator's report for each certification title, covering the units entered by the centre and will be accessible through WJEC secure website. The report will address the criteria referred to above.

A Principal Moderator's report will be provided for each series.

4.3. Access and special consideration

Qualifications at this level often require assessment of a broad range of competencies. This is because they are vocational qualifications and prepare candidates for a wide range of occupations and higher level courses.

This specification has been designed to offer fair access for all and to minimise the need to make reasonable adjustments for learners who have particular requirements. It is expected that normally, individual learners' abilities, interests and needs will be appropriately catered for by centres through:

- (a) the choice of units and qualifications available, and
- (b) the potential for personalisation of controlled assessment.

If there are any queries about the use of this flexibility inherent in the specification to meet learners' needs, or about the use of reasonable adjustments, centres should contact WJEC.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. For this reason, very few candidates will have a complete barrier to any part of the assessment. Information on reasonable adjustments is found in the Joint Council for Qualifications document '*Access Arrangements and Reasonable Adjustments*'. This document is available on the JCQ website (www.jcq.org.uk).

4.4. Post results services

If a centre wishes to query the outcome of the moderation and/or examination process this must be done formally by the head of the centre, notifying WJEC within 21 days of the publication of results.

The sample of work submitted for moderation will be reviewed by a moderator/examiner not involved in the original process, and the centre informed of the outcome.

Should the centre not be satisfied with the outcome of the review, there is provision for an appeal to WJEC.

4.5. Performance measures and classification codes

Every specification is assigned a national classification code (discounting code) indicating the subject area to which it belongs.

Centres should be advised that where learners take two qualifications with the same classification code, performance indicators for the centre will show that they have only achieved one of the two qualifications. The same view may be taken if learners take two specifications that have different classification codes but have significant overlap of content. The discounting system affects the calculation of performance measures for a school in the performance tables. It does not alter the awards an individual learner has achieved or limit the qualifications they can take.

Learners who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes. Information on performance points can be obtained from DfE (www.education.gov.uk) and/or QiW (<https://www.qiw.wales/>).