

Edexcel Diplomas

Units

Level 3 Principal Learning

in Construction

Draft accredited units

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DRAFT

Unit 1: Design the built environment: The design factors

Principal Learning unit

Level 3

Guided learning hours 60

Externally assessed

About this Unit

Our built environment has been designed and created throughout history reflecting social, economic and political issues of that time. Exciting designs of major cities and towns have been matched by superb engineering and construction techniques together with excellent craftsmanship. This has resulted in the creation of landmarks, infrastructure and transport systems that are known throughout the world. Planning and design solutions for smaller towns and villages have created recognisable architectural styles, social integration and a wide variety of communities.

In this unit you will gain an understanding of the historical, political and social factors that have influenced the design process. You will also develop knowledge about how the built environment and infrastructure including transport have changed over time, and the factors that have impacted upon changing design styles and approaches to design.

You will examine how the built environment responds to community needs and how it contributes to social engineering. You will investigate policies and priorities that influence designs and explore exciting and essential design solutions for future generations.

Learning outcomes

On completion of this unit a learner should:

- 1.1 Know the social and economic factors influencing community needs and designs
- 1.2 Understand how historical approaches and political priorities have impacted upon development
- 1.3 Be able to evaluate the relationship between function, form and aesthetics.

What you need to cover

- 1.1** Know the social and economic factors influencing community needs and designs.
- Throughout history a wide range of social and economic factors have had a major influence on the design of the built environment. You will identify these factors and develop an understanding of the reasons for their impact. You will investigate the cyclical nature of economic growth and recession and will explore the key social benefits and issues arising from this economic cycle that have influenced the design of the built environment.
- You will explore conventional and non-conventional approaches to design, examining the social and economic dilemmas that need to be faced to respond to community needs. In doing so you will focus on the following:
- Community energy planning
 - Use of local materials
 - Design of public spaces
 - Expansion or restriction of transport networks
 - Natural and artificial lighting
 - Site location, views and neighbours
 - Social engineering and integration
 - Cycle and pedestrian networks
 - Developing brownfield sites
 - Need for identity, character and culture
 - Low speed areas
 - Rainwater harvesting
- 1.2** Understand how historical approaches and political priorities have impacted upon development.
- You will investigate the local and regional planning and design development over the last century. During your investigation you will evaluate the links between political priorities and development of the built environment. You will develop knowledge and understanding of the impact of different forms of private and public funding on built environment projects. You will consider some of the following as appropriate to your area:
- Government priorities
 - Community needs
 - Planning issues
 - Design trends and styles
 - Infrastructure plans including transport networks
 - Development zones
 - Resource availability and costs
 - Tracking of local area development
- Whilst investigating the above you will gain an understanding of how the built environment has changed over time and key factors that have influenced architecture, engineering and services. In doing so you will be able to analyse approaches and priorities that will impact upon future designs for the built environment.

1.3 Be able to evaluate the relationship between function, form and aesthetics.

Developing designs for the built environment can be very exciting, requiring a wide range of skills often involving working as part of a team. Many considerations need to be made to ensure the technology, costs, design and programme meet the needs of the client and the structure is appropriate for the site and fits into the surrounding environment.

You will investigate and apply a range of design styles and techniques for a variety of projects that consider the following:

- Client requirements and user activities
- Structure, shape and proportion
- Climate, site features and topography
- Orientation and daylight factors
- Anthropometrics and ergonomics
- Internal and external elements
- Constraints and accessibility
- Safety, security and services
- Cost, quality, time and maintenance
- Sustainability, environment and comfort

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
1.1	Know the social and economic factors influencing community needs and designs	<ul style="list-style-type: none"> • Describe the control of transport networks so as to suit community needs, and how local suppliers can reduce heavy transport. • Describe issues involved in the development of brown field sites. • Select features that can be introduced to design solutions that can benefit the community.
1.2	Understand how historical approaches and political priorities have impacted upon development	<ul style="list-style-type: none"> • Describe and evaluate current government policy regarding housing requirements. • Explain how government policy is communicated to local authorities. • Describe and evaluate community needs with regards to housing.
1.3	Be able to evaluate the relationship between function, form and aesthetics	<ul style="list-style-type: none"> • Compare different design solutions against client requirements. • Describe and evaluate the effective use of space. • Describe and evaluate sustainable features and the benefits they can bring to a development. • Describe and evaluate how dwelling are adapted for disabled users.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to, and therefore you will be assessed by, external examination.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the design can be examined and analysed. Availability of project drawings and specifications from these developments will enhance the quality and relevance of the visits. Design styles, features and techniques can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future

graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.

Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site/office visits will aid the students' general awareness and perceptions of site/office design activities, it is nevertheless essential that all site/office visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of any site visit. It would also be appropriate for the office manager to do a brief presentation to the learners in advance of an office visit. This will enable the students to become aware of how the office is managed together with the layout and purpose of each room. In addition the elements of the office design that allow for creativity and teamwork within the work environment can be discussed. Suitable activities could include:

- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- The impact on the surrounding environment and communities.
- An investigation into the history of the site and previous uses.
- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on-site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice.
- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site/offices in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site and office visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition and Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available. The Royal Institute of British Architects (RIBA) has opened a *Centre for Excellence in Teaching and Learning through Design (CETLD) Bene Education Room* which creates new possibilities in the way the British Architectural Library's collection of over four million photographs, drawings and books can be accessed.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating and analysing various factors affecting design and development
<u>Creative thinkers</u>	Selecting beneficial design features
<u>Reflective learners</u>	Reviewing own development
<u>Team workers</u>	
<u>Self managers</u>	Planning and organising own work, including research analysis
<u>Effective participators</u>	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes

Follow and understand the need for safety and security practices

Conducting research and managing notes

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting and assimilating research into social, economic, historic and political factors affecting design

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting research

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling, assimilating and managing their research

Present information in ways that are fit for purpose and audience

Producing and managing ICT work

Evaluate the selection and use of ICT tools and facilities used to present information

Producing and managing ICT work

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their learning briefs and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Thompson A - *Architectural Design Procedures 2nd Edition* (Architectural Press 2005) ISBN: 0340719419

Chudley R and Greeno R - *Construction Technology* (Pearson, 1999) ISBN: 0582316162

Harris C and Borer P - *The Whole House Book: Ecological building design and materials* (CAT Publications) ISBN: 1902175220

Watkin D - *English Architecture* (Thames and Hudson) ISBN: 0-500-20171-4

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk

www.englishpartnerships.co.uk

www.hbf.co.uk

www.designforhomes.org

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.
Building a Cleaner Future, produced by the Environment Agency
Future home - watch and learn (Orange, www.orange.co.uk/socialresponsibility for additional resources)
Grand Designs Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

'Architect's Journal'. Centres would benefit from taking out a subscription to keep abreast of current design developments, case studies and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 2: Design the built environment: Stages in the design and planning processes

Principal Learning unit

Level 3

Guided learning hours 90

(70 hours learning time with approx. 20 hours for assessment). Internally assessed

About this Unit

Designing the built environment requires an understanding of architectural styles, artistic skills, spatial awareness, knowledge of structures and construction technology. Developing designs for the built environment can be very rewarding and requires a range of skills to ensure user requirements are met along side sustainable considerations and planning legislation. Design, planning and construction teams need to work together to ensure safety, environmental, legal, cost and quality matters are all considered in a timely manner.

In this unit you will learn to explore urban design and its influence on the urban environment. You will gain knowledge of the processes and procedures that develop the client's requirements into a design proposal, and examine the impact of planning requirements on the design. You will investigate the decision making stages in the design and planning processes and demonstrate knowledge of the wider influences on major project planning. In doing so you will be able to examine job roles and their relationships to each other as well as potential career pathways and qualification requirements.

Learning outcomes

On completion of this unit a learner should:

- 2.1 Understand complex aspects of urban design, and of the urban environment
- 2.2 Understand in detail the stages of the design process
- 2.3 Understand in detail the stages of planning processes
- 2.4 Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.

What you need to cover

- 2.1 Understand complex aspects of urban design, and of the urban environment**
- Good quality urban design requires teamwork and joined up thinking to develop an urban environment that offers an enjoyable place to live and creates better public services and a sustainable infrastructure together with more effective use of public spaces. Communities will thrive where excellent planning and urban design have given an area distinctive character with good quality buildings, structures and landscaping as well as integrated transport and pedestrian links.
- In this unit you will gain knowledge and understanding of the resources, processes and effects of the urban environment. You will consider the significance of good quality architecture and buildings as well as transport strategies on the urban environment and social inclusion. You will subsequently investigate their impact upon economic growth, quality of life and environmental sustainability.
- You will explore management and design of urban spaces and investigate key strategies for their development. You will also investigate the interdisciplinary nature of urban design, developing and applying creative skills and vision that enable you to illustrate alternative representations and strategies for existing and future urban designs.
- 2.2 Understand in detail the stages of the design process**
- Innovation and creativity need to be balanced with realism and awareness of constraints throughout the complete design cycle. Architects and engineers at the forefront of designing the built environment are looking to create and develop great places to live and work but need to be mindful of business, social and environmental sustainability issues.
- You will identify a range of people and organisations responsible for commissioning work involving the design of the built environment. You will gain knowledge and understanding of the various stages of the design process. In doing so you will investigate a wide range of decisions that need to be made to progress the design solution whilst ensuring compliance with all the necessary regulations and planning requirements. You will consider the following:
- Client requirements and aims
 - Procurement options and working relationships
 - Briefing design teams
 - Feasibility studies
 - Creating the design solutions and visual impact
 - Design development and realisation
 - Working drawings and project documentation
 - Liaising with construction teams
 - Refining and revising designs

2.3 Understand in detail the stages of planning processes

Planning processes work to retain the integrity and validity of a project and to ensure that designs comply with legislative and regulatory requirements throughout the planning cycle. You will explore from project inception throughout the planning and design stages the importance of continually considering the following:

- Design functions, aesthetics and visual impact, structures, finishes and services
- Fire, noise, access, thermal and inclusive environments
- Time, cost, quality, safety and environmental matters
- Location, comfort and climate issues
- Specific user requirements and obligations

Whilst considering the above elements you will investigate how planning processes are managed throughout the planning cycle. You will identify and evaluate the primary social, political and economic factors that influence the planning process including major project planning. You will examine planning requirements and develop a strategy to achieve an acceptable design solution, exploring appropriate treatments of the design at each stage of the planning process. In doing so you will explore ways of responding to circumstances to ensure continuing compliance and you will also identify the monitoring and approval requirements to ensure completion of the planning process.

You will identify a range of projects that are at outline and detailed planning stages and investigate a range of planning and design considerations for these projects. In doing so you will develop an understanding of the need for building regulations and planning permission as well as other key legislation that influences the client, design and construction teams.

2.4 Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.

You will investigate the main job roles and responsibilities of the people involved in the design of the built environment. You will conduct a thorough analysis of the work that they carry out during the planning and design stages of a project. You will demonstrate an understanding of the continuity and teamwork required from design through to creation and use of the built environment. In doing so you will create team and organisation structures that clearly illustrate roles and responsibilities throughout the life of a project.

You will explore the wide variety of career progression opportunities and qualifications required for these jobs. You will also investigate the range and role of professional institutions within the design and planning stages associated with these careers.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
2.1	Understand complex aspects of urban design, and of the urban environment	<ul style="list-style-type: none"> ▪ Understand factors affecting a complex design for the urban environment. ▪ Describe relevant proposals and strategies for improved infrastructure and transport services for a complex project.
2.2	Understand in detail the stages of the design process	<ul style="list-style-type: none"> ▪ Understand in detail the stages and participants of the design process. ▪ Understand in detail and address in a report the requirements of a 'green' client for a complex construction project.
2.3	Understand in detail the stages of planning processes	<ul style="list-style-type: none"> ▪ Understand in detail the stages of the planning process, including relevant practical aspects, regulatory requirements and legislation. ▪ Identify major factors that influence planning for a complex project.
2.4	Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages	<ul style="list-style-type: none"> ▪ Use peer feedback (RL 4, RL 5) and self management (SM 2) to produce and refine a description of job roles, responsibilities and interactions, including the teamwork aspects and progression opportunities, within planning and design for the built environment. ▪ Link these to relevant qualifications, progression paths and professional institutions.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore you will be assessed by your tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed using 5th generation, or equivalent, web browsers.

You will be required to complete two assessed tasks.

Task One

Your tutor will provide you with outline drawing details for this project.

You are a junior consultant with specialist knowledge in planning and design for the built environment. You have been approached by a 'green' client who requires an innovatively designed and complex building on a site in your region.

Your client has not been involved in construction before, and is considering taking a first step towards business expansion by setting up new facilities in your area. The client needs to find out about the local urban environment to establish whether their plans for a complex project will be suitable. They also need to know the step-by-step design and planning processes that should be followed to procure a sustainable and environmentally friendly project.

You will produce a report that enables your 'green' client to:

- (i) Know about excellent urban design and an inclusive urban environment. This will include existing and future proposals and strategies for improved infrastructure and transport services in your area.
- (ii) Understand all of the stages of the design process from inception through to carrying out site works.
- (iii) Understand the planning processes including regulatory requirements and legislation. You will need to explain key elements and considerations relating to planning permission and building regulations approval. In addition you will need to consider the impacts of primary social, political and economic factors that influence major project planning.

For each of the main elements of the report you will identify the people involved and describe the interaction and decisions that need to be made to progress to the next stage of the process. Your report should include:

- Title, author, date and aims
- Executive summary overview
- Introduction
- Three main elements
- Conclusion
- Recommendations
- Bibliography

Your report must be a word processed A4 document and be included in your portfolio, together with the observation records. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number. You should include in your portfolio a copy of the briefing materials provided to you by your tutor.

Task Two

Whilst working on the above project you are approached by the local secondary school to do a careers promotion. You are tasked with creating exciting material covering potential job opportunities, career pathways and professional institutions to encourage young people to consider a career linked to the design and planning stages of the built environment. Within the above you will be required to identify the roles played by the various design, construction and planning professionals and institutions. You

will also consider how they interact to produce a quality design that provides best value for the client. The promotional material could take a variety of different forms including: paper based outcomes such as posters and leaflets, a recording for a radio advertisement, a video recording for a television advertisement or even a web-site.

You are to present your materials to your peers for review and discussion, as you prepare them and when they are completed.

You should include in your portfolio a copy of your presentation materials, together with notes showing how you have used peer review to regularly review, evaluate and adjust the content and quality of your work, and copies of any relevant planning notes, observation records or witness statements.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.** The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and complexity, with a greater depth of description, reasoning, evaluation and justification as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
2.1 Understand complex aspects of urban design, and of the urban environment	Describes some factors affecting a complex design for the urban environment; briefly describes relevant proposals and strategies for improved infrastructure and transport services, for a complex project. (0-5)	Describes clearly a range of factors affecting a complex design for the urban environment; describes a range of relevant proposals and strategies for improved infrastructure and transport services for a complex project. (6-9)	Describes clearly and examines a wide range of factors affecting a complex design for the urban environment; examines and justifies a wide range of relevant proposals and strategies for improved infrastructure and transport services for a complex project. (10-12)	12
2.2 Understand in detail the stages of the design process	Describes in detail some of the stages and participants of the design process; briefly addresses some of the requirements of the 'green' client. (0-7)	Describes clearly in detail all of the stages and participants of the design process; addresses all of the requirements of the 'green' client. (8-13)	Describes clearly in detail and evaluates all of the stages and participants of the design process; analyses and addresses all of the requirements of the 'green' client. (14-18)	18

<p>2.3 Understand the detailed stages of planning processes</p>	<p>Describes in detail some of the stages of the planning process, including relevant practical aspects, regulatory requirements and legislation; briefly describes some of the major factors that influence planning for a complex project.</p> <p style="text-align: right;">(0-7)</p>	<p>Describes clearly in detail all of the stages of the planning process, including relevant practical aspects, regulatory requirements and legislation; describes most of the major factors that influence planning for a complex project.</p> <p style="text-align: right;">(8-13)</p>	<p>Describes clearly in detail and evaluates all of the stages of the planning process, including relevant practical aspects, regulatory requirements and legislation; discusses most of the major factors that influence planning for a complex project.</p> <p style="text-align: right;">(14-18)</p>	<p>18</p>
<p>2.4 Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.</p>	<p>With the benefit of peer feedback, describes some key job roles, responsibilities and interactions within planning and design for the built environment, including the teamwork aspects; briefly describes relevant qualifications, progression paths, and professional institutions for these.</p> <p style="text-align: right;">(0-5)</p>	<p>With the benefit of peer feedback, describes clearly a range of job roles, responsibilities and interactions within planning and design for the built environment, including the teamwork aspects. Describes all of the relevant qualifications, progression paths, and professional institutions for these.</p> <p style="text-align: right;">(6-9)</p>	<p>With the benefit of peer feedback, describes clearly and examines a wide range of job roles, responsibilities and interactions within planning and design for the built environment, including the teamwork aspects. Discusses and justifies all of the relevant qualifications, progression paths, and professional institutions for these.</p> <p style="text-align: right;">(10-12)</p>	<p>12</p>
<p>Total marks</p>				<p>60</p>

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained in the two reports. These reports should address assessment foci 1 to 4. Photographic evidence, diagrams and/or drawings where appropriate should be included in the report itself.

There are a number of assessment tasks detailed above and it should be noted that there is no requirement for candidates to undertake any design work. It is the centre's responsibility to provide appropriate drawings and details that allow the candidate to complete the reports.

The report is the vehicle of assessment for the whole of this unit and should address each of the four assessment foci. Where group activities are used, eg conducting research by visiting sites and interviewing people from industry or the local planning department, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects

evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a ‘hurdle’ approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: description with some detail, and use, for some elements at mark band 1; and clear description with well reasoned examination analysis and justification and evidence of deeper understanding and reasoning for a wide range of elements, and selection justification and autonomous/consistent use, at band 3. Learners are expected to be able to address complex tasks at this level. Learner additional support and guidance at band 1 may be relatively significant, but should be minimal at band 3 where learners should be expected to demonstrate a high level of autonomy.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of ... and explain the impact they have on ...' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner’s marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner

work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the design can be examined and analysed. Availability of project drawings and specifications from these developments will enhance the quality and relevance of the visits. Design styles, features and techniques can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future

graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site/office visits will aid the students' general awareness and perceptions of site/office design activities, it is nevertheless essential that all site/office visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of any site visit. It would also be appropriate for the office manager to do a brief presentation to the learners in advance of an office visit. This will enable the students to become aware of how the office is managed together with the layout and purpose of each room. In addition the elements of the office design that allow for creativity and teamwork within the work environment can be discussed. Suitable activities could include:

- The variety of roles at the design and planning stages of a project including members of the construction and building services teams.
- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- The impact on the surrounding environment and communities.
- An investigation into the history of the site and previous uses.
- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on-site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice.
- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site/offices in advance to carry out risk assessments and agree specific health

and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site and office visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition and Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available. The Royal Institute of British Architects (RIBA) has opened a *Centre for Excellence in Teaching and Learning through Design (CETLD) Bene Education Room* which creates new possibilities in the way the British Architectural Library's collection of over four million photographs, drawings and books can be accessed.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of these specifications.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating urban design and the urban environment Investigating planning and design processes Investigating job roles
<u>Creative thinkers</u>	Designing promotional materials
<u>Reflective learners</u>	Producing a client report Analysing social, political and economic factors influencing major project planning Reviewing own development
<u>Team workers</u>	Working with 'green' client Describing job roles
<u>Self managers</u>	Producing a client report Planning and organising own work, including research analysis
<u>Effective participators</u>	Producing and reviewing materials for careers promotion

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes. Assembling and managing their e-portfolio

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes. Assembling and managing their e-portfolio

Follow and understand the need for safety and security practices

Conducting research and managing notes. Assembling and managing their e-portfolio

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting research into urban design and planning for their assignment task

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting research into job roles in design and planning for their assignment task

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings. Producing job-role promotional materials. Assembling and managing their e-portfolio

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling and managing their research. Producing job-role promotional materials. Assembling and managing their e-portfolio

Present information in ways that are fit for purpose and audience

Producing and managing ICT work. Producing job-role promotional materials. Assembling and managing their e-portfolio

Evaluate the selection and use of ICT tools and facilities used to

Producing and managing ICT work. Assembling and managing their e-portfolio

present information

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations. Presenting job-role promotional materials

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their assignment brief and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes and WP reports and job-role promotional materials for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Thompson A - *Architectural Design Procedures 2nd Edition* (Architectural Press 2005) ISBN: 0340719419

Chudley R and Greeno R - *Construction Technology 3rd Edition* (Pearson, 2003) ISBN:0582316162

Chudley R and Greeno R - *Building Construction Handbook 6th Edition* (Butterworth-Heinemann) ISBN:0582316162

Harris C and Borer P - *The Whole House Book: Ecological building design and materials* (CAT Publications) ISBN: 1902175220

Watkin D - *English Architecture* (Thames and Hudson) ISBN: 0-500-20171-4

Construction Health and Safety Management - Alan Griffith and Tim Howarth (Longman) ISBN: 0582414423

Hughes P - *Introduction to Health and Safety in Construction - 2nd Edition* (Butterworth-Heinemann) ISBN: 9780750681117

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk
www.englishpartnerships.co.uk
www.hbf.co.uk
www.designforhomes.org
www.cibse.org.uk

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.
Building a Cleaner Future, produced by the Environment Agency
Future home - watch and learn (Orange, www.orange.co.uk/socialresponsibility for additional resources)
Grand Designs Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

'Architect's Journal'. Centres would benefit from taking out a subscription to keep abreast of current design developments, case studies and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM
The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 3: Design the Built Environment: Physical and environmental influences

Principal Learning unit

Level 3

Guided learning hours 90

(70 hours learning time with approx. 20 hours for assessment). Internally assessed

About this Unit

Global warming and climate change are having a major impact on the design of the built environment. Increased awareness of the environmental damage caused by pollutants, carbon emissions and waste is essential to ensure the emergence of sustainable designs for the future.

In this unit you will gain knowledge and understanding of health, safety and environmental factors influencing the design of the built environment. You will produce risk assessments relating to the health, safety and environmental issues identified at the design phase of a construction project. You will explore good practice in designs that offer sustainable construction and inclusion of renewable energy. You will also investigate innovative design ideas that have successfully reduced emissions to air, land and water. In doing so you will examine the importance of the integration and distribution of incoming utilities and the consideration of alternative energy efficient, sustainable design solutions.

Learning outcomes

On completion of this unit a learner should:

- 3.1 Know about the health, safety and environmental factors that influence design
- 3.2 Understand the planning and design processes required for the provision of primary services utilities
- 3.3 Understand the influence of environmental and climatic changes on the design process
- 3.4 Be able to evaluate design considerations for energy sourcing, use and management.

What you need to cover

- 3.1** Know about the health, safety and environmental factors that influence design.
- In order to successfully complete this learning outcome you will:
- identify the general and specific health, safety and environmental responsibilities of all people in the workplace. You will examine regulatory requirements and legislation that impact on the design of the built environment and analyse how design and construction teams as well as clients respond.
 - explain how the safety, security and well being of people, creating and using the built environment are considered during the design process. In doing so you will develop knowledge and understanding of the principles involved in ensuring that the health, safety and environmental protection are fully reflected in the design process.
 - evaluate excellent design, but also investigate potential hazards and environmental issues created by the design process. You will also examine how health, safety and environmental consideration and regulatory requirements for the use of the building or structure impact on the design process. In doing so you will risk manage the design process by conducting appropriate risk and environmental impact assessments.
- 3.2** Understand the planning and design processes required for the provision of primary services utilities.
- Primary services utilities (PSU) are an essential functioning element of a building or structure that bring it operationally to life. PSU provides water, drainage, power and services to the built environment. You will identify the need for primary service utilities and develop an understanding of their integration into the design and construction processes. In doing so you will gain knowledge and understanding of the methods for scaling down utilities to provide effective supplies to buildings and structures.
- Timing and selection of appropriate services as well as incorporation into the design and eventually the installation into the structure are all crucial. You will explore primary service utility solutions for a range of sustainable developments and will consider:
- provision and location
 - accessibility and maintenance
 - costs against benefits
 - procurement and management
 - aesthetics and convenience
 - installation and distribution
 - safe uninterrupted use
 - environmental and energy efficiency
 - performance and sustainability.
- 3.3** Be able to evaluate the influence of environmental and climatic changes on the design process.
- The built environment is having a significant impact on global warming and major changes have to be made to reduce emissions to air, land and water. You will investigate projected climate change and explain the impact upon the future designs for the built environment. You will develop an understanding of global warming and the range of issues it causes for the natural and built environment. In doing so you will examine how designs can be developed to minimise waste and pollution, and also offer protection against changes in the water table and drought.
- You will analyse environmental predictions and identify legislation and policies designed to reduce carbon emissions and increase sustainable development. You will investigate the need for air-tightness in buildings and explore the design considerations for heating, heat exhaust and

ventilation that would enable successful design.

3.4 Understand design considerations for energy sourcing, use and management.

Energy used in constructing, occupying and operating buildings accounts for about half of the greenhouse gas emissions in the United Kingdom. The design of low carbon buildings and developments essentially requires the inclusion of new and existing technologies in a smart and disciplined manner. You will develop knowledge and understanding of renewable energy and the importance of energy efficiency. In doing so you will examine the principles of renewable energy and their impact on technical, economic and social factors in the design process.

You will compare and contrast traditional energy supplies with alternative renewable energy and evaluate their contribution to responsible design together with methods for enhancing their performance. In doing so you will explore the process of energy management from sourcing, design, costing and installation through to integration, use and maintenance.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
3.1	Know health, safety and environmental factors that influence design	<ul style="list-style-type: none"> • Demonstrate knowledge and understanding of key responsibilities, and health, safety and environmental factors influencing complex design • Describe the environmental impacts of these factors. • Describe appropriate risk management techniques for these factors.
3.2	Understand the planning and design processes required for the provision of primary services utilities	<ul style="list-style-type: none"> • Demonstrate knowledge and understanding of the primary services utilities required for complex projects • Describe alternative approaches for the provision of services utilities for a specified complex project, together with the benefits of these.
3.3	Understand the influence of environmental and climatic changes on the design process	<ul style="list-style-type: none"> • Demonstrate knowledge and understanding of global warming and climate change. • Demonstrate knowledge and understanding of global warming/ climate change legislation for reducing carbon emissions and increasing sustainability. • Describe steps that can be taken in the design process to minimise emissions to air, land and water, together with the design impacts of these.
3.4	Be able to evaluate design considerations for energy sourcing, use and management	<ul style="list-style-type: none"> • Demonstrate a basic level of knowledge and understanding of the use of traditional and renewable energy sources for complex projects • Describe and evaluate (IE 4) the alternative energy sources available for use in a specified complex project, including time, cost, design, use and maintenance factors. • Explore possibilities for (CT 1) and propose an appropriate energy - efficient design solution for a specified complex project.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore will be assessed by you tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed using 5th generation, or equivalent, web browsers.

Your tutor will provide you with a design brief for a complex new build project in your area, and you will act as a services and environmental management consultant. Your client is a large plc and their representative has corporate social responsibility as part of their remit for the company, as well as being responsible for your project. Her mandate also covers risk management to ensure health, safety and environmental matters are given top priority. As a company they are concerned about global warming and climate change. You are required to produce outline design proposals for the project that clearly reflect these considerations.

You will complete a series of research and outline design tasks that will clarify for your client:

- the method by which health, safety and environmental factors influencing your outline design have been accounted for, including compliance with regulatory requirements and legislation. You will identify appropriate outline design proposals and give examples of thorough risk management and environmental impact analyses that satisfy your client's brief.
- the primary services utility alternatives and how in the outline design they will be scaled down from source and integrated into the design and eventual construction of the building or structure. You will explain key reasons for their timely selection and the range of benefits that ensure efficient and effective sustainable performance.
- your understanding of global warming and climate change and the steps you are proposing within your outline design to minimise emissions to air, land and water. You will identify legislation and policies that ensure that designs pro-actively reduce carbon emissions and increase sustainability.
- a range of considerations for energy sourcing, use and management including the potential for renewable energy to be used on the project. You will explain the principles of renewable energy, confirming potential technical, economic and social impacts from their use. You will compare and contrast traditional energy supplies with renewable energy emphasising time, cost, design, use and maintenance factors and describe a preferred outline design approach.

Your evidence must be included in your portfolio. Written material should be in the form of a word processed A4 document. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

You should include in your portfolio copies of any relevant presentation materials, observation records or witness statements.

Your overall proposals can be presented as a report and / or presentation, provided your evidence adequately cover all of the items prescribed in the brief.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of

the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and complexity, with a greater depth of description, reasoning, evaluation and justification as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
<p>3.1</p> <p>Know about the health, safety and environmental factors that influence design.</p>	<p>Describes some key responsibilities and other factors influencing complex design; describes appropriate risk management and the environmental impact factors for these.</p> <p>(0-6)</p>	<p>Describes clearly a range of key responsibilities and health, safety, environmental and other factors influencing complex design; explains appropriate risk management and the environmental impact aspects for all of these.</p> <p>(7-11)</p>	<p>Describes clearly and examines a wide range of key responsibilities and health, safety and environmental factors influencing complex design; analyses a wide range of appropriate risk management and the environmental impact aspects for all of these.</p> <p>(12-15)</p>	<p>15</p>
<p>3.2</p> <p>Understand the planning and design processes required for the provision of primary services utilities.</p>	<p>Describes some of the primary services utilities required for complex projects; describes their selection of some of the services for a specified complex project, including the benefits.</p> <p>(0-6)</p>	<p>Describes clearly a range of the primary services utilities required for complex projects; selection of most of the services for a specified complex project, including the benefits.</p> <p>(7-11)</p>	<p>Describes clearly and examines all of the key primary services utilities required for complex projects; describes clearly and justifies their selection of all of the services for a specified complex project, including the benefits.</p> <p>(12-15)</p>	<p>15</p>
<p>3.3</p> <p>Understand the influence of environmental and climatic changes on the</p>	<p>Describes some of the aspects of global warming and climate change, and of legislation to reduce carbon emissions and increase sustainability; explains in detail some of the steps taken in their outline design to minimise emissions to air, land and water, and to increase sustainability, including the design</p> <p>(0-6)</p>	<p>Describes clearly a range of the aspects of global warming and climate change, and of legislation to reduce carbon emissions and increase sustainability; explains in detail all of the steps taken in their outline design to minimise emissions to air, land and water, and to increase sustainability, including the</p> <p>(7-11)</p>	<p>Describes clearly and examines a wide range of the aspects of global warming and climate change, and of legislation to reduce carbon emissions and increase sustainability; explains in detail and justifies all of the steps taken in their outline design to minimise emissions to air, land and</p> <p>(12-15)</p>	

design process.	Impact and the legislation covering most of these.	design impact and the legislation covering all of these.	water, and to increase sustainability, including the design impact and the legislation covering all of these.	
	(0-6)	(7-11)	(12-15)	15
3.4 Be able to evaluate design considerations for energy sourcing, use and management.	Describes the use of some traditional and some renewable energy sources for complex projects; describes some of the alternative energy sources available for a specified complex project, including time, cost, design, use and maintenance factors, and describes their proposed outline design solution.	Describes clearly the use of a range of traditional and renewable energy sources for complex projects; describes clearly all of the alternative energy sources available for a specified time, cost, design, use and maintenance factors, and describes clearly their proposed outline design solution.	Describes clearly and examines the use of a wide range of traditional and renewable energy sources for complex projects; describes clearly and evaluates all of the alternative energy sources available for a specified complex project, including time, cost, design, use and maintenance factors, and describes clearly and justifies their proposed outline design solution.	15
	(0-6)	(7-11)	(12-15)	
Total marks				60

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained within a presentation to be determined by the candidate(s). The proposal should include photographic evidence of work in progress and the completed outcome. Where work is 'hidden' or not evident in the completed outcome, for example role play or presentations, then observation records, video evidence or photographs showing the activities taking place should be provided. Centres are required to ensure that sufficient evidence is provided to confirm the quality of a candidate's work.

There are a number of assessment tasks detailed above. It is the centre's responsibility to provide appropriate working drawings, project details and access to research materials/IT facilities that allow the candidate to complete each task.

As noted above some assessment elements, such as presentations and role play can be assessed directly by the tutor during the activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration

describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: description with some detail, and use, for some elements at mark band 1; and clear description with well reasoned examination analysis and justification and evidence of deeper understanding and reasoning for a wide range of elements, and selection justification and autonomous/consistent use, at band 3. Learners are expected to be able to address complex tasks at this level. Learner additional support and guidance at band 1 may be relatively significant, but should be minimal at band 3 where learners should be expected to demonstrate a high level of autonomy.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of ... and explain the impact they have on ...' If their response covers an appropriate range and this is accompanied by a clear

description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the design can be examined and analysed. Availability of project drawings and specifications from these developments will enhance the quality and

relevance of the visits. Design styles, features and techniques can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site/office visits will aid the students' general awareness and perceptions of site/office design activities, it is nevertheless essential that all site/office visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of any site visit. It would also be appropriate for the office manager to do a brief presentation to the learners in advance of an office visit. This will enable the students to become aware of how the office is managed together with the layout and purpose of each room. In addition the elements of the office design that allow for creativity and teamwork within the work environment can be discussed. Suitable activities could include:

- The variety of roles at the design and planning stages of a project including members of the construction and building services teams.
- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- The impact on the surrounding environment and communities.
- An investigation into the history of the site and previous uses.
- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on-site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice and use of renewable energy.
- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site/offices in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site and office visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in

environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition and Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available. The Royal Institute of British Architects (RIBA) has opened a *Centre for Excellence in Teaching and Learning through Design (CETLD) Bene Education Room* which creates new possibilities in the way the British Architectural Library's collection of over four million photographs, drawings and books can be accessed.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15]and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating and describing health and safety impact analysis Investigating and describing primary services utilities and energy sourcing Investigating and describing environmental and climate change
<u>Creative thinkers</u>	Investigating and proposing risk-management techniques Investigating and proposing: the provision of services utilities; steps for minimising emissions; energy-efficient design solutions
<u>Reflective learners</u>	Responding to a design brief Analysing health, safety and environmental factors influencing design proposals Reviewing own development
<u>Team workers</u>	
<u>Self managers</u>	Responding to a design brief Planning and organising own work, including research analysis
<u>Effective participators</u>	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes. Assembling and managing their e-portfolio

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes. Assembling and managing their e-portfolio

Follow and understand the need for safety and security practices

Conducting research and managing notes. Assembling and managing their e-portfolio

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting research into health and safety or global warming issues for their assignment task

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting research into the provision of primary service utilities for their assignment task

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports, presentations and drawings. Assembling and managing their e-portfolio

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling and managing their research. Preparing a report or presentation. Assembling and managing their e-portfolio

Present information in ways that are fit for purpose and audience

Producing and managing ICT work. Preparing a report for a client. Assembling and managing their e-portfolio

Evaluate the selection and use of ICT tools and facilities used to present information

Producing and managing ICT work. Preparing a powerpoint presentation. Assembling and managing their e-portfolio

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations. Making a presentation to a client.

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their assignment brief and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing a report for a client. Presenting notes and WP reports within their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical,

social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Thompson A - *Architectural Design Procedures 2nd Edition* (Architectural Press 2005) ISBN: 0340719419

Chudley R and Greeno R - *Construction Technology 3rd Edition* (Pearson, 2003) ISBN:0582316162

Chudley R and Greeno R - *Building Construction Handbook 6th Edition* (Butterworth-Heinemann) ISBN:0582316162

Harris C and Borer P - *The Whole House Book: Ecological building design and materials* (CAT Publications) ISBN: 1902175220

Watkin D - *English Architecture* (Thames and Hudson) ISBN: 0-500-20171-4

Construction Health and Safety Management - Alan Griffith and Tim Howarth (Longman) ISBN: 0582414423

Hughes P - *Introduction to Health and Safety in Construction - 2nd Edition* (Butterworth-Heinemann) ISBN: 9780750681117

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk

www.englishpartnerships.co.uk

www.hbf.co.uk

www.designforhomes.org

www.cibse.org.uk

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.

Building a Cleaner Future, produced by the Environment Agency

Future home - watch and learn (Orange, www.orange.co.uk/socialresponsibility for additional resources)

Grand Designs Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

'Architect's Journal'. Centres would benefit from taking out a subscription to keep abreast of current design developments, case studies and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 4: Create the built environment: Health, safety and environmental influences

Principal Learning unit

Level 3

Guided learning hours 60

Externally assessed

About this Unit

Globally there is a need to conserve natural resources, recycle waste and maximise the use of renewable energy on projects involving the creation of the built environment. Exciting new projects, using sustainable construction concepts and innovative production methods, are continually showcased by the media. Management of the environment throughout the construction stage is considered alongside quality and safety as a key priority by design and construction teams.

In this unit you will identify and examine a wide range of health, safety and environmental issues created by the construction processes on site. In doing so you will explore the principles involved in safeguarding structures and their surrounding areas during construction. You will gain knowledge of current legislation and evaluate reports and records of site accidents and incidents. You will also investigate how companies and employees implement procedures to comply with regulatory requirements and conditions.

You will gain knowledge and understanding of a range of sustainable materials and the techniques involved in their specification and sourcing. You will explore the potential uses of renewable energy sources and the importance of air-tightness in buildings in reducing carbon emissions and energy costs. You will explore methods of protecting the natural environment as well as the incentives and controls in place that demand effective environmental management during the construction stage.

Learning outcomes

On completion of this unit a learner should:

- 4.1 Know about health, safety and environmental requirements on a construction site
- 4.2 Be able to monitor and evaluate health, safety and environmental issues
- 4.3 Understand the processes and principles involved in the use of sustainable resources
- 4.4 Know about sources of renewable energy and understand the need for energy conservation.

What you need to cover

- 4.1** Know about health, safety and environmental requirements on a construction site.
- In order to successfully complete this unit you will:
- Investigate the different methods for safeguarding structures and surrounding areas, both below and above ground during construction. You will pay particular attention to specific regulations, legislation and conditions governing the construction processes relating to health, safety and the environment.
 - Develop a systematic approach to identifying the need for safe and environmentally aware working practices for a range of construction operations as follows:
 - Demolition
 - Excavation
 - Concreting
 - Working at height
 - Confined spaces
 - Using scaffolding and ladders
 - Disposal of materials off site
 - Using cranes and mobile plant
 - Electrical work
- 4.2** Be able to monitor and evaluate health, safety and environmental issues.
- Dangerous situations, injuries and accidents are commonplace in construction, impacting on the lives of many people. Fundamental lapses in attention to health and safety on site costs the construction industry millions of pounds each year.
- You will develop an understanding of the health, safety and environmental issues created by the construction process on site. You will also evaluate the costs associated with these issues throughout the supply chain. You will analyse a range of accidents and incidents that have occurred on construction sites resulting in non-fatal injuries and fatalities as well as environmental concerns. In doing so you will examine their influence on the construction process and investigate how modern methods of construction can be implemented to improve site safety and quality control.
- 4.3** Understand the processes and principles involved in the use of sustainable resources.
- Processing materials for use on construction projects can involve local, regional or perhaps international suppliers. When a decision is being made to place an order with a company it is important to consider the environmental impact in terms of the specification and also the distance travelled by the materials required.
- You will establish the principles behind the use of sustainable resources. You will identify a range of construction materials and explore the ways in which these materials are having an impact on the built and natural environment. In doing so you will investigate the methods used in the processing of the raw materials and establish their suitability as sustainable resources. You will evaluate ways of conserving natural resources and recycling waste materials from sites. You will consider some of the following:
- Sourcing, selection and use of sustainable materials
 - Recycling and reclaiming materials
 - Conservation or loss of site features
 - Waste management of materials on site

- Materials working together for a low carbon building
 - Whole life costing approach
-

4.4 Know about sources of renewable energy and understand the need for energy conservation on construction projects.

There is a global need to reduce carbon emissions. Zero carbon energy and developments at affordable prices to purchasers are central to future sustainable construction initiatives. Renewable energy is not only encouraged for individual developments but also at a community level so smaller schemes can link together.

You will develop knowledge of the main types of energy supplied to construction projects and gain an understanding of their uses. You will explore the long term availability and viability of these supplies and investigate methods of energy conservation. In doing so you will identify the benefits and disadvantages of the main types of energy both financially and environmentally.

You will identify methods of renewable energy production and consider a range of sustainability measures and initiatives that will enable the creators of the built environment to work towards a greener future. You will understand energy audits for a range of buildings and structures. You will investigate a range of energy supplies planned for use on a number of local and regional projects and in doing so you will explore alternative renewable energy sources

You will consider the use of some of the following on construction projects:

- Biomass
- Wind turbines
- Solar
- Photovoltaics
- Heat pumps
- CHP
- Other renewable energy solutions

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
4.1	Know about health, safety and environmental requirements on a construction site	<ul style="list-style-type: none"> • Describe key purposes and benefits of specific regulations, legislation and conditions governing the construction processes relating to health, safety and the environment. • Describe with the use of illustrations and evaluate, details of different methods for safeguarding structures during construction. • Demonstrate a systematic approach to and awareness of safe and environmentally aware working practices, for a range of construction operations
4.2	Be able to monitor and evaluate health, safety and environmental issues	<ul style="list-style-type: none"> • Describe the health, safety and environmental issues created by the construction process on site. • Analyse a range of accidents and incidents that have occurred on construction sites resulting in non-fatal injuries and fatalities, as well as environmental concerns. • Examine the influence of accidents and incidents on construction processes, and subsequently describe ways for the improvement of safety on site.
4.3	Understand the processes and principles involved in the use of sustainable resources	<ul style="list-style-type: none"> • Describe and evaluate the principles underpinning the use of sustainable resources on a complex construction project. • Describe and analyse key processes for ensuring sustainability on complex construction projects. • Describe and analyse effective waste management and recycling of materials on site.
4.4	Know about sources of renewable energy and understand the need for energy conservation	<ul style="list-style-type: none"> • Demonstrate knowledge of types of conventional and renewable energy supplied to a construction site, including their sources and long term viability. • Describe and analyse methods for conserving energy on complex construction projects. • Describe and analyse financial and environmental benefits and disadvantages of alternative renewable energy supplies.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to, and therefore you will be assessed by, external examination.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the health, safety and environmental issues as well as the construction technology can be examined and analysed. Availability of project drawings and specifications from these developments will enhance the quality and relevance of the visits. Use of sustainable resources, conservation of site features and energy efficiency measures can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- An investigation of quality control procedures in use on site.
- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- The impact on the surrounding environment and communities.
- An investigation into the history of the site and previous uses.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on-site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- An investigation into the architectural detailing of installed construction components.

- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice.
- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating and describing methods for safeguarding structures Investigating and describing health and safety, sustainability and renewable energy issues methods for safeguarding structures Investigating the use of renewable energy
<u>Creative thinkers</u>	Addressing uses of sustainable resources Reviewing own development
<u>Reflective learners</u>	Generating ideas for improving site safety Examining the impact of site waste Planning and organising own work, including research analysis
<u>Team workers)</u>	
<u>Self managers</u>	Planning and organising own work, including research analysis
<u>Effective participators</u>	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes

Follow and understand the need for safety and security practices

Conducting research and managing notes

Troubleshoot

Addressing practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting and assimilating research into health, safety and environmental issues.

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting and assimilating research into renewable energy.

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling, assimilating and managing their research

Present information in ways that are fit for purpose and audience

Producing and managing ICT work

Evaluate the selection and use of ICT tools and facilities used to present information

Producing and managing ICT work

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their learning briefs and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Specialist Resources

This unit will require specialist workshop facilities appropriate to the selected practical task.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Construction Health and Safety Management - Alan Griffith and Tim Howarth (Longman) ISBN: 0582414423

Hughes P - *Introduction to Health and Safety in Construction - 2nd Edition* (Butterworth-Heinemann) ISBN: 9780750681117

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.buildingforlife.org/

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk

www.englishpartnerships.co.uk

www.hbf.co.uk

www.designforhomes.org

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.

Building a Cleaner Future, produced by the Environment Agency

Future home - watch and learn (Orange,

www.orange.co.uk/socialresponsibility for additional resources)

Grand Designs - Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 5: Create the Built Environment: Management Processes

Principal Learning unit

Level 3

Guided learning hours 90

(70 hours learning time with approx. 20 hours for assessment). Internally assessed

About this Unit

Managing the processes that create the built environment can be very exciting and rewarding. You are part of a team developing landmarks of the future. There are many career pathways available with both office and site work locally, nationally and even internationally. All construction projects require a combination of resources to be utilised throughout the duration of the site programme of work. Excellent management of these resources will enable projects to be completed with a positive impact on the environment, to an agreed design and cost, the desired quality and in a timely manner.

In this unit you will identify and evaluate the construction processes to construct the substructures and superstructures of a range of built structures, including finishes and services. You will identify and evaluate a range of quality assurance and monitoring processes needed to ensure the project meets the given specification throughout the construction process. You will apply skills that will develop your knowledge and understanding of a range of project management processes and techniques. In doing so you will be able to examine job roles and their relationships to each other as well as potential career pathways and qualification requirements.

Learning outcomes

On completion of this unit a learner should:

- 5.1 Know the construction processes required to create substructures and superstructures
- 5.2 Understand the management skills required to ensure the quality of work on site
- 5.3 Understand project management processes and techniques
- 5.4 Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages

What you need to cover

- 5.1** Know about the construction processes required to create substructures and superstructures.
- In order to successfully complete this learning outcome you will:
- Be aware that there are a range of operations, methods and techniques used to construct the substructure and superstructure of low-rise domestic and commercial dwellings. You will evaluate the processes required to ensure effective use of resources and establish the importance of doing work in the correct sequence.
 - Investigate a range of sites with varying ground conditions and excavation requirements. You will develop an understanding of the issues associated with the construction of a range of types of foundations up to five metres deep identifying the health and safety and environmental considerations. During your investigation you will also consider the principles of foundation design and construction for strip, raft, pile and pad foundations as well as the requirements for drainage and incoming services.
 - Consider a range of sites with varying external and internal elements and finishing materials and services systems. You will compare existing and developing processes used in the creation of the built environment and evaluate how they impact on the needs of society.
 - Develop an understanding of traditional and modern methods of construction, exploring the applications of modern methods to satisfy traditional requirements and vice versa. You will investigate the use of on and off-site production that meet design and quality criteria and provide cost effective and environmentally suitable solutions. In doing so you will examine their impact on project safety and duration.
- 5.2** Understand the management skills required to ensure the quality of work on site.
- You will investigate and apply the processes and procedures needed to ensure the quality of work meets the given specification for a construction project. You will consider client/customer communications that ensure design and construction teams are kept fully aware of progress on site. You will develop an awareness of the interpersonal skills required by managers for organising, directing and developing staff teams and individuals. You will also investigate the need for effective two-way communication and explore a variety of media that can be used to convey essential information throughout the construction stage. During your investigation you will evaluate the links between effective communication together with management of quality and improved safety and environmental impact. You will consider some of the following as appropriate to your project:
- Site layout planning and storage
 - Site inductions and staff training
 - Progress meetings and site diaries
 - Work inspections, continuous snagging and making good
 - Diverse methods of communication
 - Subcontracting work and quality monitoring
 - Environmental impact of your resource management
 - Benefits of staff development for your workforce

5.3 Understand project management processes and techniques.

The development of project management IT software has enabled dynamic planning, monitoring and progress control of projects. You will explore a range of management techniques and tools that enable effective management of sites. You will demonstrate an ability to construct Gantt charts and critical path networks for a simple project, and will learn to continually extend your awareness and use of project management processes and techniques.

As all construction projects require a combination of resources to be utilised throughout the duration of the site programme of work. You will identify the various stages in the procurement of materials, plant and labour on to site and investigate the most environmentally friendly and cost effective approaches in using the construction supply chain. For example, during your investigations you may need to consider some of the following:

- On or off site production and fabrication
- Materials procurement from drawings to site fixing
- Scheduling, delivery monitoring and stock control
- Simple cost planning and control of site resources
- Method statements and risk assessments
- Decisions to buy, hire or lease plant

5.4 Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.

You will examine the main job roles and responsibilities at craft, technical, supervisory and management levels and investigate their relationship to each other within the construction industry, including the teamwork aspects. You will conduct a thorough analysis of the construction and design teams and the work that they carry out during the construction stage of a project.

You will investigate the links to the work that is carried out prior to commencing on site and the connections to the work required after the site programme of work has been completed. You will explore the career progression opportunities, qualification requirements and the role of the Professional Institutions within construction and the built environment.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
5.1	Know the construction processes required to create substructures and superstructures	<ul style="list-style-type: none"> • Describe different types of substructure elements, including typical ground conditions. • Describe different types of superstructure elements, including services and finishes • Describe key details of traditional and modern methods of construction, for complex low-rise construction projects.
5.2	Understand the management skills required to ensure the quality of work on site.	<ul style="list-style-type: none"> ▪ Describe site induction processes, including site layout planning and storage. ▪ Describe key processes for continually monitoring quality on site. ▪ Describe effective team, customer and client communications on site.
5.3	Understand project management processes and techniques	<ul style="list-style-type: none"> • Describe management skills for communicating with/between, directing and developing staff on site. • Describe key processes for the procurement of materials and plant onto site', and identify the environmental impacts of these. • Produce a detailed Gantt chart that covers the operations of a complex construction project.
5.4	Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.	<ul style="list-style-type: none"> • Describe site-job roles, responsibilities and interactions, including teamwork aspects at craft, technical, supervisory and management levels, and relevant qualifications, progression paths and professional institutions. • Describe office job roles, responsibilities and interactions, including teamwork, and relevant qualifications, progression paths and professional institutions. • Describe roles, responsibilities and interactions at technical and management levels that are linked to tasks carried out prior to, and after, the site programme of work.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore will be assessed by you tutor.

You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed using 5th generation, or equivalent, web browsers.

Your tutor will provide you with details of a proposed local low-rise construction project including a site layout, and the position of mains utilities and the required service entry points.

You will take on and produce evidence relating to the following key roles, responsibilities and activities for the project:

- a) **Site Manager** ~ ensure all personnel on site and visitors are familiar with the site layout and storage plans and have a thorough site induction. Clearly evidence your knowledge of construction technology for both substructure and superstructure elements for a low-rise project, illustrating a range of alternative processes and comparing both modern and traditional construction techniques. You will need to consider the principles of sustainable design and construction and quality control.
- b) **Project Manager** ~ produce an agenda for a progress meeting on site and describe the information flow required to accomplish this agenda. Identify a variety of media that could be used to support effective two-way communication on site and describe a range of situations where they could be utilised. This should ensure that you clearly evidence your understanding of the skills needed to manage human resources on site and develop your site teams to fulfil their potential.
- c) **Planning Engineer** ~ describe the process for procuring a range of essential resources onto site. Produce a Gantt chart developed from a method statement showing a clear understanding of the link between sequencing and levels of resources to project duration. You should identify environmental considerations and approximate costs for construction operations.
- d) **Personnel Manager** ~ produce a presentation illustrating to prospective employees the roles, responsibilities and career progression opportunities for the site workforce. Clearly evidence your awareness of the career pathways and skills required for the design and construction office teams throughout the construction stage of a project. Explain how work carried out by the teams prior to commencing and after completion of the programme of site operations ensures roles and responsibilities can be effectively completed.

You will produce a portfolio of evidence, split into four sections as above. Written material should be in the form of a word processed A4 document. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Elements of your overall evidence may be presented as reports and / or presentations, or as role play exercises observed by your tutor, perhaps with peer reviews. Overall, your evidence must adequately cover all of the items prescribed in the brief. You should include in your portfolio copies of any relevant observation records or witness statements.

Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus

relates directly to one of the Learning outcomes of this unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The maximum marks available for each Assessment Focus represent its relative significance within the unit. The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and complexity, with a greater depth of description, reasoning, evaluation and justification as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
<p>5.1</p> <p>Know the construction processes required to create substructures and superstructures</p>	<p>Describes for a specified complex low-rise construction project: some different types of substructure elements including typical ground conditions; some different types of superstructure elements including services and finishes; and some key details of traditional and modern methods of construction.</p> <p>(0-6)</p>	<p>Describes clearly for a specified complex low-rise construction project: a range of different types of substructure elements including typical ground conditions; a range of different types of superstructure elements including services and finishes; and a range of key details of traditional and modern methods of construction.</p> <p>(7-11)</p>	<p>Describes clearly and analyses for a specified complex low-rise construction project: a wide range of different types of substructure elements including typical ground conditions; a wide range of different types of superstructure elements including services and finishes; and a wide range of key details of traditional and modern methods of construction.</p> <p>(12-15)</p>	<p>15</p>
<p>5.2</p> <p>Understand the management skills required to ensure the quality of work on site</p>	<p>Describes some of: the key requirements for a site induction, including site layout, planning and storage; the key processes for continually monitoring quality on site for an element of superstructure; the key aspects of effective team, customer and client communications on site.</p> <p>(0-6)</p>	<p>Describes clearly a range of: the key requirements for a site induction, including site layout, planning and storage; the key processes for continually monitoring quality on site for an element of superstructure; the key aspects of effective team, customer and client communications on site.</p> <p>(7-11)</p>	<p>Describes clearly and evaluates a wide range of: the key requirements for a site induction, including site layout, planning and storage; the key processes for continually monitoring quality on site for an element of superstructure; the key aspects of effective team, customer and client communications on site.</p> <p>(12-15)</p>	<p>15</p>

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<p>5.3</p> <p>Understand management processes and techniques</p>	<p>Describes some of the key management skills and techniques for communicating with/between, directing and developing staff on site; produces a detailed Gantt chart that cover most of the procurements and operations on a construction project, including environmental and cost considerations.</p> <p style="text-align: right;">(0-6)</p>	<p>Describes clearly a range of the key management skills and techniques for communicating with/between, directing and developing staff on site; produces a detailed Gantt chart that covers clearly a wide range of the key procurements and operations on a construction project, including environmental and cost considerations.</p> <p style="text-align: right;">(7-11)</p>	<p>Describes clearly and examines a wide range of the key management skills and techniques for communicating with/between, directing and developing staff on site; produces a detailed Gantt chart that covers clearly a wide range of the key procurements and operations on a construction project, including environmental and cost considerations.</p> <p style="text-align: right;">(12-15)</p>	<p style="text-align: right;">15</p>
<p>5.4</p> <p>Be able to describe job roles, qualifications and career progression opportunities, and the importance of teamwork, throughout the planning and design stages.</p>	<p>Describes some key site and office job roles, including responsibilities, interactions and teamwork aspects, for craft, technical, supervisory, office and management levels, including technical and management levels that are linked to tasks carried out prior to, and after, the site programme of work; describes some of the progression paths, qualifications and the roles of professional institutions for these roles.</p> <p style="text-align: right;">(0-6)</p>	<p>Describes clearly a range of key site and office job roles, including responsibilities, interactions and teamwork aspects, for craft, technical, supervisory, office and management levels, including technical and management levels that are linked to tasks carried out prior to, and after, the site programme of work; describes clearly the progression paths, qualifications and the roles of professional institutions for each of these roles.</p> <p style="text-align: right;">(7-11)</p>	<p>Describes clearly and analyses a range of key site and office job roles, including responsibilities, interactions and teamwork aspects, for craft, technical, supervisory, office and management levels, including technical and management levels that are linked to tasks carried out prior to, and after, the site programme of work; discusses the progression paths, qualifications and the roles of professional institutions for each of these roles.</p> <p style="text-align: right;">(12-15)</p>	<p style="text-align: right;">15</p>
<p>Total marks</p>				<p>60</p>

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained within a portfolio. The report should include photographic evidence of work in progress and the completed outcome. Where work is 'hidden' or not evident in the completed outcome, for example role play or presentations, then observation records, video evidence or photographs showing the activities taking place should be provided. Centres are required to ensure that sufficient evidence is provided to confirm the quality of a candidate's work.

There are a number of assessment tasks detailed above. It is the centre's responsibility to provide appropriate working drawings, project details and access to research materials/IT facilities that allow the candidate to complete each task.

As noted above some assessment elements, such as presentations and role play can be assessed directly by the tutor during the activities. If this approach is used, suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

The assessment in this unit is covered by four activities. Assessment Focus 1,2 and 3 relate to the work-related activity from members of the team creating the built environment and assessment focus 4 covers a presentation about job roles and occupational structures. The portfolio, together with accompanying photographs, is the vehicle of assessment for Assessment Focus 1,2 and 3, whilst the presentation will be assessed via a copy of the powerpoint and accompanying narrative, together with witness statements to verify the organisation, quality, timing and delivery of the spoken element of this section. Where group activities are used, eg for the presentation on job roles, tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.

states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.
briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a 'hurdle' approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: description with some detail, and use, for some elements at mark band 1; and clear description with well reasoned examination analysis and justification and evidence of deeper understanding and reasoning for

a wide range of elements, and selection justification and autonomous/consistent use, at band 3. Learners are expected to be able to address complex tasks at this level. Learner additional support and guidance at band 1 may be relatively significant, but should be minimal at band 3 where learners should be expected to demonstrate a high level of autonomy.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of ... and explain the impact they have on ...' If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Most students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the design and construction can be examined and analysed. Availability of project drawings, programme of work and specifications from these developments will enhance the quality and relevance of the visits. Management styles together with construction and design features and techniques can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, programmes, environmental policies, quality control documentation and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.

- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site visits will aid the students' general awareness and perceptions of on site construction activities, it is nevertheless essential that all site visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. Suitable activities could include:

- An investigation of quality control procedures in use on site.
- Observation of planning, engineering, site and project management activities on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills is a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) will be of benefit to all students, and will allow them to view modern construction practices and become aware of new products and systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Researching and describing construction processes
	Researching and describing management techniques
	Researching and describing job roles
	Researching and describing job roles
<u>Creative thinkers</u>	Devising and describing a site induction
	Producing a Gantt chart
<u>Reflective learners</u>	Reviewing own development of management skills
<u>Team workers</u>	Describing and evaluating job roles and interactions
<u>Self managers</u>	Working towards completion of their assessments
	Planning and organising own work, including research
<u>Effective participators</u>	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes. Assembling and managing their e-portfolio

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes. Assembling and managing their e-portfolio

Follow and understand the need for safety and security practices

Conducting research and managing notes. Assembling and managing their e-portfolio

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting research into senior site roles, for their assignment task

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting research into senior site roles, for their assignment task

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their e-portfolio

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling and managing their research. Producing reports and presentations. Assembling and managing their e-portfolio

Present information in ways that are fit for purpose and audience

Producing and managing ICT work. Producing reports and presentations. Assembling and managing their e-portfolio

Evaluate the selection and use of ICT tools and facilities used to

Producing and managing ICT work. Assembling and managing their e-portfolio

present information

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others. Preparing reports and powerpoint presentations.

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations. Making presentations or presenting a report.

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their assignment brief and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing and revising notes, presentations and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Construction Health and Safety Management - Alan Griffith and Tim Howarth (Longman) ISBN: 0582414423

Hughes P - *Introduction to Health and Safety in Construction - 2nd Edition* (Butterworth-Heinemann) ISBN: 9780750681117

Griffith A & Watson P - *Construction Management Principles and Practice* (Palgrave Macmillan) ISBN 0333968786

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.cat.org.uk

www.whichplaceswork.org.uk/

www.biat.org.uk - Chartered Institute of Architectural Technologists

www.buildingforlife.org/ - identifies good design in housing

www.riba.org.uk - Royal Institute of British Architects

www.englishpartnerships.co.uk

www.hbf.co.uk - home builders federation

www.designforhomes.org

www.cibse.org.uk - The Chartered Institute of Building Services Engineering sets the standards and promotes the interests of building services professionals.

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.

Building a Cleaner Future, produced by the Environment Agency

Future home - watch and learn (Orange,

www.orange.co.uk/socialresponsibility for additional resources)

Grand Designs - Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 6: Value and use of the Built Environment: Adding value to the wider community

Principal Learning unit

Level 3

Guided learning hours 90

(70 hours learning time with approx. 20 hours for assessment). Internally assessed

About this Unit

The built environment is valued and used by communities when it has been well planned, designed and subsequently created to an excellent standard. Effective investment and timely maintenance help to ensure positive engagement of the wider community with the built environment. Healthy, productive and meaningful lifestyles result from sustainable local, regional and national developments.

In this unit you will gain an understanding of the importance of communities, businesses and other stakeholders in the development and use of built environment. In doing so you will explore the contribution of the built environment and local infrastructure including transport to the social and economic developments of the wider community. You will explore the impact planning of the built environment and local infrastructure has upon community development and social cohesion. You will also investigate the main career pathways and job roles associated with valuing, using and maintaining the built environment.

Learning outcomes

On completion of this unit a learner should:

- 6.1 Know the factors influencing the engagement of stakeholders and the whole community in the development and use of the built environment
- 6.2 Understand the social, economic and commercial contribution of the built environment to the wider community
- 6.3 Be able to analyse job roles, qualifications and career progression opportunities, and the importance of teamwork, in asset management, use and maintenance of the built environment.

What you need to cover

- 6.1** Know the factors influencing the engagement of stakeholders and the whole community in the development and use of the built environment.
- Quality of life is to some extent determined by how we interact with the built environment and local infrastructure including transport services. You will investigate and describe cultures where communities appreciate and value their surroundings and explain how this improves social cohesion and can then contribute to increased economic activity and prosperity. You will identify ways in which communities can influence developments in the creation and use of the built environment.
- You will identify a variety of stakeholders and community groups and explain how they contribute and impact upon the development of the built environment in your region. In doing so you will pay particular attention to the local concerns and needs of your community. You will investigate stakeholder proposals that are developing sustainable communities and evaluate key factors that will contribute to future development and use of the built environment. Your overall analysis should consider stakeholders with a range of views, interests and perspectives linked to some of the following:
- Social
 - Business and economic
 - Heritage and preservation
 - Voluntary
 - Education
 - Environment
 - Sustainability
 - Faith
 - Cultural
 - Other groups
- Whilst analysing the above you will explore how these stakeholders can promote a whole region strategic approach in their role of influencing development of the built environment.
- 6.2** Understand the social, economic and commercial contribution of the built environment to the wider community.
- You will investigate the statutory framework for controlling development within your community. You will examine local and regional development plans and explain the contribution made by built environment activities and planning to the well being of individuals and the development of communities and local businesses. In doing so you will identify key social and commercial factors that influence the planning and design process.
- You will develop an understanding of the way that the built environment is instrumental in providing economic activity and prosperity as well as social cohesion to particular areas. In doing so you will explore business drivers and the manner in which they influence developments. You will also evaluate the financial contribution of the built environment activities to the wider community and broader economy.

- 6.3** Be able to analyse job roles, qualifications and career progression opportunities, and the importance of teamwork, in asset management, use and maintenance of the built environment.
- You will examine the main job roles and responsibilities, including the teamwork aspects, at craft, technical, supervisory and management levels and investigate their relationships with each other. You will identify specific career pathways and qualification requirements that are required for career progression. In doing so you will explore the range and roles of professional institutions associated with valuing, using, protecting and maintaining the built environment.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
6.1	Know the factors influencing the engagement of stakeholders and the whole community in the development and use of the built environment	<ul style="list-style-type: none"> • Describe the engagement in the development and use of the built environment of different stakeholders and community groups, and their contributions. • Describe the benefits of these contributions for social cohesion and future projects.
6.2	Understand the social, economic and commercial contribution of the built environment to the wider community and the environment	<ul style="list-style-type: none"> • Describe key social contributions of the built environment to the wider community. • Describe key economic contributions of the built environment to the wider community. • Describes key commercial contributions of the built environment to the wider community, including key business drivers.
6.3	Be able to analyse job roles, qualifications and career progression opportunities, and the importance of teamwork, in asset management, use and maintenance of the built environment	<ul style="list-style-type: none"> • Collaborate with others (TW 1) to describe and discuss (EP 1, TW 5) key job roles, including their responsibilities, interactions and teamwork aspects, from within asset management, use of the built environment or maintenance of the built environment. • Describe relevant qualifications, progression paths, and professional institutions.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to activity based assessment and therefore will be assessed by you tutor. You are expected to present your evidence within an e-portfolio, and this must be constructed so that its contents can be assessed using 5th generation, or equivalent, web browsers.

You will be required to complete two assessed tasks.

Task One

Your teacher/tutor will provide you with details of local community areas.

You will act in the role of an advisor working for a local consultancy company. Your task is to identify built environment developments including infrastructure and transport services that would be suitable for your community areas. In addition, you will describe ways in which stakeholders and the wider community can become engaged with and influence these developments. You will produce a WP report that focusses on the following areas:

- 1 identification of a wide range of stakeholders and community groups contributing to and influencing local developments. You will also explain how this involvement has improved social cohesion and could contribute to future projects across the region.
- 2 potential developments for your community area and business drivers associated with these developments. Explain how these plans could contribute to economic activity and prosperity noting the controlling statutory framework within your areas. Evaluate the financial contribution of these proposed built environment activities to the wider community and broader economy.

You should address sustainability issues and the impact on the community and the environment.

Your document must be included in your portfolio. Written material should be in the form of a word processed A4 document. Should you need to provide any drawings or sketches then they should be no larger than A3 and should also be included in your portfolio. Each page of your portfolio should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Task Two

You are to act in the role of a consultant working in the recruitment sector. Your specialist area is the built environment with a specific interest in asset management, building maintenance and other property services related to protecting, valuing and using the built environment. You and your peer group have been approached by one of the professional institutions and asked to participate in a presentation and discussion on career options in specific specialist areas, and other relevant related fields.

Working as a member of a presentation team, you should contribute fully to the planning of the presentation and discussion, the preparation of the presentation materials (including powerpoint slides) and during the presentation and discussion itself. You should take responsibility for the presentation of a specialist area within asset management, building maintenance and other property services, and coordinate this choice, together with the overall structuring and management of the presentation, with your peers to ensure a broad coverage of job roles across the group. Your tutor will observe you and the other members of

your group while you do all of this.

You will therefore need to research the relevant jobs and careers, including the qualifications required and the links to the relevant professional institutions. You will also investigate the interactions and working relationships of these roles with other relevant job roles, including the teamwork aspects, and clearly identify how your chosen roles can influence and be responsible for decisions that impact positively on the built environment and the community. Your presentation must include powerpoint overheads, and these should include drawings or diagrams as well as text. You should include in your portfolio a copy of your presentation materials, together with copies of any relevant observation records or witness statements. Each page of your presentation should be numbered and include the following information; candidate name, candidate number, centre name and centre number.

Assessment

The evidence requirements are shown in the assessment grid, and each Assessment Focus relates directly to one of the Learning outcomes of this unit. The maximum marks available for each Assessment Focus represent its relative significance within the unit. **You should concentrate your efforts on these requirements in order to help maximise your final marks for this unit.**

The assessment grid will be used by your tutor when marking your completed work. Your tutor will decide which mark band should be applied to your work for each area of assessment focus. This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.

To improve your marks and move across the mark bands from band 1 to band 3 your work will have to generally increase in depth, breadth and complexity, with a greater depth of description, reasoning, evaluation and justification as you move across the mark bands.

Assessment Grid

Assessment Focus	Band 1	Band 2	Band 3	Mark awarded
<p>6.1</p> <p>Know the factors influencing the engagement of stakeholders and the whole community in the development and use of the built environment.</p>	<p>Describes some of the ways in which specific stakeholders and the whole community can be engaged in and contribute to the development and use of the built environment; describes for most of these the benefits for social cohesion and future projects.</p> <p>(0-8)</p>	<p>Describes clearly a range of the ways in which specific stakeholders and the whole community can be engaged in and contribute to the development and use of the built environment; describes for all of these the benefits for social cohesion and future projects.</p> <p>(9-15)</p>	<p>Describes clearly and examines a wide range of the ways in which specific stakeholders and the whole community can be engaged in and contribute to the development and use of the built environment; analyses for all of these the benefits for social cohesion and future projects.</p> <p>(16-20)</p>	<p>20</p>
<p>6.2</p> <p>Understand the social, economic and commercial contribution of the built environment to the wider community</p>	<p>Describes social, economic and commercial key contributions of the built environment to the wider community; describes some key business drivers.</p> <p>(0-8)</p>	<ul style="list-style-type: none"> Describes clearly a range of social, economic and commercial key contributions of the built environment to the wider community; describes clearly a range of key business drivers. <p>(9-15)</p>	<p>Describes clearly and analyses a range of social, economic and commercial key contributions of the built environment to the wider community; examines a range of key business drivers.</p> <p>(16-20)</p>	<p>20</p>

<p>6.3 Be able to analyse job roles, qualifications and career progression opportunities, and the importance of teamwork, in asset management, use and maintenance of the built environment.</p>	<p>In a team presentation and discussion, describes some key job roles, including responsibilities, interactions and teamwork aspects, selected from asset management, use of the built environment or maintenance of the built environment; describes for the selected roles some of the progression paths and qualifications, and the roles of professional institutions.</p> <p style="text-align: right;">(0-8)</p>	<p>In a team presentation and discussion, describes clearly a range of key job roles, including responsibilities, interactions and teamwork aspects, selected from asset management, use of the built environment or maintenance of the built environment; describes clearly for each of the selected roles some of the progression paths and qualifications, and the roles of professional institutions.</p> <p style="text-align: right;">(9-15)</p>	<p>In a team presentation and discussion, describes clearly and analyses a wide range of key job roles, including responsibilities, interactions and teamwork aspects, selected from asset management, use of the built environment or maintenance of the built environment; discusses for each of the selected roles the progression paths and qualifications, and the roles of professional institutions.</p> <p style="text-align: right;">(16-20)</p>	<p>20</p>
Total marks				60

Assessment Guidance

Approaches to Assessment

Evidence for this unit will be contained within an advisory document and a report. Where work is 'hidden' or not evident in the completed outcome, for example role play or presentations, then observation records, video evidence or photographs showing the activities taking place should be provided. Centres are required to ensure that sufficient evidence is provided to confirm the quality of a candidate's work.

There are a number of assessment tasks detailed above. It is the centre's responsibility to provide appropriate working drawings, project details, access to research materials/IT facilities and visits that allow the candidate to complete each task.

As noted above some assessment elements, such as presentations and role play can be assessed directly by the tutor during the activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

The assessment in this unit is covered by two activities. Assessment Focus 1 and 2 relate to the work-related linked to valuing and using the built environment and assessment focus 3 covers a report about job roles, career pathways and interaction. The advisory document together with accompanying photographs, is the vehicle of assessment for Assessment Focus 1 and 2 whilst the report will be assessed for assessment focus 3. Where group activities are used, (eg. for the report on job roles or design of future developments) tutors will need to ensure that individual learners are provided with equal experiential and assessment opportunities.

Applying Marks in the Assessment Grid

The evidence requirements are shown in the assessment grid. The following table provides guidance on the expectations within the Assessment Grid in respect of the use of specific words. **Further guidance on this, together with guidance to assessors on the 'benchmark' standards of learner work expected for each mark band, is available in the Edexcel C&BE Principal Learning Tutor Support Materials.**

Word	Meaning
(example)s	at least two significant elements are addressed
some	More than two significant elements, but less than a majority, are addressed.
most	a majority of significant elements are addressed
all	all of the significant elements are addressed
a range	embraces representative, significant, elements partly across the breadth of the topic
a wide range	embracing representative, significant, elements fully across the breadth of the topic.
states	provides a simple statement of fact, without further elaboration
identifies	provides a simple naming, eg in the form of a list.

briefly describes	provides a description that just captures most of the key aspects, but includes minimal elaboration
describes	provides a description that just captures all of the key aspects and includes some elaboration
describes clearly	provides a rounded and well-structured description that fully captures and includes elaboration on all of the key aspects
examine	performs an inspection or logical questioning of relevant aspects
explain	provides an account of underlying reasons or aspects
compare	performs a comparison between two (or more) items or aspects
evaluate	performs an in-context appraisal against relevant criteria
analyse	performs a detailed examination of a topic
justify	demonstrates the validity or appropriateness of a topic

In allocating marks, the general principle is to decide which mark is to be applied to the work for each area of assessment focus.

- This will be on the principle of best fit and, for example, work may be classified as mark band 2 despite aspects of the work falling into mark band 1 and other areas of the work falling into mark band 3.
- Assessment of work does NOT follow a ‘hurdle’ approach, whereby the Assessor cannot award marks from the next band if one item for an assessment focus from a lower band has been omitted, regardless of the quality of the rest of the work for that assessment focus
- If the learner does all that is required in a band for an assessment focus then he/ she normally will be awarded the full available marks for that band.
- If a candidate does more on one aspect of work for an assessment focus than required by a band then he/she may be able to be awarded marks from the bottom of the higher band.
- Likewise if he/she has done less than is required in any aspect of work for an assessment focus, or indeed omitted an aspect, then the mark may move down within the band.
- Judgements are made on the principle of compensation and are completely separate for the individual assessment focus. Low marks in one focus area will be offset by higher marks in other areas as the awarding of grades is based on an overall aggregate marks obtained across all focus areas. It may therefore be possible, depending on the weighting of the assessment focus, for a learner to pass a unit even if zero marks are awarded for one focus area within the unit.

In general, progression across the assessment grid is achieved by: description with some detail, and use, for some elements at mark band 1; and clear description with well reasoned examination analysis and justification and evidence of deeper understanding and reasoning for a wide range of elements, and selection justification and autonomous/consistent use, at band 3. Learners are expected to be able to address complex tasks at this level. Learner additional

support and guidance at band 1 may be relatively significant, but should be minimal at band 3 where learners should be expected to demonstrate a high level of autonomy.

Marks should take into consideration the quality of work produced by a student. For example, a learner may be required to 'describe clearly a range of ... and explain the impact they have on ...'. If their response covers an appropriate range and this is accompanied by a clear description of each item in the range, the assessor should be considering a mark in the upper half of the relevant band. If there is also appropriate explanation of the impacts then full marks for that band should be awarded. If, on the other hand, the explanation is thin then marks are likely to be held near the middle of the band. If the student covers an appropriate range but the description is a bit thin, then the assessor should be considering a mark at the lower end of the band. Good explanation of the impacts will pull it up towards the middle.

For each assessment focus, assessors should clearly indicate in their marking the extent to which the learner's marks have been adjusted to reflect a level of learner guidance, supervision or autonomy that is considered to be outside of that which might reasonably be expected at the level.

Learner guidance, supervision and autonomy

Tutors must ensure that all learners are provided with equitable and appropriate levels of initial guidance, feedback and supervision for the assessment tasks. However, the levels of ongoing support and guidance needed and the degree of autonomy demonstrated by individual learners should be borne in mind when applying marks in the assessment grid, together with the final quality of the learner work. Where group work is used, tutors must ensure that the marks allocated to individual learners accurately represents their personal level of participation and achievement.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of the design can be examined and analysed. Availability of project drawings and specifications from these developments will enhance the quality and relevance of the visits. Design styles, features and techniques can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential and assessment opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office/Community Visits

Whilst site/office visits will aid the students' general awareness and perceptions of site/office design activities, it is nevertheless essential that all site/office visits have a specific focus. Preparation and follow up activities should be prepared and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of any site visit. It would also be appropriate for the office manager to do a brief presentation to the learners in advance of an office visit. This will enable the students to become aware of how the office is managed together with the layout and purpose of each room. In addition the elements of the office design that allow for creativity and teamwork within the work environment can be discussed. Suitable activities could include:

- The links and communication methods between office and site.
- An analysis of the site working practices of the design team and client.
- The impact on the surrounding environment and communities.
- The impact of the development on the wider communities.
- An investigation into the history of the site and previous uses.
- An investigation of quality control procedures in use on site.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- An investigation into the architectural detailing of installed construction components.
- How stakeholders and the wider community are supported and informed throughout the construction process.
- Observation of sustainable site practice.

- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site/offices in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site and office visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition and Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available. The Royal Institute of British Architects (RIBA) has opened a *Centre for Excellence in Teaching and Learning through Design (CETLD) Bene Education Room* which creates new possibilities in the way the British Architectural Library's collection of over four million photographs, drawings and books can be accessed.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating and describing the engagement and contributions of stakeholders Investigating and describing contributions of the built environment to the wider community Investigating and describing job roles
<u>Creative thinkers</u>	Designing a careers presentation
<u>Reflective learners</u>	Preparing, reviewing and practicing a presentation A Reviewing own development
<u>Team workers</u>	Contributing to and making a presentation with peers
<u>Self managers</u>	Planning, preparing and delivering to schedule a presentation Planning and organising research analysis Planning and organising own work, including research analysis
<u>Effective participators</u>	Contributing to and making a presentation with peers

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes. Assembling and managing their e-portfolio

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes. Assembling and managing their e-portfolio

Follow and understand the need for safety and security practices

Conducting research and managing notes. Assembling and managing their e-portfolio

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting research into the factors affecting the relationship between society and the built environment.

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting research into job roles and careers in asset management, building maintenance and property services for their assignment task

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings. Assembling and managing their e-portfolio

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling and managing their research. Preparing a report on the relationship between society and the built environment Assembling and managing their e-portfolio

Present information in ways that are fit for purpose and audience

Producing and managing ICT work. Preparing a presentation on job roles and careers in asset management, building maintenance and property services. Assembling and managing their e-portfolio

Evaluate the selection and use of ICT tools and facilities used to

Producing and managing ICT work. Assembling and managing their e-portfolio

present information

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Assembling and managing their e-portfolio, and when exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations. Making a presentation on job roles and careers in asset management, building maintenance and property services.

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their assignment brief and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor. Preparing a report on the relationship between society and the built environment. Preparing and revising notes and WP reports for inclusion in their e-portfolio

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Ching FDK - *Architectural Graphics, 4th Edition*, (John Wiley and Sons, Inc, 2003) ISBN: 0-471-20906-6

Thompson A - *Architectural Design Procedures 2nd Edition* (Architectural Press 2005) ISBN: 0340719419

Chudley R and Greeno R - *Construction Technology* (Pearson, 1999) ISBN: 0582316162

Harris C and Borer P - *The Whole House Book: Ecological building design and materials* (CAT Publications) ISBN: 1902175220

Watkin D - *English Architecture* (Thames and Hudson) ISBN: 0-500-20171-4

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials

and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.fmb.org.uk - The Federation of Master Builders website - includes access to downloadable copies of master builder magazine.

www.edenproject.com

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk

www.englishpartnerships.co.uk

www.hbf.co.uk

www.designforhomes.org

www.cibse.org.uk

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.

Building a Cleaner Future, produced by the Environment Agency

Future home - watch and learn (Orange,

www.orange.co.uk/socialresponsibility for additional resources)

Grand Designs Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

'Architect's Journal'. Centres would benefit from taking out a subscription to keep abreast of current design developments, case studies and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003,

The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79 Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)

Unit 7: Value and use of the Built Environment: Protecting and maintaining

Principal Learning unit

Level 3

Guided learning hours 60

Externally assessed

About this Unit

Use of the built environment and infrastructure including transport services is having a major impact upon global warming, climate change and emissions to air, land and water. Action must be taken to reduce carbon emissions and improve energy efficiency across all existing building stock. Effective environmental maintenance is essential in order to develop sustainable communities and services for the future.

In this unit you will identify private and public built assets and consider their lifespan, financial viability and social use. You will explore the importance of sustainable asset maintenance in order to ensure the safety, comfort and well being of individuals and communities. You will explore ways in which people using buildings and structures can protect the environment and ultimately the planet. In doing so you will identify materials and technologies which can contribute directly to sustainability and have an impact in reducing emissions to air, land and water from the built environment. You will gain an understanding of the need to secure and protect the physical structure of the built environment and preserve our heritage.

Learning outcomes

On completion of this unit a learner should:

- 7.1 Know how the environment can be protected during the use of buildings and structures
- 7.2 Understand the principles and practices for maintenance of the built environment
- 7.3 Be able to evaluate the role of asset management in protecting and maintaining.

What you need to cover

- 7.1** Know how the environment can be protected during the use of buildings and structures.
- We all interact with the built environment whether at home or work for business or pleasure. We show that we value our buildings and structures by carrying out regular maintenance and protection operations, however some activities do cause harm and have a detrimental effect.
- You will identify current practices in the use of buildings and structures that can impact, both positively or negatively, on the environment. In doing so you will gain knowledge and understanding of the changes required to enhance future environmental management as well as sustain and protect natural resources, buildings and structures. You will evaluate transport services and connectivity together with materials and technologies that are contributing directly to sustainability in communities.
- You will explore ways in which stakeholders and communities can be engaged in protecting the built environment and evaluate methods for securing buildings and structures ensuring they are protected from damage. You will investigate ways of minimising energy demand and reducing emissions to air, land and water. You will analyse legislation, regulatory requirements and innovative proposals that are driving forward essential environmental improvements. In doing so you will identify sustainable processes that offer social, environmental and economic benefits locally and nationally.
- 7.2** Understand the principles and practices for maintenance of the built environment.
- Maintenance is a major element of the work carried out by the construction industry. Timely and effective maintenance that is planned and well thought through commences from the design stage of a project. Good quality maintenance prolongs the life of a building or structure and impacts positively on the building occupants and the environment.
- You will identify best practice in the maintenance of buildings and structures, exploring factors that need to be considered for effective maintenance, refurbishment and adaptation. In doing so you will explore and apply techniques that identify ways to maintain the integrity of the structure from damage from the elements. You will also evaluate the principles for assuring the feasibility of the maintenance work and the processes required to enable the work to be carried out complying with regulations and client requirements.
- You will develop an understanding of the need to proactively plan maintenance and evaluate the social and community benefits arising from good strategic planning of maintenance. In doing so you will examine the importance of life cycle costing, inspection, conservation, quality and communication in ensuring effective sustainable maintenance.
- 7.3** Be able to evaluate the role of asset management in protecting and maintaining.
- You will explore the principles and practices of the management of built assets. In doing so you will identify a wide range of asset management activities for both private and public provision. You will analyse the impact of asset management services on the lifespan, financial viability and social utility of built assets. Your overall analysis should consider some of the following:
- Public image, use and quality
 - Risk evaluation and investigation
 - Preventive and corrective work
 - Life expectancy

- Change control and strategies
- Legislation and compliance
- Resource management and budgets
- Local interests and needs
- Customer impression and reliability
- Key performance indicators

Whilst analysing the above you will explore the importance of well managed assets on the safety, comfort and well being of individuals and communities. In doing so you will develop knowledge of the requirement to achieve both social and economic benefits from asset management. You will also evaluate the financial value of asset management services and examine their contribution to the national and local economy.

QCF unit summary

Outcome Number	Learning Outcome The learner will:	Assessment The learner can:
7.1	Know how the environment can be protected during the use of buildings and structures	<ul style="list-style-type: none"> • Describe current practice in the use of buildings and structures that can impact on the environment in terms of energy consumption, material use and emissions to air, land and water. • Explain how transport services and connectivity, together with materials and technologies, contribute to sustainable communities and to minimising impacts on the natural environment. • Describe, illustrate and discuss methods of reducing, emissions to air, land and water, together with a reduction in energy demand and consumption. • Describe and analyse relevant legislation and innovative design proposals that can create sustainability benefits locally and nationally.
7.2	Understand the principles and practices for maintenance of the built environment	<ul style="list-style-type: none"> • Describe how sustainable and effective maintenance, refurbishment and adaptation is planned, carried out and managed so as to ensure compliance with client requirements and current legislation and regulations. • Describe and explain the need to proactively plan maintenance work, and to consider the benefits of this to stakeholders and the community at large • Describe and explain the ‘whole life’ principal of building design and management, including: life cycle costing; conversion; quality control; and improving sustainability throughout the whole life of a building.
7.3	Be able to evaluate the role of asset management in protecting and maintaining	<ul style="list-style-type: none"> • Describe and discuss the process of asset management, and analyse its impact on building lifespan, financial viability and social utility. • Describe and discuss how asset management affects the safety, comfort and well being of communities and individuals. • Describe and discuss the financial value of asset management, and analyse its impact on the local and national economies. • Describe and evaluate the impact on asset management of relevant legislation and regulations.

References in parenthesis indicate any PLTS elements that are naturally embedded within the unit assessment requirements. See page [19] of this specification. Opportunities for developing and enhancing learner PLTS are suggested in a later section of this unit.

How you will be assessed

This unit is suited to, and therefore you will be assessed by, external examination.

Guidance for teaching this Unit

General

Tutors delivering this unit have opportunities to use a wide range of techniques. Lectures, discussions, seminar presentations, independent learning, research, site visits, supervised exercises, role play, use of internet or library resources and use of personal and/or industrial experience are all suitable. Delivery should stimulate, motivate, educate, and enthuse the learner. Visiting expert speakers could add to the relevance of the subject. Throughout the delivery learners must have the opportunity to engage in applied and sector relevant learning and assessment activities.

Planning and reviewing are critical to experiential learning. It is essential that learners are engaged in the iterative and formative process of planning, doing and reviewing and, most importantly, doing again, to enable them to experience first hand how iteration can improve outcomes. Reviewing must be a formative and developmental process. Learners must be encouraged and provided with opportunities to plan and reflect on their experience, draw out and articulate lessons learned and apply their learning to new activities or situations.

Classroom Activities

Some students will not have visited a construction site before starting this course and during introductory lessons would benefit from the use of construction drawings linked to photographs of the actual construction carried out on site. These should ideally be ICT based on CD or DVD ROM, so as to allow their use in a variety of appropriate ways.

The investigations detailed in the 'Site/Office Visits' section (see below) will form the focus of many classroom activities. These visits could be to recently completed projects (new build or refurbishment) where aspects of maintenance, protection and environmental issues as well as the asset management can be investigated and analysed. Availability of project drawings and specifications from these developments will enhance the quality and relevance of the visits. Use of sustainable resources, conservation of site features and energy efficiency measures can then be observed, evaluated and reviewed.

Sample materials should be available and, where possible, on permanent display within the classroom, to enable pupils to become readily familiar with their identification, use and application.

Wall displays featuring architects' drawings and photographs of construction work will help to promote an effective learning environment and will focus learner attention on the construction sector and the vocational approach of the course. The use of mind mapping as an accelerated learning technique, particularly when introducing new topics, can help to develop inclusive learning where all members of the class are involved.

The use of visiting speakers and role models from industry will help to promote and facilitate many classroom activities within a vocational context. For example, this support could provide the introduction to a task or investigation, act as an ongoing resource or perform an evaluative role at the end of an activity.

Where group work is used, tutors must ensure that individual learners are provided with equal experiential opportunities.

Industry Links

The involvement of industry is essential to the establishment of a real world context within the delivery of the course content. In the current industrial climate most medium to large construction companies are actively seeking links with schools, especially with a view to the recruitment of trainees and future graduates. Centres should actively seek links with such companies, and establish what form of help they will be able to provide. Links or assistance could include:

- The use of visiting speakers to promote recruitment onto the Diploma programme.
- Possible sponsorship of the centre's construction programme.
- Provision of materials or samples.
- Loan of or assistance with specialist equipment.
- Access to specifications, construction drawings, quality control documentation, environmental policies and health & safety documentation.
- Assistance with the development of links with other sources of help, including; material suppliers, architects, clerk of works consultancies, trade associations, consultants etc.
- Sponsorship of individual students and direct recruitment onto modern apprenticeships and training schemes.
- The provision of focussed site visits and/or sector-related work experience.
- Access to visiting speakers who will put students' learning into an industrial context. Specific content level and expected outcomes will need to be discussed in advance.

Site/Office Visits

Whilst site/office visits will aid the students' general awareness and perceptions of on site/office activities, it is nevertheless essential that all site/office visits have a specific focus. Preparation and follow up activities should be planned and discussed with the company well in advance of the visit. It will probably be necessary to have copies of drawings or other documentation in advance of the visit. As noted above in classroom activities these visits could be to completed sites or working offices that can assist with focus on the learning outcomes for this unit. Suitable activities could include:

- An investigation of quality control procedures in use.
- The links and communication methods between office and site.
- An analysis of the working practices of the teams.
- The impact on the surrounding environment and communities.
- An investigation into maintenance planning and asset management operations.
- An investigation into the different types of materials in use on site and their use within the main elements of substructure, superstructure, external works and drainage.
- The use of a variety of materials as features or aesthetic elements within construction as well as effective use of glazing and building position to maximise the benefits of natural lighting.
- An investigation of on site wastage including procedures adopted to minimise waste and the segregation of waste and its disposal.
- To carry out a risk assessment of on site construction operations (companies will be sensitive to possible conclusions and may require you to be guided by their health & safety officer)
- How stakeholders and the wider community are supported and informed.
- Observation of sustainable site/office practice.
- An investigation into the temporary (for the site set up and offices) and permanent energy supplies used for the project.

It may be that within one site visit different groups will investigate different 'on site' elements or operations.

It is essential that school and LEA guidelines and procedures are strictly adhered to for all visits, and that teachers visit the site/offices in advance to carry out risk assessments and agree specific health and safety requirements with the company's health and safety officer. Pupils, in small groups, should be supervised and accompanied at all times during a site or office visit.

Sustainability

Tutors should use every opportunity to develop a learners' understanding and appreciation of sustainability and its wide ranging impact upon modern construction. These impacts can be identified in many areas, including site and management practice, built structure design and characteristics, and natural and environmental issues. Sustainability is a very important issue in the modern world of construction, and tutors/learners should utilise site visits and visiting speakers to reinforce and further their knowledge and understanding of current practice. A number of universities and colleges along with industry are carrying out research in environmental concepts and sustainability for the built environment. Opportunities to link up with these establishments should be utilised wherever possible and appropriate.

Learning Scenarios

In line with the construction and the built environment focus of this course, all learning scenarios should, wherever possible, be placed in a realistic industrial context. Examples of how this requirement could be satisfied are provided in the above sections.

ConstructionSkills

ConstructionSkills are a useful resource for use by schools. They employ trained schools liaison officers in all regions, publish a list of activities and organise competitions and events that are intended to stimulate and encourage students to become interested and involved in the construction sector.

Exhibition Visits

Visits to exhibitions such as the Building Exhibition (Interbuild) and the Centre for Alternative Technology (CAT) will be of benefit to all students, and will allow them to view modern environmentally-sound construction practices and become aware of new products and sustainable systems as they become available.

Health and Safety

Health, safety and welfare issues are paramount and should be strictly reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken prior to practical activities. Centres are advised to read the delivery and approach section on page [15] and Annexe C (PUWER) of the specification.

Opportunities for developing and confirming Personal Learning and Thinking Skills

Tutors should note that the development and ongoing enhancement in learners of Personal Learning and Thinking skills (PLTS) underpins the Diploma concept. This Principal Learning unit should be treated as a vehicle through which these important generic skills can be delivered and reinforced, and in a context that is relevant both to the sector and to learner level. Although certain PLTS are identified elsewhere within this unit as an inherent part of the assessment criteria, there are further opportunities to develop and enhance a range of PLTS through various approaches to teaching and learning, and some examples of these are provided below. The use of formative assessment techniques and mentoring to aid learner development in these important personal skill areas is strongly encouraged. Where appropriate, group work may be used to provide further opportunities for developing and providing formative assessment on Team Working and Effective Participation.

<u>Skill</u>	<u>Where learners are</u>
<u>Independent enquirers</u>	Investigating and describing ways of protecting the environment Investigating and describing aspects of the maintenance of the built environment Investigating and describing the role of asset management
<u>Creative thinkers</u>	Solving problems, eg relating to reduction of energy demand
<u>Reflective learners</u>	Reviewing own development
<u>Team workers</u>	
<u>Self managers</u>	Planning and organising own work, including research
<u>Effective participators</u>	

Functional skills

This Principal Learning unit should also be treated as a vehicle through which Functional Skills can be reinforced and developed in a context that is relevant both to the sector and to the learner. There are many opportunities within this unit to do so, and some examples of these are provided below. It is a requirement of the Level 3 Diploma that learners are separately assessed for Functional Skills at Level 2. The use of formative assessment techniques and mentoring to aid learner development in these important skill areas is strongly encouraged.

Functional Skills - Level 2

Skills

When learners are...

ICT - Use ICT Systems

Select, interact with and use ICT systems independently for a complex task to meet a variety of needs

Conducting research and preparing notes

Evaluate the effectiveness of the ICT system they have used

Reflecting on their learning.

Manage information storage to enable efficient retrieval

Conducting research and managing notes

Follow and understand the need for safety and security practices

Conducting research and managing notes

Troubleshoot

Address practical ICT issues as they arise.

ICT - Find and select information

Select and use a variety of sources of information independently for a complex task

Conducting and assimilating research into the maintenance and protection of the built environment.

Access, search for, select and use ICT-based information and evaluate its fitness for purpose

Conducting and assimilating research into the role of asset management.

ICT - Develop, present and communicate information

Enter, develop and format information independently to suit its meaning and purpose, including:

Producing, assembling and managing their learner notes, reports and drawings

Text and tables

Images

Numbers

Records

Bring together information to suit content and purpose

Assembling and managing their research

Present information in ways that are fit for purpose and audience

Producing and managing ICT work

Evaluate the selection and use of ICT tools and facilities used to present information

Producing and managing ICT work

Select and use ICT to communicate and exchange information safely, independently, responsibly and effectively including storage of messages and contacts lists

Exchanging information with their tutor, peers and others

Skills

When learners are...

Maths

Recognise that a situation has aspects that can be represented using mathematics

Make an initial model of a situation using suitable forms of representation

Decide on the methods, operations and tools, including ICT, to use in a situation

Select the mathematical information to use

Skills

English - Speaking and listening

Make a range of contributions to discussions and make effective presentations in a wide range of contexts

Taking part in discussions with their tutor and peers, in a range of different learning situations

English - Reading

Compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions

Understanding their learning briefs and conducting and assimilating relevant research information from various sources

English - Writing -

Write documents communicating information, ideas and opinions effectively and persuasively

Preparing and revising their notes and learning assignments, and in written communications with their tutor

Wider curriculum mapping

The Edexcel Principal Learning for the Diploma in Construction and the Built Environment provides opportunities for the learner to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of environmental issues, European developments, health and safety considerations and equal opportunities issues. Further information on these opportunities is provided in Annexe B of these specifications.

Work experience

All learners undertaking the Diploma are required to undergo a period of work experience that has relevance to the Construction and Built Environment sector. To enable learners to achieve maximum benefit from their work experience, before and/or after this takes place, tutors should identify opportunities to reflect and incorporate relevant materials and activities into the delivery and assessment of this unit.

Reference materials

Recommended reading

Smith P - *Eco-refurbishment - a guide to saving and producing energy in the home* (Architectural Press, 2004) ISBN: 0750659734

Woodley T, et al - *Green Building Handbook* (ACTAC, 1997) ISBN: 0-419-226907

Coventry S, et al - *The reclaimed and recycled construction materials handbook* (CIRIA, 1999) Publication C523 ISBN: 0-86017-513-8

Shah S - *Sustainable Practice for the Facilities Manager* (Blackwell) ISBN: 9781405135573

Sharpe G R - *A Contractor's Guide to Conservation* (CIOB) ISBN: 9781853801006

Egan Sir J - *Skills for Sustainable Communities - The Egan Review* (RIBA) ISBN: 9781859461426

Wordsworth P & Lee R - *Lee's Building Maintenance Management 4th Edition* (Blackwell) ISBN: 9780632053629

Websites

www.actionenergy.co.uk - provides a range of energy efficiency best practice resources

www.cabe-education.org.uk - Commission for Architecture and the Built Environment

www.dqi.org.uk - Design Quality Indicators

www.ogc.gov.uk - UK Office of Government and Commerce, 'Achieving Excellence in Construction', 'Procurement Guide 09 - Design Quality'

www.dti.gov.uk/construction/sustain - covers issues and reports relating to sustainable construction

www.sustainabilityworks.org.uk - a reference tool for sustainable housing

www.ecoconstruct.com - a resource for sustainable construction materials and methods

www.ciria.org.uk - research into best practise solutions.

www.citb.org.uk - CITB Construction Skills provides information on careers, construction and national construction week and has downloadable research papers and a teacher support section.

www.ciob.org.uk - The Chartered Institute of Building sets the standards and promotes the interests of construction professionals worldwide. The CIOB website contains member services and industry information.

www.edenproject.com

www.buildingforlife.org/

www.cat.org.uk

www.whichplaceswork.org.uk/

www.buildingforlife.org/

www.riba.org.uk

www.englishpartnerships.co.uk

www.hbf.co.uk

www.designforhomes.org

www.imbm.org.uk

www.bifm.org.uk

www.apm.org.uk

www.iam-uk.org

www.channel4.com/4homes/ontv/grand-designs

Videos

Designs That Hold Water - Sustainable Urban Drainage Systems Explained, produced by Shot in the Dark for the Urban Design Alliance.

Building a Cleaner Future, produced by the Environment Agency

Future home - watch and learn (Orange,

www.orange.co.uk/socialresponsibility for additional resources)

Grand Designs - Channel 4

Other reading

'Building' magazine. Centres would benefit from taking out a subscription to keep abreast of current developments and to source possible links and other relevant information.

Demonstrations of sustainability - the Rethinking Construction demonstrations and how they have addressed sustainable construction issues, Rethinking Construction Ltd

The Egan Review: Skills for Sustainable Communities ODPM

The UK Construction Industry: progress towards more sustainable construction 2000-2003, The Sustainable Construction Task Group, October 2003

Bartholomew. D, et al. Renewable Energy in London - An overview of current and future projects, (London Research Centre, 2000)

Bartholomew. D, Exploiting Renewable Energy in London - An overview of renewable energy technologies, (London Research Centre, 1998)

DFE. School Grounds - A guide to good practice, (HMSO, 1997), Building bulletin 85

DFE. Passive Solar Schools - A design guide, (HMSO, 1994), Building bulletin 79

Coventry S and Woolveridge C - Environmental good practice on site (CIRIA 2000)