# Unit 24: Conversion, Adaptation and Maintenance of Buildings

## Delivery guidance

All countries have many existing properties that require ongoing maintenance, alterations, changes and upgrades. This optional unit focuses on such properties and how we can ensure their suitability for continued use, both now and for future generations.

### Approaching the unit

Learners will explore the reasons why buildings need to be converted or adapted and why maintenance is so important in the preservation of the fabric of a property. They will develop a maintenance plan for a property, learn the processes involved and the methods employed to develop a successful project, before applying this to their own design scheme. They should be encouraged to draw on their own wider experience of construction from other units to present suitable solutions.

Delivery of this unit is likely to use a range of different methods, including tutor presentations, individual and group work, along with paired investigations. There is also opportunity for a range of practical investigations of existing building projects. Learners would greatly benefit from the involvement of local employers in the delivery of this unit if there are opportunities to do so.

### Delivering the learning aims

#### Learning aim A

Learning aim A investigates the needs driving the conversion and adaptation of properties, introducing learners to the different levels of intervention and approaches available. The difference between the conversion and adaptation of a building should be clarified at an early stage. Learners can investigate the reasons why existing properties can become old and dilapidated, such as lack of maintenance, or the property no longer being fit for its intended purpose, listed and historic buildings and government requirements for increased brownfield development due to limited greenfield sites.

Research could be carried out in the context of existing buildings in your area that have become dilapidated, or focus on high-profile buildings. From investigation and class discussion, learners should be able to identify the reasons why buildings have been neglected, or why older buildings have been converted or adapted in recent years. This analysis can direct learners to carry out their own further independent study into why there is a need for conversion and adaptation of a property. Learners should research all the possible reasons why a building may need to be converted or adapted, including changes in social needs, financial costs of maintaining the building, improving energy efficiency and technological advancements. The learners could continue their independent research to look at examples of different levels of intervention, from general maintenance to prevent deterioration of the fabric of the building, to the

complete refurbishment of the whole property, and create a list of the types of work carried out.

### Learning aim B

In learning aim B, you should make sure that learners develop their understanding of the need for maintenance and how to develop a maintenance plan for a property. Learners could link with *Unit 3: Construction Science* to identify the range of construction materials used in construction projects and research the defects associated with each material. Learners could be given a range of case studies that feature properties with problems, and they could investigate the possible causes, such as inappropriate specification, poor construction, structural failure, human impact or lack of maintenance. There are a number of popular television programmes that look at problems that may occur with properties (suggestions are included in the Resources section), and these may be a good prompt for class discussion.

You could give learners a research task so that they gain an understanding of cyclical maintenance requirements for a building (such as their school or college). This could then be complemented by further paired or group activities where learners investigate a range of maintenance approaches that can be used by building owners, each offering advantages and disadvantages when looking to extend the life of a property. Finally, you could give learners a range of buildings and ask them to use the knowledge they have gained to create a maintenance plan for the building they have been allocated.

### Learning aim C

The delivery of learning aim C will link closely with *Unit 2: Construction Design*. Learners could work in small groups alongside an industrial partner to investigate the different stages of planning for work in the local area for a range of case studies, identifying the direct impact the plan would have on a conversion or adaptation of a building. Learners could then progress to investigate planning legislation, which may impact on a conversion and adaptation project. Case studies could be introduced and discussed as a group. This would again be an excellent opportunity to work with an industry partner to engage learners further with real-life examples that have encountered different legislative constraints, such as planning permission, listed building consent or building in a specific conservation area.

With the legislative requirements understood, the group could then be challenged to research the range of options for the conversion and adaptation of properties. This research could be supplemented by looking at existing projects, identifying and justifying how they have been converted or adapted. These examples could be the same case studies as investigated in learning aim A. Working in small groups, the learners could suggest the most suitable form of conversion or adaptation. This should include assessing the client's requirements, such as structural alterations or lateral or vertical extensions, and then deciding how best to meet these.

Finally, the learners should be able to create proposals for conversion and adaptation schemes. You could use a local or national example of a conversion, adaptation or maintenance project that learners are familiar with, and they could then work in pairs to identify the different types of building survey reports available, building confidence in their analytical skills as they interpret the information.

Learners will again call on these skills when analysing and interpreting plans, elevations and sectional details for proposed schemes, and may draw on knowledge from the optional *Unit 12: Building Surveying in Construction*. Learners could produce maintenance plans for these projects, specifying how often the various elements will need attention. You could work in partnership with a local design or construction organisation to give learners the opportunity to present and discuss their proposals for the different schemes.

## Assessment model

| Learning aim | Key content areas | Recommended assessment approach |
|---|---|---|
| **A** Examine the need for conversion and adaptation of a property | **A1** Conversion and adaptation<br>**A2** Levels of intervention | A written report that considers the need for conversion and adaptation, looking at the options for and levels of intervention. |
| **B** Develop a maintenance plan for a property | **B1** Need for maintenance<br>**B2** Maintenance approaches<br>**B3** Levels of maintenance intervention and repair | A written report that considers the need for maintenance of a property, and the different options, to allow for the production of a maintenance plan for a specified property. |
| **C** Develop a scheme design and specification for the conversion and adaptation of a property | **C1** Process of conversion and adaptation<br>**C2** Legislative requirements<br>**C3** Options for conversion and adaptation<br>**C4** Proposals for conversion and adaptation schemes | A written report, annotated drawings and specification for a conversion and adaptation project for a given scenario. |

## Assessment guidance

There is a maximum of three summative assessments for this unit. You should set the assignment briefs within the context of an existing property.

For assignment 1, which will cover learning aim A, you should give adequate details about the existing state of the property so that learners can evaluate the needs and intervention options for the conversion and adaptation.

Learning aim B will be addressed in assignment 2, and learners will need to include an evaluation of the maintenance requirements and critical analysis of their proposed maintenance plan, justifying their rationale of how to preserve and extend the life of a given property.

Learning aim C will be addressed in assignment 3, and learners must justify a proposed scheme design and specification for a conversion and adaptation project for a given property. This should include evidence of how it meets legislative requirements.

You could ask for assessment evidence in the form of a project report and a portfolio containing drawings and specifications. As part of the assignment brief, you could ask learners to include sketches, illustrations and a list of information sources used.

## Getting started

**This gives you a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.**

### Unit 24: Conversion, Adaptation and Maintenance of Buildings

**Introduction**

In the delivery of this unit, there is the opportunity for you to develop links with local construction and design companies who may be able to give learners suitable conversion or adaptation challenges or scenarios that could be used to help develop their skills.

Once the underpinning knowledge and understanding from learning aims A, B and C have been addressed, a more holistic approach could be employed, which would give learners the opportunity to develop a scheme design and specification for the conversion and adaptation of a property.

### Learning aim A – Examine the need for conversion and adaptation of a property

**Learning aim A1**

- Introduce this learning aim with a class discussion on a range of conversion, adaptation or maintenance projects. You may wish to look at well-known examples with learners, such as Olympic Stadiums, or choose a more local example, such as a new hotel or residential apartment block within a listed building.
- Then ask learners to research, independently or in pairs, all the reasons why existing properties need to be adapted or converted. Research could be captured in a number of formats, such as a brief report or presentation. This should include reasons why old buildings have become dilapidated, increased brownfield development, legislative changes, historic preservation, architectural trends, changes in societal needs, financial issues, improving energy efficiency and increased human comfort requirements.
- One example of a case study could be to review the energy efficiency of old versus new properties; various data exist, e.g. through the illustration of thermal losses for two given buildings. This could then include a discussion on potential remedies, from basic methods, such as insulation, to installation of renewable technologies to improve the cost efficiency of a building. This could take into account any consents or permissions required for older buildings in particular.

**Learning aim A2**

- Next, have learners investigate the different levels of intervention that may be required, e.g. general maintenance to prevent deterioration of the fabric of the building, or refurbishment of the whole property.
- Learners could work in small groups to visit and research buildings in their local area – perhaps their school, college or local houses – and create a list of the type of work that has been carried out. They will assess levels of general maintenance and any alterations or extensions that may have been added to the buildings to ensure they are suitable to meet modern living standards. The research of all the groups can be shared through group discussions.
- Learners also need to research the examples of retaining a façade and elevation, with a new building behind it. Often, examples can be found in town and city centres. You should also consider other types of historic buildings, such as old factories.

- Within their groups, learners should collate the reasons for the intervention options studied, summarising their clear rationale for the need for the conversion and adaptation of a range of properties. This can be shared with peers through tutor-led discussion or learner presentations.

## Learning aim B – Develop a maintenance plan for a property

**Learning aim B1**

- The focus of learning aim B is to consider the reasons why properties need ongoing maintenance to preserve their fabric and ensure their longevity. You could ask your learners to suggest a possible impact that a defect can have on a construction project and highlight that such defects are one of the major causes of disputes within construction projects.
- Learners could then work in pairs to research the different materials used in construction projects and the common defects to which they are susceptible. Learners should also research design defects and poor specifications, and the impact that these can have on the structure. Looking at the example of The Rana Plaza disaster would be a shocking eye-opener for many.
- Another possible reason why a building may require maintenance is through poor workmanship. To address this, task learners to look at a range of images of case studies of poor workmanship and as a class discuss the possible causes and consequences.
- During your presentations, you may find it useful to refer to clips from television programmes such as 'Cowboy Builders', 'Homes Under the Hammer' or 'Restoration Man' to look at problems that may occur with properties.
- Give learners a research task so that they gain an understanding of cyclical maintenance requirements for a building such as their school or college. This could then be complemented by further paired or group activities, where learners investigate a range of maintenance approaches that can be used by building owners. Learners would need to identify the advantages and disadvantages of each in extending the life of a property.
- Finally, you could give learners a range of buildings and ask them to use the knowledge they have gained to create a maintenance plan for the building they have been given.

**Learning aim B2**

- Maintenance of buildings is a vital part of the whole life cycle of a building, and learners should investigate the range of different approaches to building maintenance. In a small group exercise, learners could discuss the advantages and disadvantages of unplanned and planned maintenance, listing the possible outcomes of an unplanned maintenance approach. Acknowledging the major part of planned maintenance as part of the asset management plan, the groups could then research the local council and identify the different properties it is responsible for maintaining, researching the annual maintenance costs of the buildings. You could conclude with a class discussion on what may happen to maintenance plans as budgets are cut.
- Learners should also research other forms of maintenance approaches, such as scheduled and condition-based, to identify the advantages and disadvantages of each approach, and look at possible situations where each approach may be most suitable. They could work individually or in pairs to do this.

**Learning aim B3**

- Moving on to the levels of maintenance intervention and repair, have learners work in small groups to assess case studies such as local schools, colleges, houses, council buildings, hospitals etc., identifying emergency repairs (repairs that need to be carried out imminently as

there is a risk to human life or major damage to the building) and describe the actions that need to be taken to rectify the situation. Learners can then research different forms of repairs – such as temporary, targeted and planned – and suggest situations where they are applicable, being aware of the advantages and disadvantages of each. Research from this task could be shared in a class discussion, with tutor guidance to clarify or correct learner understanding.

- Learners will need knowledge of the regular inspections and reports that accompany planned preventative maintenance (PPM) or cyclical maintenance and repairs. This is an opportunity to link with an industrial partner to look at PPM for council buildings, and also private companies. This will demonstrate to learners real examples of how PPM can prevent unwanted, unexpected and expensive repairs. It should also highlight the suitable approach of the PPM, whether it be scheduled based on time or on the condition.
- Learners must be aware of the point when it is not economically viable to repair and when a replacement plan may be necessary. This can happen with equipment, the building fabric or building services. Learners should make a list of building fabric and services that may need to be replaced and estimate the expected life span of each.

As preparation for assessment for this learning aim, ask learners to use their own home as an example, and to come up with two changes or upgrades they would carry out to make improvements. This could be new windows, a new roof, converting the attic or replacing the old bathroom suite with a new one. They may present their ideas in the form of sketch drawings, showing both the existing and the new layouts. When presenting to the rest of the class, learners should demonstrate their understanding of the impact of the work, e.g. will you need to move out or will you be able to remain in the house? These investigations and sketches could then be presented to the rest of the class.

## Learning aim C – Develop a scheme design and specification for the conversion and adaptation of a property

### Learning aim C1

- The focus here is for learners to be able to examine a client's requirement for a conversion or adaptation project, taking into consideration external factors, such as planning, statutory, environmental, social and economic constraints, to create a possible solution.
- This section also offers you the opportunity to develop links with an industry partner who could identify possible projects that your learners could investigate. The learners could work in pairs to recommend and justify solutions that meet the client's vision, and work within the constraints. These recommendations could be presented to the industry partner, who could criticise the solutions.
- Ask learners to work in groups to investigate the different stages of planning work for a range of case studies. This is an opportunity to work with an industrial partner to look at case studies and identify the work involved at each stage of the plan. Learners could work in small groups, tackling tutor-provided scenarios and explaining how each stage of the conversion or adaptation of a building would be impacted by the plan of work.
- Following this, have learners work in small groups to list buildings in the local area that have become redundant or obsolete. Using the knowledge gained from learning aim A, they should identify the reasons why the buildings became redundant or obsolete, before coming together for class discussion to debate the possible uses of the buildings following adaptation or conversion. To help generate ideas, you could view the BBC series 'Inside the Merchant'. This is about the 5-star Merchant Hotel in Belfast, Northern Ireland (opened in 2006) and is an excellent example of how vacant buildings can be converted and help to

regenerate rundown parts of a city. The Grade A listed buildings were originally the headquarters of the Ulster Bank (1867).

**Learning aim C2**

- Linking with *Unit 2: Construction Design*, learners could identify the range of planning legislation that may impact on a conversion and adaptation project. Case studies could be introduced and discussed as a group. This would be an excellent opportunity to work with an industry partner, such as the local planning authority or a designer, who may have a range of projects that have encountered different legislative constraints, such as Planning Permission, Listed Building Consent or building in a specific conservation area.
- Learners could then research other legislation that may impact on the conversion or adaptation of a building, such as building regulations, health and safety and other property-related legislation relevant to the location. Extend this understanding with an activity that challenges your learners to consider your school or college fire risk assessment, and task them to list all of the items that should be included in the fire risk assessment report.

**Learning aim C3**

- Then challenge learners to research the range of options for conversion and adaptation of properties. This research could be supplemented by looking at existing projects, identifying and justifying how they have been converted or adapted. These examples could be the same case studies as investigated in learning aim A. Working in small groups, the learners could suggest the most suitable form of conversion or adaptation. This should include assessing the client's requirements and then deciding how best to meet these, such as structural alterations or lateral or vertical extensions.
- Finally, the learners should be able to create proposals for conversion and adaptation schemes – this will link with *Unit 2: Construction Design*. Use a conversion, adaptation or maintenance project that learners are familiar with, such as the Buckingham Palace refurbishment or the Olympic 2012 Regeneration scheme in London, or a local example, perhaps a new hotel or residential apartment block that may have been built within a listed building. Ask learners to work in pairs to identify the different types of building survey reports available, and analyse and interpret information from each type of survey.
- Learners need to be able to analyse and interpret plans, elevations and sectional details for proposed schemes. In a tutor-led discussion, have learners collaborate in small groups to assess the content of specifications that you have given them (representing relevant projects and linked to plans, elevations and sections).
- Following this, have learners work in pairs to produce detailed maintenance plans for the projects, looking at the different elements that need maintenance to give recommendations on how often they should be maintained.
- Learner proposals could then be presented to and discussed with local industry partners, such as design or construction firms.

## Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit has links to:

- Unit 1: Construction Technology
- Unit 2: Construction Design
- Unit 3: Construction Science
- Unit 7: Graphical Detailing
- Unit 9: Building Information Modelling and Artificial Intelligence
- Unit 12: Building Surveying in Construction.

## Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this unit of the BTEC International Qualifications in Construction and the Built Environment. Check the Pearson website (http://qualifications.pearson.com/endorsed-resources) for more information as titles achieve endorsement.

### Textbooks

Doran, D, Douglas, J and Pratley, R – *Refurbishment and Repair in Construction* (Whittles Publishing, 2009) ISBN 9781904445555. This book gives information on the refurbishment of existing constructions with minimal alterations, and how this is a more sustainable and preferable approach than demolition and reconstruction.

Douglas, J – *Building Adaptation*, 2nd Edition (Butterworth-Heinemann, 2006) ISBN 9780750666671. This book gives a general introduction to the conversion, extension and refurbishment of property.

Wood, B – *Building Maintenance* (Wiley-Blackwell, 2009) ISBN 9781405179676. The book gives information on building maintenance processes.

### Videos

On the Channel 5 website, search for 'Cowboy Builders' – a series looking at some of the disasters left by disreputable workmen.

On the BBC website, search for 'Homes Under the Hammer, which follows the progress of properties purchased at auction.

On YouTube, search for 'The Full Story of the Rana Plaza Factory Disaster'.

Go to the Channel 4 website and search for 'Restoration Man' – a programme focusing on historically and architecturally significant buildings.

On YouTube, search for 'Inside the Merchant, Episode 1 Full BBC Documentary 2016'; more episodes can also be found on YouTube.

## Websites

Visit the Royal Institution of Chartered Surveyors (RICS) website. This is a professional body offering information, research, standards and guidance on property conversion, heritage conservation and adaptation.

*Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.*