APPLY PRINCIPLES OF SUSTAINABILITY IN RESIDENTIAL BUILDING PRACTICES
CERTIFICATE II IN BUILDING AND CONSTRUCTION
(PATHWAY – PARAPROFESSIONAL)
30013
LECTURER’S GUIDE
BUILDING AND CONSTRUCTION
Apply principles of sustainability in residential building practices

30013

Lecturer’s guide
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Introduction

This guide takes you through basic knowledge relating to the principles of sustainability in residential building practices.

Areas of explanation in the unit include:

- factors that impact on sustainable design for residential buildings
- the principles of energy efficiency and sustainability and how they apply to the residential building industry
- examples of environmentally responsible improvements that could be incorporated into housing.

It is intended that the content of this unit will be delivered face-to-face in a classroom environment.

Qualification overview

This unit of competency, 30013 *Apply principles of sustainability in residential building practices* forms part of the Certificate II in Building and Construction (Pathway – Paraprofessional) and is aimed at people who are considering a paraprofessional career in the residential building industry (as opposed to a career in the trade sector).

The course consists of 12 units of study and a period of work placement. These two components, study and work, will provide learners with an introductory background to the paraprofessional side of the residential building industry.

To progress further in the industry from this introductory level, learners will then need to specialise in a particular field of study, such as building, estimating, scheduling, drafting or building design. Courses for these careers usually commence at Certificate IV level and progress through to diploma or even advanced diploma levels at a registered training provider who delivers these programs.

Some areas of study, such as architecture, interior design and construction management can then be studied further at degree level at a university.
Unit overview

This unit of competency specifies the outcomes required to understand the importance of climate, how it effects our built environment and how we can best adapt our housing to meet our future needs in a more sustainable and environmentally responsible way. It also looks at how to live more sustainable lives in our houses.

The full unit of competency is provided for you at Annex A to this guide.

Competence in this unit will be demonstrated by researching, reading and being able to identify, and discuss environmentally responsible changes that could be incorporated into standard residential housing.

Please note that this unit is designed to provide learners with a very basic understanding of the principles of sustainability as they apply to the residential building industry.

Resources and preparation

You will need to provide access to the following resources:

• computer and internet – for use in class
• National Construction Code Series 2012, Volume Two, Building Code of Australia; Class 1 and Class 10 Buildings
• ‘Your Home Technical Manual – Design for Lifestyle and the Future’ (learners can access online, or you can provide printed copies)
• the project house plan
• a house plan for use in Session 9 – Class presentation.

Learners will need to provide:

• a USB thumb drive
• an A4 note pad
• an A4 file for notes, handouts and printed documents
• a calculator.

The resources listed below provide options for additional information and practice. Resources noted in this guide may vary across regions, especially state legislation.

You will need to check all websites noted in the learner’s guide before each delivery session as addresses can change without notice.

Resources noted in the learner’s guide may also vary across regions, especially where state/territory legislation is referenced. Please review within the context of your own local requirements.

Check the resources column of the delivery plan, provided at Annex B to this guide, for preparation required in each section of the program.
### Information area

<table>
<thead>
<tr>
<th>Resource</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>All residential buildings covered by Regulations</td>
<td>Australian Building Codes Board</td>
</tr>
<tr>
<td>of Australia; Class 1 and Class 10 Buildings – library use</td>
<td></td>
</tr>
<tr>
<td>Sustainability technical information</td>
<td>Australian Government</td>
</tr>
<tr>
<td>‘Your Home Technical Manual’ (online)</td>
<td></td>
</tr>
<tr>
<td>Water reuse/recycling</td>
<td>Western Australian Government</td>
</tr>
<tr>
<td>Water Corporation</td>
<td></td>
</tr>
<tr>
<td><a href="http://www.watercorporation.com.au">www.watercorporation.com.au</a></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>Australian Government</td>
</tr>
<tr>
<td><a href="http://www.livinggreener.gov.au">www.livinggreener.gov.au</a></td>
<td></td>
</tr>
</tbody>
</table>

### Legislation

BCA Part 3.12 Energy Efficiency

### Websites

The following websites may be useful to support the content of this unit.

- Australian Building Codes Board (ABCB) [www.abcb.gov.au](http://www.abcb.gov.au)
- CSIRO [www.csiro.au](http://www.csiro.au)
- Department of Climate Change and Energy Efficiency [www.climatechange.gov.au](http://www.climatechange.gov.au)
Delivery strategy

A delivery plan is provided at Annex B to this guide. It provides a detailed breakdown of each session’s content and preparation requirements.

Learners should be encouraged to research and source their own answers to questions, so as to develop their knowledge of where information can be sourced.

Fifteen two-hour sessions have been planned. Successful completion of the three assessments that are provided is evidence of competency.

If you have not already done so, get a copy of the learner’s guide and familiarise yourself with it.
The learner’s guide

Format and intent

General

In the learner’s guide you’ll find a variety of material to help you deliver this unit. This includes:

• content – text, images and diagrams
• activities, including – fill in the blanks, discussions, research and written, all related to the content most recently covered.

All activities are designed to be written directly into the learner’s guide. When learners have finished the unit, their guide should be complete and able to be used as a reliable reference in the future. For this to be the case, the activities need to be checked and/or discussed to give learners the opportunity to correct any incorrect or incomplete parts.

Note: The learner’s guide is not intended to be content-heavy, and it is not a text book. It is designed to complement your classroom delivery and provide learners with a summary of the unit content.

For this unit

All answers provided to the activities and on the sketches for orientation are suggestions only of the type of information required. You will need to direct and focus discussion and research activities as required. Some information may need to be adjusted to meet specific local requirements.

In Section 1 – Global and local environments, you introduce learners to the ‘big picture’ about the earth’s atmosphere, our environment, and influences affecting it both locally and globally.

Section 2 explores the impact that climate change has on buildings. You may be able to expand this topic further by discussing current events occurring locally or globally (such as earthquakes, floods etc). Suggested answers to the activities are provided here for you.

Note: please remind learners to bring a copy of a recent power bill for the next session.
Section 3 looks at energy use in the construction and operation of a home. If you would like to add in an extension activity, you could ask learners to nominate another example of a building material, and work through the energy assessment in the same way as the guide does with the example of a house brick.

The numbers for the pie chart activity are:

- Standby 3%
- Cooking 4%
- Lighting 7%
- Refrigeration 7%
- Water heating 25%
- Heating and cooking 38%
- Other appliances 16%

Note: you may need to provide some support in activity 3.3, where learners are required to do some calculations.

Assessment 1 is introduced in this section. You will need to lead and support learners in doing internet research and completing the questions for this first assessment.

Climate zones are the topic of Section 4. You can refer to the Your Home Technical Manual for the answers to the first set of activities (4.1). If your location is not in Western Australia, you may wish to explore the topic of climate zones further with learners as that will impact on the other sections of the unit.

Section 5 explores solar movement. A simple but effective way of demonstrating how the sun tracks over the sky and how it hits the wall of a house is to use a house model and a desk lamp. Move the desk lamp around the house model, to demonstrate the movement of the sun. In Activity 5.1, learners are required to come up with some solutions to suit a house plan. To extend this activity, you could discuss the various solutions and options for orientating the house, and with each option note the best position for the windows.

Thermal mass is introduced in Section 6. You may need to provide further detail relating to figures 6.4–6.7, and support for Activity 6.2. Assessment 2 – House plan: part 1 is introduced here.
The focus of **Section 7** is energy efficiency. The ‘Your Home Technical Manual’ is a great resource to support this section. An option for an extension activity to this section would be to set learners a homework task to investigate a range of white goods and/or appliances at a local store, and report back on what they find out about the range of energy and water ratings they have. Assessment 2 – House plan: part 1 is due here.

**Section 8** covers water management in the context of residential home buildings. There is opportunity in this section to facilitate interesting conversations around the topic of water recycling and public opinion on the matter. Assessment 3 – House plan: part 2 is introduced here.

**Section 9** is dedicated to the class presentation. **You will need to provide a plan for learners to use.** Learners should be grouped into small teams of three or four so that there is enough time in the session for them to do their presentations. You will need to facilitate this session closely and provide support as needed. To assist learners, you could bring a range of magazines and publications to class for them to use. Assessment 3 – House plan: part 2 is due here.

In **Section 10**, learners are asked to reflect on their progress and review the unit. You can facilitate conversation around this, and seek additional feedback if required.
Apply principles of sustainability in residential building practices
Lecturer’s guide
Assessment summary

The three assessments in this unit are designed to assess competency in the unit 30013 Apply principles of sustainability in residential building practices, as listed in the unit details at Annex A to this guide.

In Assessment 1 learners are required to conduct research on global warming and discuss the issues.

Assessment 2 involves applying knowledge of solar movement and thermal mass principles to design ideas.

In Assessment 3 learners are required to apply principles of sustainability to house design.

An assessment plan providing a suggested scheduling of the assessments is provided at Annex C to this guide. A matrix is provided at Annex E to this guide, showing how the assessment tasks map to the unit performance criteria.

Results and appeals

Please refer to your training organisation or association website for information about the assessment process.
Annex A – Unit details

<table>
<thead>
<tr>
<th>Unit title</th>
<th>Apply principles of sustainability in residential building practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor</td>
<td>This unit specifies the outcomes required to research, interpret and apply good practice in environmental responsibility to relevant residential building processes</td>
</tr>
<tr>
<td>Employability skills</td>
<td>The following employability skills are an integral part of the delivery of this unit. They include: communication; teamwork; problem solving; initiative and enterprise; planning and organising; self-management; learning; and technology.</td>
</tr>
<tr>
<td>Pre/co-requisite units</td>
<td>Nil</td>
</tr>
<tr>
<td>Application</td>
<td>This unit applies to support roles in the non-trade fields in the building industry, particularly related to residential buildings.</td>
</tr>
</tbody>
</table>

Element 1 Identify the need for environmentally responsible housing

1.1 Develop a knowledge of the factors that affect the global and local environments

1.2 Develop a knowledge of the impacts of climate change on buildings

1.3 Identify how energy is used in the construction and operation of a home

Element 2 Identify the main factors that influence thermal performance

2.1 Identify the effect of solar movement and orientation on thermal performance

2.2 Develop an understanding of factors that can affect thermal performance

Element 3 Identify effective solutions to reduce operational energy

3.1 Identify an understanding of the effect of energy use on gas emissions

3.2 Identify the benefits of energy efficient systems in residential buildings

3.3 Identify the benefits of renewable or low greenhouse energy sources
Apply principles of sustainability in residential building practices

Lecturer’s guide

Annex A

Element 4 Identify principles for the sustainable use of water resources

4.1 Identify the *drivers* of environmentally responsible water management

4.2 Identify water reduction principles and practice

4.3 Identify *reuse/recycle* water principles and practice

Element 5 Seek opportunities to contribute to environmental responsibility

5.1 Develop an ability to assess basic thermal performance features of a proposed residential housing project

5.2 Make *suggestions* for improvements and discuss with supervisors and other responsible people

Required skills and knowledge

This describes the essential skills and knowledge and the level required for this unit.

**Essential knowledge**

Understanding of:

- environmental responsibility and the means by which it can be incorporated into design and construction in the residential building sector
- global warming, impact of greenhouse gases and the ways the residential buildings sector can play a role in minimisation of these effects
- environmental and resource hazards, risks and efficiencies associated with the residential buildings sector

**Essential skills**

Ability to:

- recognise options, be innovative and respond to change
- ask relevant questions and seek clarification relating to environmentally sustainable practices and to propose and report on suggested improvements to practices that promote environmental sustainability
- show literacy and numeracy skills to interpret workplace policies, plans and procedures that relate to use of resources, materials and appliances, and the organisation’s environmental sustainability practices
Range statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

| Factors that affect the global and local environments may include: | • minimising environmental impact and risk by means such as: |
| | ◦ reducing resource consumption |
| | ◦ reducing waste |
| | ◦ reducing emissions |
| | ◦ limiting amount of clearing and soil disturbance |
| | ◦ avoiding use of dangerous products |
| | • maximising opportunities to improve construction and permanent operational resources usage by means such as: |
| | ◦ use of renewable materials |
| | ◦ installation of recycling systems |
| | ◦ installation of energy efficient appliances |
| | ◦ installation of clean energy generation equipment |

| Impacts of climate change may include: | • weather patterns |
| | • severe and/or extreme weather events |
| | • season length |
| | • water tables |
| | • sea levels |
| | • atmospheric composition |

| Factors that can affect thermal performance may include: | • properties of products |
| | • insulation |
| | • glazing |
| | • ventilation |
| | • thermal mass |
| | • building size and form |
| | • landscape |
Thermal mass is defined as:

- the capacity of a body to store heat, and:
  - may alternatively be called heat capacity or thermal capacitance
  - is measured by how much heat it takes to raise the body's temperature a set number of degrees i.e. joules per degree

**Drivers may include:**

- scientific data
- scientific reports
- clients
- government agencies
- community responses and attitudes
- environment groups

**Reuse/recycle water principles and practice may include:**

- reuse of grey water
- capture and use of rainwater
- use of stormwater
- use of ground water sources
- associated health issues

**Suggestions may include:**

- ideas and initiatives that may:
  - minimise environmental impacts
  - maximise resource efficiency
  - maximise use of alternative energy sources
  - reduce emissions
  - reduce greenhouse gas emissions
  - reduce waste
  - recycle resources
Evidence guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and Assessment Guidelines for this course.

<table>
<thead>
<tr>
<th>Critical aspects of assessment and evidence required to demonstrate this competency unit:</th>
<th>A person who demonstrates competency in this unit must be able to provide evidence of the ability to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• demonstrate basic knowledge of the need for an environmentally responsible approach to housing</td>
</tr>
<tr>
<td></td>
<td>• identify, read and discuss environmentally sustainable articles and reports in industry publications and the media</td>
</tr>
<tr>
<td></td>
<td>• identify straightforward examples of environmentally responsible improvements that could be incorporated into housing plans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access and equity considerations:</th>
<th>Reasonable adjustment may be made to meet individual learner needs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Context of specific resources for assessment:</td>
<td>This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.</td>
</tr>
<tr>
<td></td>
<td>Assessment of essential underpinning knowledge will usually be conducted in an off-site context.</td>
</tr>
<tr>
<td></td>
<td>Assessment is to comply with relevant regulatory or Australian Standards’ requirements.</td>
</tr>
<tr>
<td></td>
<td>Resource implications for assessment include:</td>
</tr>
<tr>
<td></td>
<td>• an induction procedure and requirement</td>
</tr>
<tr>
<td></td>
<td>• realistic tasks or simulated tasks covering the mandatory task requirements</td>
</tr>
<tr>
<td></td>
<td>• relevant specifications and work instructions</td>
</tr>
<tr>
<td></td>
<td>• tools and equipment appropriate to applying safe work practices</td>
</tr>
<tr>
<td></td>
<td>• support materials appropriate to activity</td>
</tr>
<tr>
<td></td>
<td>• workplace instructions relating to safe working practices and addressing hazards and emergencies</td>
</tr>
<tr>
<td></td>
<td>• material safety data sheets</td>
</tr>
<tr>
<td></td>
<td>• research resources, including industry related systems information.</td>
</tr>
<tr>
<td></td>
<td>Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.</td>
</tr>
</tbody>
</table>
### Method of Assessment:

<table>
<thead>
<tr>
<th>Assessment methods must:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Integrated Framework Training Package</td>
</tr>
<tr>
<td>• include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application</td>
</tr>
<tr>
<td>• reinforce the integration of employability skills with work place tasks and job roles</td>
</tr>
<tr>
<td>• confirm that competency is verified and able to be transferred to other circumstances and environments.</td>
</tr>
</tbody>
</table>

### Validity and Sufficiency of Evidence Requires That:

<table>
<thead>
<tr>
<th>Validity and sufficiency of evidence requires that:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace</td>
</tr>
<tr>
<td>• where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice. A decision on competency should only be taken at the point when the assessor has complete confidence in the person’s demonstrated ability and applied knowledge</td>
</tr>
<tr>
<td>• all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.</td>
</tr>
</tbody>
</table>

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.
Annex B – Delivery plan

Delivery plan

The following notes will help you to prepare for the delivery of this unit’s content.

The learner’s guide is a required resource for all sessions. In addition, each session may require specific resources (see below), while some will share resources over a number of weeks’ delivery.

This delivery strategy is not intended to be the only way the unit content could be delivered. Delivery methods may vary depending on local, regional and/or organisational requirements.

Given that learners in this unit are likely to lack experience of any of this content, you will have to guide them through the content on most occasions. However, learners should also be encouraged to find their own answers to questions so as to develop their knowledge of where information can be sourced, even if they don’t have any background in the residential building industry at all.

Note: This delivery plan is based on 15 x two-hour sessions. A different session length or number of sessions will require adjustments to the plan.

<table>
<thead>
<tr>
<th>Session</th>
<th>Performance criteria</th>
<th>Guide</th>
<th>Resources</th>
</tr>
</thead>
</table>
| 1       | 1.1                  | Course and unit overview  
Section 1 – Global and local environments  
• The earth’s atmosphere  
• Greenhouse gases  
• Global warming | Computer and internet |
| 2       | 1.2                  | Section 2 – Impact of climate change on buildings  
• What is climate change? | Computer and internet  
‘Your Home Tech Manual’ (online)  
BCA |
<table>
<thead>
<tr>
<th>Session</th>
<th>Performance criteria</th>
<th>Guide</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1.3 3.1</td>
<td>Section 3 – Energy use in the construction and operation of a home</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• What is embodied energy?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assessing embodied energy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Energy usage in the operation of a house</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Greenhouse gas emissions</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.1, 1.2 3.1</td>
<td>In-class research</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduce Assessment 1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2.1 2.2</td>
<td>Section 4 – Climate zones</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td>6</td>
<td>2.1, 2.2</td>
<td>Section 5 – Solar movement</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Orientation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Assessment 1 due</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2.1, 2.2</td>
<td>Section 6 – Thermal performance</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• What is thermal mass?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Thermal properties of building materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduce Assessment 2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2.1, 2.2</td>
<td>Section 6 (continued)</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Factors affecting thermal performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Insulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>◦ Microclimates</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>5.1</td>
<td>Section 6 (continued)</td>
<td>Computer and internet ‘Your Home Tech Manual’ (online)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assessing basic thermal performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suggesting improvements</td>
<td></td>
</tr>
<tr>
<td>Session</td>
<td>Performance criteria</td>
<td>Guide</td>
<td>Resources</td>
</tr>
<tr>
<td>---------</td>
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</tr>
</tbody>
</table>
| 10      | 5.2                  | Section 7 – Energy efficiency  
• Heating water  
• Lighting  
  ◦ light bulbs  
  – Power usage of light bulbs  
• Heating and cooling rooms  
• Selecting white goods | Computer and internet  
‘Your Home Tech Manual’ (online) |
| 11      | 3.2                  | Section 7 (continued)  
• Energy-efficient systems  
  ◦ Renewable energy | Computer and internet  
‘Your Home Tech Manual’ (online) |
| 12      | 4.1, 4.2, 4.3        | Section 8 – Water management  
• Water reduction principles and practice  
  ◦ Toilets  
  ◦ Showers  
  ◦ The garden | Computer and internet  
‘Your Home Tech Manual’ (online)  
Water corporation – online |
| 13      | 4.3                  | Section 8 (continued)  
• Water reuse/recycle principles and practice | Computer and internet  
‘Your Home Tech Manual’ (online)  
Water Corporation (online) |
| 14      | All                  | Section 9 – Class presentation  
**Assessment 3 – House plan: part 2 due** | Computer and internet |
| 15      | All                  | Section 10 – Summary and evaluation | |
## Annex C – Assessment plan

<table>
<thead>
<tr>
<th>Due</th>
<th>Assessment</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 6</td>
<td><strong>Assessment 1 – Research assignment</strong></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>This assessment involves research on global warming and its contributing factors. Learners will then identify changes that can be made to reduce the energy cost of construction. Discuss the main cause of global warming and three contributing factors to this cause.</td>
<td></td>
</tr>
<tr>
<td>Session 11</td>
<td><strong>Assessment 2 – House plan: part 1</strong></td>
<td>1, 2, 5</td>
</tr>
<tr>
<td></td>
<td>In this assessment learners will identify the effects of solar movement on a building, consider its basic thermal mass principles, and make design suggestions to improve the building’s energy performance.</td>
<td></td>
</tr>
<tr>
<td>Session 14</td>
<td><strong>Assessment 3 – House plan: part 2</strong></td>
<td>1, 3, 4, 5</td>
</tr>
<tr>
<td></td>
<td>For this third assessment, learners are required to incorporate energy efficient solutions and water saving principles into the design of the house.</td>
<td></td>
</tr>
</tbody>
</table>

Suggestions as to the kind of information required for Assessment 2 are provided on the following pages.
Apply principles of sustainability in residential building practices

Lecturer’s guide

This is an example of the type of information that should be added to the drawing in Assessment 2. It is recommended to use different colours to add clarity to the drawing.

Thermal mass – Concrete slab on ground with tiles to the informal living areas to gain solar access and store energy, cavity brick walls and plastered brick internal walls, shading to alfresco
For Assessment 2, learners need to add information and note why they are placing the items there, ie:

- hot water system – solar = reducing power bills
- rainwater tank for recycling rainwater on to gardens.

Learners can add to the previous assignment or do this as an overlay. They need to add items and notes such as:

- LED and compact fluorescent lighting
- energy efficient appliances
- water efficient appliances
- water efficient taps, showerheads.
Apply principles of sustainability in residential building practices
Lecturer’s guide
Annex D – Assessments
Apply principles of sustainability in residential building practices
Lecturer’s guide
Assessment 1 – Research assignment

Introduction

You are required to research and identify the main points relating to climate change and how it affects residential building practices.

Requirements

Research and answer the following questions. You must answer the questions in your own words.

You’re encouraged to include any charts, diagrams etc that will support your answers. All work must be referenced, acknowledging its source and author. You should aim to have between half a page and a page of information in total, plus supporting pictures and diagrams.

Specifically, you must:

1. provide information on the main cause of global warming and three contributing factors to this cause
2. list and discuss three changes that can be made to our houses to reduce construction energy cost (embodied energy) and greenhouse gas emissions. Indicate environmental and resource hazards, risks and efficiencies that may be associated with these changes.

Assignment format

All documents are to be A4 in size, and submitted in an appropriate file with a cover sheet for assessment. The submission must include the marking guide at Annex E.

All information is to be correctly referenced to its origin. You must state the publication (or website), author, and page references.
Apply principles of sustainability in residential building practices
Lecturer's guide

Annex D
30013

Apply principles of sustainability in residential building practices

Assessment 1 – Research assignment

Name ________________________________ Date ____________

I have received feedback on this assessment.

Signature ______________________________ Date ____________

Assessor’s initials
Assessment 2 – House plan: part 1

Introduction

You’re required to identify effects of solar movement on a building and basic thermal mass principles.

Requirements

1. Identify the best orientation for the home, based on the Perth area. Indicate on the plan the following items:
   1.1 north point
   1.2 direction of cooling breezes, hot breezes
   1.3 winter sun: direction and angle
   1.4 summer sun: direction and angle.

2. 2.1 Identify and mark on the plan the best locations for thermal mass.
    2.2 Suggest a suitable material and finish.
    2.3 Note the reasons for your selection.

3. Indicate on the external walls, the best position for windows and sliding doors. Note the reasons for the placement.

4. Indicate suggested eave overhangs and shade devices on the plan. Note how these may affect the thermal mass.

Assignment format

Submit the plan in an appropriate file with a cover sheet for assessment. The submission must include the marking guide at Annex E.

Any references you use to back up your decisions must be referenced correctly.
Apply principles of sustainability in residential building practices
Lecturer’s guide
The house plan
Apply principles of sustainability in residential building practices
Lecturer’s guide
30013

Apply principles of sustainability in residential building practices

Assessment 2 – House plan: part 1

Name ______________________________ Date ______________

I have received feedback on this assessment.

Signature __________________________ Date ______________

Assessor’s initials
Apply principles of sustainability in residential building practices
Lecturer’s guide
Assessment 3 – House plan: part 2

Introduction

Using the same floor plan as in Assessment 2, identify and list on the attached plan where you could incorporate energy efficient solutions and water reducing solutions.

Requirements

Mark on the attached plan, using sketches and notes, where you would implement energy and water saving principles. Make a note next to each item why you are recommending it and what benefits you think it will add to the home.

You need to consider the following items as a minimum:

1. energy-efficient solutions
   1.1 hot water system
   1.2 lighting
   1.3 appliances

2. water-efficient solutions
   2.1 water-reducing systems
   2.2 taps
   2.3 reuse water/recycling principles
   2.4 collection
   2.5 garden
   2.6 appliances.

3. Identify two drivers for environmentally responsible water management. Write a paragraph to explain each driver.

Assignment format

Submit the plan in an appropriate file with a cover sheet for assessment. The submission must include the marking guide at Annex E.

Any references you use to back up your decisions must be referenced correctly.
Apply principles of sustainability in residential building practices
Lecturer’s guide
The house plan
Apply principles of sustainability in residential building practices
Lecturer's guide
30013

Apply principles of sustainability in residential building practices

Assessment 3 – House plan: part 2

Name ________________________________ Date _____________

I have received feedback on this assessment.

Signature ______________________________ Date _____________

Assessor’s initials
## Annex E – Assessment guide

<table>
<thead>
<tr>
<th>Unit name</th>
<th>National ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply principles of sustainability in residential building practices</td>
<td>30013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment 1</th>
<th>Assessment 2</th>
<th>Assessment 3</th>
</tr>
</thead>
</table>

### Element 1 Identify the need for environmentally responsible housing

| 1.1 Develop a knowledge of the factors that affect the global and local environments | Q1          |
| 1.2 Develop a knowledge of the impacts of climate change on buildings               | Q2          |
| 1.3 Identify how energy is used in the construction and operation of a home       | Q2          |

### Element 2 Identify the main factors that influence thermal performance

| 2.1 Identify the effect of solar movement and orientation on thermal performance   | Q1, Q3, Q4  |
| 2.2 Develop an understanding of factors that can affect thermal performance       | Q2, Q3, Q4  |

### Element 3 Identify effective solutions to reduce operational energy

| 3.1 Identify an understanding of the effect of energy use on gas emissions        | Q1          |
| 3.2 Identify the benefits of energy efficient systems in residential buildings   | Q1          |
| 3.3 Identify the benefits of renewable or low greenhouse energy sources          | Q1          |
## Element 4 Identify principles for the sustainable use of water resources

<table>
<thead>
<tr>
<th></th>
<th>Assessment 1</th>
<th>Assessment 2</th>
<th>Assessment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Identify the drivers of environmentally responsible water management</td>
<td></td>
<td></td>
<td>Q3</td>
</tr>
<tr>
<td>4.2 Identify water reduction principles and practice</td>
<td></td>
<td></td>
<td>Q2</td>
</tr>
<tr>
<td>4.3 Identify reuse/recycle water principles and practice</td>
<td></td>
<td></td>
<td>Q2.3, Q2.4</td>
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</tbody>
</table>

## Element 5 Seek opportunities to contribute to environmental responsibility

<table>
<thead>
<tr>
<th></th>
<th>Assessment 1</th>
<th>Assessment 2</th>
<th>Assessment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Develop an ability to assess basic thermal performance features of a proposed residential housing project</td>
<td></td>
<td></td>
<td>Q2</td>
</tr>
<tr>
<td>5.2 Make suggestions for improvements and discuss with supervisors and other responsible people</td>
<td></td>
<td></td>
<td>Q2, Q3, Q4</td>
</tr>
</tbody>
</table>
### Essential knowledge

**Understanding of:**

<table>
<thead>
<tr>
<th>Environmental responsibility and the means by which it can be incorporated into design and construction in the residential building sector</th>
<th>Q2</th>
<th>Q1–Q4</th>
<th>Q1, Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global warning, impact of greenhouse gases and the ways the residential buildings sector can play a role in minimisation of these effects</td>
<td>Q1, Q2</td>
<td></td>
<td>Q3</td>
</tr>
<tr>
<td>Environmental and resource hazards, risks and efficiencies associated with the residential buildings sector</td>
<td>Q2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Essential skills

**Ability to:**

<table>
<thead>
<tr>
<th>Recognise options, be innovative and respond to change</th>
<th>Q2</th>
<th>Q1–Q4</th>
<th>Q1, Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask relevant questions and seek clarification relating to environmentally sustainable practices and to propose and report on suggested improvements to practices that promote environmental sustainability</td>
<td>Q2</td>
<td>Q1–Q4</td>
<td>Q1, Q2</td>
</tr>
<tr>
<td>Show literacy and numeracy skills to interpret workplace policies, plans and procedures that relate to use of resources, materials and applications, and the organisation’s environmental sustainability practices</td>
<td>Q1–Q2</td>
<td>Q1–Q4</td>
<td>Q1–Q3</td>
</tr>
</tbody>
</table>
### Critical aspects of evidence

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

<table>
<thead>
<tr>
<th>Demonstrate basic knowledge of the need for an environmentally responsible approach to housing</th>
<th>Q1–Q2</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify, read and discuss environmentally sustainable articles and reports in industry publications and the media</td>
<td>Q1</td>
<td>Q1–Q3</td>
</tr>
<tr>
<td>Identify straight forward examples of environmentally responsible improvements that could be incorporated into housing plans</td>
<td>Q2</td>
<td>Q1–Q4</td>
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</tbody>
</table>

### Dimensions of competency

<table>
<thead>
<tr>
<th>Task skills</th>
<th>Q1</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task management skills</td>
<td>Q2</td>
<td>Q1–Q4</td>
</tr>
<tr>
<td>Task contingency skills</td>
<td>Q2</td>
<td>Q1–Q4</td>
</tr>
<tr>
<td>Job role/Work environment skills</td>
<td>Q2</td>
<td>Q1–Q4</td>
</tr>
</tbody>
</table>
Annex F – Marking guides
Assessment 1 – Research assignment – Marking guide

Instructions for learners

Tick the boxes on the left once you are happy with that aspect of your assessment and before you submit it.

Instructions for assessors

Place a cross in the boxes on the right only if the item is not acceptable or not competent.

- Document folder submitted on time .................................................................
  The requested documents have been submitted –
  - A discussion of the main causes of global warming and three contributing factors to the cause .................................................................
  - A list and discussion of three changes that can be made to our houses to reduce construction energy cost (embodied energy) and greenhouse gas emissions …
  - Indicate environmental and resource hazards, risks and efficiencies that may be associated with these changes ...........................................

- Appropriate text is written ................................................................................
- Appropriate diagrams, tables, charts are included ............................................
- Documents comply with the required submission format .................................
Note: Your assessor may provide specific notes on your submission as an alternative to completing the feedback section below.

Feedback: ...........................................................................................................................................
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Assessment successfully completed: Yes / No
# Assessment 2 – House plan: part 1 – Marking guide

<table>
<thead>
<tr>
<th>Learner to complete</th>
<th>Assessor to complete</th>
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<tbody>
<tr>
<td>Name:</td>
<td>Assessor:</td>
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<td></td>
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<tr>
<td>1st submission date:</td>
<td>Assessment: (circle)</td>
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<td>Competent</td>
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<td>Resubmit</td>
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</table>

**Instructions for learners**
Tick the boxes on the left once you are happy with that aspect of your assessment and before you submit it.

**Instructions for assessors**
Place a cross in the boxes on the right only if the item is not acceptable or not competent.

- Document folder submitted on time .................................................................

The house plan:

- north point noted on plan .................................................................
- direction of cooling breezes, hot breezes shown ........................................
- winter sun direction and angle shown/noted ..............................................
- summer sun direction and angle shown/noted ..............................................
- best location for thermal mass shown/noted ..............................................
- suitable material for thermal mass noted ................................................
- reasons for selection noted .................................................................
- position for doors and windows shown/noted ...........................................
- eave overhangs, shade devices indicated .................................................
- how the eave and shade devices may impact on thermal mass noted .........

Appropriate text is written to explain each item ...........................................

Documents comply with the required submission format ............................
Note: Your assessor may provide specific notes on your submission as an alternative to completing the feedback section below.

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Assessment successfully completed:  Yes  /  No
Assessment 3 – House plan: part 2 – Marking guide

Instructions for learners
Tick the boxes on the left once you are happy with that aspect of your assessment and before you submit it.

Instructions for assessors
Place a cross in the boxes on the right only if the item is not acceptable or not competent.

Learner to complete

Name:

Assessor:

Date:

1st submission date:

Assessment: (circle)

2nd submission due date: (if required)

Assessor to complete

Document folder submitted on time .................................................................

The plan has the following items:

- energy-efficient solutions shown .................................................................
- hot water system – type and location shown ................................................
- lighting – type and number of lights shown ................................................
- appliances – type of appliance and star rating shown ................................
- others ............................................................................................................

Water saving principles shown on the plan:

- water reducing solutions shown .................................................................
- taps – WELS rating shown ...........................................................................
- reuse – types of systems/locations and water reuse shown ..........................
- collection – location/collection area/water reuse shown ..............................
- garden – finishes (hard landscaping), plants (soft landscaping) shown ........
- appliances shown ......................................................................................
- two drivers for environmentally responsible water management explained ...

Appropriate text and research material is provided to explain each item ..........

Documents comply with the required submission format ..................................
Note: Your assessor may provide specific notes on your submission as an alternative to completing the feedback section below.

Feedback: ...........................................................................................................................................
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Assessment successfully completed: Yes / No
APPLY PRINCIPLES OF SUSTAINABILITY IN RESIDENTIAL BUILDING PRACTICES
CERTIFICATE II IN BUILDING AND CONSTRUCTION
(PATHWAY – PARAPROFESSIONAL)
30013

LECTURER’S GUIDE

DESCRIPTION
This lecturer’s guide has been written to support the delivery and assessment of the unit 30013 Apply principles of sustainability in residential building practices from Certificate II in Building and Construction (Pathway – Paraprofessional). The course, and the learner’s guide, focus on the skills and knowledge required as a paraprofessional in the residential building industry.

The lecturer’s guide provides you with the following resources and tools:

• unit delivery strategy
• unit delivery plan
• assessment plan
• assessment instruments and marking keys
• assessment matrix.

Support is also provided through highlighting of any pre-delivery preparation required, and of any specific requirements for each delivery session and assessment.

EDITION
Edition 1, 2012
Unit and course codes updated 2014

COURSE/QUALIFICATION
Certificate II in Building and Construction (Pathway – Paraprofessional)

UNIT
30013 Apply principles of sustainability in residential building practices

RELATED PRODUCTS
BC1930: Apply principles of sustainability in residential building practices – learner’s guide.

This resource is one of a series that covers all 12 units of the Certificate II in Building and Construction (Pathway – Paraprofessional) qualification. Please refer to our product catalogue for more information.

Government of Western Australia
Department of Training and Workforce Development

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