

Unit 25: Construct Horizontal Landscape Surfaces

Unit code:	A/600/9955
QCF Level 3:	BTEC National
Credit value:	10
Guided learning hours:	60

● Aim and purpose

This unit aims to provide learners with an understanding of how to construct horizontal landscape surfaces and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

● Unit introduction

The landscape sector is a major employer within the horticultural industry and employees need to have a wide range of skills and a sound knowledge of construction techniques as well as good horticultural skills. People working in the landscape industry must also have excellent organisational and time management skills to carry out complex and potentially hazardous landscape projects efficiently and effectively.

This unit will help learners develop a sound knowledge of the material and technical requirements for constructing horizontal surfaces and steps. The unit includes the practical skills required for setting out lines and levels and constructing a variety of surface and step types using a range of landscape materials. Learners will also develop an understanding of the correct technical terminology used when specifying construction and ordering materials.

Hard landscaping involves a number of hazards to the landscaper, the public and the environment (for example the caustic properties of cement and the dangers surrounding excavations and handling tools and equipment). Health and safety and environmental protection will be emphasised throughout the unit. Learners will appreciate the consequences of their work and understand and adopt safe working practices.

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to form ground profiles for landscape works
- 2 Understand the formation of ground profiles for landscape works
- 3 Be able to construct horizontal surfaces and simple steps
- 4 Understand the maintenance of horizontal surfaces and simple steps.

Unit content

1 Be able to form ground profiles for landscape works

Setting out: right angles; geometric shapes; informal shapes; establish new levels and falls for the excavation of hard surfaces and steps; establishing level, ground profiles and datum points using a range of equipment, eg manual methods (spirit level and boning rods), mechanical methods (automatic, optical or laser levels); health and safety; personal protective equipment (PPE)

2 Understand the formation of ground profiles for landscape works

Skills and techniques: establishing new levels, datum points, longitudinal and cross falls for paving; how this information is interpreted on site within a landscape project; establishing changes in levels within the construction of simple steps; the human and material requirements when calculating treads and risers; how this information is interpreted on site before excavation and during construction; health and safety

3 Be able to construct horizontal surfaces and simple steps

Construction of horizontal surfaces: working from a base plan; excavation to ground profiles; establishment of the formation layer; introduction and consolidation of sub-base material; establishing laying course; introduction of surface layers and edge restraints as required for rigid and flexible surfaces; health and safety requirements; risk assessments; PPE

Construction of simple steps: working from prepared plan and cross sectional drawings; selecting appropriate materials in keeping with site requirements (eg timber, brick concrete, paving flag); using the correct construction and component terminology and techniques; health and safety requirements; risk assessments; PPE

4 Understand the maintenance of horizontal surfaces and simple steps

Constructional techniques of horizontal surfaces: technical terminology: surfaces (rigid and flexible); specifications and ergonomic requirements for horizontal surface construction from excavation and establishment of the formation layer through to a range of surface finishes; edge restraints.

Constructional techniques of simple steps: technical terminology; the specification required for step design and implementation using different landscape materials; evaluating ergonomic and user-related restrictions on the specification and dimensioning of simple steps; using ergonomic data to establish dimensions for treads, risers and path width

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 set out a site from a plan	M1 assess the accuracy of different methods of setting out from a plan	D1 evaluate the construction techniques and specifications used in the construction of horizontal surfaces and steps
P2 establish a suitable sub-base and base according to specifications		
P3 describe construction standards and regulations for operations involving foundations [IE]	M2 evaluate different hard surfaces with reference to their maintenance requirements	
P4 evaluate the range of layers and materials and their uses		
P5 identify potential sources of waste, adverse environmental impact and methods to minimise and optimise these [CT]		
P6 explain typical site problems and contingencies for dealing with them		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P7 construct rigid hard surfaces safely [TW]		D2 evaluate the materials used in the construction of horizontal surfaces and steps, including, bricks, block paving, concrete, tarmac, flags and paviers.
P8 construct flexible hard surfaces safely [TW]		
P9 set out formwork and construct simple steps [TW, EP]		
P10 describe the legal requirements for use of steps, including the dimensions of risers and treads		
P11 summarise the estimation of run off and drainage requirement and where to source expert advice		
P12 evaluate the effectiveness of a range of maintenance operations.	M3 discuss the security of a site and protection of work until it is fit for use.	

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
------------	--	---	--

Essential guidance for tutors

Delivery

Tutors are encouraged to use a wide range of techniques in delivering this unit and lectures, discussions, site visits, supervised landscape practicals should all be used to stimulate and educate learners. Learners should also carry out independent study, internet and/or library-based research, and reflect on their industry experience.

Learners must have the opportunity to carry out setting out and construction techniques, individually or as part of a small construction team. At all time it is essential that tutors stress the importance of sound construction techniques, environment management and the need to manage tasks using safe and legal methods.

Health and safety issues relating to working with tools and equipment must be stressed and reinforced regularly, and risk assessments must be undertaken before any practical activities. Adequate PPE must be provided and used following the production of suitable risk assessments.

Learning outcomes 1 and 2 cover the understanding of and practical skills in setting out horizontal surfaces and simple steps before landscape work begins. Learners need to be proficient at marking out lines, levels, falls and level changes for paving and step construction. This will be carried out using practical methods such as datum points and profiles.

For learning outcome 3, learners will practise using construction skills in relation to horizontal surfaces and simple steps within landscape projects. Learners will have the opportunity to develop the range of practical skills and experience required for employment in the landscape sector.

Learning outcome 4 investigates the technical knowledge required for the specification, planning and construction of horizontal surfaces and simple steps within landscape projects.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment

Assignment 1: Practical Activities (P1, P2, P7, P8, M1)

Tutor introduces the practical activities and assignment brief.

Practical group activity 1: Flexible and Ridged Paving (P1, P2, P7, P8, M1)

Marking out and construction exercise for a flexible and ridged horizontal surface; learners develop the ability to demonstrate the basic skills and techniques for this landscape activity.

Topic and suggested assignments/activities and/assessment

Practical group activity 2; Practical – Simple Step Construction (P9, P10)

Marking out and construction skills for a set of simple steps; learners develop the ability to demonstrate the skills and techniques for this landscape activity.

Theory session: introduction to the range of landscape materials, terms and their construction specification.

Assignment 2: Material and Construction Evaluation (P3, P6, M2, D1, D2).

Review and evaluation of landscape surface materials and their constructional requirements. Tutor introduces the assignment brief.

Theory session: maintenance requirements for landscape surfaces and simple steps, this may be supported with site visits or practical sessions.

Assignment 3: Site Management Report (P4, P5, P11, P12, M3).

A management plan for a given landscape project including aspects of health and safety, environmental impacts and maintenance requirements. Tutor introduces the assignment brief.

Theory session: discussion workshop on environmental impact of landscape activities.

Site visits to landscape projects.

Provide feedback to individuals or construction teams, identifying strengths and areas for improvement.

Learner investigation into materials and techniques.

Unit review.

Assessment

For P1, learners must undertake practical activities involving the marking out of line and level, of horizontal surfaces and simple steps using profiles and datum points. Learners must interpret dimensions from a given scale plan and set out features accurately on existing levels. Tutors should identify the scale plan or agree it through discussion with learners. P1 is linked to M1 where learners assess the accuracy of the methods used to set out sites from a plan.

P2 requires learners to prepare a sub-base before construction of a given landscape surface. Tutors should identify the site or agree it through discussion with learners. Where possible, to ensure assessment is fair the size and complexity of the task should be the same for all learners.

P3 and P4 require learners to investigate constructional specifications, techniques, regulation and standards and landscape materials used in the construction of hard surfaces and steps. Evidence could be in the form of a landscape surface construction report or presentation. P4 may also be linked with D1 and D2 which require an in-depth evaluation of the materials and technical specifications for landscape construction.

For P5, learners are required to identify potential sources of waste and the environmental impact of using natural resource in relation to landscape construction. This must include implications of natural resources being extracted and processed for use in the landscape. P5 and P12 may be linked to P3 to form a management and maintenance assignment covering many aspects of site planning, health and safety and sustainability issues.

P7 and P8 could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities would be photographs and observation records completed by learners and the tutor. P1 and P2 may be linked to P7 to allow a transition of skills development and assessment during the practical activities.

P9 would also provide an opportunity for developing and assessing P1 and P2. By using structured questioning at the start of the practical session, or the completion of a questionnaire relating to the legal and technical aspects of step construction, it would be possible to link P10 to this practical activity.

For P11, learners should summarise the drainage requirements for a range of surfaces, including the calculation of falls and where to source expert advice. Evidence for this could be related to that collected for P3 and P4.

For M1, learners must evaluate the accuracy of the methods they have used to set out the site. They should comment on ways of improving the accuracy and on alternative methods available.

M2 requires learners to evaluate the maintenance requirements of a range of surface features and finishes, making appropriate recommendations for effective improvement. Tutors should identify the surface features or agree them through discussion with learners. This could be based on the features constructed for P7, P8 and P9. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners.

M3 requires learners to discuss issues relating to the security of a landscape under construction and methods of protecting the work until it is fit for use. This may be linked to a case study within industry or learners' practical projects but must include current health and safety at work legislation and established good practice.

To achieve a distinction grade, learners must meet all of the pass and merit grade criteria and the two distinction grade criteria.

D1 requires learners to evaluate the construction processes of selected landscape features, making appropriate recommendations for material selection and specification. Tutors should identify the range of surface features or agree them through discussion with learners. This could be based on the features constructed for P7, P8 and P9. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners. This should include evaluation of the materials used, the construction process and final product. Human requirements for landscape features and the ergonomics of features should be discussed. Proposals for any amendments or snagging should be submitted as evidence

D2 requires learners to evaluate selected landscape materials. Tutors should identify this range or agree them through discussion with learners. This could be linked to the features constructed for P7, P8 and P9. Where possible, to ensure assessment is fair the number of materials selected should be the same for all learners.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P7, P8, M1	Flexible and Ridged Paving	Mark out and construct, individually or within a team, a flexible horizontal surface incorporating edge restraints. Mark out and construct, individually or within a team, a ridged horizontal surface.	Practical.
P9, P10	Practical – Simple Step Construction	Mark out and construct, individually or within a team, a simple set of steps incorporating three risers or more.	Practical.

Criteria covered	Assignment title	Scenario	Assessment method
P3, P6, M2, D1, D2	Material and Construction Evaluation	Produce a detailed technical review of landscape materials suitable for horizontal surface and step construction. Learners will explain the expected constructional techniques and maintenance requirements for each material.	Portfolio or project.
P4, P5, P11, P12, M3	Site Management Report	Produce a management plan for a given landscape project including health and safety and environmental implications.	Written report.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Land-based sector suite. This unit has particular links with:

Level 2	Level 3
Construct Landscape Foundations and Surfaces	L23 Prepare sites for landscape construction and installation L24 Construct hard landscape components CU20 Maintain and repair structures and surfaces
Setting Out from a Plan	Understand the Principles and Practices of Landscape and Garden Design
	Construct and Maintain Timber Landscape Features
	Construct and Maintain Decorative Landscape Features

Essential resources

Learners will need access to appropriate facilities, tools and landscape materials in order to undertake the practical activities. Facilities may be within a workshop environment or on actual landscape projects. Personal protective equipment, site safety signage and equipment must be available and used throughout the practical activities.

Employer engagement and vocational contexts

This unit focuses on the practical aspects of horizontal surface and step construction within a landscape setting and will give learners the background knowledge relating to a variety of construction skills, techniques, health and safety and legislation requirements. Centres are encouraged to create and develop links with local landscape contractors, architects and local authorities as they may be helpful in providing guest speakers, workshops or enabling visits to see landscape construction in action.

Indicative reading for learners

Textbooks

Blake J – *Introduction to Landscape Design and Construction* (Gower Publishing, 1999) ISBN 978-0566077692

Fortlage C and Phillips E – *Landscape Construction: Roads, Paving and Drainage, Volume 2* (Ashgate Publishing group, 1996) ISBN 978-0566090424

Littlewood M – *Landscape Detailing: Surfaces Volume 2* (Architectural Press, 1993) ISBN 978-0750613033

Littlewood M – *Landscape Detailing: Structures, 3rd Edition* (Architectural Press, 1997) ISBN 0750623209

Journals

Horticulture Week

The Landscaper

Websites

www.ced.ltd.uk

Civil Engineering Developments Limited

www.hse.gov.uk

Health and Safety Executive

www.marshalls.co.uk

Marshalls

www.pavingexpert.com

Pavingexpert

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	researching landscape materials and their specifications. researching current legislation regarding health and safety, environmental or sustainability issues
Creative thinkers	applying techniques and knowledge while problem solving management issues relating to environmental impact and maintenance requirements
Team workers	undertaking the practical activities of marking out horizontal surface and step construction
Effective participators	participating in practical team activities and applying the techniques and skills learned from previous activities.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Team workers	analysing own performance while participating in team practicals such as marking out or excavation for sub-base, identifying strengths and areas of improvement
Self-managers	meeting assignment deadlines and participating in practical activities within agreed timeframes.

● Functional Skills — Level 2

Skill	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	researching information, using a variety of sources collating and presenting information such as text with images, graphs and numerical data
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records. 	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	calculating quantities of materials for paving exercises establishing ratios and falls within marking out exercises using optical levelling equipment for establishing datum points and levels solving mathematical problems involving ergonomic data for step construction calculating riser and tread sizes for step construction

Skill	When learners are ...
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	reading and summarising manufacturers' information on landscape paving products interacting within and contributing to the practical activities, listening and acting on instruction.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	