

SQA Advanced Unit Specification

General information

Unit title: Architectural CADT: Landscape Design (SCQF level 8)

Unit code: HR7F 48

Superclass: TD

Publication date: August 2017

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to enable learners to develop the skills and knowledge required in the electronic production of 3-dimensional complex solutions and 2-dimensional CAD drawings for real-world landscape environments using sophisticated computer-aided-design software packages.

Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Evaluate a brief and produce complex 3-dimensional topographical CAD solutions to satisfy the brief.
- 2 Manipulate, edit and modify the topographical solutions created in Outcome 1 in response to given design data.
- 3 Evaluate a topographical environment and produce a range of hard landscaping features appropriate to the brief, using sophisticated computer-aided design software packages.
- 4 Evaluate a topographical environment and produce a range of soft landscaping features appropriate to the brief, using sophisticated computer-aided design software packages.

Credit points and level

1 SQA Advanced Credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

While access to this Unit is at the discretion of the centre, this Unit advances CAD competencies with new knowledge and skills and it would be beneficial if learners have a range of underpinning CAD skills prior to the commencement of this Unit. Such experience may be evidenced by possession of the Units HR6P 47 *Architectural CADT: Principles and Practice*, HR70 47 *Architectural CADT: Construction Detailing* or similar, equivalent Units. It would also be beneficial if learners have prior knowledge and skills in the area of design aesthetics, methodology, or similar. Such experience may be evidenced by possession of the Units HR6Y 47 *Architecture: Form, Order and Composition*, or similar, equivalent Units.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

SQA Advanced Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Evaluate a brief and produce complex 3-dimensional topographical CAD solutions to satisfy the brief.

Knowledge and/or skills

- ◆ design brief
- ◆ source data
- ◆ topography creation
- ◆ topographic articulation
- ◆ CAD (topographic) modelling skills
- ◆ CAD draughting skills
- ◆ CAD presentation tools
- ◆ CAD standards

Outcome 2

Manipulate, edit and modify the topographical solutions created in Outcome 1 in response to given design data.

Knowledge and/or skills

- ◆ point edits
- ◆ additive edits
- ◆ subtractive edits
- ◆ division of topography
- ◆ topography properties
- ◆ CAD (topographic) editing skills
- ◆ CAD draughting skills
- ◆ CAD presentation tools
- ◆ CAD standards

Outcome 3

Evaluate a topographical environment and produce a range of hard landscaping features appropriate to the brief, using sophisticated computer-aided-design software packages.

Knowledge and/or skills

- ◆ feature types
- ◆ feature proportions
- ◆ feature siting

- ◆ feature impact to site and topography
- ◆ feature CAD modelling:
 - scale and proportion
 - sophistication
 - materials and finishes
 - surface expression
 - durability and maintenance
- ◆ CAD presentation tools
- ◆ CAD standards

Outcome 4

Evaluate a topographical environment and produce a range of soft landscaping features appropriate to the brief, using sophisticated computer-aided-design software packages.

Knowledge and/or skills

- ◆ planting types:
 - appropriateness to brief
 - variety
 - species
- ◆ planting function
- ◆ planting scale
- ◆ planting aesthetics
- ◆ planting organisation
- ◆ planting layout
- ◆ CAD design skills
- ◆ CAD presentation tools
- ◆ CAD standards

Evidence Requirements for this Unit

Outcome 1

Learners will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can produce complex 3-dimensional CAD solutions which are an appropriate response to the given design brief. Assessors will provide the design brief, which must provide details on the client type, environment type, and site and location influences.

Learners must evaluate and manipulate the following sources of data when producing the 3-dimensional topographical CAD solutions: photographic, terrain definition, contouring, point data information, and site extents.

Learners must provide evidence of the topography creation from either imported data sources **or** user generated data.

Learners must demonstrate clear topographic articulation, expressive of colour, texture, 3-dimensional visual representation and accuracy.

Learners must prepare finished CAD solutions to agreed standards and generate **at least one** hard-copy plot of the completed topographic solutions to suitable paper sizes (A3 or larger) using appropriate output scales, suitably annotated with supporting notes.

The application of CAD draughting and design tools, the use of CAD standards and CAD presentation tools must be of typical industry quality requirements and be consistently applied at all times.

Assessment will be open-book, undertaken in controlled, supervised conditions. Learners will be allowed access to course material, textbooks or the Help files associated with the software used in the generation of the solutions.

Outcome 2

Learners will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can manipulate, edit and modify the 3-dimensional topographical CAD solutions from the Outcome 1 activity in response to given design brief parameters. Assessors will provide the design brief parameters, which must provide details on the nature, range and extent of changes required to satisfy the original brief.

Learners must prepare finished CAD solutions to agreed standards and design parameters, and produce finished CAD solutions to satisfy **all of the** knowledge and skills items, and generate **at least one** hard-copy plot of the completed topographic solutions to suitable paper sizes (A3 or larger) using appropriate output scales, suitably annotated with supporting notes.

The application of CAD draughting and design tools, the use of CAD standards and CAD presentation tools must be of typical industry quality requirements and be consistently applied at all times.

Assessment will be open-book, undertaken in controlled, supervised conditions. Learners will be allowed access to course material, textbooks or the Help files associated with the software used in the generation of the solutions.

Outcome 3

Learners will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can evaluate a topographic environment and produce appropriate hand landscaping features for the environment, relative to the design brief parameters set. A **minimum of four feature** type objects must be generated by learners in any assessment occasion.

Learners must prepare finished CAD solutions to agreed standards and design parameters, and produce finished CAD solutions to satisfy **all of the** knowledge and skills items, and generate **at least one** hard-copy plot of the completed topographic environment, displaying the hand landscaping features, to suitable paper sizes (A3 or larger) using appropriate output scales, suitably annotated with supporting notes.

The application of CAD draughting and design tools, the use of CAD standards and CAD presentation tools must be of typical industry quality requirements and be consistently applied at all times.

Assessment will be open-book, undertaken in controlled, supervised conditions. Learners will be allowed access to course material, textbooks or the Help files associated with the software used in the generation of the solutions.

Outcome 4

Learners will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can evaluate a topographic environment and produce appropriate soft landscaping features for the environment, relative to the design brief parameters set.

A **minimum of six planting** type objects must be generated by learners in any assessment occasion.

Learners must prepare finished CAD solutions to agreed standards and design parameters, and produce finished CAD solutions to satisfy **all of the** knowledge and skills items, and generate **at least one** hard-copy plot of the completed topographic environment, displaying the soft landscaping features, to suitable paper sizes (A3 or larger) using appropriate output scales, suitably annotated with supporting notes.

The application of CAD draughting and design tools, the use of CAD standards and CAD presentation tools must be of typical industry quality requirements and be consistently applied at all times.

Assessment will be open-book, undertaken in controlled, supervised conditions. Learners will be allowed access to course material, textbooks or the Help files associated with the software used in the generation of the solutions.

SQA Advanced Unit support notes

Unit title: Architectural CADT: Landscape Design (SCQF level 8)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

The Unit is at SCQF level 8 and has been devised as an additional Unit within the SQA Advanced Diploma in Computer Aided Architectural Design and Technology award. However, this does not preclude the use of the Unit in other awards where award designers feel this to be appropriate.

A suggested range of topics required to introduce the knowledge and/or skills to be covered by centres along with recommendations as to how much time should be spent on each Outcome assessment is provided. This has been done to help lecturers decide what depth of treatment should be given to topics attached to each of the Outcomes.

Guidance on approaches to delivery of this Unit

In all Outcomes the learner should be able to evaluate the range of design criteria and landscape project briefs, as provided by assessor(s) from given briefs, following the knowledge and skills items.

Learners should be encouraged to explore a range of possible solutions. Additional learning from acceptable texts, e-learning environments and other resources should be actively supported. Assessor(s) should make maximum use of visual data in the delivery of all topics. Learners should evaluate the briefs and select the most appropriate medium with which to develop and realise design solutions — no specific software is recommended, though it is anticipated that centres will use industry-standard CAD software, with dedicated topographic tools, or equivalent modelling options, suitable for 3-dimensional landscape drawings and graphics.

At all times, learners are required to illustrate solutions in a clear and coherent manner, typical of professional requirements in industry. Emphasis throughout delivery of the topic should be placed on the professional standards of graphic presentation, reflecting performance criteria of the computer-aided landscape details. Learners will be encouraged to use their own discretion and judgement in the selection of CAD software best suited to both the interrogative study of solutions, recording of elemental data and the production of graphic solutions.

Learners are required to produce primarily 3-dimensional CAD graphics, however, it may be appropriate in certain instances additionally to generate projected elevations or plan views, in 2-dimensional representation to aid illustrative solutions. The 2-dimensional details generated might typically be section views to illustrate changes in topographic, or in terms of planned planting layout schemes. The precise nature of details generated is at the discretion of the centre, but should be driven by original briefs set by the assessor(s) for each assessment event.

At all times, the design criteria should be the governing aspects of learner critical thinking and evaluation, with the resulting CAD details displaying strengths in technical knowledge and fast, practical skills in the communication of these.

A suitable design brief for the landscape project should be provided to learners at the outset of the Unit, and may be in the form of public, private or commercial terrains. Suggested design briefs could be private gardens, modest landscape environs for commercial buildings, or public spaces such as parks, parklands or similar. It is suggested that, if using a larger, parkland type brief, individual learners focus on elements or portions for individual assessment. This may open up possibilities for a group based assessment approach, with learners contributing elements to a larger whole, for example, in the realisation of a golf course landscape, with each learner design one feature hole each. Centres should use their own discretion and contextualise, perhaps to suit the wider framework being taught, or by integration with other Units.

The Unit relies heavily on the use of sophisticated computer-aided solutions throughout, and it is strongly recommended centres use suitable CAD software capable of the assessment tasks.

In **Outcome 1**, learners should be introduced to the complexity of producing point-defined topographic surfaces. It is anticipated that most centres would utilise CAD software which generates topographic data as surface mesh details, though this is not the only possible approach.

Learners should build some familiarity in the reading of topographic information from a wide range of sources, including Ordnance Survey, other cartographic sources, photographs and industry produced CAD site and location drawings.

Learners should be discretely introduced to the appropriate tools and techniques used to generate topographic data, including, but not limited to:

- ◆ importing from other software packages
- ◆ creating manually from provided data
- ◆ importing from external sources, such as Ordnance Survey

and be provided with opportunities to explore and develop skills with structured tutorials in the execution of these approaches.

Learners should be able to complete these graphics and drawings to a professional standard by the further consideration of finishing details to topography in terms of surface finishes (soil, grass, earth or other).

In **Outcome 2**, learners should be introduced to the variety of methods used to edit and manipulate topography in terms of berming, embankment, terracing, stepping, excavation, sloping/grading, alignment or other manipulations appropriate to the resolution of the brief, for example in creating a terraced garden, or a greenside bunker on a golf hole. Point definitions should be explored within the CAD environment, and modified using a variety of techniques, including:

- ◆ 2-dimensional movement
- ◆ 3-dimensional movement
- ◆ copy and array patterns
- ◆ property value changes

Additionally, learners should be considering the basic division of topography in terms of surface expression change, and considering the functions of space management, access and movement within the landscape, and develop considered landscape layout ideas in response to this.

In **Outcome 3**, learners should be introduced to the consideration of hard landscaping features and elements relevant to landscape projects. The selection and design of these elements will at all times, be dictated by the overarching response to the initial design brief, and be relevant to that environment. Elements might include, but not be limited to:

- ◆ walled structures
- ◆ pergola structures
- ◆ screens and fences
- ◆ garden ornamentation and furniture
- ◆ sculptural objects
- ◆ garden/park buildings
- ◆ decking/patio features
- ◆ water features
- ◆ boundary features

Learners would be expected to utilise the most efficacious CAD techniques or tools in the realisation of these elements, where the emphasis should be on visual representation, rather than full technical accuracy of the objects, notwithstanding any of the other knowledge and skills set.

In **Outcome 4**, learners should be introduced to the consideration of soft landscaping features and elements relevant to landscape projects. The selection and design of these elements will at all times, be dictated by the overarching response to the initial design brief, and be relevant to that environment. This Outcome is primarily an exercise in planting design and layout, and learners should be introduced to factors governing the appropriate selection of planting types, species and schemes, including:

- ◆ species consideration:
 - geographic/climatic needs
 - foliage and seasonal change
 - evergreen requirements
 - life cycle (maturation)
- ◆ species consideration:
 - height
 - spread
 - light and shade
 - groundcover requirements
 - windbreak requirements
- ◆ relationship to hard landscaped elements
- ◆ relationship to landscape setting
- ◆ layout:
 - species grouping
 - species organisation
 - succession planting
 - habitat/wildlife encouragement

Learners would be expected to utilise the most efficacious CAD techniques or tools in the realisation of these elements, where the emphasis should be on visual representation, rather

than full technical accuracy of the objects, notwithstanding any of the other knowledge and skills set. Pictorial rendered views should be generated by learners to illustrate aesthetic values and related criteria, and a 2-dimensional planting layout produced to illustrate species arrangement, organisation and relationship to space management and utilisation.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

A suitable brief for a modest landscaping project should be provided by the assessor at the outset of assessment activity, and used throughout all assessment tasks. Assessment for this Unit could be delivered as individual assessment events or could be integrated into one single assessment covering all Outcomes. If assessment is conducted using an integrated approach, it is recommended that the solutions reached and presented be in the form of a holistic portfolio of CAD details and graphics, with clear recommendations. This approach would match very closely to industry practice. Learners should produce the Evidence Requirements using CAD packages and supported by fully annotated and referenced drawings.

Assessment guidelines

Outcome 1

The focus of the assessment should be on the production of graphic evidence in the form of 3-dimensional CAD graphics which demonstrate the learners' grasp of the advanced creation of sophisticated topographic conditions for the assigned landscape project, and their ability to express and communicate these concepts and ideas accurately. The suggested time allocation for assessment activity is two hours.

Learners are provided with a design brief containing data for a specified landscape project and are required to produce the correct topographic details required. The CAD details provided should be clear and effective visually and be supported by extensive and appropriate annotation.

Assessment of this Outcome could be delivered as a stand-alone assessment, with subsequent Outcomes in the Unit using different development brief data. However, it is anticipated that centres use an integrated approach to assessment, by using the same holistic design brief data for all Outcomes, allowing learners to enhance and develop solutions by adding to the results of the Outcome 1 activity with the solutions and details reached in Outcomes 2, 3 and 4.

A checklist could be used to support the Evidence Requirements for each of the knowledge and/or skills required in the Outcome.

Outcome 2

The focus of the assessment should be on the production of graphic evidence in the form of 3-dimensional CAD graphics which demonstrate the learners' grasp of the advanced modification of sophisticated topographic conditions for the assigned landscape project, and

their ability to express and communicate these concepts and ideas accurately. The suggested time allocation for assessment activity is two hours.

Learners could be provided with a design brief containing data for a specified landscape project and are required to produce the correct topographic details required. The CAD details provided should be clear and effective visually and be supported by extensive and appropriate annotation.

A checklist could be used to support the Evidence Requirements for each of the knowledge and/or skills required in the Outcome.

Outcome 3

The focus of the assessment is on the production of graphic evidence in the form of 3-dimensional CAD graphics, which demonstrate the learner's ability to produce appropriate modelling solutions, suitable to the landscape environment brief, and their ability to express and communicate these concepts and ideas accurately. The suggested time allocation for this assessment activity is two hours.

Learners could continue following the design brief issued for the earlier assessment tasks and consider and select suitable solutions for hand landscaping elements and features. The CAD details provided should be clear and effective visually and supported by extensive and appropriate construction detail annotation.

A checklist could be used to support the assessment requirements for each of the knowledge and/or skills required in the Outcome.

Outcome 4

The focus of the assessment is on the production of graphic evidence in the form of 2-dimensional and 3-dimensional CAD drawings and graphics, which demonstrate the learner's grasp of the considerations and decisions in the selection of appropriate planting types and arrangements for a given landscape project, and their ability to express and communicate these concepts and ideas accurately. The suggested time allocation for this assessment activity is two hours.

Learners should continue following the design brief issued for the earlier assessment tasks and consider and select suitable solutions for soft landscaping elements and features. The CAD details provided should be clear and effective visually and supported by extensive and appropriate construction detail annotation.

A checklist could be used to support the assessment requirements for each of the knowledge and/or skills required in the Outcome.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

Although no automatic certification of Core Skills or Core Skills components exists within this Unit, opportunities to develop components of some Core Skills are possible. Learners are working to design brief remits which requires the ability to create and manipulate objects in a computer-aided-design environment, thus developing the Core Skills of *Numeracy*, *Problem Solving* and *ICT* at SCQF level 6. Access to, and evaluation of, examples of complex design drawings would be of value in formative work. Learners should be able to work unaided in correct file management: considerations of security and safety should be a routine aspect of good practice. The selection of appropriate software application packages and the ability to manipulate objects, components and annotation is integral to achievement, as are techniques in editing data to meet identified needs of purpose and content. *Critical Thinking*, *Planning and Organising*, and *Reviewing and Evaluating* are requirements for these tasks.

Accuracy of interpretation and effective communication of numerical and graphic information underpins the competencies developed in the Unit, and learners are assessed on their ability to create and edit elements within a drawing using a full range of software commands. All these tasks provide further opportunities to challenge the learner to improve on the breadth of Core Skills mentioned above. Some learners may benefit from formative opportunities to further develop effectiveness in the understanding, analysis and application of numerical and graphic data, and the use of software packages or online tutorials to reinforce Numeracy skills may be useful.

Learners could additionally benefit from discussions with the class group and/or assessor in order to encourage analytical evaluation of approaches to the design process.

History of changes

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced qualifications.

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General information for learners

Unit title: Architectural CADT: Landscape Design (SCQF level 8)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit has been designed to help you develop underpinning knowledge in the understanding and practical production of landscape design solutions using computer-aided techniques. In response to a given design brief, you will produce a progressive series of solutions for:

- ◆ topographic land surfaces
- ◆ hand landscaping elements
- ◆ soft landscaping elements

You will be introduced to a wide range of design factors in the evaluation of these solutions, including an understanding of land terrain, cartography and surface modelling skills, as well as aesthetic, performance related and material considerations for hand landscaping, and an appreciation of 'soft' landscaping relevant to planting schemes.

The Unit will be taught with a series of lectures, practical exercises and design tutorials, which will logically, and sequentially progress knowledge and skills from the simple to the complex. At all times, a strong design base will underpin your learning and assessment.

It is imperative that you develop your technical knowledge within this Unit so learning within the Unit builds upon other knowledge and skills. As you will have existing CAD skills, you will use these skills to produce primarily 3-dimensional CAD graphics, occasionally supported by the production of 2-dimensional details. The use of CAD standard template files, conventions, symbols, annotation and referencing should be consistently applied at all times, these being assumed knowledge and skills at point of entry to the Unit.

In this Unit, adherence to the appropriate British Standards, Building Regulations and other accepted design parameters is essential to effective communication of solutions. Individual learning tasks, lectures and tutorials will also form part of the delivery of this Unit.

There are four formal assessment events, which may be integrated. The greater element of assessment time and effort will be on the practical production of CAD solutions appropriate to a landscape brief.

Assessments will be supervised and conducted under open-book conditions in which you will be allowed access to notes, textbooks and other material during the assessment. You will sit these assessments at prescribed points during the Unit at the discretion of the lecturer.

As you will be working consistently with numerical and graphical data within an IT-based platform, opportunities exist within this Unit for you to also develop Core Skills in *Information and Communication Technology (ICT)*, *Problem Solving* and *Numeracy* to SCQF level 6.