

End-point assessment plan for Geotechnical engineer integrated degree apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0881	7	Yes

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Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the Geotechnical engineer integrated degree apprenticeship standard. It explains how EPA for this apprenticeship standard must operate.

This document provides the EPA design requirements for Universities in their role as end-point assessment organisations (EPAOs) for this apprenticeship standard. It will also be useful for apprentices undertaking this apprenticeship, their employers and training providers.

EPA must be conducted by an EPAO approved to deliver EPA for this apprenticeship standard. Each employer should select an approved EPAO from the Education & Skills Funding Agency's Register of end-point assessment organisations (RoEPAO).

In an integrated degree apprenticeship standard, the degree incorporates on-programme learning and assessment with an EPA to test the occupational standard's knowledge, skills, and behaviours (KSBs). The degree required for this apprenticeship standard is a Masters in Geotechnical Engineering. The level of credits that makes up the degree may vary across universities; however, the EPA must contribute one-third of the total.

Full-time apprentices will typically spend 30 months on-programme (before the gateway) working towards this occupational standard. All apprentices must spend a minimum of 12 months on-programme. All apprentices must spend a minimum of 20% of on-programme time undertaking off-the-job training.

Before starting EPA, an apprentice must meet the gateway requirements. For this apprenticeship they are:

- the employer must be content that the apprentice is working at or above the occupational standard
- the apprentice must complete and pass all credit carrying modules of the Masters in Geotechnical Engineering, apart from the final module which will form the EPA
- the apprentice must agree the subject, title, and scope for their EPA project with their employer and EPAO to confirm its suitability at the gateway
- the apprentice must compile and submit a portfolio of evidence to their EPAO, which will underpin the EPA interview
- the apprentice must achieve English and mathematics at Level 2¹

The EPAO must confirm that all required gateway evidence has been provided and accepted as meeting the gateway requirements. The EPAO is responsible for confirming gateway eligibility. Once this has been confirmed, the EPA period starts.

This EPA should then be completed within an EPA period lasting typically for nine months.

¹ For those with an education, health and care plan or a legacy statement, the apprenticeship's English and Mathematics minimum requirement is Entry Level 3. British Sign Language (BSL) qualifications are an alternative to English qualifications for those who have BSL as their primary language.

This EPA consists of two discrete assessment methods.

It will be possible to achieve the following grades in each assessment method:

Assessment method 1: **Project: report and presentation with questions**

- fail
- pass
- distinction

Assessment method 2: **Interview, underpinned by a portfolio of evidence**

- fail
- pass

Performance in these assessment methods will determine the overall apprenticeship standard grade of:

- fail
- pass
- distinction

EPA summary table

<p>On-programme (typically 30 months)</p>	<p>Training to develop the knowledge, skills and behaviours (KSBs) of the occupational standard</p> <p>Training towards English and mathematics Level 2¹ if required</p> <p>Completing on programme modules of the Masters in Geotechnical Engineering degree</p> <p>Compiling a portfolio of evidence</p>
<p>End-point assessment gateway</p>	<p>The employer must be content that the apprentice is working at or above the occupational standard</p> <p>The apprentice must have achieved English and mathematics Level 2¹ as a minimum</p> <p>The apprentice must complete and pass all credit carrying modules of the Masters in Geotechnical Engineering, apart from the final module which will form the EPA</p> <p>The apprentice must agree the subject, title and scope for their EPA project with their employer and EPAO</p> <p>The apprentice must submit a portfolio of evidence to their EPAO, which will underpin the EPA interview</p>
<p>End-point assessment (typically nine months)</p>	<p>Assessment method 1: Project: report and presentation with questions</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>Assessment method 2: Interview, underpinned by a portfolio of evidence</p> <ul style="list-style-type: none"> • fail • pass <p>Performance in these assessment methods will determine the overall apprenticeship standard grade of:</p> <ul style="list-style-type: none"> • fail • pass • distinction

Professional recognition	<p>This apprenticeship standard has professional recognition.</p> <p>The Geological Society:</p> <ul style="list-style-type: none"> Chartered Geologist (partial alignment) <p>The Institution of Civil Engineers*:</p> <ul style="list-style-type: none"> Chartered Engineer (partial alignment) <p>*The degree programme must be accredited by the Engineering Council to be considered by the Institution of Civil Engineers as part of the chartership process.</p> <p>This apprenticeship standard is designed to prepare successful apprentices to meet the educational base/further learning requirements for professional recognition. The experience gained and responsibility held by the apprentice on completion of the apprenticeship standard will either wholly or partially satisfy the requirements for registration with the professional body. The awarding of professional status is under the remit of the professional institutions and is subject to their rules and requirements. For more information, please refer directly to the professional institutions' guidance on chartership routes and requirements.</p>
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Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically nine months, starting when the EPAO has confirmed that all gateway requirements have been met.

Order of end-point assessment methods

The assessment methods can be delivered in any order.

The result of one assessment method does not need to be known before starting the next.

EPA gateway

The apprentice should only enter the gateway once the employer is content that the apprentice is working at or above the occupational standard. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

The EPAO determines when all other gateway requirements have been met, and the EPA period will only commence once the EPAO has confirmed this.

In addition to the employer's confirmation that the apprentice is working at or above the level in the occupational standard, the apprentice must have completed the following gateway requirements prior to beginning EPA:

- Achieved English and mathematics at Level 2.
For those with an education, health and care plan or a legacy statement, the apprenticeship's English and Mathematics minimum requirement is Entry Level 3. British Sign Language (BSL) qualifications are an alternative to English qualifications for those who have BSL as their primary language.
- Completed and passed all credit carrying modules of the Masters in Geotechnical Engineering, apart from the final module which will form the EPA

For the project: report and presentation with questions:

- the EPAO should sign off the project's subject, title and scope to confirm its suitability at the gateway

For the interview, the apprentice will be required to submit:

- a portfolio of evidence – see requirements below

Portfolio of evidence requirements:

- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
- it must contain evidence related to the KSBs that will be assessed by the interview
- the portfolio of evidence will typically contain ten discrete pieces of evidence
- apprentices must map the evidence against the KSBs assessed by the interview
- evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested
- evidence sources may include:
 - workplace documentation, for example workplace policies/procedures, records
 - witness statements
 - annotated photographs
 - video clips (maximum total duration 10 minutes); the apprentice must be in view and identifiable

This is not a definitive list; other evidence sources are possible.

- it should not include any methods of self-assessment
- any employer contributions should focus on direct observation of performance (for example witness statements) rather than opinions
- the evidence provided must be valid and attributable to the apprentice; the portfolio of evidence must contain a statement from the employer and apprentice confirming this
- the portfolio of evidence must be submitted to the EPAO at the gateway

The portfolio of evidence is not directly assessed. It underpins the interview and therefore should not be marked by the EPAO. EPAOs should review the portfolio of evidence in preparation for the interview but are not required to provide feedback.

End-point assessment methods

The apprentice will be assessed against the KSBs assigned to the assessment methods outlined below, as shown in the mapping section of this EPA plan.

End-point assessment method 1: Project: report and presentation with questions

Overview

This assessment method has two components: 1a. report and 1b. presentation with questions.

A project involves the apprentice completing a significant and defined piece of work that has a real business application. The project must be undertaken after the apprentice has gone through the gateway, apart from initial research to inform the project title and scope.

The project should be designed to ensure that the apprentice's work meets the needs of the business, is relevant to their role and allows the relevant KSBs to be assessed for the EPA. Therefore, the project's subject, title and scope will be agreed between the employer and the EPAO at the gateway. The employer will ensure it has a real business application. The EPAO will ensure it meets the requirements of the EPA (including suitable coverage of the KSBs assigned to this assessment method, as shown in the mapping of assessment methods) and degree accreditation requirements. The EPAO must refer to the grading descriptors to ensure that projects are pitched appropriately.

The independent assessor will assess all components of this assessment method holistically.

The independent assessor will make all grading decisions.

The rationale for this assessment method is:

- it is a holistic assessment method, allowing the apprentice to demonstrate KSBs in an integrated way
- it allows for a range of geotechnical engineering activities to be demonstrated
- it provides a cost-effective assessment, as it minimises independent assessor time and makes use of the apprentice's employer's workplace, equipment and resources, and should contribute to workplace productivity

Project

The project must be based on the development and testing of a hypothesis in relation to a non-routine geotechnical engineering investigation. It can be a desk study, site-based, laboratory-based, or numerically-based. It must explore geotechnical concepts/practices in depth, for example, but not limited to:

- comparing the performance of a completed geotechnical structure (such as foundation, retaining wall, tunnel, slope or other earthwork) with estimated performance during design and assessing the appropriateness of the design assumptions made for given ground conditions and drawing appropriate conclusions

- comparing the performance of a geotechnical engineering structure under working load (for example, settlements) with estimated performance from post-construction testing (for example, pile load testing or from Case Pile Wave Analysis Programme, CAPWAP data) or data collected during construction (for example, pile installation rig data) and assessing the appropriateness of the assumptions made for the testing approach in given ground conditions
- undertake testing to consider the impact of techniques used to validate one criteria have on others and the implications of this on long term performance (for example, over-rotation in Continuous Flight Auguring (CFA), pile installations, to prove lack of penetration in rock, smoothing the soil above, potentially reducing the interaction between soil and cast pile in the longer term)
- comparison with a historic data sets, for given ground conditions, held by the company (such as Standard Penetration Testing and shear strength data) with published correlations to assess the appropriateness of these correlations for the ground conditions under consideration
- comparison of datasets for given ground conditions with geospatial/temporal changes to assess changes in given geotechnical parameters and assess the impacts this has on design
- laboratory studies to investigate fundamental geotechnical performance of soils for given loading and drainage conditions and determining the connotations for design
- numerically modelling complex loading conditions on geotechnical structures to better understand the short/long-term performance of these structures and the connotations for design
- desk based research to consider materials not commonly considered for geotechnical engineering applications (such as secondary/recycled aggregates from wastes and site-won materials), identifying current limitations or unknowns that would need to be addressed for widespread embrace within the industry and how statute/design standards would have to be adjusted to allow for the use of these materials

The project must require:

- apprentices to utilise at least one of the following: experimental approaches, numerical approaches, or draw on existing data through desk studies
- the application of a research method
- a literature review to develop a thorough understanding of the problem, to firm up proposed aims and objectives, to develop a suitable methodology for the project and, if undertaking a desk-based study identify suitable datasets to underpin data analysis. However, a literature review alone cannot meet the needs of the project assessment due to the lack of data interpretation and engineering decision making.
- data collection phase (for example, from site-based operations, laboratory sourced data, numerically sourced data or data from the literature – if undertaking a desk-based study)
- analysis and interpretation of data to develop an engineering understanding for the basis of engineering decisions

The project starts after the apprentice has gone through the gateway. The typical duration of the project should be 600 hours of work, inclusive of the time to write the report and prepare the presentation.

The employer should ensure the apprentice has sufficient time and the necessary resources, within this period, to plan and undertake the project.

Whilst completing the project, the apprentice should be subject to supervision arrangements. The EPAO should nominate a person (or persons) to advise on the EPA process, provide guidance and to act as a mentor. They cannot provide information that will influence their grade.

A minimum of three meetings (not necessarily face to face, virtually, via the phone or email might also suffice) is suggested, more so if both parties deem it necessary. The apprentice should also be supported through normal employer supervision arrangements.

If this assessment method is failed, the apprentice is not required to undertake a new project, instead they should submit an amended project report or presentation as appropriate.

Project location

The project work can take place in:

- the apprentice's workplace - office, laboratory
- site locations as required
- the University's premises

Component 1a: Project report

Delivery

The project outcome must be in the form of a report.

The report should include the following:

- a 200-word executive summary (or abstract)
- an introduction
- the scope of the project (including key performance indicators, aims and objectives)
- a project plan that includes: a Gantt chart; a brief commentary on how the research method will be implemented and the aims and objectives met; the required administrative forms, which can be stored within an appendix, for example: risk assessments, ethical reviews, budgetary requirements.
- research outcomes
- data analysis outcomes
- literature review findings
- project outcomes
- discussion of findings
- recommendations and conclusions
- references
- appendix containing mapping of KSBs to the report

The report has a maximum word limit of 10,000 words. Appendices and references will not be included in this word limit.

The report must map, in an appendix, how it evidences the KSBs assessed by this assessment method – see mapping of KSBs.

The apprentice must conduct their project and submit the report and presentation content (see below) to the EPAO after a maximum of eight months from the gateway.

When the report is submitted, the employer and the apprentice should verify the submitted work is that of the apprentice.

The independent assessor will make all grading decisions.

KSBs met must be recorded by the independent assessor.

The evidence from the project: report and presentation with questions will be assessed holistically.

The project: report and presentation with questions must be subject to the EPAO's moderation processes.

Project report location

The project report work should take place in:

- the apprentice's workplace - office, laboratory
- other suitable venue
- the University's premises

Component 1b: Presentation with questions

Delivery

A presentation with questions involves an apprentice presenting to an independent assessor, followed by questioning from the independent assessor. It may be conducted either face-to-face or via online video conferencing.

The presentation content must be completed after the gateway and submitted by the apprentice with their project report.

The presentation must focus on their project and cover:

- background
- summary of what they did
- how they achieved it
- what they concluded - transferable lessons

The purpose of the questioning is:

- to verify that the project is the apprentice's own work
- to seek clarification on the report or presentation
- to assess the depth and breadth of knowledge, skills and behaviours

- to assess those KSBs that the apprentice did not have the opportunity to demonstrate during the project, although these should be kept to a minimum

The presentation with questions must last for 40 minutes. Typically, the presentation will last 10 minutes and typically the questioning will last 30 minutes. The independent assessor has the discretion to increase the time of the presentations and questions by up to 10% to allow the apprentice to complete their last answer.

To deliver the presentation, the apprentice must have access to audio-visual equipment (if required) that facilitates presentations. The apprentice needs to notify the EPAO at the submission of the presentation of any technical requirements for the presentation component. The apprentice must be given two weeks' notice of the presentation date and the independent assessor must have a minimum of two weeks to review the project and presentation prior to the presentation date.

The apprentice must be given the opportunity to prepare themselves prior to the start of the presentation (uploading presentation, etc), before the assessment starts.

The independent assessor must use the full time available for questioning to allow the apprentice the opportunity to evidence occupational competence at the highest level available, unless the apprentice has already achieved the highest grade available.

The independent assessor must ask a minimum of five questions at the end of the presentation. They may ask follow-up questions where clarification is required.

Independent assessors must use their EPAO's question bank as a source for questions and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for asking suitable follow-up questions in line with the EPAO's training and standardisation process.

KSBs met and answers to questions, must be recorded by the independent assessor, for the quality assurance purposes of the EPAO. The independent assessor will make all grading decisions.

The evidence from the project: report and presentation with questions will be assessed holistically.

The project: report and presentation with questions must be subject to the EPAO's moderation processes, therefore a moderator may be present during the presentation with questions.

Assessment location

EPAOs must ensure that the presentation and questioning elements are conducted in a suitable controlled environment. The venue should be a quiet room, free from distraction and external influence.

The presentation with questions may take place in:

- employer's premises
- a suitable venue selected by the EPAO, such as the University's premises

Specific venue requirements that must be in place: audio-visual equipment (if required) that facilitates presentations.

Video conferencing can also be used to conduct the presentation but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

Question and resource development

A question bank must be developed by EPAOs. The question bank must be of sufficient size to prevent predictability and the EPAO must review it regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs. Independent assessors must use the question bank as a source for questions and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for asking suitable questions in line with the EPAO's training and standardisation process.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

EPAOs will produce the following material to support this assessment method:

- assessment specifications
- grading guidance
- question bank (for independent assessors only, not for wider distribution)
- assessment recording documentation
- guidance document for employers and apprentices on the process / timescales for the assessment as well as a description of the purpose
- guidance document for independent assessors on how to carry out the assessment

End-point assessment method 2: Interview, underpinned by a portfolio of evidence

Overview

This assessment method has one component.

An interview consists of an independent assessor asking an apprentice a series of questions to assess their competence against the KSBs. The independent assessor leads this process to obtain information from the apprentice to enable structured assessment decision-making to occur.

The rationale for this assessment method is:

- it allows for assessment of KSBs that do not occur on a predictable or regular basis and may not naturally be assessed as part of the project
- it allows for testing of responses where there are a range of potential answers
- it is cost effective, as apart from a venue, it does not require additional resources

Delivery

An independent assessor will conduct and assess the interview.

The interview must last for 60 minutes. The independent assessor has the discretion to increase the time of the interview by up to 10% to allow the apprentice to complete their last answer.

The interview will be structured to allow a minimum of nine questions. During the interview, the independent assessor must combine questions from the EPAO's question bank and those generated by themselves.

The purpose of the questions will be to assess the following topics:

- ground investigations
- fundamental analysis and design
- project management
- teamwork and communication
- continued professional development (CPD)

The interview will be conducted as outlined below.

EPAOs must make arrangements for the interview with the apprentice's employer.

The independent assessor should have a minimum of five working days to review the portfolio of evidence.

Apprentices must be given at least two-weeks' notice of the date and time of the interview.

Questions should be open. Additional follow up questions are allowed, to seek clarification and to make a judgement against the grading descriptors. Independent assessors must use the question bank as a source for questions and are expected to use their professional judgment

to tailor those questions appropriately. Independent assessors are responsible for asking suitable questions in line with the EPAO's training and standardisation process.

Apprentices must have access to their portfolio of evidence during the interview. Apprentices can refer to and illustrate their answers with evidence from their portfolio of evidence, however the portfolio of evidence is not directly assessed.

Apprentices are expected to understand and use relevant occupational language that would be typical of a competent person in this occupation.

Evidence from the interview underpinned by a portfolio of evidence must be assessed holistically using the grading criteria for this assessment method.

KSBs met and answers to questions, must be recorded by the independent assessor for external quality assurance processes.

The independent assessor will make all grading decisions.

The interview, underpinned by a portfolio of evidence must be subject to the EPAO's moderation processes; therefore, a moderator may be present during the interview.

Assessment location

The interview should take place in a quiet room, free from distractions and external influence. Video conferencing can also be used to conduct the interview but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

The interview can take place in any of the following:

- employer's premises
- a suitable venue selected by the EPAO, such as the University's premises

Question and resource development

A question bank must be developed by EPAOs. The question bank must be of sufficient size to prevent predictability and the EPAO must review it regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs. Independent assessors must use the question bank as a source for questions and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for asking suitable questions in line with the EPAO's training and standardisation process.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

EPAOs will produce the following material to support this assessment method:

- assessment specifications
- grading guidance
- question bank (for independent assessors only, not for wider distribution)
- assessment recording documentation

- guidance document for employers and apprentices on the process / timescales for the assessment as well as a description of the purpose
- guidance document for independent assessors on how to carry out the assessment

Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments to the assessment methods for the EPA for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustment and what reasonable adjustments will be made. The adjustments must maintain the validity, reliability and integrity of the assessment methods outlined in this assessment plan.

Overall EPA grading

All assessment methods are weighted equally in their contribution to the overall EPA pass grade. Performance in the project: report and presentation with questions will determine if a distinction grade is awarded.

Performance in the EPA will determine the apprenticeship grade of fail, pass, or distinction.

Independent assessors must individually grade each assessment method, according to the requirements set out in this plan.

EPAOs must combine the individual assessment method grades to determine the overall EPA grade.

Apprentices who fail one or more assessment method will be awarded an overall EPA fail.

To gain an overall EPA pass, apprentices must achieve a pass in both assessment methods.

To achieve an overall EPA distinction, apprentices must achieve a distinction in the project: report and presentation with questions and a pass in the interview, underpinned by a portfolio of evidence.

Grades from individual assessment methods should be combined in the following way to determine the grade of the EPA as a whole:

Assessment method 1 – Project: report and presentation with questions	Assessment method 2 – Interview, underpinned by a portfolio of evidence	Overall grading
Fail	Any grade	Fail
Any grade	Fail	Fail
Pass	Pass	Pass
Distinction	Pass	Distinction

Any grade = fail, pass, or distinction

Re-sits and re-takes

Apprentices who fail one or more assessment method will be offered the opportunity to take a re-sit or a re-take at the employer's discretion. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action. In addition, the re-sit or re-take must be in line with the University's regulations.

A re-sit does not require further learning, whereas a re-take does.

Apprentices should have a supportive action plan to prepare for a re-sit or a re-take.

An apprentice who fails one or more assessment methods, and therefore the EPA in the first instance, will be required to re-sit or re-take the failed assessment methods only.

If the apprentice fails the project assessment method, they may amend the project report and presentation in line with the independent assessor's feedback, rather than complete a new project.

The timescale for a re-sit/re-take is agreed between the employer and EPAO. A re-sit is typically taken within six months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within nine months of the EPA outcome notification.

All assessment methods must be taken within a 12-month period, otherwise the entire EPA will need to be re-sat/re-taken.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to a higher grade.

Where any assessment method has to be re-sat or re-taken, the apprentice will be awarded a maximum EPA grade of pass, unless the EPAO determines there are exceptional circumstances requiring a re-sit or re-take.

Roles and responsibilities

Role	Responsibility
Apprentice	<p>As a minimum, apprentices should:</p> <ul style="list-style-type: none"> • participate in and complete on-programme training to meet the KSBs as outlined in the occupational standard for a minimum of 12 months • undertake 20% off-the-job training as arranged by the employer and training provider • understand the purpose and importance of EPA • undertake the EPA including meeting all gateway requirements
Employer	<p>As a minimum, employers should:</p> <ul style="list-style-type: none"> • work with the training provider (where applicable) to support the apprentice in the workplace to provide the opportunities to develop the KSBs • arrange and support a minimum of 20% off-the-job training to be undertaken by the apprentice • decide when the apprentice is working at or above the occupational standard and so is ready for EPA • select the EPAO • ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan • remain independent from the delivery of the EPA • confirm arrangements with the EPAO for the EPA (who, when, where) in a timely manner (including providing access to any employer specific documentations as required, for example company policies) • ensure that the EPA is scheduled with the EPAO for a date and time which allow appropriate opportunity for the KSBs to be met • ensure the apprentice is well prepared for the EPA • ensure the apprentice is given sufficient time away from regular duties to prepare for and complete any post-gateway elements of the EPA, and that any required supervision during this time (as stated within this EPA plan) is in place • where the apprentice is assessed in the workplace, ensure that the apprentice has access to the resources used on a daily basis

EPAO (University)	<p>As a minimum, EPAOs should:</p> <ul style="list-style-type: none"> • agree the EPA price • understand the occupational standard • appoint administrators (and invigilators where required) to administer the EPA as appropriate • provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading • provide adequate information, advice and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA • arrange for the EPA to take place, in consultation with the employer • deliver the EPA as outlined in this EPA plan in a timely manner • where the apprentice is not assessed in the workplace, ensure that the apprentice has access to required resources and liaise with the employer to agree this if necessary • use appropriate assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders • have no direct connection with the apprentice, their employer or training provider. In all instances including when the EPAO is the training provider (i.e. HEI) there must be procedures in place to mitigate any conflicts of interest which will be monitored by external quality assurance (EQA) activity • have policies and procedures for internal quality assurance (IQA), and maintain records of regular and robust IQA activity and moderation for EQA purposes • conform to the requirements of the nominated external quality assurance provider (EQAP) • conform to the requirements of the Register of End-Point Assessment Organisations (RoEPAO) • deliver induction training for independent assessors, and for invigilators and markers where used • undertake standardisation activity on this apprenticeship standard for all independent assessors before they conduct an EPA for the first time, if the EPA is updated and periodically as appropriate (a minimum of annually)
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	<ul style="list-style-type: none"> • manage invigilation of apprentices in order to maintain security of the assessment in line with their malpractice policy • verify the identity of the apprentice being assessed • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard • request certification via the Apprenticeship Service upon successful achievement of the EPA
Independent assessor	<p>As a minimum, an independent assessor should:</p> <ul style="list-style-type: none"> • have the competence to assess the apprentice at this level and hold any required qualifications and experience in line with the requirements of the independent assessor as detailed in the IQA section of this EPA plan • understand the occupational standard and the requirements of this EPA • have, maintain and be able to evidence up to date knowledge and expertise of the subject matter • deliver the end-point assessment in-line with the EPA plan • comply with the IQA requirements of the EPAO • have no direct connection or conflict of interest with the apprentice or their employer and must not have been involved with the apprentice's on-programme delivery. • attend induction training • attend standardisation events when they begin working for the EPAO, before they conduct an EPA for the first time and a minimum of annually on this apprenticeship standard • assess each assessment method, as determined by the EPA plan, and without extending the EPA unnecessarily • assess against the KSBs assigned to each assessment method, as shown in the mapping of assessment methods and as determined by the EPAO, and without extending the EPA unnecessarily • make all grading decisions • record and report all assessment outcome decisions, for each apprentice, following instructions and assessment recording documentation provided by the EPAO in a timely manner • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard

Independent EPAO moderator	<p>As a minimum, a moderator should:</p> <ul style="list-style-type: none"> • have the competence to assess the apprentice at this level • understand the occupational standard and the requirements of this EPA • have, maintain and be able to evidence, up-to-date knowledge and expertise of the subject matter • have no direct connection or conflict of interest with the apprentice or their employer and must not have been involved with the apprentice's on-programme delivery • attend induction training • attend standardisation events when they begin working for the EPAO, before they conduct an EPA for the first time and a minimum of annually on this apprenticeship standard in the years in which they are required to conduct assessment
Training provider (University)	<p>As a minimum, the training provider should:</p> <ul style="list-style-type: none"> • work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the knowledge, skills and behaviours as listed in the occupational standard • conduct training covering any knowledge, skill or behaviour requirement agreed as part of the Commitment Statement (often known as the Individual Learning Plan). • monitor apprentices progress during any training provider led on-programme learning • advise the employer, upon request, on the apprentice's readiness for EPA • remain independent from delivery of the EPA. Where the training provider is the EPA (i.e. HEI) there must be procedures in place to mitigate against any conflict of interest

Internal Quality Assurance (IQA)

Internal quality assurance refers to the strategies, policies, and procedures that an EPAO must have in place to ensure valid, consistent, and reliable end-point assessment decisions. EPAOs for this EPA must adhere to all requirements within the roles and responsibilities section and:

- have effective and rigorous quality assurance systems and procedures that ensure fair, reliable, and consistent assessment across employers, places, times, and independent assessors
- appoint independent assessors who are competent to deliver the end-point assessment and who meet the following minimum requirements:
 - recent relevant experience of the occupation/sector gained in the last five years or significant experience of the occupation/sector
 - experience of working as a geotechnical engineer (either in industry or academia)
- operate induction training for independent assessors and moderators
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- where appropriate:
 - provide training for moderators
- undertake standardisation activity on this apprenticeship standard for all independent assessors:
 - before they conduct an EPA for the first time
 - if the EPA is updated
 - periodically as appropriate (a minimum of annually in the years they are required to conduct assessments)
- conduct effective moderation of assessment decisions and grades

Value for money

Affordability of the EPA will be aided by using at least some of the following practices:

- use of technology – for example video conferencing for the project presentation and questions and interview
- location – for example use of employer or University's premises for the project presentation and questions and interview
- making maximum use of each typical 7.5 hour working day; the possibility of scheduling the interview and presentation with questions component of the project on the same day
- project activity will contribute to workplace operations

Professional body recognition

This apprenticeship standard has professional recognition.

The Geological Society:

- Chartered Geologist (partial alignment)

The Institution of Civil Engineers*:

- Chartered Engineer (partial alignment)

*The degree programme must be accredited by the Engineering Council to be considered by the Institution of Civil Engineers as part of the chartership process.

This apprenticeship standard is designed to prepare successful apprentices to partially meet the educational base/further learning requirements. The experience gained and responsibility held by the apprentice on completion of the apprenticeship standard will either wholly or partially satisfy the requirements for registration with the professional body. The awarding of professional status is under the remit of the professional institutions and is subject to their rules and requirements. For more information, please refer directly to the professional institutions' guidance on chartership routes and requirements.

Mapping of knowledge, skills and behaviours (KSBs)

End-point assessment method 1: Project: report and presentation with questions

Knowledge
K3: Soil and rock behaviour (soil and rock mechanics) when exposed to changes in load and/or environmental conditions and the implications this can have on the short- and long-term performance of geotechnical assets.
K4i: Numerical, analytical and critical analysis techniques for the analysis of engineering problems and development of solutions. K4ii: The limitations of these approaches.
K5: Desk based research techniques for developing a specification for a ground investigation. Correlating outcomes from a ground investigation with fundamental engineering parameters relating to the soil/rock.
K10: Current and previous industry developments, case studies and forensic analysis for use in design solutions.
K14: Project management techniques for geotechnical engineering activities: estimating, programming, cost and budget control and resource management.
K20: Communication techniques: oral, written, drawings and presentations.
K21i: Information technology: digital tools for research, analysis. K21ii. Information technology: digital tools for presentation of data, digital communication and collaboration packages.

Skills
S3: Collect, analyse, and interpret data using numerical, analytical and critical analysis techniques to develop an engineering understanding of the ground and how this will impact upon future design solutions; short- and long-term responses.
S4: Undertake research and employ suitable methods to improve understanding of the engineering response of the ground. For example, undertake a laboratory study, numerical analysis, interpret previously published data on the ground conditions (or data from laboratory/numerical investigations), learn from previous case studies and/or utilise established correlations between parameters.
S5: Make geotechnical engineering decisions.
S9: Use project management techniques. For example, estimating, programming, cost and budget control and resource management.

S14: Communicate with colleagues and stakeholders: oral, written, drawings, and presentations.

S15i: Use information technology: digital tools for research and analysis.

S15ii: Use information technology: digital tools for presentation of data, digital communication and collaboration packages.

Behaviours

B3i: Takes responsibility for engineering decisions taken.

End-point assessment method 2: Interview, underpinned by a portfolio of evidence

Knowledge
K1: Ground investigation techniques and solutions to derive soil and rock parameters for subsequent geotechnical engineering activities: intrusive and non-intrusive in situ techniques, laboratory tests, and instrumentation and monitoring techniques.
K2: Ground conditions and ground shaping processes: soil and rock forming, hydrology, hydrogeology and geomorphology; naturally occurring and/or from human activities. How they can impact on construction projects and create geohazards for geotechnical assets.
K6: Principles of economic responsibilities, ethical principles, social responsibilities and environmental protection and sustainability. How they must be applied to geotechnical engineering activities in the short- and long-term.
K7: The implications of contaminated land on geotechnical activities and design solutions in the short- and long-term. Contaminated land remediation approaches.
K8: Design principles and methods for geotechnical engineering and their limitations.
K9: Design codes and standards for geotechnical engineering activities.
K11: The need for 'buildability' and consideration of long-term asset performance during the design stage.
K12: Geotechnical asset management techniques and approaches through construction and post construction; and the importance of considering these during the design stage.
K13: Construction methods and management approaches used when constructing/managing geotechnical assets.
K15: Risk management techniques relating to the uncertainty/ambiguity inherent geotechnical engineering activities. For example, controlling risks to the environment, economy and society, risks arising during construction, risks on the geotechnical assets themselves, and those associated with the project: programme/budget control, commercial and financial issues.
K16: Legal requirements, including Health and Safety at Work, Environmental Protection and sustainability, Construction Design Management (CDM), data protection.
K17: Commercial and contractual requirements when undertaking geotechnical engineering activities: forms of contract, mechanisms of payment, specifications, and procurement.
K18: Time management techniques.
K19: Teamwork and leadership: negotiation techniques, conflict management, development techniques and, diversity, equality and inclusivity considerations.
K21iii. Information technology: Building Information Modelling (BIM).

Skills
S1: Specify ground investigations to obtain geotechnical data including in situ techniques, laboratory tests and instrumentation and monitoring techniques.
S2: Interpret the ground investigation data and develop a ground model including the identification of geohazards, contaminated land and other risks to the project as appropriate.
S6: Use geotechnical design principles, methods, codes and standards when developing geotechnical solutions.
S7: Develop geotechnical engineering strategies and evaluate the potential impacts of these. For example, economic sustainability, ethical, societal and, environmental and sustainability perspectives and practical considerations such as buildability and long-term asset management.
S8: Produce geotechnical engineering designs, specification and drawings. For example, for tender and construction stages.
S10: Identify and comply with legal and statutory requirements. For example, health and safety, Environmental protection and sustainability, CDM and data protection.
S11: Use risk management techniques and manage risks associated with geotechnical engineering activities.
S12: Plan and manage own time.
S13: Work with and lead others including, negotiation, conflict management and developing others; taking account of diversity, equality and inclusivity.
S15iii: Use information technology: Building Information Modelling.

Behaviours
B1: Prioritises and promotes ethical, sustainable and socially responsible practices.
B2: Adaptable, flexible and resilient in challenging and/or changing environments.
B3ii: Takes responsibility for designs and procedures.
B4: Takes a whole life cycle view.
B5: Committed to continued professional development and is open to innovation.
B6: Collaborates and promotes teamwork across diverse teams: internal, external and across disciplines.

Grading descriptors

End-point assessment method 1: Project: report and presentation with questions

KSBs	Pass, apprentices must demonstrate all the pass descriptors in order to pass	Distinction, in addition to the pass criteria apprentices must demonstrate all the following distinction descriptors in order to get a distinction
<p>Fundamental geotechnical analysis</p> <p>K3 K4i K4ii K5 K10 K21i S3 S4 S15i</p>	<p>Identifies and applies numerical, analytical and critical techniques to data collected to develop an engineering understanding of the ground and the behaviour of rock and soil when exposed to changes in load and/or environmental conditions and outlines the implications this can have on the performance of geotechnical assets. (K3, K4i S3)</p> <p>Identifies the limitations of numerical and analytical analysis techniques (K4ii)</p> <p>Undertakes research and employs methods to improve understanding of the engineering response of the ground including current and previous industry developments. (S4, K5, K10)</p> <p>Uses digital tools for research and analysis to support work. (K21i, S15i)</p>	<p>Critically evaluates engineering approaches to develop an understanding of the ground and impact on future design solutions (K5)</p> <p>Critically evaluates the use of numerical and analytical techniques to develop solutions to engineering problems. (K4i)</p> <p>Synthesises complex information. (S3)</p>
<p>Geotechnical decisions</p> <p>S5 B3i</p>	<p>Takes responsibility for making geotechnical engineering decisions. (S5, B3i)</p>	<p>Demonstrates critical evaluation to develop suitable geotechnical engineering decisions. (S5)</p>

Project management K14 S9	Identifies and applies project management techniques (for example, estimating, programming, cost and budget control, and resource management) in line with company policy and practice. (K14, S9)	Critically evaluates project management techniques used. (S9)
Team work and communication K20 K21ii S14 S15ii	Applies oral, written, drawn and digital tools and communication techniques to interact with colleagues and stakeholders. (K20, K21ii, S14, S15ii)	Persuasive and engaging in articulating engineering analysis and decisions. (S14)
Fail: apprentices will fail where they do not meet the pass criteria		

End-point assessment method 2: Interview, underpinned by a portfolio of evidence

KSBs	Pass, apprentices must demonstrate all the pass descriptors to pass	
Ground investigations K1 K2 S1 S2	Defines and justifies ground investigations to obtain the geotechnical data (soil and rock parameters, ground conditions and shaping processes) required for engineering activities including in situ techniques, laboratory tests and instrumentation and monitoring techniques. (K1, S1)	Interprets ground investigation data and develops ground models to correctly identify geohazards, contaminated land and other risks to the project as appropriate and analyses their potential impact. (K2, S2)
Fundamental analysis and design K6 K7 K8 K9 K11 K12 S6 S7 S8 B1 B3ii B4	Develops reliable geotechnical engineering strategies and evaluates potential impacts in the short and long-term for example, economic responsibilities, ethical, societal and, environmental and sustainability perspectives providing reasoned analysis. (K6, S7).	Takes responsibility for creating geotechnical design solutions and procedures that demonstrate buildability, consideration of long-term asset performance, appreciation of asset management requirements and whole life cycle view. Demonstrates use of design principles, methods, codes, and standards required for the geotechnical solutions. Designs solutions that prioritise and promote ethical, sustainable, and socially responsible practices. (K9, K11, K12, S6, B1, B3ii, B4).

	<p>Defines and produces geotechnical engineering designs, specifications, and drawings for tender and construction stages that present design solutions. (K8, S8)</p> <p>Analyses the implications of contaminated land on geotechnical activities and design solutions in the short and long-term and ground remediation approaches. (K7)</p>
<p>Project management</p> <p>K13 K15 K16 K17 K18 K21iii</p> <p>S10 S11 S12 S15iii</p> <p>B2</p>	<p>Analyses different construction methods and management approaches used when constructing/managing geotechnical assets. (K13)</p> <p>Evaluates the commercial and contractual requirements when undertaking geotechnical engineering activities: forms of contract, mechanisms of payment, specifications, and procurement. (K17)</p> <p>Identifies and complies with legal and statutory requirements for health and safety, environmental protection and sustainability, CDM and data protection. (K16, S10)</p> <p>Critically analyses the risks relating to the uncertainty/ambiguity of geotechnical engineering activities, justifying their choice of management techniques. (K15, S11)</p> <p>Plans and manages their own time to deliver project requirements, whilst applying adaptable, flexible and resilient approaches in challenging and/or changing environments to the benefit of geotechnical engineering activities. (K18, S12, B2)</p> <p>Uses BIM to support work. (K21iii, S15iii)</p>
<p>Teamwork and communication</p> <p>K19</p> <p>S13</p> <p>B6</p>	<p>Identifies and applies the principles of collaboration, teamwork, leadership, negotiation techniques, conflict management and development techniques with reference to the policies of inclusivity, equality and diversity of the organisation/company to promote collaboration across teams internally, externally or across disciplines. (K19, S13, B6)</p>
<p>CPD</p> <p>B5</p>	<p>Demonstrates evidence of a commitment to CPD and incorporates new ideas/methods into their work and interactions. (B5)</p>
<p>Fail: apprentices will fail where they do not meet the pass criteria</p>	