

Assessment Plan – Civil Engineering Technician Apprenticeship Level 3

Summary

Civil Engineering Technician provides technical support to engineers and other construction professionals in the design, development, construction, commissioning, decommissioning, operation or maintenance of the built environment and infrastructure. Technicians will be required to have a broad skills base to work in areas which include sustainable construction, structural integrity, geotechnics, materials, tunnelling, marine and coastal engineering, water, waste management, flood management, transportation, and power. As a civil engineering technician, the apprentice could be working under supervision in the public or private sector, local government, central government departments and agencies, engineering consultancy practices or contracting firms.

A technician's work involves:

- Design – assisting in the development of technical solutions by producing design models, calculations, reports and drawings, surveying a site, using appropriate analysis and relevant codes.
- Analysis – using appropriate software systems and other data gathering tools and tests to solve technical problems.
- Project delivery – contributing to planning, managing work schedules, budgets, and deadlines, and ensuring outputs comply with client and industry specifications, standards, and guidance.
- Site engineering - operating quality systems and Health, Safety and Risk Management procedures and checking specified technical aspects of site activities.

The Civil Engineering Technician Apprenticeship provides an integrated programme of knowledge and skills acquisition alongside developing confidence and maturity. Successful achievement of the Apprenticeship Standard demonstrates that the apprentice has the skills knowledge and behaviours to work competently as a Civil Engineering Technician.

This assessment plan ensures that successful candidates will have satisfied the requirements for registration as an Engineering Technician with the relevant Professional Engineering Institution as the first step in a career as a Civil Engineer. Engineering Technician is an internationally recognised benchmark of competence with associated professional title – EngTech.

The end point assessment will be in two stages and typically undertaken in the last two months of the apprenticeship: -

STAGE 1 – is the preparation for the presentation and structured interview. It will consist of

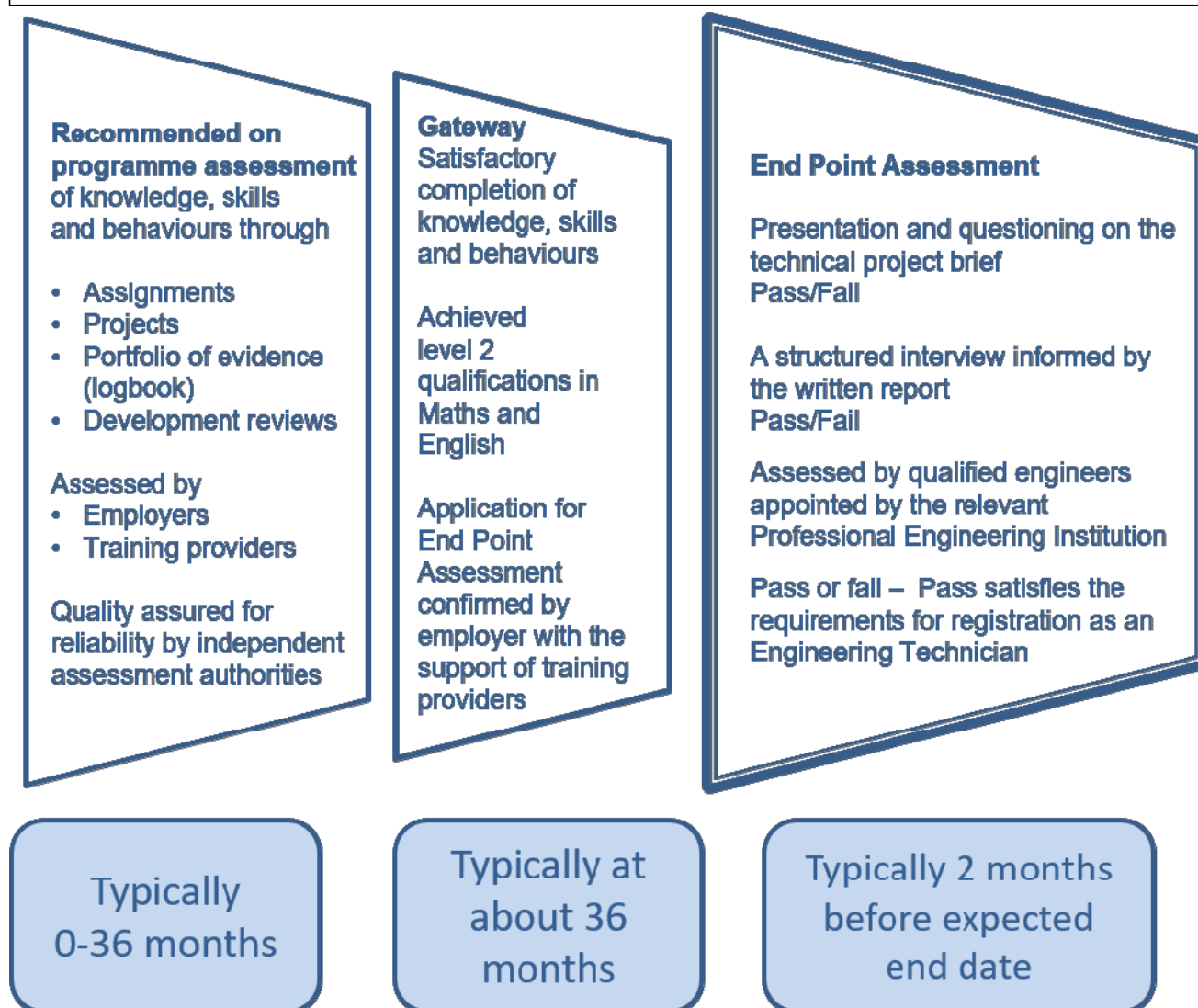
- A project which will test the apprentice's ability to integrate the knowledge, skills and behaviours acquired during the apprenticeship by developing a response to a technical project brief set by the Professional Engineering Institution, with a number of options and a rationale for the choice of one as the optimum solution.
- A written report of 1400-1600 words which demonstrates how, in the course of their apprenticeship, the apprentice has integrated the knowledge, skills and behaviours needed to be a competent Civil Engineering Technician. The report is verified by a professionally qualified engineer and will be used to inform the structured interview

STAGE 2

- A 10-minute presentation by the apprentice to the Assessor Panel showcasing their response to the project brief. This will be followed by 10-15 minutes of questions and discussion.

- A 30-40-minute structured interview based on the written report submitted prior to the interview, the purpose being to determine the apprentice's ability to integrate the knowledge, skills and behaviours acquired during the apprenticeship

To be successful the apprentice must pass the Presentation and Structured Interview. The assessment will satisfy the requirements for registration as an Engineering Technician by the Engineering Council. The Assessor Panel will consist of two experienced, qualified, and trained Civil Engineers nominated by the relevant Professional Engineering Institution. Benchmarking the End Point Assessment against the Engineering Council UK-SPEC requirements for EngTech means that the assessment outcomes will be consistent and reliable, allowing a fair and proper comparison between apprentices employed across the UK in different types and sizes of organisations.



Assessment Overview

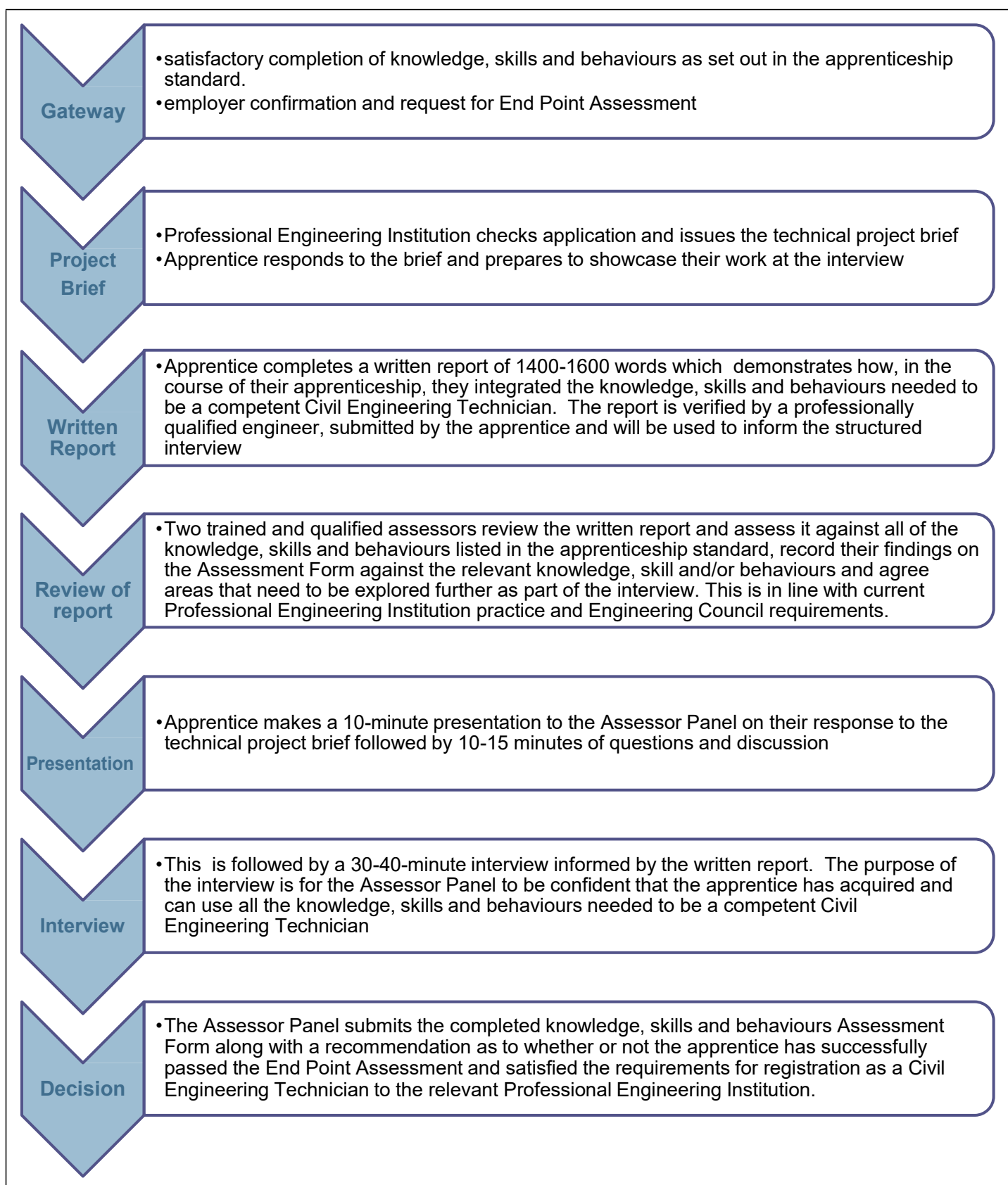
Assessment Method	Area Assessed	Assessed by	Grading
Presentation and questioning on technical project brief	Knowledge, skills, and behaviours from across the Standard. Details for each	Assessor Panel appointed by the	Pass/Fail

Structured interview informed by the written report	method can be found in Annex A	relevant Professional Engineering Institution	Pass/Fail
--	--------------------------------	---	-----------

On Programme Assessment

The recommended approach is that the apprentice will demonstrate their progress through a combination of written/on-line examinations, assignments, documented development reviews with experienced professionals, completion of work based projects, and the maintenance of a portfolio of evidence (logbook) which demonstrates how the apprentices has met each of the Knowledge, Skills and Behaviours statements in the Standard which will be signed off by the employer . It is recommended that these should be supervised by in-company mentors and tested by external assessors and verifiers.

Process Summary



Assessment Gateway

The apprentice will need to demonstrate satisfactory completion of all aspects of their apprenticeship before they are able to undertake the End Point Assessment, including having achieved Level 2 qualifications in Maths and English. Once satisfied that the apprentice is ready to undertake the End Point Assessment the employer will submit an application to the relevant Professional Engineering Institution.

End Point Assessment

What will be assessed

The apprentice will be expected to demonstrate through a presentation setting out their response to a technical project brief and a structured interview informed by a written report, that they have acquired the knowledge, skills and behaviours as described by the statements in the standard and can, through their integration, competently undertake the role of a Civil Engineering Technician. See Annex A for a mapping of the standard against the assessment methods.

How will it be assessed

The End Point Assessment will use the relevant Professional Engineering Institution's Engineering Technician review process, which is an existing and well-respected synoptic assessment that covers the broad areas of knowledge, skills and behaviours identified in the standard using a range of assessment methodologies outlined below.

The assessment will be in two stages

STAGE 1 – is the pre-work necessary to prepare for the presentation and interview. It is anticipated that completing the project and written report will take 6 weeks in total.

Project

The Professional Engineering Institution will provide the apprentice with a technical project brief. The purpose of the brief is to set the apprentice a task which will assess their ability to integrate a range of knowledge, skills and understanding they have acquired during their apprenticeship. For detail on areas covered see Annex A.

A bank of technical project briefs will be developed and maintained securely by the Professional Engineering Institution (using the expertise of the members of the Professional Engineering Institution's register of assessors). The bank will be reviewed and refreshed every two years. Each project brief will be approved by the Professional Engineering Institution panel responsible for EngTech registration as complying with the requirements for EngTech and meeting the demand for consistent content, depth, and breadth. The project briefs will be made available on request to all organisations approved to assess the Civil Engineering Technician Apprenticeship on the Register of Apprentice Assessment Organisations.

Criteria for the Project Brief

The bank of project briefs will need to cover the range of civil engineering specialisms and employment sectors as listed in the occupational profile at the top of the Apprenticeship Standard. Each project brief will be a maximum of 500 words and designed to take between 25-30 hours to complete. Generically responding to the project brief will involve research and preparing material for the presentation and include a requirement for

- ✓ A project plan summarising the actions needed to complete the task with a timeline

- Calculations and drawings appropriate for level 3
- Reference to
 - relevant scientific and engineering principles
 - relevant legislation and standards
 - health and safety considerations
 - any environmental sustainability concerns
- At least two options proposed with a rationale for the chosen option
- A reflective evaluation as to how the apprentice went about the process of producing the response to the project brief – what worked, what did not work, obstacles that needed to be overcome and how this was achieved, what they would do differently next time.

2 Written Report (1400 – 1600 words) – the apprentice will submit a reflective account which gives

- A minimum of 2 and a maximum of 4 examples of tasks undertaken in the course of their apprenticeship to demonstrate where the Apprentice solved a technical problem, explaining their role and how they selected the appropriate techniques, procedures and methods used. The report prepared by the Apprentice should explain any scientific, technical or engineering principles used, how the findings / recommendations were made, what they did for their employer or other people involved such as clients or suppliers and include anything they did to ensure the safety of people, equipment or data.
- A minimum of 2 and a maximum of 4 examples to demonstrate how they identified, planned, and organised the resources needed to effectively complete a project or task, explaining how the Apprentice took into consideration cost, quality, safety and any environmental impact. The report should make reference to what equipment was used, how data was gathered and analysed and how the Apprentice initiated the project to produce the desired outcome.
- A minimum of 2 and a maximum of 4 examples to demonstrate how the Apprentice has complied with the Professional Engineering Institution's Code of Conduct, how the Apprentice keeps in touch with developments in their technical area and how the Apprentice intends to continue to develop their knowledge and skills.

A registered member of a Professional Engineering Institution (EngTech, IEng or CEng) who works with the apprentice will verify that the work described in the written report has been carried out by the apprentice. The written report will be submitted electronically to the Professional Engineering Institution at least three weeks ahead of the date of the interview. Two trained and qualified assessors will review the written report and assess it against the knowledge, skills and behaviours listed in the apprenticeship standard, record their findings on the Assessment Form against the relevant knowledge, skill and/or behaviour and agree areas that need to be explored further as part of the interview.

STAGE 2 – Presentation and Structured Interview.

It is anticipated time from submission of the written report to interview will be 3-4 weeks.

The Assessor Panel of two qualified and trained assessors will assess both elements of the End Point Assessment.

Presentation. The apprentice will give a 10-minute presentation showcasing their response to the technical project brief. The Assessor Panel will be made aware of the content of the project brief issued to the apprentice 3 weeks in advance of the presentation. The presentation must be supported by 'hard copy' such as slides, drawings, spreadsheets, which the apprentice will have prepared beforehand and made available at the start of the presentation. The presentation will be followed by 10-15 minutes of question and discussion. The presentation and discussion will be marked on the Assessment Form according to the grading criteria set out in this Assessment Plan and awarded a mark of Pass or Fail.

Structured Interview This is then followed by a 30-40-minute structured interview with members of the Assessor Panel. The purpose of the interview is so that the Assessor Panel members can assure themselves that the apprentices has the competence to work as a Civil Engineering Technician.

The questions should focus on 4 main areas in the context of the occupational specialism demonstrated in the written report. At least one question must be asked for each of the 4 areas,

- ✓ Technology and problem solving – questions about the use of software tools in design and data collection, awareness of the range of factors affecting choice of engineering solutions, choices of systems and components, health and safety, environmental impact and sustainability, whole life costing,
- ✓ Management – questions about working to quality, time and budget, planning workload, the importance of technical standards and procedures, keeping proper records.
- ✓ Communication – questions exploring examples of technical and non-technical presentations and reports, working as part of a team.
- ✓ Commitment and ethics – questions about client confidentiality, the importance of safe systems of work, the need for sustainable solutions, professional development

The structured interview will be marked according to the grading criteria set out in this Assessment Plan and awarded a mark of Pass or Fail.

To achieve an overall pass for the End Point Assessment the apprentice must gain a pass grade for both the presentation and the structured interview.

What will apprentice have to do?

- ✓ Prepare and present a response to a technical project brief including any handouts and/or slides.
- ✓ Submit a written report on the knowledge, skills and behaviours acquired during the apprenticeship.
- ✓ Attend an interview
 - Make a 10-minute presentation showcasing their response to the project brief, answer questions and take part in a discussion based on the presentation
 - Take part in a structured interview

Where will the assessment take place?

The interview will be set up by the Professional Engineering Institution in a suitable venue to minimize travel wherever possible by the apprentice and the assessors. In exceptional circumstances, for example if the apprentice is working in a remote location, the option of an interview by using video conference facilities may be used.

Who

Who will carry out assessment and who will be on the Register?

The End Point Assessment will be carried out by an Assessor Panel of two assessors appointed by the relevant Professional Engineering Institution which has the ability to assess applicants as Civil Engineering Technicians and award the status of EngTech.

Following receipt of the application for End Point Assessment the Professional Engineering Institution will check that it is all in order and then select two assessors at least one of whom is matched to the apprentice's area of specialism.

The Professional Engineering Institution will be on the Register of Apprentice Assessment Organisations

Minimum requirements for assessors

The members of the Assessor Panel are required to be professionally qualified members of a Professional Engineering Institution and must have been trained to carry out their role as assessors. Applicants must either be working in the industry or, if not currently working in the industry or recently retired (up to two years), will need to demonstrate that they have maintained links with the industry and current practices. Each application to become an assessor will be evaluated on its own merits. The evaluation process will

consider all relevant factors such as a minimum of three years industry experience, professionally qualified to at least EngTech and having post-professional qualification experience. Once appointed the assessor will undertake training as required by the Professional Engineering Institution and be subject to the Professional Engineering Institution's quality assurance process including maintaining and submitting CPD records on request. This training includes how to undertake assessments, marking standardisation, questioning techniques and observing interviews and is a tried and tested process within the Professional Engineering Institutions which are licensed by the Engineering Council, the UK regulatory body for the engineering profession.

How will the panel work and who will have the casting vote?

The Assessor Panel will be appointed by the Professional Engineering Institution.

The Written Report and End Point Assessment Application submitted by the apprentice will be checked by Professional Engineering Institution staff to ensure that all is in order before they are passed onto the Assessor Panel members for them to study ahead of the interview. The Assessor Panel members will consider the written report record their findings on the Assessment Form which lists the knowledge, skills and behaviours from the standard along with the grading criteria and agree between themselves on the areas to be covered in the interview. The assessors will record their findings for both the presentation and the structured interview on the same Assessment Form. The assessors will mark each component as pass or fail backing their decision up with evidence from the various elements of the End Point Assessment. To be successful the apprentice must demonstrate that they have met all of the knowledge skills and behaviours in the standard and have obtained a pass grade for both the presentation and structured interview elements of the End Point Assessment.

The completed form with the Panel's recommendation will then be submitted to the Professional Engineering Institution for audit and approval.

If, after discussion, one or more of the assessors are of the opinion that the required standard has not been achieved then the outcome is a fail.

Final Judgement

Who makes the final decision about whether the apprentice has passed?

The relevant Professional Engineering Institution which will be registered and listed on the Register of Apprenticeship Assessment Organisations (RoAAO). If the apprentice has been unsuccessful the employer will have to apply to resit/retake the End Point Assessment taking into account assessor feedback on areas where they did not demonstrate competence as evidenced in the summary report on the Assessment Form. The feedback will be provided in writing at the same time as the apprentice is informed that they have failed the End Point Assessment. If the apprentice passes the presentation element they only have to resit/retake the structured interview. The resit/retake must include a structured interview even if it was passed first time round. The resit/retake must be taken within 12 months of the original End Point Assessment

Independence

Who is providing the independent End Point Assessment?

The Professional Engineering Institution will coordinate the entire End Point Assessment process completely independently of the employer and any training providers. The assessors appointed to carry out the End Point Assessment will not be from the apprentice's employer or training provider or related to the apprentice in any other way.

How is this deliverable for all employers?

The interview will be set up by the Professional Engineering Institution in a suitable venue to minimize travel wherever possible by the apprentice and the assessors. In exceptional circumstances, for example if the apprentice is working in a remote location, the option of an interview by using video conference facilities may be used.

Summary of Roles and Responsibilities

Employers will submit the application for the End Point Assessment once the apprentice can demonstrate that they have satisfactorily completed all aspects of their apprenticeship programme.

The Professional Engineering Institution will be responsible for coordinating the entire End Point Assessment completely independent of the employer and training provider. This includes

- The recruitment, training and monitoring of assessors
- Administration associated with the carrying out of the End Point Assessment
- The End Point Assessment itself
- Quality control of the assessment process
- Informing the apprentice of the outcome of the End Point Assessment
- Arranging resits/retakes
- Dealing with any issues or appeals that arise
- Applying for the apprenticeship completion certificate

Quality Assurance - Internal

The Professional Engineering Institution will have its own internal quality assurance procedures to ensure that the assessment process is valid and reliable. These procedures are in accordance with the Engineering Council requirements from which it gets its license in the first place.

The End Point Assessment will be conducted by assessors who are trained, approved, and reviewed by the relevant Professional Engineering Institution.

The Professional Engineering Institution will sample all failures and 10% of passes of the End Point Assessment results for consistency and reliability. Regular meetings with assessors will be held at least annually to provide an update and feedback on the assessment process.

The Professional Engineering Institution has an appeal process if an Apprentice wishes to challenge the process of the end-point-assessment.

Quality Assurance - External

The EQA will be delivered by the Engineering Council, working in partnership with the IfA.

End Point Grading

A grading exemption has been applied for in relation to the Civil Engineering Technician Standard

The table below outlines the scoring criteria that will be applied for each assessment method.

End point assessment method	Pass criteria	Fail Criteria
Presentation (based on response to technical project brief)	<p>Using Annex A provides evidence of knowledge, skills and behaviours required to</p> <ul style="list-style-type: none"> · Review and select appropriate techniques, procedures, and methods to undertake tasks (K1) · Use appropriate scientific, technical, or engineering principles (K2) · Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions (B6) · Identify, organize, and use resources effectively to complete tasks, with consideration for cost, quality, safety, security, and environmental impact (K3) 	<p>Fails to provide evidence to meet knowledge, skills and behaviours as required in Annex A for this assessment method</p>

	<ul style="list-style-type: none"> · Work reliably and effectively without close supervision to the appropriate codes of practice (K3, B2, B5) · Use oral, written, and electronic methods for the communication in English of technical and other information (K4, S4, B7) · Manage and apply safe systems of work (K6, S5, B1) · Undertake engineering work in a way that contributes to sustainable development (K7) <p>To pass the apprentice must demonstrate achievement of all these grading criteria.</p>	
<p>Structured interview (informed by a written report)</p>	<p>Using Annex A provides evidence of knowledge, skills and behaviours required to</p> <ul style="list-style-type: none"> · Review and select appropriate techniques, procedures, and methods to undertake tasks (K1, S1) · Use appropriate scientific, technical, or engineering principles (K2, S2) · Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions (S2, B6) · Identify, organize, and use resources effectively to complete tasks, with consideration for cost, quality, safety, security, and environmental impact (K3, S2, S3) · Work reliably and effectively without close supervision to the appropriate codes of practice (K3, S3, B2, B4, B5) · Accept responsibility for work of self and others (S3, B2, B4) · Accept, allocate and supervise technical and other tasks (S3) · Use oral, written, and electronic methods for the communication in English of technical and other information (K4, S4, B7) · Work effectively with colleagues, clients, suppliers, or the public, and be aware of the needs and concerns of others especially when related to diversity and equality (K3, S3) · Comply with the Codes of Practice of the Professional Engineering Institution (K5) · Manage and apply safe systems of work (K6, S5, B1) · Undertake engineering work in a way that contributes to sustainable development (K7) · Carry out and record Continuing Professional Development (CPD) necessary to maintain and enhance competence in own area of practice (K8, S6, B2, B3) · Exercise responsibilities in an ethical manner 	<p>Fails to provide evidence to meet all the knowledge, skill and behaviour requirements as required in Annex A for this assessment method</p>

	To pass the apprentice must demonstrate achievement of all these grading criteria.	
Implementation		
<p><i>Affordability</i></p> <p>The cost of the End Point Assessment is based on the overall costing of: -</p> <ul style="list-style-type: none"> · Logging applications for end point assessment and issuing technical project brief. · Setting up the interview and appointment of assessors · Venue costs · Assessor travelling and subsistence expenses · Quality assurance to ensure consistency and rigour · External quality assurance payment · General administration of the process <p>This is estimated to be of the order of 4% of the total cost of the apprenticeship.</p> <p>In drawing up these costs the affordability and feasibility of the End Point Assessment were taken into account, including the option of undertaking the interviews by video conferencing link.</p>		
<p><i>Professional body recognition</i></p> <p>This is embedded in the process – the End Point Assessment will be carried out by the relevant Professional Engineering Institution and the outcome is that the apprentice will have fully satisfied the requirements for EngTech registration with the Engineering Council. EngTech registration is linked to membership of the Professional Engineering Institution and so, on successful completion of the End Point Assessment, the apprentice is also eligible to apply for membership of the institution.</p>		
<p><i>Consistent</i></p> <p>Benchmarking the end point assessment against the Engineering Council UK-SPEC requirements for EngTech and the internal and external quality assurance processes mean that the assessment outcomes will be consistent and reliable, allowing a fair and proper comparison between apprentices employed in different types and sizes of organisations and at different geographical locations.</p>		
<p><i>Volumes</i></p> <p>In the first year of delivery starting September 2017 - it is estimated that 250 apprentices will be starting on the programme. It is anticipated that this will rise to a figure of approximately 400 apprentices a year in future years. Colleges already deliver part-time academic qualifications for the industry and so there are no issues with capacity and scalability. Similarly, Professional Engineering Institutions already deliver their professional review assessment processes and have the required infrastructure in place.</p>		

ANNEX A

Civil Engineering Technician

MAPPING OF EPA METHODOLOGY TO STANDARD

Ref	Core knowledge to be assessed	Presentation based on response to technical project brief	Structured Interview informed by a written report
K1	The different techniques and methods used to design, build, and maintain civil engineering projects. This includes understanding how ideas and requirements are converted into engineering designs, knowing the standards, contracts and specifications and their impact on the design and construction process.	✓	✓
K2	The appropriate scientific, technical, and engineering principles relating to the design of infrastructure and buildings. This includes an understanding of the mathematical, scientific, engineering techniques and software packages required to support the design and construction processes, including building information management and modelling aspects of civil engineering disciplines with a demonstrable knowledge of sustainability.	✓	✓
K3	How to work effectively and contribute to engineering solutions by the correct use of resources and time. This includes an understanding of project management systems, tools, and techniques as they are applied to the design and construction process	✓	✓
K4	How to communicate effectively using a range of techniques. This includes an understanding of different communication methods and when to use them; how to write technical reports, drawing and modelling conventions and engineering terminology; collaboration and effective team working.	✓	✓
K5	The code of conduct of relevant professional bodies and institutions including ethics and their application in design and delivery of projects. Understanding the protection of client confidentiality, the need to adhere to corporate policies on ethics and diversity and the professional obligation to contribute to society		✓
K6	Safe working practices and how to comply with them. Understanding of regulations such as Construction, Design and Management (CDM), Common Safety Method (CSM), hazard identification, and risk mitigation in relation to project delivery.	✓	✓
K7	Sustainable development and their own contribution to economic, environmental, and social wellbeing. Understanding of company	✓	✓

	and client sustainability and environmental policies and their effect on design and delivery; and an awareness of the environmental impact of projects and mitigating actions.		
K8	Sources of and approaches to Continuing Professional Development (CPD). Understanding of appraisal schemes including training and development plans, CPD obligations and competency requirements relating to self and others.		✓

Ref	Core skills to be assessed	Presentation Based on response to technical project brief	Structured Interview Informed by a written report
S1	Select and use appropriate scientific, technical, and engineering principles, techniques, and methods to contribute to the design and delivery of infrastructure and building projects. This includes the ability to produce and self-check; calculations, models, and drawings; use appropriate systems and software packages for data gathering, Computer Aided Drawing, Building Information Management, and project management; and assist with site surveys and inspections		✓
S2	Work with others to contribute to produce integrated engineering solutions by the correct use of resources and time. This includes the ability to contribute to developing, evolving, and monitoring solutions to engineering problems whilst working to programme and within budget.		✓
S3	Manage and maintain the quality of their work and that of others. Assess the task to be done, plan/schedule work and manage time; decide when to allocate work to other people; maintain the flow of information; check work at an appropriate level and against appropriate standards and specifications. Keep well organised personal records of work undertaken		✓
S4	Communicate effectively and appropriately with others using a range of techniques including verbal communication, written reports, models, and drawings using correct terms, standards, and formats.	✓	✓
S5	Keep themselves and others safe by adhering to safe working practices. This includes the ability to identify hazards and assess risks, follow safe systems of work, and adhere to all company safety policies.	✓	✓
S6	Maintain their skills base and learning. This includes the ability to assess their own competence against training objectives and identify development needs and training action plans		✓

Ref	Core behaviours to be assessed	Presentation Based on response to technical project brief	Structured Interview Informed by a written report
B1	Take a responsible approach to health and safety	✓	✓
B2	Be professional, proactive, and receptive to constructive advice and guidance		✓
B3	Be willing to learn new skills and to adapt in the light of experience		✓
B4	Know one's limitations and when to ask for help or escalate		✓
B5	Work independently when appropriate and take responsibility for and pride in their work	✓	✓
B6	Demonstrate a positive approach to problem solving	✓	✓
B7	Show an ability to contribute to discussions as part of a team	✓	✓