T Level Technical Qualification in Design and Development for Engineering and Manufacturing

Employer-Set Project (8730-035)

Candidate Pack

(Sample)

September 2025 Version 2.0

Contents

Version and date	Change detail	Section
1.0 September 2023	Published version.	Full document
2.0 September 2025	Candidate guidance, Brief and Tasks amalgamated into one document. 'Assessment Objectives and Core Skills' section removed.	Full document Employer-Set Project Introduction

Employer-Set Project introduction

The Employer-Set Project (ESP) is an assessment, made up of a number of tasks, which will assess the knowledge and skills you have learnt as part of the 'Core' element of your T Level.

Each project is developed together with employers in the industry to reflect realistic types of developments, activities and challenges.

All the tasks relate to the same ESP brief in the following order:

Task		What will you be doing?	Timings	Marks
1	Research	You will conduct research in relation to the project brief.	3 hours	15
2	Design	Using the results of your research from task 1 and the knowledge and skills you have been taught, you will draft a design to meet the requirements of the brief.	8 hours	24
3	Plan	Using the details within the project brief, you will produce a short programme of work plan and supporting statement.	5 hours	18
4	Present	You will present the outcomes of tasks 1, 2 and 3 to your tutor, as if they were a client.	2.5 hours	24
		Totals	18.5 hours	81
		Maths, English and digital skills		9
		Total marks		90

Maths, English and digital skills

Throughout the completion of the tasks within the project, you will generate evidence towards your maths, English and digital skills. There are 9 marks allocated to maths, English and digital skills across all tasks like this:

Maths	3 marks available
English	3 marks available
Digital	3 marks available

General guidance for candidates

As all the tasks relate to the project brief, it is important that you read it carefully and fully **before you start the project**. You will be given 30 minutes reading time for this purpose at the start of the project.

The ESP is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of the written work you produce. It is therefore important that you carry out your work to the highest standard you can. How well you know and understand the subject, and how you have used your knowledge to complete the project must be clear to the marker. This means you should explain your thinking and how and why you have made your decisions within your written work e.g. as part of your planning, reflections, or evaluations.

Plagiarism

Plagiarism is the failure to acknowledge sources properly and/or the submission of work that is not your own. Plagiarism is **not** allowed in this project.

This project is an assessment of your abilities, so the work submitted **must** be all your own and carried out under the conditions stated. You will be asked to sign a declaration that you have not had any help with the project. Your tutor is allowed to give you some help understanding the instructions, if necessary, but they will record any other guidance you need, and this will be taken into account during marking.

Where research is allowed, your tutor **must** be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge sources used and clearly reference any information taken from them (e.g. providing as a minimum a list of web addresses/books/articles etc. used).

Use of Artificial Intelligence (AI)

AI may only be used as a source where the use of the internet is allowed for a research task. Where you use AI, you **must** acknowledge its use and show clearly how you have used it. Please be aware that how you have decided to use it may impact on the overall mark you are allocated.

Guidance and feedback

There are some rules around how much guidance and feedback your tutor can provide as part of completing the project. Your tutor is allowed to give you some help in understanding the task instructions if necessary. However, if your tutor has to provide significant clarification and guidance, this will be recorded and considered as part of the marking process and may reduce your mark. Your tutor will make it clear if any guidance given may reduce your mark before it is given, so that you understand this when asking for guidance.

Timings and planning

Each task has an allocated duration – you will have to plan your work so you can complete the task within the time allowed. You should take care to make sure you have divided the time available between parts of the task appropriately. If you are not sure how much time you have, check and clarify this with your tutor.

When working under supervised conditions for longer sessions, your tutor will advise you on how breaks can be facilitated.

At the end of the project, before submitting your work, you will be required to sign a 'Declaration of authenticity'. This document confirms the work submitted work is your own and that the project tasks were completed within the set assessment times. The 'Declaration of authenticity' will also be signed by your tutor.

Presentation of work

Presentation of work must be neat, legible and appropriate to the task. You should make sure that each piece of evidence, including any forms, are clearly labelled with your name. Where there is a template to use this will be provided by your tutor.

All electronic files must be given a clear file name that allows your tutor to identify it as your work. You should consider using a consistent, clear file-naming convention across all the pieces of evidence you generate for submission.

Written work may be word processed or handwritten, unless stated otherwise. Any sketches should be neat and tidy, and annotated appropriately. Any technical drawings should be neat and tidy, drawn to an appropriate scale and annotated appropriately.

Any calculations should be set out clearly, with all working shown, and any assumptions made. You should use appropriate units of measurement at all times. Answers must be expressed to a degree of accuracy, consistent with the requirements of the project.

Word counts

Typical word counts or numbers of pages of evidence are provided within the requirements of each task. Where word counts have been provided, these are given as an indicative guide only to support you to understand the type of response that is expected from you. You will not be penalised as part of the marking if your response is below or above the indicative word count provided, however you should consider the clarity and succinctness of your response if it goes above the word count.

Submission of evidence

Your work will be submitted as final at the end of each assessment session. You will not have an opportunity to rework any of your evidence once the assessment session ends. However, if through other tasks within the project, you develop your ideas or build on earlier tasks, then you should continue to build on these and should use your evaluation to outline the reasons why this happened.

Brief

The employer

Component Tech Limited is an established supplier of street furniture throughout the UK. The company provides products such as seating, planters, litter bins, bicycle stands and bollards to local authorities and contractors for installation into public realm spaces. Public realm spaces are spaces that are free and open to anyone. These spaces might be located between buildings, in squares, forecourts, parks, or outside railway stations.

The project

Component Tech Limited has been approached by Train Express Limited to develop a new bollard, a short post used to prevent traffic from entering an area. The bollard is to be sited in the public realm spaces immediately outside their stations to prevent unauthorised vehicular access. Railway stations are places frequented by people catching and alighting trains daily. It is useful for rail passenger companies to keep track of the number of people using their infrastructure.

You are part of the team at Component Tech Limited who are working to plan the design and manufacture of a new bollard (illuminated post) for Train Express. You have been tasked with researching and providing initial design solutions and a technical specification for the design of the bollard in line with requirements provided by Train Express Limited.

An extract of the design brief relating to your part of the project has been provided: this includes performance requirements, pictures, budget constraints and timescale requirements.

Product design specification

Performance requirements for the bollard

Train Express Limited wish to develop a bespoke bollard to be sited in public realm spaces outside their stations across the UK (refer to Photograph 1). The company wish to 're-engineer' an internally illuminated bollard (refer to Photograph 2) used frequently in streetscapes across the UK. The new bollard is also required to monitor the number of people using a station and should be energy efficient. The specific performance requirements of the bollard are:

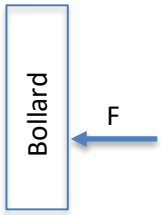
- the bollard shall have a height of 1000 mm (tolerance 50mm)
- each bollard needs to be able to sustain an impact loading from a vehicle. The force applied to the bollard should be calculated in accordance with 'BS EN 1991-1-1:2002 Eurocode 1: Actions on Structures Part 1-1: General Actions- Densities, Self-weight, Imposed Loads for Buildings. (refer to Table 1)
- the bollard's outer housing is to be batch manufactured from fifty percent recycled or sustainable material to aid a Green Design approach
- the bollard is to be fitted with current and mature technology that is able to count people who pass by it
- the bollard is to be lit by a low energy lighting source to provide 600 lumen. The cost of running the bollard should be less than £35 a year, assuming electricity charged at 14p per kilowatt hour
- the bollard is to have an internal light source, which ensures that it is clearly visible from all sides
- the overall shape, ergonomic features, and aesthetic design of the bollard is to be modern and reflect the intended siting outside a railway station
- there is no requirement for the bollard to have the same colour scheme or signage as the example given in Photograph 2
- a base connection and foundation base for bollard should be designed
- the bollard's outer shell should be easily replaceable in case of damage
- Train Express Limited wish to limit any mains power source to the bollard
- the bollard should be designed to be vandal proof

- the bollard should be designed to operate in external environmental conditions
- the bollard should be reliable and require minimum maintenance during its life.

Table 1: Loading applied to the bollard

The horizontal characteristic force F (in KN) should be equal to that delivered by the impact of a vehicle given by:

$$F = \frac{0.5\, m\, v^2}{\partial c + \partial b}$$



Where:

m is the gross mass of the vehicle (in kg)

v is the velocity of the vehicle (in m/s) normal to the bollard

∂c is the deformation of the vehicle (in mm)

∂b is the deformation of the bollard (in mm)

NB - The force could be applied at any location on the bollard.

Photographs

Photograph 1: Typical area outside a Train Express Limited Station

(Source of image: Shutterstock)

Photograph 2: A standard internally illuminated bollard

(Source of image: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/244067/traffic-bollards-low-level.pdf)

Budget
Trains Express Limited have budgeted for a supply price of £500 per bollard unit and wish to purchase 800 units a year from Component Tech Limited, who manufacture in the UK. They have not set a budget for the installation cost of a bollard unit within station forecourts.

Project duration
Train Express Limited would like to limit the installation time for each individual bollard to an overnight possession of the station forecourt area.

The project manager at Component Tech Limited has indicated that the overall planning, design, prototype development and manufacturing time is to be 62 weeks.
There are 32 stations, with 25 bollards proposed at each station.

Task 1 Research

You have been asked to respond to the client Trains Express Limited's design specification. You will research some technologies for the new bollard and confirm the client requirements.

You must conduct research to determine:

- suitable recycled or sustainable material options for the bollard casing
- suitable technology to
  - count human presence
  - power the bollard
  - light the bollard
- aesthetic design features, bollard base connection detail and foundation.

Using this research, you must write a technical brief detailing:

- an evaluation of potential bollard materials, technology and aesthetic design features
- key requirements for a suitable bollard
- your initial concept ideas for the bollard based on the client's design specification.

At this stage you do not need to recommend which of your ideas is your preferred. You will develop your ideas further in later tasks.

The technical brief will typically be 1500 words (not including references/sources). The document can include pictures, images, specifications, and diagrams. You must also provide any notes made as part of your research, including details of your research approach and how you planned your research.

Timing of assessment

- You will have **three hours** to carry out the research and complete the technical brief.

Conditions of assessment

- Your technical brief should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to the Internet to conduct your research.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Technical brief (typically 1500 words) hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).
- List of references/sources.
- Research notes.

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 15

Task 2 – Design

The technical brief you worked on in Task 1 has been submitted to Trains Express Limited. You have now been asked to develop your designs and prepare drawings and calculations for the new bollard.

Part A

You are to prepare fully annotated sketches (3D, plan, elevation, section and detail) of **at least two** bollard designs. The annotated sketches should use standard engineering conventions and clearly illustrate the:

- bollard base connection detail
- materials from which the bollard is to be constructed
- internal lighting details
- shape and ergonomic features of the bollard
- full dimensions
- count human presence technology
- anti-vandalism features.

You must:

- annotate your bollard sketches with a safe working horizontal impact force for the bollard
- prepare a supporting calculation determining the maximum horizontal vehicle force that the bollard should be designed to resist
- include all your assumptions in the calculations.

When preparing your sketches, you will need to use the information provided in the project brief, design specification, as well as a copy of the technical brief that you prepared as part of Task 1. Include notes detailing how your designs meets the brief requirements which will typically be 500 words.

Part B

Once you have developed the sketches of your bollard designs you should then prepare a final fully dimension scaled CAD drawing of your **one preferred** chosen bollard design.

The submission for this task will typically be four A3 drawings and two A4 sides of supporting calculations. You should submit your initial sketch design ideas (minimum two) and one fully dimensioned CAD drawing of your final preferred chosen design.

Timing of assessment

- You will have **eight hours** to complete your sketches, calculations and dimensioned CAD drawing. You will have access to relevant software to complete your CAD drawings.

Conditions of assessment

- Your sketches and calculations should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to a copy of your response to the previous task (for review purposes only).
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Drawings, including sketches and CAD drawing (typically four A3 size drawings).
- Supporting calculations (typically two sides of A4) – hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).
- Notes detailing how your design meets the brief requirements (typically 500 words).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 24

Task 3 – Plan

You have been asked to produce a programme of work detailing the stages and considerations required to complete the design, development and manufacture of your final bollard design. You can assume a manufacturing capacity of 40 bollards per week and a required overall timeline of 62 weeks to complete design, prototype development and manufacturing.

The programme of work will need to include:

- key stages of the project
- technology and resources required to manufacture the bollards
- duration and sequence of activities
- the critical path.

Provide a supporting statement to justify your programme taking into consideration:

- health and safety including risk assessment requirements
- manufacturing standards
- specialist equipment
- waste management.
- all assumptions relating to in-house manufacturing capabilities and resources.

The programme of work plan will typically be **one** side of A4.

The supporting statement will typically be 1000 words.

Timing of assessment

- You will have **five hours** to complete your programme of work plan and supporting statement.

Conditions of assessment

- Your programme of work plan and supporting statement should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to software that may be required to create the programme of work (e.g. word processing software, spreadsheets etc.).
- You will have access to copies of your responses to the previous tasks (for review purposes only).
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Programme of work plan (one side of A4).
- Supporting statement (typically 1000 words) – copy of file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available
18

Task 4 – Present

The designs for the bollard have been completed and you are now required to present them to the client Trains Express Limited, at a meeting attended by the company's sales team. The company's sale team is made up of members with a technical background.

You are to prepare and deliver a presentation to outline the key features of the new bollard design and analysis, including the manufacturing proposal.

You must use digital technology for the presentation.

You must cover:

- challenges presented by the brief and how these have been overcome
- how well your design proposal addresses the requirements of the brief.

Your assessor will take on the role of a manger from Trains Express Limited. They will ask questions relating to your presentation from the client's perspective.

Timing of assessment

- You will have **two hours** to prepare your presentation.
- You will have **30 minutes** to present your findings and respond to questions (typically split with 20 minutes for presenting your findings and ten minutes for responding to questions).

Conditions of assessment

- Your presentation should be developed and delivered working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to copies of your responses to the previous tasks (for review purposes only) as well as any presentation materials/notes (e.g. PowerPoint slides).
- You will have access to digital technology for the presentation of your findings - you can choose the format/program and program features you wish to use (e.g. PowerPoint).
- You will have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Presentation materials – e.g. slides, handouts etc. hard copy or digital file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- Video recording of presentation.

Marks available

- 24

The T Level is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.