

[ENG11]

**UNIVERSITY OF BOLTON**

**SCHOOL OF ENGINEERING**

**BEng (HONS) CIVIL ENGINEERING**

**SEMESTER TWO EXAMINATION 2022/2023**

**SUSTAINABLE CONSTRUCTION AND MATERIALS 1**

**MODULE NO: CIE4019**

Date: Thursday 11<sup>th</sup> May 2023

Time: 14.00 - 15.30

---

**INSTRUCTIONS TO CANDIDATES:** There are **FIVE** questions on this paper.

**QUESTION ONE IS COMPULSORY.**

Answer **FOUR** questions in total.

Marks for parts of questions are shown in the brackets.

This examination paper carries a total of 100 marks.

---

School of Engineering  
BEng (Hons) Civil Engineering  
Semester Two Examination 2022/2023  
Sustainable Construction and Materials 1  
Module No. CIE4019

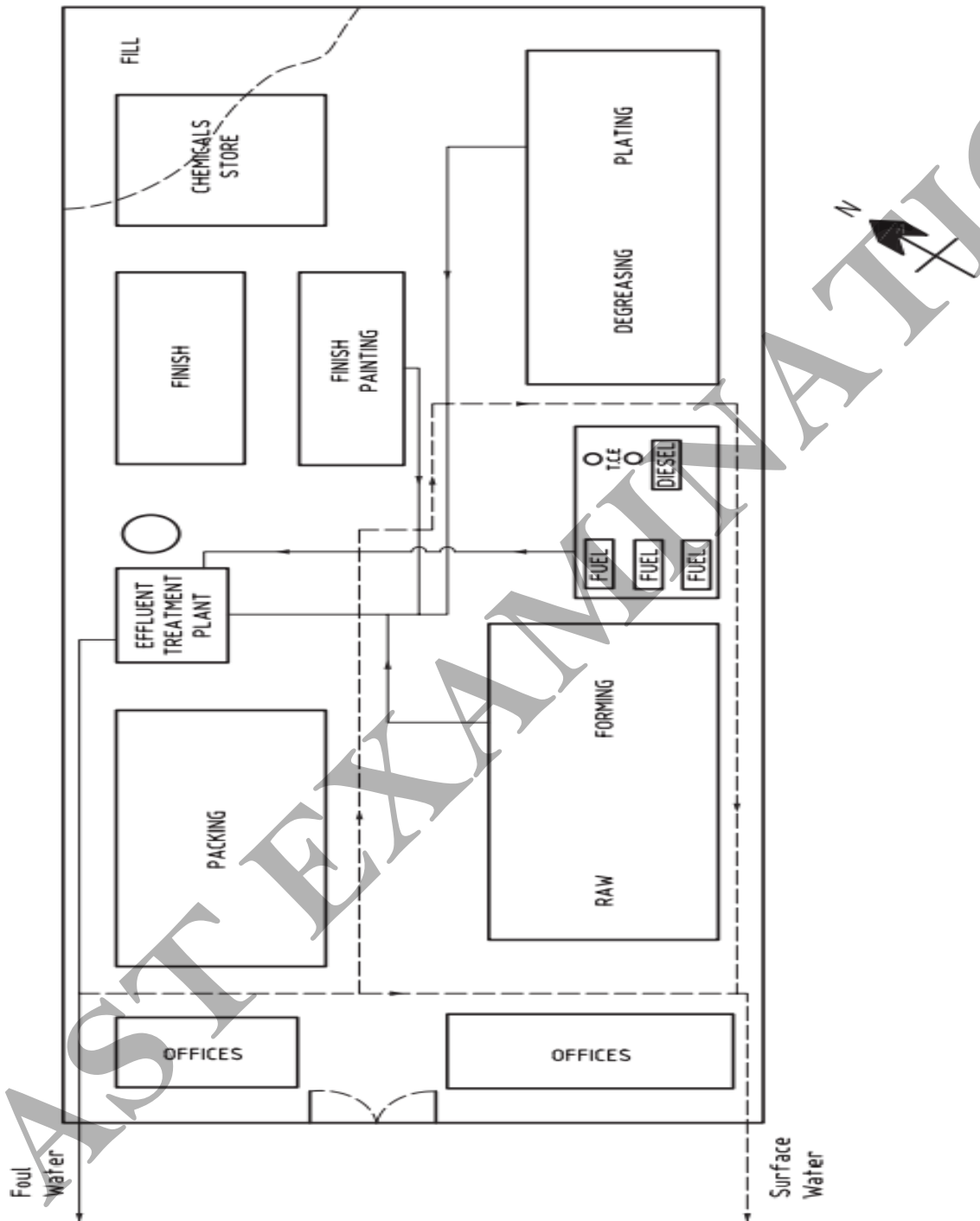


Figure 1. Proposed site for works (adapted from BSI, 2017)

PLEASE TURN THE PAGE....

School of Engineering  
BEng (Hons) Civil Engineering  
Semester Two Examination 2022/2023  
Sustainable Construction and Materials 1  
Module No. CIE4019

**Q1**

The site in Figure 1 (formerly used for the processing of chemicals such as trichloroethene (TCE) and similar solvents, electroplating chemicals and heating oils) is proposed for a 3-floor (ground floor inclusive) residential block of flats in a built-up area at Bolton. In respect to the following items, respond to the associated task.

- a) What will be the main concerns in the site investigation for the proposed works?

**(10 marks)**

- b) In detailed terms, enumerate sources of specific information that can be gathered in the desktop study.

**(10 marks)**

- c) With the aid of a diagram or sketches explain what type(s) of foundation you would recommend for the structure and why.

**(5 marks)**

**Total 25 marks**

**PLEASE TURN THE PAGE....**

School of Engineering  
BEng (Hons) Civil Engineering  
Semester Two Examination 2022/2023  
Sustainable Construction and Materials 1  
Module No. CIE4019

**Q2**

- a) In what situation is soil stabilisation required on a project and why.  
**(5 marks)**
- b) Describe a systematic approach you will adopt in considering available solutions to proffer in dealing with unsuitable ground conditions for foundation works.  
**(10 marks)**
- c) Based on the mode of construction and with the aid of a table, enumerate the advantages and disadvantages of pile types for foundation.  
**(10 marks)**
- Total 25 marks**

**Q3**

- a) With the aid of a diagram discuss the function of a wall.  
**(5 marks)**
- b) Explain the benefits of damp-proof courses and their application in buildings.  
**(8 marks)**
- c) Identify existing options for the construction of external wall insulation systems, compare and contrast their merits and demerits using a table.  
**(12 marks)**
- Total 25 marks**

**PLEASE TURN THE PAGE...**

School of Engineering  
BEng (Hons) Civil Engineering  
Semester Two Examination 2022/2023  
Sustainable Construction and Materials 1  
Module No. CIE4019

**Q4**

- a) Explain what a 'floor' is, including the enumeration of its functions.

**(6 marks)**

- b) Provide a professional advice on the functional requirements that should be considered in the design and construction of upper floor slab.

**(12 marks)**

- c) Rationalise why an architect/engineer may choose to specify a suspended timber ground floor over a ground bearing floor slab in a building design.

**(7 marks)**

**Total 25 marks**

**Q5**

- a) Explain the structural principles of a truss rafter. Draw a section through a truss rafter roof including the eaves detail annotating all component parts.

**(15 marks)**

- b) List the advantages and disadvantages of using a traditional cut roof compared to a truss rafter roof in the construction of the three storey houses on the development.

**(10 marks)**

**Total 25 marks**

**END OF PAPER**