Civil Structural Surveys Project Management

Report Title: **Structural Condition Report On Redundant ETP Slab**

Address: **The Creamery, Newcastle Emlyn**

Client: **Dairy Partners**

Project Reference: **1498**

Our Reference: **HCE-1498-STR-REP-001**

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1.0 INTRODUCTION

HCE were commissioned by Mr Ashton Daniels to carry out a structural condition survey report of the now redundant Effluent Treatment Plant (ETP) reinforced concrete slab for the purpose of assessing structural condition of the slab and its ability to act as an impermeable surface as part of the proposed secondary containment system for the new ETP.

The brief agreed between Mr Ashton Daniels and HCE Ltd was that HCE Ltd were to carry out a walk-around visual inspection of the external areas slab including relevant adjacent areas.

This report shall be for the private and confidential use of Dairy Partners Ltd for whom the report is undertaken and should not be reproduced in whole or part or relied upon by third parties for any use without the express written authority of HCE Ltd.

When describing an item in the report, the cardinal points are used. In some areas, it is more convenient to use the terms “left” and “right” (right hand side – RHS, left hand side – LHS); these refer to the directions the viewer would assume when stood centrally in front of the item being described.

Investigations have been carried out in accordance with the guidance issued by The Institution of Structural Engineers.

Where HCE Ltd. have not inspected parts of the structure which are covered, unexposed or inaccessible, and are therefore unable to report that any such part of the property is free from defect.

The walk round visual non-intrusive survey took place on the 30th May 2023 in clear, dry weather.

The report was completed on the 04th August 2023. The report has been checked and approved by Ioan Howells B.Eng (Hons), ACGI, C.Eng, MAPM, FIStructE.

2.0 SCOPE OF REPORT

This report has been prepared to determine the efficacy of the slab to act as a containment slab providing secondary containment as per CIRIA guidance [Ref.4 and 5].

3.0 DESCRIPTION OF SITE

The site is located on the existing Dairy Partners creamery site within the village of Aber-Arad adjacent to B4333 as shown in Figure 1 and Figure 2 below. The 1:1250 site location plan is included in Appendix A.

The existing external site levels in the area of the existing ETP are around +40.90AOD and with a gentle fall across site to the river Arad. The remainder of the pre-developed site to the East of the ETP, the ground rises sharply to +41.90AOD. The topographical survey for the pre-developed site is included in Appendix B. The proposed developed site will include demolishing the existing redundant large filer bed #002, reducing levels across site to +40.90m to create a large flat area (secondary containment lagoon) around the ETP with a ramped access down from the B4333. The site will then have a bund constructed around its perimeter with flood defence gates provided at two locations to mitigate against flood water

displacement during extreme flood events. The bunded site provides a secondary containment lagoon to mitigate the environmental risks from the ETP as required by NRW.

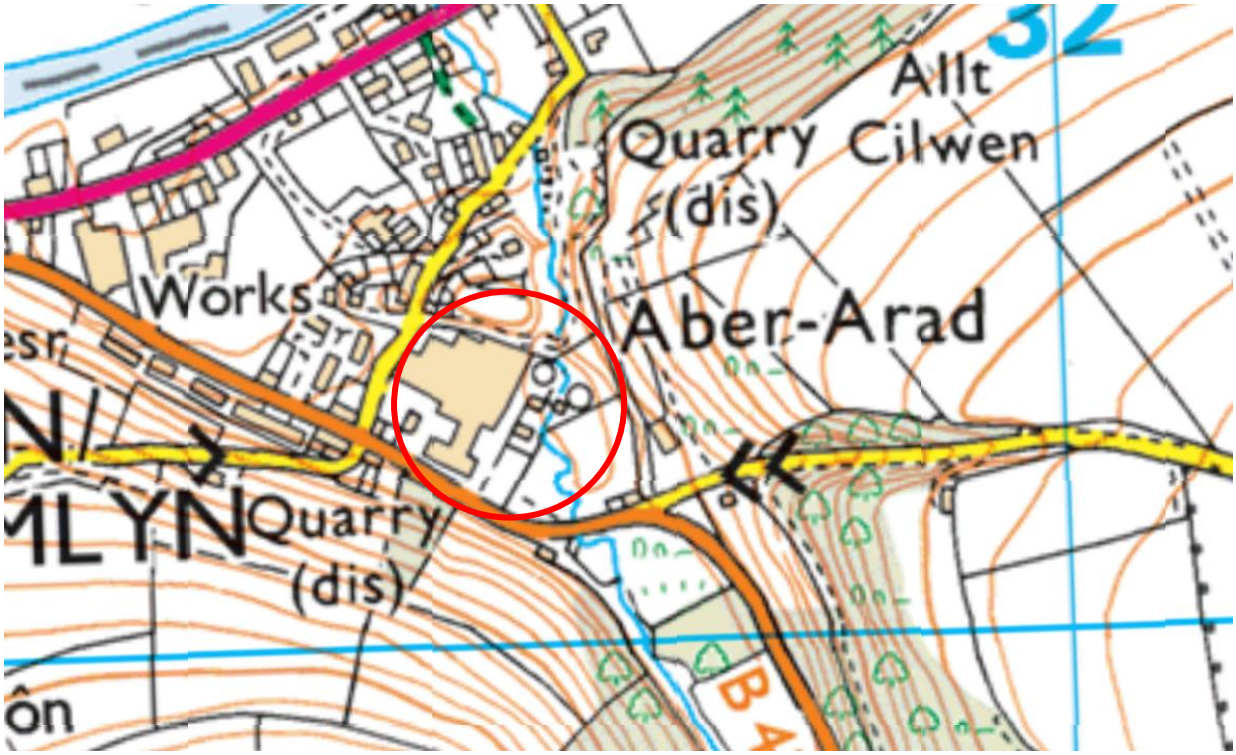
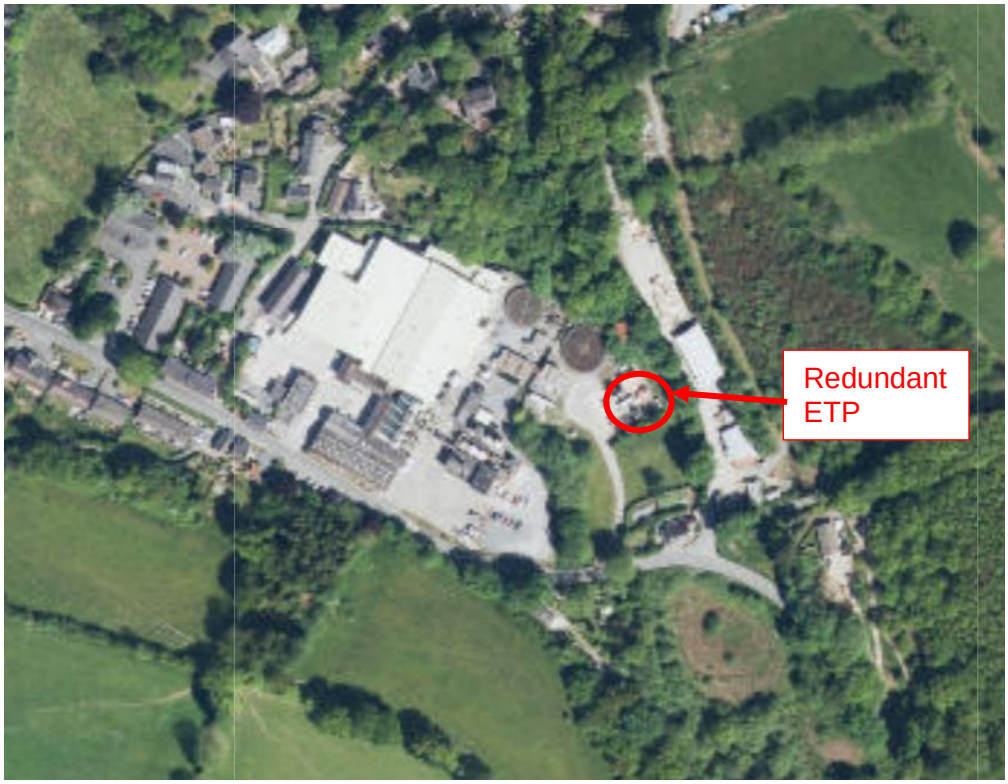


Figure 1: Current OS Map

The site plot plan is shown in Figure 2 below.

Figure 2: Site Plot Plan



Photograph 1: Aerial Photo of Pre-Developed Site

The redundant ETP plant shown in Photograph 3 below is located to the North of the new ETP storage tanks and DAF tanks. It is understood that two of the larger tanks have been re-purposed for use of sludge containment.

Photograph 2: New ETP and Redundant ETP

4.0 INSPECTION & OBSERVATIONS

The existing ETP slab comprises circa 250mm thick reinforced concrete ground bearing slab with circa 150mm upstand bund around its perimeter.

A storm water drainage system, using a 100mm ACO channel, is provided in part adjacent to the perimeter bund in certain locations. It is understood that the storm water was connected to the redundant Effluent Treatment Plant (ETP) prior to discharging from site.

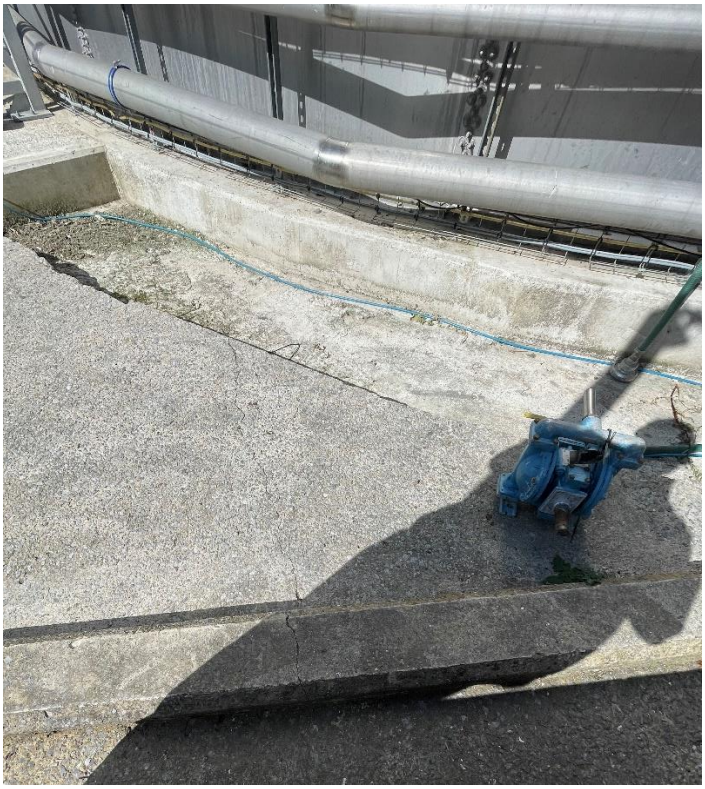
Photograph 3: Redundant ETP Process Plant – View 1

Photograph 4: Redundant ETP Process Plant – View 2

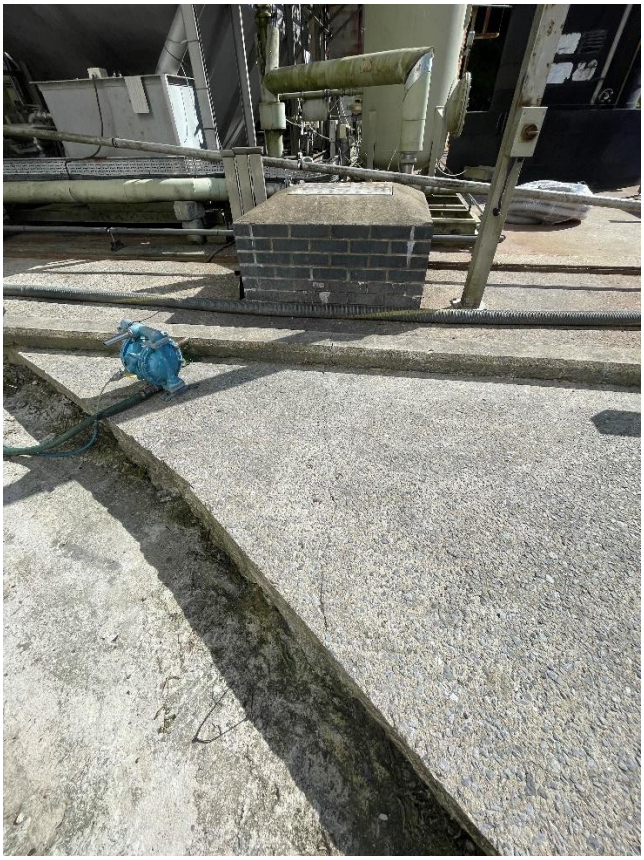
Photograph 5: Redundant ETP Main Slab Area

Photograph 6: Crack In Bund Wall

A 2-3mm wide crack observed in east bund wall as shown in Photograph 6.

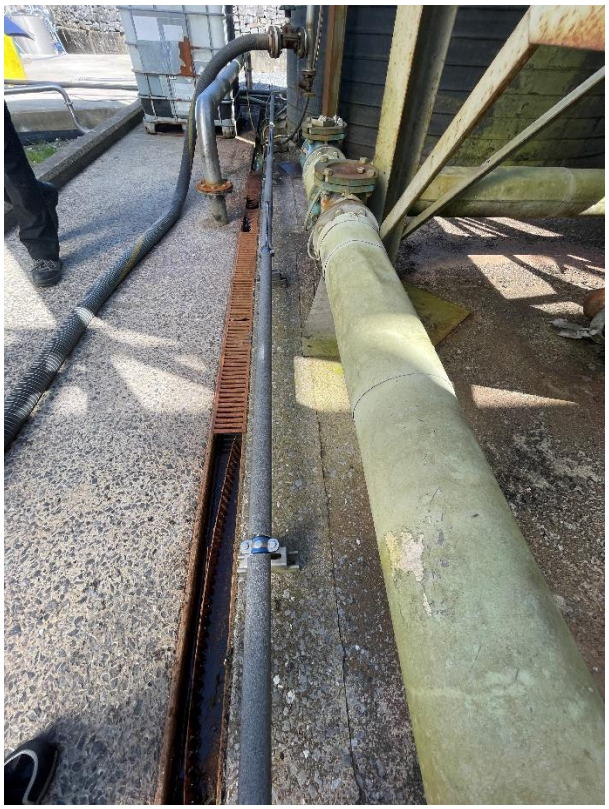


Photograph 7: 1-2mm Crack In External Apron Slab View 1



Photograph 8: 1-2mm Crack In External Apron Slab View 2

Photograph 9: Redundant ETP Slab – General View



Photograph 10: Surface Water Drainage Along West Side

A crack measuring 1-2mm in width was observed running north-south adjacent to the ACO channel as shown in Photograph 10. This is likely to be a construction joint and likely to propagate full depth.

Photograph 11: Surface Water Drainage Along South Side

Photograph 12: 2-3mm Crack In Slab Adjacent To South Drainage Channel

Photograph 13: Redundant ETP Slab – General View South East

Photograph 14: South West Corner of Slab

Photograph 15: General View Along North Side Looking East

Photograph 16: General View Along North Side Looking West

Photograph 17: General View Along East Side Looking South

Photograph 18: 1-2mm Crack Propagating From East Side Under Tank

Photograph 19: 2mm Crack Propagating From Corner of Valve Chamber

Photograph 20: 2-3mm Crack Propagating In Centre Of Main Slab

Photograph 21: 2-3mm Crack Propagating From Recessed Cover

Photograph 22: 2-3mm Crack Propagating In Main Slab Between Equipment Supports

5.0 CONCLUSIONS AND RECOMMENDATIONS

The existing ETP slab comprises circa 250mm thick reinforced concrete ground bearing slab with circa 150mm upstand bund around its perimeter.

A storm water drainage system, using a 100mm ACO channel, is provided in part adjacent to the perimeter bund in certain locations. It is understood that the storm water was connected to the redundant Effluent Treatment Plant (ETP) prior to discharging from site.

The slab on first impressions appears to be in reasonable structural condition, with no evidence of differential settlement or structural distress, however upon closer inspection, there are several cracks typically between 1-2mm in width over the majority of the slab surface. The cracks propagate several meters in length and in some locations propagate to the slab/bund edge and also under existing redundant ETP equipment.

It is concluded that whilst the cracks have had a limited affect upon the structural strength of the ground bearing slab the presence of cracks propagating for several metres to the slab/bund edge, the effectiveness of the slab as a containment slab and compliance with the relevant CIRIA guidance [Ref. 4 and 5] cannot be guaranteed.

As such it is concluded that the existing slab supporting the redundant ETP equipment and any surface water system is replaced as part of the secondary containment lagoon works, and that this are be incorporated into the works.

6.0 REFERENCES

1. BRE Digest 251 (1995) Assessment of damage in low-rise buildings
2. Subsidence of Low-Rise Buildings, Second Edition, Institute of Structural Engineers. August 2000.
3. Building Regulations 2010 Part A
4. CIRIA 736 Containment Systems For The Prevention Of Pollution
5. CIRIA 598 Chemical storage tank systems – Good Practice

APPENDIX A – Site Location Plan

DO NOT SCALE

SITE BOUNDARY

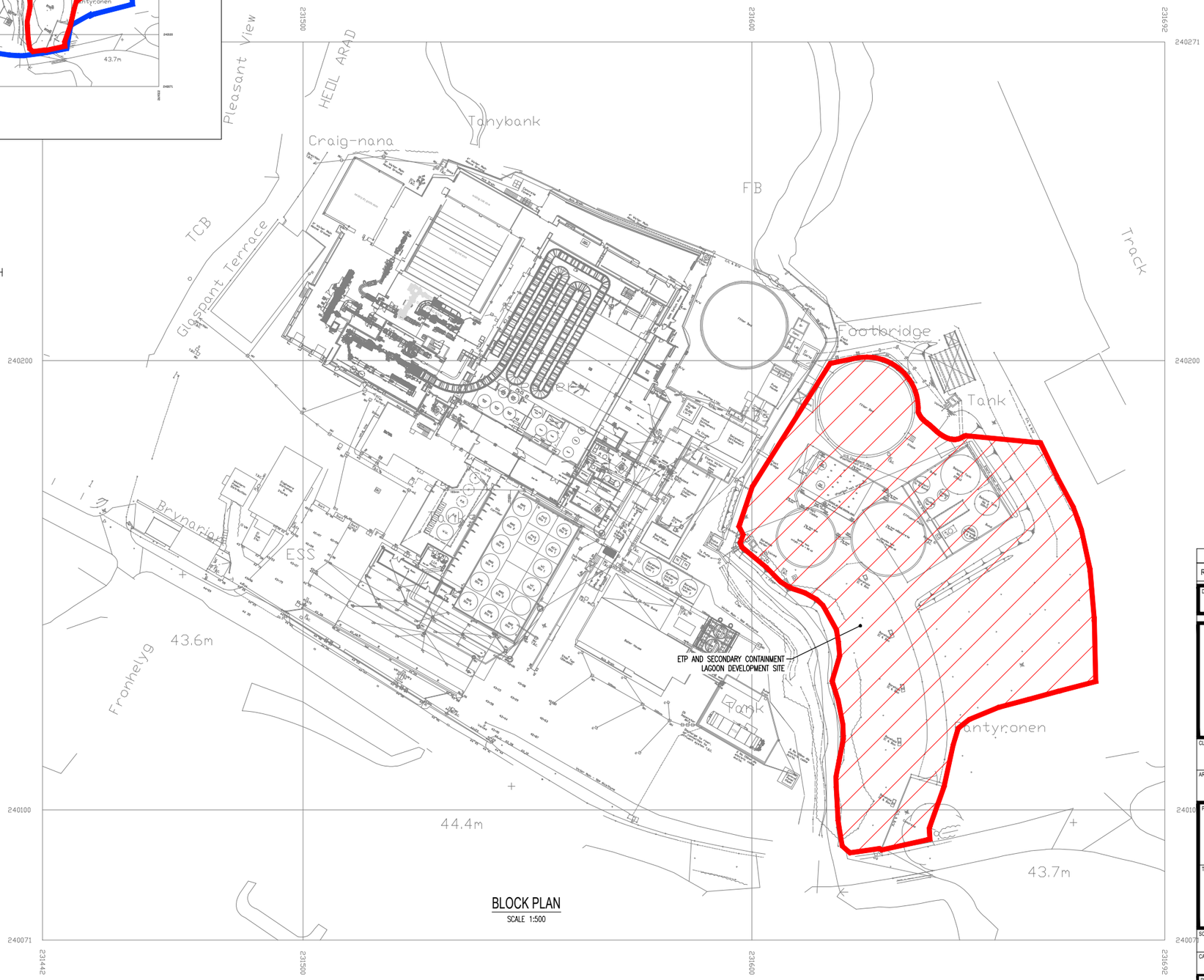
WORKS BOUNDARY

TRUE NORTH

SITE LOCATION PLAN

SCALE 1:1250

TRUE NORTH



BLOCK PLAN

SCALE 1:500

REV	DATE	BY	DESCRIPTION	CHK	APP'D

DRAWING STATUS:

HCE

Civil Engineering
Structural Engineering
Structural Surveys
Project Management
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CLIENT:

DAIRY PARTNERS

ARCHITECT:

PROJECT:

THE CREAMERY
NEWCASTLE EMLYN

TITLE:

PROPOSED ETP AND SECONDARY CONTAINMENT LAGOON
SITE LOCATION AND BLOCK PLAN

SCALE @ A1:	CHECKED:	APPROVED:
1:1250, 1:500	IH	IH
CAD FILE:	DESIGN-DRAWN:	DATE:
HCE-1498.200	LC	JULY 2022

PROJECT No:	DRAWING No:	REV:
1498	200	R01