

# Attachment 3 - Application Documents - 2 Invermay Road, Invermay - Council Meeting 6 May 2021

ireneinc  
PLANNING & URBAN DESIGN



3<sup>rd</sup> March 2021

Michael Stretton  
General Manager  
City of Launceston

Dear Mr Stretton,

## 2 INVERMAY ROAD (CT 174633/2) - MINOR STRUCTURE DA (RETROSPECTIVE)

On behalf of the University of Tasmania as the applicant we write to make a retrospective application for the development of a minor structure to provide shelter and respite, within the Inveresk Open Space Precinct. The Inveresk Precinct manager has been on site with the Students and confirmed that there will be no adverse impact on Council activities as a result of the development. The proposal has been developed and constructed as a part of the Learning by Making unit offered with the School of Architecture and Design, Inveresk, which facilitates a design and build by students of a structure for use by the public. The GFA of the proposed structure is approximately 18m<sup>2</sup> with a maximum height of 3.7m.



ireneinc

49 Tasma St, North Hobart, TAS 7000

Tel (03) 6234 9281

Fax (03) 6231 4727

Mob 0418 346 283

Email [planning@ireneinc.com.au](mailto:planning@ireneinc.com.au)

ABN 78 114 905 074



Figure 1: Design Submissions by A&D students, UTAS 2021

The proposal is located at on land at 2 Invermay Road, Invermay (CT 174633/2). The location of the works is shown in the figures below.

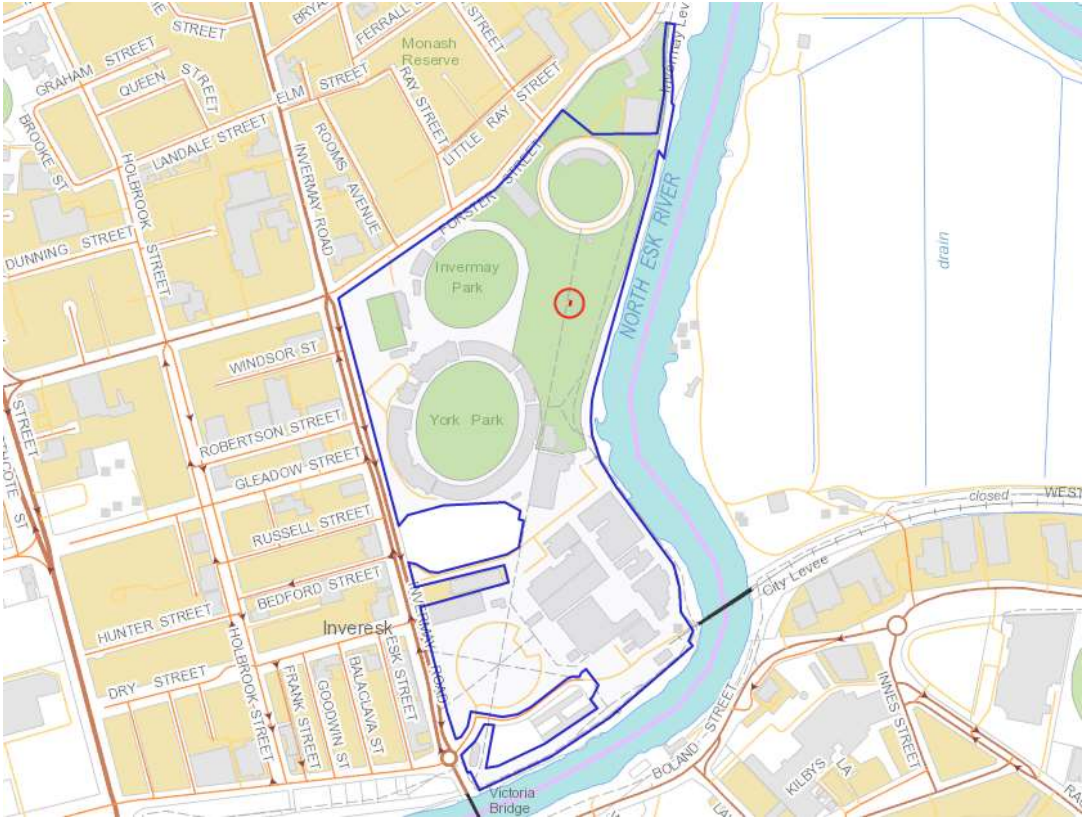


Figure 2: Site plan, development location circled in red with cadastre Source: Listmap 2021

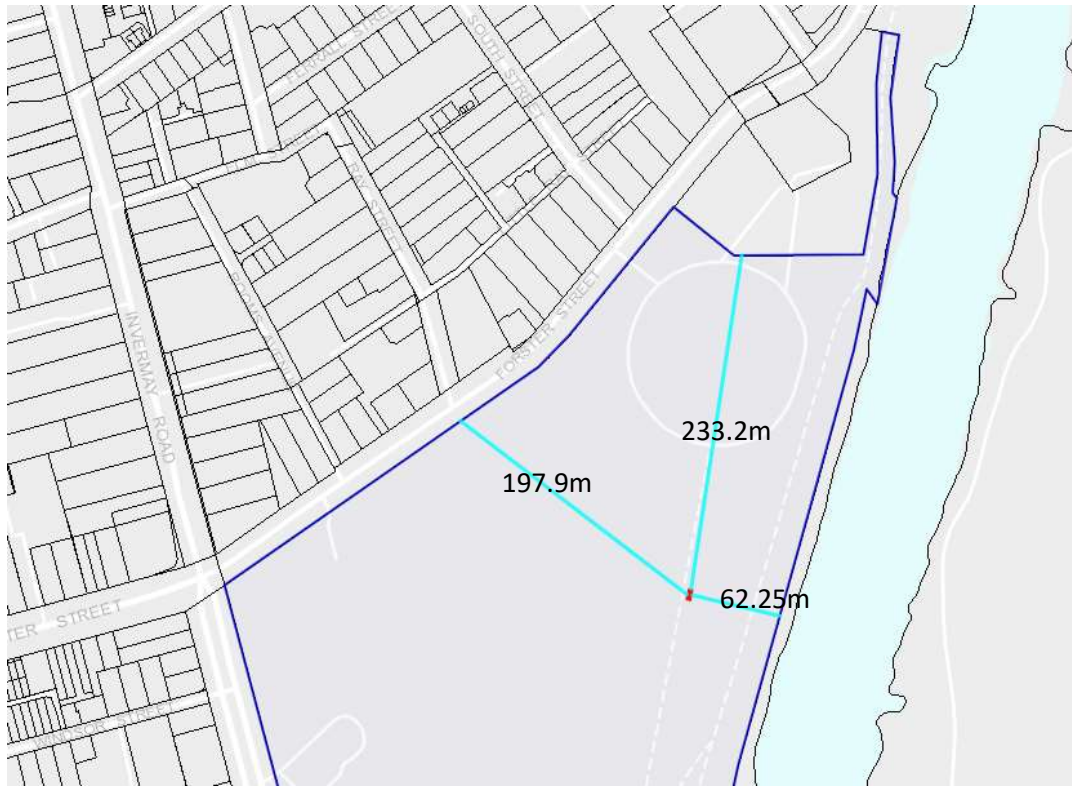


Figure 3: Development setbacks from surrounding boundaries Source: Listmap 2021



Figure 4: Development location and aerial Source: Listmap 2021

The subject site (as described above) is in the ownership of the City of Launceston, and therefore consent in accordance with S52 of the *Land Use Planning Approvals Act 1993* accompanies this application. The site is also listed on the Tasmanian Heritage Register.

## PLANNING SCHEME REQUIREMENTS

### ZONING

The proposed development is located within the Particular Purpose Zone 4: Inveresk site (PPZ4) of the *Launceston Interim Planning Scheme 2015*. The proposal falls within the Open Space Precinct. The objective of the open space precinct is:

*To provide an open space and recreational use area linking the existing York Park and Invermay Park to the North Esk River.*

*The area is to be retained as an area for public use and for events ranging from an Agricultural Show, outdoor exhibitions and displays, open air markets and general recreational activities.*

The proposal will provide a sheltered area for respite along the spine of the precinct and viewing and appreciation of the North Esk River. The shelter is for public use.

## USE

The proposal is for a shelter for informal activities such as respite, picnics etc. which falls within the use class passive recreation, for which no permit is required. The use standards do not apply to passive recreation in accordance with Table 35.3.

## DEVELOPMENT STANDARDS

### 35.4.1 Building height

#### P1

The proposed building height will not exceed 3.7m.

- a) The shelter supports the overall use of the precinct for open space purposes and provides an area for respite and appreciation of the river.
- b) The topography of the site is very flat.
- c) Many of the buildings on site exceed 15m in height.
- d) The nature of the use as a passive pavilion for respite will ultimately result in a building form subservient to the surrounding buildings.
- e) The proposal sits within a very large open area and as a result the proposal will likely appear to be small in scale relative to the site and surrounding buildings. The building will not be readily visible from Foster Street or Invermay Road.
- f) There will be some overshadowing throughout the day, however, this is very minor particularly as it is a small structure within a large open space.

### 35.4.3 Active Ground Floors

The brief of the proposal included: “Personal security for users is important - view lines, access and egress and lighting should be a key consideration”. With respect to acceptable solution A1, the proposal does not have facades facing onto a road, mall, laneway or arcade and therefore A1 a) b) and c) is not applicable. No mechanical plant or equipment is proposed. A2 is not relevant as no alterations are proposed.

## POTENTIALLY CONTAMINATED LAND

As the proposed development will not involve the disturbance of more than 1m<sup>2</sup> of land the provisions of the Potentially Contaminated Land Code do not apply. Mega anchors are proposed which is a construction technology allowing for minimal site disturbance. In the event footings must be dug, a preliminary site investigation accompanies this letter.

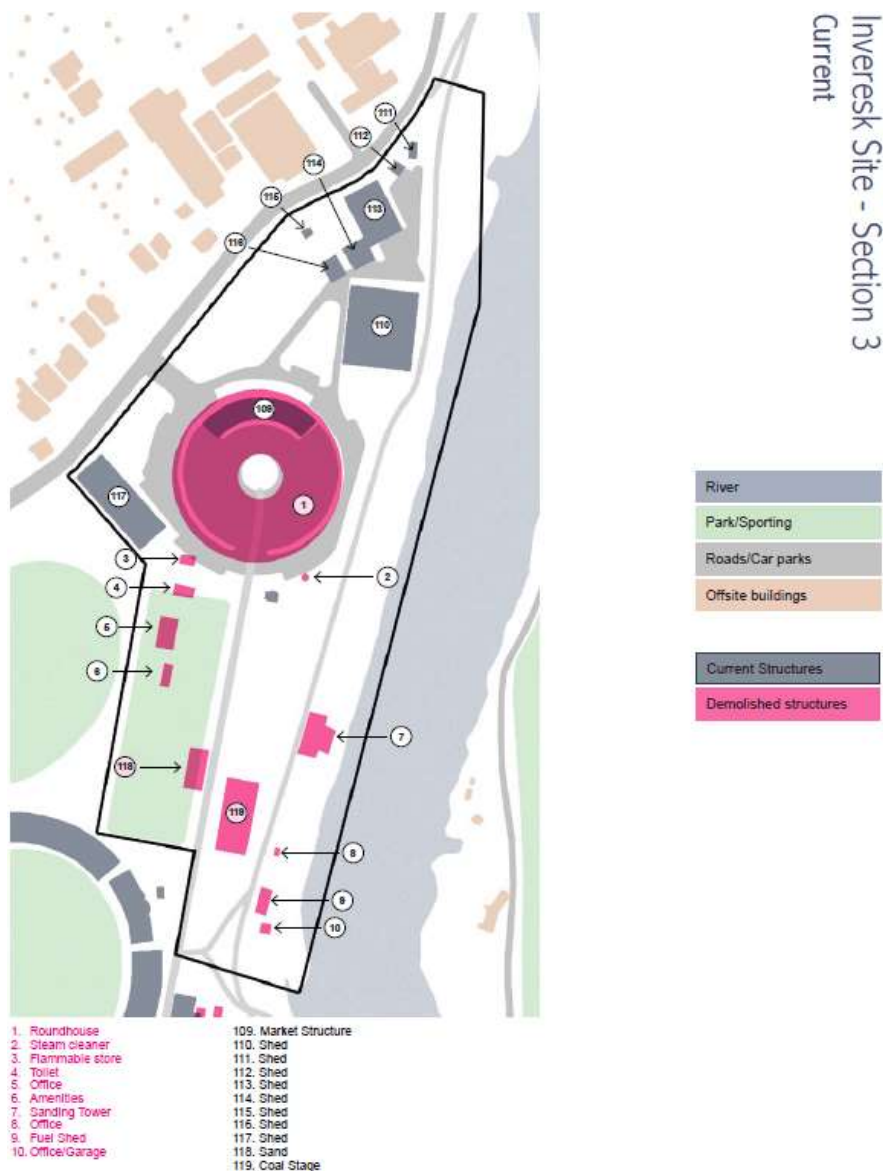
## LOCAL HISTORIC HERITAGE CODE

The site is listed within the Tasmanian Heritage Register, as well as within the Local Historic Heritage Code.

There are no use standards for this Code. No demolition is proposed.

### E13.6.4 Site coverage

The area where the proposal is located was originally an open area, with small buildings located on it as demonstrated in the below map:



**Figure 5 Site plan showing existing and historic development patterns Source: Inveresk CMP, Paul Davies, 2019 (p15)**

## P1

a) The topography is very flat

b) This area was used as a mixture of rail infrastructure and buildings, and recreational activities and buildings. The proposed shelter is incidental to the use of the area for open space and of a very small scale within minimal impact on the main heritage values of the site, notably the main workshop buildings. The proposal is similar size to the original amenities building within the recreation area and located in area previously characterized by small scale buildings.

c) The nearest buildings are 100m from the location of the development. This area is used for open space purposes. The small-scale shelter and will not introduce a substantial increase in site coverage in an area traditionally open.

d) There is minimal development in the surrounding area as it is used for open space and recreation purposes. It is characterized by small structure in large open grassed areas.

#### **E13.6.5 Height and Bulk of buildings**

##### **P1**

The proposal has been designed by the student of the Architecture and Design School. Although the final design has yet to be decided on, the submission (see introduction) shows articulation and detailing which compliments the heritage of the site.

- a) This area of the site was used as a mixture of rail infrastructure and buildings, and recreational activities and buildings. The proposed shelter is incidental to the use of the area for open space and of a very small scale within minimal impact on the main heritage values of the site, notably the main workshop buildings. The proposal is similar size to the original amenities building within the recreation area and located in area previously characterized by small scale buildings.
- b) The proposal has been designed by the student of the Architecture and Design School. Although the final design has yet to be decided on the submission (see introduction) show articulation and detailing which compliments the heritage of the site.
- c) The nearest building is located approximately 100m from the proposal's location. There are no buildings located in the immediate surrounding area otherwise. This area is characterized by small building in open space. The proposal will not exceed a height of 3.7m. The building is very small in scale with a GFA of 18m<sup>2</sup>. This is consistent with the surrounding area.
- d) The site is substantial in size. The proposal is set some way from the main workshop buildings and will have minimal impact on heritage values elsewhere on the site.
- e) The proposal is approximately 200m from Foster Street and as such will have no impact on the streetscape.

#### **E13.6.6 Site of buildings and structures**

- a) This area of the site was used as a mixture of rail infrastructure and buildings, and recreational activities and buildings. The proposed shelter is incidental to the use of the area for open space and of a very small scale within minimal impact on the main heritage values of the site, notably the main workshop buildings. The proposal is similar size to the original amenities building within the recreation area and located in area previously characterized by small scale buildings.
- b) The topography of the site is very flat.
- c) The site is substantial in size (24.5ha). The lot is bound by Invermay Road, Foster Street and the North Esk River which has characterized the lot shape
- d) The proposal is setback some way from the nearest boundaries as indicated in the above figure. This is consistent with the historic development patterns where there were a number of small buildings in open space orientated in alignment with the tracks which ran to the roundhouse (now known as the central spine).
- e) The site is substantial in size. The proposal is set some way from the main workshop buildings and will have minimal impact on heritage values elsewhere on the site.
- f) The proposal is approximately 200m from Foster Street and as such will have no impact on the streetscape.



### **E13.6.8 Roof Form and Materials**

a) b) and c) This area of the site was used as a mixture of rail infrastructure and buildings, and recreational activities and buildings. The proposal is similar size to the original amenities building within the recreation area and located in area previously characterized by small scale buildings. The roof form and materials are a corrugated metal, with a sloping angular character. This is consistent with the industrial heritage character of the roof form and materials on site. The dominant roof form of the heritage buildings is saw tooth with a corrugated finish.

d) The proposal is approximately 200m from Foster Street and as such will have no impact on the streetscape. The proposal will not be visible from Invermay Road.

### **E13.6.9 Wall Materials**

a) This area of the site was used as a mixture of rail infrastructure and buildings, and recreational activities and buildings. The proposal is similar size to the original amenities building within the recreation area and located in area previously characterized by small scale buildings.

b) & c) The materials on site are raw, utilitarian, and industrial in nature as a result of the use of the site as the former railyards. The proposal will utilize utilitarian materials such as plywood or natural finish products. The proposal is distinctly contemporary, however, through the use of materials reflects on the heritage values of the site.

d) The proposal is approximately 200m from Foster Street and as such will have no impact on the streetscape. The proposal will not be visible from Invermay Road.

### **INVERMAY/INVERESK FLOOD INUNDATION AREA CODE**

The proposal is for a non-habitable building and is therefore exempt from this code in accordance with E16.4.1.

### **OTHER MATTERS**

There is not requirement for parking for passive recreation, and as a result the Parking and Access Code and Road and Railway Code are not applicable. The proposal is a very small, roofed area (18m<sup>2</sup>) and the surrounding land is grassed, with the site hosting a gravel surface and therefore natural stormwater drainage is proposed.



**Figure 6: Site with gravel (UTAS)**

Should you have any further questions, please do not hesitate to contact our office on 62349281 or email [poppy@ireneinc.com.au](mailto:poppy@ireneinc.com.au)

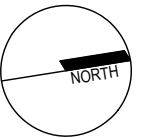
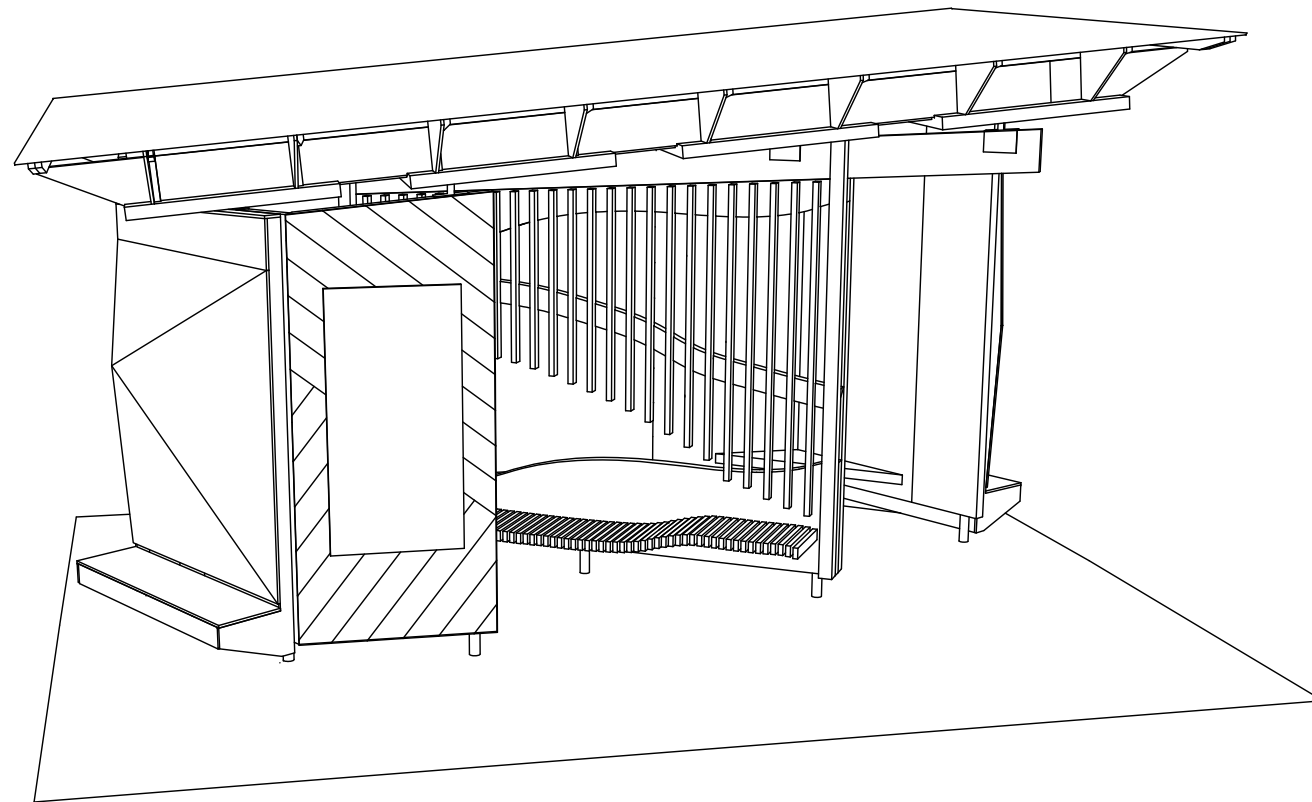
Yours faithfully

Irene Duckett  
Director  
**IRENEINC PLANNING & URBAN DESIGN**

# Proposed Shelter Pavilion for UTAS NTP at Inveresk Precinct

Wind Classification: N3  
Soil Classification:  
Climate zone: N7  
BAL level: -  
Alpine area: -  
Corrosion environment:  
Floor area: 17.6m<sup>2</sup>

SHEET NO.	SHEET NAME	DATE
A101	COVER PAGE	17/02/2021
A102	SITE PLAN	06/03/2021
A103	FLOOR + FRAMING PLAN	17/02/2021
A104	FOOTING PLAN	17/02/2021
A105	ROOF + FRAMING PLAN	17/02/2021
A201	SOUTH & WEST ELEVATIONS	17/02/2021
A202	NORTH & EAST ELEVATIONS	17/02/2021
A301	SECTION A-A	17/02/2021
A401	DETAILS	17/02/2021



**pulpstudio**

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
8 INVERMAY ROAD  
INVERESK PRECINCT  
LAUNCESTON 7250  
Client UTAS NTP

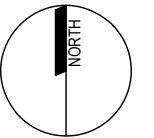
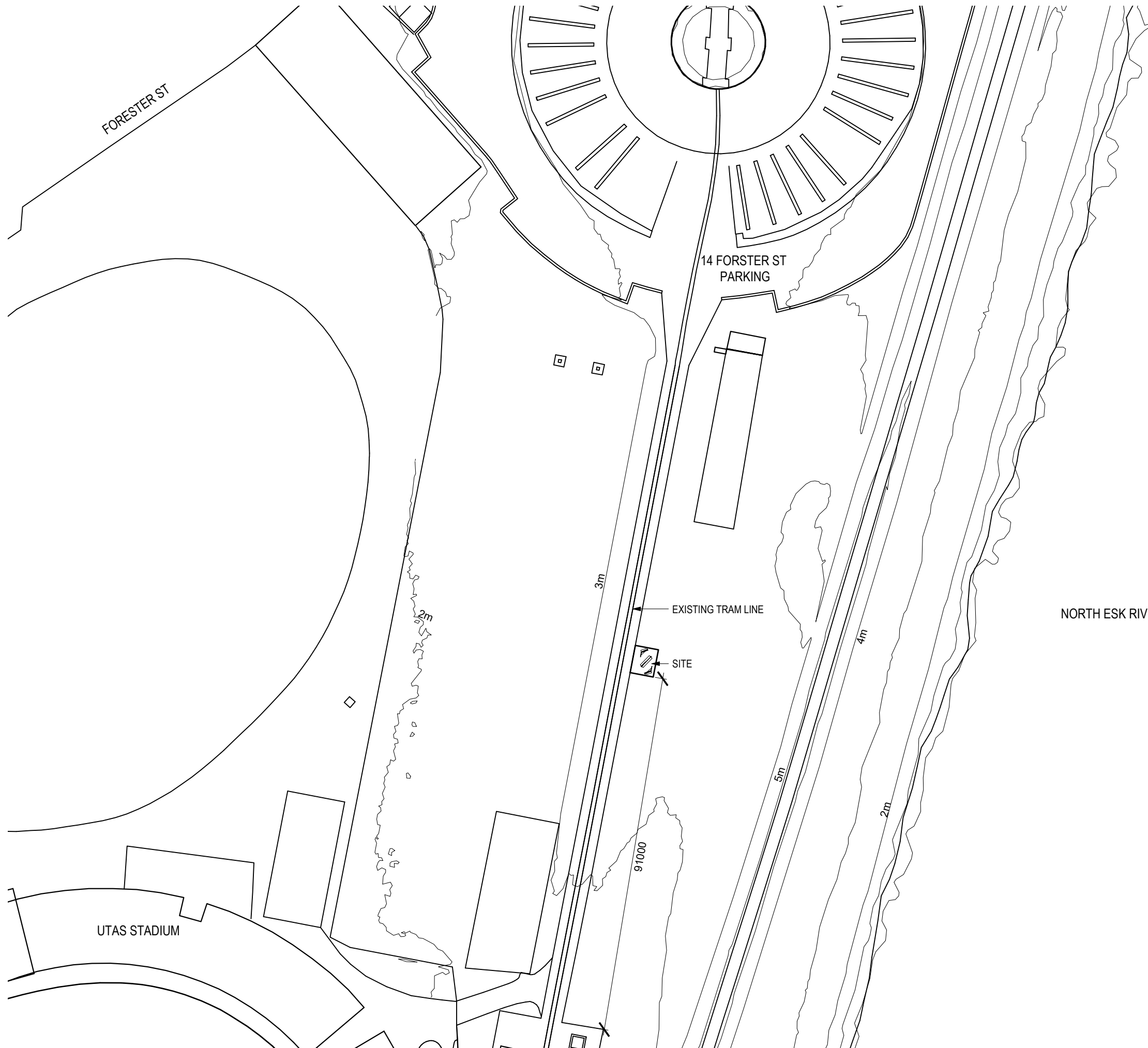
Title COVER PAGE

Issue BUILDING PERMIT

Scale N/A Date 17/02/21 Project Number

Drawing No **A101** 2101  
Rev NA

REFER TO DRAWING A103 FOR  
DETAILED RELATIONSHIP  
BETWEEN SUBJECT SITE AND  
EXISTING TRAMWAY



# pulpstudio

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
8 INVERMAY ROAD  
INVERESK PRECINCT  
LAUNCESTON 7250  
Client UTAS NTP

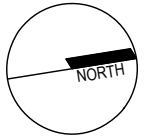
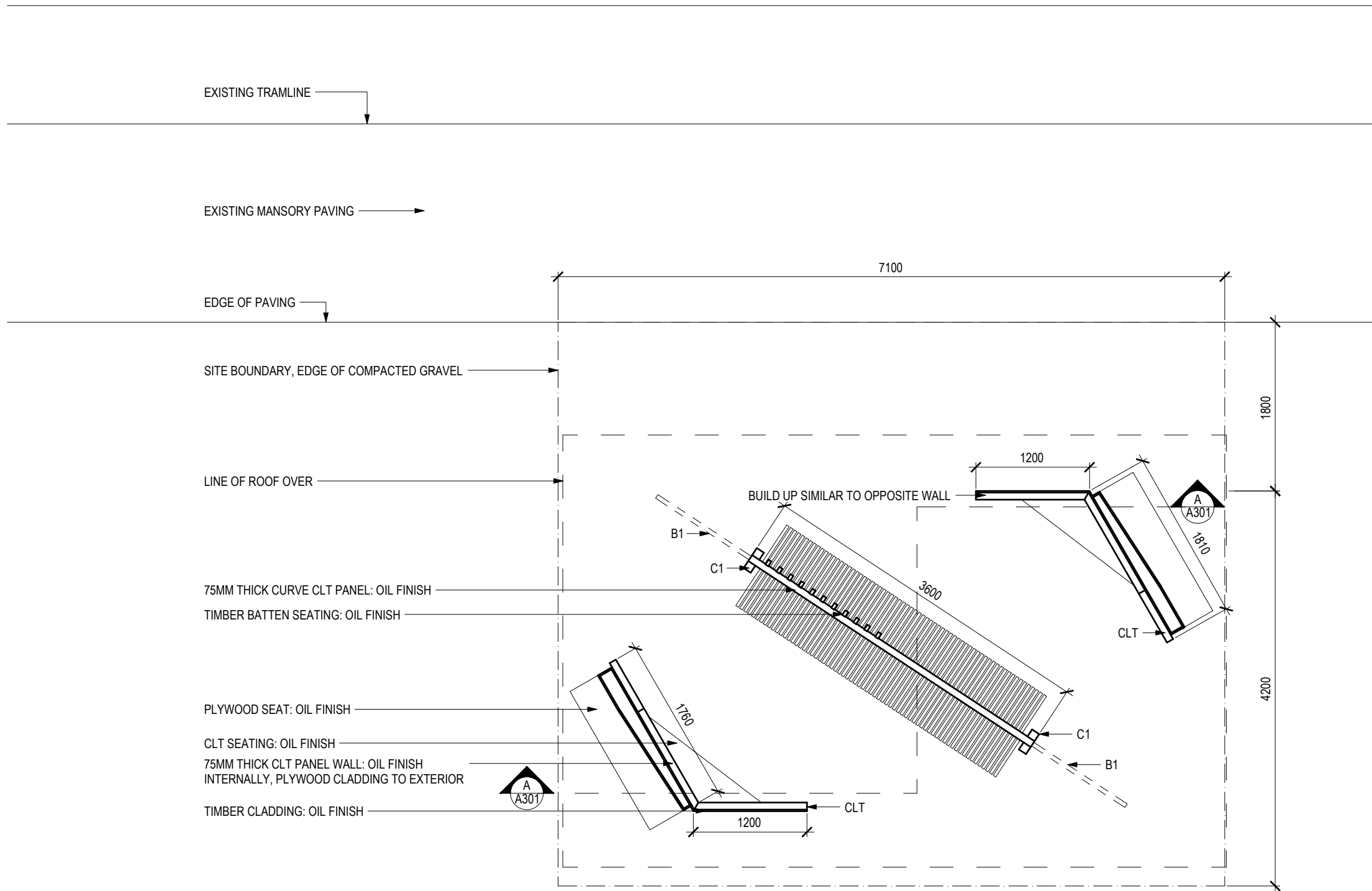
Title SITE PLAN

Issue BUILDING PERMIT

Scale 1:1000 @ A3 Date 06/03/21 Project Number

Drawing No **A102** 2101  
Rev NA

- B1 260X45 G40 ROOF BEAM, 2XM10 BOLT FIX TO C1
- C1 90X90 GLULAM COLUMNS, 3XM10 BOLT FIX TO CLT
- CLT 75 THICK HARDWOOD CLT PANEL, 50X50X3 ANGLE BRACKET WITH 4XM10 75 COACH SCREW TO CLT



**pulpstudio**

31 Hill Street West Launceston Tasmania 7250  
 T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
 © This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
 8 INVERMAY ROAD  
 INVERESK PRECINCT  
 LAUNCESTON 7250

Client UTAS NTP

Title FLOOR + FRAMING PLAN

Issue BUILDING PERMIT

Scale 1:50 @ A3 Date 17/02/21 Project Number

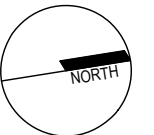
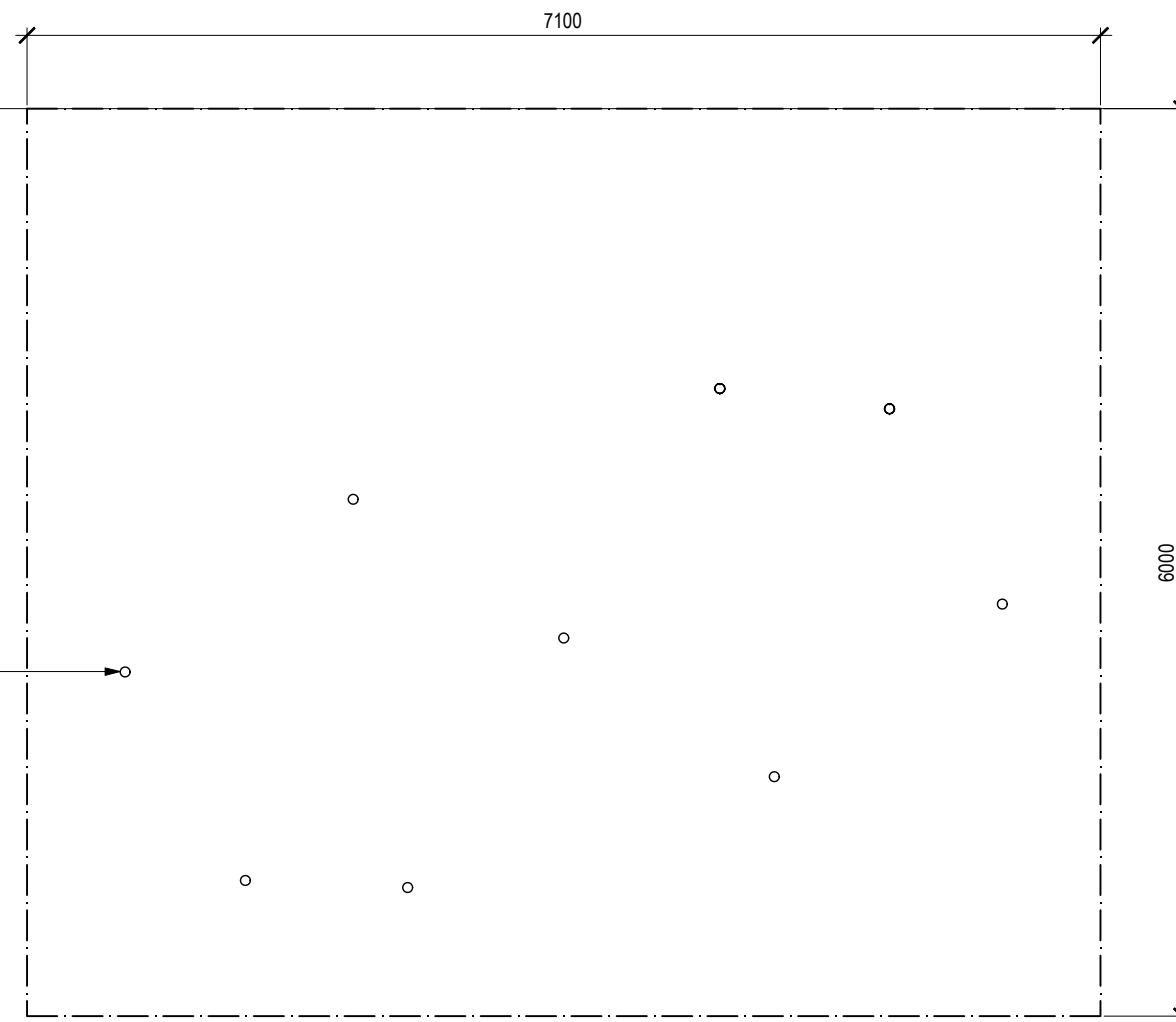
Drawing No **A103** 2101  
 Rev NA

**1** FLOOR + FRAMING PLAN  
 SCALE : 1:50

EXISTING TRAMLINE

EDGE OF PAVING

MEGA ANCHOR FOOTING SYSTEM TO MANUFACTURE SPECIFICATION



**pulpstudio**

31 Hill Street West Launceston Tasmania 7250  
 T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
 © This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
 8 INVERMAY ROAD  
 INVERESK PRECINCT  
 LAUNCESTON 7250  
 Client UTAS NTP

Title FOOTING PLAN

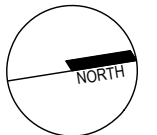
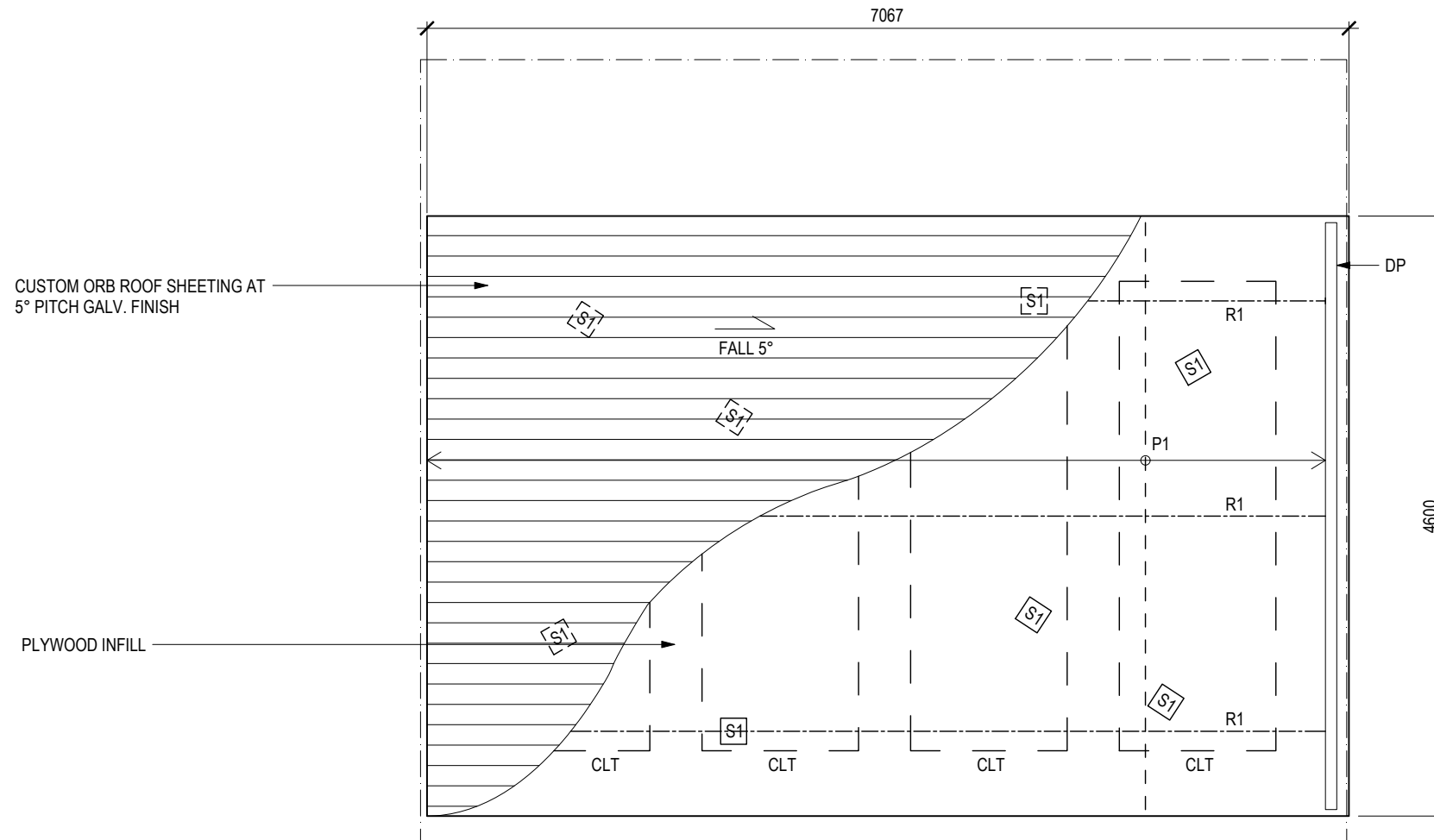
Issue BUILDING PERMIT

Scale 1:50 @ A3 Date 17/02/21 Project Number

Drawing No **A104** 2101  
 Rev NA

**1** FOOTING PLAN  
 SCALE : 1:50

- CLT 75 THICK HARDWOOD CLT  
PANEL, 50X50X3 ANGLE  
BRACKET WITH 4XM10 75 COACH  
SCREW TO CLT AND R1
- DP DOUBE P1 SCREW LAMINATED  
P1 90X35 F5 PURLIN @ 900 CTRS  
MAX. SCREW FIX TO STRAP
- R1 260X45 GL10 HARDWOOD  
RAFTER
- S1 6PL CUSTOM METAL STRIP,  
2XM10 BOLT FIX TO WALLS,  
4XM10 COACH SCREW TO CLT &  
ROOF PANEL



**pulpstudio**

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
8 INVERMAY ROAD  
INVERESK PRECINCT  
LAUNCESTON 7250

Client UTAS NTP

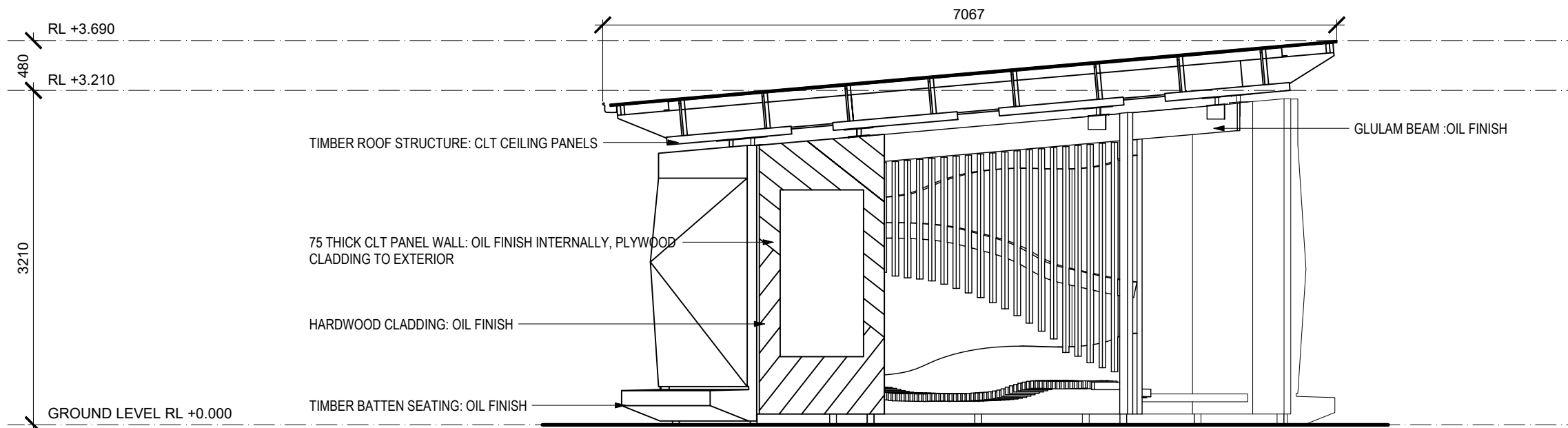
Title ROOF + FRAMING PLAN

Issue BUILDING PERMIT

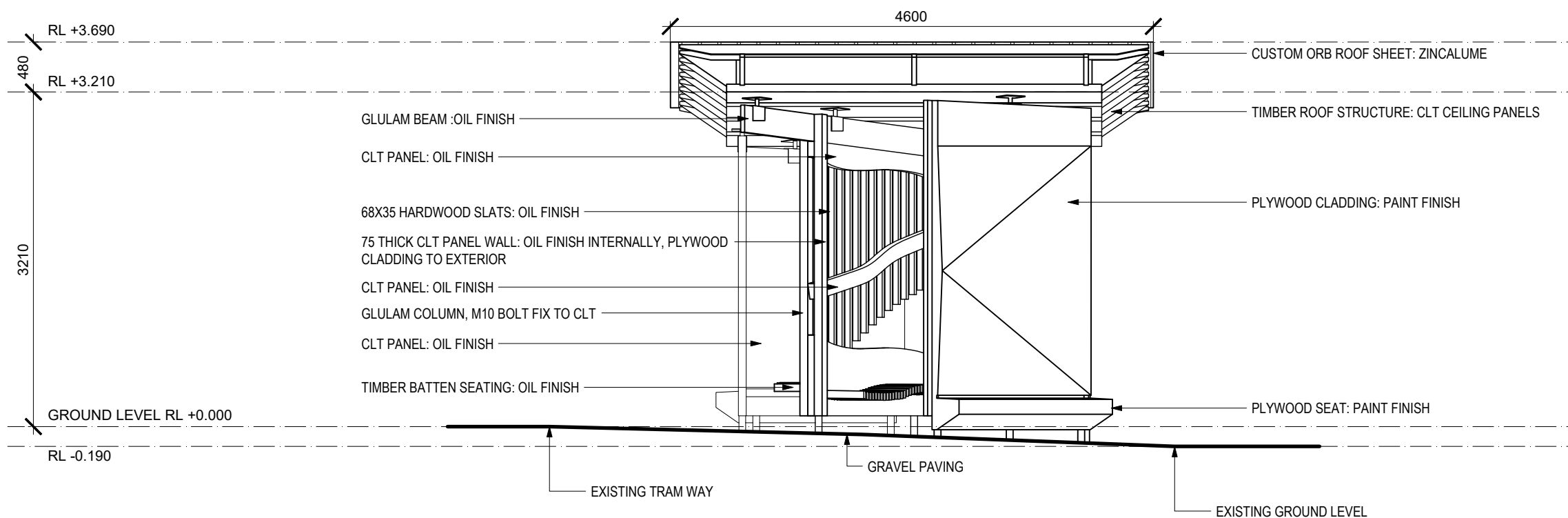
Scale 1:50 @ A3 Date 17/02/21 Project Number

Drawing No **A105** 2101  
Rev NA

**1** ROOF + FRAMING PLAN  
SCALE : 1:50



1 WEST ELEVATION  
SCALE : 1:50



2 SOUTH ELEVATION  
SCALE : 1:50

**pulpstudio**

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

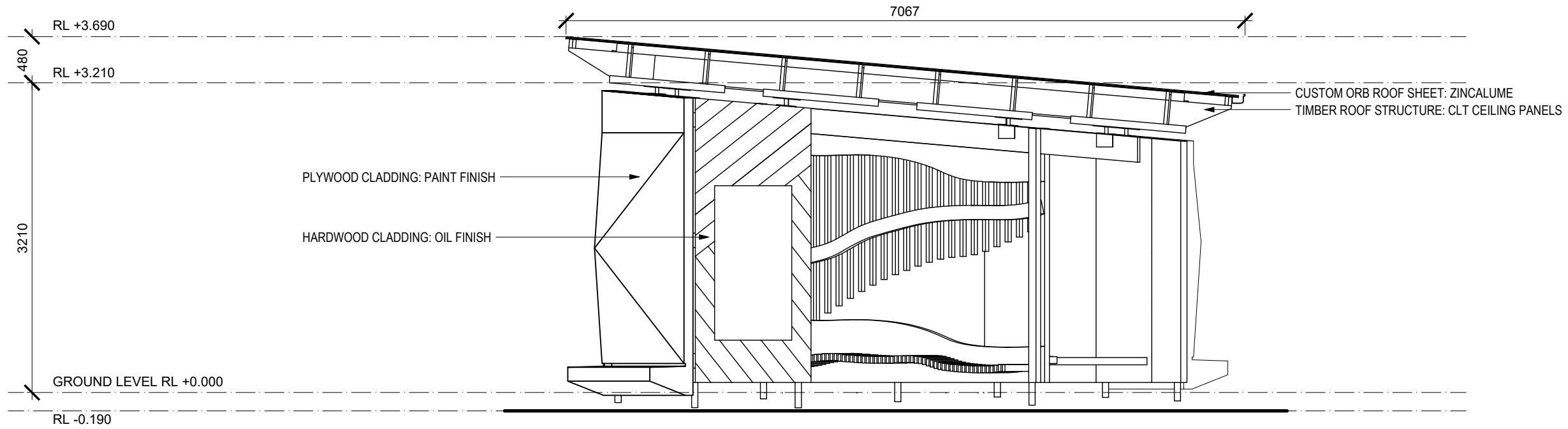
Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project	UTAS SHELTER PAVILION 8 INVERMAY ROAD INVERESK PRECINCT LAUNCESTON 7250
Client	UTAS NTP
Title	SOUTH & WEST ELEVATION
Issue	BUILDING PERMIT

Scale	1:50 @ A3	Date	17/02/21	Project Number	2101
Drawing No	<b>A201</b>			Rev	NA

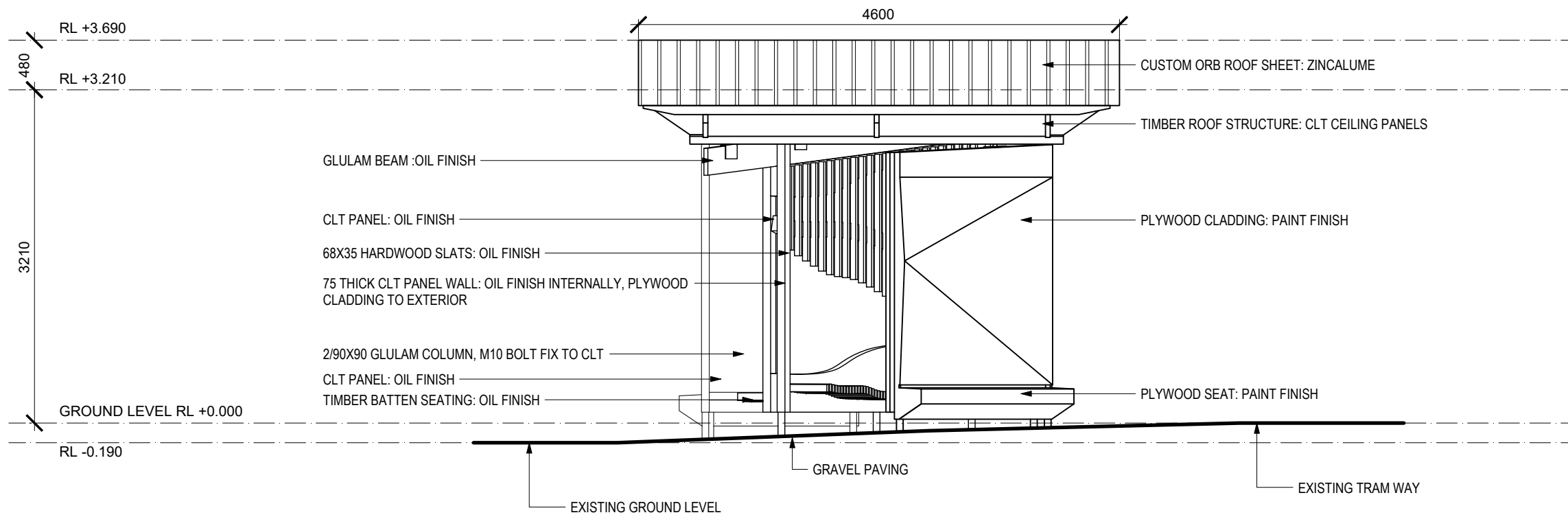




1

EAST ELEVATION

SCALE : 1:50



2

NORTH ELEVATION

SCALE : 1:50

# pulpstudio

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project	UTAS SHELTER PAVILION 8 INVERMAY ROAD INVERESK PRECINCT LAUNCESTON 7250
Client	UTAS NTP

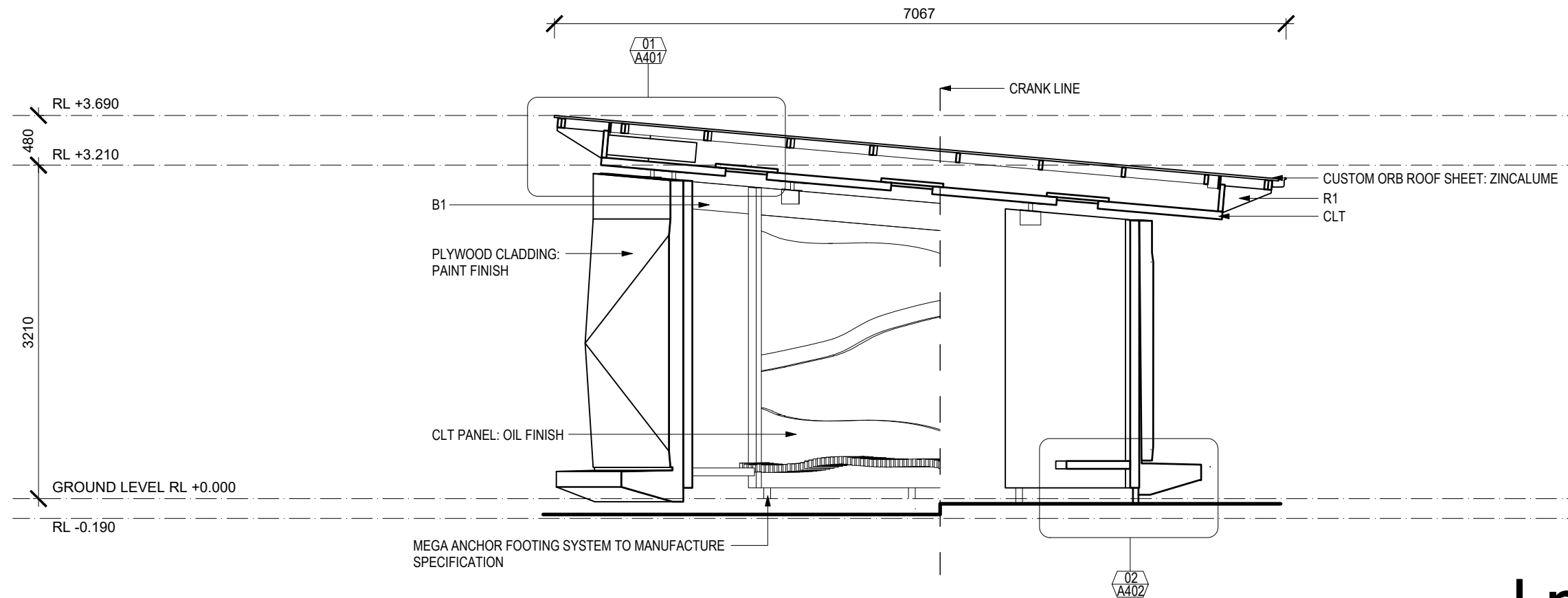
Title	NORTH & EAST ELEVATION
-------	------------------------

Issue	BUILDING PERMIT
-------	-----------------

Scale	1:50 @ A3	Date	17/02/21	Project Number	2101
-------	-----------	------	----------	----------------	------

Drawing No	<b>A202</b>	Rev	NA
------------	-------------	-----	----

- CLT 75 THICK HARDWOOD CLT PANEL, 50X50X3 ANGLE BRACKET WITH 4XM10 75 COACH SCREW TO CLT AND R1
- DP DOUBE P1 SCREW LAMINATED
- P1 90X35 F5 PURLIN @ 900 CTRS MAX. SCREW FIX TO STRAP
- R1 260X45 GL10 HARDWOOD RAFTER
- S1 6PL CUSTOM METAL STRIP, 2XM10 BOLT FIX TO WALLS, 4XM10 COACH SCREW TO CLT & ROOF PANEL



**1** SECTION A-A  
SCALE : 1:50

# pulpstudio

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
8 INVERMAY ROAD  
INVERESK PRECINCT  
LAUNCESTON 7250

Client UTAS NTP

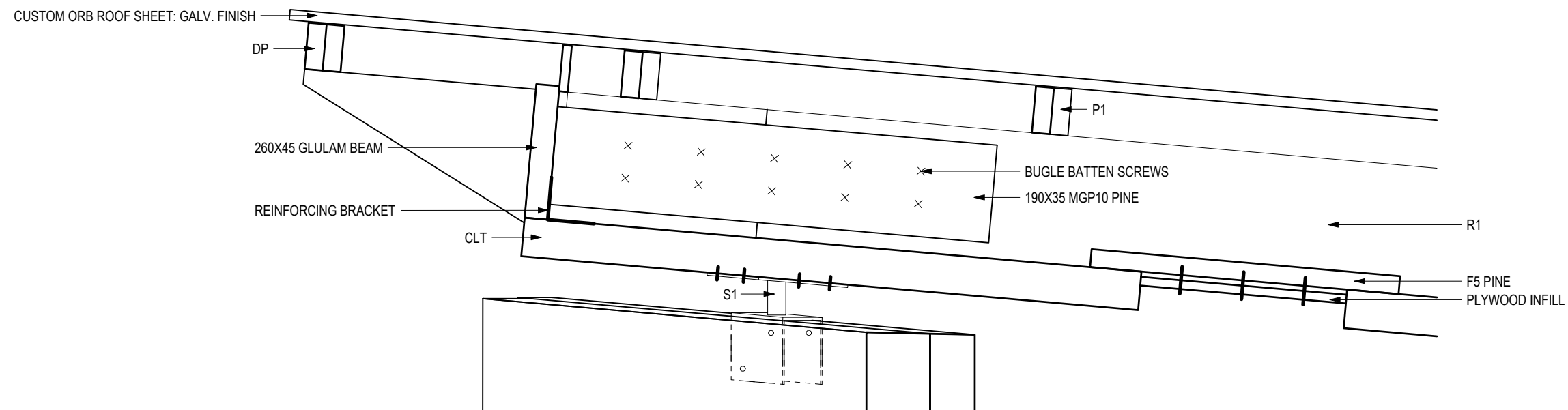
Title SECTION A-A

Issue BUILDING PERMIT

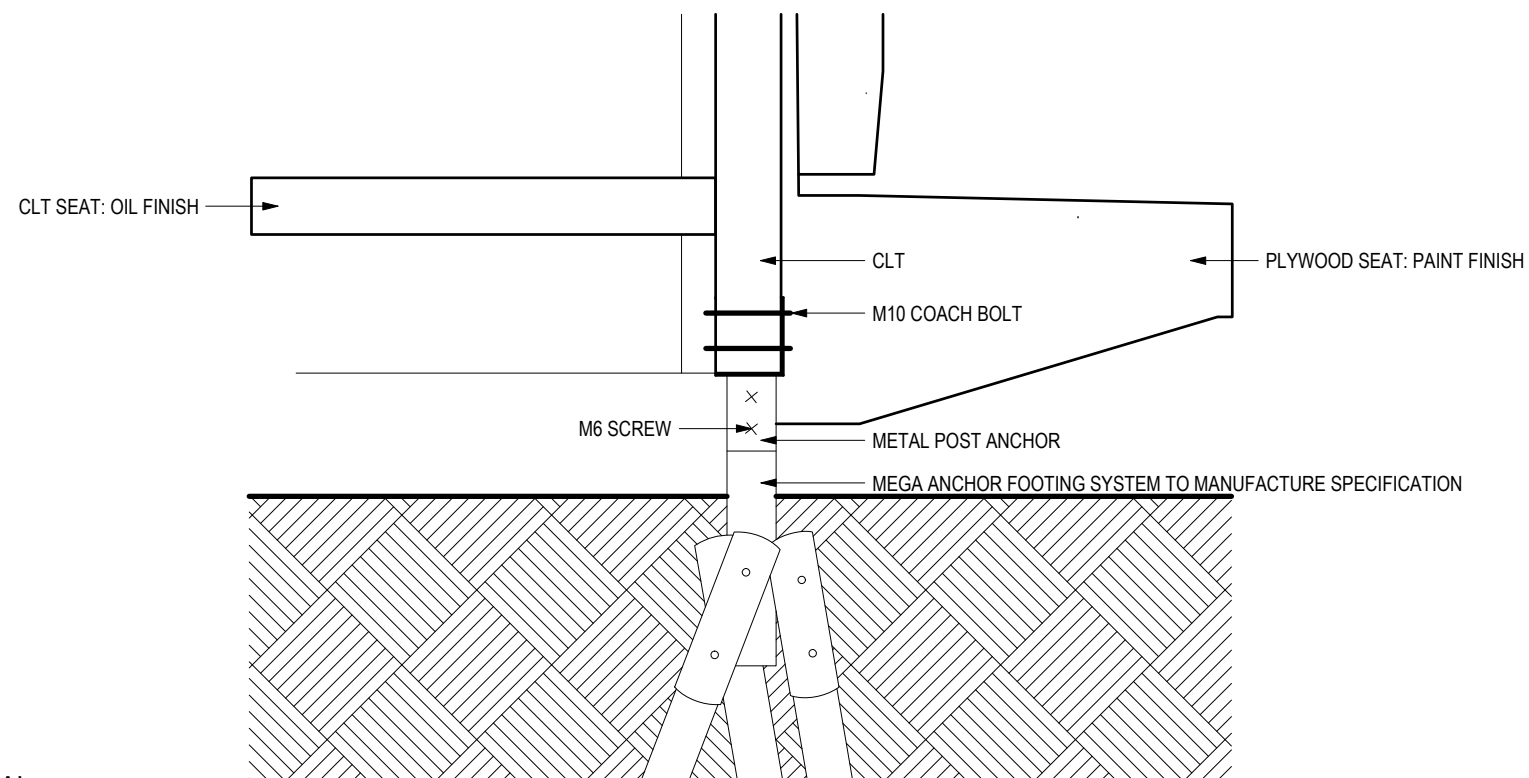
Scale 1:50 @ A3 Date 17/02/21 Project Number

Drawing No **A301** 2101  
Rev NA

- CLT 75 THICK HARDWOOD CLT PANEL, 50X50X3 ANGLE BRACKET WITH 4XM10 75 COACH SCREW TO CLT AND R1
- DP DOUBE P1 SCREW LAMINATED
- P1 90X35 F5 PURLIN @ 900 CTRS MAX. SCREW FIX TO STRAP
- R1 260X45 GL10 HARDWOOD RAFTER
- S1 6PL CUSTOM METAL STRIP, 2XM10 BOLT FIX TO WALLS, 4XM10 COACH SCREW TO CLT & ROOF PANEL



**1**  
**A301** DETAIL 01 - ROOF DETAIL  
SCALE : 1:10



**2**  
**A301** DETAIL 02- FOOTING DETIAL  
SCALE : 1:10

# pulpstudio

31 Hill Street West Launceston Tasmania 7250  
T +61 (0)418 501 973 pulp@pulpstudio.com.au

Accredited Building Practitioner Peter Booth, CC6132R

Rev	Description	Dwn	Date
-	-	-	-

Contractor shall verify all dimensions on site before commencing any work or shop drawings. Do not scale from drawings.  
© This drawing is copyright and remains the property of pulp studio.

Project UTAS SHELTER PAVILION  
8 INVERMAY ROAD  
INVERESK PRECINCT  
LAUNCESTON 7250

Client UTAS NTP

Title ROOF & FOOTING DETIAL

Issue BUILDING PERMIT

Scale 1:50 @ A3 Date 17/02/21 Project Number

Drawing No **A401** 2101  
Rev NA

---

# Preliminary Site Investigation

---

Construction of  
Small Structure  
(Architecture  
Student Project)

---

**Project No: 7593**

---

**Date: January 2021**

---



# es&d

environmental service & design

ABN: 97 107 517 144  
74 Minna Road  
Heybridge TAS 7316  
Ph: (03) 6431 2999

ACN: 107 517 144  
PO Box 651  
Burnie TAS 7320  
[www.esandd.com.au](http://www.esandd.com.au)

## Document Control

Prepared & Published by:	ES&D
Version:	1
File:	7593
Contact:	Rod Cooper
Phone No:	0364 312999
Prepared For:	UTAS Inveresk

Version:		Date:	
Draft	Carmel Parker	ES&D	28-01-2021
Review and Issue	Rod Cooper	ES&D	29-01-2021

This report has been prepared, based on information generated by Environmental Service and Design Pty Ltd from a wide range of sources. If you believe that Environmental Service and Design Pty Ltd has misrepresented or overlooked any relevant information, it is your responsibility to bring this to the attention of Environmental Service and Design Pty Ltd before implementing any of the report's recommendations. In preparing this report, we have relied on information supplied to Environmental Service and Design Pty Ltd, which, where reasonable, Environmental Service and Design Pty Ltd has assumed to be correct. Whilst all reasonable efforts have been made to substantiate such information, no responsibility will be accepted if the information is incorrect or inaccurate.

This report is prepared solely for the use of the client to whom it is addressed and Environmental Service and Design Pty Ltd will not accept any responsibility for third parties. In the event that any advice or other services rendered by Environmental Service and Design Pty Ltd constitute a supply of services to a consumer under the Competition and Consumer Act 2010 (as amended), then Environmental Service and Design Pty Ltd's liability for any breach of any conditions or warranties implied under the Act shall not be excluded but will be limited to the cost of having the advice or services supplied again. Nothing in this Disclaimer affects any rights or remedies to which you may be entitled under the Competition and Consumer Act 2010 (as amended). Each paragraph of this disclaimer shall be deemed to be separate and severable from each other. If any paragraph is found to be illegal, prohibited or unenforceable, then this shall not invalidate any other paragraphs.

## Contents

<b>Preliminary Site Investigation .....</b>	<b>1</b>
<b>Document Control .....</b>	<b>2</b>
<b>1 Executive Summary .....</b>	<b>1</b>
<b>2 Scope of Works.....</b>	<b>1</b>
<b>3 Basis for Assessment .....</b>	<b>2</b>
<b>4 Site Details .....</b>	<b>2</b>
4.1 Ownership and Location .....	2
4.2 Proposed Development .....	4
<b>5 Environment.....</b>	<b>4</b>
5.1 Topography .....	4
5.2 Surface Water.....	4
5.3 Hydrogeology .....	4
5.4 Geology .....	4
5.5 Acid Sulphate Soils .....	4
<b>6 Results .....</b>	<b>5</b>
<b>7 Comparison of Results to NEPASCM Screening Levels.....</b>	<b>8</b>
<b>8 Comparison of Results to Soil Disposal Guidelines.....</b>	<b>8</b>
<b>9 Site Contamination Sources .....</b>	<b>9</b>
<b>10 Potential Receptors.....</b>	<b>9</b>
<b>11 Conclusions.....</b>	<b>11</b>
<b>12 Council Planning Scheme Compliance .....</b>	<b>11</b>
12.1 Clause E2.5.1 (P1).....	12
12.1.1 Assessment against Clause E2.5.1 (P1).....	12
12.2 Clause E2.6.2 (P1).....	12
12.2.1 Assessment against Clause E2.6.2 (P1).....	13
<b>13 Recommendations .....</b>	<b>13</b>
<b>References .....</b>	<b>14</b>
<b>Appendices .....</b>	<b>15</b>
<b>Appendix A: Laboratory Results Certificates.....</b>	<b>16</b>

## List of Figures

Figure 3: Site Details .....	2
Figure 1: The proposed construction location.....	3
Figure 2: Sampling Location.....	3
Figure 20: Soil Results compared to Commercial/Industrial and R3recreational Use Screening Levels and Disposal Criteria .....	6
Figure 21: Soil Results compared to Commercial and Recreational screening levels and Disposal Criteria	7
Figure 23: Final Conceptual Site Model .....	10

## 1 Executive Summary

Environmental Service and Design (ES&D) were commissioned by their client, the University of Tasmania to undertake an assessment of the soil at the location of a proposed small structure to be designed and constructed as part of a student architecture project. The location of the small structure is beside the tramline near the round house and adjacent to UTAS Stadium, Inveresk.

The area to be disturbed by excavation is approximately 8 m x 3 m. A site history of the land has been completed in previous environmental reports. However, in summary petroleum hydrocarbons and associated Polycyclic aromatic hydrocarbons (PAHs) are known contaminants on the site from previous use of the site as a railway yard for the storage and repair of trams and railway lines.

Our assessment has revealed that the site is suitable for future recreational use and commercial use excluding habitable buildings.

## 2 Scope of Works

The scope includes:

- Determination of potential contaminants of concern;
- Field investigations (soil sampling);
- Consideration of the site's environmental settings (groundwater, receptors);
- Identification of potential human and ecological receptors and consideration of risks to identified receptors;
- Development of a Conceptual Site Model (CSM); and,
- Preparation of the assessment report.

Our assessment was limited to the building footprint of 8 m x 3 m and the immediate vicinity surrounding the site of the proposed shelter. Further assessment of the land will be required if future habitable buildings such as office space/ teaching spaces are proposed to be constructed.



### 3 Basis for Assessment

The assessment is required to be completed to address the proposed construction of a small structure.

The following screening levels have been considered in the assessment: Health Screening Levels (HSLs), Health Investigation Levels (HILs), Ecological Investigation Levels (EILs), Ecological Screening Levels (ESLs) and Groundwater Investigation Levels (GILs) (if applicable) provided in the *National Environmental protection (Assessment of Site Contamination) Measure 1999*, as amended April 11, 2013 (NEPASCAM).

Additional NEPASCAM reference material considered in the assessment include CRC CARE *Technical Report No. 10 "Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater Part 2: Application Document"*.

### 4 Site Details

#### 4.1 Ownership and Location

Site details are shown in Table 1. The land is owned by City of Launceston.

Figure 1: Site Details

<i>Street Address</i>	<i>Property ID</i>	<i>Title Reference</i>	<i>Approx. Area (m<sup>2</sup>)</i>
2 Invermay Road Invermay 7248	3583475	174633/2	26 hectares

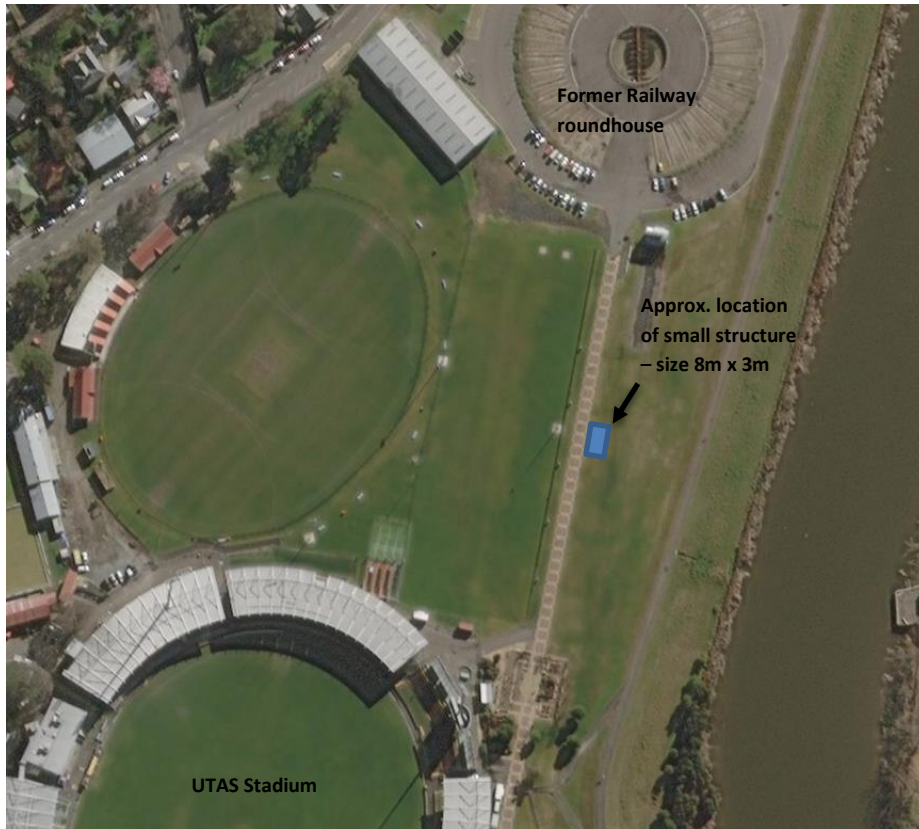


Figure 2: The proposed construction location



Figure 3: Sampling Location

**Preliminary Site Investigation**

## 4.2 Proposed Development

It is proposed to construct a small structure (shelter) approximately 8 metres x 3 metres. The structure may be of timber construction with a galvanised roof and maximum weight of 5 tons.

The structure will be supported by either anchors (Mega Anchors) which will be driven into the ground with no excavation required or alternatively footings trenches will be excavated and concrete pads constructed. Engineering design and drawings are not provided. This report will address risk with regard to exposure to contaminated soil, protection of the environment and disposal of soil offsite.

## 5 Environment

### 5.1 Topography

A review of Google Earth and topographic contours via The LISTMap indicates that the site slopes towards the levee bank, the base of the bank is located approximately 33 metres from the proposed construction location.

### 5.2 Surface Water

The nearest surface water body is the North Esk River located 50 metres to the east of the proposed construction site.

### 5.3 Hydrogeology

Based on contours, groundwater from the site is likely to flow towards the North Esk River.

### 5.4 Geology

The MRT digital geological atlas indicates the site is underlain by fill up to 2.7 metres and silty sandy clay from 2.7 m. Refer to borehole logs (Tasman Geotechnics) for soil profile description.

### 5.5 Acid Sulphate Soils

Acid sulphate soils (ASS) are soils which contain naturally occurring sulphides. If left undisturbed and waterlogged they are harmless, however, exposure to air can cause oxidation which allows subsequent rain events to produce sulfuric acid. According to the LIST, the site is located in an area that is considered 'high risk' for the presence occurrence of acid sulfate forming soils. Therefore, soil excavated from this area must be managed to prevent the formation of ASS and excavation, storage, and reuse of soils must be undertaken in accordance with the *Tasmanian Acid Sulfate Soils Management Guidelines 2009*. Management measures have been recommended for soil excavation, stockpiling and reuse.

## 6 Results

The results are as follows;

- Elevated concentrations of some metals; chromium, manganese, and nickel above Level 1 disposal criteria.
- Detection of F2, F3 and F4 petroleum hydrocarbons
- Nil detection of BTEXN and PAH compounds with all results below the LOR.

Figure 4: Soil Results compared to Commercial/Industrial and R3recreational Use Screening Levels and Disposal Criteria

	SB1_0.5 to 0.6	SB1_0.5 to 0.6B	SB1_0.8 to 0.9	SB1_1.0 to 1.1	SB1_2.6 to 2.7	HIL-D Commercial	HIL-C Recreational	ESL	IB 105 L1
Depth (mBGSL):									
Metals (mg/kg)									
Arsenic	11	6	<5	-	<5	3000	300		20
Barium	70	50	40	-	40				300
Beryllium	<1	<1	<1	-	1	500	90		2
Boron	<50	<50	<50	-	<50	300,000	20,000		
Cadmium	<1	<1	<1	-	<1	900	90		3
Chromium VI – results total Cr	27	40	35	-	<u>65</u>	3600	300		<u>50</u>
Cobalt	22	12	20	-	39	4000	300		100
Copper	73	36	57	-	60	240 000	17,000		100
Lead	57	53	22	-	<5	1500	600		300
Manganese	492	240	424	-	<u>812</u>	60 000	19,000		<u>500</u>
Nickel	<u>94</u>	43	<u>87</u>	-	<u>147</u>	6 000	1,200		<u>60</u>
Selenium	<5	<5	<5	-	<5				
Vanadium	37	120	27	-	52				
Zinc	86	73	62	-	61	400 000	30,000		200
Mercury	<0.1	0.2	<0.1	-	<0.1	730	80		

Figure 5: Soil Results compared to Commercial and Recreational screening levels and Disposal Criteria

Lab No: EM2100680 Job Ref: 7593	Sample Name					NEPASCM Health Screening Levels				Ecological ESL	Direct Contact HSL-C	Disposal	
						HSL-D SAND VI		HSL-C SAND VI				IB 105 L1	IB105 L2
Depth (mBGS):	SB1 – 0.5 to 0.6	SB1- 0.5 to 0.6B	SB1- 0.8 to 0.9	SB1- 1.0 to 1.1	SB1_2.6 to 2.7	0-<1m	1- <2m	0-<1m	1-<2m			Max. conc	Max. conc
TPH (mg/kg)													
C6 – C9 Fraction	<10	<10	<10	<10	<10							65	650
C10 – C36 Fraction (sum)	100	<50	1630	2290	3290							1,000	5,000
TRH (mg/kg)													
C6 – C10 Fraction (F1)	<10	<10	<10	<10	<10	680	2800	86,000	NL	180	5,100		
>C10 – C16 Fraction minus Naphthalene (F2)	<50	<50	<50	170	1610	500	2400	NL	NL	120	3,800		
>C16 – C34 Fraction (F3)	160	130	1340	1870	1560	-	-	-	-		5,300		
>C34 – C40 Fraction (F4)	<100	<100	640	490	170	-	-	-	-		7,400		
>C10 – C40 Fraction (sum)	160	130	1980	2530	3340								
BTEXN (mg/kg)													
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	4	10	360	2,400	65			
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5								
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5					70			
meta- & para-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5								
ortho-Xylene	<0.5	<0.5	<0.5	<0.5	<0.5								
Total Xylenes	<0.5	<0.5	<0.5	<0.5	<0.5								
Sum of BTEX	<0.2	<0.2	<0.2	<0.2	<0.2								
Naphthalene	<1	<1	<1	<1	<1	3		410		85			
Polycyclic aromatic hydrocarbons PAHs													
Naphthalene	<0.5	<0.5	-	-	-								
Acenaphthylene	<0.5	<0.5	-	-	-								
Acenaphthene	<0.5	<0.5	-	-	-								
Fluorene	<0.5	<0.5	-	-	-								
Phenanthrene	<0.5	<0.5	-	-	-								
Anthracene	<0.5	<0.5	-	-	-								
Fluoranthene	<0.5	<0.5	-	-	-								
Pyrene	<0.5	<0.5	-	-	-								
Benz(a)anthracene	<0.5	<0.5	-	-	-								
Chrysene	<0.5	<0.5	-	-	-								
Benzo(b+j)fluoranthene	<0.5	<0.5	-	-	-								
Benzo(k)fluoranthene	<0.5	<0.5	-	-	-								
Benzo(a)pyrene	<0.5	<0.5	-	-	-								
Indeno(1.2.3.cd)pyrene	<0.5	<0.5	-	-	-								
Dibenz(a.h)anthracene	<0.5	<0.5	-	-	-								
Benzo(g,h,i)perylene	<0.5	<0.5	-	-	-								
Sum of polycyclic aromatic hydrocarbons	<0.5	<0.5	-	-	-							20	40

Key  
 NL = Not Limiting for the soil type and /or depth.  
 VI = Vapour Intrusion  
 Red highlighted /underlined cells show exceedance of screening levels.

SOIL HEALTH SCREENING LEVELS FOR DIRECT CONTACT (mg/kg) \* (a,b,i,l)

Chemical	HSL-A Residential (Low Density)	HSL-B Residential (High Density)	HSL-C Recreational / Open Space	HSL-D Commercial / Industrial	Intrusive Maintenance Worker
Toluene	14,000.	21,000.	18,000.	99,000.	120,000.
Ethylbenzene (c)	4,500.	5,900.	5,300.	27,000.	85,000.
Xylenes	12,000.	17,000.	15,000.	81,000.	130,000.
Naphthalene (c)	1,400.	2,200.	1,900.	11,000.	29,000.
Benzene	100.	140.	120.	430.	1,100.
C6-C10	4,400.	5,600.	5,100.	26,000.	82,000.
>C10-C16	3,300.	4,200.	3,800.	20,000.	62,000.
>C16-C34	4,500.	5,800.	5,300.	27,000.	85,000.
>C34-C40	6,300.	8,100.	7,400.	38,000.	120,000.

\* Refer to Table Notes

Source: Table A4 from CRC Care Technical Report No 10: Health Screening Levels for Direct Contact

## 7 Comparison of Results to NEPASC M Screening Levels

### Vapour Intrusion Risk

The soil results indicate that soil on the site exceeds commercial use screening levels for F2 petroleum hydrocarbon fractions at depths of 2.6 to 2.7 metres below ground surface (mbgs). Therefore, there may be an unacceptable risk to future occupants of habitable buildings if habitable buildings such as commercial office spaces or classrooms were constructed in this area. The elevated levels of volatile F2 petroleum hydrocarbon may pose a risk of vapours entering buildings and concentrating inside buildings. For unenclosed spaces such as an outdoor shelter where there is natural ventilation within the structure an unacceptable vapour intrusion risk is not likely to be present.

### Direct Contact Risk

All results for total recoverable hydrocarbon (TRH) fractions F1 to F4 are below the health screening levels for direct contact and recreational use. All BTEXN compounds were below the limit of reporting (LOR). PAHs were also not detected near the surface 0.5 m to 0.6 mbgs therefore not posing a direct contact risk to future recreational land users.

All metals results were below the screening levels for recreational and commercial use.

### Ecological Risk

The Ecological Screening Levels were exceeded for F2 TRH fractions only. As the exceedance is from soil at depth 2.6 to 2.7 mbgs the contaminants are encapsulated and without disturbance will not pose a risk to the environment. However, if soil is excavated from depths greater than 1.1 mbgs then controls must be implemented to prevent runoff across the land and into waterways and stormwater drains.

## 8 Comparison of Results to Soil Disposal Guidelines

The results exceed Level 1 Classification under *Tasmanian EPA Information Bulletin 105 Classification and Management of Contaminated Soil for Disposal (IB105)* for chromium, manganese, nickel and C10-C36 petroleum hydrocarbons.

## 9 Site Contamination Sources

Sources of contamination include buried contaminated fill and surface spillage of diesel and petroleum products from the former railway yard operation.

## 10 Potential Receptors

A Conceptual Site Model (CSM) was developed after consideration of risks to potential receptors as outlined below.

The risks associated with construction of the shelter and exposure of soil includes the following exposure scenarios;

- Construction workers coming into contact with contaminated soils, through ingestion, direct contact (absorption) and inhalation of contaminants. These risks can be adequately managed through the use of personal protective equipment (i.e., full length shirts/pants, gloves and washing hands before eating)
- The escape of contaminants to waterways and stormwater drains. These risks can be managed through the containment of excavated soils in covered watertight skips bin/s.
- The release of contaminants to surface layers where the public will have future contact with surface /shallow soils. Placement of excavated soils directly into bins will prevent the spread of contaminants to the surface. Prevent excavation to the depth of the water table.
- Creation of acid sulfate soils and release of acid sulphate compounds to the environment can be prevented by the storage of excavated soils in covered watertight bins and the management of soils in accordance with an Acid Sulfate Management Plan.



**Figure 6: Final Conceptual Site Model**

Contamination Source	COPC	Pathway	Receptor
Petroleum hydrocarbons and metal contaminated fill buried to depths of up to 1.2mbgs approx.	<ul style="list-style-type: none"> <li>● Aromatic and aliphatic hydrocarbons</li> <li>● Heavy metals</li> </ul>	<p><b>Dermal contact of soil</b> –likely. Concentrations do not exceed the direct contact and trench worker screening levels. However, precautions to prevent contact should be implemented.</p>	<ul style="list-style-type: none"> <li>● Construction workers</li> </ul>
		<p><b>Inhalation of soil vapour into buildings</b> – Not applicable. No habitable buildings proposed for this investigation area.</p>	<ul style="list-style-type: none"> <li>● Construction workers</li> </ul>
Acid Sulfate Soils	<ul style="list-style-type: none"> <li>● Sulphuric acid – unlikely as ASS have a low probability of occurrence and area is already covered in hardstand</li> </ul>	<p><b>Dermal contact of soil</b> – unlikely. See above</p> <p>Release of ASS to the environment – this can be prevented by management controls. Prevent excavation to groundwater depths.</p>	<ul style="list-style-type: none"> <li>● Construction workers</li> <li>● North Esk River</li> </ul>

## 11 Conclusions

Elevated concentrations of metals from 0.5 to 2.7 mbgs do not pose a direct contact risk, however, soil is likely to be classified under IB105 as 'Level 2 low level contaminated soil' and appropriate disposal approvals will be required prior to offsite transport for disposal. Elevated concentrations of petroleum hydrocarbon compound were found at depth and the highest concentrations found from 0.8 to 2.7 mbgs. Contact with soil should be avoided and gloves should be worn by contractors and contact with soil should be avoided. Stockpiling of soil should be undertaken in a way that prevents the escape of soil and contaminants during rain events and should be wholly contained with a watertight bin.

Potential acid sulfate soils are also likely to be present from 0.5 mbgs and excavated soil designated for reuse onsite should be buried at depth greater than 2 mbgs and lime added to prevent formation of acid sulfate soils designated for reuse onsite or offsite disposal. The management of potential acid sulfate soils should be completed in accordance with the *Tasmanian Acid Sulfate Soils Management Guidelines 2009* and an *Acid Sulfate Management Plan* for the UTAS Inveresk site.

## 12 Council Planning Scheme Compliance

The assessment was limited to the area to be disturbed which is approximately an 8 m x 3 m designated area beside the railway line leading to the former roundhouse. A full assessment of the area has not been completed and the assessment relates to excavation works within the immediate vicinity of the proposed shelter development. Any further works outside of the footprint of the shelter development including proposed future buildings will require additional assessment to ensure that there are no vapour intrusion risk in particular to future building occupants and direct contact risks to recreational site users. Our results indicate that elevated concentrations of contaminants did not exceed direct contact screening levels for recreational use. The results for petroleum hydrocarbon indicate that there may be an unacceptable risk to future habitable buildings such as enclosed buildings, i.e. office space/teaching facility if constructed in this area. However, further assessment will be required. The proposed shelter is not a habitable building and will be a partly enclosed shelter which will not pose a risk of vapour intrusion.

The following Clauses of the City of *Launceston Interim Planning Scheme 2015 - Potentially Contaminated Land Code* have been considered in the assessment;

- Clause E2.5.1 (P1) – Use Standard
- Clause E2.6.2 (P1) – Excavation

## 12.1 Clause E2.5.1 (P1)

The Clause states;

“Land is suitable for the intended use, having regard to:

- (a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or
- (b) an environmental site assessment that demonstrates that the level of contamination does not present a risk to human health or the environment; or
- (c) a plan to manage contamination and associated risk to human health or the environment that includes:
  - (i) an environmental site assessment;
  - (ii) any specific remediation and protection measures required to be implemented before any use commences; and
  - (iii) a statement that the land is suitable for the intended use.”

### 12.1.1 Assessment against Clause E2.5.1 (P1)

ES&D have completed an assessment of the building footprint proposed for the shelter, which has included soil analysis and the assessment has found that the land is ‘not contaminated’ when comparing the analytical results to the commercial and recreational land use screening levels of the NEPASC. The footprint will be suitable for future recreational land use, excluding the construction of habitable buildings.

## 12.2 Clause E2.6.2 (P1)

The Clause states:

“Excavation does not adversely impact on health and the environment, having regard to:

- (a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or
- (b) an environmental site assessment that demonstrates that the level of contamination does not present a risk to human health or the environment; or
- (c) a plan to manage contamination and associated risk to human health and the environment that includes:

- (i) an environmental site assessment;
- (ii) any specific remediation and protection measures required to be implemented before excavation commences; and
- (iii) a statement that the excavation does not adversely impact on human health or the environment.”

### 12.2.1 Assessment against Clause E2.6.2 (P1)

Due to the presence of elevated concentrations of petroleum hydrocarbons and metals and the potential formation of acid sulfate soils excavated soils must be managed in the following way;

1. All excavated soil should be wholly contained within a watertight skip bin to prevent the escape of soil or contaminants and covered to prevent rain ingress.
2. Lime must be added to the soil to prevent the formation of acid sulfate soils prior to reuse onsite or disposal offsite. Lime amendment must be completed in accordance with *Tasmanian Acid Sulfate Soils Management Guidelines 2009* and the UTAS Inveresk Acid Sulfate Management Guidelines which are currently being prepared by ES&D.
3. The excavated soil must be tested by a suitably qualified environmental consultant and approval for disposal sought from EPA Tasmania. Soil must not be removed from the site until EPA Tasmania has issued an approval for disposal.

## 13 Recommendations

The assessment has been completed in accordance with the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended NEPASC. M.

The site is suitable for future commercial and recreational use provided that our recommendations in section 13 above are implemented.

Yours sincerely,



---

Rod Cooper BSc., CEnvP Site Contamination  
Principal Consultant ES&D



## References

Launceston Interim Planning Scheme 2015

Land Information System Tasmania (TheLIST), [www.thelist.tas.gov.au](http://www.thelist.tas.gov.au)

*National Environmental Protection (Assessment of Site Contamination) Measure 1999* as amended NEPASC

CRC Care Technical Documents

## Appendices

## Appendix A: Laboratory Results Certificates

## CERTIFICATE OF ANALYSIS

**Work Order** : **EM2100680**  
**Client** : **ENVIRONMENTAL SERVICE AND DESIGN PTY LTD**  
**Contact** : CARMEL PARKER  
**Address** : 80 MINNA ROAD PO BOX 651  
 HEYBRIDGE TASMANIA, AUSTRALIA 7316  
  
**Telephone** : ----  
**Project** : 7593  
**Order number** : 7593  
**C-O-C number** : ----  
**Sampler** : CARMEL PARKER  
**Site** : ----  
**Quote number** : EN/222  
**No. of samples received** : 5  
**No. of samples analysed** : 5

**Page** : 1 of 6  
**Laboratory** : Environmental Division Melbourne  
**Contact** : Shirley LeCornu  
**Address** : 4 Westall Rd Springvale VIC Australia 3171  
  
**Telephone** : +6138549 9630  
**Date Samples Received** : 19-Jan-2021 11:10  
**Date Analysis Commenced** : 21-Jan-2021  
**Issue Date** : 25-Jan-2021 12:54



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC





## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
^ = This result is computed from individual analyte detections at or above the level of reporting  
ø = ALS is not NATA accredited for these tests.  
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB1_0.5 to 0.6	SB1_0.5 to 0.6B	SB1_0.8 to 0.9	SB1_1.0 to 1.1	SB1_2.6 to 2.7
Sampling date / time				14-Jan-2021 11:46	14-Jan-2021 11:46	14-Jan-2021 11:47	14-Jan-2021 11:48	14-Jan-2021 12:10	
Compound	CAS Number	LOR	Unit	EM2100680-001	EM2100680-002	EM2100680-003	EM2100680-004	EM2100680-005	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>									
Moisture Content	----	0.1	%	----	----	6.3	16.2	16.5	
Moisture Content	----	1.0	%	6.4	7.5	----	----	----	
<b>EG005(ED093)T: Total Metals by ICP-AES</b>									
Arsenic	7440-38-2	5	mg/kg	11	6	<5	----	<5	
Barium	7440-39-3	10	mg/kg	70	50	40	----	40	
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	----	1	
Boron	7440-42-8	50	mg/kg	<50	<50	<50	----	<50	
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	<1	
Chromium	7440-47-3	2	mg/kg	27	40	35	----	65	
Cobalt	7440-48-4	2	mg/kg	22	12	20	----	39	
Copper	7440-50-8	5	mg/kg	73	36	57	----	60	
Lead	7439-92-1	5	mg/kg	57	53	22	----	<5	
Manganese	7439-96-5	5	mg/kg	492	240	424	----	812	
Nickel	7440-02-0	2	mg/kg	94	43	87	----	147	
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	----	<5	
Vanadium	7440-62-2	5	mg/kg	37	120	27	----	52	
Zinc	7440-66-6	5	mg/kg	86	73	62	----	61	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.2	<0.1	----	<0.1	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB1_0.5 to 0.6	SB1_0.5 to 0.6B	SB1_0.8 to 0.9	SB1_1.0 to 1.1	SB1_2.6 to 2.7
Sampling date / time				14-Jan-2021 11:46	14-Jan-2021 11:46	14-Jan-2021 11:47	14-Jan-2021 11:48	14-Jan-2021 12:10	
Compound	CAS Number	LOR	Unit	EM2100680-001	EM2100680-002	EM2100680-003	EM2100680-004	EM2100680-005	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	<b>0.6</b>	<b>0.6</b>	----	----	----	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	<b>1.2</b>	<b>1.2</b>	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10	
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<b>90</b>	<b>910</b>	
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<b>600</b>	<b>1170</b>	<b>2100</b>	
C29 - C36 Fraction	----	100	mg/kg	<b>100</b>	<100	<b>1030</b>	<b>1030</b>	<b>280</b>	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<b>100</b>	<50	<b>1630</b>	<b>2290</b>	<b>3290</b>	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10	
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<b>170</b>	<b>1610</b>	
>C16 - C34 Fraction	----	100	mg/kg	<b>160</b>	<b>130</b>	<b>1340</b>	<b>1870</b>	<b>1560</b>	
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<b>640</b>	<b>490</b>	<b>170</b>	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<b>160</b>	<b>130</b>	<b>1980</b>	<b>2530</b>	<b>3340</b>	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<b>170</b>	<b>1610</b>	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	0.5	%	<b>77.5</b>	<b>83.9</b>	----	----	----	
2-Chlorophenol-D4	93951-73-6	0.5	%	<b>79.3</b>	<b>86.0</b>	----	----	----	



### Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB1_0.5 to 0.6	SB1_0.5 to 0.6B	SB1_0.8 to 0.9	SB1_1.0 to 1.1	SB1_2.6 to 2.7
Sampling date / time				14-Jan-2021 11:46	14-Jan-2021 11:46	14-Jan-2021 11:47	14-Jan-2021 11:48	14-Jan-2021 12:10	
Compound	CAS Number	LOR	Unit	EM2100680-001	EM2100680-002	EM2100680-003	EM2100680-004	EM2100680-005	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)S: Phenolic Compound Surrogates - Continued</b>									
2,4,6-Tribromophenol	118-79-6	0.5	%	68.2	75.5	----	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	0.5	%	88.8	93.7	----	----	----	
Anthracene-d10	1719-06-8	0.5	%	92.5	98.3	----	----	----	
4-Terphenyl-d14	1718-51-0	0.5	%	92.8	98.2	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	81.6	83.7	84.7	71.9	74.3	
Toluene-D8	2037-26-5	0.2	%	88.5	91.0	89.0	71.4	80.1	
4-Bromofluorobenzene	460-00-4	0.2	%	93.9	101	95.9	68.9	88.7	



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2,4,6-Tribromophenol	118-79-6	34	122
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: EM2100680</b>	<b>Page</b>	: 1 of 8
<b>Client</b>	<b>: ENVIRONMENTAL SERVICE AND DESIGN PTY LTD</b>	<b>Laboratory</b>	: Environmental Division Melbourne
<b>Contact</b>	: CARMEL PARKER	<b>Contact</b>	: Shirley LeCornu
<b>Address</b>	: 80 MINNA ROAD PO BOX 651 HEYBRIDGE TASMANIA, AUSTRALIA 7316	<b>Address</b>	: 4 Westall Rd Springvale VIC Australia 3171
<b>Telephone</b>	: ----	<b>Telephone</b>	: +6138549 9630
<b>Project</b>	: 7593	<b>Date Samples Received</b>	: 19-Jan-2021
<b>Order number</b>	: 7593	<b>Date Analysis Commenced</b>	: 21-Jan-2021
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 25-Jan-2021
<b>Sampler</b>	: CARMEL PARKER		
<b>Site</b>	: ----		
<b>Quote number</b>	: EN/222		
<b>No. of samples received</b>	: 5		
<b>No. of samples analysed</b>	: 5		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC



## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :  
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot  
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
 LOR = Limit of reporting  
 RPD = Relative Percentage Difference  
 # = Indicates failed QC

## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3470558)</b>									
EM2100680-001	SB1_0.5 to 0.6	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	70	60	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	27	25	7.86	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	22	19	16.7	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	94	80	16.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	11	9	19.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	73	60	19.2	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	57	61	6.78	0% - 50%
		EG005T: Manganese	7439-96-5	5	mg/kg	492	426	14.5	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	37	36	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	86	78	9.97	0% - 50%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
EM2100682-008	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	150	120	19.1	0% - 50%
		EG005T: Chromium	7440-47-3	2	mg/kg	41	41	0.00	0% - 20%
		EG005T: Cobalt	7440-48-4	2	mg/kg	14	12	12.2	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	58	48	18.5	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	26	25	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	138	151	9.31	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	188	206	9.53	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	482	472	2.27	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
<b>EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3470558) - continued</b>											
EM2100682-008	Anonymous	EG005T: Vanadium	7440-62-2	5	mg/kg	40	37	7.97	No Limit		
		EG005T: Zinc	7440-66-6	5	mg/kg	254	230	9.87	0% - 20%		
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit		
<b>EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3473025)</b>											
EM2100661-060	Anonymous	EA055: Moisture Content	----	0.1	%	7.5	6.8	10.0	No Limit		
EM2100682-001	Anonymous	EA055: Moisture Content	----	0.1	%	6.9	6.1	11.8	No Limit		
<b>EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3470559)</b>											
EM2100680-001	SB1_0.5 to 0.6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
EM2100682-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit		
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3472191)</b>											
EM2100682-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
			205-82-3								
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
		EM2100603-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
				EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthene	83-32-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Fluorene	86-73-7			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Phenanthrene	85-01-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Anthracene	120-12-7			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Fluoranthene	206-44-0			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Pyrene	129-00-0			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benz(a)anthracene	56-55-3			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Chrysene	218-01-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
	205-82-3										
EP075(SIM): Benzo(k)fluoranthene	207-08-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit		





Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3472191) - continued</b>										
EM2100603-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3472090)</b>										
EM2100680-001	SB1_0.5 to 0.6	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit	
EM2100682-006	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit	
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3472192)</b>										
EM2100682-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit	
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit	
EM2100603-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit	
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3472090)</b>										
EM2100680-001	SB1_0.5 to 0.6	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit	
EM2100682-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3472192)</b>										
EM2100682-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	140	150	9.19	No Limit	
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit	
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	140	150	6.90	No Limit	
EM2100603-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit	
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit	
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit	
<b>EP080: BTEXN (QC Lot: 3472090)</b>										
EM2100680-001	SB1_0.5 to 0.6	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit	
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
EM2100682-006	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit	
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit	
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	

Page : 5 of 8  
 Work Order : EM2100680  
 Client : ENVIRONMENTAL SERVICE AND DESIGN PTY LTD  
 Project : 7593



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EP080: BTEXN (QC Lot: 3472090) - continued</b>									
EM2100682-006	Anonymous	EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



## Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
<b>EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3470558)</b>									
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	99.2	70.0	130	
EG005T: Barium	7440-39-3	10	mg/kg	<10	99.3 mg/kg	102	70.0	130	
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	0.67 mg/kg	109	70.0	130	
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----	
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	51.7	50.0	130	
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	109	70.0	130	
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	11.2 mg/kg	91.4	70.0	130	
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	95.9	70.0	130	
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	97.1	70.0	130	
EG005T: Manganese	7439-96-5	5	mg/kg	<5	590 mg/kg	96.5	70.0	130	
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	103	70.0	130	
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----	
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	61.3 mg/kg	109	70.0	130	
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	79.2	70.0	130	
<b>EG035T: Total Recoverable Mercury by FIMS (QCLot: 3470559)</b>									
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.5 mg/kg	125	70.0	130	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3472191)</b>									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	96.5	85.7	123	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	90.8	81.0	123	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	92.9	83.6	120	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	91.7	81.3	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	93.1	79.4	123	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	95.6	81.7	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	89.7	78.3	124	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	92.2	79.9	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	89.7	76.9	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	93.7	80.9	130	
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	3 mg/kg	91.0	70.0	121	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	90.5	80.4	130	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	87.0	70.2	123	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	92.2	67.9	122	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	92.2	65.8	123	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	100	65.8	127	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 3472090)</b>								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	111	58.6	131
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 3472192)</b>								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	900 mg/kg	93.9	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3030 mg/kg	94.7	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1520 mg/kg	95.9	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3472090)</b>								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	107	59.3	128
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3472192)</b>								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1160 mg/kg	92.3	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4020 mg/kg	95.7	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	280 mg/kg	99.6	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
<b>EP080: BTEXN (QCLot: 3472090)</b>								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	94.9	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	108	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	106	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	119	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	119	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	93.0	61.8	123

### Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
<b>EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3470558)</b>							
EM2100680-002	SB1_0.5 to 0.6B	EG005T: Arsenic	7440-38-2	50 mg/kg	100	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	97.1	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	102	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	106	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	105	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	102	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	103	80.0	120
<b>EG035T: Total Recoverable Mercury by FIMS (QCLot: 3470559)</b>							



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
<b>EG035T: Total Recoverable Mercury by FIMS (QCLot: 3470559) - continued</b>							
EM2100680-002	SB1_0.5 to 0.6B	EG035T: Mercury	7439-97-6	0.5 mg/kg	92.5	76.0	116
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3472191)</b>							
EM2100445-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	91.4	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	91.7	65.5	136
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 3472090)</b>							
EM2100680-002	SB1_0.5 to 0.6B	EP080: C6 - C9 Fraction	----	28 mg/kg	93.0	33.4	124
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 3472192)</b>							
EM2100603-002	Anonymous	EP071: C10 - C14 Fraction	----	900 mg/kg	93.1	71.2	125
		EP071: C15 - C28 Fraction	----	3030 mg/kg	93.5	75.6	122
		EP071: C29 - C36 Fraction	----	1520 mg/kg	95.2	78.0	120
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3472090)</b>							
EM2100680-002	SB1_0.5 to 0.6B	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	89.6	30.8	120
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3472192)</b>							
EM2100603-002	Anonymous	EP071: >C10 - C16 Fraction	----	1160 mg/kg	91.0	72.2	128
		EP071: >C16 - C34 Fraction	----	4020 mg/kg	94.7	76.5	119
		EP071: >C34 - C40 Fraction	----	280 mg/kg	99.5	66.8	138
<b>EP080: BTEXN (QCLot: 3472090)</b>							
EM2100680-002	SB1_0.5 to 0.6B	EP080: Benzene	71-43-2	2 mg/kg	94.4	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	102	57.1	131



**CHAIN OF CUSTODY**  
ALS Laboratory, please tick →

- Sydney: 277 Macquarie St, Smithfield NSW 2176
- Brisbane: 32 Sturt St, Sturford QLD 4053
- Melbourne: 241 Wessell Rd, Springvale VIC 3171
- Perth: 10 Ford Way, Kellega WA 6099
- Adelaide: 6 Roseglen Rd, Warburton SA 5204
- Perth: 8540 9500 E, Dampiera SA 5093
- Perth: 00 9200 7838 E, Campbellfield SA 5008
- Perth: 400 0433 Essendon, Essendon VIC 3040
- Townsville: 14-15 Derrin Ct, Brolla QLD 4010
- Adelaide: 2-1 Birnie Rd, Pooraka SA 5003
- Launceston: 27 Wellington St, Launceston TAS 7250
- Perth: 03 9381 2159 E, Inmanville SA 5008

CLIENT: ENVIRONMENTAL SERVICE DESIGN  
 OFFICE: 74 MINNA RD, HENBRIDGE TAS  
 PROJECT: 7593  
 ORDER NUMBER: 7593  
 PROJECT MANAGER: CPARKER  
 SAMPLER: CPARKER  
 COC emailed to ALS? (YES) (NO)  
 Email Reports to (will default to PM if no other addresses are listed): cdarver@esandl.com.au  
 Email Invoiced to (will default to PM if no other addresses are listed): cdm@esandl.com.au  
 COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS:  Standard TAT (List date date)  
 Non Standard or urgent TAT (List date date)  
 Standard TAT may be longer for some leads  
 (e.g. Ultra Trace Organics)  
 ALS QUOTE NO.:  
 CONTRACT PH:  
 SAMPLER MOBILE: 0409683615  
 EDD FORMAT (or default): X TAB  
 RELINQUISHED BY: Sammy DATE/TIME: 19/11/10 11:10  
 RECEIVED BY: DATE/TIME:  
 COC SEQUENCE NUMBER (Circle)  
 OF 1 2 3 4 5 7

LAB ID: SAMPLE ID: DATE / TIME: MATRIX: TYPE & PRESERVATIVE (refer to codes below): TOTAL BOTTLES: ANALYSIS REQUIRED INCLUDING SUITES (NB. Suite Codes must be listed to attract full price):  
 Container Information: Analysis Required including Suites (NB. Suite Codes must be listed to attract full price):  
 Additional Information:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED INCLUDING SUITES (NB. Suite Codes must be listed to attract full price)	Additional Information
1	SR1-0.570.0.6	14-01-21 11:46	S	100ml Soil Jar	1	M-S L-S	
2	SR1-0.570.0.6.B	14-01-21 11:46	S	"	1	X	
3	SR1-0.870.0.9	14-01-21 11:47	S	"	1	X	
4	SR1-1.070.1.1	14-01-21 11:48	S	"	1	X	
5	SR1-2.670.2.7	14-01-21 12:10	S	"	1	X	
						5	

Environmental Division  
 Melbourne  
 Work Order Reference  
**EM2100680**  
 Telephone : + 61-3-9549 9600

Vialer Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; G = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AF = Airtight Unpreserved Plastic  
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airtight Unpreserved Vial SA = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Spindler bottles; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass  
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Stippled Bottle; ASS = Plastic Bag for Add Sulfuric Solns; B = Unpreserved Bag

**PREIGHT**