SQUIBBS RD – MANAGEMENT, MONITORING AND OFFSET PLAN

FINAL PRELIMINARY VERSION

SQUIBBS ROAD - DRAINAGE IMPROVEMENTS

Devonport City Council

Issue	Description	Approved By	Signed	Date
1	Draft 1	DCC		1-3-2019
2	Draft 2	DCC		2-7-2019
3	Draft 3	DCC		12-8-2019

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both.

I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed 

Full name (please print) Matthew Atkins

Organisation (please print) Devonport City Council

Date 14 /08/2019

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
DCC	Devonport City Council
MMOP	Management, Monitoring and Offset Plan – Squibbs Road Drainage Improvements

Terms

Impact Site	Squibbs Road (including Road Reserve and associated roadside drains as delineated in Figure 5).
Contractor	The company/entity awarded the contract by DCC to perform the works.
DCC Superintendent	The land upon which the drainage works and associated laydown areas are to be located.
Offset Site	39 Clayton Drive, Sheffield (Title Reference 24071/361).
Plan	this *Management, Monitoring and Offset Plan – Squibbs Road Drainage Improvements*
Translocation Area	The designated area at the Offset Site (Figure 11) to where CNBC excavated from the Work Area at the Impact Site will be translocated and monitored.
Work Area	The land upon which the drainage works and associated laydown areas are to be located.
Works	The tasks, processes and overall implementation of drainage works which includes but not necessarily limited to road/drain excavation, rock-lining of drains, back-filling of trenches and material stockpiling.

PART A - BACKGROUND

A.1 Overview of Action

The Devonport City Council (DCC) proposes to make drainage improvements to a section of Squibbs Road in the locality of Spreyton to improve road safety and mitigate flood risk in the area.

The Squibbs Road Drainage Improvements project will substantially improve the safety of road users, pedestrians and residents in this area of Spreyton.

The project is to improve drainage along a section of Squibbs Road near its northern extent by -

- Excavating the existing embankment to increase road width and install an open-drain with suitable slope;
- Excavating a table drain of sufficient capacity (width and depth) to manage surface water flows alongside Squibbs Road;
- Dismantling the existing fenceline and reinstating it on the boundary of the road reservation (a move of the fenceline westwards);
- Replacing under-size culverts along Squibbs Road; and
- Rock-lining the improved drain with suitably sized rocks to prevent scouring.

As the road is a geographically fixed entity there are no alternatives to the action.

A.2 Matters of National Environmental Significance

The project will need to address the management of the endangered species which occur in the Work Area and immediately adjacent to the Work Area –

- Central north burrowing crayfish (*Engaeus granulatus*)
    - Listed as Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; and
    - Listed as endangered on the Tasmanian *Threatened Species Protection Act 1995*.

A.3 Proponent of Action

The proponent of the action is the Devonport City Council.

Proponent: Devonport City Council (DCC) (ABN 47 611 446 016))

Customer Service Centre

137 Rooke Street, Devonport TAS 7310

A.4 Location

Squibbs Road (the Impact Site) is in Spreyton, to the south of Devonport on the western shore of the Mersey River (Figure 1).

The Work Area at the Impact Site occurs in a small sub-catchment of a larger catchment (Figure of Eight Creek) which –

1. supports known records of Central North burrowing crayfish (Figures 2 and 3); and
2. drains eastwards, under Squibbs Road via culverts, to report to the Mersey River (Figure 4).

A.5 Access

The Work Area is accessed from Squibbs Road which connects to Mersey Main Road via Bishops and Kelcey Tier Roads.

A.6 Offset Site Characteristics

A.6.1 Geology and soils

The Offset Site is comprised of Permian mudstone bedrock with a shallow overlaying silty loam. Areas associated with the main channel of the creekline are deeply incised and have a muddy base. Permian mudstone derived soils are generally infertile and susceptible to erosion due to their paucity of clay content. No sites of geoconservation significance are known to occur at the site.

A.6.2 Surface Water

The Offset Site is within the Figure of Eight catchment which flows into the Mersey River estuary (Figure 2). Existing drainage within the site is shown in Figure 6.

A.6.3 Vegetation

The Offset Site is agricultural pasture and a few tree plantings associated with the private properties adjacent to the road reservation.

A.6.4 Threatened Flora

No plant species listed on the Tasmanian *Threatened Species Protection Act 1995* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are known to occur in the Offset Site.

A.6.5 Threatened Fauna

The main conservation significant fauna species in both the Impact and Offset Sites is the Central North burrowing crayfish which relies on wet areas and elevated groundwater levels during dry times.

The Central North burrowing crayfish (*Engaeus granulatus*), as its name suggests, is endemic to the central north region of Tasmania (Figure 3). The known geographic range of the species has been expanded over the past 10 years as additional surveys have located new populations. Its stronghold is the Devonport – Spreyton – Latrobe region where it occupies seeps, tea-tree swamps, wet forest areas, wetlands and stream banks in relatively undisturbed habitats and roadside and agricultural drain networks. There are many recorded locations of the species in roadside drains, wet areas within pastures and in the yards of residential properties.

Other aquatic to semi-aquatic species known to occur in the region but not within the Impact Site include giant freshwater crayfish (*Astacopsis gouldi*), green and gold frog (*Litoria raniformis*) and Australian grayling (*Prototroctes maraena*).

Conservation significant species listed in Table 1 may use habitat present in the Offset Site.

Table 1. Conservation significant animal species that may utilise habitat in the Offset Site

Species	Foraging Habitat	Nesting or denning habitat	Movement Corridor?
Spotted-tailed quoll	Yes	Yes	Yes
Tasmanian devil	Yes	Yes	Yes
Eastern barred bandicoot	Yes	Yes	Yes
Masked owl	Yes	No	Yes
Swift parrot	Yes	No	Yes

A.6.6 Weeds

One species listed as a Declared Weed on the *Weed Management Act 1999* has been recorded in the Impact and Offset Sites; blackberry (*Rubus fruticosus*).

A.6.7 *Phytophthora cinnamomi*

The EPBC Act lists 'Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)' as a key threatening process.

Root-rot fungus (*Phytophthora cinnamomi*, (PC)) is a soil-borne pathogen that causes death in a wide range of native plant species. PC often leads to floristic and structural changes in susceptible plant communities. PC evolved in tropical areas and requires warm and moist soils for at least part of the

year to produce sporangia and release zoospores. PC can be spread through the movement of infected soil or plant material by people or animals and can even be transported by water percolating through soil or via surface water, such as creeks and other drainage lines.

The nearest recorded locations for this fungus based on Department of Primary Industries, Parks, Water and Environment (DPIPWE) Natural Values Atlas data are on Nook Road south of the site and to the north-west of Devonport.

Given the surrounding landscape is cleared to semi-cleared and is a high use area for numerous vehicles and heavy machinery from across Tasmania) it is *possible* that this soil pathogen is present in the Squibbs Road area (Impact Site) and more broadly in the Figure of Eight Creek catchment (Offset Site). Despite this, site hygiene measures will be applied.

A.6.8 Chytrid fungus

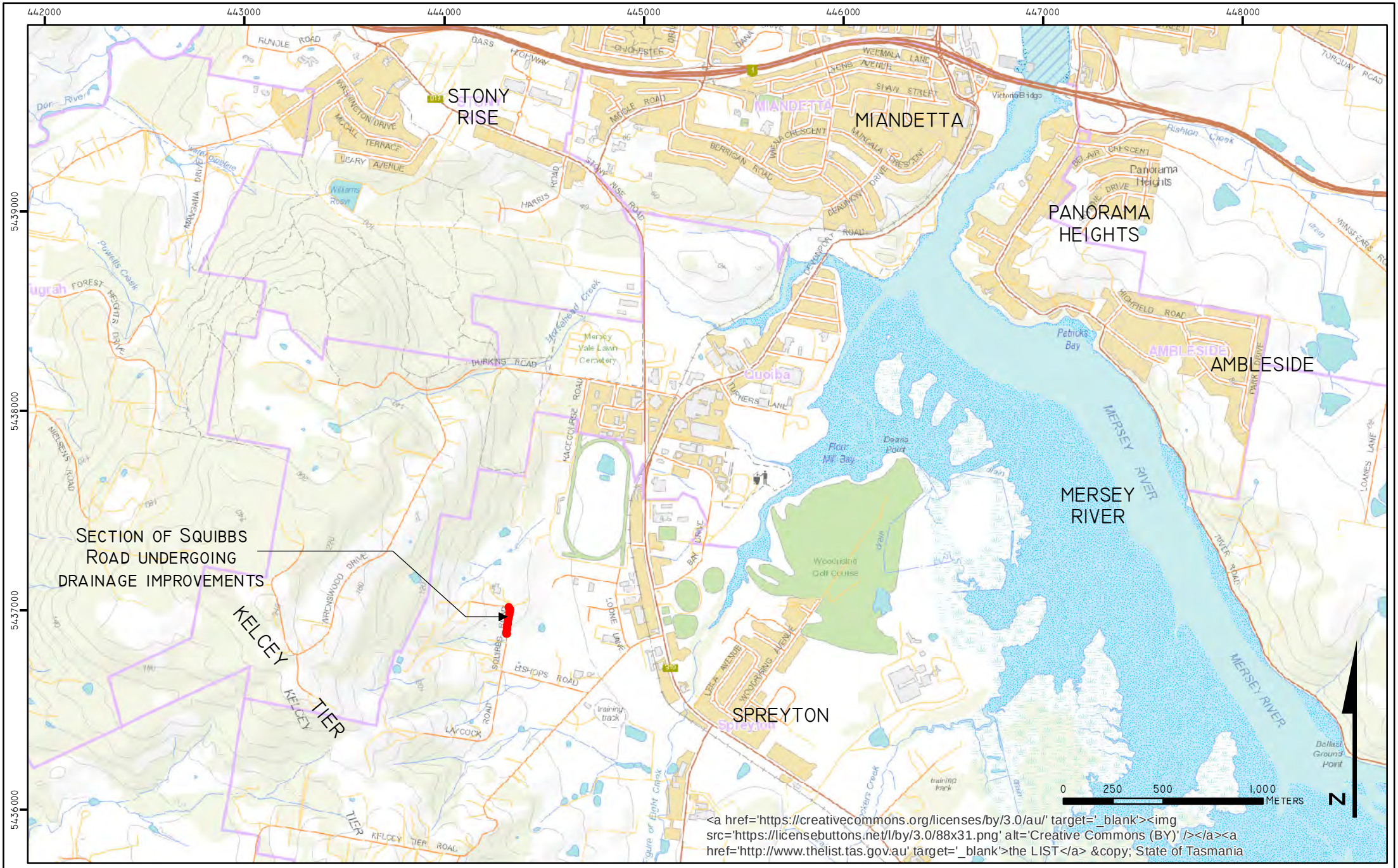
Chytrid fungus (*Batrachochytrium dendrobatidis*) causes the disease known as chytridiomycosis or chytrid infection. The fungus infects the skin of frogs destroying its structure and function and can ultimately cause death. Sporadic deaths occur in some frog populations (mild cases of infection within a site) through to 100% mortality in other populations.

'Chytridiomycosis due to the amphibian chytrid fungus' is a listed key threatening process on the EPBC Act, and specifically poses a risk to an EPBC Act listed threatened species known to occur within area of the Offset Site: the green and golden frog (*Litoria raniformis*).

Chytrid fungus is very difficult to positively confirm within the landscape as mouth-swab samples need to be collected from numerous (>60) tadpoles at a site to enable testing to be conducted (PCR testing).

DPIPWE has conducted sampling of frog populations across key areas of Tasmania and numerous sites have been reported as supporting the fungus. Chytrid fungus has been positively confirmed within the Rubicon catchment by DPIPWE but not from the Figure of Eight Creek catchment (Offset Site) or adjacent catchments (eg Don and Mersey Rivers).

Given the highly disturbed agricultural/ peri–urban landscape within which the sites are located, and inter-connectivity of the drains and waterways providing habitat linkages to frog movement in that landscape, it is *possible* that chytrid fungus is already present within all, or part, of the sites. Despite this, site hygiene measures will be applied.



EPBC 2017/7956 Squibbs Road Drainage Improvements

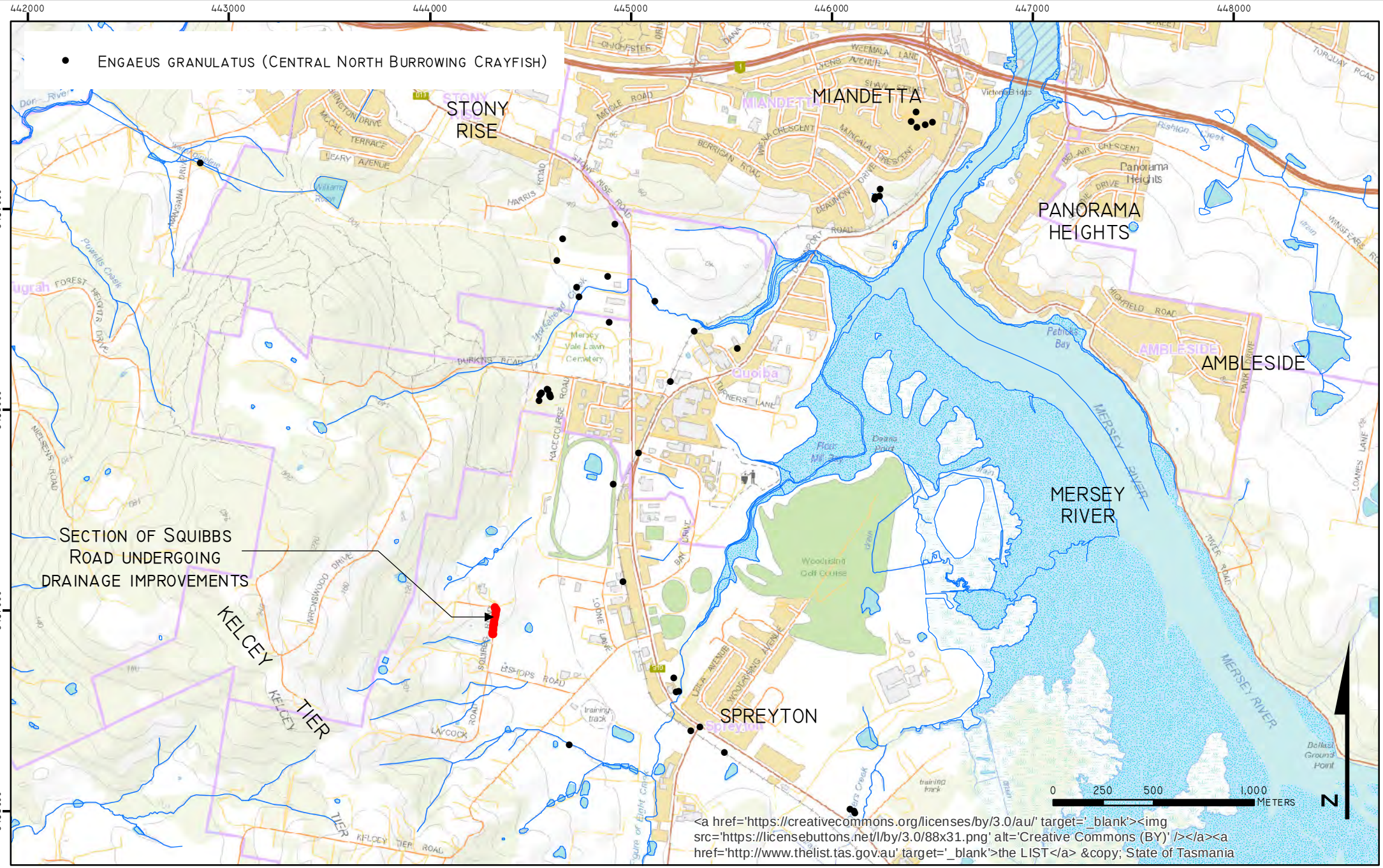
Figure 1: Location of Squibbs Road Drainage Improvements Project (Impact Site)

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 2: Local Central North Burrowing Crayfish Records (NVA sourced data)

Van Diemen Consulting

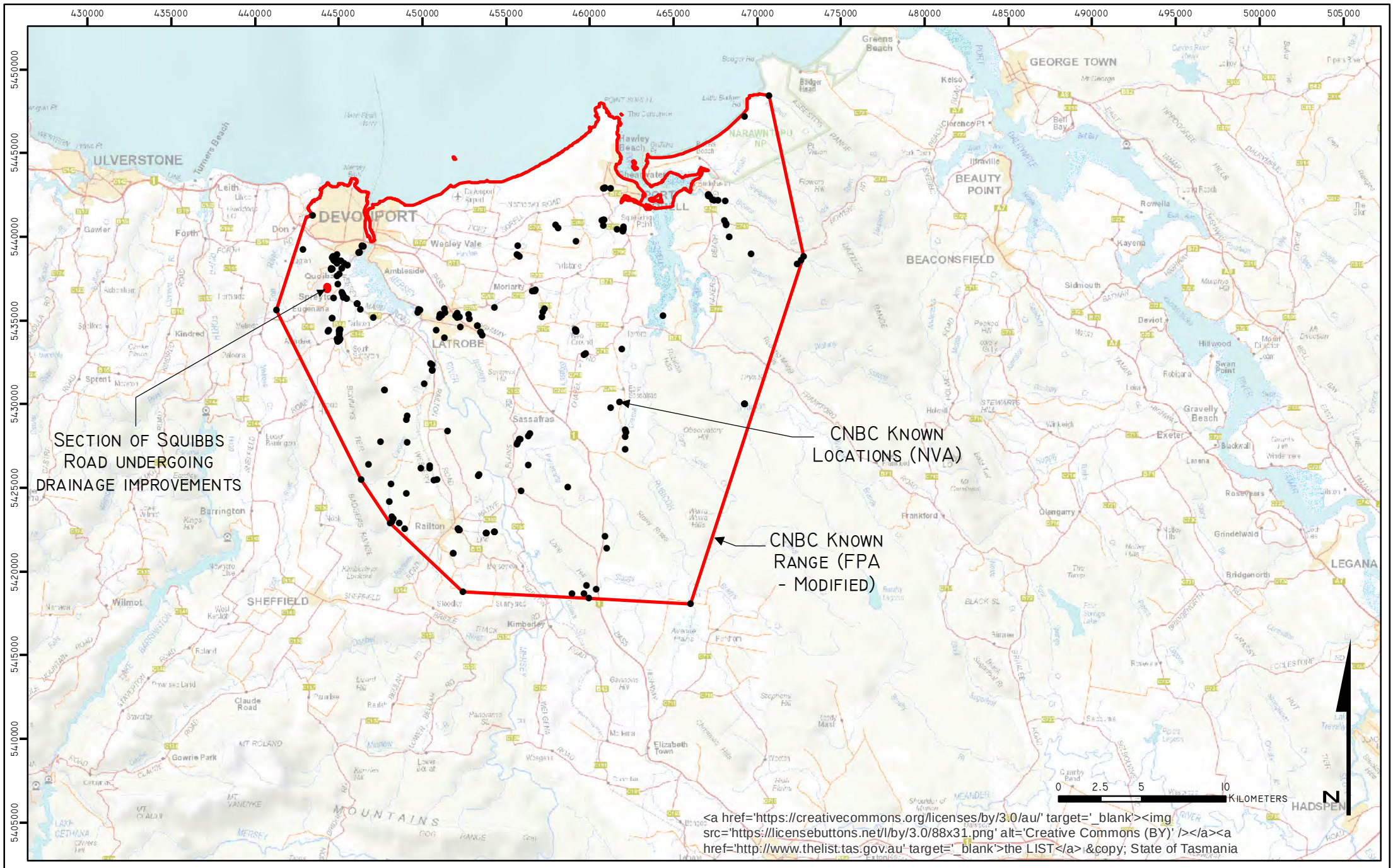
PO Box 1 New Town TAS 7008

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 3: Central North Burrowing Crayfish Distribution (NVA Range Boundary)

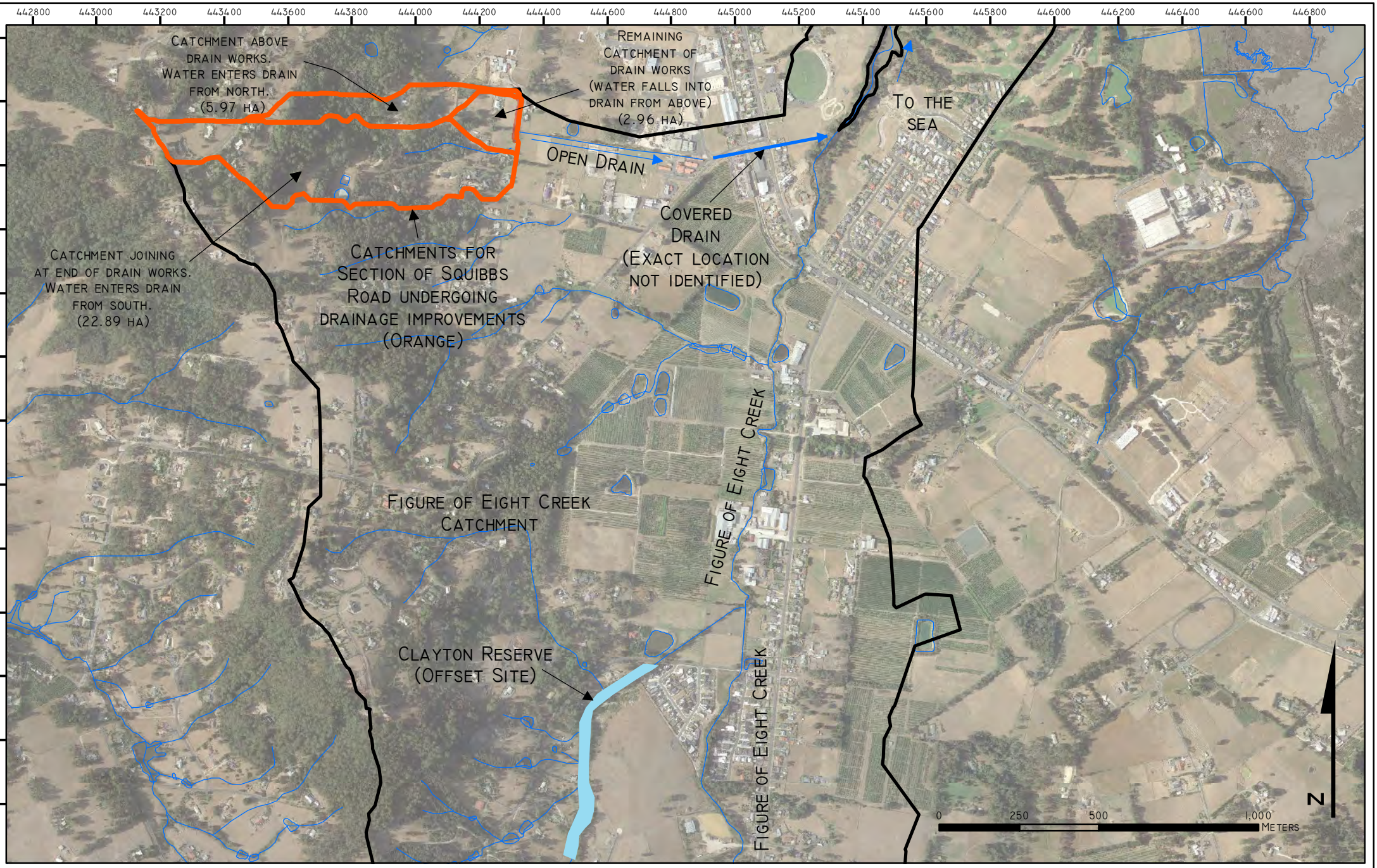
Van Diemen Consulting
PO Box 1 New Town TAS 7008

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th JUNE 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 4: Approximate Drainage Catchments of the Impact Site (Squibbs Road) and the Figure of Eight Catchment (Based on 5m contours and known drains)

Van Diemen Consulting

PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019

PART B – DESCRIPTION OF WORK AREA AND PLAN IMPLEMENTATION

B.1 Overview

The project is to improve drainage along a section of Squibbs Road near its northern extent by –

- Excavating the existing embankment to increase road width and install an open-drain with suitable slope;
- Excavating a table drain of sufficient capacity (width and depth) to manage surface water flows alongside Squibbs Road;
- Dismantling the existing fenceline and reinstating it on the boundary of the road reservation (a move of the fenceline westwards);
- Replacing under-size culverts along Squibbs Road; and
- Rock-lining the improved drain with suitably sized rocks to prevent scouring.

The technical drawings which show the layout of the completed drainage works are in Attachment A.

B.2 Roles and responsibilities for plan implementation

B.2.1 Proponent

The Devonport City Council (DCC) is responsible for:

- Ensuring that the DCC Superintendent is briefed on the requirements of the Plan and its importance to the overall success of plan implementation;
- Ensuring that this Plan is complied with, through regular assessments of the site and liaison with the DCC Superintendent;
- Ensuring that any variations to this Plan are developed and provided to the DoEE and the Policy and Conservation Assessment Branch (DPIPWE) for approval prior to their implementation; and
- Ensuring that the legislative requirements to implement the Plan have been met and are kept current, such as permits.

B.2.2 DCC Superintendent

The DCC Superintendent is responsible for:

- Ensuring that this Plan is complied with, implemented and reviewed from time to time as required;
- Ensuring appropriate reporting to the DCC or their representative on the implementation of this Plan. This will include any breaches and how they were recorded and addressed;

- Ensuring that reporting requirements and assessments of project success are initiated and completed on time;
- Ensuring that all staff working at the site are aware of the locations of underground and overhead services (maps and diagrams to be provided during induction) that may pose a safety risk to them in carrying out their assigned tasks; and
- Coordinating the training of staff and contractors in techniques for Plan implementation.

B.2.3. Staff and Contractors

All staff and contractors that work within the site will be inducted and advised of the natural values within the site. They will also be inducted and advised of management requirements within the site to protect and enhance those natural values, including actions that are unacceptable (eg dumping of rubbish).

Staff and contractors are responsible for:

- Applying the management measures in the site for which they have received training; and
- Reporting to the DCC Superintendent any breaches of this Plan as soon as practical, including provision of written details of the breach, and any measures that were taken to reduce the likelihood of any environmental harm.

B.3 Existing Drainage at the Impact Site

The Work Area (Figure 5) in the Impact Site at Squibbs Road has a drainage channel on the western side of its length. The drainage channel is scoured and, in many locations, eroded to bedrock. The channel is so deep in some sections that the road surface has been under-cut and is now at risk of collapsing into the drain. The depth of the drain is also unsafe if any driver was to leave the road and enter it – a situation that is possible given the narrow width of the road.

There is an existing culvert near a topographic low point that directs water from the western side of the road (uphill) to the eastern side of the road (downhill) as shown in Figure 6. Further northwards on Squibbs Road there is another existing culvert.

Plate 1 contains images that show the condition of the existing roadside drain and some of the damage that flooding has caused to the drain and associated road surface.

Plate 1. Squibbs Road existing drainage channels and culverts

Squibbs Road looking southwards from its corner that leads uphill towards Kelcey Tier.

The existing drain (arrow) can be seen on the topside of the roadline.

Squibbs Road looking northwards from its corner which leads uphill towards Kelcey Tier.

The existing drain (arrow) can be seen on the topside of the roadline. Water flows into the drainage channel are by surface flows and water directed to it by a culvert underneath the road surface. The blue dashed line shows the approximate location of the under-road culvert.

The drainage channel alongside Squibbs Road is scoured.

The area where water enters the under-road culvert is dominated by gravels and other sediments transported by flood waters.

B.4 Drainage works at the Impact Site and the Central North Burrowing Crayfish

Figure 7 shows the observed burrowing crayfish locations within and near the Work Area at the Impact Site. The type of burrows present and their general form are shown in Plate 2.

The greatest density of burrows was observed at the low-point in the landscape where there is a major drainage point for the road and nearby pastures. Approximately 90 burrows are estimated to occur in the Work Area – assuming half of the burrows are occupied by a crayfish, there are about 45 CNBC potentially impacted upon by the Works.

Burrows were also observed on the eastern side of Squibbs Road (outside Work Area) where there is a large and deep drain which continues southwards towards the junction of Squibbs and Bishops Roads.

Plate 2. Central North burrowing crayfish burrows/chimneys along Squibbs Road

Burrows of CNBC were observed in a few locations in the drain alongside Squibbs Road.

There were very few burrows located in the northern section of it due to the lack of sediments/clay for the species to excavate within. It appears that flooding has eroded the clay base of the drainage channel such that burrows have been destroyed.

The northern section of the Work Area is a topographic high-point on Squibbs Road, with the low-point of the Work Area being at the southern end (arrow) where there is a large drainage channel on the eastern side of the road.

The drainage area in the nearby paddock is indicated by the abundance of pin rush.

The pasture in the low point of the landscape (at the Impact Site supports numerous large chimneys (arrows) indicative of CNBC.

B.5 Marking Out Work Area at the Impact Site

All marking out should be completed before any construction related activities occur in the Work Area.

Areas to be appropriately marked out include the following –

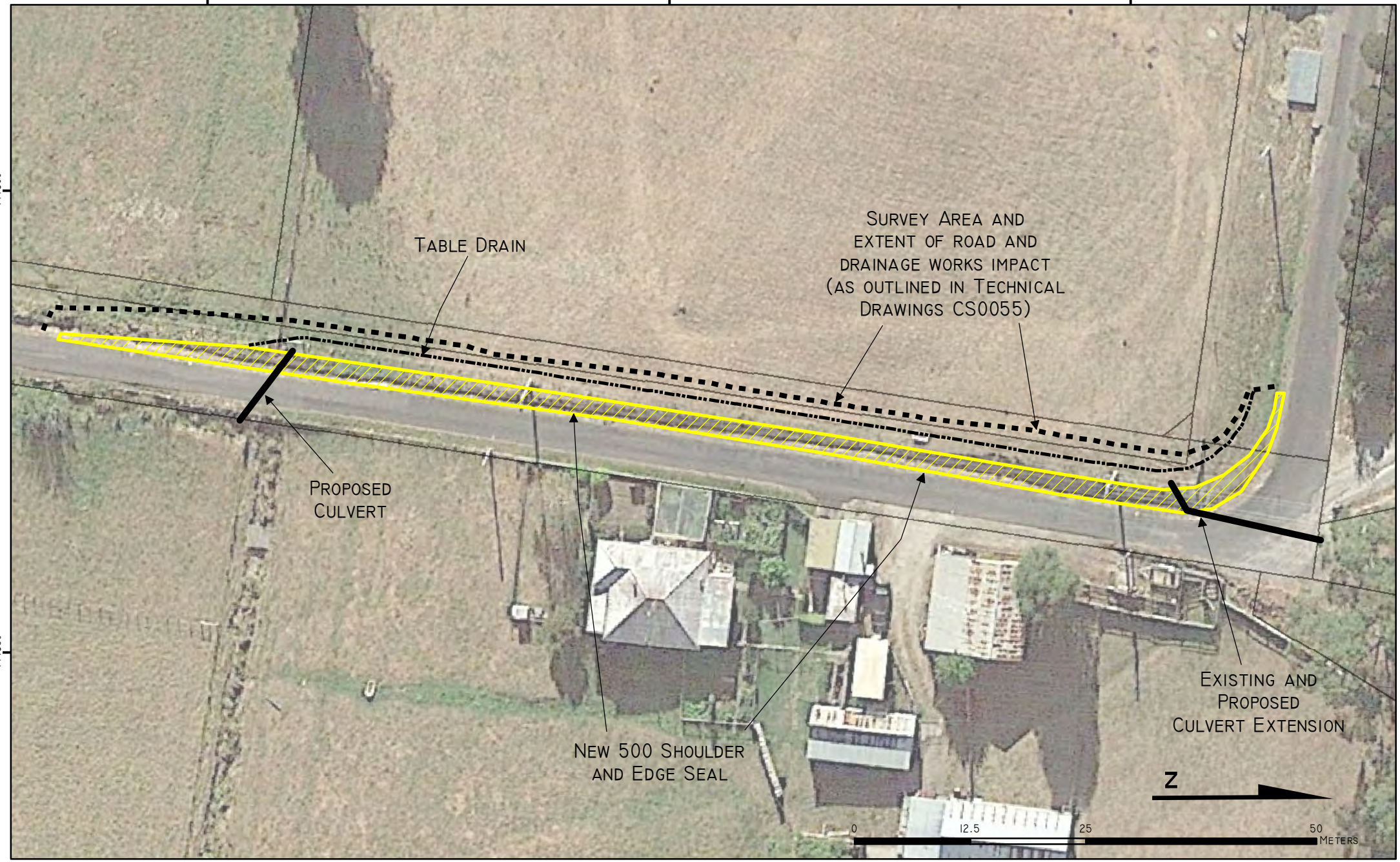
- ✓ Location of the Translocation Area in the Offset Site where CNBC are to be translocated from the Work Area (within the Impact Site);
- ✓ Marking and fencing off areas where CNBC already occur adjacent to the Translocation Area;
- ✓ Location of where sediment control measures need to be installed at the Impact Site; and
- ✓ Location of culverts (existing and to be replaced) to be installed at the Impact Site.

All other marking could be done with plastic fencing, flagging tape, wooden pegs (top painted with bright paint). No machinery or vegetation/soil disturbance should occur outside a 10m buffer measured either side of the edge of the current road formation.

B.6 Training and Inductions

All contractors working on or at the construction site are to be inducted in health, safety and environmental issues related to the construction project.

Specific commentary and information will be provided during the induction process of the requirements of this Plan and the need to be mindful of avoiding impacts external to the Work Area (ie to avoid secondary impacts to CNBC external to the Work Area).



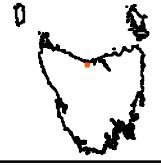
EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 5: Proposed Works (see also Drawing CS0055 – Attachment A) at Impact Site (Squibbs Road)

Van Diemen Consulting

PO Box 1 New Town TAS 7008

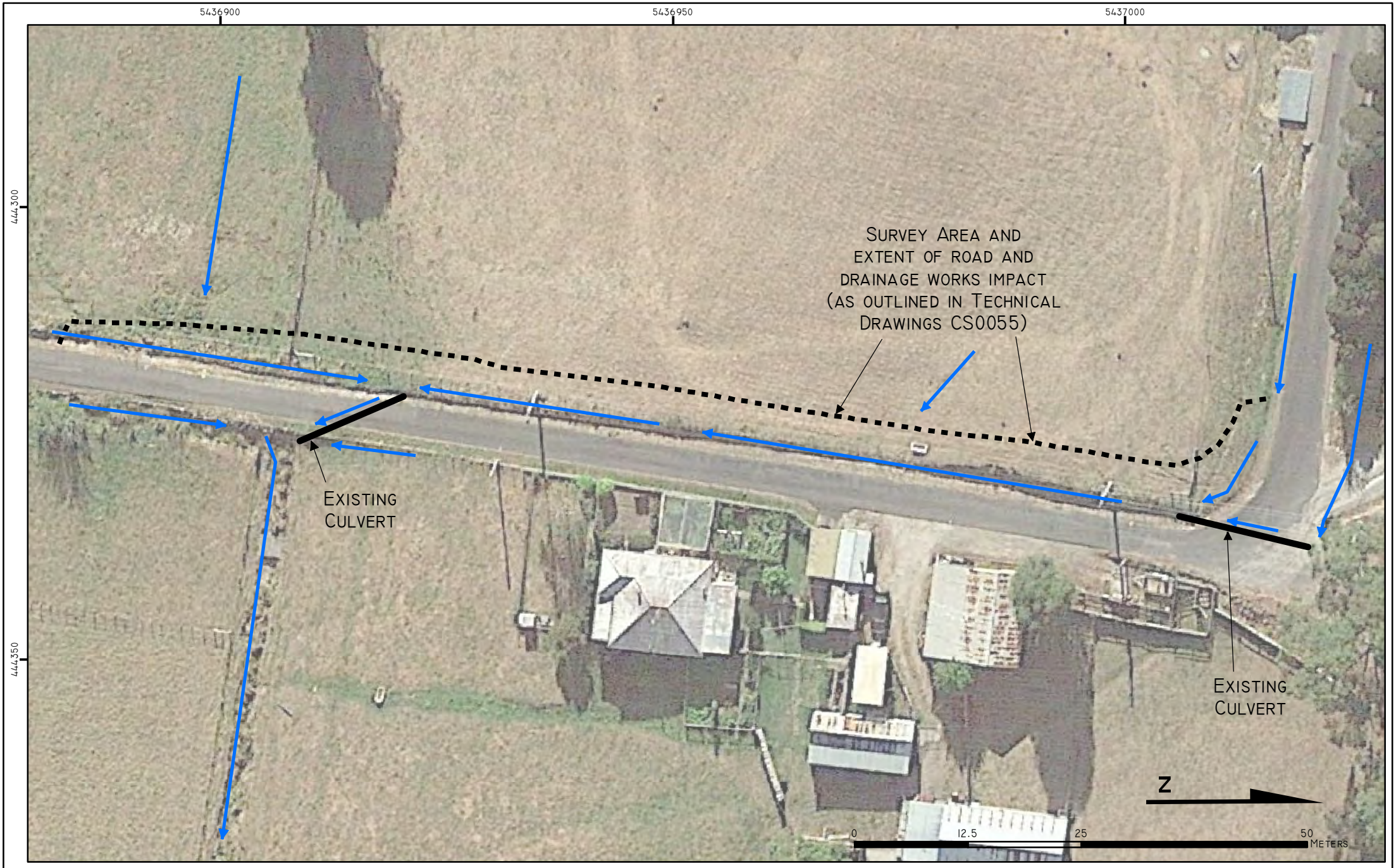
Base data by TASMAP. © State of Tasmania
Base image © Google Earth



DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 6: Detail of existing site drainage at the Impact Site (Squibbs Road)

Van Diemen Consulting

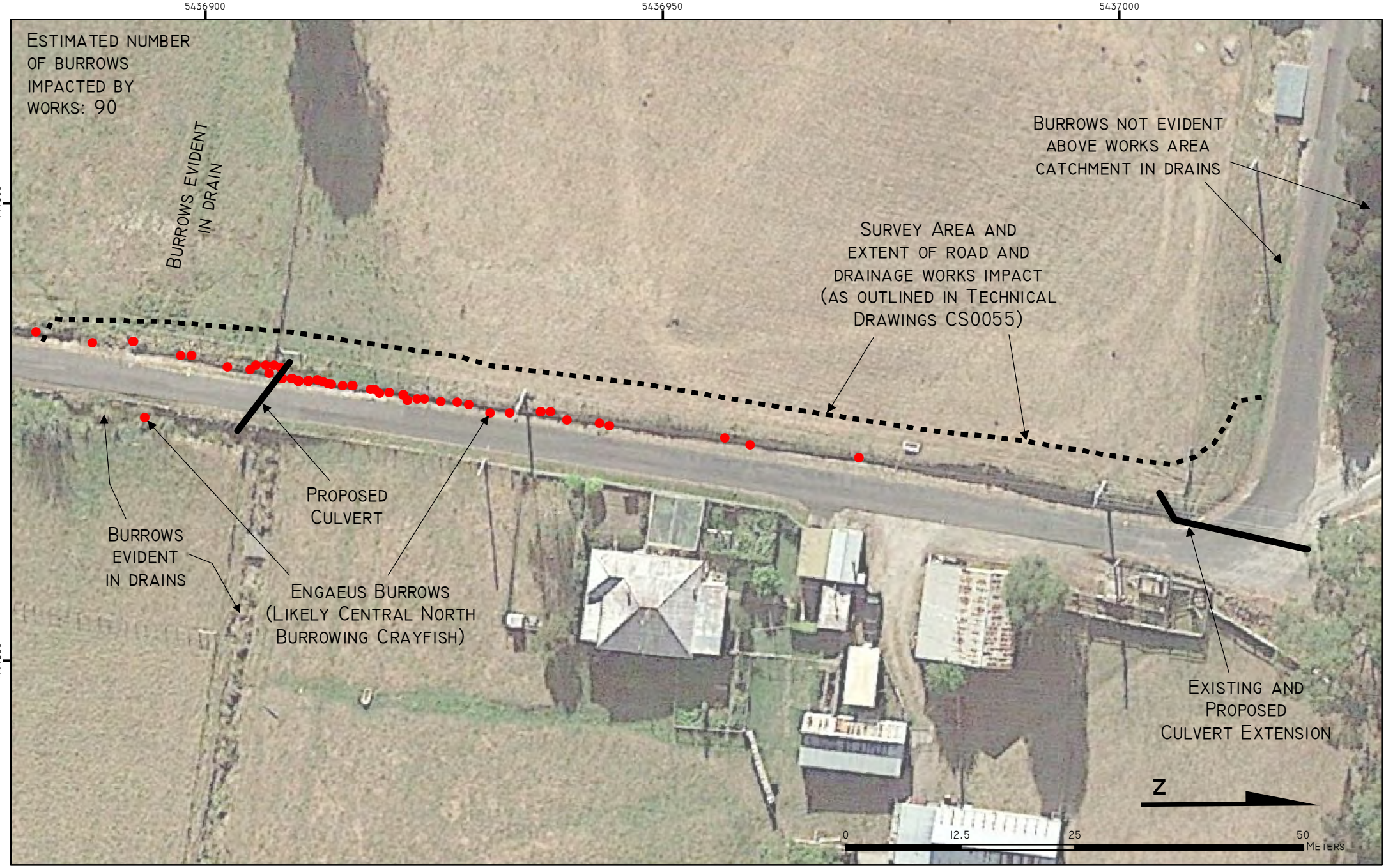
PO Box 1 New Town TAS 7008

Base data by TASMAP. © State of Tasmania
Base image © Google Earth

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

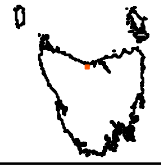
DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 7: Engaeus burrow locations in the Impact Site (Squibbs Road)

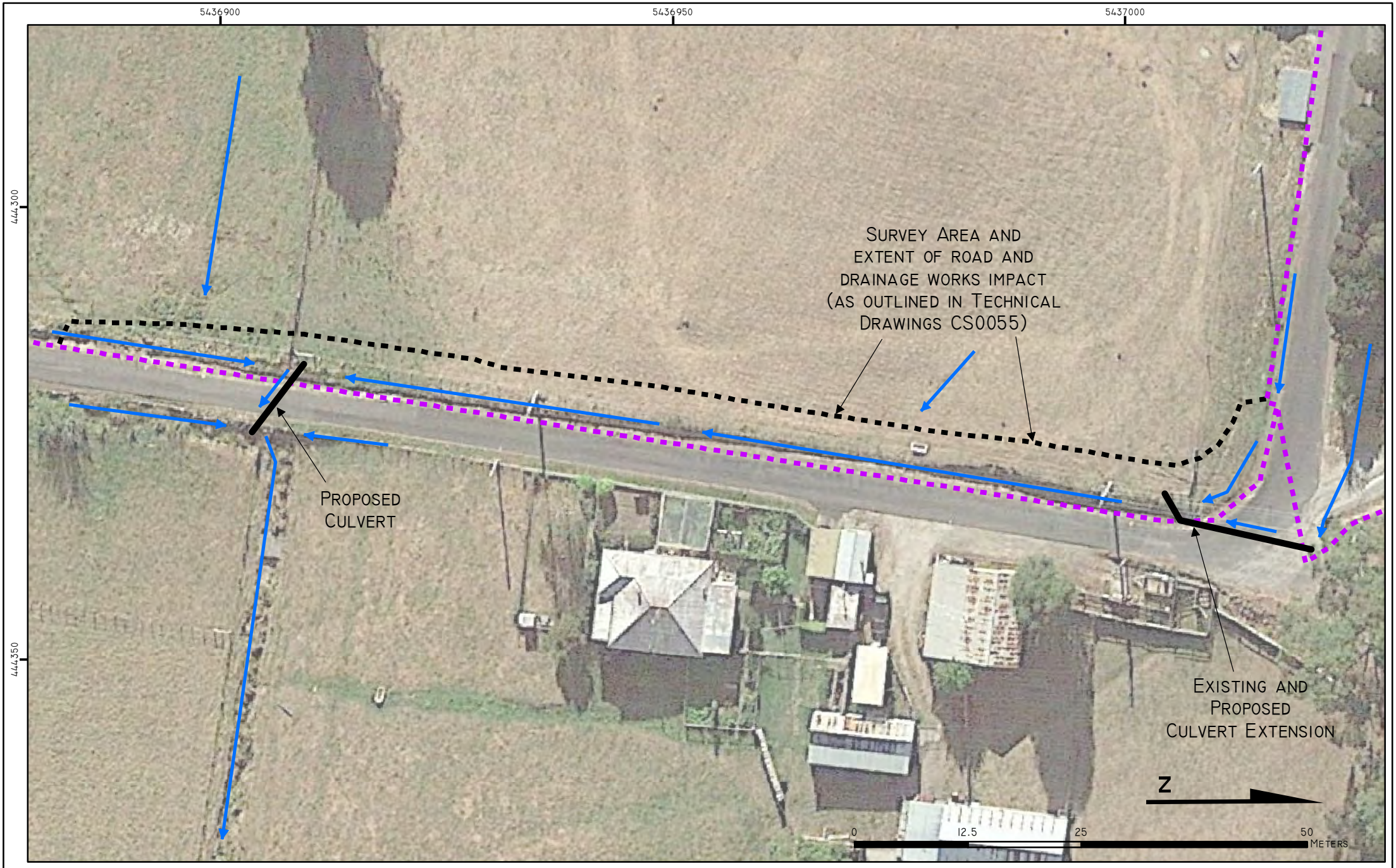
Van Diemen Consulting
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

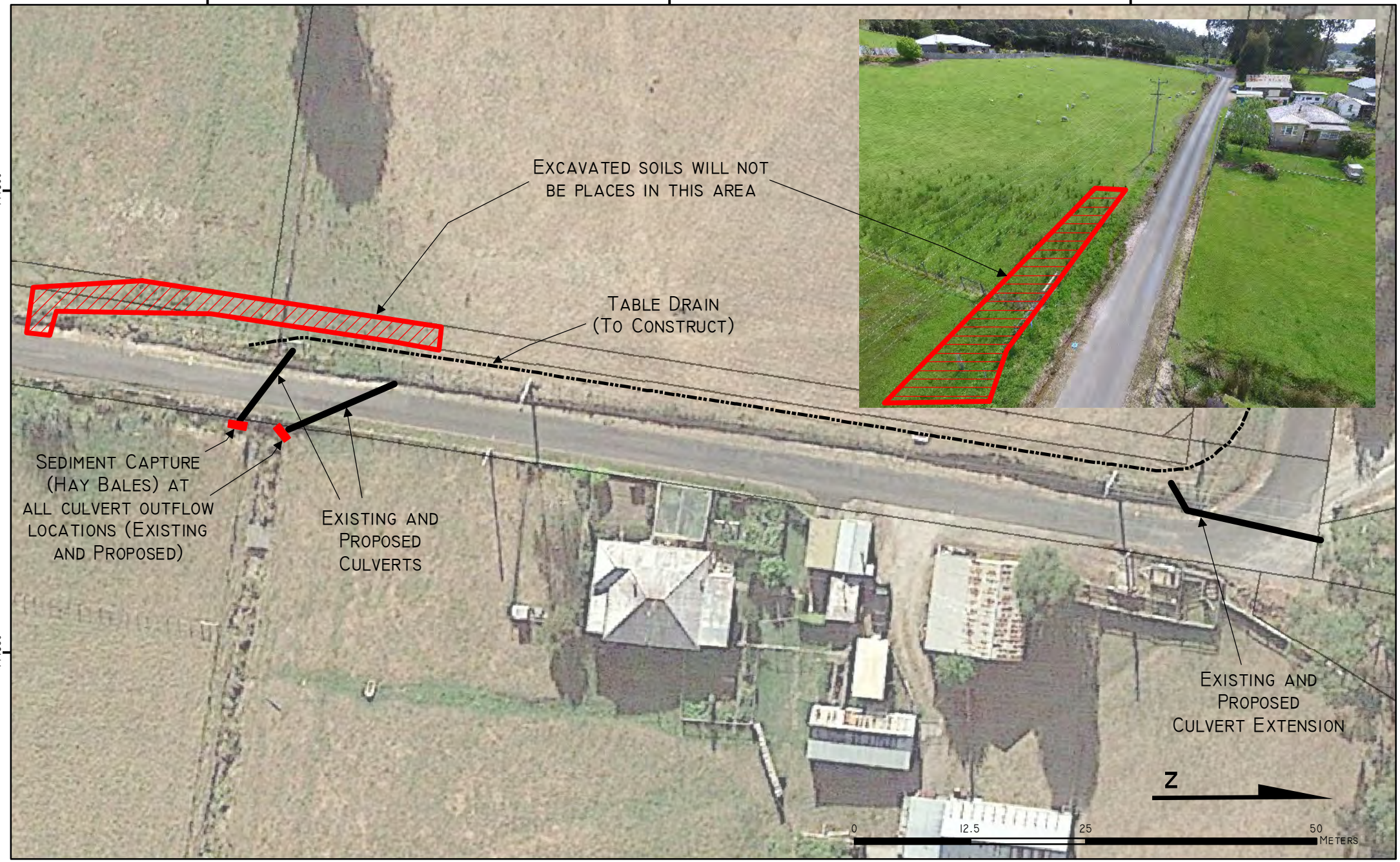
Figure 8: Detail of proposed drainage at Impact Site (Squibbs Road)

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

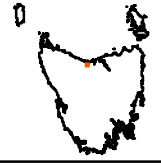
DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 9: Sediment management during construction at Impact Site (Squibbs Road)

Van Diemen Consulting
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

DATE: 17th June 2019

B.7 Emergency Response Procedures

The following measures are to be adopted in the event of an emergency in addition to those measures that form part of the standard operating – work protocols of the civil contractor.

B.7.1 Fire

In the event of a fire (eg machinery, bushfire) always the contact emergency services on 000 (triple zero) without delay.

B.7.2 Minor Spill/Leak Control Measures

In the event of a hydrocarbon spillage or leak greater than 1 L volume but less than 10 L the spill kit (or kits) will be deployed as the means of clean-up. The spill kit (or kits) will be replenished as soon as possible, and the contaminated spill kit (or kits) will be disposed of by the Contractor at an authorised location to receive such waste material.

An Incident Report must be completed by the Contractor within 72 hrs of the incident occurring and provided to the DCC Superintendent by email or fax.

B.7.3 Event leading to or possibly leading to environmental harm

If an incident causing or threatening to cause environmental nuisance, serious environmental harm or material environmental harm from pollution occurs at the Development during construction works then use this procedure.

An environmental incident may include for example,

- the sudden or excessive overflow of the sediment pond which releases unacceptable volumes of sediment, possibly caused by pump failure (if one is being used), the sudden release of water upstream in the raceline or heavy/sustained rainfall; and/or
- spillage of large quantities of oil or fuel (>10L) from machinery that cannot be adequately managed using a standard spill kit.

If you think that the incident may unacceptably pollute the environment or cause harm to human health, then it should be reported.

In the event of an environmental incident the following procedure is to be applied by the civil contractor:

1. Ensure that the safety of employees and the public is established and maintained, if it is safe for you to do so.

2. Take all reasonable steps to prevent further pollution or environmental harm form occurring, if it is safe to do so. This may include the pumping of fuel from a breached container into another or the bunding of a waterway to prevent spillage from extending further away from the spill location.
3. Contact the following persons in the following order for advice/instructions –
    a. Mr Randell Stott – 0458 533 434
    b. Mr Michael Mouat – 0438 002 620
    c. General line for Devonport Council – 03 6424 0511 (8am to 5pm, Monday to Friday (closed public holidays) or After-Hours Service (for emergencies only) 03 6423 3074.
4. If none of the above are contactable or advice is not provided, then contact the Environment Protection Authority by telephoning 1800 005 171 (a 24-hour emergency telephone number) for advice.

You may need to provide details of the incident which could include the product name, estimated volume of the spill and possible effects of the spill on the surrounding environment (eg nearby creeks, downstream uses of the waterway).

B.7.4 Notification of any incident to the DCC Superintendent

All environmental incidents must be notified to the DCC Superintendent as soon as possible, but within 24 hrs of the incident occurring. An Incident Report must be completed by the Contractor within 24 hrs of the incident occurring and provided to the DCC Superintendent by email or fax.

B.8 Offset Requirement

The estimated loss to CNBC at the Impact Site is 45 animals based on the presence of 90 burrows in the Work Area. The basis for this quantum of offset is the result of the figures inserted into the EPBC Offset Calculator provided in Attachment C.

The starting value is 0 for CNBC at the Translocation Area (Figure 11) because there are no CNBC in that location because it's currently not suitable habitat for the species.

The EPBC calculator, when using a 10-year term to ecological benefit, requires 58 animals to be successfully translocated and/or established (by colonisation of created habitat) at the Translocation Area in the Offset Site. Using the same method of burrow occupation rate, this means 116 burrows need to be both present and exhibit some signs of use by *Engaeus*.

B.8.1 If more or less CNBC are translocated

If more than 45 CNBC are excavated at the Impact Site and translocated to the Offset Site, then that number of animals (e.g. 58, 62, 51) will be used and the EPBC calculator updated to reflect the new number of animals needing to be offset.

Euthanised animals will be included in the revised number of animals.

To be conservative, if the number of animals excavated and translocated or euthanised is less than 45 then 45 will still be used (ie 45 CNBC is a minimum that need to be offset).

B.8.2 Confidence

A 90% certainty of success has been applied in the EPBC Calculator.

The successes recorded for the translocation of CNBC to the Clayton Reserve (established under a plan '39 Clayton Drive, Spreyton – Offset Management Plan' that was prepared and approved for the project 'PIPING OF OPEN DRAIN AND TRANSLOCATION OF BURROWING CRAYFISH AT SHEFFIELD ROAD, DEVONPORT TASMANIA (EPBC REF: 2011/6095) from Sheffield Road demonstrates, in our view, the successful ability of DCC to plan, implement and report on actions which involves matters of NES.

The results contained within the annual monitoring reports for EPBC REF: 2011/6095 demonstrates the ability of the CNBC to be translocated, if done correctly, to other locations where the animals and their future offspring can persist and thrive in the environment. Hence, the loss of CNBC animals at the Impact Site will be offset by attempting to salvage some CNBC from that site and improving habitat at the Translocation Area in the Offset Site – causing a net effect of negligible impact (an impact that does not qualify as a 'significant' one under the criteria).

PART C – WORKS AREA AND ENVIRONMENT MANAGEMENT MEASURES

C.1 Overview

Best practice management is important to the Devonport City Council to achieve sound environmental construction and ongoing management of the drainage works.

Environmental Management Procedures (EMP's) have been developed to address specific management prescriptions in addition to the general requirements applicable to the project indicated in the previous section.

The following Environmental Management Procedures are included in Attachment B –

- **EMP 1:** Disturbance to Terrestrial and Aquatic Flora and Fauna
- **EMP 2**: Working near waterways and drains
- **EMP 3**: Erosion, Sedimentation and Surface Run-off
- **EMP 4**: Aboriginal Artefacts – Unanticipated Discovery Plan
- **EMP 5**: Weed and Pathogen Control

C.2 New Drainage

The Works will not lead to a change in water flow rate or direction. The Works will simply formalise the scoured drain alongside Squibbs Road and improve the slope and form of the embankment. Squibbs Road will also be widened to improve safety for all road users, which requires the drain to be moved slightly to the west as shown in the Technical Drawings (Attachment A).

The Works includes the installation of two new culverts (see Figure 5), one near a major inflow into the drain and the other will be for the outflow of the drain where it flows into a much larger drainage network. The culvert to be constructed at the lower (southern) end of the drain under Squibbs Road will be positioned such that it does not excessively drain water away from those areas which support burrowing crayfish outside the Work Area.

C.2 Associated Works

The following tasks are to have been completed **prior** to initiating the construction process –

1. The Translocation Area at the Offset Site is to be established and ready to receive animals excavated from the Impact Site; and
2. Sediment controls are to be in place at the Impact Site.

The Translocation Area at the Offset Site is spatially defined in Figure 11 and will be mapped by suitably qualified persons (an ecologist and surveyor). The Translocation Area will be partially excavated to impound/impeded water to slow water infiltration long enough for the ground to become damp for an extended period. Suitably qualified persons (an ecologist and surveyor) will direct the excavation process – this is the same approach adopted for EPBC REF: 2011/6095.

C.3 Sediment Management During Works

Construction works will be managed to avoid or mitigate the effects of erosion/sediment release during excavation of soils and culverts.

Environmental Management Procedures (EMP's) will be applied to manage the risk of erosion and sediment run-off. Indicative locations to establish erosion control measures, pursuant to EMP 3, are shown in Figure 9. Excavated soils from the drain and road will not be placed in the area identified in Figure 9 – this is an area where there are sporadic burrows which need to be protected from the Works.

C.4 Translocation Area at the Offset Site

The Translocation Area is at Clayton Reserve (managed by DCC). Clayton Reserve is currently managed under plan '39 Clayton Drive, Spreyton – Offset Management Plan' that was prepared and approved for the project 'PIPING OF OPEN DRAIN AND TRANSLOCATION OF BURROWING CRAYFISH AT SHEFFIELD ROAD, DEVONPORT TASMANIA (EPBC REF: 2011/6095)'.

The plan provides the following commentary about its purpose and scope –

> 'This Plan has been developed as part of a package to offset the loss of habitat and individuals at Sheffield Road (Impact Site) brought about by a road upgrade (safety and flood mitigation) program.
>
> The Sheffield Road – Road Safety and Flood Mitigation Upgrade project will substantially improve the safety of road users, pedestrians and local residents and will also mitigate flood risk associated with poor road drainage in this low-lying region of Spreyton.
>
> The upgrade will ensure that the roadway complies with AASHTO Road Design Guide requirements for safety.
>
> The Offset Management Plan (OMP) will operate for at least 10 years from the date of approval by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) but may be reviewed from time to time as necessary. It is the intention of Devonport City Council (DCC) that the Offset Site be managed for its conservation and passive

recreation values in perpetuity, which would in effect result in the OMP (or an equivalent) being maintained beyond the 10-year period.'

The Translocation Area for the Squibbs Road Drainage Improvement project has no CNBC present, but it is an area that contributes to the natural habitat present in the Clayton Reserve – provides vegetation cover to prevent erosion of sediment into Figure of Eight Creek etc.

The '39 Clayton Drive, Spreyton – Offset Management Plan' contained a set of criteria against which the success of that offset project would be assessed. The criteria for CNBC recolonisation/survival was met in the first 2 years of monitoring and only part of the reserve was used to create CNBC habitat. Clayton Reserve still contains large areas of land not used to create CNBC habitat for EPBC REF: 2011/6095. This extra land for the most part is not suitable for CNBC nor any other *Engaeus* species because it is ephemerally dry, rocky and/or generally unsuitable – some of this currently unsuitable land is what will be used to create more CNBC habitat in the Clayton Reserve.

C.5 Translocation Process and Area Plantings

An Operating Procedure (OP) provides an overview of the environmental management objectives and guidelines for Works to be addressed by contractors in translocating CNBC as part of the Squibbs Road Drainage Improvements project**.** The OP (Attachment D) must be read in conjunction with the *Management, Monitoring and Offset Plan – Squibbs Road Drainage Improvements*.

Native sedge and grass species, including *Poa* and *Carex* species, will be planted within the Translocation Area at the Offset Site after the translocation of CNBC.

C.6 Ongoing Management of Translocation Area

Clayton Reserve is already listed on the DCC Asset Register with ongoing management of the site being performed by the DCC Works Crew through the Annual Works Program. The site is also listed on the GIS layer maintained by Council and Council staff know of the conservation importance of the site.

The Translocation Area at Clayton Reserve will be managed in the following manner which is consistent with the current management of the reserve –

- No mowing or slashing without approval by the DCC Works Manager – advice from DPIPWE and/or a suitably qualified ecological practitioner may be sought; and
- No dumping of road spoil, dirt or other substances; and
- No stock grazing.

PART D – MONITORING AND REPORTING

D.1 Monitoring

It is important that the success or otherwise of the project be assessed against key criteria.

These are:

- At least 116 additional *Engaeus* burrows present in the Translocation Area at the Offset Site;
- Re-colonisation of CNBC in some of the Work Area; and
- No moderately to highly erosive surfaces present in the Translocation Area at the Offset Site.

Three monitoring locations are identified in Figures 10 and 12. These are described below.

D.1.1 Monitoring Area 1 – Works Area

The Works Area will be assessed for the re-colonisation of CNBC – it is anticipated that over time CNBC may enter and colonise some of the area that has been reconstructed as part of the project. The rate of colonisation of the new drain by CNBC will be assessed each time the translocated CNBC at the Offset Site are assessed for survivorship.

D.1.2 Monitoring Area 2 – Existing drain

The extent of sedimentation and subsequent impact to the resident CNBC population further downstream of the Work Area needs to be monitored during and after the completion of the Works. The drainage area should be assessed at the same time as the observations are made in Monitoring Areas 1 and 3.

D.1.3 Monitoring Area 3 – Translocation Area at Offset Site

The rate of survival of translocated animals and rate of colonisation of the habitat created at the Translocation Area at the Offset Site (identified as *Monitoring Area 3* in Figure 12) will be assessed per Table 2.

D.2 Performance Measures

A suitably qualified ecologist will design the methodology and conduct the assessment of burrow number and density in the translocation area where habitat was protected, improved and created for CNBC.

Burrow counts would occur 2, 6, 12, 24 and 52 weeks from translocation (1-year monitoring total) and then one monitoring event each year for 9 years (a total of 10 years monitoring). Photopoint records will also be taken at these times.

The parameters and frequency of monitoring at the

1. Translocation Area in the Offset Site are outlined in Table 2; and
2. Works Area in the Impact Site are outlined in Table 3.

Some specialised tasks will require a suitably qualified ecologist to conduct them, such as burrow counts while other tasks can be done by a person with less specialised knowledge (but still suitably qualified for the tasks to be performed) such as counting the survival rates of planted tubestock.

Monitoring as per Tables 2 and 3 will continue for the full period identified for each phase of the project and parameter even if the above CNBC criteria have been met before the end of the 10-year DoEE reporting period.

D.2.1 Burrowing Crayfish

It is important that the success or otherwise of the project be assessed against key criteria. These are:

- Less than 1% cover of Declared Weeds or Weeds of National Significance present in or adjacent to the habitat created for CNBC;
- At least 200 m^2 of created habitat (potential or actual);
- At least 116[1] additional *Engaeus* burrows present in the Translocation Area at the Offset Site; and
- No moderately to highly erosive surfaces present in the Translocation Area at the Offset Site (indicated by areas of recent sediment accumulation, or sediment removal).

A suitably qualified ecologist will design the methodology and conduct the assessment of burrow number and density in the Offset Site where habitat was protected, improved and created for CNBC.

The assumptions used to estimate the number of CNBC at the Impact Site will be applied at the Offset Site; the number of burrows will be counted (if the area is large, then the sub-samples may be collected using quadrats across the area; advice from an ecologist will be sought in this case) and number of animals estimated based on a 50% occupation rate of the total number of burrows. This approach makes the assessment of impact and offset directly comparable in terms of number of estimated animals present.

[1] If more than 45 CNBC are excavated at the Impact Site Work Area and translocated to the Offset Site, then that number of animals (e.g. 58, 62, 51) will be used and the EPBC calculator updated to reflect the new number of animals needing to be offset.

Euthanised animals will be included in the revised number of animals.

To be conservative, if the number of animals excavated and translocated or euthanised is less than 45 then 45 will still be used (ie 45 CNBC is a minimum that need to be offset).

D.2.2 Plantings

A visual assessment will be made of the number of plant losses for each species that has been planted. Additional plants may need to be planted to compensate for any losses identified during each monitoring period.

At least 60% of all plants (applied to each individual species) planted in the Translocation Area at the Offset Site must survive to maturity which may occur before the end of the 10-year monitoring period.

D.2.3 Auger to water table and surface flows

An auger will be used to determine the depth of the water table. A visual assessment will be made of surface flow direction and intensity and notes made of any erosive or potentially erosive surfaces; remedial works may need to be conducted.

D.2.4 Photopoints

Prior to the commencement of works photopoint locations will be established by a suitably qualified person to ensure an accurate photographic record of site works and improvements at the site is made. Photos will be taken at each photopoint during the monitoring of each phase.

Guidelines are provided in Appendix D that describe how to setup and record photopoint locations.

D.3 Remedial works

A suitably qualified ecologist will provide advice on any remedial works that may be required (eg improved sediment control measures, further movement of soil to improve water soakage into or through the site). Remedial works may be needed at the Offset Site in the short-term to ensure that an optimal level of water flow and soakage is occurring in the Translocation Area.

Works to manage sedimentation and slumping may also need to be performed at the Impact Site to prevent and/or repair any impact to CNBC habitat adjacent to the Works Area.

D.4 Contingency

The project is highly likely to achieve the desired outcome (i.e. establishment of a sufficiently large and sustaining population of CNBC to compensate for the loss of CNBC due to roadworks at the Impact Site) because the project includes the:

- translocation of CNBC from the Impact Site to the Offset Site to both (a) salvage animals from the site of impact to lessen the overall impact to the species and (b) enlarge the population of CNBC at the Offset Site; and the
- further improvement of existing habitat for CNBC and creation of habitat for the species to colonise.

The contiguous nature of habitat across, into and out of the Offset Site for CNBC has no doubt provided many opportunities for CNBC to move into the created and improved habitat areas. The survival rate and additional burrows required to meet the offset requirements for EPBC REF: 2011/6095 was met within 2 years of the translocation taking place from the Sheffield Road works site.

On this basis the contingency measures for the project are the monitoring of the site and necessary adjustments to the management regime at the Offset Site to increase the probability of an increase in the number of animals at the site. This may include the use of side drains in the Offset Site to create additional areas of habitat to increase the overall amount of habitat created for the CNBC to colonise or the establishment of a new Offset Site within which habitat can be created to establish and/or expand a CNBC colony. DCC have access to other land assets that may be used for this purpose.

In the very unlikely event that the outcomes of the project are not fully achieved a review will be conducted detailing how the project was undertaken (eg what occurred, what went wrong, what worked well, what did the monitoring data show) and to explore opportunities to increase the success of translocation and habitat creation for future projects. The review will include representatives from DCC, DoEE and PCAB (DPIPWE) with input from suitably qualified persons.

D.5 Reporting

The DCC is responsible for reporting to regulatory authorities on the implementation of the project.

Reports on the progress and results of the implementation of the MMOP will be made to DoEE and the Policy and Conservation Assessment Branch within DPIPWE every 6 months from the commencement of the project for 2 years (4 reporting periods) then annually for the next 8 years (8 reporting periods) within the overall project report.

D.6 Review of Plan

The objectives, responsibilities and management actions within this Plan will need to consider and adapt to new information as it becomes available. This Plan is intended to be flexible to allow changes to be made to the focus of management actions.

A review of the MMOP will be conducted each year in conjunction with the Annual Report prepared by DCC (part of reporting on its normal Council operations and activities). Reviewed versions of the MMOP will be provided to DoEE and the Policy and Conservation Assessment Branch of DPIPWE for assessment and approval before any actions.

EPBC 2017/7956 Squibbs Road Drainage Improvements

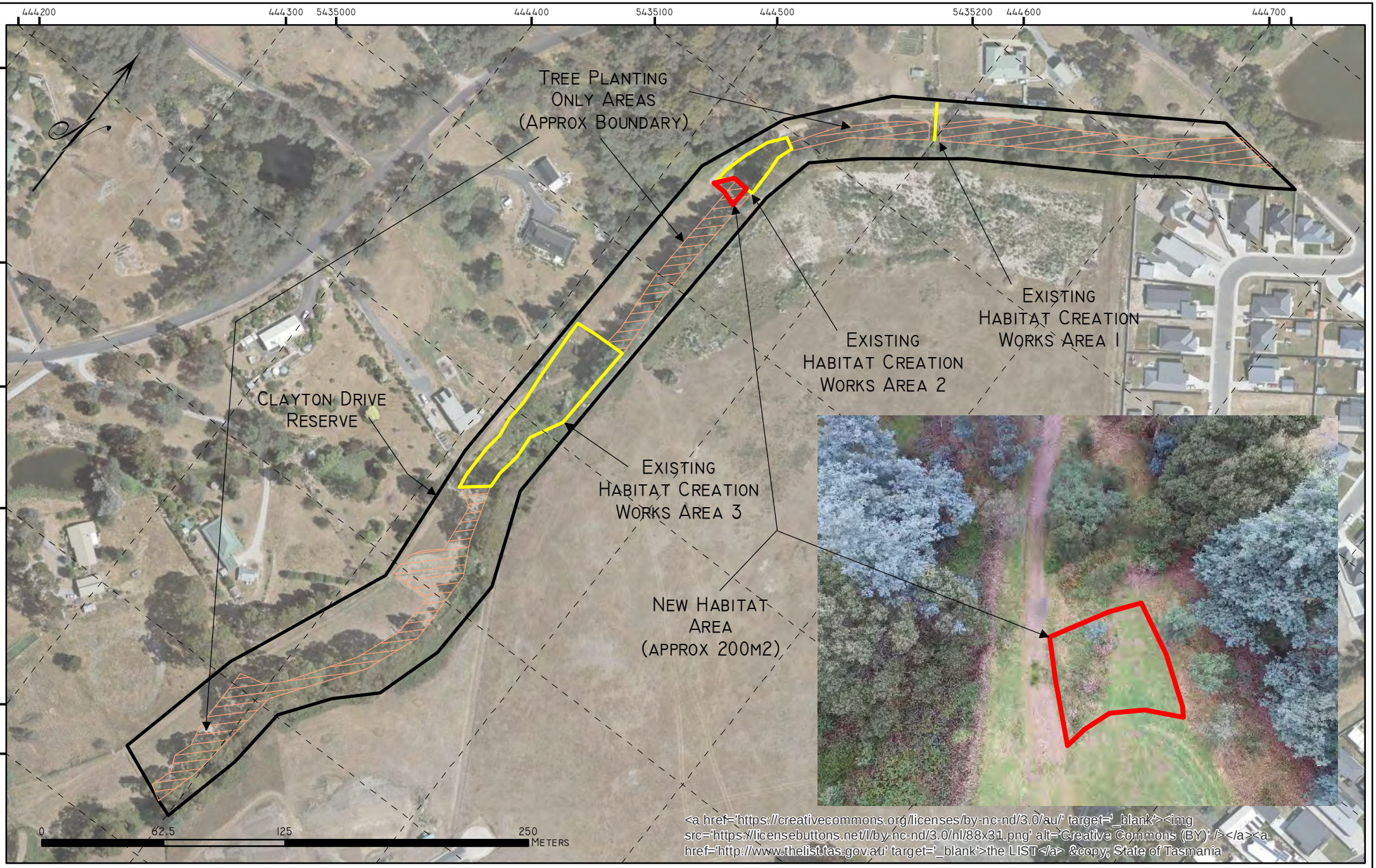
Figure 10:Monitoring of Impact Site (Squibbs Road) and surrounds

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55

TASMAP: LATROBE 4443
CLIENT: DEVONPORTCITY COUNCIL

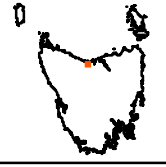
DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 11: Engaeus translocation area at Clayton Reserve (Offset Site)

Van Diemen Consulting
PO Box 1 New Town TAS 7008

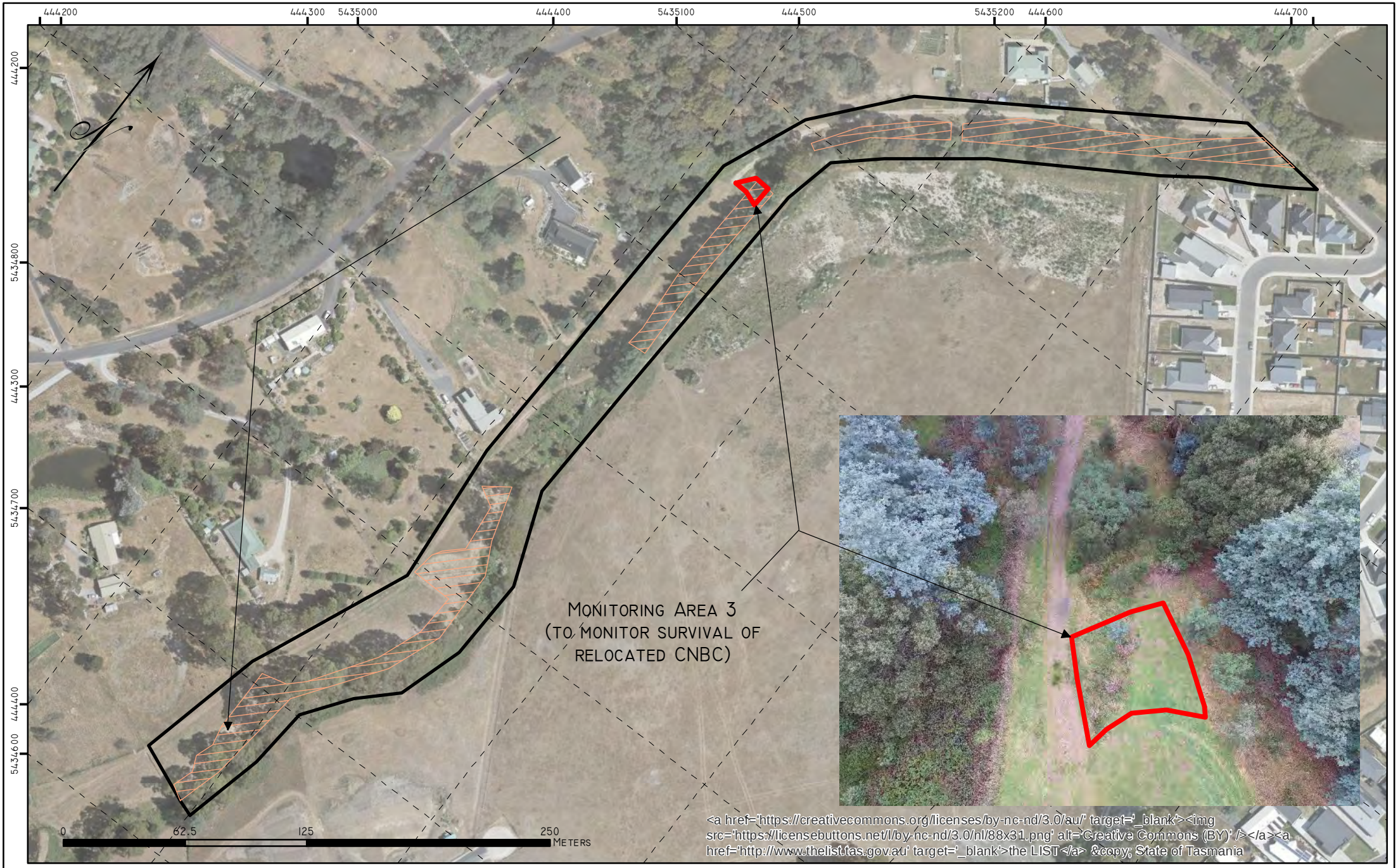


DATUM: GDA94
GRID: MGA Zone 55

TASMAP: LATROBE 4443

CLIENT: DEVONPORT CITY COUNCIL

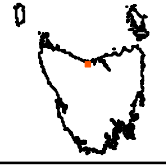
DATE: 17th June 2019



EPBC 2017/7956 Squibbs Road Drainage Improvements

Figure 12: Monitoring of translocation area at Clayton Reserve (Offset Site)

Van Diemen Consulting
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA Zone 55

TASMAP: LATROBE 4443

CLIENT: DEVONPORT CITY COUNCIL

DATE: 17th JUNE 2019

Table 2. Monitoring regime for the Translocation Area in the Offset Site based on project phase

Parameter	Tasks	Zone and frequency	Responsible
Translocation			
Survivorship	▪ Burrow Count ▪ Photopoints	2, 4, 6, 8, 10, 12, 24, 36 and 52 weeks from translocation (1-year monitoring total)	Suitably qualified ecologist
Habitat Creation			
Burrow increase	▪ Burrow Count ▪ Photopoints	4, 8, 12, 36 and 52 weeks from translocation then every 12 months (timed for March to April which is after the breeding and dispersal period of CNBC) for a further 9 years (10 years total)	Suitably qualified ecologist
Erosion	▪ Photopoints	4, 8, 12, 36 and 52 weeks from translocation then every 12 months for a further 9 years (10 years total)	Suitably qualified ecologist
Wetness	▪ Observation of surface flow areas ▪ Auger to water table	Every month for 6 months from project completion then once every 6 months (10 years total)	Suitably qualified ecologist
Plant survival	▪ Count losses ▪ Photopoints	Every 6 months from planting for 10 years	Suitably qualified person

Table 3. Monitoring regime for the Impact Site and surrounds based on project phase

Parameter	Tasks	Zone and frequency	Responsible
Monitoring Area 1 – Works Area			
Burrow occurrence	▪ Burrow Count ▪ Photopoints	2, 4, 6, 8, 10, 12, 24, 36 and 52 weeks (1-year total)	Suitably qualified ecologist
Erosion and sedimentation	▪ Photopoints ▪ Observation of surface flow areas and sediment loss/accumulation	4, 8, 12, 36 and 52 weeks from translocation then every 12 months for a further 9 years (10 years total)	Suitably qualified ecologist
Monitoring Area 2 – Existing Drain			
Burrow occurrence	▪ Burrow Count ▪ Photopoints	2, 4, 6, 8, 10, 12, 24, 36 and 52 weeks (1-year total)	Suitably qualified ecologist
Erosion	▪ Photopoints ▪ Observation of surface flow areas and sediment loss/accumulation	4, 8, 12, 36 and 52 weeks from translocation then every 12 months for a further 9 years (10 years total)	Suitably qualified ecologist
Wetness	▪ Observation of surface flow areas ▪ Auger to water table	Every month for 6 months from project completion then once every 6 months (10 years total)	Suitably qualified ecologist

ATTACHMENTS

Attachment A	Engineering Drawings for Construction - Drawing CS0055
Attachment B	Environmental Management Procedures - Construction
Attachment C	EPBC Offset Calculator Sheet – Squibbs Road Drainage Improvements
Attachment D	Standard Operating Procedure - *Engaeus granulatus* translocation
Attachment E	Photopoint Guidelines

Attachment A Engineering Drawings for Construction - Drawing CS0055

SQUIBBS ROAD DRAINAGE IMPROVEMENTS

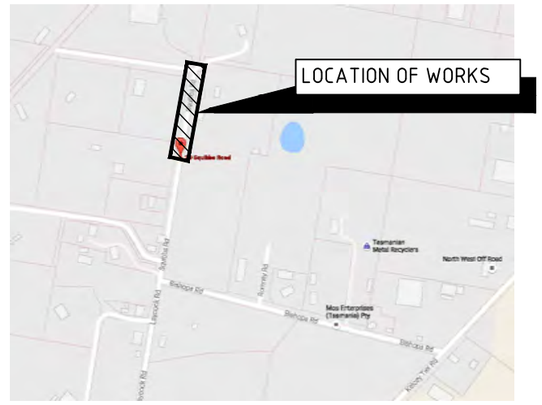
GENERAL NOTES:

G1. DIMENSIONS MUST BE CONFIRMED ON SITE.
G2. MEASUREMENTS MUST NOT BE SCALED OFF THESE DRAWINGS.
G3. STRUCTURES MUST BE KEPT IN A STABLE CONDITION AND NO PART OVERSTRESSED.
G4. CONSTRUCTION AND MATERIALS MUST BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD, TASMANIAN STANDARD DRAWINGS & STATE GROWTH SPECIFICATIONS.
G5. DISTURBED SURFACES MUST BE REINSTATED TO ORIGINAL CONDITION OR BETTER.

STORMWATER NOTES:

S1. EXISTING DRAINAGE LINES ARE TO BE CONNECTED TO THE MAIN AS THEY ARE CROSSED.
S2. REDUNDANT PIPELINES ARE TO BE SEALED WITH CONCRETE, GROUT FILLED OR REMOVED.
S3. TRENCH REINSTATEMENT MUST BE IN ACCORDANCE WITH TASMANIAN STANDARD DRAWING TSD-G01.

DRAWING INDEX



LOCATION PLAN

UTILITY NOTES:

1. GAS MAINS - ANY WORKS WITHIN 3m REQUIRES A STANDOVER TO TAKE PLACE WHILE WORKS COMMENCE. PHONE 6208 6400 IF YOU REQUIRE A STANDOVER OR LOCATION.
   NOTE 48 TO 72 HOURS NOTICE IS REQUIRED FOR A STANDOVER OR LOCATION TO BE ORGANISED.
2. TASWATER INFRASTRUCTURE, TASWATER STAFF TO DO ALL LIVE WORKS ON TASWATER ASSETS.
3.

PAVEMENT NOTES:

P1. SUPPLY, SPREAD, TRIM AND COMPACT SUB-BASE AND BASE GRAVEL MATERIALS IN ACCORDANCE WITH DSG SPECIFICATION G4 AND R40.
P2. ALL SPRAYED BITUMINOUS SURFACINGS MUST BE SUPPLIED AND PLACED IN ACCORDANCE WITH DSG SPECIFICATION R51.
P3. ALL ASPHALT SURFACING MUST BE SUPPLIED AND PLACED IN ACCORDANCE WITH DSG SPECIFICATION R55.

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	SHEET SIZE
N.T.S.	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
AHD GDA94	

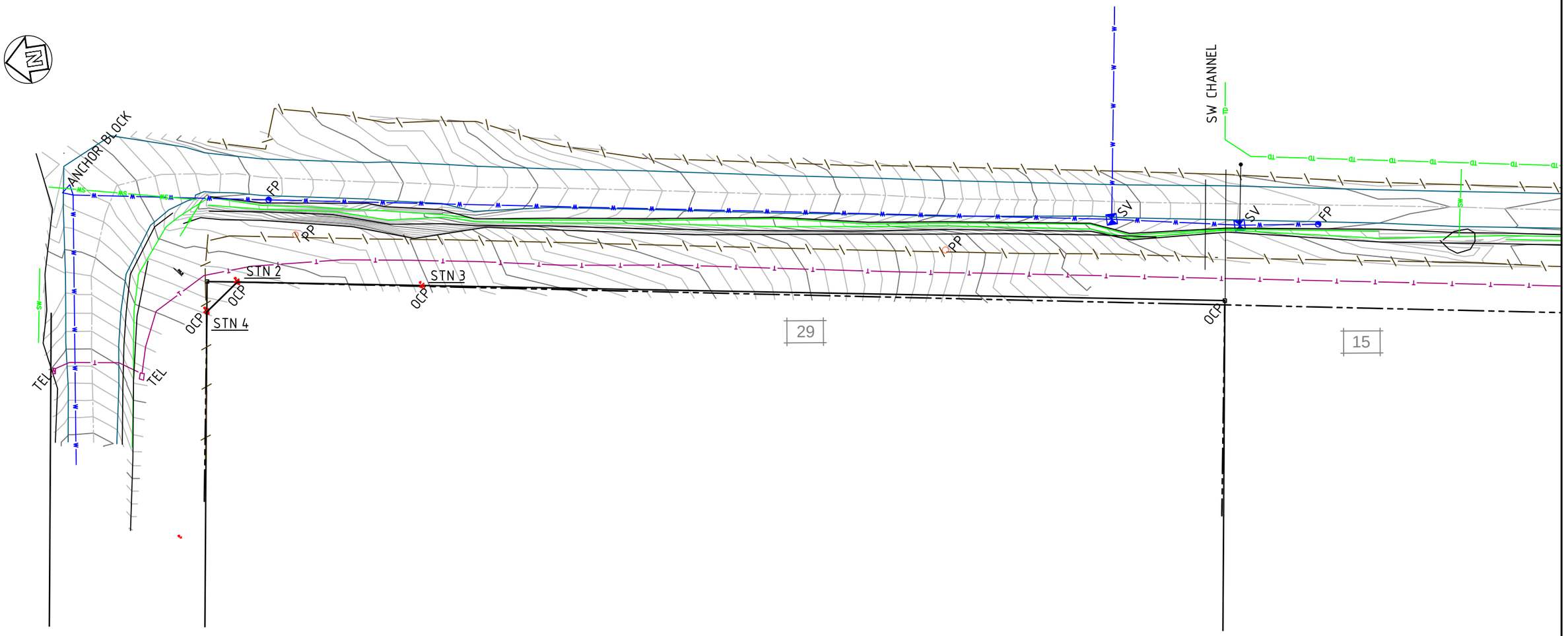
PROJECT NAME
SQUIBBS ROAD DRAINAGE IMPROVEMENTS

DRAWING TITLE
COVER PAGE

AUTHORISED OFFICER

DRAWING NO
CS0055-0001

ISSUE
–



SETOUT POINTS

Point Table				
Point #	Easting	Northing	Level	Description
2	444327.140	5437003.094	96.322	Insrument Station
3	444324.178	5436985.047	95.544	Insrument Station
4	444324.650	5437006.485	96.852	Insrument Station

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	1 : 400
SHEET SIZE	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
	AHD GDA94

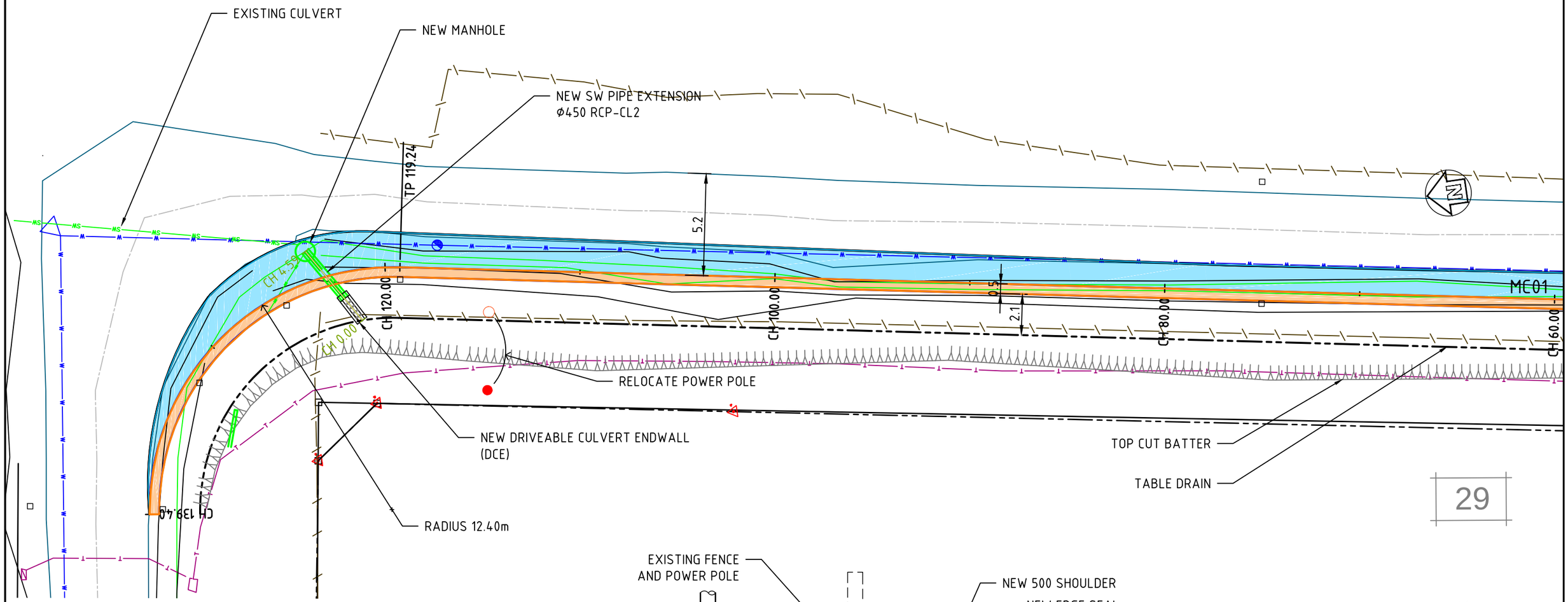
PROJECT NAME
SQUIBBS ROAD DRAINAGE IMPROVEMENTS

DRAWING TITLE
EXISTING FEATURES

AUTHORISED OFFICER

DRAWING NO
CS0055-0002

ISSUE
–



29

TYPICAL SECTION
SCALE 1:100

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	1 : 200
SHEET SIZE	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
	AHD GDA94

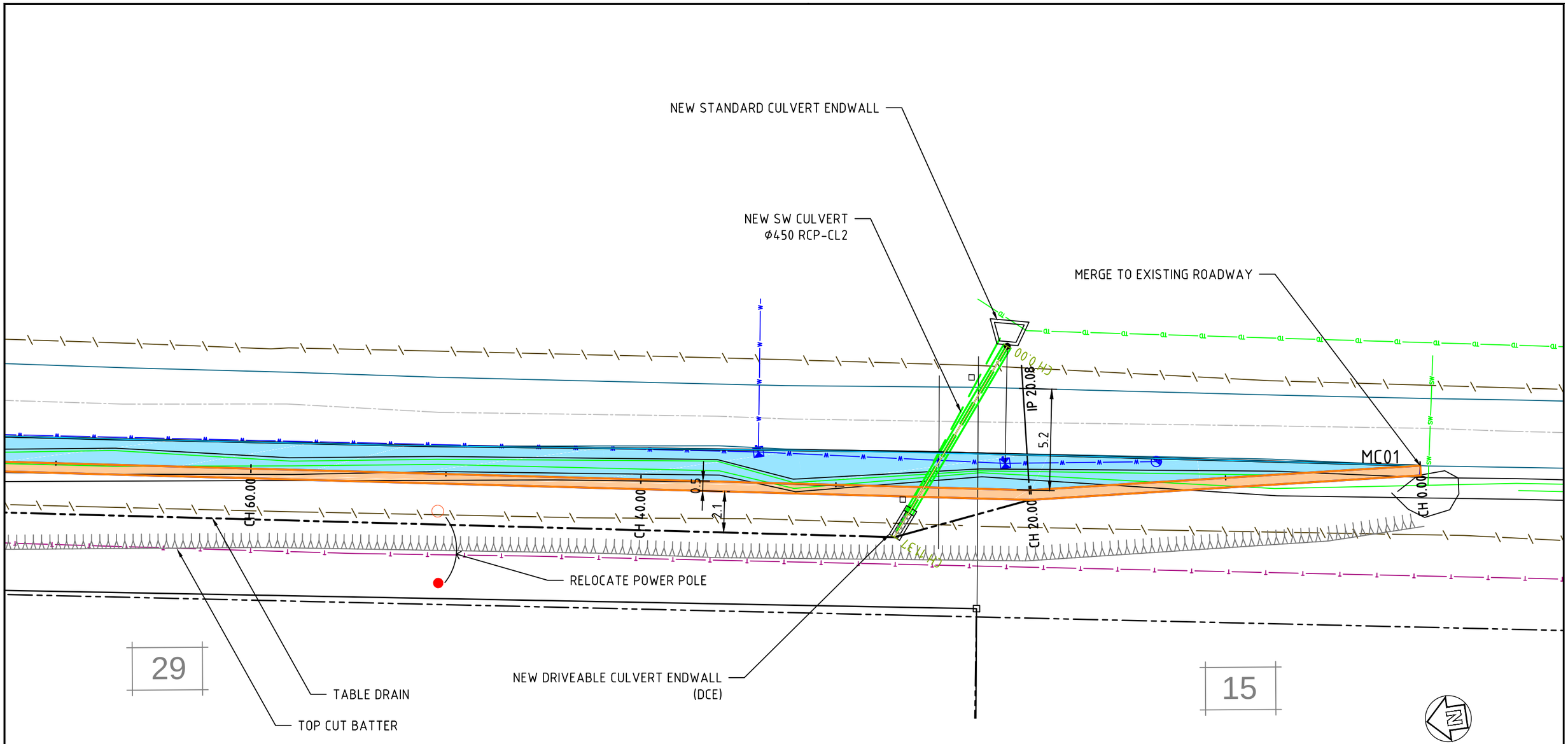
PROJECT NAME
SQUIBBS ROAD DRAINAGE IMPROVEMENTS

DRAWING TITLE
CONSTRUCTION PLAN - 1

AUTHORISED OFFICER

DRAWING NO
CS0055-0003

ISSUE
–



PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	1 : 200
SHEET SIZE	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
	AHD GDA94

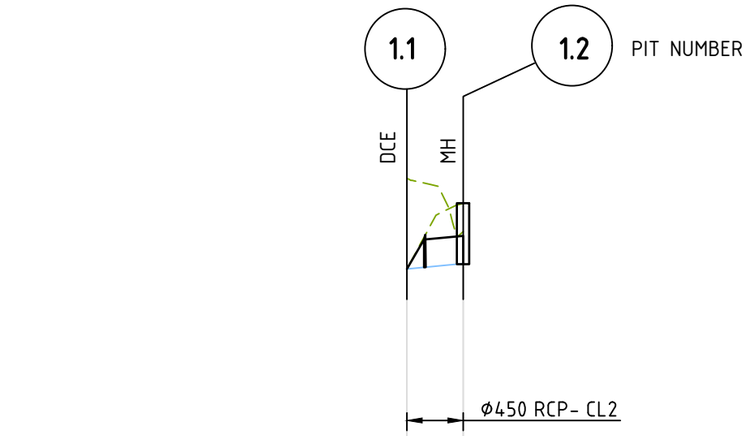
PROJECT NAME
SQUIBBS ROAD DRAINAGE IMPROVEMENTS

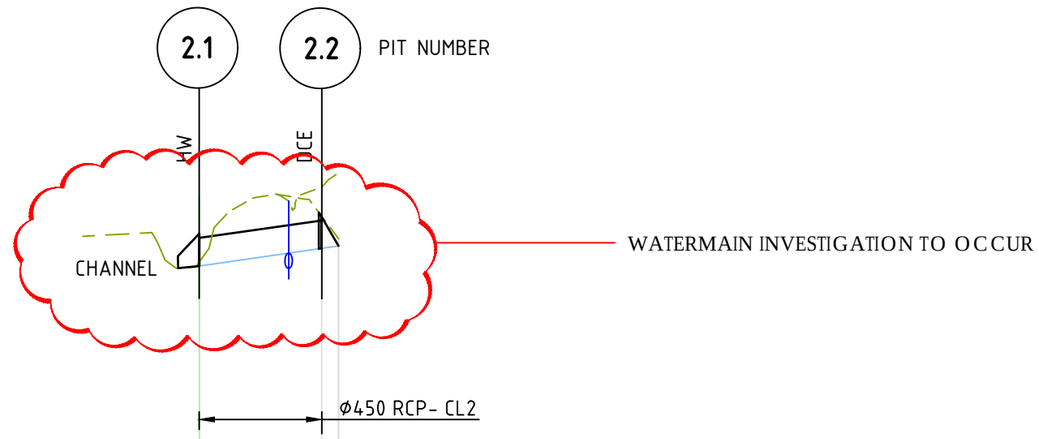
DRAWING TITLE
CONSTRUCTION PLAN - 2

AUTHORISED OFFICER

DRAWING NO
CS0055-0004

ISSUE
–





DATUM 90.00	1.94%	
HORIZONTAL GEOMETRY		
CUT/FILL DEPTH	0.000	-0.980
DESIGN LEVEL	94.353	94.442
EXISTING LEVEL	94.35	95.42
CHAINAGE	0.000	4.593

DATUM 82.00	2.87%			
HORIZONTAL GEOMETRY				
CUT/FILL DEPTH		-0.998		
DESIGN LEVEL	86.375	86.662	86.701	
EXISTING LEVEL		87.66		
CHAINAGE	0.000	10.000	11.362	11.366

LONG SECTION SW-01
SCALE 1:500H - 1:100V

LONG SECTION SW-02
SCALE 1:500H - 1:100V

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	SHEET SIZE
AS SHOWN	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
AHD GDA94	

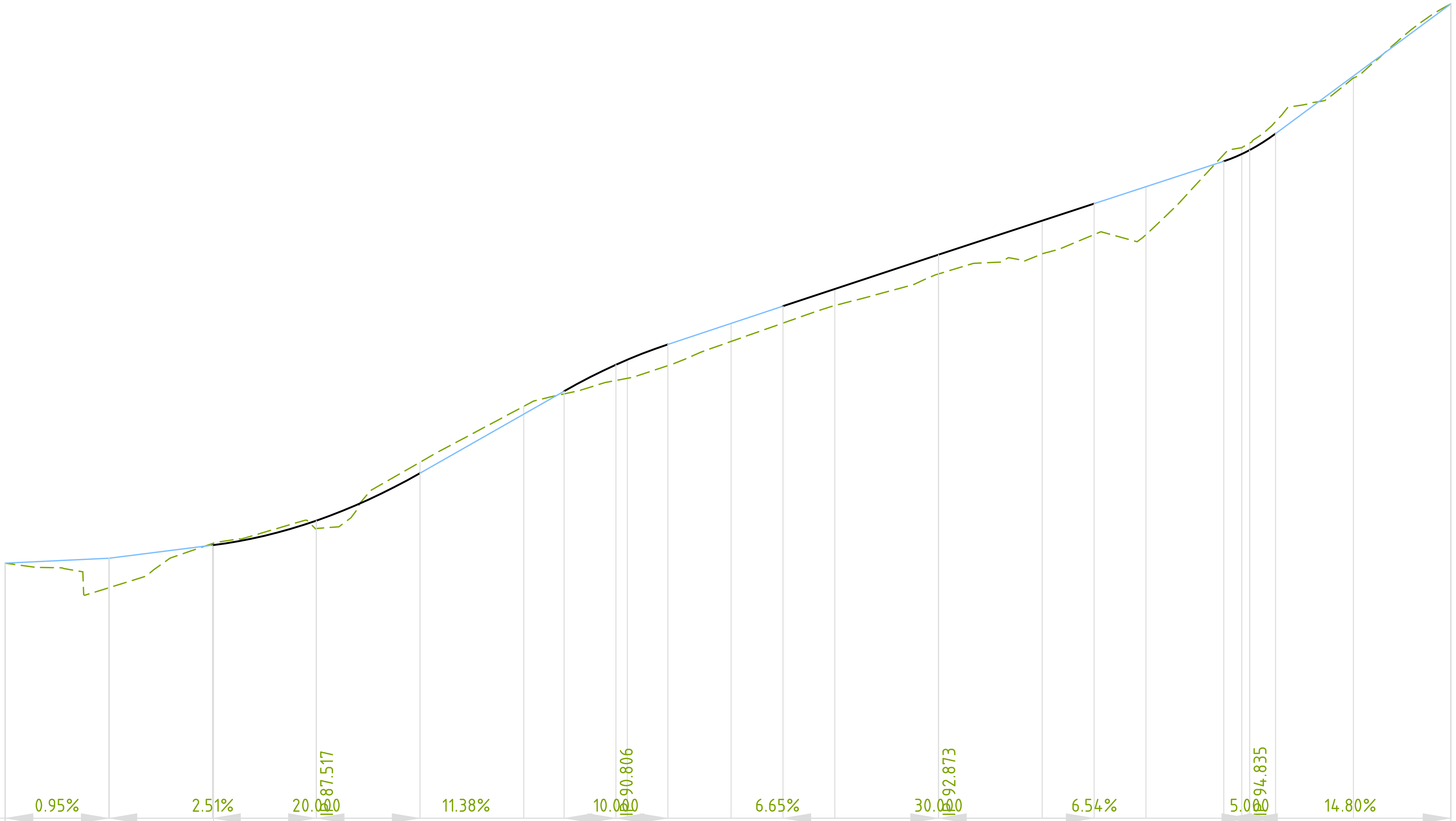
PROJECT NAME
SQUIBBS ROAD DRAINAGE IMPROVEMENTS

DRAWING TITLE
STORMWATER DETAILS
LONG SECTIONS SW-01, SW-02

AUTHORISED OFFICER

DRAWING NO
CS0055-0005

ISSUE
–



DATUM 82.00

HORIZONTAL GEOMETRY		
20.082 4°25'03"	99.156 9°35'12"	R12.500 A20.166

CHAINAGE	EXISTING LEVEL	DESIGN LEVEL	CUT/FILL DEPTH
0.000	86.92	86.920	0.000
10.000	86.45	87.015	0.569
10.021	86.45	87.015	0.568
20.000	87.30	87.266	-0.034
20.082	87.31	87.268	-0.037
30.000	87.58	87.739	0.156
40.000	88.87	88.655	-0.210
50.000	89.94	89.793	-0.151
53.896	90.18	90.237	0.054
58.896	90.44	90.747	0.304
60.000	90.48	90.843	0.359
63.896	90.73	91.138	0.409
70.000	91.20	91.544	0.348
75.000	91.55	91.876	0.327
80.000	91.89	92.208	0.319
90.000	92.50	92.869	0.371
100.000	92.89	93.527	0.641
105.000	93.26	93.854	0.597
110.000	93.26	94.181	0.925
117.500	94.80	94.671	-0.128
119.238	94.93	94.810	-0.124
120.000	95.02	94.886	-0.135
122.500	95.44	95.205	-0.232
130.000	96.27	96.315	0.041
139.404	97.71	97.707	0.000

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	SHEET SIZE
AS SHOWN	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
AHD GDA94	

PROJECT NAME

SQUIBBS ROAD DRAINAGE IMPROVEMENTS

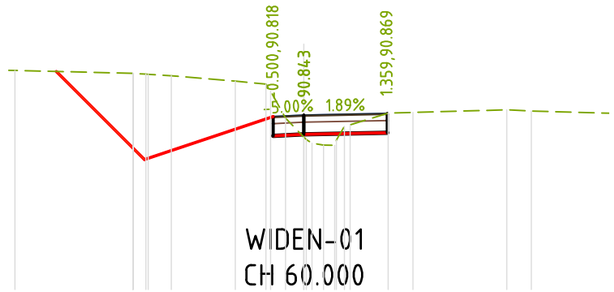
DRAWING TITLE

LONG SETION – (MC01) WIDENING

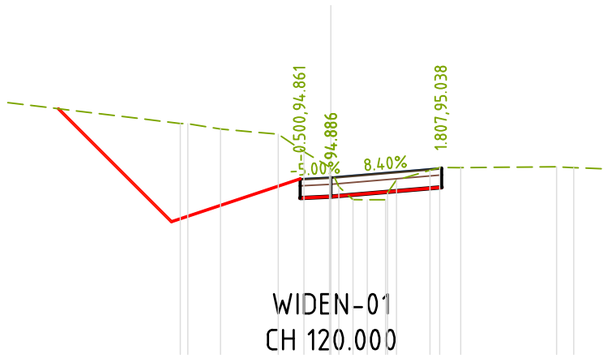
AUTHORISED OFFICER

DRAWING NO CS0055-0006

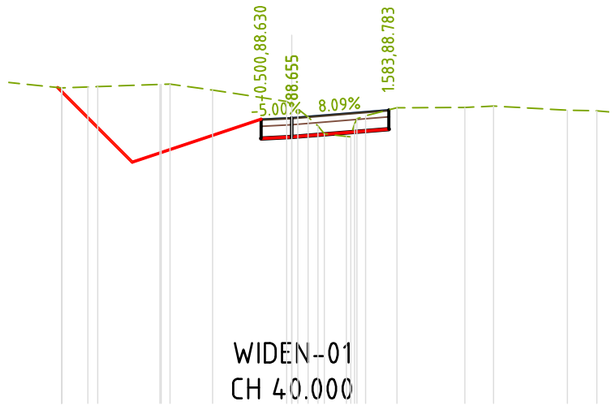
ISSUE –



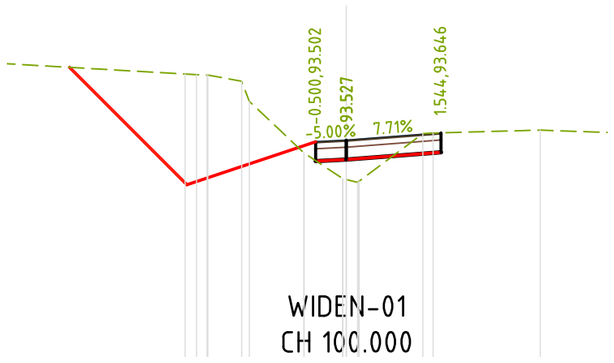
WIDEN-01
CH 60.000



WIDEN-01
CH 120.000

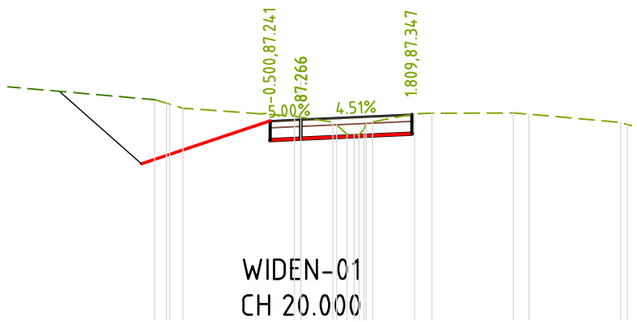


WIDEN-01
CH 40.000

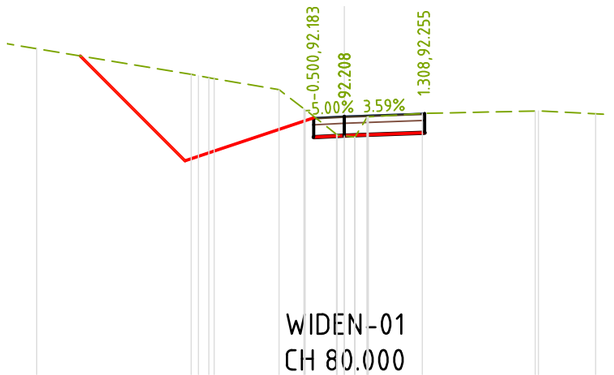


WIDEN-01
CH 100.000

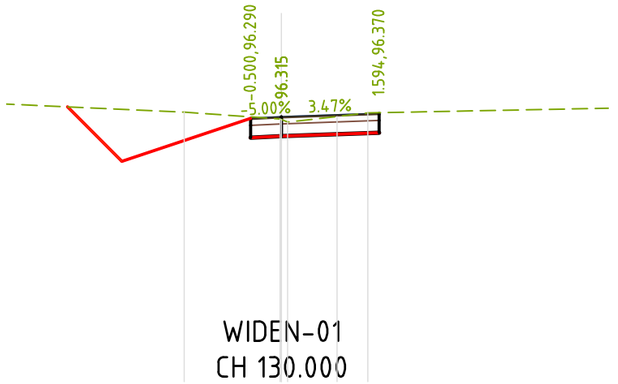
WIDEN-01
CH 139.404



WIDEN-01
CH 20.000



WIDEN-01
CH 80.000



WIDEN-01
CH 130.000

PRELIMINARY
NOT for construction

ISSUE	DATE	DESCRIPTION	CHECKED
P1	–	ISSUE FOR REVIEW	–

DEVONPORT

DIAL BEFORE YOU DIG www.1100.com.au

SCALE	SHEET SIZE
1 : 100	A3
SURVEYED	I.D.C.
DESIGNED	I.D.C.
DRAWN	I.D.C.
AHD GDA94	

PROJECT NAME

SQUIBBS ROAD DRAINAGE IMPROVEMENTS

DRAWING TITLE

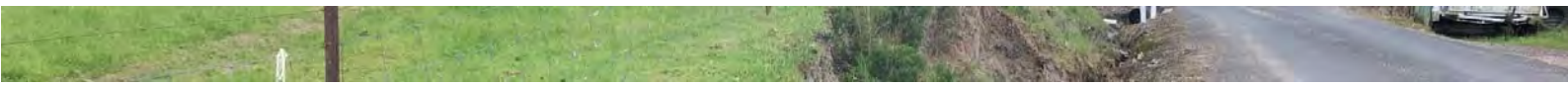
CROSS SECTIONS
CH. 00 - 140

AUTHORISED OFFICER

DRAWING NO
CS0055-0007

ISSUE
–

Attachment B Environmental Management Procedures - Construction



ENVIRONMENTAL MANAGEMENT PROCEDURES

SQUIBBS ROAD DRAINAGE IMPROVEMENTS

Overview

This document provides an overview of the DCC environmental management objectives, guidelines for works and services, issues to be addressed by contractors and contractor's responsibilities.

Environmental Objectives

The Devonport City Council (DCC) is committed to achieving environmentally and economically - sustainable development.

The DCC is committed to achieving high quality environmental outcomes through the requirement for implementation of effective environmental management systems, incorporating management of the environmental effects of the work and services, that are beneficial to the community and the natural environment.

Guidelines for Works and Services

All Contractors and service providers must abide by DCC's Environmental Protection Guidelines.

Purpose

Contractors must be able to demonstrate to the DCC that the execution of works and the provision of services will be undertaken in a manner that has minimal impact on the natural environment and as a minimum, complies with the relevant legislative requirements, regulations and policies.

Legislation

Contractors shall, as a minimum, comply with the requirements of relevant Commonwealth and Tasmanian Legislation, Regulations and Environment Policies. In addition, the Contractor shall abide by all DCC issued Ordinances and By Laws designated to protect the environment.

Contractor's Responsibilities

The Contractor is responsible for sound environmental management practices whilst implementing the project including:

- Understanding environmental legislation as it relates to their activities and the activities of subcontractors and / or consultants working on their behalf;
- Providing support, training and resources to their staff to ensure reasonable precautions, due care and diligence are applied to prevent non-compliance;
- Developing and monitoring policies, procedures and work instructions;

- For ensuring that their managers, supervisors, sub-contractors and employees within their control or influence comply with these requirements and the DCC environmental objectives;
- Monitoring performance of tasks and activities;
- Reporting to DCC on environmental performance;
- Minimising environmental damage in the event of an incident;
- Providing safeguards to minimise environmental risks; and
- Implementing the construction-relevant aspects of the Squibbs Road Management and Monitoring Plan.

DCC's Responsibilities

DCC has a responsibility to ensure that the necessary permits are in place to enable the Contractor to lawfully perform the tasks and duties of the works. DCC is to provide these permits to the Contractor prior to the commencement of works in the Work Area.

Environmental Protection Guidelines (EPGs)

This section contains Environmental Protection Guidelines (EPGs) which specify detailed management prescriptions in addition to the general requirements applicable to the project indicated in the previous section. The EPG's incorporate specific environmental protection requirements for this project.

The Contractor's Environmental Management Plan (EMP) must address these issues.

The following Environmental Protection Guidelines are included:

Document No. and Name -

- **EPG 1:** Disturbance to Terrestrial and Aquatic Flora and Fauna
- **EPG 2**: Working near waterways and drains
- **EPG 3**: Erosion, Sedimentation and Surface Run-off
- **EPG 4**: Aboriginal Artefacts – Unanticipated Discovery Plan
- **EPG 5**: Weed and Pathogen Control

ENVIRONMENTAL PROTECTION GUIDELINE Disturbance to Terrestrial and Aquatic Flora and Fauna	Document No. **EPG 1**

Objective

To minimise the effect of the construction activities on local biodiversity, particularly endangered and/or protected species.

Target

No impact on biodiversity near the project beyond that anticipated at the design phase.

Control Methods

GENERAL

- No refuelling of equipment, machines or vehicles is to occur within 20 m of a watercourse.
- Prevent the spillage of fuels, oils or other hazardous substances into drains and waterways.
- Areas of environmental significance are to be identified on the ground, together with the locations of fencing to prevent machinery access, in conjunction with a suitably qualified ecologist.
- The conditions of any approval permits must be adhered to.
- All site workers are to be familiar with the conditions of the permits and environmental aspects of the project at the site induction.

PROTECTION OF FAUNA

- Existing crayfish burrows in the translocation area will be identified in the field by a suitably qualified person and flagged using steel droppers marked with bright coloured paint (and a safety cap). Their location will be shown to contractors and others working in the site and directions given that they are to be retained;
- Any drains or trenches required to be dug at the site will be backfilled at the end of each working day or suitable plastic safety fencing established so that no open section of trench or earthworks remains accessible;
- Maintenance activities will be limited to day time to avoid impacts on nocturnal fauna; and
- Remove all 'food' rubbish to avoid attracting feral and introduced animals and birds.

Monitoring

- Weekly observation of the disturbance boundaries by the Contractor to confirm that works do not extend beyond the approved Works Area.
- Daily inspection of erosion and sediment management controls to verify their effectiveness.
- Daily inspection of burrowing crayfish habitat immediately downstream of the sites identified as susceptible to disturbance by the construction operations.

Records

Keep written records that include:

- The date and reason for each inspection.
- Details of any disturbances that need to be addressed.
- The date and time of notification to the Contractor of any failure to implement site specific management requirements.
- Directions given to the Contractor by the DCC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

All records kept by the Contractor must be provided to DCC for future reference.

ENVIRONMENTAL PROTECTION GUIDELINE Working near waterways and drains	Document No. **EPG 2**

Objective

To minimise the potential for environmental impact to waterways, drains and adjacent areas during construction.

Target

Negligible environmental impact to waterways, drains and water bodies outside the Work Area.

Control Methods

Management measures include:

- Sediment netting will be established as necessary to ensure sediment is stopped from entering waterways and drains.
- To further reduce the risk of sediment entering the drain, construction work should, when possible, be undertaken in dry weather and soil conditions.

Monitoring

- Construction near waterways and drainage lines should be inspected daily and following any heavy rainfall event.
- All observations should be recorded.

Records

Keep written records that include:

- The date and reason for each inspection.
- Details of any disturbances that need to be addressed.
- The date and time of notification to the Contractor of any failure to implement site specific management requirements.
- Directions given to the Contractor by the DCC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

All records must be provided to DCC for future reference.

ENVIRONMENTAL PROTECTION GUIDELINE Erosion, Sedimentation and Surface Run-off	Document No. **EPG 3**

Objective

To minimise the potential for erosion and avoidance of sedimentation in downstream waterways, dams and drains.

Targets

Minimal erosion within the construction areas and no sedimentation in the downstream waterways, dams and drains.

Responsibilities

The Contractor is responsible for the construction and maintenance of the erosion and sediment control works.

The Contractor is required to regularly assess the need for temporary run-off control.

The Contractor is responsible for cleaning and repairing erosion and sediment control works, and notifying the DCC Superintendent of any failures.

The Contractor will inspect all erosion controls and sediment control works, including in adjoining waterways, keep a written record of all inspections and observations and advise on improvements.

Control Methods

The following control measures are to be established and monitored during the construction period. They are to be fully operational and provide effective erosion control prior to disturbing adjacent ground and commencement of adjacent excavation. The Work Area is to be inspected daily with all observations and erosion control directions documented.

The erosion and sedimentation controls must:

- Prevent sediment laden run-off entering adjoining areas, waterways, drains and dams;
    - No soil that is to be stockpiled during construction is to be transferred across a waterway or drainage or placed on the opposite side of the drain or waterway.
- Prevent soil loss from disturbed areas through wind and water erosion;
- Undertake clean-up and remediation on completion of construction;
- Sediment control equipment (applicable to the soil texture) will be installed to minimise any suspension of sediment and prevent contamination to any waterways or drainages;
- Bunding will be installed around storage areas for fuels and oils to prevent the spillage of fuels, oils or other hazardous substances into the water;
- Wastes (especially hydrocarbon-based products) will not to be deposited into, hosed down or swept into any waterway or soak;
- Work likely to result in sediment run-off into drains and waterways should not be carried out during wet weather;

- Refueling equipment, machines or vehicles is to occur at least 50 m away from a watercourse/drain; and
- A spill kit will be maintained in the Work Area near the source of fuel/oil and other chemicals.
- Multiple spill kits may be needed when there are multiple sources of fuel, oil or other chemicals needed for the construction process.

Monitoring

- Inspect erosion and sediment control devices daily and before and after significant heavy rainfall event and record all observations.
- Observe erosion and sediment control devices daily to ensure correct functioning and placement and that available capacity is adequate.
- Devices should be cleaned and/or replaced as required to ensure that they are functional.

Emergency Response

In the event of any significant failure of the erosion and sediment control devices the following will be implemented:

- The Contractor will reinstate the erosion and sediment controls as soon as practicable.
- The Contractor will determine whether the failure constitutes a threat to any adjoining waterway or drain; advice may need to be sought from an ecologist or suitably qualified person as to the potential impact a sedimentation event may have on aquatic and semi-aquatic biota.
    - If not considered a threat to waterways, procedures are to be reviewed and the DCC Superintendent to be advised of, and approve, any alterations or installation of additional and/or more effective erosion control devices.
    - If the failure constitutes a threat to any adjoining waterway, drain or dam, the DCC Superintendent is to be notified as soon as practicable and within 24 hours. The following may need to be applied -
        - additional and more effective erosion control devices should be installed as soon as practicable; and
        - any instructions provided by the DCC Superintendent must be implemented as soon as practicable.

Records

Keep written records that include:

- The date and reason for each inspection.
- Details of any disturbances that need to be addressed.
- The date and time of notification to the Contractor of any failure to implement site specific management requirements.

- Directions given to the Contractor by the DCC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

All records must be provided to DCC for future reference.

ENVIRONMENTAL PROTECTION GUIDELINE Aboriginal Artefacts – Unanticipated Discovery Plan	Document No. **EPG 4**

Objective

To protect Aboriginal cultural heritage values, both artefacts and landscape values, that may be encountered during the project.

Target

Minimal impact on any Aboriginal cultural heritage values during construction.

Unanticipated Discovery Response

If any unanticipated discoveries of Aboriginal cultural heritage materials are made during the construction period, the following processes will be followed so that the requirements of the *Aboriginal Relics Act 1975* and the *Coroners Act 1995* are met:

Discovery of Cultural Heritage Items:

- If any project personnel, contractors or subcontractors believe that they have discovered or uncovered Aboriginal cultural heritage materials, the individual will notify machinery operators that are working in the general vicinity of the area that earth disturbance works must stop immediately.
- Immediately notify the DCC Superintendent and Contractor's site manager.
- A buffer protection zone of 10m X 10m should be established around the suspected cultural heritage site or items.
- No unauthorised entry or earth disturbance must be allowed within this 'archaeological zone' until the suspected cultural heritage items have been assessed, and appropriate mitigation measures carried out.
- Where required cooperate with management instructions applied relating to site preservation in accordance with the *Aboriginal Relics Act 1975*.

Discovery of Skeletal Material:

- Under no circumstances should the suspected skeletal remains be touched or disturbed. If these are human remains, then this area potentially is a crime scene. Tampering with a crime scene is a criminal offence.
- Any person discovering suspected skeletal remains must notify machinery operators that are working in the general vicinity of the area that earth disturbing works must stop immediately.
- A buffer protection zone of 50m X 50m should be established around the suspected skeletal remains.

- No unauthorised entry or earth disturbance must be allowed in this buffer zone until the suspected skeletal remains have been assessed.
- The relevant authorities (police) must be contacted and informed of the discovery.
- Where required cooperate with management instructions applied relating to site preservation in accordance with the *Aboriginal Relics Act 1975*.

Records

Written records should be kept that include:

- The date of any unanticipated discovery.
- Details of the actions taken.
- The date and details of responses from the relevant authorities regarding any unanticipated discovery.

All records must be provided to DCC for future reference.

ENVIRONMENTAL PROTECTION GUIDELINE Weed and Pathogen Control	Document No. **EPG 5**

Objectives

To minimise the risk of transfer of weeds, plant diseases and fungal pathogens to the Work Area.

Targets

No spread of noxious weeds, infectious plant disease and fungal infestation within the Work Area or from the Work Area to another or to adjoining land.

Control Methods

Vehicles, machinery and equipment involved in direct excavation and construction activities at the Work Area will be washed prior to their entry into site. The washing down of vehicles, machinery and equipment will occur in an appropriate location, such as a hardstand associated with a works area or commercial/industrial wash bay.

The following process should be applied in washing down vehicles, machinery and equipment (Note: Do NOT apply water to equipment that may be damaged by water)

- Locate washdown site and prepare the surface or construct bunding as required.
- Safely park the vehicle free of any hazards (e.g. electrical), ensure the engine is off and the vehicle is immobilised.
- Look over the vehicle/machine/equipment, inside and out, for where dirt, plant material including seeds are lodged. Pay attention to the underside of the vehicle, radiators, spare tyres, foot wells and bumper bars.
- Remove any guards, covers or plates if required being careful of any parts that may cause injury.
- Knock off large clods of mud, use a crow bar if required and sweep out the cabin.
- Use a vacuum or compressed air where available for removing dried plant material like weed seeds and chaff in radiators and other small spaces where this material lodges. Brush off dry material if no other facilities are available.
- Clean down with a high-pressure hose (using potable drinking water) and stiff brush/crowbar.
- Start with the underside of the vehicle, wheel arches, wheels (including spare). Next do the sides, radiator, tray, bumper bars etc and finally upper body. Some vehicles may need to be moved during washdown to facilitate washing (eg tracked machinery).
- Clean associated implements, eg buckets.
- Check there is no loose soil or plant material that could be readily dislodged or removed.
- Wash effluent away from the machinery and do not drive through wash effluent.

Monitoring

Weekly monitoring of plant and materials and location of stockpiles, especially for any germination of noxious or environmental weed species (advice on weed identification may need to be sought from a suitably qualified person).

Follow-up monitoring to be undertaken post construction and post rehabilitation for identification and appropriate additional control as disturbance from construction works is likely to stimulate germination of a range of weed species.

Emergency Response

In the event of any significant failure of infectious disease or introduced species containment control measures will be implemented:

- The Contractor is to determine whether the failure constitutes an ongoing threat to noxious weed and disease control near the Work Area.
    - If not considered an ongoing threat to minimising spread of introduced flora or diseases, procedures are to be reviewed and the DCC Superintendent is to be advised of, and approve, any alterations or installation of additional more effective control devices.
    - If the failure is considered to constitute an ongoing threat the DCC Superintendent is to be notified as soon as practicable and within 24 hours. The following may need to be applied -
        - additional and more effective erosion control devices should be installed as soon as practicable; and
        - any instructions provided by the DCC Superintendent must be implemented as soon as practicable.

Records

Written records should be kept that include:

- The date and reason for each inspection.
- Details of any non-conformance with control measures.
- The date and time of any notification to the Superintendent of any failure of control measures.

Rehabilitated area inspections are to occur during the construction phase for the presence of introduced flora species are the results are to be documented.

All records must be provided to DCC for future reference.

Attachment C EPBC Offset Calculator Sheet – Squibbs Road Drainage Improvements

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Central North Burrowing Crayfish
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	Yes		45		Count	

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	Yes	45	Count		10		0		0		58		58	90%	52.20	46.33	102.96%	Yes		

Summary

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	45	46.33	102.96%	**Yes**	$0.00	N/A	$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Attachment D Standard Operating Procedure - *Engaeus granulatus* translocation

STANDARD OPERATING PROCEDURE

ENGAEUS GRANULATUS TRANSLOCATION

SQUIBBS ROAD DRAINAGE IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT OVERVIEW

This SOP provides an overview of the DCC environmental management objectives and guidelines for works to be addressed by contractors in translocating *Engaeus granulatus* as part of the Squibbs Road Drainage Improvement Project**.**

This SOP must be read in conjunction with the Offset Management Plan and the permits and approvals given by the regulatory authorities for the project.

Environmental Objectives

The Devonport City Council is committed to achieving environmentally and economically - sustainable development.

Purpose

Contractors and Service Providers must be able to demonstrate to the DCC that the execution of works and the provision of services will be undertaken in a manner that complies with the relevant legislative requirements, regulations and policies.

Legislation

Contractors and Service Providers shall, as a minimum, comply with the requirements of relevant Commonwealth and Tasmanian Legislation, Regulations, Environmental Policies.

In addition the Contractor shall abide by all Ordinances and By Laws designated to protect the environment.

STANDARD OPERATING PROCEDURE *ENGAEUS GRANULATUS* TRANSLOCATION	Document No. **DCC SOP1**

OBJECTIVE

To maximise the number of Central North burrowing crayfish (*Engaeus granulatus*) successfully translocated from the **Activity Site** (Squibbs Road) to the **Offset Site** (Clayton Reserve).

TARGETS

- No impact on flora and fauna (except Central North burrowing crayfish, **CNBC**) in the vicinity of the project beyond that reasonably anticipated at the design phase;
- A maximum number of Central North burrowing crayfish (*Engaeus granulatus*) successfully translocated from the Activity Site to the Offset Site;
- Minimal losses of CNBC during the excavation process at the Activity Site; and
- The appropriate preservation and curation of excavation-compromised CNBC for future research opportunities.

RESPONSIBILITIES

- The Contractor has a responsibility to ensure that any conditions associated with permits issued to conduct the translocation, such as Tasmania's *Threatened Species Protection Act* 1995 (TSPA) and *Nature Conservation Act* 2002 (NCA), and the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), are met.
- Except for when the DCC is the permit holder, DCC has a responsibility to sight the necessary permits from the Contractor before they engage the Contractor to conduct the works.
- Only suitably qualified Contractor's that can lawfully perform the tasks and duties of the work will be engaged by DCC.

PERMITS / LICENCES

- Any specific conditions contained in permits obtained under the TSPA, NCA or EPBC Act must be strictly adhered to.

SITE HYGIENE

- Hand tools, gumboots, holding containers and other equipment used in the excavation of CNBC from the Activity Site can be used at the Offset Site but they must first be thoroughly washed in a solution of F10 disinfectant.

PROCEDURE

Setup

- Ensure all site workers are familiar with the conditions of the permits and environmental aspects of the project at the site induction;
- Establish with the excavator operator(s) the process of excavation (eg decide on hand signals for directions, timing of excavation and direction within each drain, direction of excavation, technique of excavation and depth); and
- Ensure that the works to create habitat at the Offset Site to receive the translocated animals has been completed prior to excavation commencing at the Activity Site including –
    - The delineation of a translocation area at the Offset Site using steel droppers (fitted with safety caps) and orange plastic fencing;
    - Auger holes created (at least 30 at the start of the translocation process as more can be dug during the project if required; a north-south oriented measured grid pattern will be used to enable more effective, accurate and efficient initial monitoring to occur) into which animals can be placed;
    - Sediment fencing and rocks are appropriately installed/located to ensure surface flows are controlled and erosion risk is kept to a minimum; and
    - Appropriate signage advising the public that the area is part of a DCC road construction project and should remain undisturbed (ie no entry) and with contact details for a DCC officer.
- Prior to the commencement of works photopoint locations will be established at the Offset Site translocation area by a suitably qualified person to ensure an accurate photographic record of site works and improvements at the site is made;

- Arrangements must be made prior to excavation works commencing for the short-term storage and then removal of dirt from the excavation area within the Activity Site;
- All safety requirements must be identified and addressed, such as working close to a main road, confined space (some of the deeper drains) and drain collapse. Measures may include the use of high-vis vests and traffic control measures.

Excavation of CNBC

- Hand tools cleaned in F10 (trowel, spade, shovel etc) will be used as the main means to excavate animals from the drainage network;
- On the advice of a suitably qualified ecologist, an excavator may be used to excavate some drains where hand tools are impractical (eg deep burrows, confined space, danger of drain collapse); and
- For safety reasons, an excavator will be used to dig drains where they qualify as a 'confined space' (drain deeper than 70cm).

Handling of CNBC

- Only authorised persons will handle CNBC animals;
- Animals once caught will be -
    - examined to check that they have not been compromised by the excavation process;
    - washed free of dirt and mud from the excavation site by placing them into a container of dechlorinated potable water (tap water that has been allowed to sit in a vented container for at least 72 hours);
    - cleaned in a second container of dechlorinated potable water;
    - rinsed in a third container of dechlorinated potable water; and
    - Stored in a cool location out of direct sunlight in an open plastic container lined with damp paper towel or sponges ready for translocation.
- The dechlorinated potable water within each container will be replaced each time animals are moved to the translocation area in the Offset Site (see 6.4 Transportation of CNBC); and

- Compromised animals, in the opinion of a suitably qualified person, may include animals that have lost both their front claws (but not animals that retain one front claw unless they have other injuries), have sustained an injury to their thorax, head or abdomen from which they are unlikely to recover or are only partially complete (eg have been decapitated or cut in half by the excavation process). These animals will be –
    - Euthanised in a solution of MS22 or AQUI-S until such time they are deemed to be dead (any leftover solution will be disposed of in accordance with the manufacturer's directions);
    - Placed into preserving jars containing 90% ethanol for preservation; and
    - Specimens will be lodged (including the appropriate collection details) with the Tasmanian Museum and Art Gallery (TMAG) for addition to the collection for future research opportunities. Specimens will be lodged within 3 months of the translocation project being completed.

Transportation of CNBC

- Only appropriately qualified/experienced persons will transport CNBC from the Activity Site to the Offset Site; and
- When 12 animals have been captured, cleaned and stored pending translocation, OR when the animal that was captured first in the group has been in captivity for 90 minutes, the animals will be transported to the Offset Site for translocation.

Introducing Animals to Offset Site

- Only appropriately qualified/experienced persons will introduce CNBC to the translocation area at the Offset Site;
- Only one animal will be placed into each auger hole;
- Auger holes that have been used to translocate an animal will be marked with a weed mat stake marked with flagging tape (blue);
- A photopoint will be established post-translocation of all the animals to show the translocation area; and

- A 'map' of the translocation area at the Offset Site will be prepared post-translocation of all the animals noting the -
    - Burrows into which a CNBC was placed;
    - Burrows into which an injured, but not compromised, CNBC (eg one front claw missing) was placed; and
    - Burrows into which a gravid female CNBC was placed (if present).

MONITORING

- A suitably qualified ecologist will design the methodology and conduct the assessment of burrow number and density in the translocation area at the Offset Site;
- The assumptions used to estimate the number of CNBC at the Activity Site will be applied at the Offset Site; the number of burrows will be counted (if the area is large then the sub-samples may be collected using quadrats across the area; advice from an ecologist will be sought in this case) and number of animals estimated based on a 50% occupation rate of the total number of burrows. This approach makes the assessment of impact and offset directly comparable in terms of number of estimated animals present; and
- Burrow counts will be conducted every 2, 4, 6, 8, 10, 12, 24, 36 and 52 weeks from the date of translocation (1-year monitoring total).

RECORDS

All written records and field notes must be provided to DCC for future reference and reporting to the Commonwealth Department of Environment and Energy (DoEE) and Policy and Conservation Assessment Branch of the Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE).

Written records of the translocation process must be kept by the Contractor, including:

- The date of excavation works, weather conditions, the names of persons involved in the excavation process and
    - the number of animals excavated and transported to the Offset Site; and

  - the number of animals that were compromised during the excavation process and subsequently euthanised and preserved.

- The date and time of notification to the Contractor of any failure to implement site specific management requirements.
- Directions given to the Contractor by the DCC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

Attachment E Photopoint Guidelines

Using photographs to visually record change in your bush

It is important to take photographs of your bush as part of the health assessment process as they give a faithful visual record of change in your bush. They are cheap, effective and require no specialist equipment. A simple and consistent way to take photographs of your bush is to establish a 'photo point site'. A 'photo point site' is a site from where a series of photographs are regularly taken. You can establish several photo point sites in your bush, or elsewhere on your property where you want to use photographs to visually record change in the landscape. For example, if you want to visually examine the impact of different land uses on each side of a fence that runs through native bush (ie one side is stock grazed and the other is not) take photographs looking down the fence line.

Photo point site location

When you select a photo point site make sure that it is typical of the bush you are assessing. Additional photo point sites can be established across your site/zone if you wish. When establishing a photo point site there are a few guiding principles to be aware of:

- Avoid steep slopes as they will make the photographs difficult to interpret.
- Try to locate the photo point site so it faces southwards to minimise sun glare. If this is not possible (ie you are taking photos of a south facing slope) reduce the glare by taking your photographs at a suitable time of day. If light conditions are not very good to take the photograph then come back when they are suitable.

Aim to take a photograph at each photo point site at least once a year and each time you conduct a bush health assessment of the site/zone. Take a photograph after every significant event at the site, such as after stock have been removed from an area, following a fire, or after major on-ground works have taken place (eg weed removal). Remember that a photograph showing no change may be just as important as one showing considerable change.

Equipment needed per photo point site

For each photo point site you will need:

- two star droppers or other marker posts, at least 1.6 m tall
- one labeling tag and numbering tool (or number the droppers before you go to the site)
- fine metal wire or a metal tie
- a pair of pliers
- a SLR camera with a standard 50 mm lens and colour film (a 50 mm lens is recommended as it closely approximates how the human eye perceives objects)
- a sledge hammer
- a 10 m tape measure
- a supply of 'Photo point information cards'
- a pen or pencil, sticky tape and a white board marker pen.

Setting up the photo point site

The layout of posts for each photo point site is shown in Figure 2.

- At the point from which you will take your photographs, hammer a dropper post into the ground so the top is close to eye level (1.4–1.6 m). This is the 'camera post'. The camera will be placed on top of this post when taking the photographs to ensure they are all taken from the same height. Record the height of the post on a 'Photo point information card' when you first take your photo in case it falls over and you need to hammer it back into the ground on your next visit.
- Hammer in another dropper post 10 m from the camera post along the direct line of sight to the vegetation, landscape or feature being monitored. This is the 'sighter post'.
- Both posts should be secure and difficult to remove. If vandalism could be a problem at your site hammer small marker pegs or decking nails into the ground at the base of each post to make

relocation possible should the post be removed. Recording the grid co-ordinates of each post with a geographic positioning system (GPS) and drawing a site map that accurately marks the location of both posts will also make relocation of the posts easier.

- Wire a metal labeling tag with the relevant photo point site identification code (see below) to the camera post above where it may be grazed by stock or native animals.

Taking the photograph

Attach an A4-sized data board (eg small whiteboard or an A4 piece of paper) to the 'sighter post' about half way up its height (Figure 2). Write the date and photo point identification code on the data board. The writing should be large enough to be readable on the developed photograph. When taking your photograph:

- Always use the same camera type (eg a 35 mm SLR with a standard 50 mm lens), or preferably the actual same camera
- Hold the camera on the 'camera post' and face the 'sighter post'. Focus the camera on the top of the 'sighter post'.
- Use a shutter speed of between 1/250 sec and 1/60 sec as this will provide good exposure and minimises the risk of the photograph being blurry. Come back another day if the lighting is poor.
- Avoid getting any bright glare in the lens.
- Always take more than one shot to make sure you get at least one good photograph.
- Number and file the photographs after developing and keep the negatives in a safe place such as a photo album. If required you could get the photographs scanned and stored on a CD when you get the film processed.

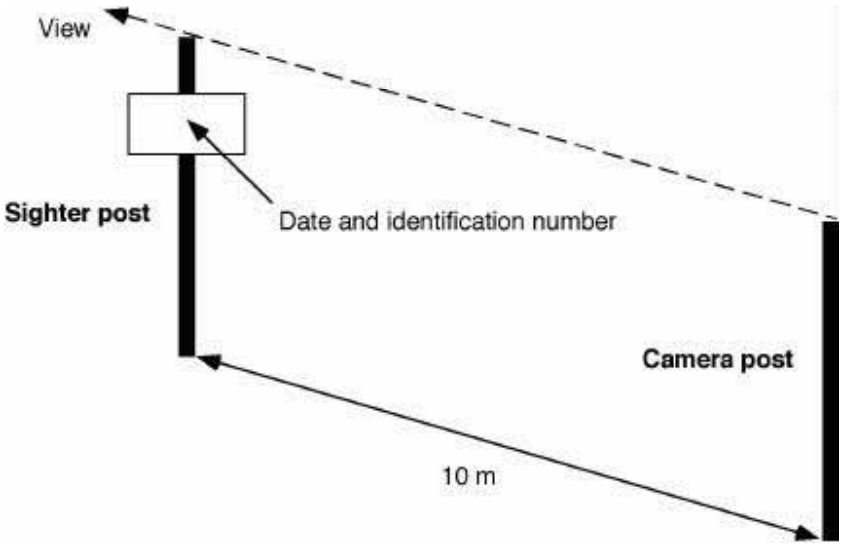


Figure 2. Layout of posts at a photo point site.

Recording photo point site information

Each photo point site must be given a unique identification code so it can be clearly distinguished from all the other photo point sites you establish. The code should be meaningful. For example, it could be JB12, which means it is photo point site 12 on John Brown's property.

For each photo point site record the following information on a 'Photo point information card': date; location, direction (compass bearing) and purpose; the number of the photographic negative; and any observations about the site. Complete a new photo point information card each time you revisit the photo point to take a photograph.

Photo Point Site Information Card

Photo point site identification code.	Date.
Location.	Photographer.
Grid coordinates of camera post.	Grid coordinates of sighter post.
Height of camera post.	Direction of photo.
Purpose of photo.	
Site observations and notes.	
Photo.	