Lot 2 PS603443D, 345-385 Perry Road, Keysborough

Development Plan- 'The Link' Industrial Estate

August 2014

Pursuant to Clause 43.04 Schedule 6 of the Greater Dandenong Planning Scheme this is a copy of the Development Plan for part of the land defined as DPO6 and particularly with reference to the Keysborough Precinct. This Dandenong South Industrial Area Extension Development Plan (No. 11) has been prepared to the satisfaction of the Responsible Authority. Once the Development Plan has been approved by Council, Council retains the sole right to amend the Development Plan.

Signed ____________ 13 August 2014
by Manager Planning and Design
City of Greater Dandenong

urban design | planning | engineering | surveying | landscape architecture | project management

Quality Assurance – Report Record

Prepared by:	Justine Williams
Reviewed by:	Phil McCutcheon
Approved by:	Phil McCutcheon
Revision No.:	D
Date of issue:	6 August 2014

Please Note that development proposed within the area covered by this Development Plan will be subject to suitable road network access arrangements to the arterial road network being constructed to the satisfaction of Council, in line with the Keysborough Structure Plan, January 2009 and that the construction of the arterial road network is subject to the availability of funds from the DCPO2 – Dandenong South Industrial Area Development Contributions Plan – Keysborough.

Please Note that the area covered by this Development Plan is located within a designated Bushfire Prone Area as per State Government mapping, meaning that there are building requirements for certain classes of operation.

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1 Introduction

This Development Plan has been prepared by SMEC Urban on behalf of Commercial & Industrial Property Pty Ltd (CIP).

This report has been prepared in support of the development plan application and provides justification for the proposal against the requirements of the Development Plan Overlay Schedule 6 (DPO6).

The proposed Development Plan area covers the remaining part of the *Dandenong South Industrial Area Extension Structure Plan* area that has not yet been approved. This includes two distinct sections of land to the east and west of the Dandenong Creek.

The proponent of this development plan, CIP, own the eastern section of land Lot 2 PS603443, which is located at 345-385 Perry Road Keysborough. Other landowners own the western section and there are multiple parcels all addressed to Perry Road, known as 259-265, 267-273, 275-281, 283-293, 295-321 Perry Road, Keysborough.

Note: All of the information and discussion within the report has been commissioned by CIP and relates to its landholdings only. As noted on the development plan, further information regarding the western parcels will need to be prepared by others for Council's approval, before any planning permit can issue for these western parcels. Refer to Table 1 for more details.

Table 1- Information required to be submitted for approval

	Further DPO6 Requirement						
Address	Layout Plan	Staging Plan	Heritage assessment report	Environmental Management Plan	Integrated transport plan	Stormwater Management Plan	Any other requirement outlined as relevant in DPO schedule 6
259-265 Perry Road	✓	✓	✓	✓	✓	✓	✓
267-273 Perry Road	✓	✓	✓	✓	✓	✓	✓
275-281 Perry Road	✓	✓	✓	✓	✓	✓	✓
283-293 Perry Road	✓	✓	✓	✓	✓	✓	✓
295-321 Perry Road	✓	✓	✓	✓	✓	✓	✓

✓ Council approval required prior to any planning permit being issued

The long term intention for the subject site is for industrial subdivision and industrial development and uses. Separate planning permit applications will be made for the subdivision, buildings and works for the site.

2 Proponent

SMEC Urban is acting on behalf of the proponent, Commercial & Industrial Property Pty Ltd (CIP).

The title details for the property owned by CIP are included in **Attachment A.** The land is formally known as Lot 2 PS603443D (Volume 11040 Folio 652).

There are two covenants that apply to the site, being G816355 and G819643. Both of these covenants relate to the existing below ground high pressure pipelines that are situated in the southern portion of the site (refer **Attachment A**).

3 Site and Context Description

3.1 Structure Plan

The Dandenong South Industrial Area Extension Structure Plan was approved in January 2009. The area of the Structure Plan covered three main areas as shown below:

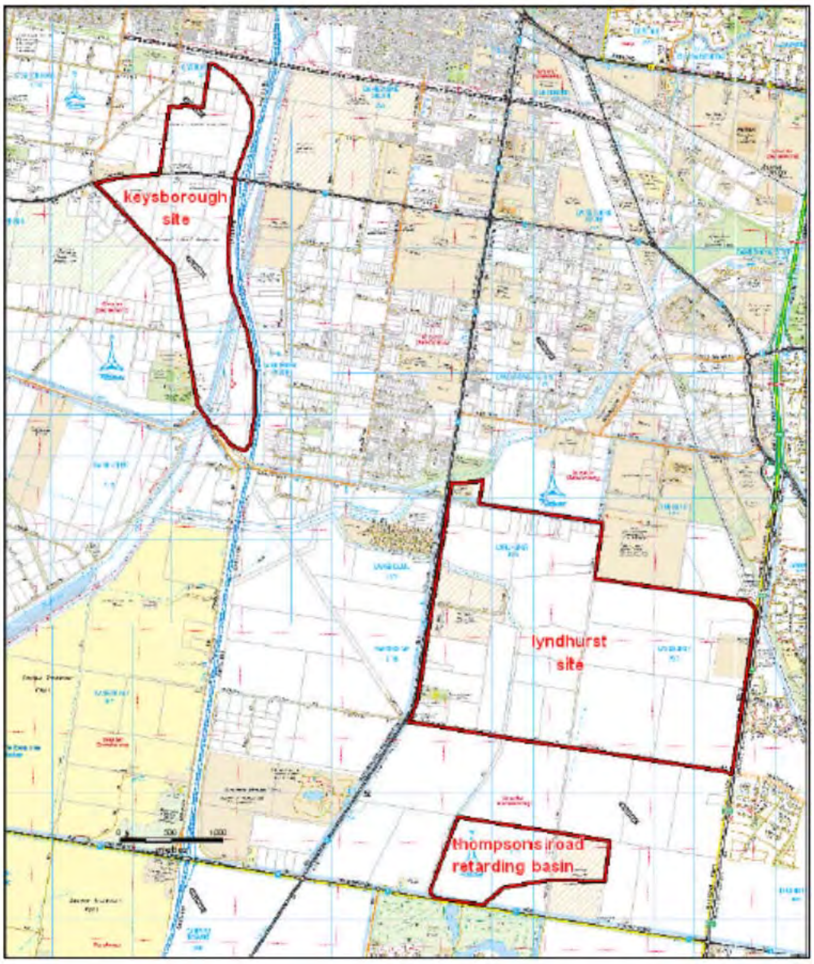


Figure 1- Area of the Structure Plan

The subject site falls within the Keysborough site. The vision for the Structure Plan area is:

The development of industrial estates which are designed and developed to host a cluster of "new economy" industry, including manufacturing, wholesaling, logistics and transport and storage businesses. The estates will incorporate the principles of:

- *High quality urban design and landscaping.*
- *Environmentally sensitive subdivision and building design based on environmental sustainability.*
- *Facilitation, development and management of effective and sustainable transport networks within the study area and its integration into the regional transportation system.*

The Keysborough Structure Plan is shown below:

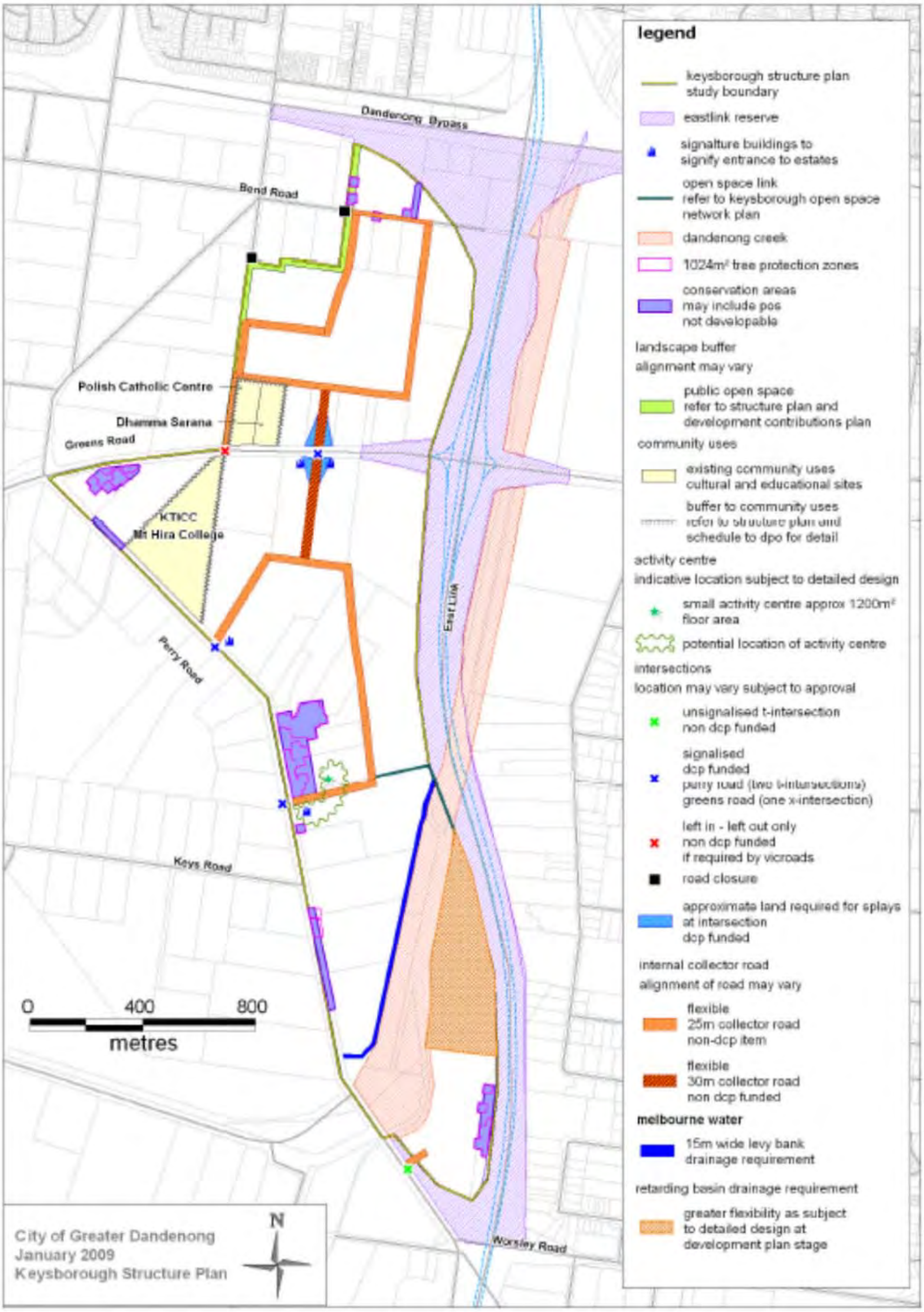


Figure 2- Keysborough Structure Plan

A Development Plan for the northern section of the Keysborough Structure Plan (known as the Australand site) was approved by Council on 8 September 2009. The remaining southern portion forms part of this Development Plan application.

3.2 Proposed Development Plan Area

The proposed Development Plan area covers the remaining part of the Structure Plan area that has not yet been approved. This includes two distinct sections of land to the east and west of the Dandenong Creek.

CIP own the eastern section of land, which is located at 345-385 Perry Road Keysborough. Other landowners own the western section and there are multiple parcels all addressed to Perry Road, known as 259-265, 267-273, 275-281, 283-293, 295-321 Perry Road, Keysborough.

Note: All of the information and discussion within the report has been commissioned by CIP and relates to its landholdings only. As noted on the development plan, further information regarding the western parcels will need to be prepared and submitted by others, before any planning permit can issue for these western parcels.

The CIP land ('the site') is approximately 19.5 hectares in size and runs north-south. The site is situated to the west of EastLink, east of the Dandenong Creek Trail, and north of Perry Road. The land is currently vacant with no permanent buildings, other than existing dams and farm shedding.

The site has a frontage to Perry Road of approximately 350 metres and a depth of approximately 990 metres running north-south. There is a small parcel of land situated between the subject site and EastLink and this land, addressed as 385 Perry Road, is currently owned by Roads Corporation (Vic Roads).

There is a transmission electricity easement that runs along the western boundary of the site, with a width of 36.59 metres. There is also a pipeline easement in the south west corner (adjacent to transmission easement) in favour of Esso Exploration & Production Australia Inc & Hematite Petroleum Pty Ltd.

There is very little existing vegetation on the site, due to the land being historically grazed by stock.

Refer to Figure 3 for more information.

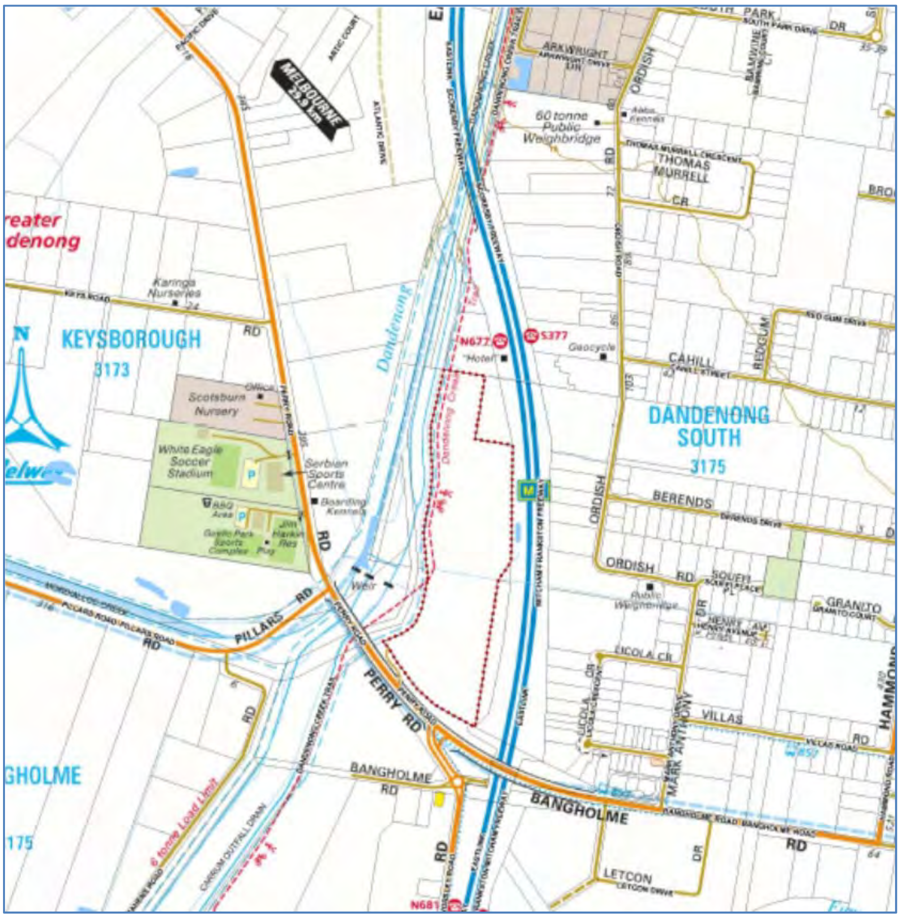


Figure 3- Location map (site in red)

3.3 Surrounding area

The land between EastLink and Perry Road is within the Industrial 1 Zone and has been identified in the Dandenong South Industrial Area Extension Structure Plan for future industrial uses. Further to the south west of Perry Road, the wider area is within the Green Wedge Zone and is mostly farming land. On the eastern side of EastLink, the land is within the Industrial 2 Zone and is predominantly established with a mix of industrial and commercial uses.

The Scottsburn and Karinga nurseries are located to the south west of the site. There is an existing recreation reserve on Perry Road that contains a playground, sporting ovals, sports centre and associated facilities.

The Dandenong Creek runs to the west of the site and the Dandenong Creek Trail (shared path) runs along the site’s western boundary.

3.4 NVPP

The Dandenong South Native Vegetation Precinct Plan (January 2009) includes the subject site.

All native vegetation that was identified as part of the NVPP is intended to be retained on the subject site (or immediately adjoining the site) as shown on the DP. Tree Protection Zones will be enforced as part of the future development layout.

3.5 Infrastructure Servicing

An Infrastructure Report has been prepared for the subject site by Dalton Consulting Engineers (DCE) dated March 2014 (refer **Attachment B**).

A succinct summary of the findings of the report is contained below:

Stormwater Drainage- the site holistically drains to the west and there is existing drainage infrastructure on the site. An existing Melbourne Water open drain traverses the entire width of the site in an east-west alignment. This open drain conveys flows from the north west of the site, but also a significant external catchment including EastLink and development to the east of EastLink.

The site is subject to the land subject to inundation overlay and advice from Melbourne Water indicates that the land is to be filled to a minimum level of RL6.6m AHD and must drain into the retarding basin.

Melbourne Water drainage scheme requirements are currently being reviewed. The site is located within the Ordish Road North DS 0201 area. A stormwater drainage strategy has been prepared for the site (refer to **Attachment H**).

DCE confirm that stormwater quality treatment will be provided for the site through integration of a wetland element in the Ordish Rd retarding basin.

Sewer reticulation- DCE confirm that an extension to the existing sewer main (of approx. 400m) will be constructed to service the subject site. This sewer extension will outfall to a propose permanent sewer pump station location near the intersection of Perry Road and Pillars Road. All works will be reimbursable by South East Water. DCE note that the provision of the sewer extension is dependent on the prior installation of the proposed ‘Keys Estate Stage 3’ works, which are expected to be completed by May 2014.

It is noted that all SEW advice is based on information available at the time and is subject to change as circumstances change or on receipt of more detailed servicing advice.

Water reticulation- DCE confirm that internal water reticulation will service each future property, with 150mm diameter sized pipes having sufficient capacity for future development. The alignment of both the external and internal water reticulation is subject to detailed design and liaison and formal approval from SEW.

It is noted that all SEW advice is based on information available at the time and is subject to change as circumstances change or on receipt of more detailed servicing advice.

Electricity- DCE confirm that electricity supply will be provided via underground cables through the development, in accordance with current Council standards.

In relation to the existing transmission electrical easement across the south west corner of the site, United Energy has confirmed that they have no assets located in this easement. United Energy note that the easement is not under their ownership. Discussions have commenced with United Energy to investigate making this easement redundant (including liaison with SP Ausnet to confirm their ownership of the easement).

Telecommunications- DCE note that Telstra will be providing infrastructure to all new broad acre development under 100 lots. Therefore, telecommunications will need to be provided to the subject site under the new Telstra extension arrangements.

Gas- there is an existing gas main on the southern side of Perry Road and DCE assume that the gas supply for future industrial development of the site is therefore available. It is anticipated that an extension from the existing gas main will be further investigated.

Existing Oil/Gas Pipeline- DCE confirm that there is both a high pressure oil pipeline and a high pressure gas pipeline on the site. Both pipelines alignments are currently located in the proposed retarding basin areas, so these will be addressed as part of the detailed design.

4 Development Plan

Schedule 6 to the DPO sets out a number of requirements that must be addressed in development plan applications. The following table summarises the relevant requirements for the subject site and demonstrate how the proposal complies with the provisions of the Greater Dandenong Planning Scheme. Further discussion is provided in the following sections of this report.

4.1 Specific Requirements of DPO6 – Summary of Response

Pursuant to the DPO6 a development plan must include the following elements to the satisfaction of the Responsible Authority. Table 1 below summarises the requirements of DPO6 and outlines how each of these matters are addressed.

Table 1 Summary of Responses

DPO Schedule 6 - Requirement	Comment
Except for the land at 90 – 120 Colemans Road for which one development plan may be approved, generally a development plan must cover an area of not less than 30 hectares.	The DP area covers an area of approx. 54 hectares. This includes two distinct sections of land to the north and south of the Dandenong Creek. CIP own the eastern section of land, which is located at 345-385 Perry Road Keysborough. Other landowners own the western section and there are multiple parcels all addressed to Perry Road, known as 259-265, 267-273, 275-281, 283-293, 295-321 Perry Road, Keysborough.
A development plan must be generally in accordance with the structure plan diagrams contained in the *Dandenong South Industrial Area Extension Structure Plan, January 2009* and otherwise have regard to that incorporated document.	The layout of the DP is in accordance with the approved Structure Plan for Keysborough. Refer to Section 3.1 for more information. The layout plan provides for all of the components shown on the Structure Plan for the CIP land including the retarding basin, the collector road access, the protection of native vegetation areas and future activity centre. The only difference to the Structure Plan is that the intersection with the proposed collector road/Perry Road will be signalised, as per the advice from O'Brien Traffic.
The comments of the Department of Sustainability and Environment and Melbourne Water must be taken into account when the responsible authority considers a development plan.	Council will seek input from both DEPI and Melbourne Water in the consideration of this DP application.
A development plan must include requirements for landscaping or other measures on industrial land to achieve effective screening of industrial development from existing residential and rural residential properties.	The DP area does not abut any existing residential land. The DP area is bounded by EastLink to the east, Perry Road to the south and west and Australand's industrial site to the north.
A development plan should ensure that industrial uses satisfy threshold distances from existing community uses and either existing or proposed residential uses.	The site is not directly abutted by any existing community or residential land uses. The site is surrounded by existing or proposed industrial land uses to the north and east (on the other side of EastLink). Land to the south and west is within a Green Wedge Zone. The threshold distances of industrial uses (as per Clause 52.10) only apply to the nearest residential zone, Capital City Zone or Docklands Zone. Therefore, there are no relevant threshold distances that are application to the Green Wedge Zone or Industrial Zones.
A Layout Plan showing as appropriate: • Significant features on the land and adjoining land. • Existing easements. • Pedestrian network. • A bicycle network.	A layout plan is included within **Attachment C**. Refer to Section 4.2 for more discussion.

DPO Schedule 6 - Requirement	Comment
• The road network, including access points to the existing road network, consistent with the access principles in the Dandenong South Industrial Area Extension Structure Plan, January 2009. • The public transport network. • Native vegetation to be retained. • Areas necessary to ensure the health of the native vegetation to be retained (native vegetation protection zones). • Areas set aside for drainage in which native vegetation may be established. • The proposed public open space network in accordance with the Dandenong South Industrial Area Extension Structure Plan, January 2009 and the Dandenong South Industrial Area Extension Development Contributions Plan, January 2009. • Urban design outcomes having regard to the urban design and landscaping guidelines contained in the Dandenong South Industrial Area Extension Structure Plan, January 2009. Landscape concept plan, including measures to protect and enhance natural features including existing significant vegetation and remnant trees which are to be retained in accordance with the Dandenong South Native Vegetation Precinct Plan, January 2009 (incorporated document). • The potential for site works (fill and excavation). • How the development within the plan area can integrate with the adjoining industrial land. • The proposed interface with residential areas and community uses. • The potential to develop an inland port in the Lyndhurst area.	
Staging plan A staging plan showing as appropriate: • Details of proposed staging and timing. • How access is proposed during all stages of development.	A staging plan has not been confirmed at the time of lodgement of this DP application. The future planning permit application for subdivision will confirm staging details.
Heritage assessment report A Heritage and Archaeological Assessment Report which details the findings of a site specific archaeological investigation for each site within the development plan area. The archaeological investigation must be undertaken by a person or firm with appropriate experience and qualifications in the field. The report should include recommendations for the management of any sites discovered during the undertaking of the investigation and/or during the development process. The responsible authority may agree to waive this requirement.	A Cultural Heritage Management Plan (No 12983) was approved by Aboriginal Affairs Victoria (AAV) on 1 May 2014. A copy of the approved version is included within **Attachment D**. A detailed summary of the CHMP is included within Section 4.3.

DPO Schedule 6 - Requirement	Comment
Environmental management plan A framework for an Environmental Management Plan (EMP) showing as appropriate: • The environmental issues affecting the land. • Goals and objectives of the EMP. • Measures to be taken to ensure that appropriate landscaping is carried out in identified areas of environmental significance. • Erosion and siltation control during construction. • Designation of areas (if any) where human access to open space areas will not be allowed, including descriptions of the systems to be established and the means of precluding human access. • An overview of the design details proposed for wetlands and open water bodies, including different edge treatments, vegetation associations, habitat areas, perching areas and underwater habitat. • A Stormwater Management Plan that ensures appropriate hydrological regimes for retained vegetation based on expert ecological assessment. Incorporation of stormwater management measures, including stormwater storage and water quality improvement devices such as wetlands and open water bodies to the satisfaction of Melbourne Water. • The requirements of the Dandenong South Native Vegetation Precinct Plan, January 2009 including the protection and enhancement of areas of public open space, native vegetation to be retained and native vegetation protection zones to be established. • Where offsets are required, the method of protecting those offsets through measures such as conservation covenants, section 173 agreements, or gifts to the Crown (where such gifts are accepted). • Method of protection of the reserve areas to be vested in Council until such time as the reserve areas are developed. • Any other matters as required by the responsible authority and the Department of Sustainability and Environment.	An Environmental Management Plan (EMP) has been prepared by CIP for the CIP land. DCE have prepared two plans that provide some preliminary information about the environmental protection measures that will be implemented during construction phases of on the site. Please refer to **Attachment E** for the EMP (dated 2014 rev 4.0) and EMP Plan 1 and 2 (dated 13/5/14 Rev C). The EMP is generally in accordance with *Construction Techniques for Sediment Pollution Control* (EPA Publication 272, 1991 or as amended). The EMP ensures that any fill material brought onto the subject land meets the specifications contained in *Soil Hazard Categorisation and Management* (EPA Publication IWRG621, 2009 or as amended).
Integrated transport plan An Integrated Transport Plan generally in accordance with the *Dandenong South Industrial Area Extension Structure Plan, January 2009.* The Integrated Transport Plan should take into account all transport modes and include an indicative public transport, road, bicycle and pedestrian network showing, as appropriate: • Provision of access to the existing road network. • Provision of adequate pedestrian and cycle ways and accommodation for potential public transport routes and public transport infrastructure. • Integration with the Principal Public Transport Network. • Any other matters as required by the responsible authority, Roads Corporation and the Department of Transport.	The proposed internal road network is shown on the layout plan in Figure 4. The CIP land will be accessed by one road (ending in a court bowl) from Perry Road, which will ultimately be a signalised intersection with Perry Road. The internal court bowl is to be a standard Dandenong Council industrial road, with a road reserve width of 22m. Pedestrian and cycling facilities will be located within the site along both sides of the proposed road and a shared path will be available in the east/west direction along Perry Road from the site access point, linking to the Eastlink Trail access. A Traffic Management Plan has been prepared by O'Brien Traffic dated April 2014, in support of the proposed development plan (refer **Attachment F**). O'Brien Traffic confirm that the above typical road cross section will sufficiently cater for the expected traffic volumes within the site. The Functional design of the future intersection will address the requirement for pedestrian crossing facilities across Perry Road. Additional assessment of the Traffic Management Plan is

DPO Schedule 6 - Requirement	Comment
	provided in Section 1.1.
Stormwater management plan A Stormwater Management Plan showing as appropriate: • Construction and maintenance requirements for water bodies and wetlands. • Details of stormwater management measures. • How development will comply with best practice environmental management or urban stormwater. • Any other matters as required by the responsible authority and Melbourne Water. The Stormwater Management Plan must also be to the satisfaction of Melbourne Water.	A Stormwater Strategy for the site has been prepared by DCE dated May 2014 (refer to **Attachment H**). NB: The Stormwater Strategy overrides the Infrastructure Report in relation to 100 yr flood level & required fill level. The Neil Craigie 100 yr ARI flood level of 6.2m AHD and minimum fill level of 6.8m AHD are to be adopted.
Specific requirements for the Keysborough site	
Boundary treatment A development plan for the Keysborough site must provide boundary treatments in accordance with the Dandenong South Industrial Area Extension Structure Plan, January 2009 to address the interface with land developed for residential purposes.	The DP area does not abut any existing residential land. The DP area is bounded by EastLink to the east, Perry Road to the south and west and Australand's industrial site to the north. The eastern (CIP) part of the DP area will have works undertaken as appropriate and in consultation with Melbourne Water. The western portion of the DP is unknown with the respective landowners being required to submit the applicable documentation to Council before it is used for industrial purposes.
Interface requirements A development plan for the Keysborough site must provide an integrated treatment of any interface with an existing community use to provide a 'buffer' of 30 metres which should incorporate existing boundary landscaped areas and boundary landscaped areas required by permits on the land used for a community purpose. The interface treatment must include landscaping on the industrial land and may include a road.	There are no existing community uses within 30 metres of the site. The closest existing community facility (the recreation reserve on Perry Road) is located further north on Perry Road and is approx 300 metres from the westernmost boundary of the CIP land. This distance includes the Dandenong Creek and Perry Road as potential buffers.

4.2 Layout Plan

The proposed development plan is shown in Figure 4 below and a full version is included within **Attachment C**. CIP is the current owner under contract of sale and has responsibility for the eastern portion of the Development Plan area, east of Dandenong Creek. Land to the west of Dandenong Creek is owned by others and whilst included in this Development Plan area, additional information will need to be submitted by these additional parties to Council's satisfaction, before any planning permits can be issued for these sites.

Figure 4- Proposed Development Plan

The proposed Development Plan responds to the requirements of DPO6 as demonstrated by the following comments:

- The Development Plan will facilitate a future industrial subdivision that allows for industrial land uses and associated warehousing activities.
- The area is well connected to other industrial areas in the surrounding area through road connections such as Perry Road and EastLink. The DP illustrates that the internal road connection to/from Australand's site will continue into the proposed DP area. There will be no direct access from the DP area to EastLink.
- The proposed internal road network is consistent with the Dandenong South Industrial Area Extension Structure Plan. There will be one access point to/from the site to Perry Road. This intersection is intended to be signalised as per the recommendations contained within the Traffic Impact Assessment report, prepared by Obrien Traffic Group (discussed in later sections of this report).
- There is minimal scope for east-west connections from CIP's land through to neighbouring properties, due to the presence of Dandenong Creek to the west and EastLink to the east.
- The final design of the Melbourne Water retarding basin is progressing. There will be significant earthworks associated with the construction of the retarding basin, which will form a separate planning permit application for works. The retarding basin presents significant landscaping and passive recreation opportunities, which will be maximised for the future Development Plan area. A landscape master plan for the proposed DP area is not yet available and will be finalised following the completion of the retarding basin detailed design. It is envisaged that the provision of shared trails to enhance the bicycle and pedestrian connections to and from Dandenong Creek will be realised.
- Aside from the passive recreation opportunities surrounding the retarding basin within the proposed Melbourne Water reserve, there are no other public open space areas proposed as part of the

Development Plan. Refer to the landscape master plan for details regarding informal public open space and recreational linkages surrounding the Melbourne Water retarding basin. Pedestrian and cycling facilities will be located within the site along both sides of the proposed road and a bike network route will be available in the east/west direction along Perry Road.

- All native vegetation that was identified as part of the NVPP is intended to be retained on the subject site (or immediately adjoining the site) as shown on the DP. Tree Protection Zones will be enforced as part of the future development layout.
- A future activity centre site has been identified within the north west corner of the DP area, which is consistent with the approved Dandenong South Industrial Area Extension Structure Plan.
- Landscape boundary treatments are proposed along the eastern boundary adjoining EastLink and details will be confirmed about the nature of these treatments.
- The CIP land does not adjoin any existing residential development, therefore there are no specific requirements for boundary treatments or buffer separations as required by the DPO6.
- Urban Design and Landscape Guidelines will be prepared and provided as part of detailed planning applications on the site. Notwithstanding this, it is noted that the subject site backs onto Eastlink and abuts green wedge land on the southern side of Perry Road. Both of these interfaces will be given due consideration in the preparation of the Guidelines.
- All external authority requirements will be addressed as necessary through the detailed design process for the subject site.

4.3 Heritage Assessment Report

A Cultural Heritage Management Plan (No 12983) was approved by Aboriginal Affairs Victoria (AAV) on 1 May 2014. A copy of the approved version is included within **Attachment D**.

The reason for preparing a CHMP is the site is within an area of cultural heritage sensitivity (adjacent to Dandenong Creek) and the proposed activity is a high impact activity.

The findings of report prepared by Urban Colors are summarised as follows:

- Three levels of assessment were completed as part of the preparation of the CHMP. A desktop assessment, a standard ground surface assessment and a complex assessment were all completed by Urban Colors.
- The results of the desktop assessment found that there is one previously registered Aboriginal cultural heritage site within the activity area (VAHR 7921-1073). This site had a total of 12 sub-surface artefacts in a sandy rise that is within the southern portion of the site. This sandy rise comprises the northern section of a much longer system that extends southwards, underneath Perry Road and into the neighbouring properties. The activity area is within the Baxter Sandstone landform, which has moderate potential for intact archaeological deposits and scarred trees. A previous CHMP within the activity area was discontinued (10763) due to a change in activity, but this presents opportunity to complete additional investigations to confirm if any other artefacts are present in the activity area.
- There were two standard assessments done, one in 2009 and the other recently completed in 2014.
- The following observations were made following the 2009 standard assessment survey:
    - The activity area is generally flat flood plain landform in the central and northern sections of the activity area;
    - Dandenong Creek is approx. 200 metres west of the activity area;
    - There are no caves rock shelters axe grinding grooves, stone raw material sources, mature eucalyptus trees or earth mounds within the activity area;
    - There is a low-lying sand ridge in the southern section of the activity area; this landform comprises Cranbourne Sands and accounts for approximately 1% of the activity area in terms of total area;
    - Ground surface visibility was 10% upon the sandy ridge area and approximately 2% across the remainder of the activity area;
    - The ground surface consists of exotic grasses which are widespread;
    - The activity area is currently utilised for grazing.

- The final conclusion of the 2009 survey was that there were no Aboriginal cultural heritage sites/places identified.
- The following observations were made during the 2014 standard assessment survey:
    - Surface visibility was very low (less than 1%) across both flood plain and sand ridge landform. The main constraints to effectively survey was the extent of exotic grasses which were widespread and long (approx. 30cm high) at the time of assessment.
    - The flood plain landform has been constructed (and disturbed) by flood regimes of Dandenong Creek as well as by wide-scale drainage activities (to assist in managing floods from the Dandenong Creek in more recent times).
    - Two important points were considered following the field survey at the activity area. These were:
        - The majority (99%) of the activity is mantled by consolidated clay deposits resulting from periodic flood regimes of the Dandenong Creek. This area may have low potential for Aboriginal cultural heritage places;
        - Elevated above the flood plain by 40–50 cm are two sand ridges in the southern section of the activity area. The two ridges may have been elevated above floodwater extents and thus remained dry. Cranbourne Sands landforms are typically sensitive for Aboriginal cultural heritage places and one previously registered site (VAHR 7921-1073) was recorded on one sand ridge in 2009.
- No Aboriginal cultural heritage sites were identified during the survey as part of the 2014 standard assessment.
- As noted by Urban Colors, the aims of the Complex Assessment were to:
    - determine the likelihood of subsurface Aboriginal cultural heritage in the activity area in areas that had not been the subject of excavation in 2009;
    - determine whether the site boundary for VAHR 7921-1073 was appropriate and accurate;
    - record the subsurface stratigraphic composition of landforms and investigate a representative sample of subsurface sediments; and
    - undertake a scientific assessment of the activity area in relation to significance of Aboriginal cultural heritage Places identified where applicable.
- The activity area was excavated over a 9 day period in February 2009 as part of discontinued CHMP 10763. One Aboriginal cultural heritage site (VAHR 7921-1073) was identified during this survey.
- The March 2014 excavations provided opportunity to further assess the subsurface component of the VAHR 7921-1073. Additional test pits were excavated and one additional artefact (a complete flake) was identified. The resulting action was that this artefact be incorporated into the existing site extent of VAHR 7921-1073.
- There were 3 final recommendations from the CHMP assessment:

1. Aboriginal Place VAHR 7921-1073 has low scientific significance. The site has effectively been destroyed through excavation and the artefacts have been collected. These are being held by the cultural heritage advisor and will remain so until the development is completed. At this time, a reburial of these artefacts will be arranged with the Traditional owners with the actual location to be determined. At this point, the site card for VAHR7921-1073 will be updated to record the reburial location.
2. On site staff (including all site contractors) to receive training prior to commencement of the activity on site. This will ensure that all staff are cognisant of Aboriginal cultural heritage sensitivity and what to do in the event that Aboriginal cultural material and human remains are identified during construction.
3. If any changes are made to the activity in terms of the nature and extent of ground to be impacted, the Sponsor must obtain statutory approvals and may be required to submit a new CHMP.

4.4 Transport Management Plan

The proposed internal road network is shown on the layout plan in Figure 4. The CIP land will be accessed by one road (ending in a court bowl) from Perry Road, which will consist of a signalised intersection with Perry Road. The internal court bowl is to be a standard Dandenong Council industrial road, with a road reserve width of 22m and a typical cross section is demonstrated below (taken from DCE's Infrastructure Report, 2014):

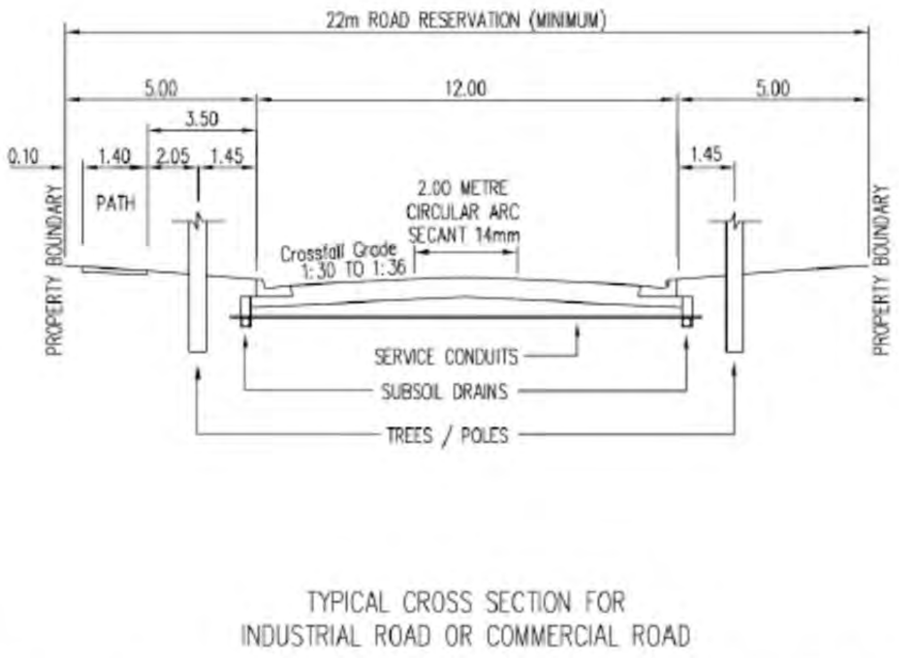


Figure 5: Typical Industrial Road Cross Section, ***City of Greater Dandenong SD005***

Pedestrian and cycling facilities will be located within the site along both sides of the proposed road and a bike network route will be available in the east/west direction along Perry Road.

A Traffic Management Plan has been prepared by O'Brien Traffic dated April 2014, in support of the proposed development plan (refer **Attachment F**). O'Brien Traffic confirm that the above typical road cross section will sufficiently cater for the expected traffic volumes within the site.

In addition, the following conclusions were made by O'Brien Traffic in relation to the subject site:

- *Traffic movements are somewhat unusual in the area due to a potentially large number of drivers using Perry Road and Worsley Road as a toll-free alternative to EastLink;*
- *The Development Contributions Plan identifies Perry Road as being a future two lane collector road with a central shared turning lane and kerbside parking;*
- *It is estimated that in the peak hour, up to 349 vehicles would enter and leave the development;*
- *Empirical data suggests a peak car parking demand of 537 car spaces, which is less that the Planning Scheme requirement, and more than currently proposed in the concept master plan (245 spaces). However, car parking demands of warehousing activities are largely dependent on the (highly variable) number of employees. This will only become apparent as development progresses, although it is noted that there is significant opportunity to increase the parking provision on site, without altering the floor area of the development;*
- *Access to the site can be satisfactorily provided a signalised T-intersection at the location of the existing access into 345 Perry Road;*
- *The provision of access to this development would not impact on the feasibility of providing a future connection to EastLink from Perry Road; and*
- *Incorporating a site access directly into the existing Perry Road / Worsley Road intersection (by creating a cross intersection) is not feasible.*

As suggested by O'Brien Traffic, further detail regarding future car parking arrangements will be confirmed once planning permit applications are made for the development of the subject site.

4.5 Native Vegetation

There is no proposed removal of any native vegetation as part of this development plan application.

Notwithstanding the above, an ecological assessment has been completed for the site, which is included within **Attachment G** for Council's information. The report has been prepared by Ecology and Heritage Partners (dated 23 October 2013) who were commissioned to undertake a desktop assessment and a peer review of previous ecological assessment for the site, including the results of targeted surveys for the nationally significant Growling Grass Frog and Eastern Dwarf Galaxias, previously undertaken for the site.

The findings are summarised below:

- CPG Australia completed brief initial assessments of the site in 2011. Their recommendations was that the site may provide suitable habitat for both Growling Grass Frog and Dwarf Galaxias. It was recommended that targeted surveys be undertaken to investigate if either species was present on the subject site.
- Targeted surveys for Growling Grass Frog and Dwarf Galaxias were undertaken by EHP between December 2011 and January 2012.
- EHP completed a peer review of CPG's 2011 assessment and concluded that the findings of the 2011 report are consistent with the findings of EHP's desktop assessment and that targeted surveys for the relevant species were made.
- There are six (6) identified water bodies within the subject site:
    - Water body 1- small dam
    - Water body 2- wetland
    - Water body 3- small dam
    - Water body 4- large dam
    - Water body 5- Drainage line
    - Water body 6- small dam
- No Growling Grass Frogs were recorded during the diurnal searches or nocturnal surveys within the study area. The habitat quality of water bodies 1, 2, 3 and 5 was low for Growling Grass Frog. Habitat quality within water bodies 4 and 6 was high. While no Growling Grass Frogs were detected during targeted surveys, there was evidence of other frog species breeding within the water bodies. It was thought that due to the multiple number of other nearby rivers and creeks with suitable habitat surrounding the site, it was unlikely that Growling Grass Frogs would disperse/use suitable habitat within the site during favourable weather conditions (i.e. extended rainfall and flooding).
- No Dwarf Galaxias were recorded within the study area during the targeted survey. The habitat quality of water bodies 1,2 3 was considered low for Dwarf Galaxias. Waterbodies 4, 5 and 6 provided moderate habitat quality for Dwarf Galaxias.
- The conclusion was reached that based on the results of the targeted surveys and habitat conditions in the study area there is a low likelihood that the study area currently supports Growling Grass Frogs or Dwarf Galaxias on a permanent basis.
- It was recommended that efforts should be made to retain Water body 4 and enhance habitat values for Growling Grass Frogs during any proposed future developments. In addition, the construction of the proposed Melbourne Water retarding basin should include enhanced Growling Grass Frog habitat to mitigate any potential impact to species habitat elsewhere as part of the development.

4.6 Advertising Guidelines

Advertising Guidelines have not yet been prepared for the future industrial development.

Notwithstanding this, a separate planning permit application for signage will be submitted to Council in the near future.

5 Conclusion

This report has been prepared in support of the Development Plan application and provides justification for the proposal against the requirements of the Development Plan Overlay Schedule 6 (DPO6).

The proposed Development Plan area covers the remaining part of the *Dandenong South Industrial Area Extension Structure Plan* area that was not approved by Council in the Australand Development Plan. The proposed development plan area includes two distinct sections of land to the east and west of Dandenong Creek.

The proponent of this Development Plan, CIP owns, under contract of sale, the eastern section of land, which is located at 345-385 Perry Road Keysborough. Other landowners own the western section and there are multiple parcels all addressed to Perry Road, known as 259-265, 267-273, 275-281, 283-293, 295-321 Perry Road, Keysborough.

It is reiterated that all of the information and discussion within this report has been commissioned by CIP and relates to its landholdings only. Further information regarding the northern parcels will need to be prepared by others for Council's approval, before any planning permit can issue for these northern parcels.

The long term intention for the subject site is for industrial subdivision and industrial use and development. The proposed industrial land uses and the Melbourne Water retarding basin/wetland are consistent with the Structure Plan layout.

A number of site investigations and reports have been prepared in support of the proposed Development Plan application including a Cultural Heritage Management Plan, a Traffic Management Plan, Ecological assessment, a Stormwater Management Strategy, an Environmental Management Plan and Infrastructure report. No impediments were identified by these site assessments to prohibit the future development of the site for industrial land uses. Additional site assessments are currently being finalised for the Development Plan area including a staging plan and the detailed design of the proposed retarding basin/wetland.

In summary, the features of the proposed Development Plan are as follows:

- The proposed layout plan is consistent with the approved layout shown for the Keysborough site within the Dandenong South Industrial Area Extension Structure Plan.
- The proposed internal road within CIP's land with run northward into the site from Perry Road and will end in an industrial standard court bowl. The intersection with this internal road and Perry Road will be a signalised intersection. The internal court bowl is to be a standard Dandenong Council industrial road, with a road reserve width of 22 metres. Pedestrian and cycling facilities will be located within the site along both sides of the proposed road and a bike network route will be available in the east/west direction along Perry Road.
- The land required for Melbourne Water Reserve is conceptually shown on the proposed Development (layout) Plan and is in accordance with Council's Structure Plan. Land within the Melbourne Water Reserve will provide informal public open space for passive recreation.
- Landscape boundary treatments are proposed along the eastern boundary adjoining EastLink and details will be confirmed about the nature of these treatments.
- There will be no impact to any existing native vegetation from future development and all vegetation is proposed within tree protection areas. This is consistent with the NVPP that applies to the surrounding area.
- On the western section of the DP area owned by others, a possible location for a future activity centre has been nominated, consistent with the Structure Plan. The internal road network continues the road connection through to Australand's development and culminates in a signalised intersection at its southern end with Perry Road.

This report has demonstrated that the proposed Development Plan is consistent with the requirements of the DPO6 and the Dandenong South Industrial Area Extension Structure Plan and therefore warrants Council's support.

6 Attachment A- Title & Covenants

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Land Victoria.

Document Type	**plan**
Document Identification	**PS603443D**
Number of Pages (excluding this cover sheet)	**4**
Document Assembled	**23/07/2014 13:39**

VOLUME 11040 FOLIO 652

Security no : 124051490792C
Produced 23/07/2014 01:38 pm

LAND DESCRIPTION

Lot 2 on Plan of Subdivision 603443D.
PARENT TITLES :
Volume 10811 Folio 142   Volume 10815 Folio 087
Created by instrument PS603443D 29/11/2007

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
CIP (PERRY ROAD) PTY LTD of UNIT 4 LEVEL 8 644 CHAPEL STREET SOUTH YARRA VIC 3141
AL134859Q 06/06/2014

ENCUMBRANCES, CAVEATS AND NOTICES

COVENANT as to part G816355

COVENANT as to part G819643

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS603443D FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AL134859Q	TRANSFER	Registered	06/06/2014

------------------------END OF REGISTER SEARCH STATEMENT------------------------

Additional information: (not part of the Register Search Statement)

Street Address: 345-385 PERRY ROAD DANDENONG SOUTH VIC 3175

DOCUMENT END

PLAN OF SUBDIVISION

Stage No.

LR use only
EDITION 2

Plan Number
PS603443D

Location of Land

Parish: EUMEMMERRING
Township:
Section:
Crown Allotment: 73A (PT), 74B (PT)
Crown Portion: 74 (PT)

Title References:
Vol 10811 Fol 142 Vol 10815 Fol 087

Last Plan Reference: LOT D ON PS513300D & LOTS 1 & 2 ON TP4166F

Postal Address: PERRY ROAD DANDENONG SOUTH

MGA Co-ordinates: E 340 910
(Of approx centre of plan) N 5 790 185 Zone 55

Vesting of Roads or Reserves

Identifier	Council/Body/Person
Nil	Nil

Council Certification and Endorsement

Council Name: GREATER DANDENONG CITY COUNCIL Ref: PSub07/0040

1 This plan is certified under section 6 of the Subdivision Act 1988.

~~2. This plan is certified under section 11(7) of the Subdivision Act 1988.~~
~~Date of original certification under section 6 / /~~

~~3. This is a statement of compliance issued under section 21 of the Subdivision Act 1988.~~

Open Space

(i) A requirement for public open space under section 18 Subdivision Act 1988 ~~has~~ / has not been made.

~~(ii) The requirement has been satisfied.~~

~~(iii) The requirement is to be satisfied in Stage~~

Council Delegate
~~Council seal~~

Date 16 / 8 / 07

~~Re-certified under section 11(7) of the Subdivision Act 1988.~~
~~Council delegate~~
~~Council seal~~
~~Date / /~~

Notations

Depth Limitation: Does not apply

Staging: This ~~is~~/is not a staged subdivision
Planning Permit No

Other Notations

Survey:- This plan ~~is~~ / is not based on survey

To be completed where applicable.
This survey has been connected to permanent marks no(s).
In proclaimed Survey Area no.

Easement Information

Legend: A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of
E-1	TRANSMISSION OF ELECTRICITY	SEE DIAG	INST E840384	SECV
E-2	PIPELINE	SEE DIAG	INST G816355	ESSO EXPLORATION & PRODUCTION AUSTRALIA INC. & HEMATITE PETROLEUM PTY LTD
	PIPELINE		INST G819643	W A G PIPELINE PTY LTD
E-3	PIPELINE	SEE DIAG	INST G816355	ESSO EXPLORATION & PRODUCTION AUSTRALIA INC & HEMATITE PETROLEUM PTY LTD
	PIPELINE		INST G819643	W A G PIPELINE PTY. LTD
	TRANSMISSION OF ELECTRICITY		INST E840384	SECV
E-4	DRAINAGE & SEWERAGE	SEE DIAG	LP149730	LOTS ON LP149730
E-5	DRAINAGE & SEWERAGE	3	PS437730Y	LOTS ON PS437730Y
	SEWERAGE		PS437730Y	SOUTH EAST WATER LTD
E-6	DRAINAGE & SEWERAGE	1	PS437730Y	LOTS ON PS437730Y
	SEWERAGE		PS437730Y	SOUTH EAST WATER LTD
	ELECTRICITY SUPPLY		PS437730Y	UNITED ENERGY LTD
E-7	ELECTRICTY SUPPLY	1	PS437730Y	UNITED ENERGY LTD

LR use only
Statement of Compliance / Exemption Statement
Received ✓
Date 27 / 11 / 07

LR use only
PLAN REGISTERED
TIME 2.52 PM
DATE 29 / 11 / 2007
Assistant Registrar of Titles

Sheet 1 of 3 Sheets

Hellier McFarland
Land Surveyors•Property Consultants•Town Planners
342 Hawthorn Road Caulfield South Vic 3162
Telephone: 03 9532 9951 Facsimile: 03 9532 9941
Internet: www.hmf.com.au Email: hmf@hmf.com.au
CAD REF PC6 C:\6.DATA\6300\6320.1 G01

LICENSED SURVEYOR STUART ANDREW McFARLAND
SIGNATURE DATE 16 / 3 / 07
REF 6320T/1 VERSION A

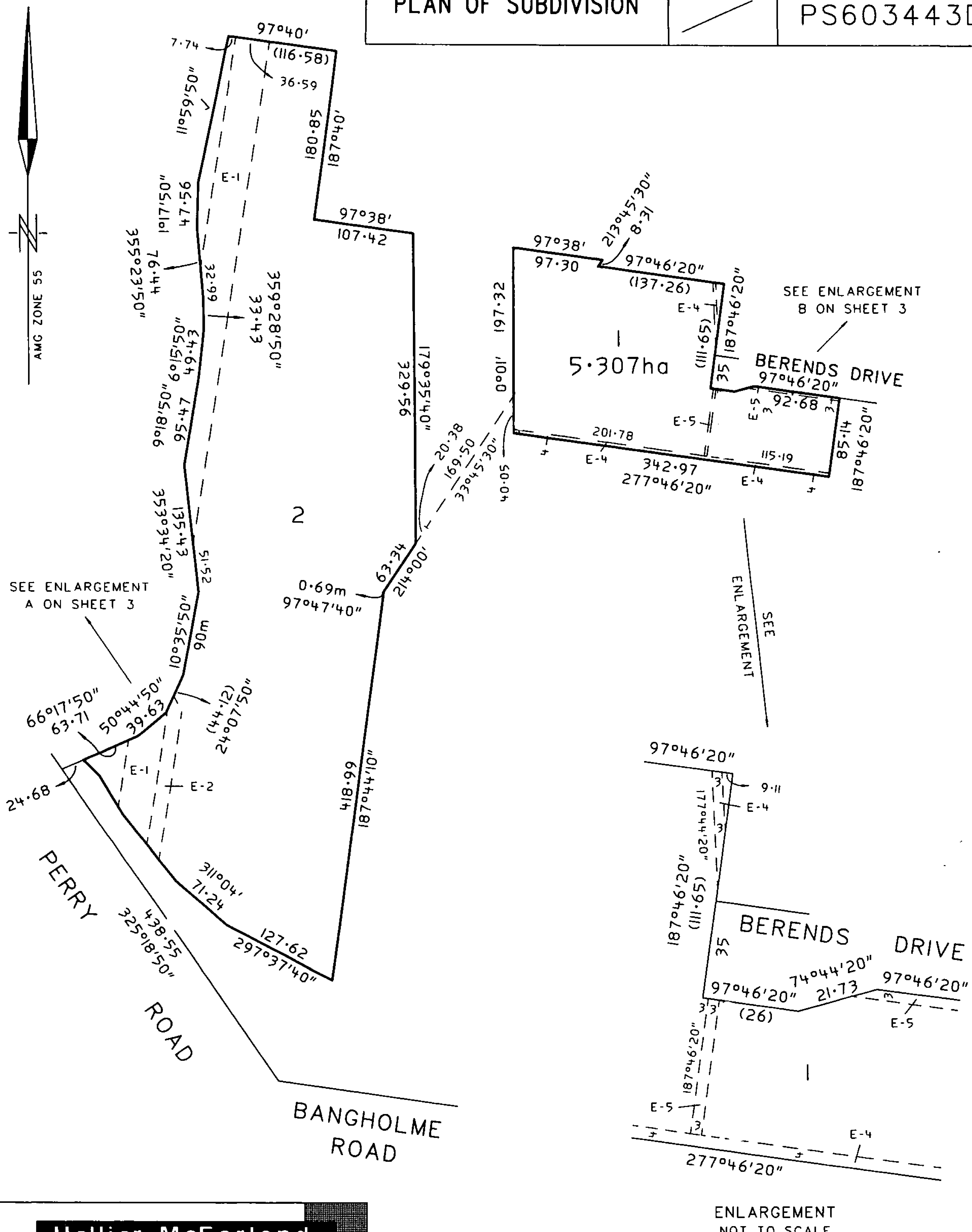
DATE / /
COUNCIL DELEGATE SIGNATURE

Original sheet size A3

PLAN OF SUBDIVISION

Stage No. /

Plan Number PS603443D



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CAD REF PC6 C:\6.DATA\6300\6320.1 GOI

ORIGINAL SHEET SIZE A3 | SCALE 1:4000

SCALE 40 0 40 80 120 160
LENGTHS ARE IN METRES

LICENSED SURVEYOR STUART ANDREW McFARLAND

SIGNATURE ________________ DATE __/__/__

REF 6320T/1 VERSION A

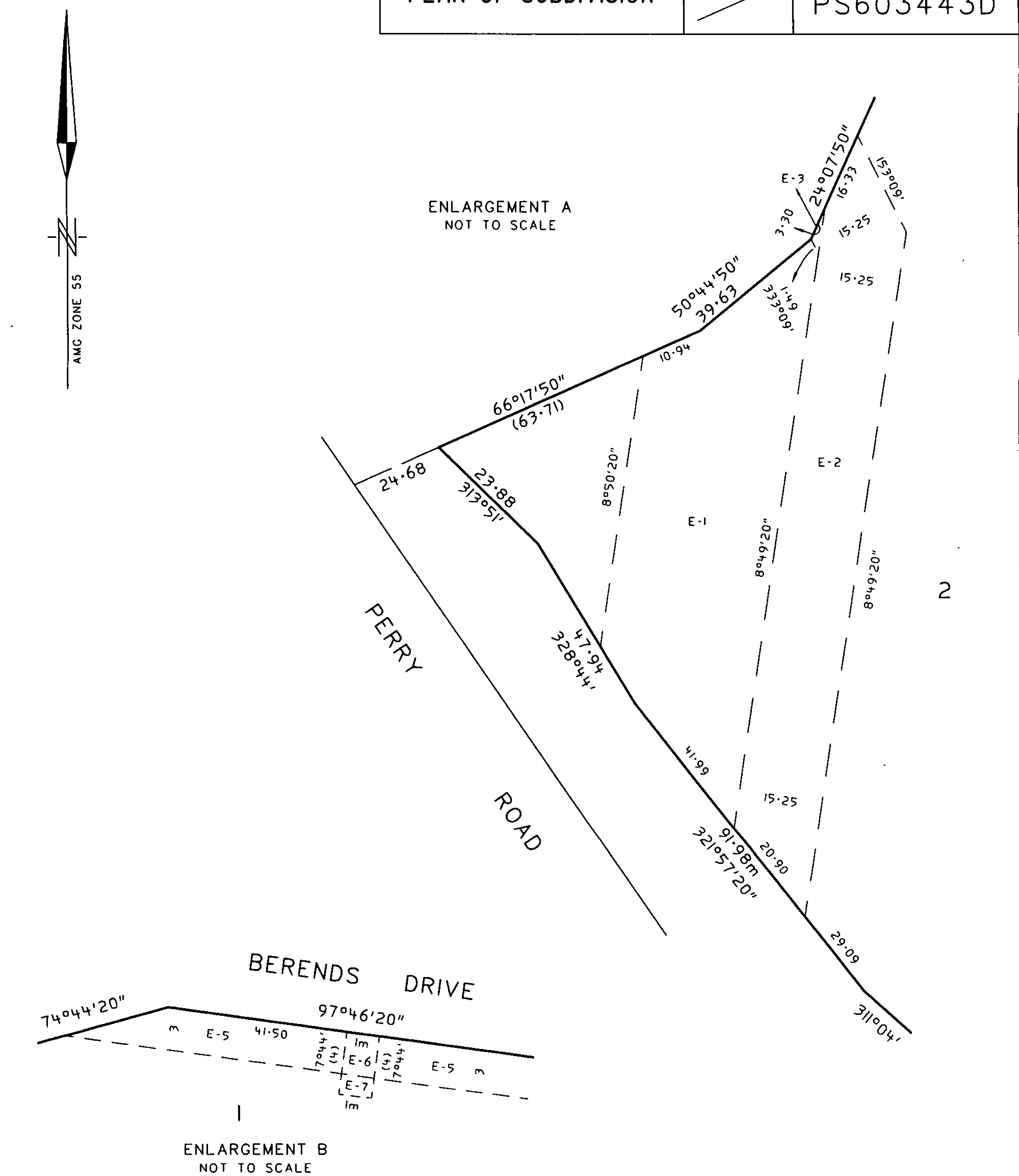
SHEET 2 OF 3 SHEETS

DATE __/__/__

COUNCIL DELEGATE SIGNATURE

PLAN OF SUBDIVISION

Stage No.	Plan Number
	PS603443D



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CAD REF PC6 C:\6_DATA\6300\6320.1 G01

SHEET 3 OF 3 SHEETS

ORIGINAL SHEET SIZE A3 | SCALE | LENGTHS ARE IN METRES

LICENSED SURVEYOR STUART ANDREW McFARLAND

SIGNATURE ____________ DATE __/__/__

REF 6320T/1 VERSION A

DATE __/__/__

COUNCIL DELEGATE SIGNATURE

RECORD OF ALL ADDITIONS OR CHANGES TO THE PLAN

PLAN NUMBER
PS603443D

**WARNING: THE IMAGE OF THIS DOCUMENT OF THE REGISTER HAS BEEN DIGITALLY AMENDED.
NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL DOCUMENT OF THE REGISTER.**

AFFECTED LAND/PARCEL	LAND/PARCEL IDENTIFIER CREATED	MODIFICATION	DEALING NUMBER	DATE	EDITION NUMBER	ASSISTANT REGISTRAR OF TITLES
		Removal of easement	PS605098H	4/9/08	2	RGM

G816355 G816355

4.00 M R T 62-40 567C53 -5-OCT-77

EM-1024

ARTHUR ROBINSON & CO.
VICTORIA

MADE AVAILABLE ISSUE TO

CREATION OF EASEMENT

GREAT NORTHERN MEATS PTY. LTD. of 464 St. Kilda Road Melbourne

(hereinafter called "the Grantor") being registered as the proprietor of an estate in fee simple in the land secondly hereinafter described, subject to the encumbrances notified hereunder, in consideration of the sum of $ 726.00 paid to me DO HEREBY TRANSFER AND GRANT unto ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC. of 380 Lonsdale Street Melbourne and HEMATITE PETROLEUM PROPRIETARY LIMITED of 500 Bourke Street Melbourne and their transferees in fee simple the registered proprietor or proprietors for the time being of ALL THOSE pieces of land being the whole of the land described in Certificates of Title Volume 8718 Folios 882, 883, 886 and 887 Volume 5992 Folio 297 and Volume 8760 Folio 562 (hereinafter called "the Grantees") at all times hereafter the full and free liberty and right, as appurtenant to the lands comprised in the said Certificates of Title (which lands are hereinafter referred to as the "dominant tenement"), on over under and through ALL THAT piece of land delineated and coloured blue on the plan annexed hereto (hereinafter referred to as the "servient tenement") being part of the land described in Certificate of Title Volume 6830 Folio 958

to lay down, construct, change the size and number of, operate, maintain, inspect, patrol (including aerial patrol), alter, remove, replace, reconstruct and/or repair one of more pipelines designed to convey or conveying oil and other liquid or gaseous hydrocarbons, natural and artificial gas and any products or by-products thereof and any other substance which the Grantees may desire to transport by pipeline together with all the works of the Grantees useful in connection with or incidental to their undertaking including but without limiting the generalty of the foregoing all such communication and power systems (including pole lines), drips, valves, valve chambers, manholes, inspection pits, fittings, meters, connections and all other equipment and appurtenances whether or not similar to the foregoing as may be useful or convenient in connection therewith or incidental thereto (hereinafter called "the Grantees' appliances") and together with the right for the Grantees and their surveyors, engineers, servants, agents, licenees, contractors, sub-contractors and other authorised by them (hereinafter called "the Grantees' associates") —

(1) to enter upon and remain, pass and repass on and over the servient tenement for all or any of the purposes aforesaid and with or without vehicles, plant and equipment of any description;

(2) to clear the servient tenement and cut and remove timber, trees, undergrowth, crops and fences and construct and maintain gates in fences crossing the servient tenement and the other adjacent land of the Grantor as the Grantees shall consider necessary or desirable.

And the Grantor for ~~himself his heirs executors administrators and assigns~~ itself and its successors in title registered proprietor or proprietors of the servient tenement and every part thereby hereby covenants with the Grantees and each of them to the extent that the burden of this covenant may run with and bind the servient tenement and every part thereof and that the benefit thereof may be annexed to and run with the dominant tenement that the Grantor shall not without the prior written consent of the Grantees plant or permit to be planted any trees or shrubs on the servient tenement or excavate, drill, install, erect or permit to be excavated, drilled, installed or erected on or under the servient tenement or any part thereof any pit, well, foundation, pavement or other structure or installation nor shall the Grantor alter or disturb or permit to be altered or disturbed (other than by the processes of nature) the present grades and contours of the servient tenement but otherwise the Grantor shall have the right fully to use and enjoy the servient tenement subject always to and so as not to interfere with the rights and privileges hereby granted and conferred upon the Grantees.

The Grantor and the Grantees hereby mutually covenant and agree one with the other of them as follows:—

A. The consideration hereinbefore mentioned is acknowledged by the Grantor to be in full satisfaction of all moneys payable for the granting of this easement in favour of the Grantees.

B. The Grantees will compensate the Grantor for damage done from and after the date this instrument shall have been delivered to the Grantees to the Grantor's crops, timber, pasture lands, live stock, improvements and other property on the servient tenement or any land of the Grantor adjacent there to by reason of the exercise of the rights hereinbefore granted. In the event of any difference arising between the Grantor and the Grantees as to the amount of such compensation the same shall be determined in the manner provided in the Arbitration Act 1958. Any compensation paid by the Grantees to the Grantor shall include compensation for damage done to the crops, timber, pasture lands, live stock, improvements and other property on the servient tenement or any land of the Grantor adjacent thereto in which any tenant, sharefarmer or other person has any interest and the Grantor agrees to idemnity the Grantees against any claim by any such tenant, sharefarmer or other person for any damage done by the Grantees in the performance of their rights under this easement.

C. The Grantees shall as soon as weather and soil conditions permit and subject to the restrictions hereinbefore contained and insofar as it is practicable so to do bury to a minimum depth of thirty inches below the level of the immediately surrounding land maintain all pipelines so as not to interfere unreasonably with the use of the servient tenement.

D. Notwithstanding any rule of law or equity the pipes (which term shall include all pipelines and the Grantees' appliances) brought onto laid or erected upon or buried in or under the servient tenement by the Grantees shall at all times remain the property of the Grantees and their assigns notwithstanding that the same may be annexed or affixed to the freehold and shall at any time and from time to time by removable in whole or in part by the Grantees and their assigns.

E. Upon the discontinuance of the use of the servient tenement by the Grantees the Grantees may at their option leave the pipes or any part thereof and the Grantees' appliances in the ground or may remove the same but if the Grantees damage the property of the Grantor during the removal of the pipes or appliances then the Grantees will compensate the Grantor upon the terms and in the manner contained in Clause B hereof.

F. The Grantees performing and observing the covenants and conditions on their part to be observed and performed shall and may peacefully hold and enjoy the rights, liberties, privileges and easement hereby granted without hindrance, molestation or interference on the part of the Grantor or of any person firm or corporation claiming by through under or in trust for the Grantor.

G. All notices to be given hereunder may be given by prepaid registered or certified letter addressed to the Grantor by being forwarded to the registered proprietor for the time being at his latest address shown in the Registered Book and to the Grantees at 380 Lonsdale Street Melbourne or such other address as the Grantor and Grantees may respectively from time to time designate in writing and any such notice shall be deemed to have been given to and received by the addressee on the third day following that on which the same is posted.

H. Neither this instrument nor anything herein contained shall affect or prejudice the rights of the Grantees or the Grantees' associates under the Pipelines Act 1967 or under any consent granted pursuant to Section 9 (2) of the said Act or under any permit granted pursuant to Section 12 of the said Act or any written permission given pursuant to Section 22 (1) of the said Act or any other rights of the Grantees under the said Act.

I. The Grantor will execute every such deed, instrument or assurance and do every such thing for further or more effectively securing the rights and interests of the Grantees to or in the servient tenement or any part or parts thereof pursuant to these present as shall by the Grantees be reasonably required.

C/E with Count
6830-958
TO
8718-882
" " 883
" " 886
" " 887
5992-297
8760-562
9/11/77

CAVEAT

SEP-15-77 686796 85744 LE D TOT 5-OC

DG816355-1-4

17.10.77

J. Wherever the singular or masculine is used it shall be construed as if the plural feminine or neuter, as the case may be, had been used where the context or the party or parties hereto so require and the rest of the sentence shall be construed as if the grammatical and other changes thereby rendered necessary had been made and where more than one Grantor is a party hereto the covenants herein contained shall extend to and bind such Grantors jointly and each of them severally.

K. Nothing herein contained shall be deemed or construed to authorise or permit the construction, operation or use of a pipeline outside the terms and conditions of any permit of licence issued pursuant to the Pipelines Act 1967.

L. Notwithstanding anything hereinbefore contained the Grantees shall not without the prior written consent of the Grantor have the right to install any of the Grantees' appliances above the surface of the servient tenement except test connections and line markers which shall be installed at fence lines.

DATED this 16th day of August One thousand nine hundred and seventy-seven

THE COMMON SEAL of GREAT ~~SIGNED by the said~~ NORTHERN MEATS PTY. LTD. was hereto affixed in accordance with its ~~in Victoria in the presence of:~~ Articles of Association in the presence of: Director. [signature] Secretary J. Taylor

THE COMMON SEAL OF NORTHERN MEATS PTY. LTD.

EXECUTED by ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC. by being SIGNED SEALED AND DELIVERED in Victoria by STUART R. McGILL its attorney under Power Number 226700 in the presence of: [signature] Steven J. Krahn

EXECUTED by HEMATITE PETROLEUM PROPRIETARY LIMITED by being SIGNED SEALED AND DELIVERED in Victoria by MICHAEL ROBERT MORRISON its attorney under Power Number 187523 in the presence of: J. Taylor M R Morrison

ENCUMBRANCES REFERRED TO:

Easement No. E840384

~~under Mortgage Number in the Register Book of part of the abovementioned land hereby consent to the above Creation of Easement and Restrictive Covenant and to this Creation of Easement and Restrictive Covenant taking priority over the said Mortgage.~~ ~~of~~ ~~being the Mortgagee~~

DISTRIBUTION: Original — Office of Titles.
1st Copy — Cons't Div. for Company.
2nd Copy — R/W Agent.
3rd Copy — Landowner.
4th Copy — Solicitor.

G 816355.

Application No.

Subdivision No.

Date ___/___/19___

TOWNSHIP OR CITY

(Surveyor)

PARISH OF

Allot. Sec.

[signature] Computer

Bearing	Distance	N.	S.	E.	W.	D.M.	Area
Blue	Hat'd.						
16°21'	16.4	15.74	–	4.62	–		
(1°04'34")	(21.83)	✓	(21.83)		(0.41)		
325°22'	(7.4)	6.09	–	–	4.21		
Secant	on	196°21.					
75.8	Sec.	(55°22' –	16°21')	=	97.56.		
			16.4 +	81.2 =	97.6	✓	
Sect	at	Bangholme	Road.	Missing	Dist	on	0°0'.
47°47'	75.8	50.9	–	56.1			
180°0'	(98.6)	–	(98.6)				
270°0'	12.8	–	–	–	12.8		
317°47'	(64.4)	(47.7)			(43.3)		
Closure	of	E'ment					
16°21'	97.6	93.7	–	27.5	–		
145°22'	(93.2)	–	76.7	53.0	–		
181°2½'	(80.4)	–	(80.3)	–	(14.7)		Brg comps 181°3'
137°47'	1483.8	–	1098.9	997.0	–		
180°0'	98.6	–	98.6	–			E'ment is
270°0'	12.8	–	–	–	12.8		Mathematically
317°47'	1578.3	1168.9	–	–	1060.5		Correct
1°2½'	806.9	806.8	–	14.7	–		
325°22'	7.4	6.1	–	–	4.2		✓
		2075.5		1092.2			

DG816355-2-1

CS1

Natural Resources and Environment

AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

INTENTIONALLY BLANK

ESSO EXPL[illegible]ATION AND PRODUCTION AUSTRALIA INC. AND HEMATITE PETROLEUM PROPRIETARY LIMITED

RIGHT-OF-WAY EASEMENT

REQUIRED FOR PIPELINE

OWNER: GREAT NORTHERN MEATS PTY. LTD.

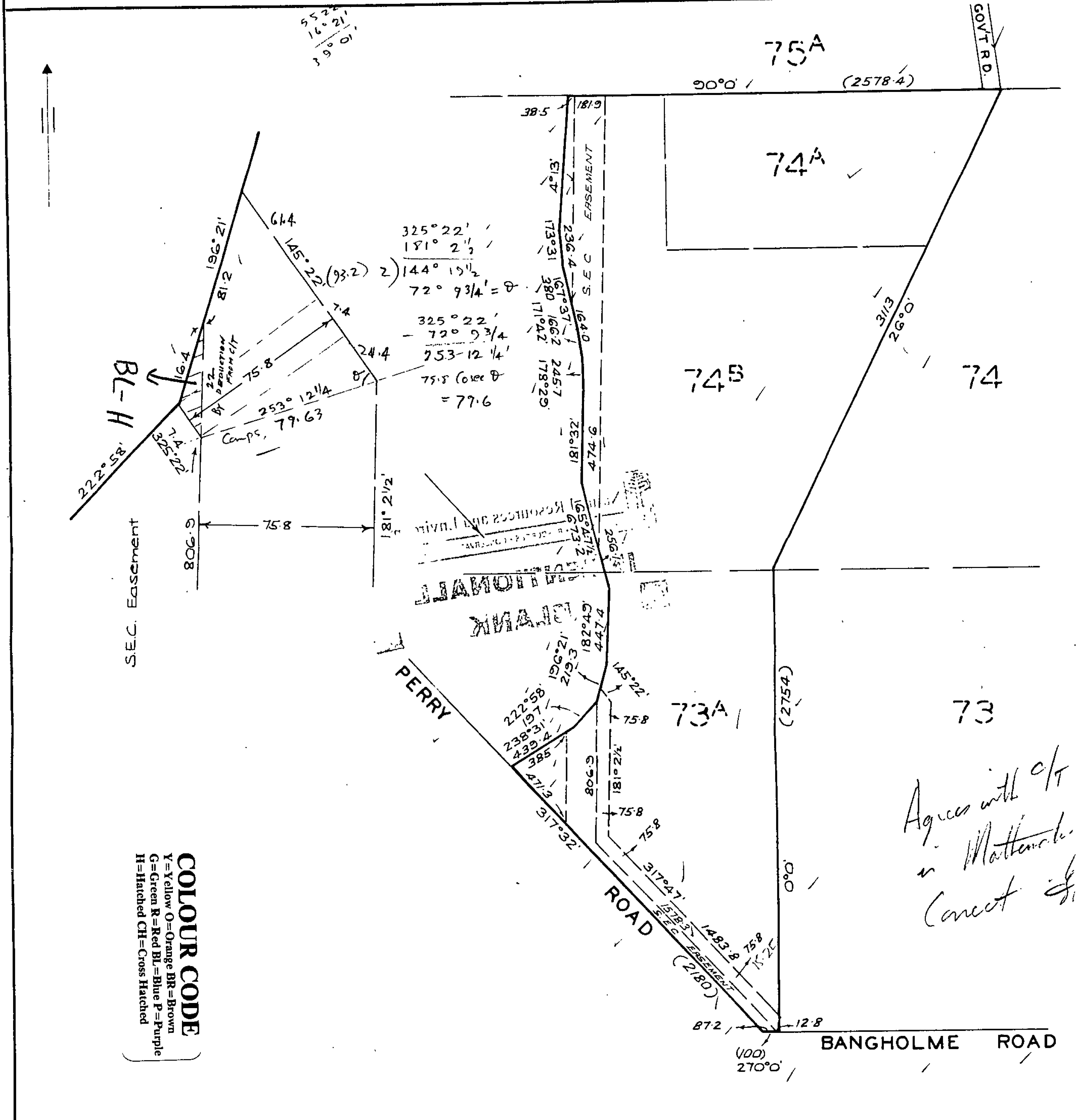
ADDRESS: 464 ST. KILDA ROAD MELBOURNE.

PART OF CROWN

PARISH OF EUMEM

Certificate of Title V

Area 1A.



COLOUR CODE
Y=Yellow O=Orange BR=Brown
G=Green R=Red BL=Blue P=Purple
H=Hatched CH=Cross Hatched

I certify that this plan has bee[n]
mathematically correct and the[y]
reasonably located in accordance

Dat[e]

ELECDIST SURV[EYOR]

DG816355-3-7

Natural Resources and Environment
AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

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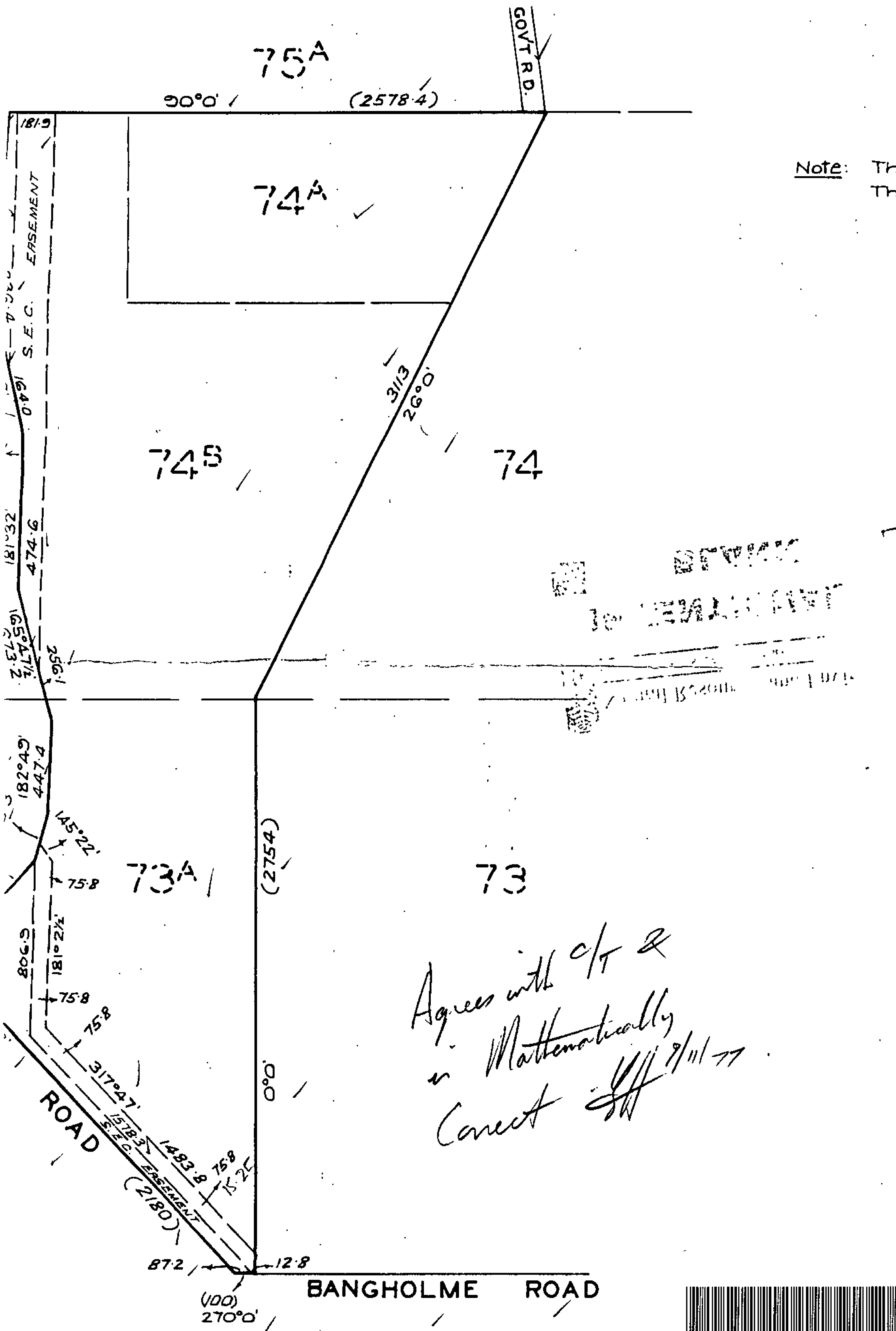
AUSTRALIA INC. ETARY LIMITED LTD. BOURNE.	PART OF CROWN ALLOTMENTS 73A & 74B AND CROWN ALLOTMENT 74A PARISH OF EUMEMMERRING — COUNTY OF MORNINGTON Certificate of Title VOLUME 6830 FOLIO 958 — Scale 6 CHAINS to an inch Area 1A. 3R. 10 3/10P – 1·81442 Ac — Measurements are in LINKS

Note: The land shown blue-hatched is encumbered.
The enlargement is not to scale.



DG816355-4-3

M R Morrison

I certify that this plan has been made by me, agrees with title, is mathematically correct and the easement being created has been reasonably located in accordance with title position. F. E. Gulliver Licensed Surveyor Date 26/3/74 ELECDIST SURVEYS PTY. LIMITED		RIGHT-OF-WAY OR EASEMENT NUMBER EM 1024 Ref. No. 9042 — Plan No.

28 MAR 1974

Natural Resources and Environment

AGRICULTURE • RESOURCES • CONSERVATION • LAND MANAGEMENT

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DG816355-5-0

To: The Registrar of Titles

Please register this Creation of Easement and on completion return the Certificate of Title Volume 6830 Folio 958 to MICHAEL NIALL ARMER

Michael Niall Armer

GREAT NORTHERN MEATS PTY. LTD.

to

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC. AND HEMATITE PETROLEUM PROPRIETARY LIMITED

CREATION OF EASEMENT

ARTHUR ROBINSON & CO.
Solicitors
447 Collins Street, Melbourne, 3000
(Ref: 14)

G819643

G819643

REGD

69-35 374325 OCT10-77

MADE AVAILABLE TO ISSUE TO ... HEDDERWICK FOOKES & ALSTON VICTORIA

Right of Way No. EM-227

G 816355

CREATION OF EASEMENT

GREAT NORTHERN MEATS PTY. LTD. of 464 St. Kilda Road, Melbourne in the State of Victoria

(hereinafter called "the Grantor") being registered as the proprietor of an estate in fee simple in the land secondly hereinafter mentioned and referred to as the servient tenement subject to the encumbrances notified hereunder in consideration of the sum of $1089-00 paid to ~~me~~ DO HEREBY TRANSFER AND GRANT unto W.A.G. PIPELINE PROPRIETARY LIMITED of 155 William Street Melbourne and its transferees in fee simple the registered proprietor or proprietors for the time being of ALL THOSE pieces of land described in the Schedule hereto (hereinafter called "the Grantee") at all times hereafter the full and free liberty and right, as appurtenant to and for the benefit of the lands and each and every piece of the lands described in the Schedule hereto (which lands are hereinafter referred to as the "dominant tenement") on over under and through ALL THAT piece of land delineated and coloured blue ~~and blue hatched~~ on the plan annexed hereto (hereinafter referred to as the "servient tenement") being part of the land more particularly described in Certificate of Title Volume 6830 Folio 958

to lay down, construct, change the size and number of, operate, maintain, inspect, patrol (including aerial patrol), alter, remove, replace, reconstruct and/or repair one or more pipelines designed to convey or conveying oil and other liquid or gaseous hydrocarbons, natural and artificial gas and any product or by-product thereof and any other substance which the Grantee may desire to transport by pipeline and also all such works as the Grantee may deem to be useful in connection with or incidental to the Grantee's undertaking or the exercise of the rights and powers acquired by the Grantee under or by virtue of the provisions of the Pipelines Act 1967 including but without limiting the generality of the foregoing all such communications equipment, valves, valve chambers, inspection connections, fittings, control meters and all other equipment and appurtenances whether or not similar to the foregoing as may be useful or convenient in connection therewith or incidental thereto (hereinafter called "the Grantee's appliances") and together with the right for the Grantee and its surveyors, engineers, servants, agents, licensees, contractors sub-contractors and others authorised by it (hereinafter called "the Grantee's associates")—

(1) to enter upon and remain, pass and repass on and over the servient tenement for all or any of the purposes aforesaid and with or without vehicles, plant and equipment of any description;

(2) to clear the servient tenement and cut and remove timber, trees, undergrowth, crops and fences and construct and maintain gates in fences crossing the servient tenement and the other adjacent land of the Grantor as the Grantee shall consider necessary or desirable.

And the Grantor for ~~himself his heirs executors administrators~~ itself its successors and assigns registered proprietor or proprietors of the servient tenement and every part thereof hereby covenants with the Grantee to the intent that the burden of this covenant may run with and bind the servient tenement ~~and every~~ part thereof and that the benefit thereof may be annexed to and run with the dominant tenement that the Grantor shall not without the prior written consent of the Grantee plant or permit to be planted any trees or shrubs on the servient tenement or excavate, drill, install, erect or permit to be excavated, drilled, installed or erected on or under the servient tenement or any part thereof any pit, well, foundation, pavement or other structure or installation nor shall the Grantor alter or disturb or permit to be altered or disturbed (other than by the processes of nature) the present grades and contours of the servient tenement but otherwise the Grantor shall have the right fully to use and enjoy the servient tenement subject always to and so as not to interfere with the rights and privileges hereby granted and conferred upon the Grantee.

The Grantor and the Grantee hereby mutually convenant and agree one with the other of them as follows:—

A. The consideration hereinbefore mentioned is acknowledged by the Grantor to be in full satisfaction of all moneys payable for the granting of this easement in favour of the Grantee.

B. The Grantee will compensate the Grantor for damage done from and after the date this instrument shall have been delivered to the Grantee to the Grantor's crops, timber, pasture land, live stock, improvements and other property on the servient tenement or any land of the Grantor adjacent thereto by reason of the exercise of the rights hereinbefore granted. In the event of any difference arising between the Grantor and the Grantee as to the amount of such compensation the same shall be determined in the manner provided in the Arbitration Act 1958. Any compensation paid by the Grantee to the Grantor shall include compensation for damage done to the crops, timber, pasture lands, live stock, improvements and other property on the servient tenement or any land of the Grantor adjacent thereto in which any tenant, sharefarmer or other person has any interest and the Grantor agrees to idemnify the Grantee against any claim by any such tenant, sharefarmer or other person for any damage done by the Grantee in the performance of its rights under this easement.

C. The Grantee shall as soon as weather and soil conditions permit and subject to the restrictions hereinbefore contained and insofar as it is practicable so to do bury to a minimum depth of thirty inches below the level of the immediately surrounding land and maintain all pipelines so as not to interfere unreasonably with the use of the servient tenement.

D. Notwithstanding any rule of law or equity the pipes (which term shall include all pipelines and the Grantee's appliances) brought onto laid or erected upon or buried in or under the servient tenement by the Grantee shall at all times remain the property of the Grantee and its assigns notwithstanding that the same may be annexed or affixed to the freehold and shall at any time and from time to time be removable in whole or part by the Grantee and its assigns.

E. Upon the discontinuance of the use of the servient tenement by the Grantee the Grantee may at its option leave the pipes or any part thereof and the Grantee's appliances in the ground or may remove the same but if the Grantee damages the property of the Grantor during the removal of the pipes or appliances then the Grantee will compensate the Grantor upon the terms and in the manner contained in Clause B hereof.

F. The Grantee performing and observing the covenants and conditions on its part to be observed and performed shall and may peaceably hold and enjoy the rights, liberties, privileges and easement hereby granted without hindrance, molestation or interference on the part of the Grantor or of any person, firm or corporation claiming by through under or in trust for the Grantor.

G. All notices to be given hereunder may be given by prepaid registered or certified letter addressed to the Grantor by being forwarded to the registered proprietor for the time being at his latest address shown in the Register Book and to the Grantee at 155 William Street Melbourne or such other address as the Grantor and Grantee may respectively from time to time designate in writing and any such notice shall be deemed to have been given to and received by the addressee on the third day following that on which the same is posted.

H. Neither this instrument nor anything herein contained shall affect or prejudice the rights of the Grantee or the Grantee's associates under the Pipelines Act 1967 or under any consent granted pursuant to Section 9 (2) of the said Act or under any permit granted pursuant to Section 12 of the said Act or any written permission given pursuant to Section 22 (1) of the said Act or any other rights of the Grantee under the said Act.

C/t + Corr.
C/T 6830-958 (pt)
To
C/T 8844-431
8288-001
8288-002
8924-588
8288-112
8288-111
8288-110
8288-109
8288-108
8288-107
8288-106
WH.

17/3/78

SKBM 11/4/78

Draft(s) checked

SEP-30-77 703468 90780 LE D 101 *****5-00

VICTORIA STAMP DUTY

DG819643-1-8

I. The Grantor will execute every such deed, instrument or assurance and do every such thing for further or more effectively securing the rights and interests of the Grantee to or in the servient tenement or any part or parts thereof pursuant to these presents as shall by the Grantee be reasonably required.

J. Wherever the singular or masculine is used it shall be construed as if the plural feminine or neuter, as the case may be, had been used where the context or the party or parties hereto so require and the rest of the sentence shall be construed as if the grammatical and other changes thereby rendered necessary had been made and where more than one Grantor is a party hereto the covenants herein contained shall extend to and bind such Grantors jointly and each of them severally.

K. Nothing herein contained shall be deemed or construed to authorise or permit the construction, operation or use of a pipeline outside the terms and conditions of any permit or license issued pursuant to the Pipelines Act 1967.

L. Notwithstanding anything hereinbefore contained the Grantee shall not without the prior written consent of the Grantor have the right to install any of the Grantee's appliances above the surface of the servient tenement, except test connections and line markers which shall be installed at fence lines.

THE SCHEDULE HEREINBEFORE REFERRED TO

ALL THOSE pieces of land being the whole of the land more particularly described in Certificates of Title Volume 8844 Folio 431, Volume 8288 Folio 001, Volume 8288 Folio 002, Volume 8924 Folio 508, Volume 8288 Folio 112, Volume 8288 Folio 111, Volume 8288 Folio 110, Volume 8288 Folio 109, Volume 8288 Folio 108, Volume 8288 Folio 107 and Volume 8288 Folio 106.

Dated this 16th day of August One thousand nine hundred ~~and~~ seventy -seven.

~~Signed by the said~~
THE COMMON SEAL of GREAT NORTHERN MEATS PTY. LTD. was
~~in Victoria in the presence of:~~
hereunto affixed in accordance with its Articles of Association and in the presence of:
~~Signed by the said~~

THE COMMON SEAL OF GREAT NORTHERN MEATS PTY. LTD.

Director

~~in Victoria in the presence of~~: J.K. Taylor Secretary

~~EXECUTED by W.A.G. PIPELINE PROPRIETARY LIMITED~~
~~by being SIGNED SEALED AND DELIVERED in Victoria by~~
~~ROY DALLAS CROOK~~
~~its Attorney under Power Number 184404 in the presence of:~~
THE COMMON SEAL of W.A.G. PIPELINE PROPRIETARY LIMITED was hereto affixed in accordance with its Articles of Association and in the presence of

W.A.G. PIPELINE PROPRIETARY LIMITED

Authorised Signatory Director

ENCUMBRANCES REFERRED TO:
As set out ~~at the foot of~~ on the Certificate of Title.

27.2.78

~~being the Mortgagee under Mortgage(s) Number(s) of in the Register Book of part of the abovementioned land hereby consent to the above Creation of Easement and Restrictive Covenant and to this Creation of Easement and Restrictive Covenant taking priority over the said Mortgage(s).~~

AMENDED
27 FEB 1978
With consent of solicitor for

DISTRIBUTION: Original — Office of Titles.
1st Copy — Cons't Div. for Company.
2nd Copy — R/W Agent.
3rd Copy — Landowner.
4th Copy — Solicitor.

ARY LIMITED

LTD.

BOURNE.

PART OF CROWN ALLOTMENTS 73A & 74B AND CROWN ALLOTMENT 74A

PARISH OF EUMEMMERRING

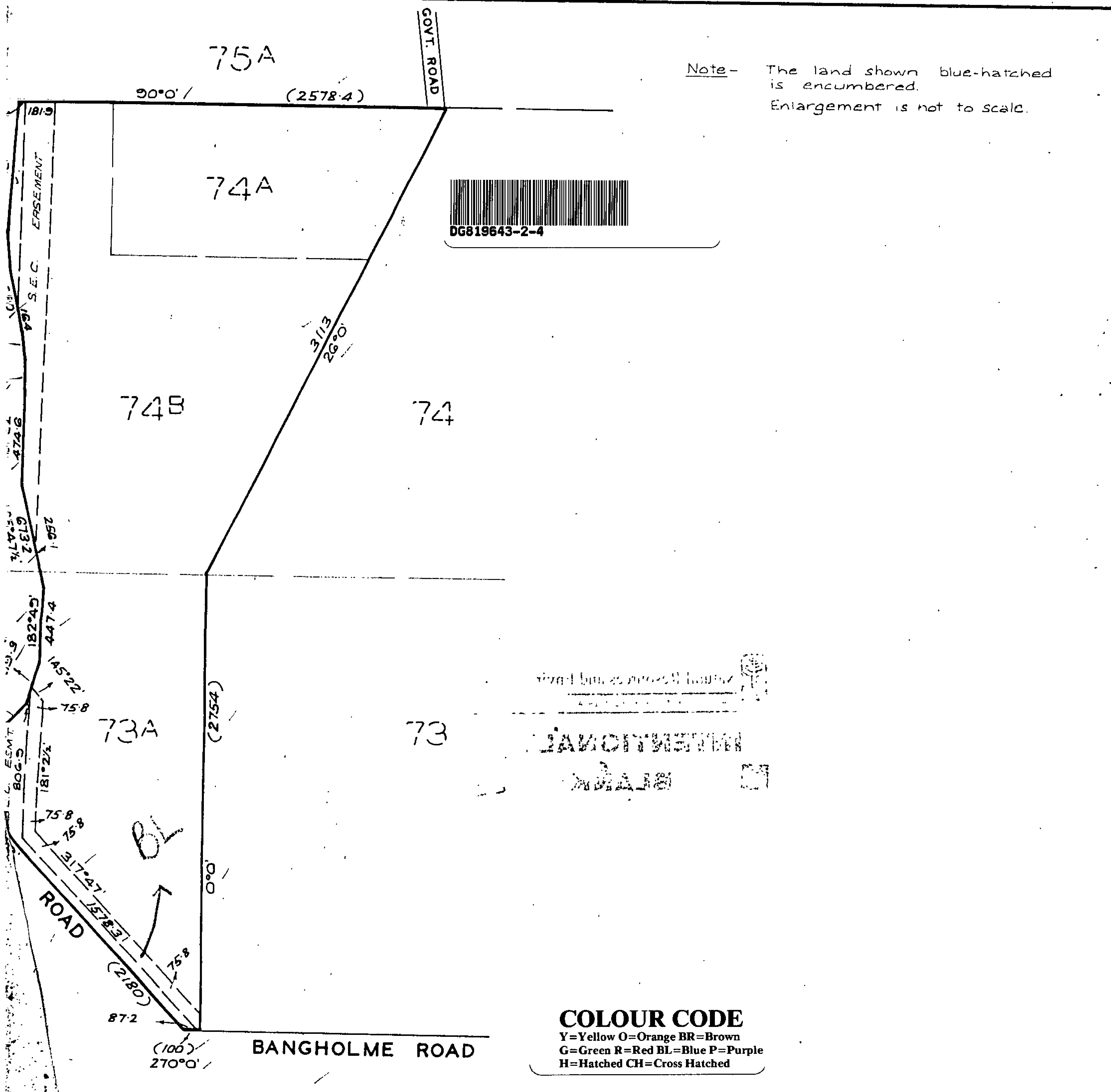
COUNTY OF MORNINGTON

Certificate of Title VOLUME 6830 FOLIO 958

Area 1A. 3R. 10 3/10P. – 1·81442 Ac.

Scale: 6 CHAINS to an inch

Measurements are in LINKS



I certify that this plan has been made by me, agrees with title, is mathematically correct and the easement being created has been reasonably located in accordance with title position.

Licensed Surveyor

Date 26 / 3 / 74

ELECDIST SURVEYS PTY. LIMITED

414 BOURKE STREET, MELBOURNE.

RIGHT-OF-WAY OR EASEMENT NUMBER

EM – 227

Ref. No. 9044

Plan No.

28 MAR 1974

Natural Resources and Environment
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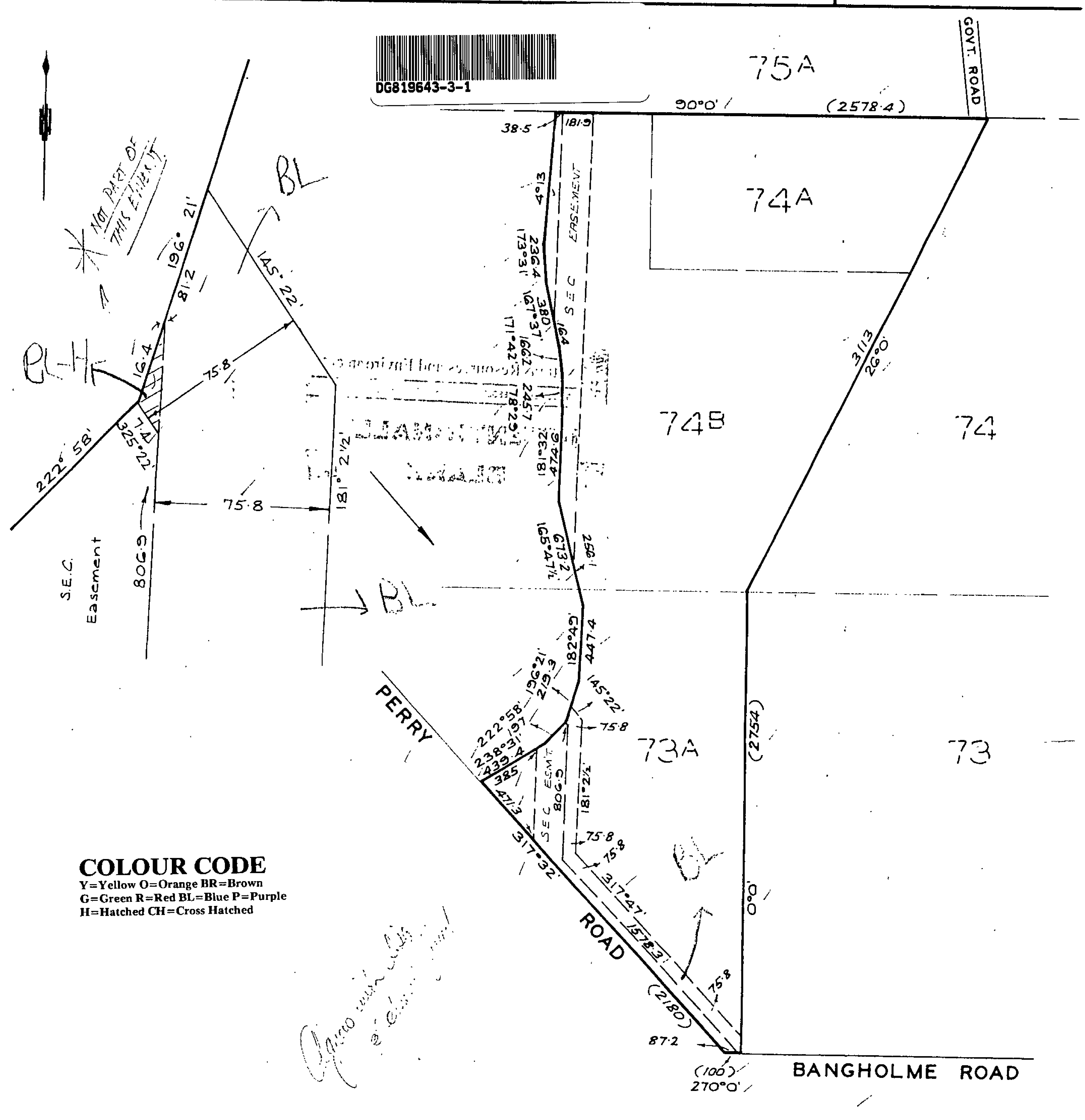
W. A. G. PIPELINE PROPRIETARY LIMITED

RIGHT-OF-WAY EASEMENT
REQUIRED FOR PIPELINE

OWNER : GREAT NORTHERN MEATS PTY. LTD.
ADDRESS: 464 ST. KILDA ROAD MELBOURNE.

PART OF CROWN ALL
PARISH OF EUMEMME
Certificate of Title VOLU
Area 1A. 3R



COLOUR CODE
Y=Yellow O=Orange BR=Brown
G=Green R=Red BL=Blue P=Purple
H=Hatched CH=Cross Hatched

I certify that this plan has been ma with title, is mathematically correct a being created has been reasonably loca with title position.

Date 26 / 3 /

Natural Resources and Environment

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ural Resources and Environment

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NTIONALLY

LANK

DG819643-4-7

To The Registrar of Titles

Please register this Deed of Creation of Easement and on completion return duplicate Certificate of Title Volume 6830 Folio 958 to Michael Niall + Armer

Michael Niall + Armer

GREAT NORTHERN MEATS PTY. LTD.

to

W. A. G. PIPELINE PTY. LTD.

CREATION OF EASEMENT

EM-227

HEDDERWICK FOOKES & ALSTON
Solicitors
121 William Street, Melbourne, Vic., 3000
J.

ARBUCKLE WADDELL PTY. LTD. 1.6.72

A memorandum of the within instrument has been entered in the Register Book.

OFFICE OF TITLES R. L. VICTORIA

7 Attachment B- Infrastructure Report

DCE dalton consulting engineers

INFRASTRUCTURE REPORT

Proposed Industrial Subdivision

Lot 2, PS 6034430
345-385 Perry Road, Keysborough

FOR

CIP

PROJECT NUMBER: 12005

MARCH 2014

Dalton Consulting Engineers Pty Ltd
ABN 78 429 221 049

255 Whitehorse Road
PO Box 349
Balwyn Victoria 3103
Australia

T 61 3 9888 6866
F 61 3 9888 6880
E info@dceprofile.com
W www.dceprofile.com

This report has been prepared solely for the benefit of Commercial and Industrial Property Pty Ltd and Dalton Consulting Engineers Pty Ltd. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval or to fulfil a legal requirement.

Revision No.
02
Date:
March 2014
Description:
Infrastructure Report
Prepared:
P Miller AN: 581071
Reviewed:
R Wills AN: 671337
Approved:
T Liakopoulos AN: 882666

CONTENTS

1. INTRODUCTION

DCE has been engaged by Commercial Industrial Property Pty Ltd to provide civil consultancy services for the development of industrially zoned property at 345-385 Perry Road, Keysborough.

This infrastructure report has been prepared for CIP Pty Ltd. It outlines the requirements for provision of services to the property north of Perry Road & immediately west of Eastlink, and will accompany planning applications to Council and the relevant Service Authorities.

The information contained in this report has been produced as a result of service investigations & onsite inspections, in conjunction with preliminary servicing advice obtained from the relevant service authorities.

The following is a summary of the relevant service authorities for the site.

Service	Responsible Authority
Storm Water Drainage	*Greater Dandenong City Council* *Melbourne Water*
Road Works	*Greater Dandenong City Council*
Sewerage Reticulation	*South East Water*
Water Reticulation	*South East Water*
Electrical Reticulation	*United Energy*
Gas Facilities	*Multinet (Comdain)*
Oil/Gas Pipeline	*Shell Company*
Telecommunication	*Telstra*

2. THE SITE

The subject site is located within Greater Dandenong City Council. The entire site is zoned Industrial 1 Zone (IN1Z) under the Dandenong Council Planning Scheme, and comprises of a single lot. The location of the site is shown below in Figure 1.

The subject site is approximately 19.57 Ha in area. The site is mostly cleared, and on first assessment has not been developed in the past. During the site inspection, the site was being utilised for grazing equestrian livestock.

An existing stables area is located in the south west corner of the property, with a short crushed rock access road connecting it to Perry Road. There are no other improvements on site, however a total of five (5) dams are located across the property. There are isolated groves of trees along the south, west and north boundaries. A high pressure gas and oil pipeline was also observed, which traverses the southern boundary of the site.

The VicMaps contours and a site visit indicate that the property is very flat with a slight slope from east to west. A Melbourne Water drainage channel intersects the middle of the site, flowing from east to west and discharging into Dandenong Creek.

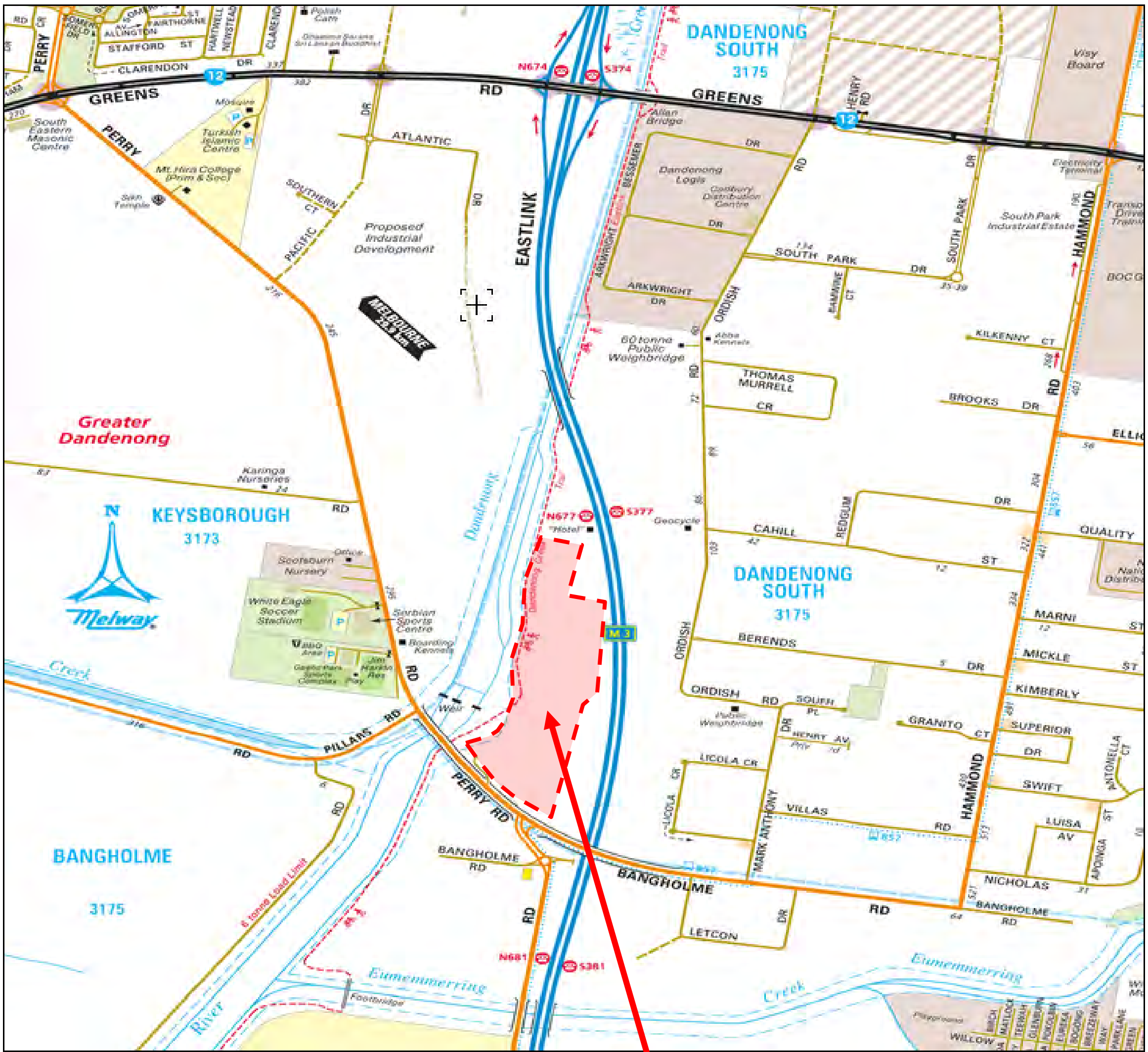

Figure 1: Site Location
Melways Reference 94 H8

The aerial photo below (Figure 2) shows the site which is located within an Industrial area of Keysborough. The property is bounded by Eastlink to the north and east, Perry Road and Bangholme Road to the south, and Dandenong Creek to the west. Extensive industrial development is located to the east of the subject site, with the surrounding rural areas progressively being developed in recent years.

Figure 2: NearMap Image
Dated 3 March 2014

The plan below shows the location of photos taken of the site and the surrounds during the site visit on 21 March 2014.

Figure 3: Photograph Layout Plan

Photograph 1: On Perry Rd looking north across Dandenong Ck waterways.

Photograph 2: Existing Melbourne Water floodgate.

Photograph 3:.Downstream Melbourne Water Syphon.

Photograph 4: Existing drainage west of Perry Rd.

Photograph 5: On Perry Rd bridge looking north across the Dandenong Creek & weir.

Photograph 6: On Perry Rd looking south.

Photograph 7: On Perry Rd looking north.

Photograph 8: On Perry Rd at existing property entrance.

Photograph 9: Existing subject site entrance, facing north. Note the large level difference to Perry Rd.

Photograph 10: Existing Perry Rd culverts.

Photograph 11 Existing Stable area, facing north-east.

Photograph 12: At south boundary of site, facing north-east.

Photograph 13: At Worsley Rd, looking south. Note existing HV overhead power.

Photograph 14 On Perry Rd looking at Worsley Rd intersection to the south.

Photograph 15: On Worsley Rd looking north across the Perry Rd intersection.

Photograph 16: At west boundary of the site looking north-east. Existing bike track.

Photograph 17: At west boundary of the site looking south-west towards Perry Rd bridge.

Photograph 18 At west boundary of site, looking east. Existing recycled water main.

Photograph 19 At west boundary of site, looking west. Existing MW waterway weir.

Photograph 20 At west boundary of site, looking south. Upstream MW drainage syphon.

Photograph 21 In MW drainage reserve, looking south towards Perry Rd bridge.

Photograph 22 Dandenong Creek & weir, looking south.

Photograph 23 At north-east of the site looking east at Eastlink drainage outfall.

Photograph 24 At north-east of the site looking east at Eastlink drainage.

Photograph 25 At east of the site looking east at Eastlink drainage outfall.

Photograph 26 At east of the site facing west along MW open drain.

3. ENGINEERING SERVICES

3.1. Roads

Both VicRoads and Greater Dandenong City Council are the responsible authorities for road works in the area of the subject property, and any proposed civil works are to be constructed to Greater Dandenong City Council standards. The subject site fronts Perry Road to the south, and EastLink to the east. EastLink is a major regional thoroughfare of traffic and a Connect East asset, with Perry and Bangholme Road being major roads under the control of Dandenong Council.

Referring to *O'Brien Traffic's Traffic Impact Assessment, 28 March 2014* external access to the site can be obtained by constructing a signalised T-intersection on Perry Road in the south west corner of the site. The centre of the proposed intersection on Perry Road would be approx. 190m from the centre of the Worsley & Perry Road intersection, and would overlay the current existing crushed rock access as seen in Figure 4 below. The specific alignment and specifications of the external access arrangements can be obtained from the traffic report & DCE 12005.2 Functional Plans.

Figure 4: External Access to Perry Rd, *DCE Preliminary External Intersection Design*

In order to provide internal access to the subdivision, it is proposed that an access road be constructed through the centre of the site, ending in an industrial court bowl. The internal road is to be a standard Dandenong Council industrial road, with a road reserve width of 22m and a typical cross-section as demonstrated in Council Standard drawing SD005 (Figure 5 below). This road type assumes a 12m kerb-to-kerb width, and a 1.4m wide footpath on one side. According to O'Brien's *Traffic Impact Assessment, 23 October 2013* this road will sufficiently cater for expected traffic volumes.

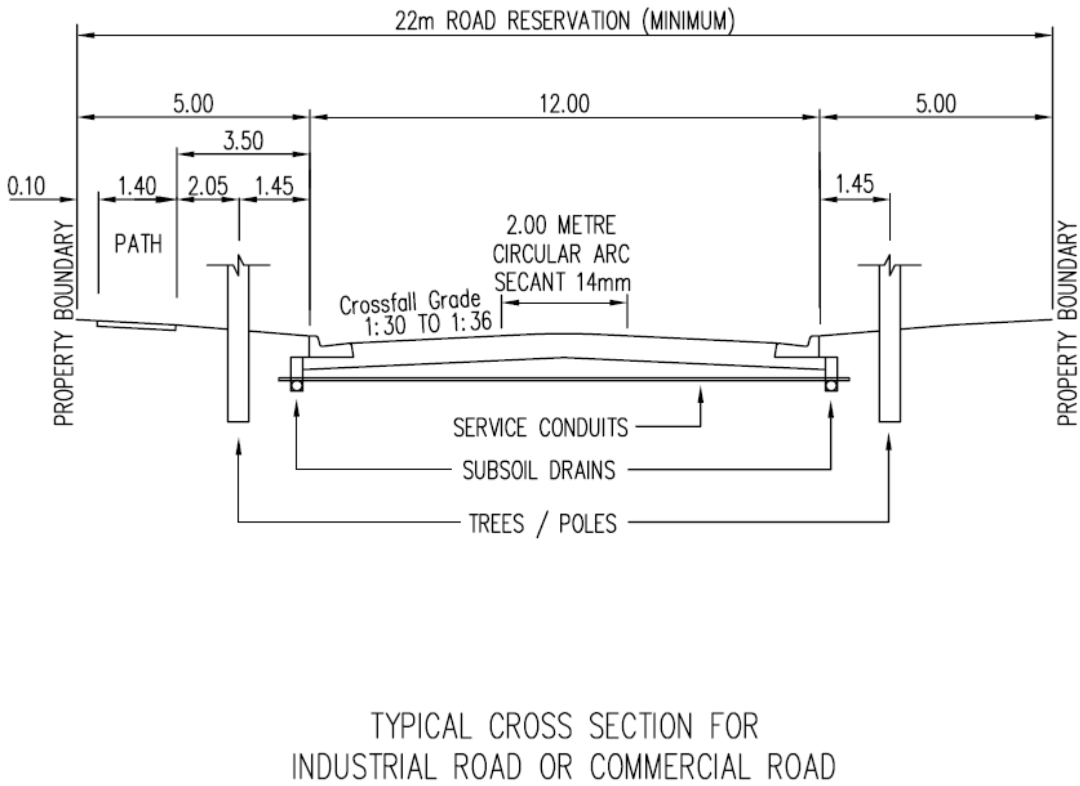

Figure 5: Typical Industrial Road Cross Section, *City of Greater Dandenong SD005*

3.2. Stormwater Drainage

The responsible authorities for stormwater drainage are Melbourne Water, and the Greater Dandenong City Council.

As indicated by the site contours, and a site inspection, the subject site is considerably flat, and does not have a single point of discharge. The site contours indicate that the site holistically drains to the west, with existing drainage infrastructure present on site. This was confirmed through both a site visit, and a desktop study of the subject site.

Existing Site Drainage

An existing Melbourne Water open drain traverses the entire width of the subject site in an east-west alignment. This MW open drain conveys flows from most of the north-west part of the site. It also drains a significant external catchment (Eastlink and the industrial lots to the east of Eastlink. As shown in Figure 6 below this open drain discharges into open drains, and a MW syphon pipe. Melbourne Water advice indicates that this syphon is a 1200mm dia. drainage pipe which ultimately discharges west into a MW open drain. The pipe diameter of this syphon is currently being confirmed.

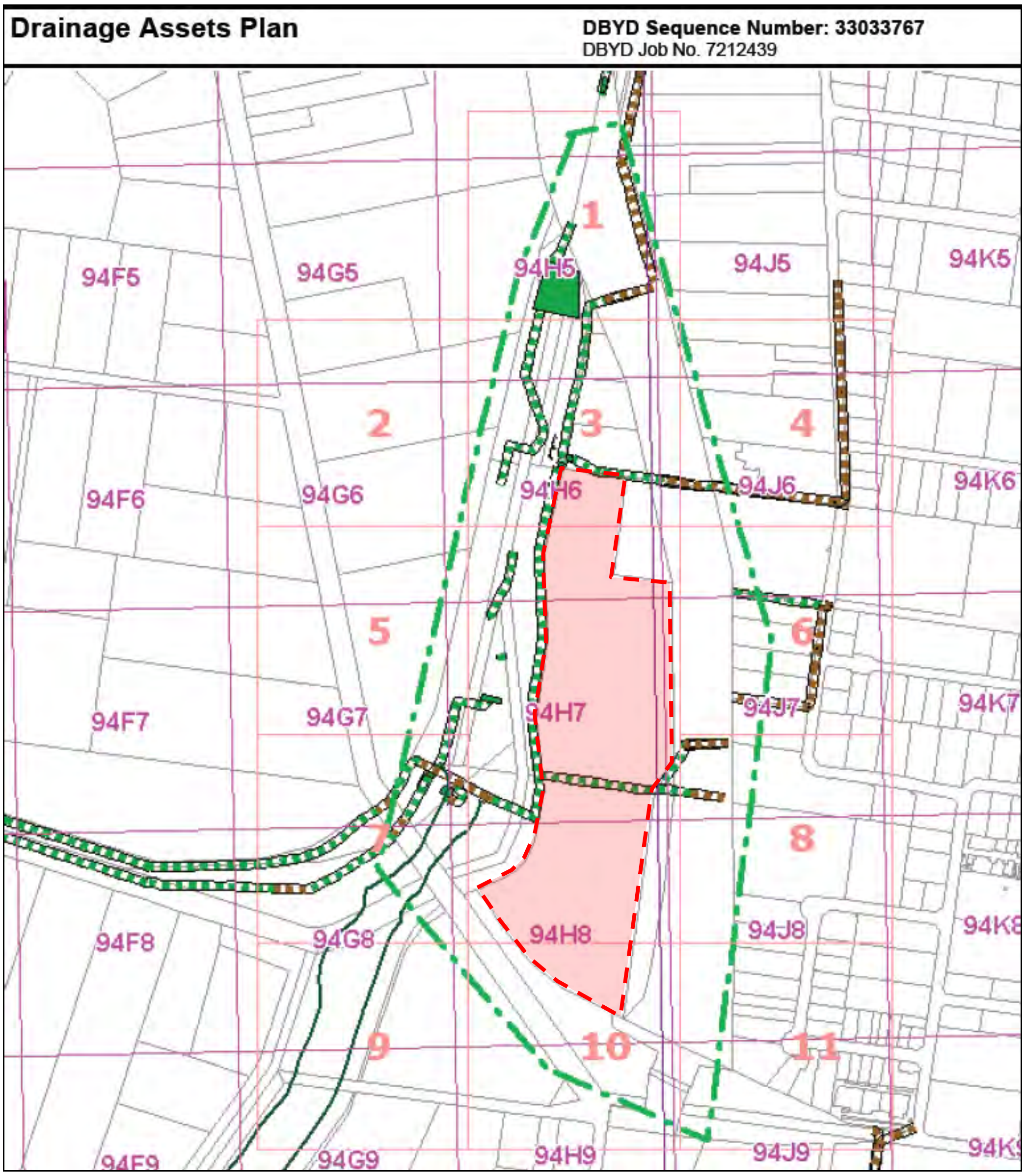

Figure 6: Melbourne Water Drainage Assets Plan, DBYD Info 13 March 2014

As confirmed during the site visit (refer to photo 10), existing culverts under Perry Road were located in the south-east corner of the subject site. The size of these culverts has been confirmed to be 3 × 2400mm × 1200mm.

As indicated by a desktop study and confirmed by a site visit, no existing Council of Greater Dandenong drainage assets are present within the subject site, or in the nearby vicinity.

Site Flood Levels

Melbourne AHD flood level data was acquired from Melbourne Water. As seen in Figure 7 below the site is subject to an inundation overlay according to the CGD Planning Scheme C87, and is subject to flooding from Melbourne Water's drainage system for a 1 in 100 yr. flood event to a level of 6.0m AHD.

Based on this flood level and according to the Melbourne Water advice received 24 Oct 2013: *"The subject land, north of Perry Road, is to be filled to a minimum level of RL6.6m AHD, and must drain into the retarding basin."*

Consultant Neil Craigie is currently completing the review of the MW drainage scheme requirements.

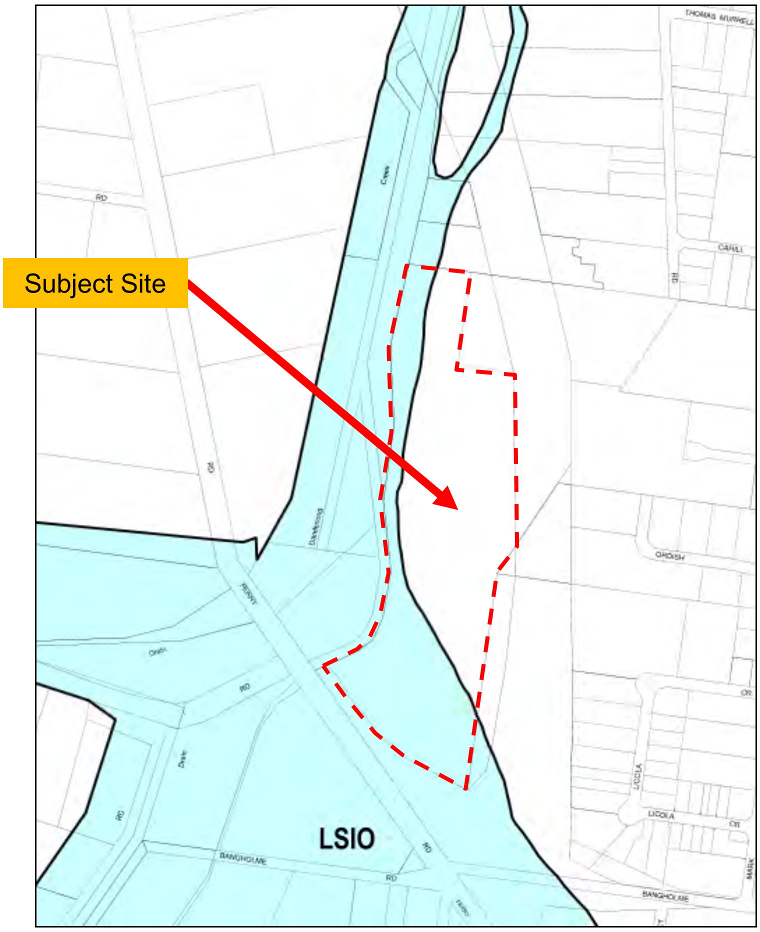

Figure 7: Land subject to Inundation Overlay, CGD Planning Scheme Amendment C87

Melbourne Water Drainage Scheme

As shown below in Figure 8 the subject site is located in the Melbourne Water drainage scheme Ordish Road North DS 0201. This drainage scheme requires the construction of a retarding basin and wetland, known as the Ordish Road Retarding Basin, and is proposed to be constructed north of Perry Road within the subject land. These retarding basin works will be funded by Melbourne Water through the Ordish Road North DS.

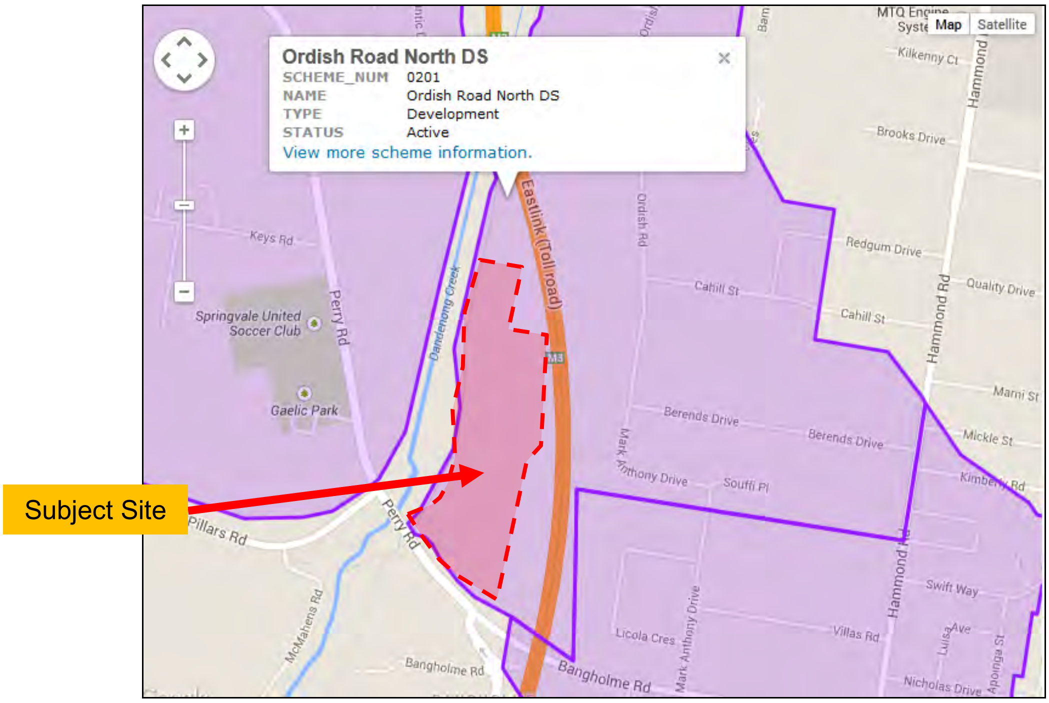

Figure 8: Melbourne Water Drainage Scheme

According to Melbourne Water's Land Development Manual, as shown in Figure 9, hydraulic contributions of $689,907 are required for an industrial development, dependent on developable area. Water Quality contributions of $372,948 will also be required if no stormwater quality treatment is provided on-site.

Stormwater Quality treatment will be provided for the site though the integration of a wetland element in the proposed Ordish Road retarding basin. If the developer enters into a works agreement with Melbourne Water to construct the wetlands, it is expected that their reimbursement will be reduced by the equivalent required water quality contributions amount.

Ordish Road North DS as at 28-March-2014	
Standard Residential Rates :	$21,042 (Water Quality) $38,925 (Hydraulic)
Area (in ha) :	11.816
Development Type :	Industrial/Commercial
Best Practice Expected / Achieved :	0 Notes
The calculator stipulates the level of best practice expected within a development. The level of treatment achieved (% of Best Practice) can be increased beyond the expected amount or decreased where mitigating circumstances prevent local treatment.	
Calculate Clear Close Print	
Calculated at $31,563 (Water Quality) and $58,388 (Hydraulic) (1.5 x Residential Rate) per Hectare.	
Hydraulic contribution :	$689,907
Water Quality contribution reduction for on-site treatment :	$0
Water Quality contribution payable :	$372,948
Final Total contribution :	$1,062,855

Figure 9: Melbourne Water Contribution Rates

Stormwater Drainage Strategy

Advice was obtained Melbourne Water regarding the subject site's point of discharge, and requirements for flow retention. For further information regarding the Stormwater Drainage Strategy, please refer to the forthcoming DCE Stormwater Report.

Advice received from Melbourne Water, received 24 October 2013, confirms that developer funded works are required on the subject site to cater for the surrounding catchment and allow for development of the property. This advice was confirmed by MW on 18 March 2014 to still be valid. These development works will necessitate the construction of a 233,000 cu.m capacity retarding basin at a TWDL of RL6.0m AHD and a 3.5ha wetland; to be located on a drainage reserve within the subject property. Additional works also include the construction of a spillway outfall into the existing Perry Road culverts.

According to the Dandenong South C87 Structure Plan (DCP), an area of approximately 7.7ha is to be acquired by Melbourne Water to facilitate the construction of this retarding basin and wetlands. Melbourne Water is currently in negotiation with VicRoads to acquire VicRoads owned land between Dandenong Creek and Eastlink to mitigate the extent of subject land acquired from 345-385 Perry Road, however no confirmation on this agreement has been received at this time.

As seen in Figure 10 below, the original nominated area for the RB was the entire north section of the subject site.

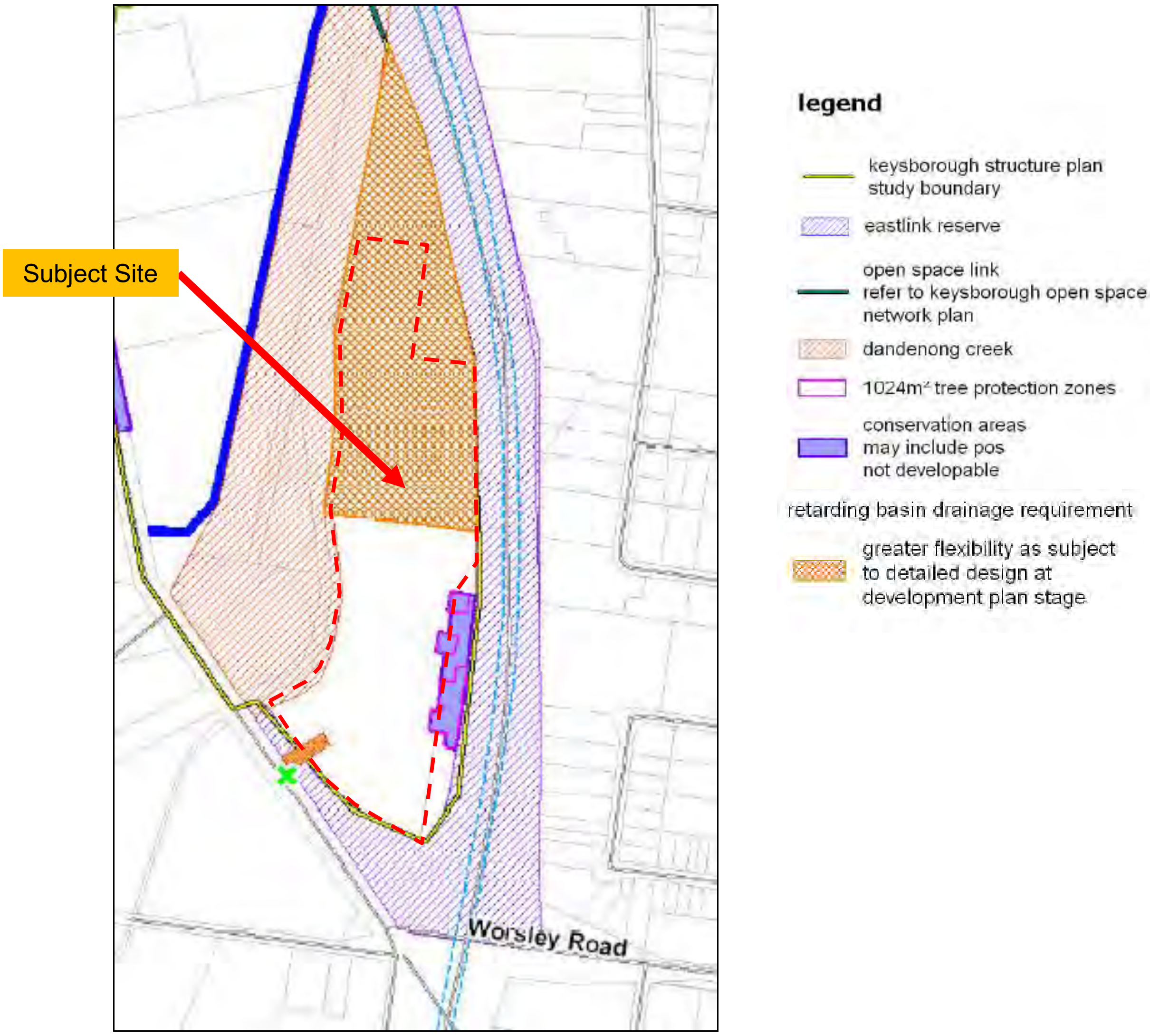

Figure 10: Keysborough Structure Plan, CGD Planning Scheme Amendment C87

Neil Craigie is currently completing his review of the MW drainage scheme, and subject to the finding of his report the flood levels and storage volumes of the retarding basin may vary.

Subject to the Neil Craigie report, it is alternatively proposed that the Ordish Road retarding basin be shaped long and slender and located along the west boundary of the site, instead of being more square-shaped in the north section of the subject site. This alternate option maximizes the Eastlink frontage for developable land and complements the natural Dandenong Creek alignment. Melbourne Water has expressed this alignment to be their preference also, according to recent discussion dated 26 September 2013. As seen in Appendix 4.1, the concept master plan for the subject site reflects this design direction.

The point of discharge for the subject site will be the proposed retarding basin and wetland. Significant earthworks will be required to facilitate free draining of the entire site to the west, with significant quantities of earthworks particularly required in the area affected by the inundation overlay to the south.

Melbourne Water has indicated that three existing drainage lines pass through and adjacent to the subject land into Dandenong Creek. As part of the development works, the flows through these drains will need to be conveyed to the proposed retarding basin. Due to the site constraints, and preference to avoid the loss of developable land to open channels, it is recommended that these flows be piped through the subject site and provided with drainage easements attributed to Melbourne Water.

Melbourne Water also indicated that Greater Dandenong City Council drainage standards will be adhered to for internal subdivision development drainage design.

Major storm(100 year ARI) runoff from within the site will be conveyed overland into the proposed Ordish Road Retarding Basin. Minor storm runoff (20 year ARI) will be conveyed by pit and pipe network to the proposed wetland, including external flows from the intersection with Perry Road. The alignment & specification of the internal drainage design will be subject to detailed design.

3.3. Sewer Reticulation

The responsible authority for the provision of sewerage facilities is South East Water.

After a servicing investigation of the local area, asset information provided by South East Water indicates that there are existing sewer assets located in vicinity to the subject site. Sewer assets located in proximity of the of the subject site include:

- 225mm diameter SEW sewer at the corner of Bangholme Drive and Letcon Drive.
- 525mm diameter SEW sewer in Ordish Road, on the opposite side of Eastlink.

Preliminary servicing advice was received from South East Water on 22 October 2013, which provided a sewer servicing strategy for the subject site. Confirmation was received from SEW on 18 March 2014 that this advice was still valid. As seen in Figure 11 below, the servicing option would require approx. 400m of reticulated sewer main to be constructed from the subject site outfall to a proposed permanent sewer pump station located close to the intersection of Perry Road and Pillars Road. These works would be reimbursable by SEW.

As stated in their advice, the provision of sewerage facilities to the subject site is entirely dependent on the prior installation of the proposed 'Keys Estate Stage 3' 225mm diameter rising main, 375mm branch sewer, and Perry Road Pump Station. SEW has advised that these works are expected to be completed by May 2014.

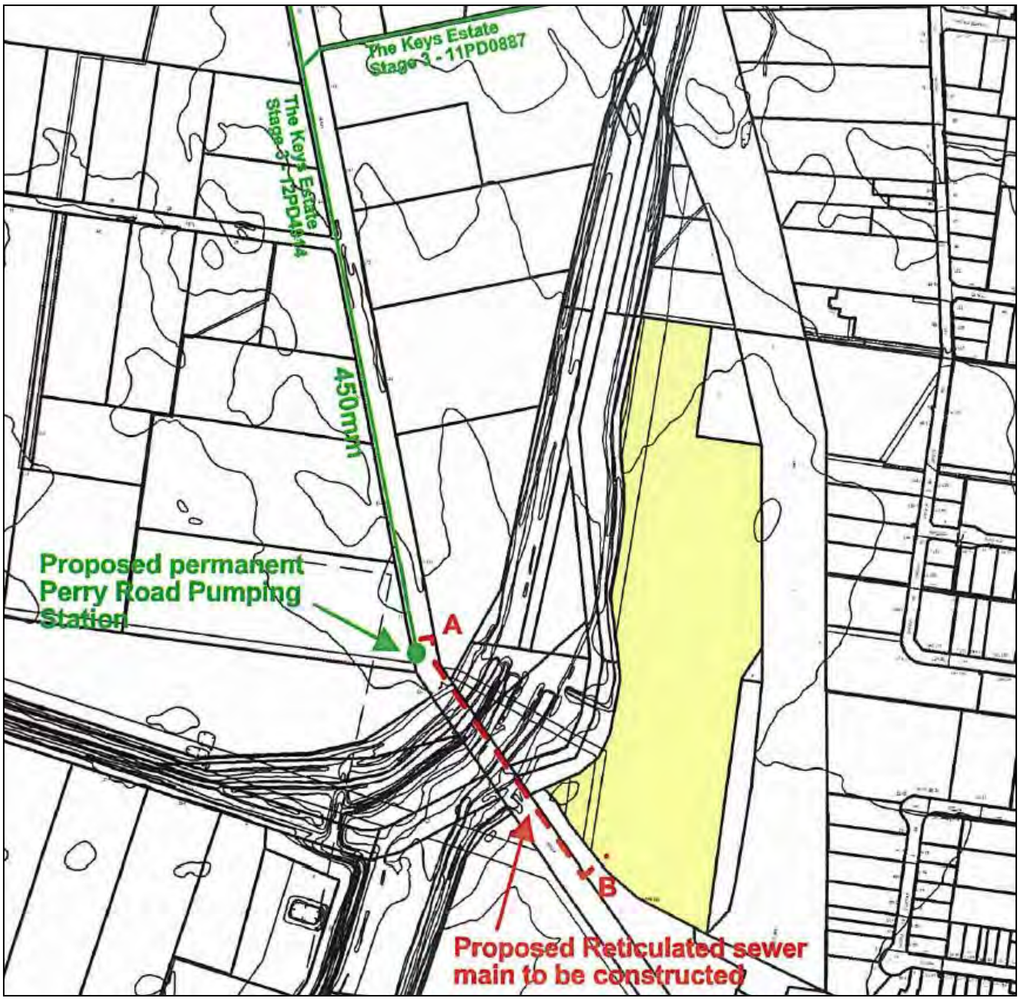

Figure 11: South East Water Sewer Servicing Strategy, 22 October 2013

DCE currently recommend that the sewer alignment be shifted further north, and be located in a proposed easement adjacent to the existing Melbourne Water syphon. The location of this sewer alignment will cross Dandenong Creek prior to the weir network, and is anticipated to facilitate a more shallow alignment to support more practicable construction. This new alignment is dependent on detailed design, however is expected to increase the SEW estimated external branch sewer length from 400m to approximately 450m.

DCE has liaised with the civil consultant responsible for the Perry Road Sewer Pump Station and obtained the design plans in AutoCAD format. These are currently being reviewed by DCE and integrated into the proposed external branch sewer functional design.

Internal sewer reticulation will service each property, with 225mm diameter sized pipes having sufficient capacity for future industrial development.

The SEW preliminary servicing advice also indicated that the subject site was not located in a special New Customer Contributions (NCC) area, and would be considered “Other Area”. As such, the NCC would be as outlined below in Figure 11.

Other Areas	
Water New Customer Contribution per lot	$640.64
Sewer New Customer Contribution per lot	$640.64

Figure 12: South East Water Contribution Rates

The alignment of both the external and internal sewer reticulation is subject to detailed design, and liaison and formal approval from SEW will be required for any proposed development of the site.

3.4. Water Reticulation

The responsible authority for the provision of water reticulation is South East Water.

After a servicing investigation of the local area, asset information provided by South East Water indicates that there are existing water mains located in vicinity to the subject site. Water assets located in proximity of the of the subject site include:

- 225mm diameter SEW water main located in Bangholme Road, 650m to the south-east corner of the subject site.
- 50mm diameter water main located in the south side of Perry Road to the south of the subject site.
- 225mm diameter SEW water main located in Perry Road 1,400m to the north of the subject site.

Preliminary servicing advice was received from South East Water on 22 October 2013, which provided a water servicing strategy for the subject site. Confirmation was received from SEW on 18 March 2014 that this advice was still valid. As seen in Figure 13 below, the servicing option would require approx. 1,200m of 150mm diameter reticulated water main to be constructed from the subject site to 'The Keys Estate – Stage 3' water main extension on Perry Road.

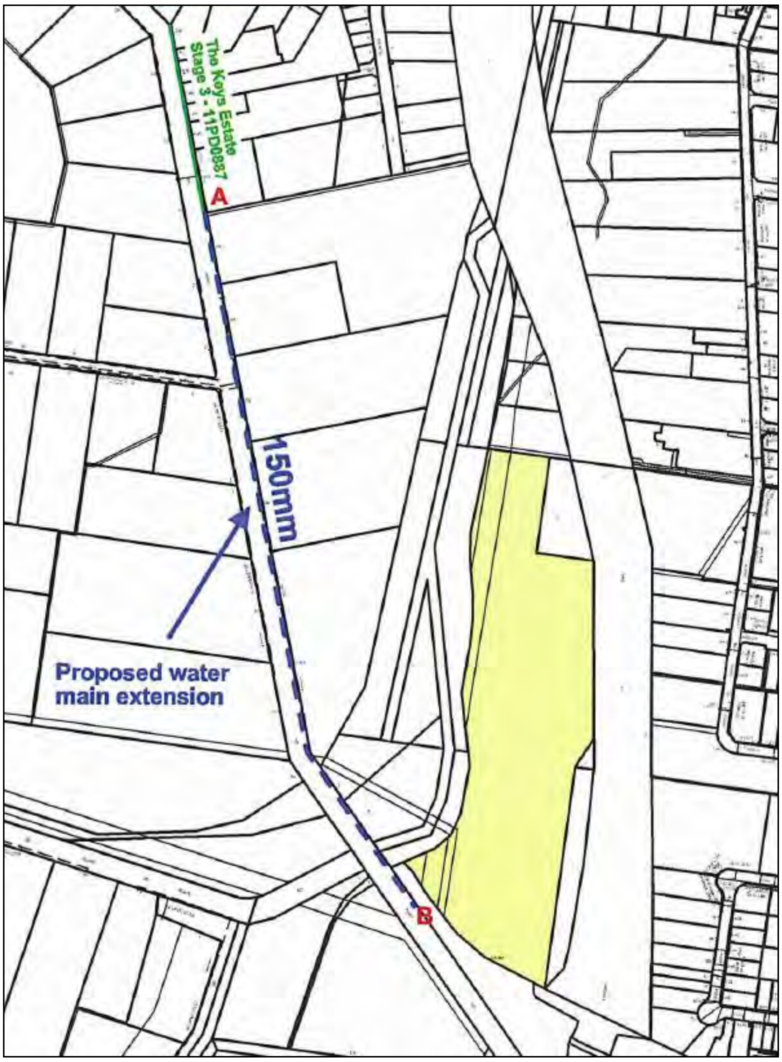

Figure 13: South East Water Water Servicing Strategy, 22 October 2013

SEW has verbally advised that due to this water main extension not being a shared asset for other developments, or part of their upcoming planned expansions, it will be classified as a 'bring-it-forward' asset. This means that the cost of the water main will be shared cost between SEW and the developer.

SEW has also indicated that the water extension works will need to reconnect existing water pipes present along the Perry Road.

DCE currently recommend that the water main alignment be shifted further north, and be located in a proposed easement adjacent to the existing Melbourne Water syphon. The location of this water alignment will cross Dandenong Creek prior to the weir network, and is anticipated to facilitate a more feasible construction. This new alignment is dependent on detailed design, however is expected to increase the length of the external water main compared to the estimated length in the SEW advice.

Internal water reticulation will service each property, with 150mm diameter sized pipes having sufficient capacity for future development.

The SEW preliminary servicing advice also indicated that the subject site was not located in a special New Customer Contributions (NCC) area, and would be considered "Other Area". As such, the NCC would be as outlined previously in Figure 12.

The alignment of both the external and internal water reticulation is subject to detailed design, and liaison and formal approval from SEW will be required for any proposed development of the site.

3.5. Electricity

The responsible authority for electrical facilities is United Energy.

Asset information and advice provided by United Energy on 26 March 2014 indicates that there is no authority HV power on frontage to the subject site.

The closest locations with HV power present are:

- Overhead HV in Perry Road, approximately 400m to the north-west.
- Overhead HV in Worsley Road, approximately 200m to the south.
- Overhead HV in Bangholme Road, approximately 500m to the south-east.

The existing stable yard buildings are serviced by a connection to LV power present in Perry Road.

Preliminary advice from United Energy indicates that power can be supplied to the property through extension of existing infrastructure. The supply arrangements will include the extension and interconnection of the overhead power lines in Perry Road to the north-west, and overhead power lines in the Worsley Road roundabout to the south-east.

It is assumed that United Energy will provide supply to the site at no charge to the developer, with all internal reticulation to be at the developers cost. United Energy has indicated that the development is assumed to require only approx. 1.5MVA. If further power supply is needed for high-use development, United Energy has advised that upstream feeder augmentation will be required.

Electricity supply will be provided via underground cables through the development, in accordance with current Council standards.

Formal servicing advice will be required from United Energy for any proposed development of the site.

According to existing survey information an existing transmission electrical easement approx. 37m wide is located across the south-west corner of the subject property. Upon a site visit however no towers, transmission lines or signs indicating underground services were observed. United Energy has confirmed that it has no assets located in the easement, and that the easement is not under its ownership.

Discussion has begun with United Energy to investigate making the existing easement redundant. This would release the electrical easement land to be made developable, or contribute to the future drainage reserve for the Ordish Road RB. United Energy is presently liaising with SP Ausnet to confirm their ownership of the easement, and the possibility of making it redundant.

3.6. Telecommunications

The responsible authority for the provision of telecommunication facilities is Telstra.

As part of the New Development Policy, Telstra will be providing infrastructure to all new broad acre developments under 100 Lots. Telecommunication facilities will need to be provided to the subject property under the new Telstra extension arrangements.

Telstra infrastructure is currently located in Perry Road on the south boundary of the property as seen in Figure 14 below. Existing Telstra infrastructure comprises of a P100 conduit which services the existing horse stables on the subject site, however it is unlikely that this infrastructure will be sufficient for full development of the property. Upgrading of the existing infrastructure will therefore be required. Advice has been requested from Telstra and we are currently awaiting response.

The scope of these upgrade works is unknown, therefore formal application to Telstra Asset Services will be required to obtain an accurate scope and cost of these works.

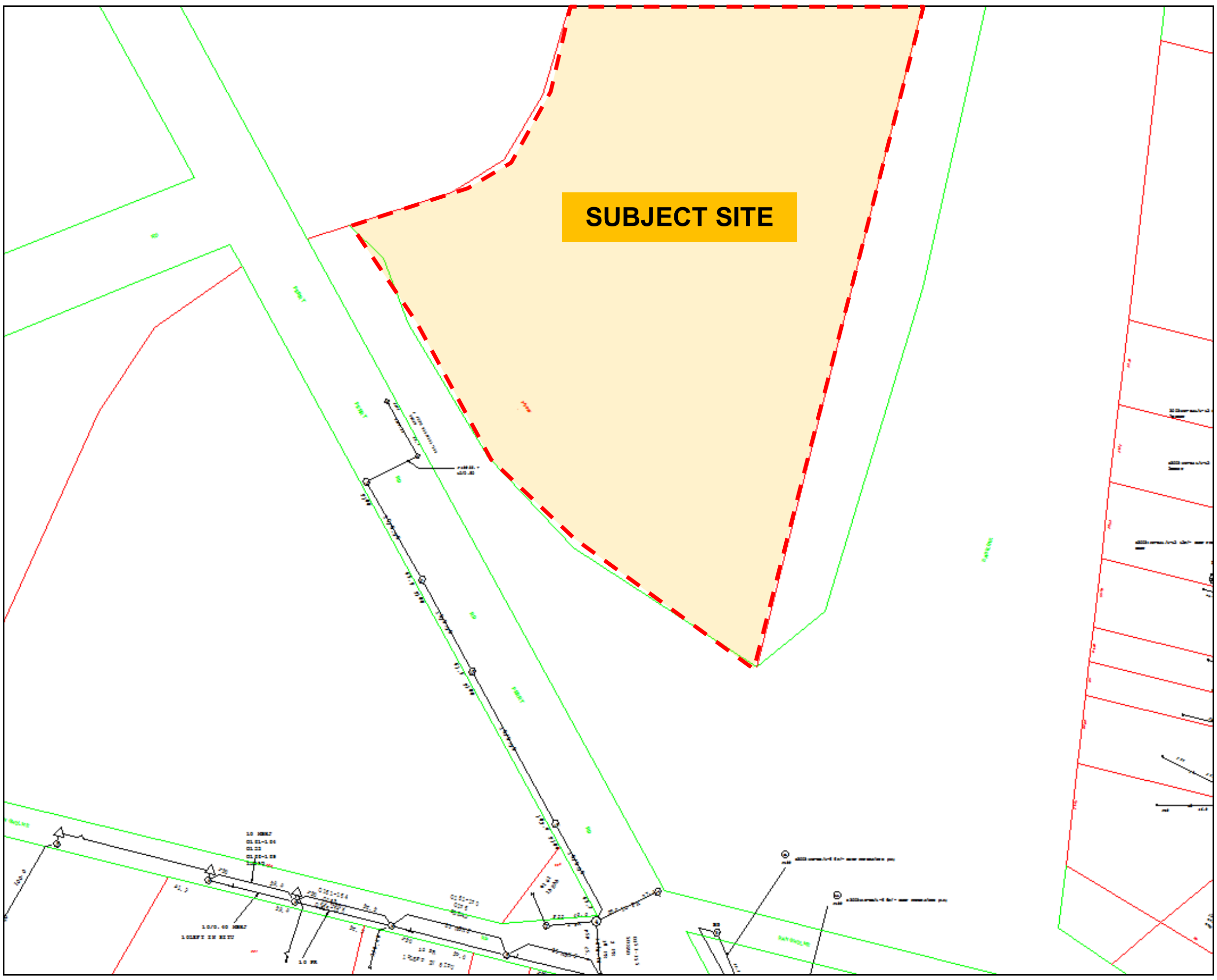

Figure 14: Existing Telstra Assets, DBYD 13 March 2014

3.7. Gas Facilities

The responsible authority for the provision of gas facilities is Multinet Gas.

Asset Information provided by Multinet Gas indicates that there is an existing 125mm diameter gas main located in Perry Road to the south of the subject site. As shown in Figure 15 below, this gas main is approx. 150m from the boundary of the subject site's south-east corner.

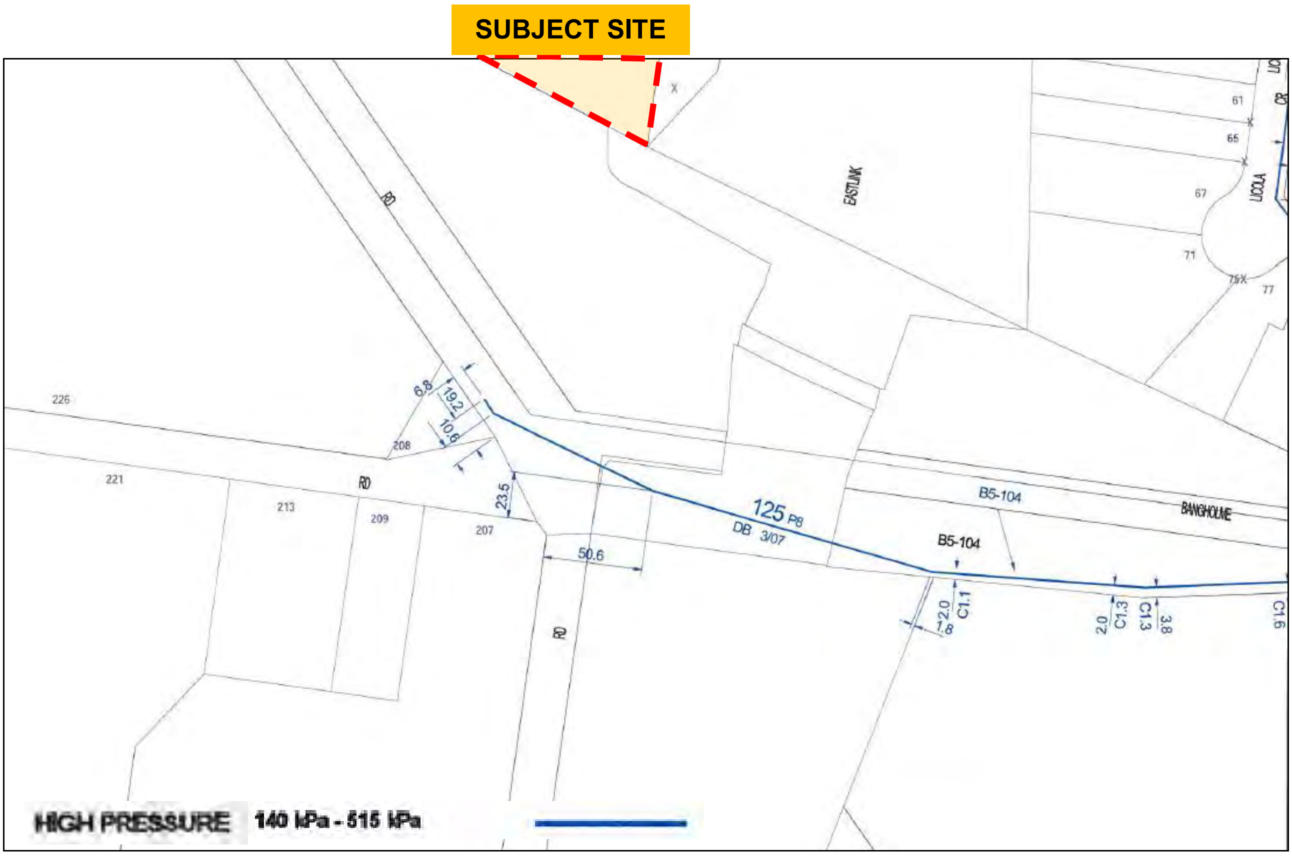

Figure 15: Existing Multinet Gas Assets, DBYD 13 March 2014

It is assumed that gas supply for future industrial development of the site is available, with extension works required to service the site. It is anticipated that a connection to the existing 125mm diameter gas main will be extended into the site for any future development, under the standard gas main extension arrangements.

Formal servicing advice will be required from Multinet Gas for any proposed development of the site.

It should be noted that the provision of reticulated gas in industrial subdivisions is entirely at the developer's cost.

3.8. Oil/Gas Pipeline

During the site visit, and desktop study of the subject site, a Shell High Pressure Oil Pipeline and Esso Ethane High Pressure Gas Pipeline were confirmed to be present on site. A 15m wide approx. existing easement sits across the south-west corner of the subject site, parallel and abutting the existing electrical easement.

As seen below in Figure 16, the existing Shell pipeline is a WAG 600mm dia. High Pressure Oil Pipeline with a cover of approximately 700mm, and traverses the site at an angle to Perry Road. The Esso Pipeline is a 250mm dia. High Pressure Ethane Pipeline with a cover of approximately 1200mm, and runs immediately adjacent to the Shell WAG pipeline.

These existing pipeline alignments are currently located where the proposed Ordish Road RB will be constructed, which will need to be taken into consideration in the detail design phase.

Formal advice will be required from Shell Company to obtain the list of conditions for works near their assets, and constraints for RB works.

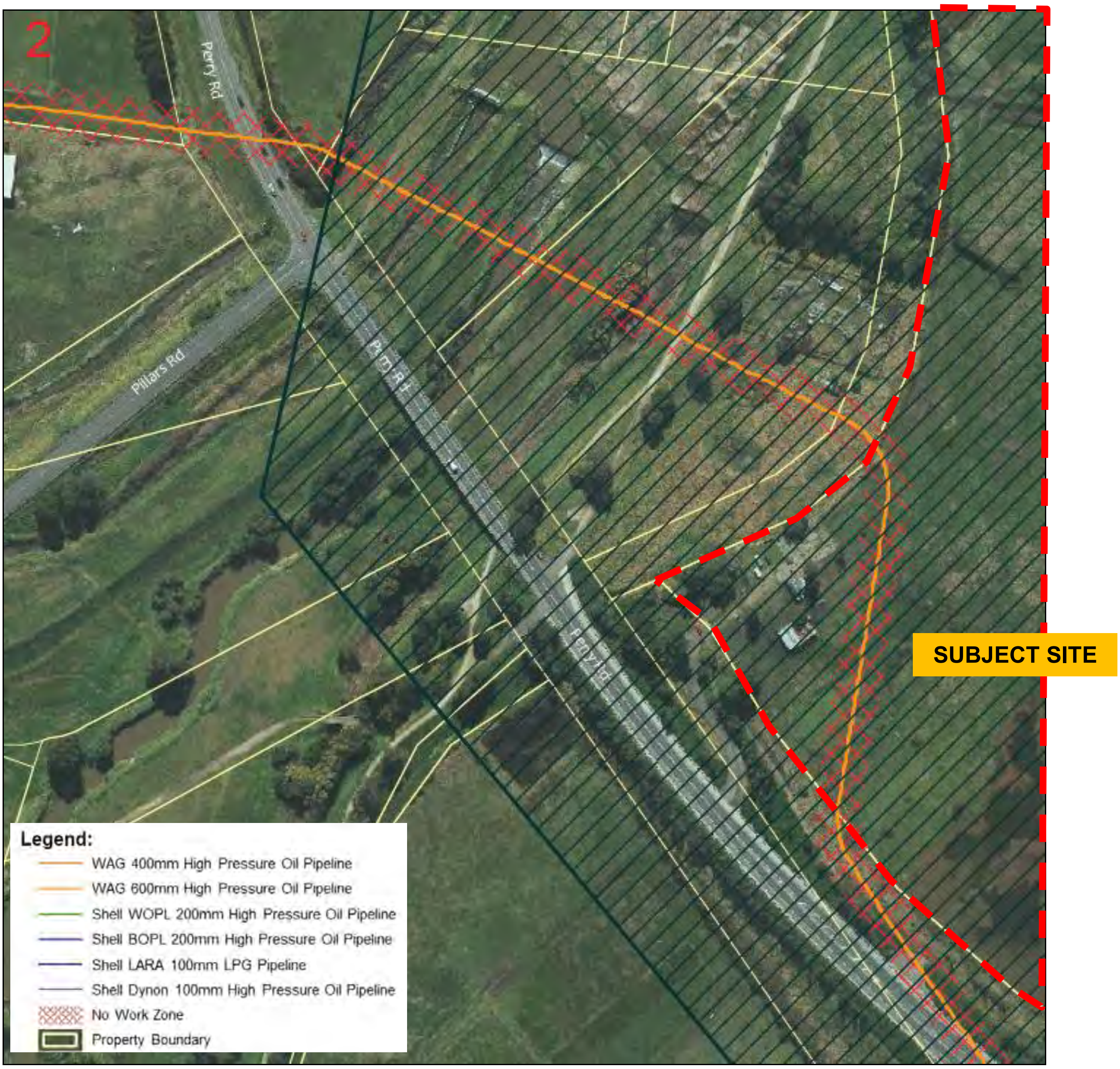

Figure 16: Existing Shell Pipeline Assets, DBYD 13 March 2014

4. APPENDICES

4.1. 12005.2 CONCEPT CIVIL DESIGN PLANS

INDUSTRIAL SUBDIVISION

INFRASTRUCTURE WORKS

LOT 2, PS603443D, 345-385 PERRY ROAD, KEYSBOROUGH

CITY OF GREATER DANDENONG

FOR

CIP Developing Relationships Building Success

CONCEPT CIVIL DRAWINGS

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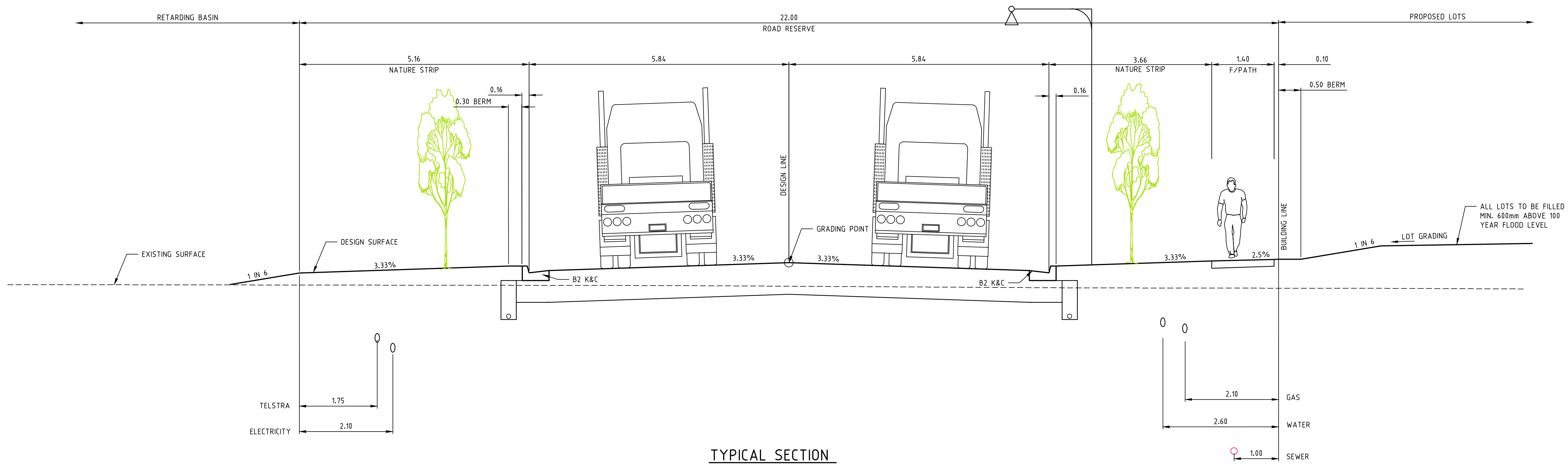

TYPICAL SECTION
ACCESS ROAD

(IN ACCORDANCE WITH CITY OF GREATER DANDENONG SD005)

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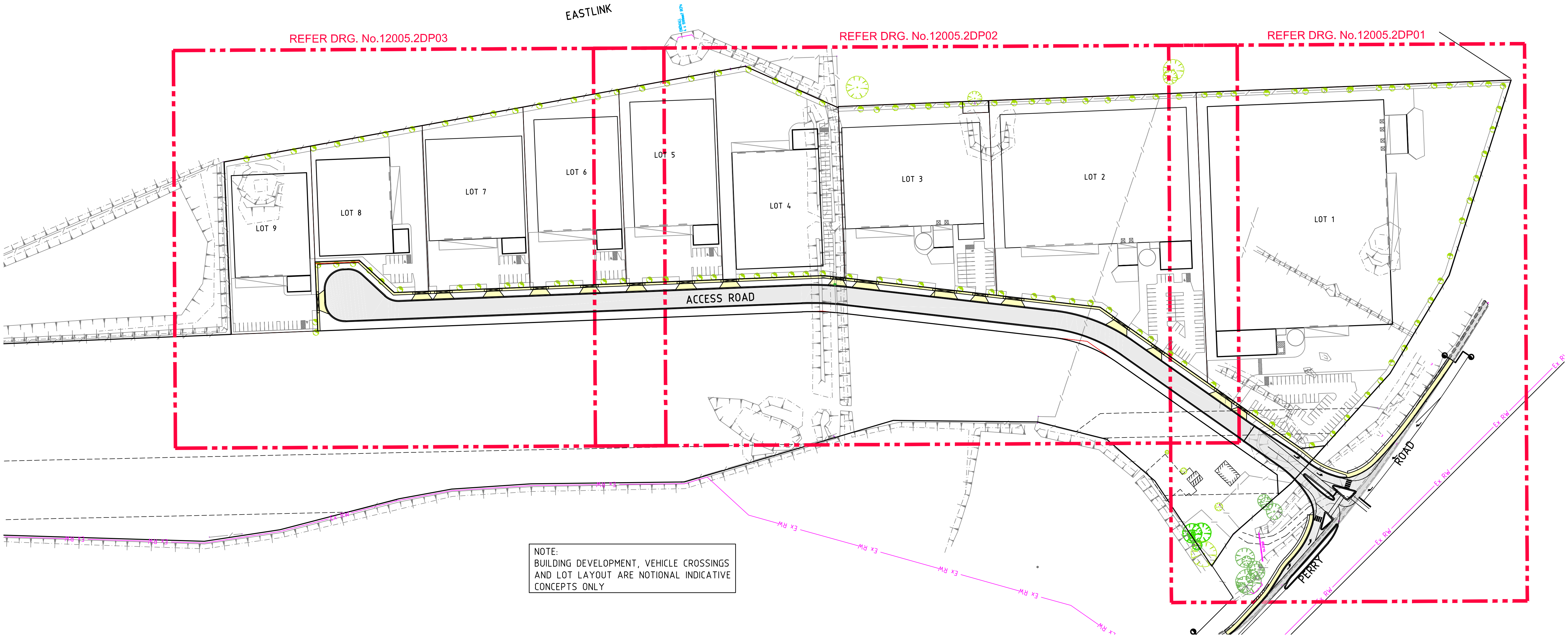

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LEGEND

Ex W	EXISTING WATER MAIN
Ex RW	EXISTING RECYCLED WATER MAIN
Ex G	EXISTING GAS MAIN
Ex E	EXISTING ELECTRICAL CABLE
Ex OP	EXISTING SHELL & ESSO PIPELINE
Ex T	EXISTING TELECOMM. CABLE AND PIT
	EXISTING STORMWATER DRAIN & PIT
	EXISTING TREES
S	SEWER MAIN AND MANHOLE
	STORMWATER DRAIN & PIT
W	WATER
T	TELECOMMUNICATIONS
E	ELECTRICITY
G	GAS
	ASPHALT PAVEMENT
	CONC FOOTPATH / DRIVEWAY

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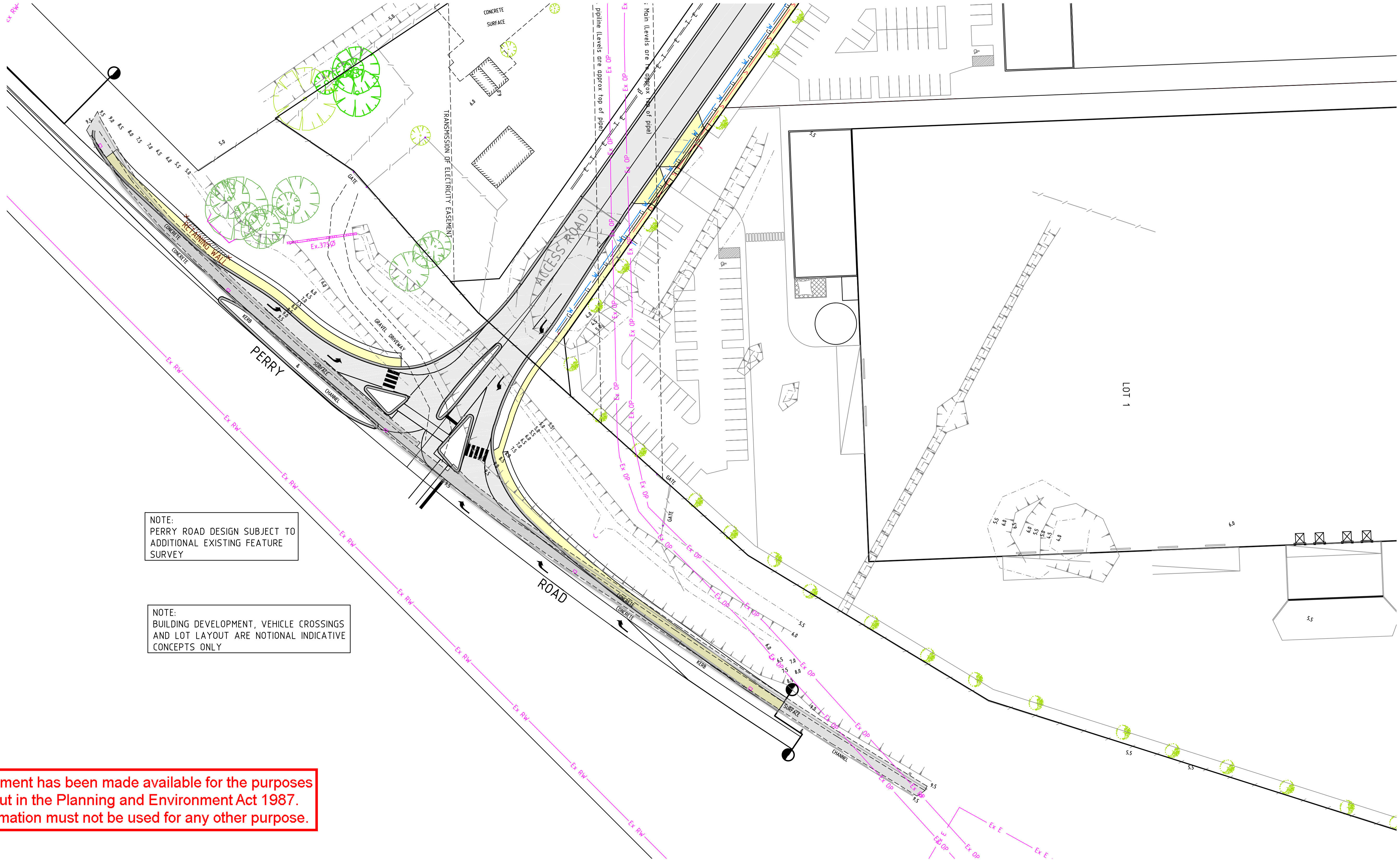
FOR CONTINUATION REFER DRG.No.12005.2DP02



NOTE:
PERRY ROAD DESIGN SUBJECT TO ADDITIONAL EXISTING FEATURE SURVEY

NOTE:
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	EXISTING STORMWATER DRAIN & PIT
	EXISTING TREES
S	SEWER MAIN AND MANHOLE
	STORMWATER DRAIN & PIT
W	WATER
T	TELECOMMUNICATIONS
E	ELECTRICITY
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	ASPHALT PAVEMENT
	CONC FOOTPATH / DRIVEWAY

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SHEET 1 OF 3
Drawing No. 12005.2DP01 Rev A
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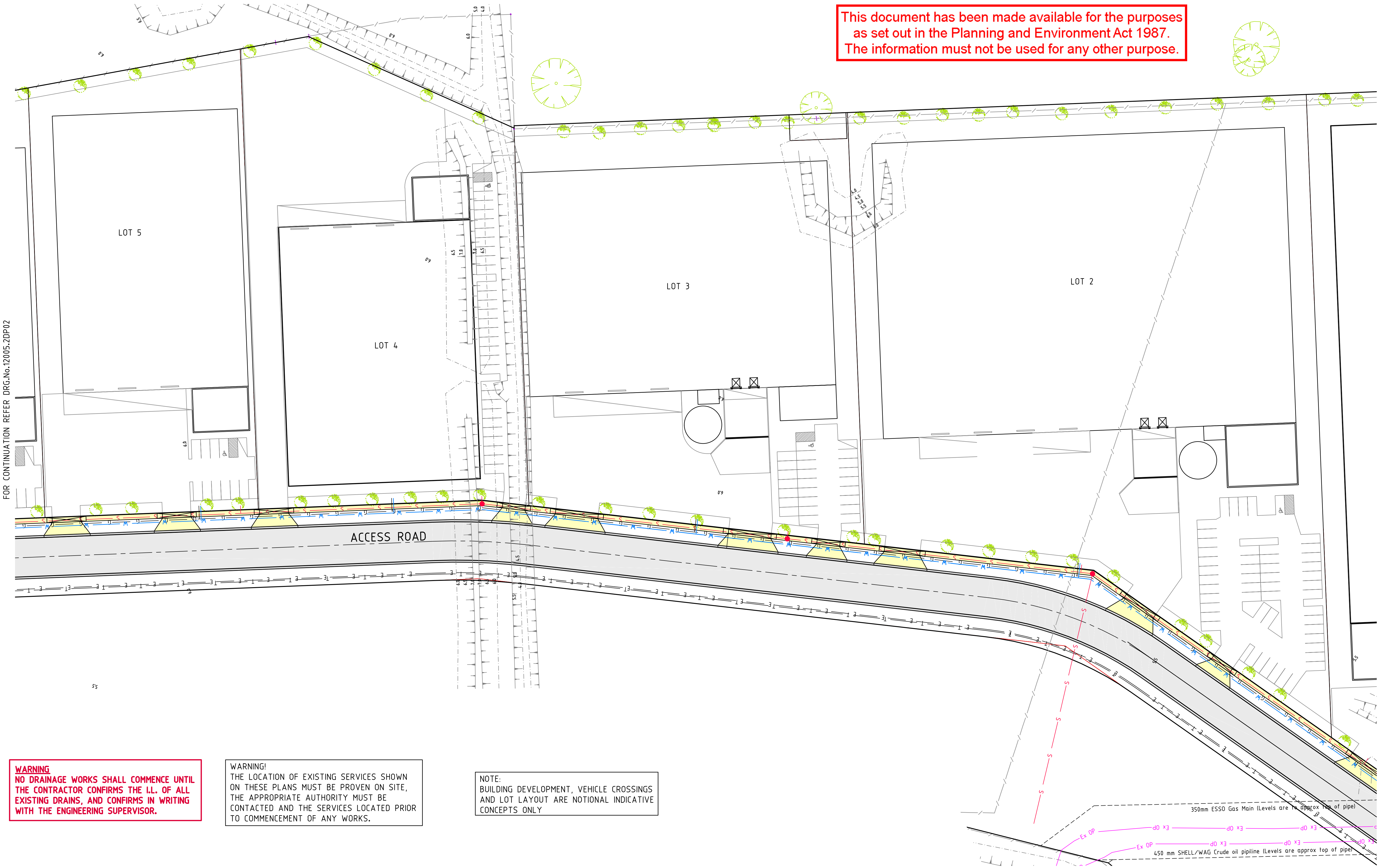

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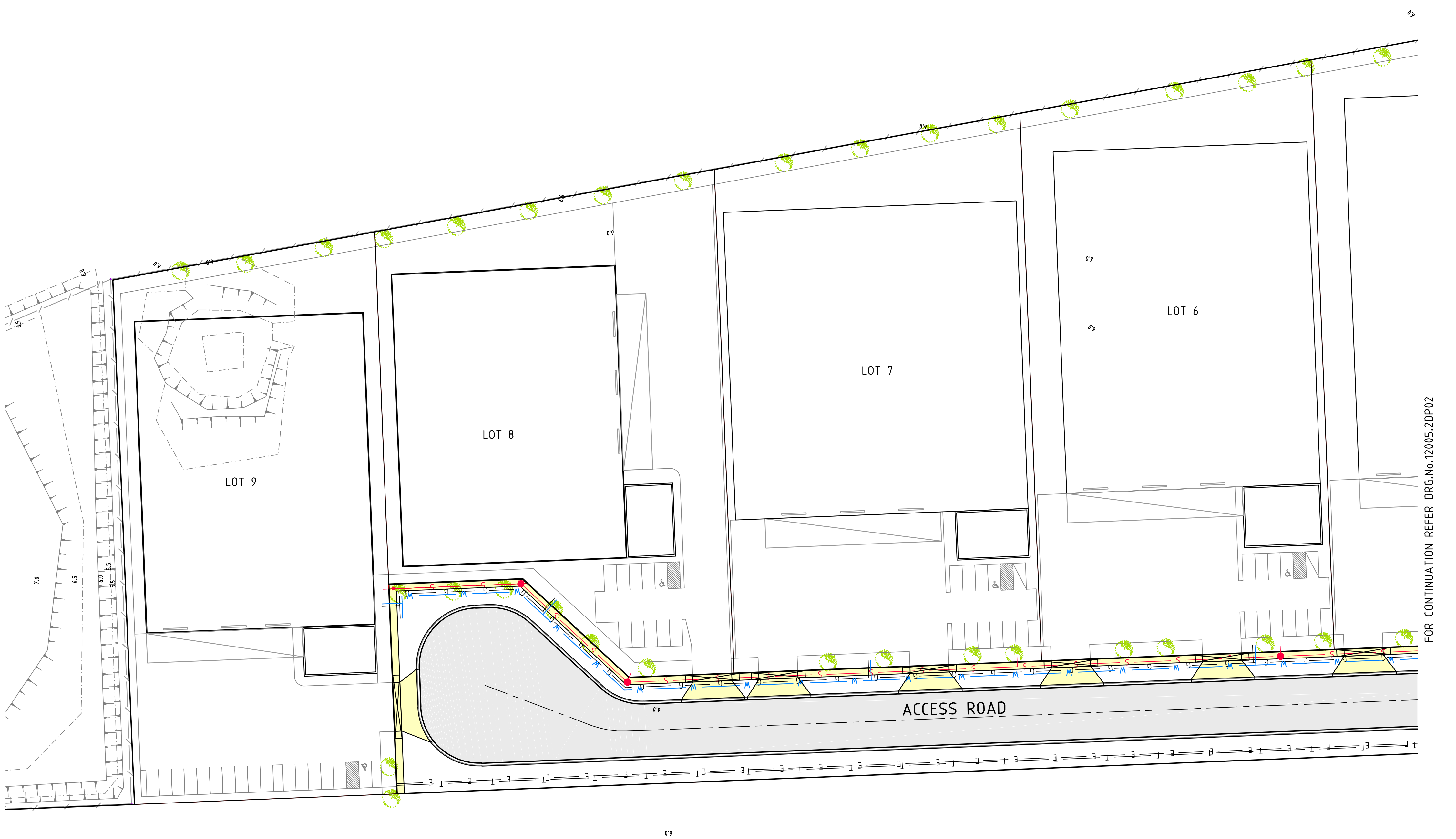

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INDUSTRIAL SUBDIVISION
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SHEET 3 OF 3
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Sheet No. 05 CONCEPT

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4.2. MELBOURNE WATER ADVICE

Phillip Miller

Subject: RE: 12005 - 345-385 Perry Road, Keysborough - Melbourne Water Development Advice

From: Shane Kelly [mailto:Shane.Kelly@melbournewater.com.au]
Sent: Tuesday, 18 March 2014 2:54 PM
To: Phillip Miller
Subject: RE: 12005 - 345-385 Perry Road, Keysborough - Melbourne Water Development Advice [Filed 18 Mar 2014 14:56]

Hi Phillip,
I can confirm that the advice provided in October is still valid as per our phone conversation. The VicRoads land to the north is under negotiation and being delt with by Melbourne Waters property team who I believe you have been in contact with.

Kind regards

Shane Kelly | Senior Development Engineer, Development Planning, Waterways Group | **Melbourne Water**

T: (03) 9679 6862 | 990 LaTrobe Street, Docklands, 3008.

PO Box 4342 Melbourne VIC 3001 | melbournewater.com.au

Enhancing Life and Liveability.

Melbourne Water

24 October 2013

Ian Prudden, Infrastructure Manager
Commercial and Industrial Property Pty Ltd
Level 8, Como Office Tower,
644 Chapel St
SOUTH YARRA VIC 3141

Dear Mr Prudden

Property: Lot 2, PS603443D, 345-385 Perry Road, Keysborough 3173
Melb Water Ref: 118459

Following our meeting on the 25 September 2013 regarding the property at 345-385 Perry Road, Keysborough Melbourne Water has the following development advice;

This property is located within Melbourne Water's Ordish Road North Development Services Scheme (DSS 0201) for which scheme contributions are applicable. Developer funded works are required on this land to cater for the surrounding catchment and allow for development of the property.

A retarding basin and wetland, known as the Ordish Road Retarding Basin, is proposed to be constructed north of Perry Road within the subject land, to control the impact on stormwater runoff and stormwater quality from development within the Ordish Road North Development Services Scheme. The retarding basin is to be excavated to obtain the required flood storage and it is assumed that most of the suitable excavated soil material will be used to fill the adjacent developable land to minimize the construction costs. The costs associated with the bulk excavation are to be borne solely by the developer.
Melbourne Water will reimburse for the wetland component of the works. This includes but is not limited to;

- Design costs
- Clay liner (if required)
- Topsoiling
- Planting
- Geotechnical Investigation Report
- ANCOLD dam break assessment
- Hard civil assets e.g. pipelines, outlet structures, spillways
- Land Acquisition in accordance with our standard acquisition principles having regard to the flood prone nature of the site

The following is a list of the preliminary design data for the retarding basin works:

- The retarding basin must adopt a design top water level of RL6.0 metres Australian Height Datum and cater for approximately 233,000 cubic metres of storage;

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990 La Trobe Street Docklands VIC 3008
PO Box 4342 Melbourne VIC 3001 Australia
T 131 722 F +61 3 9679 7099
melbournewater.com.au

- The basin is to be located on the subject land adjoining the East side of Dandenong Creek. If this is not the case a 40m wide reserve is to be created adjoining to Dandenong Creek;

- The subject land, north of Perry Road, is to be filled to a minimum level of RL6.6 metres Australian Height Datum and must drain into the retarding basin/wetland;

- The top level of the retarding basin embankment must be set at a minimum level of RL6.0 metres Australian Height Datum;

- The spillway must be 40 metres wide with levels set at RL5.7 metres Australian Height Datum to allow for 202,000 cubic metres of storage at this level;

- The retarding basin outlet ($1.5m^3/s$) is to be directed to the existing syphon beneath Dandenong Creek;

- Spillway flows are to be directed to the Perry Road culverts located just east of Dandenong Creek. The spillway flows are to match the capacity of the Perry Road culverts or be at least $5m^3/s$, whichever is greater. This is necessary for events greater than the Q100 year, or should the RB outlet block during the storm event;

- The size of the wetland must be approximately 3.5 hectares to treat stormwater to best practice standards.

- The design is to be such that industrial spills from the upstream catchment can be trapped within the basin.

- Three drainage lines enter this area from the land to the north and east of Eastlink. The flow from these pipelines is to be conveyed to the RB. This conveyance is to be funded by Melbourne Water with reimbursement to be based on the lesser cost of a pipeline or channel arrangement.

Melbourne Water's property team is currently negotiating with Vic Roads to acquire VicRoads owned land between Dandenong Creek and Eastlink i.e. land north of 345-385 Perry Road. If these properties are acquired the retarding basin will utilize these parcels for a portion of the overall storage thus increasing the developable land to the south. As of the date of this letter no confirmation has been received from Vic Roads as to whether the proposal is acceptable.

It should be noted that the adopted Dandenong South C87 Structure Plan provides for an area of approx. 7.7 hectares of the subject land to be required by Melbourne Water for Drainage Reserve purposes.

Please note that the information supplied is preliminary only and Melbourne Water looks forward to further discussion on the above.

If you have any further enquiries, please contact me on telephone 9679 6862.

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Yours sincerely

SHANE KELLY
SENIOR DEVELOPMENT ENGINEER, DEVELOPMENT PLANNING

4.3. SOUTH EAST WATER ADVICE

Phillip Miller

Subject: RE: 12005 - 345-385 Perry Road, Keysborough - SEW Land Servicing Advice

From: Bollard, Darren [mailto:Darren.Bollard@sew.com.au]
Sent: Tuesday, 18 March 2014 4:59 PM
To: Phillip Miller
Cc: Roger Wills
Subject: RE: 12005 - 345-385 Perry Road, Keysborough - SEW Land Servicing Advice [Filed 18 Mar 2014 17:10]

Phillip,

The land servicing advice provided to Commercial & Industrial Property Pty Ltd dated 22 October 2013 is still valid for the 345-385 Perry Road, Keysborough.

Since the issuing of the land servicing advice The Keys Estate Stage 3 water and sewer works have proceeded further with construction however has not obtained acceptance of works certificate for the assets. The construction of the sewerage pumping station is also under construction and is being project managed by Aurecon. Completion is expected May/June 2014.

If further information is required on this matter please contact me.

Regards

Darren

South East Water

Darren Bollard - Land Development Team Leader
20 Corporate Drive, Heatherton VIC 3202 www.southeastwater.com.au
Telephone: 9552 3318 Facsimile: 9552 3410

South East Water

22 October 2013

Commercial & Industrial Property Pty Ltd
C/o Mr Rud Lindley
KLM Spatial
PO Box 1055
DANDENONG VIC 3175

Dear Mr Lindley,

LAND SERVICING ADVICE
345 - 385 Perry Road Keysborough
Our Reference: Case Number 21413414 File 12PD5858

I refer to our meeting on 9th October 2013 and your application requesting Land Servicing Advice for the provision of South East Water's potable water and sewerage facilities to the above property. We are able to provide you with the following general servicing advice for the proposed development based on the information provided.

This land servicing advice has been prepared based on the information available at the time, however we reserve the right to vary this advice in the future as circumstances change without further notification.

POTABLE WATER

To provide permanent reticulated water facilities to the development it will be necessary to construct approximately 1,500 metres of reticulated water mains as shown A-B on the attached 'Water Plan'.

South East Water will require existing private mains to be abandoned and reconnected to the new reticulated water facilities along Perry Road as part of the water main construction.

The proposed reticulated water main alignment will be required to cross the Dandenong Creek. Consequently the consultant is required to liaise with Melbourne Water regarding construction conditions associated with the crossing and obtain approval prior to the commencement of the works.

SEWER

Preliminary investigations indicate that to provide permanent reticulated sewerage facilities to the development would require the construction of approximately 400 metres of reticulated sewer mains connecting to the proposed Perry Road Pump Station and Rising Main as shown A-B on the attached 'Sewer Plan'

The proposed reticulated sewer main alignment will be required to cross the Dandenong Creek. Consequently the consultant is required to liaise with Melbourne Water regarding construction conditions associated with the crossing and obtain approval prior to the commencement of the works.

The provision of sewerage facilities to the development proposal is dependent upon the installation of the proposed Perry Road Pump Station, 225mm diameter Rising Main and 375mm diameter Branch Sewer as shown on the attached 'Sewer Plan' for The Keys Estate Stage 3 – Ref 12PD4914. Construction of these works is to commence shortly and are anticipated to be completed April/May 2014. For further information please contact Mr Alex Gutkin from consultants Aurecon Australia Pty Ltd on 9975 1775.

New Customer Contributions
Area contributions are assessed on the potential for additional loading on the water supply and sewerage system created by developments. Area contributions are required to recover the cost of constructing systems to cater for urban growth now and in the future.

Potable Water	
New Customer Contribution per lot – Other Areas	$640.64
Sewerage	
New Customer Contribution per lot – Other Areas	$640.64

The actual rates to be applied will be those that are applicable at the time of application for a detailed Development Deed.

General Information
Upon submission of a 'Works Application', South East Water will prepare a 'Development Deed Agreement' which will specify all relevant Financial and Servicing conditions for the proposed development

The development will be subject to the servicing and financial requirements in accordance with South East Water's Land Development Policy Manual and all works are to be carried out in accordance with the Melbourne Retail Water Agency (MRWA) edition of the Water Services Association of Australia (WSAA) codes.

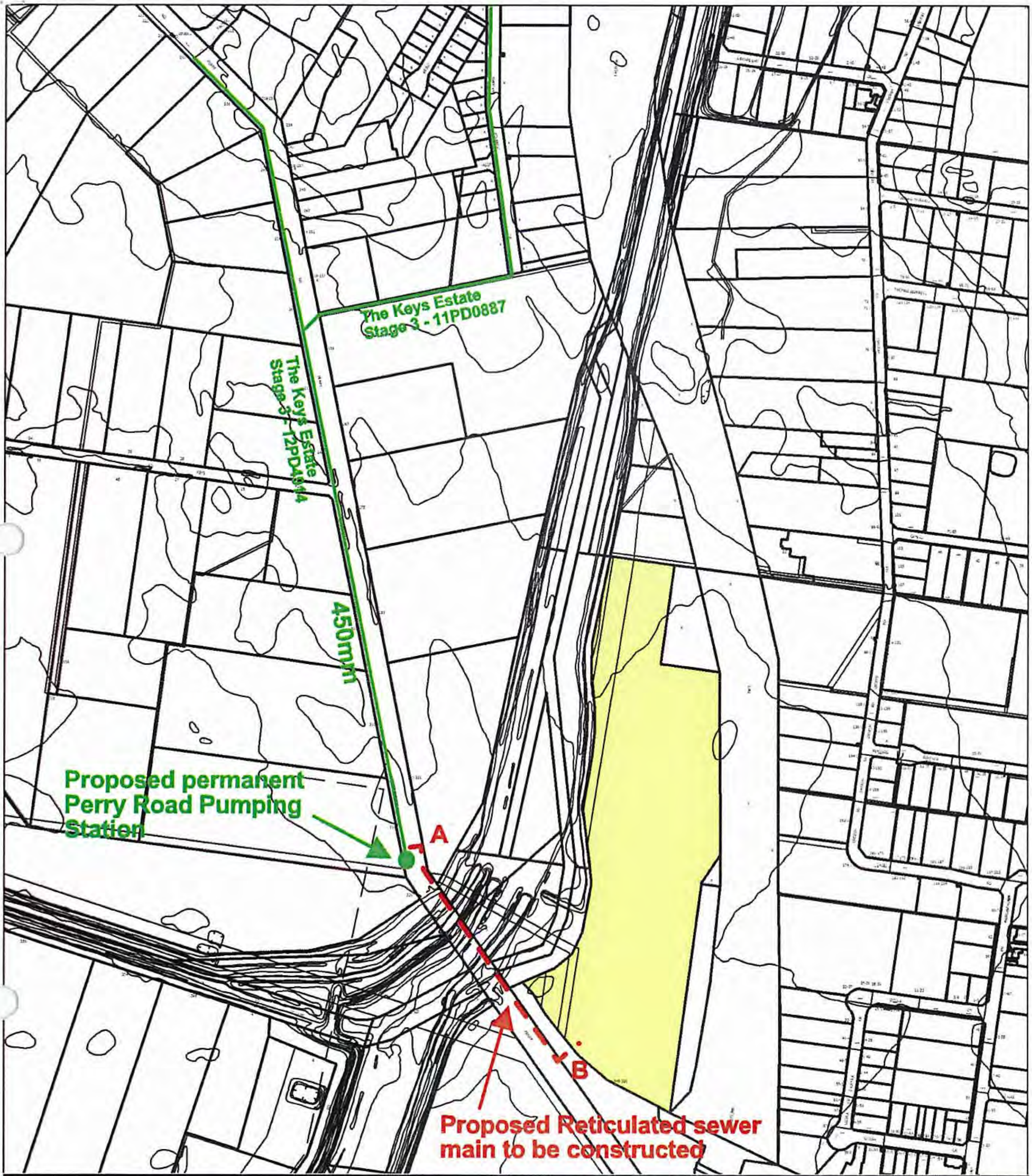
If you require further information, please contact Darren Bollard on 9552 3318.

Yours sincerely

G. Gava.

Giuliano Gava
MANAGER
LAND DEVELOPMENT

South East Water Corporation ABN 89 066 902 547
Locked Bag 1, Moorabbin, Vic 3189
Fax (03) 9552 3001
Internet www.southeastwater.com.au/ice

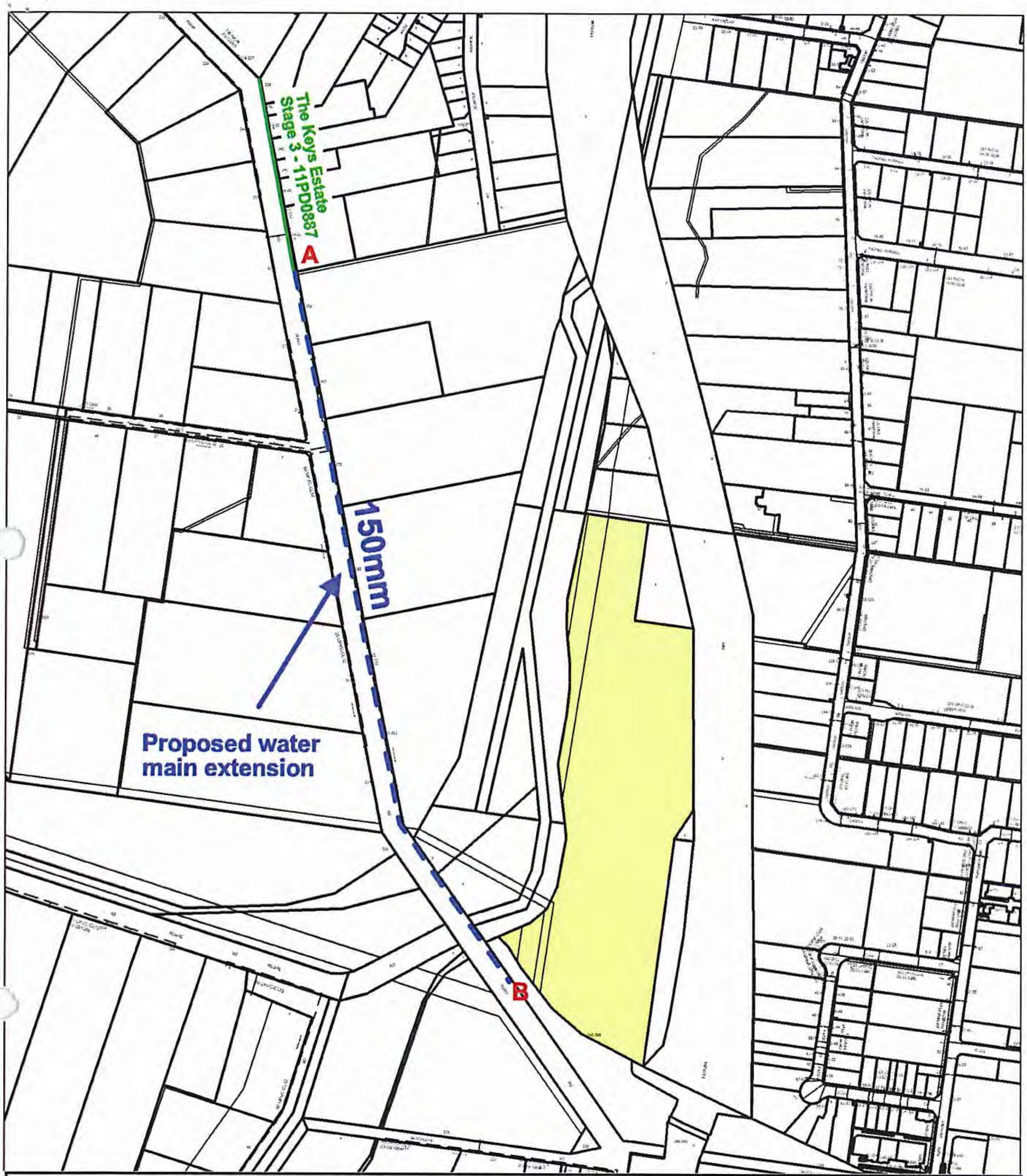


SEWER PLAN	**Development Location:**	**345 — 385 Perry Road, Keysborough**	
South East Water South East Water Corporation ABN 89 066 902 547 N	**South East Water File Ref:**	**12PD5858**	**Case: 21413414**
	Prepared By:	**Darren Bollard**	**MEL Ref: 94 J7**
	Original Size: A4	**Scale: 1 : 10000**	**B/T Area: Yes**

WARNING
This plan is issued solely for the purpose of assisting you in identifying South East Water's sewer assets through further investigation only. It is not to be used for any other purpose, including to identify any other assets, property boundaries or dimensions. Accordingly, the location of all assets should be proven by hand on site prior to the commencement of any work (Refer to Development Deed for further details).

LEGEND

		●	Maintenance Hole
— — —	Sewer main	■	Inspection Shaft
- - - - -	Easement	←	Direction of Flow



WATER PLAN	Development Location:	345 – 385 Perry Road, Keysborough	
South East Water South East Water Corporation ABN 89 066 902 547 N	South East Water File Ref:	12PD5858	Case: 21413414
	Prepared By:	Darren Bollard	MEL Ref: 94 J7
	Original Size: A4 *Note: Pipe sizes shown are the internal diameter*	Scale: 1 : 10000	Max HGRL: 83m (63 + 20m surge)

WARNING

This plan is issued solely for the purpose of assisting you in identifying South East Water's sewer assets through further investigation only. It is not to be used for any other purpose, including to identify any other assets, property boundaries or dimensions. Accordingly, the location of all assets should be proven by hand on site prior to the commencement of any work (Refer to Development Deed for further details).

LEGEND

Hydrant
Water main
Fireplug/Washout
Valve
Tapper/Reducer

4.4. UNITED ENERGY ADVICE

Phillip Miller

Subject: RE: 12005 - 345-385 Perry Road, Keysborough - Electrical Servicing Strategy

From: MCMAHON Craig [mailto:Craig.MCMAHON@Tenix.com]
Sent: Wednesday, 26 March 2014 10:27 AM
To: Phillip Miller
Subject: RE: 12005 - 345-385 Perry Road, Keysborough - Electrical Servicing Strategy [Filed 26 Mar 2014 10:31]

Phillip,

We are still searching for details of any United Energy interest in this easement.

I cannot at this stage discount UE's "ownership" but I am confident, based on the size of this easement and the designation that it is a "transmission" easement and will be in favour of SP Ausnet (SECV successor entity responsible for electricity transmission). In the interim can I ask that you refer this easement enquiry to SP Ausnet (http://www.sp-ausnet.com.au/?id=2301331700507AA09DC076AAEBCA2575760038DB0A) for comment.

Would you also be able to provide a copy of title for this parcel of land?

With regard to an electricity supply to this site I can confirm that this property does not currently have an electricity supply available. In order to provide for supply to this property it would necessary to extend and interconnect the existing 22kV overhead powerlines from the South East & North West of Perry Rd. The two feeders will have sufficient capacity for the typical demand of a property of this size (approx. 1.5MVA?). Any substantive or specific demand beyond this may however require upstream feeder augmentation.

Attached is a screen dump from United Energy's GIS system with the blue lines showing the extents of United Energy's existing 22kV network in that area.

The United Energy terms & conditions for the provision of an electricity supply to this development will be established following application from your client.

I will endeavour to get back to you with our findings on the easement but please be aware it may take a little time to confirm UE's interest or lack of in the easement although I suspect your negotiations will be with SP-Ausnet.

If you need any further info or wish to discuss please let me know.

Best regards

Craig McMahon
Customer Consultant
UE Southern Region Contract

Tenix
Email: craig.mcmahon@tenix.com
126 Watt Rd, Mornington VIC 3931, Australia
PO Box 3470, Mornington. 3931
Tel: + 61 3 9701 9464 Mobile: 0407 545 339
Web: www.tenix.com

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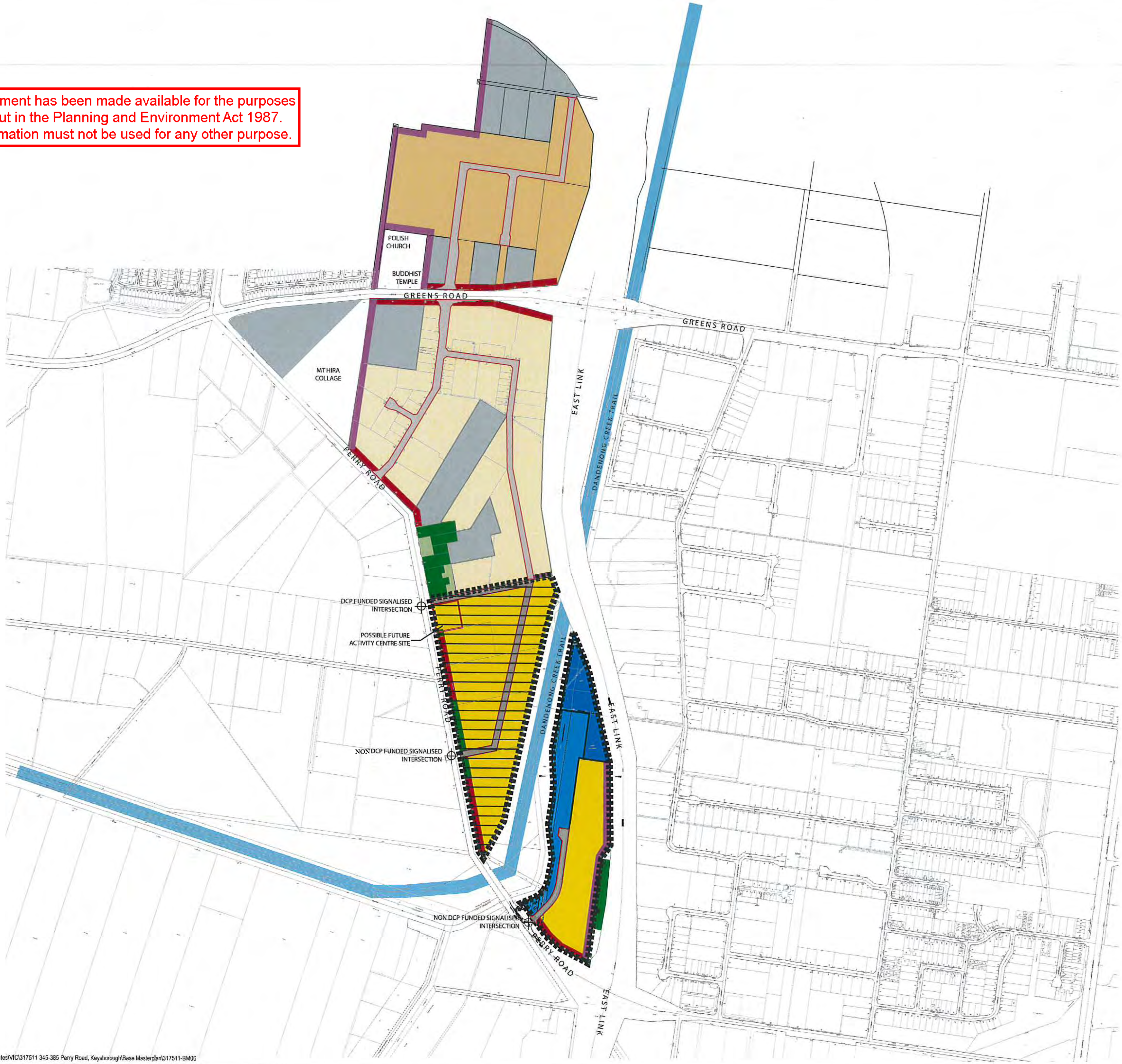
8 Attachment C- Layout Plan (Development Plan)

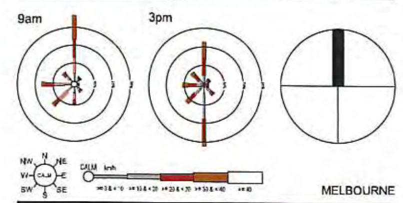


REVISIONS

A	PRELIMINARY	01.05.14
B	REVISION	06.05.14
C	PROPOSED DRAINAGE EASEMENT	07.05.14
D	REVISION	30.06.14

PLAN LEGEND

- DASHED PERIMETER BOUNDARY LINE DENOTED DEVELOPMENT PLAN AREA
- LAND REQUIRING ADDITIONAL INFORMATION TO BE PROVIDED TO COUNCIL NOT ADDRESSED IN THIS DEVELOPMENT PLAN
- DEVELOPMENT LAND
- MELBOURNE WATER RETARDING BASIN
- RESERVE VESTED IN VICROADS
- INTERNAL ROADS
- OPEN SPACE
- CONSERVATION AREA TO BE PROTECTED UNDER NVPP
- NO DIRECT ACCESS TO MAIN ROADS
- LANDSCAPE BOUNDARY TREATMENT
- DEVELOPMENT PLAN OVERLAY SCHEDULE 6 LAND NOT OWNED BY ALZ NOR CIP
- ALZ DEVELOPMENT LAND SOUTH GREENS ROAD
- ALZ DEVELOPMENT LAND NORTH GREENS ROAD
- DANDENONG CREEK TRAIL



CIP

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www.ciproperty.com.au | National Enquiries: 1800 829 877

PROJECT

DEVELOPMENT PLAN

345-385 PERRY ROAD
LOT 2, PS603443D, KEYSBOROUGH, VIC

DRAWING TITLE

PROPOSED DEVELOPMENT PLAN

0 150 300 450 600 750m

SCALE: 1:15000 @ A3

CREATE DATE: 30.06.2014
PLOT DATE: 30.06.2014
LAST SAVED BY: kchol

317511-BM06 DP D

FILE LOCATION: J:\Arch\Estates\VIC\317511 345-385 Perry Road, Keysborough\Base Masterplan\317511-BM06

9 Attachment D- Cultural Heritage Management Plan

Urban Colours

Cultural Resource Managers

www.urbancolours.com.au

Perry Road Industrial Estate

345-385 Perry Road, Dandenong South, Victoria.

Cultural Heritage Management Plan

CHMP Number: 12983

SPONSOR:	Commercial & Industrial Property Pty Ltd (ABN 30 140 628 860)
CULTURAL HERITAGE ADVISOR:	Annette Xiberras
AUTHOR:	John Stevens
DATE:	3 April 2014

Title page

345–385 Perry Road, Dandenong South

Industrial estate

Cultural Heritage Management Plan Number: 12983

Activity size:	Medium
Assessment:	Desktop, Standard and Complex
Sponsor:	Commercial & Industrial Property Pty Ltd (ABN 30 140 628 860)
Cultural Heritage Advisor:	Annette Xiberras
Author:	John Stevens
Date:	3 April 2014

Front page shows the cutting of Dandenong Creek just north of Perry Road, northern perspective (Photo: John Stevens)

Acknowledgements

On behalf of Urban Colours, the author would like to thank the following people and organisations for assisting with the development of this Cultural Heritage Management Plan:

Commercial & Industrial Property Pty Ltd (CIP)

Simon Pikkat

Wurundjeri Tribe Land and Compensation Cultural Heritage Council Incorporated (WTLCCHCI)

Anne Maree Chandler (2009 and 2014)

Michael Xiberras (2009 and 2014)

Colin Hunter (2009)

Wandoon Estate Aboriginal Corporation

Jacqui Wandin (2009)

Bunurong Land Council Aboriginal Corporation (BLCAC)

Izzy Pepper (2009 and 2014)

Boon Wurrung Foundation Limited (BWFL)

James Hughes (2014)

Sam Pender (2009)

Aboriginal Heritage Act 2006
Section 65

Cultural Heritage Management Plan – Notice of Approval

CHMP NAME:	**Perry Road Industrial Estate, 345-385 Perry Road, Dandenong South Victoria**		
CHMP NUMBER:	12983		
SPONSOR:	Commerical and Industrial Property Pty Ltd	*ACN/ABN:*	30 140 628 860
Cultural Heritage Advisor(s):	Annette Xiberras		
Author(s):	John Stevens		
Cover date:	4 April 2014	*Pages:*	121
Received for approval:	4 April 2014		

TO BE COMPLETED BY THE SECRETARY (OR DELEGATE) **I have considered the Evaluation Report for this CHMP and:**	**Yes**	**No**
I am satisfied that the CHMP has been prepared in accordance with the standards prescribed for the purposes of section 53 (in the Aboriginal Heritage Regulations 2007 and the Approved Form).	✓	
I am satisfied that the CHMP adequately addresses the matters set out in section 61.	✓	
In considering this application, I consulted with and considered the views of Aboriginal persons or bodies I considered relevant to the application.	✓	
I have given proper consideration to any relevant human rights	✓	

I, Jane Sweeney, Director Heritage Services Office of Aboriginal Affairs Victoria, acting under authority delegated to me by the Secretary, Department of Premier and Cabinet, and pursuant to section 65(2) of the *Aboriginal Heritage Act 2006* hereby **approve / refuse to approve** this cultural heritage management plan:

Signed: ....

JANE SWEENEY

Dated: 1/5/14

- **This notice of approval should be inserted after the title page and bound with the body of the management plan.**
- **The recommendations in this management plan are now compliance requirements. Officers from the Department of Premier and Cabinet may attend the subject land to monitor compliance with the recommendations.**

Executive Summary

This CHMP has been prepared in accordance with Part 4 of the Victorian *Aboriginal Heritage Act* 2006 and is required by the *Aboriginal Heritage Regulations* 2007. It presents the results of a desktop, standard and complex Aboriginal cultural heritage management plan (CHMP) for an Industrial Subdivision and Development at 345–385 Perry Road, Dandenong South. Dandenong South is located approximately 30 kilometres south-east of Melbourne CBD (Map 1).

The assessment area comprises 19.5 ha of land which is owned by Commercial & Industrial Property Pty Ltd (CIP).

The Reason for Preparing the CHMP

CIP has engaged Urban Colours Cultural Resource Managers (Urban Colours) to prepare a cultural heritage management plan for a proposed industrial subdivision and development at 345–385 Perry Road, Dandenong South, Victoria.

The preparation of a CHMP is mandatory when a proposed land use activity is located in an area of cultural heritage sensitivity and when the activity is a high impact activity. In this case, the landform has been identified as sensitive, due to Reg 23(1) of the Aboriginal Heritage Regulations 2007, which states that land within 200 metres of a named waterway is an area of cultural heritage sensitivity. The activity area is bordered by Dandenong Creek.

The activity is also a high impact activity under the *Aboriginal Heritage Regulations* 2007, due to Reg 46(2) which states that the subdivision of land into two or more lots in an industrial zone is a high impact activity.

The RAP Responsible for the Activity Area

At the beginning of the preparation of this CHMP, no Registered Aboriginal Party (RAP) had been appointed for the area. The following Aboriginal organisations had applied for RAP status:

- Bunurong Land Council Aboriginal Corporation (BLCAC)
- Boon Wurrung Foundation Ltd (BWF)
- Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc (WTL&CCHCI)

The Victorian Aboriginal Heritage Council declined the BLCAC and BWF RAP applications on 27 August 2009. However, the Council acknowledged that both BLCAC and BWF represented traditional owners of 'Boonwurrung country'. The BLCAC submitted an updated application to the VAHC on the 4 November 2010. This application was also declined on the 1 August 2011.

The WTL&CCHCI application over the area including the activity area has yet to be determined.

Consultation was conducted with the WTL&CCHCI, BLCAC and BWFL as advised by OAAV.

The Assessment Undertaken

The methodology was developed to meet the requirements for a CHMP. This comprised:

- A desktop assessment which involved research and analysis of the known Aboriginal archaeology of the region and local setting; a description of the ethno-history applicable to the activity area; description of the environment, geology and geomorphology of the activity area and its surrounding landscape; and a review of the land use history of the activity area, and implications for the cultural heritage sensitivity of the activity area.
- A standard ground surface assessment.
- A complex assessment which comprised eight 1m² test pit and 96 40 cm² shovel test pits over two field seasons (February 2009 and March 2014).

Results of the assessment

Desktop assessment summary

The Victorian Aboriginal Heritage Register (VAHR) was accessed on 27 February 2014.

A review of the VAHR at the Office of Aboriginal Affairs Victoria (OAAV) shows that there is one previously registered Aboriginal cultural heritage site within the activity area (VAHR 7921-1073) (Map 5). A total of 12 subsurface artefacts were identified within a thin sandy rise aligned north–south in the far southern section of the activity area. The sandy rise comprises the very northern edge of a much longer system that extends further to the south beneath and south of Perry Road. Urban Colours Cultural Resource Managers identified the subsurface occurrence during subsurface excavations at the site for a former Sponsor (CHMP 10763) on 9–16 February 2009. A site card was developed for the place and approved by the VAHR in March 2009.

There are 69 previously registered sites within a 3 km radius of the activity area (Map 5). The site inventory comprises 34 Aboriginal scarred trees, 18 low density artefact distributions (LDADs), 15 artefact scatters and 2 object collection forms.

Previous studies indicate that Aboriginal sites are most commonly found on higher points overlooking swamps or creeks; however this is not always the case. Many studies have shown (e.g. Long 2008; Long et. al. 2009; Adams and Stevens 2009; Light and Schell 2010) that cultural heritage sites are present across a diverse range of landform types within the greater Geographic region, particularly on low-lying Baxter Sandstone that contains both residual decomposing sand mantled by aeolian sand deposits deriving from the surrounding nodal ridge systems to the south-west. Resources are typically situated in low-lying areas within the region and correspondingly artefact assemblages indicate that a broad-range of activities was undertaken across these low-lying areas.

The activity area is located within the Baxter Sandstone landform and this has moderate potential for intact archaeological deposits and scarred trees. Cranbourne Sands, which overlay the Baxter sandstone and occur intermittently throughout the geographic region, are a highly sensitive soil profile type for Aboriginal cultural heritage material. There is one previously registered Aboriginal cultural heritage place within the activity area. The site extent has been determined for this place and a site card has been completed, lodged and approved by the VAHR.

Of particular relevance to this study are the two assessments undertaken by Long (2009); Long et al. (2009) approximately 1.5 km north of the subject activity area. Long's investigations, along with the investigation undertaken at Bend Road (Allen et. al. 2008) indicate that moderate density sites are prevalent in the geographic region, particularly when water sources and aquatic resources coincide with sand landforms or articulated sand ridgelines.

The previous discontinued CHMP (10763) undertaken within the current activity area has confirmed that a sandy ridgeline is present within the southern section of the activity area and the current study presents an opportunity to investigate other less intensively tested areas within this location. In keeping with the results of VAHR 7921-1073, it is expected that any cultural material present within the subject activity area will most likely be confined to the southern section and is assumed to represent a low-density broadly-distributed artefact scatter buried within the sand profile along the southern fence line of the property.

Standard assessment summary

The activity area was resurveyed on 3 March 2014 over the course of one day. The area was resurveyed due to the nature of activity changing and also due to a Sponsor change as detailed in Section 2 of this CHMP. Due to the identification of the low-lying sand ridge and subsurface archaeological material as part of the complex assessment undertaken for the discontinued CHMP (10763), intensive survey was undertaken across this area as part of the most recent survey. John Stevens (archaeologist) conducted the surface survey with Michael Xiberras (WTLCCHCI), James Hughes (BWFL) and Izzy Pepper (BLCAC).

The standard assessment for both CHMPs (10763 and 12983) commenced with an opportunistic survey of the activity area undertaken by the field teams, who walked over the activity area randomly in an attempt to identify areas of ground surface exposure as well as areas that had not been previously disturbed by construction-related activities.

The general aims of the field assessment were to assess the cultural heritage sensitivity of the activity area and the nature, distribution and significance of Aboriginal cultural heritage in locations to be impacted by the proposed activity. The methodology used during the ground surface survey for the 2009 CHMP (10763) and 2014 CHMP (12983) was almost identical given the size of the activity area effectively remained the same, conditions were similar and the field crew sizes for both surveys contained almost the same numbers. The methodology included walking transects through the property covering the proposed development footprint areas and then a general inspection of the surrounding area to identify areas of ground surface exposure for any cultural resources that may be present. These areas included horse paths, vehicular access tracks, dam walls, fence lines and exposures around the sheds in the western section of the activity area. There is a linear drain running east–west through the central section of the activity area and the spoil heap windrow of the drain was assessed as part of the 2009 survey. It was found to be completely overgrown with weeds during the 2014 survey.

Pedestrian surveys were then undertaken by systematic sampling. The 2009 survey comprised a field team of five surveyors who walked the activity area spaced 5 metres apart. Similarly, the 2014 survey comprised a field team of four surveyors who walked the activity area spaced 5 metres apart. Transects were walked in a north–south direction across the entire activity area and all visible surface exposures were inspected in detail. Surface exposures were limited to the areas of exposure mentioned above. Effective survey coverage was 5%, as ground surface visibility was generally low (<5%) over the majority of the activity area due to thick grass cover. Grass cover was more pronounced during the 2014 survey than it was during the 2009 survey.

The activity area is approximately 19.5ha (195,660m²) and contains two landform types: a flood plain covering an area of approximately 194,660m² in the central and northern section to the east of Dandenong Creek and sand ridge landforms covering an area of approximately 1000m² in the southern section of the activity area immediately north of Perry Road. The sand ridge and flood plain landforms are mutually exclusive both spatially on the landscape and also in terms of their formation processes.

CHMP 10763 – 2009 field survey

The 2009 surface survey identified that disturbance factors have impacted on the surface of the soil profile within the activity area. The activity area has been subject to more than 50 years of livestock grazing as well as containing a large market garden complex in the southern section of the activity area. It is unclear what was being produced onsite or how long ago the land was being farmed. The only visible remnant of market garden activities are long furrows aligned east–west just north of Perry Road. Some of the furrows dissect the sand ridge. It was noted that a number of dams have also been constructed through the activity area and a small cluster of sheds stands in the south–west of the activity area.

The 2009 field survey made the following observations following completion of the surface survey:

- <u>the activity area is generally flat flood plain landform in the central and northern sections of the activity area;</u>
- <u>Dandenong Creek is approximately 200 metres west of the activity area;</u>
- <u>there are no caves, rock shelters, axe grinding grooves, stone raw material sources, mature eucalyptus trees or earth mounds within the activity area;</u>
- <u>there is a low-lying sand ridge in the southern section of the activity area; this landform comprises Cranbourne Sands and accounts for approximately 1% of the activity area in terms of total area;</u>
- <u>ground surface visibility was 10% upon the sandy ridge area and approximately 2% across the remainder of the activity area;</u>
- <u>the ground surface consists of exotic grasses which are widespread;</u>

- the activity area is currently utilised for grazing.

No Aboriginal cultural heritage sites places were identified as part of the surface survey undertaken on 3 February 2009 for CHMP 10763.

CHMP 12983 – 2014 field survey

There were no obstacles to undertaking the 2014 field survey; although the extent of surface biomass across the activity area constrained 100% effective survey (Map 6). The activity area is 195,660 m² or approximately 19.5 ha. The flood plain landform covers approximately 194,660 m² and the sandy ridge comprises approximately 1000 m² (two sand ridges approximately 50 metres long and 10 metres wide). Surface visibility was very low (<1%) across both flood plain and sand ridge landform. There are approximately 1946.6m² of exposures with 40% visibility across the flood plain landform and 10m² of exposures with 20% visibility across the sandy ridges. Both sandy ridges were covered in a dense mat of grassland. A total ground surface exposure of 1,956.6m² across both landforms equals 1% of observable ground surface exposure within the activity area (Table 4).

The main constraint to effective survey was the extent of exotic grasses which were widespread and long (approximately 30 cm high across the entire activity area). The flood plain landform has been constructed (and disturbed) by flood regimes of Dandenong Creek as well as by wide-scale drainage activities (to assist in managing floods from the Dandenong in more recent times). Two important points were considered following the field survey at the activity area. These were:

- The majority (99%) of the activity is mantled by consolidated clay deposits resulting from periodic flood regimes of Dandenong Creek. This area may have low potential for Aboriginal cultural heritage places;
- Elevated above the flood plain by 40–50 cm are two sand ridges in the southern section of the activity area. The two ridges may have been elevated above floodwater extents and thus remained dry. Cranbourne Sands landforms are typically sensitive for Aboriginal cultural heritage places and one previously registered site (VAHR 7921-1073) was recorded on one sand ridge in 2009.

Based on the results of the subsurface excavations of CHMP 10763 it is expected that both sand ridges retain some vertical integrity and that sand ridge A is more sensitive for Aboriginal cultural heritage places than sand ridge B.

Five trees within the activity area were assessed for scarring from a result of Aboriginal modification; however, no trees showed any signs of alteration to the casing or heartwood. All five trees were assessed for scars, carvings, axe-marks and 'hoops'. No Aboriginal scarred, hooped, axe marked or carved trees were identified. A total of 1% (total ground surface exposure) of the activity area was surveyed for Aboriginal cultural heritage places (Map 6); however, no surface Aboriginal cultural heritage Places were identified by any of the field team comprising John Stevens (archaeologist), Michael Xiberras (WTLCCHCI), James Hughes (BWFL) and Izzy Pepper (BLCAC).

No Aboriginal cultural heritage sites were identified during the survey as part of the standard assessment.

Complex assessment summary

The aims of the Complex Assessment were to:

- determine the likelihood of subsurface Aboriginal cultural heritage in the activity area in areas that had not been the subject of excavation in 2009;
- determine whether the site boundary for VAHR 7921-1073 was appropriate and accurate;
- record the subsurface stratigraphic composition of landforms and investigate a representative sample of subsurface sediments; and
- undertake a scientific assessment of the activity area in relation to significance of Aboriginal cultural heritage Places identified where applicable.

The activity area was excavated over a 9 day period 9–17 February 2009 by Urban Colours as part of discontinued CHMP 10763. One Aboriginal cultural heritage site (VAHR 7921-1073) was recorded during that investigation, which yielded 12 artefacts of various classes and raw material types (Map 5). All 12 artefacts were identified on sand ridge 1 in the southern section of the activity area (Table 1).

Table 1: The twelve artefacts identified during 2009 excavations

Location		No./artefact type	Depth	GPS (MGA 94)		Raw material
Square C	**Spit 10**	1 Complete flake	500 mm	340810.35e	5788869.72n	Silcrete
	Spit 11	1 Proximal flake	550 mm	"	"	Silcrete
	Spit 13	1 Angular fragment	650 mm	"	"	Milky quartz
	Spit 14	1 Split flake	700 mm	"	"	Rose quartz
Shovel Test Pits	**TP 52**	1 Angular fragment	400 mm	340816.82e	5788877.28n	Silcrete
	TP 55	2 Split flakes	400 mm	340829.64e	5788902.77	Silcrete
	TP 55	1 Angular fragment	600 mm	"	"	Crystal quartz
	TP 58	2 Complete flakes	400 mm	340836.82e	5788912.69	Silcrete and quartzite
	TP 61	1 Backed blade	100 mm	340841.84e	5788922.4	Crystal quartz
	TP 63	1 Block fragment	100 mm	340848.98e	5788932.52	Meta-sediment

As part of the 2009 excavations an additional twelve 50 cm² radial test pits excavated on sand ridge 1 failed to identify additional artefacts. The twelve radials were excavated east and west of Square C and east and west of shovel test pits 52, 55, 58, 61 and 63. Urban Colours determined that due to an absence of cultural heritage material in these pits that site extent had been established. A total of 67 50 cm² shovel test pits and two 1 m² test pits excavated on the flood plain landform failed to identify Aboriginal cultural heritage material. A total of one 1 m² test pit and four 50 cm² shovel test pits failed to identify Aboriginal cultural heritage material on sand ridge 2 (Map 7).

Due to an activity and Sponsor change the new Sponsor decided to undertake a new CHMP (12983) in March 2014.

The March 2014 excavations as part of the current CHMP 12983 provided an opportunity to further assess the subsurface component of VAHR 7921-1073 through the excavation of an additional two 1 m² test pits and two 50 cm² shovel test pits. During these excavations one of the 2014 stratigraphic test pits on sand ridge 1 (Square G) yielded 1 artefact. The other stratigraphic test pit (Square F) did not identify additional artefacts (Map 7). One 50 cm² shovel test pit excavated 2 metres east of Square G did not identify artefacts. Two radial test pits (STP 88 and 89) excavated on the west side of Square G failed to identify additional artefacts. Due to one test pit on the east side of Square G not identifying artefacts and two shovel test pits to the west of Square G also failing to identify artefacts it was determined that the one artefact identified in Square G should be incorporated into the existing site extent of VAHR 7921-1073 through a Place Inspection Form.

Table 2: Artefact identified during 2014 excavations.

Location	No./artefact type	Depth	GPS (MGA 94)		Raw material
Square G	1 complete flake	500 mm	340823.608e	5788899.805n	silcrete

In addition to the excavations proposed on the two sand ridges a further 9 50 cm^2 shovel test pits were proposed for the flood plain in areas where excavations had not been undertaken as part of the 2009 subsurface testing program. No Aboriginal cultural heritage material was identified in any of the excavations undertaken on the flood plain.

A total of 96 shovel test pits and eight 1 m^2 stratigraphic test pits were excavated across the activity area during the 2009 and 2014 fieldwork (Map 7).

Recommendations

Recommendation 1: VAHR 7921-1073

Aboriginal Place VAHR 7921-1073 has low scientific significance (Table 9). The extent, nature and significance of the site were determined during the complex assessment as required under Regulation 60 (Aboriginal Heritage Regulations 2007).

The site has effectively been destroyed through excavation, and the artefacts collected. However, under Section 8 of the Act, Aboriginal cultural heritage does not cease to exist if it is damaged or modified. The Aboriginal Place remains at the location at which it was recorded.

It will not be possible to avoid further disturbance to the Place during works as development is planned for the section of activity area in which the Place is located, and ground disturbance will be required to a depth greater than 80 cm to prepare the ground for development (including installation of services). Excavation defined the boundaries of the site through three stratigraphic test pits, 7 shovel test pits and 14 radial test pits at two cardinal points east and west of where artefacts were identified. Results confirmed that the site appeared to be highly localised along the central sand ridge and aligned north–south along the ridge. A total of 13 artefacts identified from three 1 m^2 stratigraphic excavations and 21 shovel test pits have been collected; therefore, no further salvage is required as the entire site has been excavated.

The artefacts from VAHR 7921-1073 are currently being held by the cultural heritage advisor, and will remain so until completion of works or until the relevant Aboriginal organisations choose to rebury them. The location of the reburial must be in a location agreed on by the Aboriginal organisations and CIP (the Sponsor).

The reburial must be conducted by an archaeologist and representatives of the Traditional Owners. The Place Collection Form within the site card for VAHR 7921-1073 must then be updated to show the reburial location.

This procedure must be organised and paid for by the site contractors and / or Sponsor.

Recommendation 2: On-site staff to receive training prior to commencement of activity

Prior to the commencement of the activity, the nominated contractor/s must be advised by the Sponsor of the terms of the plan and their broader responsibilities to the *Aboriginal Heritage Act* (2006). The induction training for on-site staff should include:

- training in Aboriginal cultural heritage sensitivity;
- clear advice on the identity and contact details of the Sponsor's project delegate and contact details for a cultural heritage advisor;
- clear advice on staff responsibilities under the contingency plans contained within this report, in particular regarding the discovery of Aboriginal cultural material and human remains (see Section 10 below).

A copy of this CHMP should be kept on site during construction and revegetation works so that it can be referred to if required.

Recommendation 3: Approval required for changes to the proposed activity

Should any changes be made to the activity in terms of the nature and extent that the ground is to be impacted, the Sponsor must obtain statutory approval and may be required to submit a new CHMP (Section 52(1) *Aboriginal Heritage Act* 2006).

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Part 1 | Assessment

1 Introduction

This mandatory Cultural Heritage Management Plan (CHMP) has been sponsored by Commercial & Industrial Property Pty Ltd (CIP) and prepared by Urban Colours Cultural Resource Managers. The author of this plan is John Stevens (B.Arch (Hons)); a qualified archaeologist under the requirements of the AHA 2006. John Stevens supervised all field surveys and subsurface testing during the 2009 and 2014 field seasons. Edward East, archaeologist at Urban Colours, assisted with the survey and subsurface excavations (see Appendix 2 for details of qualifications of all personnel who worked on this CHMP).

1.1 Location of the Activity Area

The activity area is situated at 345–385 Perry Road, Dandenong South, Victoria. Dandenong South is located approximately 30 km south-east of the Melbourne CBD (Map 1). The activity area is bounded to the east by the EastLink road reserve, to the south by Perry Road, to the west by Dandenong Creek and to the north by the intersection of EastLink and Dandenong Creek (Map 2). The activity proposed comprises an industrial development subdivision of land. The proposed works will involve various levels of surface and subsurface disturbance across the activity area and therefore has the potential to impact any surface or subsurface Aboriginal archaeological sites within the activity area (Section 2).

1.2 Reason for Preparing a Cultural Heritage Management Plan

The preparation of a CHMP is mandatory when a proposed land use activity is located in an area of cultural heritage sensitivity and when the activity is a high impact activity. In this case, the landform has been identified as sensitive, due to Reg 23(1) of the Aboriginal Heritage Regulations 2007, which states that land within 200 metres of a named waterway is an area of cultural heritage sensitivity. The activity area is bordered by Dandenong Creek.

The activity is also a high impact activity under the Aboriginal Heritage Regulations 2007, due to Reg 46(2) which states that the subdivision of land into two or more lots in an industrial zone is a high impact activity.

This activity area was previously the subject of a discontinued CHMP (10763) in March 2009. Due to an activity and Sponsor change the new Sponsor decided to undertake a new CHMP (12983) in February 2014.

1.3 RAP Responsible for the Activity Area

At the beginning of the preparation of this CHMP, no Registered Aboriginal Party (RAP) had been appointed for the area. The following Aboriginal organisations had applied for RAP status:

- Bunurong Land Council Aboriginal Corporation (BLCAC)
- Boon Wurrung Foundation Ltd (BWF)
- Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc (WTL&CCHCI)

The Victorian Aboriginal Heritage Council declined the BLCAC and BWF RAP applications on 27 August 2009. However, the Council acknowledged that both BLCAC and BWF represented traditional owners of 'Boonwurrung country'. The BLCAC submitted an updated application to the VAHC on 4 November 2010. This application was also declined on 1 August 2011. The WTL&CCHCI application over the area including the activity area has yet to be determined.

Consultation was conducted with the WTL&CCHCI, BLCAC and BWFL as advised by OAAV.

1.4 Aims of the Assessment

The aims of the CHMP are:

- To determine the archaeological sensitivity of the activity area
- To determine the location, distribution and significance of the previously registered Aboriginal cultural heritage place VAHR 7921-1073, an artefact scatter comprising 12 artefacts on a low-lying sand ridge in the southern section of the activity area
- To determine the location, distribution and significance of additional cultural heritage material or places where identified
- To make an assessment of the cultural and scientific significance of any Aboriginal Places identified within the activity area
- To determine whether harm to Aboriginal Places can be avoided through design or management
- To develop a framework for managing Aboriginal cultural heritage material or places prior to, during and subsequent to proposed development related activities at 345–385 Perry Road, Dandenong South, Victoria.

This CHMP has been undertaken in accordance with the *Guide to Preparing Cultural Heritage Management Plans* (OAAV 2010).

1.5 The Sponsor

The Sponsor of the CHMP is Commercial & Industrial Property Pty Ltd (ABN: 30 140 628 860).

The contact person for the Sponsor is:

Simon Pikkat
Assistant Development Manager
Suite 59, Jones Bay Wharf
26–32 Pirrama Road, Pyrmont NSW 2009
(02) 9506 1414
spikkat@ciproperty.com.au

1.6 Personnel Involved

The Cultural Heritage Advisor for this CHMP is Annette Xiberras. Annette has a vast knowledge and understanding of the cultural heritage of south-eastern Australia. Annette is a Wurundjeri Elder who has worked in Aboriginal archaeology and cultural heritage management for more than 25 years. She has qualifications in Aboriginal cultural heritage and natural resources and environmental management (see Appendix 2). In addition to providing cultural heritage advice to the project, Ms Xiberras managed stakeholder communications and project logistics.

John Stevens authored the desktop, standard and complex assessment and undertook fieldwork for the standard and complex assessments. John has a Bachelor of Archaeology (Honours) degree in Archaeology and 12 years' experience working as a cultural heritage consultant in Victoria, as well as in New South Wales, Queensland and Tasmania.

Edward East participated in the archaeology field program. Edward was present during the ground survey and for the duration of the subsurface testing program. Edward holds a Bachelor of Archaeology (Honours) from La Trobe University and a Master of Arts (Archaeology) from Durham University.

Details of the qualifications of the main personnel involved in preparing this CHMP are listed in Appendix 2.

The WTL&CCHCI was represented in the field by Michael Xiberras, Anne Maree Chandler and Colin Hunter (2009) and Michael Xiberras (2014). The BLCAC was represented in the field during the standard and complex assessment by Izzy Pepper on 9–16 February 2009 and March 3–4 2014 and by Phaedra Murray on 17 February 2009. The Boon Wurrung Foundation was represented in the field by Sam Pender on 9–17 February 2009 and by James Hughes on 3–4 March 2014. Wandoon Estate was represented in the field by Jacqui Wandin on 9–16 February 2009.

1.7 Report Submission

The CHMP was submitted to the Secretary, Office of Aboriginal Affairs Victoria for evaluation under Section 62 *Aboriginal Heritage Act* 2006) on 3 April 2014.

2 Activity Description

The activity proposed comprises an industrial subdivision and development (Appendix 1). The proposed subdivision will include one vehicle entrance point from Perry Road into the carriageway that will be developed as part of construction-related activities. The area of the subject land is approximately 19.5 ha.

Activities associated with the development of this project will include:

- Construction of internal roads which may include excavation to a maximum depth of 0.5 m
- Construction of sewers, which may include excavation to a maximum depth of 4.0 m
- Excavation of trenches for the installation of storm water drainage to a maximum depth of 4.0 m
- Excavation of trenches for the installation of water and gas services to a maximum depth of 2.0 m
- Excavation and levelling of ground surfaces for the installation of pavements to a maximum depth of 1.0 m
- Excavation of trenches for the installation of Telstra and power services to a maximum depth of 1.0 m.

The impact on current and prior land surfaces within defined areas of development and construction will be extensive, consisting of the removal of all topsoil to approximately 300 mm and localised deeper trenching into subsoils as required for service utilities and foundation trenches. The extent of impact within the activity area will depend upon the development and subdivision of the land. The development will need to address the applicable requirements of Greater Dandenong Shire Council, including zoning and overlay provisions.

The extensive nature of soil modification during industrial development means that there is a high possibility that any archaeological sites present within the top 1 m will be harmed during the construction process. Areas where surface soils are subject to earthmoving will directly impact any surface Aboriginal sites, such as scatters of stone tools. Overall, industrial development has a very high adverse impact on intact archaeological sites unless mitigation measures are adopted. Adverse impact can generally be minimised through design and site management.

3 Extent of Activity Area

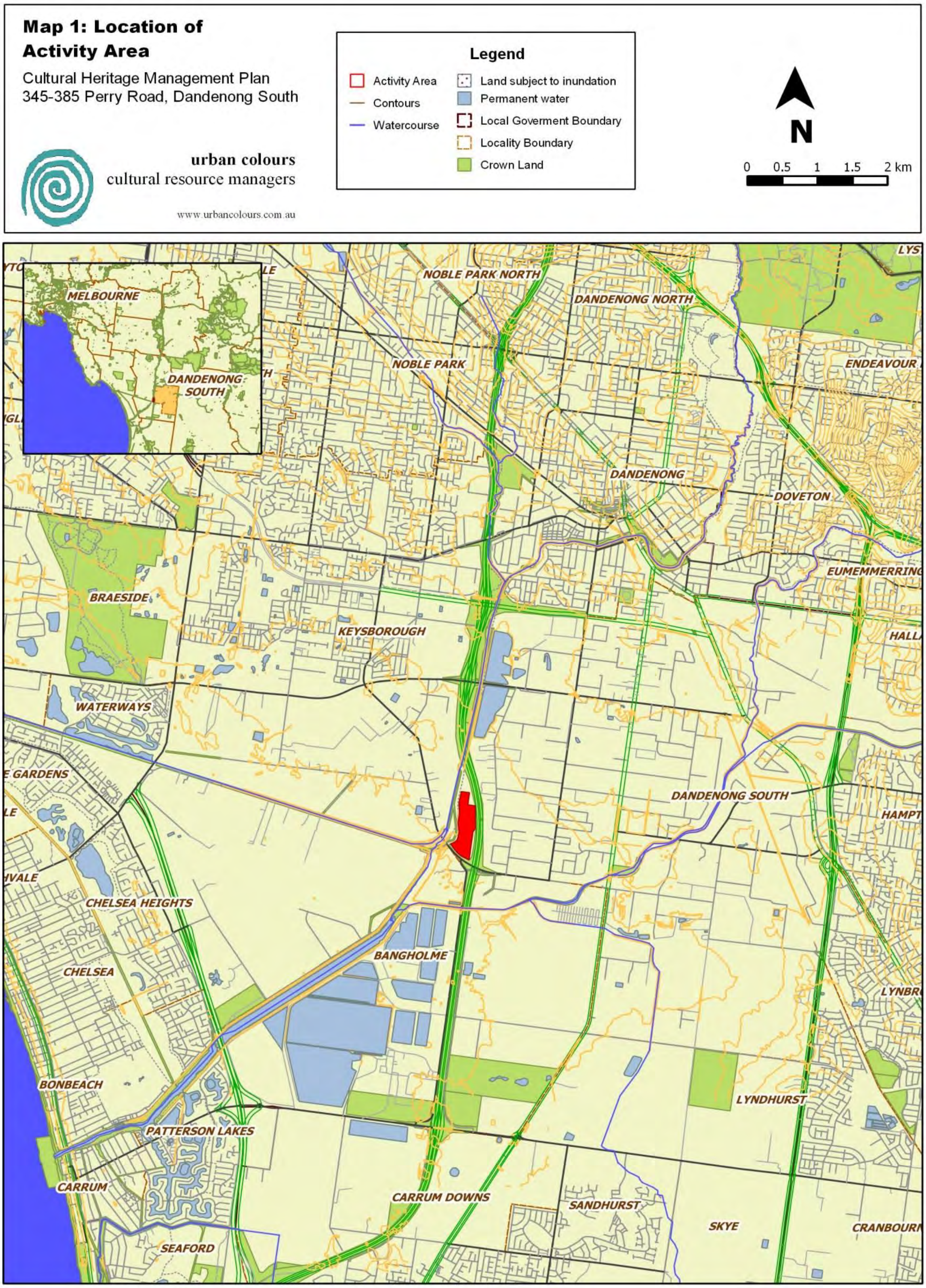
The activity area is situated at 345–385 Perry Road, Dandenong South, Victoria. Dandenong South is located 30 km south-east of the Melbourne CBD. The activity area comprises a small allotment situated north of Perry Road and is flanked on the east by EastLink and the west by Dandenong Creek. The northern section of the activity area is positioned just south of the intersection of EastLink and Dandenong Creek. The activity area is approximately 19.5 ha in area.

The proposed works will involve various levels of surface and subsurface disturbance across the activity area and therefore have the potential to impact any surface or subsurface Aboriginal archaeological sites within the activity area.

Cadastral information is detailed in Table 3.

Table 3: Cadastral information

Cadastral Information	Description
Address	345–385 Perry Road, Dandenong South, Victoria
Location	Dandenong South
Local Government Authority	City of Greater Dandenong
Lot/Plan no.	Lot 2, PS603443D
Parish	Eumemmering



Map 1: Location of activity area

Map 2: Activity area, showing existing conditions

4 Documentation of Consultation

4.1 Consultation in Relation to the Assessment

As required under Section 54 of the *Aboriginal Heritage Act* 2006, a Notice of Intent to Prepare a Cultural Heritage Management Plan was submitted to the Office of Aboriginal Affairs Victoria (OAAV) by Annette Xiberras on behalf of the Sponsor (CIP) on 26 February 2014 (Appendix 1). Aboriginal Affairs Victoria notified the Sponsor on 26 February 2014 that they had received a request to prepare a CHMP and allocated CHMP number 12983 to the project. Communication occurred with the Sponsor's representative, Simon Pikkat at CIP, by phone and email prior to the commencement of the Standard Assessment.

Three organisations have previously applied for RAP status over the land within which the activity area is located: Wurundjeri Tribe Land and Compensation Cultural Heritage Council Inc (WTL&CCHCI), the Bunurong Land Council Aboriginal Corporation (BLCAC) and the Boon Wurrung Foundation Ltd (BWF) (see Section 1.3 above for information about the status of the RAP applications). The cultural heritage advisor, Annette Xiberras, made contact with all three Aboriginal community groups on 27 February 2014. All three Aboriginal community groups responded and informed the cultural heritage advisor that they would participate in the fieldwork for the CHMP.

4.2 Participation in the Conduct of the Assessment

The WTL&CCHCI was represented in the field by Michael Xiberras, Anne Maree Chandler and Colin Hunter (2009) and Michael Xiberras (2014). The BLCAC was represented in the field during the standard and complex assessment by Izzy Pepper on 9-16 February 2009 and March 3-4 2014 and by Phaedra Murray on 17 February 2009. The Boon Wurrung Foundation was represented in the field by Sam Pender on 9-17 February 2009 and James Hughes on 3-4 March 2014. Wandoon Estate was represented in the field by Jacqui Wandin on 9-16 February 2009.

All field participants discussed the proposed activity and the results of the assessment.

4.3 Consultation in Relation to the Recommendations

The proposed complex assessment methodology, comprising a combination of 1 m² hand-excavated test pit and shovel test pits, was discussed with all representatives on site. Following both standard assessments, the field team discussed where to place test pits and shovel test pits in order to optimise excavations on particular landforms and target any identified areas of archaeological sensitivity. Locations in this investigation were agreed on based on the presence of previously registered Aboriginal cultural heritage place VAHR 7921-1073 as well as on sand ridge landforms in the south of the activity area.

Upon completion of the current complex assessment the RAP applicant representatives expressed satisfaction with the outcomes of the amount of excavation that had been undertaken across the activity area throughout the 2009 and 2014 excavations. They also noted that a large part of the activity area (particularly the central and northern section of the activity area) is a lagoonal flood plain, geomorphologically connected to flood regimes of Dandenong Creek. All participants were satisfied that sufficient testing had been undertaken, and that no further testing is required.

4.4 Summary of Outcomes of Consultation

Consultation with WTL&CCHCI, Wandoon Estate, BLCAC and BWFL was conducted at key points during the preparation of this CHMP and the discontinued CHMP 10763 in 2009. A summary of the consultation process and outcomes of consultation is provided below and summarised in Table 4.

- The field assistants were involved in the discussions in the field regarding survey methodology for the standard assessment, subsurface testing methodology and locations to be tested during complex assessment.
- On completion of standard and complex assessments the field representatives were consulted regarding the results. Discussions were held regarding the artefacts located during complex assessment, and the extent of subsurface testing undertaken.
- The field representatives and archaeologists agreed that the site located during the complex assessment was a low density, locally distributed artefact scatter, and it was considered unlikely that dense concentrations or broadly distributed cultural heritage material was likely to have been present. The field representatives were satisfied that the extent of site Perry-Scoresby VAHR [7921-1073] had been defined and considered that no further assessment was required.

Table 4: Documentation of consultation with the RAP applicants

Dates	Contact Method	Community Group	Representative(s)	Activity
9–16 February 2009	Fieldwork	WTL&CCHCI	Colin Hunter Michael Xiberras	Field Survey and subsurface testing
9–16 February 2009	Fieldwork	BLCAC	Izzy Pepper Phaedra Murray	Field Survey and subsurface testing
9–16 February 2009	Fieldwork	BWFL	Sam Pender	Field Survey and subsurface testing
9–16 February 2009	Fieldwork	Wandoon Estate	Jacqui Wandin	Field Survey and subsurface testing
3–6 March 2014	Fieldwork	WTL&CCHCI	Michael Xiberras	Field Survey and subsurface testing
3–4 March 2014	Fieldwork	BLCAC	Izzy Pepper	Field Survey and subsurface testing
3–4 March 2014	Fieldwork	BWFL	James Hughes	Field Survey and subsurface testing

5 Desktop Assessment

This section presents the results of the desktop assessment in accordance with s.53 (2) of the Act.

5.1 Search of the Victorian Aboriginal Heritage Register

Annette Xiberras accessed the VAHR on 27 February 2014. A search was conducted for previously registered Aboriginal Places and prior Aboriginal cultural heritage assessments within a 3 km radius of the activity area, and in the geographic region within which the activity area is located.

5.2 The Geographic Region

The Activity Area is located on the South Eastern Plains of Melbourne, approximately 38 km south-east of Melbourne and 10 km north-east of the shoreline of Port Phillip Bay and north of Western Port Bay. The site is approximately 16 m above sea level and is located within the north-west section of the South Victorian Uplands, an area of moderately dissected ridges associated with the Mornington Peninsula (LCC 1991: Map 3).

5.3 Geology and Geomorphology of the Geographic Region

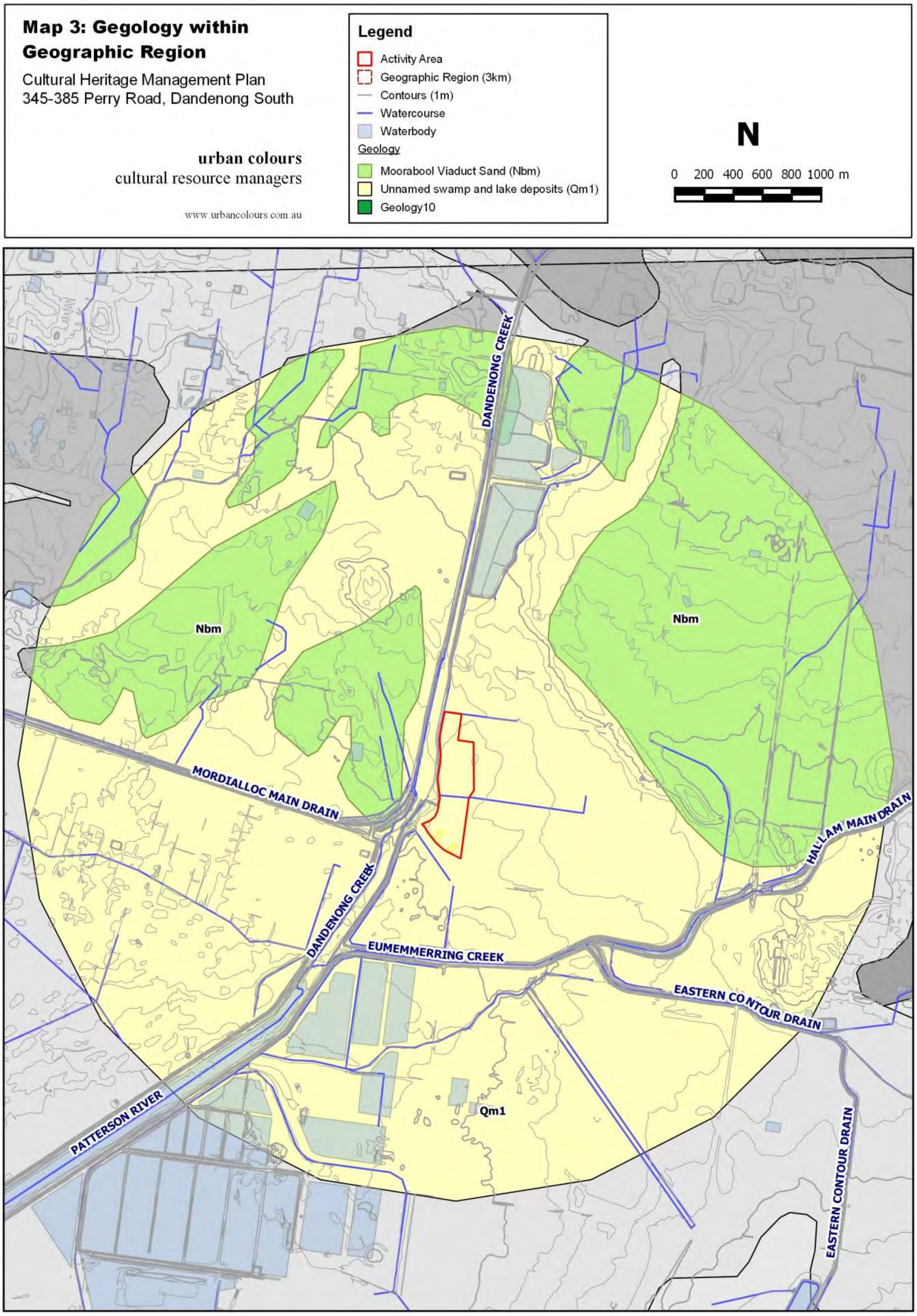
The landform of the activity area and the surrounding region has been formed predominantly through the Tertiary period which saw continual, gradual change. During this time sea levels changed and the temperature fluctuated, falling as much as 80 degrees Celsius below the current mean (Murphy & Dugay-Grist 2008: 14). At the height of the last ice age the sea level was approximately 160 m below the present level (White & O'Connell 1982: 15), creating a land bridge between Victoria and Tasmania. Between 14,000 and 10,000 years ago, climatic conditions became warmer and as a result sea levels rose. Port Phillip Bay flooded about 10,000 years ago during which time it evolved from a series of rivers to a large brackish lake during the Late Holocene. During this time the Yarra and Werribee rivers flowed across the present day Port Phillip Bay into the lake which would have been situated in the middle of the present day Bay (Holdgate et al. 2011). The ridge barrier that developed, particularly around the eastern margins of the bay, blocked discharge points for various waterways, thereby producing the Carrum Swamp (Murphy & Dugay-Grist 2008: 14). The seasonal wetland (now drained) nearest to the activity area was about 1 km to the south (Murphy & Dugay-Grist 2008: 14).

The most extensive geological features in the region are the sand deposits shaped into low ridges, the "Cranbourne Sands‟. These sand deposits date from the Pleistocene age, corresponding to the low sea level phase between 15,000 and 20,000 years ago (Cupper *pers. comm.*). Underlying the Cranbourne Sands is a Pliocene deposit known as "Baxter Sandstone‟ comprised of sandstone, sandy clay, and ligneous clay sediments (Birch 2003) (Map 3).

The activity area is located on an undulating landscape and was located between two, no longer extant, swamps, Carrum to the west and Koo-wee-rup to the east (Bell 2006: 5). This raised area, called the Cranbourne Massif (Birch 1966) was used as a transport corridor by both the Bun Wurrung (Thomas' journal in Cannon 1983) and by early Europeans (Bell 2006: 5).

5.4 Climate

The climate of the activity area is characterised by cool, wet winters and moderate summers with short dry periods. The average rainfall is slightly in excess of 750 mm per annum; the average temperature ranges from a winter minimum of 3 degrees Celsius to a summer maximum of 26 degrees Celsius (LCC 1991: 60).



Map 3: Geology of activity area and geographic region

5.5 Native Vegetation

Remnant vegetation is usually a good indicator of the degree of ground disturbance and therefore the likelihood of *in situ* Aboriginal archaeological deposits, at least in shallow deposits. In addition, it can also highlight the range of plant species available for use by the local Aboriginal groups during pre-Contact times (Murphy 2004: 6). The vegetation within the activity area changed from casuarina woodland in the early Holocene to a eucalyptus-dominated heathland as a result of climatic, water table and coastal changes (Map 4). Burning activity by Aboriginal people may also have influenced the increase in biodiversity that occurred during the period. Burning served to open the area for access, facilitate new growth, and flush out animals for hunting (Aitken & Kershaw 1993: 78).

The low-lying parts of the Cranbourne area featured swamp paperbark (*Melaleuca ericifolia*), dense tea-tree scrub (*Leptospermum spp*) and *Acacia verticillata* (LCC 1991: 100–103). Swamp gums (*Eucalyptus ovata*) were common on the less well-drained soil and along drainage lines and open woodland dominated the drier Cranbourne plains (LCC 1991: 100–103). The woodland included manna gum (*Eucalyptus viminalis*) and narrow-leaved peppermint (*Eucalyptus radiata)* and in the understorey silver banksia (*Banksia marginata*), prickly tea-tree (*Leptospermum juniperinum*) and austral bracken (*Pteridium esulentum*) were present (LCC 1991: 100–103).

5.6 Fauna

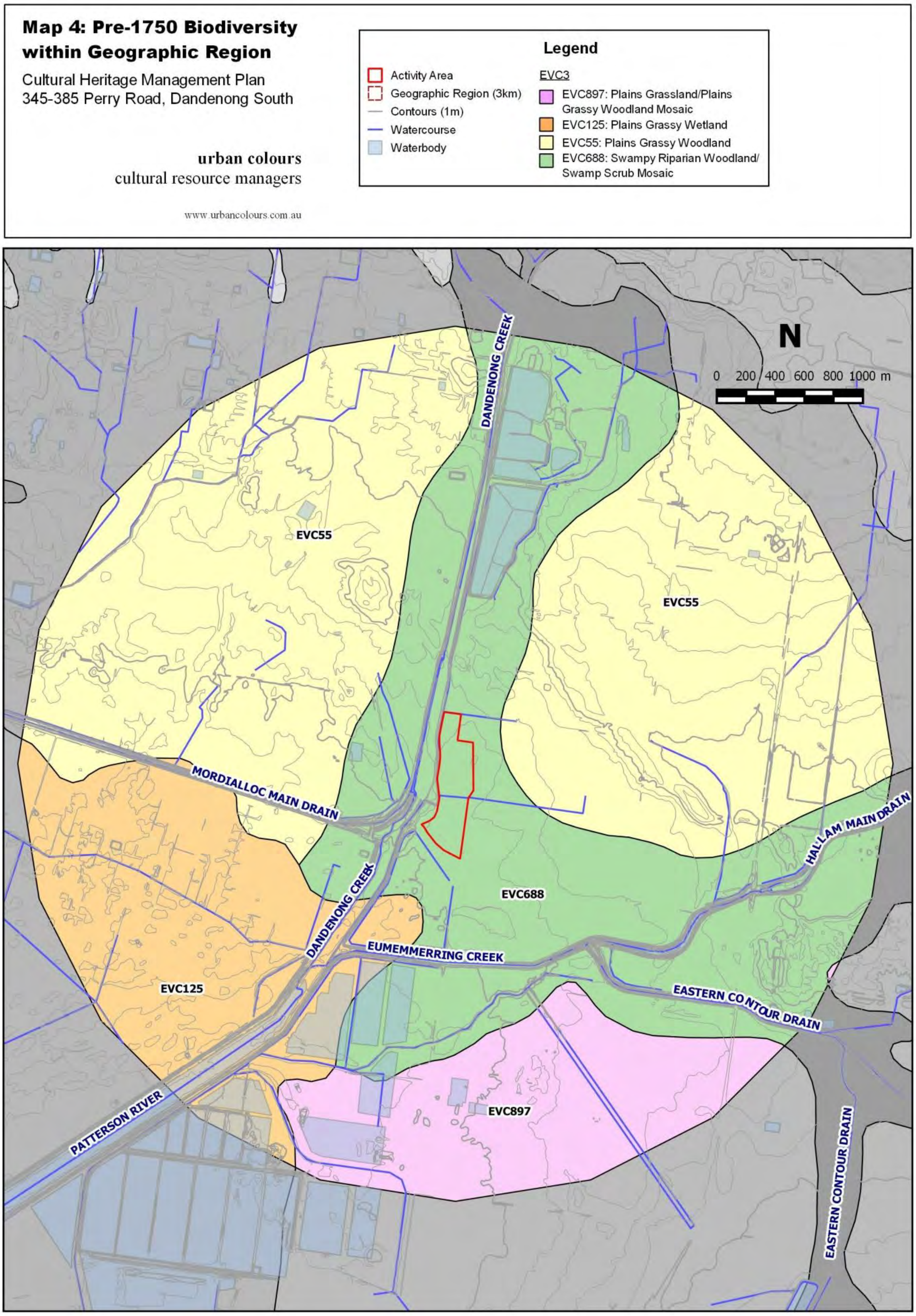
The activity area and surrounding region once supported a great diversity of arboreal and land mammals. Some of those that were common are eastern grey kangaroo, swamp wallaby, potoroo, eastern native cat, brushtail possum, ringtail possum, horseshoe bat, tiger quoll, native rats, echidna, and koala. In the wetlands and waterways eels, black swans, ducks, ibis, and quail were common. There were large amounts of fish and crustaceans. The following can be consulted for further information regarding the flora and fauna of the region: Gaughwin (1981), Gott (1983), Presland (1994), Sullivan (1981), and for a list of bird species see Lyon (1974: 61).

5.7 Natural Resources

A huge diversity of edible animal and plant species was fundamental to the economy of Aboriginal people. The unique environment of Port Phillip Bay provided local clans "one of the richest and most reliable food resource zones in the State" (Coutts 1981: 16). The diet of the Kulin people was based on various types of flora and fauna. The Kulin hunted kangaroos and other large terrestrial animals; however, the plants and smaller animals that the women caught and collected provided the food that sustained the tribe on a day-to-day basis (Coutts 1981: 6).

Roots such as the yam daisy or murnong (*Microseris scapigera*) and native carrot, as well as seeds and fruits were important staples in the diet (Gott 1999: 41). Oral histories and archaeological evidence demonstrate that "plants were the mainstay of the Aboriginal diet" in Victoria and that many hundreds of species were exploited. Large-scale hunts were organised between clans for ritual purposes as much as they were for food. Large numbers of people would gather together, form a circle of several kilometres in diameter, and then move inwards, driving the animals into traps for slaughter (Coutts 1981: 6). Animals were not only taken for food; the skins of kangaroos and possums, for example, were processed and used for clothing. Bone was used for tools and utensils as well as for body adornment, and stomach lining was used for fishing line (Coutts 1981: 14–15, 18). Reeds and other grasses were used for making fishing nets and baskets (Coutts 1981: 14–15, 18). All of these plant and animal resources were fundamental to everyday life and would have been easily accessed within close proximity of the present study area (Gott 1999: 41). Yams, roots, and tubers were roasted in hot coal-fired earth ovens, or ground, mixed with water and formed into dough that was also baked in the ovens. Recent research has also uncovered how Indigenous people used fire strategically and purposefully to increase the germination of valuable tuberous plant sources such as the vanilla lily (Salleh 2005).

Early observers, such as R B Smyth, noted that traditional dwelling places were carefully situated within a day's reach of several different environments, for example woodlands, grassy plains, river or coastal areas and so on. This meant that groups could be flexible about finding food and resources from a range of sources (Coutts 1981: 17, 52). The traditional owners of the activity area and surrounds would have utilised the abundance of water sources, resources, and flora and faunal species in their daily activities. Timber was used to make a variety of utensils, tools and weapons, such as coolamons, boomerangs, digging sticks, shields, and spears. (Coutts 1981: 61–95)



Map 4: Pre-1750 Biodiversity

6 ABORIGINAL HISTORY

6.1 Northern Mornington Peninsula Regional Aboriginal History

Archaeological evidence suggests that Aboriginal peoples have occupied south-eastern Australia for at least 40,000 years BP (Flood 1995: 284–7). The oldest dated archaeological site in Victoria occurs at Keilor in Melbourne where charcoal from a hearth excavated in 1973 has been dated to 31,000 years BP (Flood 1995: 286), older dates of 36,000 years have been attained from sites around Dandenong north of the activity area (Allen *et. al.* 2008). The information used to establish pre-settlement Aboriginal spatial organisation is mostly based on observations made by Europeans during the initial period of contact and subsequent settlement of the activity area (see Barwick 1984; Clark 1990; Goulding 1998 in LCC 1991: 14–32; Presland 1994).

The Aboriginal people who occupied this region of southern Victoria identified themselves as belonging to the Kulin nation; the activity area is included within the confines of the Kulin nation. The Kulin nation was a confederation of five language groups: the *Bun wurrung*; the *Woi wurrung;* the *Wada wurrung*; the *Taung wurrung*; and the *Ngurai illum wurrung.* The five groups shared economic and social relationships, religious beliefs, creation legends and Dreamtime ancestors. Shared beliefs formed the basis for social organisation and land and resource management (Barwick 1984: 105).

All Kulin people were affiliated with one of two groups (moieties) named after common Dreamtime ancestors: *Bunjil* (eaglehawk); and *Waa* (crow) (Barwick 1984: 105). Moiety affiliation was of patrilineal descent and determined marriage and social relationships. The Kulin nation was united by intermarriages between clan members. The clans were exogamic: women married someone outside the clan they were born into and also a member of the other. The word 'kulin' is a common word among the five language groups meaning 'human being' (Presland 2001, 12).

The activity area lies within an area disputed between the traditional lands of the *Bun wurrung* and the *Woi wurrung* (Wurundjeri) which, along with three other groups, comprise the Kulin nation (Presland 1994: 40).

The Boon Wurrung / Bunurong

The territory of the *Bun wurrung* is thought to have extended from the coast of Westernport Bay to the Dandenong Ranges (Gaughwin & Sullivan 1984: 86). The northern boundary was delineated by the source streams in the Dandenong Ranges, the western boundary was the Werribee River, and the eastern boundary was to the east of the Tarwin River (Ellender 2002, Gaughwin & Sullivan 1984: 87). A census conducted in 1839 by Thomas indicates that the *Bun wurrung* may have been comprised of about 500 people or "six square miles per person" (Thomas ML 9: 47). The *Bun wurrung* first came into contact with Europeans in the 1790s; sealers and whalers frequented the shores of Westernport Bay and kidnapped Aboriginal women for use as labourers and concubines, often resulting in hostilities (Murphy & Dugay-Grist 2008: 17). A missionary called Langhorne reported that the Aboriginal people had the "occasional affray" with the sealers and whalers and he believed this had greatly reduced their numbers (Thomas ML: 61). Most early explorers did not come into direct contact with the Aboriginal population of the Westernport region, although they did make observations on campsites, fires and artefacts (Bass 1895, Weatherall 1827).

There was little to distinguish the physical appearance of the various Kulin tribes (Murphy 2004: 16). Captain Milius of Le Naturaliste described a group of Aborigines he saw at Westernport in 1802 as being "different from many of the Aboriginals whom we had seen. They had white paint over their faces, around their eyes and over their bodies. Some members had their nostrils pierced to allow the passing through of a dry straw, which they regarded as an ornament" (Scott 1917).

The group may well have been members of a *Bonkoolawol* or war party from Gippsland, with whom the *Bun wurrung* often fought (Murphy 2004: 16). The Kulin tribes sometimes met for the purposes of intermarriage and the exchange of goods (Sullivan 1981: 36). One such gathering took place in 1844; groups of *Woi wurrung* were camped on the MCG site and groups of *Bun wurrung* were camped on the site of the future Government House (Presland 1994: 47). The *Woi wurrung* traded greenstone from the Mount William quarries to the *Bun wurrung* (McBryde 1984). Some tribes within the Kulin were more inclined to trade with certain other tribes. The *Bun wurrung* had ceremonial links and were more likely to trade wives with members of the *Taung wurrung* and the *Watha wurrung* (Gaughwin 1981: 59); however, such alignments did not prevent warfare between those tribes (Thomas ML 1, 23 March 1839).

The *Bun wurrung* clan that occupied the activity area was the *Mayune balug* (Clark 1990: 364–5). Their territory is thought to have been "Carrum Swamp, the coastal strip at the head of Western Port Bay, and the upper portion of the Mornington Peninsula" (Barwick 1984: 177). The *Mayone baluk* were members of the *Bunjil* moiety (Clark 1990: 367). During the 1840s an individual called Manmangenur was a recognised authority within the clan (Barwick 1984: 117). The *arweet* (clan leader) at the time of first contact with European settlers was Mortrungo, whose heir was Baggup, a member of the Native Police Corps (Murphy 2004: 17). Clark (1990: 367) noted that Burrenum, an influential healer, and his brother Munmunginna were also recognised as possessing influence within the clan, but were not named as *arweet*. Gunson (1974: 10) stated that members of the *Mayone bulug* usually camped beside waterholes, creeks, and at coastal locations. Early settlers of the Westernport region also noted that Aboriginal campsites containing huts were often found beside rivers and creeks (Sullivan 1981: 33). There are no burial sites recorded within a five kilometre radius of the activity area; however, Thomas saw a burial location beyond the Torbinerk (Lang Lang) in 1840 (Gunson 1974: 10). Members of the Kulin were known to both bury their dead and place them in tree hollows that were often subsequently burnt; Thomas noted that:

> *Wood was pulled up to a height of 3 feet and the ground burnt all around, this was of long standing as the woods were literally decayed and dirt over them, I suppose there were 50 sticks laid horizontal thus. At the end was a large dead trunk and hollow burnt in it as if not done by chance. I examined it but could not trace anything worthy of remark further than it appeared to have been many years previous* (in Gunson 1974: 10).

A group of 14 meteorites that landed between Officer and Pearcedale were believed by early European settlers to be important to the local Aboriginal community. Prior to the European discovery of the meteorites local shepherds had noticed Aboriginal people dancing around what is now known as Cranbourne No. 1 Meteorite (Gunson 1974: 63). It was not until a local settler attempted to tie his horse to it that the stone was discovered to be a meteorite (Gunson 1974: 63).

The Wurundjeri

The *Wurundjeri balluk* clan, who controlled land from the upper Yarra River south to Westernport Bay, was divided into two patrilines – the *Balluk-willam* inhabited the areas to the south of the Yarra River, and the *Wurundjeri-willam* occupied

> *…the Yarra flats and the upper part of that river to its source, including the northern slopes of the Dandenong Mountains, thence by Gardiner's Creek to the Yarra River and by it to the Darebin Creek* (Howitt 1904: 72).

The *Wurundjeri-willam* were closely associated with the Yarra and Plenty Rivers. The meaning of *Wurundjeri Willam* is 'white gum tree dwellers'; and the patriline's moiety is Waa (Crow). The *Wurundjeri Willam's* territory was divided into three areas and controlled by three related *Ngurungaeta* (clan head men) at the time of Contact. The preeminent *Ngurungaeta* of the *Wurundjeri Willam* was Billibellary, one of the headmen that co-signed John Batman's 'treaty' (Barwick 1984: 122; Clark 1990: 385).

The *Ngurungaeta* of the *Wurundjeri Willam* in the patriline's territory from Heidelberg up the Yarra River to Yering was *Bebejan*, William Barak's father. In 1874 William Barak became the last heir of the *Woi wurrung's Ngurungaeta* position after the death of his cousin, Simon Wonga (*Billibellary's* son). Barak named three young men who had assisted in fighting against the sale of Coranderrk as joint successors to the *Ngurungaeta* position. These men were his nephews, *Wandoon* (Robert Wandin), *Birdarak* (Thomas Banfield) and Thomas Dunolly (Barwick 1984: 122-124; Clark 1990: 385). William Barak was one of A.W. Howitt's main informants for the ethnography of the Kulin area. Howitt interviewed Barak and other Kulin elders between 1880 and 1903 (Barwick 1984: 101).

There is little specific reference to the Bangholme district in ethnographic sources that is not related to the exploitation of the Carrum Swamp; however Aboriginal people are likely to have participated in the interregional gatherings of the Kulin Nation for trade, marriage and social and political purposes (McBryde 1978).

Prior to Contact, strict social rules and customs had organised the way that people from different language groups entered each other's lands and utilised each other's resources. The massive disruption unleashed upon these long-standing codes by people being forcibly relocated, rounded up onto missions and either becoming reliant on handouts or being reduced to near-slavery was reflected in the catastrophic population decline in the Indigenous population that had occurred by 1851 and continued thereafter (Coutts 1981: 98–100, 209).

6.2 Life after European Contact

The first squatters in the region, the Ruffy brothers, arrived from Tasmania in 1836 (Murphy & Dugay-Grist 2008: 22). The brothers took up the pastoral lease of the Tomaque run to the west of Cranbourne in 1836 and held it until 1850; they then took up the lease of the 32,000 acre Mayune run 2 miles to the east of Tomaque (Billis & Kenyon 1974). The activity area is located in the Ballymarang pastoral run that is located to the west of Tomaque (Murphy & Dugay-Grist 2008: 22). Ballymarang was first held by H.G. Ashurst, a Melbourne merchant; his resident manager between 1841 and 1844 was James Horsfall (Murphy & Dugay-Grist 2008: 22).

The Wedge brothers acquired the Bangam and the Ballymarang stations and managed them as a combined run until 1852; the combined area was forty-two square miles and stretched from Ruffy"s Road to Frankston (Murphy & Dugay-Grist 2008: 22). The homestead was located at the edge of the Carrum Swamp, close to what is now the Dandenong–Frankston Road (Murphy & Dugay-Grist 2008: 22). At this time the run seems to have been referred to as the "Banyan Waterholes" (Gunson 1974: 34). An early description of the run was given by Richard Howitt in 1843:

> *…a squatting station I had seen long before I reached it, appearing taller and larger through the trees with which it was surrounded, the new weatherboard house. Cattle were sprinkled over the country – this part of Western Port being too wet in the rainy season for sheep ... This valley (swamp) is knee-deep in water, almost the whole length of it, in the wet season; yet during summer, there is no other water than what saturates the deep boggy soil of the tea-tree – at intervals – covered valley* (in Gunson 1974: 35).

During 1898 bushfires swept through the activity area, and in a broad band between Tooradin, Frankston, and Cranbourne (Gunson 1974: 171). Although most homesteads surrounding the activity area were saved, virtually all the post-and-rail fences in the area were lost, along with outhouses, haystacks, crops, orchards, and thousands of head of livestock (Gunson 1974: 171). After the First World War the dominance of Cranbourne as a market town began to decline, principally due to the development of Dandenong as a market town in the Westernport region (Murphy 2004: 9).

6.3 Specific activity area land use history

The activity area is currently utilised for the grazing of horses. The entire property on inspection showed some level of disturbance on the ground surface, although this was generally punctuated across the activity area as a whole. The entire activity area is subject to periodic flooding due to rises in Dandenong Creek which is evident in the clay profile across the majority of the activity area. Additional land use activities undertaken within the activity area may include but not be limited to:

- <u>the clearing of original native vegetation</u>

- 100 years of cattle grazing
- construction of a series of dams
- significant drainage works through the centre of the activity area
- market garden activities.

This previous land use means it is possible that much of the surface cultural heritage material would either have been disturbed in some way or possibly destroyed. This is particularly relevant where previous flood regimes are concerned. The clearing of the land and ploughing processes would have impacted upon the area. Ground disturbances that have occurred within the activity area since European settlement include clearing of the native vegetation in 1940s to facilitate a market garden within part of the activity area and the planting of an orchard in the north of the activity area.

6.4 Aboriginal Places in the Geographic Region

The Victorian Aboriginal Heritage Register (VAHR) was accessed on 27 February 2014 by Annette Xiberras.

A review of the VAHR at The Office of Aboriginal Affairs Victoria (OAAV) shows that there is one previously registered Aboriginal cultural heritage site within the activity area (VAHR 7921-1073) (Map 5). A total of 12 subsurface artefacts were identified within a thin sandy rise aligned north–south in the far southern section of the activity area. The sandy rise comprises the very northern edge of a much longer system that extends further to the south beneath and south of Perry Road. Urban Colours Cultural Resource Managers identified the subsurface occurrence during excavations at the site for a former Sponsor (discontinued CHMP 10763) on 9–16 February 2009. A site card was submitted for the Place and approved by the VAHR in March 2009.

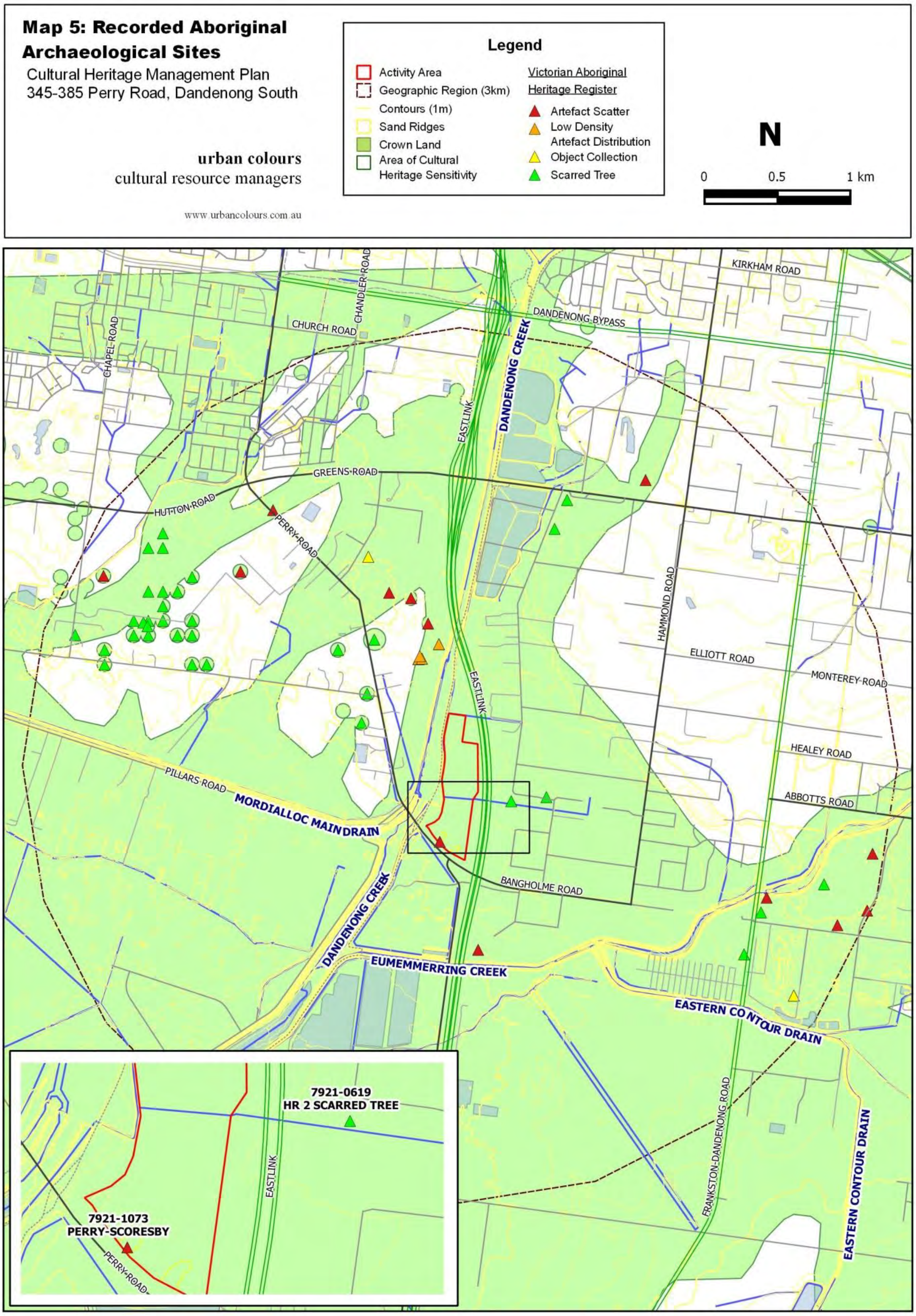
There are 69 previously registered sites within a 3 km radius of the activity area (Map 5). The site inventory comprises 34 Aboriginal scarred trees, 18 low density artefact distributions (LDADs), 15 artefact scatters and 2 object collection forms.

Table 5: Previously recorded Aboriginal Places within a 3 km radius of the activity area

VAHR PLACE ID	PLACE NAME	COMPONENT TYPE	WITHIN ACTIVITY AREA?
7921-0216	DANDENONG 3	Scarred Tree	No
7921-0217	DANDENONG 4	Scarred Tree	No
7921-0237	DANDENONG 7	Scarred Tree	No
7921-0273	MORISON 1	Scarred Tree	No
7921-0274	MORISON 3	Scarred Tree	No
7921-0275	MORISON 5	Scarred Tree	No
7921-0276	MORISON 6	Scarred Tree	No
7921-0277	MORISON 7	Scarred Tree	No
7921-0281	BEYER 2	Scarred Tree	No
7921-0309	BOWMAN 7	Scarred Tree	No
7921-0310	FRYER 3	Scarred Tree	No
7921-0311	FRYER 4	Scarred Tree	No
7921-0312	FRYER 7	Scarred Tree	No
7921-0313	FRYER 9	Scarred Tree	No
7921-0314	FRYER 10	Scarred Tree	No

VAHR PLACE ID	PLACE NAME	COMPONENT TYPE	WITHIN ACTIVITY AREA?
7921-0315	FRYER 11	Scarred Tree	No
7921-0316	FRYER 12	Scarred Tree	No
7921-0317	FRYER 13	Scarred Tree	No
7921-0318	FRYER 14	Scarred Tree	No
7921-0319	GLENN FRYER 1	Scarred Tree	No
7921-0320	GLENN FRYER 2	Scarred Tree	No
7921-0321	GLENN FRYER 3	Scarred Tree	No
7921-0322	MS FRYER 1	Scarred Tree	No
7921-0323	MS FRYER 2	Scarred Tree	No
7921-0324	FRYER 15	Scarred Tree	No
7921-0333	HEWITT 1	Scarred Tree	No
7921-0336	SCHIRMER 1	Scarred Tree	No
7921-0337	SCHIRMER 2	Scarred Tree	No
7921-0341	FRYER WALLOW	Artefact Scatter	No
7921-0370	POSTREGNA SCARRED TREE	Scarred Tree	No
7921-0398	KELLY BROS SS	Artefact Scatter	No
7921-0398	KELLY BROS SS	Object Collection	No
7921-0576	AIR CLUB	Artefact Scatter	No
7921-0611	HR 1 SCARRED TREE	Scarred Tree	No
7921-0619	HR 2 SCARRED TREE	Scarred Tree	No
7921-0660	FRYER RIDGE	Artefact Scatter	No
7921-0672	COLEMANS RD AS1	Artefact Scatter	No
7921-0810	KELLY 2	Artefact Scatter	No
7921-0811	KELLY 3	Artefact Scatter	No
7921-0812	KELLY 4	Artefact Scatter	No
7921-0815	COLEMANS ROAD SCARRED TREE 2	Scarred Tree	No
7921-1073	**PERRY-SCORESBY**	**Artefact Scatter**	**Yes**
7921-1181	PERRY ROAD 1	Artefact Scatter	No
7921-1181	PERRY ROAD 1	Object Collection	No
7921-1291	Greens Road IA 1	Artefact Scatter	No
7921-1360	Perry Road 2	Artefact Scatter	No
7921-1362	Perry Road 4	Artefact Scatter	No
7921-1363	Perry Road 5	Scarred Tree	No
7921-1361	Perry Road 3	Artefact Scatter	No
7921-1442	Perry Road Reserve AS	Artefact Scatter	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No

VAHR PLACE ID	PLACE NAME	COMPONENT TYPE	WITHIN ACTIVITY AREA?
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No
7921-1450	259 Perry Rd LDAD	Low Density Artefact Distribution	No



Map 5: Previously registered sites within the geographic region

6.5 Previous Archaeological Research in the Geographic Region

This section presents the results of prior archaeological studies relevant to or conducted in the vicinity of the subject activity area, along with the current regional model of site distribution. This information is reviewed in order to determine the archaeological sensitivity of the activity area and to develop a predictive model to inform the methodology of the field program. This section also provides insight into the range of site types that may be expected to be identified within the subject activity area along with the types of landforms sites are generally identified on.

6.5.1 Regional Archaeological Studies

Gaughwin (1981) undertook archaeological surface surveys across the northern Peninsula region into Western Port Bay (Western Port catchment area) and recorded 266 Aboriginal archaeological sites, 13 of which were found within an area referred to as “Top of the Bay” (around Bangholme, Cranbourne and Carrum Downs).

The highest number of sites and artefact densities were identified on sandy ridges around the Cranbourne area, particularly within close proximity to water. Gaughwin determined that the sites located on these sand ridges are situated to take advantage of resources associated with swamp depressions. The site prediction model formulated for the “Top of the Bay” landform is perhaps broadly relational to the current activity area. Gaughwin predicted artefact scatters and isolated artefacts are the most likely site type to occur within this unit. Gaughwin also stated that most sites will be within 100 m of a water source, including rivers, creeks, swamps, ponds, springs, coastline, lagoons and soaks.

The highest site densities will be found in Cranbourne Sands and high dry ground such as ridges and hummocks. Lowest site densities will be found along the foreshore and in low-lying areas such as the bases of former swamps. It is less unlikely that scarred tree sites will be located within the region due to the absence of large mature species trees. Surface scatters will be dominated by silcrete, quartz and chert artefacts.

Sullivan (1981) undertook a regional archaeological study of the Mornington Peninsula comprising three distinct terrain units; northern hills and plains (a landform comparable to Gaughwin's "Top of the Bay"), upland environments and the south-west peninsula. A total of 289 sites were identified by Sullivan, of which a small number (n=15) were identified within the northern hills and plains region. Pertinent to this study is that all 15 sites were identified within the upper Mornington Peninsula region.

A total of 14 of the 15 sites were artefact scatters and one site included a shell midden. All sites were located within a few hundred metres of the former Carrum Swamp margins. Sullivan argued that the propensity for more sites to be present on the Port Phillip Bay coastline indicated clear targeted resource strategies on the large and more reliable Carrum Swamp, as well as the higher number of rock platforms along the eastern edge of Port Phillip Bay as opposed to the more widespread silty-sand deposits across the greater Western Port Bay area. Larger sand depositional sequences in Western Port Bay may be attributed to the greater tidal fluctuations this bay experiences.

Smith (1991) conducted an archaeological assessment of the Berwick–Pakenham Corridor, which extends on either side of the Princes Highway between Dandenong and Bunyip, including the current activity area. The study area comprised approximately 255 square kilometres. A site survey was conducted over six weeks and 62 previously unrecorded sites were identified. Of these sites, 32 are artefact scatters, 13 are isolated artefacts, 15 are scarred trees and 2 are collections made by local landowners. The survey methodology aimed to sample each landscape unit, but the field strategy became largely an opportunistic one focusing on areas of good visibility. Smith identified four landscape units in the study area and produced a site prediction model for each zone:

- Undulating Hills: Artefact Scatters and isolated stone artefacts will be the most common artefact type in this zone. Most artefact scatters and scarred trees occur within 50 m of permanent creeks. Isolated artefacts occur on hill slopes and ridges across this unit. The most common artefact type is quartz.

- Lowland Plains: The most common site type in this zone is artefact scatters, particularly in subsurface deposits. Most artefact scatters and scarred trees occur near permanent creeks. Stone artefact scatter sites are dominated by quartz, chert and silcrete artefacts.
- Flood Plains: Scarred trees are the most common site type in this area and are predicted to occur wherever mature river red gums have survived. Artefact scatters are predicted to be rare in this zone.
- Cranbourne Sands: Artefact scatters are the most common site type in this zone and occur at the highest densities. This high density could be due to greater surface visibility in these areas, but it is suggested that this zone was resource-rich and provided dry camping locations from which resources could be exploited.

In summary, Smith concluded that the results of the survey reflected the distribution and abundance of food and water resources. The current activity area conforms to Smith's zone 'Undulating Hills'. Smith concluded that the degree of disturbance within her study area means that most sites in the area will be disturbed to some extent.

Murphy (1997) conducted a desktop Aboriginal archaeological investigation for the City of Casey over an area described as the 'Urban and Non-Urban Foreshore'; the area stretched from Cranbourne to Westernport. The predictive archaeological model generated by the study indicated that surface scatters and isolated artefacts are the most likely type of site to occur within the area covered by the investigation; also, sites are most likely to occur within 100 metres of either a past or present water source. Sites located inland and on the Cranbourne Sands landform are likely to be much older than those located near the present coastline.

Rhodes (2001) undertook an Aboriginal heritage study of the City of Greater Dandenong; the study reviewed all ethnographic and archaeological investigations that had been undertaken to date within the boundaries of the City. Rhodes conducted a cursory ground survey and recorded two new Aboriginal archaeological sites: a scarred tree and an isolated artefact. Areas of greatest potential for sites were considered to be those on undisturbed elevated ground, areas close to water, and those areas containing pre-contact red gums.

Feldman & Long (2004) produced a desktop report called Melbourne 2030 Casey–Cardinia Growth Area. This study assessed the distribution of Aboriginal archaeological sites within the Casey–Cardinia area. It divided the area into six landscape zones, within which the current activity area is represented as Urban Areas:

- Zone 1: Major Drainage Corridors – the foothills and intermediate plains are drained by four major creek complexes; these areas have clearly acted as a focus for Aboriginal occupation in the recent past and are associated with a range of comparatively dense artefact scatters and scarred trees, within both the surrounding foothills (Zone 5) and plains (Zone 2).
- Zone 2: Intermediate Plains – a slightly elevated band of flat or undulating land bordering the northern foothills (Zone 5) and Koo-wee-rup Swamp (Zone 4). This area is dominated by agriculture and urban development. The archaeological record is dominated by stone artefact occurrences on alluvial flats and outwash fans associated with creeks draining the foothills (Zone 5). These occur as comparatively dense, localised scatters and a broader backdrop of diffuse isolated finds. Research has demonstrated the potential for buried deposits to occur to a depth of 800 mm, possibly in association with a complex of palaeo-landforms (prior and former stream channels), which are obscured below the current alluvial land surface. Scarred trees, a notably significant site type in this region due to their rarity, may also occur within stands of native remnant vegetation in this zone.
- Zone 3: Urban Areas – Sections of Hampton Park have been subject to intense urban development over the past 20 years. Archaeological sites may still occur in open spaces in these areas but archaeological potential should be regarded as low.

- Zone 4: Koo-wee-rup Swamp – reclaimed low-lying swampland; this area is characterized almost entirely by irrigated agriculture and has not been comprehensively assessed and received no effective survey coverage. On the basis of comparative research we can assume that archaeological sites may occur as buried deposits associated with former drainage channels or as shallow surface deposits on raised alluvial landforms and around the margins of depressions.
- Zone 5: Northern Foothills – steep, dissected foothills to the Great Dividing Range immediately north of the Princes Highway, characterized by agricultural land and regrowth forest. This area has largely been unassessed by previous studies and the archaeological values are uncertain. On the basis of comparative research, surface scatters may occur on ridgelines, terraces and in the minor creek valleys which drain the zone. Scarred trees may occur in areas of remnant native vegetation, though much of this zone has been subject to land clearance and logging.
- Zone 6: Cranbourne Massif and Surrounding Plains – an area of undulating plains centred on an elevated ridge of volcanics and sedimentary rock characterized by widespread sand drifts. The archaeology is dominated by localized dense scatters of stone artefacts associated with sand drifts, ridgelines and drainage lines, within a broader diffuse scatter of isolated artefacts occurring widely in the landscape. Burials may occur within sand deposits.

6.5.2 Local Archaeological Studies

Webb (1995) produced the Keysborough Local Structure Plan: The Archaeological Study. This study encompassed the suburb of Keysborough to the immediate east of the current activity area. Springvale Road was the western boundary of Webb's study area. The survey identified 52 scarred trees and 4 stone artefacts scatter. Webb noted the scarred trees as probable rather than definite. During the survey difficulties were encountered with extensive ground cover, resulting in poor ground surface visibility and inability to access some areas. The stone artefact sites were either isolated artefacts or low density scatters with silcrete noted as the preferred raw material source.

Marshall (1996) conducted an Aboriginal Archaeological Survey of Braeside Park. Braeside Park is located 5km to the north west of the activity area. Braeside Park is located on land that was once the Carrum Swamp, which also encompasses parts of the eastern section of the current activity area. The field survey focused on the sections of the park with River Red Gum habitat. Areas of the park with no ground visibility were not surveyed.

Forty-one trees in the area were noted to have alterations (possible scarring); however, further analysis suggests that only six of them are likely to be Aboriginal in origin. These are VAHR 7922-0557–7922-0562. Scarred trees in the region are exclusively located on old River Red Gums as was first identified by Webb in 1995. Marshall noted that within heavily developed urban areas, Aboriginal archaeological sites are most likely to survive in parks, remnant pockets of bushland and those areas that have not been heavily modified.

Murphy and Amorosi (2003) prepared a Cultural Heritage Assessment of a site on the corner of Perry and Bangholme Roads approximately 400 metres south east of the activity area. The study area was located approximately 30 metres from the Eumemmerring Creek Drain. The survey was conducted over two days; on each day two people were involved. No Aboriginal sites or areas of sensitivity were identified. Consequently, the recommendations were that work could proceed unhindered.

Murphy (2005) undertook a Cultural Heritage Assessment of a site at 59–87 Ordish Road, Dandenong South, 1km north of the activity area. The site had been used as a dumping ground for fill and rubbish. A pedestrian survey indicated that the ground had been disturbed and also that there were no mature trees on the site. Murphy found that the earth had been disturbed down to clay and therefore there was no opportunity of identifying Aboriginal archaeological sites. The recommendation was that work could proceed but that in the unlikely case that Aboriginal cultural heritage material was identified then contingency plans needed to be referred to.

Stone (2007) undertook a Cultural Heritage Management Plan of proposed wetlands that would run parallel to Eumemmering Creek. The wetlands were to be made up of four connected basins, one of which was probably on the site of a waterhole that had been used by Aborigines to catch eels and possums. The survey did not locate any Aboriginal archaeological sites. It was thought that this was due to the extensive works that had already been carried out. Based on the results of the survey and consultation with the local Aboriginal community it was recommended that work could proceed.

Long and Thomas (2009) undertook a complex CHMP approximately 1.5 km to the north of the current activity area. One Aboriginal cultural heritage place (7921-1011) was identified, comprising two silcrete artefacts identified in a disturbed context on the surface in the north-west corner of the activity area. Extensive testing in the immediate and wider surrounds did not reveal any further cultural material. The authors suggested that there was little potential for associated subsurface material and no minimisation of harm strategies were recommended. The assessment did not identify any subsurface Aboriginal cultural heritage material and it was concluded that no further scientific investigation or other specific measures were required for the activity.

Long *et al.* (2009) undertook an additional complex CHMP in Keysborough for an industrial subdivision project approximately 2 km north of the subject activity area. While no Aboriginal cultural heritage was identified as part of the standard assessment, it was assumed that the activity area had high potential for subsurface archaeological deposits as indicated by the Bend Road 1 (7921-0735) excavations (Allen *et al.* 2008) which were located just north of the Long (2008) activity area, as well the presence of a sand landform within the extent of the subject activity area.

A total of 268 shovel test pits and 19 1 x 1m test pits were excavated to a maximum depth of 1250 mm. The results provided valuable information about subsurface soil deposits and Aboriginal cultural heritage contained within the activity area. The sites identified are summarised below;

VAHR 7921-0735 (Bend Road 1)

The site consists of an artefact scatter (n=515) of variably high density and stratified within a sandy rise landform in the north-east corner of the site. The scatter forms a contiguous extension of a previously identified Aboriginal cultural heritage place, located within the adjacent EastLink Reserve, which has previously been evaluated as part of a series of investigations (Allen et al. 2008). A number of former tool types and stone raw material classes were identified as part of the excavations and time depth comparisons with Bend Road (Allen *et al*. 2008) have been inferred based on the results of a series of OSL dates that were attained from the site.

VAHR 7921-1182 (Bend Road 3)

The Bend Road 3 assemblage consists of a small number of artefacts (n=3) comprising a limited range of stone raw material and typological variability. The place boundaries were defined on the basis of the distance between the artefact-bearing locales and the surrounding pits that yielded no artefacts.

VAHR 7921-1182 (Bend Road 4)

The Bend Road 4 assemblage consists of a single artefact retrieved from a depth of ~300 mm representing 0.2% of the overall Bend Road assemblage. This artefact is a fine-grained silcrete medial backed blade with ventrally initiated scalar and stepped retouch.

VAHR 7921-1181 (Perry Road 1)

The site consists of an artefact scatter (n=176) of variable but generally low density cultural heritage material with a high frequency of flaked material as opposed to formal tool types.

The Long *et al* (2009) investigation demonstrated that four Aboriginal cultural heritage places occur within the Activity Area, consisting of one place of high scientific significance (7921-0735), one place of moderate scientific significance (7921-1181) and two places of low scientific significance (7921-1182 & 1183), which were considered to be low density periphery occurrences to the foci at 7921-0735.

Murphy and Dugay-Grist (2009) produced a CHMP (10493) entitled Residential Subdivision, 10 & 12 Short Road, Hampton Park. This activity area is located approximately 2.5 km east of the current activity area. This voluntary CHMP was undertaken because a landform of potential sensitivity (elevated sandy rises) was located within the activity area. A high density of sites has been recorded in the wider area, particularly in sandy rises. The complex assessment comprised three 1 x 1 m test pits and eleven shovel probes. No new Aboriginal places were discovered during this assessment.

Adams and Stevens (2009) undertook a complex CHMP (10763) at 345–385 Perry Road Dandenong South (which is the subject activity area of this CHMP). The desktop assessment did not identify previously registered Aboriginal cultural heritage sites within the subject activity area and it also suggested that the entire activity are may reside within a flood plain of the nearby Dandenong Creek (approximately 50 metres to the west). The standard survey also failed to identify Aboriginal cultural heritage places, although it was noted that surface visibility was low. Two low standing sandy rise landforms were observed along the southernmost fenceline (Perry Road) and areas of exposures resultant from stock disturbance confirmed a sand profile in this area. A subsurface testing program was undertaken comprising 87 40 cm^2 shovel test pits and two 1 m^2 stratigraphic test pits in order to assess the nature, distribution and significance of Aboriginal cultural heritage places in a subsurface context.

A total of 65 shovel test pits throughout the central and northern section of the activity area confirmed a clay base land form which conforms to geological mapping of the activity area. A total of 22 shovel test pits and two $1m^2$ excavations undertaken on the sandy rise landform identified 12 artefacts manufactured from a variety of silicates. One crystal quartz backed blade was also identified as part of this assessment. The investigations undertaken as part of this CHMP confirm the association of Aboriginal cultural heritage material and Cranbourne Sands profiles. They also suggest that Cranbourne Sands soil profiles, in the form of obscure low-lying sandy rises, are prevalent outside the perceived extents of this geomorphological province.

Light and Schell (2010) produced a CHMP (11299) for the Hallam Road Upgrade, Hampton Park approximately 2 km east of the current activity area. This activity area is a 3 kilometre stretch of Hallam Road from Blackwood Drive to Livingston Rise. The activity involved the widening of Hallam Road. The desktop assessment concluded that stone artefact scatters were located within sandy environments and adjacent to wetland resources, and that the most likely place for Aboriginal heritage is on the mid-slopes and upper slopes of sandy rises that have not been subject to significant disturbance. The desktop assessment identified two previously registered small artefact scatters (VAHR 7921-0239 and 7921-0916) located outside the activity area. As the extent of these sites was not confirmed, further subsurface assessment was undertaken to establish if they extended into the subject activity area. The standard assessment consisted of pedestrian survey and auger probes. While the probes provided evidence that some parts of the activity area were highly disturbed, pockets of undisturbed deposits were identified.

During the complex assessment eleven 1 m^2 test pits and 43 shovel test probes were excavated across all landforms. Three new sites were identified as a result of the subsurface testing program, VAHR 7921-1231, 7921-1232 and 7921-1233. All of these sites are low density diffuse subsurface stone artefact scatters in areas of varying levels of disturbance.

- VAHR 7921-1231 comprises two quartz artefacts and was located within the lower-slopes landform. Testing in this area demonstrated a soil profile of introduced fill, underneath which was a grey fine-grained silty sand with water filling the bottom of the test pits. The artefacts were located at a depth of 600–700 millimetres.
- VAHR 7921-1233 comprised a single silcrete flake, located within the mid-slopes landform at a depth of 400–500 millimetres in a moist grey clayey silt deposit.
- VAHR 7921-1232 comprised of 34 stone artefacts and was located along the creek corridor at depths of 50–800 millimetres in a silt deposit. No sites were located on the upper slopes landform and significant disturbance was noted in areas that had been subject to past farming and road building activities as well as residential construction. The authors note that it was difficult to confirm the southern extent of 7921-1232 because of its diffuse nature.

Testing took place to confirm the extent of VAHR 7921-0916. No additional material was located during the testing and the boundaries of this place were consequently not extended beyond the original recording.

Of particular relevance is that this CHMP (11299) provided evidence that all landforms tested displayed low to moderate levels of archaeological sensitivity.

Dugay-Grist and McAlister (2011) produced a CHMP (11524) for 58 Somerville Road, Hampton Park: Residential Subdivision. This activity took place 3 km east of the current activity area. This CHMP was conducted voluntarily as although the land is not located within an area of cultural heritage sensitivity it does have an elevation of above 30 m AHD and a CHMP was determined to be the best way to determine and manage cultural heritage values.

The desktop assessment indicated a strong concentration of low density artefact scatters in elevated sandy deposits throughout the area. The standard assessment identified areas of prior disturbance and noted a lack of ground surface visibility. The complex assessment comprised of one 1 x 1 m test pit and five 40 x 40 cm shovel test probes.

No Aboriginal cultural heritage material was located during this testing.

6.5.3 Summary of Previous Archaeological Studies

The results of the local and regional studies, combined with an understanding of the nature and extent of past survey coverage, can be used to construct a predictive site statement for the region and activity area.

Sites including surface and subsurface cultural deposits which contain stone artefacts and scarred trees may be identified in all landforms throughout the geographic region. A review of previous archaeological investigations undertaken in the region indicates that the most likely site types within the activity area are low density subsurface artefact scatters and isolated artefacts. Scarred trees also frequently occur where stands of remnant red gums remain.

Previous studies indicate that Aboriginal sites are most commonly found on higher points overlooking swamps or creeks; however this is not always the case. Many studies have shown (e.g. Long 2008; Long et. al. 2009; Adams and Stevens 2009; Light and Schell 2010) that cultural heritage sites are present across a diverse range of landform types within the greater geographic region, particularly on low-lying Baxter Sandstone that contains both residual decomposing sand mantled by aeolian sand deposits deriving from the surrounding nodal ridge systems to the south west. Resources are typically situated in low-lying areas within the region and correspondingly artefact assemblages indicate that a broad-range of activities were undertaken across these low-lying areas.

The activity area is located within the Baxter Sandstone landform and this has moderate potential for intact archaeological deposits and scarred trees. Cranbourne Sands, which overlay the Baxter sandstone and occur intermittently throughout the geographic region, are a highly sensitive soil profile type for Aboriginal cultural heritage material. There is one previously registered Aboriginal cultural heritage place within the activity.

Of particular relevance to this study are the two assessments undertaken by Long and Thomas (2009) and Long *et al.* (2009) approximately 1.5 km north of the subject activity area. These investigations, along with the investigation undertaken at Bend Road (Allen *et. al.* 2008), indicate that moderate density sites are prevalent in the geographic region, particularly when water sources coincide with sand landforms or articulated sand ridgelines.

The previous discontinued CHMP (10763) undertaken within the current activity area has confirmed that a sandy ridgeline is present within the southern section of the activity area, and the current study presents an opportunity to investigate other less intensively tested areas within this location. In keeping with the results of VAHR 7921-1073, it is expected that any cultural material present within the subject activity area will most likely be confined to the southern section and is assumed to represent a low-density broadly distributed artefact scatter buried within the sand profile along the southern fenceline of the property.

The property has most recently been used for agriculture and grazing purposes. The construction of a variety of sheds and associated farm buildings in the south-west corner would have caused past ground disturbance and may have harmed any Aboriginal cultural material present.

Given the current site distribution model for the geographic region and the close proximity of known low density artefact scatters, the archaeological potential of the activity area is assessed as moderate to high. The area on which the buildings are present is assessed as low due to the likely impact from past ground disturbance.

6.6 Conclusions from the Desktop Assessment

The desktop review has provided salient information from which areas of Aboriginal archaeological potential may be predicted and further tested through standard and complex assessment.

The results of the desktop assessment provide preliminary insight into past Aboriginal land use and allow for the formulation of a series of expectations of the archaeological sensitivity of the geographic region in which the activity area is located. The results of numerous Aboriginal cultural heritage assessments have confirmed the sensitivity of the Baxter Sandstone Formation. More specifically, the Cranbourne Sands geomorphological province is assessed as containing generally low densities of Aboriginal cultural heritage material across a broad area around the periphery of the former Carrum swamp, the northern border of which is located 1 km south of the activity area. These occurrences are punctuated by larger, moderate density sites containing a high level of lithic variability, stone raw material classes and in some instances a high degree of stratigraphic congruency.

In summary the Desktop Assessment has confirmed that the activity area contains moderate to high potential for Aboriginal cultural heritage. The implications of the review of previously registered Places and prior studies within the geographic region are:

- <u>There is one previously registered Aboriginal cultural heritage place within the southern section of the activity area. This site (VAHR 7921-073) was excavated by Urban Colours in February 2009 as part of discontinued CHMP 10763.</u>
- <u>A total of 69 previously registered sites have been identified within a radius of 3 km from the activity area. Previously registered Aboriginal cultural heritage places are concentrated on across a range of landforms.</u>
- <u>The most common cultural heritage site type in the geographic region are Aboriginal scarred trees (n=34), followed by artefact scatters / low density artefact distributions (n=33) as well as 2 object collection forms.</u>
- <u>Scarred trees are likely to occur in all terrain units where old growth trees survive; however, bushfire activity and an early history of logging in the area reduces the potential for Aboriginal scarred tree sites.</u>
- <u>Stone artefact scatters can range from isolated artefacts to extensive scatters of >100 artefacts.</u>
- <u>The most common stone raw material is quartz, followed by lesser quantities of silcrete.</u>
- <u>Dominant stone artefact types are waste flakes (detritus), complete, distal, split, proximal and medial flakes and a small component of diagnostic formal tool types. These artefacts will be manufactured from silcrete, quartz and quartzite.</u>
- <u>Artefact scatters have been located that contain Contact archaeology elements such as flaked glass.</u>

7 STANDARD ASSESSMENT

This section outlines the aims, methods and results of the pedestrian ground surface survey of the activity area undertaken on Monday 3 March 2014.

7.1 Aims of the Standard Assessment

The aim of the standard assessment was to undertake surface survey across the activity area in order to identify extant cultural heritage places and to determine the extent and significance of any places identified. The survey was also undertaken to identify potential landforms considered archaeologically sensitive (based on the predictive model from the desktop assessment of landforms that may contain archaeological deposits in a surface or potential subsurface context). The survey also sought to identify the presence of Aboriginal scarred trees, hooped trees or carved trees as well as areas of prior ground disturbance and areas that may not have been previously disturbed. An understanding of the extent of previous disturbance will assist with developing an excavation methodology for the CHMP.

A field survey methodology was designed to maximise the opportunity for identifying surface Aboriginal cultural heritage deposits. The desktop assessment had indicated that Urban Colours (2009) identified one cultural heritage place (VAHR 7921-1073) inside the activity area as part of an excavation program undertaken in 2009 for discontinued CHMP 10763. The cultural heritage material identified included:

- one complete silcrete flake at a depth of 50 cm
- one silcrete proximal flake at a depth of 55 cm
- one milky quartz angular fragment at a depth of 65 cm
- one rose quartz split flake at a depth of 70 cm.

All four artefacts were retrieved from Square C, a 1 m^2 open excavation located on a low-lying sand ridge near the southern fenceline of the activity area. An additional eight artefacts were identified as part of a shovel test pit program. All eight artefacts were excavated on the low-lying sand ridge in the southern section of the activity area. These comprised:

- one silcrete angular fragment from STP 52 at a depth of 40 cm
- two silcrete split flakes from STP 55 at a depth of 40 cm
- one crystal quartz angular fragment identified in STP 55 at a depth of 60 cm
- one quartz complete flake and 1 silcrete complete flake from STP 58 at a depth of 40 cm
- one crystal quartz backed blade from STP 61 at a depth of 10 cm
- one meta-sediment comprising a blocky aggregate from STP 63 at a depth of 10 cm.

The subject activity area was surveyed for cultural heritage material on Tuesday 3 February 2009 over the course of one day. John Stevens and cultural heritage advisor Annette Xiberras undertook the surface survey with Anne Maree Chandler (then Wandoon Estate), Sam Pender (BWFL) and Izzy Pepper (BLCAC).

The activity area was resurveyed on 3 March 2014 over the course of one day. The area was resurveyed due to the nature of activity changing and also due to a Sponsor change as detailed in Section 1 of this CHMP. Due to the identification of the low-lying sand ridge and subsurface archaeological material as part of the complex assessment undertaken for the discontinued CHMP (10763), intensive survey was undertaken across this area as part of the most recent survey. John Stevens (archaeologist) conducted the surface survey with Michael Xiberras (WTLCCHCI), James Hughes (BWFL) and Izzy Pepper (BLCAC).

7.2 Standard Assessment Methodology

The standard assessment for both CHMPs (10763 and 12983) involved an opportunistic survey of the activity area undertaken by the field team(s), who walked over the activity area randomly in an attempt to identify areas of ground surface exposure as well as areas that had not been previously disturbed by construction-related activities.

CHMP 10763 and CHMP 12983

The general aims of the field assessment were to assess the cultural heritage sensitivity of the activity area and the nature, distribution and significance of Aboriginal cultural heritage in locations to be impacted by the proposed activity. The methodology used during the ground surface survey for the 2009 CHMP (10763) and 2014 CHMP (12983) was almost identical given the size of the activity area remained the same, conditions were similar and the field crew sizes for both surveys contained the same numbers. The methodology included walking transects through the property covering the proposed development footprint areas and then a general inspection of the surrounding area to identify areas of ground surface exposure or any cultural resources that may be present. These areas included horse paths, vehicular access tracks, dam walls, fencelines and exposures around the sheds in the western section of the activity area. There is a linear drain running east–west through the central section of the activity area and the spoil heap windrow of the drain was assessed as part of the 2009 survey. It was found to be completely overgrown with weeds during the 2014 survey.

Both pedestrian surveys were undertaken by systematic sampling. The 2009 survey comprised a field team of five surveyors who walked the activity area spaced 5 metres apart. Similarly, the 2014 survey comprised a field team of four surveyors who walked the activity area spaced 5 metres apart. The transects were walked in a north–south direction across the entire activity area and all visible surface exposures were inspected in detail. Surface exposures were limited to the areas of exposure mentioned above. Effective survey coverage was 5%, as ground surface visibility was generally low (<5%) over the majority of the activity area due to thick grass cover. Grass cover was more pronounced during the 2014 survey than it was during the 2009 survey.

The activity area is approximately 19.5ha (195,660m²) and consists two landform types including flood plain covering an area of approximately 194,660m² in the central and northern section to the east of Dandenong Creek and flood plain and sand ridge landforms covering an area of approximately 1000m² in the southern section of the activity area immediately north of Perry Road. The sand ridge and flood plain landforms are mutually exclusive, both spatially on the landscape and also in terms of their formation processes. It was expected that prior flood regimes along Dandenong Creek were primarily responsible for the lagoonal-like flood plain landform through approximately 99% of the activity area, while the sand ridge in the south of the activity area was developed by aeolian transportation and is part of the prominent Cranbourne Sands complex.

Flood regimes of Dandenong Creek affect profile development on the flood plain through a cyclical process of sediment inundation and denudation. Profiles on the flood plain landforms within the activity area will contain mixed undifferentiated sediments with no defined superposition. The flood plain landform within the activity area was thought to have low potential to contain cultural heritage material in a surface or subsurface context. The sand ridge in the southern section of the activity contains a previously registered Aboriginal Place (VAHR 7921-1073) which was extensively mapped during the 2009 complex assessment process. If additional cultural heritage material or places are present in the activity area it is anticipated that it will be confined to this area as diffuse surface and/or subsurface distributions.

7.3 Results of the Ground Survey

7.3.1 CHMP 10763 – 2009 field survey

The 2009 surface survey identified that disturbance factors have impacted on the surface of the soil profile within the activity area. The activity area has been subject to over 50 years of grazing livestock as well as containing a large market garden complex in the southern section of the activity area. It is unclear what was being produced on site or how long ago the land was being farmed. The only visible remnant of market garden activities are long furrows aligned east–west just north of Perry Road. Some of the furrows dissect the sand ridge. It was noted that a number of dams have also been constructed through the activity area and a small cluster of sheds stands in the south–west of the activity area.

The 2009 field survey made the following observations following completion of the surface survey:

- the activity area is generally flat flood plain landform in the central and northern sections of the activity area
- Dandenong Creek is approximately 200 metres west of the activity area
- there are no caves, rock shelters, axe grinding grooves, stone raw material sources, mature eucalyptus trees or earth mounds within the activity area
- there is a low-lying sand ridge in the southern section of the activity area; this landform comprises Cranbourne Sands and accounts for approximately 1% of the activity area in terms of total area
- ground surface visibility was 10% upon the sandy ridge area and approximately 2% across the remainder of the activity area
- the ground surface consists of exotic grasses which are widespread
- the activity area is currently utilised for grazing.

No Aboriginal cultural heritage sites or places were identified as part of the surface survey undertaken on 3 February 2009 for CHMP 10763.

7.3.2 CHMP 12983 – 2014 field survey

A lack of ground surface visibility was an obstacle to undertaking the 2014 field survey with the extent of surface biomass across the activity area constraining 100% effective survey (Map 6). The activity area is 195,660m² or approximately 19.5ha. The flood plain landform covers approximately 194,660m² and the sandy ridge comprises approximately 1000m² (i.e. two sand ridges approximately 50 metres long and 10 metres wide). Surface visibility was very low (<1%) across both flood plain and sand ridge landform. There are approximately 1946.6m² of exposures with 40% visibility across the flood plain landform and 10m² of exposures with 20% visibility across the sandy ridges. Both sandy ridges were covered in a dense mat of grassland. A total ground surface exposure of 1,956.6m² across both landforms equals 1% of observable ground surface exposure within the activity area (Table 6).

The main constraint to effective survey was the extent of exotic grasses which were widespread and long (approximately 30 cm high across the entire activity area). The flood plain landform has been constructed (and disturbed) by flood regimes of Dandenong Creek as well as by wide-scale drainage activities (to assist in managing floods from the Dandenong in more recent times). Two important points were considered following the field survey at the activity area. These include:

- The majority (99%) of the activity is mantled by consolidated clay deposits resultant from periodic flood regimes of the Dandenong Creek. This area may have low potential for Aboriginal cultural heritage places.
- Elevated above the flood plain by 40–50 cm are two sand ridges in the southern section of the activity area. The two ridges may have been elevated above floodwater extent and thus remained dry. Cranbourne Sands landforms are typically sensitive for Aboriginal cultural heritage places and one previously registered site (VAHR 17921-1073) was recorded on sand ridge A by Urban Colours in 2009.

Based on the results of the subsurface excavations of discontinued CHMP 10763 it is expected that both sand ridges retain some vertical integrity and that sand ridge A is more sensitive for Aboriginal cultural heritage places than sand ridge B.

A total of five trees within the activity area were assessed for scarring from a result of Aboriginal modification, however no trees showed any signs of alteration to the casing or heartwood. All five trees were assessed for scars, carvings, axe-marks and 'hoops'. No Aboriginal scarred or hooped, axe-marked or carved trees were identified. A total of 1% (total ground surface exposure) of the activity area was surveyed for Aboriginal cultural heritage places (Map 6); however, no surface Aboriginal cultural heritage Places were identified by any of the field team comprising John Stevens (archaeologist), Michael Xiberras (WTLCCHCI), James Hughes (BWFL) and Izzy Pepper (BLCAC).

Table 6: Survey attributes for the survey of the activity area

Environmental Characteristics			Area (m2)	General Surface Visibility		Exposures			Total Exposed Area		Surface Sites?
Geology	Soil	Landform		%	Exposed Area (m2)	Size (m2)	% Visible	Exposed Area (m2)	%	m2	
Baxter Sandstone	Clay	Floodplain	194660	1	1946.6	1	40	0.4	1.000205	1947	No
Baxter Sandstone	Sand	Cranbourne Sands	1000	1	10	1	20	0.2	1.02	10.2	No

7.4 *Discussion*

In addition to identifying extant surface cultural heritage places, ground surveys generally provide an opportunity to examine the archaeological sensitivity of surface landforms. Such opportunities may be constrained by the integrity or extent of past disturbance to the ground surface and the amount of vegetation or other cover which may limit surface soil and sediment observations. This was a major obstacle to attaining effective survey across the two landforms within the activity area (Plate 3). The percentage of 1% of effective ground exposure does not allow for an intensive inspection of the ground surface for cultural heritage material. In addition to the lack of surface visibility, widespread disturbance factors have contributed to an ineffective survey across the activity area. In many locations market garden furrows were observed, particularly in the southern and central section of the activity area.

An additional limitation to the identification of Aboriginal cultural heritage material is manifest in landform types. The predictive model developed as part of the desktop assessment indicates that flood plains are by far the least sensitive landform for Aboriginal cultural heritage material within the geographic region. The flood plain landform within the activity area covers approximately 194,660m² or 99% of total area. While the majority of the activity area may contain low sensitivity for Aboriginal cultural heritage places, the two sand ridge landforms comprising Cranbourne Sands in the southern section of the activity area have high likelihood of containing Aboriginal cultural heritage material. One Aboriginal cultural heritage place (VAHR 7921-1073) has been previously registered on sand ridge A.

While the predictive statement indicates that Aboriginal cultural heritage material may be present across a range of landforms, that data set is skewed by a preference to survey for Aboriginal cultural heritage places across sand sheets and sand ridges rather than across featureless flood plains; nevertheless, given the effects fluvial activity has on flood plain sediments in the activity area, it would be expected that any Aboriginal cultural heritage material that was discarded on this landform type would be incorporated into sediments or distributed across or outside the activity area. The activity area has now been the subject of two surface surveys and it is expected that all surface exposures and the potential for Aboriginal cultural heritage material within these exposures have now been accounted for. The former, discontinued CHMP 10763 undertaken within the activity area has identified a generally low-density broadly-distributed subsurface artefact scatter (VAHR 7921-1073) and this survey failed to provide additional data to further our understanding of this site at a very local level.

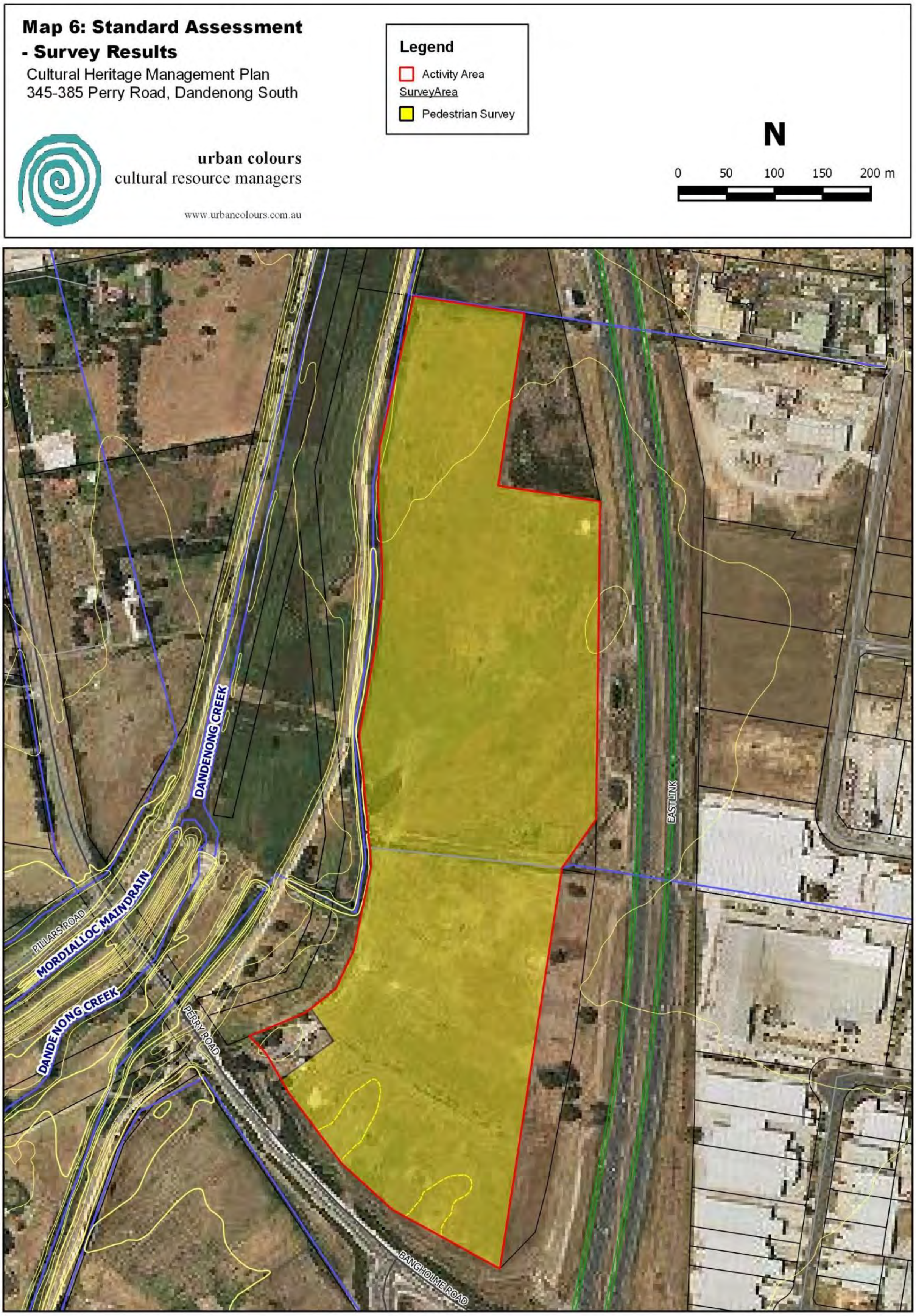
The archaeologist (and author of this plan) as well as Michael Xiberras representing the WTL&CCHCI, James Hughes representing BWFL and Izzy Pepper representing BLCAC agreed that a combination of 1m² hand-excavated test pits should be excavated on both sand ridge A and B. It was discussed that two 1m² hand excavations should be undertaken on each ridge. Further, a combination linear shovel test pit program should be undertaken in areas where shovel test pits were not excavated during the 2009 field season on both sand ridge A and B as well as the flood plain landform, particularly in the area just north of sand ridge B. These excavations will be undertaken to better understand the extent of VAHR 7921-1073.

Plate 1: Showing the copses of vegetation and trees, eastern perspective (2009 survey)

Plate 2: View of the activity area towards Perry Road and sand ridges A and B (2009 survey)

Plate 3: View of the activity area towards Perry Road and sand ridges A and B (2014 survey). Note the increase in vegetation coverage

Plate 4: Horse agistment area (2014 survey)



Map 6: Standard assessment – area surveyed across the activity area

8 COMPLEX ASSESSMENT

A subsurface testing program was undertaken for this CHMP due to the presence of two Cranbourne Sand ridges in the south of the activity area and also due to the presence of a previously registered Aboriginal place (VAHR 7921-1073). This place was registered by Urban Colours in 2009 as part of discontinued CHMP 10763.

Fieldwork was conducted in two phases (during February 2009 and March 2014). On both occasions survey procedures and subsurface testing were supervised by John Stevens (archaeologist). Michael Xiberras and Colin Hunter represented WTLCCHCI, Sam Pender represented BWFL, Izzy Pepper represented BLCAC and Jacqui Wandin represented Wandoon Estate during the February 9–17 2009 excavation program. Michael Xiberras and Anne Maree Chandler represented WTLCCHCI, James Hughes represented BWFL and Izzy Pepper represented BLCAC during the March 3–6 2014 excavation program.

Edward East (Urban Colours archaeologist) provided archaeological assistance on 5–6 March 2014.

8.1 Aims of the Subsurface Testing

The aims of the Complex Assessment were to:

- determine the likelihood of subsurface Aboriginal cultural heritage in the activity area in areas that had not been the subject of excavation in 2009
- determine whether the site boundary for VAHR 7921-1073 was appropriate and accurate
- record the subsurface stratigraphic composition of landforms and investigate a representative sample of subsurface sediments
- undertake a scientific assessment of the activity area in relation to significance of Aboriginal cultural heritage Places identified where applicable.

Urban Colours (discontinued CHMP 10763) have previously recorded one Aboriginal cultural heritage site (VAHR 7921-1073) within the activity area (Map 5). Urban Colours identified 12 artefacts of various classes and raw material types as below (Table 7). All 12 artefacts were identified on sand ridge 1 in the southern section of the activity area.

Table 7: Artefacts recovered from VAHR 7921-1073, February 2009

Location		No./artefact type	Depth	GPS (MGA 94)		Raw material
Square C	**Spit 10**	1 Complete flake	500 mm	340810.35e	5788869.72n	Silcrete
	Spit 11	1 Proximal flake	550 mm	"	"	Silcrete
	Spit 13	1 Angular fragment	650 mm	"	"	Milky quartz
	Spit 14	1 Split flake	700 mm	"	"	Rose quartz
Shovel Test Pits	**TP 52**	1 Angular fragment	400 mm	340816.82e	5788877.28n	Silcrete
	TP 55	2 Split flakes	400 mm	340829.64e	5788902.77	Silcrete
	TP 55	1 Angular fragment	600 mm	"	"	Crystal quartz
	TP 58	2 Complete flakes	400 mm	340836.82e	5788912.69	Silcrete and quartzite
	TP 61	1 Backed blade	100 mm	340841.84e	5788922.4	Crystal quartz
	TP 63	1 Block fragment	100 mm	340848.98e	5788932.52	Meta-sediment

8.2 Summary of excavations undertaken

As part of the 2009 excavations an additional twelve 50 cm² radial test pits excavated on sand ridge 1 failed to identify additional artefacts. The 12 radials were excavated east and west of Square C and east and west of shovel test pits 52, 55, 58, 61 and 63. Urban Colours determined that due to an absence of cultural heritage material as part of extent testing that site extent had been established. A total of 67 50 cm² shovel test pits and two 1 m² test pits excavated on the flood plain landform failed to identify Aboriginal cultural heritage material. A total of one 1 m² test pit and four 50 cm² shovel test pits failed to identify Aboriginal cultural heritage material on sand ridge 2 (Map 7).

The 2014 excavations as part of the current CHMP 12983 provided an opportunity to further assess the subsurface component of VAHR 7921-1073 through the excavation of an additional two 1 m² test pits and two 50 cm² shovel test pits. During these excavations one of the stratigraphic test pits on sand ridge 1 (Square G) yielded one artefact. The other stratigraphic test pit (Square F) did not identify additional artefacts (Map 7). One 50cm² shovel test pit excavated two metres east of Square G did not identify artefacts. Two radial test pits (STP 88 and 89) excavated on the west side of Square G failed to identify additional artefacts. Due to one test pit on the east side of Square G not identifying artefacts and two shovel test pits to the west of Square G also failing to identify artefacts it was determined that the one artefact identified in Square G be incorporated into the existing site extent of VAHR 7921-1073 through a Place Inspection Form.

In addition to the excavations proposed on the two sand ridges, a further nine 50 cm² shovel test pits were proposed for the flood plain in areas where excavations had not been undertaken as part of the 2009 subsurface testing program.

A total of 96 shovel test pits and eight 1 m² stratigraphic test pits were excavated across the activity area during the 2009 and 2014 fieldwork (Map 7).

8.3 Methodology of the Subsurface Testing Program

A combination of eight 1 m² stratigraphic test pits and 96 50 cm² shovel test pits were undertaken across the entire activity area in two field seasons between 9-17 February 2009 and 3-6 March 2014 to determine the presence of Aboriginal cultural heritage places in a subsurface context. Excavation test squares A and B were excavated on a flood plain landform in the central section of the activity area while excavation squares C, G and F were excavated on sand ridge 1 and excavation squares D, D(2) and E(3) were excavated on sand ridge 2 (Map 7).

Following excavation of the four stratigraphic test pits excavated in 2009 a total of 87 50cm² shovel test pits were excavated broadly across the activity area. As part of the 2014 excavations an additional four 1 m² excavations and nine 50 cm² shovel test pits were excavated in areas that had not been tested during the 2009 excavations. A total of eight 1 m² excavation squares and 96 50 cm² shovel test pits have now been excavated within the activity area. The proposed excavation methodology was discussed and agreed on with the WTLCCHCI, the BWFL and BLCAC during field operations between February 9–17 2009 and March 3–6 2014.

The stratigraphic composition of the test pits are detailed in Table 8. During the subsurface testing, site plans and maps were inspected, photographs of the activity area were taken, and detailed notes were made at differentiated spit layers. Automatic levels were taken and the test pit location was marked on plans provided and their locations recorded with a differential GPS unit. All excavated deposits were 100% sieved through 5 or 3 mm wire mesh sieves. All pits were backfilled upon completion.

8.3.1 Methodology of Stratigraphic Test Pits A and B

The locations of stratigraphic test pits A and B are shown in Map 7.

Test Pit A

Spits 1–2 were excavated by shovel scrapes from the surface to 100 mm to assist with removing disturbance factors within the upper profile and also to facilitate removal of the extensive root system identified in the first spit. Spits 3–5 were excavated by conventional layer and trowel method in 5 cm spits. Spits 6–10 were excavated using a combination of pickaxe and shovel scrapes due to the extremely consolidated nature of the profile (Plates 5–6).

Excavation ceased in the stratigraphic test pit when the loam profile started to develop large ped aggregates that were difficult to remove with pick and shovel and challenging to break down through the 5 mm sieve screen. Stratigraphic test pit A was excavated to a depth of 50.5 cm in ten spits (Plates 5–6). There was only one context to the stratigraphy which is described in Section 8.4 below. The loam was generally clean through the profile with the exception of supporting root matter (0–15cm). Loam particles were well-rounded in appearance and within 45–55% size frequency ranges providing a strong argument for fluvial depositional episodes.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, although given the largely undifferentiated sequence this was not very noticeable. It should be noted however that market garden activities have affected the integrity of the flood plain profile at least to 40 cm in depth (i.e. the depth of a rotary plough). Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens, Colin Hunter and Izzy Pepper and sieved by Annette Xiberras and Sam Pender on 11 February 2009.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit A.

Plate 5: Stratigraphic test pit A, basal deposit

Plate 6: Soil profile of stratigraphic test pit A, north wall

Test Pit B

Spits 1–3 were excavated by shovel scrapes from the surface to 150 mm to assist with removing disturbance factors within the upper profile and also to facilitate removal of the extensive root system identified in the first spit. Spits 4–8 were excavated using a combination of pickaxe and shovel scrapes due to the extremely consolidated nature of the profile. (Plate 7–8).

Excavation ceased in the stratigraphic test pit when the loam profile started to develop large ped aggregates that were difficult to remove with pick and shovel and challenging to break down through the 5 mm sieve screen. Stratigraphic test pit B was excavated to a depth of 39.5 cm in eight spits (Plates 7–8). There were two indistinct contexts to the stratigraphy which is described in Section 8.4 below. The loam was generally clean through the profile with the exception of supporting root matter (0–15cm). Loam particles were well-rounded in appearance and within 45–55% size frequency ranges, providing a strong argument for fluvial depositional episodes.

In all other respects stratigraphic test pit B reflected the observations made from stratigraphic test pit A above. The stratigraphic test pit was excavated by John Stevens, Colin Hunter and Michael Xiberras and sieved by Sam Pender on 12 February 2009.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit B.

Plate 7: Stratigraphic test pit B, basal deposit

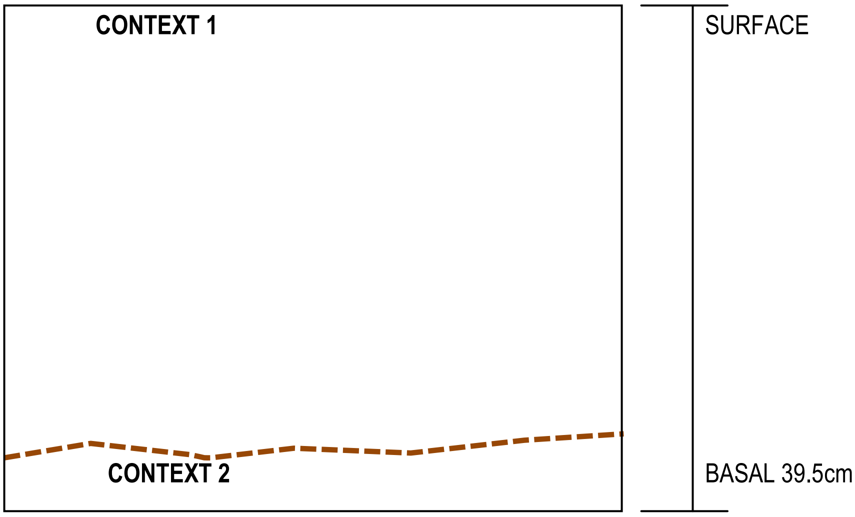


Plate 8: Soil Profile Square B, north wall

8.3.2 Methodology of Stratigraphic Test Pits C, D1, D2, E (3), F and G

The locations of stratigraphic test pits C, D1, D2, E (3), F and G are shown in Map 7.

Test Pit C

Square C was excavated on sand ridge 1 and all spits (1–16) were excavated by conventional layer and trowel method. Square C was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile, likely a product of the market garden activities that have occurred across the sand ridges in the past (Plates 9–10).

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer. All sand excavated in Square C was sieved through a 3 mm sieve screen. Stratigraphic test pit C was excavated to a depth of 79.1 cm and showed two distinct stratigraphic contexts at 52 cm, detailed in Section 8.4 below. The sand was generally clean through the profile with the exception of one piece of brick at 25 cm and two glass fragments at 30 cm. The sand profile was indicative of Cranbourne Sand sequences exhibiting a pale grey A^1 and a pale grey/brown A^2 onto coffee rock.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which was evident in the upper four spits. Again, market garden activities have affected the integrity of the upper soil profile of the sand ridge to at least 25 cm in depth (i.e. depth of brick and glass fragments). Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens, Colin Hunter and Izzy Pepper and sieved by Jacqui Wandin and Sam Pender on 16 February 2009.

A total of four Aboriginal stone tools were identified during the excavations of Square C.

Plate 9: Stratigraphic test pit C, basal deposit

Plate 10: Soil profile Square C, north wall

Test Pit D

Square D was excavated on sand ridge 2 and all spits (1–14) were excavated by conventional layer and trowel method. Square D was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile, likely a product of the market garden activities that have occurred across the sand ridges in the past (Plates 11–12).

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer. All sand excavated in Square D was sieved through a 3 mm sieve screen. Stratigraphic test pit D was excavated to a depth of 70.4 cm and displayed a distinct stratigraphic transition at 48 cm, detailed in Section 8.4 below. The sand profile was generally clean with no inclusions identified, with the exception of charcoal flecks at 40 cm in depth. The profile was indicative of Cranbourne Sand sequences exhibiting a pale grey A^1 and a pale grey/brown A^2 onto coffee rock.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which as stated was evident in the upper four spits. Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens and Michael Xiberras and sieved by Jacqui Wandin and Phaedra Murray on 16 February 2009.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit D.

Plate 11: Stratigraphic test pit D, basal deposit

Plate 12: Soil profile Square D, north wall

Test Pit D2

Square D2 was excavated on the edge of sand ridge 2 and all spits (1–11) were excavated by conventional layer and trowel method. Square D2 was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile, a trend across the activity area due to market garden activities that have occurred (Plates 13–14).

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer. All sand excavated in Square D2 was sieved through a 3 mm sieve screen. Stratigraphic test pit D2 was excavated to a depth of 56 cm and indicated a distinct stratigraphic transition at 23 cm (detailed in Section 8.4 below). The sand profile was generally clean with no inclusions identified, with the exception of charcoal flecks at 35 cm in depth. The profile was indicative of Cranbourne Sand sequences, exhibiting a pale grey A^1 and a pale grey/brown A^2 onto coffee rock.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which as stated was evident in the upper four spits. Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by archaeologist John Stevens and WTLCCHCI representative Michael Xiberras and sieved by James Hughes (BWFL) and Izzy Pepper (BLCAC) on 4 March 2014.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit D2.

Plate 13: Stratigraphic test pit D2, basal deposit

Plate 14: Soil profile square D2, north wall

Test Pit E (Square 3)

**Note: this test pit was numbered inconsistently in the field and has been renamed for this report to avoid confusion. Plates show Square 3 but it has been renamed Square E(3) for consistency.*

Square E(3) was excavated on the edge of sand ridge 2 and all spits (1–15) were excavated by conventional layer and trowel method. Square E (Square 3) was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile.

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer. All sand excavated in Square E (Square 3) was sieved through a 3 mm sieve screen. Stratigraphic test pit E (3) was excavated to a depth of 73.5 cm and showed a distinct soil transition at 52 cm (detailed in Section 8.4 below). The sand profile was generally clean with no inclusions identified with the exception of charcoal flecks at 30 cm in depth. The profile was indicative of Cranbourne Sand sequences exhibiting a pale grey A^1 and a pale grey/brown A^2 onto coffee rock (Plates 15–16).

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which as stated was evident in the upper four spits. Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens and James Hughes (BWFL) and sieved by Izzy Pepper (BLCAC) and Anne Maree Chandler (WTLCCHCI) on 13 March 2014.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit E (3).

Plate 15: Stratigraphic test pit E (Square 3), basal deposit

Plate 16: Soil profile Square E (Square 3), north wall

Test Pit F

Square F was excavated on sand ridge 1 and all spits (1–18) were excavated by conventional layer and trowel method (Plates 17–18). Square F was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile.

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer. All sand excavated in Square F was sieved through a 3 mm sieve screen. Stratigraphic test pit F was excavated to a depth of 89.8 cm and showed two distinct stratigraphic contexts comprising a bleached (likely lime) sequence at 29 cm and a gradational change to pale brown A^2 at 32 cm (detailed in Section 8.4 below). The sand profile was generally clean with no inclusions. The profile was indicative of Cranbourne Sand sequences exhibiting a pale grey A^1 and a pale grey/brown A^2 onto coffee rock; however, the bleached layer at 29 cm is likely a result of sowing lime into the soil to improve pH levels here. It is interesting, however, that this occurrence was not identified in any other excavation on either sand ridge, which indicates that it is unlikely to be related to a natural process.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which as stated was evident in the upper four spits. Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens and Michael Xiberras (WTLCCHCI) and sieved by Ed East on 5 March 2014.

No Aboriginal cultural heritage material was identified as part of the excavations undertaken for stratigraphic test pit F.

Plate 17: Stratigraphic test pit F, basal deposit

Plate 18: Soil profile square F, east wall

Test Pit G

Square G was excavated on sand ridge 1 and all spits (1–16) were excavated by conventional layer and trowel method. Square G was excavated in 5 cm lenses and some disturbance was identified in the upper 20 cm of the profile.

Excavation ceased in the stratigraphic test pit at the base defined as a composite clay / coffee rock layer which lacked homogeneity across the base (Plates 19–20). All sand excavated in Square G was sieved through a 3 mm sieve screen. Stratigraphic test pit G was excavated to a depth of 81 cm in the north-east and south-east quadrants and to 56 cm in the north-west and south-west quadrant. The profile exhibited a stratigraphic transition at 31 cm (detailed in Section 8.4 below). The sand profile was generally clean with no inclusions identified with the exception of charcoal flecks at 20 cm in depth. The profile was indicative of Cranbourne Sand sequences exhibiting a pale grey A^1 and a pale grey/brown A^2 onto a coffee rock layer lacking lateral homogeneity.

There were no obvious signs of disturbance outside of market garden activities having remixed the profile, which as stated was evident in the upper 4 spits. Fibrous roots were present in the initial three spits although these soon dissipated as the excavation became deeper (>15 cm). The stratigraphic test pit was excavated by John Stevens and Michael Xiberras (WTLCCHCI) and sieved by Ed East on 6 March 2014.

Aboriginal cultural heritage material in the form of one silcrete flake was identified as part of the excavations undertaken for stratigraphic test pit G.

Plate 19: Stratigraphic test pit G, basal deposit

Plate 20: Soil profile square G, north wall

8.4 Stratigraphy

8.4.1 Stratigraphy of Test Pits A and B (Dandenong Creek flood plain)

The stratigraphy of stratigraphic test pits A and B was similar and reflected the swampy, lagoonal-type sediments across the Dandenong Creek flood plain. A large extensive clay pan is evident throughout the activity area accounting for >98% of the total land area. The upper clay profile is indicative of sheet wash material from Dandenong Creek, with mantled lower clay levels (below the scope of the archaeological investigations) occurring as thick plasticine sheets. It is unclear whether these clays are residual (e.g. decomposing Baxter formation sandstones) or transport clays deposited over a larger time scale by Dandenong Creek. The very fine-grained texture of these clays supports a transportation process and this seems in line with geological mapping (Map 3) and Hills' (1964) comments that lands to the north and east of the old Carrum Swamp consist of alluvial flood plains.

Test pit A was excavated approximately 170 m east of Dandenong Creek in an open section of the activity area. There is no gradient between the upper margins of the Dandenong Creek terrace and the flood plain landform where the excavation was conducted, therefore the substrate of the archaeological excavation was expected to reflect depositional sequences observed in the cutting of Dandenong Creek, which was observed by the archaeologist prior to the commencement of the fieldwork. The Dandenong Creek sequence comprises undifferentiated medium-brown loam from the surface of the terrace to at least 1.8 m into the subsoil. It was observed that this A^1 acts as a mantle to residual plasticine clays forming an A^2 over Baxter Sandstone (Plate 7). The depth of the A^2 sequence is unclear but it may be many metres.

The stratigraphic detail for Squares A and B is detailed below and in Tables 8 and 9.

Test Pit A

- Spit 1 (0–5 cm): surface comprised dry medium-brown loam mixed with surface detritus. Spit 1 comprised subterranean root mat remnant of former grassland. No inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, feldspar and clay particles. No additional inclusions, some root matter.
- Spit 2 (5–10 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, some tree roots.
- Spit 3 (10–15 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, some tree roots.
- Spit 4 (15–20 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 5 (25–30cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.

- Spit 6 (30–35 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 7 (35–40 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 8 (40–45 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, slight increase in moisture compared to overlying sequences but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 9 (45–50 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, increase in moisture and consolidated but still friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.

Excavation ceased in the 1 m² test pit at the base of spit 9 which comprised a similar profile to spit 1 with the exception of damper conditions and a slightly higher clay content. The cutting of the terrace margin in Dandenong Creek suggests this profile continues to at least 1.8 m (refer to cover photo). As the floor of the test pit was becoming increasingly difficult to manually excavate due to downward pressure of overlying sediments it was determined by the archaeologist that the flood plain stratigraphy was established and that no further excavation was required.

Table 8: Test pit A stratigraphic detail

Test Pit A	Soil colour	pH	Inclusions
Spit 1 0–5cm	10 YR 7/2 light grey	7 Neutral	Leaves and twigs, no silica, pH stable.
Spit 2 5–10 cm	10 YR 7/2 light grey	7 Neutral	Fibrous roots and larger subterranean root complex
Spit 3 10–15 cm	10 YR 7/2 light grey	7 Neutral	Fibrous roots and charcoal flecks, subterranean root structure becoming less frequent
Spit 4 15–20cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 5 20–25cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 6 25–30cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 7 30–35cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 8 35-40cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 9 40-4 cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 10 45-50cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile

Test Pit B

- Spit 1 (0–5 cm): surface comprised dry medium-brown loam mixed with surface detritus (e.g. bark, leaves and other flora). Spit 1 comprised subterranean root mat remnant of former grassland. No inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, feldspar and clay particles. No additional inclusions, some root matter.
- Spit 2 (5–10 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, some tree roots.
- Spit 3 (10–15 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, some tree roots.
- Spit 4 (15–20 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 5 (25–30cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 6 (30–35 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.
- Spit 7 (35–40 cm): comprised dry medium-brown loam. As per spit 1 no inclusions loam undifferentiated, little moisture and consolidated but friable upon impact, reduced as aggregates. Soil particles show well-rolled structures with little size variation indicating fluvial sequences, low levels of silica, some biotite, and feldspar and clay particles. No additional inclusions, no tree roots, generally clean homogenous profile.

Excavation ceased in the 1 m² test pit at the base of spit 9 which comprised a similar profile to spit 1 with the exception of damper conditions and a slightly higher clay content. The cutting of the terrace margin in Dandenong Creek suggests this profile continues to at least 1.8 m (refer to cover photo). As the floor of the test pit was becoming increasingly difficult to manually excavate due to downward pressure of overlying sediments it was determined by the archaeologist that the flood plain stratigraphy was established and that no further excavation was required.

Table 9: Test pit B stratigraphic detail

Test Pit B	Soil colour	pH	Inclusions
Spit 1 0–5cm	10 YR 7/2 light grey	7 Neutral	Bark, leaves, twigs, no silica, pH stable.
Spit 2 5–10 cm	10 YR 7/2 light grey	7 Neutral	Fibrous roots and larger subterranean root complex

Spit 3 10–15 cm	10 YR 7/2 light grey	7 Neutral	Fibrous roots and charcoal flecks, subterranean root structure becoming less frequent
Spit 4 15–20cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 5 20–25cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 6 25–30cm	10 YR 7/2 light grey	7 Neutral	Undifferentiated loam, clean profile
Spit 7 30–35cm	7.5 YR 5/4 brown	7 Neutral	Undifferentiated loam, clean profile
Spit 8 35-40cm	7.5 YR 5/4 brown	7 Neutral	Undifferentiated loam, clean profile

8.4.2 Stratigraphy of Test Pits C, D, D2, E (3), F and G (Cranbourne Sands)

Two sand ridges (1 and 2) associated with the Cranbourne sands complex enter the activity area from the southern cadastral boundary fenceline (Map 2) These sand ridges account for <5% of total land area within the activity area. Quaternary sand deposits of marine, aeolian or fluviatile origin cover significant areas of the Port Phillip Bay coastal region, extending eastwards towards Westernport Bay (Cupper *et al.* 2004) and are dispersed quite randomly across the Greater eastern margins of Port Phillip Bay. Due to the haphazard nature of their location these sand deposits, which often occur as low-lying ridges (e.g. in some instances only 20 cm higher than surrounding flood plains), are not indicated on geological mapping. They are often identified in activity areas as part of survey or subsurface excavation programs. They are commonly known as the Cranbourne Sands.

The Cranbourne Sands are a series of aeolian siliceous ridges deposited in north-west to south-east trending ridges and thin sand sheets mantling Baxter Sandstone as well as older Tertiary and Palaeozoic basement volcanics and sediments. The sands are generally well sorted and fine- to medium-grained, with heavy basal minerals present in some areas. The ridge fields are extensive in the north and eastern parts of the sunklands around Cranbourne and Langwarrin, south of the Lang Lang River, on French Island and continuing southward towards the Gurdies–Grantville area (Cupper *et al.* 2004), and they are also particularly prevalent around the margins of the former Carrum Swamp, which is located 1 km south of the activity area. The Cranbourne Sands appear to have extended across the northern part of Westernport Bay prior to the Holocene marine transgression. They are thought to be a major factor in the initiation of the Koo-wee-rup Swamp.

Test Pit C

The stratigraphic detail for Square C is detailed below and in Table 10.

- Spit 1 contained short thick grass and root mat overlying medium-grey sandy silt. The spit contained two glass fragments. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex and other than the glass fragments was generally clean.
- Spit 2 is a continuation of spit 1 with charcoal flecks and fibrous roots present.
- Spit 3 is a continuation of spit 1 with one brick fragment recorded.
- Spit 4 is a continuation of the profile described for spit 1.
- Spit 5 is a continuation of the profile described for spit 1.
- Spit 6 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 7 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 8 is a continuation of the profile described for spit 1 (no fibrous roots present);

- Spit 9 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 10 demarcates a stratigraphic change from pale grey A¹ sands to pale brown A² sands, sand becoming damper and generally clean. One complete flake flake identified in this spit.
- Spit 11 is a continuation of the profile described for spit 10 with the exception of one proximal flake.
- Spit 12 is a continuation of the profile described for spit 10.
- Spit 13 is a continuation of the profile described for spit 10 with the exception of one angular fragment.
- Spit 14 is a continuation of the profile described for spit 10 with the exception of one split flake.
- Spit 15 is a continuation of the profile described for spit 10.
- Spit 16 demarcates a stratigraphic change from pale grey A² sands to the B¹ mineralised coffee rock layer. The B¹ consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A¹ and A² Cranbourne Sands profile.

Excavation ceased in Square C at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square C comprise A¹ grey sand and A² pale brown sand of the Cranbourne sand complex. As the floor of Square C was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further described in Table 10 below.

Table 10: Test pit C stratigraphic detail

Test Pit C	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile, two glass fragments identified.
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks, one brick fragment.
Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 8 35-40cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 9 40-4 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities, one complete flake.
Spit 11 50-55cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities, one proximal flake.
Spit 12 55-60cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 13 60-65cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities, one angular fragment.

Spit 14 65-70cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities, one split flake.
Spit 15 70-75cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 16 75—80cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities onto coffee rock

Test Pit D

The stratigraphic detail for Square D is detailed below and in Table 11:

- Spit 1 contained short thick grass and root mat overlying medium grey sandy silt. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex.
- Spit 2 is a continuation of spit 1 with charcoal flecks and fibrous roots present.
- Spit 3 2 is a continuation of spit 1.
- Spit 4 is a continuation of the profile described for spit 1.
- Spit 5 is a continuation of the profile described for spit 1.
- Spit 6 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 7 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 8 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 9 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 10 demarcates a stratigraphic change from pale grey A^1 sands to very pale brown A^2 sands, sand becoming damper and generally clean.
- Spit 11 is a continuation of the profile described for spit 10.
- Spit 12 is a continuation of the profile described for spit 10.
- Spit 13 is a continuation of the profile described for spit 10.
- Spit 14 demarcates a stratigraphic change from pale grey A^2 sands to the B^1 mineralised coffee rock layer. The B^1 consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A^1 and A^2 Cranbourne Sands profile.

Excavation ceased in Square C at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square C comprise A^1 grey sand and A^2 pale brown sand of the Cranbourne sand complex. As the floor of Square C was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further discussed in Table 11 below.

Table 11: Test pit D stratigraphic detail

Test Pit D	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 8 35-40cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 9 40-45 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 11 50-55cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 12 55-60cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 13 60-65cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 14 65-70cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities onto coffee rock

Test Pit D2

The stratigraphic detail for Square D2 is detailed below and in Table 12.

- Spit 1 contained short thick grass and root mat overlying medium grey sandy silt. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex.
- Spit 2 is a continuation of spit 1 with charcoal flecks and fibrous roots present.
- Spit 3 2 is a continuation of spit 1.
- Spit 4 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 5 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 6 demarcates a stratigraphic change from pale grey A^1 sands to very pale brown A^2 sands, sand becoming damper and generally clean.

- Spit 6 demarcates a stratigraphic change from pale grey A^1 sands to very pale brown A^2 sands, sand becoming damper and generally clean.
- Spit 7 is a continuation of the profile described for spit 6.
- Spit 8 is a continuation of the profile described for spit 6.
- Spit 9 is a continuation of the profile described for spit 6.
- Spit 11 is a continuation of the profile described for spit 6.
- Spit 12 demarcates a stratigraphic change from pale grey A^2 sands to the B^1 mineralised coffee rock layer. The B^1 consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A^1 and A^2 Cranbourne Sands profile

Excavation ceased in Square D2 at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square D2 comprise A^1 grey sand and A^2 pale brown sand of the Cranbourne sand complex. As the floor of Square C was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further discussed in Table 12 below.

Table 12: Test pit D2 stratigraphic detail

Test Pit D(2)	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 8 35-40cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 9 40-4 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 11 50-55cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 12 55-60cm	Very pale brown Munsell 10 YR 8/3	6 acidic	Undifferentiated very pale brown A^2 Cranbourne Sands, some charcoal in low densities onto coffee rock

Test Pit E (Square 3)

The stratigraphic detail for Square E (3) is detailed below and in Table 13. Stratigraphic test pit E (3) comprised almost the exact same superposition as Square C.

- Spit 1 contained short thick grass and root mat overlying medium-grey sandy silt. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex.
- Spit 2 is a continuation of spit 1 with charcoal flecks and fibrous roots present.
- Spit 3 2 is a continuation of spit 1.
- Spit 4 is a continuation of the profile described for spit 1.
- Spit 5 is a continuation of the profile described for spit 1.
- Spit 6 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 7 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 8 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 9 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 10 demarcates a stratigraphic change from pale grey A^1 sands to pale brown A^2 sands, sand becoming damper and generally clean.
- Spit 11 is a continuation of the profile described for spit 10.
- Spit 12 is a continuation of the profile described for spit 10.
- Spit 13 is a continuation of the profile described for spit 10.
- Spit 14 is a continuation of the profile described for spit 10.
- Spit 15 is a continuation of the profile described for spit 10.
- Spit 16 demarcates a stratigraphic change from pale grey A^2 sands to the B^1 mineralised coffee rock layer. The B^1 consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A^1 and A^2 Cranbourne Sands profile.

Excavation ceased in Square E (3) at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square E(3) comprise A^1 grey sand and A^2 pale brown sand of the Cranbourne sand complex. As the floor of Square C was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further discussed in Table 13 below.

Table 13: Test pit E(3) stratigraphic detail

Test Pit E(3)	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks.

Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 8 35-40cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 9 40-4 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A¹ Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 11 50-55cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 12 55-60cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 13 60-65cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 14 65-70cm	10 YR 7/3 very pale brown		
Spit 15 70-75cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities onto coffee composite clay / coffee rock base

Square F

The stratigraphic detail for Square F is detailed below and in Table 14.

- Spit 1 contained short thick grass and root mat overlying medium grey sandy silt. The spit contained one metal beer ring pull fragment and one half nail. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex and other than the glass fragments was generally clean.
- Spit 2 is a continuation of spit 1 including one brick fragment, also with charcoal flecks and fibrous roots present.
- Spit 3 2 is a continuation of spit 1 with one foreign basalt rock aggregate recorded.
- Spit 4 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 5 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 6 is characterized by a very fine lime deposit (approximately 29–33cm) which is likely a product of lime sowing during market garden activities. Square F is the only excavation undertaken on either sand ridge 1 or 2 to display this anomaly.
- Spit 7 demarcates a stratigraphic change from pale grey A¹ sands to pale brown A² sands, sand becoming damper and generally clean.
- Spit 8 is a continuation of the profile described for spit 7.
- Spit 9 is a continuation of the profile described for spit 7.
- Spit 10 is a continuation of the profile described for spit 7.

- Spit 11 is a continuation of the profile described for spit 7.
- Spit 12 is a continuation of the profile described for spit 7.
- Spit 13 is a continuation of the profile described for spit 7.
- Spit 14 is a continuation of the profile described for spit 7.
- Spit 15 is a continuation of the profile described for spit 7.
- Spit 16 demarcates a stratigraphic change from pale grey A^2 sands to the B^1 mineralised coffee rock layer. The B^1 consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A^1 and A^2 Cranbourne Sands profile.

Excavation ceased in Square F at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square F comprise A^1 grey sand and A^2 pale brown sand of the Cranbourne sand complex which are separated by an anomalous lime lens. As the floor of Square F was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further discussed in Table 14 below.

Table 14: Test pit F stratigraphic detail

Test Pit F	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile, one beer pull ring, and one nail.
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks and one brick fragment.
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks, one basalt aggregate.
Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Pale cream lime lens 2.5Y 8/1 white	6 acidic	Pale lime lens likely indicative of market garden activities
Spit 8 35-40cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 9 40-4 cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 11 50-55cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 12 55-60cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 13 60-65cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 14 65-70cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 15 70-75cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 16	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands,

75-80cm			some charcoal in low densities
Spit 17 80-85cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities
Spit 18 85-90cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A² Cranbourne Sands, some charcoal in low densities onto coffee rock lacking homogeneity

Square G

The stratigraphic detail for Square G is detailed below and in Table 15.

- Spit 1 contained short thick grass and root mat overlying medium grey sandy silt. The spit contained one glass fragment and one porcelain fragment. The spit comprises unconsolidated light grey sand which is generally very dry and fine-grained. Sand is indicative of the Cranbourne Sand complex and other than the glass fragments was generally clean.
- Spit 2 is a continuation of spit 1 including one glass fragment, also with charcoal flecks and fibrous roots present.
- Spit 3 2 is a continuation of spit 1 with one brick fragment recorded;
- Spit 4 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 5 is a continuation of the profile described for spit 1 (no fibrous roots present).
- Spit 6 demarcates a stratigraphic change from pale grey A¹ sands to very pale brown A² sands, sand becoming damper and generally clean.
- Spit 7 demarcates a stratigraphic change from pale grey A¹ sands to pale brown A² sands, sand becoming damper and generally clean.
- Spit 8 is a continuation of the profile described for spit 7.
- Spit 9 is a continuation of the profile described for spit 7.
- Spit 10 is a continuation of the profile described for spit 7.
- Spit 11 is a continuation of the profile described for spit 7 with the exception of an isolated silcrete complete flake.
- Spit 12 is a continuation of the profile described for spit 7.
- Spit 13 is a continuation of the profile described for spit 7.
- Spit 14 is a continuation of the profile described for spit 7.
- Spit 15 is a continuation of the profile described for spit 7.
- Spit 16 demarcates a stratigraphic change from pale grey A² sands to the B¹ mineralised coffee rock layer. The B¹ consists of a mineralised ironstone–coffee rock compound with eroded nodules >5 cm and is common at the base of the A¹ and A² Cranbourne Sands profile.

Excavation ceased in Square G at the base of the largely undifferentiated pale brown sand when compacted coffee rock was encountered. The two stratigraphic horizons identified in Square G comprise A¹ grey sand and A² pale brown sand of the Cranbourne sand complex. As the floor of Square G was becoming increasingly difficult to manually excavate it was determined by the archaeologist that the sand ridge stratigraphy was established and that no further excavation was required. The stratigraphic details are further discussed in Table 15 below.

Table 15: Test pit G stratigraphic detail

Test Pit G	Soil colour	pH	Inclusions
Spit 1 0–5cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Root mat covering in profile, one glass fragment identified, one porcelain fragment identified.
Spit 2 5–10 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks, one glass fragment identified.
Spit 3 10–15 cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Fibrous roots and charcoal flecks, one brick fragment.
Spit 4 15–20cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 5 20–25cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 6 25–30cm	Light grey undifferentiated grey sand. Munsell 2.5 Y 7/1 light grey	6 acidic	Undifferentiated grey A^1 Cranbourne Sands, some charcoal in low densities
Spit 7 30–35cm	Pale cream lime lens 2.5Y 8/1 white	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 8 35-40cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 9 40-4 cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 10 45-50cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 11 50-55cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities, artefact identified (isolated silcrete complete flake) at 51cm within this spit.
Spit 12 55-60cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 13 60-65cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 14 65-70cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 15 70-75cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 16 75-80cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 17 80-85cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities
Spit 18 85—90cm	10 YR 7/3 very pale brown	6 acidic	Undifferentiated pale brown A^2 Cranbourne Sands, some charcoal in low densities onto coffee rock

8.5 *Results of Test Pits*

Test Pit A

Test pit A comprised a generally clean profile of lagoonal-type flood plain deposits with no inclusions other than surface detritus and supporting root mat to 15 cm. Test Pit A was excavated to a depth of 50.5cm in 10 spits to a hardened clay base. No Aboriginal cultural heritage material was identified in test pit A.

Test Pit B

Test pit B comprised a generally clean profile of lagoonal-type flood plain deposits with no inclusions other than surface detritus and supporting root mat to 15 cm. Test pit B was excavated to a depth of 39.5cm in 8 spits to a hardened clay base. No Aboriginal cultural heritage material was identified in test pit B.

Test Pit C

Test Pit C comprised a generally clean profile with the exception of two glass fragments identified in spit 1 (0–5cm) and 1 brick fragment identified in spit 3 (10–15cm). Test Pit C was excavated to a depth of 79.1 cm in 16 spits to a hardened coffee rock base. A total of four Aboriginal stone artefacts were identified in Test pit C, as listed in Table 16 below.

Table 16: Artefacts identified in Test Pit C

Square C	No./artefact type	Depth	GPS (MGA 94)		Raw material
Spit 10	1 Complete flake	500 mm	340810.35e	5788869.72n	Silcrete
Spit 11	1 Proximal flake	550 mm	"	"	Silcrete
Spit 13	1 Angular fragment	650 mm	"	"	Milky quartz
Spit 14	1 Split flake	700 mm	"	"	Rose quartz

Test Pit D

Test Pit D comprises a clean Cranbourne Sands profile with two distinct horizons and no inclusions with the exception of root matter and minor charcoal flecks. Test Pit D was excavated to a depth of 70.4 cm in 14 spits to a hardened composite coffee rock / clay base. No Aboriginal cultural heritage material was identified in test pit D.

Test Pit D2

Test Pit D2 comprises a clean Cranbourne Sands profile with two distinct horizons and no inclusions with the exception of root matter and minor charcoal flecks. Test Pit D2 was excavated to a depth of 56 cm in 12 spits to a hardened composite coffee rock / clay base. No Aboriginal cultural heritage material was identified in test pit D2.

Test Pit E (3)

Test Pit E (3) comprises a clean Cranbourne Sands profile with two distinct horizons and no inclusions with the exception of root matter and minor charcoal flecks. Test Pit E (3) was excavated to a depth of 73.5 cm in 15 spits to a hardened composite coffee rock / clay base. No Aboriginal cultural heritage material was identified in test pit E.

Test Pit F

Test Pit F comprised a generally clean profile with the exception of one beer ring pull and one nail identified in spit 1 (0–5 cm), one brick fragment identified in spit 2 (5–10 cm) and one anomalous basalt fragment identified in spit 3 (10–15 cm). Test Pit F was excavated to a depth of 89.8 cm to a hardened coffee rock base. Root matter was observed in the upper 3 spits and charcoal flecks were present in very low densities through the profile to spit 11. No Aboriginal cultural heritage material was identified in test pit F.

Test Pit G

Test Pit G comprised a generally clean profile with the exception of one glass fragment and one porcelain fragment identified in spit 1 (0–5 cm), one glass fragment identified in spit 2 (5–10 cm and one brick fragment identified in spit 3 (10–15 cm). Test Pit G was excavated to a depth of 81 cm in the north-east–south-east quadrants and to a depth of 56 cm in the north-west–south-west quadrants, in both cases to a hardened coffee rock base. A total of one Aboriginal stone artefact was identified in Test pit G comprising one silcrete complete flake, as listed in Table 17 below.

Table 17: Artefacts identified in Test Pit G

Square G	No./artefact type	Depth	GPS (MGA 94)		Raw material
Spit	1 Complete flake	mm	340823.608E	5788899.805N	Silcrete

Aboriginal Cultural Heritage identified in test pits

A total of five artefacts were identified from six 1m² hand-excavation stratigraphic test pits. Three of the excavations were located on sand ridge1 and three of the excavations were located on sand ridge 2. A total of four artefacts were identified in Square C and one artefact was identified in Square G, both of which were excavated on sand ridge 1 (Maps 2; 7 and Plates 25–26).

8.6 Shovel Test Pit Results

A total of 96 50 cm² shovel test pits were excavated in 9 transects in strategic locations throughout the activity area (Map 7). The blue symbols on Map 7 show the shovel test pits excavated as part of the February 2009 field program and the green symbols represent shovel test pits excavated as part of the March 2014 excavations. The strategic approach to the shovel test pit program was designed to facilitate effective excavation of the two distinct land forms in the activity area; the flood plain environment which covers the entire activity area and the two Cranbourne Sand ridges which dissect the activity area from the southern boundary (Map 7).

A total of 71 shovel test pits were excavated on the flood plain environment while 25 were excavated on the two sand ridges (21 on sand ridge 1 and 4 on sand ridge 2). Artefacts were identified in 5 of the 21 shovel test pits excavated on sand ridge 1 (Table 18). Sixteen shovel test pits were radial test pits excavated on sand ridge 1 to determine the site extent of the two existing artefact locations at Square C (4 artefacts) and Square G (1 artefact) as well as to establish the extent of artefacts identified in the five shovel test pits including shovel test pit 52 (1 artefact), 55 (3 artefacts), 58 (2 artefacts), 61 (1 artefact) and 63 (1 artefact) which are all discussed below.

Following the identification of 4 artefacts from Square C during the 2009 subsurface testing program a total of two radial shovel test pits were excavated east and west Square C (south was outside the activity area). While undertaking a linear north–south shovel test pit transect along sand ridge 1 (starting 10 metres north of Square C) artefacts were identified in shovel test pits 52 (1 artefact), 55 (3 artefacts), 58 (2 artefacts), 61 (1 artefact) and 63 (1 artefact). Two radial test pits were excavated east and west of each of the artefact bearing shovel test pits; however, they failed to identify additional artefacts. Shovel test pits excavated during the 2009 field program that contain artefacts are detailed in Table 18 below.

A total of 8 artefacts were identified in 5 shovel test pits excavated on sand ridge 1. In summary two radial test pits were excavated east and west of Square C, an additional shovel test pit 5 metres north of Square C in the transect line failed to identify artefacts. Two radial shovel test pits were excavated east and west of shovel test pit 52, two radial test pits were excavated east and west of shovel test pit 55, two radial test pits were excavated east and west of shovel test pit 58, and two radial test pits were excavated east and west of shovel test pit 61 and two radial test pits were excavated east and west of shovel test pit 63 totalling 12 radial test pits.

Because one artefact was identified in Square G during the recent 2014 excavations an additional two radial test pits (88 and 89) were excavated 2 metres west of square G but failed to determine whether the artefact occurrence identified in Square G continued in a westerly direction off the sand ridge. No artefacts were identified in shovel test pits 88 and 89.

One shovel test pit excavated 2 metres east of Square G during the 2009 subsurface testing program did not identify artefacts. It was determined that the site extent of Square G was confined to the excavation square and that the isolated artefact should be incorporated into VAHR 7921-1073 via a Place Inspection Form.

Table 18: Artefacts identified in all shovel test pits

Shovel Test Pit	No./artefact type	Depth	GPS (MGA 94)		Raw material
TP 52	1 Angular fragment	400 mm	340816.82E	5788877.28N	Silcrete
TP 55	2 Split flakes	400 mm	340829.64E	5788902.77N	Silcrete
TP 55	1 Angular fragment	600 mm	"	"	Crystal quartz
TP 58	2 Complete flakes	400 mm	340836.82E	5788912.69N	Silcrete and quartzite
TP 61	1 Backed blade	100 mm	340841.84E	5788922.4N	Crystal quartz
TP 63	1 Block fragment	100 mm	340848.98E	5788932.5N	Meta-sediment

In summary a total of 96 shovel test pits were excavated across the activity area. Of these 96 a total of 71 were excavated on the flood plain landform while 25 were excavated on the two sand ridges in the southern section of the activity area. A total of 21 shovel test pits were excavated on sand ridge 1, 14 of these were radial test pits while 7 were excavated as part of a linear shovel test pit transect. A total of five artefacts were identified from the 21 shovel test excavated. Other than the five shovel test pits detailed above no other Aboriginal cultural heritage material was identified from the other 91 shovel test pits excavated. A total of 4 shovel test pits were excavated on sand ridge 2 to extend the three 1m² excavations that were conducted there, but none of these shovel test pits contained artefacts.

All shovel test pits displayed some level of disturbance in the upper 20 cm (likely resultant from market garden activities). Shovel test pit depth ranged from 38–55cm on the flood plain and 66–80cm on the sand ridges (Table 19) and all shovel test pit locations were spatially recorded with a DGPS.

Plate 21: Shovel test pit 15

Plate 22: Shovel test pit 45

Plate 23: Shovel test pit 58

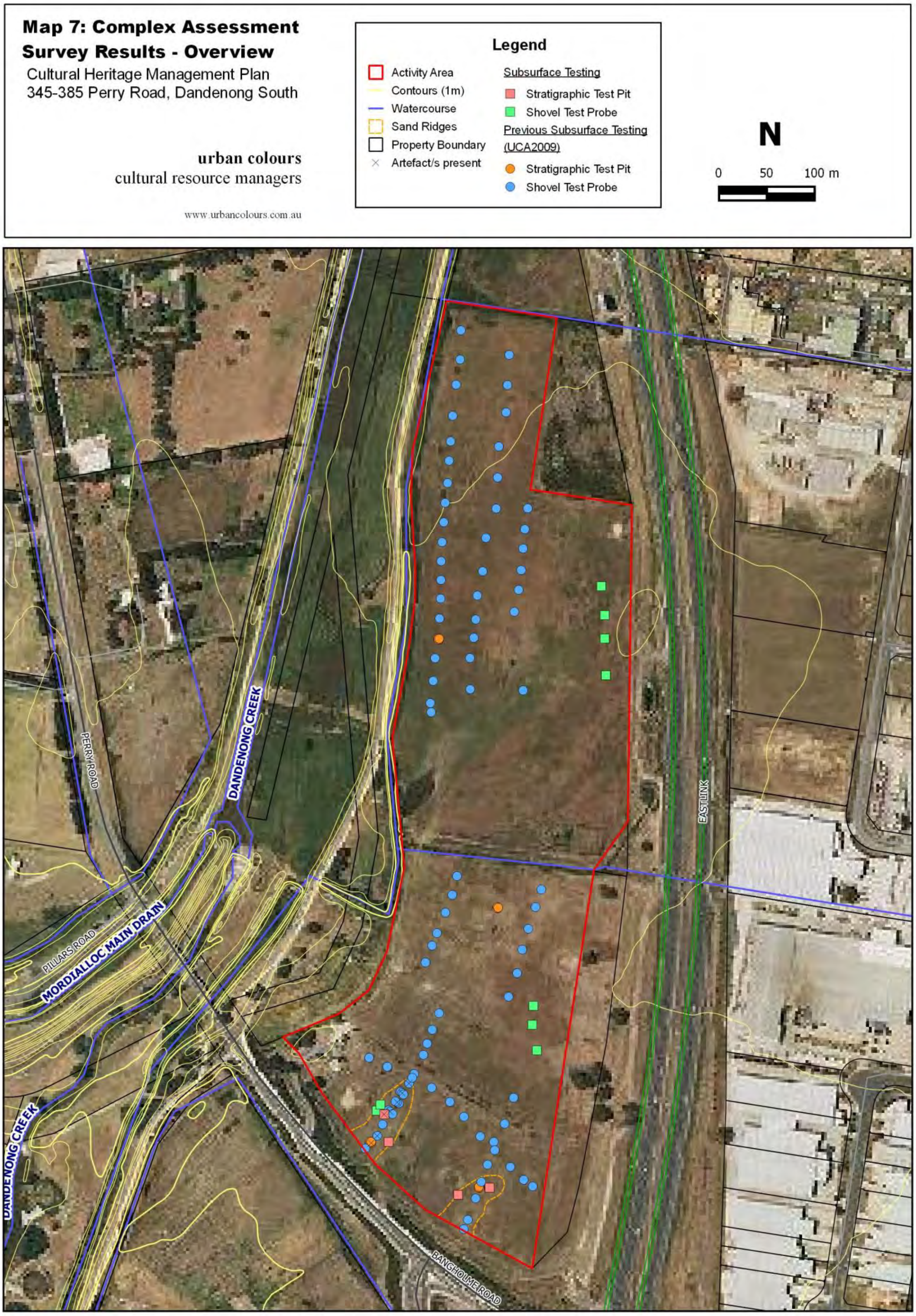
Plate 24: Stratigraphy on clay pan

Table 19: Excavation locations and depth data for all excavations undertaken (2009 and 2014)

Point ID	East	North	Elevation	Artefacts	Depth excavated
SQA	340871.25	5789395.47	5.93	None	505 mm
SQB	340938.01	5789116.58	6.14	None	395 mm
SQC	340810.35	5788869.72	5.78	4	791 mm
SQD	340925.25	5788825.98	5.92	None	704 mm
SQD2	340902.572	5788817.54	6.01	None	565mm
SQE(3)	340957.745	5788839.064	5.97	None	735mm
SQF	340828.731	5788871.177	6.50	None	898mm
SQG	340823.608	5788899.805	6.33	1	810mm
TP01	340864.52	5789319.71	5.4	None	410 mm
TP02	340863.56	5789329.2	5.37	None	438 mm
TP03	340866.09	5789352.44	5.66	None	414 mm
TP04	340867.54	5789376.07	5.82	None	420 mm
TP05	340871.4	5789417.62	5.89	None	390 mm
TP06	340872.06	5789438.32	5.93	None	395 mm
TP07	340872.07	5789457.71	5.96	None	350 mm
TP08	340871.91	5789477.32	6.03	None	355 mm
TP09	340872.53	5789497.14	6.07	None	361 mm
TP10	340873.88	5789517.91	6.12	None	390 mm
TP11	340874.99	5789538.15	6.21	None	400 mm
TP12	340877.13	5789558.85	6.4	None	400 mm
TP13	340878.16	5789582.13	6.31	None	390 mm
TP14	340879.36	5789602.37	6.22	None	360 mm
TP15	340881.08	5789629.05	6.3	None	370 mm
TP16	340884.02	5789661.48	6.24	None	440 mm
TP17	340887.67	5789687.84	6.32	None	420 mm
TP18	340888	5789718.24	6.43	None	355 mm
TP19	340938.97	5789693.61	6.32	None	380 mm
TP20	340937.71	5789662.2	6.39	None	410 mm
TP21	340936.87	5789633.63	6.38	None	400 mm
TP22	340929.98	5789597.96	6.22	None	405 mm
TP23	340929.39	5789565.64	6.04	None	400 mm
TP24	340928.47	5789533.29	6.03	None	450 mm
TP25	340918.33	5789502.54	5.96	None	455 mm
TP26	340915.61	5789467.67	5.89	None	400 mm
TP27	340910.44	5789442.24	5.88	None	395 mm
TP28	340909.31	5789417.25	5.83	None	388 mm
TP29	340907.68	5789398.14	5.79	None	390 mm
TP30	340904.1	5789377.03	5.74	None	339 mm

Point ID	East	North	Elevation	Artefacts	Depth excavated
TP31	340904.92	5789344.49	5.42	None	341 mm
TP32	340960.31	5789344.4	5.49	None	350 mm
TP33	340949.49	5789426.11	5.97	None	390 mm
TP34	340953.6	5789449.02	5.99	None	400 mm
TP35	340955.88	5789469.71	6.01	None	400mm
TP36	340957.4	5789492.19	6.11	None	410 mm
TP37	340958.81	5789512.3	6.08	None	400 mm
TP38	340961.52	5789534.18	6.03	None	400 mm
TP39	340894.9	5789149.57	5.51	None	500 mm
TP40	340890.3	5789129.9	5.75	None	550 mm
TP41	340883.49	5789111.35	5.75	None	470 mm
TP42	340875.1	5789089.7	5.7	None	460 mm
TP43	340870.27	5789076.63	5.89	None	475 mm
TP44	340863.67	5789058.95	5.8	None	440 mm
TP45	340983.38	5789137.26	5.84	None	439 mm
TP46	340977.72	5789118.86	5.82	None	430 mm
TP47	340970.56	5789096.11	5.72	None	400 mm
TP48	340964.67	5789074.28	5.64	None	400 mm
TP49	340959.75	5789049.67	5.56	None	415 mm
TP50	340951.19	5789024.9	5.58	None	400 mm
TP51	340804.46	5788863.96	5.7	None	790 mm
TP52	340816.82	5788877.28	5.86	1	800 mm
TP53	340822.08	5788889.3	5.78	None	765mm
TP54	340827.91	5788904.19	5.14	None	770 mm
TP55	340829.64	5788902.77	5.68	3	800 mm
TP56	340832.27	5788900.34	5.19	None	750 mm
TP57	340838.71	5788911.52	5.06	None	790mm
TP58	340836.82	5788912.69	5.5	2	760 mm
TP59	340835.13	5788913.61	5.1	None	770 mm
TP60	340840.18	5788923.68	5.03	None	770 mm
TP61	340841.84	5788922.4	5.47	1	760 mm
TP62	340843.28	5788920.98	5.03	None	765 mm
TP63	340848.98	5788932.52	5.45	1	740 mm
TP64	340854.02	5788942.48	5.44	None	740 mm
TP65	340863.36	5788962.57	5.3	None	690 mm
TP66	340867.13	5788974.46	5.35	None	640 mm
TP67	340872.09	5788988.97	5.47	None	480 mm
TP68	340878.97	5789006.34	5.58	None	450 mm
TP69	340909.16	5788781.96	5	None	810 mm

Point ID	East	North	Elevation	Artefacts	Depth excavated
TP70	340913.21	5788791.69	5.05	None	820 mm
TP71	340920.95	5788814.15	5.17	None	800 mm
TP72	340926.55	5788831.46	5.3	None	790 mm
TP73	340932.73	5788849.53	5.35	None	750 mm
TP74	340938.77	5788873.4	5.6	None	680 mm
TP75	340949.76	5788892.49	5.63	None	540 mm
TP76	340958.65	5788919.77	5.59	None	550 mm
TP77	340980.42	5788827.83	5.39	None	520 mm
TP78	340970.88	5788834.5	5.51	None	490 mm
TP79	340956.67	5788847.66	5.53	None	450 mm
TP80	340939.89	5788864.76	5.34	None	760 mm
TP81	340924.52	5788878.81	5.39	None	610 mm
TP82	340907.13	5788898.99	5.19	None	430 mm
TP83	340892.11	5788914.16	5.59	None	420 mm
TP84	340872.71	5788928.56	5.34	None	530 mm
TP85	340852.14	5788938.58	5.59	None	740 mm
TP86	340825.85	5788949.52	5.41	None	430 mm
TP87	340806.69	5788958.56	5.26	None	410 mm
TP88	340815.638	5788903.578	5.43	None	400mm
TP89	340819.448	5788909.859	5.35	None	430mm
TP90	340977.481	5789015.913	5.4	None	450mm
TP91	340976.745	5788996.183	6.12	None	490mm
TP92	340981.954	5788969.622	6.3	None	380mm
TP93	341039.967	5789454.449	6.35	None	400mm
TP94	341044.091	5789424.386	6.50	None	410mm
TP95	341044.613	5789400.044	6.66	None	400mm
TP96	341046.594	5789361.817	6.34	None	400mm



Map 7: Overview of subsurface testing locations across the activity area

Map 7a: Complex Assessment Survey Results - North Section

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urban colours
cultural resource managers

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Legend

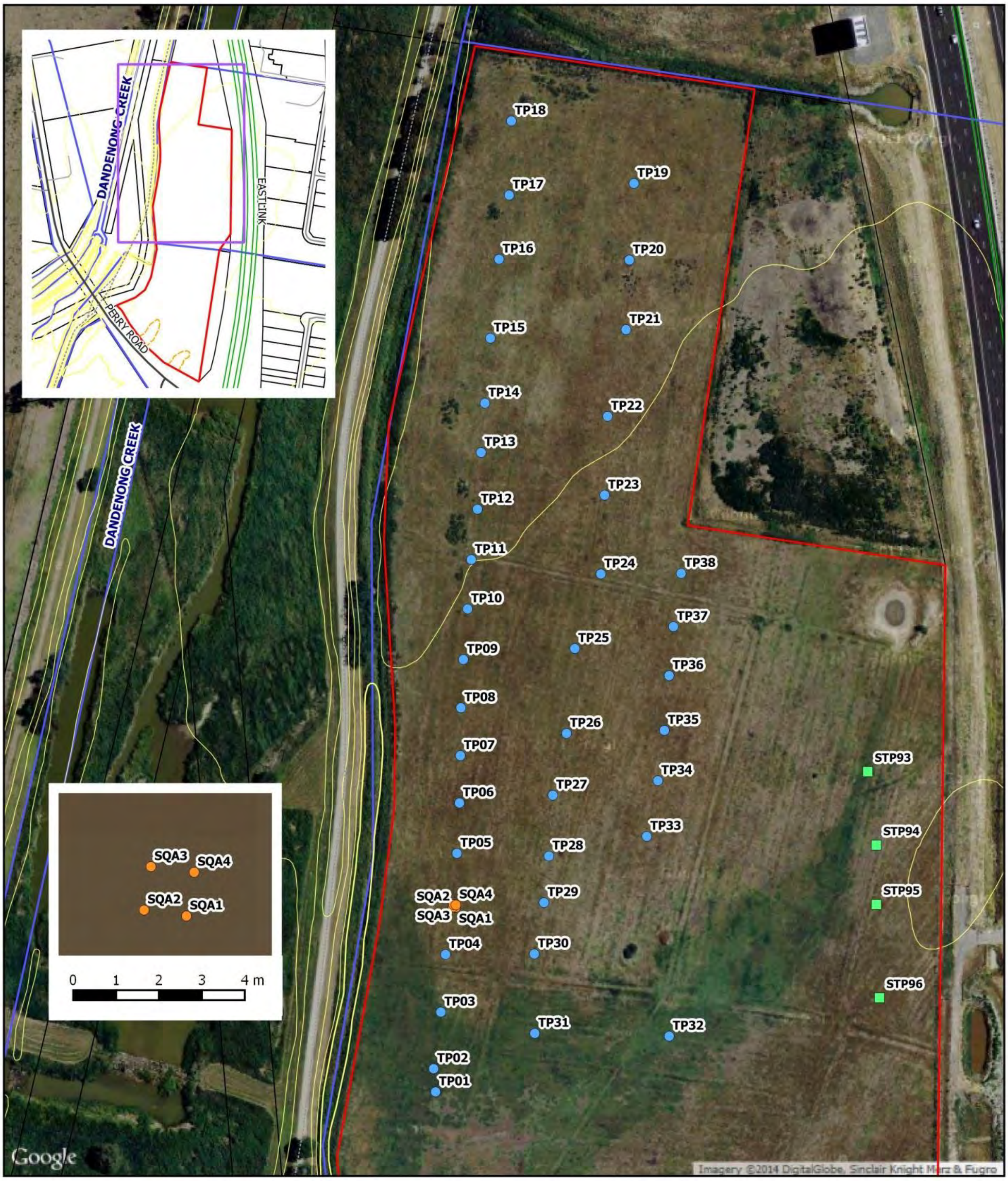
Activity Area
Contours (1m)
Watercourse
Sand Ridges
Property Boundary
Artefact/s present

Subsurface Testing
Stratigraphic Test Pit
Shovel Test Probe

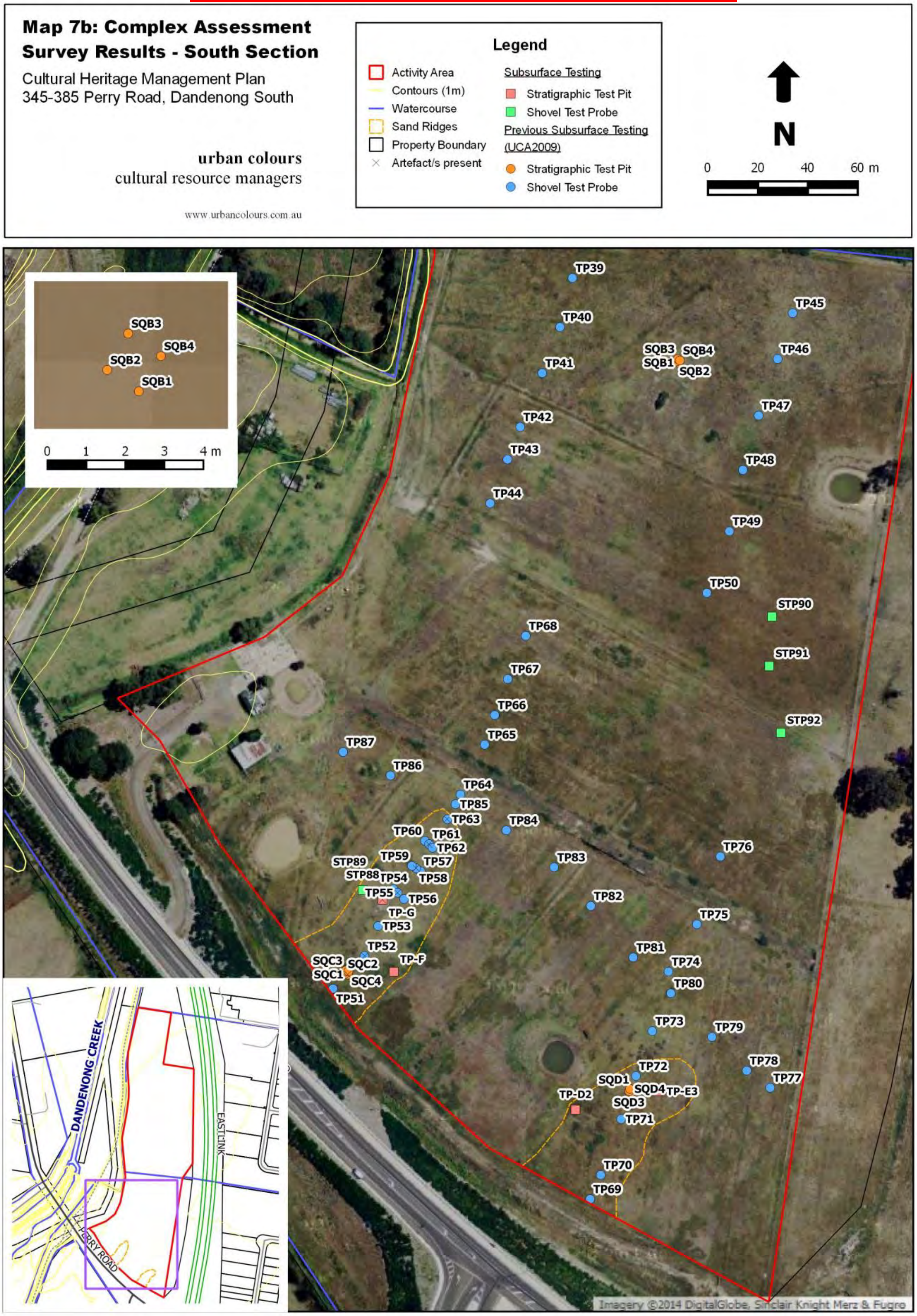
Previous Subsurface Testing (UCA2009)
Stratigraphic Test Pit
Shovel Test Probe

N

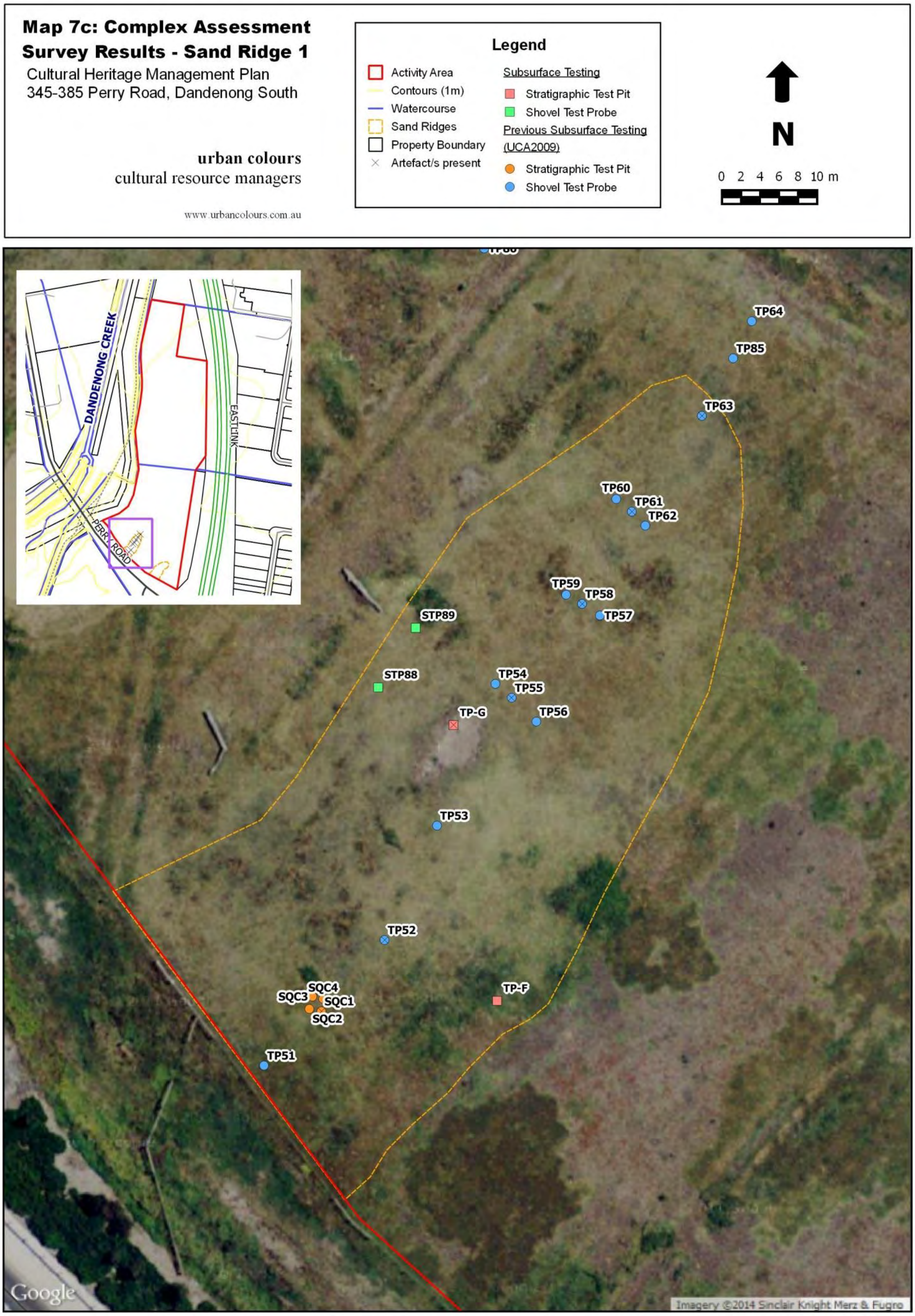
0 20 40 60 80 m



Map 7a: Complex assessment survey results, north section of activity area



Map 7b: Complex assessment survey results, south section of activity area



Map 7c: Complex assessment survey results, sand ridge 1

Map 7d: Complex assessment survey results, sand ridge 2

Map 8: Site Located within Activity Area

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Legend

- Activity Area
- Contours (1m)
- Sandridge
- Subsurface Artefacts
- Current Survey
- UCA 2009 Survey

N

0 50 100 150 200 m

Map 8: Aboriginal cultural heritage site identified in the activity area

8.7 Discussion

Aboriginal people have been undertaking subsistence throughout the greater Melbourne region for the past 37,000 years BP (Gallus 1983; Hewitt and De Lange 2007). Taking into account the data showing that Tasmania was colonised at least 38,000 years BP (Cosgrove 1990), it should be assumed that this part of what is today known as the Melbourne Basin was likely occupied at an earlier timeframe than the archaeological data indicates.

The results of previous archaeological investigations suggest that Aboriginal cultural heritage sites are most likely to be identified on low-lying sand ridgelines (where present) or on elevated landforms adjacent to primary resources, however, given the abundance of resources at the local and regional level Aboriginal cultural heritage places should be expected across all landforms within the geographic region. Because the archaeological data reflects broad land use patterns across the geographic region a number of the larger sites may be present across sand ridgelines.

The predictive statement developed at desktop level argues that there is no compelling evidence to suggest that any of the ridgeline sites are campsites and it is expected that most campsites will be identified in sheltered low-lying areas near primary resources (e.g. water). At Bend Road, approximately 5 km to the north, a large quantity of stone artefacts were identified, but no hearths were identified (Hewitt and De Lange 2007). It should be noted that stone raw material reduction may not be associated with camp sites so an archaeological signature may be difficult to detect. While the results from the current activity area provide limited data to the sensitive ridgeline model it has nonetheless provided an opportunity to comprehensively test sand ridge landforms (which are the most sensitive landform type in the geographic region) as well as a flood plain landform opposite a primary resource (Dandenong Creek) at a very local level.

There was a clear geomorphic boundary observed between the A^1 and A^2 Cranbourne Sand deposits indicating varying depositional sequences and timeframes. The A^1 profile (to 90 cm in the activity area) has been ascribed a Mid-Late Holocene chronology across the geographic region (Barker 2010), while the A^2, consisting generally of nodal and inter-nodal sands, has been ascribed a far older (at least Terminal Pleistocene e.g. 10kya – other research suggests Late Pleistocene prior to 10kya) chronology when the Carrum Downs area consisted of rolling sand dunes and salt-bush scrub with low trees and little to no surface water accumulation (Hewitt and De Lange 2007; Ellender *et al.* 2009).

Vegetation patterns were markedly different during the terminal Pleistocene due to reduced mean annual rainfall and as the substrate consisted of heavy sands and degrading residual Baxter Sandstone. There were no swamp deposits, probably very little clay and likely no Carrum Swamp; consequently intensity of occupation across the geographic region may have also been reduced at this time with perhaps a higher focus on primary water corridors and coastlines. Without a Carrum Swamp resource in the geographic region, land use practices in the Pleistocene may have been more transitional and certainly less intensive.

It is clear that Aboriginal people were actively exploiting the resources within this part of the geographic region given the presence of VAHR 7921-1073 within the activity area as well as the broader geographic region. Certainly Dandenong Creek would have provided a reliable corridor of stable resources; unfortunately the behavior of the river has also constrained archaeological detectability due to the large amount of sediment it has deposited across the majority of the activity area in the past. Flooding has laid down undifferentiated fluvial deposits to a depth of at least 1.8 m and this profile (which indicates recent lagoonal-type deposits) mantles deeper residual A^2 clays which continue to an unknown depth. The most sensitive landforms in the activity area are the two low-lying sand ridges; however, recent flood regimes of the river have either mixed material randomly through the profile or completely washed material further across the generally featureless landscape and what may be left comprises a redistributed low-density broad-scale artefact occurrence devoid of spatial congruency.

The absence of cultural heritage material within the remainder of the activity area is expected given the predictive model indicates that Aboriginal cultural heritage sites are generally located on ridgeline landforms. The premise that large artefact scatters are present adjacent to primary resource zones is conditional on the geomorphological integrity of the landform. A landform sensitive for Aboriginal cultural heritage sites adjacent to primary water corridors should be protected from natural erosive processes (e.g. flooding) and also rapid sediment development (e.g. colluvium and fluvial sediment deposition). The flood plain landform is both at a similar level as the river bank and is subject to flooding from the west.

Given that the activity area has now effectively been subject to two CHMPs (discontinued CHMP 10763 and the present CHMP 12983), comprising a total of eight 1m² test pits and 96 shovel test pits, it can be stated with a good level of certainty that there is low likelihood that further Aboriginal cultural heritage material will be identified within the activity area.

9 DETAILS OF ABORIGINAL CULTURAL HERITAGE IN THE ACTIVITY AREA

One Aboriginal Place was recorded within the activity area. VAHR 7921-1073 (Perry Scoresby) is a low density artefact scatter. The site when it was recorded comprised a total of 12 artefacts. A total of one artefact was identified as part of the 2014 excavation program which has been incorporated into the current site extent of VAHR 7921-1073. Place VAHR 7921-1073 has been updated with a place inspection form to reflect the current density of artefacts at the place.

The site contained 1 complete silcrete flake, 1 silcrete proximal flake, 1 milky quartz angular fragment and 1 rose quartz split flake all excavated in Square C. In addition Shovel test pit 52 contained 1 silcrete angular fragment, shovel test pit 55 contained 2 silcrete split flakes and 1 crystal quartz angular fragment. Shovel test pit 58 contained 2 complete flakes, one manufactured from quartzite the other from silcrete, shovel test pit 63 identified 1 block fragment manufactured from an unquantified meta-sediment and Square G identified one silcrete complete flake.

9.1 Assessment of Aboriginal Cultural Heritage

The artefact scatter was located on sand ridge 1 in the southern section of the activity area. The artefacts may have undergone vertical displacement due to the nature of stratigraphy and chemical processes occurring on the surface of the ridge. Given the low quantity of artefacts identified and the limited range of variability within the assemblage, there is little meaningful scientific information to inform on the range of activities undertaken and the archaeological significance of the site.

9.1.1 Site formation processes

Artefact scatters are the result of a range of activities including everyday tasks such as food preparation, tool making, wood-working and hide working. They can occur as a concentration in a location where people carried out their activities, or they can be isolated occurrences or low-density accumulations that are the product of discard or disturbance. At the current site, the 13 artefacts were found at similar depths in the profile (7 artefacts identified at depths of 40–60 cm); however, there has been secondary redistribution of sand minerals through the profile. Furthermore, the unconsolidated and hence unstable nature of the A^1 profile as well as the small dimensions of all artefacts identified (<5 mm) provides enough uncertainty to question whether the artefacts identified are actually in situ. Two artefacts were identified at a depth of 10 cm, and given the intensive market garden activities that have occurred across the activity area (Map 2) the two artefacts were likely disturbed from a depth deeper than where they were identified.

9.1.2 Artefact analysis

9.1.3 Artefacts identified during the 2009 subsurface testing program

The objectives of the stone artefact analysis were to determine which type of stone raw materials were used at the site, the type of artefact technologies manufactured from them and what function (if any) the artefacts may have performed. Artefact types were identified using McCarthy (1976) and / or Holdaway and Stern (2004); artefact terminology derived from the same sources. A total of 87 50x50cm STPs as well as four 1m² hand excavated test pits provide a spatially comprehensive subsurface testing program in an activity area. A total of 12 stone artefacts were excavated from 4 1m² test pits and 87 50x50cm STPs. For a complete list of the artefacts retrieved as well as the GPS location and the depth they were excavated see Tables 5–7 and 9. Artefacts were separated into ES and/or STP numbers and then separated again into spit numbers (where applicable). Basic on site analysis was performed on-site in order to separate stone artefacts from natural stone on the basis of the following criteria:

1. stones with a bulb of percussion and/or striking platform were designated artefacts;

2. stone materials which had evidence of use were designated artefacts;

3. angular fragments or conchoidal pieces of silcrete that did not display a bulb of percussion, a striking platform or a type of termination were designated angular or block fragments.

Artefacts were logged into a database under the square and spit number (depth) where they were excavated. Post-excavation analysis concentrated on the recording of a number of attributes which are described below; artefact numbers location test pit number spit depth (cm) artefact type number of negative flake scars termination type, platform type raw material type length, width and weight additional comments.

The artefacts were identified as types by the various attributes which they displayed; for instance, an artefact that had no termination but did have a striking platform was designated a proximal flake, an artefact that did have a termination but did not possess a striking platform was designated a distal flake and so forth. The maximum length of artefacts was established by artefact orientation, for example, the identification of a platform, point of force application and/or the bulb of percussion, or the longest line between two points when orientation could not be discerned. All artefacts were measured using Vernier manual callipers. As part of the artefact analysis, the archaeologist analysed the edges of all stone artefacts for retouch and/or edge damage using a stereo microscope. The presence of retouch may indicate how certain implements were utilised in the past. Indicators of use wear and retouch are microchips, striations and the accumulation of siliceous matter.

Raw materials Artefacts were kindly inspected by Dr Stephen Carey from the Earth Sciences Department, University of Ballarat. Dr Carey identified all the stone raw material types from the activity area. The overwhelming majority of artefacts are manufactured from silcrete raw material, a highly siliceous rock type formed as marine sediments. Quartz is the next most common raw material. Chert, quartzite and a meta-sediment occur in very low densities; the latter rock type is a low contributor to the assemblage as a whole. Previous archaeological research both locally and regionally has established that a diverse array of stone raw material was accessible to Aboriginal people in the area. Various meta-sediments (metamorphosed hornfels and slates) were present in low densities as was a very fine grained chert. Silcrete and to a lesser extent quartz (including rose and crystalline) dominate the stone record at the activity area as well as in several archaeological sites a few kilometres to the west.

The silcrete material was present in high concentration (n=6) with a texture ranging from medium fine-grained to very fine-grained. Quartz occurred in relatively high densities (n=4) when compared to the quantity of the assemblage (n=12). The very fine grained material was almost flint-like and was of an extremely high grade. The siliceous material (silcrete and quartz) were also present in various forms from rose, crystal to milky for quartz and light grey to dark grey and beige for silcrete. The variations in the colour of the silcrete and quartz raw material depends largely on the sediment composition or chemical derivatives during the geological formation process; however, what is important in the sourcing, manufacture and use of silcrete for the manufacture of stone tools is the quality of the raw material. Silcrete is by definition highly siliceous and very fine-grained producing sharp edges; it has a predictable fracture pattern and is very compact and durable making it ideal for stone tool production. A limited number of other stone raw materials were identified within this investigation and are defined below:

Quartz

Quartz is a high-silicon-content rock, mostly milky to clear crystalline. It is often associated with acid volcanics or as foliated deposits in areas of regional metamorphics. Quartz is abundant in the east outer Melbourne region either as river pebbles or as reefs. Quartz varies in flaking quality but while it is traditionally a hard rock type, it is found in archaeological contexts to be consistently brittle and often includes substantial natural fracture, limiting the size of flake able to be produced. Natural fracture in quartz may be propagated for use as striking platforms. This character may also produce „blocky" fragments and pseudo step-fractures, making it difficult to distinguish fractures as a consequence of cultural or natural processes.

Meta-sediment

Meta-sediments are typically defined as a partially altered sedimentary rock. This alteration occurs either as regional or contact metamorphosis through thermal or shear zone pressure. We use the term „meta-sediments" to describe all types of metamorphosed rocks at the site (e.g. hornfels, slate, schist and greywacke). The meta-sediments observed within the activity area are described here as having only partially fused grains, being relatively soft and powdery and occasionally occurring in parallel sheets (e.g. slate).

Quartzite

This is a fine metamorphic rock formed of altered sandstone. It is characterised by fusing of original sand particles. Quartzite is variable in quality, ranging from very good to poorly bonded sugary material with limited flaking application. Coarse-grained quartzites can also be extremely tough and difficult to flake, although they can be a useful stone raw material type for the manufacturing of axes.

The predominant stone type is silcrete with lesser quantities of high to fair grade quartz (including crystal, rose and milky quartz). Quartzite and meta-sediment densities were too low to provide any meaningful observations on raw material use at the site. Other Holocene sites throughout the Melbourne Basin region show this marked tendency for a narrow range of raw material use and point to the deliberate selection of silcrete over all other stone. How much the selection of silcrete raw material is a product of site type, location and/or general availability of silcrete raw material is unclear.

The sheer volume of silcrete from archaeological contexts in the Port Phillip region suggests an adequate supply which is presumably readily accessible through either local or regional sourcing or trade. A significant amount of archaeological data from south-eastern Australia also indicates that this raw material has played a continual and pivotal role in stone tool manufacture over the last 4000 years BP (Hiscock 1993: 65-70; Mulvaney & Kamminga 1999: 235).

All 12 artefacts were excavated from sand ridge 1. No artefacts were excavated from sand ridge 2 or on the clay pan. Average STP depth on the sand ridges was approximately 700mm while on the clay pan it was approximately 400mm. A total of n=1 or 8.33% of the total assemblage was retouched or edge damaged on one or more lateral or back margins, a moderate number in an assemblage comprising n=12. This consisted of one backed blade. The backed artefact was manufactured from a high quality, almost amorphous, crystal quartz raw material type comprised of small interlocked crystals making planes of fracture predictable. Retouched artefacts are important temporal markers. Worked artefacts such as backed blades and other microliths are useful chronological indicators for inferring relative dates (Holdaway & Stern 2004: 79; Mulvaney & Kamminga 1999: 235). Microlithic technology first appears in the archaeological record about 4000 years around the Pilbara and in sites around Brisbane. It took perhaps another 1000 years to slowly diffuse into Victoria (Mulvaney & Kamminga 1999: 235). Given the above, complete sites displaying microlithic technologies in basal deposits throughout southern Victoria are probably no older than around 3000 years BP. The backed artefact was retrieved from 100 mm in depth from TP 61 so no relative site chronology can be determined from this isolated implement. The backed blade retrieved displayed evidence of secondary retouch under 20X magnification (Plate 36). Even though the current assemblage is low in quantity, the dataset highlights that the majority of artefacts excavated are by-products (angular fragments) of on-site reduction of stone raw materials. The flake material and angular fragments (n=4 from 12 artefacts or 33.33% of the total assemblage) are described here as angular or fractured fragments or conchoidal flakes with no evidence of a bulb of percussion, a striking platform or evidence of use or secondary retouch .

The vast majority of implements analysed from the activity area are quite small (0–20 mm in maximum length and width and 0–0.5g in weight). Of the 12 artefacts excavated at the site, all are <20mm in maximum length and/or width. Furthermore, nine of the twelve artefacts excavated fall between 0–0.5 gram mass scales. These data indicate that the majority of artefacts recovered are very small implements. These dimension and mass scales are in line with what would be expected from a site where fine duty knapping activities are undertaken.

No cores were excavated from any of the test excavations to support the notion that stone knapping activities were undertaken on site. While the lack of cores from the activity area may be explained by sampling issues, it is probable that cores were utilised in a curated fashion and removed from site. As stated, the size distribution of all artefacts are typical of a fine-duty knapping site. From this site type we typically anticipate that more than 50% of the flakes will occur in the lowest size range (Whittaker 2005: 20), which is in line with the current dimension and mass scales in the Perry Road assemblage. Obviously these percentages depend on the type of raw material source utilised as some raw materials create a great amount of small flake shatter than others. At the activity area shatter material between 0–10mm accounts for 50 % (n=6) of the total assemblage. Higher densities of shatter material between these dimensions may are likely present at the site; however, they may have been unobserved through the sieves due to the diameter of the sieve screen.

A total of 8 artefacts were recovered from 87 50x50cm STPs. This equates to an average of approximately 00.91 artefacts to one 50x50cm test pit. There were 4 artefacts excavated from SQ.C, the only 1x1m ES containing artefacts. Square C sediment per spit equated to 9 buckets at 7 kg per bucket (63 kg per spit) and 144 buckets per square (1008 kg of sediment per square totalling 16 spits). This equates to an average of 0.25 artefacts per spit from 9 buckets (63 kg) of total sediment weight. These ratios are typical of a low density stone artefact occurrence.

9.1.4 Artefacts identified during the 2014 subsurface testing program

A total of one silcrete complete flake was identified from stratigraphic test pit G at 50cm in depth. No other Aboriginal stone artefacts were identified during the 2014 subsurface testing program.

(Table 20; Plates 25–26).

Table 20: All artefacts identified from the 2009 and 2014 subsurface testing programs

Raw material	Manufacture type	Flake platform	Flake termination	Flake scars	Mods	Tool type	L	W	TH	MD
Silcrete	Flaked	Flaked	Flaked	4		Complete flake	18.7	9.7	2.4	18.7
Silcrete	Flaked	Flaked				Proximal Flake	12.9	9.3	3.2	12.9
M quartz	Flaked	Flake piece				Flaked piece	14.3	14.1	4.1	15.2
R quartz	Flaked	Flaked	Feather	1		Split flake	9.9	6.0	2.7	9.9

Silcrete	Flaked	Flake piece				Flaked piece	19.3	16.1	3.4	21.7
Silcrete	Flaked	Flaked	Hinge	2		Split flake	8.9	5.1	2.1	8.9
Silcrete	Flaked	Crushed		2		Split fake	9.1	16.0	5.2	16.0
C quartz	Flaked	Flake piece		3		Flaked piece	4.9	2.9	2.1	5.5
Silcrete	Flaked	Flaked	Feather	3		Complete flake	9.7	16.1	3.7	16.1
Quartzite	Flaked	flaked	Feather	2		Complete flake	9.9	16.4	4.9	16.4
C quartz	Flaked				Retouched	Backed blade	20.0	8.3	3.7	20.0
Meta-sed	Flaked					Flaked piece	14.7	12.2	8.1	15.5
Silcrete	Flaked	Flaked	Hinge	3		Complete flake	21.3	12.9	6.8	23.3

Plate 25: Artefacts identified during the 2009 subsurface excavations (Square C, shovel test pits 52, 55, 58, 61 and 63)

Plate 26: Artefact identified during the 2014 subsurface excavations (Square G)

9.2 RAP Information about Aboriginal Cultural Heritage within the Activity Area

There is currently no RAP appointed for the land within which the activity area is located and therefore it was not possible to obtain information from a RAP about the cultural significance of the Aboriginal cultural heritage in the activity area.

9.3 VAHR 7921-1073 Perry Scoresby

Table 21: Details of registered Aboriginal Place

Site name	Perry-Scoresby
VAHR No	7921-1073
Primary grid coordinate	340810.35 N 5788869.72E
Cadastral description	345–385 Perry Road, Dandenong South
Site type	Artefact scatter
Landform/topography	Nodal dune system
Site contents	6 silcrete artefacts, 4 quartz artefacts, 1 quartzite artefact and 1 meta-sediment (n=13)
Potential for additional material	Low
Scientific significance	Low
Potential for additional knowledge	Low

9.3.1 Extent of VAHR 7921-1073 Perry Scoresby

VAHR 7921-1073 is located within Square C, a 1m² stratigraphic test pit and extends to shovel test pits 52, 55, 58, 61 and 63 and 1m² stratigraphic test pit Square G. The greatest distance between artefacts is 35 metres. Radial shovel test pits at cardinal points 2 metres from all artefact bearing test pits failed to identify additional cultural heritage material. The artefact occurrence is situated almost exclusively along the middle point aligned north–south along sand dune 1. Given the close proximity of the two artefact occurrences one LDAD accurately represents the activities that were undertaken on this section of the dune landform.

Table 22: Table of all artefacts identified within the activity area

Location		No./artefact type	Depth	GPS (MGA 94)		Raw material
Square C	**Spit 10**	1 Complete flake	500 mm	340810.35e	5788869.72n	Silcrete
	Spit 11	1 Proximal flake	550 mm	"	"	Silcrete
	Spit 13	1 Angular fragment	650 mm	"	"	Milky quartz
	Spit 14	1 Split flake	700 mm	"	"	Rose quartz
Square G	**Spit 10**	1 complete flake	500mm	340823.608e	5788899.805n	silcrete
Shovel Test Pits	**TP 52**	1 Angular fragment	400 mm	340816.82e	5788877.28n	Silcrete
	TP 55	2 Split flakes	400 mm	340829.64e	5788902.77	Silcrete
	TP 55	1 Angular fragment	600 mm	"	"	Crystal quartz
	TP 58	2 Complete flakes	400 mm	340836.82e	5788912.69	Silcrete and quartzite
	TP 61	1 Backed blade	100 mm	340841.84e	5788922.4	Crystal quartz
	TP 63	1 Block fragment	100 mm	340848.98e	5788932.52	Meta-sediment

9.3.2 Nature of VAHR 7921-1073 Perry Scoresby

VAHR 7921-1073 (Perry Scoresby) is considered to represent a broadly distributed low-density artefact scatter. The presence of one lithic at 70 cm in depth suggests there may be a Mid-Holocene time-depth; however, because the split flake is very small there is some likelihood that the archaeological material is not *in situ* and may have been subject to vertical displacement through the profile. Seven of the 13 artefacts were identified between 40 and 60 cm, and this level appears more in line with regional sequences. Given these uncertainties, coupled with flood regimes of Dandenong Creek, sand samples were not taken for dating purposes.

It is difficult to elaborate on the range of activities that may have been undertaken at the place with such a low quantity of artefacts (n=13); however, similar archaeological sites in the geographic region where larger quantities of lithics have been identified have been interpreted as representing maintenance or 'gearing up' sites to facilitate the exploitation of the local swamp or foreshore rock platform resources. This interpretation appears to be in line with the activities that are likely to have been undertaken at the subject activity area

9.3.3 Significance of VAHR 7921-1073 Perry Scoresby

The significance of Perry-Scoresby (VAHR 7921-1073) has been determined according to the significance assessment criteria, following Bowdler 1981, and detailed in Table 23. The overall significance rating is detailed in Table 24.

Two main criteria are used when assessing the significance of Aboriginal cultural heritage sites. These are social and cultural significance, and scientific and archaeological significance.

9.3.3.1 Social and cultural significance of VAHR 7921-1073 Perry Scoresby

A statement of significance on accordance with Aboriginal tradition has not been sought for this CHMP as there is currently no RAP appointed. RAP applicant field assistants contributed to the assessment and did not consider the site to be of high significance.

9.3.3.2 Scientific and archaeological significance of VAHR 7921-1073 Perry Scoresby

Scientific significance can be assessed by suitably qualified archaeologists and cultural heritage advisors. Scientific value assessments are generally based on the rarity, quality and representativeness of cultural heritage sites and hence their value to research or research potential (Australian Standards for the International Council on Monuments and Sites ICOMOS 1999: 2). There are three primary criteria used to assess the scientific significance and research potential of Aboriginal cultural heritage sites; these are detailed below in Table 23.

Table 23: Description of Significance Ratings

Rating description	Rating	Description
Site contents Site contents refers to all material and organic remains present that are the result of past human behaviour or are associated with past human behaviour or can shed light on past human behaviour. Site contents also refers to the structure of the site including its size, the distribution or patterning of material remains, the presence of any stratified deposits and the rarity of the material remains. The site condition affects its site significance and sites are assessed on the basis of the degree to which they have been disturbed.	0	No cultural material.
	1	Small number of artefacts or limited range of cultural materials with no evident stratification.
	2A	Large number but limited range of cultural materials.
	2B	Some intact stratified deposits.
	3A	Large number of diverse range of cultural materials.
	3B	Largely intact stratified deposit.
	3C	Surface spatial patterning of cultural materials that still reflects the way the materials were deposited.
Site condition Site condition refers to the degree of disturbance that has affected the cultural heritage site.	0	Site destroyed.
	1	Site in deteriorated condition and with high degree of disturbance but some cultural materials remain.
	2	Site in fair to good condition but with some disturbance.
	3	Site in excellent condition with little or no disturbance.

Rating description	Rating	Description
Representativeness Representativeness refers to the local or regional distribution of a particular site type and is assessed on whether the site is common, rare or unique in a given region. Assessments of representativeness are hence subjective and constantly changing as they are biased by current knowledge of the distribution and numbers of archaeological sites in a region. This varies from place to place depending on the extent of previous archaeological research. Consequently, a site which is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of current knowledge of the local or regional archaeology. Any such site should be subject to reassessment as additional archaeological research is undertaken. Assessment of representativeness also takes into account the contents and condition of a particular site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, even though they are common in the region (Bowdler 1981: 12, 123–133).	1	Common occurrence
	2	Occasional occurrence
	3	Rare occurrence
Overall scientific significance Overall scientific significance ratings for sites based on a cumulative score for site contents, site integrity and representativeness are given as follows.	1–4	Low scientific significance
	5–7	Moderate scientific significance
	8–9	High scientific significance

Table 24: Significance rating for VAHR 7921-1073 (Perry Scoresby)

Site name & VAHR number:	Rating description:	Rating:	Overall significance rating:
Perry-Scoresby VAHR 7921-1073	Content Condition Representativeness	1 1 1	3 – Site is a small site with seven artefacts that have been subject to varying degrees of vertical displacement.

According to the significance assessment, VAHR 7921-1073 has a low scientific significance assessment. The site is a low density artefact scatter that has been subject to secondary natural displacement. The site is a common site type within the geographic region and there is little potential for further scientific analysis of this site or the cultural heritage material excavated.

10 Consideration of Section 61 matters – Impact Assessment

This section assesses the potential for any future development in the activity area to impact on Aboriginal cultural heritage. CHMPs are required to address matters raised in Section 61 of the *Aboriginal Heritage Act* 2006. These matters concern the management of Aboriginal cultural heritage prior to, during, and after the activity. A discussion of these matters is provided below.

10.1 Can harm to Registered Aboriginal Place VAHR 7921-1073 (Perry Scoresby) be avoided?

The proposed activity cannot avoid harm to the Aboriginal cultural heritage within the activity area. This is because the proposed activity involves ground disturbance across the entire activity area in order to level the site for construction works and for the activities to be carried out by the development, and deeper excavation works for trenches for underground services and for the foundations of the dwellings. As Aboriginal Place VAHR 7921-1073 is located 90–100 cm in depth, which falls within the expected depth of subsurface disturbance, harm to this Place cannot be avoided.

10.2 Are specific measures needed for the management of and mitigation of harm to Registered Aboriginal Place VAHR 7921-1073 (Perry Scoresby)?

No specific measures are required for the management of the site, however, once the artefacts are reburied in a location agreed on by the relevant Aboriginal organisations and the Sponsor, CIP, this location should be protected from further development.

10.3 Are there particular contingency plans that might be necessary?

Processes to be followed in relation to disputes, delays and other obstacles are outlined in the Management Requirements (Part 2). Procedures are outlined for factors that may affect the conduct of the activity. These include procedural guidelines in the event that suspected human remains are discovered, and safety requirements.

10.4 What custody and management arrangements might be necessary?

The custody and management of Aboriginal cultural heritage is addressed in Part 2 of this CHMP.

Part 2 | Cultural Heritage Management Recommendations

Note: These recommendations become compliance requirements once this Cultural Heritage Management Plan is approved.

11 Specific Cultural Heritage Management Requirements

11.1 Recommendation 1: VAHR 7921-1073

Aboriginal Place VAHR 7921-1073 has low scientific significance (Table 24). The extent, nature and significance of the site were determined during the complex assessment as required under Regulation 60 (Aboriginal Heritage Regulations 2007).

The site has effectively been destroyed through excavation, and the artefacts collected. However, under Section 8 of the Act, Aboriginal cultural heritage does not cease to exist if it is damaged or modified. The Aboriginal Place remains at the location at which it was recorded.

It will not be possible to avoid further disturbance to the Place during works as development is planned for the section of activity area in which the Place is located, and ground disturbance will be required to a depth greater than 80 cm to prepare the ground for development (including installation of services). Excavation defined the boundaries of the site through three stratigraphic test pits, 7 shovel test pits and 14 radial test pits at two cardinal points east and west of where artefacts were identified. Results confirmed that the site appeared to be highly localised along the central sand ridge and aligned north–south along the ridge. A total of 13 artefacts was identified from three 1 m² stratigraphic excavations and 21 shovel test pits. No further salvage is required as the entire site has been excavated.

The artefacts from VAHR 7921-1073 are currently being held by the cultural heritage advisor, and will remain so until completion of works or until the relevant Aboriginal organisations choose to rebury them. The location of the reburial must be in a location to be agreed on by the Aboriginal organisations and CIP.

The reburial must be conducted by an archaeologist and representatives of the Traditional Owners. The Place Collection Form within the site card for VAHR 7921-1073 must then be updated to show the reburial location.

This procedure must be organised and paid for by the site contractors and / or Sponsor.

11.2 Recommendation 2: Onsite staff to receive training prior to commencement of activity

Prior to the commencement of the activity, the nominated contractor/s must be advised by the Sponsor of the terms of the plan and their broader responsibilities to the *Aboriginal Heritage Act* (2006). The induction training for on-site staff should include:

- training in Aboriginal cultural heritage sensitivity;
- clear advice on the identity and contact details of the Sponsor's project delegate and contact details for a cultural heritage advisor;
- clear advice on staff responsibilities under the contingency plans contained within this report, in particular regarding the discovery of Aboriginal cultural material and human remains (see Section 10 below).

A copy of this CHMP should be kept on site during construction and revegetation works so that it can be referred to if required.

11.3 Recommendation 3: Approval required for changes to the proposed activity

Should any changes be made to the activity in terms of the nature and extent that the ground is to be impacted, the Sponsor must obtain statutory approval and may be required to submit a new CHMP (Section 52(1) *Aboriginal Heritage Act* 2006).

12 ABORIGINAL CULTURAL HERITAGE MANAGEMENT CONTINGENCIES

12.1 Contingency – Aboriginal Cultural Heritage Sites

If any Aboriginal cultural heritage sites are located during the proposed works at 345–385 Perry Road, Dandenong South, the following actions must be undertaken;

- All works within 10 m of the known extent of the relevant discovery area must cease immediately and protective fencing must be erected around the relevant area.
- The person making the discovery shall immediately notify the nominated project delegate for the RAP (or OAAV in the absence of a RAP) and the nominated project delegate for the Sponsor.
- While works are suspended, the nominated project delegates and the Cultural Heritage Advisor must evaluate the Aboriginal cultural heritage.
- An appropriately qualified Cultural Heritage Advisor must be engaged by the Project Sponsor to record and assess the findings and advise on possible management strategies (see Section 11.5: Contingency plan regarding non-compliance).

As far as practicable, the Cultural Heritage Advisor and representative of the RAP must inspect the site within 24 hours of being notified. During this inspection the management of any Aboriginal cultural heritage will be discussed and agreed to. The Cultural Heritage Advisor will be required to record the nature and extent of the site during the initial inspection or, if this is not possible, as soon as practical after the initial inspection is undertaken. Documentation of the site may include subsurface testing to establish the temporal and spatial extent of the site. If the Aboriginal cultural heritage is determined to be significant (i.e. an intact cultural deposit), the RAP may require site protection measures. If this is not possible, a sample salvage excavation, undertaken by a suitably qualified and experienced archaeologist, may be required to obtain adequate data prior to works proceeding.

The RAP will advise the Sponsor's delegate when suspended construction works can recommence.

Failure of parties to reach an agreed course of action will be classed a dispute (see Section 11.4).

Work may recommence within the 10 m buffer of the known extent of the site when:

- Appropriate protective measures have been undertaken.
- The relevant records for the Aboriginal cultural heritage have been completed by the heritage advisor.
- Any dispute has been resolved.

The Cultural Heritage Advisor, the Sponsor and the RAP must ensure that all these measures are followed and that legal obligations and requirements are complied with at all times.

The Cultural Heritage Advisor must submit all relevant site records including VAHR forms to OAAV within fourteen days of completing the assessment of the cultural heritage site.

In the situation that salvage is required then the following process/methodology will be applied by a suitably Cultural Heritage Advisor (i.e. a qualified and experienced archaeologist):

- The soil from each spit will be placed in a bucket within the square, weighed and then deposited directly into one of the sieves operating. All soil (100%) will be sieved through 5 mm sieve screens. All soils are to be 100% sieved to basal level (e.g. 120 cm on the sand ridge and up to 60 cm on the slope of the ridge). Excavations will continue until culturally sterile deposits have been reached. At the completion of each spit basal photographs will be taken and excavation sheets will be completed, noting changes in stratigraphic horizons (soil colour and texture), rocks, gravel and other materials not of cultural origin. Munsell (soil colour) and pH levels will also be taken. Sieving will be conducted at a reasonable distance from the excavation area to avoid backfilling of the square. Disturbance around the excavation areas will be kept to a minimum, with only the excavator and excavation recorder present while soil extraction is in progress.

- Upon the completion of the excavation to a sterile layer, stratigraphic horizons will be identified and profiles of two of the trench walls (north perspective and east perspective) will be drawn to provide a concise schematic representation of the stratigraphy as well as to complement the photographs and relate stratigraphic horizons to excavation notes and descriptions.

- Following this, the trenches will be backfilled to the requirements of the developer and the satisfaction of the Aboriginal field assistants.

- All artefacts will be bagged with date, spit number and site name clearly labelled. An extensive analysis of any collected material will be conducted at a location to be decided upon by the Aboriginal field assistants and the Cultural Heritage Advisors.

- A detailed artefact analysis will be conducted by the archaeologist and the Cultural Heritage Advisor. Analysis methodology will be formalised at a later date; however, it is expected that analysis of artefacts will be concerned with the presence or absence of striking platforms, bulbs of percussion, termination types, raw material type, number of negative flake scars, artefact types, type of reduction technique, edge damage etc. Length, width and weight scales will also be recorded and conjoining analysis will also be undertaken. Use-wear analysis will be conducted using either X20 or X40 magnification on a stereomicroscope. Images of any edge damage or use-wear will be provided and detailed in the salvage report. This will facilitate determinations of which type of stone raw materials were used at the site, the type of artefact technologies manufactured from them and what function (if any) the artefacts may have performed. Artefact types and attributes will be identified using Holdaway and Stern (2004) and artefact terminology will derive from the same source.

- The archaeological material located will be curated and stored appropriately; this is a matter for discussion between the cultural heritage advisor and the relevant Aboriginal community.

- If sufficient samples can be recovered during the salvage program, then any charcoal or other datable material must be collected in the appropriate manner and submitted for radiocarbon (C14) dating. If no charcoal samples are available then soil (sand) samples will be acquired for Optically Stimulated Luminescence (OSL) dating. The cost of this testing is to be met by the Sponsor. Collection of these samples will follow recommendations by Dr Alan Hogg from the Laboratory at the University of Waikato. This institution is very prompt (7 days if necessary) with their determinations and very competitively priced when compared with other dating laboratories. The dating of charcoal samples is priced at NZ $475 a sample. Dates can be obtained from charcoal samples of 1g; however, an 8–10 g sample is deemed optimal. Any faunal remains that may be excavated can also be utilised for dating purposes. The minimum sample weight for C14 radiometric dating of bone is 50 g, with the ideal sample weight being 100–200 g. For smaller samples of charcoal or faunal skeletal remains, AMS (Accelerator Mass Spectrometry) dating is also available. In this case the minimum sample size for charcoal is 100 mg, while for bone it is 1.0–5.0 g.

- A summary review of the information gathered will be given to all stakeholders. Copies of all reports associated with the salvage program will be lodged with the Office of Aboriginal Affairs Victoria. This must be completed 60 days after the completion of the salvage excavations.

12.2 Contingency – Aboriginal Cultural Heritage Material

Any Aboriginal cultural heritage recovered or salvaged during works at 345--385 Perry Road, Dandenong South would ordinarily remain the property of the RAP (if appointed). The custody and management of Aboriginal cultural heritage during the course of the activity should comply with the requirements established by the *Aboriginal Heritage Act* 2006 and be assigned according to the following order of priority: the RAP; any relevant registered native title holder; any relevant native title party; relevant Aboriginal person with traditional or familiar links; an Aboriginal body with historical or contemporary links; the owner of the land; the Museum of Victoria.

For this activity area it will be the responsibility of the Cultural Heritage Advisor to:

- catalogue the Aboriginal cultural heritage;
- label and package the Aboriginal cultural heritage with reference to provenance;
- arrange storage of the Aboriginal cultural heritage in a secure location together with copies of the catalogue and assessment documentation.

Contact details for the Office of Aboriginal Affairs Victoria are:

Office of Aboriginal Affairs Victoria
GPO Box 2392
Melbourne
Vic 3001
Phone: 1800 762 003
Fax: (03) 9208 3292
aboriginalaffairs@dpc.vic.gov.au

12.3 Contingency – Human Burials

If any suspected human burial remains are exposed at any stage of the proposed development, then all works must cease and Victoria Police and the State Coroner's Office should be notified immediately.

If there are reasonable grounds to believe that the remains may be Aboriginal, the OAAV State Control Centre must be contacted immediately on **1300 888 544**.

The following contingency plan is provided in the event of any such discovery within the activity area at 345--385 Perry Road, Dandenong South.

12.3.1 Discovery

All activity in the vicinity of the suspected human remains must cease to ensure minimal damage to the remains.

The remains must be left in place and protected from harm or damage.

12.3.2 Notification

The State Coroner's Office and Victoria Police must be notified immediately. The State Coroner's Office may be contacted at any time on **1300 309 519**. The Office of Aboriginal Affairs State Control Centre must be contacted on **1300 888 544.**

The details of the location and nature of the human remains must be provided to the relevant authorities.

If it is confirmed by these authorities that the discovered remains are Aboriginal skeletal remains, the person responsible for the activity must report the existence of human remains to The Secretary (DPC) in accordance with s.17 of the Act.

12.3.3 Impact Mitigation of Salvage

The Secretary, after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal human remains, will determine the appropriate course of action as required by s.18(2)(b) of the Act.

Note: In consultation with any relevant RAP, a Sponsor may consider incorporating a contingency plan to reserve an appropriate area for reburial of any recovered human remains that may be discovered during the activity. This may assist the Secretary in determining an appropriate course of action.

12.3.4 Curation and Further Analysis

The treatment of human remains must be in accordance with the direction of the Secretary and in accordance with s.18 (2) (b) of the *Aboriginal Heritage Act* 2006.

12.3.5 Reburial

Any reburial site(s) must be fully documented by an experienced and qualified archaeologist and clearly marked and all details provided to the Office of Aboriginal Affairs Victoria (OAAV).

Appropriate management measures must be implemented to ensure that the remains are not disturbed in the future.

Do not touch or otherwise interfere with the remains, other than to safeguard them from further disturbance.

Do not contact the media.

12.4 Contingency – Dispute Resolution

Should any or all parties have any concerns regarding non-compliance with this CHMP, they are advised to immediately consult with the cultural heritage advisor and with the Office of Aboriginal Affairs Victoria.

12.5 Contingency – Non-compliance with the Cultural Heritage Management Plan

Although no further archaeological investigation has been recommended in this CHMP, it is possible that cultural heritage material may be uncovered during the proposed works. In order to inform the Sponsor of their legal responsibilities in regards to cultural heritage management, specific legislative requirements are provided below.

In addition, a checklist referring to matters that must be complied with under the CHMP is included in Appendix 3.

The monetary value of all listed penalties is current at the time of writing.

Aboriginal Cultural Heritage

Causing harm to Aboriginal cultural heritage is an offence under the *Aboriginal Heritage Act* 2006. Under section 81, the Minister may order a cultural heritage audit to be carried out if there is reason to believe that the sponsor has contravened, or is likely to contravene, the recommendations contained in this CHMP.

Part 3 **PROTECTION OF ABORIGINAL CULTURAL HERITAGE**

Division 1 **Protection from harm**

s.27 Harming Aboriginal cultural heritage unlawful

(1) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage;

and

b) at the time the act was committed the person knew that the thing harmed was Aboriginal cultural heritage.

(2) A person who is guilty of an offence under subsection (1) is liable to a penalty not exceeding:

a) in the case of a natural person, 1800 penalty units or **$198 216.00;**

b) in the case of a body corporate, 10,000 penalty units or **$1 101 200.00**.

(3) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage; and

b) at the time the act was done the person was reckless as to whether the thing harmed was Aboriginal cultural heritage.

(4) A person who is guilty of an offence under subsection (3) is liable to a penalty not exceeding:

a) in the case of a natural person, 1200 penalty units or **$132 144.00;**

b) in the case of a body corporate, 6000 penalty units or **$660 720.00.**

(5) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage; and

b) at the time the act was done the person was negligent as to whether the thing harmed was Aboriginal cultural heritage.

(6) A person who is guilty of an offence under subsection (5) is liable to a penalty not exceeding:

a) in the case of a natural person 600 penalty units or **$66 072.00**;

b) in the case of a body corporate, 3000 penalty units or **$330 360.00.**

(7) An offence under this section is an indictable offence.

Note: the provisions of Division 12 Part 1 of the *Crimes Act 1958* (which deal with attempts) apply to indictable offences against this Act.

s.28 Doing an act likely to harm Aboriginal cultural heritage unlawful

A person is guilty of an offence if:

The person knowingly does an act that is likely to harm Aboriginal cultural heritage; and

At the time the act was done the person knew that the act was likely to harm Aboriginal cultural heritage.

A person who is guilty of an offence under subsection (1) is liable to a penalty not exceeding:

In the case of a natural person, 1200 penalty units or **$132 144.00;**

In the case of a body corporate, 6000 penalty units or **$660 720.00.**

An offence under this section is an indictable offence.

Note: the provisions of Division 12 Part 1 of the *Crimes Act 1958* (which deal with attempts) apply to indictable offences against this Act.

Division 4 **Aboriginal Places and Objects**

s. 24 Reporting discovery of Aboriginal places and objects

(1) This section applies if:

a) a person discovers an Aboriginal place or object; and

b) the person knows that the place or object is an Aboriginal place or object.

(2) The person must report the discovery to the Secretary as soon as practicable unless, at the time of making the discovery, the person has reasonable cause to believe that the Register contained a record of the place or object.

Penalty: In the case of a natural person, 60 penalty units or **$6 607.20;**

In the case of a body corporate, 300 penalty units or **$33 036.00.**

If a discovery of an Aboriginal place or object is made in the course of works being carried out on any land, the person in charge of the works is deemed for the purposes of this section to be the person who discovered the place or object.

12.6 Provision for Review

Review of this plan can be undertaken at any time by project delegates representing the Sponsor and OAAV, or an agreed independent reviewer, to ensure that all parties are complying with the terms of the plan.

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Appendix 1: Notice of Intent

Victoria

Department of Planning and Community Development

Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the *Aboriginal Heritage Act 2006*

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the *Aboriginal Heritage Act 2006* (the "Act").

For clarification on any of the following please contact Victorian Aboriginal Heritage Register (VAHR) enquiries on 1800-726-003.

SECTION 1 - Sponsor information

Sponsor:	Simon Pikkat
ABN/ACN:	30 140 628 860
Contact Name:	Commercial and Industrial Property Pty Ltd
Postal Address	Suite 59, Jones Bay Wharf 26-32 Pirrama Road Pyrmont NSW 2009
Business Number:	+61 2 9506 1414 Mobile:
Email Address:	spikkat@ciproperty.com.au

Sponsor's agent (if relevant)

Company:	
Contact Name:	
Postal Address	
Business Number:	Mobile:
Email Address:	

SECTION 2 - Description of proposed activity and location

Project Name:	345 - 385 Perry Road Bangholme
Municipal district:	Greater Dandenong City Council

Clearly identify the proposed activity for which the cultural heritage managment plan is to be prepared (ie. Mining, road construction, housing subivision)

Industry

SECTION 3 - Cultural Heritage Advisor

Name	Company	Email address
annette xiberras	Urban Colours Arts Cultural Heritage Consultants	bunjilin@bigpond.com

SECTION 4 - Expected start and finish date for the cultural heritage management plan

Start Date: 26-Feb-2014 Finish Date: 26-Jun-2014

Submitted on 26 Feb 2014

SECTION 5 - Why are you preparing this cultural heritage management plan?

☑ A cultural heritage management Plan is required by the Aboriginal Heritage Regulations 2007

What is the high Impact Activity as it is listed in the regulations?

Industry

Is any part of the activity an area of cultural heritage sensitivity, as listed in the regulations? Yes

☐ Other Reasons (Voluntary)

☐ An Environmental Effects Statement is required

☐ A Cultural Heritage Management Plan is required by the Mister for Aboriginal Affairs.

SECTION 6 - List the relevant registered Aboriginal parties (if any)

This section is to be completed where there are registered Aboriginal parties in relation to the management plan.

SECTION 7 - Notification checklist

Ensure that any relevant registered Aboriginal party/s is also notitifed. A copy of this notice with a map attached may be used for this purpose.
(A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.)

In addition to notifying the Deputy Director and any relevant registerd Aboriginal party/s, a Sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice with a map attached may be used for this purpose.

Submitted on:26 Feb 2014


LOT 8
SITE AREA 5,995 sqm
WAREHOUSE 3,008 sqm
OFFICE 150 sqm
TOTAL BUILDING AREA 3,158 sqm
EFFICIENCY 52.68 %
AWNING (6m) 192 sqm
CARPARKING PROVIDED 16 spaces
HEAVY DUTY PAVEMENT (H) 1,296 sqm
LIGHT DUTY PAVEMENT (L) 249 sqm
LOT 7
SITE AREA 6,024 sqm
WAREHOUSE 2,760 sqm
OFFICE 150 sqm
TOTAL BUILDING AREA 2,910 sqm
EFFICIENCY 48.31 %
AWNING (6m) 216 sqm
CARPARKING PROVIDED 10 spaces
HEAVY DUTY PAVEMENT (H) 1,485 sqm
LIGHT DUTY PAVEMENT (L) 272 sqm
LOT 6
SITE AREA 4,202 sqm
WAREHOUSE 1,800 sqm
OFFICE 150 sqm
TOTAL BUILDING AREA 1,950 sqm
EFFICIENCY 46.41 %
AWNING (6m) 180 sqm
CARPARKING PROVIDED 6 spaces
HEAVY DUTY PAVEMENT (H) 1,005 sqm
LIGHT DUTY PAVEMENT (L) 98 sqm
EASTLINK
EASTLINK
PERRY ROAD
LOCATION PLAN
REVISIONS
LOT 5
SITE AREA 3,772 sqm
WAREHOUSE 1,545 sqm
OFFICE 150 sqm
TOTAL BUILDING AREA 1,695 sqm
EFFICIENCY 44.94 %
AWNING (6m) 144 sqm
CARPARKING PROVIDED 13 spaces
HEAVY DUTY PAVEMENT (H) 1,057 sqm
LIGHT DUTY PAVEMENT (L) 385 sqm
LOT 4
SITE AREA 10,657 sqm
WAREHOUSE 4,752 sqm
OFFICE 200 sqm
TOTAL BUILDING AREA 4,952 sqm
EFFICIENCY 46.47 %
AWNING (6m) 216 sqm
CARPARKING PROVIDED 27 spaces
HEAVY DUTY PAVEMENT (H) 1,808 sqm
LIGHT DUTY PAVEMENT (L) 1,026 sqm
LOT 3
SITE AREA 8,987 sqm
WAREHOUSE 3,780 sqm
OFFICE 200 sqm
TOTAL BUILDING AREA 3,980 sqm
EFFICIENCY 44.29 %
AWNING (6m) 186 sqm
CARPARKING PROVIDED 30 spaces
HEAVY DUTY PAVEMENT (H) 2,672 sqm
LIGHT DUTY PAVEMENT (L) 1,101 sqm
LOT 2b
SITE AREA 13,145 sqm
WAREHOUSE 7,081 sqm
OFFICE 350 sqm
TOTAL BUILDING AREA 7,431 sqm
EFFICIENCY 56.53 %
AWNING (3m) 36 sqm
AWNING (6m) 144 sqm
CARPARKING PROVIDED 68 spaces
HEAVY DUTY PAVEMENT (H) 1,909 sqm
LIGHT DUTY PAVEMENT (L) 1,710 sqm
LOT 2a
SITE AREA 13,972 sqm
WAREHOUSE 7,081 sqm
OFFICE 350 sqm
TOTAL BUILDING AREA 7,431 sqm
EFFICIENCY 53.18 %
AWNING (3m) 36 sqm
AWNING (6m) 144 sqm
CARPARKING PROVIDED 91 spaces
HEAVY DUTY PAVEMENT (H) 2,246 sqm
LIGHT DUTY PAVEMENT (L) 2,383 sqm
LOT 1
SITE AREA 32,210 sqm
WAREHOUSE 16,296 sqm
OFFICE (2 LEVELS) 1,200 sqm
TOTAL BUILDING AREA 17,496 sqm
EFFICIENCY 54.32 %
AWNING (3m) 72 sqm
AWNING (6m) 360 sqm
CARPARKING PROVIDED 150 spaces
HEAVY DUTY PAVEMENT (H) 4,798 sqm
LIGHT DUTY PAVEMENT (L) 4,695 sqm
DEVELOPMENT SUMMARY
TOTAL SITE AREA 195,660 sqm
MWC REQUIRED RETARDING BASIN 77,019 sqm
DEVELOPABLE SITE 118,641 sqm
ROAD RESERVE 19,677 sqm
NET DEVELOPABLE AREA 98,964 sqm
TOTAL WAREHOUSE AREA 48,103 sqm
TOTAL OFFICE AREA 2,900 sqm
TOTAL BUILDING AREA 51,003 sqm
TOTAL CARPARKING PROVIDED 411 spaces
TOTAL HEAVY DUTY PAVEMENT (H) 18,276 sqm
TOTAL LIGHT DUTY PAVEMENT (L) 11,919 sqm
CARPARKING REQUIRED (AS PER COUNCIL'S REQUIREMENTS)
2 SPACES PER PREMISES PLUS 18 spaces
WAREHOUSE - 1.5 per 100 sqm 722 spaces
OFFICE - 3.5 per 100 sqm 102 spaces
TOTAL CARPARKING REQUIRED 842 spaces
LOT 8
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2b
LOT 2a
LOT 1
SECONDARY ROAD RESERVE
ROAD RESERVE
ROAD RESERVE
MELBOURNE WATER DRAINAGE EASEMENT
PROPOSED RETARDING BASIN RESERVE
PERRY ROAD
PERRY ROAD
PROPOSED SLIP LANE
107310
100050
126240
149910
212170
54000
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96000
76000
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MELBOURNE
CIP
Developing Relationships
Building Success
PROJECT
CONCEPT MASTERPLAN
345-385 PERRY ROAD
DANDENONG SOUTH, VIC
DRAWING TITLE
CONCEPT MASTERPLAN
0 25 50 75 100 125m
317511 MP06 000 A

Appendix 2: Qualifications of Personnel involved in this CHMP

Annette Xiberras

Cultural Heritage Advisor

Grad Dip, Natural and Cultural Resource Management (Deakin)

Wurundjeri Elder

Annette has been working in the field of Aboriginal cultural heritage since 1989. Her long career in this area has seen her gain numerous formal qualifications in Cultural Heritage Management, and has allowed her to work with some of Victoria's leading archaeological experts. Annette's status as an acknowledged Wurundjeri Elder, and her links with other Victorian Indigenous communities, mean that she has a unique standing and authority within the field of Aboriginal Cultural Heritage Management in Victoria.

Annette's most recent experience has been in preparing Cultural Heritage Management Plans in the Metropolitan Melbourne, Westernport, Mornington Peninsula and Gippsland Regions through her consultancy, Urban Colours Arts and Cultural Heritage Consultants

- residential housing developments
- road infrastructure
- pipeline route developments
- urban developments
- mixed use zone developments
- waterway rehabilitation works
- national and state park management projects
- major infrastructure developments

Fields of competence

- Aboriginal archaeological surveys, subsurface testing and excavation
- field excavation and supervision
- project management
- Aboriginal, community and client liaison
- material culture analysis
- cultural heritage management plan composition

Recent employment

2007 – present

Managing Director, Urban Colours Arts and Cultural Heritage Consultants

2004–2005

Cultural Heritage Officer, Central Victoria Program, Aboriginal Affairs Victoria

1999–2004

Regional Manager, Kulin Nations Cultural Heritage Organisation

Education

1994–1995

Archaeological and cultural heritage training

Northern Metropolitan Institute of TAFE

2005–2006

Graduate Diploma, Natural and Cultural Resource Management

Deakin University, Institute of Koori Education

Recipient of Pratt Foundation Scholarship

Selected Aboriginal cultural heritage projects and experience

Rivendale Estate, Drouin – Cultural Heritage Management Plan

Tooradin Airfield Helicopter Hangar – Cultural Heritage Management Plan

1040 Glasscocks Road, Cranbourne – Cultural Heritage Management Plan

Mt Shamrock Quarry Extension, Pakenham – Joint Contractors (with Biosis Research), Archaeological Salvage Operation

Bend Road, EastLink – Archaeological Field Assistant, Wurundjeri Tribe Lands and Cultural Heritage Council Inc

Mt William, Sunbury Rings, Bullum Bullum – Site preservation, restoration and education of future generations

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John Stevens

Archaeologist and CHMP author

Bachelor of Archaeology (Honours) La Trobe University (2004); Bachelor of Science (Honours) Deakin University (1994)

John holds a Bachelor of Archaeology (Hons) degree in Aboriginal Archaeology from La Trobe University and is a former PhD student at the La Trobe University Campus. John also holds an Honours degree in Geomorphology from Deakin University. He is a member of the Australian Archaeological Association, the Society for American Archaeology and has presented and published papers in both Australia and the United Kingdom.

For the past seven years he has developed his project management skills by directing and delivering on large, complex cultural heritage projects including those associated with mining sites (Boral, Xstrata, Barro Group) PSP-level residential subdivisions (MAB Corp, VicUrban), wind farms (Origin Energy) and major road (VicRoads) and water infrastructure (Melbourne Water, City West Water, Wannon Water, NVIRP) projects.

John has extensive experience with standard and complex CHMPs, team leadership, business and marketing experience, large project management experience, peer reviews, VCAT panel hearings and cultural heritage audits. He has a sound knowledge of cultural heritage legislation across all states and has authored or co-authored over 40 CHMPs.

Edward East

Archaeologist

Bachelor of Archaeology, La Trobe University (2006); M.A., Durham (2013)

Edward has worked as a consultant archaeologist in Australia since 2008. During that time Edward has gained a wide range of field experience working on numerous historical and Aboriginal archaeology projects. Over this time Edward has worked on archaeology projects in many parts of Victoria, as well as in Central Province, Papua New Guinea, Northern Western Australia and Central Queensland. In addition to his extensive field experience Edward has written desktop assessments, field reports and Cultural Heritage Management Plans and also has considerable experience in using various computer programs for archaeology projects. During his career Edward has worked with some of the leading archaeology companies in Australia.

Fleur Taylor

Editor

BA (Hons), University of Melbourne

Fleur is an editor of more than thirteen years' experience. She is an Accredited Editor of the Institute of Professional Editors Limited.

Selected recent Cultural Heritage Management Plans edited:

- Isabella Williams Memorial Reserve, Deer Park
- 65 Ives Road, Lindenow South
- Clearwood Drive Reserve, Truganina
- Campbells Cove, Werribee South

Appendix 3: Compliance checklist

Checklist for compliance with the Cultural Heritage Management Plan

Date: __/_____/_____

Name: ________________________ Position: ________________________

CHMP NO: ____________________ Title: __________________________

Period of time covered by checklist: ___________________________________

Check YES/NO boxes and complete comments as appropriate

POINT	TASK	YES	NO	COMMENTS
1	Has the CHMP being approved			
2	Is there a designated contact person for dealing with Aboriginal cultural heritage issues? Name of contact person: ………………………………………………			
3	Has a map been prepared that shows the location of sites within the activity area?			N/A
4	Has the map referred to in Point 3 been distributed to all on-site workers?			N/A

MANAGEMENT OF ABORIGINAL CULTURAL HERITAGE FOUND DURING THE ACTIVITY. Where appropriate, this section should be completed with the assistance of the Cultural Heritage Advisor.

CONTINGENCY PLANS FOR THE DISCOVERY OF ABORIGINAL CULTURAL HERITAGE

POINT	TASK	YES	NO	COMMENTS
5	Has any previously unrecorded Aboriginal cultural heritage been uncovered during works? If YES, complete Points 7 to 18			
6	Was the designated contact person for dealing with Aboriginal cultural heritage issues immediately notified of the discovery?			
7	Did all works cease within a 25 metre radius buffer of the identified Aboriginal cultural heritage?			
8	Was this buffer clearly marked with safety webbing or other highly visible marker?			
9	Was the Cultural Heritage Advisor notified within 24 hours of the discovery?			
10	Was the Secretary of the Department of Planning and Community Development notified within 24 hours of the discovery?			
11	Did the Cultural Heritage Advisor notify the RAP of the discovery and invite them to inspect the site within 2 working days of notification?			
12	Did the Cultural Heritage Advisor inspect the discovery within 2 working days of notification?			
13	Did the Cultural Heritage Advisor determine that the discovery was a new site that required registration with the VAHR? If YES, complete Points 17 to 20			
14	Did the RAP, in consultation with the Cultural Heritage Advisor and land manager, provide the land manager with recommendations to be followed in the management of the identified Aboriginal cultural heritage within 5 working days of the site inspection?			

15	Have any recommended measures been implemented?			
16	Have new or updated site record cards for the discovery been submitted to OAAV?			
17	Were further archaeological investigations required? If YES, complete Point 19			
18	Were any further investigations overseen by an appropriately qualified archaeologist and representatives of the RAP?			

CONTINGENCY PLANS FOR ABORIGINAL CULTURAL MATERIALS

POINT	TASK	YES	NO	COMMENTS
19	Have any Aboriginal cultural materials identified on the property been returned to the RAP?			
20	If harm to the discovered Aboriginal cultural heritage could not be avoided have the cultural heritage advisor and representatives of the RAP or RAP applicants undertaken a salvage excavation?			
21	In the case of a salvage program taking place has the following been addressed: Has the salvage program taken place in accordance with R61? Has the Cultural Heritage Advisor completed new or updated site records for the VAHR? Has the Cultural Heritage Advisor catalogued and analysed the found cultural material? Has a report been produced detailing the results of the salvage excavation and analysis of cultural material and been lodged with OAAV or the RAP? Has the Cultural Heritage Advisor arranged for the custody of the cultural heritage material to be passed on to the most appropriate person/group as listed in Section 9.2?			
22	Has the Cultural Heritage Advisor: catalogued the Aboriginal cultural heritage? appropriately packaged and labelled the Aboriginal cultural heritage? consulted with the RAP to arrange secure storage of the Aboriginal cultural material and associated documentation?			

CONTINGENCY PLANS FOR THE DISCOVERY OF HUMAN SKELETAL REMAINS

POINT	TASK	YES	NO	COMMENTS
23	Have any human skeletal remains been uncovered during works? If YES, complete Points 25 to 30			
24	Was the designated contact person for dealing with Aboriginal cultural heritage issues immediately notified of the discovery?			
25	Did all activity in the vicinity cease immediately?			
26	Were the Coroner's Office and Victoria Police notified of the discovery of the remains?			
27	Was the DEPI Emergency Co-ordination Centre notified of the discovery of the remains?			
28	Were the remains identified as Aboriginal? If YES, complete Points 31 to 34.			

29	Did the designated contact person report the discovery of the remains to the Secretary of the Department of Planning and Community Development?			
30	Was the course of action established by the Secretary of the Department of Planning and Community Development implemented?			
31	If the remains were reburied, was the location of the reburial documented by a qualified archaeologist and the details provided to OAAV?			
32	Were appropriate management measures implemented to ensure that the remains are not disturbed in the future?			

CONTINGENCY PLANS FOR REVIEWING COMPLIANCE WITH THE CHMP

POINT	TASK	YES	NO	COMMENTS
33	Has communication been maintained between the Sponsor, Cultural Heritage Advisor and RAP?			
34	Have changes in contact details been circulated to all parties?			
35	Were any queries or issues dealt with immediately?			
36	Was last fortnight's checklist for compliance with the Cultural Heritage Management Plan completed?			
37	Was last fortnight's checklist for compliance with the Cultural Heritage Management Plan circulated to the Cultural Heritage Advisor and the RAP?			

CONTINGENCY PLANS FOR DISPUTE RESOLUTION

POINT	TASK	YES	NO	COMMENTS
38	Were these disputes referred to OAAV?			

ADDITIONAL COMMENTS	
SIGNATURES	
Signature of person who completed this checklist:	Signature of designated contact person for dealing with Aboriginal cultural heritage issues:

Appendix 4: Glossary

Archaeology: The study of the material remains of the human past.

Archaeological site: A place/location of either Aboriginal or non-Aboriginal origin that contains material remains relating to the human past.

Artefact: Any product made by human hands or caused to be made through human actions.

Artefact scatter: A surface scatter of stone artefacts is defined as being the presence of items of cultural material within a given area.

Backed blade (geometric microlith): Backing is the process by which one or more margins contain consistent retouch opposite to the sharp working edge. A backed blade is a blade flake that has been abruptly retouched along one or more margins opposite the sharp working edge. Backed pieces include backed blades and geometric microliths. Backed blades are a feature of the Australian Small Tool Tradition dating from between 5,000 and 1,000 years ago in southern Australia (Mulvaney 1975).

Blade: A long parallel sided flake from a specially prepared core. Blade flakes retain observable and complete fracture planes, platform, lateral margins and termination and are twice as long as they are wide. A broken blade is any stone artefact retaining partial diagnostic features of a blade.

Bipolar: A core or a flake which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms often indicate that the flake has come off a heavily worked core.

BP: Before Present. The present is defined as 1950.

Core: An artefact from which flakes have been detached using a hammerstone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake.

Cortex: Original or natural (unflaked) surface of a stone. This may be further divided into nodule, pebble and terrestrial cortex indicating the original source of the material.

Ethnography: The scientific description of living cultures.

Flake

Broken Flake: Any stone retaining partial diagnostic features of a flake

Complete/Whole Flake: An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core), platform, termination and bulb of percussion.

Distal Flake: Any flake on which the breakage removes the platform but retains the termination

Proximal Flake: Any flake on which the breakage removes the termination but retains the platform.

Primary flake: The first flakes struck off a core in order to create a platform from which other flakes can then be struck.

Secondary flaking/retouch: Secondary working of a stone artefact after its manufacture. This was often done to resharpen stone tools after use, or in the production of formal tool types such as blade flakes and scrapers.

Focal platform: This is a term used to describe the shape of the platform on a flake. A focal platform is narrower than the body of the flake. Focal platform flakes are produced when flakes are struck off near the edge of the platform on a core.

Geometric microlith: Artefacts less than 80 mm in maximum dimension which are backed at one or other end, sometimes at both ends, and sometimes on one lateral margin as well, the result being a form that is symmetrical around its transverse axis.

Hammerstone: A cobble or cobble fragment exhibiting pitting and abrasion as a result of percussion.

Hearth: Usually a subsurface feature found eroding out of a river or creek bank or in a sand ridge – it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

Historic site: Sites/areas that contain extant (standing) remains of pre-1950 non-Aboriginal occupation. Historic sites may or may not also contain archaeological remains (Aboriginal and/or historic).

Holocene, recent or postglacial period: The time from the end of the Pleistocene Ice Age (c. 10,300 BP) to the present day.

Implement: A general term for tools, weapons etc. made by people.

Microlith: Small (1–3 cm long) stone tools with evidence of retouch; includes 'Bondi Points' segment, scrapers, backed blades, triangles and trapezoids.

In situ: Refers to cultural material that is discovered as being undisturbed and considered to be in its original context. That is, material which, when identified is considered to be in the same location as when the site was abandoned.

Lithic: Anything made of stone.

Pleistocene: The dates for the beginning and end of the Pleistocene generally correspond with the last Ice Age. That is from 3.5 to 1.3 million years ago. The period ends with the gradual retreat of the ice sheets, which reached their present conditions around 10,300 BP.

Retouch: **Scalar**: Shallow scale like scars on margin with feather terminations, usually small rounded scars.

Step: Small, abrupt flake scars on margin, with step terminations.

Rock shelter/cave: These are sites that are located within a rock shelter/overhang or cave. The archaeological deposits within such sites can vary considerably but are often predominantly lithic. Depending on their location, the archaeological deposits may also include midden deposits of shellfish, fish or terrestrial fauna. Due to the often undisturbed deposits at these sites, they are potentially very valuable sites and are generally considered of high scientific significance. Instances where rock shelter sites also possess artwork on the stone walls are considered rock shelters/art sites combined.

Scarred tree: Scars on trees may be the result of removal of strips of bark by Aborigines for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds for climbers after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to being naturally made by branches falling off etc. is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some regrowth has occurred around the edges of the scar, and no holes or knots are present in the heartwood.

Silcrete: A sedimentary rock that is 'formed through the impregnation of a sedimentary layer with silica of quartz grains in a matrix of either amorphous or fine-grained Silica' (Holdaway & Stern 2004:24)

Stratigraphy: Layering.

Stone Artefact: A piece of stone that has been formed by Aboriginal people to be used as a tool or is a by-product of Aboriginal stone tool manufacturing activities. Stone artefacts can be flaked such as points and scrapers or ground such as axes and grinding stones.

Scraper: A tool used for scraping. A flake with one or more margins of continuous retouch.

Thumbnail scraper: A small flake with a convex scraper edge shaped like a thumbnail and located opposite the flake's platform.

Raw material: Organic or inorganic matter that has not been processed by people.

Use-wear: Tiny flakes or chips that have been broken off the edges of a stone artefact during use

10 Attachment E- Environmental Management Plan

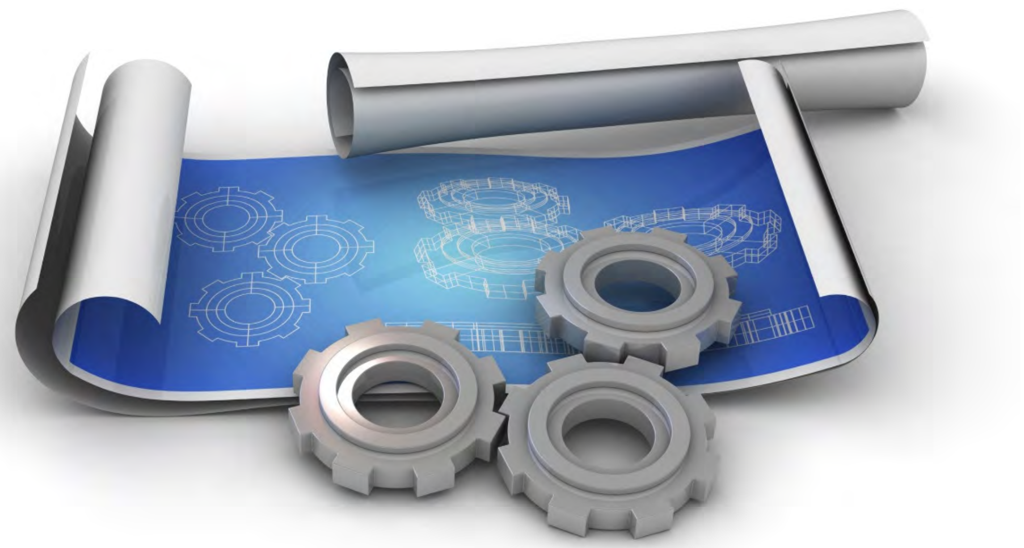
The Link Industrial Estate

345 – 385 Perry Road, Dandenong South Vic

Environmental Management Plan

July 2014

Revision 4.0



CIP

Developing Relationships Building Success

Contents

The Link Industrial Estate – Site Servicing

Project Name	The Link Industrial Estate
Revision	4.0
Date of issue	July 2014
Document Name	Environmental Management Plan
Prepared by	CIP (Perry Road) Pty Ltd **Sydney Office** Suite 59, Upper Deck Jones Bay Wharf 26-32 Pirrama Road, Pyrmont, NSW 2009 Telephone: 02 9506 1400 Facsimile: 02 9506 1499 Email: spikkat@ciproperty.com.au Web: www.ciproperty.com.au

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Abbreviations	
AS	Australian Standards
BCA	Building Code of Australia
CoC	Condition of Consent
PM	Project Manager
EPA	Department of Environment and Resource Management
EMP	Environmental Management Plan
HSR	Health and Safety Representative
LEP	Local Environment Plan
LGA	Local Government Area
SM	Site Manager

ENVIRONMENTAL MANAGEMENT POLICY

Commercial & Industrial Property Pty Ltd (CIP) is a commercial and industrial property developer operating across Australia. We have developed this policy to serve as a statement of our commitment to protecting our environment while conducting our activities and preventing pollution.

CIP's approach to Environmental Risk Management is one of continuous improvement through the enhancement of skills, knowledge and commitment of our employees at all levels of the organisation.

CIP aims to:

- Develop, implement and maintain an Environmental Management System that complies with the requirements of ISO 14001, applicable environmental legislation, regulations, codes of practice and industry best practice;
- Provide relevant employees with the appropriate skills, resources and support to enable them to carry out their work with due consideration to the environment;
- Develop a culture that encourages employees and subcontractors to demonstrate work practices that are consistent with the objectives of this policy and prevention of pollution;
- Continuously monitor and record relevant parameters of our activities to provide objective evidence of the environmental risk management performance and improvement where there is opportunity to do so;
- Provide a framework for setting and reviewing environmental objectives and targets;
- Consider environmental protection during planning, design and construction of projects;
- Assign responsibility and authority for environmental risk management to relevant employees;
- Communicate the importance of meeting our environmental obligations including this policy to all personnel working for or on our behalf;
- Expect our suppliers and subcontractors to meet the same environmental objectives and systems we have set for ourselves;
- Implement effective communication channels with those who are affected or likely to be affected by our business practices.

MANAGING DIRECTOR: Paul McKenna

SIGNATURE:

DATE: July 2012

Next Review Date: June 2014

INTRODUCTION

1.1 Background to the Project

The Link Industrial Estate is located at 345-385 Perry Road, Dandenong South Vic. It consists of one large irregularly shaped parcel located between the EastLink Freeway to the east and Dandenong Creek to the west. The parcel is known as Lot 2 on PS603443D and has a total area of 19.53ha.

There are three easements that burden the south western portion of site. These are an electricity easement benefitted by Vicpower (State Electricity Commission of Victoria), a pipeline easement benefitted by ExxonMobil (ESSO Exploration & Production Australia) and a second pipeline easement benefitted by ExxonMobil.

The City of Greater Dandenong's planning scheme requires 7.7ha of land along the western boundary of the site to be dedicated for the construction of a stormwater retarding basin. CIP will oversee the construction of the basin which will include, design, bulk excavation, wetlands, landscaping and structures. The excavated material from the proposed retarding basin will be used to fill the developable area of the site to the required minimum pad level of 6.5AHD.

1.2 Context of the EMP

An Environmental Management Plan (EMP) is required to outline environmental management practices and procedures to be followed during the development of the Link Industrial Estate. The EMP provides a tool for ensuring that relevant requirements are observed during the project.

The EMP provides, but is not limited to:

- A description of the roles and responsibilities for all relevant employees involved in the construction activities; and

- The EMP outlines environmental management responsibilities, anticipated statutory requirements, incident management, corrective action procedures, and complaint handling responsibilities, auditing requirements and training programs.

Section 6 of this EMP contains actions and checklists to assist in monitoring compliance with the EMP.

This document is designed as a dynamic document that should be reviewed and amended as needed to incorporate additional requirements, and/or modifications in the construction approach and schedule. CIP will draw on the requirements of the EMP and incorporate these into all Work Method Statements.

1.3 Objectives of the Environmental Management Plan

The primary objective of this EMP is to provide an environmental management manual to be used by management and construction staff involved in the activities of the site to minimise adverse environmental impacts. The EMP will also provide information to relevant regulatory authorities regarding the environmental management practices that will be implemented throughout construction. The EMP has the following objectives:

- To ensure compliance with legislated responsibilities;
- To reduce or eliminate the release of pollutants into the environment during construction;
- To promote environmental awareness amongst employees and contractors and best environmental practise; and
- To reduce waste generation and the depletion of resources by utilising the "avoid, reduce, reuse, recycle" principles where practicable and appropriate.

1.4 Applicable legal and other requirements

The development of this estate will be governed by the approved Development Plan, Planning Permit and Conditions of Consent (CoC). The CoCs will be detailed in the Compliance Matrix and will form an integral part of this EMP.

The applicable legal and other requirements are identified in the relevant management plans in Section 5. Copies of these plans and documents are available from the SM.

Compliance with the applicable legal and other requirements is assessed by regular monitoring of environmental controls through site inspections and audits.

This document has been prepared in accordance with the requirements of the following:

- AS/NZS ISO 14001:2004 Environmental Management Systems;

2 PROJECT DESCRIPTION

2.1 Location

Site address: The site is located at 345 – 385 Perry Road, Keysborough (Lot 2 on PS603443D)

2.2 Progression & Duration of Construction Works

The infrastructure servicing works are scheduled to commence August 2014 and be completed by November 2014.

2.3 Key Stakeholders

The key stakeholders for the project include:

- Owner: CIP (Perry Road) Pty Ltd
- Principal Contractor: CIP Constructions (VIC) Pty Ltd

2.4 Construction Hours

The proposed construction activities associated with the infrastructure servicing works will be within the hours of 7.00 am to 6.00 pm from Monday to Friday, 9.00 am to 2.00 pm on Saturdays and no work on Sundays or Public Holidays. Written consent from City of Greater Dandenong would be sought for any works outside of these hours.

2.5 Staffing

The number of personnel associated with the works will fluctuate depending upon the particular work stage and the level of work required. At peak periods, it is estimated that the construction staff would be approximately 30 people. Indicatively, the internal staff will comprised of:

Development Manager (DM)

Project Manager (PM)

Site Manager (SM)

Site Foreman (SF)

Contract Administrator (CA)

Health and Safety Representative (HSR)

2.6 Materials Management

The management of materials will follow as far as practicable, the principles of ecologically sustainable development and a waste minimisation hierarchy. The hierarchy for waste minimisation is as follows:

Avoid - preventing the generation of waste in the first place;

Reduce - reducing waste involves creating less waste;

Reuse - finding or adapting products after their initial use so that they have the same, similar or alternative uses, thus extending the life of a product;

Recycle - a process by which materials that would otherwise become solid waste are collected, separated, processed and returned to the economic mainstream in the form of raw materials or product.

Dispose – Remove from site materials not able to be incorporated into the works.

Consideration has been made to the reuse of materials on site, so there is no import or export of materials to obtain the correct site elevations. Consideration will also be given to and include:

- Using recycled materials where possible;
- Maximising opportunities to generate less waste, such as wrapping/packaging to be returned to the supplier, recyclable or biodegradable/compostable;
- Avoiding unnecessary waste creation; and
- Minimising consumption of resources by ordering only required amounts of materials. The waste management procedures identified are incorporated into the waste action plan (**Section 5.2**).

3 SITE CONSTRAINTS & CONSIDERATIONS

3.1 Historical Land Uses

A review the historical information indicates that the site has been primarily used for agricultural purposes. Farm shed buildings were present on the site in the south west corner since at least 1951. Historical aerial photographs have shown the site to be largely used for agricultural with surrounding areas, especially in the north and east experiencing significant urbanisation, primarily through commercial / industrial property development from 1985 to the present.

3.2 Topography

The site grades generally from east to west, with grades of between 1 in 90 at the north and 1 in 400 in the southern section of the site. There are several existing small farm dams located at the north-east, centre-west, south-east and south-west of the site. The site RLs range between 5.5 and 6.0 Australian Height Datum (AHD), however there are small isolated variances above or below predominant AHD.

3.3 Drainage & Retarding Basin

The development is to include construction of a wetland-retarding basin (WLRB) as part of Melbourne Water's Ordish Road North Drainage Scheme. The WLRB is to be constructed east of Dandenong Creek and will form the western boundary of the development. Major flows (Q100, 100 year ARI) are to be conveyed overland within the site via the road network and will discharge directly to Melbourne Water's Ordish Road Retarding Basin. Flows from external catchments to the east of the site and EastLink will be piped through the development to the WLRB.

3.4 Site Filling

The Q100 flood level associated with the retarding basin, will be 6.2m AHD, and will require the site to be filled to a minimum level of 6.8m AHD. The excavated material from the proposed basin will be used to fill the developable area of the site to the required minimum level.

3.5 Geology and Soils

The Geological survey of Victoria 1:63,360 series, Chelsea and Keysborough Sheet, indicates the subject site to be underlain by alluvial deposits of Quaternary age. These deposits comprise shallow sands overlying clay, peaty clay and sandy clay. The clays are generally moderately to highly reactive. Tertiary deposits occurring on the higher elevations and beneath the alluvium.

A.S. James (Geotechnical Engineer) carried out Geotechnical Investigation of the site and confirmed subsoil at the site consists of an approximately 0.2-0.3m thick layer of silt underlain by a layer of silty clay with traces of sand. The clay was of moderate to high plasticity to an approximate depth of 3.5-4.0m and then graded to moderate to low plasticity. The moderate to high plasticity clays at the top are assumed to be of alluvium origin and graded to lower plasticity clays of tertiary sedimentary formation.

A.S. James also carred out a Preliminary Environmental Site Assessment for 385A Perry Road and noted that:

'A review of the Dept. of Primary Industries Coastal Acid Sulphate Soil Hazard Map 3 – Central Coast of Victoria indicates the site not to be present on a Prospective Land Zone. Preliminary Field pH results indicate that the presence of PASS or AASS is unlikely and should not impact the site. This is in line with previous experience in the area.'

3.6 Biodiversity

The Dandenong South Native Vegetation Precinct Plan – January 2009 (NVPP) applies to the site. In accordance with the NVPP, vegetation protection controls apply to the group of established trees located adjacent to the eastern boundary of the site (general proximity to proposed boundary between lots 1 and 2 on EastLink reserve). The area around the trees is also included in a 'conservation area' which provides added protection for the trees, and extends across the title boundary into the subject site. The 'conservation area' is to be protected at all times during construction with no fill to be placed within this area.

3.7 Traffic & Site Access

The existing road network involves four major roads within close proximity to the site. These roads are the Eastlink Freeway, Hutton Road, Dandenong-Frankston Road and the Mornington Peninsula Freeway. This road network allows for good access from the site to the major centres in and around Melbourne.

Primary B-Double access to the site is via the Hutton Road exit off the EastLink Motorway. Vehicles are then required to make a left turn off Hutton Rd onto Perry Road. All three of these roads are B-Double approved and should pose no issues to vehicle movements.

Access into the subject development is proposed through a signalised T-intersection in the location of the existing access into 345-385 Perry Road. The construction of this intersection will require the following works to be carried out:

- Filling will be required to bring existing RL of the site (roughly 5.5m AHD) up to match the RL of Perry Road (roughly 9.0m AHD);
- Perry Road will require widening facilitate the construction of two slip lanes;
- Traffic signalisation;
- The construction of three road islands;
- Line marking; and
- Stormwater system, including a box culvert beneath the estate road.

Controls, including shaker grids, to be utilised during construction to minimise the potential for mud and debris from the Site being carried out onto adjoining roads.

4 PROJECT ORGANISATIONAL STRUCTURE

The organisational structure of CIP Constructions that will be used during construction is provided in **Figure 3.1.2**

4.1 Roles and Responsibilities

The preliminary roles and responsibilities of personnel working on the project are outlined below.

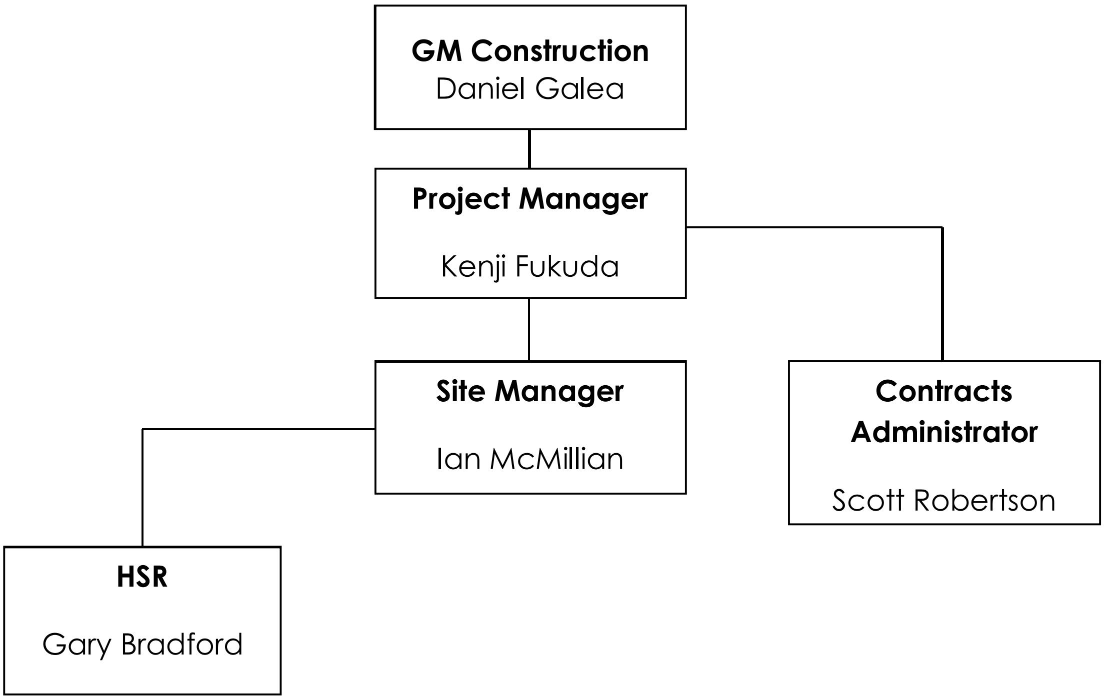
4.1.1 Project Management Team

The Project Management Team (PMT) is comprised of the Principal Contractor's personnel and will consist of the roles of the PM, SM and the HSR. The detailed roles and responsibilities of the PM, SM and HSR are outlined in **Sections 3.1.2, 3.1.3** and **3.1.4**.

The responsibilities of the PMT include, but are not limited to, the following:

- Accountable for overall delivery and compliance with regulatory requirements including the Conditions of Consent;
- Allocate resources and funding as appropriate;
- Hold PMT meetings to conduct regular reviews of progress and to devise actions and processes for continual improvement of the construction and environmental performance;
- Provide direction and feedback on progress as required;
- Resolve external business factors that may influence progress;
- Review and approve the EMP;
- Review and approve the site induction and training program for all persons involved in the construction activities and monitor implementation;
- Where needed, approve compliance reports and environmental performance reports to be submitted to relevant authorities;
- Where needed, ensure specialist studies and reports are undertaken; and
- Maintain overall control of the site management function.

Figure 3.1.2 Project Organisational Structure



4.1.2 Project Manager

The PM is a representative of the Principal Contractor. The PM's role includes but is not limited to the following:

- Overall management of the project;
- Coordination of the PMT; and
- Management of contractual and environmental issues in particular contractor plant and equipment.

4.1.3 Health and Safety Representative

The HSR is part of the PMT and is a representative of the Principal Contractor. The HSR is responsible to the PMT on matters directly relevant to the health and safety component of the project and on matters relating to the implementation of the Health and Safety Management Plan and are defined in the Health and Safety Management Plan.

The HSR will have responsibilities that will include:

- Ensuring induction training includes occupational health and safety;

- Leading safety and incident management and risk assessments;
- Ensuring compliance with the Health and Safety Management Plans;
- Ensuring a monitoring system is in place to track and report all health and safety incidents and liaise with the relevant staff on an as-needed basis;
- Attend routine meetings with the PMT and SM and report any issues of health and safety concern at these meetings; and
- Review corrective and preventative actions to ensure the implementation of recommendations made from the audits and site inspections; and
- Review and approve revisions to the EMP.

4.1.4 Site Manager

The SM's role includes but is not limited to the following:

- Coordinate and manage training of all staff and contractors/subcontractors prior to the commencement of construction activities, including EMP training;
- Conduct competency assessments;
- Identify environmental aspects and impacts;
- Conduct risk assessment;
- Identify operational controls;
- Manage day-to-day implementation of the EMP;
- Report directly and promptly to the PM on all environmental matters including incidents and non-conformances;
- Implement all required corrective actions and as appropriate amend the EMP;
- Report directly and promptly to the HSR on all occupational health and safety matters including incidents and accidents;
- Conduct site inspections to ensure environmental management measures are effectively in place; and
- Liaise with the relevant staff on an as-needed basis.

4.1.5 Subcontractor's Construction Supervisor

The subcontractor's construction supervisor's roles and responsibilities include but are not limited to:

- Ensuring all staff have all relevant statutory and non-statutory licences that are necessary;
- Completing (and ensuring) all the subcontractor's staff complete the induction and environmental awareness training including competency assessments;
- Effectively managing environmental issues associated with their work;
- Reporting any serious environmental incidents directly and promptly to the SM;
- Reporting all communications with the community (including complaints and inquiries) and report the incident directly and promptly to the SM;
- Reporting any serious injuries or accidents to personnel directly and promptly to the SM and HSR;

- Coordinate all corrective action requests given by the SM;
- Notify the SM of forthcoming activities that may affect the community;
- Record all contact with the community;
- Report any environmental incidents, communication with the community and occupational health and safety issues to the SM immediately; and
- Direct staff to install and maintain environmental management devices, where necessary.

4.1.6 Work team

The Work Team is comprised of all personnel on site including Principal Contractor's personnel, consultants, sub-consultants, contractors and subcontractors. The Work Team's role includes:

- Completing the induction and environmental awareness training including competency assessment and maintenance of records;
- Recording (or seeking appropriate assistance to record) all contact with the community on an appropriate register;
- Reporting any environmental incidents, communication with the community and occupational health and safety issues to the SM immediately;
- SM will report all incidents etc. to the PM for consultation with the regulatory authorities, as appropriate; and
- Carrying out all directions from the SM, including installing all environmental management devices.

4.2 Communication

4.2.1 Key Contacts

Key contacts associated with the construction works are identified in Table 3.1. Except in the case of emergency, the primary contact in the first instance should be the SM (Environment, Construction, Health and Safety and Community Liaison). Government and regulatory authorities should not be contacted under normal circumstances. Section 3.2.2 provides an indication of the circumstances under which each contact should be contacted.

Table 3.1 Key Contacts for construction activities

Agency	Circumstances	Contact details1
Ambulance Fire Police	All emergency situations	000
Project Manager (PM) **Kenji Fukuda**	Overall Project Control, environmental and contractual issues. Project related incidents, complaints etc.	+61 3 9829 0234 +61 411 858 801
Health and Safety Representative (HSR) **Gary Bradford**	Incidents/Accidents etc.	+61 3 8360 8666 +61 400 002 991
First Aid Officer **Gary Bradford**	First Aid injuries	+61 3 8360 8666 +61 400 002 991
Site Manager (SM) **Ian McMillian**	Suspected pollution/environmental incident and construction related incident etc.	+61 488 779 969
Contracts Administrator (CA) **Scott Robertson**	Contracts Administration	+61 295 061 427 +61 428 312 721

4.2.2 Community Consultation and Communication

Communication with the adjoining properties and neighbouring workers shall be undertaken on an on-going basis, in advance of activities that may be considered as potentially affecting amenity (such as excessively noisy, dusty or traffic generating activities).

Follow-up/closure communication will be undertaken following any complaints received from stakeholders and neighbours to ensure that the issues raised have been adequately resolved. This process is to be managed using form EMP-002 Complaints Register.

A sign at the construction area will advise stakeholders of:

- The requirement that unauthorised entry to the work site is prohibited;
- The name of the person in charge of the work site, a 24 hour telephone number(s) at which that person may be contacted during and outside working hours, postal addresses; and
- The Name of Principal Contractor.

5 ENVIRONMENTAL IMPACTS AND RISKS

5.1 Management Requirements

As considered necessary, the Principal Contractor will prepare a statement of environmental management measures. The statement will include their scope of works, a risk analysis and controls that will be put in place to mitigate deleterious environmental impacts of their activities that are consistent with the procedures of this EMP. All personnel working on site, including subcontractors will be required to undertake site induction and EMP training (**Section 6.1**).

The environmental action plans provided in **Section 6** are to be referred to and used by sub-contractors in the preparation of the statement.

5.2 Environmental Aspects & Impacts

Activities and processes associated with construction may have negative impact on the environment are summarised below which identifies the applicable environmental impacts associated with the works, outlines how these activities may impact on the environment and comments on the status of the site in relation to the environmental impact.

Specific control measures for activities that have significant environmental impact (Rating 1) are contained within the Action Plans in **Section 5**. Activities that have been identified as having an environmental impact rating of 2 or 3 are to be monitored to ensure that the risks associated with these activities are not increasing.

Aspects & Impacts Register

Sr.	Area	Aspect/s	Potential Impact/s	Impact Rating	Control Measures	Legal & Other Requirements
1	**Site Offices, Amenities and General Site Areas**	Lighting / IT Equipment	• Use of energy • Use of natural resources	2	• Turn off the lights when not required. • Monitor electricity consumption. • Periodic maintenance. • Use of CFL and low voltage fittings where possible. • Turn all IT equipment to energy saver mode. • Periodic maintenance.	Nil.
		Printing	• Use of natural resources/paper • Use of energy • Waste & by-products	2	• Turn all printers into energy saver mode. • Avoid printing by screen reading. • Encourage/default double sided printing. • Encourage grey scale printing. • Recycle waste paper. • Recycle printer	Nil

				• cartridges. • Periodic maintenance. • Procure green star rating printers.	
	HVAC	• Emissions to air • Use of energy • Use of natural resources	2	• Periodic maintenance. • Set temperature to 22"C. • Individual controls for low use areas like meeting rooms.	Nil
	Waste	• Waste and by-products • Emissions to land • Emissions to water	2	• Avoid waste by buying bulk packaging. • Reuse waste where possible like scrap paper. • Segregate recyclable and general office waste. • Monitor waste disposal.	EPA Act 1970
	Appliances	• Use of natural resources • Use of energy • Emissions to air	2	• Periodic maintenance. • Procure at least 4 star rated appliances. • Recycle e-waste.	Nil
	Emergency	• Emissions to air • Emissions to land • Emissions to water	2	• Periodic maintenance of emergency equipment. • Dispose of any contained spill / leaks as per MSDS.	EPA Act 1970
	Water usage	• Use of natural resources	2	• Minimize water usage. • Use water saving taps. • Fix drips and leaks.	Nil
	Cleaning chemicals	• Waste and by-products • Emissions to land • Emissions to water	2	• Minimize usage. • Procure eco-friendly chemicals. • Disposal of left-over chemicals, contained spill / leaks & empty containers as per MSDS.	EPA Act 1970
	Travel	• Use of natural resources and fossil fuels • Emissions to air	2	• Limit travel by use of communication technology. • Use of alternate means of transport where possible. • Buy carbon credits as part of travel bookings. • Use of small engine size / hybrid hire cars.	Nil
	Minor site purchases	• Emissions to air • Emissions to land • Emissions to	2	• Procure "green" products where possible. • Buy from local suppliers where	Nil

			water		possible. • Buy bulk packaging	
2	**Construction Activities**	Removal of vegetation / soil disturbance	• Loss of biodiversity • Soil erosion	1	• Implement requirements of Erosion and Sediment Control Plan. • Periodic site inspections. • Remove vegetation that is utmost necessary for the construction activities.	EPA Act 1970
		Excavation – Culturally heritage sensitive area	• Disturbance of Aboriginal heritage sites	2	• Staff training in Aboriginal cultural heritage sensitivity • Implement an unexpected finds procedure during excavation.	Reg 23(1) of the Aboriginal Heritage Regulations 2007 Approved CHMP Reference 12983
		Excavation – Tree Protection Zones	• Disturbance of protected native vegetation	2	• Exclusion zones to be setup around tree protection zones to prevent works being carried out in these area; • Prepare a site plan detailing the location and guidelines for the protected vegetation.	Dandenong South Native Vegetation Precinct Plan – 2009 Refer to Appendix B Site Plan
		Excavation - Acid Sulphate Soils and Unsuitable / Contaminated soils	• Emissions to land • Emissions to water • Odour • Emissions to air • Complaints / legal breach	1	• Develop and implement Remediation Works Plan & Air Quality Management Plan when contamination is found. • Implement complaints procedure	EPA Act 1970Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999 EPA SEPP (Waters of Victoria)
		Excavation & Demolition - General	• Emissions to air - dust • Noise • Vibration • Complaints / legal breach • In-ground utilities and services	1	• Work in accordance with DA conditions. • Implement complaints procedure • Undertake Dial Before You Dig survey and permit to excavate.	EPA Act 1970 EPA SEPP (Air Quality Management)
		Use of construction equipment	• Emissions to air – dust and carbon emission • Noise • Vibration • Use of natural resources / fossil fuels • Spills & leaks	1	• Minimize use • Maintain adequate spill kits on site • Use of residential class mufflers • Avoid idle running • Conduct periodic maintenance • Implement dust control measures like speed limits, water spray, etc.	EPA Act 1970 EPA SEPP (Air Quality Management)

		Use of construction vehicles	• Disruption to local traffic • Noise • Emissions to air – dust and carbon emission • Spills & Leaks	1	• Minimize use • Implement requirements of Traffic Control Plan • The covering of loads and the installation of "shake down" pads will ensure no materials are left on public roads. • Maintain adequate spill kits on site. • Maintain road worthiness • Conduct periodic maintenance • Avoid idle running	EPA Act 1970 EPA SEPP (Air Quality Management)
		Water Usage	• Use of natural resources • Run-off of polluted water into storm water system.	1	• Minimize use • Use recycled water for construction activities where possible. • Disposal of polluted water in accordance with statutory requirements.	EPA Act 1970 EPA SEPP (Waters of Victoria)
		Use of construction chemicals	• Spills and leaks • Emissions to air • Emissions to water • Emissions to land	1	• Minimize use • Store in bunded containers • Follow MSDS requirements • Minimize stock	EPA Act 1970 EPA SEPP (Air Quality Management) EPA SEPP (Waters of Victoria)
		Construction Waste	• Waste and by-products • Emissions to land • Emissions to water	1	• Avoid waste by buying bulk packaging and required quantities. • Reuse waste where possible. • Segregate recyclable and general construction waste. • Monitor waste disposal. • Monitor construction water quality before discharge/disposal.	EPA Act 1970 EPA SEPP (Waters of Victoria)
		Site Hoarding	• Visual Impact	1	• Ensure site hoarding is constructed in accordance with planning permit conditions. • Ensure graffiti and damage to site hoarding is promptly rectified.	Nil

		Consequence				
		Disaster	Very Serious	Serious	Substantial	Minor
Likelihood	Almost certain	1	1	1	2	2
	Likely	1	1	2	2	2
	Possible	1	2	2	2	3
	Remotely possible	2	2	2	3	3

Likelihood / consequence	Risk Class
The hazard has the potential to: • Permanently disable or kill • Cause major damage to the structure • Have significant impact on the surrounding population and environment	1
The hazard has the potential to: • Temporarily disable or seriously injure • Cause minor damage to the structure • Breach the site boundary and pollute local environment	2
The hazard has the potential to: • Cause minor injury • Be contained within the site boundary	3

The environmental impacts with a rating of 1 or those having any legal or other requirements associated with it are considered as "significant". The ratings shall be based on the control and influence CIP can have on the environmental impact.

The aspects and impacts are to be reviewed at least quarterly or when changes in construction activities which are likely to change the environmental risk profile or impacts.

6 ENVIRONMENTAL ACTION PLANS AND MONITORING REQUIREMENTS

Sections 6.1 to **6.11** includes the action plans for each environmental aspect that may be impacted upon from the construction works. The action plans set out the environmental monitoring and management tasks that need to be undertaken during the works. Details regarding the location and frequency of monitoring and auditing are specified. Each action plan specifies the monitoring required to assess the effectiveness of environmental controls and who is responsible for each action. Monitoring requirements also includes the periodic inspections of the emergency response measures to ensure that these are maintained in operative conditions at all times.

Records of monitoring and site inspe ctions are maintained as part of IMS records.

It is essential that prior to the commencement of the construction works, the site personnel and subcontractors are made aware of their environmental management responsibilities associated with their designated tasks. CIP ensures that all personnel working for and on behalf of CIP are inducted into the project environmental requirements including this CEMP and any associated management plans and documents. Re-training is conducted when changes to the site environmental conditions occur.

Records of project induction are maintained as part of IMS records.

6.1 General Site Issues

(including Authority requirements, monitoring of environmental performance, and actions to address impacts. (Condition 5.4 (c) and (d)).

Strategy: To ensure all management procedures operate effectively.

Performance Target: All personnel are trained.
All Registers and Reporting processes are in place and maintained.
Construction works aim for continual improvement.

Legislation, Guidelines, References: Environmental Protection Act 1970
And all associated Legislations
Complaints Register EMP-002
Site Environmental Control Checklist

Table 6.1 General Site Issues

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Ensure that all Subcontractors are aware of this EMP.	SM	Pre-Construction	CMP
Ensure that this EMP forms part of any subcontract document.	CA	Pre-Construction	CMP
Ensure EMP, checklists, registers and Work Instructions are available to all personnel and documentation is maintained as outlined in the CMP and **Section 9** of this EMP.	PM	Pre-Construction	CMP and **Section 9** of EMP
Ensure all approvals and licenses are obtained.	SM	Pre-Construction	**Section 2** of the CMP
Conduct a site induction including site environmental training for all personnel involved in the construction works to orientate them to the work areas and to explain the requirements of the EMP. Environmental training is to include all aspects detailed in **Section 7** of this EMP.	SM	Pre-Construction, or during construction for new personnel	Induction and Training Register **Section 7** of this EMP
Conduct an initial site inspection to ensure environmental controls are established on-site in accordance with site checklists.	SM	Pre-Construction	**Section 9.2** of this EMP
Construction activities associated with the works, including the delivery of materials to and from the site, are to be within the hours of 6.30 am to 6:00 pm from Monday to Fridays, 6.30 am to 1.00 pm Saturdays. All work will occur within these stipulated times.	SM	Daily throughout entire construction period	**Section 2.4** of this EMP
Review the EMP and amend where necessary.	PM / HSR	As necessary	**Section 10.0** of this EMP
Inspections and Audits			
Inspect environmental controls and repair as necessary.	SM	Daily and/or after rain	**Section 8.2** of this EMP
Monitor the implementation of all	SM	To be established	Site Checklist

environmental management control procedures, check compliance with requirements and take remedial action where necessary.			
Ensure all Registers are maintained accurately.	SM	Daily	Site Checklist
Incidents and Accidents			
Report any oil or chemical spills or accidents on-site that are likely to cause environmental pollution or health and safety issues. Document incident.	SM	Immediately on incident	**Section 5** of CMP
Following any spillage or incident the SM will ensure the appropriate contractor is responsible for the clean-up. Any clean-up will be documented in accordance with **Section 9** of this EMP and the CMP. Any contaminated material or waste required to be removed off-site will be sent to an appropriately licensed landfill.	SM	Immediately on incident	**Section 5 and 7** of CMP
Notify the SM immediately of any incidents breaching the EMP or legislative provisions.	Work Team	Immediately on incident	**Section 5** of CMP
Notify the relevant authority immediately of any incidents breaching legislative provisions.	PM	Immediately on incident	**Section 8** of this EMP
Document any complaints, inquiries or contact with stakeholders.	PM	As per incident/complaint	**Section 8** of this EMP
Respond to all complainants.	SM or PM	As soon as practicable	Complaints Register
Issue a Non-conformance/Corrective Action Report when: • A complaint is received regarding any pollution or other environmental impact caused by the project; and • A departure from approved or agreed procedures is observed.	SM	When required	**Section 9.3** of this EMP

6.2 Waste Action Plan

Strategy: That development and ongoing management reduce waste generation and maximise appropriate use of recycled or recyclable materials.

Performance Target: Evaluate options for utilising recycled and recyclable materials. Consider waste generation during construction activities.

Compliance with all applicable environmental legislation and guidelines

Table 6.2 Waste Action Plan			
Environmental Management Requirement	**Responsibility**	**Timing/Frequency**	**Reference/Notes**
Incorporate into contracts where possible, requirements for the procurement of materials to have high recycled or recyclable content.	CA	Pre-tender	Contract documents
As possible, ensure the Subcontractor's methods include practices which minimise the generation of waste, maximise recycling opportunities and re-use waste materials (eg. order the right quantity, reuse from work).	PM & CA	Pre-construction	Contract documents
Ensure that facilities for the collection, transfer and disposal of all identified waste streams are in place.	SM	Pre-construction	Section 3 of CMP
During Construction			
Construction waste to be disposed off-site (if any) to be classified in accordance with Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid wastes, to the EPA and to be disposed of to a facility that may lawfully accept the waste.	SM	Throughout construction	Section 3 of CMP
All recyclable waste streams identified from construction to ensure materials are reuse and or recycled where practicable.	SM	Throughout construction	Waste contractors monthly recycling report
Waste containers/skips must not be located on a public road or road related area (footpath, nature strip, shoulder, road reserve, public car park, etc.)	SM	Throughout construction	
Ensure bins are serviced regularly to ensure the area remains tidy.	SM	Throughout construction	
Dispose of any waste that cannot be reused or recycled at a landfill licensed by the EPA to accept that type of waste.	SM	As required	
Construction employees and subcontractors will be encouraged to minimise domestic waste production and reuse/recycle where possible.	SM	As required	
Ensure the site is maintained in a clean and tidy condition.	SM	Throughout construction	

Post Construction			
Clean and remove rubbish from the site working areas.	SM	Throughout construction	
Monitoring Requirements			
Waste dockets to be provided and kept on site for construction waste (not including domestic waste) is collected and transported to landfill.	SM	As needed	Section 3 of CMP
Visual inspection of bins and other waste disposal areas.	SM	Daily	

6.3 Traffic and Access Action Plan

Strategy: To minimise disruption to roads and road users.

Performance Target: Minimise traffic congestion
Allow safe access along roads for all users
Compliance to Project Specific Traffic management Plan

Legislation, Guidelines, References: Environmental Protection Act 1970
And all associated Legislations
Project Specific Traffic Management Plan
Complaints Register EMP-002
Site Environmental Control Checklist

Table 6.3 Traffic/Access Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Parking for all construction staff and personnel is to be contained on-site within designated areas.	SM & Subcontractors	Pre-construction	Section 2 CMP
All construction traffic is to enter/exit the construction site via the site main access way.	SM & Subcontractors	Throughout construction period	TMP
Identify and use a primary transportation route for construction trucks.	SM & Subcontractors	Throughout the entire construction period	TMP
Drivers will notify the Site Manager of major changes to the transportation route.	SM & Subcontractors	As required	Revise TMP
Ensure trucks are correctly sized and fully loaded (not overloaded) so that the volume of each delivery is maximised and the number of trips is therefore minimised.	SM & Subcontractors	Throughout the entire construction period	
Consult with Council and VicRoads as necessary to identify periods when major road works or traffic re-developments in designated routes are occurring.	SM	Throughout the entire construction period	
Use communication systems (such as CB radios, mobile phones) as necessary to manage the flow of truck movements to site.	SM & Subcontractors	Throughout the entire construction period	
Post Construction			
All roads damaged by construction activities must be rehabilitated – i.e. re-seal or fill in holes and ditches etc. that the construction equipment has caused.	SM	As needed and on completion of the project, as required	
Monitoring Requirements			
Visual inspections to be undertaken of the condition of accesses to the site, parking areas, access roads, and compliance with vehicle speeds at construction site	SM	Throughout construction	Section 2 CMP

6.4 Hazards and Risk Action Plan

Strategy: That measures are taken to minimise hazards and risks.

Performance Target: Zero environmental accidents or incidents

Legislation, Guidelines, References: Environmental Protection Act 1970
And all associated Legislations

NB: this Action Plan relates to environmental hazards and risks only. Occupational, Health and Safety hazards and risks are addressed in the Occupational Health and Safety Plan and will be incorporated into the subcontractors Safe Work Method Statements and Job Safety Analysis

Table 6.4 Hazards and Risk Action Plan

Environmental Management Requirement	Responsibility	Timing /Frequency	Reference/Notes
Prepare a construction safety management plan that will identify the potential risks presented to non-construction workers and present strategies to minimise these risks.	HSR	Pre-construction	SSMP002 Risk Assessment
During Construction			
Ensure the subcontractor takes measures to include spill containment procedures and appropriate storage and control of chemical facilities (include locations on the site layout plans).	SM	During construction	SWMS MSDS
Any imported fill must be validated in accordance with Council's Contaminated Lands Policy and EPA requirements.	Specialist Consultant	Prior to importing fill	Council Policies, EPA guidelines
Minimise the amount of chemicals, oil and fuel stored temporarily on site as part of construction activities works and ensure substances are stored and used in appropriately contained areas. Refuel vehicles using mini-tankers (thereby eliminating on site fuel storage).	SM	Throughout construction	Project safety plan
Incident Management Procedures identified in Section 8 are to be followed at all times.	SM	Throughout construction	Section 8 of this EMP
To manage risks associated with trip hazards, overhead hazards and other potential dangers surrounding the site: ▪ Fully fence the site and ensure all materials are contained within it, ▪ Provide signage that advises of the works and alternative access arrangements around the area; and ▪ Provide separate visitor access to the site that avoids construction areas.	HSR & SM	Throughout construction	Section 5 of CMP

6.5 Air Quality Action Plan

Objective: To have no change to the existing air quality

Strategy:
Minimise dust
Control dust generated from demolition and removal of existing structures
Minimise impact of exhaust emissions
Monitor dust generation

Performance Target: No dust and particulate matter generated at the site boundary

Legislation, Guidelines, References:
Environmental Protection Act 1970
EPA State Environment Protection Policy (Air Quality Management)
And all associated Legislations
Complaints Register EMP-002
Site Environmental Control Checklist

Table 6.5 Air Quality Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference /Notes
During Construction			
Ensure dust suppression resources are provided on-site (i.e. water carts).	SM	Throughout construction	
Ensure trafficable areas are clearly defined and stabilised and the on-site speed limit is adhered to.	SM	Throughout construction	
Maintain construction equipment including trucks and vehicles, to reduce exhaust emissions.	SM & Subcontractors	When required	
Control any dust generated from the demolition and removal of existing buildings and structures.	SM	Throughout construction	
Keep dust-generating activities to a minimum during dry and windy conditions. Cease all works that have the potential to generate dust in excessively windy conditions and/or use fine mist sprays to suppress the dust.	SM	When required	
Keep large, unprotected areas moist during windy weather. If water is insufficient, soil binders and/or dust retardants may be used	SM	During construction	
Load and cover trucks and ensure the tailgates of all trucks transporting spoil from site are securely fixed prior to loading and immediately after unloading.	SM & Subcontractors	During construction	
Ensure there is no burning of waste material on site.	SM	Throughout construction	
Minimise diesel pollutant impacts on surrounding land uses by: ▪ Turning off diesel combustion engines on construction equipment not in active use and on dump trucks that are idling while waiting to load or unload material; and ▪ Ensuring vehicles are well	SM & Subcontractors	Throughout construction	

maintained.			
Post Construction			
Stabilise soils as soon as practicable after disturbance to prevent dust generation.	SM	As soon as practicable	
Progressively rehabilitate all disturbed areas to their original condition as soon as possible to prevent dust generation.	SM	As soon as practicable	
Monitoring Requirements			
Regularly monitor Bureau of Meteorology wind forecasts to enable the re-programming of works with potential to generate dust in excessively windy conditions.	SM	Daily	www.bom.gov.au/vic
Visually inspect the site on a regular basis to check for the deposition of dust. Where a significant accumulation of dust is determined, cease antecedent works and review practices in this area prior to recommencing.	SM	Daily	
Install dust monitoring gauges and analyse monthly.	SM & Specialist consultant	Monthly	Dust Monitoring Methodology Document

6.6 Noise and Vibration

Objective: The impact of construction noise on surrounding land uses is minimised.

Strategies: Keep construction noise levels within community accepted levels
Comply with EPA guidelines for construction and traffic noise
Ensure construction equipment has adequate noise prevention safeguards and is maintained in good working condition

Performance Target: No complaints relating to noise arising from construction activities.

Legislation, Guidelines, References: Environmental Protection Act 1970
And all associated Legislations
Complaints Register EMP-002
Site Environmental Control Checklist

Table 6.6 Noise and Vibration Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Pre-Construction			
Ensure all equipment (excavators, backhoes, cranes, trucks etc.) have adequate noise prevention safeguards such as residential class mufflers, acoustic enclosures for any diesel generators and/or air compressors as necessary.	SM & Subcontractors	Pre-Construction	
Provide a mechanism to ensure that any complaints arising from noisy activities are addressed.	PM & SM	Pre-construction	Section 8.3 of this EMP
Ensure that the technical specifications for all subcontractors plant and equipment are written to incorporate consideration of noise mitigating procedures.	SM & CA	Pre-construction	
During Construction			
The hours for construction activities associated with the works, including the delivery of materials to and from the site are between 7:00am and 6.00pm, Monday to Friday and 9:00am to 2:00pm on Saturdays. No work is to be carried out on Sundays or on public holidays.	PM	Throughout construction	
Establish and ensure regular use of effective communication with relevant stakeholders. Surrounding occupiers to be notified of the schedule of construction works and given forewarning for especially noisy activities.	PM & SM	As necessary	
In the event of a noise complaint, implement the complaint procedures detailed in Section 9.6.	PM & SM	Immediately on incident	
Instruct subcontractors and other personnel to maintain vehicles and equipment to ensure manufacturers noise control equipment remain intact and any squeaks and rattles on dump	SM & Subcontractors	As necessary	

truck bodies and excavator tracks are minimised.			
Maintain truck routes on the site in good condition and ensure trucks remain on designated internal routes. Maintain low speeds.	SM & Subcontractors	Throughout construction	
Ensure there is no 'warming up' of plant and machinery outside the construction site.	SM & Subcontractors	Throughout construction	
Maintain low speeds at the construction site to minimise engine noise and chassis rumble.	SM & Subcontractors	Throughout construction	
Where possible, locate construction equipment in a position that provides the most acoustic shielding from surrounding land uses.	SM & Subcontractors	When required	
Ensure trucks are fully loaded so that the volume of each delivery is maximised and the number of trips is therefore minimised.	SM & Subcontractors	Throughout construction	
Minimise rock breaker use where possible. Ripping using a larger excavator or dozer is preferred, if possible, to longer periods of hammering with a smaller machine.	SM & Subcontractors	Throughout construction	
Monitoring Requirements			
Carry out noise compliance checks as necessary on all major equipment, such as drills and cranes to ensure the noise emission levels are generally within expected levels. Instruct subcontractors and other construction personnel to repair or remove noisy equipment from the site if noise levels are exceeded.	SM & Subcontractors	During construction	

6.7 Erosion, Sedimentation and Water Quality

Objective: To protect the soil from erosion and sedimentation caused by construction works.

Strategies: Minimise the amount of soil disturbance during construction.
Minimise potential risk of sediments entering waterways including soil erosion or chemical spillage

Performance Target: No erosion of soils on site and no sedimentation down slope of works.
Compliance to Erosion and Sediment Management Plan.
Compliance to draft Site Management Plan.

Legislation, Guidelines, References:
EPA Act 1970
EPA State Environment Protection Policy (Waters of Victoria)
And all associated Legislations
Project specific erosion and sediment management plan
Complaints Register EMP-002
Site Environmental Control Checklist

Table 6.7 Erosion and Sedimentation Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Pre-Construction			
Install Sedimentation Controls as per the Erosion and Sediment Control Plan	SM	Pre-Construction	Erosion and Sediment Control Plan
All boundaries are to be provided with siltation fencing: ▪ Protection of stormwater system (eg. sandbags on roads, sealed areas, around drains, geotextile silt/sediment fences on unsealed areas and hay bales on grassed areas).	SM	Pre-Construction and throughout construction	Erosion and Sediment Control Plan
During Construction			
Minimise the area of potential soil exposure. Ensure any area of potential soil exposure is kept to an absolute minimum, including all machinery parking sites.	SM	Throughout construction	Erosion and Sediment Control Plan
Divert runoff generated outside the work areas around the construction site and divert to sedimentation control.	SM	Throughout construction	Erosion and Sediment Control Plan
All construction vehicles exiting the site will depart via a wheel wash facility.	SM	Throughout construction	Erosion and Sediment Control Plan
Control vehicle and machinery movements to well defined compounds where possible. Access areas to be limited to a maximum width of 10 m.	SM	Throughout construction	Erosion and Sediment Control Plan
Maintain all construction equipment and regularly inspect for leaks, fuels and oils.	SM & Subcontractors	During construction	
Post Construction			

Stabilise soils as soon as practicable after disturbance.	SM	After disturbance	Erosion and Sediment Control Plan
Lands recently established with grass species must be watered regularly until effective cover has properly established.	SM	After grass planting	Erosion and Sediment Control Plan
Remove all temporary erosion and sedimentation control structures.	PM & SM		Erosion and Sediment Control Plan
Monitoring Requirements			
Discharges to the stormwater system from the sedimentation controls will be monitored for parameters identified according to EPA's pollution control.	Civil / Stormwater Consultant	First discharge and then every three months or after heavy rainfall events.	Erosion and Sediment Control Plan
Visually monitor water runoff for oils and grease after rainfall events (>10mm in 24hrs). If a sheen or oil film is present, prevent discharge to waterways and undertake water quality sampling and notify the PM. The monitoring will be completed in accordance to the checklists outlined in **Appendix A.**	Civil / Stormwater Consultant	During/after rainfall events	Erosion and Sediment Control Plan
Monitor rehabilitation to determine if rehabilitation has been effective.	PM & SM	As required	

6.8 Contaminated Soils

Objective: To limit exposure to contaminated soils during construction works.

Strategies:
Minimise the amount of soil disturbance during construction.
Maintain overlying capping layers at all times.
Dispose any excavated soils appropriately.
Ensure imported soil materials meet clean fill requirements.

Performance Target:
Compliance to Erosion and Sediment Management Plan.
Compliance to draft Site Management Plan.

Legislation, Guidelines, References:
Environmental Protection Act 1970
And all associated Legislations
Project specific erosion and sediment management plan
Draft Site Management Plan
Complaints Register EMP-002
Site Environmental Control Checklist

Table 5.8 Contaminated Soil Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
During Construction			
Minimise the area of potential soil exposure. Ensure any area of potential soil exposure is kept to an absolute minimum, including all machinery parking sites.	SM	Throughout construction	Erosion and Sediment Management Plan
Ensure capping layer is maintained at all times (where practical) to avoid exposure of underlying contaminated materials. The capping layer should comprise one of the following: - a concrete slab (minimum thickness 100mm); - bitumen/asphalt paving on 150mm compacted roadbase; or - compacted low permeability soil to a minimum depth of 0.5m.	SM	Throughout construction	Erosion and Sediment Management Plan
Off-site disposal of contaminated soil must be carried out in accordance with the conditions of a Disposal Permit, issued under Section 424 of the EP Act. Contaminated soil must not be removed off-site without a Disposal Permit.	SM & specialist consultants	Throughout construction	Erosion and Sediment Management Plan
Any imported fill will be assessed/sampled (as appropriate) to demonstrate compliance with clean fill criteria. The source of all imported materials will be documented and assessed. Imported fill may be required to be sampled at a rate of 1 sample per 200m3 to confirm compliance with clean fill criteria. However, if imported fill is a quarry product or can be verified to be from a clean source, then sampling may not be required.	SM & specialist consultants	Throughout construction	Erosion and Sediment Management Plan
If stockpiling of excavated soils is required, where possible, soil material is to be stockpiled on existing	SM & specialist consultants	Throughout construction	Erosion and Sediment Management Plan

hardstand areas. If soil material is unable to be stockpiled on hardstand areas, validation testing will be required beneath the stockpile footprint following the removal of stockpiled materials.			
If during excavations on site, offensive or noxious odours and/or evidence of gross contamination not previously detected is identified, work must cease in this area of the site and specialist assistance sought to prevent environmental harm. Any remedial action should be developed by an appropriately qualified and experienced person in accordance with Section 381 of the EPA Act.	SM & specialist consultants	Throughout construction	Erosion and Sediment Management Plan

6.9 Flora and Fauna

Objectives: To minimise impacts to flora and fauna.

Strategies: Conduct activities within identified construction areas to minimise contact with any existing flora and fauna
Remove noxious weeds encountered throughout construction
Carry out appropriate rehabilitation and revegetation.

Performance Target: No harm to sensitive areas or detrimental change to flora and fauna in vicinity of works.

Legislation, Guidelines, References: Environmental Protection Act 1970
And all associated Legislations

Table 6.9 Flora and Fauna Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Pre-Construction			
Protected trees under the Dandenong South Native Vegetation Precinct Plan are to be identified with exclusion zones setup in accordance with the planning scheme requirements. Trees required to be cleared from the site must first be checked for the presence of arboreal mammals or active nests (that is, containing fertile eggs or nestlings). Should observations identify the presence of these, the subject tree (s) should not be removed or pruned until animals nesting in them have completed their breeding cycle or arboreal mammals have been relocated.	SM	Pre-Construction	Refer to Appendix B Site Plan
During Construction			
If, during the course of construction, personnel becomes aware of the presence of any sensitive fauna at or near the site, all work likely to affect the sensitive fauna is to immediately cease and the DCC consulted to determine an appropriate course of action prior to the recommencement of work at that site.	SM	During construction	
Any weed removal (if necessary) is to be undertaken in accordance with Council's Noxious and Environmental Weeds Policy and using appropriate pesticides and herbicides handling procedures.	SM	When required	
Weed debris and weed-contaminated debris is to be destroyed and disposed appropriately.	SM	When required	
If any native fauna is found injured during construction, notify and obtain advice from Wildlife Victoria immediately.	Work Team	When required	

Undertake any planting or replacement of shrubs with locally native species as possible.	SM & CA	When required	
Monitoring requirements			
Visual inspections for sensitive flora and fauna to be undertaken on site and at site boundaries	SM	When required	

6.10 Groundwater

Objective: To ensure protection of groundwater.
To ensure surface waters are not polluted by contaminated groundwater.

Strategies: Manage construction activities to avoid impacts on groundwater.

Performance Target: No change to groundwater quality

Table 6.10 Groundwater Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
During Construction			
Prevent excavation to depth where groundwater table is encountered.	SM	During construction	
Although groundwater is not likely to be encountered, any de-watering should be undertaken in accordance with the requirements of EPA	PM	As required	

6.11 Utilities and Services

Objective: To avoid damage to any existing utilities and services.

Strategies: Ensure measures are taken to avoid damage to existing utilities and services.

Performance Target: No damage to existing utilities and services.

Legislation, Guidelines, References: Dial-before-you-dig on 1100
Permit to Excavate SSMP-045

Table 6.11 Utilities and Services Action Plan

Environmental Management Requirement	Responsibility	Timing/Frequency	Reference/Notes
Pre-Construction			
Ensure that services and utilities are identified using Site Drawings and the 'Dial-before-you-dig on 1100' service. Permit to Dig and services search process.	PM	Pre-construction	Permit to Excavate SSMP-045
Identify any services potentially affected by construction activities in consultation with relevant authorities and determine requirements for diversion, protection and/or support.	PM	Pre-construction	CMP
If utilities and/or services are identified, the Principal Contractor will consult with the relevant provider of the utilities identified and make arrangements to adjust and/or relocate their services as required.	PM	As required	CMP
During Construction			
Ensure no services are disrupted to the local community due to construction works.	SM	During construction	
In the event of damage to utilities or services cease works immediately and implement the Incident Management Plan, as required.	SM	During construction	

7 INDUCTION AND TRAINING

7.1 Initial Site Induction and Training

CIP is responsible for ensuring all personnel working on site have received an initial site induction prior to each employee commencing work on site. Records of this induction will be maintained.

CIP's construction supervisor is responsible for training all subcontractors' employees in relation to this EMP and ensuring subcontractor's personnel attend their induction training. Anyone found departing from the environmental requirements and breaching the controls on site will face strict disciplinary action and potential for permanent removal from the site.

7.2 On-going Training

CIP and the subcontractor's construction supervisor will be responsible for ensuring all personnel working on site receive on-going training if construction activities/plan/schedule change or as the need arises.

8 INCIDENT MANAGEMENT

An emergency and incident response plan has been prepared for the demolition and import/ preload phase of the project. The emergency and incident response plan includes the procedures to be followed during any incidents that can cause environmental damage.

Any incident likely to cause pollution of the site (such as an oil or chemical spill or accident) must be reported immediately to the SM. If the incident results in a breach of legislative provisions, then SM must inform the PM & HSR. The PM will contact relevant authorities (including the EPA) as required.

The EPA must be notified of incidents causing or threatening material harm to the environment as soon as practicable after a person/organisation becomes aware of the incident. The HSR, in his EM role, is responsible for notification to the EPA. Written details of the incident must be notified to the EPA within 7 days of the date on which the incident occurred, if requested by the EPA. Whilst all reporting will occur via the EM, subcontractors and other personnel are required to assist to the fullest extent possible in the notification and reporting of such incidents.

The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by CIP. CIP will provide such further details to the EPA within the time specified in the request. Relevant personnel involved with the construction activities on site must be made aware of such requests and facilitate the attainment of these requirements.

Emergency scenarios for this project include the following:

- Chemical & Oil spills and leaks
- Fire
- Contamination
- Unexpected find
- Damage to heritage structure

Emergency contact numbers are provided in **Table 3.1**.

Incidents are recorded in the incident report and investigation, as necessary, is carried out to assess the root cause of incident to prevent its recurrence.

9 CHECKING, CORRECTIVE ACTION AND REPORTING

9.1 Training Records

Section 7 of this EMP details the initial site induction and on-going environmental training that all personnel working on the construction will be required to undertake. The SM will ensure all employees working on site have received initial site induction and environmental training. Records of all training undertaken at the construction site will be maintained by the SM. The SM will therefore be able to assess the competency of individuals in accordance with their roles and responsibilities.

9.2 Site Environmental Inspections and Checklist

A site environmental checklist is a simple means for checking the day-to-day environmental controls at a site and recording the details in a manner that is available for inspection. It provides a series of items that can be quickly examined to provide an accurate indication of the effectiveness of safeguards contained in the EMP. An environmental checklist has been developed to cover environmental aspects and impacts identified in **Section 6**. The checklist will be revised as necessary to ensure that it is specific to the site and work to be undertaken.

Inspections will be undertaken by the project personnel. If any deficiency is detected it shall be fixed and a record is made of the corrective action taken. A timeline for corrective actions will be established dependent upon the nature of the action, however, the goal will be to ensure all corrective actions are closed out as soon as possible.

During periods of rainfall greater than 10mm per day, all work areas will be visited and the erosion control facilities inspected by the SM.

9.3 Non-conformance, Corrective Action and Preventive Action

Corrective and preventive action, as appropriate, will be undertaken when non-conformances and incidents occur at the construction site. These will occur at times that include when:

- A complaint is received regarding any pollution or other environmental impact caused by construction site activities;
- A departure from approved or agreed procedures (i.e. performance targets specified in **Section 5**) is observed;
- A non-conformance is identified as a consequence of any self-assessment, formal audit or other environmental survey or inspection.

If the non-conformance is considered to breach legislative requirements, the SM will be responsible for notifying the PM who will be responsible for reporting any perceived breaches of legislative requirements to the appropriate regulatory authority as soon as possible.

Non-conformances will be analysed and investigated by the SM and/or PM to determine the cause of the non-conformance and to develop a corrective action to prevent recurrence. The SM and/or the PM will record all non-conformances and ensure that the corrective actions are undertaken as soon as possible.

Refer to procedure for Nonconformity, Corrective Action and Preventive Action for more details.

9.4 Auditing

CIP has implemented an internal audit regime for its offices and project sites. Audits are carried out to determine the compliance with the IMS, EMP and AS/NZS ISO 14001:2004.

The PM will arrange audits of the subcontractor's activities as necessary to determine compliance with the EMP. The frequency of audits will be determined by the PM and the need for these audits will be reviewed throughout the duration of the project.

Refer to Project Environmental Management Checklist completed by the Construction Manager / Director.

10 DOCUMENT AND RECORD CONTROL

Distribution and control of this EMP and related documents is the responsibility of CIP's Project Management Team. All project personnel shall be provided access to the correct revision of the EMP. A copy of these documents is also made available on E-site for reference purposes.

This EMP is considered to be a dynamic document, which will be reviewed at the regular PMT meetings and any amendments required will be made accordingly to reflect changes to the project conditions.

Changes to the EMP will be communicated to the appropriate level of responsibility through inductions, on-going training and the issue of revised documentation where necessary.

Records are maintained to demonstrate compliance with the requirements of this EMP, CoC, CIP IMS, etc. The records maintained for the project construction activities are available on site and E-site.

Refer to procedure for Control of Documents and Records for more details.

11 MANAGEMENT REVIEW

11.1 Environmental Management Review

The performance and effectiveness of the implementation of this EMP and related documents is reviewed at the regular PMT and client meetings. Participation from other project staff, specialist consultants, and stakeholders, as appropriate, will be included.

Following meetings are held on site where the performance of EMP is reviewed:

- Fortnightly project meetings
- Monthly Project Control Group meetings/report

Records of these meetings are maintained in the form of minutes and the PMT is responsible to ensure that actions arising out of these meetings are taken in a timely manner.

CIP senior management also regularly reviews the performance of its Environmental Management System across the company as part of the IMS review. Records of these meetings are maintained in the form of minutes held in the Sydney office.

11.2 Continual Improvement

Continual improvement of the EMP will be achieved by continually evaluating environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. The continual improvement process for the project has been designed to:

- Identify areas of opportunity for improvement of environmental management which leads to improved environmental performance;
- Determine the root cause or causes of non-conformances and deficiencies;
- Develop and implement a plan of corrective and preventative action to address root causes;
- Verify the effectiveness of the corrective and preventative actions;
- Document any changes in procedures resulting from process improvement; and
- Make comparisons with objectives and targets.

Implementation of strategies/techniques to improve the environmental performance of the construction works is the responsibility of the PM. Actions and further opportunities for continual improvement will be discussed at Project Management Team Meetings as required.

12 APPENDICES

Appendix A Environmental Check List

Appendix B Erosion and Sediment & Environmental Management Plan

Appendix C Complaints Register

Document Revision History

Issue No	Date	Sec No	Brief Description of Change	Reason	Prepared By	Approved By
1.0	May 14	All sect	Initial setup	Set up of project	SP	IP
2.0	May 14	All sect	Formatting and wording amendments	Amendement after review	SP	IP
3.0	July 14	All sect	General amendements	Amendments incorporating Council comments	KF	KF
4.0	July 14	All sect	General amendements	Amendments incorporating Council comments	KF	KF

Melbourne Office
Level 8, Como Office Tower
644 Chapel Street
South Yarra VIC 3141
T: 03 9829 0200
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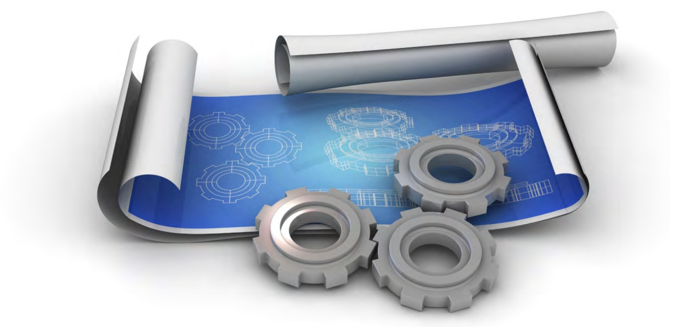
Sydney Office
Suite 59
Jones Bay Wharf
26-32 Pirrama Road
Pyrmont, NSW 2009
T: 02 9506 1400
F: 02 9506 1499

Brisbane Office
Level 1
12 Riverview Terrace
Indooroopilly QLD 4068
T: 07 3878 8316
F: 07 3878 1856

www.ciproperty.com.au
National enquiries: 1800 829 877



CIP

Developing Relationships Building Success

Appendix A Environmental Check List

CIP	Project: The Link Industrial Estate	IMS
		EMP 001
	Site Environmental Control Checklist	

Code: (C) – Conformance (N) – Non-conformance W/E___/___/ 20___

No	Task	M	T	W	T	F	S	N/A	Action Required
1.0	**Erosion & Sediment Control**								
1.1	Is the Erosion & Sediment Control (ESC) Plan reflecting the current stage and activities								
1.2	Is the disturbance to the existing areas minimised and construction limited to required work areas								
1.3	Are all erosion and sediment controls in place as per the project ESC Plan								
1.4	Are all ESC measures maintained in an effective condition								
1.5	Are there effective controls in place to keep site access and public roads free of silt and mud								
2.0	**Waste Management**								
2.1	Are work areas free of rubbish/waste and adequate bins provided								
2.2	Are separate bins provided to collect general waste and recyclable waste								
2.3	Are records of waste disposal available on site indicating the recycling quantities								
2.4	Are bins secure with covers								
2.5	Are Concrete washout areas maintained								
3.0	**Community and Complaints Management**								
3.1	Are all complaints registered, closed out and communicated at the Tool Box Meeting.								
3.2	Are all activities that can affect the community communicated to local residents								
3.3	Is the Site operating within the DA hours of work								
3.4	Is the community notified of the upcoming works as per DA								Check weekly.
4.0	**Flora and Fauna**								
4.1	Are all protected flora and fauna identified with exclusion zones setup and maintained?								
5.0	**Air Quality**								
5.1	Is the movement of vehicles limited to stabilised/dust controlled areas								
5.2	Are there any visual signs of excessive dust generation on site								

Code: (C) – Conformance (N) – Non-conformance W/E___/___/ 20___

No	Task	M	T	W	T	F	S	N/A	Action Required
5.3	Are water carts available on site for dust suppression								
5.4	Are there any visual signs of black smoke from vehicles and/or plant & equipment								
5.5	Are there any vehicles and plant & equipment noticed during site inspection that are left on and idling without any appropriate reason								
5.6	Is dust monitoring in place and maintained in accordance with DA requirements								
6.0	**Traffic Management**								
6.1	Does the approved TMP reflect all current activities								
6.2	Are loads being covered prior to leaving site								
6.3	As far as practicable, large and heavy deliveries should be co-ordinated during off-peak hours to minimise the impact on local traffic.								
6.4	Is there any evidence of leaks/spills from any plant								
7.0	**Utilities and Services**								
7.1	Has Dial Before You Dig and service location been completed and documented								Check weekly.
7.2	Are all excavation works being conducted under CIP approved Excavation Permits								
8	**Water Management**								
8.1	Are there any apparent leaks in the water system on site								
8.2	Is recycled water used for dust suppression and general cleaning on site								Check weekly.
9	**Heritage Management**								
9.1	Are heritage area No-Go Zones maintained								
9.2	Is there any evidence of damage to heritage areas								
9.3	Are potential heritage significant items discovered on site identified								
9.4	Is the Heritage Consultant involved prior to commencing works in &/or around heritage areas on an ongoing basis								
10	**Vegetation Management & Weed Control**								
10.1	Is vegetation/trees to be retained adequately protected by fencing,								

Code: (C) – Conformance (N) – Non-conformance W/E___/___/ 20___

No	Task	M	T	W	T	F	S	N/A	Action Required
	barricades, signage, etc.								
10.2	Is there any evidence of transfer & spread of weeds								
10.3	Is spread of weeds controlled eg. through pesticides								
11	**Contaminated Land**								
11.1	Is there any evidence of contaminated soils observed on site eg. PASS, ASS, Asbestos, etc.								
11.2	Is the contaminated material disposed of in accordance with the legal procedures								
11.3	Is there adequate monitoring of contaminated areas								
11.4	Are controls like fencing, signage, water spraying, etc implemented on site								
12	**Noise & Vibration**								
12.1	Are respite periods provided to minimize tonal noise impact								
12.2	Is operating heavy plant & equipment kept away from existing structures to minimize vibration impact								
12.3	Are noise and vibration controls initiated at source eg. Machine cowling, maintenance, etc.								
13	**Use of chemicals, hazardous substances and dangerous goods**								
13.1	Are current MSDS available for all chemicals and HS&DS being used on site								Check weekly.
13.2	Are empty containers/packaging disposed of in accordance with MSDS / as part of construction waste								
13.3	Are all chemicals stored in bunded areas								
13.4	Is all stationary equipment fitted with drip trays								
13.5	Are fully stocked spill kits available on site								Check weekly.
13.6	Are adequate number of fire extinguishers available on site								Check weekly.
13.7	Are all containers appropriately labelled								
14	***Site Specific Requirements***								
14.1									
14.2									
14.3									
14.4									

	Project: The Link Industrial Estate	IMS
		EMP 001
	Site Environmental Control Checklist	

Code: (C) – Conformance (N) – Non-conformance W/E___/___/ 20___

No	Task	M	T	W	T	F	S	N/A	Action Required
14.5									
14.6									
14.7									
	DAILY SIGN OFF								
	Initials of staff member who completed the review: Position:_______________								

Actions Required	Responsibility	Target Date	Close-out

WEEKLY SIGN OFF

Weekly Signature: .... Date:..

(To be signed by the nominated senior position on site)

Appendix B Erosion and Sediment Management Plan

SITE EMP A1 PLAN (1) - TYPES AND LOCATIONS OF ENVIRONMENTAL PROTECTION MEASURES

PROJECT NAME: 345-385 PERRY ROAD KEYSBOROUGH INDUSTRIAL SUBDIVISION

DATE AND REVISION: 13/05/2014 REV C

THE FOLLOWING HAVE BEEN IDENTIFIED AS SIGNIFICANT ENVIRONMENTAL ASPECTS FOR THE SITE:

- STORMWATER RUN-OFF
- SEDIMENTATION AND EROSION CONTROL
- MUD DEPOSITING ON ROAD
- THESE ASPECTS SHALL BE MANAGED WITH THE ENVIRONMENTAL PROTECTION MEASURES OUTLINED ON THIS PLAN.

THESE ASPECTS SHALL BE MANAGED WITH THE ENVIRONMENTAL PROTECTION MEASURES OUTLINED IN THIS PLAN

MANAGEMENT

1. RESPONSIBILITIES:
- CONTRACTOR SUPERINTENDENT

EMERGENCY CONTACT
1: - TBA
2: -

4. STAGING OF WORKS:
- WHOLE SITE PROGRESSIVE CUT TO FILL

2. COMMUNICATION OF EMP REQUIREMENTS:
- SITE NOTICE
- SITE INDUCTIONS
- TOOLBOX MEETINGS

5. INFORMING RESIDENTS:
- N/A

3. INSPECTIONS AND MAINTENANCE:
- PER CONTRACTOR
- P.M.P

6. ASSOCIATED DOCUMENTS:
- COUNCIL, EPA, MWC, SPECIFICATIONS AND CODES OF PRACTICE
- CONSTRUCTION TECHNIQUES FOR SEDIMENT CONTROL (EPA 1991)
- ENVIRONMENTAL GUIDELINES FOR MAJOR CONSTRUCTION SITES (EPA 1996)

NOISE — RISK: LOW

REQUIREMENT: EPA VICTORIA AND COUNCIL REQUIREMENTS MUST BE ADHERED TO IN RELATION TO THE LEVEL OF NOISE AND WORKING HOURS, TO ENSURE THAT RESIDENTS AND OTHER APPLICABLE NEIGHBOURS TO THE SITE ARE NOT DISTURBED UNREASONABLY. THE GENERATION OF NOISE MUST BE MINIMISED.

7. WORKING HOURS:
7.00 AM TO 6.00 PM MON-FRI
7.00 AM TO 1.00 PM SAT

8. NOISE MINIMISATION METHODS:
- APPROVED NOISE SUPPRESSION ON MACHINERY

9. OTHER:
- SITE REMOTE FROM NEIGHBOURS

DUST — Risk: Medium

REQUIREMENT: DUST GENERATION MUST BE MINIMISED TO ENSURE THERE IS NO HEALTH RISK OR LOSS OF AMENITY.

10. MINIMISING DUST GENERATION:
- MINIMISE VEHICLE AND MACHINERY INTERNAL HAUL & TRAVEL DISTANCES WHERE POSSIBLE

8. Contingencies:
- WATER SPRAY EXPOSED AREAS WHERE DRY DISPERSIVE SOILS SUBJECT TO HIGH WINDS

11. DUST SUPPRESSION:
- WATER CART WHERE CONDITIONS REQUIRE

13. Other:
- CEASE WORK IN EXTREME CONDITIONS

EROSION AND SEDIMENT — RISK: MEDIUM

REQUIREMENT: EROSION AND SEDIMENT MUST BE MANAGED IN ACCORDANCE WITH CURRENT BEST PRACTICE ENVIRONMENTAL MANAGEMENT PRACTICES, TO PREVENT SEDIMENT-LADEN WATER FROM ENTERING ANY DRAINAGE SYSTEM OR NATURAL WATERWAY.

14. DRAINAGE MANAGEMENT:
- EXCAVATED BASIN PROVIDES PRIMARY CONTROL
- CONTROLLED OUTFLOW TO CREEK ROCK BUNDS ETC

17. SEDIMENT TRAPS:
- ROCK BUNDS ON OUTLET
- RUMBLE GRID AT ENTRANCE
- SILT FENCING
- ROCK LOGS AROUND PIT INLETS

18. DEWATERING:
- DIRECT FLOWS/PUMP PUMP INTO TEMPORARY SED. BASIN BEFORE DISCHARGE

15. SOIL STABILISATION
DURING CONSTRUCTION

POST WORKS:
- BUILDING CONSTRUCTION EXPECTED
- STABILISATION OF EXPOSED SOILS WITH LOCAL NATIVE VEGETATION FROM ECOLOGICAL VEGETATION CLASSES (EVC) IF REQUIRED.

19. VEHICLE AND ROAD MANAGEMENT
SITE ACCESS:
- RUMBLE GRID & CCR RAMP AT ENTRY

CLEANING VEHICLES:
- RUMBLE GRID

STREET CLEANING:
- STREET BROOMING AS REQUIRED

16. STOCKPILE PROTECTION:
- SHAPE AND TRACK ROLL AS PLACED
- SILT FENCES

20. OTHER:

WASTE — RISK: LOW

REQUIREMENT: LITTER AND WASTE MUST BE CONTAINED ON SITE, BEFORE DISPOSAL IN A RESPONSIBLE MANNER. WASTE GENERATION MUST BE MINIMISED.

21. MOVEMENT OF SOIL:
CONTAMINANT STATUS:

22. WASTE MINIMISATION METHODS:
- LUNCHROOM TYPE WASTE

23. WASTE STORAGE AND DISPOSAL
- RUBBISH BINS
- SMALL SKIP

CHEMICALS: — RISK: LOW

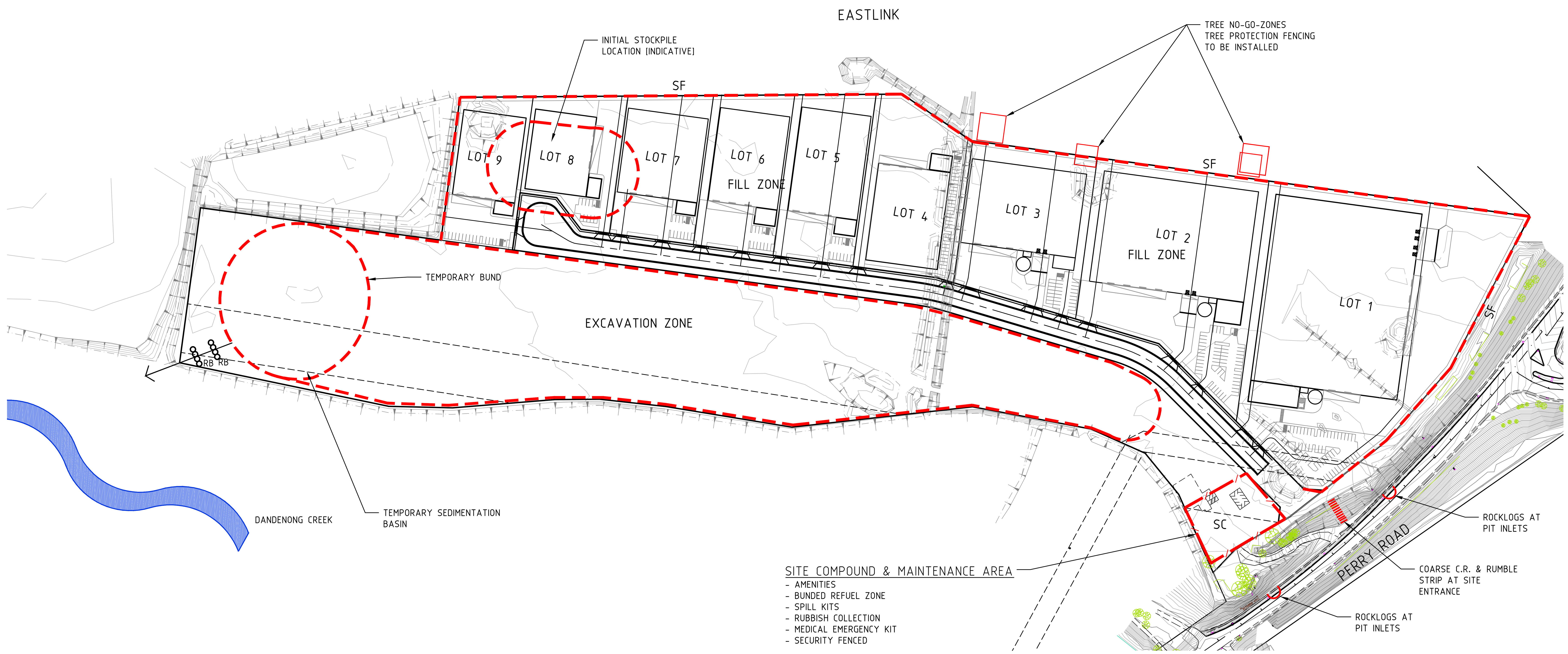
REQUIREMENT: STORAGE AND SPILL MANAGEMENT PRACTICES MUST BE IMPLEMENTED TO ENSURE THAT NO ENVIRONMENTAL DAMAGE CAN RESULT FROM THE ESCAPE OR SPILLAGE OF CHEMICALS OR FUELS.

25. STORAGE:
- NO CHEMICALS OR HAZARDOUS MATERIALS TO BE STORED ON SITE
- IF REQUIREMENT ARISES, STORE IN BUNDED AREA
IN BUNDED

27. REFUELLING PROCEDURE
- USE OF MOBILE REFUELING TRUCKS
- MINIMAL OR NO ON-SITE FUEL, IF REQUIRED TO BE LOCATED IN BUNDED AREA WITHIN COMPOUND

26. SPILL MANAGEMENT
- REFUEL AWAY FROM AREAS FREE DRAINING TO CREEK
- NEARBY SPILL KITS

28. OTHER
- MSDS WHERE REQUIRED



STANDARD SYMBOLS	ENVIRONMENTAL PROTECTION MEASURES
SC	SITE COMPOUND
BIN	BINS
	STOCKPILE
SF	SILT FENCE
	STABILIZED CRUSHED ROCK ACCESS POINT
CD	CATCH DRAIN / CUT OFF DRAIN
24. OTHER SB	STRAW BALES
TS	TOP SOIL
TREE NGZ	TREE NO GO ZONE
RB	ROCK BUND

WARNING!
THE LOCATION OF EXISTING SERVICES SHOWN ON THESE PLANS MUST BE PROVEN ON SITE, THE APPROPRIATE AUTHORITY MUST BE CONTACTED AND THE SERVICES LOCATED PRIOR TO COMMENCEMENT OF ANY WORKS.

Hor 1:2000 0m 20m 40m 80m 120m

OTHER SITE SPECIFIC ISSUES

SIGNIFICANT FLORA/FAUNA — RISK: HIGH/MEDIUM/LOW	ARCHAEOLOGICAL/HERITAGE — RISK: HIGH/MEDIUM/LOW	RISK: SIGNIFICANT/MED/LOW	RISK: SIGNIFICANT/MED/LOW
REQUIREMENT: ALL SIGNIFICANT FLORA AND FAUNA ON AND ADJACENT TO THE SITE MUST BE PROTECTED.	REQUIREMENT: PLACES, SITES AND OBJECTS OF ARCHAEOLOGICAL OR HERITAGE SIGNIFICANCE MUST BE PROTECTED.	31.	32.
29. NO. N/A	30. NO. N/A		

I have read this Environmental Management Plan and agree to undertake works and ensure sub-contractors undertake works in accordance with this plan.

Developer

Consultant

Contractor

SITE EMP A1 PLAN (2) - RISK ASSESSMENT AND DESIGNS OF ENVIRONMENTAL PROTECTION MEASURES

PROJECT NAME: 345-385 PERRY ROAD KEYSBOROUGH
DATE AND REVISION: 13/05/2014 REV C

RISK ASSESSMENT CHECKLIST

NOISE

ISSUES:	
• NATURE OF NOISE GENERATING WORKS: MACHINERY ASSOCIATED WITH BULK EARTHWORKS • POTENTIAL NOISE RECEPTORS: NO NEARBY RECEPTORS • PROXIMITY OF WORKS TO NOISE RECEPTORS: REMOTE	LIKELIHOOD LOW CONSEQUENCE LOW OVERALL RISK LOW

DUST

ISSUES:	
• DUST SOURCES: BULK EARTHWORKS • POTENTIAL DUST RECEPTORS: FREEWAY EAST SIDE • PROXIMITY OF WORKS TO DUST RECEPTORS: ADJACENT • EXTENT OF EXPOSED EARTH AND DURATION OF TIME EXPOSED: PROGRESSIVELY WHOLE SITE • WIND CONDITIONS: VARIABLE	LIKELIHOOD MODERATE CONSEQUENCE LOW OVERALL RISK LOW

EROSION AND SEDIMENT

ISSUES:	
• EROSION AND SEDIMENT SOURCES: BULK EXCAVATION AND FILLING • POTENTIAL EROSION AND SEDIMENT RECEPTORS: DANDENONG CREEK • PROXIMITY OF WORKS TO EROSION AND SEDIMENT RECEPTORS: ADJACENT • EXTENT OF EXPOSED EARTH AND DURATION OF TIME EXPOSED: PROGRESSIVELY WHOLE SITE • SOIL TYPE AND SENSITIVITY: • SLOPE: • SITE DRAINAGE REGIME: DRAINAGE INTO WETLAND CONNECTION • RAINFALL: MELB 2YR & 6HR ~ 6mm HR • VEHICLE MOVEMENT ON AND OFF SITE: VIA RUMBLE GRIDS & CCR AT ENTRY	LIKELIHOOD MODERATE CONSEQUENCE MODERATE OVERALL RISK MODERATE

WASTE

ISSUES:	
• NATURE OF WASTE TO BE GENERATED: PREDOMINANTLY LUNCHROOM TYPE • PRESENCE OF WASTE ON SITE PRIOR TO WORK COMMENCEMENT: • QUANTITY OF WASTE ANTICIPATED: RUBBISH BINS • POTENTIAL WASTE RECEPTORS: N/A • PROXIMITY TO POTENTIAL WASTE RECEPTORS: N/A	LIKELIHOOD LOW CONSEQUENCE LOW OVERALL RISK LOW

CHEMICALS

ISSUES:	
• TYPE OF CHEMICALS AND FUELS USED AND/OR STORED ON SITE: N/A • QUANTITIES OF CHEMICALS AND FUELS USED AND/OR STORED ON SITE: • POTENTIAL CHEMICAL RECEPTORS: • PROXIMITY TO POTENTIAL CHEMICAL RECEPTORS:	LIKELIHOOD LOW CONSEQUENCE LOW OVERALL RISK LOW

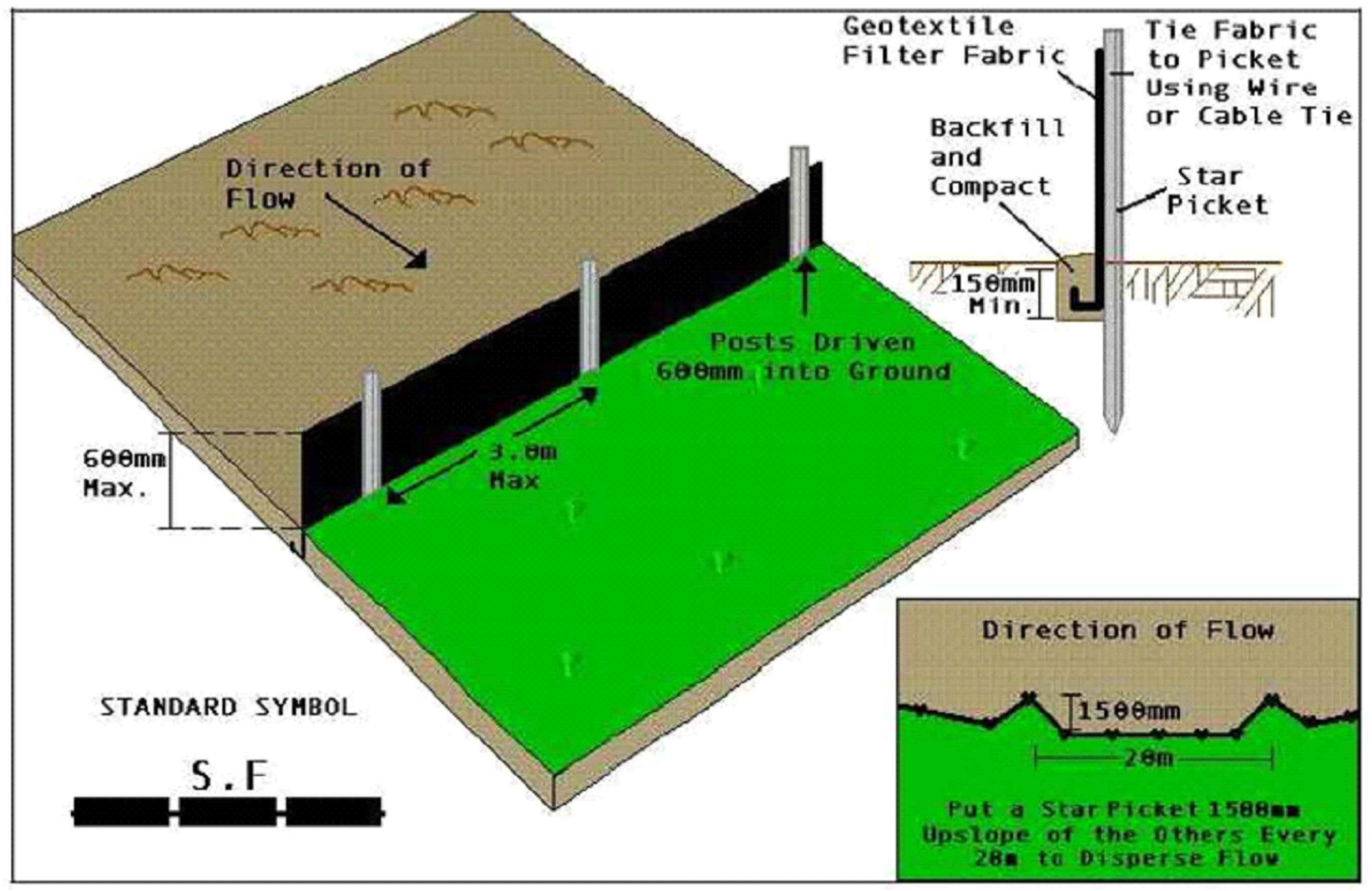
SIGNIFICANT FLORA/FAUNA

ISSUES:	
• TYPES OF FLORA/FAUNA: N/A • VULNERABILITY OF FLORA/FAUNA: • PROXIMITY OF FLORA/FAUNA TO WORKS: • WORK ACTIVITIES WHICH MAY THREATEN FLORA/FAUNA: • POTENTIAL IMPACTS ON FLORA/FAUNA:	LIKELIHOOD LOW CONSEQUENCE LOW OVERALL RISK LOW

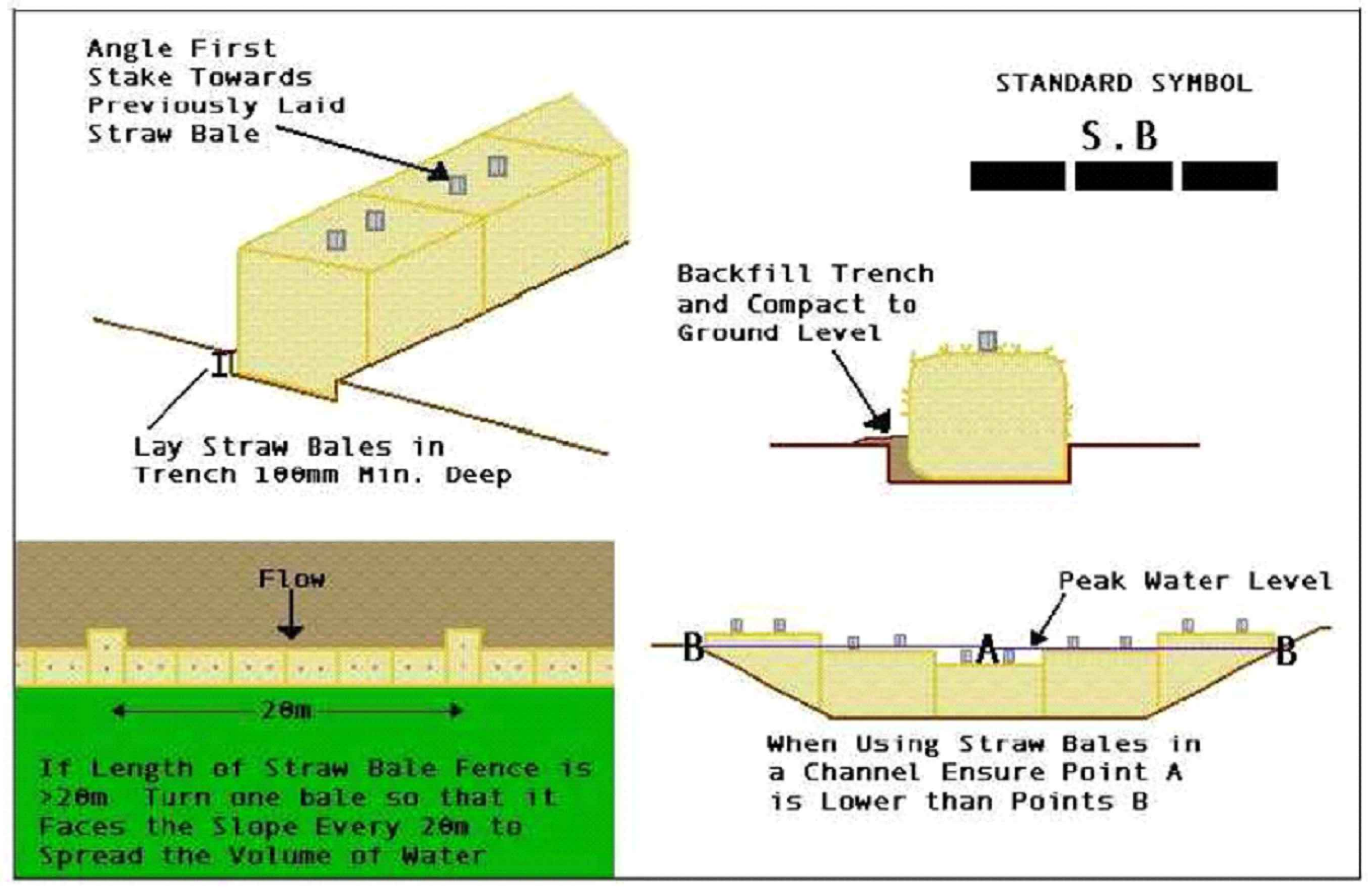
ARCHAEOLOGICAL/HERITAGE

ISSUES:	
• TRADITIONAL LAND OWNERS CONSULTED? YES/NO: • SURVEY OR ASSESSMENT CONDUCTED? YES/NO/NOT REQUIRED: • PROBABILITY OF ENCOUNTERING ARCHAEOLOGICAL/HERITAGE ITEMS DURING WORKS: • TYPES OF ARCHAEOLOGICAL/HERITAGE ITEMS ON SITE: • PROXIMITY OF ARCHAEOLOGICAL/HERITAGE ITEMS TO WORKS ON SITE: • WORK ACTIVITIES WHICH MAY THREATEN ARCHAEOLOGICAL/HERITAGE ITEMS: • POTENTIAL IMPACTS ON ARCHAEOLOGICAL/HERITAGE ITEMS:	LIKELIHOOD N/A CONSEQUENCE OVERALL RISK

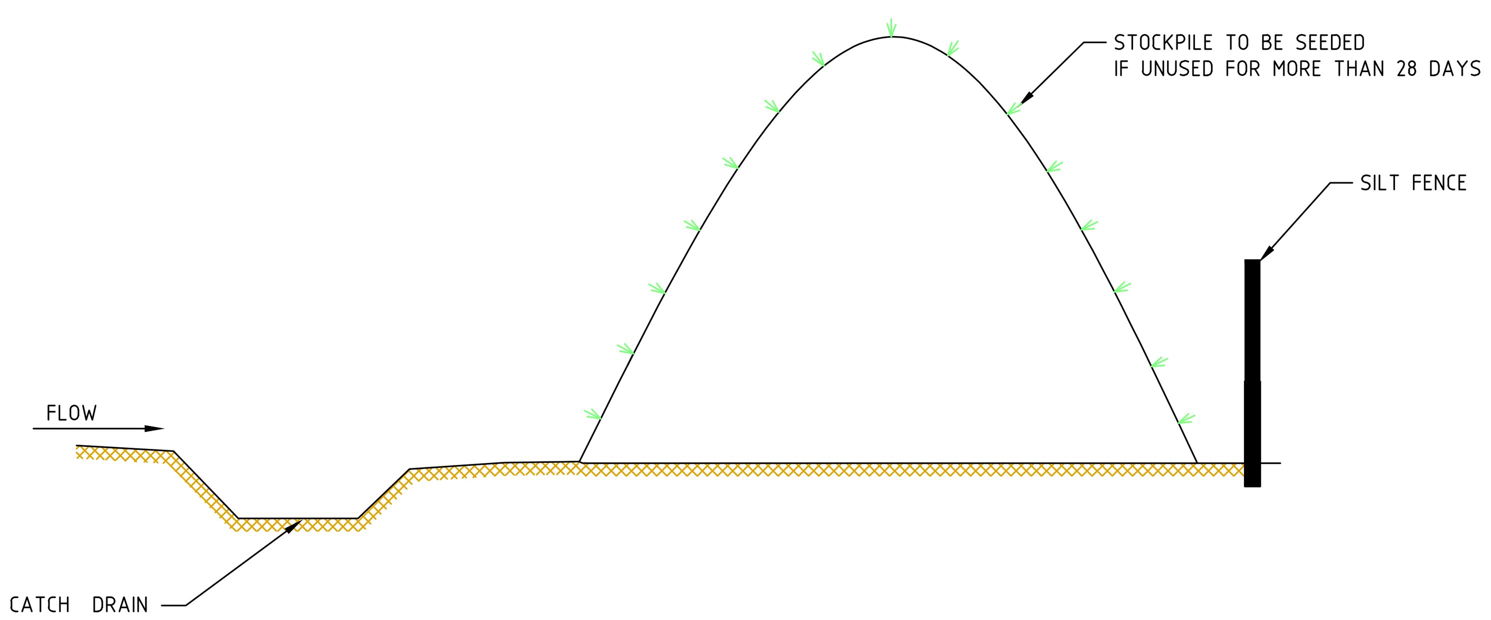
Environmental protection measures shall be constructed in accordance with the following designs.



SILT FENCE DETAIL



STRAW BALES



STOCKPILE MANAGEMENT

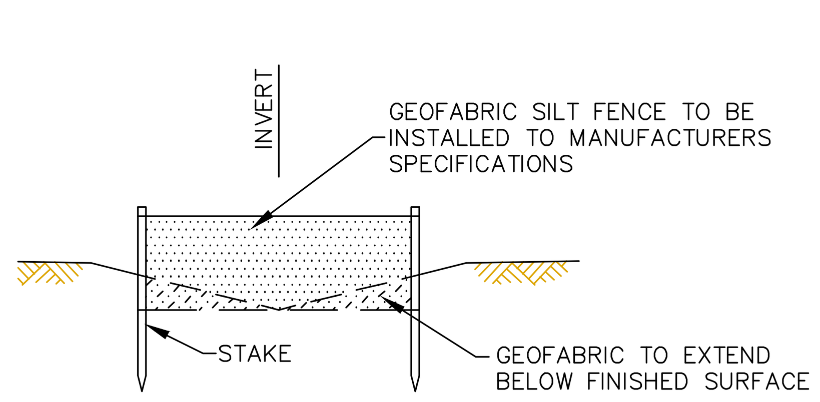
NOTES:

1. THE CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION + DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTION

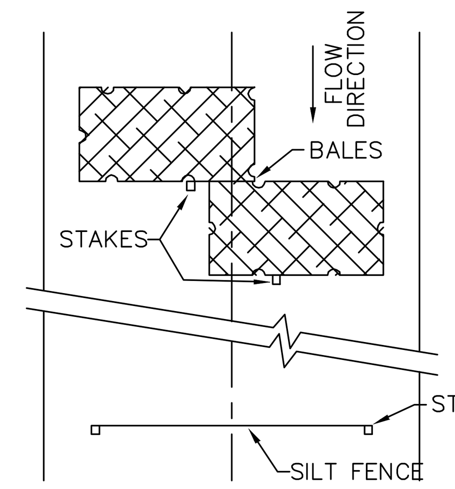
2.ALL SEDIMENT CONTROL DEVICES SHALL BE MONITORED,CLEANED AND OR REPLACED WHEN ACCUMULATED SEDIMENT REDUCES CAPACITY.

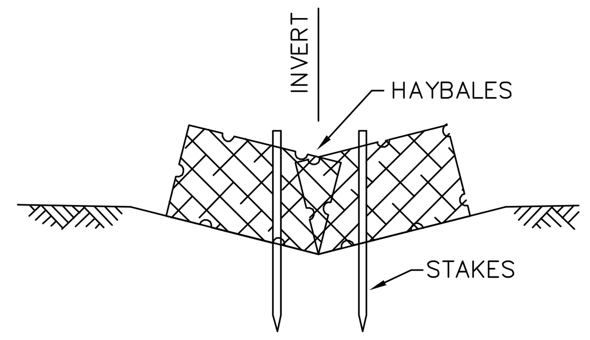
3.AT ALL TIMES THE CONTRACTOR SHALL MONITOR WEATHER CONDITIONS AND PROTECT DOWNSTREAM CONSTRUCTION.

4.CATCH DRAINS TO HAVE UNINTERRUPTED GRADE TO AN OUTLET .

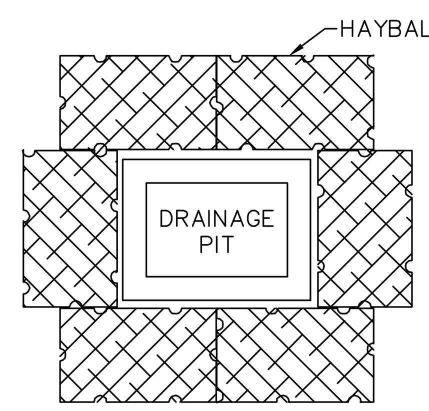


OPEN DRAIN CROSS SECTION
GEOFABRIC SILT FENCE





OPEN DRAIN CROSS SECTION
USING HAY BALES



DRAINAGE PITS
USING HAY BALES

NOTE:
THE SPACING OF HAY BALES OR SILT FENCES TO BE DETERMINED AFTER CONSIDERING THE SLOPE AND SIZE OF THE CATCHMENTS.

SILT CONTROL OPTIONS
NOT TO SCALE

Issues: • • • • • •	LIKELIHOOD CONSEQUENCE OVERALL RISK

Issues: • • • • • •	LIKELIHOOD CONSEQUENCE OVERALL RISK

I have read this Environmental Management Plan and agree to undertake works and ensure sub-contractors undertake works in accordance with this plan.

Developer ____________ Consultant ____________ Contractor ____________

Appendix C Complaints Register

PROJECT: The Link Industrial Estate

Date	Complaint No	Complainant	Issue Raised	Close Out Action	Closed	Open

11 Attachment F- Transport Management Plan

TRAFFIC REPORT

Proposed Industrial Development

Lot 2, P5603443D
345 – 385 Perry Road
Keysborough

Transport Management Plan

April 2014

Client:

Commercial & Industrial Property Pty Ltd
Level 8, Como Office Tower
644 Chapel St
South Yarra VIC 3141

O'BRIEN TRAFFIC
ABN 55 007 006 037
Suite 2, 22 Gillman Street
Hawthorn East VIC 3123
T: (61 3) 9811 3111
F: (61 3) 9811 3131
W: obrientraffic.com

1. INTRODUCTION

O'Brien Traffic has been engaged by Commercial & Industrial Property Pty Ltd to undertake a traffic engineering assessment of a proposed industrial subdivision development Lot 2, P5603443D, 345-385 Perry Road, Keysborough and prepare this Transport Management Plan.

In the course of preparing this Plan:

- The subject site and surrounding road network has been inspected;
- The Concept Masterplan of the development, prepared by CIP, dated 26 February 2014 has been reviewed;
- Traffic volume data has been collected and collated;
- Access arrangements have been analysed and layouts designed; and
- The traffic and parking implications of the proposal have been assessed.

2. EXISTING CONDITIONS

2.1 Location and Land Use

The subject site is located on the northern side of Perry Road and immediately west of the EastLink Tollway in Keysborough. The site is irregular in shape and covers an area of approximately 19.5 ha. The site and the surrounding area are shown in **Figure 1** and a recent aerial view is shown in **Figure 2**.

The site is currently undeveloped apart from a farm building within the south western corner of the site.

The site is zoned *Industrial 1* in the Greater Dandenong Planning Scheme, and is within the area of the Dandenong South Industrial Area Extension Structure Plan – Keysborough (**Figure 3**) and is subject to a Development Contributions Plan (DCP).

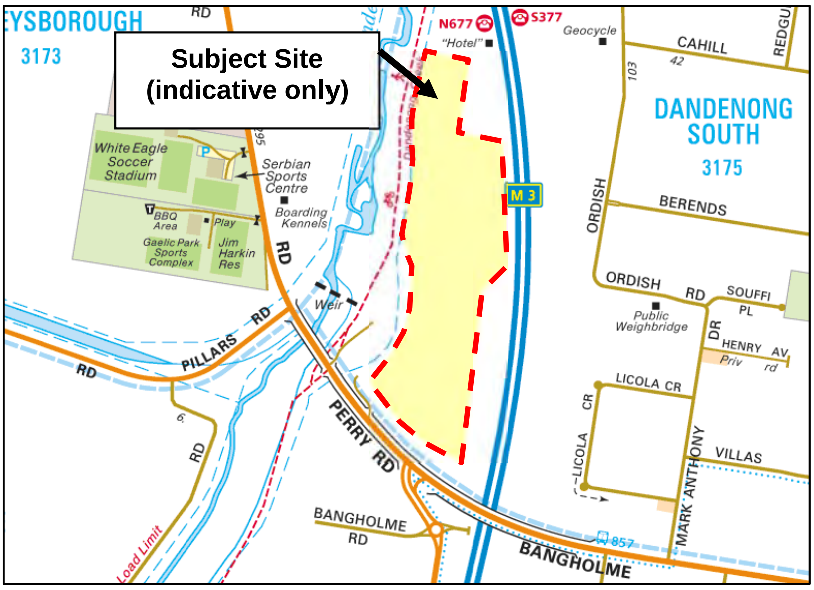


Figure 1: Location of Subject Site

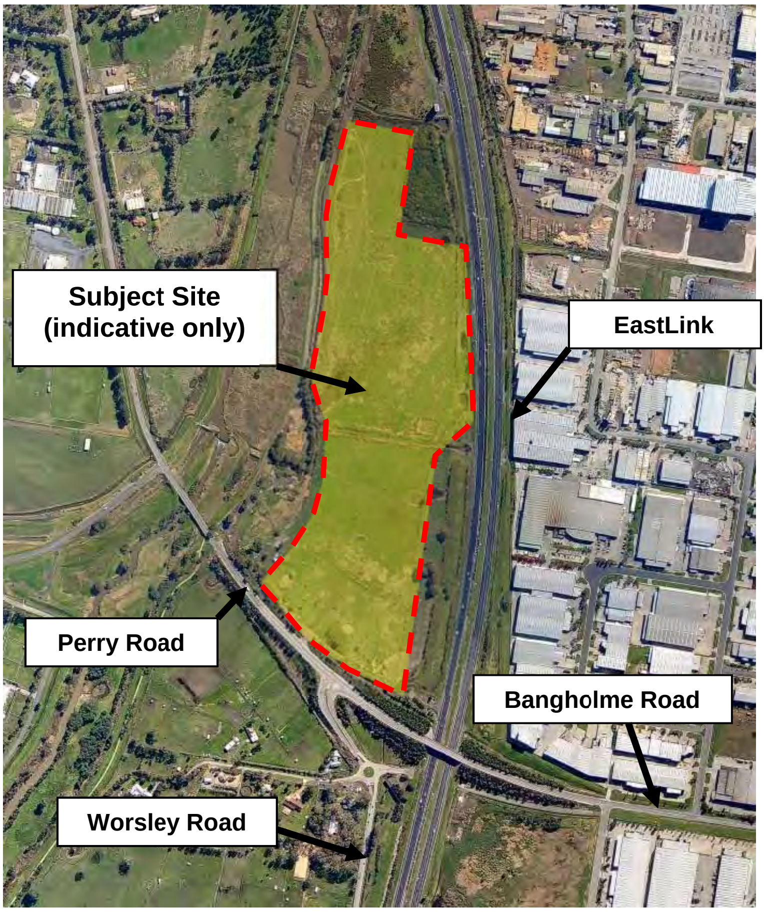


Figure 2: Aerial view of the subject site (Source: nearmap.com)

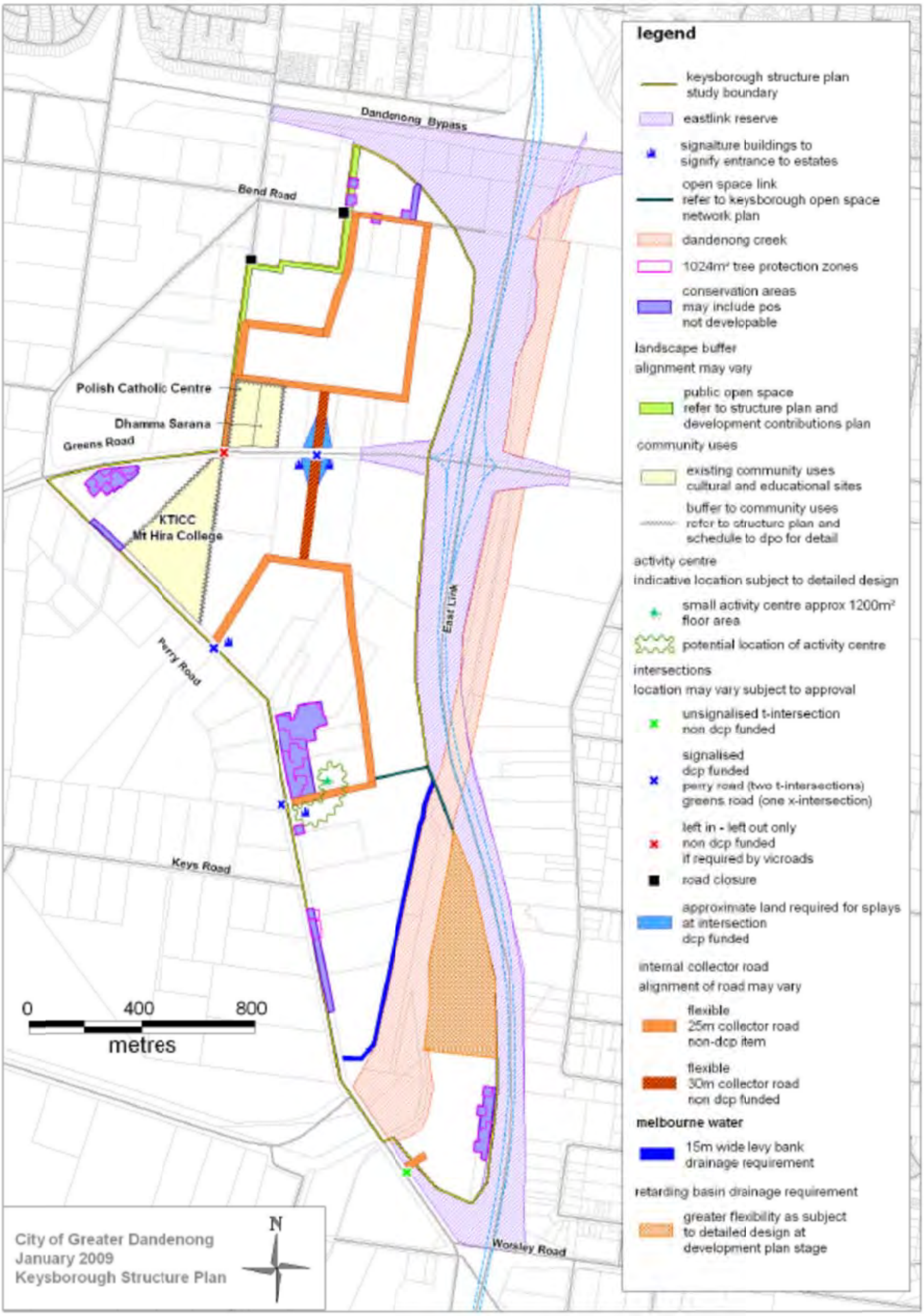


Figure 3: Dandenong South Industrial Area Extension Structure Plan – Keysborough (2009)

2.2 Surrounding Land Use

Land uses to the east of EastLink in the vicinity of the site are generally industrial in nature, with surrounding land uses immediately to the west of EastLink being currently rural but progressively subject to industrial development.

2.3 Road Network

Perry Road is located along the southern boundary of the site (as shown in **Figure 1** and **Figure 2**). It is zoned *Road Zone Category 2* in the Greater Dandenong Planning Scheme and is under the control of Council. It is listed as a major Council Road in the *Melway* street directory.

In the vicinity of the site, Perry Road is an undivided road with one traffic lane in each direction, and a footpath on the northern side. The posted speed limit is 60 km/h. Perry Road is also a designated B-Double route.

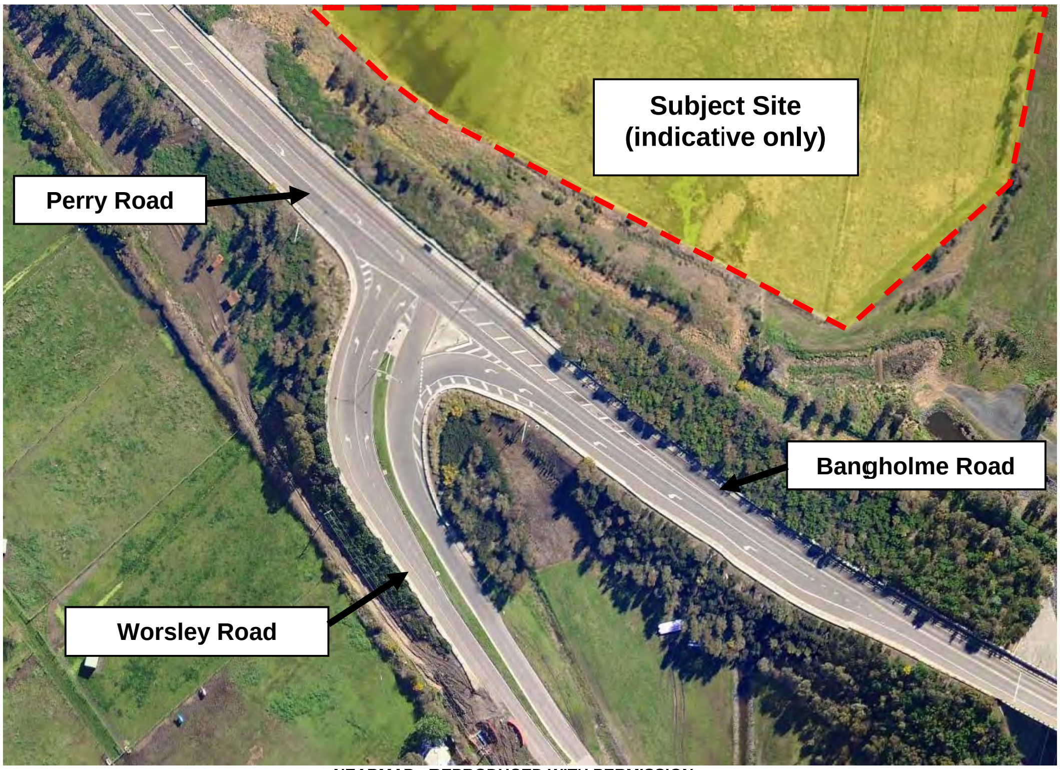
Views of Perry Road looking east and west are shown in **Figure 4** and **Figure 5** respectively.

Figure 4: View of Perry Road looking east (subject site on left of photo)

Figure 5: View of Perry Road looking west (subject site on right of photo)

Bangholme Road is the continuation of Perry Road across EastLink to the east. Near the eastern end of the southern boundary of the site, Worsley Road intersects with Perry Road, and forms an unsignalised T-intersection. The intersection includes a left turn slip lane from the east, a right turn lane from the west, and separate left and right turn lanes from the south. It is understood that the intersection has received VicRoads Black spot funding that will enable the installation of traffic signals at this location during 2014.

An aerial view of the Perry Road and Bangholme Road intersection is shown in **Figure 6**.



NEARMAP - REPRODUCED WITH PERMISSION

Figure 6: Aerial view of the intersection of Perry Road and Worsley Road

EastLink is a tolled section of the M3 freeway linking a large area through the eastern and south-eastern suburbs of Melbourne, and runs parallel to the eastern boundary of the site. When the DCP was being developed (circa 2007), there was a half diamond interchange proposed which would link Bangholme/Perry Road to EastLink, providing access to and from the north. A road reservation (adjacent the subject site) has been retained for this purpose.

2.4 Existing Traffic Volumes

Greater Dandenong Council collected weekday traffic counts for the Perry Road in May 2013. These counts were undertaken to the south of Keys Road (1 kilometre to the west of the site) and found that the average weekday traffic volume was 8,538 vehicles per day.

In addition to the Council data, O'Brien Traffic commissioned turning movement counts at the intersection of Perry Road and Worsley Road to ascertain the existing peak hour traffic demands adjacent to the site. These counts were undertaken on Tuesday 8 October 2013 in the morning peak between 7am and 9am, and 4pm to 6pm in the evening peak period.

The surveyed traffic volumes for the Perry Road/Worsley Road intersection are shown for the peak hours in **Figure 7**.

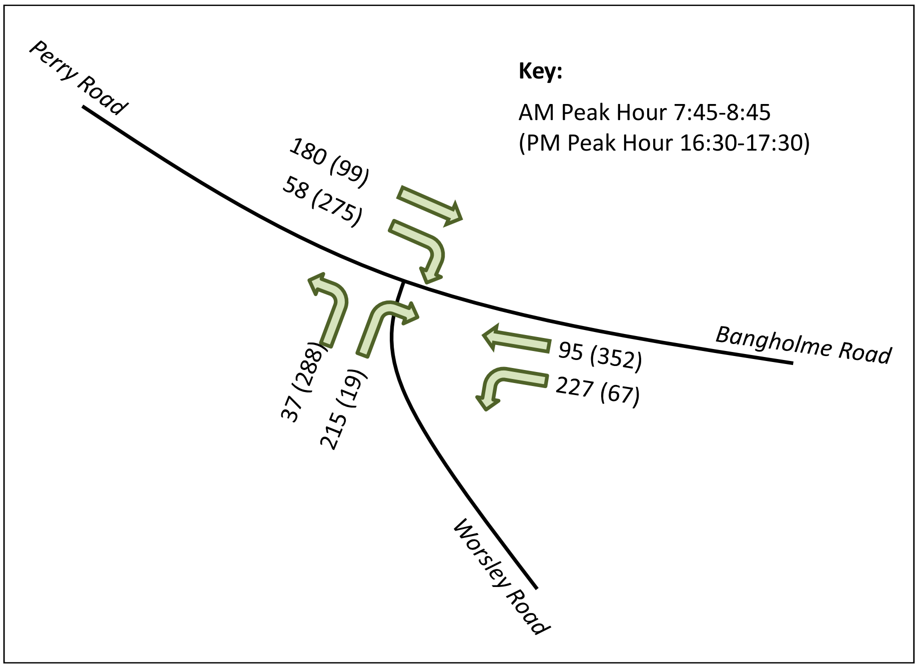


Figure 7: Perry Road / Worsley Road – AM and PM Peak hour traffic volumes

The above results show significantly higher flows in the PM peak period. There are very 'tidal' flows with eastbound, south to east, and east to south in the AM and westbound, south to west and south to east in the PM. There are potentially a large number of drivers who are using Perry Road - Worsley Road as a "toll-free" alternative to EastLink.

2.5 Public Transport

The site is not very well served by public transport at present with the nearest service being Bus Route 857 that runs along Bangholme Road and Worsley Road to the east and south of the site. This service provides connections to Dandenong and Chelsea.

3. THE PROPOSAL

The concept plan for 345 – 385 Perry Road is for an industrial subdivision and development comprising of 9 lots, ranging in size from 0.6Ha to 31,4Ha. Each lot will potentially be occupied by a warehouse and associated parking and access areas.

A significant proportion of the subject site (7.7Ha) is proposed to be a Melbourne Water drainage reserve (refer **Figure 8**).

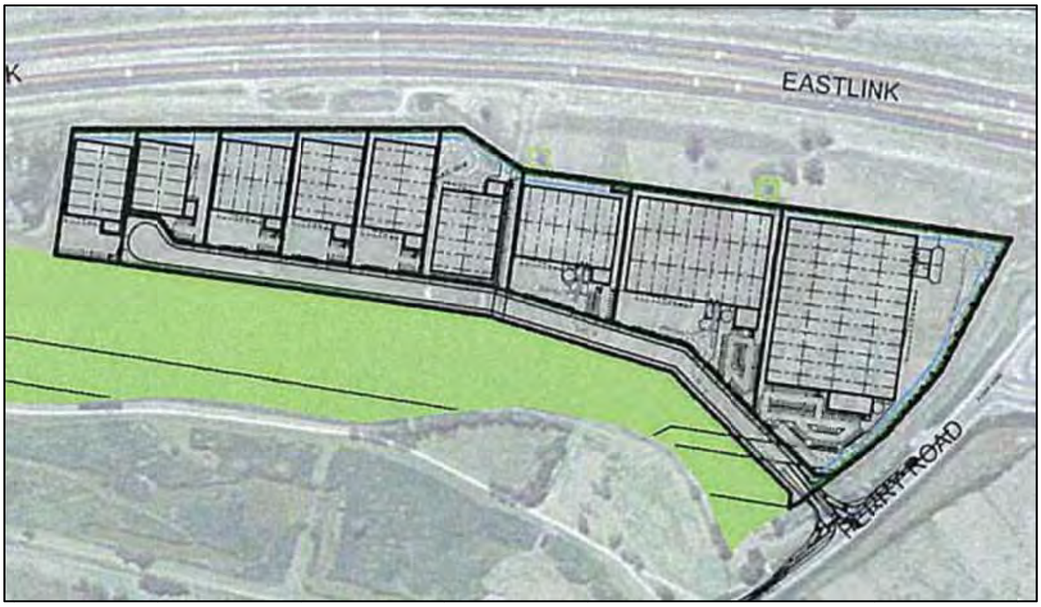


Figure 8: The Proposed Concept Plan

Based on the current concept plan, the total development floor areas are indicated in **Table 1**.

	Warehouse Floor Area (sq m)	Ancillary Office Floor Area (sq m)	Total Floor Area (sq m)
Total Development	50,312	3,350	53,662

Table 1: Development Floor Areas

Access to the land is proposed via a single road access to Perry Road and no other direct access is proposed. The internal road network consists of a single road with a court bowl at its northern end that will provide direct access to each lot.

Further details of the access arrangements are discussed later in this report.

4. CAR PARKING

4.1 Planning Scheme Parking Supply Requirements

The parking policy and requirements applicable to the proposed development are specified in Clause 52.06 of the Greater Dandenong Planning Scheme. The purpose of Clause 52.06 is:

- *To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.*
- *To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.*
- *To support sustainable transport alternatives to the motor car.*
- *To promote the efficient use of car parking spaces through the consolidation of car parking facilities.*
- *To ensure that car parking does not adversely affect the amenity of the locality.*
- *To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.*

The Planning Scheme resident parking requirement for warehouse use is 2 car spaces to each premises plus 1.5 spaces to each 100 sq m of net floor area. The concept master plan includes 53,662 sq m of warehouse area (including ancillary offices), resulting in a Planning Scheme requirement of 823 car spaces.

4.2 Empirical Assessment of Parking Demand

Warehousing uses are highly variable in the amount of traffic that they generate, with the actual demand for parking correlated to the number of employees on site. At this stage a concept master plan is being submitted to Council, and it is currently unclear as to the types of businesses that may occupy this development. However, it is generally recognised that the Planning Scheme rates represent a high estimate of the parking demand for large warehouse developments such as the currently proposed development.

To predict the number of employees, the Gross Floor Area (GFA) per employee can be estimated, and used this to calculate the likely total number of employees.

A review of available data held by O'Brien Traffic and other information available on the internet provides a range of rates. For example:

- The *Guide to Traffic Generating Developments* published by the Roads and Traffic Authority, NSW, outlines average employee density for industrial developments. However, the Guide notes that the Industrial rate (50sq m/employee) is particularly dependent on the type of industry. Additionally, this rate was established from surveys undertaken in the late 1970s. Since that time, higher levels of factory automation and the decline in certain industries where employees are at closely spaced workstations (such as the clothing and textile industries) has undoubtedly resulted in decreased densities since that time.

- To gain an understanding of the floor space requirements for a modern industrial site, an internet-based review was carried out. Again the rate depended on the type of industry, with the highest densities occurring in the textile industry, distribution centres where goods are directly sent to the consumer, and some high-tech industries. Industrial uses where there was a significant amount of floor space devoted to the long term storage of bulk products typically have the lowest densities.
- For this assessment it has been assumed that any industrial use on the site would have an 'average' employee density rate rather than one that is very high or very low. One such study, from the Miami Valley Planning Commission (USA), estimated the employee density of the approximately 68.5 million square metres of industrial floor area within their jurisdiction. Based on a total of 75,800 employees, they estimated an average employee density of 90 sq m per employee. It is considered that the nature of industry in this North American region would not be significantly different to that in the Dandenong South/Keysborough area.

It is considered that the rate of 90 sq m per employee appears to be reasonable compared to the 1970s RTA rate of 50 sq m per employee (which is likely to result in a considerable over estimate of employee numbers given modern industrial practices).

Applying this rate to the total floor area of the development above results in an estimate of 596 employees.

Assuming in this case (given the location of the site and the lack of public transport in the area) that all employees would travel by car, and that some employees would car pool, it is anticipated that up to 90% of employees would be car drivers (i.e. 537 employee vehicles).

Thus a more likely estimate for parking demand of this development is for 537 car parking spaces.

4.3 Adequacy of Car Parking Supply

The amount of on-site parking proposed in the concept master plan (245 spaces) is significantly below that required by the Planning Scheme (823 spaces), and that estimated in the empirical assessment above (537 spaces). It is considered likely, but not inevitable that a greater provision of parking may be required.

However, it is noted that the proposed layout of the development provides significant potential to provide for additional parking in each of the lots without requiring a reduction in the associated building area (refer **Figure 9**).

Figure 9: Potential for additional car parking

It is recommended that a parking demand assessment is carried out for each lot when a planning permit is being applied for, and that adequate parking (and/or provision for deferred car parking) should be provided accordingly.

5. INTERNAL ROAD LAYOUT

The internal road layout has been designed to permit access and egress movements by large vehicles. A single access road is proposed with a 22 metre wide road reserve. Given the slight angle of directional changes along the access road, the current cross-section is appropriate for all large vehicle types (including B-triples).

As a circulation road is not considered viable due to the relatively long and narrow site an industrial court bowl is proposed. The court bowl is proposed with a minimum radius of 15 metres to facilitate turning by B-doubles. Should access by very large vehicles such as B-triples (dependent on approval of access routes) be considered in future, the radius of the court bowl would need to be increased to 16.5 m, and the entry and exit radii adjusted. It should be noted that "no-stopping" restrictions would be required around the perimeter of the court bowl to ensure that it is available for large vehicles to perform turning movements.

6. TRAFFIC GENERATION & DISTRIBUTION

6.1 Traffic Generation

The subdivision may be developed in one or two stages with all vehicle access to be via a newly formed intersection with Perry Road. There is no vehicle access between the subdivision and EastLink or other adjoining sites.

Before considering what type of access is appropriate, it is necessary to estimate the traffic likely to be generated by the site.

The traffic generating capacity in the critical AM and PM peak periods for industrial sites is largely predicted by the number of employees. **Section 4.2** of this report estimates the predicted number of employees of this development as 596 employees. It is anticipated that 90% of employees would be car drivers (i.e. 537 employee vehicles).

To ascertain peak hour flows, it has been conservatively assumed that 65% of all employees arrive and leave during the existing on-road peak hour. This is conservative as typically industrial subdivisions generate traffic earlier in the peak periods than most other uses and their traffic is spread more during the peaks due to variations in the operation of each lot. Thus, applying this percentage to the predictions of employee numbers would result in an estimate of 349 vehicles per hour entering and exiting the subdivision in the peak hour.

6.2 Traffic Distribution

At the completion of the development, it is assumed that peak hour vehicle movements will be reasonably spread as follows:

- To and from the west along Perry Road (in the direction of the EastLink onramps at Greens Road);
- To and from the east and south along Bangholme Road (in the direction of Central Dandenong); and,
- To and from the south along Worsley Road (in the direction of Frankston).

This is based on a review of the observed traffic counts. Hence, the following traffic distribution assumptions are made:

- 30% of trips are to and from the east via Bangholme Road and ;
- 50% of trips are to and from the north and west via Perry Road; and
- 20% of trips are to and from the south via Wolseley Road.

For the peak hours at the Perry Road intersection it is anticipated that 90% of traffic to and from the development would be inbound in the morning peak, and 80% outbound in the evening peak.

Based on the above assumptions, the estimated peak hour traffic generated by the development is shown in **Figure 10.**

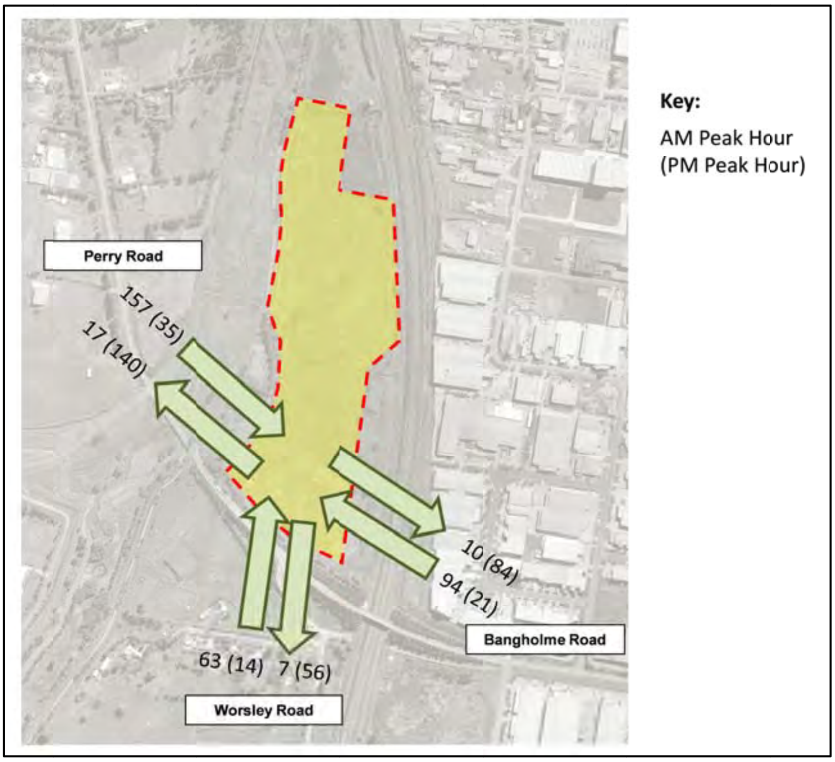


Figure 10: Peak Hour Traffic Distribution

6.3 Background Traffic Growth

For the traffic external to the site on Perry Road (not entering the development), traffic volumes have been previously been estimated as part of the DCP process for the year 2031 (when all development was envisaged to be complete). However, the associated traffic modelling was based on the inclusion of a half-diamond interchange on Bangholme Road, which is now unlikely.

Therefore, as an alternative, the observed traffic counts from October 2013 have been factored up by 40%, to allow for future growth. This produces similar traffic volumes, as those estimated by the DCP model at the Greens Road end of Perry Road, away from the localised impact of an additional interchange with EastLink.

7. SITE ACCESS

7.1 Design Requirements

The DCP identifies Perry Road in the vicinity of the site as ultimately being a collector road with one 3.5 metre wide traffic lane and a 2.0 metre wide parking lane in each direction with a central shared turning lane of 4.0 metres all within the existing road reserve. A 2.5 metre wide footpath is proposed within the verge along each side of the road. Greater Dandenong Council Engineers have verbally advised that the proposed modifications to the Perry Road cross-section are still planned, but that the timeframes for their implementation have been extended due to the slower than anticipated uptake of industrial land within the area.

To accommodate the parking lanes and footpaths, the existing Perry Road carriageway and embankment would need to be widened. Whilst this could easily be accommodated within the existing road reserve, any proposed access will need to allow for this ultimate cross-section.

It is proposed to locate the site access in the immediate vicinity of the existing access to 345 Perry Road. This would provide for sufficient space for left-turn deceleration and right turn lanes, and appropriate sight distances for the 60 km/hr speed limit. An alternative site access linking directly to the existing Perry Road / Worsley Road intersection is investigated in **Section 7.2.**

Although no connection from Perry Road - Bangholme Road to EastLink is currently proposed, a road reservation for a future half-diamond interchange with EastLink is provided. If an interchange were to be constructed, it is likely that the on-ramp located adjacent the eastern boundary of the subject site would connect to a signalised intersection with Perry Road, approximately 120 metres east of the Worsley Road intersection. Such a project could be entirely contained within the existing reservation and would not require acquisition of any part of the subject site (refer **Figure 11**).

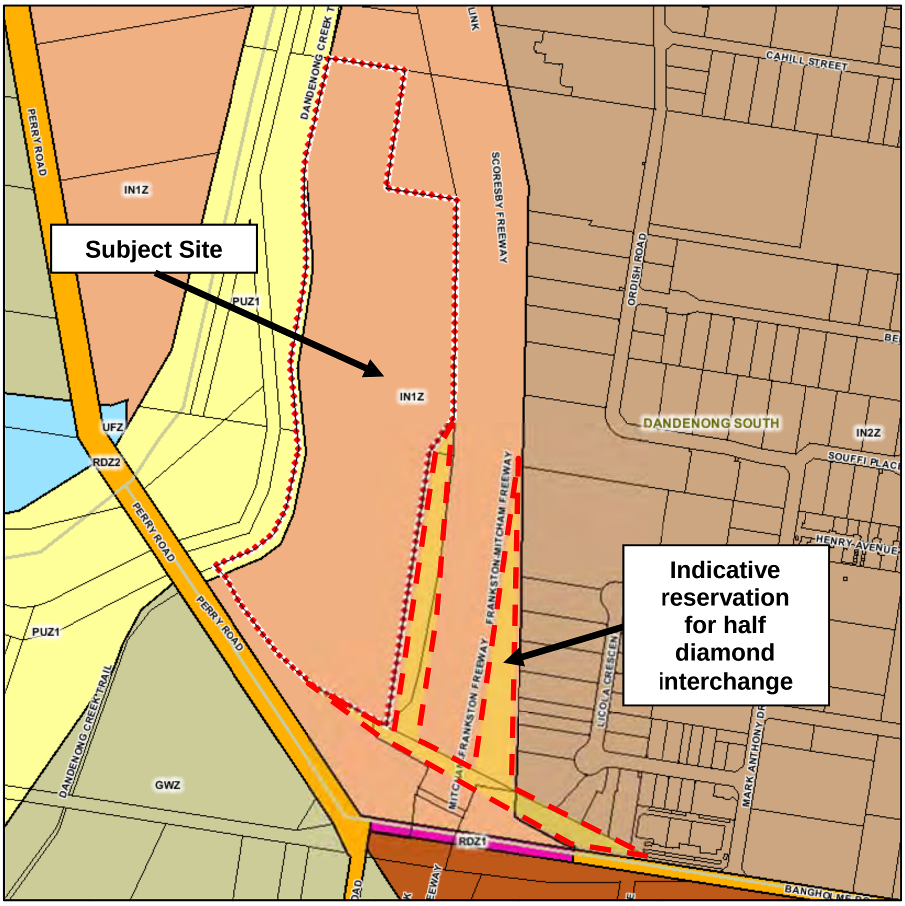


Figure 11: Indicative Interchange Reservation

7.2 Intersection Analysis

Two locations for an access to the site were initially considered, a **T**-intersection in the location of the existing access to 345 Perry Road and the conversion of the existing Perry Road / Worsley Road intersection to form a crossroads.

It is considered that the critical time period for both potential locations is the evening peak, where right turn movements out of the site are at their highest, and where both right turn movements from Perry Road into Worsley Road and through movements westwards along Perry Road are both high.

An assessment of the likely operation of the locating the site access at the location of the existing 345 Perry Road site access has been undertaken using the intersection design tool SIDRA, the current traffic volumes, and the likely traffic generation and distribution (**Section 6**).

Table 2 presents a summary of the results of the SIDRA intersection analysis for the PM peak hour for the unsignalised site access in the location of the existing 345 Perry Road access.

Table 3 presents the SIDRA analysis of the proposed intersection in the PM peak with an estimated 40% growth in traffic on Perry Road (associated with future development along this corridor).

Detailed results are provided in **Appendix A**.

The intersection analysis has assumed the following:

- 40m right turn lane on the east leg of Perry Road (excluding taper);
- 40m left turn lane on the west leg of Perry Road (excluding taper); and
- Two lane exit from the subject site.

Movement	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)
Perry Road East			
Through	0.37	0	0
Right	0.03	10	1
Site Access North			
Left	0.21	12	6
Right	0.63	32	23
Perry Road West			
Left	0.02	9	0
Through	0.22	0	0

Table 2: SIDRA Unsignalised Intersection – PM Peak Hour

Movement	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)
Perry Road East			
Through	0.52	0	0
Right	0.04	11	1
Site Access North			
Left	0.26	14	8
Right	**1.36**	**235**	**143**
Perry Road West			
Left	0.02	9	0
Through	0.30	0	0

Table 3: SIDRA Unsignalised Intersection (Allowing for Future Growth) – PM Peak Hour

Table 2 shows that following the construction of the development the intersection would initially operate at an acceptable level during critical PM peak periods.

However, **Table 3** shows with a future background traffic growth of 40%, the right turn from the site access would operate in excess of capacity (Degree of Saturation greater than 1.0). Thus the signalisation of this access is warranted.

An assessment of the likely operation of a signalised intersection at the location of the existing site access to 345 Perry Road has been undertaken using the intersection design tool SIDRA, current traffic volumes with a 40% traffic growth applied, and the likely traffic generation and distribution.

Table 4 presents a summary of the results of the SIDRA intersection analysis for the future PM peak hour for the signalised site intersection of Perry Road and the site access. This includes 40% traffic growth applied to the current Perry Road traffic volumes.

Detailed results are provided in **Appendix A**.

- The intersection analysis has assumed the following:
- Left turn slip lanes into and out of the site;
- A right turn lanes on the east leg of the intersection;
- Cycle time at 70 seconds; and
- Two-phase signal operation.

Movement	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)
Perry Road East			
Through	0.73	7	140
Right	0.10	15	4
Site Access North			
Left	0.27	10	9
Right	0.69	43	43
Perry Road West			
Left	0.04	8	1
Through	0.43	5	61

Table 4: SIDRA Signalised Intersection (Allowing for Future Growth) – PM Peak Hour

Table 4 shows that a signalised site access in the location of the existing 345 Perry Road access would operate acceptably with future traffic growth applied to Perry Road. Based on the 95th percentile back of queue for the site access, the minimum distance from the stop line of the proposed intersection to the nearest vehicle access to Lot 1 would be 43 metres.

Although the above analysis has shown that access can be provided by a signalised intersection at the location of the existing access into 345 Perry Road, Council may have a preference for providing a site access as a forth leg to a signalised Perry Road / Worsley Road intersection.

An analysis of this scenario has been undertaken using the intersection design tool SIDRA, the current traffic volumes given with a 40% traffic growth rate applied, and the likely traffic generation and distribution.

Table 5 presents a summary of the results of the SIDRA intersection analysis for the future PM peak hour for the signalised site intersection of Perry Road and Worsley Road.

Detailed results are provided in **Appendix A**.

The intersection analysis has assumed the following:

- Left turn slip lanes on each approach;
- Right turn lanes on the east and west legs of the intersection;
- Through and right lanes on the north (site access) and south;
- Cycle time at 70 seconds; and
- Three-phase signal operation (including a protected right-turn phase from Perry Road west).

Movement	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)
Worsley Road South			
Left	0.67	16	64
Through/Right	0.16	32	9
Bangholme Road East			
Left	0.09	9	4
Through	0.69	16	106
Right	0.06	20	3
Site Access North			
Left	0.12	9	3
Through/Right	0.70	37	59
Perry Road West			
Left	0.03	8	1
Through	0.21	6	24
Right	**1.03**	**68**	**106**

Table 5: SIDRA Signalised Intersection (Allowing for Future Growth) – PM Peak Hour

Table 5 shows that the proposed signalised intersection layout would not operate in the future at an acceptable level based on the degree of saturation of the right turn lane from the western leg of Perry Road. A variety of different of signal phasing arrangements were trialled, but were all found to be ineffective in addressing this issue.

The key problem was found to be the high volumes of vehicles turning right from Perry Road (west) being opposed by high volumes of through traffic from the opposing direction. Whilst this issue could be addressed, it would involve the provision of a considerably larger intersection with additional traffic lanes on the Perry Road approaches. This would have significant capital cost implications as the levels either side of Perry Road are significantly lower and substantial fill material would be required.

7.3 Proposed Intersection Treatment

Given the traffic generation and distribution and the analysis of a variety of intersection options, it is considered that the most appropriate access arrangement would be to provide a signalised T-intersection in the location of the existing access to 345 Perry Road. It would provide a location with good sightlines in either direction, suitably separated from the Worsley road intersection and potentially requiring less fill material than the originally proposed location.

It is considered that this will satisfactorily provide access to the development in the long term.

Layout details of the proposed intersection are provided in **Appendix B.**

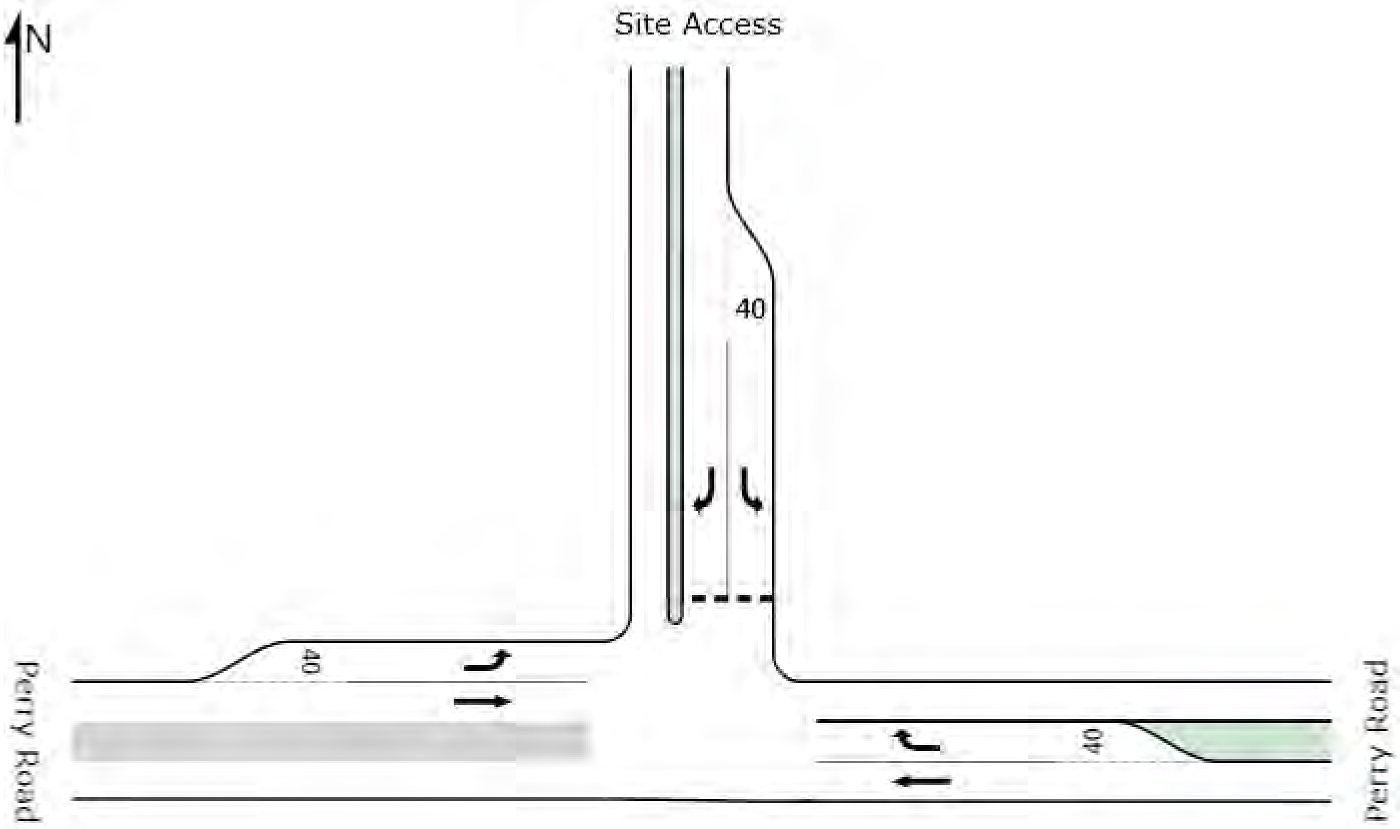
8. CONCLUSIONS

Based on the investigation carried out in relation to the proposal and outlined in this report, it is concluded that:

- Based on the anticipated warehouse net floor areas (including ancillary offices) the standard Planning Scheme parking requirement is 823 car spaces;
- Empirical data suggests a peak car parking demand of 537 car spaces will be generated, which is less that the Planning Scheme requirement, and more than currently proposed in the concept master plan (245 spaces). However, the proposed layout of the development provides significant potential to provide for additional parking in each of the lots without requiring a reduction in the associated building area;
- The layout of the internal road will allow for convenient access to all lots by large vehicle types (including B-triples). The radius of the court bowl may need to be increased from 15m to 16.5m to cater for U-turns by B-triples;
- It is anticipated that up to 349 vehicles would enter and leave the development site in the AM and PM peak hours. The majority of trips generated will be to and from the north and west via Perry Road;
- Intersection capacity analysis by SIDRA software confirms that the access to the site can be satisfactorily provided via a signalised T-intersection at the location of the existing access into 345 Perry Road;
- Intersection capacity analysis by SIDRA software confirms that incorporating a site access directly into the existing Perry Road / Worsley Road intersection (by creating a cross intersection) is not feasible; and,
- The provision of access to this development would not impact on the feasibility of providing a future connection to EastLink from Perry Road – Bangholme Road.

Appendix A

SIDRA Outputs


N
Site Access
40
40
40
Perry Road
Perry Road

LANE SUMMARY

Site: Perry-Site Access - Unsig - Dev 1645

Perry Road/Site Access
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Perry Road																
Lane 1	0	674	0	674	10.0	1831	0.368	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	36	36	10.0	1104	0.032	100	10.2	LOS B	0.1	1.1	40	Turn Bay	0.0	0.0
Approach	0	674	36	709	10.0		0.368		0.5	NA	0.1	1.1				
North: Site Access																
Lane 1	142	0	0	142	10.0	694	0.205	100	11.7	LOS B	0.8	6.0	40	Turn Bay	0.0	0.0
Lane 2	0	0	159	159	10.0	251	0.632	100	32.0	LOS D	3.0	23.2	500	–	0.0	0.0
Approach	142	0	159	301	10.0		0.632		22.4	LOS C	3.0	23.2				
West: Perry Road																
Lane 1	36	0	0	36	10.0	1733	0.021	100	8.6	LOS A	0.0	0.0	40	Turn Bay	0.0	0.0
Lane 2	0	394	0	394	10.0	1831	0.215	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	36	394	0	429	10.0		0.215		0.7	NA	0.0	0.0				
Intersection				1440	10.0		0.632		5.1	NA	3.0	23.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

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SIDRA INTERSECTION 5.1.13.2093
Project: N:\Document\Current Documents\14545 re opened\SIDRA\14595 Perry-Site Access.sip
8000033, ANDREW O'BRIEN & ASSOCS PTY LTD, FLOATING

SIDRA INTERSECTION

LANE SUMMARY

Site: Perry-Site Access - Unsig - Ult+Dev 1645

Perry Road/Site Access
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Perry Road																
Lane 1	0	943	0	943	10.0	1831	0.515	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	36	36	10.0	916	0.039	100	11.2	LOS B	0.2	1.2	40	Turn Bay	0.0	0.0
Approach	0	943	36	979	10.0		0.515		0.4	NA	0.2	1.2				
North: Site Access																
Lane 1	142	0	0	142	10.0	554	0.256	100	13.8	LOS B	1.0	7.8	40	Turn Bay	0.0	0.0
Lane 2	0	0	159	159	10.0	117	1.360	100	234.6	LOS F	18.8	142.7	500	–	0.0	0.0
Approach	142	0	159	301	10.0		1.360		130.3	LOS F	18.8	142.7				
West: Perry Road																
Lane 1	36	0	0	36	10.0	1733	0.021	100	8.6	LOS A	0.0	0.0	40	Turn Bay	0.0	0.0
Lane 2	0	552	0	552	10.0	1831	0.301	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	36	552	0	587	10.0		0.301		0.5	NA	0.0	0.0				
Intersection				1867	10.0		1.360		21.4	NA	18.8	142.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

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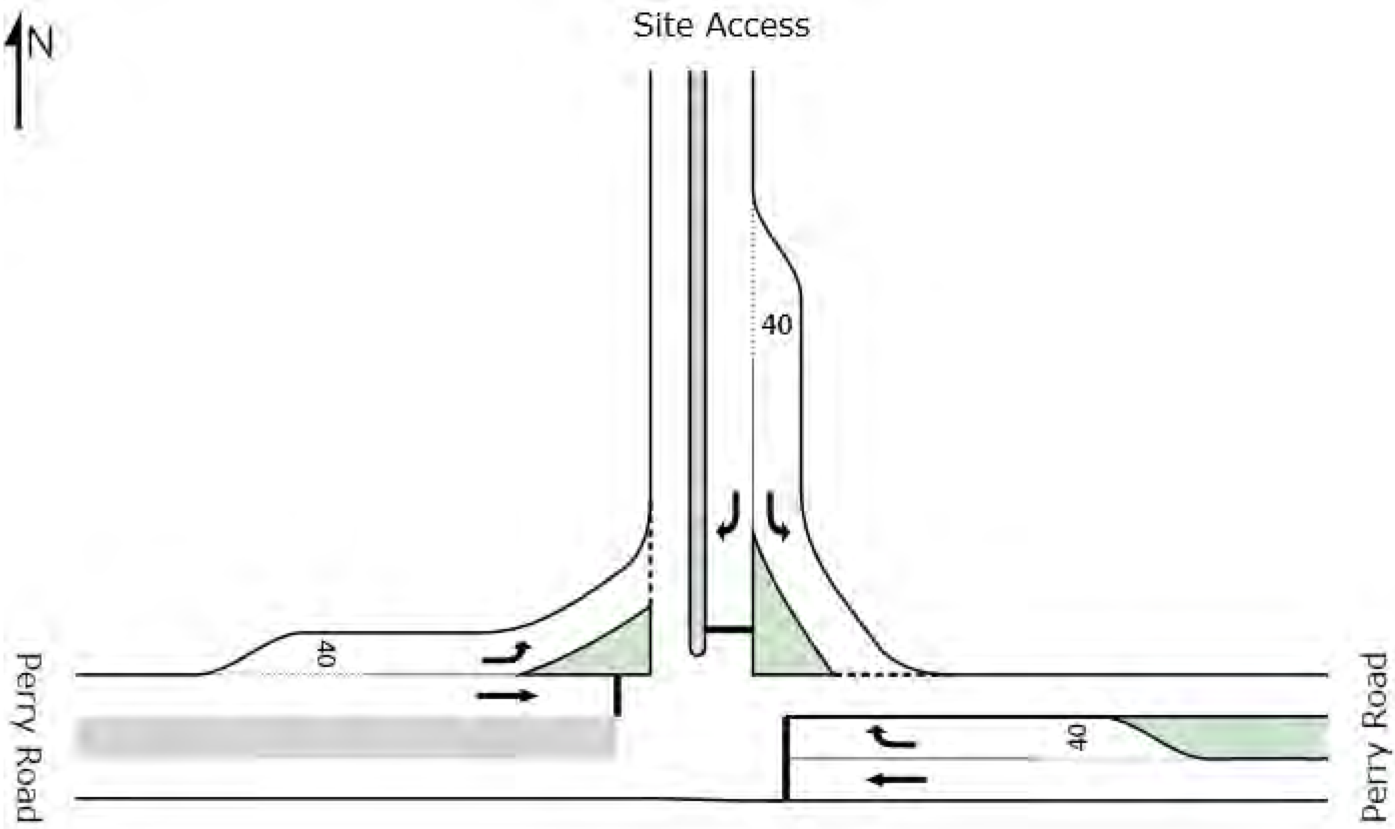
Project: N:\Document\Current Documents\14545 re opened\SIDRA\14595 Perry-Site Access.sip
8000033, ANDREW O'BRIEN & ASSOCS PTY LTD, FLOATING


N
Site Access
40
40
40
Perry Road
Perry Road

LANE SUMMARY

Site: Perry-Site Access - Sig - Ult +Dev 1645

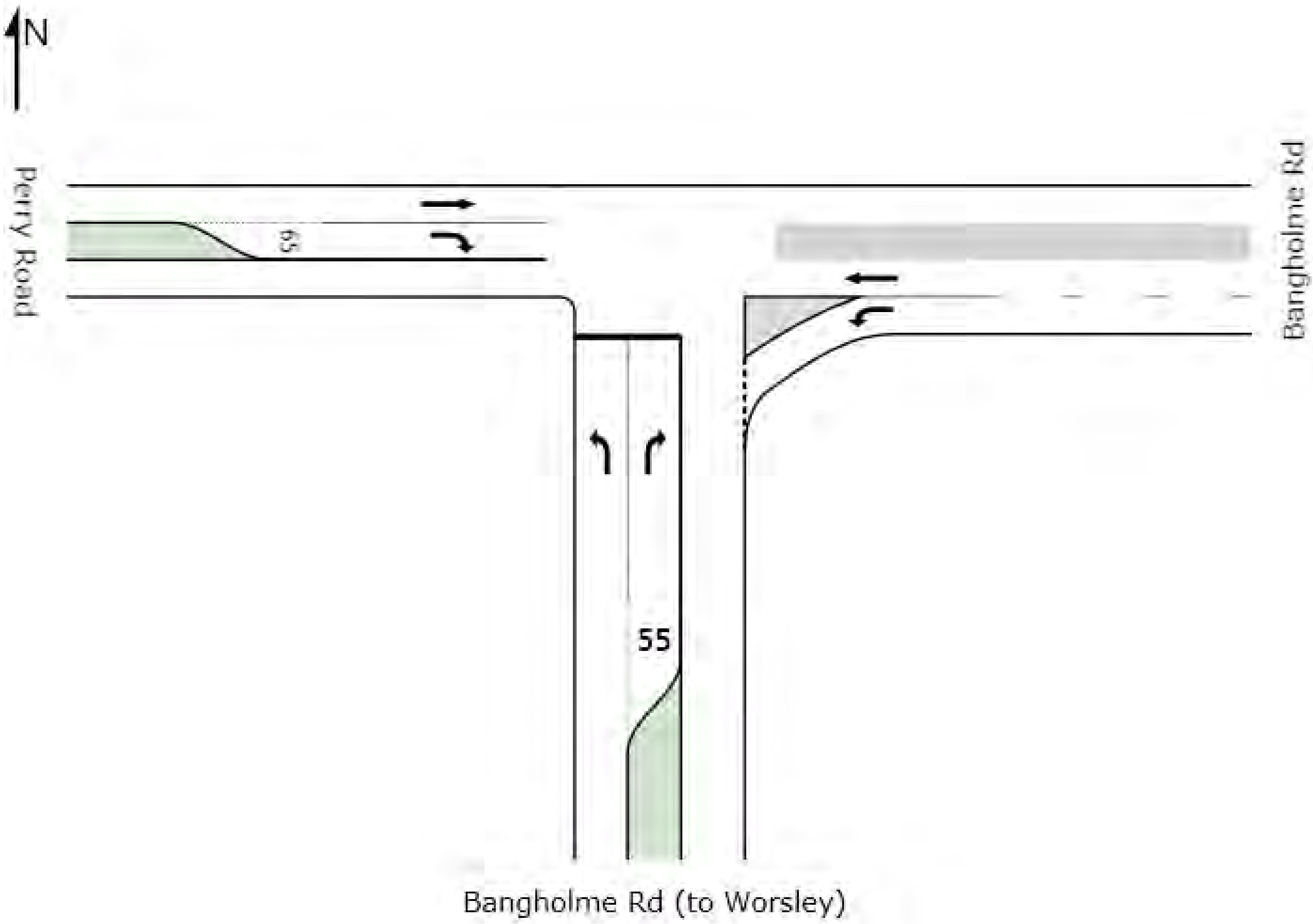
Perry Road/Site Access
Signals - Fixed Time   Cycle Time = 70 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Perry Road																
Lane 1	0	943	0	943	10.0	1295	0.728	100	6.9	LOS A	19.7	131.9	500	–	0.0	0.0
Lane 2	0	0	36	36	10.0	375[1]	0.095	100	15.3	LOS B	0.5	4.0	40	Turn Bay	0.0	0.0
Approach	0	943	36	979	10.0		0.728		7.2	LOS A	19.7	131.9				
North: Site Access																
Lane 1	142	0	0	142	10.0	522[1]	0.272	100	10.0	LOS B	1.2	9.0	40	Turn Bay	0.0	0.0
Lane 2	0	0	159	159	10.0	231	0.688	100	43.2	LOS D	5.7	43.1	500	–	0.0	0.0
Approach	142	0	159	301	10.0		0.688		27.5	LOS C	5.7	43.1				
West: Perry Road																
Lane 1	36	0	0	36	10.0	1008[1]	0.035	100	8.4	LOS A	0.1	0.9	40	Turn Bay	0.0	0.0
Lane 2	0	552	0	552	10.0	1295	0.426	100	4.8	LOS A	8.0	60.9	500	–	0.0	0.0
Approach	36	552	0	587	10.0		0.426		5.0	LOS A	8.0	60.9				
Intersection				1867	10.0		0.728		9.8	LOS A	19.7	131.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect


N
Perry Road
65
Bangholme Rd
55
Bangholme Rd (to Worsley)

LANE SUMMARY

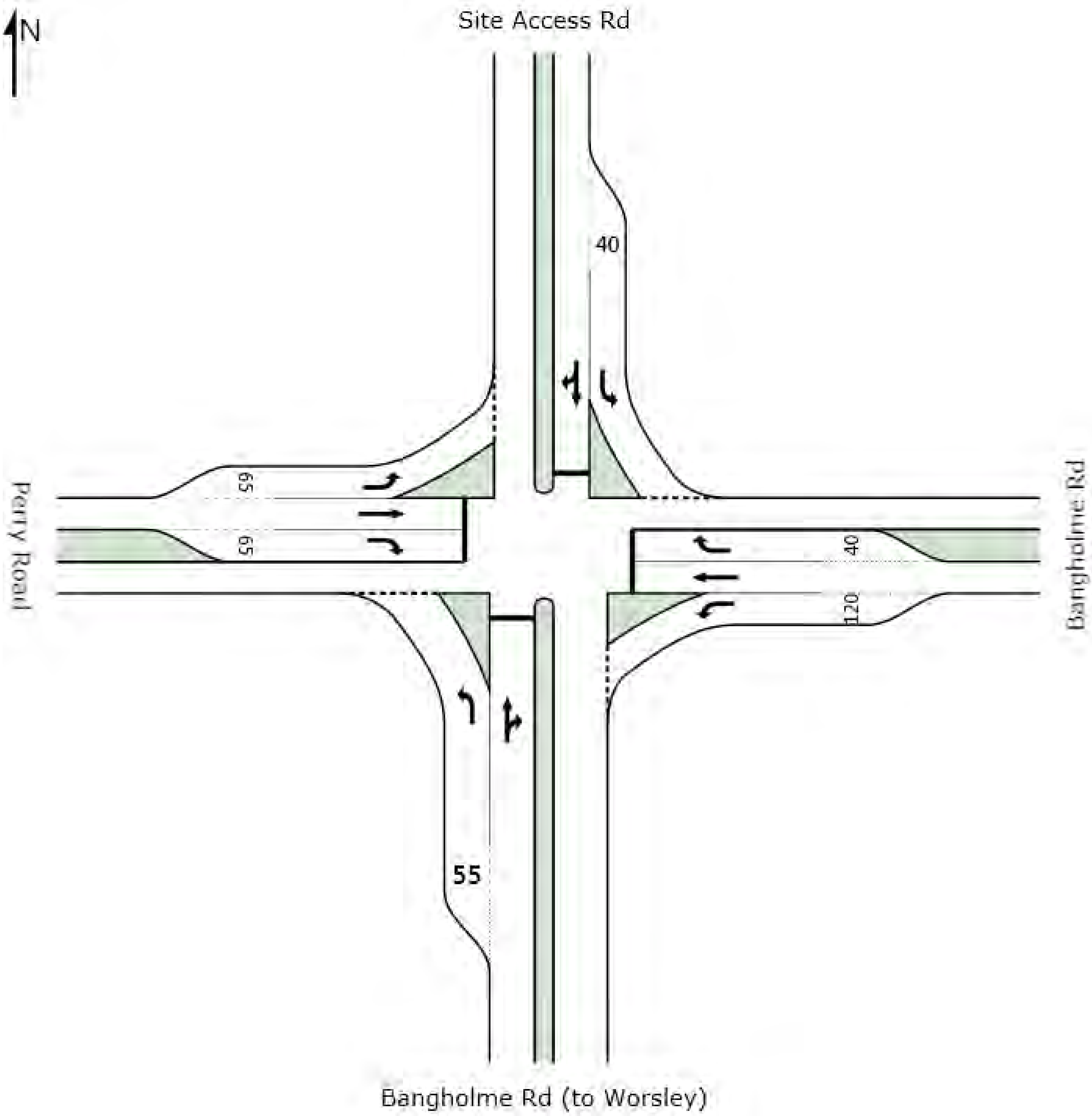
Site: Bangholme-Perry - Ex L - Ult 1630

Bangholme Road/Perry Road
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Bangholme Rd (to Worsley)																
Lane 1	424	0	0	424	10.0	555	0.764	100	24.2	LOS C	7.2	48.0	500	–	0.0	0.0
Lane 2	0	0	28	28	10.0	252	0.113	100	24.5	LOS C	0.4	2.4	55	Turn Bay	0.0	0.0
Approach	424	0	28	453	10.0		0.764		24.3	LOS C	7.2	48.0				
East: Bangholme Rd																
Lane 1	99	0	0	99	10.0	1101	0.090	100	9.7	LOS A	0.4	2.6	120	–	0.0	0.0
Lane 2	0	519	0	519	10.0	1831	0.283	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	99	519	0	618	10.0		0.283		1.5	NA	0.4	2.6				
West: Perry Road																
Lane 1	0	146	0	146	10.0	1831	0.080	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	405	405	10.0	942	0.430	100	12.6	LOS B	2.8	18.7	65	Turn Bay	0.0	0.0
Approach	0	146	405	552	10.0		0.430		9.2	NA	2.8	18.7				
Intersection				1622	10.0		0.764		10.5	NA	7.2	48.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.


N
Site Access Rd
40
65
65
Perry Road
40
120
Bangholme Rd
55
Bangholme Rd (to Worsley)

LANE SUMMARY

Site: Bangholme-Perry-Site - Sig - Ult+Dev 1630

Bangholme Road/Perry Road
Signals - Fixed Time   Cycle Time = 70 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: Worsley Rd																
Lane 1	474	0	0	474	10.0	704[1]	0.673	100	16.4	LOS B	9.5	63.9	55	Turn Bay	0.0	18.6
Lane 2	0	15	32	47	10.0	288	0.163	100	32.4	LOS C	1.4	9.4	500	–	0.0	0.0
Approach	474	15	32	521	10.0		0.673		17.8	LOS B	9.5	63.9				
East: Bangholme Rd																
Lane 1	111	0	0	111	10.0	1183	0.094	100	9.4	LOS A	0.6	4.3	120	Turn Bay	0.0	0.0
Lane 2	0	580	0	580	10.0	846	0.686	100	16.3	LOS B	15.8	106.1	500	–	0.0	0.0
Lane 3	0	0	24	24	10.0	368[1]	0.064	100	19.8	LOS B	0.4	3.0	40	Turn Bay	0.0	0.0
Approach	111	580	24	714	10.0		0.686		15.4	LOS B	15.8	106.1				
North: Site Access Rd																
Lane 1	95	0	0	95	10.0	827[1]	0.115	100	8.7	LOS A	0.4	3.1	40	Turn Bay	0.0	0.0
Lane 2	0	64	159	222	10.0	316	0.703	100	36.9	LOS D	7.7	58.6	500	–	0.0	0.0
Approach	95	64	159	318	10.0		0.703		28.5	LOS C	7.7	58.6				
West: Perry Rd																
Lane 1	40	0	0	40	10.0	1207[1]	0.033	100	8.4	LOS A	0.1	0.8	65	Turn Bay	0.0	0.0
Lane 2	0	164	81[0]	245	10.0	1142	0.214	100	6.0	LOS A	3.6	23.9	500	–	0.0	0.0
Lane 3	0	0	372	372	10.0	361	1.029	100	67.5	LOS E	15.8	106.0	65	Turn Bay	0.0	49.9
Approach	40	164	453	656	10.0		1.029		41.0	LOS D	15.8	106.0				
Intersection				2209	10.0		1.029		25.4	LOS C	15.8	106.1				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
1 Reduced capacity due to a short lane effect

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SIDRA INTERSECTION 5.1.13.2093

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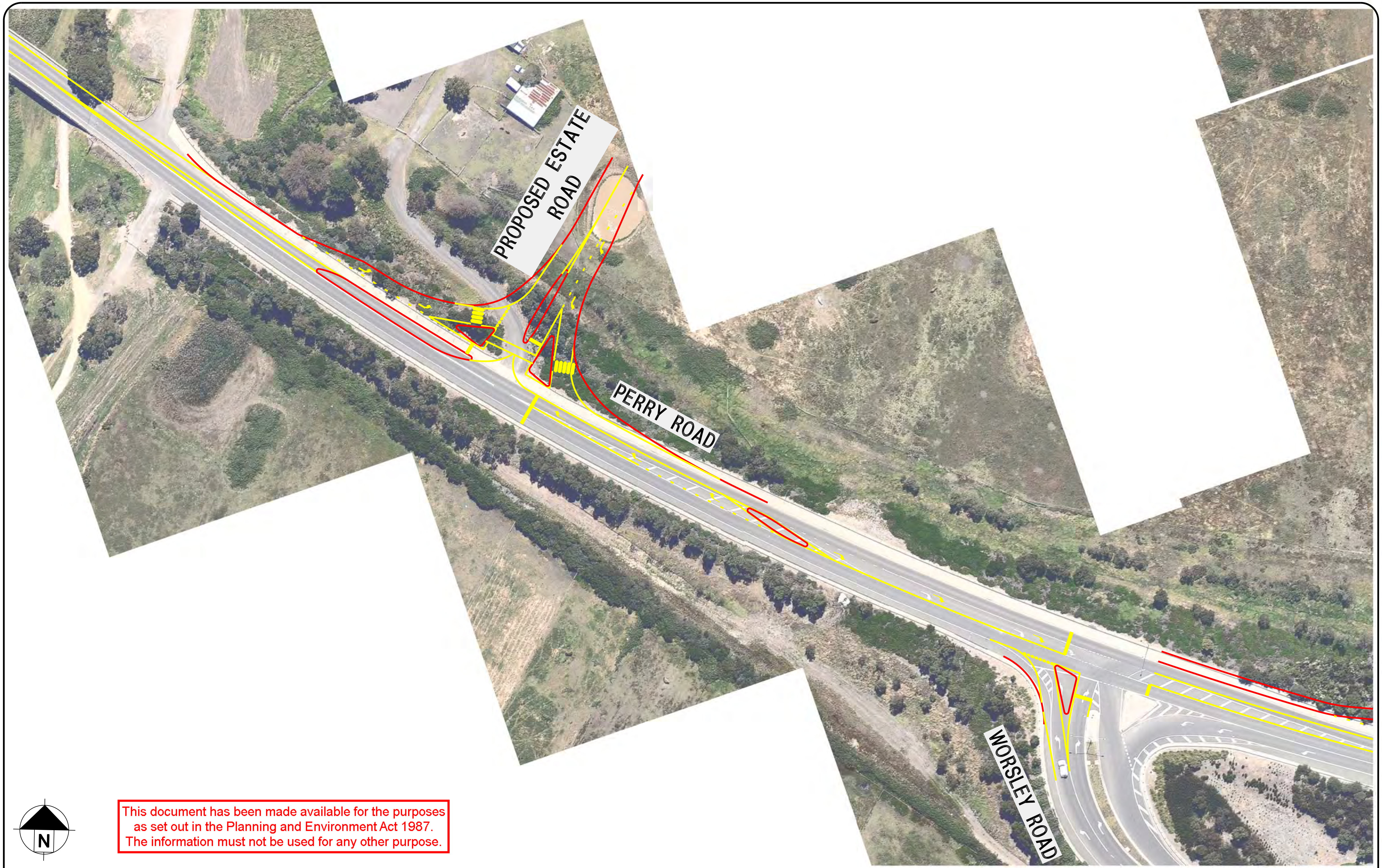
8000033, ANDREW O'BRIEN & ASSOCS PTY LTD, FLOATING

SIDRA INTERSECTION

Appendix B

Proposed Intersection



ISSUE	DATE	AMENDMENTS	BY

NOTES:
TRAFFIC SIGNALIZATION AND INTERSECTION LIGHTING NOT SHOWN.

OBT O'BRIEN TRAFFIC
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• Traffic Engineering •Road Safety
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ENGINEER: T.HARDINGHAM	CAD FILE: 14545004.DGN
DESIGNED BY: B.VANDERWERF	DRAWING NO: 14545004
SCALE: 1:1000 / ORIGINAL: A3	DATE: 05/03/14 / JOB NO: 14545
Hor. Scale Ver. 0 10 20	SHEET NO: 1 OF 3 / ISSUE:

345-385 PERRY ROAD, KEYSBOROUGH

ULTIMATE CONCEPT ACCESS LAYOUT
PERRY ROAD/ESTATE ROAD/
WORSLEY ROAD

MELWAYS REF: 94 H8

12 Attachment G- Ecological Report

ecology & heritage partners

Simon Pikkat

Assistant Development Manager

Commercial and Industrial Property Pty Ltd

23rd October 2013

Our reference: 5442

Dear Simon,

Re: Desktop ecological assessment, peer review and targeted surveys for Growling Grass Frog and Dwarf Galaxias, Lot 2, PS603443D, 345-385 Perry Road, Dandenong South

Ecology and Heritage Partners were engaged by Commercial and Industrial Property Pty Ltd (CIP) to undertake a desktop assessment, and peer review of previous ecological assessments for a property at 345-385 Perry Road, Dandenong South. Additionally, CIP requested a summary of the results of targeted surveys for the nationally significant Growling Grass Frog *Litoria raniformis* and Eastern Dwarf Galaxias *Galaxiella pusilla*, previously undertaken for the site. This report is presented below.

If you require any further information or clarification, please do not hesitate to contact me.

Yours sincerely,

Kim Downs

Kim Downs

Zoologist

Ecology and Heritage Partners Pty Ltd

ADELAIDE 8 Greenhill Road, Wayville, SA 5034 P (08) 8372 7829 | BRISBANE Level 7, 140 Ann Street, Brisbane, Qld 4000 P (07) 3221 3352 F (07) 3002 6499 | GEELONG Suite 6 / 32 Myers Street, Geelong, Vic 3220 P (03) 5221 8122 F (03) 5221 2760 | MELBOURNE 292 Mt Alexander Rd, Ascot Vale, Vic 3032 P (03) 9377 0100 F (03) 9377 0199

www.ehpartners.com.au

ABN : 65 685 233 760

1 Background

Commercial and Industrial Property Pty Ltd (CIP) engaged Ecology and Heritage Partners Pty Ltd to provide advice regarding any ecological constraints on the development of a property at Lot 2, PS603443D, 345-385 Perry Road, Dandenong South. Brief initial assessments of the property were undertaken by CPG Australia in 2011. Based on recommendations in this report, targeted surveys for Growling Grass Frog *Litoria raniformis* and Dwarf Galaxias *Galaxiella pusilla* were undertaken by Ecology and Heritage Partners between December 2011 and January 2012.

Targeted surveys aimed to quantify the current use of these waterbodies by Growling Grass Frogs and Dwarf Galaxias. Furthermore, the surveys were required to provide advice on any potential impacts associated with the development of the site, including advice on appropriate mitigation measures to ensure that these species (if present) are not adversely impacted by future development.

1.1 Objectives

The objectives of this report are:

- Undertake a brief desktop assessment to identify any ecological constraints to developing the property;
- Conduct a brief peer-review of the ecological assessment conducted at the site by CPG (2011);
- Present the results of targeted surveys for Growling Grass Frog and Dwarf Galaxias undertaken at the property; and
- Outline the implications of relevant federal, state and local legislation.

2 Desktop Assessment

2.1 Study area

The study area is located at 345-385 Perry Road, Dandenong South within the City of Greater Dandenong. The property is agricultural land of approximately 19.5 hectares and is predominately cleared pasture paddocks (CPG Australia 2011). The western boundary of the site includes a plantation of native vegetation parallel to Dandenong Creek and the Dandenong Creek Trail (CPG Australia 2011). The Eastlink Tollway and Tollway Road Reserves bound the property to the east of the site (CPG Australia 2011). The study area lies within the Yarra catchment, and within the Urban Waterways segment of the State Environment Protection Policy (SEPP) Waters of Victoria (WoV) (Schedule F7 Yarra Catchment) (EPA 2003). The property is located within the Gippsland Plain Bioregion (DEPI 2013).

According to DEPI (2013), pre-1750 vegetation would have comprised Swampy Riparian Woodland/Swamp Scrub EVC mosaic (EVC 688). Extant mapping (2005) shows some small, scattered patches of Swampy Woodland/Swamp Scrub mosaic still occurring along the Dandenong Creek.

The study area includes seven existing waterbodies including five dams/wetlands and two drainage lines that run from east to west across the centre of the property. During the survey period, one of the drainage lines was dry and thus only six waterbodies were assessed (See Figure 2 and Plates 3–8).

2.2 Previous Records

2.2.1 *Growling Grass Frog*

There are 17 previous documented records of Growling Grass Frog within 10 kilometres of the study area (AVW), most of which are from the 1970's and the 1990's (Figure 3). There is potential habitat for Growling Grass Frogs in farm dams within the study area.

2.2.2 *Dwarf Galaxias*

There are 33 previous documented records of Dwarf Galaxias within 10 kilometres of the study area (AVW 2011), most of which are recent records (2004–2008) from Eumemmering Creek in Hallam (Figure 3). The Protected Matters Search Tool (SEWPaC 2013) predicts habitat for Dwarf Galaxias as potentially occurring in the local area. There is potential habitat, albeit of low to moderate quality, for Dwarf Galaxias in farm dams within the study area.

2.3 Native Vegetation Precinct Plan

The study area is incorporated into the Dandenong South Native Vegetation Precinct Plan (NVPP) (City of Greater Dandenong 2009). No vegetation is mapped as occurring within the study area. The NVPP states that no permit is required for the removal of vegetation specified as such, or for native vegetation not identified within the NVPP. Therefore, no planning permit is required to remove vegetation within the study area.

3 Peer Review.

3.1 CPG Australia 2011. Ecological Assessment: 345 Perry Road, Dandenong South.

CPG Australia was commissioned by Ammiche Architects to undertake an ecological assessment of the site located at 345-385 Perry Road, Dandenong South. The objectives of this assessment were to:

- review existing documentation and relevant database;
- undertake onsite assessment to determine the ecological significance of the site, with particular reference to significant fauna; and,
- outline recommendations to reduce potential impacts of development, and conduct further ecological investigations (if relevant).

CPG Australia conducted appropriate desktop review of relevant databases, policies and previous ecological assessments. An onsite survey was conducted on 7 October 2011. The results of the desktop and field assessments concluded:

- The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Maters Search Tool (PMST) (SEWPaC 2013) and FIS (Viridans 2011) database search identified potential habitat for several significant flora and fauna within the vicinity of the study site;
- The site is highly modified and has been cleared of all indigenous overstorey and understorey vegetation;

- Existing vegetation within the site is dominated by exotic pasture weeds and other environmental weeds, with only scattered occurrences of indigenous species;
- No species listed under the EPBC Act or *Flora and Fauna Guarantee Act 1988* (FFG Act) were recorded during the field assessment;
- Potential habitat was identified for the EPBC Act listed fauna Growling Grass Frog, Dwarf Galaxias and Yarra Pygmy Perch;
- The Yarra Pygmy Perch is considered extinct in the Dandenong Creek catchment; and,
- Targeted surveys for the Growling Grass Frog and Dwarf Galaxias are recommended, with the necessity for an EPBC Act referral reviewed after the targeted surveys have been completed.

3.1.1 *Summary of review*

The conclusions contained within this report are based on appropriate peer review of relevant databases, previous ecological reports and onsite field assessments. The identification of potential habitat for significant species was consistent with the findings of our desktop review, and appropriate recommendations to conduct targeted surveys for the relevant species were made.

We consider the findings of this report relevant, as it is highly unlikely that the conditions onsite have significantly changed since the field investigations were undertaken.

4 Targeted Growling Grass Frog and Dwarf Galaxias Surveys

CPG Australia prepared an ecological assessment of the site in November 2011, which stated that the site may provide suitable habitat for both Growling Grass Frogs and Dwarf Galaxias (CPG Australia 2011). Targeted surveys were therefore undertaken to investigate if a population of these species were present within the study area, and to inform any future planning approvals or development.

4.1 Target Species

4.1.1 *Growling Grass Frog Litoria raniformis*

Growling Grass Frogs have several other common names, including Warty Bell Frog, Southern Bell Frog, Warty Swamp Frog and Green and Golden Frog. Growling Grass Frogs are a large green frog (females may exceed 100 millimetres) varying in colour from olive to emerald green (and sometimes dark brown) with a distinctive tympanum (ear membrane). The dorsum (back) is warty with short skin folds, with irregular bronze/ gold or brown coloured blotches (Cogger 1996) (Plate 1). The coarsely granular underside is generally off-white and the posterior of the thighs and groin are turquoise (Barker *et al.* 1995).

Growling Grass Frogs are listed as Vulnerable under the EPBC Act and Vulnerable in the National Action Plan for Australian Frogs (Tyler 1997). It is also listed as a threatened species under the FFG Act and endangered in the *Advisory List for Threatened Vertebrate Fauna in Victoria* (DSE 2009). Overall, the species is of national conservation significance and a National Recovery Plan identifying key priorities for protection and enhancement of the species has prepared (Clemann and Gillespie 2010).

Plate 1. Growling Grass Frog, *Litoria raniformis* (Source: Aaron Organ - Ecology and Heritage Partners Pty Ltd).

Although formally widely distributed across southern eastern Australia, including Tasmania (Littlejohn 1963; 1982; Hero *et al.* 1991), the species has declined markedly across much of its former range due to native vegetation clearance, agricultural intensification and grazing, and development of terrestrial and aquatic habitats (DEWHA 2009b). The resulting restriction of opportunities for dispersal, breeding and colonisation of adjacent areas of suitable habitat due to habitat loss, degradation and fragmentation has contributed to the species decline (DEWHA 2009a). This has been most evident over the past two decades and in many areas, particularly in south and central Victoria, populations have experienced apparent declines and local extinctions (Mahoney 1999).

This species is largely associated with permanent or semi-permanent still or slow flowing waterbodies (i.e. streams, lagoons, farm dams and old quarry sites) (Hero *et al.* 1991; Barker *et al.* 1995; Cogger 1996; Ashworth 1998). Frogs can also utilise temporarily inundated waterbodies for breeding purposes providing they contain water for at least three to four months over the breeding season (DEWHA 2009a).

Based on previous investigations, there is a strong correlation between the presence of the species and key habitat attributes at a given waterbodies. For example, the species is typically associated with waterbodies supporting extensive cover of emergent, submerged and floating vegetation (Robertson *et al.* 2002). Emergent vegetation provides basking sites for frogs and protection from predators, while floating vegetation provides suitable calling stages for adult males and breeding and oviposition (egg deposition) sites. Terrestrial vegetation (grasses, sedges), rocks and other ground debris around wetland perimeters also provide foraging, dispersal and over-wintering sites for frogs (Pyke 2002). Additionally, waterbodies located within 300–500 metres of each other, which support key habitat characteristics, are more likely to support a Growling Grass Frog population, compared to isolated sites lacking important habitat features (Hamer and Organ 2008).

Recent studies indicate that the spatial orientation of waterbodies across the landscape is an important habitat determinant influencing presence of the species at a given site (Robertson *et al.* 2002; Hamer and Organ 2008; Heard *et al.* 2010). Growling Grass Frogs have been observed foraging more than 100 metres from wetland habitat (Ecology and Heritage Partners Pty Ltd Unpublished Data), highlighting the need for suitable buffers around waterbodies when considering habitat conservation.

4.1.2 *Dwarf Galaxias Galaxiella pusilla*

The Dwarf Galaxias is a small freshwater fish endemic to south-eastern Australia, growing to a maximum length of about 40 millimetres for females and 34 millimetres for males (Saddlier *et al.* 2010). Dwarf Galaxias are olive–amber on the dorsal surface and sides, with a silvery-white belly, while the fins are transparent. The species is sexually dimorphic, with males smaller than females, and having three longitudinal black stripes along each side of the trunk, and a distinct orange stripe between the mid and lowest black stripe (Plate 2). The black stripes are less distinct or absent in females (Saddlier *et al.* 2010).

Dwarf Galaxias are listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as Vulnerable on the DSE Advisory List (DSE 2007) and are listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act). Overall, the species is of national conservation significance and a National Recovery Plan identifying key priorities for protection and enhancement of the species has prepared (Saddlier *et al.* 2010).

Plate 2 Dwarf Galaxias *Galaxiella pusilla* (Source: Ecology and Heritage Partners Pty Ltd).

In Victoria, the distribution of Dwarf Galaxias is patchy. The majority of populations occur within the Glenelg and Hopkins River Basins, with populations scattered through waterways of the Gippsland region. Dwarf Galaxias are typically sedentary species living their complete life cycle within the same water body. They occur in slow flowing and still water areas such as swamps, billabongs, drains, and backwaters of creeks and usually in shallow water with abundant aquatic vegetation (McDowall 1996). This species is the only Galaxias species known to exhibit sexual dimorphism (variation between the sexes males are smaller and more brightly coloured than females). This species may also aestivate (i.e. become dormant) when pools dry up (Beck 1985; Saddlier *et al.* 2010) potentially using burrowing crayfish burrows as shelter (Beck 1985; Saddlier *et al* 2010).

Although there is no evidence of a reduction in the range of the Dwarf Galaxias, the species was almost certainly once more widespread and abundant throughout lowland river systems in Victoria (Saddlier *et al.* 2010). However, the range of Dwarf Galaxias has since declined to occur only in small fragmented populations. The major causes of this decline are wetland drainage and alteration, reduced inundation frequency, unlimited stock access, riparian vegetation removal and predation by other exotic species (particularly Plague Minnow) (Saddlier *et al.* 2010).

4.2 Methods

Nocturnal surveys for Growling Grass Frogs were undertaken on 29 December 2011 and 8 January 2012 in accordance with the *Biodiversity Precinct Structure Planning Kit* guidelines (DSE 2010). Targeted surveys focused on six waterbodies within the study area and included call identification and active searching for metamorphs (Figure 2).

Weather conditions were appropriate, with day air temperatures exceeding 15°C, and night temperatures greater than 12°C. A known reference site, located on a property in Clyde (Melways: Map 135 F10), was visited to indicate if Growling Grass Frogs were active during nocturnal surveys.

4.2.1 *Nocturnal Surveys*

Nocturnal surveys involved quiet listening at each waterbody for approximately five minutes. Recordings of the advertisement call of a male Growling Grass Frog were played back several times to elicit a response from any adult males present. Surveyors listened for any response from calling male Growling Grass Frog. On completion of call play-back, surveyors used 30 Watt, 12 volt hand-held spotlights to search for any frogs on the margins or surface of the water bodies and in areas of emergent or floating vegetation. The accessible terrestrial habitat surrounding each waterbody was searched using spotlights and observers overturned any suitable ground debris to look for frogs. All frog species observed or heard calling were recorded, to inform the suitability of the study area for breeding frogs.

4.2.2 *Diurnal surveys and habitat assessment*

A diurnal targeted Growling Grass Frog survey and habitat assessment was conducted in accordance with the Biodiversity Precinct Structure Planning Kit (DSE 2010) across the study area on 30 December 2011. An Aquatic Ecologist and Zoologist walked throughout areas of potentially habitat within the study area, searching for frogs basking or resting on vegetation in or beside the water, and listening for any frogs entering the water when disturbed. Active searching of vegetation and moveable debris was undertaken, looking for any frogs within, or beneath structures.

In situ water quality, the presence of fish and levels of aquatic and semi-aquatic vegetation, were recorded in accordance with DSE (2010) guidelines. All in situ water quality data was collected using a calibrated Horiba™ multi-probe and meter for the following parameters: dissolved oxygen, pH, electrical conductivity and temperature. Turbidity was recorded using an 'A Hach - Portable Turbidimeter (Model 2100P)'.

4.2.3 *Aquatic surveys*

Overnight trapping for Dwarf Galaxias was undertaken on 29 December 2011 across the six waterbodies within the study area (Figure 2). At each of the waterbodies, one fyke net and eight collapsible bait traps (with glow sticks) were set over night and retrieved the following morning. Dip netting, for approximately 10 minutes, was also conducted at each waterbody, focussing on areas within the waterbody that supported vegetation and other microhabitat such as snags and undercut banks.

4.3 Assessment Limitations

During the Growling Grass Frog surveys, waterbodies were visited on two occasions during optimal climatic conditions (i.e. calm, mild, over 15ºC), during the known active season for the species. Targeted surveys for Growling Grass Frog were undertaken by experienced personnel during the active period (October to February), in accordance with methods recommended by DSE and SEWPaC (Heard *et al.* 2006; DEWHA 2009a, 2009b; DSE 2010), and was therefore considered appropriate to meet the objectives of this assessment. Overall, the results from targeted surveys, and the authors' understanding of the current distribution of Growling Grass Frog and Dwarf Galaxias in the surrounding area, is considered sufficient in demonstrating that the study area does not currently support a permanent, or existing population of the species.

5 Results

5.1 Targeted Surveys

3.2.1 Water Quality Assessment

The Growling Grass Frog and Dwarf Galaxias are tolerant to harsh physico-chemical conditions. Water quality parameters recorded across the study area were well within the physiological range for these species, despite the variability across the six waterbodies (Table 1). Temperatures ranged from 18.96–31.36 °C, with higher temperatures recorded within the wetland and dams and much lower temperatures recorded within the deeper drainage line (Waterbody 5; plate 7). pH levels were variable between waterbodies ranging from 6.43–8.37 (Table 3). These levels are within the SEPP (WoV) objectives (EPA 2003). Dissolved oxygen concentrations were extremely variable between waterbodies ranging from 1.35–23.50 mg/L (Table 1). This is likely to be due to the size and depth of the individual waterbodies, as well as the level of vegetation. Waterbody 5 and 6 exceeded the SEPP (WoV) objectives (>6.0mg/L). Conductivity was relatively low and consistent across each of the waterbodies (Table 1). Turbidity was variable, with very high turbidity levels observed within Waterbody 2 (211 NTU) and Waterbody 5 (121 NTU).

Table 1. Water quality within the study area.

Site	Temperature (°C)	pH	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	Turbidity (NTU)
Waterbody 1 Small Dam	25.37	7.68	11.83	0.259	31.7
Waterbody 2 Wetland	31.36	8.37	23.50	0.463	211
Waterbody 3 Small Dam	27.71	8.05	10.68	0.408	39.3
Waterbody 4 Large Dam	23.30	7.25	8.77	0.176	26.9
Waterbody 5 Drainage line	18.69	6.89	1.35	0.257	101
Waterbody 6 Small Dam	21.44	6.43	2.65	0.313	7.22

3.2.2 Growling Grass Frog

No Growling Grass Frogs were recorded during diurnal searches or nocturnal surveys within the study area. Two locally common frog species (Spotted Marsh Frog *Limnodynastes tasmaniensis* and Striped Marsh Frog

Limnodynastes peronii) were heard calling during both the diurnal and nocturnal surveys (Table 3). Tadpoles and metamorphs of the Spotted Marsh Frog were observed in waterbodies 2 (Wetland) and 3 (Small Dam), indicating that habitat conditions are suitable for breeding to occur at these locations (see Table 5). Weather conditions during the surveys were suitable for Growling Grass Frogs to be active and calling during both the diurnal and nocturnal surveys (Heard et al. 2006; DEWHA 2009a; 2009b; DSE 2010) (Table 2).

Table 2 Summary table of weather conditions during Growling Grass Frog surveys

Date	Starting Time (24hr)	Air Temperature (°C)	Relative Humidity (%)	Cloud Cover (Octas)	Wind (0-4)	Moon (stages)	General Conditions
29/12/11	21:30	16.6	73	5/8	1	New moon	Mild, light breeze, overcast
30/12/11	10:30	17.1	60	3/8	1	N/A	Warm, slightly overcast and calm
8/1/12	21:30	18.5	70	4/8	1	New moon	Warm, slightly overcast and calm

3.2.3 Growling Grass Frog Habitat Assessment

The habitat quality of waterbodies 1, 2, 3 and 5 was low for Growling Grass Frogs (Table 3). These sites were grazed to the banks and had very little emergent, floating or submerged vegetation. Habitat quality within waterbodies 4 and 6 was high, with a higher cover of submerged and floating vegetation that may provide good refuges from predators for Growling Grass Frogs (Table 3). The presence of emergent (*Eleocharis* sp.) and floating vegetation (i.e. Pondweed *Potamogeton* sp.) is also likely to provide suitable basking habitat for breeding or foraging purposes (Plates 6 & 8).

While no Growling Grass Frogs were detected during targeted surveys, there was evidence of other frog species breeding within waterbodies during the surveys. Tadpoles of the Spotted Marsh Frog were recorded from waterbodies 2 and 3 (Table 5). This indicates that these waterbodies provide breeding habitat for locally common frog species. While Patterson River to the south, lower Dandenong Creek to the west and lower Eumemmering Creek to the east, may provide permanent habitat for the Growling Grass Frog, there is only a low-moderate likelihood that they will disperse / use suitable habitat within the study area during favourable environmental conditions (i.e. extended rainfall). Waterbodies 4 and 6 provide the highest quality aquatic habitat within the study area. As Waterbody 6 falls within the development area, efforts should be made to retain Waterbody 4 and enhance habitat values for Growling Grass Frogs during any proposed future development if possible.

Table 3 Summary results of the Growling Grass Frog habitat assessment within the study area

Habitat Assessment Location	Waterbody 1 Small Dam	Waterbody 2 Wetland	Waterbody 3 Small Dam
Approx. size of survey area (metres)	15 x 15	60 x 30	8 x 12
Emergent vegetation (%)	<1	1	3
Submerged vegetation (%)	0	0	0
Open water (%)	99	99	97
Floating vegetation (%)	<1	<1	0
Fringing Vegetation (%)	80	20	90
Surrounding habitat (within 30 metres)	Paddock with pasture grasses used for horse grazing	Paddock with pasture grasses used for horse grazing	Paddock with pasture grasses used for horse grazing
Water quality and depth	Moderate-Good (0.2 – 1.6 metres)	Poor (0.1 – 0.4 metres)	Moderate (0.2 – 0.8 metres)
Fish present	Yes (refer to Table 5)	Yes (refer to Table 5)	Yes (refer to Table 5)
Frog eggs present	Not visible	Not visible	Not visible
Frogs seen/heard	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x8)	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x40) Striped Marsh Frog *Limnodynastes peronii* (x4)	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x2) Striped Marsh Frog *Limnodynastes peronii* (x1)
Macrophytes present	Spikerush *Eleocharis acuta*, Umbrella sedge *Cyperus* sp., Duckweed *Lemna* sp., Watercouch *Paspalum distichum*	Spikerush *Eleocharis acuta*, Umbrella sedge *Cyperus* sp., Duckweed *Lemna* sp., Watercouch *Paspalum distichum,* Water fern *Azolla* sp.	Spikerush *Eleocharis acuta*
Overall Habitat Quality	Low Grazed up to bank, minimal floating and submerged vegetation. Reasonable amount of fringing vegetation.	Low Grazed up to bank, minimal floating, submerged and fringing vegetation. Poor water quality.	Low Grazed up to bank, minimal floating and submerged vegetation. Reasonable amount of fringing vegetation.

Table 3 cont Summary results of the Growling Grass Frog habitat assessment within the study area

Habitat Assessment Location	Waterbody 4 Large Dam	Waterbody 5 Drainage Line	Waterbody 6 Small Dam
Approx. size of survey area (metres)	30 x 10	4 x 200	10 x 10
Emergent vegetation (%)	5	100	40
Submerged vegetation (%)	40	0	40
Open water (%)	45	0	0
Floating vegetation (%)	10	0	20
Fringing Vegetation (%)	100	100	100
Surrounding habitat (within 30 metres)	Paddock with pasture grasses used for horse grazing	Paddock with pasture grasses used for horse grazing	Paddock with pasture grasses used for horse grazing
Water quality and depth	Good (0.2 – 1.7 metres)	Poor (0.6 – 1.2 metres)	Poor (0.2 – 0.8 metres)
Fish present	Yes (refer to Table 5)	Yes (refer to Table 5)	Yes (refer to Table 5)
Frog eggs present	Not visible	Not visible	Not visible
Frogs seen/heard	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x2) Striped Marsh Frog *Limnodynastes peronii* (x1)	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x13)	Spotted Marsh Frog *Limnodynastes tasmaniensis* (x17) Striped Marsh Frog *Limnodynastes peronii* (x5)
Macrophytes present	Common Reed *Phragmites australis*, Pondweed *Potamogeton* sp., Spikerush *Eleocharis acuta and Eleocharis sphacelata*, Umbrella sedge *Cyperus* sp., Rush *Juncus* sp., Duckweed *Lemna* sp., Watercouch *Paspalum distichum*, Water fern *Azolla* sp.	Common Reed Phragmites australis	Common Reed *Phragmites australis*, Pondweed *Potamogeton* sp., Spikerush *Eleocharis acuta*, Watercouch *Paspalum distichum*, Water fern *Azolla* sp.
Overall Habitat Quality	**High** Good cover of floating, submerged and fringing vegetation. Many macrophyte species present.	**Low** No floating or submerged vegetation. Drainage line choked with the Common Reed.	**High** High cover of floating and emergent vegetation. Many macrophyte species present.

3.2.4 Dwarf Galaxias

No Dwarf Galaxias were recorded within the study area during the targeted survey. Seven fish species, including three native (Carp Gudgeon *Hypseleotris* sp., Common Jollytail *Galaxias maculates*, Short-finned Eel *Anguilla australis*) and four introduced species (Common Carp *Cyprinus carpio*, Goldfish *Carassius auratus*, Eastern Gambusia *Gambusia holbrooki*, Oriental Weatherloach *Misgurnus anguillicaudatus*) as well as one vertebrate (Eastern Long-necked Turtle *Chelodina longicollis*), and one freshwater shrimp *(Paratya australiensis*) were recorded throughout the study area (Table 5).

The introduced Eastern Gambusia are a significant threat to Dwarf Galaxias, via competitive and predation pressures (nipping the fins of native galaxias species). The high abundance of Eastern Gambusia within the study area is likely to exclude Dwarf Galaxias from the area. The presence of Short-finned Eel within the study area may also limit Dwarf Galaxias via predation pressures.

3.2.5 Dwarf Galaxias Habitat Assessment

Overall, the habitat quality of waterbodies 1, 2, 3 was low for Dwarf Galaxias (Tables 3 and 4). All riparian vegetation had been cleared, there was no large woody debris (LWD) and low levels of coarse particulate organic matter (CPOM) and macrophyte cover. Waterbodies 4, 5 and 6 provided moderate habitat quality for Dwarf Galaxias with a high amount of CPOM and very high macrophyte cover (Tables 3 and 4). The submerged (i.e. Pondweed) and floating (i.e. Duckweed, Watercouch and Water fern) vegetation within waterbodies 4 and 6 provided good habitat for Dwarf Galaxias. Although waterbody 5 had no floating or submerged vegetation, the drainage line was thick with the Common Reed *Phragmites australis* that would provide cover and habitat.

Table 4 Summary results of the Dwarf Galaxias habitat assessments within the study area

Waterbody	Bank Erosion (%)	Riparian Vegetation Cleared (%)	Overhanging Vegetation (%)	Large Woody Debris (%)	Coarse Particulate Organic Matter (%)	Macrophyte cover (%)	Substrate
Waterbody 1 (Small Dam)	0	100	0	0	5	1	Clay/silt
Waterbody 2 (Wetland)	0	100	0	0	10	3	Clay/silt
Waterbody 3 (Small Dam)	0	100	0	0	5	2	Clay/silt
Waterbody 4 (Large Dam)	0	90	1	0	20	50	Clay/silt
Waterbody 5 (Drainage Line)	0	90	90	0	>60	90	Clay/silt
Waterbody 6 (Small Dam)	0	100	0	0	>60	100	Clay/Silt

Table 5: Summary results of targeted Dwarf Galaxias survey within the study area

Waterbody	Trap Type (# of traps)	Carp Gudgeon *Hypseleotris spp.*	Common Carp* *Cyprinus carpio*	Common Jollytail *Galaxias maculatus*	Eastern Gambusia* *Gambusia holbrooki*	Eastern Long-necked Turtle *Chelodina longicollis*	Freshwater Shrimp *Paratya australiensis*	Goldfish* *Carassius auratus*	Oriental Weatherloach* *Misgurnus anguillicaudatus*	Short-finned Eel *Anguilla australis*	Spotted Marsh Frog (Tadpole) *Limnodynastes tasmaniensis*
Waterbody 1	Bait trap (8)	1			283			2			
Small Dam	Dip Netting				15						
	Fyke Net (1)							32		5	
Waterbody 2	Bait trap (8)				16						3
Wetland	Dip Netting				17						
	Fyke Net (1)				73	2			15		6
Waterbody 3	Bait trap (8)			1	180				1		
Small Dam	Dip Netting				38						1
	Fyke Net (1)			1	1004	1			107		2
Waterbody 4	Bait trap (8)				67			2		1	
Large Dam	Dip Netting				20			2			
	Fyke Net (1)				5	1		1		4	
Waterbody 5	Bait trap (8)			1	14			1	4		
Drainage Line	Dip Netting				7						
	Fyke Net (1)		3	6	40		20	1		5	
Waterbody 6	Bait trap (8)				95						
Small Dam	Dip Netting				44						
	Fyke Net (1)			4	57	2		53	2		
All Sites	All trap types	1	3	13	1975	6	20	94	129	15	12

3.2.6 Other significant fauna

Two individual Latham's Snipe *Gallinago hardwickii* were observed foraging in submerged vegetation around the margins of Waterbody 2. This species listed as a Marine species and a Migratory species under the EPBC Act and listed as Near Threatened under the Advisory List of Threatened Vertebrate Fauna in Victoria 2013 (DSE 2013). The species is also listed on the following international migratory bird treaties to which Australia is a signatory: Japan-Australia Migratory Bird Agreement (JAMBA); China-Australia Migratory Bird Agreement (CAMBA); Republic of Korea - Australia Migratory Bird Agreement (ROKAMBA); and, Convention on the Conservation of Migratory Species of Wild Animals - (Bonn Convention).

Important sites for Latham's Snipe are those that support at least 18 individuals and "is naturally occurring open, freshwater wetland (sic) with vegetation cover nearby" (DEWHA 2009c, p.11). The future development of this site is unlikely to trigger any conservation implications for this species based on several reasons; i) the poor habitat quality of Waterbody 2, ii) the low number of individuals recorded within the study area, and; iii) the ability of this species to disperse to other habitats within the local area.

6 Legislative implications

6.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of National Environmental Significance (NES), or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are considered likely to have an impact on any matters of NES. A referral under the EPBC Act is required if a proposed action is likely to have a 'significant impact' on any of the following matters of NES:

- World Heritage properties
- National heritage places
- Ramsar wetlands of international significance
- Threatened species and ecological communities
- Migratory and marine species
- Commonwealth marine area
- Nuclear actions (including uranium mining)
- Great Barrier Reef Marine Park

An action requires approval from the Commonwealth Environment Minister if it will, or if it is likely to, have a significant impact on an endangered or critically endangered species, or on an 'important population' or critical habitat of a listed vulnerable species.

Despite targeted surveys being undertaken during an appropriate time of year and under conditions suitable for the detection of Growling Grass Frogs and Dwarf Galaxias, none were recorded within the study area during targeted surveys. Based on the results of the targeted surveys and habitat conditions in the study area there is a low likelihood that the study area currently supports Growling Grass Frogs or Dwarf Galaxias on a permanent basis.

Implications for the proposed development

Based on the results of our desktop analysis, targeted surveys, and our understanding of what is considered to be a significant action, as defined by the Commonwealth (DEWHA 2009d) we do not consider an EPBC Act referral to the Commonwealth Environment Minister for Growling Grass Frog and Dwarf Galaxias is required.

6.2 *Flora and Fauna Guarantee Act* 1988

The primary legislation for the protection of flora and fauna in Victoria is the FFG Act. The Act builds on broader national and international policy in the conservation of biodiversity. The Act contains protection procedures such as the listing of threatened species and/or communities of flora and fauna, and the preparation of action statements to protect the long-term viability of these values.

Implications

Despite Growling Grass Frogs and Dwarf Galaxias being listed under the FFG Act, there are no implications relating to the development of the site. There are no requirements for the proponent of the development to apply for a permit under the FFG Act, as the proposed works are unlikely to require the handling of a FFG Act-listed fauna species since none were recorded during the current surveys.

Based upon the results of targeted surveys, it is unlikely that Growling Grass Frog and Dwarf Galaxias reside within the study area on a permanent basis. However, it may be prudent to notify the Department of Environment and Primary Industries (DEPI) of the proposed works, in the event that any Growling Grass Frog or Dwarf Galaxias are unearthed or discovered during the construction process.

6.3 Water Act 1989

The purposes of the Water Act 1989 are manifold but (in part) relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing environmental qualities of waterways and their instream uses as well as catchment conditions that may affect water quality.

Any type of works or activities that impact the condition of the waterway (including the beds, banks, quality or quantity of water) or associated riparian vegetation, requires a licence in accordance with Section 67 (and related sections) of the Act, or a permit or approval from the relevant authority under By Laws established in accordance with Sections 160 and 219 of the Act.

Implications

If future development is going to impact on any of the waterbodies within the study area, particularly the two drainage lines, further consultation with Melbourne Water will be required to determine whether a permit is likely to be required for any works within these waterways.

If structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these works should be referred to the DSE, Melbourne Water and the PPWCMA for comment.

6.4 *State Environment Protection Policy (SEPP) (Waters of Victoria)*

The SEPP sets a statutory framework for the protection of the uses and values of Victoria's fresh and marine water environments (EPA 2003).

Implications

Future development of the study area should consider the implications and potential impacts of works on each of the waterbodies and administer appropriate measures with an aim to protect and rehabilitate the aquatic environment to a level where environmental objectives are met and beneficial uses (including aquatic ecosystem) are protected.

Guidance should be sought from Melbourne Water and EPA Victoria with regard to establishing appropriate water quality objectives and monitoring requirements should any major construction work occur within and surrounding the two drainage lines. Construction managers may need to monitor affected surface waters before and during construction to ensure that water quality objectives are being met.

6.5 *Wildlife Act* 1975 and *Wildlife Regulations* 2002

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife.

The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and,
- To prohibit and regulate the conduct of those involved in wildlife related activities.

Wildlife Regulations 2002

The objectives of the Wildlife Regulations are:

- To make further provision in relation to the licensing system established by section 22 of the *Wildlife Act* 1975;
- To prescribe fees, offences, royalties and various other matters for the purposes of the *Wildlife Act* 1975; and,
- To provide for exemptions from certain provisions of the *Wildlife Act* 1975.

Implications

While a permit will be required for removal of fauna habitat within the study area, this could be in the form of a permit to remove native vegetation under the *Planning and Environment Act 1987*. Consequently, a permit to remove fauna habitat as part of this project under either the *Wildlife Act 1975* is unlikely to be required if permission under the *Planning and Environment Act 1987* is obtained.

If the future development requires the direct removal, salvage, temporary holding or translocation of any terrestrial fauna species (including birds, mammals, frogs and reptiles), then an additional 'Management Authorisation' permit may be required under the *Wildlife Act 1975*. This applies to all native species, not just those listed under Federal or State legislation.

7 Mitigation measures

The implementation of suitable mitigation measures will play a critical role in the future protection of suitable fauna habitat within the study area. A site Construction Environmental Management Plan (CEMP) should be developed and include measures to ensure that noxious weed control and drainage controls are implemented prior to the commencement of any major construction activities.

Where possible, measures that should be undertaken to minimise the impact on terrestrial and aquatic values present within the study area associated with the development of the site, include:

- Adopt best practice sediment control measures to protect in-stream habitat. Management practices and construction techniques should be consistent with *Construction Techniques for Sediment Pollution Control* (EPA 1991) and *Environmental Guidelines for Major Construction Sites* (EPA 1996);
- All hazardous materials should be stored off-site and be prevented from entering or being stored near water sources;
- Avoid disturbance or removal of waterbodies and associated aquatic vegetation (where possible);
- Avoid undertaking construction activity in late winter and spring to avoid potential high rainfall events and sediment laden stormwater runoff;
- Any construction stockpiles should be placed away from all waterbodies;
- Keep soil disturbance to a minimum to reduce the potential for sedimentation input into dams/wetlands and the drainage lines;
- Any soil removed should be bunded or removed to a skip;
- Where stormwater runoff has the potential to occur, no soil disturbance should be undertaken, and potential pollutants should be stored elsewhere;
- All vehicles to be refuelled away from the waterbodies;
- Vehicles should be inspected routinely for leaks and repaired if they occur;
- Employ sediment and pollution retention precautions at all times;
- Avoid having heavy vehicles/plant equipment set close to banks to prevent bank slough; and,

- Undertake appropriate post construction clean-up of the site in accordance with environmental best practices, including the stabilisation of exposed soils with local native vegetation from the appropriate Ecological Vegetation Classes (EVC) and rehabilitation/reintroduction of in-stream habitat features where required (e.g. reintroduction of large woody debris, bed or bank stabilisation).

8 Summary

No Growling Grass Frog or Dwarf Galaxias were recorded during the targeted surveys, with a low likelihood that these species reside within the study area on a permanent basis.

There is only a low-moderate likelihood that Growling Grass Frogs or Dwarf Galaxias may disperse or use suitable habitat within the study area in the future, during favourable environmental conditions (i.e. extended rainfall and flooding).

Based on our assessment, and understanding of what is considered to be a significant action as defined by the Commonwealth (SEWPaC 2009) we do not consider an EPBC Act referral to the Commonwealth Environment Minister for Growling Grass Frog and Dwarf Galaxias is required.

If the future development requires the direct removal, salvage, temporary holding or translocation of any terrestrial fauna species (including birds, mammals, frogs and reptiles), then an additional 'Management Authorisation' permit may be required under the Wildlife Act 1975 by the proponent.

Appropriate mitigation measures should be implemented, prior to the commencement of any major construction activities, to minimise any potential impacts to terrestrial and aquatic values present within the study area. Efforts should be made to retain Waterbody 4 and enhance habitat values for Growling Grass Frogs during any proposed future developments. In addition, the construction of the proposed Melbourne Water retarding basin should include enhanced Growling Grass Frog habitat to mitigate any potential impact to species habitat elsewhere are part of the development.

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10 Plates

Plate 3. Waterbody 1 (Small dam) – (Source: Ecology and Heritage Partners Pty Ltd).

Plate 4 Waterbody 2 (Wetland) – (Source: Ecology and Heritage Partners Pty Ltd).

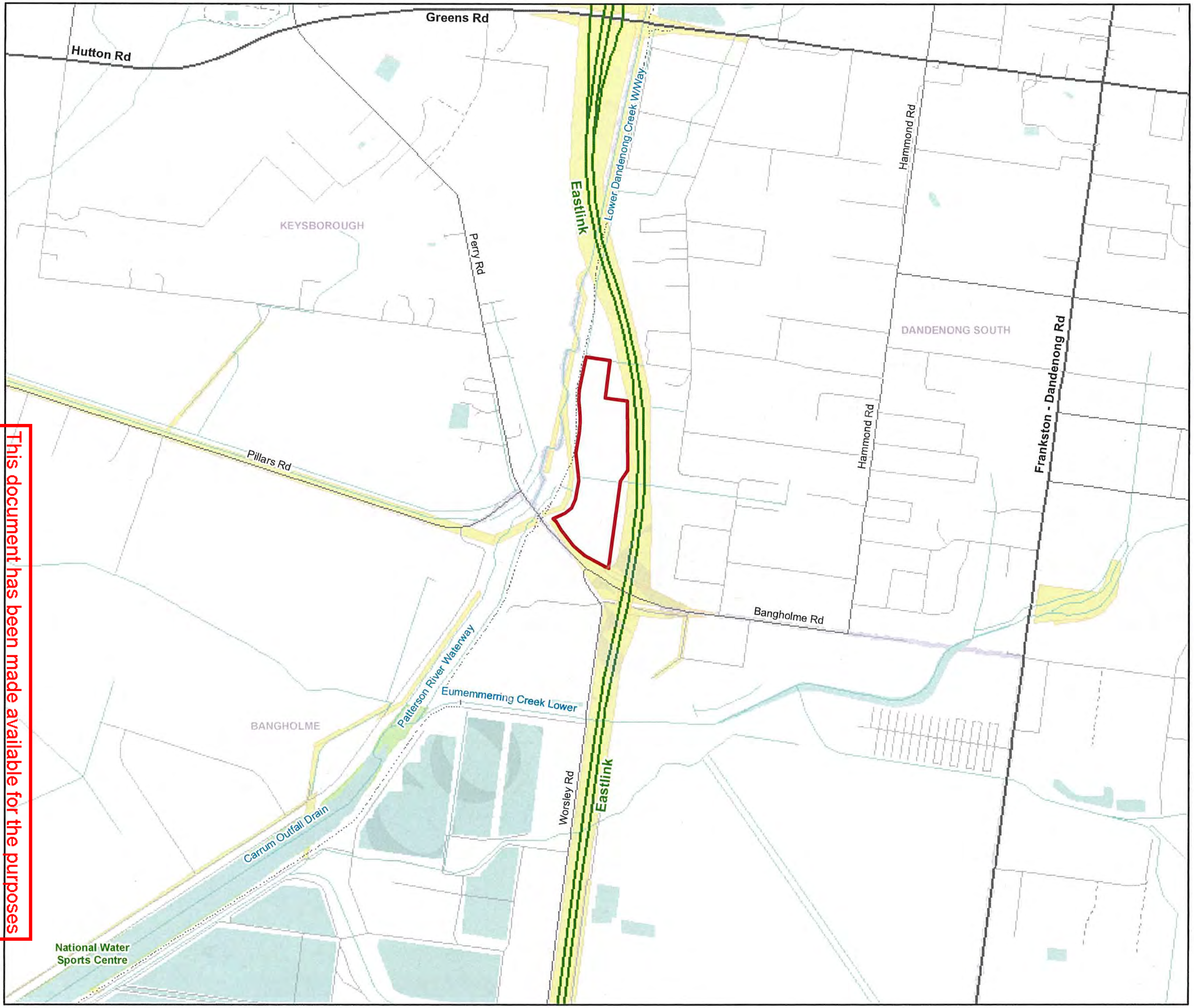
Plate 5 Waterbody 3 (Small dam) – (Source: Ecology and Heritage Partners Pty Ltd).

Plate 6 Waterbody 4 (Large dam) – (Source: Ecology and Heritage Partners Pty Ltd).

Plate 7 Waterbody 5 (Drainage line) – (Source: Ecology and Heritage Partners Pty Ltd).

Plate 8 Waterbody 6 (Small dam) – (Source: Ecology and Heritage Partners Pty Ltd).

11 Figures



Legend

- Study Area
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

Figure 1
Location of the study area
345 Perry Road,
Dandenong South

0 245 490
Metres

ecology & heritage partners

VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

Legend

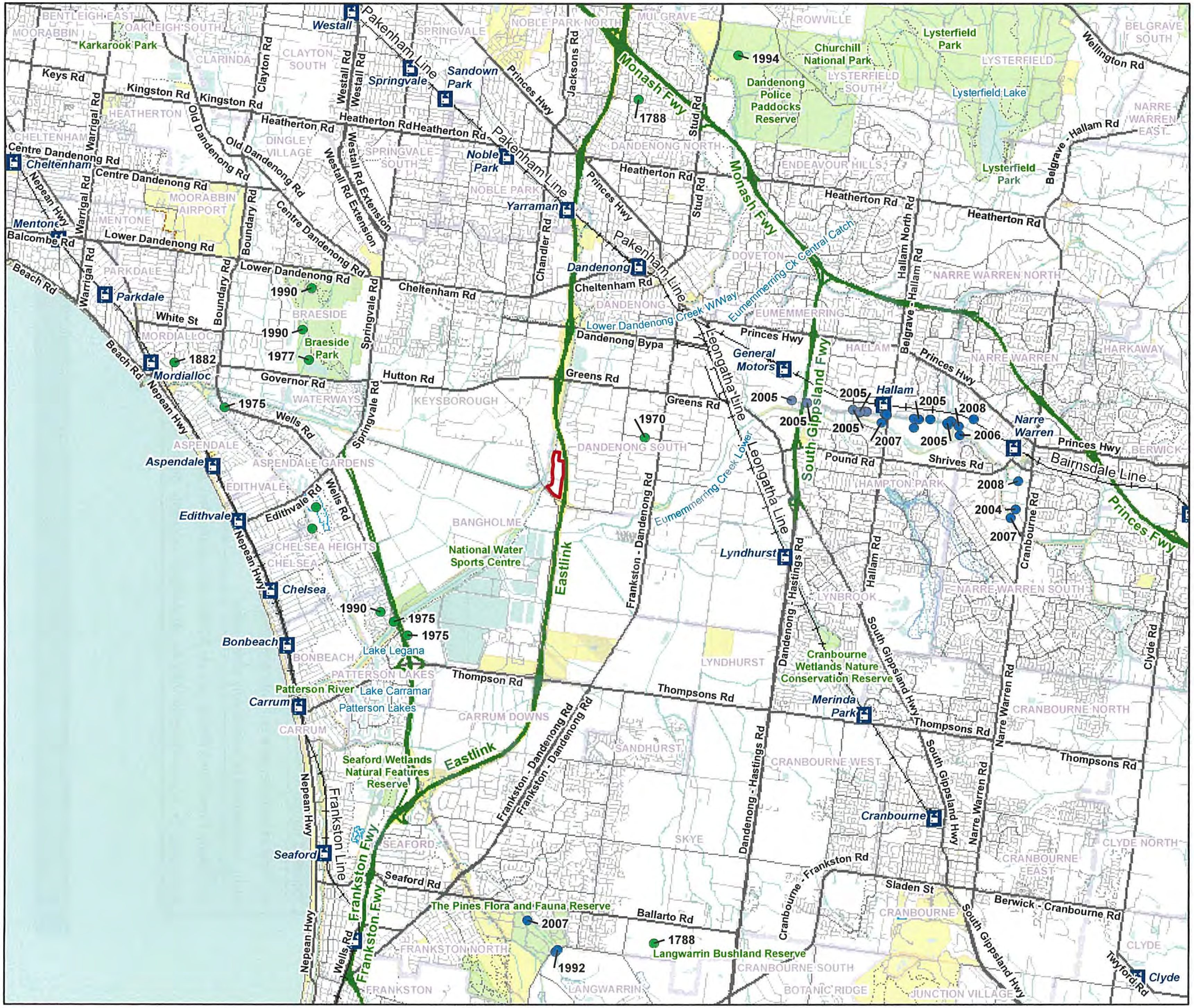
Study Area

Survey Points

Figure 2
Targeted Growling Grass Frog and Dwarf Galaxias Survey Locations
345 Perry Road, Dandenong South

0 55 110
Metres

ecology & heritage partners



Legend

- Study Area
- Dwarf Galaxias
- Growling Grass Frog

Figure 3
Location of Growling Grass Frog and Dwarf Galaxias Records within 10km of the study area
345 Perry Road, Dandenong South

0 1,100 2,200
Metres

ecology & heritage partners

Appendix 1 – Significance Assessment

Criteria used by Ecology and Heritage Partners Pty Ltd to define conservation significance, vegetation condition and habitat quality are provided below.

A1.1. Rare or Threatened Categories for listed Victorian taxa

Table A1.1. Rare or Threatened categories for listed Victorian taxa.

Rare or Threatened Categories
CONSERVATION STATUS IN AUSTRALIA (Based on the EPBC Act 1999, Briggs and Leigh 1996*)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
CONSERVATION STATUS IN VICTORIA (Based on DSE 2009, DSE 2007, FIS 2011)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

A1.2. Defining Ecological Significance

Table A1.2. Defining Ecological Significance.

Criteria for defining Ecological Significance	
NATIONAL SIGNIFICANCE	
Flora	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
Flora	Flora listed as rare in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
Fauna	Fauna listed as extinct, critically endangered, endangered, vulnerable, Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans for terrestrial taxon prepared for the Department of Sustainability, Environment, Water, Population and Communities: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et al.* 1993), and amphibians (Tyler 1997).
Fauna	Species that have not been included on the EBPC Act but listed as significance according to the *IUCN 2009 Red List of Threatened Species* (IUCN 2009).
Communities	Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.
STATE SIGNIFICANCE	
Flora	Threatened taxa listed under the provisions of the FFG Act.
Flora	Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System (most recent Version).
Flora	Flora listed in the State Government's *Advisory List of Rare or Threatened Plants in Victoria*, 2009 (DSE 2009).
Flora	Flora listed as poorly known in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	Threatened taxon listed under Schedule 2 of the FFG Act.
Fauna	Fauna listed as extinct, critically endangered, endangered and vulnerable on the State Government's *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007).
Fauna	Listed as Data Deficient, Insufficiently Known or Near-threatened under National Action Plans for terrestrial species prepared for the Department of Sustainability, Environment, Water, Population and Communities: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et. al.* 1993), and amphibians (Tyler 1997).

Criteria for defining Ecological Significance	
Communities	Ecological communities listed as threatened under the FFG Act.
	Ecological vegetation class listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
REGIONAL SIGNIFICANCE	
Flora	Flora considered rare in any regional native vegetation plan for a particular bioregion.
	Flora considered rare by the author for a particular bioregion.
Fauna	Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the Otway Plain bioregion.
	A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government's Advisory List of *Threatened Vertebrate Fauna in Victoria* - 2007 (DSE 2007).
Communities	Ecological Vegetation Class listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (DSE Website) and considering vegetation condition.
	Ecological Vegetation Class considered rare by the author for a particular bioregion.
LOCAL SIGNIFICANCE	
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.	

A1.3 Defining Site Significance

The following geographical areas apply to the overall level of significance with respect to the current survey.

National: Australia

State: Victoria

Regional: Gippsland Plain bioregion

Local: Within 10 kilometres surrounding the study area

Table A1.3. *Defining Site Significance.*

Criteria for defining Site Significance
NATIONAL SIGNIFICANCE
A site is of National significance if: - it regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the Department of Sustainability, Environment, Water, Population and Communities. - it regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. - it is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. - it is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. - it contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. - it is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
STATE SIGNIFICANCE
A site is of State significance if: - it occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. - it regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2009), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. - it contains an area, or part thereof designated as 'critical habitat' under the FFG Act. - it supports, or likely to support a high proportion of any Victorian flora and fauna taxa. - it contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular Bioregion. - it is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.

Criteria for defining Site Significance
REGIONAL SIGNIFICANCE
A site is of Regional significance if: - it regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. - is contains a large population (i.e. greater than 1%) of flora considered rare in any regional native vegetation plan for a particular bioregion. - it supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. - it is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
LOCAL SIGNIFICANCE
Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as: - an area which supports indigenous flora species and/or a remnant Ecological Vegetation Class, and habitats used by locally significant fauna species. - an area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

A1.4. Defining Vegetation Condition

Table A1.4. *Defining Vegetation Condition.*

Criteria for defining Vegetation Condition
Good condition - Vegetation dominated by a diversity of indigenous species, with defined structures (where appropriate), such as canopy layer, shrub layer, and ground cover, with little or few introduced species present.
Moderate condition - Vegetation dominated by a diversity of indigenous species, but is lacking some structures, such as canopy layer, shrub layer or ground cover, and/or there is a greater level of introduced flora species present.
Poor condition - Vegetation dominated by introduced species, but supports low levels of indigenous species present, in the canopy, shrub layer or ground cover.

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A1.5. Defining Habitat Quality

Several factors are taken into account when determining the value of habitat. Habitat quality varies on both spatial and temporal scales, with the habitat value varying depending upon a particular fauna species.

Table A1.5. Defining Habitat Quality.

Criteria for defining Habitat Quality
HIGH QUALITY
High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups).
High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity).
High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat.
Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007.
MODERATE QUALITY
Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups.
Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes.
Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat.
Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007.
LOW QUALITY
Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups).
Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes.
Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat.
Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2007.

13 Attachment H- Stormwater Strategy

DCE dalton consulting engineers

STORMWATER STRATEGY

Lot 2, PS603443D
345-385 Perry Road, Keysborough

FOR

CIP

PROJECT NUMBER: 12005

MAY 2014

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Revision No.
2
Date:
May 2014
Description:
345-385 Perry Road Stormwater Strategy
Prepared:
F Goff AN: 281205
Reviewed:
J McGrath AN:
Approved:
T Liakopoulos AN:

EXECUTIVE SUMMARY

The subject site at 345-385 Perry Road, Keysborough, is proposed to be subdivided and developed into a number of industrial lots. In order to progress the Development Plan and receive Planning Permits for Subdivision, Earthworks and Building Development; a stormwater strategy is to be approved by City of Greater Dandenong and Melbourne Water.

The development is to include construction of a wetland-retarding basin (WLRB) as part of Melbourne Water's Ordish Road North Drainage Scheme. The WLRB is to be constructed east of Dandenong Creek and will form the western boundary of the development. These works are to be funded by the developer, with certain aspects of the design and construction reimbursable by Melbourne Water.

Major flows (Q100, 100 year ARI) are to be conveyed overland within the site via the road network and will discharge directly to Melbourne Water's Ordish Road Retarding Basin. The Q100 flood level associated with the retarding basin, as determined by Consultant Neil M. Craigie Pty Ltd, will be 6.2m AHD, and will require the site to be filled to a minimum level of 6.8m AHD. Flows from external catchments to the east of the site and EastLink will be piped through the development to the WLRB.

Minor event (Q20, 20 year ARI) runoff from the development will be captured and conveyed by a pit-and-pipe network and will discharge to the WLRB at the west of the site.

Stormwater quality will be provided in the Melbourne Water wetland to be constructed within the Ordish Road Retarding Basin, and will achieve best practice targets. Offset of Drainage Scheme contributions will be made against reimbursement by Melbourne Water for the scheme works undertaken by the developer/subdivider.

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CONTENTS

REFERENCES

Craigie, N. (2014), *Perry Road Wetland/Retarding Basin, Design Options Report, Version DRAFT*, Neil M Craigie Pty Ltd

1. INTRODUCTION

The following report details the stormwater management strategy for the subject site at 348-385 Perry Road, Keysborough. It is intended to inform the Development Plan for the site and support an application to the City of Greater Dandenong for Planning Permits for Subdivision, Earthworks and Building Development.

The subject site is located between Dandenong Creek to the west and Eastlink to the east, and is currently zoned IN1Z. In line with this zoning it is proposed to subdivide the land into a multi-lot industrial subdivision.

The local government authority is the City of Greater Dandenong and the Catchment Management Authority is Melbourne Water.

2. EXISTING CONDITIONS

2.1 Subject Site Features

The site is currently rural in nature and being used for stock grazing. Refer to Figure 1 for an aerial image of the site. It is accessed from Perry Road at the southern end and is bounded by Dandenong Creek to the west, Perry Road to the south and EastLink to the east. A wedge of land adjacent to the northern boundary of the site is currently owned VicRoads and is subject to an investigation by Melbourne Water to be purchased and used for a proposed retarding basin.

The site grades generally from east to west, with grades of between 1 in 90 at the north and 1 in 400 in the southern section of the site. There are several existing small farm dams located at the north-east, centre-west, south-east and south-west of the site.

Runoff from the majority of the site currently discharges to Dandenong Creek via an existing channel which bisects the site east-west. Existing culverts beneath Perry Road at the southwest of the site drain a small catchment within the site. A further catchment drains to existing dams at trapped low points at the site’s southeast.

A strip of the site along the western boundary is currently subject to a SP Ausnet easement, up to approximately 37m in width. No overhead assets exist within the easement. An existing recycled water main owned by South East Water follows the western boundary of the site.

Refer to Figure 4 which shows the drainage directions of existing catchments at the site.

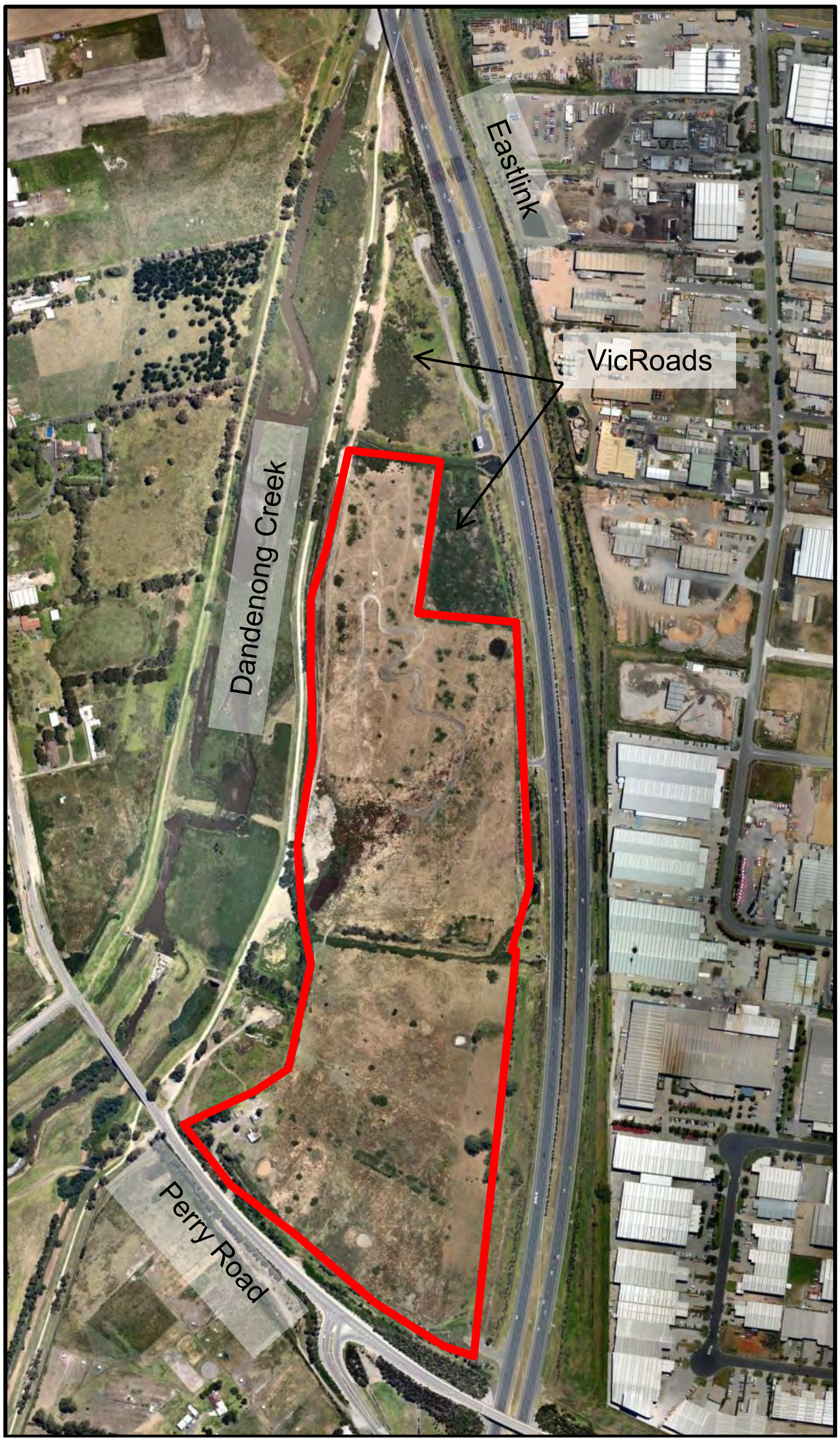


Figure 1 – Aerial image of the subject site (outlined in red)

Figure 2 – The site looking north from Perry Road

Figure 3 – Existing culverts under Perry Road at southwest corner of the site

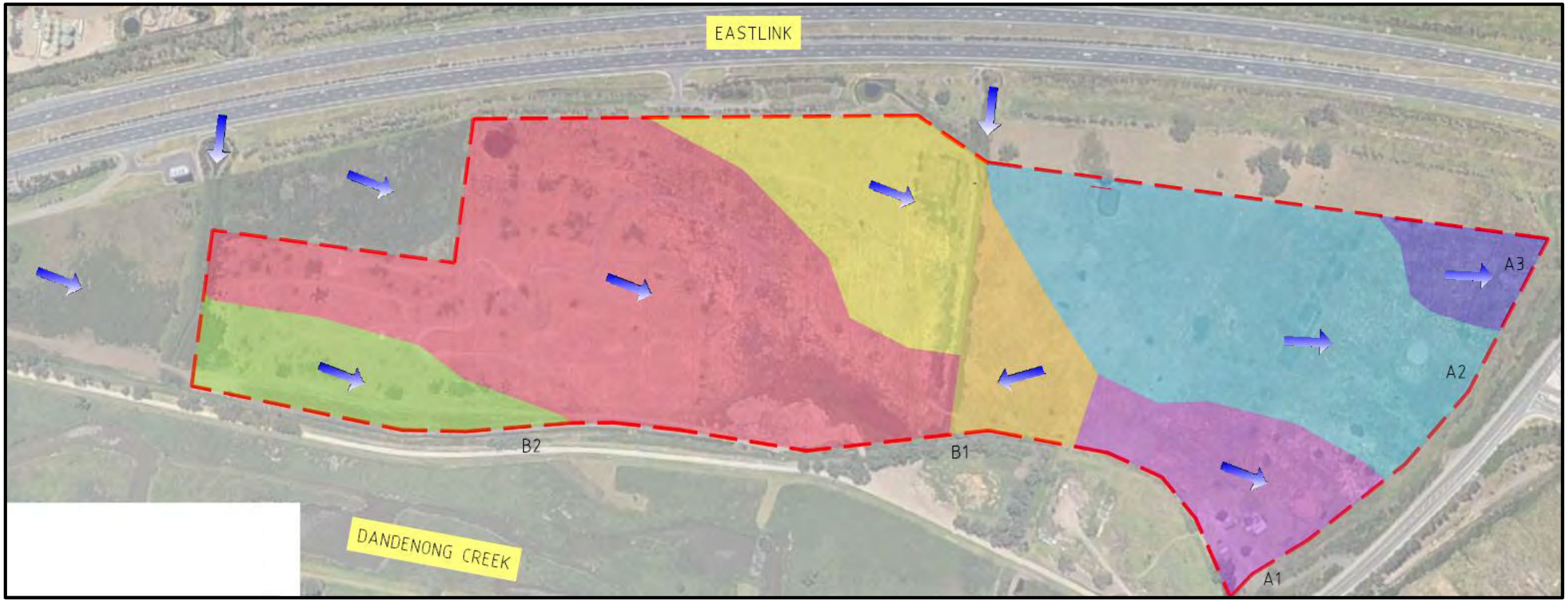


Figure 4 – Existing drainage catchments within the subject site

2.2 Dandenong Creek

The western boundary of the site is mostly defined by Dandenong Creek, which flows from north to south. The creek in this location is heavily modified by broad crested weirs, syphons, gates, bunds/levees and bypass channels, and is divided into four main channels.

The westernmost channel emerges from a 1200mm dia. syphon which crosses beneath the creek from Melbourne Water-owned land along the west of the subject site. This channel crosses beneath Perry Road via a box culvert, shown in Figure 5 (approx. dimensions 2250mm x 950mm) and continues along the western side of Pillar Road, eventually forming Mordialloc Creek.

The two central channels are the main creek channels and include a broad crested weir, sluice gates and a low flow bypass channel. Perry Road crosses these channels via a bridge.

The easternmost channel contains a broad crested weir in a location approximately adjacent to the alignment of the syphon, presumably to facilitate the creek crossing of the syphon. This channel is overgrown with reeds and also flows beneath the bridge at Perry Road.

There is a Land Subject to Inundation Overlay (LSIO) on the western portion of the site related to Dandenong Creek.

Figure 5 – Culvert under Perry Road (downstream of syphon)

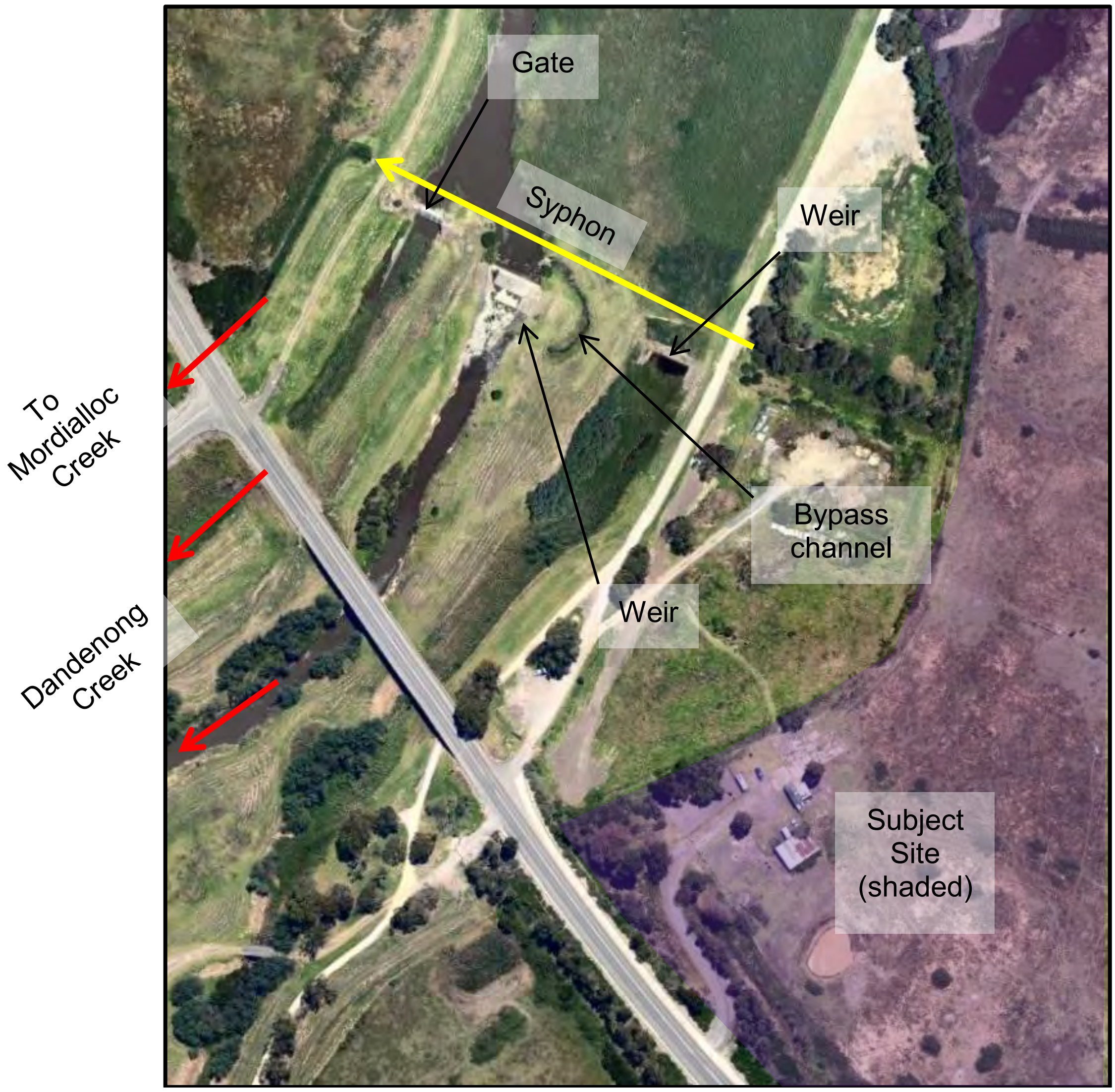


Figure 6 – Detail of Dandenong Creek adjacent to the site

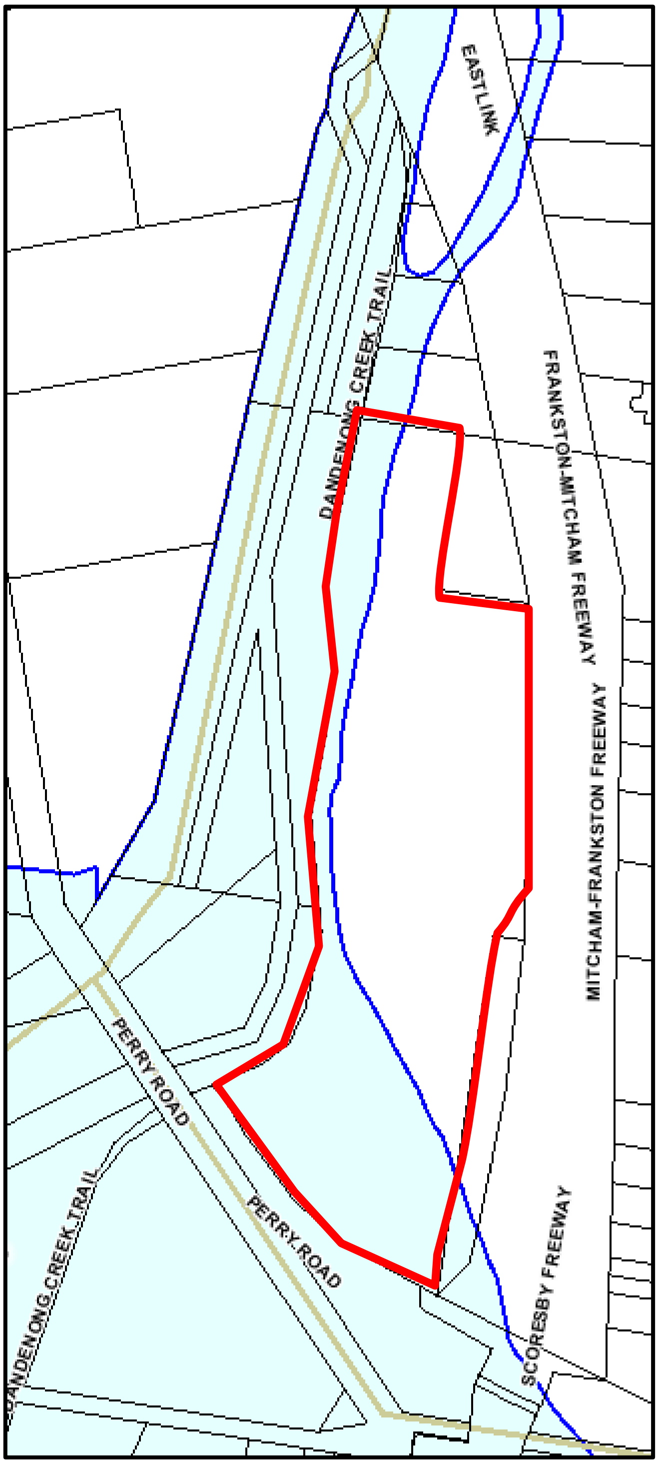


Figure 7 – Existing LSIO on the southern and western boundaries of the site

2.3 External Catchments

External catchments enter the site from the northeast and east via culverts under the EastLink Tollway (Figure 8, Figure 9 and Figure 10).

The flows from these culverts are conveyed through the site to Dandenong Creek via existing open channels across the northern boundary of the site and across the middle of the site (Figure 11). The channel bisecting the centre of the site includes a bund along the northern bank, presumably formed from excavated material from the channel.

Figure 8 – Existing culvert under EastLink at centre-east of subject site

Figure 9 – Existing culvert under EastLink at centre-east of subject site

Figure 10 – Existing culvert under EastLink at north east of the site

Figure 11 – Existing channel conveying flows from EastLink through the subject site (looking west from eastern site boundary)

3. PROPOSED CONDITIONS

The proposed layout of the subdivision of the subject site is shown in Figure 12 below and includes two industrial lots with a cumulative area of approx. 13.2 ha.

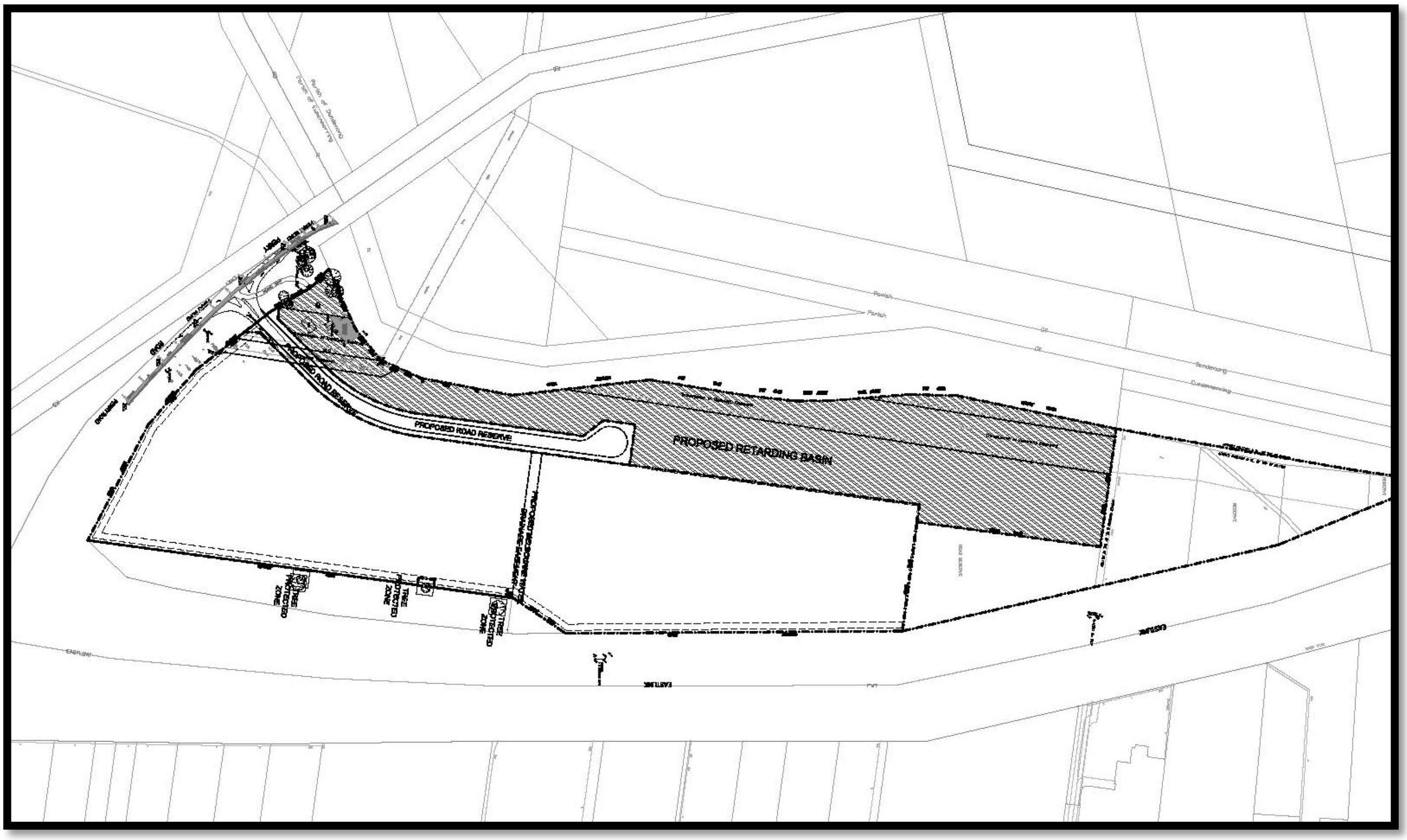


Figure 12 – Proposed layout of the development

3.1. Ordish Road North Drainage Scheme

The subject site is within Melbourne Water's Ordish Road North Scheme, shown in Figure 13. The Ordish Road North Drainage Scheme allows for the construction of a wetland and retarding basin (WLRB) infrastructure within the site, to be known as the Ordish Road Retarding Basin. Works completed under the Drainage Scheme are to be developer funded, some of which are reimbursable and include the following:

- Bulk excavation of retarding basin (non-reimbursable)
- Design and construction of WLRB, including:
    - Clay liner
    - Topsoiling
    - Planting
    - Geotechnical investigation
    - ANCOLD dam break assessment
    - Civil assets such as pipelines, structures, spillways
    - Land acquisition

Advice received from Melbourne Water included the following specifications for the WLRB:

- Top water level of RL6.0m AHD
- Storage volume of 233,000m³
- Adjacent developable land to be filled to a minimum level of 6.6m AHD and drain into the WLRB
- 40m wide spillway set at 5.7m AHD (storage of 202, 000m³ to this level)
- Retarding basin outlet to be existing syphon beneath Dandenong Creek (1.5m³/s capacity)
- Spillway flows to Perry Road culverts at the south-west of the subject site with a capacity of 5m³/s or the capacity of the culverts, whichever is greater
- Wetland area of 3.5Ha

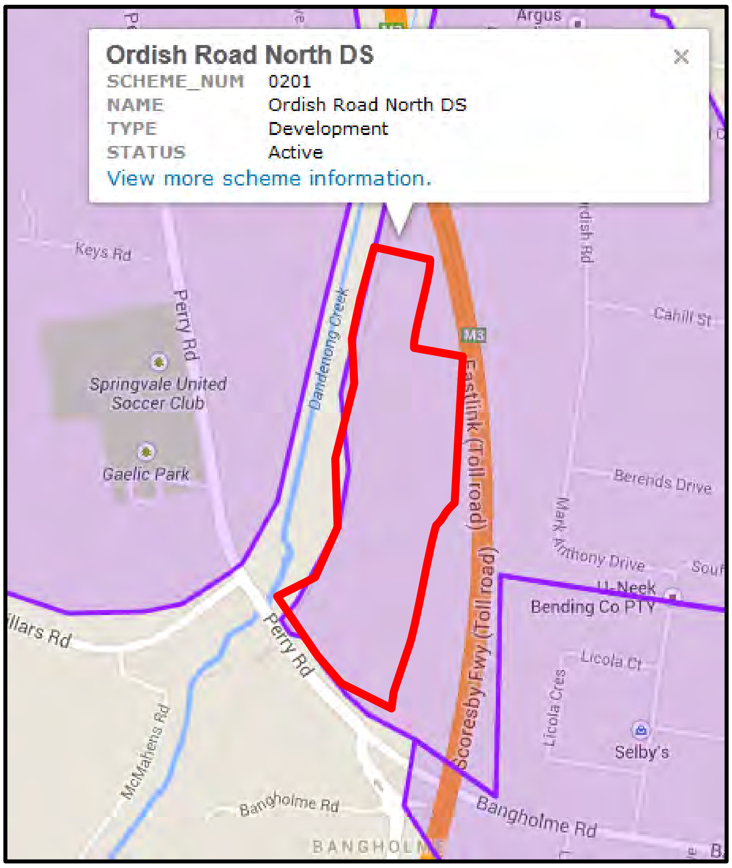


Figure 13 – Melbourne Water Scheme Map – Ordish Road North DS

Figure 14 – Upstream inlet of the MW syphon under Dandenong Creek

Figure 15 – Downstream outlet of the MW syphon under Dandenong Creek

Figure 16 – Melbourne Water's Dandenong Creek (location of the WLRB on far bank)

3.2. Neil Craigie Report

The size and location of the WLRB has recently been subject to a review by Neil Craigie, and is based on the assumption that the acquisition of VicRoads land to the north of the subject site will allow the WLRB to be extended into a more linear shape. Craigie's report recommends adopting the following:

- Raising the 100 year ARI level from RL6.0m to RL6.2m AHD
- A minimum storage volume of 141,000m³
- Adjacent developable land to be filled to a minimum level of 6.8m AHD and drain into the WLRB
- 40m wide spillway set at 5.80m AHD (storage of 141,000m³ to this level)
- Retarding basin outlet to be existing syphon beneath Dandenong Creek (2.5m³/s capacity)
- All discharge through the Perry Road culverts can be easily prevented in the 100 year ARI event
- A wetland area of 4.3Ha, greater than the 3.5Ha as requested by MW

3.3. Major Event Flows

The major flows for the 100 year Average Recurrence Interval (ARI) event are to be conveyed overland in accordance with Melbourne Water requirements. These flows will be conveyed along the internal road network and discharge at the west of the site to the Ordish Road Retarding Basin, which provides centralised retardation of flows.

The site will be filled to a minimum level of 6.8m AHD and graded to ensure overland flows discharge to the retarding basin. Dependent on Geotechnical investigation, suitable material obtained from excavation of the retarding basin will be available for filling of the site.

The major flows from external catchments which are currently conveyed through the site in the existing channel are proposed to be piped and will discharge directly to the Ordish Road Retarding Basin.

The anticipated major event runoff from the site is presented in Table 1 – Peak major event discharges from the site below.

Table 1 – Peak major event discharges from the site

	Q_{100} to Dandenong Creek at Centre west of site (m^3/s)	Q_{100} to Dandenong Creek at Northwest of site (m^3/s)	Q_{100} to Perry Rd culverts (m^3/s)	Q_{100} to Southeast trapped low points (m^3/s)
Location on Catchment Plan	B1	B2	A1	A2/A3
Existing	0.45	0.05	0.09	0.22/0.05
Developed	3.78*	-	-	-

*Note: The site is to be regraded so that all flows are directed to the Ordish Road Retarding Basin at the west of the site

Refer to rational method computations provided in Appendix C for further details of the runoff rates expected from the proposed works.

3.4. Minor Event Flows

City of Greater Dandenong's *Subdivision Design Specification (D5 – Stormwater Drainage Design)* specifies the average exceedance probabilities for the design of drainage networks in the Council. For design of Industrial subdivisions, the minor drainage network is to be designed for a Q20 (20 year ARI) event.

The expected discharges from the site for the minor event are shown in Table 2.

Table 2 – Peak minor event discharges from the site

	Q_{20} to Dandenong Creek at Centre west of site (m^3/s)	Q_{20} to Dandenong Creek at Northwest of site (m^3/s)	Q_{20} to Perry Rd culverts (m^3/s)	Q_{20} to Southeast trapped low points (m^3/s)
Location on Catchment Plan	B1	B2	A1	A2/A3
Existing	0.28	0.03	0.06	0.14/0.3
Developed	2.45*	-	-	-

*Note: The site is to be regraded so that all flows are directed to the Ordish Road Retarding Basin at the west of the site

Drainage of the minor event flows for the development will be via a pit and pipe system within the roadways and easements within lots. Design of the minor drainage network will comply with Council's specifications. The pit and pipe network will discharge to the wetland within the Ordish Road Retarding Basin. The outfall to the wetland will be to Melbourne Water standards as per Figure 17.

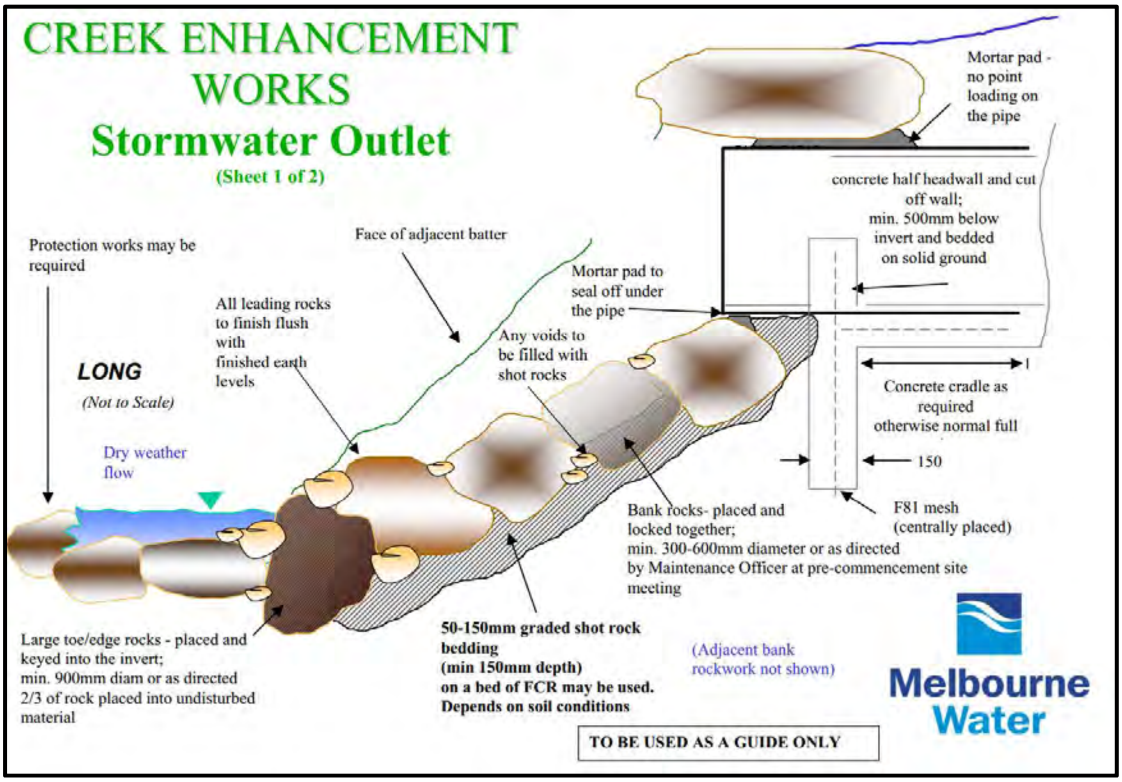


Figure 17 – Standard Melbourne Water outlet connection

Refer to rational method computations provided in Appendix C for further details of the runoff rates expected from the proposed works.

Refer to the Stormwater Management Plan in Appendix B for further details.

3.5. Stormwater Quality

Stormwater quality is to be provided in the Melbourne Water wetland to be constructed adjacent to the site, and will achieve best practice targets as outlined in Craigie (2014).

Grated pits within the development will minimise the ingress of gross pollutants to the minor drainage network. Within the wetland, the treatment train will consist of sedimentation ponds and surface flow wetlands.

3.6. Drainage Scheme Contributions

As the site is within a Melbourne Water drainage scheme, contributions towards centralised treatment facilities can be made in lieu of providing stormwater treatment infrastructure within the site. As the developer is to fund construction of the Ordish Road Retarding Basin adjacent to the site, offset of contributions will be made against reimbursement from Melbourne Water for the scheme works.

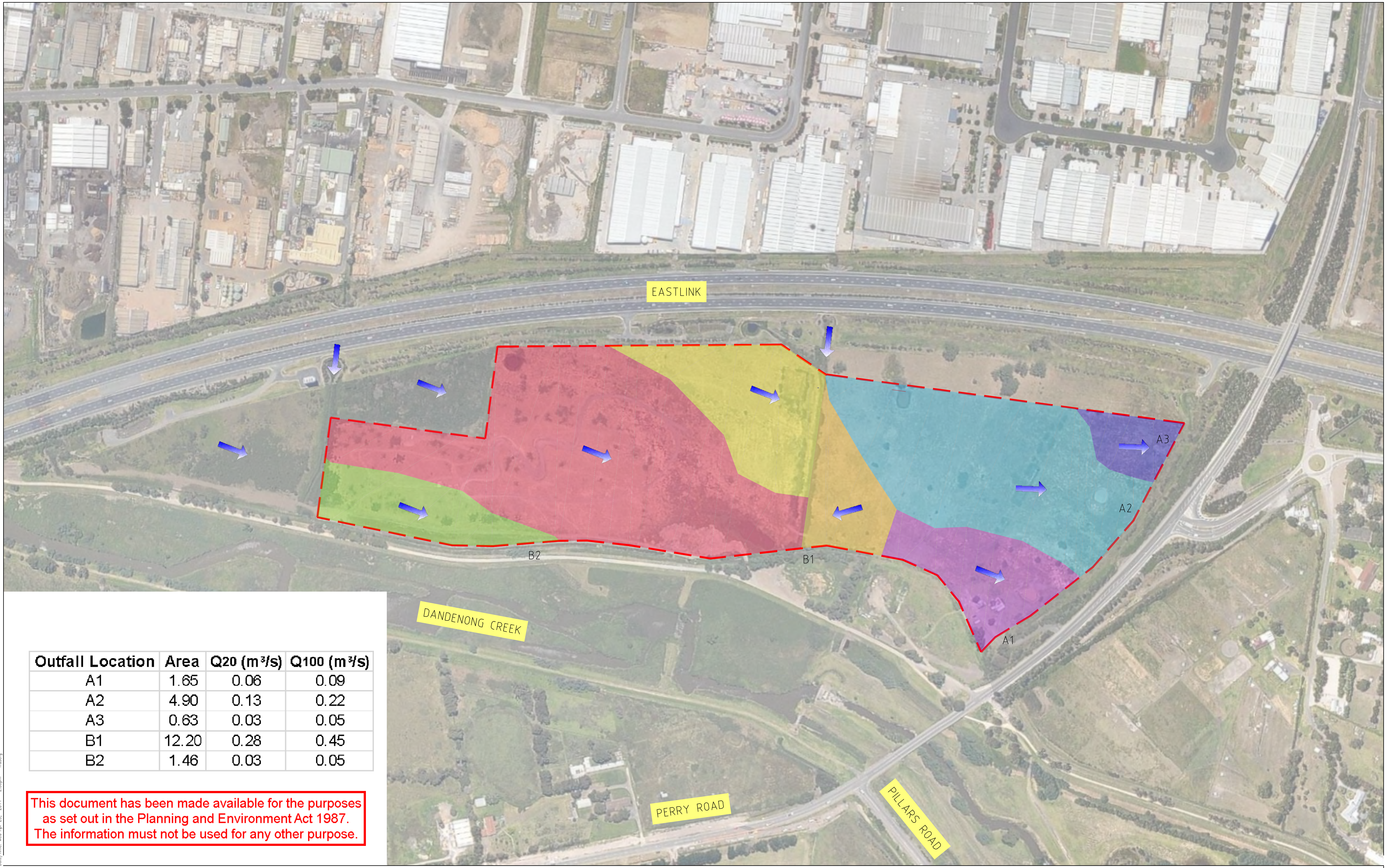
The current contribution rates for the Ordish Road North Drainage Scheme are summarised in Table 3 below. Hydraulic contributions cannot be offset by drainage works and must be paid prior to Melbourne Water's release of statement of compliance. Water Quality contributions are not required if 100% best practise on-site treatment is provided for the entire development.

Table 3 - Melbourne Water drainage contributions

Charge	Water quality measures provided in development	
	No on-site treatment	Full on-site treatment
Hydraulic contribution	$ 689,907	$ 689,907
Water quality contribution	$ 372,948	$ 0
Total charge	$1,062,855	$ 689,907

Due to the cost of constructing 100% best practise on-site treatment measures will likely exceed the approx. $371,948 Water Quality contribution required, DCE recommend that the most economical option will likely be paying water quality contributions in lieu of constructing on-site stormwater treatment measures.

Appendix A – Existing Conditions Catchment Plan



Outfall Location	Area	Q20 (m^3/s)	Q100 (m^3/s)
A1	1.65	0.06	0.09
A2	4.90	0.13	0.22
A3	0.63	0.03	0.05
B1	12.20	0.28	0.45
B2	1.46	0.03	0.05

This document has been made available for the purposes as set out in the Planning and Environment Act 1987. The information must not be used for any other purpose.

Drawing File: G:\Designdata\12000\12005-345-385 Perry Road Keysborough\Acad\General\
12005CP01 - Existing Catchments.dwg - 12005CP01
Date/Time: Wed Apr 23, 2014 - 2:50pm --fraserg--

NOT TO BE USED FOR CONSTRUCTION

REVISION IN PROGRESS

REV	AMENDMENTS	DATE	APP'D.
A	ISSUED FOR STORMWATER STRATEGY	22/04/14	TL

Drawn FG Date 18/03/14
Designed ####
Date ####
AN
Verified ####
Date ####
AN
Audited ####
Date ####
AN
Approved ####
Date ####
AN

Written dimensions to take precedence over scale.
Contractor shall check and verify all dimensions on site.
Discrepancies to be brought to the attention of the Superintendent.

LEGEND

- CATCHMENT FLOW DIRECTION
- SUBJECT SITE
- B1 LOCATION OF EXISTING DRAINAGE OUTFALL

Coords: MGA
Levels: AHD

Hor 1:500 0m 5m 10m 20m 30m

Scale @ A1/A3

THE LINK
345-385 PERRY ROAD
DANDENONG SOUTH
STORMWATER STRATEGY
EXISTING CONDITIONS CATCHMENT PLAN
Drawing No. 12005CP01 Rev A
Sheet No. 01 PRELIMINARY

ABN 78 429 221 049

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Appendix B – Preliminary Stormwater Flow Calculation

PEAK FLOW CALCULATION SHEET

(RATIONAL METHOD)

JOB NAME: 345-385 Perry Road, Keysborough
JOB No.: 12005

Rural Development

C_{10}	0.200
COEFFICIENT OF RUNOFF	
C_1	0.160
C_2	0.170
C_5	0.190
C_{20}	0.210
C_{50}	0.230
C_{100}	0.240

Road

C_{10}	0.800
COEFFICIENT OF RUNOFF	
C_1	0.640
C_2	0.680
C_5	0.760
C_{20}	0.840
C_{50}	0.920
C_{100}	0.960

Developed Commercial

C_{10}	0.900
COEFFICIENT OF RUNOFF	
C_1	0.720
C_2	0.765
C_5	0.855
C_{20}	0.945
C_{50}	1.000
C_{100}	1.000

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Job Description: 345-385 Perry Road, Keysborough
Job Number: 12005
Compiled by: FG   ***Date:*** **23-Apr-14**

Location and ARI

	ARI	**a**	**b**	**c**	**d**	**e**	**f**	**g**
dev	20	3.446300	-0.625400	-0.013000	0.006770	-0.000855	0.000047	-0.000022

Catchment	Catchment Length	Velocity	Tc	Area	C	Ae	ΣAe	I_{20}	**Q_{20}**
	m	m/s	mins	ha		ha	ha	mm/hr	**m^3/s**
A1	300.0	0.35	21.35	1.7	0.21	0.347	0.347	58.556	0.056
A2	430.0	0.30	30.84	4.9	0.21	1.029	1.029	47.209	0.135
A3	120.0	0.33	12.98	0.6	0.21	0.132	0.132	76.996	0.028
B1	590.0	0.28	41.83	12.2	0.21	2.562	2.562	39.245	0.279
B2	290.0	0.11	49.97	1.5	0.21	0.307	0.307	35.171	0.030

	A1	A2	A3	B1	B2	
Approx. Flow Depth, say	0.1	0.1	0.1	0.2	0.1	m
Base width	20	20	20	20	20	m
Slope	0.008	0.007	0.008	0.003	0.001	
side slopes	50	100	50	50	100	1 in
Area	2.5	3	2.5	6	3	m^2
ss length	5.00	10.00	5.00	10.00	10.00	m
Wetted Perim.	30.00	40.00	30.00	40.00	40.00	m
R	0.08	0.07	0.08	0.15	0.07	m
mannings n	0.050	0.050	0.050	0.050	0.050	
Capacity	0.87	0.90	0.84	1.69	0.34	m^3/s
velocity	0.35	0.30	0.33	0.28	0.11	m/s

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Location and ARI

	ARI		a	b	c	d	e	f	g
dev		20	3.446300	-0.625400	-0.013000	0.006770	-0.000855	0.000047	-0.000022

Location	Sub-Catchments	Catchment Length	Velocity	Tc	Area	See below	Ae	∑Ae	I_{20}	Q_{20}
		m	m/s	mins	ha		ha	ha	mm/hr	m^3/s
1	E	430.0	1.00	14.17	4.510		4.262	4.262	73.507	0.870
2	D, E	510.0	1.00	15.50	5.460		5.160	5.160	70.033	1.004
3	A	400.0	1.00	13.67	3.280		3.100	3.100	74.924	0.645
4	A, B, C, F	640.0	1.00	17.67	7.500		6.993	6.993	65.172	1.266
5	A,B,C,D,E,F,G	690.0	1.00	18.50	21.3		13.9	13.896	63.517	2.452

Catchment	Area	C	Effective Area
A	3.28	0.9	3.10
B	2.14	0.9	2.02
C	1.18	0.9	1.12
D	0.95	0.9	0.90
E	4.51	0.9	4.26
F	0.90	0.8	0.76
G	8.30	0.2	1.74

Where:

Tc = Time to concentration = 7 + ((Length/Velocity)/60)

Ae = effective area = Area * C (co-efficient of imperviousness)

I_{20} = 20yr Intensity, which is derived from the co-efficients **a** to **e** (as per City of Greater Dandenong's Drainage Design Manual) * Tc

Q_{20} = 20yr Flow = (Area * Intensity)/360

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Job Description: 345-385 Perry Road, Keysborough
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Location and ARI

	ARI	a	b	c	d	e	f	g
dev	100	3.783700	-0.643500	-0.013000	0.005420	-0.000415	0.000279	-0.000073

Catchment	Catchment Length	Velocity	Tc	Area	C	Ae	ΣAe	I_{100}	Q_{100}
	m	m/s	mins	ha		ha	ha	mm/hr	m^3/s
A1	300.0	0.35	21.35	1.7	0.24	0.396	0.396	83.742	0.092
A2	430.0	0.30	30.84	4.9	0.24	1.176	1.176	66.986	0.219
A3	120.0	0.33	12.98	0.6	0.24	0.151	0.151	111.444	0.047
B1	590.0	0.28	41.83	12.2	0.24	2.928	2.928	55.358	0.450
B2	290.0	0.11	49.97	1.5	0.24	0.350	0.350	49.448	0.048

	A1	A2	A3	B1	B2		
Approx. Flow Depth, say	0.1	0.1	0.1	0.2	0.1	m	
Base width	20	20	20	20	20	m	
Slope	0.008	0.007	0.008	0.003	0.001		
side slopes	50	100	50	50	100		1 in
Area	2.5	3	2.5	6	3	m^2	
ss length	5.00	10.00	5.00	10.00	10.00	m	
Wetted Perim.	30.00	40.00	30.00	40.00	40.00	m	
R	0.08	0.07	0.08	0.15	0.07	m	
mannings n	0.050	0.050	0.050	0.050	0.050		
Capacity	0.87	0.90	0.84	1.69	0.34	m^3/s	
velocity	0.35	0.30	0.33	0.28	0.11	m/s	

Job Description: 345-385 Perry Road, Keysborough
Job Number: 12005
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Location and ARI

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Location	Sub-Catchments	Catchment Length	Velocity	Tc	Area	See below	Ae	ΣAe	I_{100}	Q_{100}
		m	m/s	mins	ha		ha	ha	mm/hr	m^3/s
1	E	430.0	1.00	14.17	4.510		4.510	4.510	106.161	1.330
2	D, E	510.0	1.00	15.50	5.460		5.460	5.460	100.919	1.531
3	A	400.0	1.00	13.67	3.280		3.280	3.280	108.305	0.987
4	A, B, C, F	640.0	1.00	17.67	7.500		7.464	7.464	93.617	1.941
5	A,B,C,D,E,F,G	690.0	1.00	18.50	21.3		14.9	14.916	91.139	3.776

Catchment	Area	C	Effective Area
A	3.28	1.0	3.28
B	2.14	1.0	2.14
C	1.18	1.0	1.18
D	0.95	1.0	0.95
E	4.51	1.0	4.51
F	0.90	1.0	0.86
G	8.30	0.2	1.99

Where:

Tc = Time to concentration = 7 + ((Length/Velocity)/60)

Ae = effective area = Area * C (co-efficient of imperviousness)

I_{100} = 100yr Intensity, which is derived from the co-efficients **a** to **e** (as per City of Greater Dandenong's Drainage Design Manual) * Tc

Q_{100} = 100yr Flow = (Area * Intensity)/360

Appendix C – Advice from Melbourne Water

Ordish Road North DS as at 22-April-2014		
Standard Residential Rates :	$21,042 (Water Quality) $38,925 (Hydraulic)	
Area (in ha) :	11.816	
Development Type :	Industrial/Commercial	
Best Practice Expected / Achieved :	0	Notes
The calculator stipulates the level of best practice expected within a development. The level of treatment achieved (% of Best Practice) can be increased beyond the expected amount or decreased where mitigating circumstances prevent local treatment.		
Calculate Clear Close Print		
Calculated at $31,563 (Water Quality) and $58,388 (Hydraulic) (1.5 x Residential Rate) per Hectare.		
Hydraulic contribution :		$689,907
Water Quality contribution reduction for on-site treatment :		$0
Water Quality contribution payable :		$372,948
Final Total contribution :		$1,062,855

Ordish Road North DS as at 22-April-2014		
Standard Residential Rates :	$21,042 (Water Quality) $38,925 (Hydraulic)	
Area (in ha) :	11.816	
Development Type :	Industrial/Commercial	
Best Practice Expected / Achieved :	100	Notes
The calculator stipulates the level of best practice expected within a development. The level of treatment achieved (% of Best Practice) can be increased beyond the expected amount or decreased where mitigating circumstances prevent local treatment.		
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Hydraulic contribution :		$689,907
Water Quality contribution reduction for on-site treatment :		$372,948
Water Quality contribution payable :		$0
Final Total contribution :		$689,907

24 October 2013

Ian Prudden, Infrastructure Manager
Commercial and Industrial Property Pty Ltd
Level 8, Como Office Tower,
644 Chapel St
SOUTH YARRA VIC 3141

Dear Mr Prudden

Property: Lot 2, PS603443D, 345-385 Perry Road, Keysborough 3173
Melb Water Ref: 118459

Following our meeting on the 25 September 2013 regarding the property at 345-385 Perry Road, Keysborough Melbourne Water has the following development advice;

This property is located within Melbourne Water's Ordish Road North Development Services Scheme (DSS 0201) for which scheme contributions are applicable. Developer funded works are required on this land to cater for the surrounding catchment and allow for development of the property.

A retarding basin and wetland, known as the Ordish Road Retarding Basin, is proposed to be constructed north of Perry Road within the subject land, to control the impact on stormwater runoff and stormwater quality from development within the Ordish Road North Development Services Scheme. The retarding basin is to be excavated to obtain the required flood storage and it is assumed that most of the suitable excavated soil material will be used to fill the adjacent developable land to minimize the construction costs. The costs associated with the bulk excavation are to be borne solely by the developer.
Melbourne Water will reimburse for the wetland component of the works. This includes but is not limited to;

- Design costs
- Clay liner (if required)
- Topsoiling
- Planting
- Geotechnical Investigation Report
- ANCOLD dam break assessment
- Hard civil assets e.g. pipelines, outlet structures, spillways
- Land Acquisition in accordance with our standard acquisition principles having regard to the flood prone nature of the site

The following is a list of the preliminary design data for the retarding basin works:

- The retarding basin must adopt a design top water level of RL6.0 metres Australian Height Datum and cater for approximately 233,000 cubic metres of storage;

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- The basin is to be located on the subject land adjoining the East side of Dandenong Creek. If this is not the case a 40m wide reserve is to be created adjoining to Dandenong Creek;

- The subject land, north of Perry Road, is to be filled to a minimum level of RL6.6 metres Australian Height Datum and must drain into the retarding basin/wetland;

- The top level of the retarding basin embankment must be set at a minimum level of RL6.0 metres Australian Height Datum;

- The spillway must be 40 metres wide with levels set at RL5.7 metres Australian Height Datum to allow for 202,000 cubic metres of storage at this level;

- The retarding basin outlet ($1.5m^3/s$) is to be directed to the existing syphon beneath Dandenong Creek;

- Spillway flows are to be directed to the Perry Road culverts located just east of Dandenong Creek. The spillway flows are to match the capacity of the Perry Road culverts or be at least $5m^3/s$, whichever is greater. This is necessary for events greater than the Q100 year, or should the RB outlet block during the storm event;

- The size of the wetland must be approximately 3.5 hectares to treat stormwater to best practice standards.

- The design is to be such that industrial spills from the upstream catchment can be trapped within the basin.

- Three drainage lines enter this area from the land to the north and east of Eastlink. The flow from these pipelines is to be conveyed to the RB. This conveyance is to be funded by Melbourne Water with reimbursement to be based on the lesser cost of a pipeline or channel arrangement.

Melbourne Water's property team is currently negotiating with Vic Roads to acquire VicRoads owned land between Dandenong Creek and Eastlink i.e. land north of 345-385 Perry Road. If these properties are acquired the retarding basin will utilize these parcels for a portion of the overall storage thus increasing the developable land to the south. As of the date of this letter no confirmation has been received from Vic Roads as to whether the proposal is acceptable.

It should be noted that the adopted Dandenong South C87 Structure Plan provides for an area of approx. 7.7 hectares of the subject land to be required by Melbourne Water for Drainage Reserve purposes.

Please note that the information supplied is preliminary only and Melbourne Water looks forward to further discussion on the above.

If you have any further enquiries, please contact me on telephone 9679 6862.

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Yours sincerely

SHANE KELLY
SENIOR DEVELOPMENT ENGINEER, DEVELOPMENT PLANNING