

City of Whittlesea

Shenstone Park Precinct Structure Plan

Preliminary Environmental Contamination Assessment

Project No: 116442

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Prepared for:

City of Whittlesea
25 Ferres Boulevard
South Morang, VIC 3752



**City of
Whittlesea**



Meinhardt Infrastructure & Environment

Level 12, 501 Swanston Street
Melbourne, Vic 3000

P. 03 8676 1200 | F. 03 8676 1201
www.meinhardtgroup.com

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REV	DATE	DETAILS	Written	Reviewed	Approved
A	11/01/17	DRAFT Preliminary Environmental Contamination Assessment	DQ	MBC	
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Executive Summary

Introduction

The City of Whittlesea (Council), in conjunction with the Victorian Planning Authority (VPA), is preparing a Precinct Structure Plan (PSP) for Shenstone Park (VPA Ref. PSP 1069.1) which comprises sixteen (16) separate properties over an area of approximately 620 hectares (ha) in the Donnybrook area, within the jurisdiction of City of Whittlesea, Victoria, Australia (the PSP). Meinhardt has been engaged by the Council to prepare a Preliminary Environmental Contamination Assessment (PECA). This assessment will inform the finalisation of the PSP in terms of suitability of nominated land uses.

The PSP incorporates a total of 16 properties, which together with an area of additional investigation in the surrounding area, which represents a 250 m buffer around the southern and eastern boundaries of the PSP, comprise the Study Area. A further six (6) additional properties are included within the 250 m buffer around the southern and eastern boundaries of the PSP.

The overall objective of the PECA is to provide a high-level assessment of the potential for environmental contamination within the Study Area, assessing the nature of potential contaminants to be considered during the design and construction phases. The PECA also includes an assessment of hydrological and geological features of the Study Area which may affect its development.

The PECA report included an initial desktop review of available current and historical information relating to potential environmental contamination, hydrological and geological features, and a subsequent visual site inspection of the properties within the Study Area (completed on 30 November 2016). No intrusive investigation or sampling of environmental media (soil, surface water, groundwater and soil vapour/ground gas) was undertaken as part of the PECA.

Conclusions

Potential Environmental Contamination

The results of the desk based study and subsequent visual site inspections identified the following information in relation to potential environmental contamination on the properties within the Study Area:

- **Properties 1 to 9, 12 to 14, 16 & 22** are active or historic farming properties. Consistent with land used for farming and/or agricultural purposes throughout Victoria, it is considered that there may be potential for environmental impacts on these properties associated with current and/or historical farming operations, including the use of fuels, maintenance of farm equipment, use of (fertilisers, pesticides, herbicides) and the presence farming infrastructure at the Site including (including effluent pits, livestock dips, unlicensed landfilling and stock yards). Hydrocarbons present in fuels may pose a risk to the environment as even minor spill incidents can result in significant environmental impacts. Agricultural chemicals and associated wastes (fertilisers, pesticides, herbicides and animal wastes) have the potential for environmental degradation by increasing toxicity, faecal coliforms in ground and surface waters, or by causing eutrophication within surrounding water features. In particular, Property 16 was noted to have been subject to uncontrolled/unregistered filling on the property with construction fill (i.e. rubble and concrete which was not clean fill in accordance with EPA requirements) at some point prior to 2006.
- **Property 10** is the active Mountain View Quarries rock quarry and concrete batching plant. Operations at the rock quarry include blasting, crushing, screening, stockpiling and conveying of rock. The batching plant includes operations to produce concrete. Noise and dust emissions associated with these operations, present a human health and environmental risk to surrounding properties. EPA Publication 1518, *Recommended Separation Distances for Industrial Residual Air Emissions* (EPA 2013), recommends that a 500 m separation distance is applied for quarries with blasting and 250 m for quarries without blasting. Meinhardt understands that blasting is conducted at the Mountain View Quarries rock quarry. For a concrete batching plant producing >5,000 tonnes per year the recommended separation distance is 100 m.
- **Properties 11 & 15** are rural residential properties, with large sheds, several vehicles and general waste material (i.e. scrap metal, wood pallets, old cars). Potential contamination may be present

from storage of fuels, maintenance of farm equipment, use/storage of potentially harmful agricultural chemicals in sheds and the presence of farming wastes.

- **Properties 17, 18, 19, 20 and 21** are predominantly used for grazing purposes only. It is considered that the potential may exist on these properties for environmental contamination issues associated with farming operations through the use potentially harmful agricultural chemicals (fertilisers, pesticides, herbicides). This assessment includes only those parts of these properties which lie within the 250 m buffer zone. No assessment of the remainder of these properties outside of the buffer zone was conducted.

This information was then subject to a qualitative risk assessment in accordance with the DSE 2005 guidance, resulting in the following assessment of the Potential for Contamination (PfC) for the properties within the Study Area.

For 16 properties within the PSP area:

- One (1) property was classified as having '**High**' potential contamination risk (Property 10 – the active Mountain View Quarries rock quarry and concrete batching plant); and
- The remaining 15 properties were classified as having a '**Medium**' potential contamination risk (Properties 1 to 9 and 11 to 16);

For the six (6) properties (Properties 17 to 22) located within the 250 m buffer zone:

- One (1) property was classified as having a '**Medium**' PfC rating (Property 22); and
- Five (5) properties were classified as having a '**Low**' PfC rating (Properties 17 to 21).

Hydrology

Surface water runoff from within the Study Area is likely to move in a south-westerly direction towards Merri Creek which forms the south westernmost boundary to the PSP, passing immediately to the south west of Property 4 and flowing through the south-western part of the Study Area passing through Property 17. Merri Creek flows in a southerly direction, where it eventually discharges into the Yarra River.

Three (3) ephemeral water courses, two (2) of which are unnamed and one (1) of which is Curly Sedge Creek, start within or pass through the Study Area, joining either Merri Creek or Darebin Creek to the south and east of the Study Area.

Based on the available information, none of the properties within the PSP itself are subject to inundation or floodways. However, a Land Subject to Inundation Overlay (LSIO) and Rural Floodway Overlay (RFO) is present in the south-western part of the Study Area where Merri Creek passes through from west to south.

Hydrogeology

Groundwater beneath the Study Area is present in two (2) main aquifers, the upper Newer Volcanics aquifer, a fractured rock basalt aquifer, and a deeper regional bedrock aquifer within the Silurian aged Melbourne Formation.

The depth to groundwater in the Study Area will vary depending on topography, but is likely to be present between 5 – 10 metres below the ground surface within the upper Newer Volcanics aquifer.

Groundwater salinity in the Newer Volcanics aquifer is expected to range between 1,001 – 3,500 mg/L and is classified as Segment B groundwater. Groundwater salinity in the Melbourne Formation aquifer is expected to range between 3,501 – 13,000 mg/L and is classified as Segment C groundwater.

Geology

The geology within the Study Area comprises predominantly of Miocene to Holocene aged Newer Volcanic Group with tholeiitic to alkalic basalts.

At the location of the former Woody Hill (now the Mountain View Quarries rock quarry) the geology consists of the Silurian aged Melbourne Formation with siltstone and sandstone, mainly thin-bedded.

Geotechnical

Based on the review of available geological information, potential geotechnical constraints that may affect the development of the Study Area include:

- Settlement of proposed road formations and structures – where alluvial clay, weathered basalt and/or unconsolidated fill material are present;
- Slope stability – on steeper inclines and where weathered material is present;
- Bearing capacity – on soft clays, alluvium and/or weathered/vesicular basalt;
- Shrink-swelling – on weathered basalt clays.
- Erosion – along surface water courses.

Recommendations

Potential Environmental Contamination

In accordance with the DSE 2005 guidance, the following recommendations for further assessment works should be considered for those properties assigned '**High**', '**Medium**' and '**Low**' PfC ratings:

- Properties assigned a '**High**' PfC rating, proposed for sensitive land use (i.e. residential, child care centres, pre-school or primary schools) require a Level A Assessment. The DSE 2005 guidance defines a Level A Assessment as an:

'Environmental Audit required by Ministerial Direction No. 1 or the Environmental Audit Overlay when a planning scheme amendment or planning permit application would allow a sensitive use to establish on potentially contaminated land'.

As the only '**High**' PfC rated property was Property 10, the active Mountain View Quarries rock quarry and concrete batching plant, Meinhardt recommends that the application of an Environmental Audit Overlay is appropriate for this property to provide a suitable degree of protection for any future development of the property for more sensitive land uses.

- Properties assigned a '**Medium**' PfC rating, proposed for sensitive land use (i.e. residential, child care centres, pre-school or primary schools) require a Level B Assessment. The DSE 2005 guidance defines a Level B Assessment as a:

'Site assessment from a suitably qualified environmental professional if insufficient information is available to determine if an audit is appropriate. If advised that an audit is not required, default to C'.

Meinhardt recommends that for those properties assigned a '**Medium**' PfC rating a further site assessment should consist of a more detailed site specific Phase 1 ESA, site inspection and, if required, a limited environmental sampling program, to provide a better understanding of potential environmental contamination at the property. These further site assessment works should be undertaken as a planning application requirement, prior to any future redevelopment. If negligible impacts are observed at the property '**Medium**' PfC rated properties may be able to be re-classified to '**Low**' PfC rated properties.

- Properties assigned a '**Low**' PfC rating require Level C Assessment. The DSE General Practice Note defines a Level C Assessment as:

'General duty under Section 12(2)(b) and Section 60(1)(a)(iii) of the Planning and Environment Act 1987'

However, due to the limited nature of the visual site inspection properties assigned a '**Low**' PfC rating may be recommended for assessment in the future, based on receipt of additional information not available at the time of this assessment.

In addition, to the recommendations above for further assessment of identified potential environmental contamination sources/activities, hazardous materials surveys should be carried out for those structures within the Study Area identified for future demolition or relocation.

Hydrology and Hydrogeology Recommendations

The identified surface water features within the Study Area will require feature surveys to provide details of drainage patterns for urban drainage system design. Drainage paths will need to be either maintained, diverted or alternative provided to ensure all areas remain appropriately drained during and after any development.

Geological and Geotechnical Recommendations

It is recommended that detailed geological and geotechnical assessments be completed prior to the detailed design stage for any future development within the Study Area to address the potential issues identified.

1 Introduction

1.1 Background

The City of Whittlesea (Council), in conjunction with the and the Victorian Planning Authority (VPA), is preparing a Precinct Structure Plan (PSP) for Shenstone Park (VPA Ref. PSP 1069.1) which comprises sixteen (16) separate properties over an area of approximately 620 hectares (ha) in the Donnybrook area, within the jurisdiction of City of Whittlesea, Victoria, Australia (the PSP). Meinhardt has been engaged by the Council to prepare a Preliminary Environmental Contamination Assessment (PECA). This assessment will inform the finalisation of the PSP in terms of suitability of nominated land uses.

A site location map is provided as **Figure 1, Appendix A**. The map shows the 16 properties located in the PSP and an area of additional investigation in the surrounding area, which represents a 250 m buffer around the southern and eastern boundaries of the PSP. A total of six (6) additional properties located within this 250 m buffer around the southern and eastern boundaries of the PSP were also included in the assessment. The PSP and six (6) additional properties together comprise the Study Area for the purposes of this assessment (the Study Area).

1.2 Objectives

The overall objective of the PECA is to provide a high-level assessment of the potential for environmental contamination within the Study Area, assessing the nature of potential contaminants to be considered during the design and construction phases. The PECA also includes an assessment of hydrological and geological features of the Study Area which may affect its development.

The key objectives of the PECA assessment were to conduct a desktop study and visual site inspection to:

- Assess the suitability of properties within the Study Area for potential future sensitive land uses and, if required, what level of further assessment may be required to determine suitability of properties for sensitive uses in accordance with the Department Sustainability and Environment (DSE) (now Department of Environment, Land, Water Planning (DELWP)), *Potentially Contaminated Land General Practice Note*, 2005 (DSE 2005);
- Assess the hydrological and geological features of the Study Area to assess potential effects on its proposed development; provide a plan of the Study Area clearly showing which properties were included in the desktop study and which properties have a '**Low**', '**Medium**' or '**High**' Potential for Contamination (PfC) rating; and
- Prepare a report of findings that will be used to inform the design of the PSP for the Study Area (in terms of suitability of land uses nominated for each location/area) and to identify key issues that should be addressed during the detailed design phase and construction.

1.3 Scope of Works

1.3.1 Desktop Review

A desktop review was conducted to evaluate current and previous land uses across the Study Area. An assessment was then made based on this information regarding the potential implications of these current and historic land use activities for potential environmental contamination, along with an assessment of pertinent hydrological and geological features.

The desktop review included a review of documentation from and consultation with:

- Environment Protection Agency Victoria (EPA) for review of records including the Priority Sites Registry and the list of issued Certificates and Statements of Environmental Audit;
- DELWP, Port Phillip & Westernport Catchment Management Authority, Southern Rural Water, Yarra Valley Water and Melbourne Water for groundwater and drainage information and other relevant data;

- Hydrological and geological conditions desktop review, including survey, mapping and other base data as available from relevant authority and agency data sets and maps. This is aimed at identifying potential shortcomings in data coverage;
- Review and summary of any previous reports or studies regarding environmental, hydrological or geological conditions in the Study Area;
- Compilation of known groundwater borehole/well locations and testing results;
- Review of Wetlands databases and Sites of National Environmental Significance; and
- Historical title search of any properties where further historical land use information is needed to establish PfC rating.

1.3.2 Site Inspection

A visual site inspection of the properties within the Study Area to assess them for evidence of current or historical activities which may have the potential to have led to environmental contamination.

Where possible direct access to the individual properties was sought. However, not all properties were able to be accessed at the time of the site inspection. Where direct access to the properties was not possible these properties were assessed visually from adjacent public areas, or properties.

The visual site inspection was conducted following completion of the desktop review, and primarily focused on those areas identified in the desktop review as being of interest to the scope of the assessment.

1.3.3 Reporting

Based on the findings of the desktop assessment and visual site inspection, Meinhardt prepared this report which includes the following:

- A summary of findings and recommendations of the desktop review and visual site inspection for each discipline area (potential environmental contamination, hydrology and geotechnical assessment);
- Provision of summary of findings and resultant recommendations for management and/or remediation in terms of potential environmental contamination and hydrological and geological features;
- Outline of any future testing and more detailed investigations if recommended;
- Evaluation (to the extent practicable within limitations of the scope of works completed) of the suitability of properties for sensitive uses and what level of further assessment would be required to determine suitability of properties for sensitive uses in accordance with the DSE 2005 guidance;
- A plan of the Study Area clearly showing those properties included in the Study Area and which properties have a '**Low**', '**Medium**' or '**High**' PfC rating; and
- Clear and concise drawings/maps, to illustrate existing site conditions.

It should be noted that the scope of works completed for this PECA report was a limited to desktop assessment and visual site inspection only. No sampling and analysis of soils, surface water, groundwater or soil vapour/ground gas was performed as part of the scope of works for the PECA.

1.3.4 Legislative Requirements and Relevant Assessment Guidelines

The scope of work for the PECA was performed in general accordance with requirements outlined in the following documents:

- Australian and New Zealand Environment and Conservation Council (ANZECC) and the National Health and Medical Research Council (NHMRC), *Australian and New Zealand Guideline for the Assessment and Management of Contaminated Sites*, January 1992;
- DSE 2005;
- National Environment Protection Council, *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 (as amended 2013) (NEPM 2013);

- State Environment Protection Policy (SEPP), *Groundwaters of Victoria*, December 1997, No. S160;
- State Environment Protection Policy (SEPP), *Prevention and Management of Contaminated Land*, June 2002, No. S95; and
- State Environment Protection Policy (SEPP), *Waters of Victoria*, October 2004, No. S210.

1.3.5 Limitations

Meinhardt has prepared this PECA report (the Report) for the exclusive use of Council, VPA, regulatory authorities, Auditors and others approved by Council for the purpose of provision of preliminary information regarding potential environmental contamination, hydrological and geological features based on a desktop study and visual site inspection only for the Study Area (comprising the PSP and six (6) additional properties located within a 250 m buffer around the southern and eastern boundaries of the PSP).

The Report must be read with the following caveats and assumptions:

- The limited readership and purposes for which it was intended;
- Its reliance upon information provided to Meinhardt by Council and others which has not been verified by Meinhardt and over which Meinhardt has no control;
- The limitations and assumptions referred to throughout the Report;
- Other relevant issues which are not within the scope of the Report;
- Subject to the limitations referred to above, Meinhardt has exercised all due care in the preparation of the Report and believes that the information, conclusions, interpretations and recommendations of the Report are both reasonable and reliable;
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- This disclaimer must accompany every copy of the Report, which is an integral document and must be read in its entirety.

2 Site Description

2.1 Location and Description

The Study Area includes 22 separate properties: 16 within the PSP itself (approximately 620 ha); and six (6) additional within the 250 m buffer around the southern and eastern boundaries of the PSP (approximately 180 ha), comprising a total area of approximately 800 ha.

A summary of the property details for those properties located within the Study Area is provided in **Table 1**.

Table 1 Property Details

Property No.	Property Address	Legal Description	Approximate Area (ha)
Properties within the PSP			
1	40 Langley Park Drive – Donnybrook	Lot 7 LP118142	12.25
2	90 Langley Park Drive – Donnybrook	Lot 7 LP118142	12.15
3	110 Langley Park Drive – Donnybrook	Lot 5 LP118142	12.19
4	130 Langley Park Drive – Donnybrook	Lot 4 LP118142	15.05
5	840 Donnybrook Road – Donnybrook	Lot 1 LP117710	12.20
6	75 Langley Park Drive – Donnybrook	Lot 1 LP118142	12.11
7	95 Langley Park Drive – Donnybrook	Lot 2 LP118142	12.10
8	125 Langley Park Drive – Donnybrook	Lot 3 LP118142	15.85
9	105 Langley Park Drive – Donnybrook	Lot 3 LP118142	
10	870 Donnybrook Road – Donnybrook	Lot 2 LP132357	89.13
11	910 Donnybrook Road – Donnybrook	Lot 1 LP123641	12.26
12	960 Donnybrook Road – Donnybrook	Lot 1 TP371225	208.3
13	1030 Donnybrook Road – Donnybrook	Lot 1 TP380512	66.23
14	1100 Donnybrook Road – Donnybrook	Lot 1 LP38239	67.35
15	1140 Donnybrook Road – Donnybrook	Lot 1 LP98632	0.30
16	1150 Donnybrook Road – Donnybrook	Lot 2 LP98632	67.38
Properties within 250 m Buffer			
17	620 Summerhill Rd – Wollert	Lot 2 LP116834	-
18	570 Summerhill Rd – Wollert	Lot 1 LP116834	-
19	430 Summerhill Rd – Wollert	Crown Allotment SPI 10A\PP2819	-
20	274 Summerhill Rd – Wollert	Lot 1 TP709759	-
21	825 Epping Road – Woodstock	CP152285	-
22	1190 Donnybrook Road – Donnybrook	Lot 5 LP143205	-

2.2 Land Use within the Study Area

The Study Area generally comprises flat plains/grassland with occasional trees used primarily for non-intensive agricultural purposes such as horse breeding and training, livestock grazing and livestock feed production. Several current and historic farmsteads and rural residential properties are located through the PSP area. The notable exception to this is the active Mountain View Quarries rock quarry (owned by Barro Group Pty Ltd) located in Property 10 (870 Donnybrook Road).

The study area is bound to the west by the Melbourne to Sydney Railroad, to the north by Donnybrook Rd, and to the south and east by agricultural grazing land.

Site location and features figures are presented in **Figure 1 and Figure 2, Appendix A**.

2.3 Surrounding Land Use

The land uses directly adjacent to the Study Area include:

- **North** – The Study Area is bound to the north by Donnybrook Road with farmland with residences and other associated structures (sheds, etc.) present beyond. Merri Creek is located to the north and west of the Study Area. The Donnybrook PSP is located directly to the north and Woodstock PSP is located to the north-east.
- **East** – The Study Area is bound to the east by farmland with residences and other associated structures (sheds, etc.). Epping Road passes from north to south approximately 2 km to the east of the Study Area boundary. Wollert Landfill operated by Hanson Landfill Services is located approximately 3.5 km to the south-east of the Study Area.
- **South** – The Study Area is bound to the south by the future Northern Quarries PSP area, which consists of predominately farmland. Further south (approximately 2.3 km) is Summerhill Plant (owned by Austral Bricks) a former clay brick quarry and manufacturing plant, located in Craigieburn. The former clay brick quarry currently operates as a buildings material supplier (Austral Bricks Clearance Centre).
- **West** – The Study Area is bound to the west by the Melbourne to Sydney railway line which runs from north to south. Beyond the railway is the English Street PSP area, Merri Creek and agricultural land. Merri Creek passes immediately adjacent to the south west corner of the PSP (Property 10).

2.4 Proposed Land Use

This PECA report has been prepared as part of the pre-planning process for the PSP, with specific proposed land uses to be decided in the future (partly based on the outcomes of this PECA report). For the purposes of assessing the suitability of the properties for future land use, Meinhardt has considered those potential land use categories listed in the Land SEPP and Groundwater SEPP, to provide a comprehensive assessment and allow for potential changes which may occur during the design and planning process.

In this case a conservative approach has been adopted, assuming that potential future land use may include 'sensitive' land uses.

2.5 Current Planning Zones and Overlays

A review of the DELWP, Planning Maps Online service indicated that the properties within the Study Area are currently subject to the Planning Zones and Planning Overlays summarised in

Table 2.

Maps and details of the planning zones and overlays within the Study Area are provided in **Appendix B (pp. 37 – 41)**.

Meinhardt notes that neither Properties 2 to 4, 6 to 9 (within the PSP boundary) nor Properties 17 to 22 (in the 250 m buffer zone) are currently zoned as an Urban Growth Zone (UGZ).

Table 2 Current Planning Zones and Overlays

Property No.	Address	Planning Zones	Planning Overlays
Properties within PSP			
1	40 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) 	<ul style="list-style-type: none"> Public Acquisition Overlay 9
2	90 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) 	<ul style="list-style-type: none"> Public Acquisition Overlay 9
3	110 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) 	<ul style="list-style-type: none"> Public Acquisition Overlay 9
4	130 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) Rural Conservation Zone - Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4 Environmental Significance Overlay - Schedule 3 Public Acquisition Overlay 9 Rural Flood Overlay
5	840 Donnybrook Road - Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) 	<ul style="list-style-type: none"> No Overlays
6	75 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) 	<ul style="list-style-type: none"> No Overlays
7	95 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) 	<ul style="list-style-type: none"> No Overlays
8	125 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Farming Zone (FZ) Rural Conservation Zone - Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> No Overlays
9	105 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Rural Conservation Zone - Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4
10	870 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) Special Use Zone – Schedule 4 (covers the extent of the quarry) (SUZ4) 	<ul style="list-style-type: none"> No Overlays
11	910 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) 	<ul style="list-style-type: none"> No Overlays
12	960 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) Rural Conservation Zone - Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4
13	1030 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) 	<ul style="list-style-type: none"> No Overlays
14	1100 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4
15	1140 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) 	<ul style="list-style-type: none"> No Overlays
16	1150 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Urban Growth Zone (UGZ) Farming Zone (FZ) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4

Continued over...

Property No.	Address	Planning Zones	Planning Overlays
Properties within 250 m Buffer			
17	620 Summerhill Rd – Wollert	<ul style="list-style-type: none"> Rural Conservation Zone – Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Rural Floodway Overlay Development Contributions Plan Overlay Heritage Overlay Incorporated Plan Overlay Public Acquisition Overlay Environmental Significance Overlay – Schedule 3 & 4 Land Subject to Inundation Overlay
18	570 Summerhill Rd – Wollert	<ul style="list-style-type: none"> Rural Conservation Zone – Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Rural Floodway Overlay Development Contributions Plan Overlay Heritage Overlay Incorporated Plan Overlay Public Acquisition Overlay Environmental Significance Overlay – Schedule 3 & 4 Land Subject to Inundation Overlay
19	430 Summerhill Rd – Wollert	<ul style="list-style-type: none"> Special Use Zone – Schedule 4 (SUZ4) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4
20	274 Summerhill Rd – Wollert	<ul style="list-style-type: none"> Rural Conservation Zone – Schedule 1 (RCZ1) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 4
21	825 Epping Road – Woodstock	<ul style="list-style-type: none"> Green Wedge Zone (GWZ) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 1 & 5
22	1190 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Green Wedge Zone (GWZ) 	<ul style="list-style-type: none"> Environmental Significance Overlay - Schedule 1 & 5

2.6 Topography

The 1974 1:25,000 scale topography map for the area shows that highest point in the Study Area used to be Woody Hill at an elevation of 290 mAHD, located within the south-western part of Property 10 (in the same area as the Mountain View Quarries rock quarry). Woody Hill was a former eruption point, which rises above the surrounding lava plain (Geological Survey of Victoria, 1973).

However, since quarrying activities commenced circa 1990 at the Mountain View Quarries rock quarry site, the former Woody Hill feature has been effectively removed, razing the former hill down to a level consistent with the surrounding area, at approximately 230 to 240mAHD with the land surrounding the former Woody Hill sloping gently toward the south.

An elevation contours map showing topography within and surrounding the Study Area is provided in **Appendix B (p. 7)**.

2.7 Hydrology and Hydrogeology

Information regarding the hydrology and hydrogeology of the Study Area is based solely on the desktop study. No evaluation of groundwater chemistry was performed as part of this assessment.

2.7.1 Surface Water Assessment

Water Features

The Study Area is located within the Port Phillip and Western Port Catchment. Surface water runoff from within the Study Area is likely to move in a generally south-westerly direction towards Merri Creek and/or other minor tributary water bodies which eventually feed into Merri Creek. Merri Creek forms the south westernmost boundary to the PSP, passing immediately to the south west of

Property 4 and flowing through the south-western part of the Study Area passing through Property 17. Merri Creek flows in a southerly direction, where it eventually discharges into the Yarra River.

An ephemeral water course (unnamed) passes through the central and western parts of the Study Area (through properties 4 to 12), joining Merri Creek in the south-western corner of the Study Area.

Another ephemeral water course (Curly Sedge Creek) starts within the Study Area in the south-eastern part of Property 12, passing out of the Study Area to the south. This also eventually joins with Merri Creek approximately 5 km south of the Study Area.

A final ephemeral water course (unnamed) starts within the Study Area in the northern part of Property 14, passing to the south east through Property 16 and out of the Study Area to the south east. This joins Darebin Creek approximately 1 km south east of the Study Area.

A topographic map of showing the surface water features within the Study Area is provided in **Appendix B (p. 6)**.

Inundation Areas & Floodways

Based on the available information reviewed in the desktop study, none of the properties within the PSP itself are subject to inundation or floodways. However, a Land Subject to Inundation Overlay (LSIO) and Rural Floodway Overlay (RFO) is present in the south-western part of the Study Area where Merri Creek passes through from west to south.

2.7.2 Groundwater Assessment

Regarding the Department of Natural Resources and Environment (DNRE), *Groundwater Beneficial Uses Map for South Western Victoria*, 1994, the groundwater beneath the Study Area is present in two (2) main aquifers, the upper Newer Volcanics aquifer, a fractured rock basalt aquifer, and a deeper regional bedrock aquifer within the Silurian aged Melbourne Formation.

The Department of Environment, Land, Water, and Planning (DELWP) Groundwater Resource Report provides a summary of the typical groundwater characteristics, which are summarised in **Table 3**. The depth to groundwater in Study Area will vary depending on topography, but is likely to be present between 5 – 10 metres below the ground surface within the upper Newer Volcanics aquifer (DELWP 2016).

The Newer Volcanics aquifer system is complex and generally consists of several superimposed basalt flows, often separated by clay and silt aquitards (Leonard 1992). Due to the varying characteristics of different basalt flows, salinity and yield in the Newer Volcanics aquifer can be highly variable over short distances.

2.7.3 Groundwater Resources and Usage

The DELWP *Water Measurement Information System* identified 19 registered boreholes within the Study Area. The bores are registered for the following uses:

- Nine (9) bores registered for domestic and stock use;
- Two (2) bores registered for stock use;
- One (1) bore registered for domestic use;
- One (1) bore registered as non-groundwater; and
- Six (6) bores registered as use 'unknown'.

No bores within the Study Area were registered for industrial groundwater extraction. A map and list of the installation details for the registered boreholes within the Study Area and within a 2 km radius is provided in **Appendix B (pp. 22 – 32)**.

Table 3 Groundwater Aquifers

Aquifer	Depth below surface (mbgl)	Groundwater salinity (mg/L)	Groundwater Segment	Groundwater uses
Newer Volcanics basalt aquifer	5 – 10	1,001 – 3,500	B	Potable mineral water Irrigation Industry Stock water Ecosystem Protection Buildings & services
Silurian Melbourne Formation aquifer	10 – 211	3,501 – 13,000	C	Industry Stock water Ecosystem Protection Buildings & services

Source

DELWP Groundwater Resource Report <http://www.depi.vic.gov.au/water/groundwater/groundwater-resource-reports> (accessed 24 November 2016)

2.8 Wetlands

Wetland classification and mapping was undertaken across Victoria from 1980 onwards culminating in a state-wide wetland inventory. The inventory lists approximately 13,000 naturally occurring wetlands (over one hectare in size) covering about 635,000 hectares. These have been classified into six (6) categories: freshwater meadows, shallow freshwater marshes, deep freshwater marshes, permanent open freshwater wetlands, semi-permanent saline wetlands and permanent saline wetlands.

No wetlands were identified within the Study Area. A wetland immediately to the north of the Study Area was identified and details are provided in **Table 4**.

Table 4 Wetlands in Vicinity of Study Area

Map Sheet	Wetland	Area (ha)	Wetlands - 1994	
			Category	Sub-Category
7822	229427	5.63	Open water	Impoundment

2.9 Geology

The Melbourne Map Sheet (SJ 55-5) in the 1:250,000 Geological Map Series 1997 (Vandenberg, 1997) indicates that the geology within the Study Area comprises predominantly of Miocene to Holocene aged Newer Volcanic Group (Neo2) with tholeiitic to alkalic basalts.

At the location of the former Woody Hill (now the Mountain View Quarries rock quarry) the geology consists of the Silurian aged Melbourne Formation (Sxm) with siltstone and sandstone, mainly thin-bedded.

The cross-section on the Sunbury Map Sheet 1:63,000 (Geological Survey of Victoria 1973), confirms that the geology underlying the Study Area comprises Newer Volcanic (Qvn) deposits to an approximate depth of up to 50 m below ground level (mbgl), underlying the Newer Volcanics is the Dargile Formation (Sud), consisting of interbedded shale, mudstone and greywacke.

A map of the geology within and surrounding the Study Area is provided in **Appendix B (p. 33)**.

2.10 Soil Characteristics

The Australian Soil Resource Information System (ASRIS) map identifies the soils in the Study Area to be Sodosols [SO] classification. Sodosols soils are generally shallow, dark and reddish brown, heavy clays with thin loamy topsoil. Outcrops of basalt rock are common and basalt floaters (boulders) occur extensively. The surface soils in the region are likely to have a pH range between 4.8 - 5.5 and the subsoil a pH range between 6.0 - 6.5.

A soil survey of the Shire of Whittlesea was completed by School of Agriculture, University of Melbourne to provide a background for a study of farming and living conditions (Baldwin 1949). The soils of the basalt plains in Donnybrook consist of Corangamite stony loam on the stony rises, Mooleric clay bordering the stony rises and Grenville clay/loam forming the slopes and plains beyond the influence of the stony rises.

2.11 Acid Sulphate Soils

The ASRIS map indicates that the Study Area.1 has an extremely low probability of being at risk from Acid Sulphate Soils. This was confirmed by reviewing the Coastal Acid Sulphate Soil Hazard Map (UTM Zone 55) for Melbourne – T7822.

2.12 Historical Mining Activity

The Mountain View Quarries rock quarry is located within Property 10 (870 Donnybrook Road). Property 10 has been subdivided into three (3) separate lots, with the quarry located on a lot zoned as a special use zone. The quarry is currently owned by Barro Group Pty Ltd.

Council has provided planning permits for the operation of the quarry and they have advised that commercial excavation of the quarry was first permitted under a planning scheme amendment in 1987, with prior soil sampling and analysis conducted in the 1960's and 1970's. Additionally, a planning permit was granted for the construction of a concrete batching plant ancillary to the existing quarry, in July 2007.

2.13 Expected Geological Conditions

Based on the available information from Sunbury Map Sheet 1:63,000, the geological conditions summarised in **Table 5** are expected to be present in the uppermost 50 mbgl of the soil and rock profile within the Study Area.

In addition, to the general subsurface profile referenced from geological maps, a review of aerial photography was also conducted. This indicated the presence of three (3) surface ephemeral water courses within the Study Area which indicate the presence of localised pockets of soft, unconsolidated alluvial sediments, that are not shown as being present on the geological map.

Table 5 Geological Conditions in the Uppermost 50 mbgl

Layers (0 – 50m BGL)	Material
Upper (<1 mbgl)	Thin layer of topsoil or fill material.
Middle (1-10 mbgl)	Residual silt and clay soil extremely weathered from underlying basalt.
Lower (>10 mbgl)	Bedrock comprising basalt with areas of minor scoria and ash belonging to the Newer Volcanic Group.

2.14 Potential Geotechnical Constraints

Based on the review of available geological information, Meinhardt has prepared a summary of potential geotechnical constraints that may affect the development of the Study Area. This is presented in **Table 6**.

Table 6 Summary of Potential Geotechnical Constraints

Potential Constraints	Discussion
Settlement of proposed road formations and structures	Alluvial clay and silt deposits are typically poorly consolidated and un-lithified, so may settle if unsupported or overloaded. The presence of localised un-engineered fill material may also result in a differential settlement hazard. Dependent on the state of weathering, localised areas of extremely weathered basalt may result in differential settlement of overlying residual clay.
Slope stability	Although the majority of the Study Area has a relatively low surface gradient, steeper slopes are noted around basalt outcrops, the former Woody Hill (now Mountain View Quarries rock quarry) in the south western part of Property 10 and the banks of Merri Creek. Weathered alluvial material or residual material can be susceptible to shallow soil failure (soil creep, slumping and collapse) in areas of increased gradient.
Bearing capacity	Low bearing capacity within soft clay material or unconsolidated alluvial material can result in a loss of stability or potential collapse of structures during the construction phase of the development. The presence of soft material encountered at depth may result in a bearing capacity or settlement hazard for any proposed foundations. Although basalt bedrock is relatively competent the bearing capacity may be significantly reduced if it is vesicular or has been subject to significant weathering processes.
Shrink-swelling	Clay likely to be derived from basalt rock is likely to be moderately to highly reactive, and subject to considerable shrinkage or swelling in response to change in moisture content. Highly expansive clay can cause unexpected ground movements that are able to damage to building foundations, structures and road infrastructure.
Erosion	At least three (3) surface ephemeral water courses are located across the Study Area. It is possible that during flood events these could serve as drainage channels for storm water, resulting in the localised erosion of soft sediment and bedrock.

3 Records Review

3.1 Search of Public Records

3.1.1 Certificates of Title

Land ownership records were reviewed to obtain evidence of current and historical land uses on the properties within the PSP only (properties within the buffer zone were excluded) as the occupation of land owners is often included. While an occupation does not necessarily denote land use for a property, it can give an indication of potential land use.

Current titles and three (3) historic certificates of title were obtained from the Victorian State Government website (Landata) for all properties within the PSP. A summary of the title information for the properties within the PSP is provided in **Table 7**.

Table 7 Summary of Current and Historical Title Information

Property No.	Street Address	Listed Owner Occupation and Dates
1	40 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Currently owned by a Manager from (1977 – present). Owned by a Farmer/Pharmaceutical Chemist from 1969 – 1977. Owned by a Farmer from 1953 – 1969.
2	90 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Currently owned by Yarra Valley Water Corporation (2012 – present). Owned by a Farmer/Pharmaceutical Chemist from 1969 – 1977. Owned by a Farmer from 1953 – 1969.
3	110 Langley Park Drive – Donnybrook	
4	130 Langley Park Drive – Donnybrook	
5	840 Donnybrook Road - Donnybrook	<ul style="list-style-type: none"> Currently privately owned with no listed profession (2007 – present). Owned by a Farmer/Pharmaceutical Chemist from 1969 – 1977. Owned by a Farmer from 1953 – 1969.
6	75 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Currently owned by Yarra Valley Water Corporation (2012 – present). Owned by a Farmer/Pharmaceutical Chemist from 1969 – 1977. Owned by a Farmer from 1953 – 1969.
7	95 Langley Park Drive – Donnybrook	
8	125 Langley Park Drive – Donnybrook	
9	105 Langley Park Drive – Donnybrook	<ul style="list-style-type: none"> Currently owned by Barro Group Pty Ltd (2003 – present). Woody Hill Extractive Industries from 1971 – 2003. Owned by farmers and graziers from 1926 – 1971
10	870 Donnybrook Road – Donnybrook	
11	910 Donnybrook Road – Donnybrook	
12	960 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Currently owned by Donnybrook JV Pty Ltd (2014 – present). Owned by Holcim Australia from 2011 – 2014. Owned by farmers and graziers from 1918 – 2011
13	1030 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Currently owned by Donnybrook JV Pty Ltd (2015 – present). Owned by a Driver from 1983 – unknown. Owned by farmers and graziers from 1918 – 1983
14	1100 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Currently privately owned with no listed profession (1996 – present). Owned by a Driver from 1980 – unknown. Owned by farmers and graziers from 1924 – 1980
15	1140 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Currently privately owned with no listed profession (2016 – present). Owned by a Motor Mechanic from 1983 – unknown. Owned by farmers and graziers from 1924 – 1983
16	1150 Donnybrook Road – Donnybrook	<ul style="list-style-type: none"> Starwood Pty Ltd 1987 – present Owned by farmers and graziers from 1924 – 1987

The review of historic title information indicates that the land within the PSP has been historically owned by farmers and graziers, with the following notable exceptions:

- Property 10 was owned by Woody Hill Extractive Industries from 1971 – 2003 and then by Barro Group Pty Ltd from 2003 – present;
- Property 11 was owned by a Motor Mechanic from 1978 – 1982; and
- Property 15 was owned by a Motor Mechanic from 1983 – unknown.

Copies of current and historic certificates of title are presented in **Appendix C**.

3.1.2 Environmental Protection Authority

A search of Victoria EPA records, including the Priority Sites Registry (PSR) and the list of issued Certificates and Statements of Environmental Audit, was performed to identify properties within the Study Area and within a 2 km radius, that have been listed as having been issued with a clean-up notice or pollution abatement notice (relative to land and/or groundwater) or undergone a statutory environmental audit.

No properties within the Study Area were listed in the EPA records. A former EPA Priority Site was identified to the north of the Study Area, the details of which are summarised in **Table 8**.

Table 8 EPA Recorded Sites in Vicinity of Study Area

Notice	Address	Status	Distance from Study Area	Direction	Issue
90007080	915 Donnybrook Rd, Donnybrook	Previous pollution notice	21 m	North	Not known

A current EPA Works Approval and EPA Licence were noted for a brick manufacturing plant (Austral Bricks) located at 585 Summerhill Rd, Wollert, approximately 2.3 km to the south of the Study Area. A summary of the details of the Works Approval and Licence are provided in **Table 9**.

Table 9 EPA Licenced Activities and Works Approvals in Vicinity of Study Area

Licence / Works Approval No.	Organisation	Address	Distance from Study Area	Direction	Activity
11517 / 1000810	Austral Brick Pty Ltd	585 Summerhill Rd, Wollert	2.3 km	South	H03 Ceramic Works

No recorded EPA Environmental Audits or EPA Groundwater Restricted Use Zones were identified within a 2 km radius of the Study Area.

3.1.3 Local Government Records

Council does not maintain a contaminated site register. As such no information was available regarding properties within the Study Area or its surrounds. However, Meinhardt was able to obtain a record of Council permits granted to properties within the Study Area.

Details of Council permits are provided in **Appendix D**. Relevant permit information is summarised in **Table 10**. Council permit information for potentially contaminating activities includes:

- A concrete batching plant at Property 10; and
- Filling of land at some point prior to 2006 with uncontrolled/unregistered construction fill (i.e. rubble and concrete), specifically noted as '*not clean fill in accordance with EPA requirements*' at Property 16¹.

¹ As detailed in the 'Planning Permit Audit List' provided to Meinhardt by Council.

Table 10 Whittlesea Council Permit Information

Property No.	Address	Year of Application	Development Type	Status	Additional Notes
5	840 Donnybrook Rd, Donnybrook	2015	Advertising Sign(s)	Permit Issued by Council	-
6	75 Langley Park Dr, Donnybrook	1999	Rural Dwelling	Permit Issued by Council	-
10	870 Donnybrook Rd, Donnybrook	2007	Buildings & Works	Permit Issued	Concrete Batching Plant
14	1100 Donnybrook Rd, Donnybrook	2008	Alterations and Additions	Permit Issued by Council	Garage & Verandah
15	1140 Donnybrook Rd, Donnybrook	2000	Swimming Pool	Permit Issued	-
16	1150 Donnybrook Rd, Donnybrook	2005	Filling of Land	Withdrawn	Filling with uncontrolled/unregistered construction fill (i.e. rubble and concrete which was not clean fill in accordance with EPA requirements).

3.1.4 Dangerous Good Licence

To obtain Dangerous Goods License (DGL) information from WorkSafe Victoria a Letter of Authorisation is required from each property owner, before a search for DGLs could be conducted. Letters of authorisation from the property owners have not been, and are not anticipated to be, requested for this assessment and the lack of data regarding DGLs is considered to represent a data gap.

3.1.5 Aerial Photos

Copies of selected aerial photographs dating back to 1966 were obtained for the Study Area. These aerial photos were reviewed to ascertain information about the historic land use in the Study Area and surroundings.

A summary of notable observations from the review of the aerial photographs is provided in **Table 11**. Copies of the historical aerial photographs are provided in **Appendix B (pp. 14 – 20)**.

Table 11 Review of Aerial Photographs

Date	General Site Description
1966	<ul style="list-style-type: none"> The majority of the Study Area appears to be used as grazing farmland. No cropping is evident from the photograph. A number of farmsteads / rural residential properties are located in the north of the Study Area along Donnybrook Rd.
1974	<ul style="list-style-type: none"> No significant change from 1966. The majority of the Study Area appears to be used as grazing farmland. No cropping is evident from the photograph.
1977	<ul style="list-style-type: none"> No significant change from 1974. A dam is located at 960 Donnybrook Rd. The majority of the Study Area appears to be used as grazing farmland. No cropping is evident from the photograph.
1984	<ul style="list-style-type: none"> A dirt road is located at 870 Donnybrook Rd, which leads to the present day Mountain View Quarries rock quarry at the former Woody Hill. No quarrying has commenced. Circular tracks are located at properties 960 Donnybrook Rd and 1100 Donnybrook Rd.
1990	<ul style="list-style-type: none"> Quarrying has commenced on the northern portion of Woody Hill. No significant changes are evident on the remaining properties.
2002	<ul style="list-style-type: none"> Quarrying has been undertaken on the northern and eastern portions of Woody Hill. No significant changes are evident on the remaining properties.
2009	<ul style="list-style-type: none"> No significant changes are evident.
2015	<ul style="list-style-type: none"> The entirety of Woody Hill has been excavated to a level consistent with the surrounding topography. A concrete batching plant is located on the north side of the quarry.

3.1.6 Previous Reports and Documents

Phase 1 Environmental Site Assessments have been completed for other PSPs surrounding the Study Area. These PSPs include:

- Meinhardt, *Donnybrook PSP 1067 - Environmental, Hydrological & Geotechnical Assessment*, 2013;
- Meinhardt, *Woodstock PSP 1096 - Environmental, Hydrological & Geotechnical Assessment*, 2013; and
- Cardo Lane Piper Pty Ltd, *Wollert PSP 1070 - Phase 1 Environmental Site Assessments*, 2012.

The Wollert Phase 1 ESA identified that Wollert Landfill is located approximately 3.5 km to the south-east of the Study Area. The Wollert Landfill is operated by Hanson Landfill Services and accepts putrescible and solid inert waste, asbestos, contaminated soil and recycled products including tyres, car batteries and metals.

The EPA, *Best Practice Environmental Management Guidelines – Siting, Design, Operation and Rehabilitation of Landfills*, Publication 788.3 2015 (BPEM 2015) recommends buffer distances for EPA licenced landfills. The buffer distances for the Type 2 Wollert Landfill are:

- 100 m from surface waters;
- 500 m from buildings and/or structures;
- 1,500 m from an aerodrome for piston-engine propeller driven aircraft; and
- 3,000 m from an aerodrome for jet aircraft.

Based upon the buffer distances recommended in the Landfill BPEM 2015 the Wollert Landfill site would not have and potential buffer zone impacts on the Study Area.

4 Site Inspection

4.1 Summary of Site Inspection Observations

A visual site inspection of the Study Area was conducted by suitably qualified Meinhardt staff on 30 November 2016. Meinhardt predominately observed the properties within the PSP from existing roadways and publicly accessible areas. Aerial photographs (historic and current) and other cartographic sources were used to help identify specific properties, where potentially contaminating activities have or have previously occurred.

During the site inspection conducted on 30 November 2016 Meinhardt was also able to gain access to conduct a limited inspection of the following key properties, selected as they represented the largest properties and/or had been identified as having notable potential sources of environmental impact:

- Property 10 – 870 Donnybrook Road, Donnybrook;
- Property 11 – 910 Donnybrook Road, Donnybrook; and
- Property 12 – 960 Donnybrook Road, Donnybrook.

A photo log containing photographs of the properties within the Study Area is provided in **Appendix E**.

4.1.1 Property 1 - 40 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- The property is currently used for agricultural grazing, with a farm shed and stock yard located in southern portion of the property; and
- Earthworks associated with the construction of the Yarra Valley Water (YVW) Amaroo Branch Sewer are currently taking place, with spoil material stockpiled at the property. The spoil material could potentially contain contaminated soils, which may have the potential to contaminate surface soils on the property.

4.1.2 Property 2 - 90 Langley Park Drive – Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- The property is currently used for agricultural grazing. Old farmhouse sheds, a stock yard, and general waste material (bricks, scrap metal, wooden pallets) were observed at the property; and
- Earthworks associated with the construction of the YVW Amaroo Branch Sewer are currently taking place, with spoil material stockpiled at the property. The spoil material could potentially contain contaminated soils, which may have the potential to contaminate surface soils on the property.

4.1.3 Property 3 - 110 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- The property is currently used for agricultural grazing. Old farmhouse sheds, a stock yard, shipping containers, old cars, farming vehicles and general waste material (bricks, scrap metal, wooden pallets, oil drums) were observed at the property; and
- Earthworks associated with the construction of the YVW Amaroo Branch Sewer are currently taking place, with spoil material stockpiled at the property. The spoil material could potentially contain contaminated soils, which may have the potential to contaminate surface soils on the property.

4.1.4 Property 4 - 130 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property;
- The property is currently used for agricultural grazing. Old farmhouse sheds, a stock yard, farming vehicles and general waste material (bricks, scrap metal, wooden pallets) were observed at the property;
- Earthworks associated with the construction of the YVW Amaroo Branch Sewer are currently taking place, with spoil material stockpiled at the property. The spoil material could potentially contain contaminated soils, which may have the potential to contaminate surface soils on the property; and
- An above ground high voltage transmission power line runs along the southern boundary of the property.

4.1.5 Property 5 - 840 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property; and
- The property is currently used for agricultural grazing. Old farmhouse sheds, a stock yard and farming vehicles were observed at the property.

4.1.6 Property 6 - 75 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property;
- The property is currently used for agricultural grazing. Old farmhouse sheds, farming vehicles, shipping containers and general waste material (bricks, scrap metal, wooden pallets) were observed at the property; and
- An olive grove was observed at the property.

4.1.7 Property 7 - 95 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- The property is currently used for agricultural grazing. Old farmhouse sheds, a stock yard, and farming vehicles and general waste material were observed at the property.

4.1.8 Properties 8 and 9 - 125, 105 Langley Park Drive, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- Rural homesteads are located on the properties;
- The properties are currently used for agricultural grazing. Farmhouse sheds, a stock yard, and farming vehicles were observed at the property; and
- An above ground high voltage transmission power line runs along the southern boundary of the property.

4.1.9 Property 10 - 870 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing, until it began operating as a quarry in circa 1990. Visual assessment of the property identified the following:

- A weighbridge is located at the property entrance off Donnybrook Rd;
- A concrete batching plant is in operation at the property and a bunded above ground diesel tank was observed near the batching plant; and
- A rock crusher is in operation at the property and a second above ground diesel tank was observed near the quarry office.

4.1.10 Property 11 - 910 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural residential homestead is located on the property; and
- Sheds, old cars and general waste material (bricks, scrap metal, wooden pallets) were observed at the property.

4.1.11 Property 12 - 960 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- The property is currently used for agricultural grazing;
- Farm sheds, storage of fuels, a stock yard, farming vehicles were observed at the property;
- General waste material (bricks, scrap metal, wooden pallets) were observed at the property; and
- Evidence of waste burning (appeared to be green waste and wood) was observed at the property.

4.1.12 Property 13 - 1030 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property; and
- Farm sheds, a stock yard, farming vehicles were observed at the property.

4.1.13 Property 14 - 1100 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property;
- Farm sheds, old cars, farming vehicles were observed at the property;
- General waste material (bricks, scrap metal, wooden pallets) were observed at the property; and
- An APA high pressure natural gas transmission pipeline runs from north to south through the property. APA plant infrastructure is located on the north of the property associated with the gas pipeline and adjacent to Donnybrook Road.

4.1.14 Property 15 - 1140 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property; and
- Large sheds were observed at the property.

4.1.15 Property 16 - 1150 Donnybrook Road, Donnybrook

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property; and
- Farm sheds, a stock yard, farming vehicles were observed at the property.

4.1.16 Properties 17 to 21 – 250 m Buffer Zone Properties

Aerial photographs and historical titles indicate that these properties were used for agricultural grazing. Visual assessment of the property identified the following:

- Within the area of investigation Properties 17 to 21 have no buildings or structures. The land appears to be used for agricultural grazing.
- Merri Creek transects Property 17 from north west to south;
- Property 21 has a rural homestead, with farm sheds, stock yards and farming vehicles observed at the property; and
- An above ground high voltage transmission power line transects properties 17 and 18.

4.1.17 Property 22 – 250 m Buffer Zone Property (1190 Donnybrook Road, Donnybrook)

Aerial photographs and historical titles indicate that the property was used for agricultural grazing. Visual assessment of the property identified the following:

- A rural homestead is located on the property; and
- Several farm sheds, a stock yard, farming vehicles and grazing livestock were observed at the property.

4.2 Identified Potential for Environmental Contamination

The information obtained during the visual site inspections identified the following issues which are considered to have the potential to have caused, or continue to cause, environmental contamination of the soil, surface water, groundwater or soil vapour/ground gas within the Study Area:

- Land and facilities used for agricultural farming activities are located in and around the Study Area. Due to the nature of these activities they represent an increased potential risk to the environment through the use of farm machinery (oils, fuels, etc.) and/or agrochemicals (herbicides, pesticides, etc.), and should be assessed accordingly.
- Agricultural and residential buildings and facilities have the potential for the presence of asbestos containing materials (ACM) within building materials. Asbestos is harmful to health and if discovered during construction works in buildings or in soils must be removed by a licenced contractor.
- Fuel storage, fuelling and farm machinery maintenance operations have occurred and may continue to occur on the rural holdings within the Study Area. Hydrocarbons present in fuels pose risk to the environment as even minor spill incidents can result in significant environmental impacts. Due to the rural nature of these properties and historic agricultural connection, many properties may have been subject to current or historical fuel and oils storage and use.
- Heavy plant equipment and farm equipment is stored, utilised, and possibly maintained on several properties within the Study Area. Heavy plant equipment has increased potential for environmental degradation due to increased volumes of chemical oils and greases required for maintenance. Leakage is also common from these vehicles, which can be stationary for long periods of the year, resulting in point sources of contamination. This is especially relevant to Property 10 (Mountain View Quarries rock quarry).
- The Mountain View Quarries rock quarry and concrete batching plant is located at Property 10. Operations at this Property include blasting, crushing, screening, stockpiling and conveying of rock. The batching plant includes operations to produce concrete. Noise and dust emissions are associated with these operations. Above ground diesel tanks were also observed at the quarry and at the concrete batching plant. EPA Publication 1518, *Recommended Separation Distances for*

Industrial Residual Air Emissions, 2013 (EPA 2013), recommends that a 500 m separation distance is applied for quarries with blasting and 250 m for quarries without blasting. Meinhardt understands that blasting is conducted at the Mountain View Quarries rock quarry. For a concrete batching plant producing >5,000 tonnes per year the recommended separation distance is 100 m.

- Chemical and organic contaminants from agricultural operations (fertilisers, pesticides, herbicides and animal wastes) within the Study Area have the potential for environmental degradation by increasing toxicity, faecal coliforms in ground and surface waters, or by causing eutrophication within surrounding water features.
- Materials stockpiled within or near the Study Area (e.g. soil stockpiles) have the potential to silt up water bodies and/or to contain contaminants which can cross contaminate soils or that can be harmful to the environment.
- Over irrigation of land within and surrounding the Study Area has the potential to act as a flow path for contaminants related to agricultural activity.

A summary of activities that have potential for environmental degradation at each property is provided in **Table 12**.

Table 12 Properties Noted with Activities with the Potential for Contamination

Property ID	Property Uses	Potentially Contaminating Activities	Potential Contaminants
1, 2, 3 & 4	<ul style="list-style-type: none"> • Historic & current farmstead • Grazing farmland • Farming sheds • YVW sewer construction 	• Equipment Storage & Maintenance	• Heavy Metals, TPH, BTEX, PAH, Solvents & Asbestos
		• Fuelling Operations and Fuel Storage	• Heavy Metals, TPH, BTEX, PAH
		• Farming Activities (including effluent pits, stock yards and animal waste burial pits)	• Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms
		• Soil/Rock stockpiling associated with the YVW sewer construction earthworks	• Heavy Metals, Acid Sulphate Soils, TPH & PAH.
		• Structures (Including possible Septic Tanks)	• Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms
5, 6, 7, 8, 9, 12, 13, 14 & 22*	<ul style="list-style-type: none"> • Historic & current farmstead • Grazing farmland • Farming sheds 	• Equipment Storage & Maintenance	• Heavy Metals, TPH, BTEX, PAH, Solvents & Asbestos
		• Fuelling Operations and Fuel Storage	• Heavy Metals, TPH, BTEX, PAH
		• Farming Activities (including effluent pits, stock yards and animal waste burial pits)	• Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms
		• Structures (Including possible Septic Tanks)	• Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms

Continued over...

Property ID	Property Uses	Potentially Contaminating Activities	Potential Contaminants
10	<ul style="list-style-type: none"> Historic grazing farmland Quarry operations Concrete batching plant 	<ul style="list-style-type: none"> Equipment Storage & Maintenance 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH, Solvents & Asbestos
		<ul style="list-style-type: none"> Fuelling Operations and Fuel Storage (i.e. above ground fuel storage tanks) 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH
		<ul style="list-style-type: none"> Structures (Including possible Septic Tanks) 	<ul style="list-style-type: none"> Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms
		<ul style="list-style-type: none"> Farming Activities (including effluent pits, stock yards and animal waste burial pits) 	<ul style="list-style-type: none"> Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms
		<ul style="list-style-type: none"> Quarrying operations generating noise and dust emissions 	<ul style="list-style-type: none"> Dust particles: PM10 (Particles with mean aerodynamic diameter less than 10 microns) PM2.5 (Particles with mean aerodynamic diameter less than 2.5 microns) Respirable crystalline silica (defined as the PM2.5 fraction)
		<ul style="list-style-type: none"> Concrete batching plant generating dust emissions 	
11 & 15	<ul style="list-style-type: none"> Historic grazing farmland Rural residential property 	<ul style="list-style-type: none"> Equipment Storage & Maintenance 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH, Solvents, ACM and hazardous building materials.
		<ul style="list-style-type: none"> Fuelling Operations and Fuel Storage 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH
		<ul style="list-style-type: none"> Farming Activities (including effluent pits, stock yards and animal waste burial pits) 	<ul style="list-style-type: none"> Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms
		<ul style="list-style-type: none"> General waste (i.e. scrap metal, wood pallets, old cars) 	<ul style="list-style-type: none"> Heavy Metals, TPH & PAH.
		<ul style="list-style-type: none"> Structures (Including possible Septic Tanks) 	<ul style="list-style-type: none"> Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms
16	<ul style="list-style-type: none"> Known historical uncontrolled/unregistered filling Historic & current farmstead Grazing farmland Farming sheds 	<ul style="list-style-type: none"> Known filling with construction fill (i.e. rubble and concrete which is not clean fill in accordance with EPA requirements). 	<ul style="list-style-type: none"> ACM, Heavy Metals, TPH, BTEX, PAH, Solvents
		<ul style="list-style-type: none"> Equipment Storage & Maintenance 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH, Solvents & Asbestos
		<ul style="list-style-type: none"> Fuelling Operations and Fuel Storage 	<ul style="list-style-type: none"> Heavy Metals, TPH, BTEX, PAH
		<ul style="list-style-type: none"> Farming Activities (including effluent pits, stock yards and animal waste burial pits) 	<ul style="list-style-type: none"> Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms
		<ul style="list-style-type: none"> Structures (Including possible Septic Tanks) 	<ul style="list-style-type: none"> Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms

Continued over...

Property ID	Property Uses	Potentially Contaminating Activities	Potential Contaminants
17, 18, 19, 20 & 21*	<ul style="list-style-type: none"> Grazing farmland 	<ul style="list-style-type: none"> No visible potential for serious contaminating activities. Site may have potential for contamination due to use of agrochemicals as part of farming operations. 	<ul style="list-style-type: none"> Fertiliser / Herbicide / Pesticides

Notes

TPH - Total Petroleum Hydrocarbons

BTEX - Benzene, Toluene, Ethyl benzene, Xylene

PAH - Poly Aromatic Hydrocarbons

* Only those parts of Properties 17 to 22 which lie within the 250 buffer zone around the PSP have been assessed.

4.3 Key Concerns

The key concerns for potential environmental contamination within the Study Area are anticipated to be the potential impacts associated with contaminants in soil, surface water, groundwater and soil vapour/ground gas, for site construction workers and/or future residents who may come into direct contact with potentially contaminated materials. Additionally, there is potential for on and off-site impacts to the environment resulting from the mobilisation of contamination at the identified potential areas of concern from surficial runoff during inclement conditions and/or through the sub-surface via transport in groundwater, particularly during construction when the areas identified would be disturbed. Soil contamination also has the potential to be mobilised through the generation of dust and tracking of soils during construction in each of the potential areas of concern.

As described earlier in this report, other concerns relate to geotechnical and watercourse constraints. An intrusive site-specific geotechnical investigation would be required to fully identify potential geotechnical constraints for development. Additionally, there are watercourses and dams present across the Study Area which will require consideration during future planning and development stages.

5 Qualitative Risk Assessment

A qualitative risk assessment approach was used to assess for potential environmental contamination issues across the Study Area. This approach is adopted from the Standards Australia and Standards New Zealand, AS/NZS ISO 31000: 2009 - Risk Management Principles and Guidelines, 2009 and the Australian Standards, Handbook for Environmental Risk Management – Principles and Processes, 2006.

The qualitative risk assessment for potential contamination sources has been developed in line with guidance outlined in DSE 2005 guidance which classifies potentially contaminating activities as having a '**High**', '**Medium**' or '**Low**' PFC rating.

Table 13 summarises the likelihood of a selected source and receptor being linked by an identified pathway. **Table 14** provides a summary of the severity of a consequence occurring, assuming the selected source and receptor are linked by the identified pathway.

Table 13 Qualitative Measures of Likelihood

Indicator	Frequency
Almost certain	Is expected to occur almost all of the time (95 to 100%)
Likely	Is expected to occur most of the time (55 to 95%)
Probable	Might occur (45 to 55%)
Unlikely	Might occur but not expected to (5 to 45%)
Rare	Only expected to occur under atypical conditions (0 to 5%)

Table 14 Qualitative Measures of Impact

Consequences	LikelihoodFg
Very High	There is a high probability that severe harm to a designated receptor could arise from an identified source, without appropriate remedial action.
High	A designated receptor is likely to experience significant harm from an identified source, without remedial action.
Medium	It is possible that harm could arise to a specific receptor, but it is unlikely that such harm would be significant.
Low	It is possible that harm could arise to a designated receptor, though it is likely to be mild.
Negligible	The presence of the identified source does not give rise to the potential to cause significant harm.

The overall 'Risk Classification' considers the likely effect on a given receptor, taking account of both of the previous rankings (i.e. consequence and likelihood). The risk classifications are assigned using the consequence/likelihood matrix detailed in **Table 15**.

Table 15 Overall Risk Matrix

Consequence	Likelihood				
	Almost Certain	Likely	Probable	Not Likely	Rare
Severe	VERY HIGH	VERY HIGH	HIGH	HIGH	MEDIUM
High	VERY HIGH	HIGH	HIGH	MEDIUM	LOW
Medium	HIGH	HIGH	MEDIUM	MEDIUM	LOW
Low	MEDIUM	MEDIUM	MEDIUM	LOW	LOW
Negligible	LOW	LOW	LOW	LOW	LOW

Based on the findings from the desktop study, the visual site inspections and our understanding of the future land uses for the PSP, the overall likelihood or risk of contamination being encountered at each individual property has been assessed in **Table 16**.

Table 16 Qualitative Risk Assessment

Property Nos	Potential Sources / Contaminants	Critical Receptors / Pathways	Likelihood	Potential Consequence	Risk Classification
1, 2, 3 & 4	<ol style="list-style-type: none"> Source: Equipment Storage & Maintenance Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Fuelling Operations and Fuel Storage Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Farming Activities (including effluent pits, stock yards and animal waste burial pits). Contaminants: Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms Source: Soil/Rock stockpiling associated with sewer construction earthworks Contaminants: Heavy Metals, Acid Sulphate Soils, TPH & PAH. Source: Structures (Including possible Septic Tanks) Contaminants: Lead, Asbestos, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms 	<ol style="list-style-type: none"> Human receptors: Current site users, future site users including construction workers, adjacent site users Potential Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Potential Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Probable	Medium	MEDIUM
5, 6, 7, 8, 9, 12, 13, 14 & 22*	<ol style="list-style-type: none"> Source: Equipment Storage & Maintenance Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Fuelling Operations and Fuel Storage Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Farming Activities (including effluent pits, stock yards and animal waste burial pits). Contaminants: Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms Source: Structures (Including possible Septic Tanks) Contaminants: Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms 	<ol style="list-style-type: none"> Human receptors: Current site users, future site users including construction workers, adjacent site users. Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Probable	Medium	MEDIUM

Property Nos	Potential Sources / Contaminants	Critical Receptors / Pathways	Likelihood	Potential Consequence	Risk Classification
10	<ol style="list-style-type: none"> Source: Equipment Storage & Maintenance Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Fuelling Operations and Fuel Storage Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Quarrying operations & concrete batching plant Contaminants: PM10 (Particles with mean aerodynamic diameter less than 10 microns), PM2.5 (Particles with mean aerodynamic diameter less than 2.5 microns), Respirable crystalline silica (defined as the PM2.5 fraction) 	<ol style="list-style-type: none"> Human receptors: Current Site users, future site users including construction workers, adjacent site users. Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Probable	High	HIGH
11, 15	<ol style="list-style-type: none"> Source: Equipment Storage & Maintenance Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Fuelling Operations and Fuel Storage Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Structures (Including possible Septic Tanks) Contaminants: Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms 	<ol style="list-style-type: none"> Human receptors: Current site users, future site users including construction workers, adjacent site users Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Probable	Medium	MEDIUM

Property Nos	Potential Sources / Contaminants	Critical Receptors / Pathways	Likelihood	Potential Consequence	Risk Classification
16	<ol style="list-style-type: none"> Source: Known historical uncontrolled/unregistered filling on the property with construction fill (i.e. rubble and concrete) not clean fill in accordance with EPA requirements. Contaminants: ACM, Heavy Metals, TPH, BTEX, PAH, Solvents Source: Equipment Storage & Maintenance Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Fuelling Operations and Fuel Storage Contaminants: Heavy Metals, TPH, BTEX, PAH, Solvents Source: Farming Activities (including effluent pits, stock yards and animal waste burial pits). Contaminants: Heavy Metals, Pesticides, Herbicides, Fertilisers, TPH, PAH, Faecal Coliforms Source: Structures (Including possible Septic Tanks) Contaminants: Lead, ACM, hazardous building materials, Pesticides, Herbicides, Faecal Coliforms 	<ol style="list-style-type: none"> Human receptors: Current site users, future site users including construction workers, adjacent site users. Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Probable	Medium	MEDIUM
17, 18, 19, 20 & 21*	<ol style="list-style-type: none"> Source: Grazing farmland Contaminants: Pesticides, Herbicides, Fertilisers 	<ol style="list-style-type: none"> Human receptors: Current site users, future site users including construction workers, adjacent site users Pathways: Dermal contact, ingestion, and inhalation Environmental receptors: Groundwater, surface water, flora & fauna Pathways: Permeation through soil profile, perched groundwater flow, surface runoff leaching and uptake 	Not Likely	Low	LOW

Notes

* Only those parts of Properties 17 to 22 which lie within the 250 buffer zone around the PSP have been assessed.

6 Conclusions and Recommendations

6.1 Conclusions

6.1.1 Potential Environmental Contamination

Based upon the findings of the desktop study and visual site inspections detailed and the outcomes of the qualitative risk assessment conducted in this PECA report, the risk for potential contamination to soil, surface water, groundwater and soil; vapour/ground gas in the Shenstone Park (VPA Ref. PSP 1069.1) and a surrounding 250 m buffer zone to the south and east (the Study Area) has been assessed on a property by property basis.

Table 17 and **Figure 3, Appendix A** provide a summary of the PfC rating for each property in the Study Area.

Of the 16 properties within the PSP area:

- One (1) property was classified as having '**High**' potential contamination risk; and
- 15 properties were classified as having a '**Medium**' potential contamination risk;

Of the six (6) properties located within the 250 m buffer zone:

- One (1) property was classified as having a '**Medium**' PfC rating; and
- Five (5) properties were classified as having a '**Low**' PfC rating.

The assessments of the PfC rating for each property have been made in accordance with the DSE 2005 guidance.

Properties with a High Potential for Contamination Rating

Property 10 (870 Donnybrook Rd) is currently occupied by the active Mountain View Quarries rock quarry and concrete batching plant. In accordance with the DSE 2005 guidance this property was given a '**High**' PfC rating (concrete production is considered a high contamination risk). Potential contamination and environmental issues associated with the property include:

- Quarrying operations such as blasting, crushing, screening, stockpiling and conveying of rock generating dust particles that impact on off-site residents; and
- Concrete batching operations generating dust particles that impact on off-site residents.

EPA Publication 1518 *Recommended Separation Distances for Industrial Residual Air Emissions* recommends that a 500 m separation distance is applied for quarries with blasting and 250 m for quarries without blasting (EPA 2013). Meinhardt understands that blasting is conducted at the Mountain View Quarries rock quarry and concrete batching plant. For a concrete batching plant producing >5,000 tonnes per year the recommended separation distance is 100 m.

Council and VPA have informed Meinhardt that they are in the process of undertaking a separate assessment in relation to the Mountain View Quarries rock quarry and concrete batching plant (Property 10) to assess whether it has the potential to impact the PSP.

Properties with a Medium Potential for Contamination Rating

In general, properties with historical or current farmsteads with associated farm infrastructure were given a '**Medium**' PfC rating, as farming operations and infrastructure have significant potential for use of pesticides, herbicides and storage of chemicals and fuels, resulting in environmental degradation and or potential environmental contamination. Smaller rural residential properties were also observed to have ancillary sheds and outbuildings with the potential for storage of chemicals and fuels were given a '**Medium**' PfC rating.

In particular, Property 16 was noted to have been subject to uncontrolled/unregistered filling on the property with construction fill (i.e. rubble and concrete which was not clean fill in accordance with EPA requirements) at some point prior to 2006.

Properties with a Low Potential for Contamination Rating

Those properties assigned a '**Low**' PfC rating were generally those which were used for solely agricultural purposes, such as grazing, without the presence of site buildings or structures.

Potential Off- Site Impacts/Issues

The Summerhill Plant (Austral Bricks) is located approximately 2.3 km to the south of the Study Area. This is a clay brick manufacturing plant, located in Craigieburn. A Phase 1 ESA (Cardno 2012) conducted for the Wollert PSP 1070 indicates that the property was used as quarry from 1966 and was then converted to a clay brick manufacturing plant. The Phase 1 ESA indicates the property currently operates as a buildings material supplier (Austral Bricks Clearance Centre); however, it is possible that brick manufacturing still occurs as Austral Brick contains an active EPA Licence for brick manufacturing.

EPA Publication 1518 Recommended Separation Distances for Industrial Residual Air Emissions recommends a 250 m buffer zone for a brick manufacturing plant. Therefore, if the Austral Plant is still operational it will not constrain development within the Study Area.

6.1.2 Potential Hydrology and Hydrogeology Constraints

There is no land subject to inundation or floodways within the PSP area. An inundation overlay and rural floodway overlay is located to the south-western part of the wider Study Area along the Merri Creek flow path.

6.1.3 Potential Geological and Geotechnical Constraints

The key potential geotechnical constraints that may affect the development of the Study Area are:

- Differential settlement of overlying residual clay in localised areas of extremely weathered basalt;
- Shallow soil failure (soil creep, slumping, collapse) in areas of increased gradient;
- The presence of soft material encountered at depth may result in a bearing capacity or settlement hazard for any proposed foundations;
- Clay likely to be derived from basalt rock is likely to be subject to considerable shrinkage or swelling in response to change in moisture content. Highly expansive clay can cause unexpected ground movements which can damage to building foundations, structures and road infrastructure; and
- Ephemeral watercourses crossing the Study Area may serve as drainage channels for storm water during flood events, resulting in the erosion of soft sediment and bedrock.

6.2 Recommendations

6.2.1 Environmental Contamination Recommendations

In accordance with the DSE 2005 guidance document, the following recommendations for further assessment works should be considered for those properties assigned '**High**', '**Medium**' and '**Low**' PfC ratings:

- Properties assigned a '**High**' PfC rating, proposed for sensitive land use (i.e. residential, child care centres, pre-school or primary schools) require a Level A Assessment. The DSE 2005 guidance defines a Level A Assessment as an:

'Environmental Audit required by Ministerial Direction No. 1 or the Environmental Audit Overlay when a planning scheme amendment or planning permit application would allow a sensitive use to establish on potentially contaminated land'.

As the only '**High**' PfC rated property was Property 10, the active Mountain View Quarries rock quarry and concrete batching plant, Meinhardt recommends that the application of an Environmental Audit Overlay is appropriate for this property.

- Properties assigned a '**Medium**' PfC rating, proposed for sensitive land use (i.e. residential, child care centres, pre-school or primary schools) require a Level B Assessment. The DSE 2005 guidance defines a Level B Assessment as a:

'Site assessment from a suitably qualified environmental professional if insufficient information is available to determine if an audit is appropriate. If advised that an audit is not required, default to (assessment level) C'.

Meinhardt recommends that for those properties assigned a '**Medium**' PfC rating a further site assessment should consist of a more detailed site specific Phase 1 ESA, site inspection and, if required, a limited environmental sampling program, to provide a better understanding of potential environmental contamination at the property. These further site assessment works should be undertaken as a planning application requirement, prior to any future redevelopment. If negligible impacts are observed at the property '**Medium**' PfC rated properties may be able to be re-classified to '**Low**' PfC rated properties.

- Properties assigned a '**Low**' PfC rating require Level C Assessment. The DSE General Practice Note defines a Level C Assessment as:

'General duty under Section 12(2)(b) and Section 60(1)(a)(iii) of the Planning and Environment Act 1987'

However, due to the limited nature of the visual site inspection properties assigned a '**Low**' PfC rating may be recommended for assessment in the future, based on receipt of additional information not available at the time of this assessment.

In addition, to the recommendations above for further assessment of identified potential environmental contamination sources/activities, hazardous materials surveys should be carried out for those structures within the Study Area identified for future demolition or relocation. These surveys should assess ACM, lead-based paint, polychlorinated biphenyls in electrical fixtures, hazardous materials storage and any other hazardous building materials present. Should ACM be encountered during future investigations or construction, the testing, inspection and removal of this material is required by law to be undertaken by a suitably qualified and licensed asbestos specialist/removalist.

6.2.2 Hydrology and Hydrogeology Recommendations

The identified surface water features within the Study Area will require feature surveys to provide details of drainage patterns for urban drainage system design. Drainage paths will need to be either maintained, diverted or alternative provided to ensure all areas remain appropriately drained during and after any development.

6.2.3 Geological and Geotechnical Recommendations

It is recommended that detailed geological and geotechnical assessments be completed prior to the detailed design stage for any future development within the Study Area to address the potential issues raised in **Section 6.1.3**.

Table 17 Site Contamination Potential within the Study Area

Property No	Address	Legal Description	Area (Ha)	Historic Activity	Current Activity	Contamination Potential
1	40 Langley Park Drive – Donnybrook	Lot 7 LP118142	12.25	Grazing Farmland	Grazing Farmland / Shed / Stock Yard	Medium
2	90 Langley Park Drive – Donnybrook	Lot 7 LP118142	12.15	Grazing Farmland	Grazing Farmland / Sheds / Stock Yard	Medium
3	110 Langley Park Drive – Donnybrook	Lot 5 LP118142	12.19	Grazing Farmland	Grazing Farmland / Sheds / Stock Yard	Medium
4	130 Langley Park Drive – Donnybrook	Lot 4 LP118142	15.05	Grazing Farmland	Rural Residential / Grazing Farmland / Sheds / Stock Yard	Medium
5	840 Donnybrook Road – Donnybrook	Lot 1 LP117710	12.20	Grazing Farmland	Rural Residential / Grazing Farmland / Sheds / Stock Yard	Medium
6	75 Langley Park Drive – Donnybrook	Lot 1 LP118142	12.11	Grazing Farmland	Rural Residential / Grazing Farmland / Sheds / Olive Grove	Medium
7	95 Langley Park Drive – Donnybrook	Lot 2 LP118142	12.10	Grazing Farmland	Rural Residential / Grazing Farmland / Sheds	Medium
8	125 Langley Park Drive – Donnybrook	Lot 3 LP118142	15.85	Grazing Farmland	Rural Residential / Grazing Farmland / Sheds / Stock Yard	Medium
9	105 Langley Park Drive – Donnybrook					
10	870 Donnybrook Road – Donnybrook	Lot 2 LP132357	89.13	Grazing Farmland / Rock Quarry	Concrete Batching Plant / Rock Quarry	High
11	910 Donnybrook Road – Donnybrook	Lot 1 LP123641	12.26	Grazing Farmland	Rural Residential / Sheds	Medium
12	960 Donnybrook Road – Donnybrook	Lot 1 TP371225	208.3	Grazing Farmland	Grazing Farmland / Shed	Medium
13	1030 Donnybrook Road – Donnybrook	Lot 1 TP380512	66.23	Grazing Farmland	Farmhouse / Grazing Farmland / Sheds / Stock Yard	Medium

Property No	Address	Legal Description	Area (Ha)	Historic Activity	Current Activity	Contamination Potential
14	1100 Donnybrook Road – Donnybrook	Lot 1 LP38239	67.35	Grazing Farmland	Farmhouse / Grazing Farmland / Sheds / Stock Yard	Medium
15	1140 Donnybrook Road – Donnybrook	Lot 1 LP98632	0.30	Grazing Farmland	Rural Residential / Sheds	Medium
16	1150 Donnybrook Road – Donnybrook	Lot 2 LP98632	67.38	Grazing Farmland and known unregistered/ uncontrolled filling	Farmhouse / Grazing Farmland / Sheds / Stock Yard	Medium
17	620 Summerhill Rd – Wollert	Lot 2 LP116834	-	Grazing Farmland	Grazing Farmland	Low
18	570 Summerhill Rd – Wollert	Lot 1 LP116834	-	Grazing Farmland	Grazing Farmland	Low
19	430 Summerhill Rd – Wollert	Crown Allotment SPI 10A\PP2819	-	Grazing Farmland	Grazing Farmland	Low
20	274 Summerhill Rd – Wollert	Lot 1 TP709759	-	Grazing Farmland	Grazing Farmland	Low
21	825 Epping Road – Woodstock	CP152285	-	Grazing Farmland	Grazing Farmland	Low
22	1190 Donnybrook Road – Donnybrook	Lot 5 LP143205	-	Grazing Farmland	Farmhouse / Grazing Farmland / Sheds / Stock Yard	Medium

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8 Limitations

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The extent of historic sampling of soil, surface water, groundwater and soil vapour/ground gas in the Study Area is extremely limited, or non-existent. As such, there is still the potential for additional contamination to exist in unexpected locations, or from unexpected/unknown sources.

soil, surface water, groundwater and soil vapour/ground gas conditions are often variable, resulting in heterogeneous contaminant distributions across a Site. Boundaries between zones of variable contamination are often indistinct, and can only be interpreted based on available information and the application of professional judgement.

Meinhardt accepts no liability for the findings or conclusions made by consultants external to Council regarding the history of the investigation area and its surrounding properties. This report does not provide a complete assessment of the environmental status of the Study Area, and it is limited to the scope defined herein. Should new information become available regarding conditions at the Study Area including previously unknown sources of contamination, Meinhardt reserves the right to review the report in the context of the additional information.