Expert Opinion

Whittlesea Planning Scheme Amendment C214WSEA: Shenstone Park Precinct Structure Plan

Subject Site: 1150 Donnybrook Road, Donnybrook

Prepared for:

1150 Donnybrook Road Pty Ltd

Panel Hearing

October 2020

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Areas of Expertise
Key areas of expertise relevant to this report are summarised below
- Assessment of drainage and flood related issues
- Stormwater management planning

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Areas of Expertise
Key areas of expertise relevant to this report are summarised below
- Assessment of drainage and flood related issues
- Stormwater management planning

Scope of Contribution
Rianda assisted in the preparation of this report, including background data reviews and preparation of materials, under my supervision.

3 Scope of the Report

In relation to the Whittlesea Planning Scheme Amendment C214WSEA: Shenstone Park Precinct Structure Plan and the subject site 1150 Donnybrook Road, Donnybrook, I have been engaged to act as an expert on stormwater management issues relevant to the subject site (1150 Donnybrook Road, Donnybrook).

I have been asked to review the Amendment and provide evidence in relation to drainage matters.

4 Basis of this Report

This report is based on:

- Review of the Shenstone Park Precinct Structure Plan – VPA, City of Whittlesea, October 2020.
- Review of the following supporting documents, including:
    - Shenstone Park Background Report – VPA, September 2019
    - Shenstone Park Precinct Structure Plan (PSP 1069.1), Donnybrook, Victoria: Post-Contact Heritage Assessment – Ecology and Heritage Partners Pty Ltd May 2017
    - Shenstone Park PSP assessment, Hydrologic regime report – Alluvium, February 2018
    - Geomorphology and Vegetation Values Assessment - Drainage - Alluvium - February 2018
    - Planning Scheme Ordinance documents – various
    - PSP Submission 12 – Shenstone Park PSP 1150 Donnybrook Rd – Tract, November 2019
    - PSP Submission 18 – Yarra Valley Water comments – Yarra Valley Water, November 2019
    - PSP Submission 19 – Melbourne Water review of PSA C241Wsea – Melbourne Water October 2019
    - PSP Submission 20 – 1100 Donnybrook Rd Developments Pty Ltd – Dominion Property Group, November 2019
    - PSP Submission 25 – Submission by the Merri Creek Management Committee – Merri Creek Management Committee, November 2019
    - PSP Submission 32 - Planning Scheme Amendment C241wsea – Council Submission
- Previous reports, memorandums and addendums completed by Rain Consulting Pty Ltd, including:
    - Lot 2, 1150 Donnybrook Road, Donnybrook – Stormwater Management Plan – October 2019
    - MWA-1168020: Lot 2, 1150 Donnybrook Road – Addendum to the SWMS – 8 May 2020
    - MWA-1168020: Lot 2, 1150 Donnybrook Road – Response to MW – 1 September 2020

5 Introduction

I have been instructed by Best Hooper Lawyers on behalf of 1150 Donnybrook Road Pty Ltd to provide expert evidence in relation to drainage matters significant to the subject site for Amendment C214 to the Whittlesea Planning Scheme.

6 Background

6.1 Locality

The subject site ("the site") sits at 1150 Donnybrook Road, Donnybrook. The site is zoned as UGZ2 (Urban Growth Zone) and RCZ1 (Rural Conservation Zone) as shown in Figure 6-1.

The 67-ha site is located approximately 30 km due north of Melbourne. As shown in Figure 6-2 , the site is bound by Donnybrook Road to the North. A branch of Darebin Creek passes through the property and the UGZ boundary follows the eastern boundary. The Olivine development by Mirvac is north of the site.

Elevations across the site are shown in Figure 6-3. The site is at its highest along the northern boundary, with elevations reaching 239 m AHD. The lowest elevation is seen in the south-east corner of the site, with an elevation of approximately 223 m AHD. The site is split into two catchment areas, the 'North Catchment' and the 'South Catchment'.

The site is covered by the Woodstock West (4566) Developer Services Scheme (DSS).

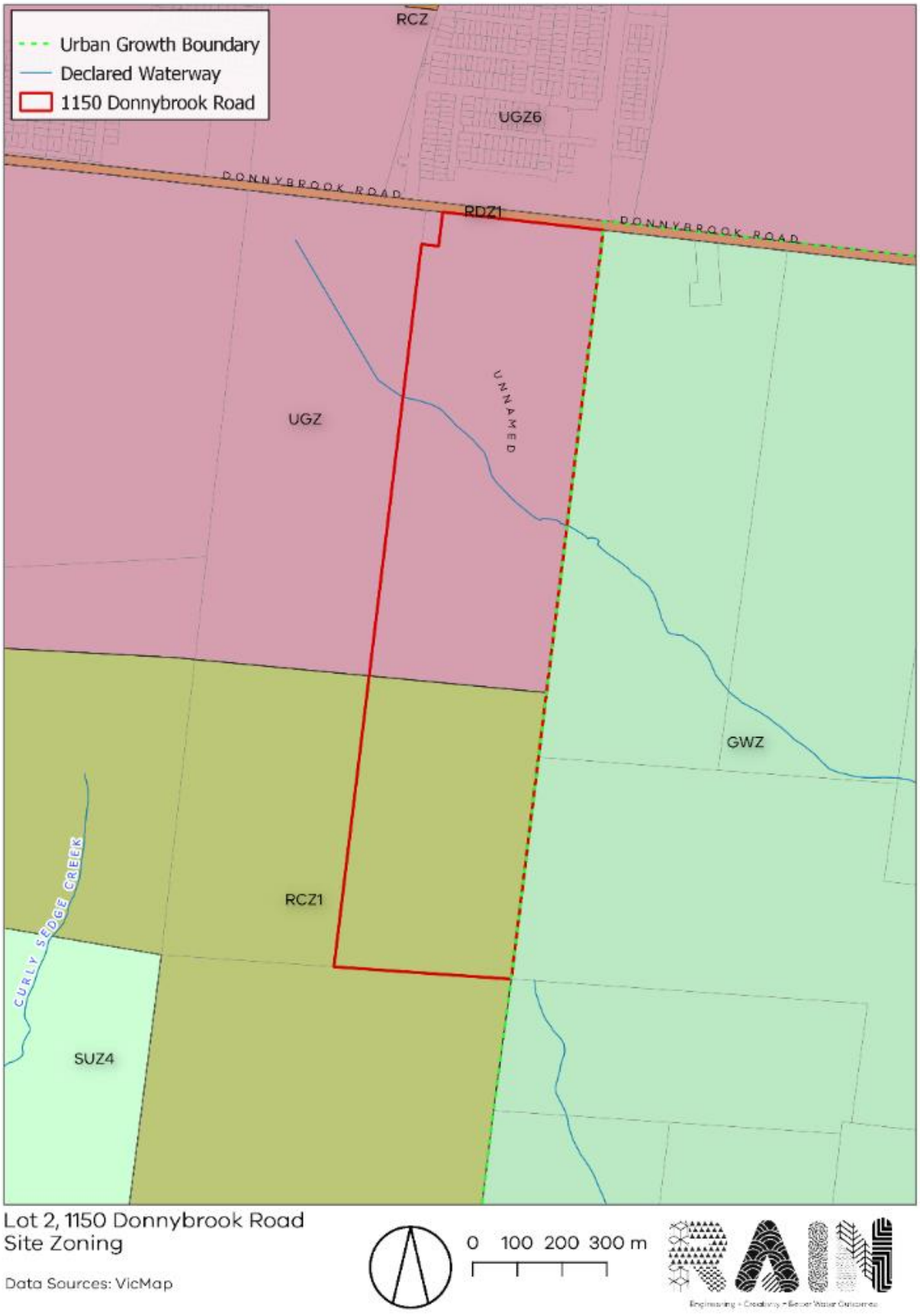


Figure 6-1 Site Zoning

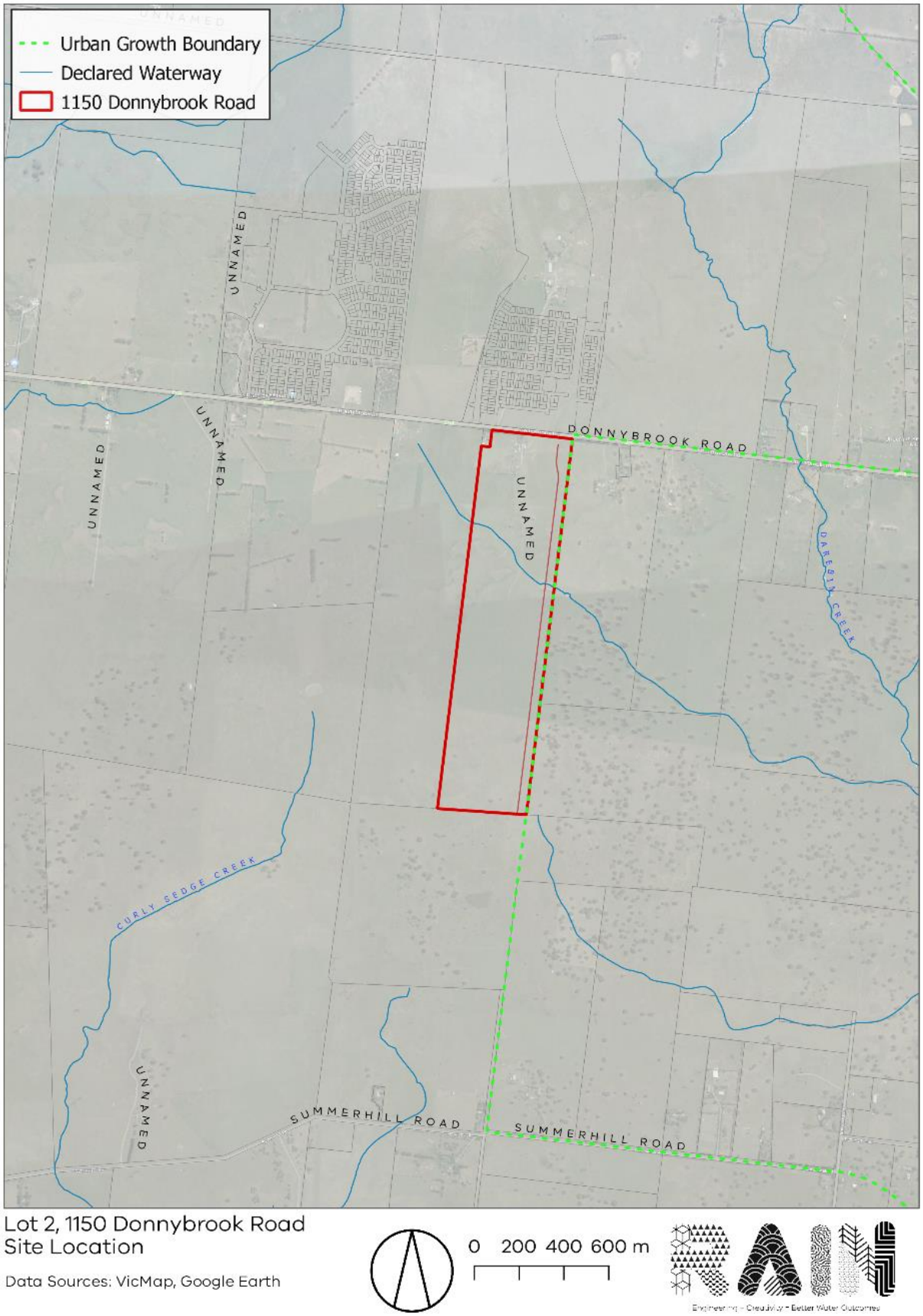


Figure 6-2 Site Locality

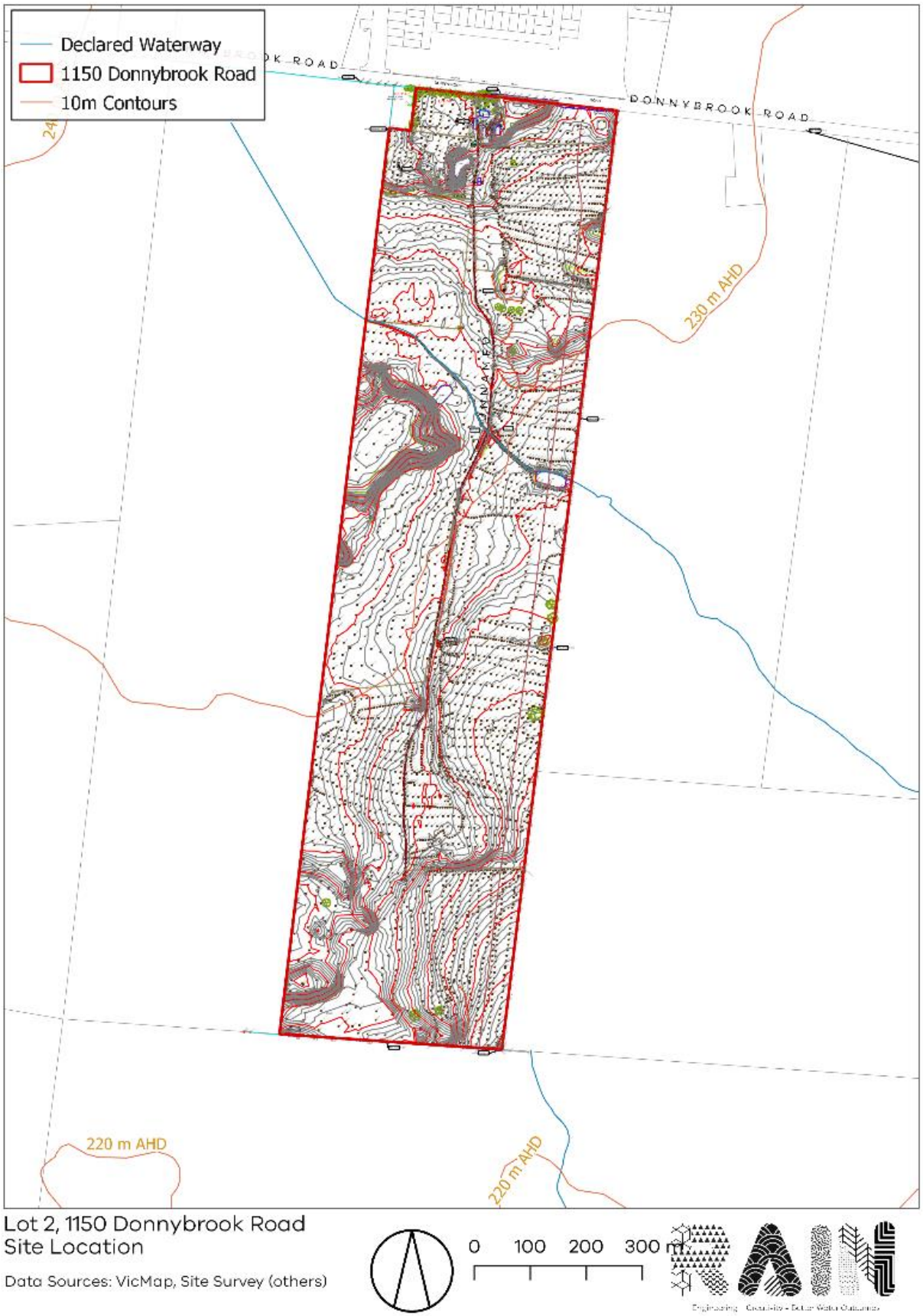


Figure 6-3 Site Terrain

6.2 Client's Position

My client's high-level position in relation to drainage matters for the subject site can be summarised as follows. Per the SWMS, the site is split into the 'North Catchment' (discharging to the east) and the 'South Catchment' (discharging to the south):

6.2.1.1 North Catchment

- Water enters the site from the upstream property to the west of 1150 Donnybrook Road. An invert of 700 mm below the existing surface has been assumed.
- A constructed waterway of 45 m width will traverse west to east through the site before meeting the site of RB-02. This waterway width and alignment is reflected in the updated PSP.
- Stormwater will be treated by two sediment basins and one wetland. The wetland will be sited within the footprint of the retarding basin (RB-02).
- RB-02 will retard flows back to predevelopment conditions and discharge to the property to the east of 1150 Donnybrook Road. The area required for the basin is reflected in the updated PSP (Table 8).
- There is concern regarding how the outfall to the neighbouring property to the east will be handled. Rain Consulting is currently liaising with Melbourne Water on this issue. It is noted that the outlet of RB-02 is the ultimate outlet for the DSS and therefore is likely to be of interest to all upstream properties.

6.2.2 South Catchment

- Scheme pipe B1-B2 will convey flows from the upstream catchment into the site.
- Stormwater will be treated by one sediment basin and one wetland located within RB-05 (the wetland is referred to as WL03 in the SWMS). The wetland will be sited within the footprint of the retarding basin RB-05.
- The retarding basin in RB-05 (referred to as RB03 in the SWMS) will retard flows back to predevelopment conditions. The area required for the basin is reflected in the updated PSP (Table 8).
- The wetland in RB-05 has been oversized to allow for the consolidation of the two wetlands shown in the original DSS (named WL3 and WL4 in the original DSS). This has been discussed with and consequently agreed to by both Melbourne Water and Council. This is reflected in the updated PSP.
- A 1% AEP capacity pipe will convey flows from RB-05 to the south via Koukoura Drive for an ultimate discharge to the south.
- A smaller sedimentation basin is required in place of the wetland that has been removed from the south (WL4). Due to the small size of the basin, it was recommended that this be replaced with a Gross Pollutant Trap (GPT) or equivalent. The outlet of this GPT will connect to the 1% AEP pipe within Koukoura Drive.
- There is concern regarding how the outfall to the neighbouring property to the south will be handled. It is recommended that Melbourne Water liaise with downstream landowners to find an appropriate solution outside of the scheme boundary.

Further details around the proposed drainage conditions can be found within the SWMS and the accompanying addendums listed in Section 4 of this report.

7 Review of Materials

The below sections detail the review of each of the documents deemed as relevant to drainage at the subject site.

Four topics which attract a higher level of concern have been identified:

- The entrance level of the constructed waterway entering the site from the neighbouring property;
- The need for certainty around downstream works to cater for the outfall of RB02;
- Sediment basins are not shown in the PSP; and,
- Culverts as shown in the PSP for the site may be subject to change.

These topics are addressed in more detail in Section 8.

7.1 Shenstone Park Precinct Structure Plan – VPA, City of Whittlesea, October 2020.

Relevant Item	**Response**
The document asks to ensure "sensitive land uses" (as defined by Australian Standard 2885.1-2012) are located outside the measurement length of the high pressure gas transmission pipeline where possible and that construction is managed to minimise risk of adverse impacts. Page 11.	I am aware of the gas pipeline on the neighbouring property to the west of 1150 Donnybrook Road. I am unable to comment on whether this will impact the drainage conditions on the site as gas infrastructure and its impacts is outside my area of expertise.
Planting in streetscapes and parks abutting waterways should make use of indigenous species to the satisfaction of Melbourne Water and the responsible authority. Page 22.	I agree with this requirement.
Lots must front on waterways. Page 23.	I agree with this requirement.
Buildings to face waterways/open space. Page 30.	I agree with this requirement.
Plan 8 shows a DELWP Scattered Tree. Page 38.	This tree is not within the footprint of RB-02 but is close by. If there are any protected trees that cannot be relocated in either of the wetland/retarding basins, it may be possible that these could be accommodated through the functional design stage.
The layout and design of the waterways, wetlands and retarding basins (including the design of paths, bridges and boardwalks and the stormwater drainage system) within conservation areas, should integrate with biodiversity and natural systems to the satisfaction of the responsible authority, Melbourne Water	The only drainage works that are interfacing with the conservation area in the south of the subject site is the pipe draining RB-05. It is my understanding that this pipe will be located within the road reserve of Koukoura Drive. It is assumed that any impacts on the conservation zone will be addressed as part of the road design.

Relevant Item	Response
and the Department of Environment, Land, Water and Planning. Page 39.	
All infrastructure (including but not limited to roads, drainage, or utility) must only cross the APA gas pipeline at 90 degrees unless with the consent of the pipeline owner or operators (APA VTS) and be engineered to protect the integrity of the pipeline. Page 46.	I am aware of the gas pipeline on the neighbouring property upstream of the subject site. The plans show that this is currently not crossing at a 90-degree angle. If the alignment of the upstream waterway is changed, this has potential to impact drainage on the subject site 1150 Donnybrook Road. It is recommended that any changes within the upstream property result in the waterway entering 1150 Donnybrook Road at the same location so as to not impact the drainage within the subject site.
Shared paths, where along waterways or retarding basins must: • Be above 1:10 year flood level with any crossing of the waterway designed to be above the 1:100; flood level to maintain hydraulic function of the waterway. • Be positioned above 1:100-year flood where direct access is provided to the dwelling from the waterway reserve. • Be located constructed to a standard that satisfies the requirements of relevant responsible authorities. Page 50.	I agree with this requirement.
Final design of constructed waterways (including widths), waterway corridors, stormwater quality treatment, retarding basins, wetlands, associated paths, boardwalks, bridges, and planting, must be to the satisfaction of Melbourne Water and the responsible authority. Page 54.	I agree with this requirement.
Subdivision applications must demonstrate how: • Waterways and integrated water management design enables land to be used for multiple recreation and environmental purposes; • Overland flow paths and piping within road reserves will be connected and integrated across property / parcel boundaries; and	Integrated water management has not been completed for this site as yet. Given the waterway and the size of the assets in the site this should be able to be accommodated. I agree with this requirement.

Relevant Item	Response
Melbourne Water and the responsible authority's freeboard requirements for overland flow paths will be adequately contained within road reserves. Page 54.	
Final design of constructed waterways (including widths), waterway corridors, stormwater quality treatment, retarding basins, wetlands, associated paths, boardwalks, bridges, and planting, must be to the satisfaction of Melbourne Water and the responsible authority. Page 54.	I agree with this requirement.
Table 8 on Page 55 shows the proposed asset owners.	I agree with the proposed owners of each asset and this is in line with discussions held between Rain Consulting and both Council and Melbourne Water. Per Section 8, sediment basins have not been included in this table.
The figure on Page 57 shows a potable water asset crossing the constructed waterway immediately upstream of the subject site.	Any impact on the invert levels of the waterway entering 1150 Donnybrook Road will have potential to impact drainage within the property. It is recommended that work be completed by the developers of the neighbouring property to ensure levels are not impacted.
Utilities must be placed outside of conservation areas, natural waterway corridors or on the outer edges of these corridors in the first instance. Page 58.	The only drainage works that are interfacing with the conservation in the south of the subject site is the pipe draining RB-05. It is my understanding that this pipe will be located within the road reserve of Koukoura Drive. It is assumed that any impacts on the conservation zone will be addressed as part of the road design.
Plan 14 (page 62) shows culvert locations.	It is unclear to me what the purpose of CU02 and CU03 are. CU01 is potentially shown in the wrong location and sizing is subject to change. See Section 8 for more commentary.
Table 8 (page 55) shows the required land take for each of the assets within the site.	The SWMS prepared by Rain Consulting reported on surface areas of assets only. When using industry standard factors to estimate land take for each asset, the values in Table 8 match well. It should be noted however that the sediment basin in the south has not been shown in the PSP. See Section 8 for more commentary.

Relevant Item	Response
Services must be placed outside of natural waterway corridors or on the outer edges of these corridors to avoid disturbance to existing waterway values. Page 105.	I agree with this requirement.

7.2 Shenstone Park Background Report - VPA, September 2019

Relevant Item	Response
Meinhardt assessment suggested that 'medium potential contamination area' exists across the site. Page 21.	The waterway, wetlands, sediment basins and retarding basins will all require cut. It is recommended that this is addressed at functional design once more information is known.
The hydrological assessment identified that many of the waterways are dominated by grasses. These grasses experience periodic wetting in existing conditions but are able to withstand the expected wetter conditions following development. Ponding though may create issues and it is recommended to minimise ponding areas. Page 36.	Noted. The wetlands, sediment basins and retarding basins will encourage ponding due to their nature, but the waterway corridor has adequate fall to avoid ponding. Vegetation within the wetlands will be to the requirements of Melbourne Water and Council. Should the waterway through the site be required to change slope due to the conditions on the upstream property, further ponding within the waterway may occur in larger rainfall events.
The image on Page 38 shows a DELWP Scattered Tree (162) close to the footprint of the wetland/RB.	This tree is not within the footprint of RB-02 but is close by. If there are any protected trees that cannot be relocated in either of the wetland/retarding basins, it may be possible that these could be accommodated through functional design.

7.3 Shenstone Park Precinct Structure Plan (PSP 1069.1), Donnybrook, Victoria: Post-Contact Heritage Assessment - Ecology and Heritage Partners Pty Ltd May 2017

Relevant Item	Response
No areas of relevance to impact on drainage for the subject site were found	Not applicable.

7.4 Shenstone Park PSP assessment, Hydrologic Regime Report – Alluvium February 2018

Relevant Item	Response
Vegetation communities are considered to be relatively water tolerant and unlikely to be significantly impacted by an increase in the frequency of inundation. Although minor alterations to community structure are anticipated under post	Noted. It is acknowledged that whilst the downstream flows will be retarded back to existing conditions flow rates, the frequency of flows post development increases. Rain Consulting are currently working through

Relevant Item	Response
development hydrological regime, they are unlikely to lead to the degradation or wholesale change of the vegetation community. Page 12.	downstream outlet requirements with Melbourne Water.
Should localised ponding occur due to an increase in the duration of inundations, significant impacts to native vegetation are considered likely. Page 12.	Noted. The wetlands, sediment basins and retarding basins will encourage ponding due to their nature, but the waterway corridor has adequate fall to avoid ponding. Vegetation within the wetlands will be to the requirements of Melbourne Water and Council. Should the waterway through the site be required to change slope due to the conditions on the upstream property, further ponding within the waterway may occur in larger rainfall events.

7.5 Geomorphology and Vegetation Values Assessment - Drainage - Alluvium February 2018

Relevant Item	Response
Conduct further desktop studies to assess the potential impacts of altered hydrological regimes along Darebin Creek tributary on the proposed future Grassy Eucalypt Woodland and associated biodiversity reserve to the east of the PSP. This reserve has a high potential for significant ecological values to occur along and adjacent to the waterway, including nationally significant Plains Grassland and Plains Grassy Woodland communities and associated threatened species. Page 25	Per the requirements of the DSS, flow rates will be restricted back to pre-development levels at the outlet of the subject site. It is hence considered that the downstream flood extent is unlikely to change greatly (which should be clarified with hydraulic modelling at a later stage). Like most development areas, the frequency of stormwater runoff through the downstream property will increase. If the proposed Grassy Eucalypt Woodland and biodiversity reserves are within the downstream flood extent for more minor events, the frequency of flows may cause impact. I consider this to be an issue relevant to the entire upstream catchment, not just the subject site. Once further information is available on downstream flood extents and the frequency of downstream inundation of these areas, it is recommended that Melbourne Water investigate ways to manage this risk.
The other waterways in the study reach have low geomorphic value due to the significant modification that has occurred. These waterways should be converted into high quality constructed waterways to improve their condition for environmental and social values in the	This statement is in line with the constructed waterway and wetland/retarding basin assets planned for the site.

new urban areas that will be developed. Page 25.	

7.6 Submission 12 – Shenstone Park PSP 1150 Donnybrook Rd – Tract, November 2019

Relevant Item	Response
The document outlines the land-take areas for each of the large drainage assets. Page 4.	Calculations of the asset surface areas were completed by Rain Consulting with overall land-take completed by others on the project team. Following review, the areas listed seem reasonable and in line with what we would estimate.
Table 9 of the PSP shows three culverts along the length of Koukoura Drive. Creo Consultants reviewed the culverts and pipe dimensions. Page 4.	I agree with the change of the dimensions to CU01 noting that these may change through design as RB-02 is refined. It is unclear to me what the purpose of CU02 and CU03 are. CU01 is potentially shown in the wrong location and sizing is subject to change. See Section 8 for more commentary.
Recommendation is made that within Section 3.7.1 of the PSP, a requirement should be added to state that Melbourne Water should be responsible for any outfall from any retarding basin outside the PSP boundary. Page 6.	I agree with this statement. As the subject site is the most downstream of the PSP and the scheme, the outfall arrangements are important for all properties upstream. Rain Consulting is currently working with Melbourne Water on downstream outfall arrangements on behalf of our client.
Depth to groundwater issues are discussed. Page 44.	Groundwater levels have not been assessed as part of the drainage strategy for the subject site. High groundwater levels may impact the design and construction of drainage assets.

7.7 Submission 18 – Yarra Valley Water comments – Yarra Valley Water, November 2019

Relevant Item	Response
Page 3 refers to the Upper Merri Creek IWMP currently being developed and that development should be in line with that.	I have not reviewed the IWMP being developed. Generally, IWMP is an important step in the process and I recommend a site specific IWMP is completed at a later date. Site specific plans generally refer to the various IWM objectives set for the broader area in which they sit.

7.8 Submission 19 – Melbourne Water review of PSA C241Wsea – Melbourne Water October 2019

Relevant Item	Response
The DSS has catered for cleanout works downstream of the RB to obtain a free draining outfall if required. Based on existing topography, a 15 m wide channel of 500 m long may be required. Page 2.	We have commenced discussions with Melbourne Water on this topic on behalf of our client. See Section 8 for more commentary.
Active edges are required on either side of the waterway. Page 7.	I agree with this requirement.
Further investigation is required to better understand the soil types within the footprints of assets. Page 10.	I agree with this requirement.
It is noted that a number of existing tributaries within the footprint of the PSP have not been identified with the appropriate corresponding buffer areas for cultural heritage sensitivity. Page 10.	My review of the provided documents has not noted any specific impacts within the proposed drainage assets. Cultural heritage sensitivity and the identification of these areas is outside of my area of expertise.

7.9 Submission 20 – 1100 Donnybrook Rd Developments Pty Ltd – Dominion Property Group, November 2019

Relevant Item	Response
Drainage considerations are listed for the neighbouring site, particularly around the alignment of the waterway with relation to the gas pipeline. Page 4.	Noted. I assume that the basic principles of the DSS will remain with the waterway entering 1150 Donnybrook Road in the same location with the same flow and water quality requirements as listed in the DSS.

7.10 Submission 25 – Submission by the Merri Creek Management Committee – Merri Creek Management Committee, November 2019

Relevant Item	Response
The achievement of the objective stated in the Explanatory Report that '..existing waterways will be retained and improved ..' is questionable unless soils information is considered when designing constructed waterways and determining how to achieve functional stormwater treatment and retarding basin assets. Page 4.	In line with Melbourne Water's recommendation, I agree that further investigation is required to better understand the soil types within the footprints of assets.
MCMC recommends that a detailed investigation of the soil sodicity and dispersiveness be undertaken in order to fully inform the Shenstone Park PSP and to identify the approaches needed to	I have not received any information relating to soil sodicity. The geomorphic impacts due to soil types is outside my area of expertise. Once more information is known about soil types, further work can be completed to manage soil

effectively manage the associated risk. We believe this information is needed at the PSP stage. Page 4.	conditions. It is noted that the waterway, wetland and retarding basins proposed within the subject site will be constructed (not per their natural form).

7.11 Submission 32 - Planning Scheme Amendment C241wsea – Council Submission – City of Whittlesea, date unknown

Relevant Item	Response
No areas of relevance to impact on drainage for the subject site were found.	Not applicable.

7.12 Planning Scheme Ordinance Documents - varied

Relevant Item	Response
SCHEDULE 11 TO CLAUSE 37.01 SPECIAL USE ZONE	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE 7 TO CLAUSE 37.07 URBAN GROWTH ZONE A Stormwater Management Strategy that assesses the existing surface and subsurface drainage conditions on the site, addresses the provision, staging and timing of stormwater drainage works, including temporary outfall provisions, to the satisfaction of Whittlesea City Council and Melbourne Water. Page 5.	The current SWMS prepared by Rain Consulting does not consider subsurface drainage conditions on the site. This is outside my area of expertise and if required, should be considered at a later stage. No information was available on the staging and timing of stormwater and drainage works for the site. I agree that once required, these should be designed to the satisfaction of Whittlesea Council and Melbourne Water.
SCHEDULE TO CLAUSE 43.01 HERITAGE OVERLAY	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE 8 TO CLAUSE 43.03 INCORPORATED PLAN OVERLAY	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE 9 TO CLAUSE 43.03 INCORPORATED PLAN OVERLAY	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE TO CLAUSE 52.17 NATIVE VEGETATION	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE TO CLAUSE 52.33 POST BOXES AND DRY STONE WALLS	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE TO CLAUSE 66.04 REFERRAL OF PERMIT APPLICATIONS UNDER LOCAL PROVISIONS	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE TO CLAUSE 66.06 NOTICE OF PERMIT APPLICATIONS UNDER LOCAL PROVISIONS	No areas of relevance to impact on drainage for the subject site were found.
SCHEDULE TO CLAUSE 72.04 DOCUMENTS INCORPORATED IN THIS PLANNING SCHEME	No areas of relevance to impact on drainage for the subject site were found.

Relevant Item	Response
1030 Donnybrook Road, Donnybrook Statement of Significance	No areas of relevance to impact on drainage for the subject site were found.
AMENDMENT C241WSEA EXPLANATORY REPORT Existing waterways will be retained and improved to cater for increased surface water flows resulting from increased hard surface area associated with urban development.	The approved SWMS allows for a constructed waterway per the DSS requirements.
AMENDMENT C241WSEA EXPLANATORY REPORT Waterways will be complemented by water treatment facilities, wetlands and retarding basins to ensure water flowing through and out of the precinct is conveyed safely and is of a high quality.	The proposed constructed waterway within 1150 Donnybrook Road will be complemented by sediment basins, a wetland and retarding basin. These provide treatment to BPEMG, and retard outflows back to the requirement.
AMENDMENT C241WSEA EXPLANATORY REPORT An integrated stormwater and drainage system will be adopted to appropriately manage stormwater runoff and quality, while also enhancing the amenity of the precinct through recreation, cooling and greening benefits.	IWMP is an important step in the process and I recommend a site specific IWMP is completed at a later date.

8 Areas of Specific Concern

Throughout the review of the above documentation, as well as through liaison completed between Rain Consulting and Melbourne Water, the following sections outline areas of specific concern to drainage matters at 1150 Donnybrook Road, Donnybrook.

8.1 Invert Levels of Upstream Waterway

As shown in the SWMS prepared by Rain Consulting (October 2019), the constructed waterway through the site is dictated by upstream invert levels entering the site. Due to the lack of available information regarding the upstream channel, an invert of 700 mm below the natural surface was selected (approximately 231.30 m AHD). The 1% AEP top water level of RB-02 will be set to 231.14 m AHD which will engage a portion of the constructed waterway for storage in the 1% AEP flood event. The extent of waterway inundated for storage as part of the retardation basin operation will remain within the subject site.

If the entering invert of the constructed waterway is lowered further than expected, this will result in the lowering of the waterway through the subject site, causing an extension of flooding upstream of what has been allowed for, and potentially outside the subject site and into the neighbouring upstream property.

As RB-02 is the most downstream asset in the DSS, the operation of this basin is critical to the success of the scheme. It is recommended that the upstream waterway invert is no lower than the designed for 231.14 m AHD. If levels are raised, this can likely be accommodated for within the subject site through either a) a steeper waterway corridor or b) a drop structure/chute within the constructed waterway.

8.2 Downstream Outlet Conditions

The subject site has two formal outlets, one to the east and one to the south. Both outlet to properties located outside of the PSP and upstream of the ultimate waterway discharge point.

DSS principles outline that flows are to be restricted back to pre-development conditions at the outfall of the scheme. This can be achieved through the implementation of RB-02 and RB-05. Through development of land, the imperviousness of the catchment area will increase which will limit the amount of stormwater that can infiltrate into the soil. While the retarding basins will limit the peak flow rates exiting the catchment, the frequency of flows leaving the site will increase.

Rain Consulting are currently liaising with Melbourne Water regarding the outlet to the east from RB-02. Following discussion and agreement with Melbourne Water, we have been engaged by our client to prepare a downstream impact assessment which will investigate the likely impacts of increased flows on the downstream property. The assessment involves review of geotechnical information for the site (yet to be received at time of writing) as well as hydraulic (flood) modelling of the downstream conditions. Preliminary results from the hydraulic modelling of the downstream site suggests that, in larger events (such as the 1% AEP), the majority of flows will travel as expected to the east, however there is a break-away flow which moves south within the downstream property.

It is expected that some form of downstream works will be required as part of the scheme. There appears to be two options for an outfall to the east from RB-02.

- Melbourne Water to formalise a drainage channel through the downstream property to cater for the entire 1% AEP flow leaving RB-02, including flows that are likely to be travelling south in existing conditions. This may result in flow rates greater than existing downstream of the scheme but would provide a cleaner outfall arrangement.
- Melbourne Water allow for the expected breakaway to the south, acknowledging that the frequency of flow may be increased along this flow path and work with the downstream landowner to accommodate. Works to formalise an outlet to the east following the waterway alignment will likely be required. This option would maintain existing flow rates.

The outlet in the SWMS has been designed to discharge to the surface of the downstream property (230.00 m AHD). If Melbourne Water propose any downstream works which lower the allowable invert level, this will allow for a lowering of RB-02 and its upstream waterway if required (particularly if upstream works require lowering the entering invert).

The southern outlet of the site will travel via Koukoura Drive through the conservation zone to discharge to the south. It is suggested that outlet arrangements for the downstream

property are formalised by Melbourne Water. Unlike the outlet of RB-02, this outlet design in the SWMS is not overly sensitive to invert level changes.

8.3 Sediment Basins

The sediment basins outlined in the SWMS have not been shown in the updated PSP. Four sediment basins have been recommended for the site:

- Two sediment basins upstream of RB-02 servicing the proposed developable area within the study site. These are referred to as SB2North (640 m^2) and SB2South (370 m^2) in the SWMS. It is likely that these could be accommodated within the area set aside for RB-02 or within the waterway corridor.
- One sediment basin is required as part of RB-05. This sedimentation basin is 900 m^2 in surface area and should be located within the footprint of RB-05.
- The SWMS recommended the removal of DSS wetland WL4 (named RB-06 in superseded versions of the PSP) by oversizing the wetland within RB-05 to compensate. Following the submission of the SWMS, this was agreed to by both Melbourne Water and Council and is reflected in the updated PSP (Table 8, Plan 12). A smaller sediment basin (400 m^2) is still required to manage the expected sediment load from the southernmost part of the site. Since this basin would be very small, it was recommended that it may be more appropriate to replace this asset with a GPT or equivalent.

It is recommended that the above assets be reviewed and included in PSP plans where required.

8.4 Culverts

Three culverts are shown within the PSP crossing beneath Koukoura Drive:

CU-01: This culvert has been revised in the latest version of the PSP to match the outlet design of RB02. It should be noted that:

- The location of the culverts requires altering to shift further south to match the alignment of the waterway.
- The exact dimensions of this culvert may change as the design of RB2 progresses. Their general capacity is unlikely to change significantly.

Rain Consulting was not involved in the discussions around CU-02 and CU-03 and cannot make comment on these culverts.

9 Conclusions

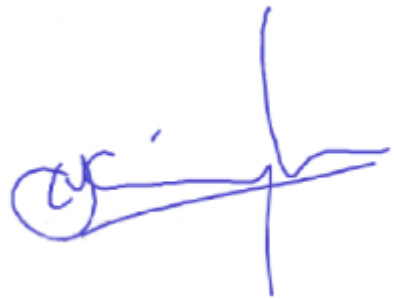
With respect to the Whittlesea Planning Scheme Amendment C241WSEA: Shenstone Park Precinct Structure Plan, I make the following conclusions:

- The updated PSP documents (October 2020) generally follow the position of my client. This is supported by various conversations I have had with both Melbourne Water and Council who are supportive of the findings of the SWMS prepared by Rain Consulting.

- The reviewed documents generally did not provide significant concern for drainage matters within the subject site other than those listed in Section 8.
- The level of the constructed waterway entering the subject site will impact the design of the waterway, wetland and retarding basin within 1150 Donnybrook Road. Through consultation with Melbourne Water during the development of the SWMS, 700mm below the existing surface was adopted as the entrance level to the site. To progress with design on the subject site, certainty will be required that this can be achieved on the upstream property.
- On behalf of our client, Rain Consulting have commenced discussions with Melbourne Water regarding the outlets to downstream properties. Being the most downstream property within the DSS, achieving an outlet is of interest to all upstream developments. Further work will be required by Melbourne Water to ensure an appropriate outlet through each property can be found.
- Culvert CU-01 will be subject to change through design and should be shifted in the PSP plans to align with the waterway alignment.
- The sediment basins outlined in the SWMS required to meet best practice environmental management objectives have not been shown in the PSP. The two sediment basins required upstream of RB-02 and the one sediment basin required upstream of RB-05 are assumed to be within the footprints shown for each asset in the PSP. A small sediment basin is required in the south of the site, this was designed in the SWMS to have a surface area of 400m^2 (estimated land take 700m^2). Due to the small size of this basin, it may be more appropriate to utilise a Gross Pollutant Trap (GPT) in this location. A GPT could be located within a road reserve and hence would not require land take (subject to design). It is recommended that the PSP makes reference to the required sediment basins and the preference for a GPT in the south of the site.

10 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.



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