ENGENY

PLENTI PROPERTY PTY LTD

Hallets Way, Bacchus Marsh

Stormwater Management Strategy Plan

VC1033_02-REP-001-1

14 AUGUST 2023

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Rev	Date	Description	Author	Reviewer	Project Mgr.	Approver
0	8/06/2023	Client Issue	Chiranjivi Majhi	Lola Nurhalim	Lola Nurhalim	Paul Clemson
1	14/08/2023	Updated 5-Lot Subdivision Plan	Chiranjivi Majhi	Paul Clemson	Maria Matamala	Paul Clemson
Signatures:						

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1. INTRODUCTION

1.1 Objectives

Plenti Property Pty Ltd have engaged Engeny Australia (Engeny) to prepare a Stormwater Management Strategy Plan (SWMP) for the proposed 5-lot subdivision plan located at Halletts Way, Bacchus Marsh, hereafter referred to as "the site". The total site area is approximately 2.61 ha and comprises of three sub-areas (excluding Hallets Way and Adelong Way) (Refer to Figure 1.1). The site is located to the east of existing Underbank Estate.

Figure 1.1 below provides an overview of the existing site.

FIGURE 1.1: EXISTING SITE LOCATION (SOURCE: NEARMAP)

Engeny understands that this SWMP is required to assist in the rezoning application (from farming to residential zone). Engeny have previously prepared a surface water investigation for the overall Underbank Farm development, which is located immediately to the west of the site.

The following stormwater drainage report has been used to guide this SWMP in a similar approach:

- Underbank Farm, Bacchus Marsh – Surface Water Investigation, prepared by Engeny Water Management (May 2013).

Pre-development advice was obtained from Melbourne Water (MW), and they have advised that Council is the drainage authority for the site (not Melbourne Water) (Refer to Appendix F:). MW will assess the application when it is formally referred by Council through Planning Permit process. It is recommended that a pre-development advice from MW is to be requested again during planning permit application stage, as it has the potential to change the required approach to stormwater management for the site.

This SWMP presents the proposed plan for managing internal and associated external catchment stormwater flows generated on the site.

1.2 Background

Urbanisation leads to an increase in stormwater runoff and a subsequent increase in pollutant wash-off. It can also have detrimental effects on the receiving waterways. In determining the urban structure, it is critical that assets required for drainage purposes are determined early so that the impacts from the increase of stormwater runoff due to urbanisation can be mitigated. As a result, new development can proceed without the risk of flooding to the development, or of flooding neighbouring properties and limiting the impact on the natural environment and receiving waterways, in this case Werribee River located along the southern boundary of the site.

Liveability and resilience should be incorporated into all new developments. With respect to stormwater management, this involves utilising the stormwater as an asset for the community whilst ensuring fundamentals such as flood protection, safety with respect to flow management and water supply security are maintained. This can be achieved through incorporation of best planning practices for stormwater management during the development of the urban structure.

Engeny understands that for Underbank Estate, there is no specific requirement for flood retarding due to the peak runoff from the development will be much more immediate than the peak flow in the waterways. This approach has been adopted for the site considering its location adjacent to Underbank Estate. This assumption requires confirmation from Melbourne Water. In relation to the stormwater quality management, proposed assets for will be provided to provide treatment of runoff.

1.3 Site Description

The approximately 2.61 ha site shown in the previous figure comprises of the following planning scheme zones / overlays:

- Zoned as Farming Zone (FRZ)
- Design and Development Plan Overlay (DDO)
- Environmental Significance Overlay (ESO)
- Lands Subject to Inundation Overlay (LSIO)
- Design and Development Overlay (DDO)
- Aboriginal Cultural Heritage
- Designated Bushfire Prone Area

1.4 Proposed Development

The proposed subdivision of the 2.6 ha site intends to form 5 lots, in which 3 lots are for residential purposes (Lots A, B and D) and 2 lots (Lots C and E) are for reserve purposes, being within the 1% AEP flood zone area.

The concept layout plan for the proposed subdivision is presented in Figure 1.2 and Appendix A. This forms the basis for the SWMP.

FIGURE 1.2: PROPOSED SUBDIVISION PLAN (NOT TO SCALE) (SOURCE: BEVERIDGE WILLIAMS)

For the purpose of modelling and calculations of this SWMP report, Engeny has used the following assumption of lots usage and their corresponding area (refer to Table 1.1 below).

TABLE 1.1: HALLETS WAY INDICATIVE LOTS AREA

Subdivision Development	Residential Lots Area (ha)	Road Reserve Area (ha)	Reserve Area (ha)	Total Area (ha)
Lot A west	0.30	0.13	0.07	0.50
Lot B south	0.10	0.06	0.10	0.19
Lot C south	-	-	0.11	0.11
Lot D east	0.21	0.17	0.06	0.44
Lot E east	-	-	1.37	1.37
			Total	**2.61**

1.5 Data Collation and Review

Engeny obtained data and information to assist with this study from a variety of sources, including but not limited to, MapshareVic, the Bureau of Meteorology and the Infrastructure Design Manual. Table 1.2 summarises the data obtained for this study, its purpose, and the source.

TABLE 1.2: SUMMARY OF DATA USED

Data	Purpose	Source
Property Report (zoning)	Landuse / zoning requirements	MapshareVic
Site specific Intensity Frequency Duration (IFD) data	To quantify pre / post development flows	Bureau of Meteorology (BoM)
Development's hydrological parameters	To quantify pre / post development flows	Infrastructure Design Manual (IDM)

2. CATCHMENT CHARACTERISTICS

As shown in Figure 2.1, the site can be accessed from Hallets Way and Adelong Way. The site is surrounded by existing residential houses along the western boundary and existing grasslands / trees along the northern boundary, with Werribee River running along the southern boundary.

The site is located within the Werribee River catchment. Site elevations vary between approximately 109 m AHD on the north and approximately 105 m AHD along the southern boundary, adjacent to Werribee River. The site generally drains in a north to south direction towards the river under the existing conditions. Figure 2.1 is annotated with arrows showing existing overland flow paths within the subject site.

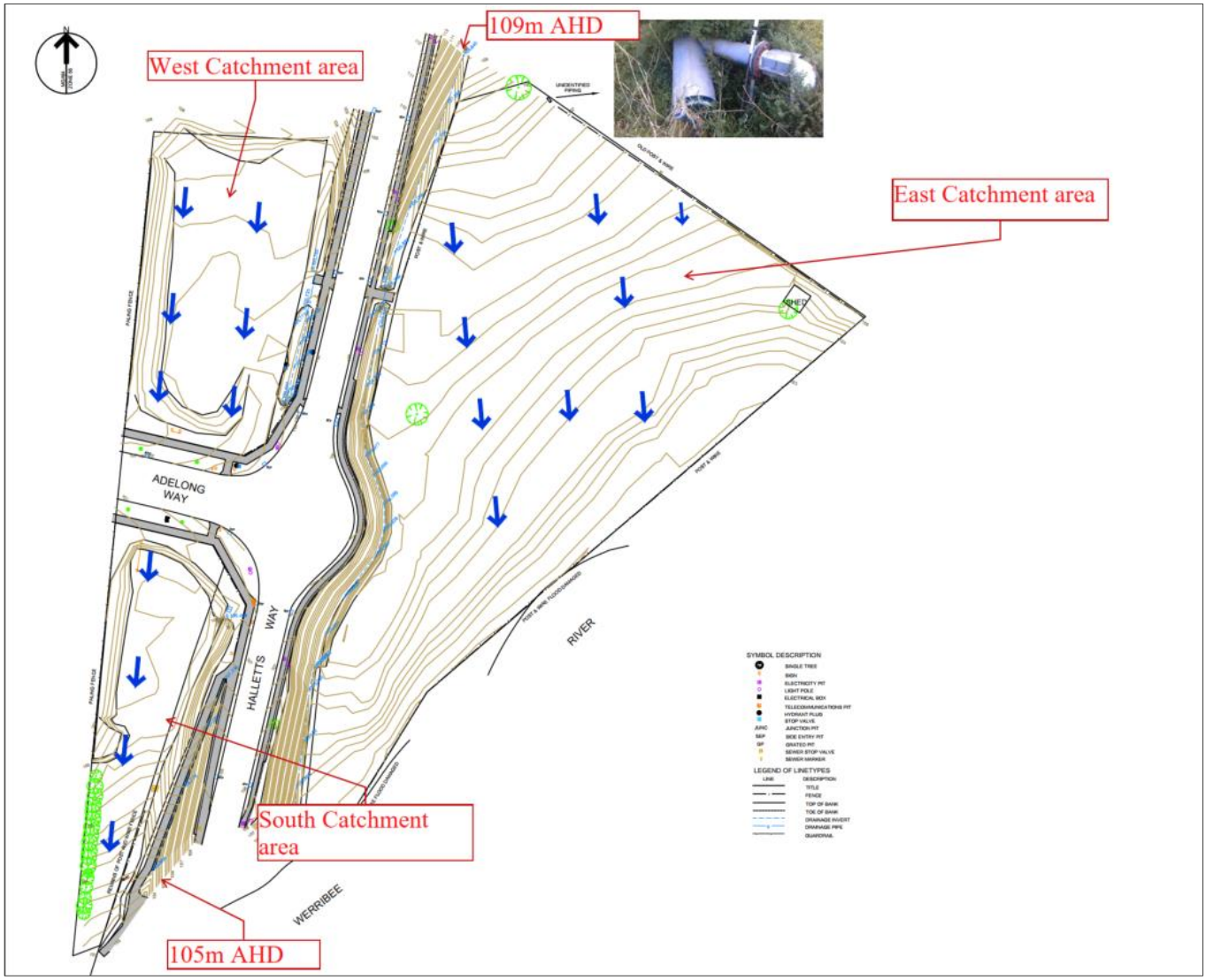


FIGURE 2.1: HALLETS WAY FEATURE SURVEY PLAN (SOURCE: TAYLORS)

3. STORMWATER QUANTITY MANAGEMENT

3.1 Approach

The main objective of stormwater quantity management is to address potential issues arising from increased runoff from the development site, including flooding and erosion. Engeny understands the minor drainage system will need to be designed to convey the 20% AEP storm event and the major drainage system will need to prevent the occurrence of flooding of dwellings in events up to the 1 % AEP storm event. The proposed approach to managing stormwater through the site will need to be consistent with the major and minor drainage system philosophy outlined in the ARR 2019 stormwater industry guidelines and the Infrastructure Design Manual (IDM). The details of this approach for the site are described in the subsequent sections.

3.1.1 Surface Water Investigation for Underbank Farm Report

As previously stated, Engeny have prepared a surface water investigation report (May 2013) for the overall Underbank Estate, which is located immediately to the west of the development site. The assessment includes the overall review of surface water for the Underbank site, including stormwater quantity management and peak flow control.

In terms of peak flow control, Engeny's 2013 report for the Underbank Estate refers to correspondence with Melbourne Water that indicates no specific requirement for flood retarding. Due to the relative size of the overall Underbank development (approximately 168 ha) to the Korkuperrimul Creek catchment and the Werribee River catchment, the peak runoff from the development will be much more immediate than the peak flow in the waterways, and therefore, retarding flows from the development will have minimal effect on peak flows in the receiving river.

A similar approach for the proposed Hallets Way Development Site's peak flow control has been adopted. Due to the relative size of the development area (approximately 2.61 ha) to the Werribee River catchment, the peak runoff will be much more immediate than the peak flow in Werribee river. Therefore, no retardation is proposed as retarding flows will have almost negligible effect on peak flow in Werribee River. This approach should be confirmed with Melbourne Water.

3.2 Hydrology

3.2.1 Overview

A catchment plan has been developed to include the developable area of the subject site and associated external catchment areas (Refer to Figure 4.1). The arrows indicate the directions in which stormwater flows are directed towards Adelong Way for the western sub-area (and eventually into Werribee River) and into Werribee River directly for southern and eastern sub-areas.

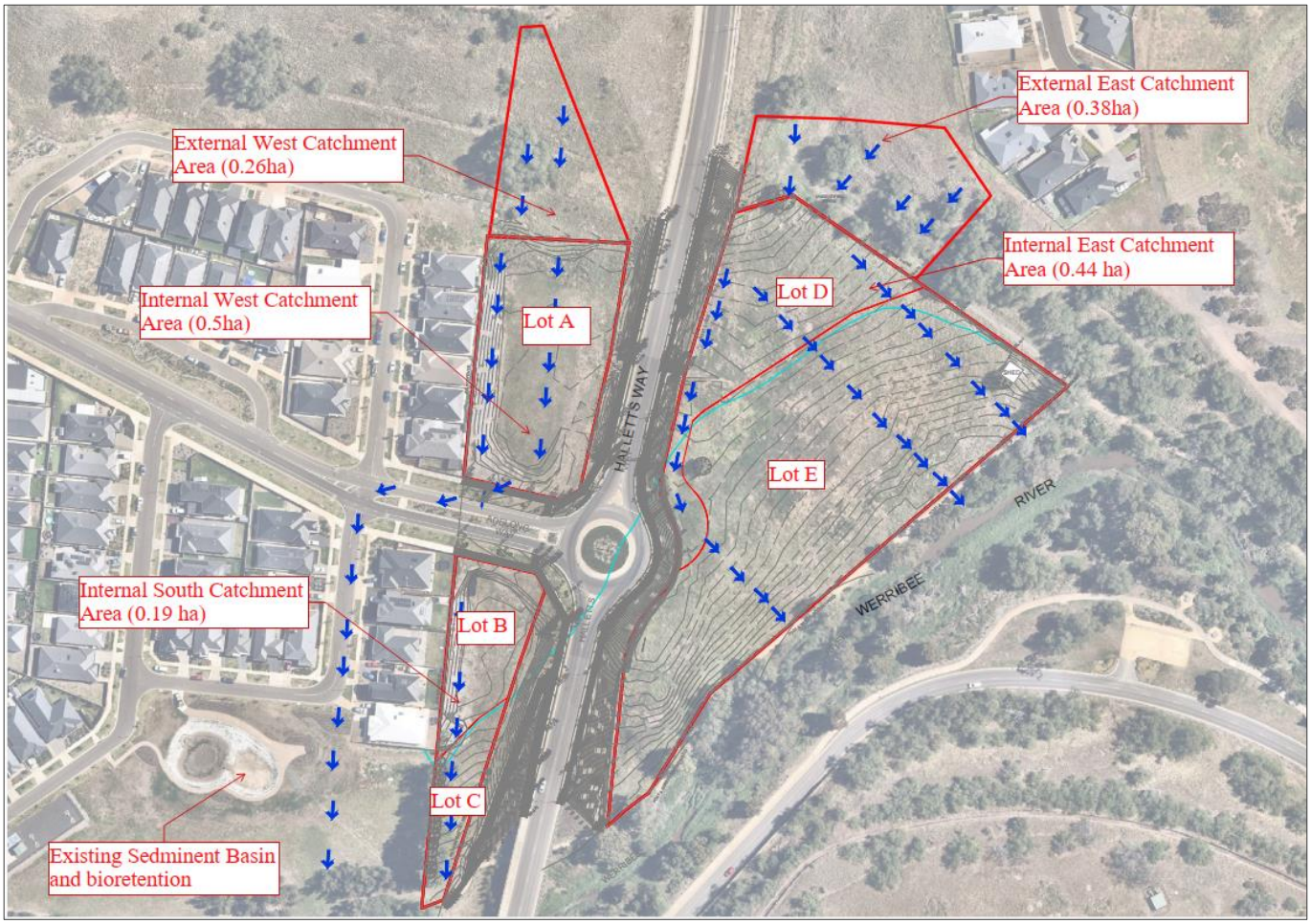


FIGURE 3.1: CATCHMENT PLAN

3.2.2 Pre and Post Development Flows

The hydrological analysis for the 1% AEP and 20% flows was undertaken using Rational Method calculations with IFD data as per the Australian Rainfall and Runoff (ARR) 2019. The calculations have been undertaken to assess the change in 1 % AEP peak flows as a result of the proposed development. The calculated flows have also been used to estimate the peak 1 % AEP developed conditions flow that will need to be discharged into the Werribee River or Adelong Way via the proposed subdivisional road.

The Rational Method calculations have been undertaken for the proposed 5-lot subdivision as shown in Figure 1.2 with assumptive lots usage and corresponding area as per Table 1.1 to reflect the subsequent increases in fraction impervious in the residential development. The calculations are included in Appendix C and the results are shown in Table 3.1, Table 3.2 and Table 3.3.

TABLE 3.1: ESTIMATED FLOW RESULTS FOR 1% & 20% AEP PRE & POST DEVELOPMENT FLOWS FOR EASTERN SUB-AREA* (LOT D AND ASSOCIATED EXTERNAL CATCHMENT)

AEP Event	Pre-Development Flow (m^3/s)	Post Development Flow (m^3/s)
1% AEP Flows for Site Development (including external catchment)	0.061	0.163
20% AEP Flows for Site Development (including external catchment)	0.021	0.077

*Please note that the above calculations results do not include Lot E as this lot is within 1% AEP flood zone and is intended to be used as reserve area for future development. Therefore, it is expected that post development flow will be maintained as pre-development condition.

TABLE 3.2: ESTIMATED FLOW RESULTS FOR THE 1% & 20% AEP PRE & POST DEVELOPMENT FLOWS FOR SOUTHERN SUB-AREA* (LOT B)

AEP Event	Pre-Development Flow (m^3/s)	Post Development Flow (m^3/s)
1% AEP Flows for Site Development	0.017	0.056
20% AEP Flows for Site Development	0.006	0.028

*Please note that the above calculations results do not include Lot C as this lot is within 1% AEP flood zone and is intended to be used as reserve area for future development. Therefore, it is expected that post development flow will be maintained as pre-development condition.

TABLE 3.3: ESTIMATED FLOW RESULTS FOR THE 1% & 20% AEP PRE & POST DEVELOPMENT FLOWS FOR WESTERN SUB-AREA (LOT A AND ASSOCIATED EXTERNAL CATCHMENT)

AEP Event	Pre-Development Flow (m^3/s)	Post Development Flow (m^3/s)
1% AEP Flows for Site Development (including external catchment)	0.057	0.172
20% AEP Flows for Site Development (including external catchment)	0.020	0.083

3.3 Minor / Sub-Surface Drainage (20% AEP)

The proposed subsurface drainage network will be designed to convey the 20% AEP flows from the three sub-areas of the development site for discharge into the existing drainage pipes along Adelong Way (for the western subarea) and directly into the Werribee River via the proposed stormwater treatment assets for the southern and eastern subareas.

It is intended that the proposed drainage network from the western sub-area will be designed to connect to the existing 375 dia pipe along Adelong Way (Refer to Figure 3.2), constructed as part of the Stage 5A River Edge (Underbank) development, which conveys flow to the existing stormwater treatment assets in Underbank. These pipes, running along Adelong Way and Carinya Street, have been designed to convey 20% AEP flows generated from the contributing development area in Underbank to discharge into Werribee River (with low flows conveyed to the treatment assets). A pipe capacity check from the Underbank As-Constructed Stage 5 Road and Drainage Plan Set of Drawings (Refer to Appendix B) indicates that there is adequate capacity for the existing 375 dia pipe to cater for the 20% AEP post development flow from the western sub-area (Lot A) of the development site.

The 20% AEP flows from the southern (Lot B) and eastern (Lot D) sub-areas will be conveyed by the proposed drainage pipes and discharged into the proposed stormwater treatment assets, prior to discharge into Werribee River.

The minor drainage system and internal stormwater network from each sub-area of the development site are to be designed in accordance with the Infrastructure Design Manual (IDM).

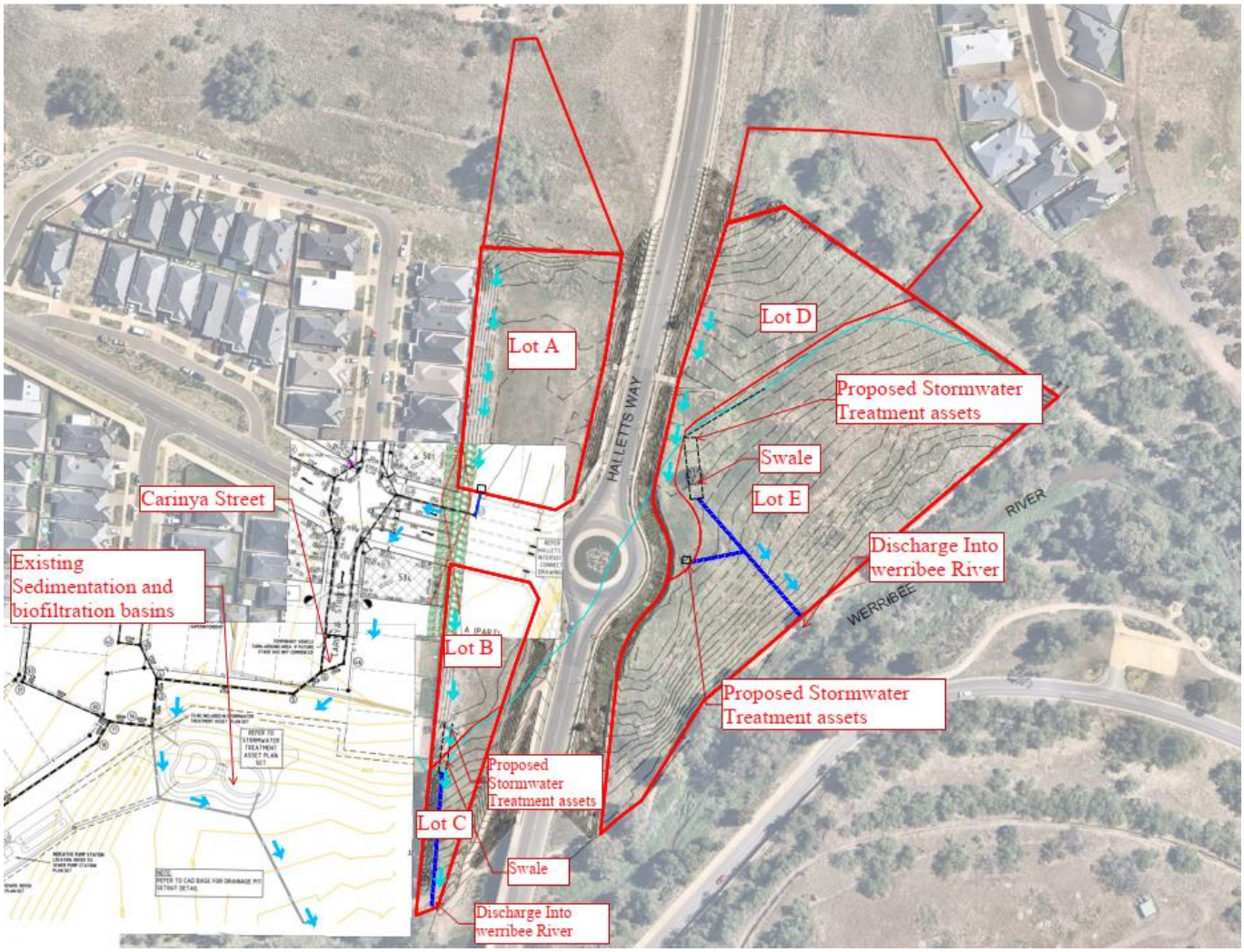


FIGURE 3.2: INDICATIVE CATCHMENT PLAN FOR 20% AEP FLOW

3.4 Major Drainage / Overland Flow Path (1% AEP)

The primary objective of the major drainage system is to provide flood conveyance and protection for the development for up to the 1 % AEP storm event and to ensure that this flow can be safely conveyed through the development. Engeny understands the major drainage system at the site will consist of the proposed internal road within each sub-area of the site development, which will be designed to convey flows from each sub-area to Adelong Way and Werribee River (Refer to Figure 3.3 for Overland Flow Path Layout plan).

Overland flow from the western sub area will be directed to Adelong Way (Lot A) and eventually to the Werribee River via Carinya Street and adjacent reserve. Overland flow from the eastern (Lot D) and southern (Lot B) sub areas will be directed directly to the Werribee River via the adjacent reserve.

The internal road within each sub-area of the site is to be designed during the Functional Layout Plan (FLP) of subdivision stage to ensure that the overland flow (gap flow) through each sub-area is within the safe hydraulic capacity of the road.

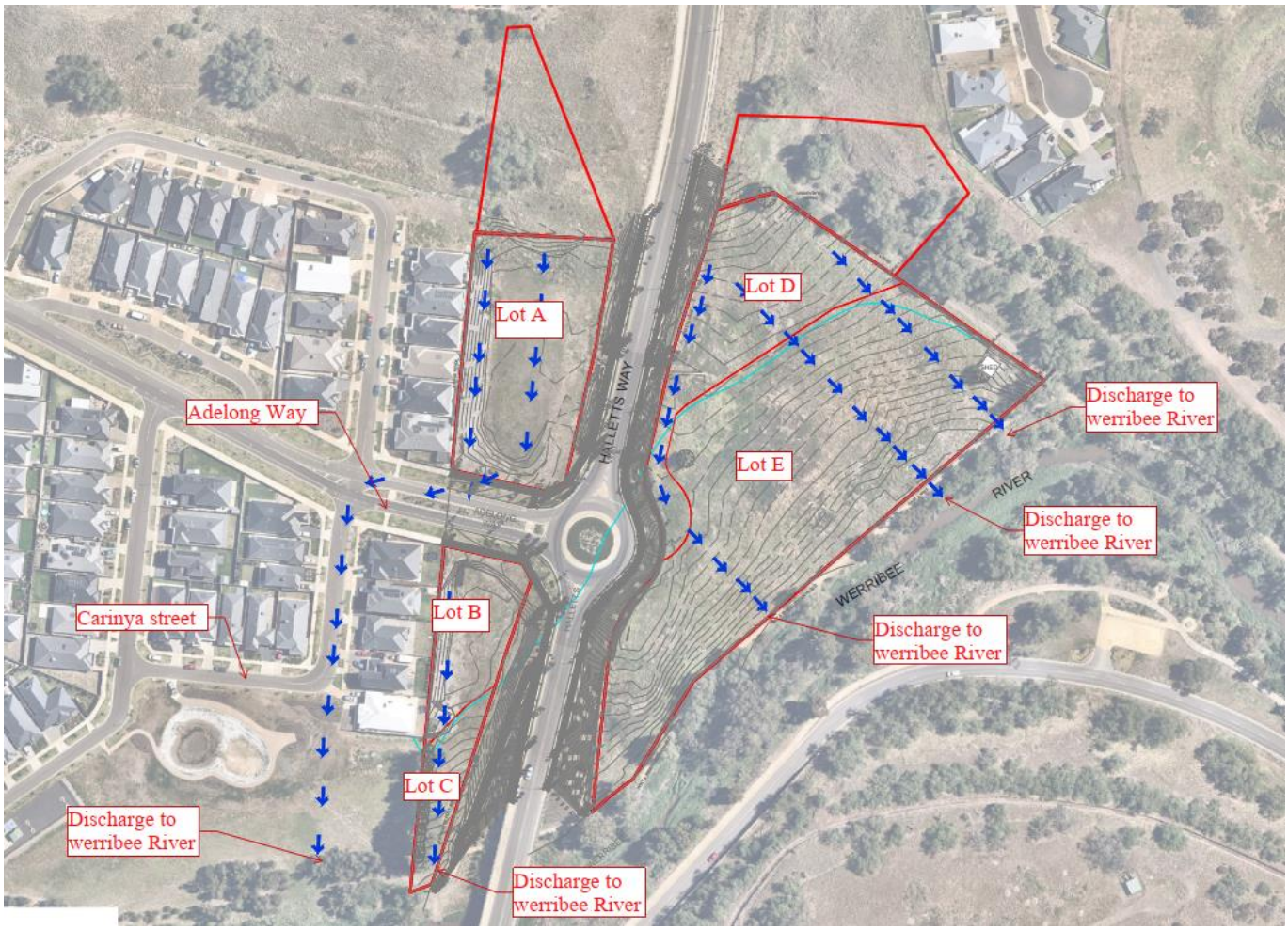


FIGURE 3.3: INDICATIVE OVERLAND FLOW PATH LAYOUT PLAN

3.4.1 Gap Flow and PC Convey Assessment

Gap flows, which are the difference between the 1% AEP and 20% AEP post development flows, were calculated using Rational Method (refer to Appendix C) for each sub area of the development site. Gap flows for the Eastern and Western sub-areas were calculated using the difference between 1% AEP post development flows from internal and external catchment and 20% AEP post development flows from internal catchment only. The results are shown in Table 3.4.

TABLE 3.4: ESTIMATED GAP FLOWS FOR EAST INTERNAL SUBDIVISION

Assessment Location & Area	1% AEP Flow (m^3/s)	20% AEP Flow (m^3/s) (Internal Catchment Only)	Gap Flow (m^3/s)
Eastern (Lot D) Sub-area	0.163	0.077	0.086
Western (Lot A) Sub-area	0.172	0.083	0.089
Southern (Lot B) Sub-area	0.056	0.028	0.028

Three PC Convey checks were prepared to show that the internal gap flows for the eastern, western, and southern sub-areas of the development can be adequately conveyed within the indicative (typical) 7 m, 12 m, and 7 m road reserve widths respectively. These checks are preliminary only and to be further confirmed during the Functional Layout Plan (FLP) stage of subdivision as the design progresses.

The section locations for the PC Convey are as shown in Figure 3.3, and the PC Convey results are shown in Figure 3.4, Figure 3.5, and Figure 3.6 with detailed information provided in Appendix D:.

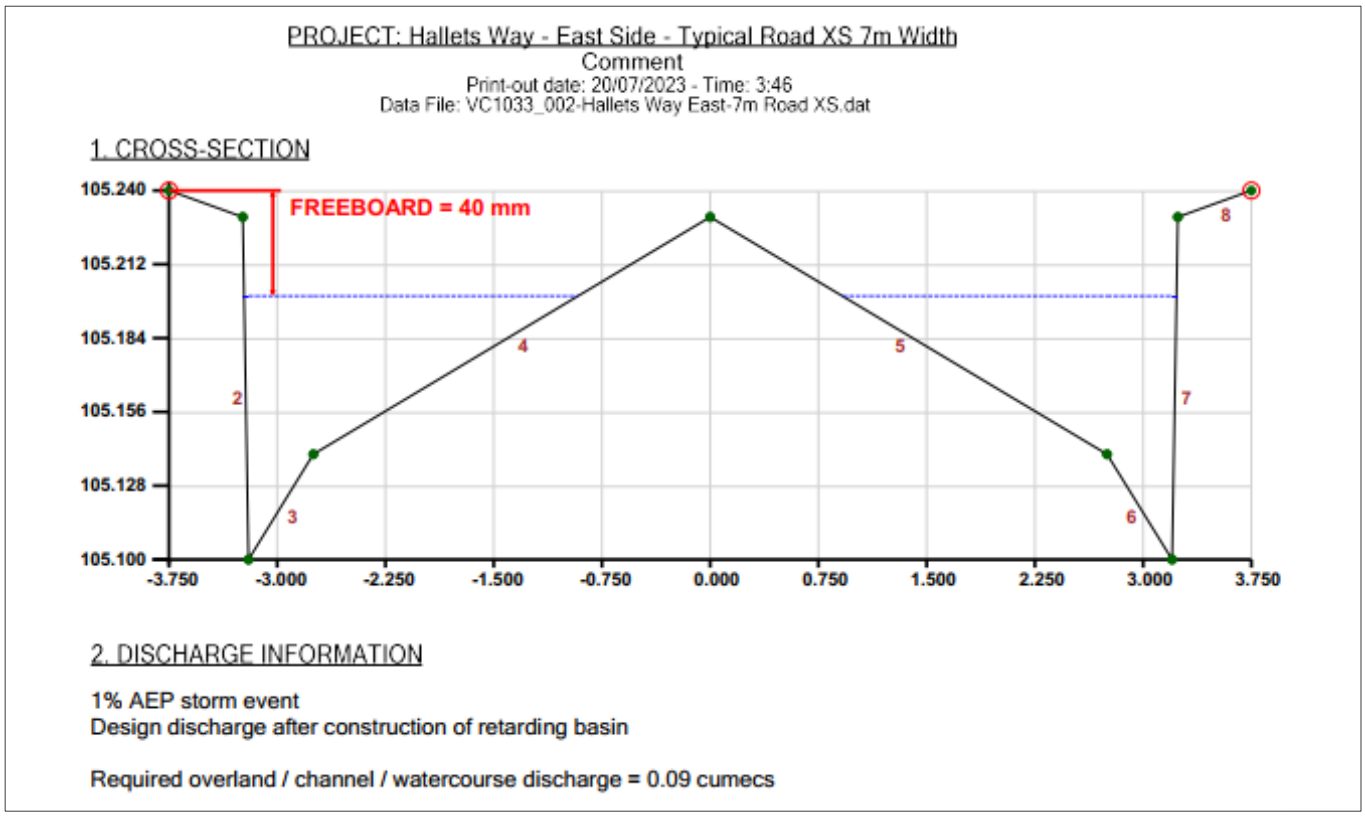


FIGURE 3.4: INDICATIVE PC CONVEY RESULT FOR TYPICAL 7M EAST SIDE (LOT D) ROAD RESERVE CROSS SECTION

As shown on above, the gap flows of 0.09 m^3/s for the eastern sub-area can be contained within the typical 7 m road reserve with 40 mm freeboard. If required (depending on lot levels), dwelling floor levels can be raised to achieve freeboard requirements. In addition, the velocity (V) m/s x maximum depth (dmax) is 0.06 m^2/s, which is less than 0.30 m^2/s, and the maximum depth (dmax) is 0.10 m, which is less than 0.30 m. The velocity (V) is 0.62 m/s, which is less than 2.0 m/s. Therefore, the gap flow is within the recommended safety limits from Guidelines for Development in Flood Affected Areas (DELWP, 2019).

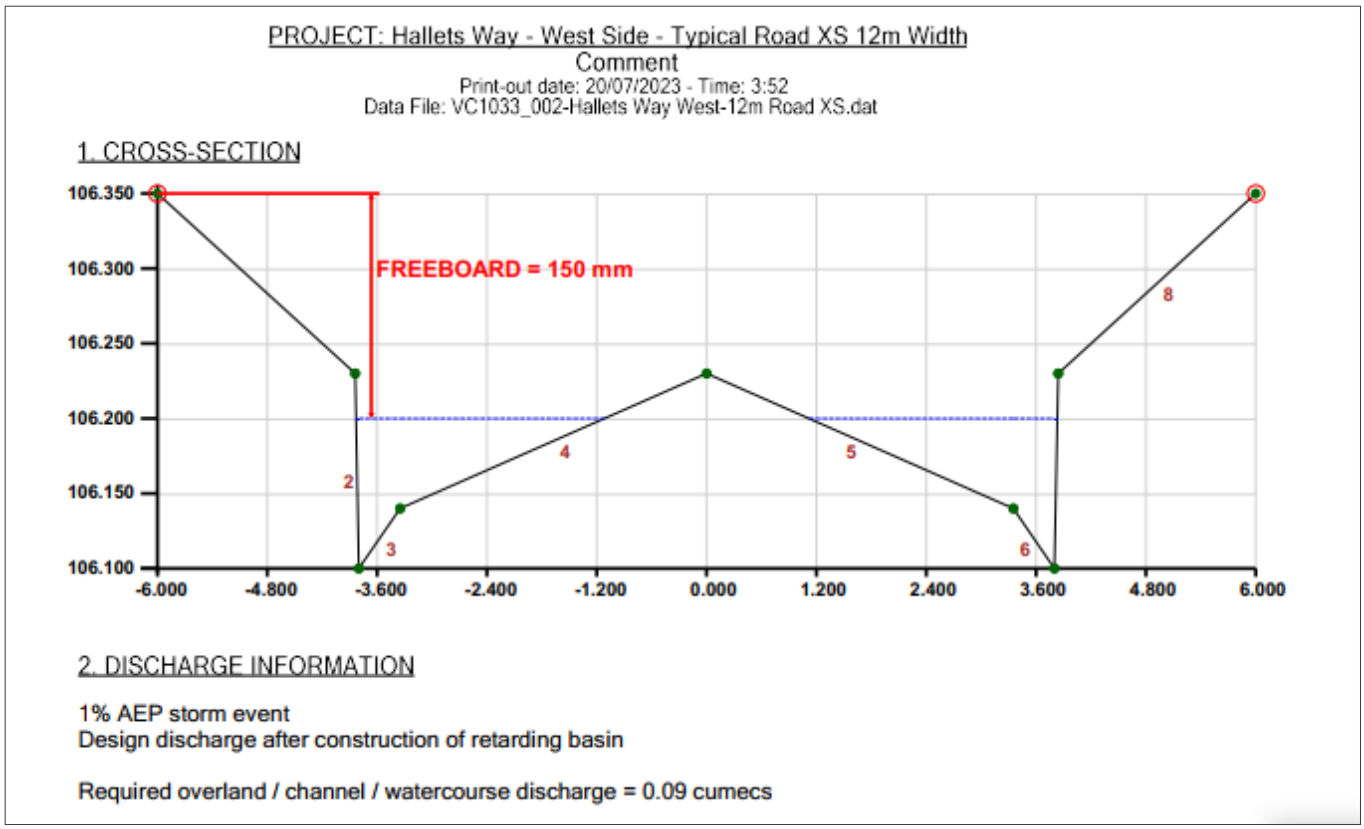


FIGURE 3.5: INDICATIVE PC CONVEY RESULT FOR TYPICAL 12M WEST (LOT A) SIDE ROAD RESERVE CROSS SECTION

As shown on above, the gap flows of 0.09 m^3/s for the southern sub-area can be contained within the typical 12 m road reserve with 150 mm freeboard. In addition, the velocity (V) m/s x maximum depth (dmax) is 0.06 m^2/s, which is less than 0.30 m^2/s, and the maximum depth (dmax) is 0.10 m, which is less than 0.30 m. The velocity (V) is 0.61 m/s, which is less than 2.0 m/s. Therefore, the gap flow is within the recommended safety limits from Guidelines for Development in Flood Affected Areas (DELWP, 2019).

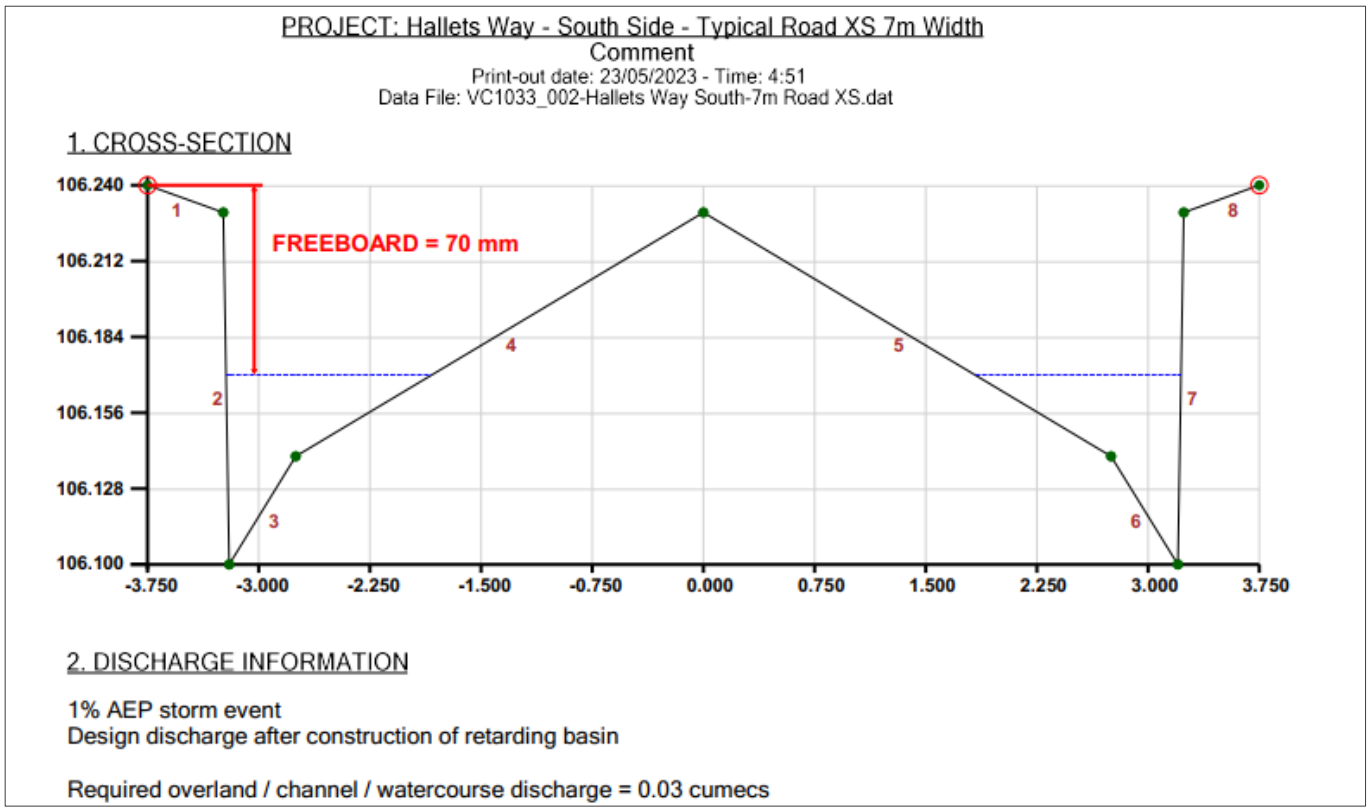


FIGURE 3.6: INDICATIVE PC CONVEY RESULT FOR TYPICAL 7M SOUTH (LOT B) SIDE ROAD RESERVE CROSS SECTION

As shown on above, the gap flows of 0.03 m^3/s for the southern sub-area can be contained within the typical 7m road reserve with 70 mm freeboard. Additional freeboard can be provided through the lots. In addition, the velocity (V) m/s x maximum depth (dmax) is 0.03 m^2/s, which is less than 0.30 m^2/s, and the maximum depth (dmax) is 0.07 m, which is less than 0.30 m. The velocity (V) is 0.47 m/s, which is less than 2.0 m/s. Therefore, the gap flow is within the recommended safety limits from Guidelines for Development in Flood Affected Areas (DELWP, 2019).

4. STORMWATER QUALITY MANAGEMENT

4.1 Approach

Engeny have undertaken MUSIC modellings for the eastern (Lot D) and southern (Lot B) sub-areas to assess the estimated requirement of stormwater treatment system. Engeny have also reviewed the previous MUSIC modelling undertaken for catchment H of the existing Underbank Estate to determine whether there is adequate capacity for the existing sedimentation basin and bioretention system on Carinya Street to provide stormwater treatment for the western (Lot A) sub-area. Details of these assessments are provided the following sub-sections.

4.1.1 Surface Water Investigation for Underbank Farm Report

As previously stated, Engeny have prepared a surface water investigation report (May 2013) for the overall Underbank Estate, which is located immediately to the west of the development site. The assessment includes the overall review of surface water for the Underbank site, including stormwater quality management.

In terms of stormwater treatment system and as shown in the Figure 4.1 below, there are existing sedimentation and biofiltration basins located within the Underbank development site, to the southwest of the subject site (Refer to Figure 4.1). These existing assets are currently providing stormwater treatment for sub-catchment H of the Underbank Estate and outlet directly to the adjacent Werribee River.

Due to the proximity of these treatment assets to the Hallets Way site and considering the area of the Hallets Way development is relatively minor, it is possible these assets can provide stormwater treatment for the western sub-area. This is further discussed in the subsequent sub-sections.

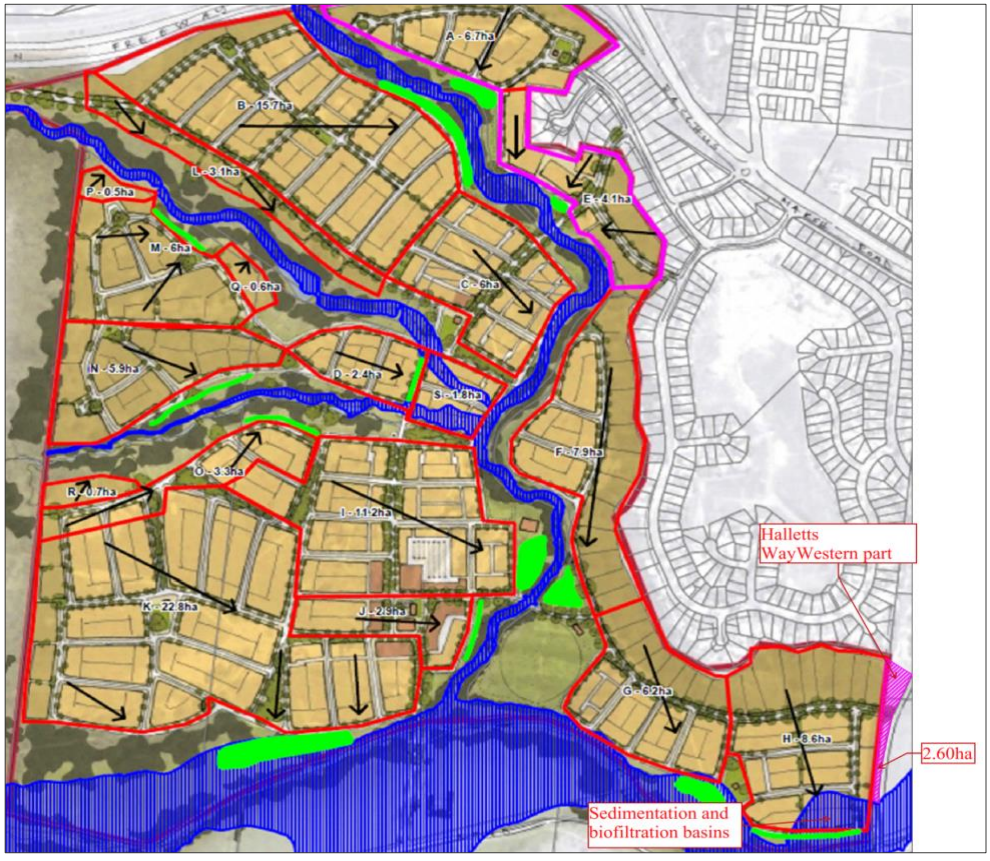


FIGURE 4.1: UNDERBANK ESTATE PLAN (SOURCE: ENGENY SURFACE WATER INVESTIGATION, MAY 2013)

4.2 Policy and EPA Guideline Best Practice Targets

The State Environment Protection Policy (SEPP) defines the required water quality conditions for urban waterways. Clause 56.07-4 of the Victorian Planning Provisions (and the clause 53.18 extension of these requirements to non-residential development) sets the stormwater treatment targets required for development in Victoria to comply with SEPP and the Planning Scheme. In the absence of The Urban Stormwater – Best Practice Environmental Management (BPEM) Guidelines (Victorian Stormwater Committee, 1999), water quality targets are specified by the Urban Stormwater Management Guidance, prepared by EPA (June 2021), as achieving compliance with the SEPP. The BPEM targets are presented in Table 4.1.

TABLE 4.1: BEST PRACTICE POLLUTANT REDUCTION TARGETS

Pollutant	Performance Objectives
Total Suspended Solids (TSS)	80% reduction from typical urban load
Total Phosphorous (TP)	45% reduction from typical urban load
Total Nitrogen (TN)	45% reduction from typical urban load
Gross Pollutants (GP)	70% reduction from typical urban load

4.3 MUSIC Modelling Parameters

A Model for Urban Stormwater Conceptualisation (MUSIC) model was developed for the subject site. The model was developed in accordance with the most recent Melbourne Water's MUSIC Modelling Guidelines (2018). The following summarises the key parameters adopted:

- 6-minute rainfall data corresponding to the 10-year period between 1971-1980 from the weather station at Melbourne Airport (086282).
- Soil Store Capacity = 120 mm and Field Capacity = 50 mm in line with Melbourne Water's MUSIC Guidelines.
- Urban mixed land use source nodes were applied.

4.4 Eastern (Lot D) Sub-area

MUSIC modelling was undertaken to determine the stormwater quality assets required for the eastern (Lot D) sub-area, with estimated area of 0.44 ha (Refer to previous Table 1.1) and average fraction impervious of 0.66. MUSIC modelling was undertaken for two treatment options, which are summarised below:

- Option 1 – This option proposes implementation of a gross pollutant trap (GPT) such as SPEL stormsack (or equivalent) and a swale (20m length and 5 m width) to treat the majority of the residential area and an additional GPT to treat a small portion of the road.
- Option 2 - This option proposes utilisation of gross pollutant trap (GPT) such as SPEL stormsack (or equivalent) and another proprietary device, such as SPEL hydrosystem (or equivalent) to treat the overall sub-area.

The layouts of the MUSIC models are shown in Figure 4.2 and Figure 4.3 and the results are shown in Table 4.2 and Table 4.3.

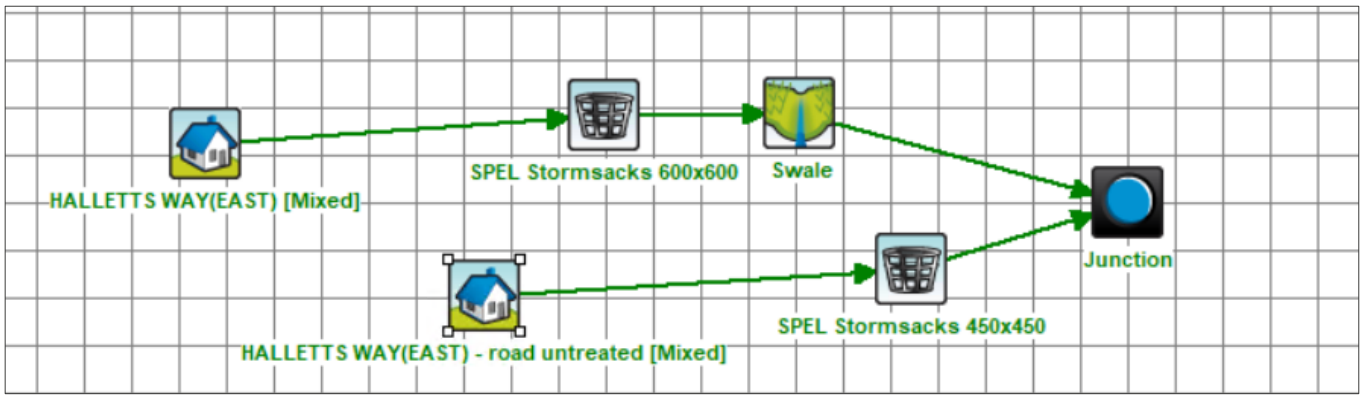


FIGURE 4.2: INDICATIVE MUSIC MODEL SETUP FOR HALLETS WAY EAST (LOT D) SUBAREA OPTION 1

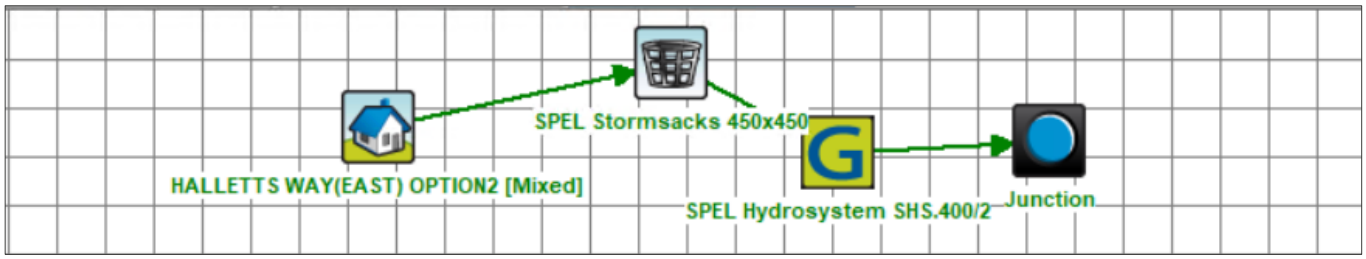


FIGURE 4.3: INDICATIVE MUSIC MODEL SETUP FOR HALLETS WAY EAST (LOT D) SUBAREA OPTION 2

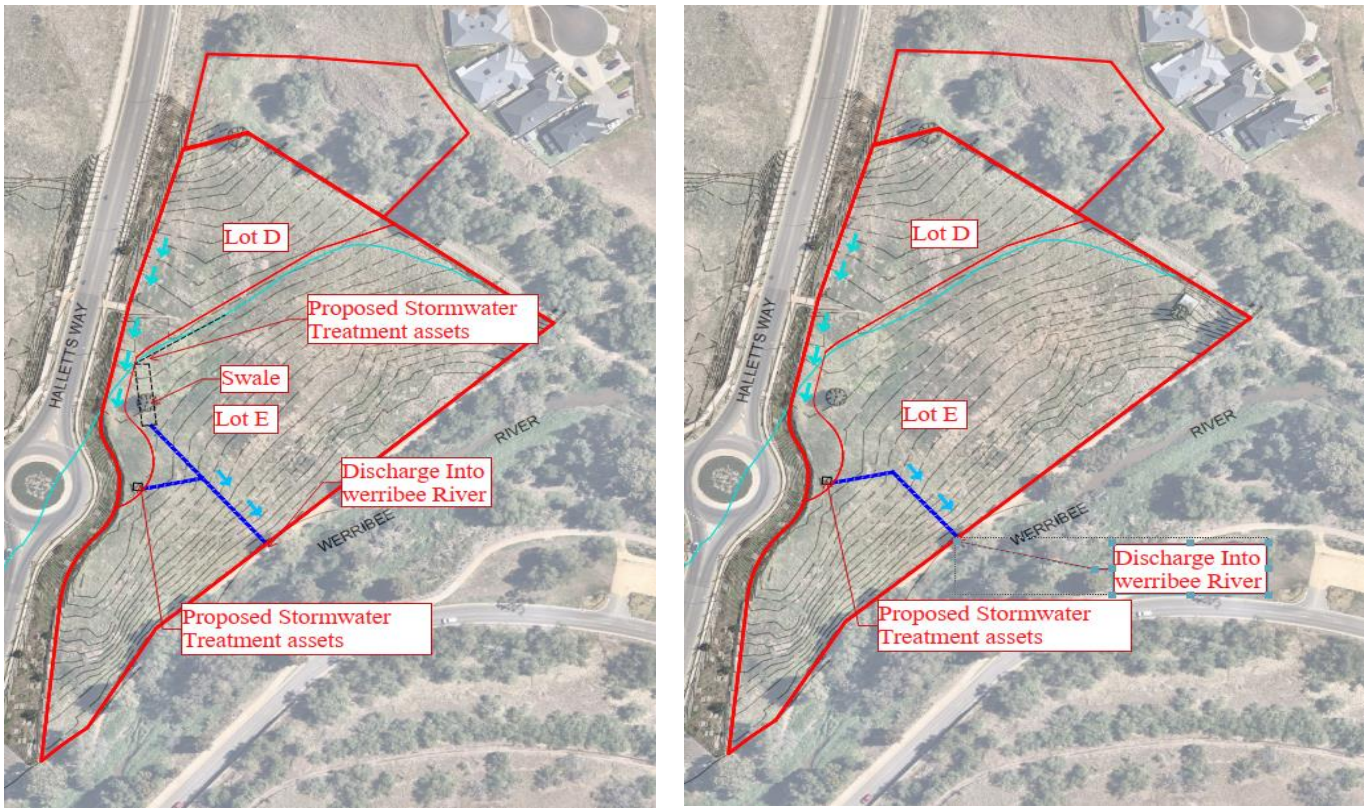
TABLE 4.2: MUSIC MODEL RESULTS FROM HALLETS WAY EAST (LOT D) SIDE (OPTION 1)

Pollutant	% Removal of Source Load
Total Suspended Solids (TSS)	87.7 % reduction from typical urban load
Total Phosphorous (TP)	60.8 % reduction from typical urban load
Total Nitrogen (TN)	45.3 % reduction from typical urban load
Gross Pollutants (GP)	100% reduction from typical urban load

TABLE 4.3: MUSIC MODEL RESULTS FROM HALLETS WAY EAST (LOT D) SUBAREA (OPTION 2)

Pollutant	% Removal of Source Load
Total Suspended Solids (TSS)	84.2 % reduction from typical urban load
Total Phosphorous (TP)	65.2 % reduction from typical urban load
Total Nitrogen (TN)	61.3 % reduction from typical urban load
Gross Pollutants (GP)	97.9 % reduction from typical urban load

The results in the above Table 4.2 and Table 4.3 show that best practice (BPEM) targets are achieved for all the pollutant types with the proposed treatment assets for both options. Concept drainage plan layouts showing both options are provided in Figure 4.4.



OPTION 1 **OPTION 2**

FIGURE 4.4: CONCEPT STORMWATER TREATMENT LAYOUT PLAN FOR HALLETS WAY EAST (LOT D) SIDE OPTIONS 1 AND 2

The preferred stormwater treatment option will be subject to future subdivision functional layout plan and Council approval.

4.5 Southern (Lot B) Sub-area

MUSIC modelling was undertaken to determine the stormwater quality assets required for the southern (Lot B) sub-area, with estimated area of 0.19 ha (Refer to previous Table 1.1) and average fraction impervious of 0.70. The proposed treatment train includes implementation of a gross pollutant trap (GPT) such as SPEL stormsack (or equivalent) and a swale (19m length and 3 m width) to treat the proposed residential and road of the southern sub-area.

The layout of the MUSIC model is shown in Figure 4.5 and the results are shown in Table 4.4.

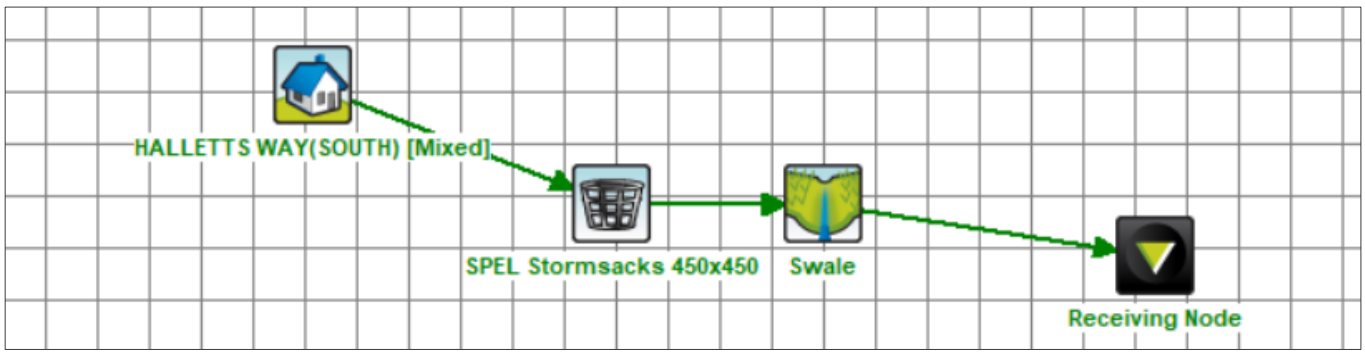


FIGURE 4.5: INDICATIVE MUSIC MODEL SETUP FOR HALLETS WAY SOUTHERN (LOT B) SUBAREA

TABLE 4.4: MUSIC MODEL RESULTS FOR HALLETS WAY SOUTH (LOT B) SUBAREA

Pollutant	% Removal of Source Load
Total Suspended Solids (TSS)	90.7% reduction from typical urban load
Total Phosphorous (TP)	64.9% reduction from typical urban load
Total Nitrogen (TN)	46.6% reduction from typical urban load
Gross Pollutants (GP)	100% reduction from typical urban load

The results in Table 4.4 show that best practice (BPEM) targets are achieved for all the pollutant types with the proposed treatment assets. A concept drainage plan is provided in Figure 4.6 below.

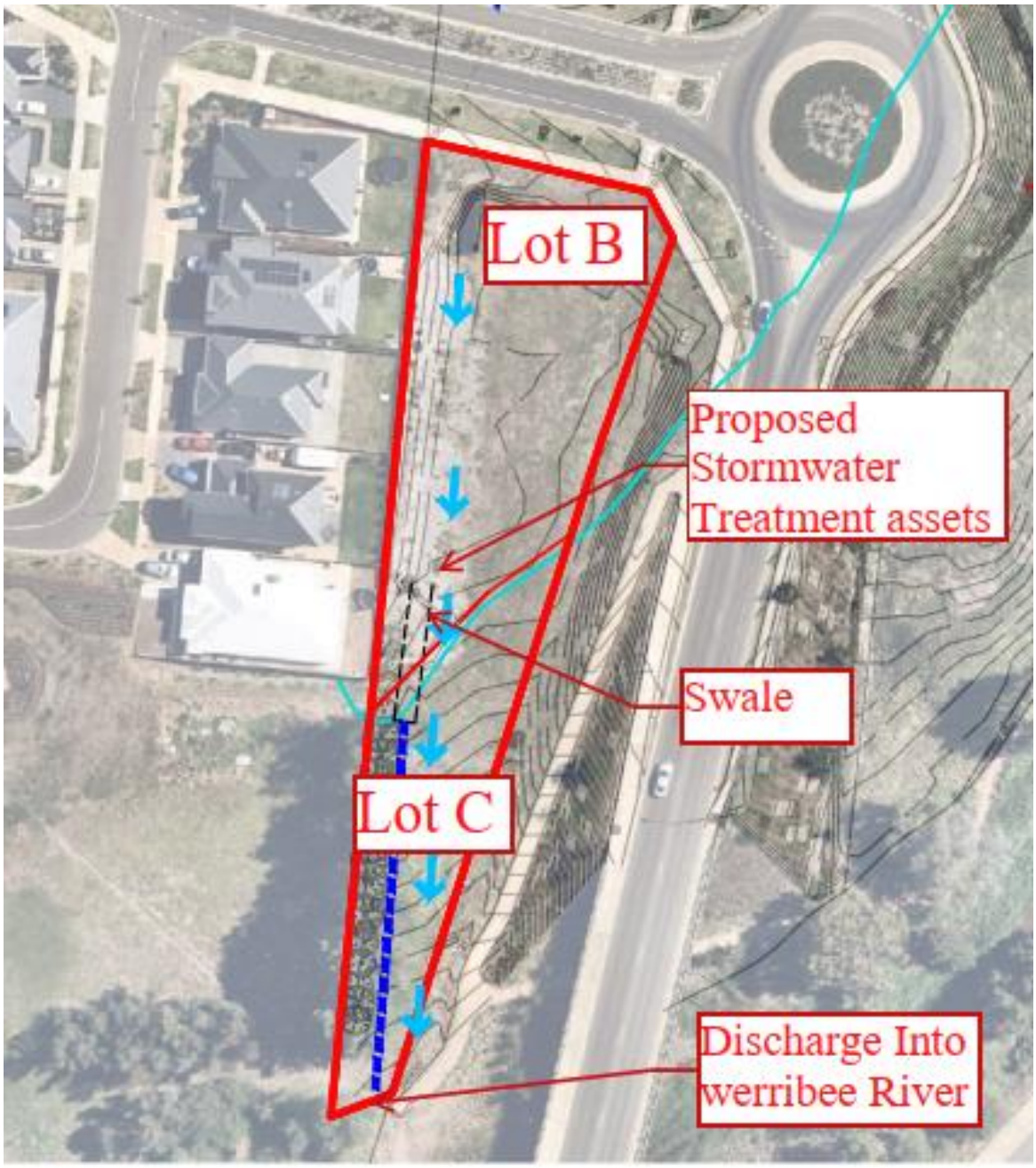


FIGURE 4.6: CONCEPT DRAINAGE PLAN LAYOUT HALLETS WAY SOUTH SUBAREA

4.6 Western (Lot A) Sub-area

As discussed in Section 4.1.1, there are existing sedimentation and biofiltration basins located in Underbank Estate, close to the western (Lot A) subarea of the subject site. These existing assets are currently providing stormwater treatment for sub-catchment H of the Underbank Estate and outlet to the adjacent Werribee River.

The as built plan for the constructed treatment assets in the Underbank Estate is shown in Figure 4.7 and Appendix E: and photos of the existing assets are shown in the following Figure 4.8 and Figure 4.9. These photos were taken on Engeny's recent site visit to the site on 11 May 2023.

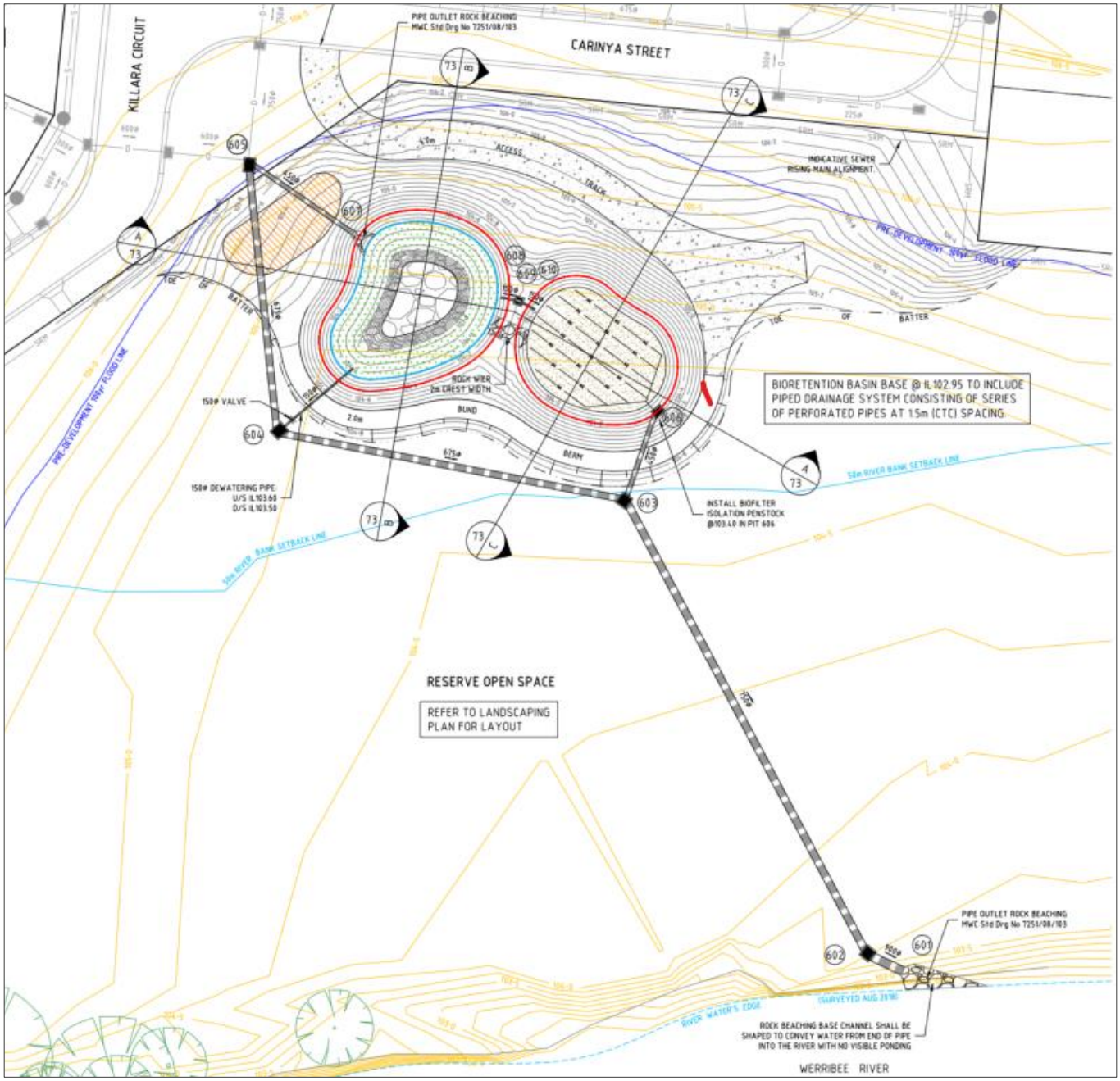


FIGURE 4.7: 'AS-CON' PLANS FOR STAGE 5A RIVER EDGE WSUD (SOURCE: URBAN DESIGN & MANAGEMENT)

FIGURE 4.8: PHOTO OF EXISTING SEDIMENTATION POND AND BIORETENTION SYSTEM AT RIVER EDGE

FIGURE 4.9: PHOTO OF EXISTING SEDIMENTATION POND AND BIORETENTION SYSTEM AT RIVER EDGE

From the as-built drawings, the sedimentation basin area 207 m2 with EDD 0.3m and biofiltration area is 137 m2 with EDD 0.3m and Dry Zone 72m2. Both SB and biofiltration depth are 2m and 1m respectively. From Engeny's site visit it is shown that both sediment and biofiltration basins are in good condition.

Engeny undertook a check of the Underbank Estate MUSIC model to verify whether the additional area of the Halletts Way western (Lot A) sub-area development (with estimated area of 0.5 ha and average fraction impervious of 0.65) can be treated in the existing sedimentation and biofiltration basins treatment and still achieve best practice. Both basins parameters in the MUSIC model have been adjusted to suit the as-built drawings The MUSIC model layout is presented in Figure 4.10 and the results are provided in Table 4.5 and Table 4.6.

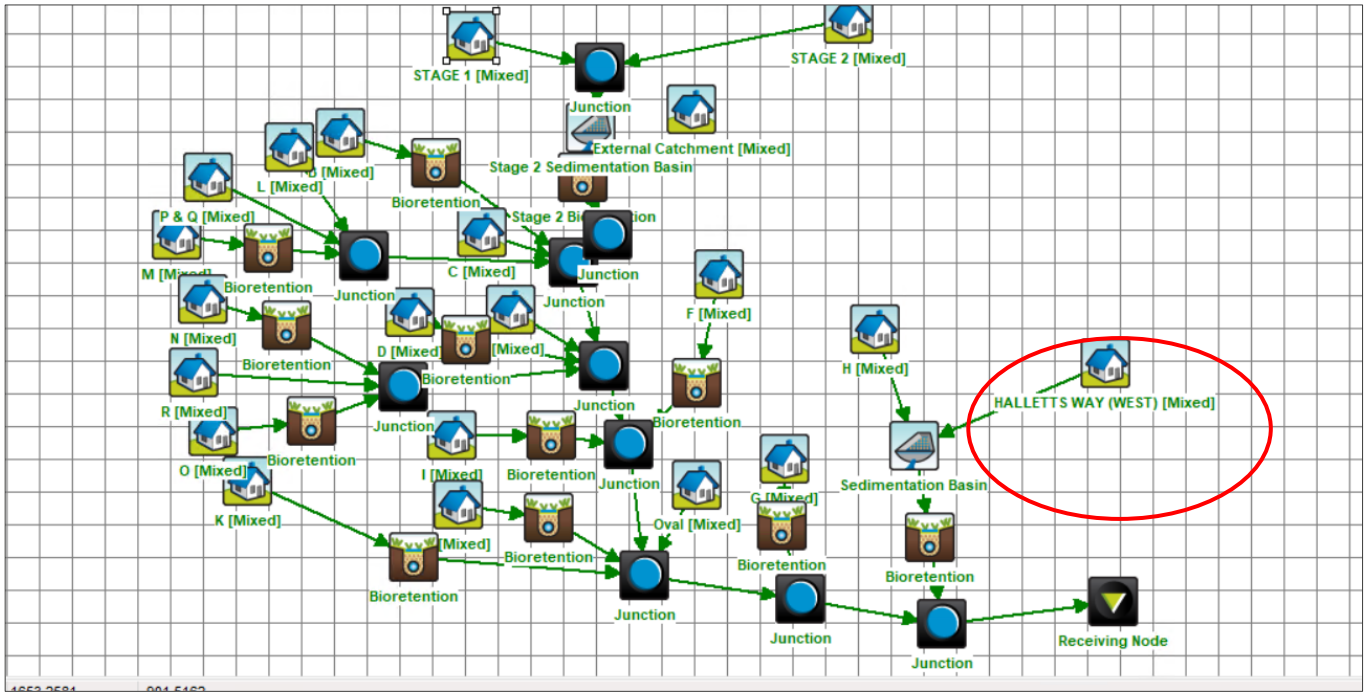


FIGURE 4.10: MUSIC MODEL SETUP FOR HALLETS WAY WEST SUBAREA

TABLE 4.5: MUSIC MODEL RESULTS AT THE EXISTING BIORETENTION ASSETS FOR CATCHMENT H OF UNDERBANK ESTATE AND WESTERN (LOT A) SUB-AREA OF HALLETS WAY

Pollutant	% Removal of Source Load
Total Suspended Solids (TSS)	83.2 % reduction from typical urban load
Total Phosphorous (TP)	56.6 % reduction from typical urban load
Total Nitrogen (TN)	45.4 % reduction from typical urban load
Gross Pollutants (GP)	100.0 % reduction from typical urban load

TABLE 4.6: MUSIC MODEL RESULTS OF UNDERBANK ESTATE AT THE RECEIVING NODE

Pollutant	% Removal of Source Load
Total Suspended Solids (TSS)	81.5 % reduction from typical urban load
Total Phosphorous (TP)	54.5 % reduction from typical urban load
Total Nitrogen (TN)	60.9 % reduction from typical urban load
Gross Pollutants (GP)	85.6 % reduction from typical urban load

The MUSIC model results in Table 4.5 and Table 4.6 indicate that with the additional catchment area from the western sub-area of the Hallets Way development, the existing treatment assets still meet the BPEM targets for all pollutant types. Therefore, the western sub-area of the Hallets Way can be catered for by the existing sedimentation and biofiltration basins located on the southwestern part of the development site (Refer to Figure 4.11 for the concept drainage plan for western sub-area).

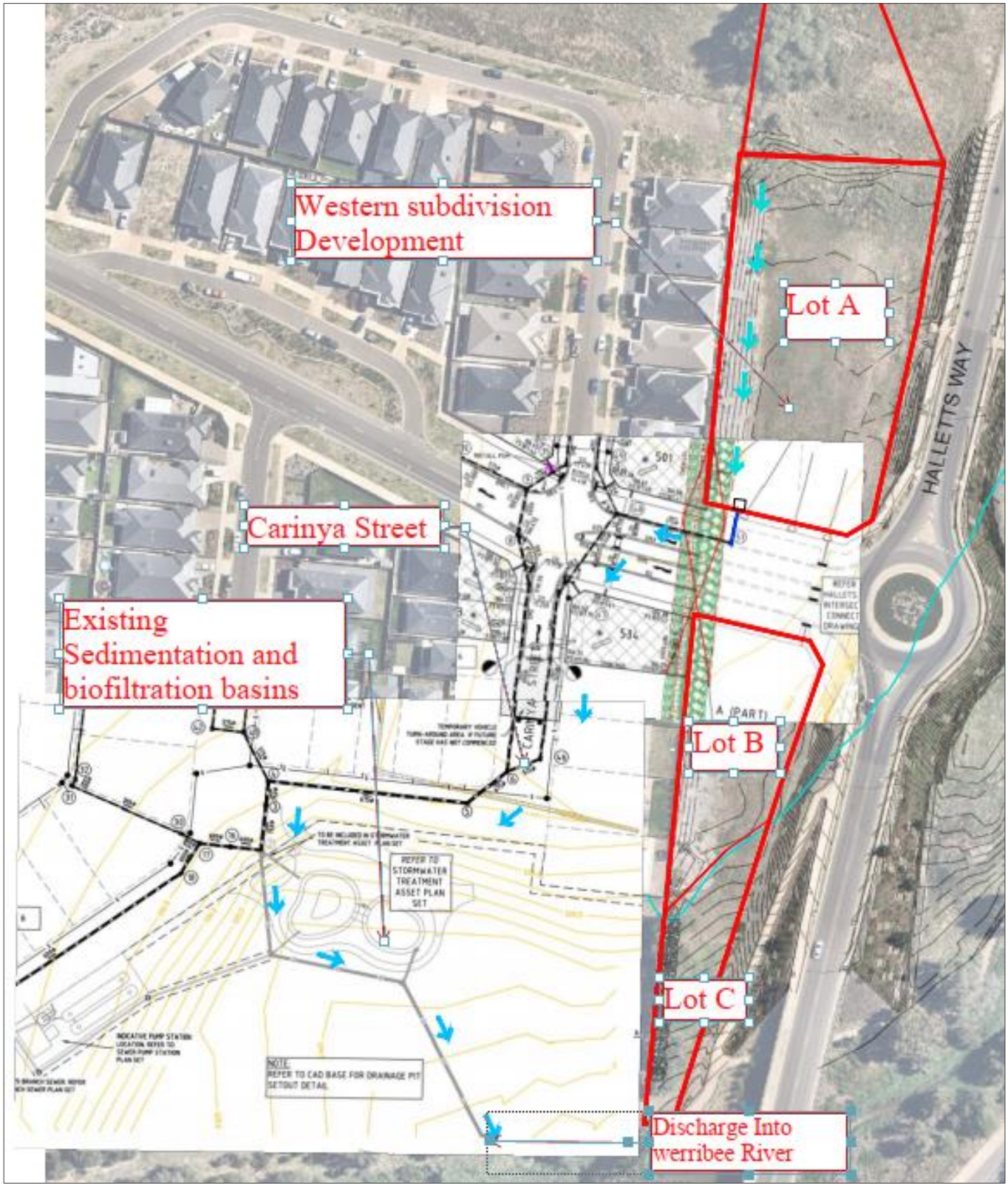


FIGURE 4.11: INDICATIVE CONCEPT DRAINAGE LAYOUT PLAN FOR HALLETS WAY WESTERN (LOT A) SUBAREA

5. CONCLUSIONS

This SWMP, which is required to assist the rezoning application for the proposed 5-lot subdivision plan (from farming to residential zone) located on Halletts way, Bacchus Marsh has been developed to inform the management of stormwater following development of the site. The plan specifies the stormwater management approach and design requirements for managing flows generated on the site. The following summarises the key aspects of the SWMP.

(1) The stormwater management at the site has been undertaken in accordance with the major and minor drainage system philosophy outlined by the industry guidelines ARR 2019. The minor and major drainage systems are summarised as follows:

   (a) The minor drainage system at the site will be developed as the development plan and design progress and is likely to consist of a pit and pipe network with sufficient capacity to convey, at minimum, the 20 % AEP event peak flow to the existing drainage system on Adelong Way and Carinya Street and the proposed outfalls on Werribee River.

   (b) The major drainage system, which include the proposed overland flow path and road network through the site will be constructed to convey up to the 1 % AEP flow to Werribee River.

(2) This SWMP has considered the suitability of the existing sedimentation pond and bioretention system for treating the estimated runoff from western (Lot A) sub-area, a GPT and a swale or another proprietary device to treat the eastern (Lot D) sub-area and a GPT and a swale to treat the southern (Lot B) sub-area. The suitability of the treatment system for each sub area has been verified using MUSIC modelling. Best practise targets for the reduction of key water quality parameters for each estimated sub-area have been achieved as demonstrated by the MUSIC model results.

Overall, this SWMP for the site has considered the previous stormwater management strategy for the adjacent Underbank development prepared by Engeny (May 2013). Engeny recommends that any further or future considerations for development at the site to consider the ultimate strategy proposed by above report and this SWMP report.

Engeny recommends that another pre-development advice during planning permit application stage should be obtained from Melbourne Water to verify whether the approach of the SWMP achieves Melbourne Water's requirements.

6. QUALIFICATIONS

(a) In preparing this document, including all relevant calculation and modelling, Engeny Australia Pty Ltd (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

(b) Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

(c) Engeny reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:

  (i) Additional sources of information not presently available (for whatever reason) are provided or become known to Engeny; or

  (ii) Engeny considers it prudent to revise any aspect of the works in light of any information which becomes known to it after the date of submission.

(d) Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the works, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works. All limitations of liability shall apply for the benefit of the employees, agents and representatives of Engeny to the same extent that they apply for the benefit of Engeny.

(e) This document is for the use of the party to whom it is addressed and for no other persons. No responsibility is accepted to any third party for the whole or part of the contents of this Report.

(f) If any claim or demand is made by any person against Engeny on the basis of detriment sustained or alleged to have been sustained as a result of reliance upon the Report or information therein, Engeny will rely upon this provision as a defence to any such claim or demand.

(g) This Report does not provide legal advice.

7. REFERENCES

Engeny (May 2013), Underbank Farm, Bacchus Marsh – Surface Water Investigation

Environment Protection Authority (June 2021), Urban Stormwater Management Guidelines

MapshareVic, Lot S401 Property Report

Bureau of Meteorology, Randwick Avenue IFD data

Local Government Infrastructure Design Association (2022), Infrastructure Design Manual

APPENDIX A: CONCEPT SUBDIVISION LAYOUT PLAN

West side Subdivision Development

East side Subdivision Development

South side Subdivision Development

Lot A
5011m²

Lot B
1917m²

Lot C
1067m²

Lot D
4465m²

Lot E
13665m²

HALLETTS WAY

ADELONG WAY

WERRIBEE RIVER

100 YEAR FLOOD EXTENT

54
1.2
42.1
94.8
56.4
39.3
8
23.5
62.8
63
29.9
67.9
69.4
27.4
5.7
17.7
16.5
7.5
4.3
15
18.9
38.8
5.2
13.7
124.3
14.7
44.6
45.8
31.1
60.4
20.8
32
7.3
30.9
81.1
13.2
14.5
23.7
41.4
57.4
41.7
9.2

Notes

- This plan is indicative only and is intended for discussion purposes only
- This plan is subject to Council Approval
- All dimensions and areas are subject to survey and final computations
- Further investigation and changes may be required for fire buffers, vegetation retention and removal, site access and egress, and aboriginal and cultural heritage.
- Wetland / Drainage areas are approximate only and subject to detailed engineering design and the approval of the relevant Authorities
- Access/egress to the site is subject to Council/Vicroads approval
- All roads are 16m local access level 1 unless noted otherwise
- Road pavement is indicative only and subject to engineering design
- All public open space areas are conceptual only and subject to change during the detailed design process
- Arc dimensions shown are the length of arc (not chord)

10 0 10 20 30 40 50 60m

Beveridge Williams

1 Glenferrie Road, Malvern, Victoria 3144
ph : 03 9524 8888 - www.beveridgewilliams.com.au

Indicative Subdivision Plan - Halletts Way

Underbank, Bacchus Marsh

Kataland

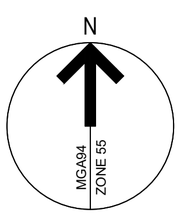
Version	Date	Description	Drafted	Approved
01	02.04.20	Initial Issue	WEB	DRAFT
02	05.04.23	Bushfire buffer included	WEB	DRAFT
03	26.05.23	Lot bounadries confrimed	WEB	DRAFT
04	31.05.23	Updated based on client's comments	OX	WEB

Date: 31.05.23
Version No: 04
Job No: 2000150
Scale (A1): 1:500
(A3): 1:1000

N

K:\JOBS DATA\2000150 - UNDERBANK - BACCHUS MARSH_UD\CAD\2000150_UD_BASE01_HALLETTS WAY.DWG

APPENDIX B: FEATURE SURVEY



SYMBOL	DESCRIPTION
	SINGLE TREE
	SIGN
	ELECTRICITY PIT
	LIGHT POLE
	ELECTRICAL BOX
	TELECOMMUNICATIONS PIT
	HYDRANT PLUG
	STOP VALVE
JUNC	JUNCTION PIT
SEP	SIDE ENTRY PIT
GP	GRATED PIT
	SEWER STOP VALVE
	SEWER MARKER

LEGEND OF LINETYPES

LINE	DESCRIPTION
	TITLE
	FENCE
	TOP OF BANK
	TOE OF BANK
	DRAINAGE INVERT
D	DRAINAGE PIPE
	GUARDRAIL

SURVEY NOTES:

DATA ON THIS PLAN MAY ONLY BE MANIPULATED WITH THE PERMISSION OF TAYLORS DEVELOPMENT STRATEGISTS PTY. LTD.

WHILST EVERY EFFORT HAS BEEN MADE TO LOCATE ALL FEATURES AND SERVICES WITHIN THE SURVEYED AREA, TAYLORS CANNOT BE HELD RESPONSIBLE FOR FEATURES CONCEALED, BURIED, OR UNDER CONSTRUCTION AT THE TIME OF SURVEY.

SURVEY DATUM:

BEARING DATUM - PROJECT MGA94 DATUM

CO-ORDINATE DATUM - PROJECT MGA94 DATUM

LEVEL DATUM - AUSTRALIAN HEIGHT DATUM (AHD)
BASED ON KORKUPERRIMUL PM 155 - RL: 175.185

FEATURE & LEVEL SURVEY:

THE FOLLOWING ACCURACIES HAVE BEEN ACHIEVED:
POSITIONAL ACCURACY
HARD SURFACES H ± 0.05m V +0.025m
SOFT SURFACES H ± 0.05m V +0.05m

DIGITAL TERRAIN MODEL (DTM):
CONTOUR HAVE BEEN GENERATED AT INTERVALS OF 0.2m AND LABELLED AT 1m INTERVALS.
HAS BEEN PROVIDED ON LAYER "TO_DTM_TRIANGLES" WITHIN THE CAD FILE.

LICENSED SURVEYOR CERTIFICATION:

This plan has been prepared from a survey completed on the 02/06/2023. The survey was carried out under my direction and supervision in accordance with the Surveying Act 2004. This plan is accurate and correctly represents the adopted boundaries and achieves the survey accuracy required by Regulation 7(1) of the Surveying (Cadastral Surveys) Regulations 2015.

Digitally Signed:

6/6/2023

CLIENT:

Plenti Property Pty Ltd

PROJECT:

UNDERBANK ESTATE
ADELONG WAY
BACCHUS MARSH 3340

DRAWING:

PLAN OF FEATURE & LEVEL SURVEY

Proj. Ref:	02111/S	Approved by:	DLS (LS)
Sheet:	1 of 1	Approval Date:	xx/xx/xxxx

10 0m 10 20 30 40

1:500 @ A1

DRAWING NUMBER: 02111-D3

VERSION: 01

TAYLORS
Urban Development | Infrastructure
8/270 Ferntree Gully Road, Notting Hill VIC 3168
Phone: (03) 9501 2800 | **www.taylorsds.com.au**

APPENDIX C: RATIONAL METHOD CALCULATIONS

Date	16/05/2023
Calculations	CM
Reviewed	LN

Hallets Way - East Side
Rural Rational Method - Pre Development for Site & External Catchment

Area	0.8267	hectares
Time of Concentration	$0.76*A^{0.38}$	
	7.4	mins
$C_{5\ (C10*0.9)}$	0.14	
C_{10}	0.15	
$C_{20\ (C10*1.1)}$	0.17	
$C_{50\ (C10*1.2)}$	0.18	
$C_{100\ (C10*1.3)}$	0.20	
I_{5} (5 year intensity for tc)	66.3	mm/hr
I_{10} (10 year intensity for tc)	81.0	mm/hr
I_{20} (20 year intensity for tc)	95.9	mm/hr
I_{50} (50 year intensity for tc)	116.7	mm/hr
I_{100} (100 year intensity for tc)	133.3	mm/hr
Q	C*I*A/360	
Q_5	**0.021**	**m^3/s**
Q_{10}	**0.029**	**m^3/s**
Q_{20}	**0.037**	**m^3/s**
Q_{50}	**0.049**	**m^3/s**
Q_{100}	**0.061**	**m^3/s**

Date	16/05/2023
Calculations	CM
Reviewed	LN

Hallets Way - East Side

Rural Rational Method - Post Development External Catchment only

Area	0.3836	hectares
Time of Concentration	$0.76*A^{0.38}$	
	5.5	mins
$C_{5\ (C10*0.9)}$	0.14	
C_{10}	0.15	
$C_{20\ (C10*1.1)}$	0.17	
$C_{50\ (C10*1.2)}$	0.18	
$C_{100\ (C10*1.3)}$	0.20	
$I_{5\ (5\ year\ intensity\ for\ tc)}$	72.5	mm/hr
$I_{10\ (10\ year\ intensity\ for\ tc)}$	88.4	mm/hr
$I_{20\ (20\ year\ intensity\ for\ tc)}$	104.6	mm/hr
$I_{50\ (50\ year\ intensity\ for\ tc)}$	127.2	mm/hr
$I_{100\ (100\ year\ intensity\ for\ tc)}$	144.9	mm/hr
Q	C*I*A/360	
Q_5	**0.011**	**m^3/s**
Q_{10}	**0.014**	**m^3/s**
Q_{20}	**0.019**	**m^3/s**
Q_{50}	**0.025**	**m^3/s**
Q_{100}	**0.031**	**m^3/s**

Date	19/07/2023
Calculations	CM
Reviewed	LN

Hallets Way - East Side (Lot D)
Rational Method - Post Dev - Site Only

	Site development	
Area	0.443	hectares
Time of Concentration	Residential	
	6.0	mins
C_5	0.75	
C_{10}	0.75	
C_{20}	0.75	
C_{50}	0.75	
C_{100}	0.75	
I_{5} (5 year intensity for tc)	71.5	mm/hr
I_{10} (10 year intensity for tc)	87.0	mm/hr
I_{20} (20 year intensity for tc)	103.2	mm/hr
I_{50} (50 year intensity for tc)	125.4	mm/hr
I_{100} (100 year intensity for tc)	142.8	mm/hr
Q	C*I*A/360	
Q_5	**0.066**	**m^3/s**
Q_{10}	**0.080**	**m^3/s**
Q_{20}	**0.095**	**m^3/s**
Q_{50}	**0.116**	**m^3/s**
Q_{100}	**0.132**	**m^3/s**

gap flow	**0.097**	**m^3/s**

Date	16/05/2023
Calculations	CM
Reviewed	LN

Hallets Way-West Side
Rural Rational Method - Pre Development for Site & External Catchment

Area	0.7661	hectares
Time of Concentration	$0.76*A^{0.38}$	
	7.2	mins
$C_{5\ (C10*0.9)}$	0.14	
C_{10}	0.15	
$C_{20\ (C10*1.1)}$	0.17	
$C_{50\ (C10*1.2)}$	0.18	
$C_{100\ (C10*1.3)}$	0.20	
$I_{5\ (5\ year\ intensity\ for\ tc)}$	67.0	mm/hr
$I_{10\ (10\ year\ intensity\ for\ tc)}$	81.8	mm/hr
$I_{20\ (20\ year\ intensity\ for\ tc)}$	96.9	mm/hr
$I_{50\ (50\ year\ intensity\ for\ tc)}$	117.9	mm/hr
$I_{100\ (100\ year\ intensity\ for\ tc)}$	134.6	mm/hr
Q	C*I*A/360	
Q_5	**0.020**	**m^3/s**
Q_{10}	**0.027**	**m^3/s**
Q_{20}	**0.035**	**m^3/s**
Q_{50}	**0.046**	**m^3/s**
Q_{100}	**0.057**	**m^3/s**

Date	16/05/2023
Calculations	CM
Reviewed	LN

Hallets Way-West Side

Rural Rational Method - Post Development for External Catchment

Area	0.263	hectares
Time of Concentration	$0.76*A^{0.38}$	
	4.8	mins
$C_{5\ (C10*0.9)}$	0.14	
C_{10}	0.15	
$C_{20\ (C10*1.1)}$	0.17	
$C_{50\ (C10*1.2)}$	0.18	
$C_{100\ (C10*1.3)}$	0.20	
$I_{5\ (5\ year\ intensity\ for\ tc)}$	75.0	mm/hr
$I_{10\ (10\ year\ intensity\ for\ tc)}$	91.3	mm/hr
$I_{20\ (20\ year\ intensity\ for\ tc)}$	108.1	mm/hr
$I_{50\ (50\ year\ intensity\ for\ tc)}$	131.3	mm/hr
$I_{100\ (100\ year\ intensity\ for\ tc)}$	149.4	mm/hr
Q	C*I*A/360	
Q_5	**0.008**	**m^3/s**
Q_{10}	**0.010**	**m^3/s**
Q_{20}	**0.013**	**m^3/s**
Q_{50}	**0.018**	**m^3/s**
Q_{100}	**0.022**	**m^3/s**

Date	19/07/2023
Calculations	CM
Reviewed	LN

Hallets Way-West Side

Rational Method - Post Dev - Site Only

	Site development	
Area	0.5031	hectares
Time of Concentration	Residential	
	6.0	mins
C_5	0.75	
C_{10}	0.75	
C_{20}	0.75	
C_{50}	0.75	
C_{100}	0.75	
I_{5} (5 year intensity for tc)	71.5	mm/hr
I_{10} (10 year intensity for tc)	87.0	mm/hr
I_{20} (20 year intensity for tc)	103.2	mm/hr
I_{50} (50 year intensity for tc)	125.4	mm/hr
I_{100} (100 year intensity for tc)	142.8	mm/hr
Q	C*I*A/360	
Q_5	**0.075**	**m^3/s**
Q_{10}	**0.091**	**m^3/s**
Q_{20}	**0.108**	**m^3/s**
Q_{50}	**0.131**	**m^3/s**
Q_{100}	**0.150**	**m^3/s**

gap flow	**0.097**	**m^3/s**

Date 16/05/2023
Calculations CM
Reviewed

Hallets Way South Side
Rural Rational Method - Pre Development for Site & External Catchment

Area	0.1951	hectares
Time of Concentration	$0.76*A^{0.38}$	
	4.3	mins
$C_{5\ (C10*0.9)}$	0.14	
C_{10}	0.15	
$C_{20\ (C10*1.1)}$	0.17	
$C_{50\ (C10*1.2)}$	0.18	
$C_{100\ (C10*1.3)}$	0.20	
$I_{5\ (5\ year\ intensity\ for\ tc)}$	76.7	mm/hr
$I_{10\ (10\ year\ intensity\ for\ tc)}$	93.4	mm/hr
$I_{20\ (20\ year\ intensity\ for\ tc)}$	110.5	mm/hr
$I_{50\ (50\ year\ intensity\ for\ tc)}$	134.2	mm/hr
$I_{100\ (100\ year\ intensity\ for\ tc)}$	152.6	mm/hr
Q	C*I*A/360	
Q_5	**0.006**	**m^3/s**
Q_{10}	**0.008**	**m^3/s**
Q_{20}	**0.010**	**m^3/s**
Q_{50}	**0.013**	**m^3/s**
Q_{100}	**0.017**	**m^3/s**

0.077

Date	19/07/2023
Calculations	CM
Reviewed	LN

Hallets Way South Side (Lot B)
Rational Method - Post Dev - Site Only

	Site development	
Area	0.1951	hectares
Time of Concentration	Residential	
	6.0	mins
C_5	0.72	
C_{10}	0.72	
C_{20}	0.72	
C_{50}	0.72	
C_{100}	0.72	
I_{5} (5 year intensity for tc)	71.5	mm/hr
I_{10} (10 year intensity for tc)	87.0	mm/hr
I_{20} (20 year intensity for tc)	103.2	mm/hr
I_{50} (50 year intensity for tc)	125.4	mm/hr
I_{100} (100 year intensity for tc)	142.8	mm/hr
Q	C*I*A/360	
Q_5	**0.028**	**m^3/s**
Q_{10}	**0.034**	**m^3/s**
Q_{20}	**0.040**	**m^3/s**
Q_{50}	**0.049**	**m^3/s**
Q_{100}	**0.056**	**m^3/s**

0.173

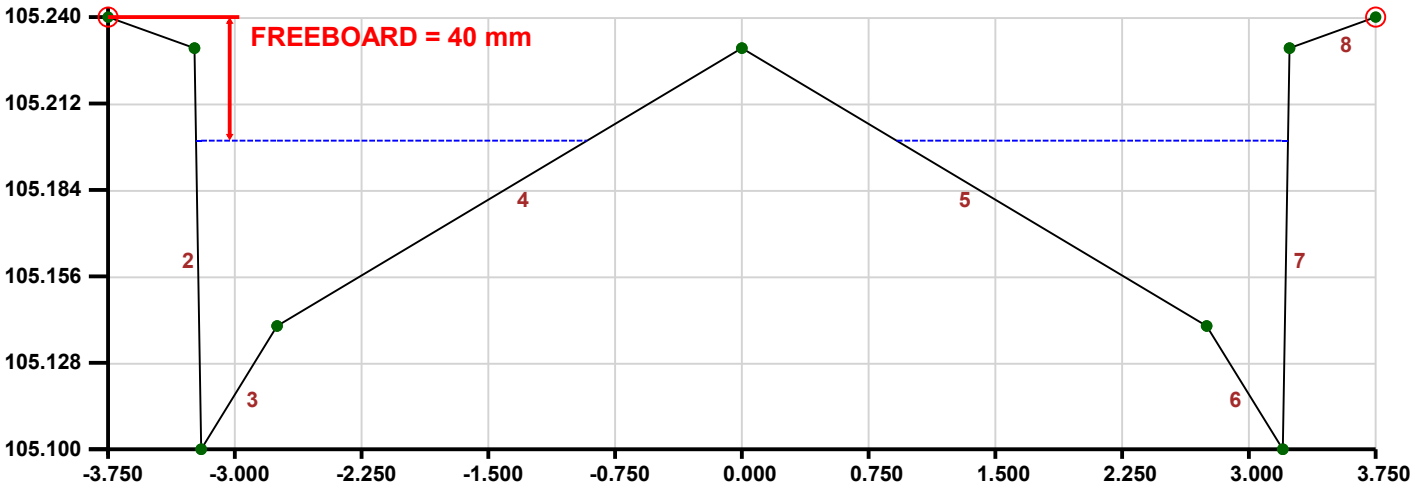
0.334

gap flow **0.03** **m^3/s**

APPENDIX D: PC CONVEY RESULTS

PROJECT: Hallets Way - East Side - Typical Road XS 7m Width
Comment
Print-out date: 20/07/2023 - Time: 3:46
Data File: VC1033_002-Hallets Way East-7m Road XS.dat

1. CROSS-SECTION



2. DISCHARGE INFORMATION

1% AEP storm event
Design discharge after construction of retarding basin

Required overland / channel / watercourse discharge = 0.09 cumecs

3. RESULTS Water surface elevation = 105.200 m

High Flow Channel grade = 1 in 200, Main Channel / Low Flow Channel grade = 1 in 200.

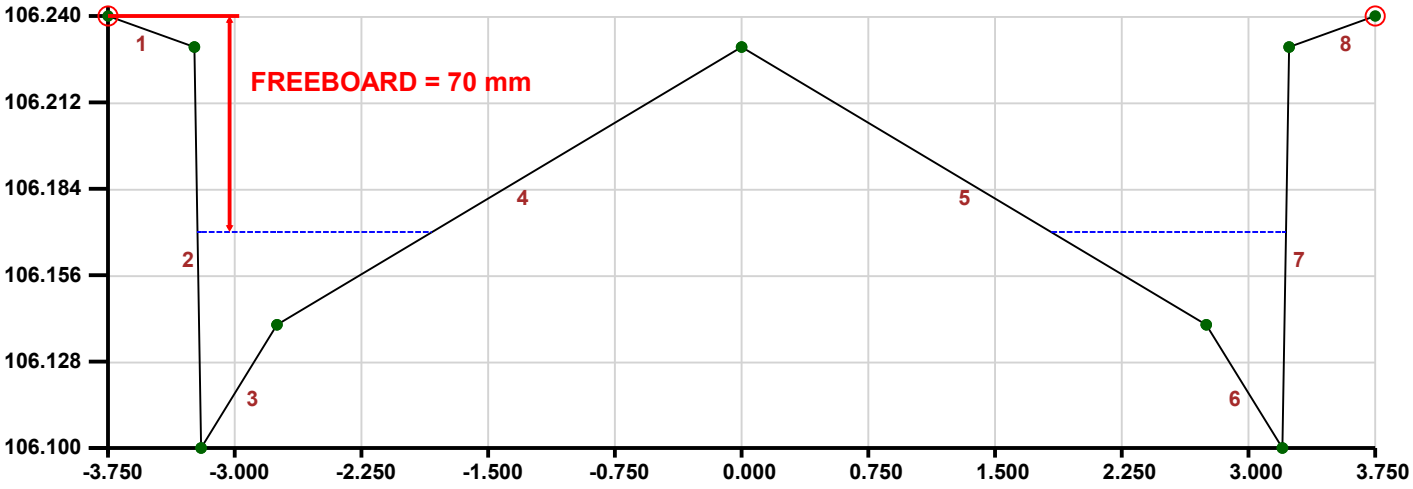
	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.115	0.000	0.115
D(Max) = Max. Depth (m):	0.000	0.100	0.000	0.100
D(Ave) = Ave. Depth (m):	0.000	0.040	0.000	0.040
V = Ave. Velocity (m/s):	0.000	0.622	0.000	0.622
D(Max) x V (cumecs/m):	0.000	0.062	0.000	0.062
D(Ave) x V (cumecs/m):	0.000	0.025	0.000	0.025
Froude Number:	0.000	0.994	0.000	N/A
Area (m^2):	0.000	0.185	0.000	0.185
Wetted Perimeter (m):	0.000	4.781	0.000	4.781
Flow Width (m):	0.000	4.628	0.000	4.628
Hydraulic Radius (m):	0.000	0.039	0.000	0.039
Composite Manning's n:	0.000	0.013	0.000	N/A
Split Flow?	-	-	-	Yes

4. CROSS-SECTION DATA

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
1	-3.750	105.240	-3.240	105.230	0.013
2	-3.240	105.230	-3.200	105.100	0.013
3	-3.200	105.100	-2.750	105.140	0.013
4	-2.750	105.140	0.000	105.230	0.013
5	0.000	105.230	2.750	105.140	0.013
6	2.750	105.140	3.200	105.100	0.013
7	3.200	105.100	3.240	105.230	0.013
8	3.240	105.230	3.750	105.240	0.013

PROJECT: Hallets Way - South Side - Typical Road XS 7m Width
Comment
Print-out date: 23/05/2023 - Time: 4:51
Data File: VC1033_002-Hallets Way South-7m Road XS.dat

1. CROSS-SECTION



2. DISCHARGE INFORMATION

1% AEP storm event
Design discharge after construction of retarding basin

Required overland / channel / watercourse discharge = 0.03 cumecs

3. RESULTS Water surface elevation = 106.170 m

High Flow Channel grade = 1 in 200, Main Channel / Low Flow Channel grade = 1 in 200.

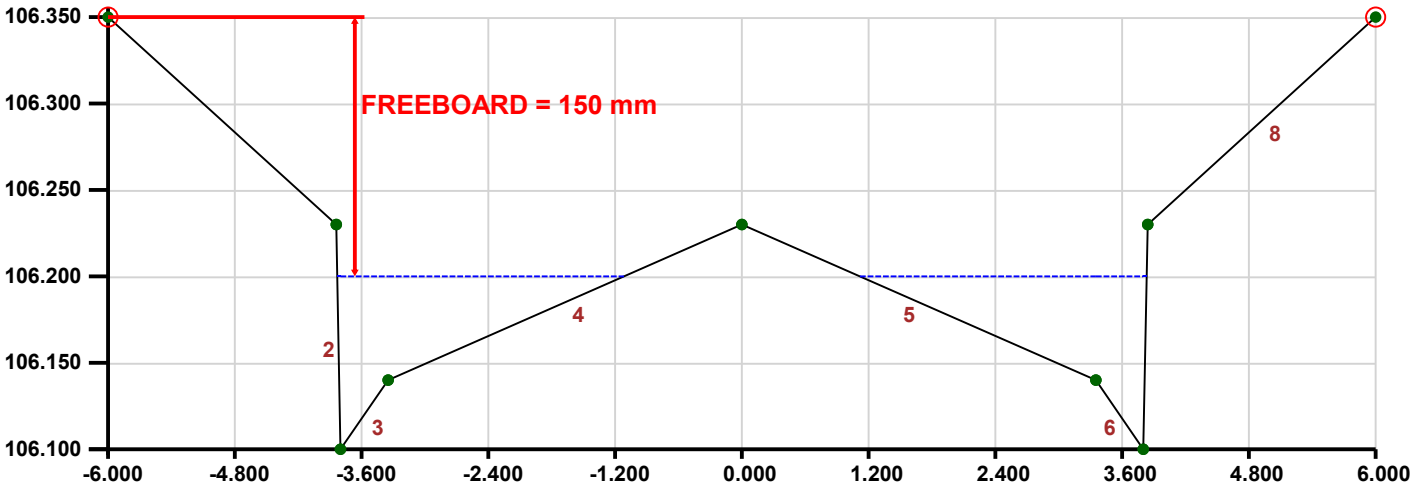
	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.035	0.000	0.035
D(Max) = Max. Depth (m):	0.000	0.070	0.000	0.070
D(Ave) = Ave. Depth (m):	0.000	0.027	0.000	0.027
V = Ave. Velocity (m/s):	0.000	0.473	0.000	0.473
D(Max) x V (cumecs/m):	0.000	0.033	0.000	0.033
D(Ave) x V (cumecs/m):	0.000	0.013	0.000	0.013
Froude Number:	0.000	0.925	0.000	N/A
Area (m^2):	0.000	0.074	0.000	0.074
Wetted Perimeter (m):	0.000	2.884	0.000	2.884
Flow Width (m):	0.000	2.776	0.000	2.776
Hydraulic Radius (m):	0.000	0.026	0.000	0.026
Composite Manning's n:	0.000	0.013	0.000	N/A
Split Flow?	-	-	-	Yes

4. CROSS-SECTION DATA

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
1	-3.750	106.240	-3.240	106.230	0.013
2	-3.240	106.230	-3.200	106.100	0.013
3	-3.200	106.100	-2.750	106.140	0.013
4	-2.750	106.140	0.000	106.230	0.013
5	0.000	106.230	2.750	106.140	0.013
6	2.750	106.140	3.200	106.100	0.013
7	3.200	106.100	3.240	106.230	0.013
8	3.240	106.230	3.750	106.240	0.013

PROJECT: Hallets Way - West Side - Typical Road XS 12m Width
Comment
Print-out date: 20/07/2023 - Time: 3:52
Data File: VC1033_002-Hallets Way West-12m Road XS.dat

1. CROSS-SECTION



2. DISCHARGE INFORMATION

1% AEP storm event
Design discharge after construction of retarding basin

Required overland / channel / watercourse discharge = 0.09 cumecs

3. RESULTS Water surface elevation = 106.200 m

High Flow Channel grade = 1 in 200, Main Channel / Low Flow Channel grade = 1 in 200.

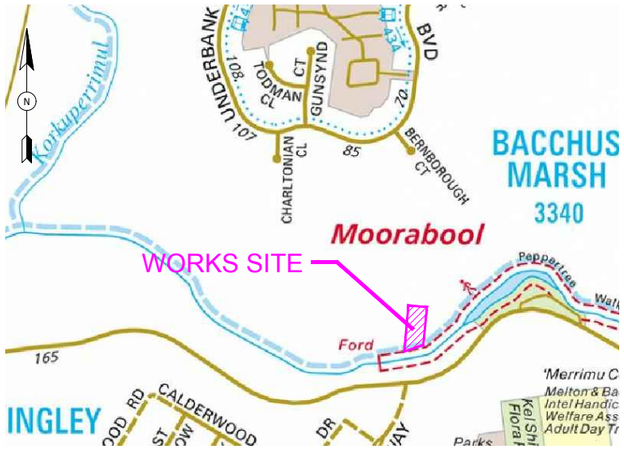
	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.127	0.000	0.127
D(Max) = Max. Depth (m):	0.000	0.100	0.000	0.100
D(Ave) = Ave. Depth (m):	0.000	0.039	0.000	0.039
V = Ave. Velocity (m/s):	0.000	0.609	0.000	0.609
D(Max) x V (cumecs/m):	0.000	0.061	0.000	0.061
D(Ave) x V (cumecs/m):	0.000	0.023	0.000	0.023
Froude Number:	0.000	0.991	0.000	N/A
Area (m^2):	0.000	0.209	0.000	0.209
Wetted Perimeter (m):	0.000	5.581	0.000	5.581
Flow Width (m):	0.000	5.428	0.000	5.428
Hydraulic Radius (m):	0.000	0.037	0.000	0.037
Composite Manning's n:	0.000	0.013	0.000	N/A
Split Flow?	-	-	-	Yes

4. CROSS-SECTION DATA

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
1	-6.000	106.350	-3.840	106.230	0.030
2	-3.840	106.230	-3.800	106.100	0.013
3	-3.800	106.100	-3.350	106.140	0.013
4	-3.350	106.140	0.000	106.230	0.013
5	0.000	106.230	3.350	106.140	0.013
6	3.350	106.140	3.800	106.100	0.013
7	3.800	106.100	3.840	106.230	0.013
8	3.840	106.230	6.000	106.350	0.030

APPENDIX E: LAYOUT PLAN OF EXISTING SEDIMENTATION AND BIOFILTRATION BASINS

UNDERBANK
Rivers Edge - Stage 5
Bioretention & Sediment Basins



LOCALITY PLAN

NOT TO SCALE

DRAWING INDEX		
JOB No	SHEET No	SHEET DESCRIPTION
11022-05	71	LOCALITY PLAN
11022-05	72	DETAIL PLAN
11022-05	73	SECTIONS
11022-05	74	SETOUT
11022-05	75	DRAINAGE LONGITUDINAL SECTIONS, PIT SCHEDULE & DETAILS

KATALAND

MELBOURNE ONE CALL SYSTEM DIAL 1100 DIAL BEFORE YOU DIG

GENERAL NOTES:

AUTHORITY WORKS INSPECTIONS

1. THE CONTRACT SUPERINTENDENT OR THEIR REPRESENTATIVE SHALL BE NOTIFIED 24 HOURS BEFORE ANY INSPECTION IS DUE FOR ALL WORKS INSPECTIONS BY COUNCIL AND 3 WORKING DAYS FOR WATER AUTHORITY.

WORKS VARIATIONS

2. THE CONTRACTOR SHALL NOT UNDERTAKE ANY WORK WHICH MAY LEAD TO A CLAIMABLE VARIATION(S) WITHOUT PRIOR APPROVAL OF THE CONTRACT SUPERINTENDENT.

CONTRACTOR RESPONSIBILITIES

3. COUNCIL IS TO BE NOTIFIED SEVEN (7) CLEAR WORKING DAYS PRIOR TO THE COMMENCEMENT OF WORKS WITH A PRECOMMENCEMENT MEETING BEING HELD BETWEEN COUNCIL, THE CONSULTANT AND THE CONTRACTOR BEFORE WORKS COMMENCE. A SITE MANAGEMENT PLAN IS TO BE SUBMITTED PRIOR TO COMMENCEMENT OF WORKS.
4. ALL WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH COUNCILS CURRENT STANDARD DRAWINGS AND SPECIFICATIONS, THE APPROVED SET OF CONSTRUCTION PLANS, AND TO THE SATISFACTION OF THE SUPERINTENDENT. IN THE EVENT OF ANY DISREPANCY THE CONTRACTOR IS TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
5. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH AS2124-1992 GENERAL CONDITIONS OF CONTRACT.
6. THE CONTRACTOR IS REQUIRED TO CONFINE ALL CONSTRUCTION VEHICLES TO THE ROAD RESERVE AND EASEMENTS. ANY DAMAGE CAUSED TO ALLOTMENTS MUST BE MADE GOOD.
7. AT THE COMPLETION OF ALL WORKS, ALL RUBBISH, DEBRIS AND SURPLUS SPOIL SHALL BE REMOVED FROM THE SITE AND THE SITE SHALL BE CLEANED TO THE SATISFACTION OF THE SUPERINTENDENT.
8. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL NECESSARY WARNING SIGNS, LIGHTING AND BARRICADES TO COMPLY WITH THE REQUIREMENTS OF THE ROAD TRAFFIC REGULATIONS.

SURVEYING AND SETTING OUT

9. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
10. ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
11. ALL CO-ORDINATES ARE TO AUSTRALIAN MAP GRID (AMG).
12. ALL ROAD CHAINAGES REFER TO ROAD RESERVE CENTRELINES EXCEPT FOR KERB RETURNS AND COURT HEADS WHERE CHAINAGES REFER TO LIP OF KERB.
13. KERB RETURN RADII ARE GIVEN TO LIP OF KERB, UNLESS SHOWN OTHERWISE.
14. ALL EASEMENTS ARE 2.5m OR 3.5m WIDE DRAINAGE AND SEWERAGE EASEMENTS UNLESS OTHERWISE SHOWN.
15. TBM'S TO BE RE-ESTABLISHED BY THE PRINCIPLES LICENSED SURVEYOR IF FOUND TO BE MISSING AT THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR CARE AND MAINTENANCE OF TBM'S THEREAFTER.
16. AN ELECTRONIC COPY OF THE DESIGN DRAWINGS WILL BE MADE AVAILABLE TO THE CONTRACTOR FOR THE PURPOSE OF SETTING OUT.
17. THE CONTRACTOR IS TO OBTAIN A BUILDING PERMIT FOR ANY STRUCTURES / FENCES AND FOR ANY RETAINING WALLS OVER 1.0M IN HEIGHT.

EARTHWORKS AND EXCAVATION

18. EXCESS TOPSOIL SHALL BECOME PROPERTY OF THE PRINCIPLE AND STORED AT THE CENTRAL TOPSOIL STOCKPILE AS DIRECTED BY THE SUPERINTENDENT. NO TOPSOIL SHALL BE REMOVED FROM SITE WITHOUT SPECIFIC APPROVAL OF THE SUPERINTENDENT.
19. WHERE SHOWN, EXISTING DAMS ARE TO BE BREACHED, DRAINED, DISLODGED AND BE EXCAVATED TO A CLEAN FIRM BASE. THE SURFACE SHALL BE INSPECTED AND APPROVED BY THE ENGINEER AND LEVELLED PRIOR TO COMMENCEMENT OF WORK. THE FILL SHALL BE APPROVED SELECTED ON-SITE MATERIAL OR APPROVED IMPORTED MATERIAL. THE FILL SHALL BE PLACED UNDER CONTROLLED MOISTURE CONDITIONS. OF BETWEEN 85% AND 125% OF OPTIMUM AND APPROPRIATE TO THE TYPE OF COMPACTION EQUIPMENT USED. THE FILL SHALL BE UNIFORMLY COMPACTED IN LAYERS NOT EXCEEDING 150MM DEPTH TO A MINIMUM OF 95% STANDARD DRY DENSITY.
20. PRIOR TO COMMENCEMENT OF THE WORKS, THE CONTRACTOR SHALL PROVIDE THE FOLLOWING INFORMATION:
    a) SOURCE OF QUARRY MATERIAL
    b) N.A.T.A. APPROVED TESTS RESULTS FOR THE F.C.R. THAT IS TO BE USED
    c) IF THE SOURCE OF THE QUARRY MATERIAL IS CHANGED DURING THE COURSE OF THE WORKS, THEN NEW TEST RESULTS SHALL BE PROVIDED.
21. PRIOR TO COMMENCEMENT OF WORKS ON SITE, THE CONTRACTOR MUST ENSURE THAT ALL MATTERS RELATING TO THE OCCUPATIONAL HEALTH AND SAFETY ACT 2004 AND OCCUPATIONAL HEALTH AND SAFETY REGULATIONS 2007, HAVE BEEN AND WILL BE COMPLIED WITH.
22. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UNDERGROUND SERVICES PRIOR TO COMMENCING EXCAVATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING SERVICE AUTHORITIES PRIOR TO COMMENCING ANY WORKS ON SITE.
23. WHERE WORKS ARE IN THE VICINITY OF EXISTING SERVICES, THESE SERVICES ARE TO BE EXPOSED AND PROVED PRIOR TO COMMENCEMENT OF WORKS, AND THE RELEVANT AUTHORITIES NOTIFIED SEVEN (7) CLEAR DAYS PRIOR TO THE COMMENCEMENT OF THE WORKS.
24. ALL TRENCHING OF DEPTH 1.5m OR GREATER SHALL COMPLY WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS 2007, PART 5.1 CONSTRUCTION.
25. ON COMMENCEMENT OF CONSTRUCTION WORKS, THE CONTRACTOR MUST COMPLY WITH THE RECOMMENDATIONS OF THE ENVIRONMENT PROTECTION AUTHORITY PUBLICATION "CONSTRUCTION TECHNIQUES FOR SEDIMENT POLLUTION CONTROL." APPROPRIATE SILTATION CONTROL IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND MAINTENANCE PERIOD OF THE WORKS.
26. THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL SHORING, PLANKING AND STRUTTING, DEWATERING DEVICES, BARRICADES, SIGNS, LIGHTS, ETC. NECESSARY TO KEEP WORKS IN A SAFE AND STABLE CONDITION, AND TO PROTECT THE PUBLIC FROM HAZARDS ASSOCIATED WITH THE WORKS.
27. ON-SITE BLASTING IS NOT RECOMMENDED. IF BLASTING IS REQUIRED THEN THE CONTRACTOR IS TO NOTIFY THE SUPERINTENDENT AND COUNCIL IN WRITING, AND OBTAIN ALL REQUIRED PERMITS AND LICENSES. BLASTING IS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT REGULATIONS, DANGEROUS GOODS (EXPLOSIVES) REGULATIONS 2000 AND WORKSAFE VICTORIA REQUIREMENTS.
28. THE CONTRACTOR IS TO PROVIDE DETAILS IN WRITING OF THE DISPOSAL SITE FOR EXCESS SPOIL INCLUDING THE TRUCK ROUTE AND SUBMT TO COUNCILS REPRESENTATIVE FOR APPROVAL PRIOR TO THE COMMENCEMENT OF ANY WORKS.
29. FILL AREAS TO BE STRIPPED OF TOPSOIL, FILLED AND TOPSOIL REPLACED TO OBTAIN FINAL FILL LEVELS AS SHOWN ON PLAN. FILLING IS TO BE CLEAN CLAY COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY VALUE DETERMINED BY THE STANDARD COMPACTION TEST IN ACCORDANCE WITH A.S.1289.5.1.1-2003.
30. FILLING TO COMPLY WITH A.S.3798-2007, 'GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS'.
31. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL IMPORTED FILL MATERIAL, INCLUDING TOPSOIL, SATISFIES THE DESCRIPTION FOR CLEAN FILL MATERIAL IN EPA BULLETIN PUBLICATION NO 448 (MAY 2007) AND SUBSEQUENT REVISIONS. THE CONTRACTOR SHALL IF REQUIRED PROVIDE VERIFICATION INCLUDING TEST CERTIFICATES TO THE SUPERINTENDENT AND COUNCILS REPRESENTATIVE.

LOT GRADING

32. ALL BLOCKS ARE TO HAVE A SURFACE GRADE WITH A MIN. FALL OF 1 IN 150 ALONG THE LOW SIDE BOUNDARY TO THE POINT OF DISCHARGE.
33. THE FINISHED SURFACE OF ALLOTMENTS AND RESERVES IN FILL SHALL BE SMOOTHED, GRADED AND SHAPED TO AN EVEN SURFACE TO THE SATISFACTION OF THE SUPERINTENDENT.
34. UNLESS OTHERWISE SHOWN, BATTERS INTO ALLOTMENTS SHALL NOT BE STEEPER THAN 1 IN 6. NATURE STRIPS AND ALL AREAS OF CUT OUTSIDE THE ROAD RESERVE SHALL BE SURFACED WITH 100MM MINIMUM COMPACTED LAYER OF TOPSOIL. IF THE SOIL IS NOT DEEMED SUITABLE, IT SHALL BE IMPORTED AT THE CONTRACTOR'S EXPENSE.

EXISTING TREES

35. ALL TREES AND SHRUBS ARE TO BE RETAINED UNLESS OTHERWISE SHOWN OR DIRECTED BY COUNCILS REPRESENTATIVE.
36. WHERE, AS A CONDITION OF THE PLANNING PERMIT OR AS A RESULT OF THE PRE-CONSTRUCTION MEETING, FENCING OF AREAS CONTAINING TREES, NATIVE GRASSES AND SHRUBS IS REQUIRED, A THREE STRAND STAR PICKET AND WIRE FENCE SHALL BE CONSTRUCTED.
37. NO EXCAVATION SHALL BE UNDERTAKEN WITHIN 5m OF ANY EXISTING TREE WITHOUT THE APPROVAL OF THE SUPERINTENDENT.
38. LOPPING OF BRANCHES ON PRESERVED TREES TO BE DIRECTED BY SUPERINTENDENT.
39. TREES MARKED ON PLANS FOR REMOVAL MUST BE REMOVED FROM THE SITE PRIOR TO THE COMMENCEMENT OF WORKS. APPROVAL FROM COUNCILS REPRESENTATIVE SHOULD BE OBTAINED PRIOR. ANY TREES REMOVED, VEGETATION OR OTHER MATERIALS ARE NOT TO BE BURNT ON SITE.

EXISTING INFRASTRUCTURE

40. ANY EXISTING PAVEMENT OR DRAINAGE WORKS DAMAGED DURING CONSTRUCTION OR THE MAINTENANCE PERIOD TO BE REINSTATED TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCILS REPRESENTATIVE.
41. WHERE NEW ASPHALT, CONCRETE K & C, PATHS AND DRIVEWAYS MATCH INTO EXISTING, THE EXISTING SURFACE IS TO BE SAW CUT AND MATCHED NEATLY.
42. ALL REDUNDANT ASSETS ARE TO BE REMOVED AND DISPOSED OFF SITE.
43. ALL EXISTING AUTHORITY ASSETS AFFECTED BY THE WORKS; SHALL BE REINSTATED BY THE CONTRACTOR PRIOR TO THE COMPLETION OF THE WORKS AND TO THE SATISFACTION OF THE ASSET OWNER.
44. WHERE IT IS INTENDED TO INSTALL SERVICES OR OTHER EQUIPMENT UNDER EXISTING PAVEMENTS, THE CONTRACTOR SHALL OBTAIN A PERMIT AND PAY ANY FEES, FROM THE COUNCIL OR OTHER ROAD AUTHORITY PRIOR TO UNDERTAKING ANY EXCAVATION.

SERVICES

45. THE LOCATION OF EXISTING SERVICES SHOULD BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCING AND EXCAVATION BY CONTACTING ALL LOCAL SERVICE AUTHORITIES. ANY EXISTING SERVICES SHOWN ON THESE DRAWINGS ARE OFFERED AS A GUIDE ONLY AND ARE NOT GUARANTEED AS CORRECT.
46. EXISTING SEWER AND STORM WATER DRAINAGE BACK FILLING UNDER THE ROAD PAVEMENT AND BEHIND KERB AND CHANNEL (WITHIN THE ROAD RESERVATION) SHALL BE REPLACED WITH CLASS 2 CRUSHED ROCK.
47. GAS AND WATER CONDUITS TO BE 50mm DIA. P.V.C. PIPE CLASS 12 LAID AT A A MINIMUM DEPTH OF 225mm BELOW ROAD SUBGRADE LEVEL UNLESS NOTED OTHERWISE.
48. CONDUITS FOR GAS AND WATER SERVICES ARE TO BE LOCATED IN THE POSITIONS SHOWN. THEY ARE TO BE PLACED AT RIGHT ANGLES TO THE KERB AND SERVICE ALIGNMENT AND ARE TO EXTEND MIN 600mm BEHIND THE BACK OF KERB. CONDUITS ARE TOO REFERENCED IN 50mm HIGH LETTERS ON THE FACE OF KERB AND CHANNEL.
49. GAS AND WATER CONDUITS ARE TO BE LAID WITH THE FOLLOWING MIN. COVER TO FINISHED SURFACE LEVELS: UNDER ROADS- 0.9m ELSEWHERE- 0.6m.
50. WATER TAPINGS FOR LOTS SITUATED ON THE SAME SIDE OF THE WATER MAIN ARE TO BE LOCATED AT THE CENTRE OF THE LOT UNLESS NOTED OTHERWISE. THE KERB IS TO BE MARKED 'W' WITH AN ARROW POINTING TO THE TAPING.
51. REFER TO THE TELECOMMUNICATIONS DRAWINGS (BY OTHERS) FOR DETAILS ON CONDUITS AND TRENCHING.
52. REFER TO THE ELECTRICAL AND LIGHTING DRAWINGS (BY OTHERS) FOR DETAILS ON CONDUITS AND TRENCHING.
53. ALL SERVICE CONDUITS TRENCHES UNDER ROAD PAVEMENTS ARE TO BE BACKFILLED WITH 20mm 3% CEMENT TREATED CLASS 3 CRUSHED ROCK COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY VALUE DETERMINED BY THE MODIFIED COMPACTION TEST IN ACCORDANCE WITH A.S.1289.5.1.1-2003.
54. ALL FIRE HYDRANTS ARE TO BE MARKED IN ACCORDANCE WITH "IDENTIFICATION OF STREET HYDRANTS FOR FIREFIGHTING PURPOSES" PUBLICATION (DEVELOPED BY C.F.A, M.F.E.S.B & N.R.E). MARKINGS TO BE VIA BLUE RAISED REFLECTIVE PAVEMENT MARKER AND A MARKER POST.

DRAINAGE

55. WHERE CURVED PIPES ARE SHOWN ON THE FACE PLANS THEY ARE TO BE LAID PARALLEL TO THE BACK OF KERB, EXCEPT WHERE A RADIUS HAS BEEN SPECIFICALLY NOMINATED.
56. ALL STORMWATER DRAINS ARE TO BE CLASS 2 R.C. OR F.R.C PIPES UNLESS NOTED OTHERWISE. ALL PIPES UP TO AND INCLUDING 600mm DIA. ARE TO BE RUBBER RING JOINTED. INTERLOCKING / FLUSH JOINTS WITH EXTERNAL BANDS CAN ONLY BE USED ON PIPE SIZES OVER 600mm DIA.
57. ALL DRAINS BEHIND KERB AND CHANNEL SHALL BE BACKFILLED TO MATCH PAVEMENT SUBGRADE LEVEL WITH 20mm CLASS 2 F.C.R. CONSOLIDATION OF CRUSHED ROCK BACKFILL TO BE 97% DRY DENSITY STANDARD COMPACTION TEST.
58. WHERE STORMWATER DRAINS ARE TO BE LAID UNDER ROAD PAVEMENT, DRIVEWAYS AND FOOTPATHS, TRENCH IS TO BE BACKFILLED WITH CLASS 3 CRUSHED ROCK IN ACCORDANCE WITH COUNCILS SPECIFICATION.HOUSE DRAINS ARE TO BE CONNECTED DIRECT TO AN UNDERGROUND DRAIN OR PIT IF POSSIBLE.
59. PROPERTY INLET PITS ARE TO BE LOCATED 1.0m FROM LOW SIDE BOUNDARY UNLESS OTHERWISE SHOWN. INVERT LEVEL OF PROPERTY INLET IS TO BE A MINIMUM OF 500mm BELOW FINISHED/EXISTING SURFACE LEVEL.
60. AGRICULTURAL DRAINS ARE TO BE PLACED BEHIND ALL KERB AND CHANNEL, KERB ONLY AND EDGE STRIPS IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS.
61. ALL TABLE DRAINS AND VERGES ARE TO BE REINSTATED UPON COMPLETION OF WORKS TO THE SATISFACTION OF COUNCIL.
62. FOR ALL DRAINAGE PITS, REFER TO COUNCIL STANDARD DRAWINGS UNLESS NOTED OTHERWISE.

CONCRETE WORKS

63. GENERALLY (SM2) SEMI-MOUNTABLE KERB AND CHANNEL IS TO BE POURED THROUGHOUT THE SUBDIVISION. WHERE OTHER KERB TYPES ARE REQUIRED THEY ARE SPECIFICALLY SHOWN ON THE DRAWINGS.
64. ALL NEW CONCRETE WORKS SHALL BE JOINED INTO ABUTTING EXISTING CONCRETE IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS AND SPECIFICATION, UNLESS OTHERWISE SPECIFIED.
65. ANY EXPOSED AGGREGATE CONCRETE WORKS TO BE ACHIEVED BY SAND-BLASTING ONLY. WASHING AGGREGATE OFF WITH WATER IS NOT PERMITTED.
66. CONCRETE STRENGTH SHALL BE A MINIMUM OF 25MPA AT 28 DAYS UNLESS OTHERWISE NOTED
67. TRANSITION BETWEEN DIFFERENT KERB PROFILES SHALL BE OVER 3m IF THEY CANNOT BE INCORPORATED INTO A PRAM CROSSING OR DRIVEWAY CROSSING.
68. VEHICLE CROSSINGS ARE TO BE CONSTRUCTED AS PER COUNCILS STANDARD DRAWINGS AND SPECIFICATION.
69. DRIVEWAYS ARE TO BE LOCATED, 0.45M FROM SIDE BOUNDARY OR EASEMENT AND CLEAR OF DRAINAGE PITS, SEWER MANHOLES AND EXISTING TREES UNLESS SHOWN OTHERWISE.
70. UNLESS SPECIFICALLY EXCLUDED, FOOTPATHS MUST BE PROVIDED ON AT LEAST ONE SIDE OF ALL ROADS AND STREETS HAVING FRONTAGE FROM LOTS IN THE SUBDIVISION.
71. FOOTPATHS ARE TO BE DESIGNED IN ACCORDANCE WITH COUNCILS STANDARD DRAWINGS AND CONSTRUCTED OF CONCRETE, BITUMEN OR OTHER APPROVED PAVEMENT.
72. ALL FOOTPATHS LOCATED WITHIN PARKS AND RESERVES ARE TO BE A MINIMUM 125mm THICK AND 2m WIDE.
73. WHERE TACTILE GROUND SURFACE INDICATORS ARE REQUIRED THEY SHALL BE CONSTRUCTED IN ACCORDANCE WITH VICROADS STANDARD DRAWINGS SD2031 & SD2032. TACTILE GROUND SURFACE INDICATORS MUST CONFORM TO AS1428.4 AND BE APPROVED BY COUNCIL.

PAVEMENTS

74. WHERE PAVEMENT IS CONSTRUCTED ON FILLING, FILL MATERIAL IS TO BE APPROVED BY THE SUPERINTENDENT AND COUNCIL, AND CONSTRUCTED IN LAYERS 150mm THICK WITH COMPACTION ACHIEVING 95% AUSTRALIAN STANDARD DENSITY.
75. WEARING COURSE TO BE CONSTRUCTED 5mm ABOVE LIP OF KERB AND CHANNEL.
76. THE CONTRACTOR SHALL CO-OPERATE WITH OTHER AUTHORITIES AND SHALL ENSURE THAT ALL SERVICES ARE INSTALLED PRIOR TO THE FINAL PAVEMENT COURSE.
77. PAVEMENT DEPTH SPECIFIED IS A MINIMUM DEPTH AND MAY BE VARIED BY THE SUPERINTENDENT AND/OR COUNCILS REPRESENTATIVE. SOFT SPOTS SHALL BE EXCAVATED TO A PROOF ROLLED BASE AND BACKFILLED WITH APPROVED MATERIAL COMPACTED IN 150mm LAYERS TO ACHIEVE A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY VALUE DETERMINED BY THE STANDARD COMPACTION TEST IN ACCORDANCE WITH A.S.1289.5.1.1-2003.
78. PAVEMENT SUB-BASE AND BEDDING TO KERB AND CHANNEL IS TO EXTEND 150mm BEHIND BACK OF KERB.

TRAFFIC MANAGEMENT

79. ALL TRAFFIC CONTROL MEASURES, SIGNS AND LINEMARKING SHALL BE IN ACCORDANCE WITH A.S.1742 - 1, 2 & 3. LINEMARKING TO BE CARRIED OUT USING THERMOPLASTIC PAINT.
80. STREET NAME SIGNS ARE TO BE IN ACCORDANCE WITH COUNCIL STANDARD DRAWING AND SPECIFICATION.
81. ALL SIGNS TO BE CLASS 1 HIGH INTENSITY TYPE AND TO COMPLY WITH THE REQUIREMENTS OF A.S.1743 -2001.

LANDSCAPING

82. RESERVES TO BE LEFT IN A CONDITION SATISFACTORY TO THE COUNCILS SUPERVISING ENGINEER.
83. TOPSOILING WORKS ARE TO BE PREPARED AS SPECIFIED FOR HAND OVER TO THE LANDSCAPING CONTRACTOR.
84. SOFT SPOTS, WHERE DIRECTED BY THE SUPERVISING ENGINEER ARE TO BE EXCAVATED AND BACKFILLED WITH SPECIFIED MATERIALS.
85. ALL DISTURBED AREAS, IE, NATURESTRIPS, BATTERS, ALLOTMENTS & RESERVES, ARE TO BE REINSTATED TO A CLEAN, TIDY CONDITION, TOP DRESSED (100mm LOAMY TOP SOIL FREE OF CLUMPS, SODS AND CLAY LUMPS) AND SOWN WITH GRASS SEED. SEED IS TO BE A GENERAL PARKLAND AND NATURESTRIP BLEND AS APPROVED BY COUNCIL UNLESS OTHERWISE DETAILED. GRASS IS TO BE ESTABLISHED PRIOR TO THE END OF THE MAINTENANCE PERIOD.

No.	REVISION	DATE	DES/DFT	APPROVED
A	PRELIMINARY ISSUE	11.09.18	MR	TM

UNDERBANK

Preliminary Plan
Not to be used for construction

Melway Reference
333 E7

Principal
KATALAND
LEVEL 10, 278 COLLINS ST
MELBOURNE VIC 3000

UrbanDesign and management
Urban Design and Management Pty Ltd
PO Box 468 Sunbury 3429
Phone: +61 3 9971 6300 | Fax: +61 3 9971 6399
Office 1, Level 1, 114 Evans Street, Sunbury, VIC, 3249
Project Management | Land Development | Civil Engineering | Traffic and Transport Engineering | Urban Design

Designed
T. MOTET

Checked
T.PHILLIPS

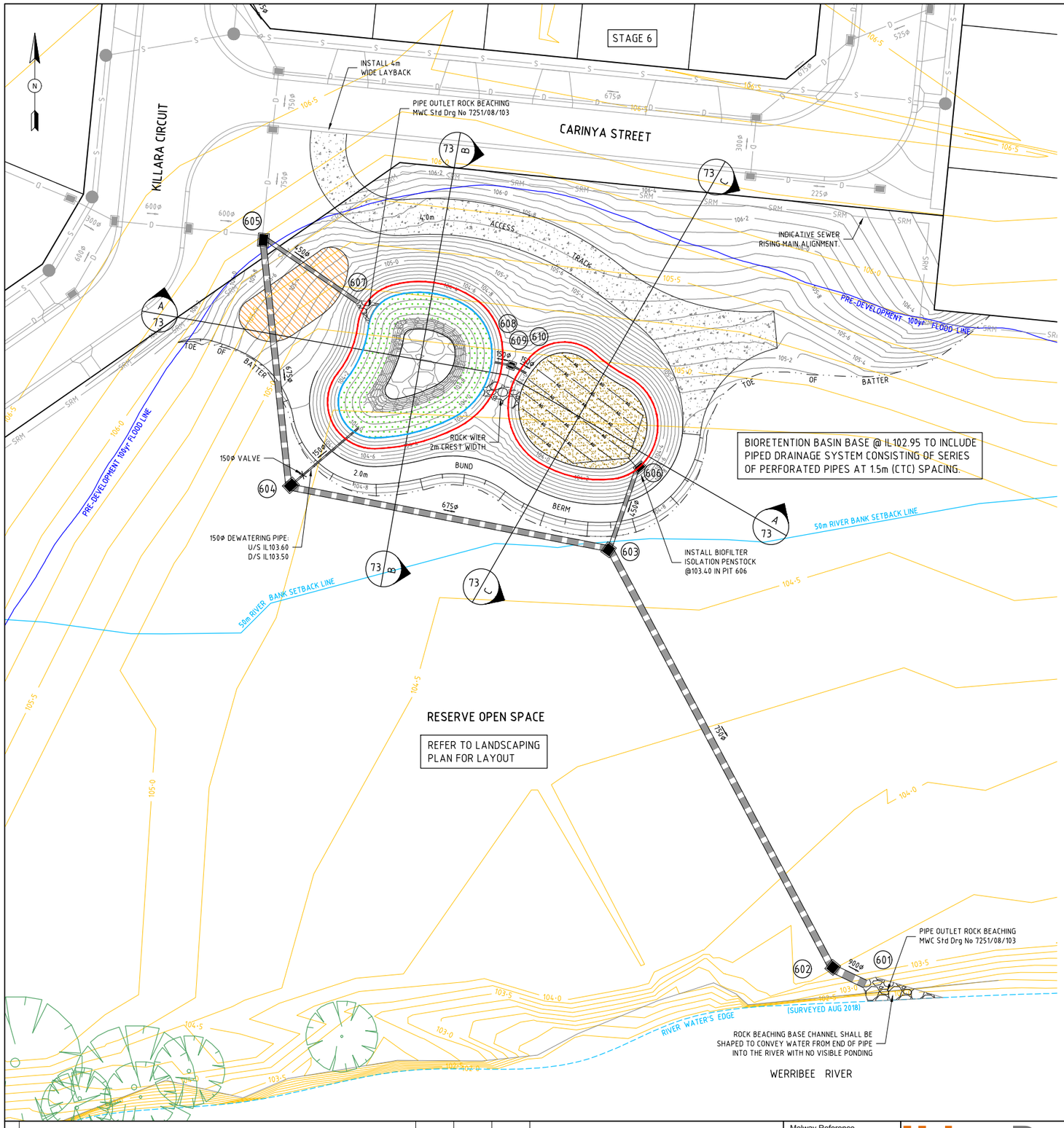
Approved
T.MILINKOVIC

Date
SEPTEMBER 2018

UNDERBANK
RIVERS EDGE - STAGE 5
MOORABOOL SHIRE COUNCIL
BIORETENTION & SEDIMENT BASINS
LOCALITY PLAN & NOTES

Drawing No: 11022-05-71
Revision: A
Sheet No: 1 of 5
Scale @ A1
NOT APPLICABLE

file name 11022-05-71.dwg layout name 71 file location L:\Work\Eng\11022 Randwick Ave\Rivers Edge\Stage 5\Drawings



SEDIMENT BASIN

- NOMINAL WATER LEVEL (NWL) @ 104.10m AHD
- EXTENDED DETENTION DEPTH (EDD) @ 104.40m AHD
- SURFACE AREA @ NWL = 207m^2
- PERMANENT POOL VOLUME BELOW NWL = 91m^3

BIORETENTION BASIN

- BASIN SURFACE LEVEL @ 103.90m AHD
- EXTENDED DETENTION DEPTH (EDD) @ 104.20m AHD
- SURFACE AREA @ BASIN LEVEL = 137m^2

DRYING ZONE

- AREA = 72m^2

LEGEND

- BIORETENTION BASIN WITH DN100 PERFORATED PIPES (VINIDEX DRAINCOIL OR EQUIVALENT). REFER SHEET 3 FOR COMPOSITION
- SEDIMENT BASIN BASE. REFER SHEET 3 FOR COMPOSITION
- SEDIMENT BASIN SIDE @ 1 in 2. REFER SHEET 3 FOR COMPOSITION
- SAFETY BATTER @ 1 in 8
- ROCK BEACHING
- DRYING ZONE
- ACCESS TRACK 4m WIDE 200mm DEPTH COMPACTED FCR3
- EXTENDED DETENTION DEPTH (EDD)
- NATURAL WATER LEVEL (NWL)
- STORMWATER PIPE WITH PIT
- DESIGN CONTOUR (125.6)
- EXISTING CONTOUR (105.5)

REFER TO LANDSCAPING PLAN FOR VEHICLE EXCLUSION FENCING DETAIL AND ALIGNMENT INCLUDING GATE ACROSS ACCESS TRACK

PIT LOCATION CO-ORDINATES

No	EASTING	NORTHING
601	272529.209	5826521.089
602	272525.512	5826522.854
603	272500.635	5826569.771
604	272464.733	5826576.689
605	272461.773	5826604.704
606	272503.739	5826578.783
607	272472.343	5826597.427
608	272487.799	5826590.642
609	272489.644	5826590.284
610	272490.241	5826594.171

CO-ORDINATES REFER TO INTERSECTION OF PIPE CENTRELINES

TBM LOCATION CO-ORDINATES

No	EASTING	NORTHING	RL
TDS5	272372.380	5826535.520	107.12
TDS6	272474.710	5826608.510	105.86
TDS11	272554.680	5826535.360	103.97

DIAL BEFORE YOU DIG — MELBOURNE ONE CALL SYSTEM — DIAL 1100

WARNING

THE LOCATION OF SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.SPECIAL CONSIDERATION SHOULD BE GIVEN TO CONSTRUCTION PROCEDURES UNDER OVERHEAD ELECTRICITY TRANSMISSION LINES.

No.	REVISION	DATE	DES/DFT	APPROVED
A	PRELIMINARY ISSUE	11.09.18	MR	TM

UNDERBANK

Preliminary Plan
Not to be used for construction

Melway Reference
333 E7

Principal
KATALAND
LEVEL 10, 278 COLLINS ST
MELBOURNE VIC 3000

UrbanDesign and management
Urban Design and Management Pty Ltd
PO Box 468 Sunbury 3429
Phone: +61 3 9971 6300 | Fax: +61 3 9971 6399
Office 1, Level 1, 114 Evans Street, Sunbury, VIC, 3249
Project Management | Land Development | Civil Engineering | Traffic and Transport Engineering | Urban Design

Designed T. MOTET
Checked T.PHILLIPS
Approved T.MILINKOVIC
Date SEPTEMBER 2018

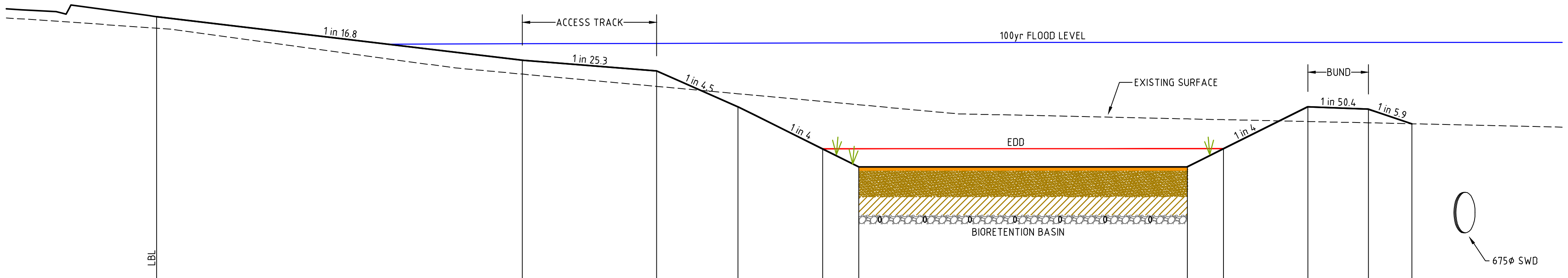
UNDERBANK

RIVERS EDGE - STAGE 5
MOORABOOL SHIRE COUNCIL
BIORETENTION & SEDIMENT BASINS
DETAIL PLAN

Drawing No: 11022-05-72
Revision: A
Sheet No: 2 of 5
Scale @ A1 1:250 (0 2.5 5 10)

ABN 62 525 443 156

file name 11022-05-72.dwg layout name 02 file location L:\Work\Eng\11022 Randwick Ave\Rivers Edge\Stage 5\Drawings



DATUM102.0

DESIGN SURFACE	106.397	105.673	105.496	104.900	104.200	103.900	103.900	104.200	104.900	104.860	104.616
EXISTING SURFACE	106.204	105.443	105.239	105.115	104.987	104.932	104.698	104.685	104.654	104.632	104.616
OFFSET	0.000	12.179	16.647	19.358	22.174	23.379	34.318	35.523	38.330	40.348	41.797

SECTION C-C

LEGEND

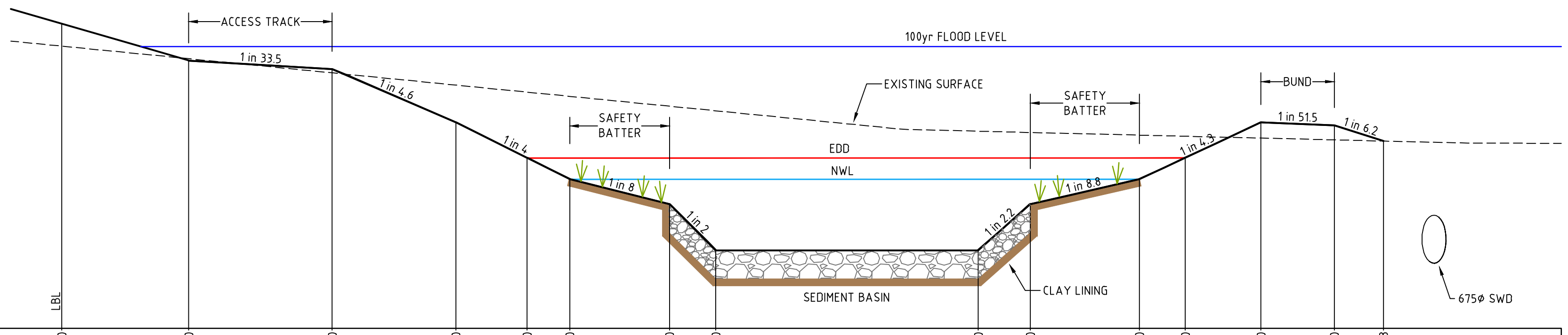
- DESIGN SURFACE
- EXISTING SURFACE
- 100yr FLOOD LEVEL
- EXTENDED DETENTION DEPTH (EDD)
- NATURAL WATER LEVEL (NWL)

SEDIMENT BASIN

- BASE: 400mm DEPTH COMPACTED ROCK. USE FLAT ROCKS WITH >DN300mm AND EXTEND 300mm UP BASIN SIDES.
- SIDE: 300mm THICK CRUSHED ROCK D_{50} = 150mm TO SAFETY BATTER.
- CLAY LINING

BIO-FILTER MEDIA

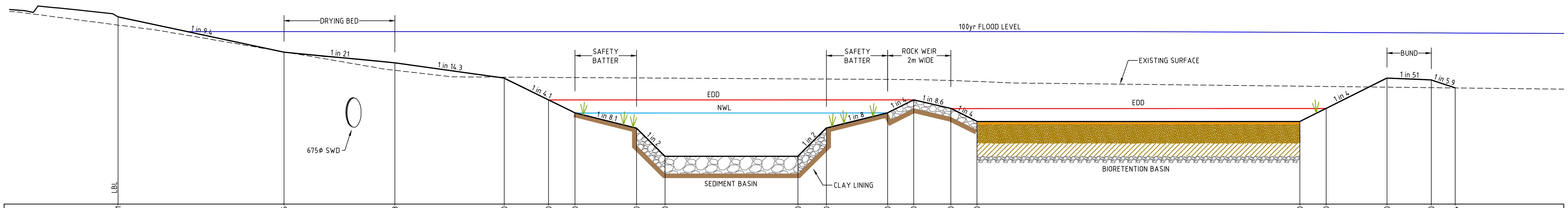
- 50mm DEPTH SURFACE ROCK MULCH
- 500mm FILTER MEDIA CONSISTING OF SANDY LOAM WITH HYDRAULIC CONDUCTIVITY APPROXIMATELY 180mm/hr, BETWEEN 5% AND 10% ORGANIC CONTENT, 60mg/kg ORTHOPHOSPHATE CONTENT, pH NEUTRAL
- 300mm SUBMERGED ZONE CONSISTING OF MEDIUM-COARSE SAND AND EXCLUSIVE OF 50mm TRANSITION LAYER CONSISTING OF COARSE SAND. THE SUBMERGED ZONE SHOULD INCLUDE A LOW NUTRIENT CARBON SOURCE SUCH AS SUGAR CANE MULCH, PINE CHIPS (NO BARK) AND PINE FLOUR ("SAW DUST")
- 150mm DRAINAGE LAYER CONSISTING OF GRAVEL AROUND DN100 PERFORATED PIPES (VINIDEX DN100 DRAINCOIL OR EQUIVALENT).



DATUM102.0

DESIGN SURFACE	106.290	105.770	105.650	104.900	104.400	104.100	103.750	103.100	103.100	103.750	104.100	104.400	104.900	104.860	104.638
EXISTING SURFACE	105.974	105.798	105.598	105.426	105.327	105.267	105.129	105.064	104.777	104.759	104.722	104.706	104.680	104.655	104.638
OFFSET	0.000	3.569	7.598	11.074	13.074	14.274	17.075	18.376	25.752	27.213	30.278	31.567	33.694	35.754	37.132

SECTION B-B



DATUM102.0

DESIGN SURFACE	106.311	105.495	105.253	104.900	104.400	104.100	103.750	103.100	103.100	103.750	104.100	104.400	104.200	103.900	103.900	104.200	104.900	104.860	104.674
EXISTING SURFACE	106.121	105.505	105.081	104.922	104.916	104.912	104.904	104.900	104.882	104.878	104.870	104.866	104.846	104.822	104.714	104.707	104.692	104.680	104.674
OFFSET	0.001	7.644	12.752	17.789	19.833	21.052	23.885	25.196	31.322	32.635	35.448	36.651	38.363	39.566	54.446	55.650	58.455	60.496	61.599

SECTION A-A

No.	REVISION	DATE	DES/DFT	APPROVED
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RIVERS EDGE - STAGE 5
MOORABOOL SHIRE COUNCIL
BIORETENTION & SEDIMENT BASINS
SECTIONS

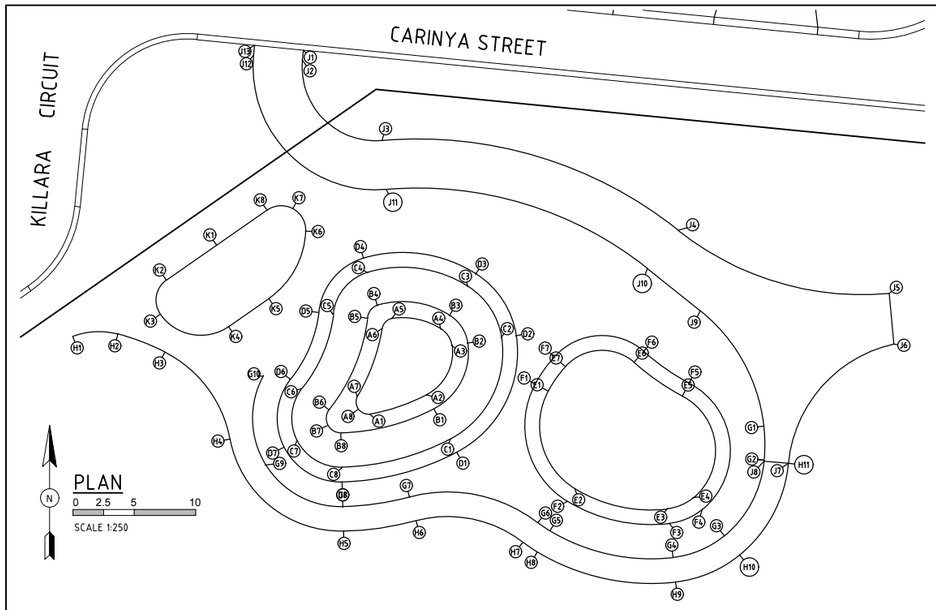
Drawing No: 11022-05-73

Revision: A

Sheet No: 3 of 5

Scale @ A1 0 1 2 4
H1:100, V1:50 0 0.5 1 2

file name 11022-05-73.dwg layout name 03 file location L:\Work\Eng\11022 Randwick Ave\Rivers Edge\Stage 5\Drawings



Alignment A

Point no	Easting	Northing	RL
A1	272476.647	5826586.474	103.100
A2	272481.243	5826588.075	103.100
A3	272483.267	5826592.104	103.100
A4	272482.406	5826593.423	103.100
A5	272478.413	5826594.281	103.100
A6	272477.567	5826593.452	103.100
A7	272475.601	5826587.960	103.100
A8	272475.648	5826586.882	103.100

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
A1 - A2	17.607	15.900	4.886	0.187	0.140	1.220	1.213	1.222	103.100
A2 - A3	70.638	3.900	4.808	0.718	0.534	1.183	1.072	1.202	103.100
A3 - A4	48.987	1.900	1.624	0.171	0.128	0.603	0.385	0.406	103.100
A4 - A5	40.505	5.900	4.171	0.365	0.273	1.037	1.005	1.043	103.100
A5 - A6	72.609	1.000	1.267	0.194	0.144	0.312	0.281	0.317	103.100
A6 - A7	20.875	16.100	5.866	0.266	0.200	1.464	1.452	1.466	103.100
A7 - A8	65.264	1.000	1.139	0.158	0.118	0.281	0.258	0.285	103.100
A8 - A1	65.264	1.000	1.139	0.158	0.118	0.281	0.258	0.285	103.100

Alignment B

Point no	Easting	Northing	RL
B1	272481.853	5826586.927	103.750
B2	272484.553	5826592.300	103.750
B3	272483.102	5826594.521	103.750
B4	272477.235	5826595.353	103.750
B5	272476.379	5826594.339	103.750
B6	272473.287	5826586.864	103.750
B7	272473.156	5826585.581	103.750
B8	272474.263	5826584.920	103.750

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
B1 - B2	70.638	5.200	6.411	0.957	0.712	1.577	1.429	1.603	103.750
B2 - B3	48.987	3.200	2.736	0.288	0.215	0.679	0.648	0.684	103.750
B3 - B4	48.600	7.200	6.107	0.638	0.477	1.515	1.448	1.527	103.750
B4 - B5	67.166	1.200	1.407	0.200	0.149	0.347	0.317	0.352	103.750
B5 - B6	31.721	14.800	8.194	0.563	0.422	2.042	2.003	2.048	103.750
B6 - B7	64.971	1.200	1.361	0.188	0.140	0.336	0.309	0.340	103.750
B7 - B8	64.971	1.200	1.361	0.188	0.140	0.336	0.309	0.340	103.750
B8 - B1	26.387	17.200	7.921	0.454	0.340	1.976	1.950	1.980	103.750

Alignment C

Point no	Easting	Northing	RL
C1	272483.168	5826584.455	104.100
C2	272487.321	5826592.720	104.100
C3	272484.601	5826596.886	104.100
C4	272476.453	5826598.042	104.100
C5	272473.597	5826594.661	104.100
C6	272471.091	5826588.600	104.100
C7	272470.654	5826584.326	104.100
C8	272474.342	5826582.121	104.100

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
C1 - C2	70.638	8.000	9.863	1.472	1.095	2.427	2.198	2.466	104.100
C2 - C3	48.987	6.000	5.130	0.540	0.403	1.273	1.215	1.282	104.100
C3 - C4	48.600	10.000	8.482	0.886	0.662	2.105	2.010	2.121	104.100
C4 - C5	67.166	4.000	4.689	0.668	0.497	1.156	1.057	1.172	104.100
C5 - C6	31.721	12.000	6.644	0.457	0.342	1.656	1.624	1.661	104.100
C6 - C7	64.971	4.000	4.536	0.626	0.466	1.119	1.030	1.134	104.100
C7 - C8	64.971	4.000	4.536	0.626	0.466	1.119	1.030	1.134	104.100
C8 - C1	26.387	20.000	9.211	0.528	0.396	2.298	2.267	2.303	104.100

Alignment D

Point no	Easting	Northing	RL
D1	272483.731	5826583.395	104.400
D2	272488.507	5826592.901	104.400
D3	272485.244	5826597.900	104.400
D4	272476.117	5826599.194	104.400
D5	272472.405	5826594.799	104.400
D6	272470.149	5826589.344	104.400
D7	272469.581	5826583.788	104.400
D8	272474.375	5826580.922	104.400

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
D1 - D2	70.638	9.200	11.342	1.693	1.260	2.791	2.528	2.836	104.400
D2 - D3	48.987	7.200	6.156	0.648	0.484	1.527	1.458	1.539	104.400
D3 - D4	48.600	11.200	9.500	0.992	0.741	2.357	2.252	2.375	104.400
D4 - D5	67.166	5.200	6.096	0.868	0.646	1.502	1.374	1.524	104.400
D5 - D6	31.721	10.800	5.979	0.411	0.308	1.490	1.462	1.495	104.400
D6 - D7	64.971	5.200	5.897	0.814	0.606	1.454	1.338	1.474	104.400
D7 - D8	64.971	5.200	5.897	0.814	0.606	1.454	1.338	1.474	104.400
D8 - D1	26.387	21.200	9.764	0.560	0.419	2.436	2.403	2.441	104.400

Alignment E

Point no	Easting	Northing	RL
E1	2724.91.140	5826588.415	103.900
E2	2724.93.359	5826580.430	103.900
E3	272500.891	5826578.820	103.900
E4	272502.975	5826579.709	103.900
E5	272502.116	5826587.991	103.900
E6	272498.161	5826590.720	103.900
E7	2724.92.544	5826590.409	103.900

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
E1 - E2	87.353	6.000	9.148	1.661	1.230	2.232	1.912	2.287	103.900
E2 - E3	37.437	12.000	7.841	0.635	0.475	1.951	1.900	1.960	103.900
E3 - E4	32.902	4.000	2.297	0.164	0.123	0.572	0.561	0.574	103.900
E4 - E5	112.743	5.000	9.839	2.231	1.638	2.362	1.802	2.460	103.900
E5 - E6	13.801	20.000	4.818	0.145	0.109	1.204	1.199	1.204	103.900
E6 - E7	89.356	4.000	6.238	1.156	0.856	1.520	1.292	1.560	103.900
E7 - E1	14.011	10.000	2.445	0.075	0.056	0.611	0.609	0.611	103.900

Alignment F

Point no	Easting	Northing	RL
F1	2724.90.082	5826588.981	104.200
F2	2724.92.745	5826579.400	104.200
F3	272501.030	5826577.628	104.200
F4	272503.739	5826578.783	104.200
F5	272502.674	5826589.053	104.200
F6	2724.98.956	5826591.619	104.200
F7	2724.91.655	5826591.215	104.200

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
F1 - F2	87.353	7.200	10.977	1.993	1.476	2.678	2.294	2.744	104.200
F2 - F3	37.437	13.200	8.625	0.698	0.522	2.147	2.089	2.156	104.200
F3 - F4	32.902	5.200	2.986	0.213	0.159	0.744	0.729	0.747	104.200
F4 - F5	112.743	6.200	12.200	2.766	2.031	2.928	2.234	3.050	104.200
F5 - F6	13.801	18.800	4.528	0.136	0.102	1.131	1.127	1.132	104.200
F6 - F7	89.356	5.200	8.110	1.502	1.112	1.976	1.680	2.027	104.200
F7 - F1	14.011	11.200	2.739	0.084	0.063	0.684	0.682	0.685	104.200

Alignment G

Point no	Easting	Northing	RL
G1	272508.730	5826585.522	104.900
G2	272508.755	5826582.755	104.900
G3	272505.522	5826576.624	104.900
G4	272501.354	5826574.847	104.900
G5	272491.312	5826576.994	104.900
G6	272490.333	5826577.659	104.900
G7	272479.867	5826579.727	104.900
G8	272474.432	5826578.922	104.900
G9	272468.084	5826582.367	104.900
G10	272467.919	5826589.587	104.900

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
G1 - G2	11.344	14.000	2.772	0.069	0.051	0.693	0.691	0.693	104.900
G2 - G3	45.293	9.000	7.115	0.694	0.519	1.767	1.698	1.779	104.900
G3 - G4	32.902	8.000	4.594	0.328	0.245	1.145	1.121	1.148	104.900
G4 - G5	37.437	16.000	10.454	0.846	0.633	2.602	2.533	2.614	104.900
G5 - G6	6.781	10.000	1.183	0.018	0.013	0.296	0.296	0.296	104.900
G6 - G7	52.787	12.000	11.056	1.251	0.934	2.740	2.595	2.764	104.900
G7 - G8	13.601	23.200	5.507	0.163	0.122	1.376	1.371	1.377	104.900
G8 - G9	60.202	7.200	7.565	0.971	0.724	1.870	1.741	1.891	104.900
G9 - G10	60.202	7.200	7.565	0.971	0.724	1.870	1.741	1.891	104.900

Alignment H

Point no	Easting	Northing	RL
H1	272452.399	5826592.846	105.996
H2	272456.080	5826593.025	105.805
H3	272459.908	5826591.556	105.396
H4	272465.217	5826584.478	104.880
H5	272474.486	5826576.975	104.860
H6	272480.392	5826577.827	104.860
H7	272489.108	5826576.072	104.860
H8	272490.279	5826575.270	104.860
H9	272501.568	5826572.814	104.860
H10	272506.786	5826575.017	104.860
H11	272510.764	5826582.496	104.860

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
H1 - H2	35.773	6.000	3.746	0.290	0.217	0.933	0.910	0.937	105.939
H2 - H3	11.767	20.000	4.108	0.105	0.079	1.026	1.024	1.027	105.600
H3 - H4	52.513	10.000	9.165	1.032	0.770	2.271	2.153	2.291	105.050
H4 - H5	80.798	9.200	12.974	2.194	1.628	3.177	2.786	3.243	104.860
H5 - H6	13.601	25.200	5.982	0.177	0.133	1.495	1.489	1.496	104.860
H6 - H7	52.787	10.000	9.213	1.042	0.778	2.283	2.162	2.303	104.860
H7 - H8	6.781	12.000	1.420	0.021	0.016	0.355	0.355	0.355	104.860
H8 - H9	37.437	18.000	11.761	0.952	0.712	2.927	2.849	2.940	104.860
H9 - H10	32.902	10.000	5.742	0.409	0.307	1.431	1.401	1.436	104.860
H10 - H11	45.293	11.000	8.696	0.848	0.634	2.160	2.076	2.174	104.860

Alignment K

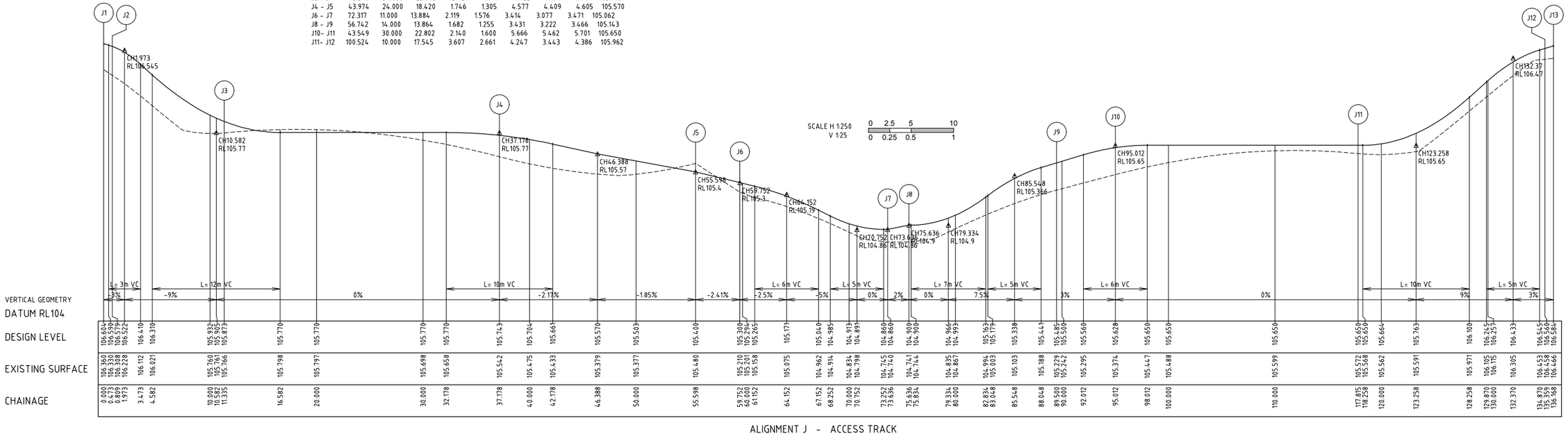
Point no	Easting	Northing	RL
K1	272464.143	5826600.280	105.500
K2	272460.039	5826597.425	105.575
K3	272459.540	5826594.641	105.516
K4	272465.108	5826593.642	105.240
K5	272468.391	5826595.926	105.107
K6	272471.389	5826601.423	105.227
K7	272470.348	5826603.250	105.347
K8	272468.248	5826603.136	105.424
K9	272464.145	5826600.281	105.500

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
K2 - K3	90.000	2.000	3.142	0.586	0.434	0.765	0.649	0.785	105.573
K3 - K4	90.000	4.000	6.283	1.172	0.867	1.531	1.298	1.571	105.350
K5 - K6	53.130	7.000	6.491	0.739	0.552	1.608	1.522	1.623	105.076
K6 - K7	63.435	2.000	2.214	0.299	0.223	0.547	0.505	0.554	105.288
K7 - K8	63.435	2.000	2.214	0.299	0.223	0.547	0.505	0.554	105.394

Alignment J (ACCESS TRACK)

Point no	Easting	Northing	RL
J1	272471.214	5826616.174	106.604
J2	272471.135	5826615.370	106.579
J3	272477.621	5826608.806	105.873
J4	272501.763	5826601.495	105.743
J5	272518.982	5826596.350	105.400
J6	272519.369	5826592.214	105.300
J7	272510.764	5826582.496	104.860
J8	272508.773	5826582.683	104.900
J9	272503.573	5826594.929	105.485
J10	2724.99.266	5826598.370	105.628
J11	272477.965	5826604.821	105.650
J12	272467.154	5826615.760	106.560
J13	272467.233	5826616.565	106.584

Curve no	l	Radius	Arc	A	B	X	Y	l	Mid point RL
J2 - J3	100.524	6.000	10.527	2.164	1.596	2.548	2.066	2.632	106.184
J3 - J4	43.549	34.000	25.843	2.426	1.814	6.422	6.191	6.461	105.770
J4 - J5	43.974	24.000	18.420	1.746	1.305	4.577	4.409	4.605	105.570
J6 - J7	72.317	11.000	13.884	2.119	1.576	3.414	3.077	3.471	105.062
J8 - J9	56.742	14.000	13.864	1.682	1.255	3.431	3.222	3.466	105.143
J10 - J11	43.549	30.000	22.802	2.140	1.600	5.666	5.462	5.701	105.650
J11 - J12	100.524	10.000	17.545	3.607	2.661	4.247	3.443	4.386	105.962



ALIGNMENT J - ACCESS TRACK

No.	REVISION	DATE	DES/DFT	APPROVED
A	PRELIMINARY ISSUE	11.09.18	MR	TM

UNDERBANK

Preliminary Plan
Not to be used for construction

Melway Reference
333 E7

Principal
KATALAND
LEVEL 10, 278 COLLINS ST
MELBOURNE VIC 3000

UrbanDesign and management
Urban Design and Management Pty Ltd
PO Box 468 Sunbury 3429
Phone: +61 3 9971 6300 | Fax: +61 3 9971 6399
Office 1, Level 1, 114 Evans Street, Sunbury, VIC, 3249
Project Management | Land Development | Civil Engineering | Traffic and Transport Engineering | Urban Design

Designed
T. MOTET

Checked
T.PHILLIPS

Approved
T.MILINKOVIC

Date
SEPTEMBER 2018

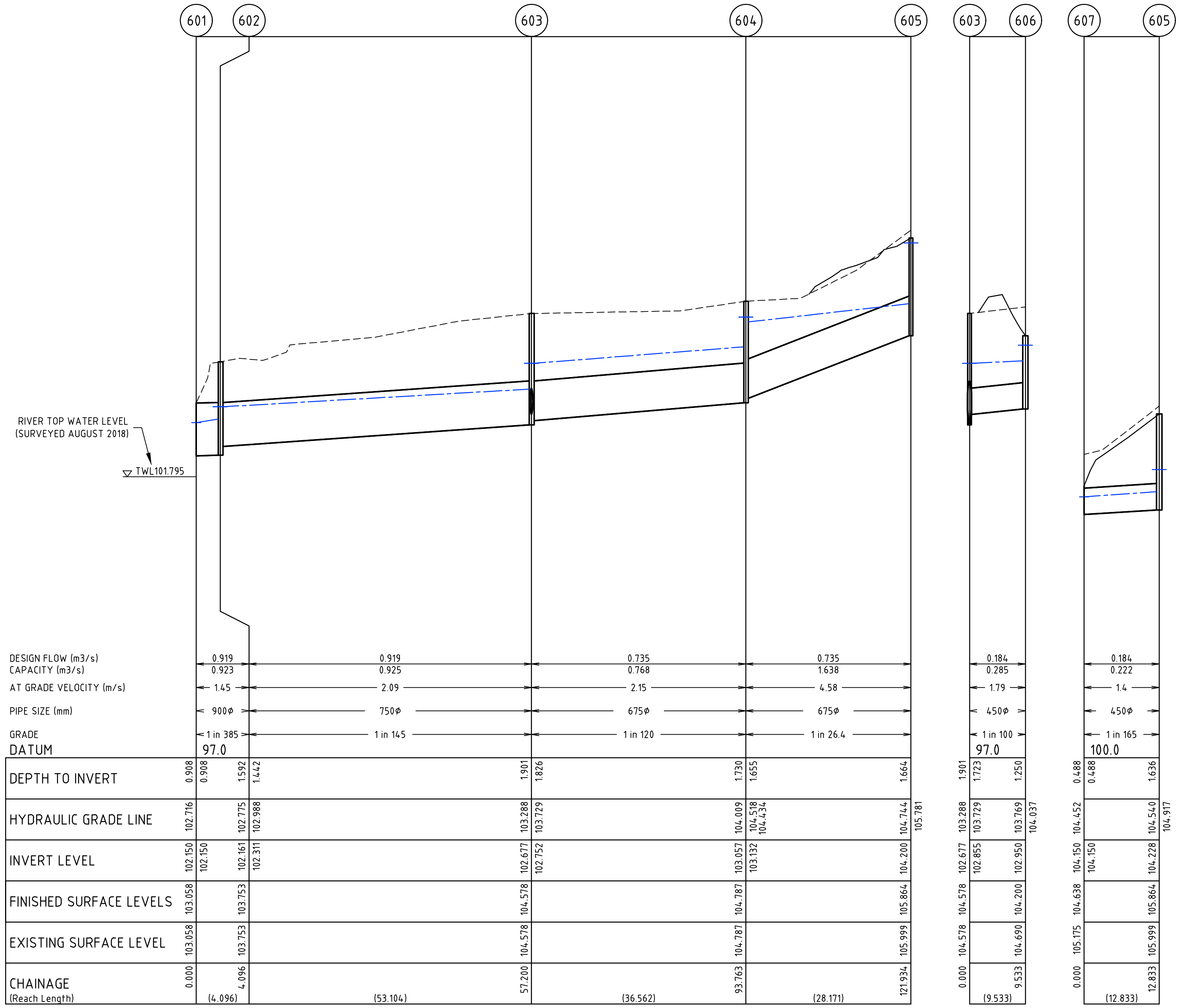
UNDERBANK
RIVERS EDGE - STAGE 5
MOORABOOL SHIRE COUNCIL
BIORETENTION & SEDIMENT BASINS
SETOUT PLAN

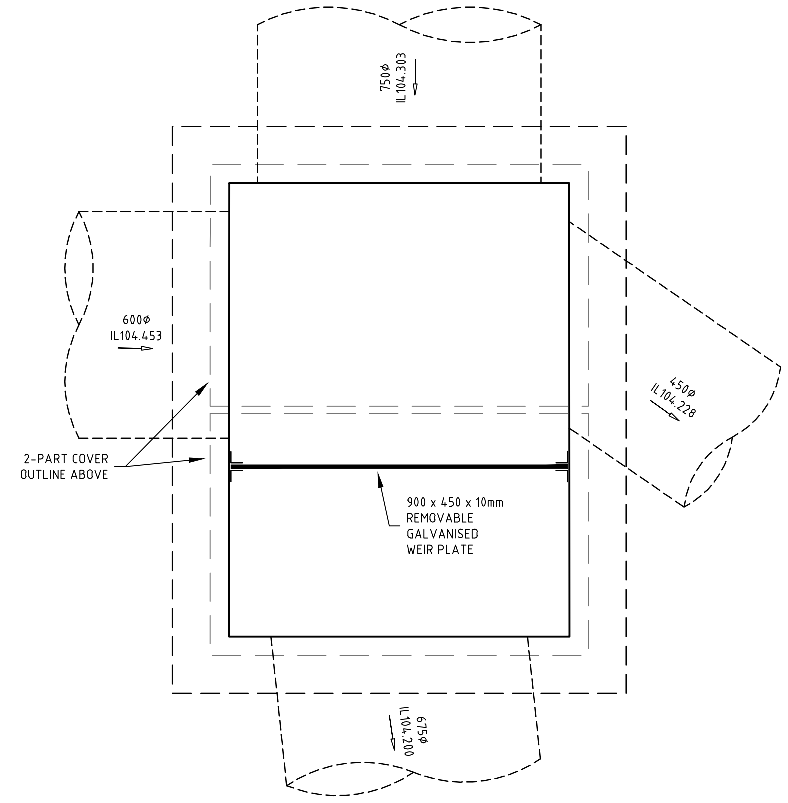
Drawing No: 11022-05-75
Revision: A
Sheet No: 4 of 5
Scale @ A1
AS SHOWN

file name 11022-05-74.dwg layout name 05 file location L:\Work\Eng\11022 Randwick Ave\Rivers Edge\Stage 5\Drawings

LEGEND
- - - - - - EXISTING SURFACE
———— DESIGN SURFACE
———— DRAINAGE PIPE/PIT
— · — · — HYDRAULIC GRADE LINE

CRB - COMPACTED CLASS 3 FCR BACKFILL





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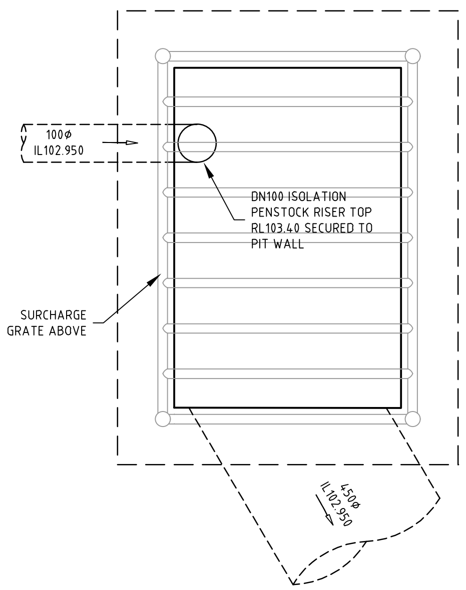
900x1200
SCALE 1:10



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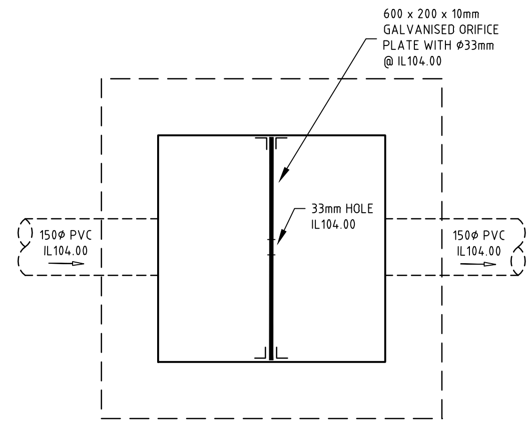
SCALE 1:10



PIT 609
600x600
SCALE 1:10

PIT SCHEDULE											
NAME	TYPE	INTERNAL		INLET		OUTLET		PIT		STD DWG	REMARKS
		WIDTH	LENGTH	DIA	INVERT	DIA	INVERT	SETOUT RL	DEPTH		
601	ENDPIPE			900	102.150			103.058	0.908	MWC STD DWG 7251/08/103	INSTALL HUME-KING FLOODGATE OR APPROVED EQUIVALENT
602	JUNCTION PIT	900	1050	750	102.311	900	102.161	103.753	1.592	MWC STD DWG 7251/08/404	HAUNCH PIT TO 600x900
603	JUNCTION PIT	900	1050	675 450	102.752 102.855	750	102.677	104.578	1.901	MWC STD DWG 7251/08/404	HAUNCH PIT TO 600x900
604	JUNCTION PIT	900	1200	675	103.132	675	103.057	104.787	1.730	MWC STD DWG 7251/08/404	HAUNCH PIT TO 600x900
605	JUNCTION PIT	900	1200	750 600	104.303 104.453	675 450	104.200 104.228	105.864	1.664	REFER DETAIL	PIT TO HAVE 2-PART COVER
606	JUNCTION PIT	600	900			450	102.950	104.200	1.250	MWC STD DWG 7251/08/404	BIO-FILTER OVERFLOW PIT WITH GRATED COVER
607	ENDPIPE			450	104.150			104.638	0.488	MWC STD DWG 7251/08/103	
608	ENDPIPE			150	104.100			104.302	-		
609	JUNCTION PIT	600	600	150	104.000	150	104.000	104.209	0.302	REFER DETAIL	ORIFICE PIT WITH BOLT DOWN COVER
610	ENDPIPE					150	103.900	104.209	-		

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SEPTEMBER 2018

UNDERBANK
RIVERS EDGE - STAGE 5
MOORABOOL SHIRE COUNCIL
BIORETENTION & SEDIMENT BASINS
DRAINAGE LONGITUDINAL SECTIONS
PIT SCHEDULES & DETAILS

Drawing No: 11022-05-76
Revision: A
Sheet No: 5 of 5
Scale @ A1 H1:500, V1:50

file name 11022-05-75.dwg layout name 06 file location L:\Work\Eng\11022 Randwick Ave\Rivers Edge\Stage 5\Drawings

APPENDIX F: MELBOURNE WATER PRE-DEVELOPMENT ADVICE

26 May 2023

Lola Nurhalim
Engeny
PO Box 12192
Melbourne VIC 8006

Dear Lola,

Proposal: Pre-development advice - Request for drainage advice
Site location: Lot No A, WERRIBEE VALE ROAD BACCHUS MARSH 3340

Melbourne Water reference: MWA-1291043
Date referred: 12/05/2023

I refer to the above request and note that Council is the drainage authority for this site, not Melbourne Water.

Melbourne Water will assess the application against the planning policy framework and the *Guidelines for Development in Flood Affected Areas, DELWP 2019* when it is formally referred to us by Council through the Planning Permit process.

Advice

For general development enquiries contact our Customer Service Centre on 131 722.

Regards,

Statutory Referral Permit Services

Melbourne Water ABN 81 945 386 953
990 La Trobe Street Docklands VIC 3008
PO Box 4342 Melbourne VIC 3001 Australia
T 131 722 F +61 3 9679 7099
melbournewater.com.au