

Geology Mapping

Based on the environmental geology series of the Geological Survey of Western Australia (1983), 1:50,000 scale Armdale map sheet, the natural material underlying the current development is anticipated to be LATERITE.

Groundwater

The Perth Groundwater Map does not provide guidance on maximum groundwater levels at the development site, however perched stormwater in close proximity to the development levels would be anticipated as a function of the Laterite ground conditions.

Infiltration

On-site infiltration is unlikely to be feasible. Detention to the Local Government drainage network will be necessary.

SUMMARY - LOT1	
NO	
1	
11	

PARKING SUMMARY - LOT2	
TYPE	NO
ACCESSIBLE BAY	1
STANDARD BAYS	7
WAITING BAY	2

LEGEND:



BLACK EXPOSED AGGREGATE CONCRETE FOOTPATH AS SPECIFIED. REFER STRUCT. ENG'S DWGS FOR DETAILS.



EXISTING RED ASPHALT TO REMAIN.



TREE PROTECTION ZONE. REFER TO ARBORIST REPORT FOR FURTHER DETAILS.



TREE TRUNK.



NEW SOFT LANDSCAPING BEDS. TOTAL AREA = 916m² OR 22% OF OVERALL SITE.



NEW RED ASPHALT TO MATCH EXISTING.



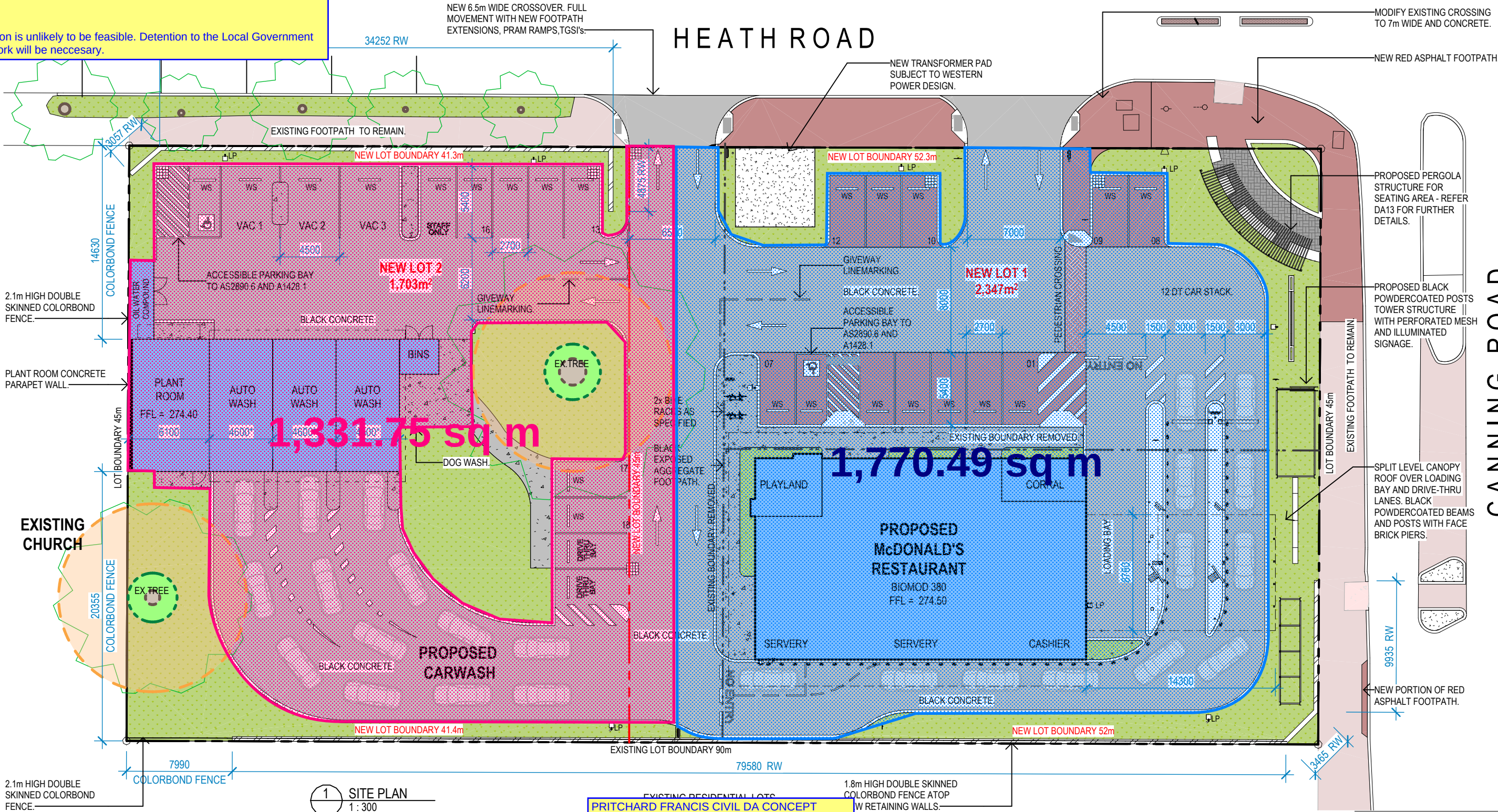
ROOT PROTECTION ZONE. REFER TO ARBORIST REPORT FOR FURTHER DETAILS.



WS RUBBER WHEELSTOPS AS SPECIFIED. QTY: 28



NEW RED STENCILLED CONCRETE.



Revisions	General Notes
0 AMENDED DA AS CLOUDED	Do not scale this drawing. The drawing shows design intent only. All dimensions to be checked on site prior to construction or production. Construction details to be confirmed by contractor/manufacturer. This is a computer generated drawing. Do not amend by hand. Figure dimensions are to be used. Contact architect for clarification if dimensions are not clear. All dimensions are in millimeters. All discrepancies and omissions on site must be reported to the architect for their comments or approval prior to commencing work.
Issue	Description
0	AMENDED DA AS CLOUDED
AUGUST 2024	DATE
AJJ	CHK
NR	INT

Drawing Notes
Level 1, 430 Roberts Road Subiaco WA 6008 PO Box 2150 Subiaco WA 6904 Telephone: (08) 9382 5111 admin@pfeng.com.au

pritchard francis

civil and structural engineering consultants

Client: McDonalds Australia
Project: Canning Road, Kalamunda
Drawing Set: 24155-C8-DG-07
Revision: A
Date: 26 November 2024

McDonalds Australia

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Hindley and Associates Pty Ltd

Building Designers
Unit 4/166 Stirling Highway
Nedlands WA 6009
PO Box 199 Nedlands WA 6009
08 9386 6699
www.hindley.com.au

McDonalds STANDARD DOCUMENTS

Location: LOTS 28(16) AND 29(14) CANNING ROAD AND LOT 3(5) HEALTH ROAD, KALAMUNDA

Scale
As indicated @ A3

Drawing
SITE PLAN

Project Number
0882

Drawing Number
DA03

Issue
0

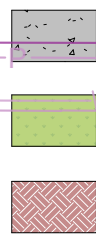
DEVELOPMENT APPLICATION

SITE AREA SCHEDULE	
IDENTITY	AREA m2
ORIGINAL LOT 3,28,29	4050m2
NEW LOT 1	2347m2
NEW LOT 2	1703m2

PARKING SUMMARY - LOT1	
TYPE	NO
ACCESSIBLE BAY	1
STANDARD BAYS	11

PARKING SUMMARY - LOT2	
TYPE	NO
ACCESSIBLE BAY	1
STANDARD BAYS	7
WAITING BAY	2

LEGEND:



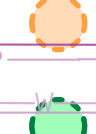
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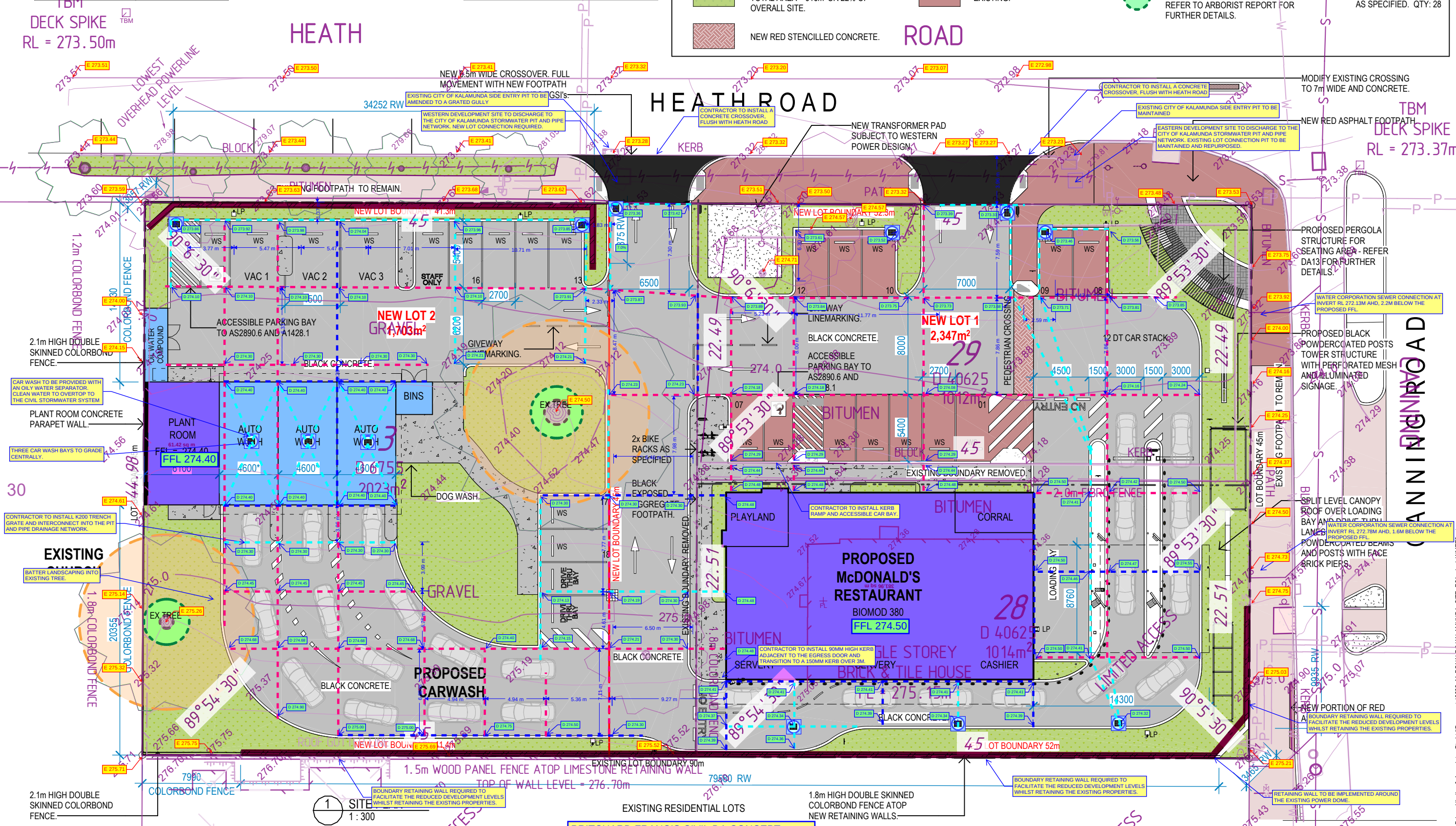


TREE PROTECTION ZONE. REFER TO ARBORIST REPORT FOR FURTHER DETAILS.

ROOT PROTECTION ZONE. REFER TO ARBORIST REPORT FOR FURTHER DETAILS.

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Drawing Notes

1 SITE 1:300

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Client: McDonald's Australia Limited
ABN: 43 008 496 928
02 9875 6666

Project Manager: [Image]

Architect: **IMA**
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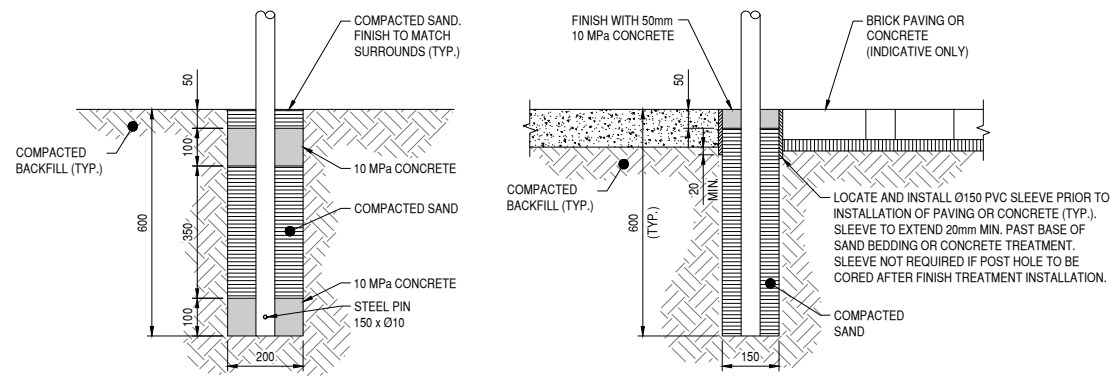
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Issue: 0

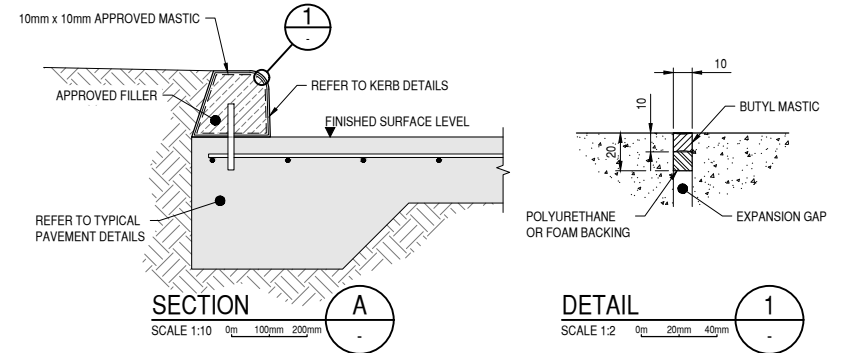
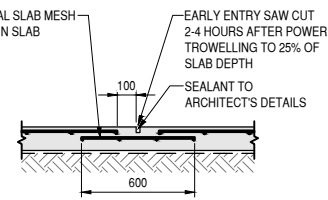
DEVELOPMENT APPLICATION

TBM DECK SPIKE RL = 273.67m

DA03



TYPICAL EXTERNAL SAW CUT JOINT DETAIL (S.J.)



KERB EXPANSION JOINT NOTES

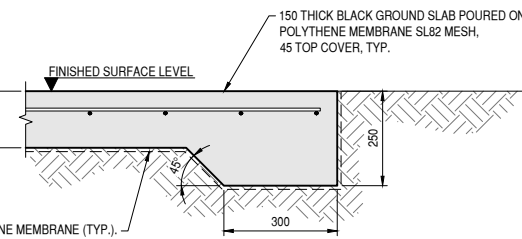
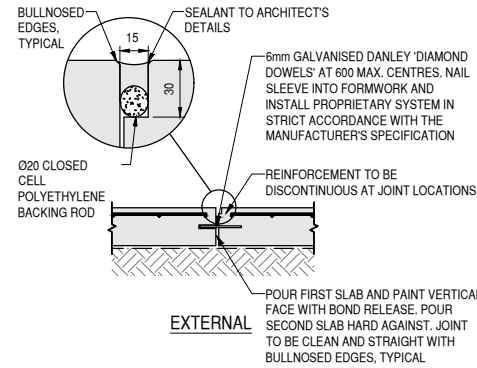
- EXPANSION AND CONTRACTION JOINTS SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.
- KEYS SHALL BE INSTALLED FOR ALL RADII LESS THAN OR EQUAL TO 40m
- KERBING ALONG WITH EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED PRIOR TO LAYING OF ANY BRICK PAVING.
- BACKFILL BEHIND KERB SHALL BE COMPACTED TO 90% M.M.D.D. IN ACCORDANCE WITH THE SPECIFICATION
- WHERE PATHS ARE CONSTRUCTED DIRECTLY BEHIND THE KERB, EXPANSION AND CONTRACTION JOINTS IN THE PATH AND KERB SHALL BE ALIGNED

KERB EXPANSION JOINT AND CRACK CONTROL DETAILS

SCALE 1:200

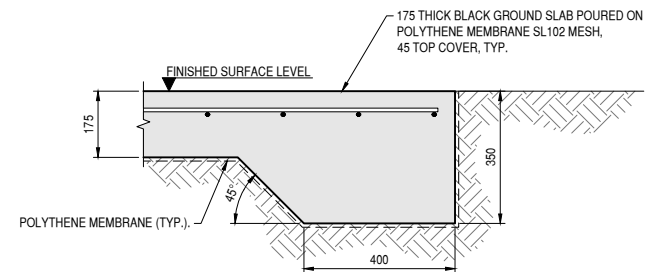
TYPICAL DOWEL CONTROL JOINT DETAIL (C.J.)

SCALE 1:20



TYPICAL CONCRETE AND SLAB EDGE DETAIL

SCALE 1:10



TYPICAL HEAVY DUTY CONCRETE AND SLAB EDGE DETAIL

SCALE 1:10

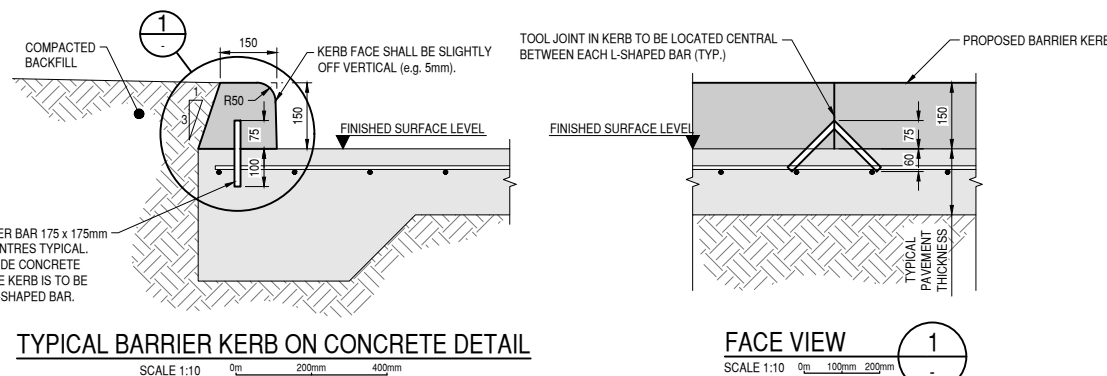
TYPICAL ROAD SIGN CLEARANCE AND FOOTING DETAILS

SCALE 1:10

- NOTES**
- LOCAL AUTHORITY OR CLIENT SPECIFICATIONS AND DETAILS TAKE PRECEDENCE.
 - DETAIL FOR USE IN WIND REGIONS 'A' AND 'B' ONLY. FOOTINGS FOR WIND REGIONS 'C' AND 'D' SHALL BE STRUCTURALLY ENGINEERED.
 - SIGN INSTALLATION SHALL COMPLY WITH AS2890 SERIES AND AS1742 SERIES
 - IF LOCATED WITHIN ROAD RESERVE, SIGN INSTALLATION SHALL COMPLY WITH MAIN ROADS W.A. SPECIFICATIONS AND DETAILS.

SIGN PANEL LATERAL CLEARANCE	
KERB TYPE	MIN. CLEARANCE (mm)
BARRIER KERB	300
SEMI-MOUNTABLE KERB	500
MOUNTABLE KERB	500
UNKERBED	2000

SIGN PANEL VERTICAL CLEARANCE	
DESIGN SCENARIO	MIN. CLEARANCE (mm)
LOCATED IN UNPAVED VERGE - FROM VERGE LEVEL - FROM PAVEMENT LEVEL	2000 2200
WHEN OVER HANGING OR LOCATED WITHIN FOOTWAY	2500

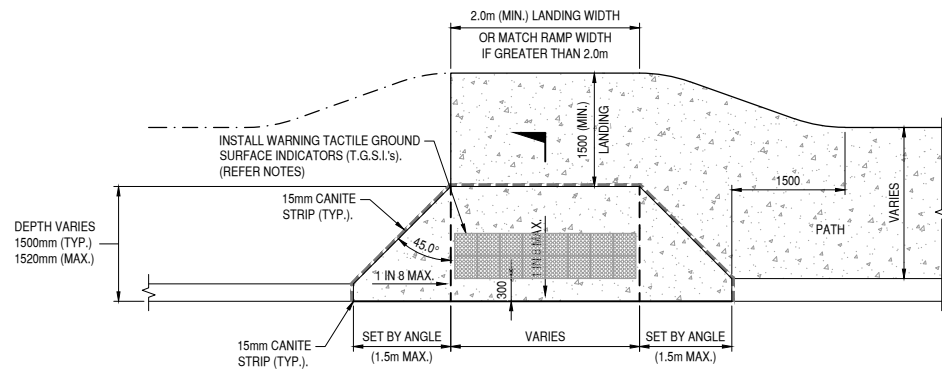
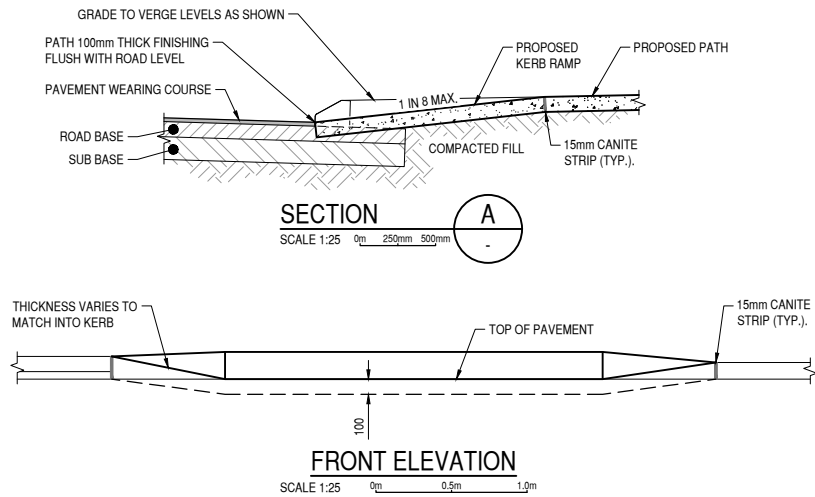


NOMINATED DETAILS LIKELY TO APPLY TO THE PROJECT, HOWEVER TO BE CONFIRMED DURING DETAILED DESIGN PRIOR TO BUILDING PERMIT APPLICATION.



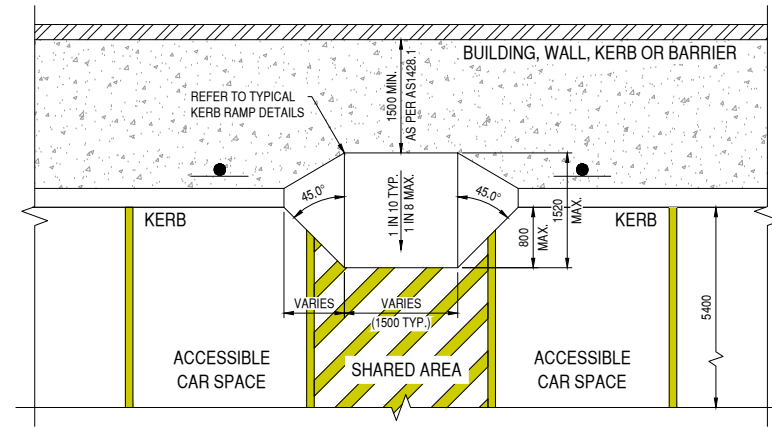
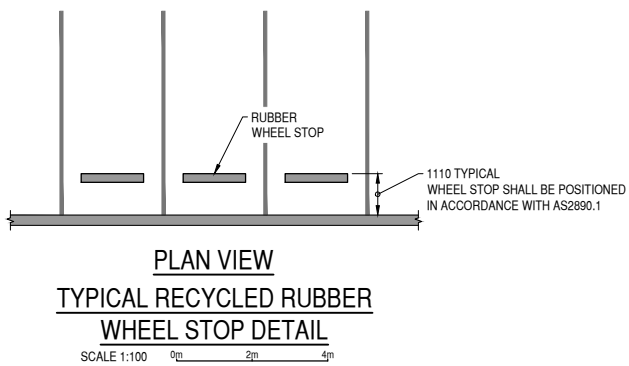
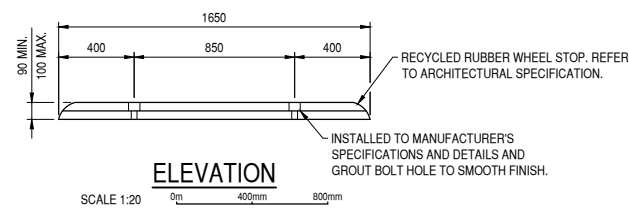
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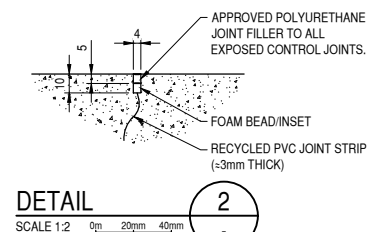
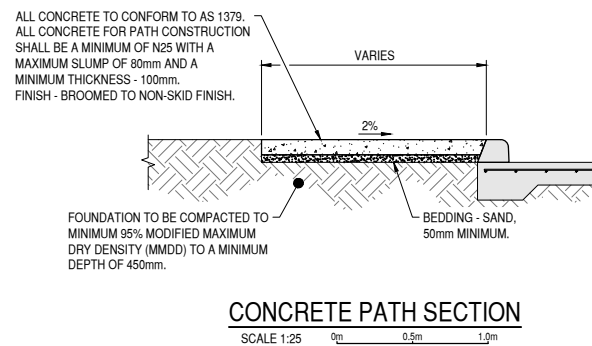
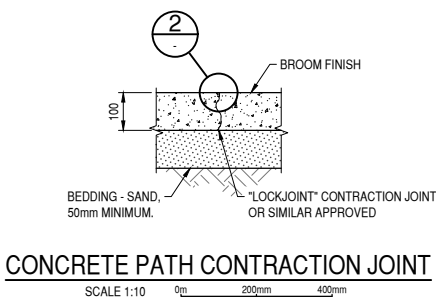
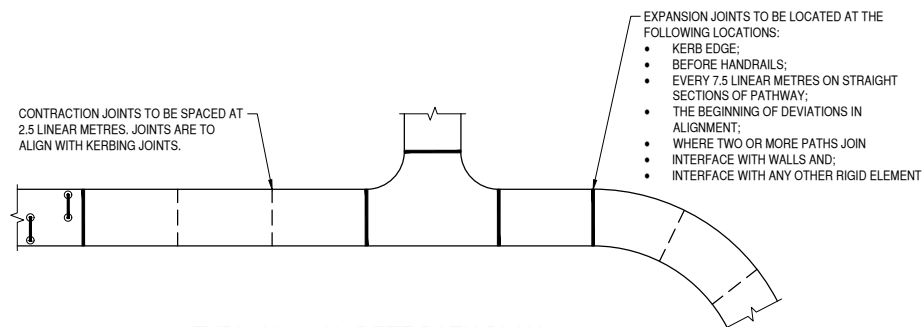


NOTES

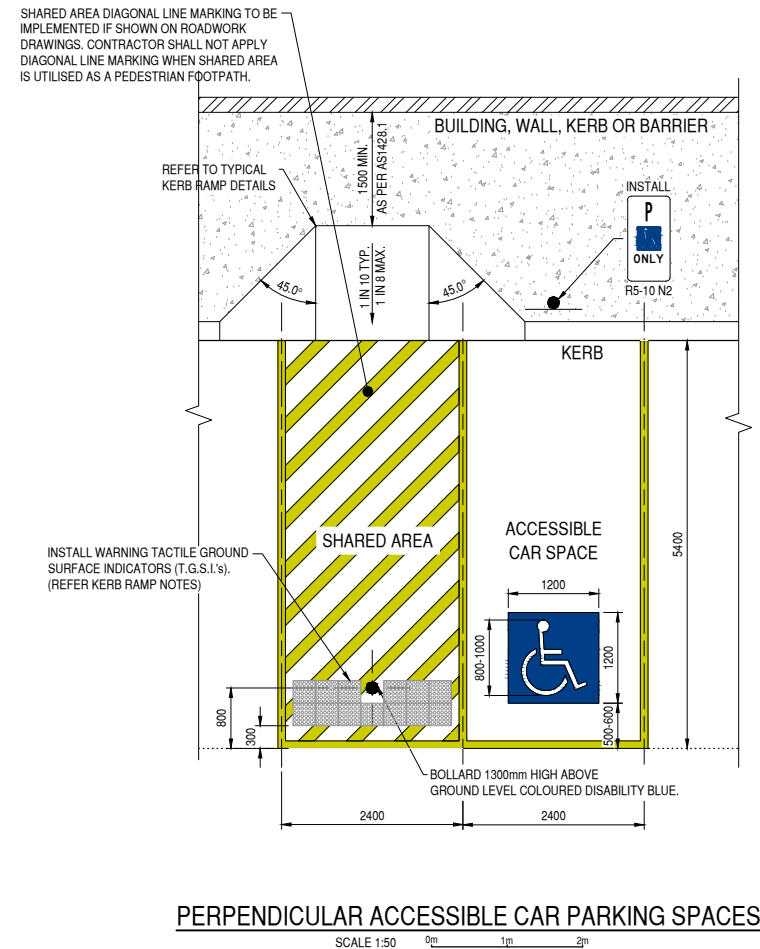
1. ALL CONCRETE TO BE A MINIMUM OF 25MPa, 20mm AGGREGATE AND A MAXIMUM SLUMP OF 80mm, FROM AN APPROVED PRE-MIX BATCH PLANT
2. MINIMUM THICKNESS - 100mm.
3. BEDDING - SAND, 50mm MINIMUM.
4. FINISH - BROOMED TO NON-SKID FINISH PARALLEL TO LINE OF KERB WITH TOOLED EDGES
5. EXPANSION JOINTS - APPROVED MATERIAL SHALL BE EXPANDITE-FLEXICELL.
6. TACTILE GROUND SURFACE INDICATORS (T.G.S.I.'s) SHALL BE IN ACCORDANCE WITH AS1428.1 AND AS1428.4.
7. CONTRACTOR TO INSTALL STAINLESS STEEL WARNING T.G.S.I.'s FOR FULL WIDTH OF CONCRETE KERB RAMP. REFER TO ARCHITECTURAL FINISHES SCHEDULE FOR DETAILS.
8. WARNING TGSIs ARE NOT TO BE CUT. CONTRACTOR SHALL SELECT SUITABLE SIZE TO EXTEND ACROSS FULL WIDTH OF KERB RAMP (EXCLUDING SPLAYS).
9. WHERE THE KERB RAMP IS CONSTRUCTED USING BLOCK PAVERS, THE CONTRACTOR SHALL INSTALL TGI PAVERS IN A CONTRASTING COLOUR CONFORMING WITH AS1428.4 LUMINANCE REQUIREMENTS.



ALTERNATIVE KERB RAMP ARRANGEMENT



CONCRETE PATH EXPANSION JOINT



ACCESIBLE PARKING SPACE NOTES

SPACE IDENTIFICATION
EACH DEDICATED SPACE SHALL BE IDENTIFIED BY MEANS OF A WHITE SYMBOL OF ACCESS IN ACCORDANCE WITH AS1428.1 BETWEEN 600mm AND 1000mm HIGH PLACED ON A BLUE RECTANGLE WITH NO SIDE MORE THAN 1200mm, PLACED AS A PAVEMENT MARKING IN THE CENTRE OF THE SPACE BETWEEN 500mm AND 600mm FROM ITS ENTRY POINT AS ILLUSTRATED.

SPACE DELINEATION
PAVEMENT MARKINGS SPECIFIED IN ITEMS (A) AND (B) OF THIS CLAUSE SHALL BE YELLOW AND SHALL HAVE A SLIP RESISTANT SURFACE. RAISED PAVEMENT MARKERS SHALL NOT BE USED FOR SPACE DELINEATION.

- PAVEMENT MARKINGS SHALL BE PROVIDED AS FOLLOWS:
1. LINEMARKING:
 - 1.1. DEDICATED PARKING SPACES SHALL BE OUTLINED WITH UNBROKEN LINES 80 TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
 - 1.2. SHARED AREAS SHALL BE MARKED AS FOLLOWS:
 - 2.1. WALKWAYS WITHIN OR PARTLY WITHIN A SHARED AREA SHALL BE MARKED WITH UNBROKEN LONGITUDINAL LINES ON BOTH SIDES OF THE WALKWAY EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL.
 - 2.2. OTHER VACANT NON-TRAFFICKED AREAS, WHICH MAY BE INTENTIONALLY OR UNINTENTIONALLY OBSTRUCTED (E.G. BY UNINTENDED PARKING), SHALL BE OUTLINED WITH UNBROKEN LINES 80mm TO 100mm WIDE ON ALL SIDES EXCEPTING ANY SIDE DELINEATED BY A KERB, BARRIER OR WALL, AND MARKED WITH DIAGONAL STRIPES 150mm WIDE WITH SPACES 300mm BETWEEN STRIPES. THE STRIPES SHALL BE AT AN ANGLE OF 45° TO THE SIDE OF THE SPACE.
 - 2.3. NO SHARED AREA MARKINGS SHALL BE PLACED IN TRAFFICKED AREAS.
 - 2.4. ALL LINEMARKING MUST BE NON SLIP.
 2. BOLLARDS:
 - 3.1. MINIMUM HEIGHT 1300mm.
 - 3.2. RECOMMENDED COLOUR BLUE TO CONTRAST AGAINST YELLOW LINE MARKING.

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Stormwater Design Guidelines for Subdivisional and Property Development

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1. Introduction

This guide is intended to be used by developers, builders and consulting engineers to produce consistent designs for Stormwater Management Systems for residential, commercial, and industrial developments within the City of Kalamunda. This guideline should also be referenced when preparing an Urban Water Management Plan or Stormwater Management Strategy.

The objectives are:

1. The increased runoff generated from impervious areas does not adversely impact downstream properties, including storm events up to the one percent annual exceedance probability (1% AEP).
2. The water volumes, flow rates, time of concentration, and water quality support the functions of the greater catchment.

The 1% AEP is also referred to as the one-hundred-year Average Rainfall Incidence (1 in 100 ARI).

This guideline should be read in conjunction with the following documents:

- Department of Water: *Stormwater Management Manual* (2004)
- Department of Water: *Better Urban Water Management* (2008)
- Department of Water: *Water Sensitive Urban Design* (2011)
- Australian Rainfall and Runoff: *A Guide to Flood Estimation*
- IPWEA and WAPC: *Local Government Guidelines for Subdivisional Development*

2. Making Submissions

No works are to commence that involve changing the groundwater or public stormwater system without written approval from the City of Kalamunda.

A detailed design of the Stormwater Management System shall be submitted in the following situations:

- To comply with conditions of approval for a subdivision application,
- To comply with conditions of approval for a development application,
- When required for complex or unusual building applications,
- When any change to or where connection will be made to the public stormwater system, and
- When there is any change in overland flow or groundwater flow into or from a public area.

The System shall be designed by a suitably qualified Civil Engineer.

The Stormwater Management System consists of the information outlined in **Appendix A**.

Submissions are to be sent to the Enquiries details below (refer to section 10 below), attention to "Development Engineering".

An assessment fee in line with the City's adopted Fees and Charges may apply depending on the nature of the submission.

These guidelines may change from time to time and it is recommended that you refer to the City of Kalamunda website www.kalamunda.wa.gov.au to ensure that you have the current version.

3. Stormwater Management Strategies

Where a Stormwater Management Strategy or UWMP has been prepared and approved by the City for the area, the Stormwater Management System must incorporate the recommendations and requirements of the Strategy and UWMP.

4. Geotechnical Investigation

A geotechnical investigation is required to determine the drainage method, being either Onsite Retention (OSR) or **Onsite Detention (OSD)**.

Geotechnical investigations shall be carried out in accordance with AS 1726:2017 Geotechnical Site Investigations.

The requirements are:

- The maximum allowable infiltration rate is 5m/day.
- The minimum infiltration rate shall not be less than 1.0m/day for retention strategy.
- A clearance of 500mm from maximum groundwater table to the invert level is required to allow for infiltration.
- If the site classification report is 'A' class a full geotechnical report is not required.
- If the site classification is below 'A' class a full geotechnical report with drainage recommendation is required.
- A geotechnical report may not be required for hilly regions which commonly have shallow sand layers with gravelly/laterite substrates, and where OSD is the common drainage strategy.
- The determination of saturated infiltration rate should be carried out at the invert level of soakwells in accordance with the procedures outlined in AS/NZS 1547:2012 Onsite Domestic Wastewater Management.

5. Onsite Retention System (OSR)

OSR is usually used in sandy areas of the foothills including Forrestfield, High Wycombe, and Wattle Grove.

Following geotechnical investigation, if the site is suitable for an Onsite Retention System, then the OSR shall be designed as follows:

OSR for Residential Development

- Retention devices are to be sized for 5% AEP (1 in 20 ARI), critical stormwater duration, if lot levels are above the road level.
- Retention devices are to be sized for 1% AEP (1 in 100 ARI), critical stormwater duration, if lot levels are below the road level.
- If the lot size is less than 350m², a discharge rate of 20% AEP (1 in 5 ARI) predevelopment flow rate is allowed to connect to the City's drainage system. This is to be achieved by using a bubble-up pit or similar infrastructure located at the property boundary and typically discharged via the vehicle crossover or hardstand.
- A combination of below and above ground storage can be considered for battle axe or common access driveways. Underground retention is to be sized for a minimum of 5% AEP (1 in 20 ARI) events. The maximum inundation depth for above ground storage is 50mm.
- If the development is land-locked, the minimum pad level is to be set at 150mm above the lowest lid point of the inlet pit.
- All storage devices are to be connected at or near the top of the device.
- Developers are encouraged to introduce water quality improvement devices such as rainwater gardens, vegetated swales and biofiltration. Please visit <https://www.newwaterways.org.au> for more information.

OSR for Commercial/Industrial Development

- Retention devices are to be sized for 1% AEP (1 in 100), critical stormwater duration.
- A combination of below and above ground storage can be considered for carpark areas. Underground retention is to be sized for a minimum of 5% AEP (1 in 20 ARI) events. The maximum inundation depth for above ground storage is 50mm.
- All storage devices are to be connected at or near the top of the device.
- Developers are encouraged to introduce water quality improvement devices such as rainwater gardens, vegetated swales and biofiltration to treat 1 year AEP (1 in 1 ARI). Please visit www.water.wa.gov.au for more information.

6. Onsite Detention System (OSD)

Following the geotechnical investigation, if the site soil is not suitable for Onsite Retention, then an Onsite Detention system (OSD) will need to be installed. OSD provides temporary

storage of stormwater runoff from developments and restricts the discharge from the site to a rate that the City's drainage system is capable of accepting.

The OSD shall be designed as follows:

OSD for Residential Development

- Detention devices are to be sized for 5% AEP (1 in 20 ARI), critical stormwater duration, if the lot levels are above the road level. A discharge rate of no more than 20% AEP (1 in 5 ARI) predevelopment flow rate may be connected with the City's drainage system, with the flow rate controlled by an orifice.
- Detention devices are to be sized for 1% AEP (1 in 100 ARI), critical stormwater duration, if the lot levels are below the road level with permissible site discharge (PSD) connected at a legal point of discharge.
- A combination of below and above ground storage can be considered for battle axe or common access driveways. Underground devices are to be sized for a minimum 5% AEP (1 in 20 ARI) events, and the maximum inundation depth for above ground storage is 50mm.
- All storage devices are to be connected at or near the base of the device.
- If the development is land locked, the minimum pad level is to be set at 150mm above the lowest lid level of the inlet pit.

OSD for Commercial/Industrial Development

- Detention devices are to be sized for 1% AEP (1 in 100 ARI), critical stormwater duration with permissible site discharge (PSD) connected at a legal point of discharge controlled by an orifice.
- A combination of below and above ground storage can be considered for carpark areas. Underground detention is to be sized for a minimum of 5% AEP (1 in 20 ARI) events. The maximum inundation depth for above ground storage is 50mm.
- All storage devices are to be connected at or near the base of the device.
- Developers are encouraged to introduce water quality improvement devices such as rainwater gardens, vegetated swales and biofiltration to treat 1 year AEP events (1 in 1 ARI). Please visit www.water.wa.gov.au for more information.

7. Permissible Site Discharge (PSD) and Time of Concentration (TC)

The Permissible Site Discharge (PSD) is calculated using a predevelopment runoff coefficient of 0.15 ($c=0.15$) for 20% AEP (1 in 5 ARI) with minimum time of concentration of 5 minutes.

8. Legal Point of Discharge (LPD)

The legal point of discharge (LPD) is a point agreed by the City where stormwater from a property can be discharged. This point is usually Council's stormwater drainage system. Water courses shall only be used following acceptance by the relevant authority (the Water Corporation, Department of Water or City of Kalamunda).

In some situations, adjacent property owners may also need to be contacted to confirm the discharge point.

Where required to create the legal point of discharge, the City may consider extending its drainage system at the developer's cost and to the specification and satisfaction of the City of Kalamunda.

A drainage easement may be required to be created where it is necessary to convey stormwater across lands, other than the development site, to gain access to the public drainage system or a natural watercourse.

Note: All drainage easements and drainage systems located within private property will be solely owned and maintained by the Landowner/s up to the LPD

Requirements for Discharging To LPD

- The requirements for connecting a lot connection with the LPD are as follows:
- The applicant provides an approval letter from the relevant authority for the proposed Legal Point of Discharge (for example the Water Corporation or Department of Water).
- If there is a drainage pipe in front of the property with no connection pit, a new pit will be installed by the applicant, at the most perpendicular alignment to the property discharge pipe.
- Where specified by the City, gross pollutant traps, oil-water separators, and silt traps shall be installed in the drainage system prior to discharging into the public drainage system (including drainage basins or creeks).

Pump System

A pump system may be permitted when all of the following conditions are met:

- The lot level of the development site is lower than the receiving drainage system,
- There is no legal point of discharge though a drainage easement, and
- The pump discharge rate does not exceed the permissible site discharge into the Legal Point of Discharge.

When possible, the pump line shall terminate within the property at an allocated discharge pit, with gravity discharge to the City's drainage system.

Pump systems shall be designed in accordance with AS3500.3:2015 Plumbing and Drainage Stormwater Drainage with separate pipe to prevent backflow.

9. Drainage in the Road Reserve

Road drainage network shall be designed for

- 20% AEP for residential areas
- 10% AEP for industrial areas and distributor A and B Roads

This standard has been in place since approximately 2007 therefore older road networks do not meet these criteria

10. Work in the Road Reserve of Public Area

Work in the road reserve may require a Traffic Management Plan (TMP). This will be advised during the assessment of the Stormwater Management System.

When required, a Traffic Management Plan shall be prepared by an individual accredited in Advanced Worksite Traffic Management, and submitted for review by the City, before the work commences on site. Note that the assessment of plans may require a minimum of two weeks.

Any work in the road reserve or public area may require an asset protection bond.

The requirements are (in brief):

1. The applicant will need to pay for the bond and administration fee.
2. Works are not to commence until the bond has been processed.
3. Once the applicant receives the bond receipt from the City, and has received approval for the Stormwater Management System and TMP (if applicable), then the applicant may proceed with the works.
4. All local government infrastructure is to be reinstated in accordance with the "Restoration and Reinstatement Specifications" published by the Institute of Public Works Engineering Australasia (IPWEA)
5. Once the work is completed, the applicant needs to submit a refund request form for the asset protection bond. If the work is completed in full and no rectification is needed after an inspection has been undertaken by the City, then the bond will be released in line with the City's adopted Fees and Charges.

11. Enquiries

Enquiries may be directed to the Asset Services team by calling the City on 9257 9999 or emailing enquiries@kalamunda.wa.gov.au.

12. References

- Western Australian Planning Commission, 2006, State Planning Policy 2.9 Water Resources. Available at https://www.dplh.wa.gov.au/getmedia/c7b9a4d5-160b-45e1-8e3e-0de8dd6a11f1/SPP_2-9_water_resources
- Department of Water and Environmental Regulation, 2004, Stormwater Management Manual for WA. Available at <http://www.water.wa.gov.au/urban-water/urban-development/stormwater/stormwater-management-manual>
- Institution of Engineers, Australia, 1987, Australian Rainfall and Runoff (ARR87).
- Institute of Public Works Engineering Australasia (IPWEA), 2017, Local Government Guidelines for Subdivisional Development. Available at <https://www.dplh.wa.gov.au/getmedia/4b5222bc-b5e4-45b8-a6aa-33effd8b47f3/GD-SDV-Local-government-subdivisional-guidelines>

13. Glossary

Annual Exceedance Probability (AEP) - Annual Exceedance Probability (AEP) refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which may be calculated to have a 1% chance to occur in any one year, is described as 1%AEP

An annual recurrence (ARI) - An annual recurrence interval is sometimes also known as 'return period'. It is the average number of years that it is predicted will pass before an event of a given magnitude occurs. For example, a 50-year ARI event would on average happen every 50 years.

Legal point of Discharge (LPD) - A legal point of discharge is the point that stormwater from any building or development on your property is directed to. This is usually: an underground Council drain either within the property's easement or within the street, the kerb and channel, or, an open earth drain next to the property.

Onsite Detention System (OSD) - on-site stormwater detention is a means of detaining the stormwater for a short period of time within the site, before the stormwater is discharged in a controlled manner.

Onsite Retention System (OSR) - on-site stormwater detention is a means of detaining the stormwater permanently within the site, with no discharge for the design rainfall events.

Typically this assumes the system provides either a permeable surface where the stormwater infiltrates into the ground, or a permanent water body.

Permissible Site Discharge (PSD) - The 'Permissible Site Discharge'(PSD), which is a maximum flow rate, will normally be set by your Council based on the block area. The flow rate is usually controlled by making all the flow pass through an Orifice (a small diameter hole) before it can be discharged.

Time of Concentration (Tc) - The Tc is generally defined as the time required for a drop of water to travel from the most hydrologically remote point in the sub catchment to the point of collection.

Appendix A: Stormwater Drainage Details for an Individual Lot

Modifications to site stormwater management or new stormwater proposals are to be completed in accordance with the City's Stormwater Design Guidelines for Subdivisional and Property Development, the conditions of development or building approval, and the City's requirements.

When submitting stormwater plans, designs, or proposals for an individual lot the following details need to be completed. Applicants are encouraged to seek the services of a civil engineer to ensure the values are correctly entered.

	Parameters	Units	Requirement
A	CORE DETAILS		
A01	Geotechnical report		If the site classification is below 'A' class a full geotechnical report with drainage recommendation is required. A geotechnical report may not be required for hilly regions where onsite detention device is proposed. For "S" Class site infiltration test result is necessary to support retention strategy through soakwells.
A02	Site levels		Site levels including spot levels of adjacent properties. Where the level difference between the subdivided lot and a neighbouring lot is greater than 200mm, a retaining wall will be required.
A03	Sand pad level		Sand pad level of lots to achieve the minimum site class "S"
A04	Total Catchment Area	m ²	Include a plan showing the area
A05	Total Impervious Area (TIA)	m ²	To be used for rational method
A06	Effective Impervious area (EIA)	m ²	EIA=70-80% of Directly Connected Impervious Area (DCIA) and for small subcatchment, it can trend upto 100% of TIA. EIA is approximately 60% of TIA. To be used for modelling.
A07	Roof Area	m ²	

A08	Other paved area	m ²	
A09	Pervious Area	m ²	
A10	Permeability/Infiltration Rate	m/d	If permeability test is done more than one BH/point. Result of all the points need to submit. Infiltration rate shall be not less than 1m/d at the base level of soakwells if retention strategy is proposed with soakwells
A11	Ground Water Table (GWT) depth	m	Confirm any perched ground water exits. GW depth both from surface and from sea level (AHD) are required.
A12	Lot Floor Finished Level (FFL) to Road Level	mm	Higher / Lower?
A13	Overland flow length if applicable	m	
A14	Slope of overland flow if applicable	%	
A15	Time of Concentration for pre-development flow (T_c PRE)	min	Min 5 min. Friend's equation (preferred)/ Kinematic wave equation can be used for overland sheet flow time. 15 years back pre-existing condition to be considered. T_c for post development will differ and need to be determined combinedly (PA& IA) including partial area effect if applicable.
A16	Predevelopment runoff coefficient (C_{PRE} value)		$C=0.15$ for minor storm (1 in 5/10/20 years) $C=0.18$ for major storm (1 in 50/100 years) C -value for post development will differ and needs to be determined.
A17	Critical Time of Duration	min	Check 6 min to 72 hrs and /ARR2019
A18	Pre-development discharge (Q_{PRE}) OR Permissible Site Discharge (PSD)	m ³ /s	1 in 5 ARI (20% AEP) rainfall intensity (I -value in mm/hr) with above C_{PRE} value and T_c PRE

B	STORAGE DETAILS		
B01	Required Storage Capacity	m ³	
B02	Proposed Storage Capacity	m ³	
B03	Type of storage with reasoning:		

C	DISCHARGE DETAILS
C01	Does the applicant need to connect the drainage to the legal point of discharge?
	Yes, Permission needed / Yes, Permission received / No
C02	If the proposal is to connect to the City's drainage system, describe the connection method
C03	If the proposal is for point discharge other than to the City's drainage system, describe the receiving infrastructure and erosion protection.
C04	If the proposal is for distributed discharge, describe the receiving environment and erosion protection.
D	SUPPORTING INFORMATION
D01	Is the design consistent with an Urban Water Management Plan (UWMP), Stormwater Management Strategy, or Development Application (DA)? If so, provide the report title and date.
	Yes, based on UWMP / Stormwater Strategy / DA / No

D02	Geotechnical Report attached with permeability rate, GWT info and suggestion of storm water drainage
	Yes / To be provided
D03	Report submitted that includes assumptions considered during design, description of the modelling method, manual calculation method, and provide.
D04	Copies of calculations submitted
D05	Catchment plan submitted

G	DRAINAGE PLAN The drainage plan includes:	Tick or "Yes", Cross or "No"
G01	Drainage design, plan, and long section	
G02	Invert levels of upstream and downstream pipes, and surface contour levels	
G03	All existing drainage infrastructures and proposed structures on the site including enclosed drainage, open drains, stormwater gullies, field inlets, headwalls, culverts, swales, outlets, inter-allotment roof water drainage, kerb and channel, detention basins, bio-retention basins etc. if related or connected/applicable with this plan.	
G04	The first flush treatment device if applicable	
G05	Arrows showing the flow direction and location of surface water runoff on the site including disposal path and outlet with contour	
G06	The system that will be used to convey runoff away from structures and any impervious surfaces on the site	
G07	Public drainage infrastructure if related/applicable	
G08	Utility services and underground assets if affected	
G09	Pavement ponding area if applicable	
G10	The location of easement with beneficiary to whom, if applicable	
G11	The location for access during construction	

Please submit the completed form with attachments to enquiries@kalamunda.wa.gov.au. Enquiries regarding the form can be directed to the City of Kalamunda Asset Planning team.