

ATTACHMENT 5

STORMWATER MANAGEMENT PLAN



ROWE
GROUP

Our Ref: BH/SA/L235.21
Job No: 21-03-029

18 November 2021

Landsdale Unit Trust & Alexander Unit Trust
PO Box 268
NEDLANDS WA 6009

Level 2 Kishorn Court
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Mount Pleasant WA 6153

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Attention: Steve Hindley

Dear Steve,

**LOTS 154 & 155 ALEXANDER DRIVE (CNR LANDSDALE RD), EAST LANDSDALE
STORMWATER MANAGEMENT PLAN - Rev C**

Porter Consulting Engineers (PCE) has been engaged to prepare a stormwater management plan to assist the development application for the above project. The proposed development consists of commercial development and associated parking.

The site is located at Alexander Drive and currently undeveloped land. The site is bounded by residential lots to the north and west. Landsdale Road is situated on the southern boundary. Refer to site location plan shown in **Figure 1** below. The development site is bounded in blue.

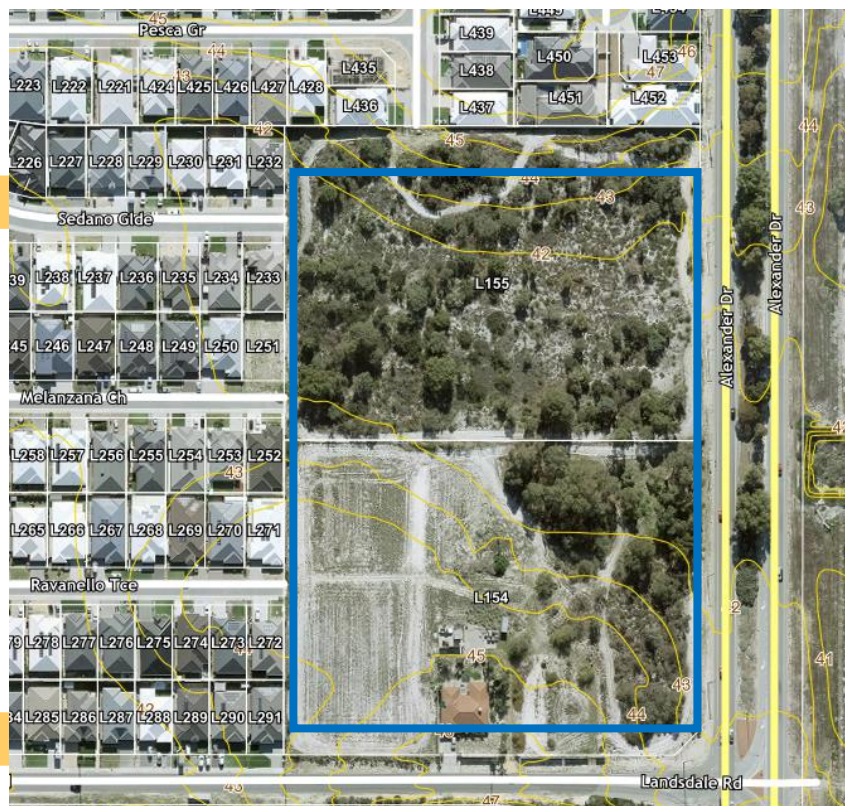


Figure 1 – Lots 154 and 155 Alexander Drive, East Landsdale (bound in blue)¹

¹ MNG Access, viewed on 8 October 2021, <www.mngaccess.com.au/>

The commercial development is proposed to consist of a number of retail stores, drive through restaurant outlets, liquor store, a carwash, service station and a supermarket as shown in **Attachment 1**.

Landform – The Site is 32,436m² in area, with an existing home for the former market garden occupying lot 154. The topography of the Site is such that the midpoint of the site is located in a local depression of 42m AHD, with 46m AHD along the northern and southern boundary of the Site.

Geotechnical testing found the permeability very high, in excess of 40m/day. Based on this, a conservative permeability rate on site has been used at 15m/day.

Based on the Perth Groundwater Atlas², the maximum groundwater contour of approximately 40.5m AHD intersects the Site.

The Acid Sulphate Soils (ASS) online risk mapping³ indicates that the Site is in a “moderate to low risk of ASS occurring within 3m of natural soil surface but high to moderate risk of ASS beyond 3m of natural soil surface”. As sewer excavations are not expected to occur beyond 3m depths, for the purpose of this advice, it is assumed ASS management will not be required.

Drainage – The City of Wanneroo will require that the development manage and dispose of the 1% AEP (1:100 year) rainfall event within the respective commercial lot boundaries. It is expected the use of soakwells or underground infiltration structures will be utilised to manage the onsite stormwater disposal which would be installed as part of the built-form works. Initial calculations are contained in **Attachment 2**.

For the extension of Sedano Glade and Mela Way, preliminary discussions⁴ held with the City of Wanneroo have suggested they would support in principle extension and connection to the existing pit and pipe system in Sedano Glade, which discharges into a fenced sump at the intersection of Sedano Glade and Pomodora Avenue.

A portion of the Sedano Glade runoff near the Alexander Drive intersection is expected to connect to existing drainage in Alexander Drive which discharges into a nearby fenced sump.

For Landsdale Road, there is a local high point approximately midway fronting the development, with existing drainage pits by 357 and 359 Landsdale Road and a drainage pit near Alexander Drive which should avoid the need to install new drainage along Landsdale Road following the kerbing of the development frontage. However, this could be extended if required through the detailed design process.

For the linking extension of Melanzana Chase / Ravello Terrace, the nearest existing drainage is located at the eastern end of Melanzana Chase. The road connection grades to this drainage pit and therefore connection to this network is readily available for minor catchment increase.

² Water and Rivers Commission 1997, *Perth Groundwater Atlas*.

³ Department of Water and Environmental Regulations, *ASS risk maps*, viewed 24 June 2019, <<https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/65-ass-risk-maps>>

⁴ Mr A. Baxter 2019, pers comms with S. Highman, 26 June 2019

An indicative layout of the development site is included at **Attachment 3** with suggested number of soakwells for the commercial development. The final drainage design and location would be subject to the detailed design process. It is noted that the road levels and the drainage design would ensure no drainage water crosses boundaries between lots 154 / 155. The residential lots would dispose on site through soakwells and the same would apply to the child care site when this is developed in the future.

CONCLUSION

Based on the information available to us and the strategies set out above, we consider the site capable of meeting the City of Wanneroo requirements for onsite drainage disposal.

If you have any questions regarding this information, please contact the undersigned on 9315 9955.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'R Thomson', written in a cursive style.

RACHEL THOMSON
PROJECT ENGINEER

Enc.

ATTACHMENT 1 – Architectural Layout



LEGEND

- BUILDING FOOTPRINT GFA
- ANCILLARY STRUCTURE/ USE AREA
- BITUMEN SEALED PAVEMENT. REFER TO CIVIL DETAILS
- BLACK CONCRETE HARDSTAND. REFER TO CIVIL.
- SELECTED PAVED FOOTPATH.
- SOFT LANDSCAPED AREA.
- COLOURED PAVING ROLL-OVER HARDSTAND
- EXISTING LEVELS/ OVERLAY
- NEW 350mm HIDE Limestone BLOCK RETAINING WALL SHOWN INDICATIVELY. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
- NEW 200mm HIDE SEMI PORTABLE CONCRETE KERBSING. TIE INTO EXISTING ROAD KERBS AS REQUIRED. REFER TO CIVIL DRAWINGS FOR MORE INFORMATION.
- NEW RAMPS WITH TACTILE STRIPS. CONSTRUCTION TO BE IN ACCORDANCE WITH AS1428.1. REFER TO CIVIL DRAWINGS FOR DETAILS

LANDSCAPING NOTE

ALL LANDSCAPING IS TO BE DESIGNED AND INSTALLED IN ACCORDANCE WITH BIOSPHERE MANAGEMENT PLAN AS REQUIRED. PLEASE REFER TO LANDSCAPING PLAN BY OTHERS FOR MORE INFORMATION.

LOT 154

TOTAL SITE AREA 20,265m²
SOFT LANDSCAPING 2,350m²
LANDSCAPING COVERAGE 10.5%

LOT 155

TOTAL SITE AREA 12,264m²
SOFT LANDSCAPING 1,600m²
LANDSCAPING COVERAGE 13.02%



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DEVELOPMENT APPLICATION

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ACN No. 088 989 904

NO. DATE: REVISION: DRAWN: CHECK:
A 29.11.21 ISSUED FOR DEVELOPMENT APPROVAL JJR SJH

A1 SHEET

PROPOSED SITE PLAN
SCALE 1:400

PROPOSED CENTRE ZONE DEVELOPMENT
LOT 154 & 155 Cnr. ALEXANDER DRIVE & LANDSDALE ROAD, EAST LANDSDALE
for LANDSDALE UNIT TRUST & ALEXANDER UNIT TRUST

Date 24.08.20
Design SJH
Drawn JJR
Checked SJH
Scale 1:400
Job No. 0456
Dwg - DA03
Rev - A

Attachment 2 - Drainage Calculations

Project East Landsdale
 Job Number 21-03-029
 Date 24/8/21
 Engineer RT
 Summary Soakwell with Storage Tanks
 Scenario 1% AEP Containment

File Name T122.21
 Revision B
 Reference Document Architect Layout - DA03 Rev C

IFD Used Landsdale IFD used (31.81° S,115.87° E) generated from BoM website
 Ground Conditions High permeability - 15m/day
 Groundwater High (RL 40.0m)
 Site RL 42-45m



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Intensities (mm/hr)	Duration	1 EY (1 year)		0.2 EY (5 year)		10% AEP (10 Year)		1% AEP (100 Year)	
		6 minute	30 minute	6 minute	30 minute	6 minute	30 minute	6 minute	30 minute
1 EY (1 year)	6 minute	59.5							
	30 minute	25.20							
	1 hour	16.30							
	3 hour	8.02							
0.2 EY (5 year)	6 minute	86.70							
	30 minute	36.70							
	1 hour	23.50							
	3 hour	11.40							
10% AEP (10 Year)	6 minute	102.00							
	30 minute	43.10							
	1 hour	27.60							
	3 hour	13.50							
1% AEP (100 Year)	6 minute	159.00							
	30 minute	66.40							
	1 hour	42.90							
	3 hour	22.00							
1% AEP (100 Year)	6 minute	14.60							
	12 hour	9.40							
	24 hour	5.69							
	72 hour	2.29							

Catchment Details

Area (ha) = 3.240
 Co-efficient of Runoff = 0.90

Soakwell details

Soakwell Diameter (m) = 1.8
 Liner Depth (m) = 1.8
 Effective Depth (m) = 1.8
 Soakwell base area (m²) = 2.54
 Soakwell Volume (m³) = 4.58
 No of Soakwells = 131

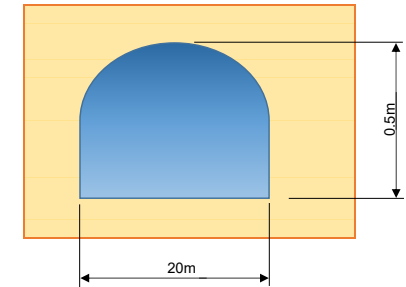
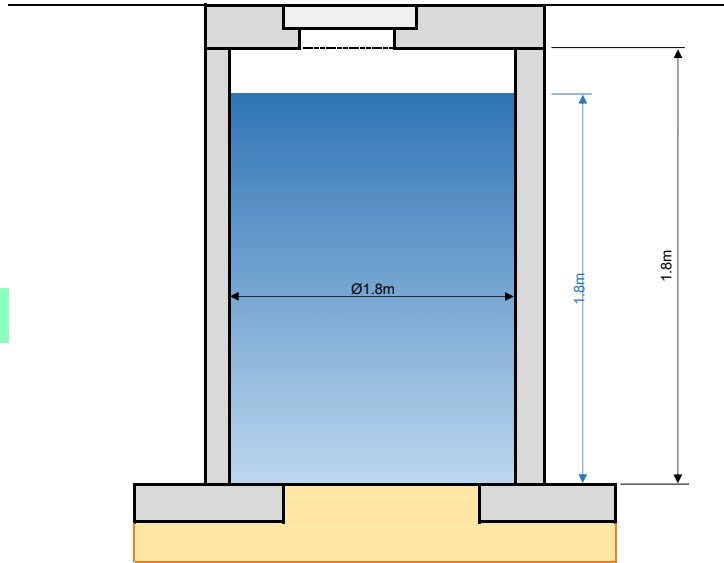
Infiltration

Rate of Soakage (m/day) = 15

Storage Cells

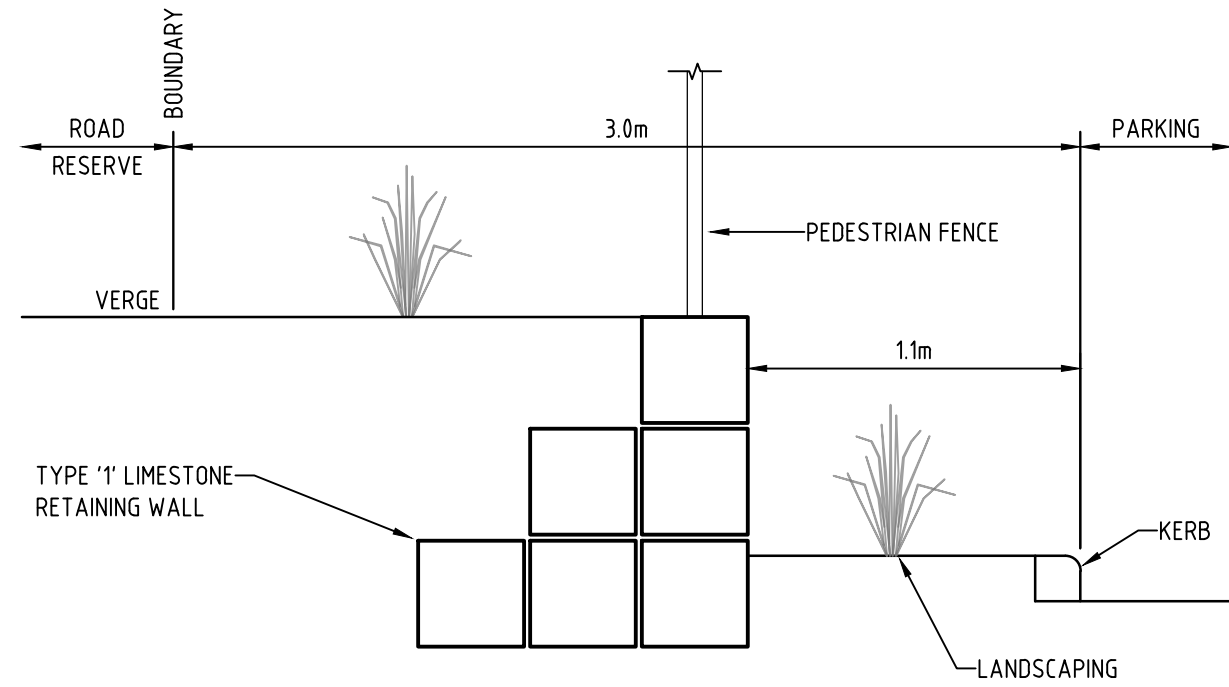
Length (m) = 20.000
 Width (m) = 20.000
 Height (m) = 0.500

Volume (m³) = 200.00
 Base Area (m²) = 400.00



Event	1EY (1 Year)						0.2 EY (5 Year)						10% AEP (10 Year)						1% AEP (100 Year)							
	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	6 min	30 min	1 hour	3 hour	6 hour	12 hour	24 hour	72 hour
Intensities	59.5	25.2	16.3	8.02	5.14	3.29	86.70	36.7	23.5	11.40	7.33	5.58	102	43.1	27.6	13.50	8.71	5.58	159	66.40	42.90	22.00	14.60	9.4	5.69	2.29
Q (m ³ /s)	0.4823	0.2043	0.1321	0.0650	0.0417	0.0267	0.7028	0.2975	0.1905	0.0924	0.0594	0.0452	0.8269	0.3494	0.2237	0.1094	0.0706	0.0452	1.2889	0.5383	0.3478	0.1783	0.1184	0.0762	0.0461	0.0186
Volume	173.64	367.71	475.69	702.15	900.01	1152.16	253.02	535.51	685.81	998.07	1283.48	1954.12	297.67	628.90	805.46	1181.92	1525.12	1954.12	464.01	968.89	1251.96	1926.10	2556.46	3291.88	3985.28	4811.75
SW Vol.	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04	600.04
Soak Vol	20.83	104.17	208.35	625.04	1250.08	2500.16	20.83	104.17	208.35	625.04	1250.08	2500.16	20.83	104.17	208.35	625.04	1250.08	2500.16	20.83	104.17	208.35	625.04	1250.08	2500.16	5000.32	15000.95
SW Total	620.87	704.21	808.38	1225.08	1850.12	3100.20	620.87	704.21	808.38	1225.08	1850.12	3100.20	620.87	704.21	808.38	1225.08	1850.12	3100.20	620.87	704.21	808.38	1225.08	1850.12	3100.20	5600.35	15600.99
Cell Vol	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Cell Soak	25.00	125.00	250.00	750.00	1500.00	3000.00	25.00	125.00	250.00	750.00	1500.00	3000.00	25.00	125.00	250.00	750.00	1500.00	3000.00	25.00	125.00	250.00	750.00	1500.00	3000.00	6000.00	18000.00
Cell Total	225.00	325.00	450.00	950.00	1700.00	3200.00	225.00	325.00	450.00	950.00	1700.00	3200.00	225.00	325.00	450.00	950.00	1700.00	3200.00	225.00	325.00	450.00	950.00	1700.00	3200.00	6200.00	18200.00
Total Vol	845.87	1029.21	1258.38	2175.08	3550.12	6300.20	845.87	1029.21	1258.38	2175.08	3550.12	6300.20	845.87	1029.21	1258.38	2175.08	3550.12	6300.20	845.87	1029.21	1258.38	2175.08	3550.12	6300.20	11800.35	33800.99
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

ATTACHMENT 3 – Concept Drainage Sketch

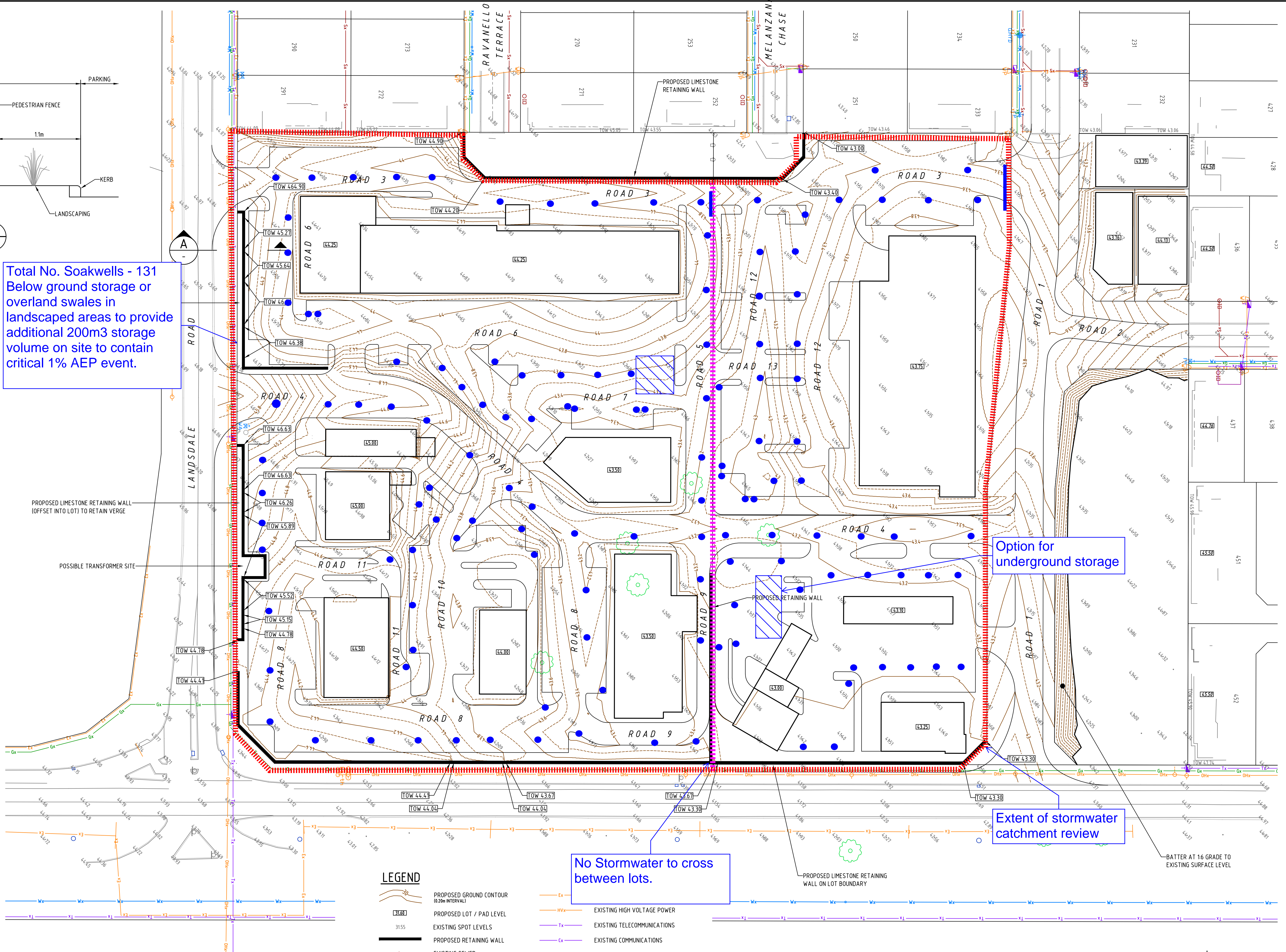


SECTION A
SCALE 1:25

EARTHWORKS NOTES

- VERTICAL DATUM : AUSTRALIAN HEIGHT DATUM (AHD)
- HORIZONTAL DATUM : PERTH COASTAL GRID (PCG94)
- EXISTING CONTOURS FROM SITE SURVEY BY MCMULLEN NOLAN GROUP.
- SERVICES, SUCH AS SEWER, WATER, GAS, COMMUNICATIONS, ELECTRICITY AND DRAINAGE MAY BE ENCOUNTERED DURING CONSTRUCTION OF THE WORKS. SERVICES INFORMATION SHOWN ON DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. BEFORE EXCAVATION COMMENCES THE LOCATION OF ALL SUCH SERVICES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITIES.
- THE CONTRACTOR SHALL COMPLETE ALL WORKS AS REQUIRED IN THE GEOTECHNICAL REPORT AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. THE CONTRACTOR SHALL ENGAGE A GEOTECHNICAL ENGINEER TO CERTIFY THAT ALL COMPLETED EARTHWORKS SATISFY THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. THE CERTIFICATION SHALL CONFIRM THAT THE SITE HAS BEEN COMPACTED TO MINIMUM CLASSIFICATION AS NOTED IN THE GEOTECHNICAL INVESTIGATION.
- ALL WORKS SHALL BE TO THE PROJECT SPECIFICATION, BUT WHERE NO DETAIL IS PROVIDED, TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.
- THE CONTRACTOR SHALL CO-ORDINATE THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO COMMENCEMENT OF WORK. ANY CONFLICTS ARE TO BE REPORTED TO THE SUPERINTENDENT IMMEDIATELY.
- THE CONTRACTOR SHALL PROVIDE A SAFE WORKING SITE FOR THE DURATION OF THE CONSTRUCTION WORKS. THIS SHALL INCLUDE, BUT NOT LIMITED TO, TEMPORARY FENCING ON RETAINING WALLS AND TEMPORARY PERIMETER FENCING WHERE REQUIRED.
- DUST SUPPRESSION METHODS SHALL BE IMPLEMENTED BY THE CONTRACTOR IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
- CONTRACTOR SHALL ENSURE CORDING IS PLACED FOR ALL POWER CABLING IN THE VICINITY OF RETAINING WALLS.
- THE CONTRACTOR SHALL LIMIT ACCESS TO THE WORKS TO THE EARTHWORKS BOUNDARY. EXISTING VEGETATION OUTSIDE OF BOUNDARY TO BE PROTECTED.
- THE CONTRACTOR SHALL CLEAR LOTS AND REMOVE ALL VEGETATION FROM SITE. LOTS TO BE GRADED TO PRODUCE A SMOOTH EVEN FINISH AND TIED.
- TOPSOIL SHALL BE PLACED IN LOCATIONS AND THICKNESS AGREED TO BY THE ENGINEER.
- UNLESS OTHERWISE SPECIFIED IN THE GEOTECHNICAL REPORT, THE SITE SHALL BE PROOF ROLLED AND ANY AREAS OF UNSUITABLE MATERIAL SHALL BE EXCAVATED, REMOVED AND REPLACED WITH SUITABLE MATERIAL PRIOR TO PLACEMENT OF FILL. THE CONTRACTOR'S GEOTECHNICAL ENGINEER SHALL PROVIDE WRITTEN CERTIFICATION THAT THE SITE HAS BEEN PREPARED IN ACCORDANCE WITH THE PRE-CONSTRUCTION GEOTECHNICAL REPORT REQUIREMENTS.
- ALL FILL SHALL BE PLACED IN UNIFORM LAYERS NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% MAXIMUM DRY DENSITY.
- ALL FILL SHALL BE CLEAN NON PLASTIC MATERIAL FREE FROM VEGETATION AND OTHER DELETERIOUS MATERIAL AND CERTIFIED AS SUITABLE FOR RESIDENTIAL LANDUSE.
- THE CONTRACTOR SHALL GRADE EVENLY BETWEEN DESIGN CONTOURS AND MATCH INTO EXISTING SURFACE AT LIMIT OF EARTHWORKS BOUNDARY WHERE APPROPRIATE.
- THE CONTRACTOR SHALL SET ALL TRANSFORMER AND SWITCHGEAR SITES TO AN ELEVATION AS PER WESTERN POWER STANDARDS. THE CONTRACTOR SHALL CONFIRM THE ELEVATION OF THE SITES ARE COMPLIANT WITH WESTERN POWER STANDARDS PRIOR TO SETTING TRANSFORMER AND SWITCHGEAR SUPPORTS.
- THE CONTRACTOR SHALL HYDROMULCH LOTS AND VERGES AT COMPLETION OF CONSTRUCTION WORKS.
- THE CONTRACTOR SHALL PREPARE AS-CONSTRUCTED EARTHWORKS DRAWINGS (INCLUDING SURVEY) TO THE SATISFACTION OF THE LOCAL AUTHORITY. AS CONSTRUCTED PLANS TO BE ISSUED TO THE ENGINEER FOR SIGNING AND PRESENTATION TO THE LOCAL AUTHORITY.
- THE CONTRACTOR IS TO ENGAGE A STRUCTURAL ENGINEER TO CERTIFY THAT ALL RETAINING WALLS ARE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN DRAWINGS AND SPECIFICATION.
- PRACTICAL COMPLETION CAN NOT BE AWARDED UNTIL ALL GEOTECHNICAL REQUIREMENTS HAVE BEEN MET AND COMPLIANT QUALITY ASSURANCE DOCUMENTS AND AS CONSTRUCTED PLANS HAVE BEEN RECEIVED.

Total No. Soakwells - 131
Below ground storage or
overland swales in
landscaped areas to provide
additional 200m3 storage
volume on site to contain
critical 1% AEP event.



PROJECT:
**LOT 154 AND 155 ALEXANDER DRIVE
EAST LANDSDALE**

NO.	DATE	REVISION
C	15-11-2021	EARTHWORKS LEVELS AMENDED
B	3-11-2021	EARTHWORKS LEVELS AMENDED
A	8-10-2021	ISSUED FOR COMMENT

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ONLY PLANS WITH NUMERICAL REVISION (REV 'Y' OR HIGHER) AND SIGNED AS APPROVED SHALL BE USED FOR CONSTRUCTION.

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10000 Pty Ltd ABN 616 091 348 as trustee for The Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 036 296 385

CLIENT:
**LANDSDALE UNIT TRUST
AND
ALEXANDER UNIT TRUST**

DRAWING:
BULK EARTHWORKS PLAN
STATUS: **FOR COMMENT**

SCALE	DATE	DESIGN	DRAWN	CHECK	DRAWING No	REV No	ORIGINAL DRAWING SIZE
1:500	OCT 2021	DLC	DLC	APPD	21-3-29/102	C A1	
					FILE NAME: S:\ACTIVE PROJECTS\21-03-29\ACAD\2129-102.dwg		