Appendix 1

PROPOSED BERNERA ROAD UPGRADE WORKS

LIVERPOOL CITY COUNCIL

BERNERA ROAD

YARRAWA STREET TO YARRUNGA STREET, PRESTONS

ROAD UPGRADE

DETAILED DESIGN

LOCALITY PLAN

Map Data 2020 Whereis®, Sensis Pty Ltd

DRAWING INDEX

PART NUMBER	CODE	NAME
PART 1	GE	GENERAL
	RD	ROAD ALIGNMENT AND DETAIL
	RC	ROAD CROSS SECTIONS
	UT	UTILITIES
	SM	STORMWATER MANAGEMENT
	PV	PAVEMENT
	RF	ROADSIDE FURNITURE AND LINEMARKING
	MS	MISCELLANEOUS

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME
s:\300332\DWG\engineering\DD\300332-DD-GE-0001.dwg

LINEAR REFERENCING
START: FINISH:

PLOT DATE / TIME 6/21/2023 9:25 AM
PLOT BY Rexx

PREPARED BY

Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

DESIGNED	REVIEWED	VERIFIED
SIGNED	SIGNED	SIGNED
NAME REXX BROWN	NAME IAN BROWN	NAME IAN BROWN
TITLE CIVIL ENGINEER	TITLE SENIOR CIVIL ENGINEER	TITLE SENIOR CIVIL ENGINEER
DATE 16.12.22	DATE 16.12.22	DATE 16.12.22

LCC PROJECT MANAGER
NAME MAHAVIR ARYA
TITLE TRAFFIC & TRANSPORT ENGINEER

VALIDATION AND ACCEPTANCE OF THESE DRAWINGS AND THE DESIGN SHOWN THEREON IS TO BE CARRIED OUT UNDER SEPARATE PROCESS

CLIENT

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARRUNGA STREET, PRESTONS

A3

LCC PROJECT No.	DESIGN PROJECT No.		
-	-		
DESIGN PROJECT No. 300332			PART -
ISSUE STATUS DETAILED DESIGN	EDMS No. -	SHEET No. GE-0001	ISSUE 3

© Roads and Maritime Services

SHEET No.	SHEET DESCRIPTION	ISSUE																
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GE	GENERAL																	
GE-0002	SHEET INDEX																	
GE-0020	OVERVIEW PLAN	16.12.22	10.02.23	10.03.23	21.06.23													
RD	ROAD ALIGNMENT AND DETAIL																	
RD-0001	TYPICAL CROSS SECTIONS - SHEET 1	16.12.22	10.02.23	10.03.23	21.06.23													
RD-0005	TYPICAL DETAILS	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
RD-0011	ALIGNMENT PLAN AND SCHEDULES	16.12.22	10.02.23	10.03.23	21.06.23													
RD-0012	KERB RETURN PLAN AND ALIGNMENT SCHEDULES	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
RD-0101	DETAIL PLAN	16.12.22	10.02.23	10.03.23	21.06.23													
RD-0211	ROAD LONGITUDINAL SECTION - BERNERA ROAD SHEET 1	16.12.22	10.02.23	10.03.23	21.06.23													
RC	ROAD CROSS SECTIONS																	
RC-0001	BERNERA ROAD - SHEET 1	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0002	BERNERA ROAD - SHEET 2	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0003	BERNERA ROAD - SHEET 3	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0004	BERNERA ROAD - SHEET 4	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0005	BERNERA ROAD - SHEET 5	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0006	BERNERA ROAD - SHEET 6	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0007	BERNERA ROAD - SHEET 7	16.12.22	10.02.23	10.03.23	21.06.23													
RC-0008	BERNERA ROAD - SHEET 8	NOT ISSUED	10.02.23	10.03.23	21.06.23													
RC-0009	BERNERA ROAD - SHEET 9	NOT ISSUED	10.02.23	10.03.23	21.06.23													
RC-0010	BERNERA ROAD - SHEET 10	NOT ISSUED	10.02.23	10.03.23	21.06.23													
UT	UTILITIES																	
UT-0001	UTILITY PLAN	16.12.22	10.02.23	10.03.23	21.06.23													
SM	STORMWATER MANAGEMENT																	
SM-0100	DRAINAGE SETOUT	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
SM-0101	STORMWATER DETAIL PLAN	16.12.22	10.02.23	10.03.23	21.06.23													
PV	PAVEMENT																	
PV-0100	PAVEMENT DETAILS	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
PV-0101	PAVEMENT PLAN	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
RF	SIGNPOSTING AND PAVEMENT MARKING																	
RF-0001	SIGNAGE AND MARKING PLAN	16.12.22	10.02.23	10.03.23	21.06.23													
MS	MISCELLANEOUS																	
MS-0001	19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 1	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
MS-0002	19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 2	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													
MS-0003	19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 3	NOT ISSUED	NOT ISSUED	10.03.23	21.06.23													

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
s:\300332\DWG\engineering\DD\300332-DD-GE-0002.dwg

DESIGN LOT CODE
...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME
6/21/2023 9:25 AM

PLOT BY
stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

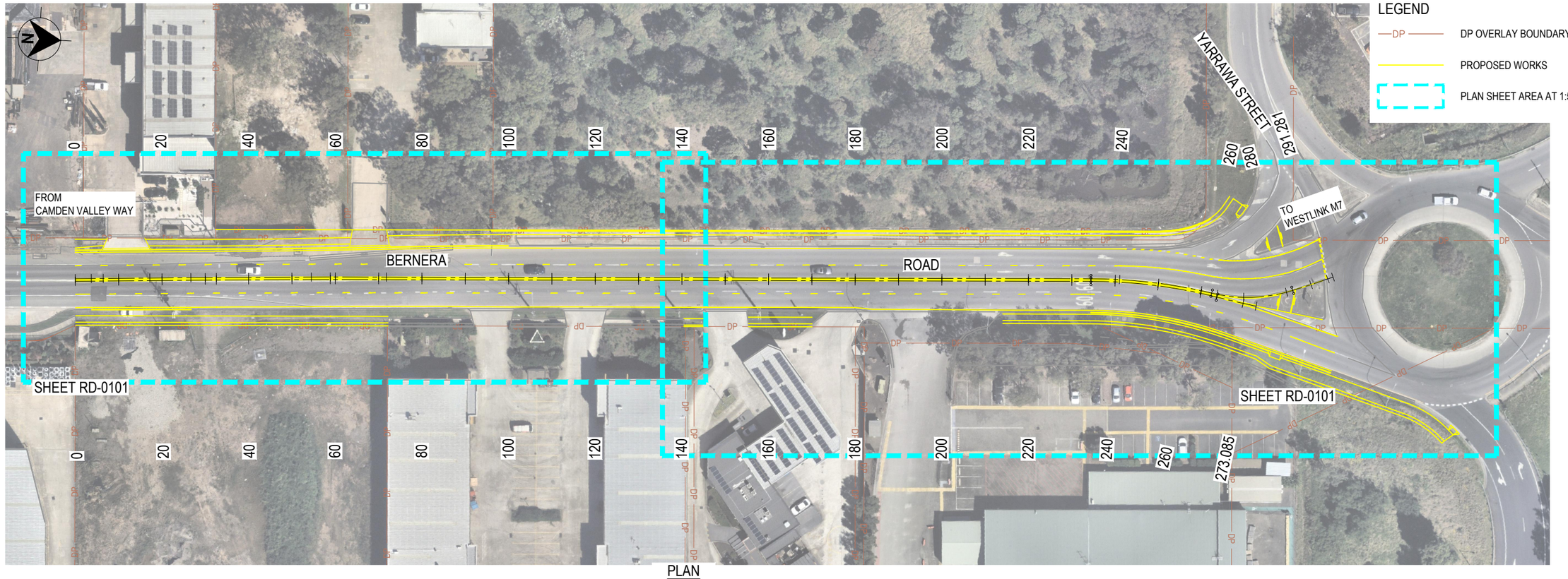
LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
GENERAL
SHEET INDEX

A3

DESIGN PROJECT No. 300332
PART -
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. GE-0002
ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:1000

GENERAL NOTES

REFER TO SHEET GE-0002 FOR DRAWING LIST
REFER TO SHEET RD-0001 FOR TYPICAL SECTIONS

ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH LCC CONSTRUCTION STANDARDS, SPECIFICATION AND STANDARD DRAWINGS, CURRENT AT THE TIME OF COMMENCEMENT OF WORK.

EROSION CONTROL

APPROPRIATE MEASURES ARE TO BE UNDERTAKEN FOR THE CONTROL OF SOIL EROSION AND THE MINIMISATION OF DOWNSTREAM SEDIMENT TRANSFER DURING THE CONSTRUCTION PERIOD AND FOR THE FULL PERIOD OF OPERATION OF THE DEVELOPMENT. THE WORK SHALL COMPLY WITH THE GENERAL PRINCIPLES AS SET DOWN IN THE COUNCIL'S SPECIFICATION. PARTICULAR ATTENTION SHOULD BE PAID TO SURFACE RUNOFF FROM ALL EXPOSED AREAS.

PUBLIC UTILITIES

ALL PUBLIC UTILITIES ARE TO BE CLEARLY IDENTIFIED IN THE FIELD PRIOR TO ANY CIVIL WORKS. THIS FIRM DOES NOT ACCEPT ANY RESPONSIBILITY FOR DAMAGES OR RELOCATION COSTS TO PUBLIC UTILITIES DURING THE CONSTRUCTION OF THE DEVELOPMENT. LIVERPOOL CITY COUNCIL ARE TO BE NOTIFIED PRIOR TO THE COMMENCEMENT OF ANY WORKS AND CONCURRENCE FROM BOTH ORGANISATIONS SHALL BE OBTAINED PRIOR TO THE COMMENCEMENT OF WORK.

IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT ALL WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE WORK HEALTH AND SAFETY ACT.

STORMWATER DRAINAGE NOTES

D1. LOCATION OF EXISTING SERVICES ON THESE PLANS IS INDICATIVE ONLY BASED ON SERVICES EVIDENT AT THE TIME OF SURVEY AND DIAL BEFORE YOU DIG SEARCHES MADE AT THE TIME OF PLAN PREPARATION. THE CONTRACTOR IS TO CARRY OUT A COMPLETE SERVICES SEARCH PRIOR TO CONSTRUCTION AND TAKE ALL NECESSARY PRECAUTIONS.

D2. FOR DETAILS OF SW PITS REFER TO LCC STANDARD DRAWINGS WHERE APPLICABLE.

D3. STANDARD STEP IRONS TO BE PROVIDED FOR PITS WHERE DEPTH EXCEEDS 1200mm OR AS OTHERWISE REQUIRED BY LCC SPECIFICATIONS.

D4. CONCRETE CHARACTERISTIC STRENGTH SHALL BE 25 MPA (MIN) WITH SLUMP OF 60-80 mm, UNLESS NOTED OTHERWISE.

D5. SET OUT POINTS FOR STORMWATER PITS HAS BEEN TAKEN AS THE CENTRE OF THE PIT, UNLESS NOTED OTHERWISE.

D6. ALL R.C. STORMWATER PIPES TO BE CLASS "4", UNLESS NOTED OTHERWISE.

ROADWORKS NOTES

R1. SUBGRADE CBR'S FOR PAVEMENT DESIGN ARE BASED ON GEOTECHNICAL INVESTIGATIONS.

R2. SUBGRADE AND BASECOURSE TO BE COMPACTED IN ACCORDANCE WITH R.M.S.SPECIFICATION.

R3. SIGNPOSTING AND LINE MARKING TO CONFORM WITH AS1742.2. AND R.M.S. REQUIREMENTS.

R4. STREET SIGNS TO R.M.S. STANDARD SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

LINEMARKING NOTES

1. ALL SIGNPOSTING AND LINE MARKING (INCLUDING RAISED PAVEMENT MARKERS) TO BE IN ACCORDANCE WITH AS 1742.2 AND R.M.S. SPECIFICATIONS.

2. ALL CHEVRONS TO BE WATERBOURNE PAINT LINE MARKING, AND DIRECTIONAL ARROWS TO BE THERMOPLASTIC.

3. REMOVE ALL REDUNDANT LINE MARKING BY GRINDING OR WATER BLASTING IN ACCORDANCE WITH R.M.S. SPECIFICATION.

4. REMOVE ALL REDUNDANT SIGNPOSTING.

EARTHWORKS NOTES

N1. EARTHWORKS TO BE CARRIED OUT TO R.M.S. SPECIFICATIONS. UNSOUND MATERIALS ARE TO BE REMOVED FROM ROADS PRIOR TO FILLING. THE CONTRACTOR IS TO ARRANGE AND MAKE AVAILABLE COMPACTION CERTIFICATES WHERE REQUIRED.

N2. PROVIDE MIN. 100mm. AND MAX. 200mm. TOPSOIL WITH TURF ON FOOTPATHS, FILLED AREAS AND ALL OTHER AREAS DISTURBED DURING CONSTRUCTION. TOPSOILING AND TURF IS ONLY APPROPRIATE IN BROAD LOWLY GRADED AREAS IN CONJUNCTION WITH SILT FENCING.

N3. THE CONTRACTOR SHALL CONTROL SEDIMENTATION, EROSION AND POLLUTION DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF RMS.

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME
s:\300332\DWG\engineering\DD\300332-DD-GE-0020.dwg

DESIGN LOT CODE
...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:25 AM
PLOT BY: stevenz

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING
0 10 20 30 40
HORIZONTAL SCALE 1:1000m

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

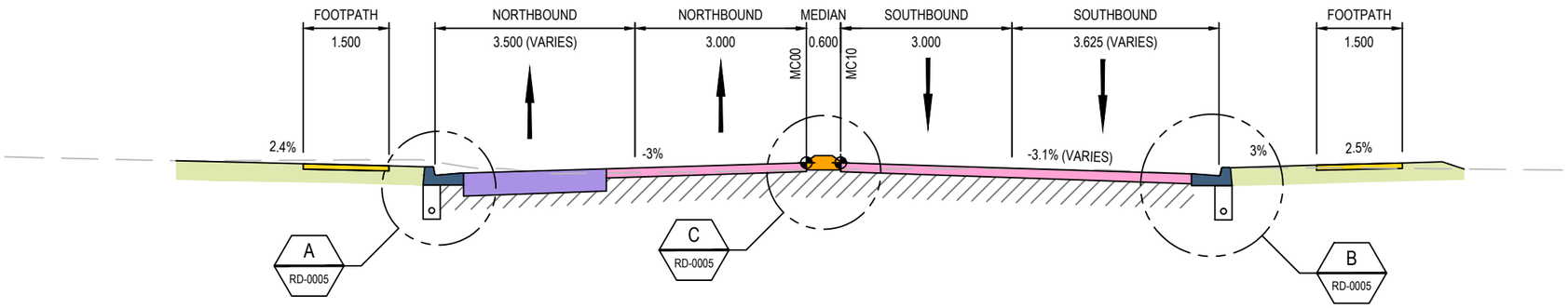
CLIENT
LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
GENERAL
OVERVIEW PLAN

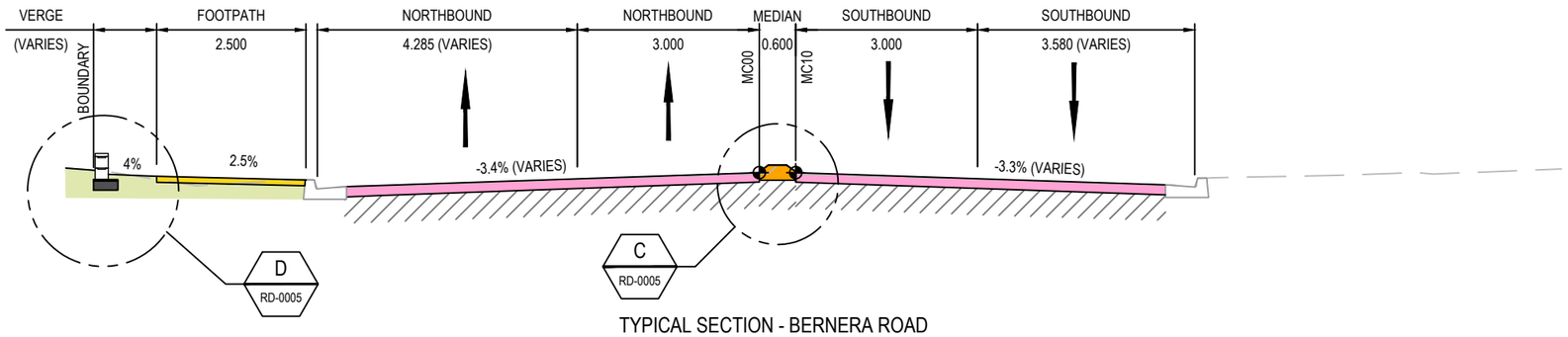
A3

DESIGN PROJECT No. 300332
PART -
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. GE-0020
ISSUE 3

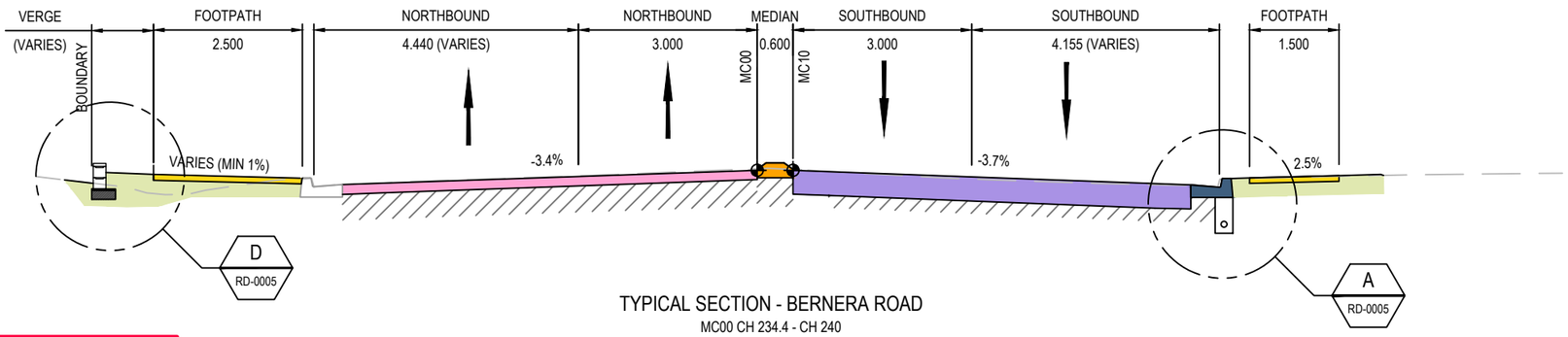
© Roads and Maritime Services



TYPICAL SECTION - BERNERA ROAD
MC00 CH 0 - CH 54.5
SCALE 1:100



TYPICAL SECTION - BERNERA ROAD
MC00 CH 100 - CH 140
SCALE 1:100



TYPICAL SECTION - BERNERA ROAD
MC00 CH 234.4 - CH 240
SCALE 1:100

LEGEND

- FULL DEPTH PAVEMENT TO BE CONSTRUCTED
- PAVEMENT OVERLAY TO BE CONSTRUCTED
- KERBS TO BE CONSTRUCTED
- CONCRETE MEDIAN TO BE CONSTRUCTED
- FOOTPATHS TO BE CONSTRUCTED
- VERGE / EMBANKMENT TO BE CONSTRUCTED
- DRIVEWAY ACCESS TO BE CONSTRUCTED
- EXISTING PAVEMENT
- DP — DP OVERLAY BOUNDARY

NOTES

1. REFER SHEET PV-0100 FOR PAVEMENT DETAILS.
2. REFER SHEET SM-0100 AND SM-0101 FOR SUBSOIL DRAINAGE DETAILS.

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RD-0001.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:25 AM

PLOT BY: stevenz

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 1 2 3 4 HORIZONTAL SCALE 1:100m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT: LIVERPOOL THE GREAT SOUTH WEST

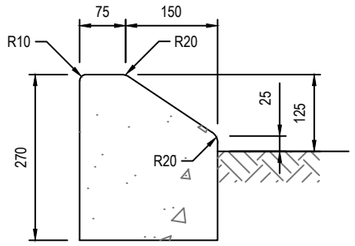
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
TYPICAL CROSS SECTIONS SHEET 1

A3

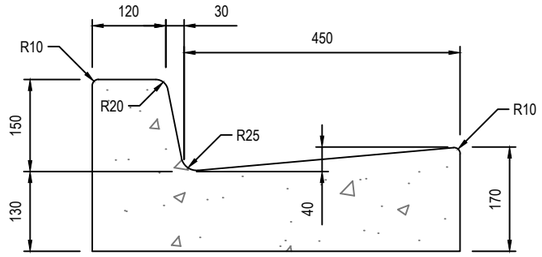
DESIGN PROJECT No. 300332 | PART -

ISSUE STATUS: DETAILED DESIGN | EDMS No. - | SHEET No. RD-0001 | ISSUE 3

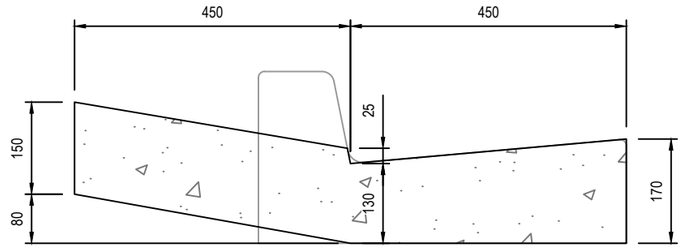
© Roads and Maritime Services



TYPE A MOUNTABLE KERB
SCALE 1:10



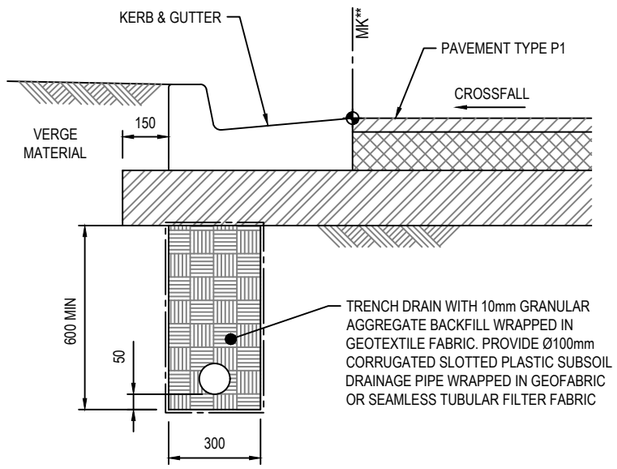
KERB & GUTTER
SCALE 1:10



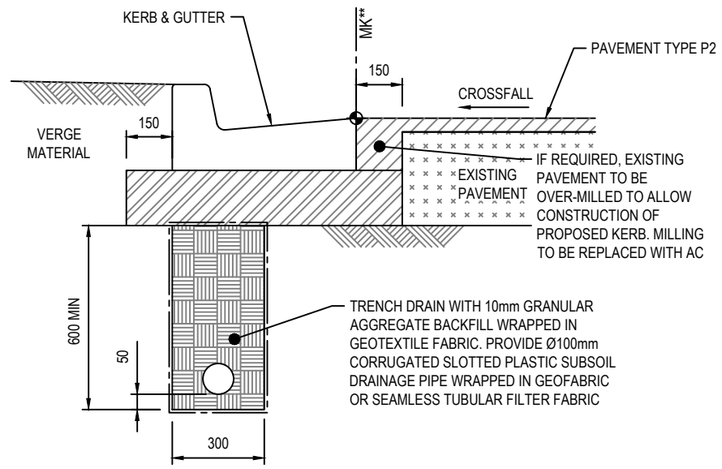
DRIVEWAY LAYBACK
SCALE 1:10

NOTES:-

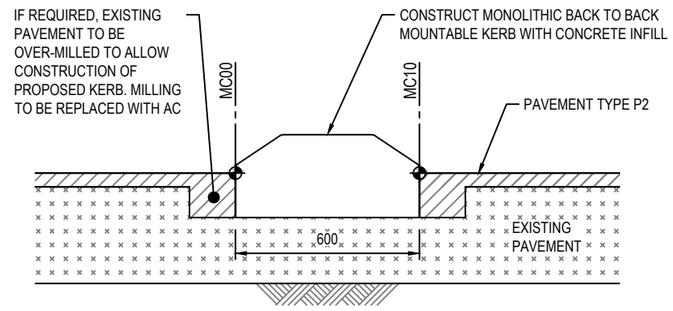
1. FOR ADDITIONAL KERB DETAILS, REFER LIVERPOOL CITY COUNCIL STANDARD DRAWING No. R2
2. FOR PAVEMENT DETAILS, REFER PV SERIES DRAWINGS
3. ALL KERB RAMPS TO BE CONSTRUCTED 1.5m WIDE (UNLESS SPECIFIED DIFFERENTLY ON PLAN) IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL STANDARD DRAWINGS R17 & R23.
4. SETOUT INFORMATION IS TO BE VERIFIED BY THE CONTRACTOR AGAINST THE PLAN VIEW, LONGITUDINAL SECTIONS & ELECTRONIC 12D DATA BEFORE BEING USED. IF THERE IS A DISCREPANCY, THE SUPERINTENDENT IS TO BE NOTIFIED AND DIRECTION WILL BE PROVIDED IN WRITING BEFORE PROCEEDING.



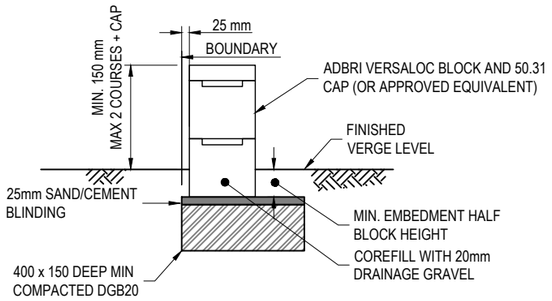
DETAIL A
SCALE 1:20
RD-0001



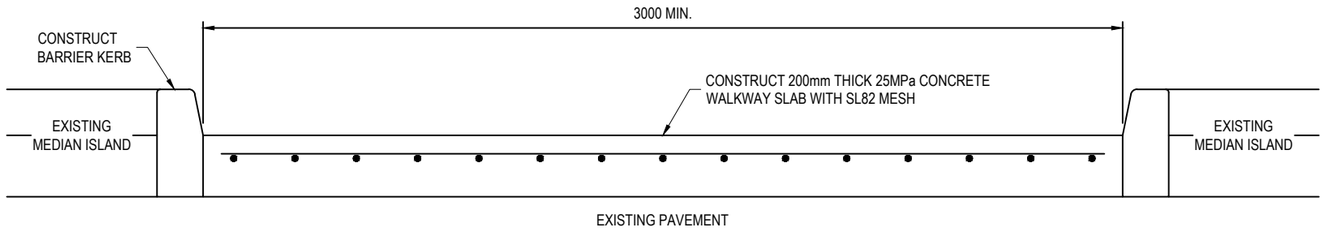
DETAIL B
SCALE 1:20
RD-0001



DETAIL C
SCALE 1:20
RD-0001



DETAIL D
SCALE 1:20
RD-0001



DETAIL E
SCALE 1:20
-

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
s:\300332\DWG\engineering\DD\300332-DD-RD-0005.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:25 AM	stevenz

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
x_SHT	0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
x_LABELS	1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
x_DESIGN	2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
x_SURVEY	3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		
x_DRAINAGE					
x_UTILITIES					

SCALES ON A3 SIZE DRAWING
0 100 200 300 400
HORIZONTAL SCALE 1:10mm
0 200 400 600 800
HORIZONTAL SCALE 1:20mm

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT
LIVERPOOL THE GREAT SOUTH WEST

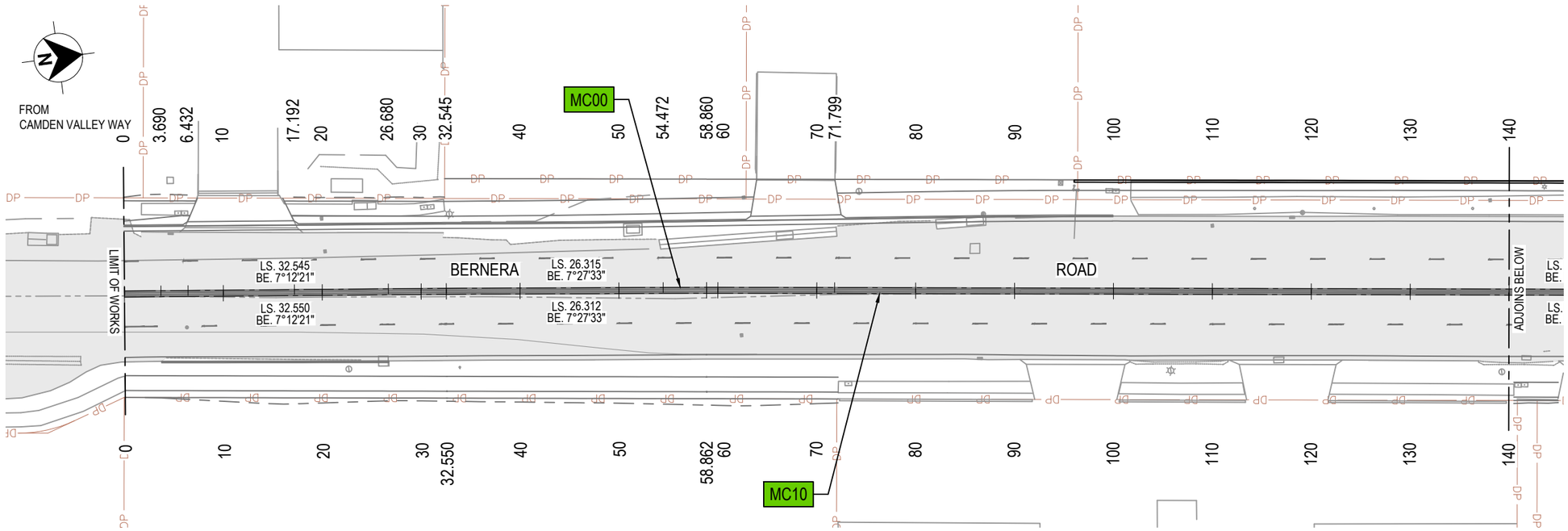
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
TYPICAL DETAILS

A3

DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RD-0005	3

© Roads and Maritime Services



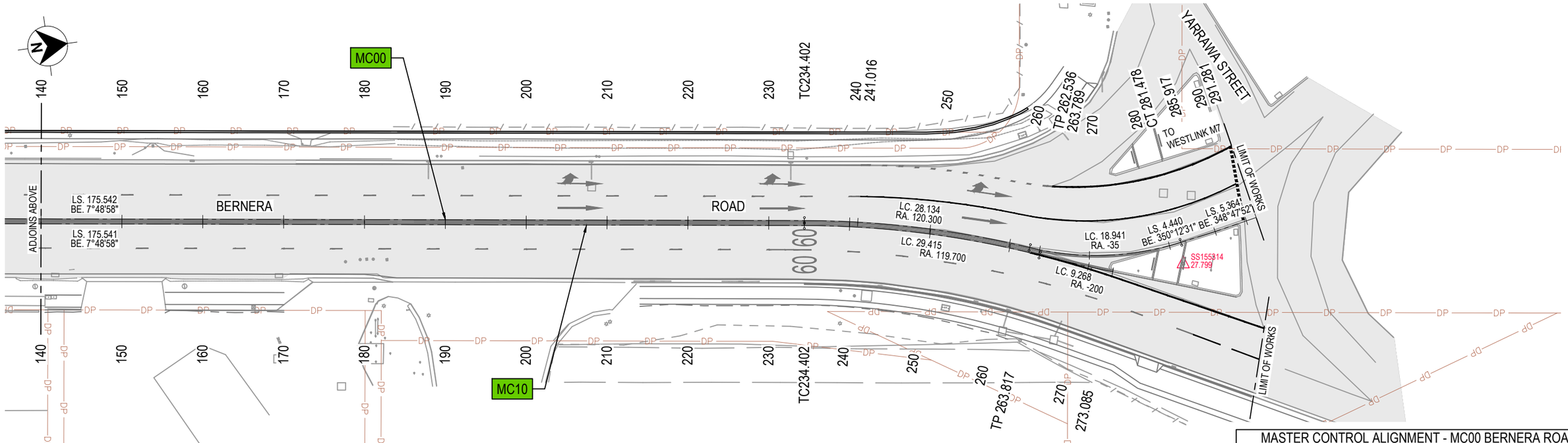
PLAN
SCALE 1:500

LEGEND

- DP OVERLAY BOUNDARY
- CONTROL ALIGNMENT
- MC00 — CONTROL ALIGNMENT LABEL
- EXISTING ROAD PAVEMENT
- R004 80.443 — SURVEY MARKS

NOTES

1. CONTRACTOR TO VERIFY SETOUT PRIOR TO COMMENCING CONSTRUCTION. REFER ANY DISCREPANCIES TO THE ENGINEER.
2. REFER TO SHEET RD-0012 FOR ALIGNMENT SCHEDULES.
3. PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES THAT MAY AFFECT THE SURVEY INFRASTRUCTURE, CONTACT THE NSW DEPARTMENT OF LAND AND PROPERTY INFORMATION TO OBTAIN THE SURVEYOR GENERAL'S AUTHORITY. COMPLY WITH SURVEYOR GENERAL'S DIRECTIONS NO.11 "PRESERVATION OF SURVEY INFRASTRUCTURE". PERMANENT SURVEY & CADASTRAL REFERENCE MARKS ARE PROTECTED UNDER SECTION 24 OF THE SURVEYING AND SPATIAL INFORMATION ACT. REFER TO AN APPLICATION UNDER SECTION 88 OF THE SURVEYING AND SPATIAL INFORMATION REGULATION FOR THE PROCESS TO REMOVE OR OBLITERATE MARKS.



PLAN
SCALE 1:500

NOT FOR CONSTRUCTION

CONTROL ALIGNMENT - MC10 BERNERA ROAD

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
S	0.000	302986.750	6242770.405	7°12'21.19"	LINE		32.550
DIS	32.550	302990.833	6242802.698	7°27'32.94"	LINE		26.312
DIS	58.862	302994.249	6242828.787	7°48'57.85"	LINE		175.541
TC	234.402	303018.121	6243002.697	7°48'57.85"	ARC	119.700	29.415
CC	263.817	303025.644	6243031.057	21°53'44.78"	ARC	-200.000	9.268
E	273.085	303028.899	6243039.734	19°14'26.13"			

MASTER CONTROL ALIGNMENT - MC00 BERNERA ROAD

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
S	0.000	302986.155	6242770.486	7°12'21.47"	LINE		32.545
DIS	32.545	302990.238	6242802.774	7°27'32.69"	LINE		26.315
DIS	58.860	302993.654	6242828.867	7°48'57.86"	LINE		175.542
TC	234.402	303017.527	6243002.778	7°48'57.79"	ARC	120.300	28.134
CC	262.536	303024.562	6243029.952	21°12'56.23"	ARC	-35.000	18.941
CT	281.478	303026.424	6243048.570	350°12'30.56"	LINE		4.440
DIS	285.917	303025.669	6243052.945	348°47'51.81"	LINE		5.364
E	291.281	303024.627	6243058.207	348°47'51.81"			

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RD-0011.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

PLOT DATE / TIME: 6/21/2023 9:25 AM — PLOT BY: stevenz

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT: LIVERPOOL — THE GREAT SOUTH WEST

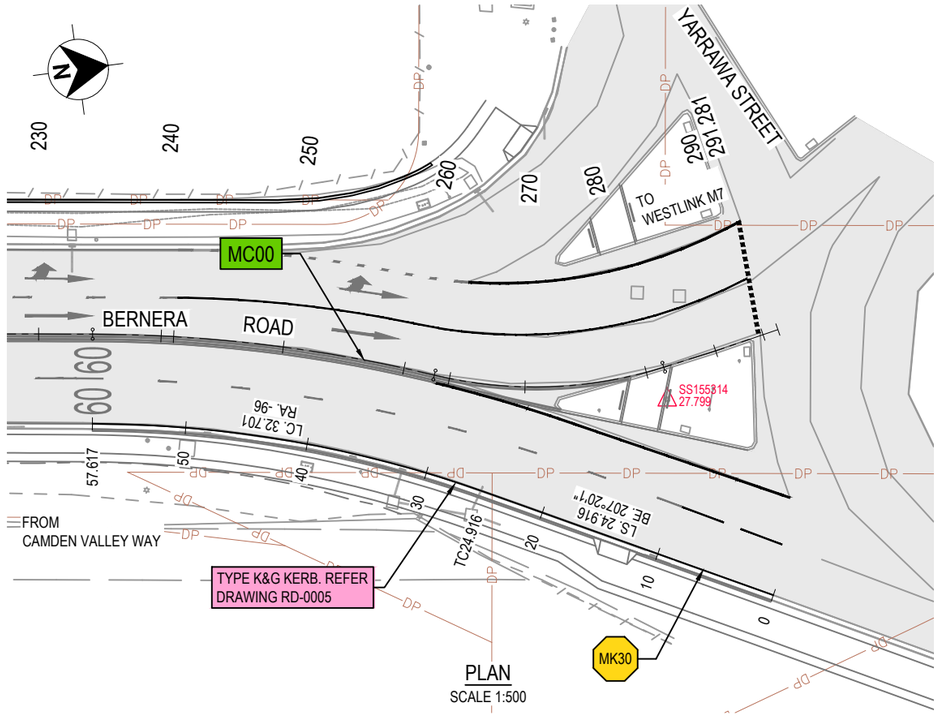
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
ALIGNMENT PLAN

A3

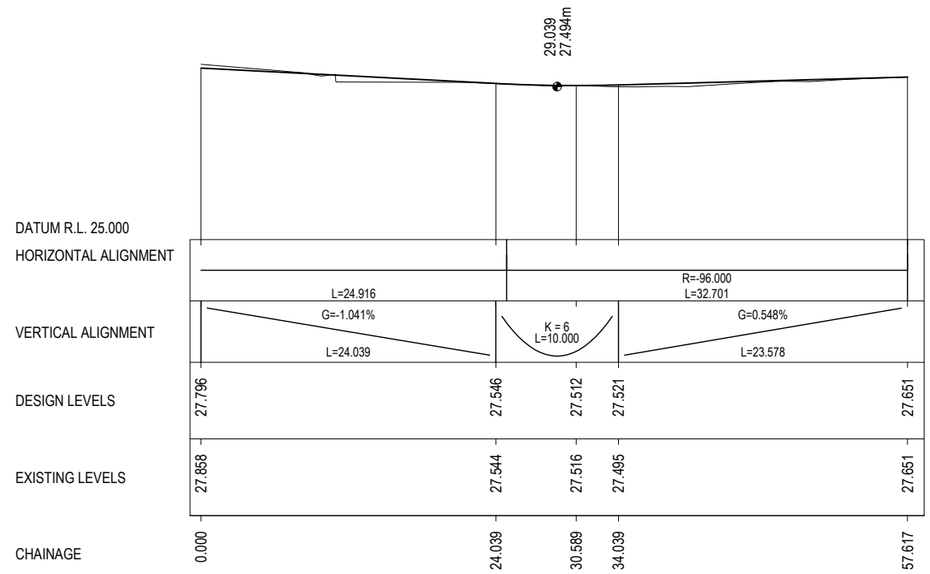
DESIGN PROJECT No. 300332 — PART -

ISSUE STATUS: DETAILED DESIGN — EDMS No. - — SHEET No. RD-0011 — ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500



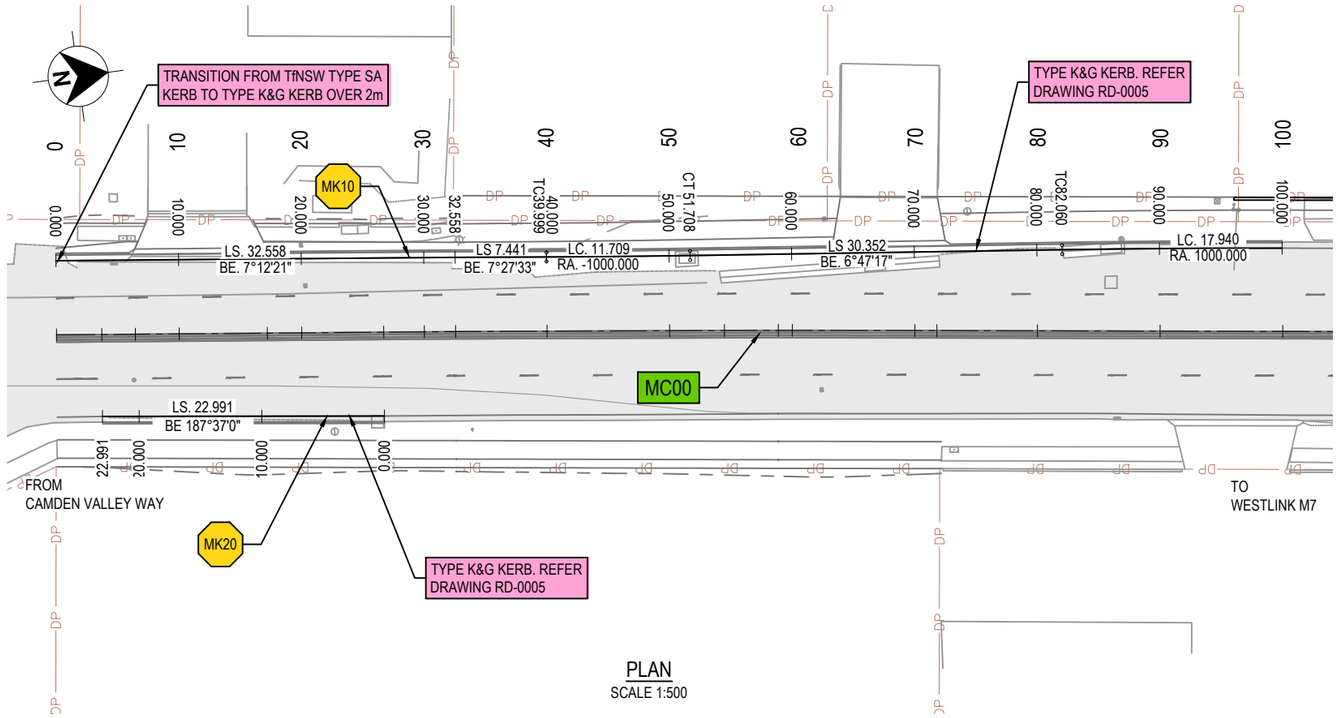
KERB PROFILE - MK30
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND

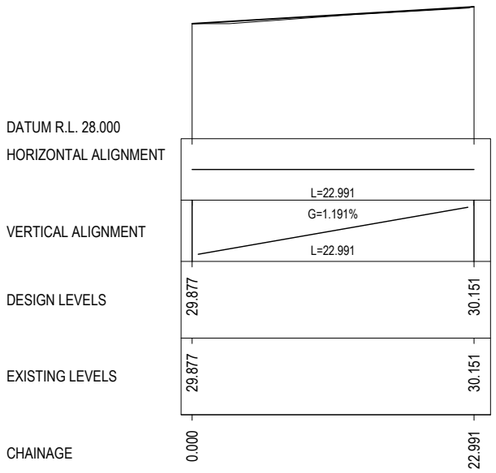
- DP OVERLAY BOUNDARY
- CONTROL ALIGNMENT
- MC00 — CONTROL ALIGNMENT LABEL
- MK01 — KERB RETURN ALIGNMENT LABEL
- EXISTING ROAD PAVEMENT
- R004 80.443 — SURVEY MARKS

NOTES

1. CONTRACTOR TO VERIFY SETOUT PRIOR TO COMMENCING CONSTRUCTION. REFER ANY DISCREPANCIES TO THE ENGINEER..
2. PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES THAT MAY AFFECT THE SURVEY INFRASTRUCTURE, CONTACT THE NSW DEPARTMENT OF LAND AND PROPERTY INFORMATION TO OBTAIN THE SURVEYOR GENERAL'S AUTHORITY. COMPLY WITH SURVEYOR GENERAL'S DIRECTIONS NO.11 "PRESERVATION OF SURVEY INFRASTRUCTURE". PERMANENT SURVEY & CADASTRAL REFERENCE MARKS ARE PROTECTED UNDER SECTION 24 OF THE SURVEYING AND SPATIAL INFORMATION ACT. REFER TO AN APPLICATION UNDER SECTION 88 OF THE SURVEYING AND SPATIAL INFORMATION REGULATION FOR THE PROCESS TO REMOVE OR OBLITERATE MARKS.



PLAN
SCALE 1:500



KERB PROFILE - MK20
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

HORIZONTAL KERB ALIGNMENT - MK10 (TYPE SA KERB)

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
S	0.000	302980.153	6242771.245	7°12'21.47"	LINE		32.558
DIS	32.558	302984.237	6242803.546	7°27'32.69"	LINE		7.441
TC	39.999	302985.203	6242810.924	7°27'32.69"	ARC	-1000.000	11.709
CT	51.708	302986.655	6242822.543	6°47'17.48"	LINE		30.352
TC	82.060	302990.243	6242852.682	6°47'17.48"	ARC	1000.000	17.940
E	100.000	302992.523	6242870.476	7°48'57.86"			

KERB ALIGNMENT - MK20 (TYPE SA KERB)

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
S	0.000	302996.286	6242796.098	187°37'00.05"	LINE		22.991
E	22.991	302993.238	6242773.311	187°37'00.05"			

KERB ALIGNMENT - MK30 (TYPE SA KERB)

PT	CHAINAGE	EASTING	NORTHING	BEARING	DEP.SEG	DEP.RAD	DEP.LEN
S	0.000	303046.026	6243054.943	207°20'01.36"	LINE		24.916
TC	24.916	303034.585	6243032.809	207°20'01.36"	ARC	-96.000	32.701
E	57.617	303024.759	6243001.785	187°49'01.17"			

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RD-0012.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
KERB RETURN PLAN AND ALIGNMENT SCHEDULES

A3

DESIGN PROJECT No. 300332

PART -

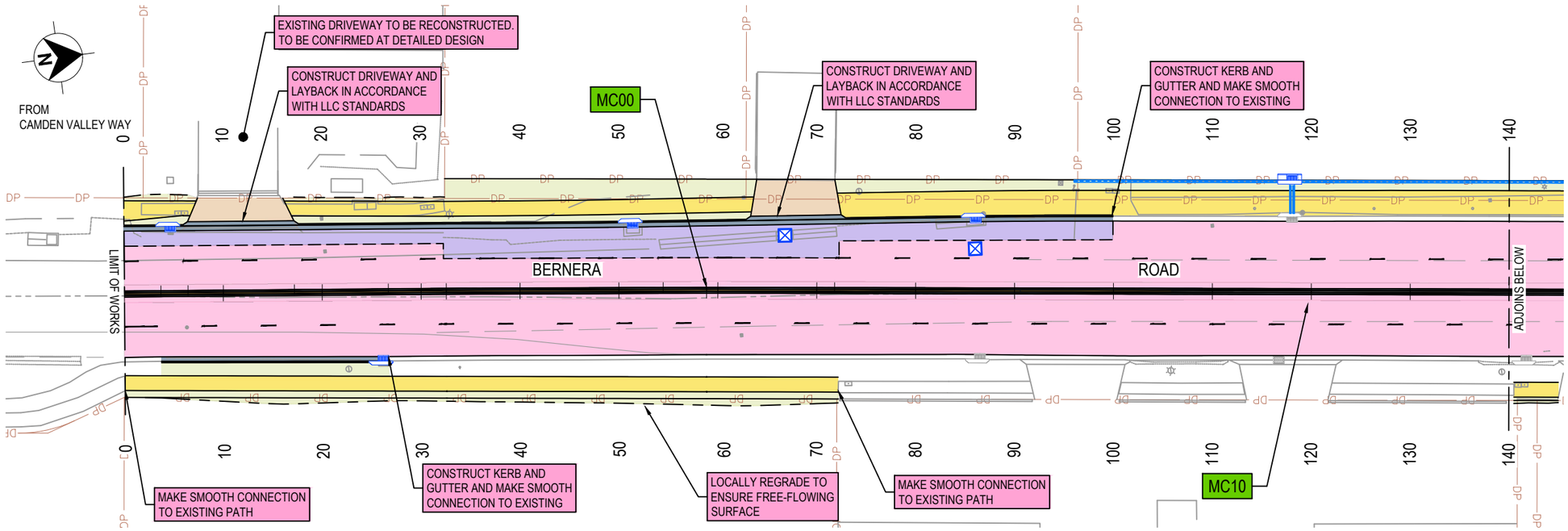
ISSUE STATUS: DETAILED DESIGN

EDMS No. -

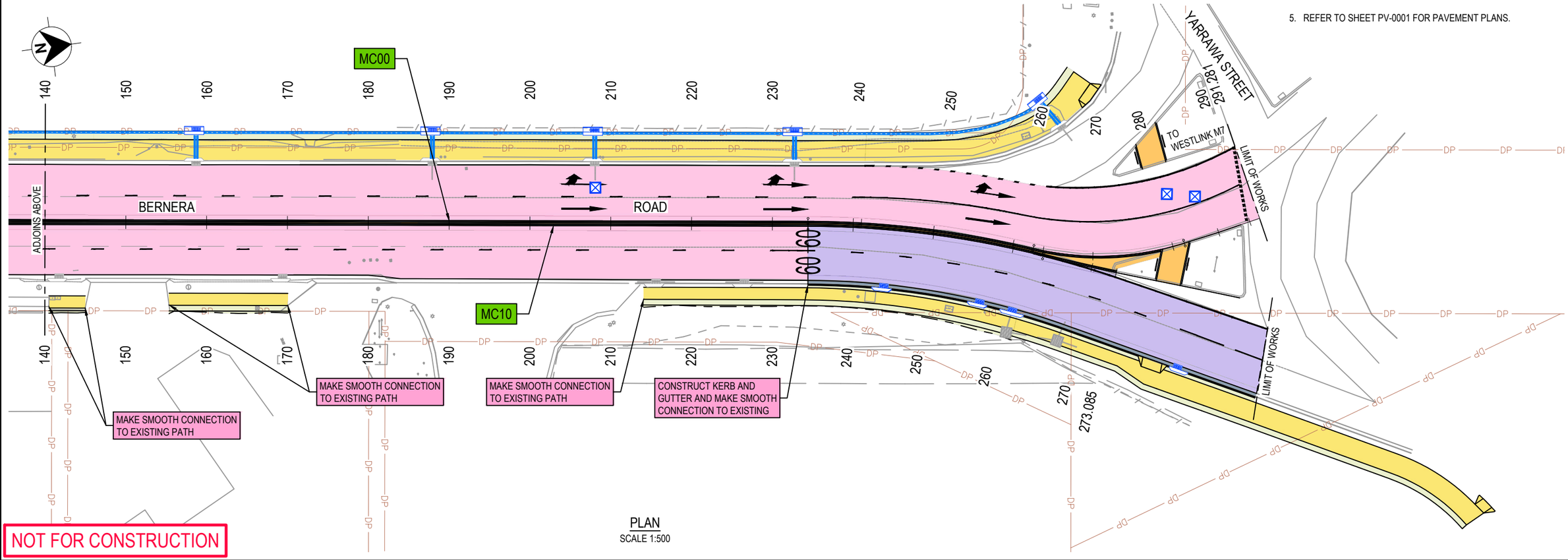
SHEET No. RD-0012

ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500



PLAN
SCALE 1:500

NOT FOR CONSTRUCTION

LEGEND

- DP OVERLAY BOUNDARY
- MC00 CONTROL ALIGNMENT LABEL
- TREES TO BE REMOVED
- FULL DEPTH PAVEMENT TO BE CONSTRUCTED
- PAVEMENT OVERLAY TO BE CONSTRUCTED
- CONCRETE MEDIAN TO BE CONSTRUCTED
- KERBS TO BE CONSTRUCTED
- PATHS AND KERB RAMPS TO BE CONSTRUCTED
- DRIVEWAY ACCESS TO BE CONSTRUCTED
- VERGE / EMBANKMENT TO BE CONSTRUCTED

NOTES

1. REFER TO SHEET RD-0001 AND RD-0002 FOR ROAD TYPICAL SECTIONS, AND RD-0005 FOR TYPICAL DETAILS.
2. REFER TO SHEETS RD-0011 TO RD-0012 FOR MASTER CONTROL AND KERB ALIGNMENT PLANS, AND SCHEDULES.
3. REFER TO SHEET UT-0001 FOR UTILITY PLANS.
4. REFER TO SHEET SM-0101 FOR DRAINAGE PLANS.
5. REFER TO SHEET PV-0001 FOR PAVEMENT PLANS.

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RD-0101.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT: LIVERPOOL THE GREAT SOUTH WEST

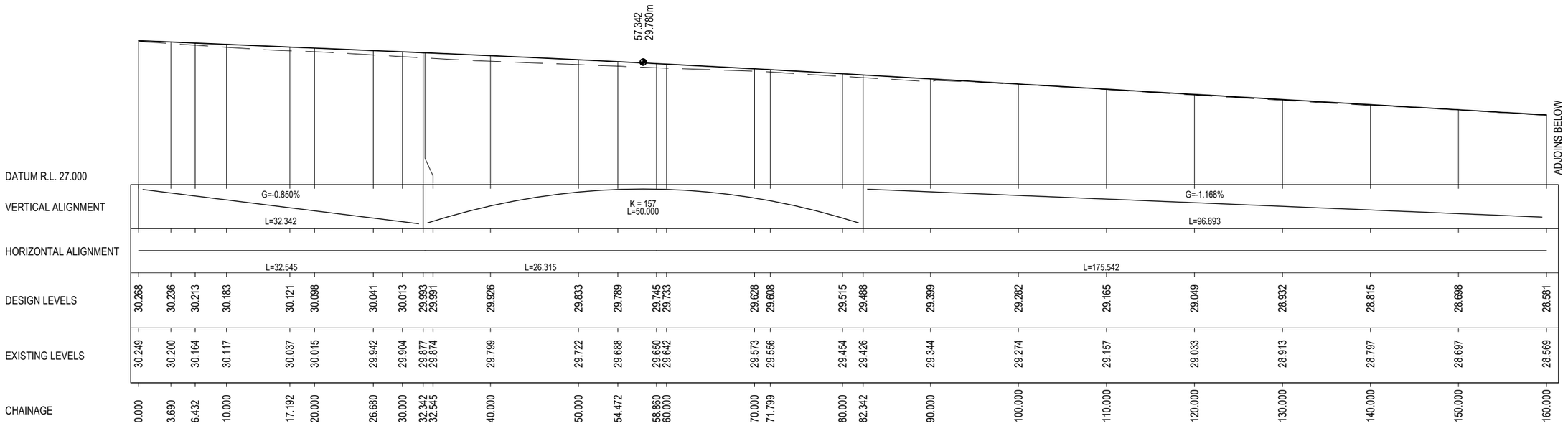
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
DETAIL PLAN

A3

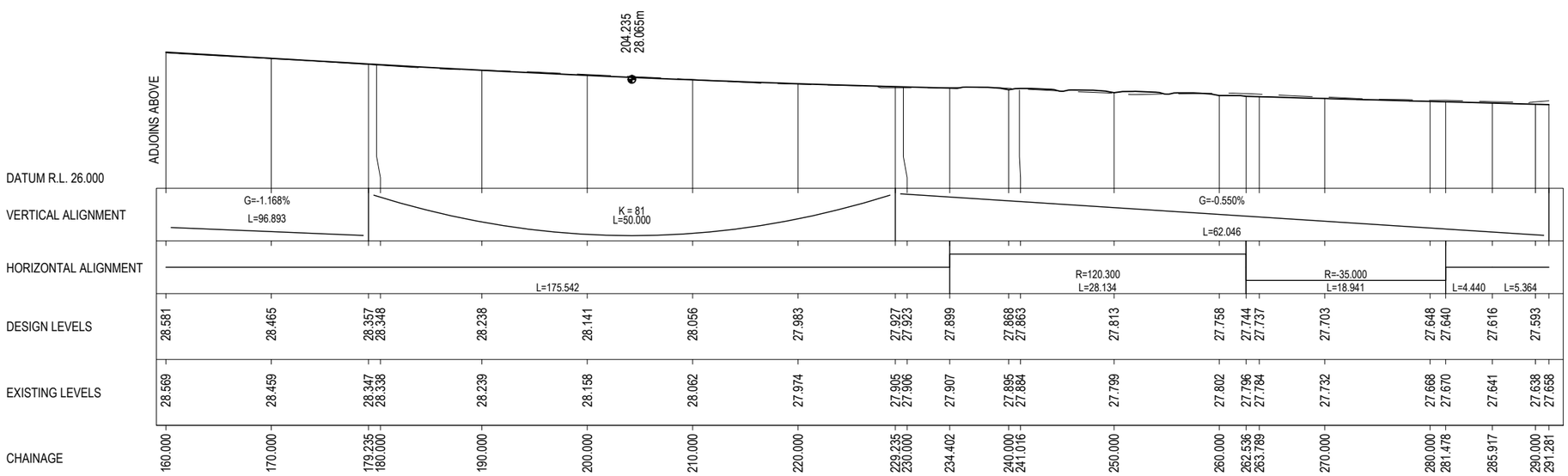
DESIGN PROJECT No. 300332 | PART -

ISSUE STATUS: DETAILED DESIGN | EDMS No. - | SHEET No. RD-0101 | ISSUE 3

© Roads and Maritime Services



MC00 - BERNERA ROAD
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



MC00 - BERNERA ROAD
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME
s:\300332\DWG\engineering\DD\300332-DD-RD-0211.dwg

DESIGN LOT CODE
...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM
PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING
0 5 10 15 20
HORIZONTAL SCALE 1:500m
0 1 2 3 4
VERTICAL SCALE 1:100m

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD ALIGNMENT AND DETAIL
ROAD LONGITUDINAL SECTION - BERNERA ROAD

A3

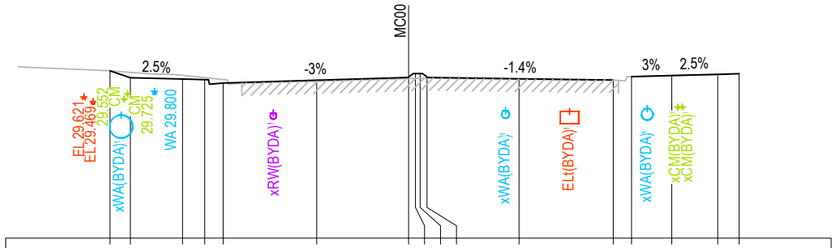
DESIGN PROJECT No. 300332
PART -
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. RD-0211
ISSUE 3

© Roads and Maritime Services

NOTE

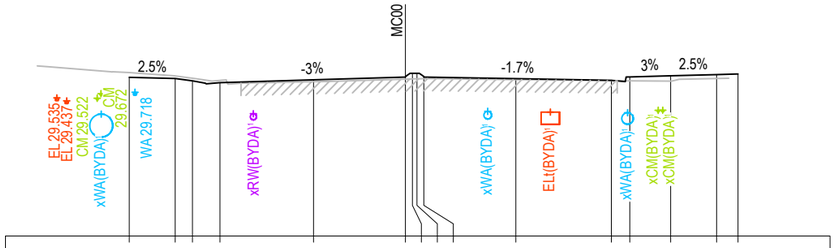
1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



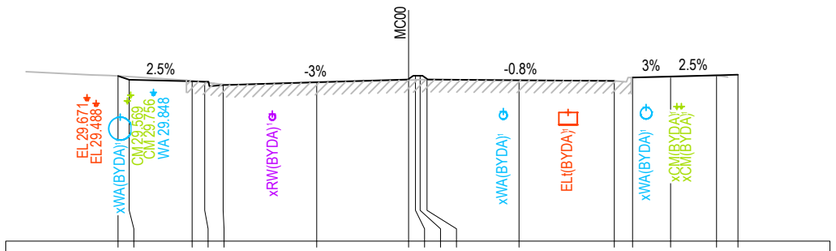
DATUM 25.0														
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	30.451	30.229	30.187	30.165	30.055	30.146	30.236	30.361	30.361	30.236	30.194	30.151	30.261	30.300	30.338	30.359
EXISTING LEVELS	30.451	30.401	30.306	30.23	30.169	30.114	30.2	30.207	30.211	30.216	30.177	30.151	30.264	30.294	30.327	
DESIGN OFFSETS	-9.741	-9.076	-7.376	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.673	7.273	8.583	10.083	10.783

3.69



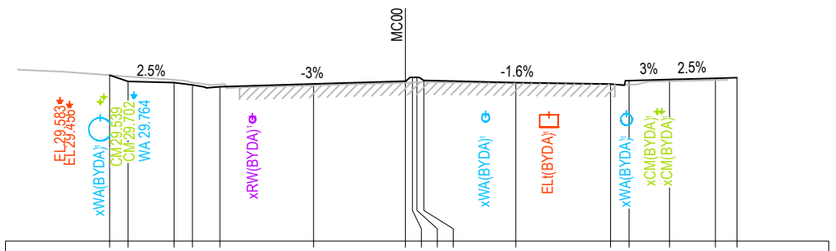
DATUM 25.0														
CUT STRINGS	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	30.174	30.137	30.061	30.001	30.093	30.183	30.308	30.308	30.183	30.130	30.076	30.186	30.226	30.263	30.284
EXISTING LEVELS	30.332	30.221	30.144	30.073	30.033	30.117	30.123	30.127	30.134	30.099	30.065	30.06	30.05	30.137	
DESIGN OFFSETS	-9.011	-7.511	-6.950	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.718	7.318	8.650	10.150	10.850

10



DATUM 25.0														
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	30.382	30.260	30.208	30.196	30.086	30.178	30.268	30.393	30.393	30.268	30.244	30.220	30.330	30.367	30.405	30.426
EXISTING LEVELS	30.382	30.359	30.223	30.177	30.109	30.168	30.249	30.255	30.26	30.262	30.242	30.22	30.333	30.353	30.403	
DESIGN OFFSETS	-9.481	-9.114	-7.062	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.707	7.307	8.544	10.044	10.744

0



DATUM 25.0														
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	30.406	30.206	30.168	30.091	30.031	30.123	30.213	30.338	30.338	30.213	30.166	30.118	30.228	30.268	30.305	30.326
EXISTING LEVELS	30.406	30.363	30.257	30.17	30.109	30.077	30.164	30.17	30.175	30.181	30.143	30.106	30.101	30.211	30.245	
DESIGN OFFSETS	-9.648	-9.048	-7.548	-6.950	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.692	7.292	8.612	10.112	10.812

6.432

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RC-0001.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

CLIENT: LIVERPOOL THE GREAT SOUTH WEST

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 2 4 6 8 HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY: COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS
BERNERA ROAD - SHEET 1

A3

DESIGN PROJECT No.: 300332

PART: -

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: RC-0001

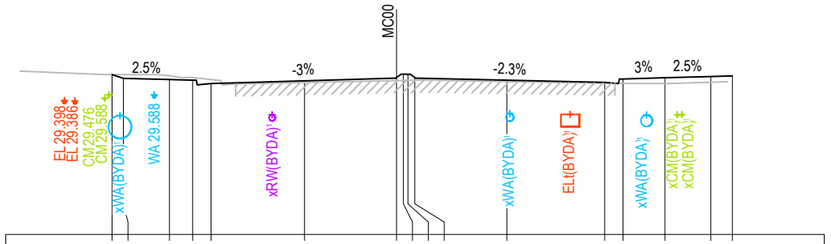
ISSUE: 3

© Roads and Maritime Services

NOTE

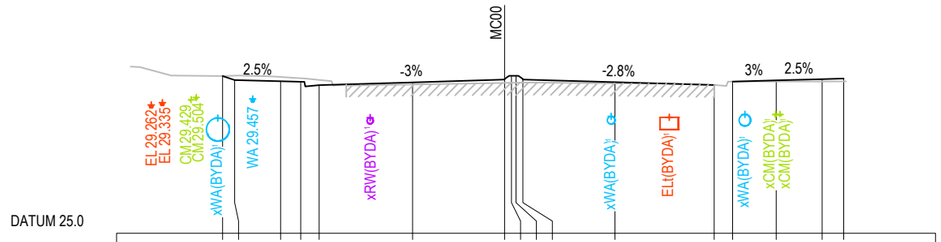
1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



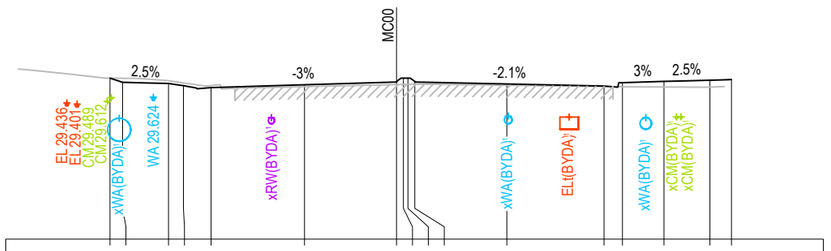
DATUM 25.0																													
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV													
DESIGN LEVELS	30.210	30.086	30.049	30.026	29.916	30.008	30.098	30.223	30.223	30.098	30.029	29.957	30.067	30.108	30.145	30.166													
EXISTING LEVELS	30.21	30.21	30.175	30.112	30.047	29.951	30.015	30.02	30.023	30.028	29.982	29.929	29.924	29.917	29.959														
DESIGN OFFSETS	-9.277	-8.908	-7.408	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.790	7.390	8.755	10.255	10.955													

20



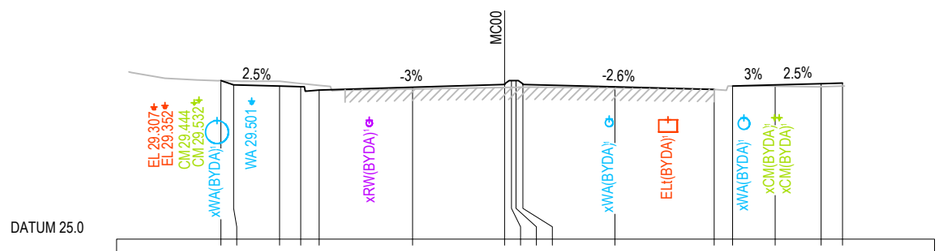
DATUM 25.0																													
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV													
DESIGN LEVELS	30.129	29.998	29.961	29.941	29.831	29.923	30.013	30.138	30.138	30.013	29.928	29.837	29.947	29.989	30.027	30.048													
EXISTING LEVELS	30.129	30.142	30.101	30.057	30.001	29.855	29.904	29.907	29.91	29.914	29.892	29.837	29.95	29.95	29.952	29.953													
DESIGN OFFSETS	-9.198	-8.804	-7.304	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.838	7.438	8.861	10.361	11.061													

30



DATUM 25.0																													
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV													
DESIGN LEVELS	30.247	30.111	30.074	30.000	29.940	30.031	30.121	30.246	30.246	30.121	30.058	29.990	30.100	30.141	30.178	30.199													
EXISTING LEVELS	30.247	30.241	30.163	30.09	30.005	29.972	30.037	30.042	30.045	30.05	30.014	29.971	29.965	29.959	29.956														
DESIGN OFFSETS	-9.345	-8.937	-7.437	-6.950	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.769	7.369	8.726	10.226	10.926													

17.192



DATUM 25.0																													
CUT STRINGS	IA	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV													
DESIGN LEVELS	30.166	30.027	29.990	29.969	29.859	29.951	30.041	30.166	30.166	30.041	29.962	29.877	29.987	30.029	30.066	30.087													
EXISTING LEVELS	30.166	30.153	30.144	30.071	30.011	29.893	29.942	29.946	29.948	29.952	29.928	29.877	29.99	29.983	29.966	29.987													
DESIGN OFFSETS	-9.254	-8.839	-7.339	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.837	7.437	8.826	10.326	11.026													

26.68

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY	CLIENT
s:\300332\DWG\engineering\DD\300332-DD-RC-0002.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:26 AM	stevenz	

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8
HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS
BERNERA ROAD - SHEET 2

A3

DESIGN PROJECT No.	PART
300332	-

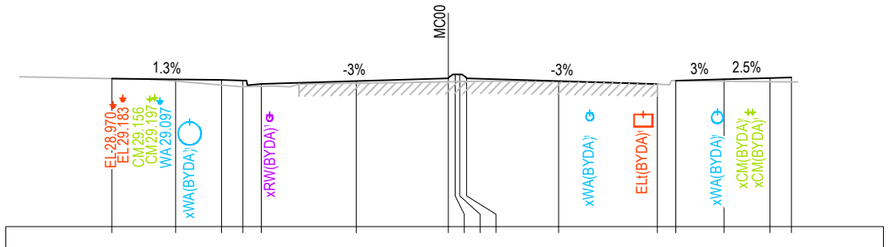
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0002	3

© Roads and Maritime Services

NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

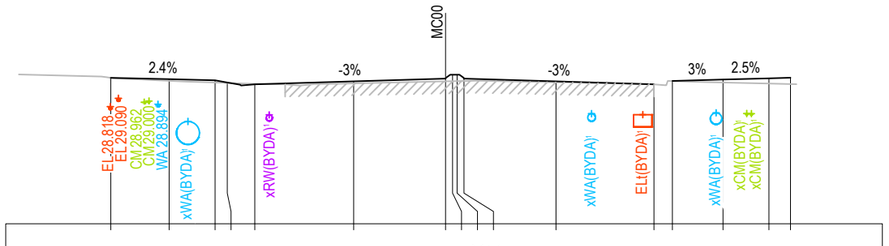
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



DATUM 25.0

CUT STRINGS	EV	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.825	29.799	29.780	29.760	29.650	29.743	29.833	29.958	29.958	29.833	29.743	29.646	29.756	29.803	29.841	29.862
EXISTING LEVELS	29.825	29.743	29.613	29.561	29.573	29.674	29.722	29.726	29.728	29.732	29.717	29.646	29.754	29.738	29.723	29.716
DESIGN OFFSETS	-10.975	-8.893	-7.393	-6.700	-6.100	-3.000	0.000	0.225	0.375	0.600	3.600	6.822	7.422	8.995	10.495	11.195

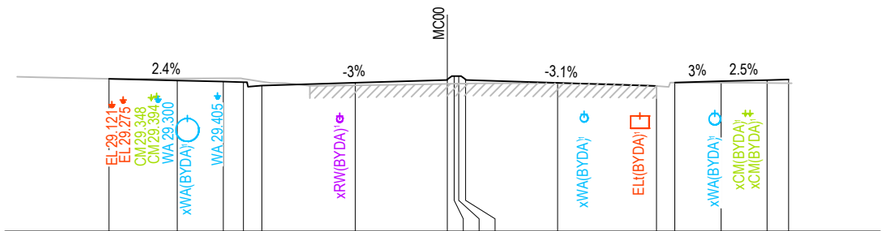
50



DATUM 25.0

CUT STRINGS	EV	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.758	29.713	29.678	29.607	29.547	29.643	29.733	29.858	29.858	29.733	29.642	29.545	29.655	29.704	29.742	29.763
EXISTING LEVELS	29.758	29.662	29.604	29.591	29.562	29.577	29.642	29.647	29.65	29.655	29.614	29.545	29.65	29.606	29.571	29.555
DESIGN OFFSETS	-10.923	-9.021	-7.521	-7.124	-6.224	-3.000	0.000	0.225	0.375	0.600	3.600	6.797	7.397	9.049	10.549	11.249

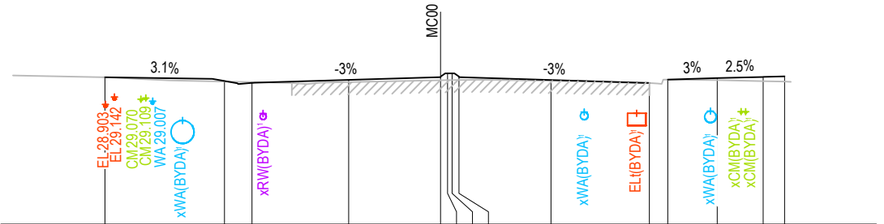
60



DATUM 25.0

CUT STRINGS	EV	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.962	29.910	29.874	29.854	29.744	29.836	29.926	30.051	30.051	29.926	29.831	29.730	29.840	29.885	29.923	29.944
EXISTING LEVELS	29.962	29.971	29.979	29.965	29.869	29.754	29.799	29.803	29.805	29.809	29.82	29.73	29.84	29.837	29.828	29.821
DESIGN OFFSETS	-11.034	-8.807	-7.307	-6.650	-6.050	-3.000	0.000	0.225	0.375	0.600	3.600	6.823	7.423	8.933	10.433	11.133

40



DATUM 25.0

CUT STRINGS	EV	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.787	29.664	29.604	29.699	29.789	29.914	29.914	29.789	29.698	29.600	29.710	29.759	29.796	29.817
EXISTING LEVELS	29.787	29.646	29.627	29.629	29.688	29.692	29.694	29.697	29.671	29.6	29.709	29.692	29.66	29.644
DESIGN OFFSETS	-10.948	-7.051	-6.151	-3.000	0.000	0.225	0.375	0.600	3.600	6.811	7.411	9.022	10.522	11.222

54.472

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RC-0003.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 2 4 6 8 HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS
BERNERA ROAD - SHEET 3

A3

DESIGN PROJECT No. 300332

PART -

ISSUE STATUS: DETAILED DESIGN

EDMS No. -

SHEET No. RC-0003

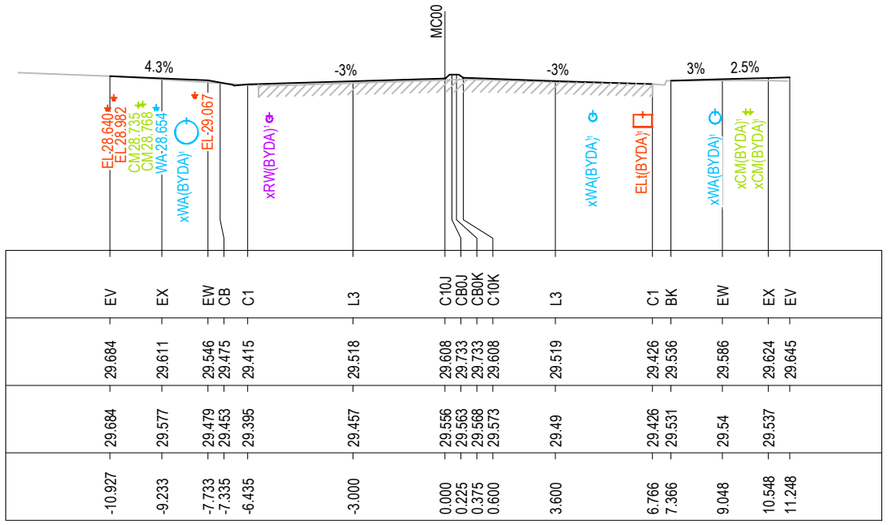
ISSUE 3

© Roads and Maritime Services

NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

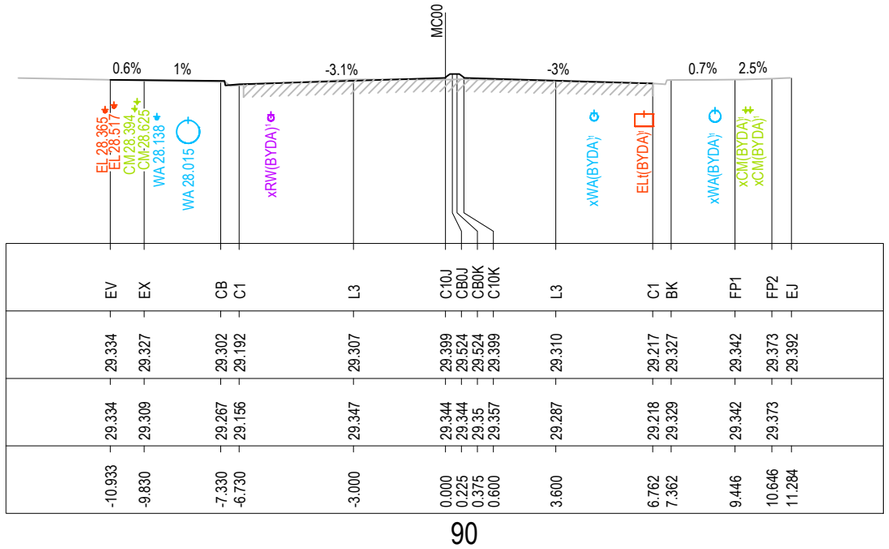
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



DATUM 24.0

CUT STRINGS	EV	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.684	29.611	29.546	29.475	29.415	29.518	29.608	29.733	29.733	29.608	29.519	29.426	29.536	29.586	29.624	29.645
EXISTING LEVELS	29.684	29.577	29.479	29.453	29.395	29.457	29.556	29.563	29.568	29.573	29.49	29.426	29.531	29.54	29.537	
DESIGN OFFSETS	-10.927	-9.233	-7.733	-7.335	-6.435	-3.000	0.000	0.225	0.375	0.600	3.600	6.766	7.366	9.048	10.548	11.248

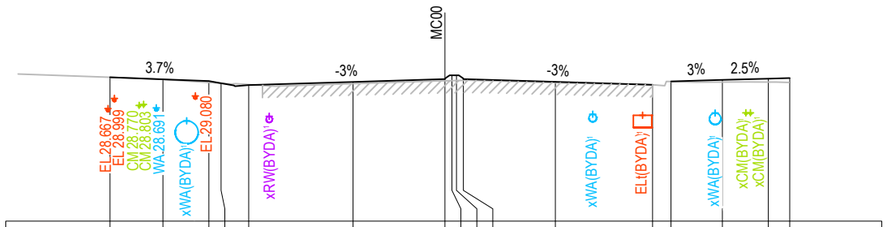
71.799



DATUM 24.0

CUT STRINGS	EV	EX	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	FP1	FP2	EJ
DESIGN LEVELS	29.334	29.327	29.302	29.192	29.307	29.399	29.524	29.524	29.399	29.310	29.217	29.327	29.342	29.373	29.392
EXISTING LEVELS	29.334	29.309	29.267	29.156	29.347	29.344	29.344	29.35	29.357	29.287	29.218	29.329	29.342	29.373	
DESIGN OFFSETS	-10.933	-9.830	-7.330	-6.730	-3.000	0.000	0.225	0.375	0.600	3.600	6.762	7.362	9.446	10.646	11.284

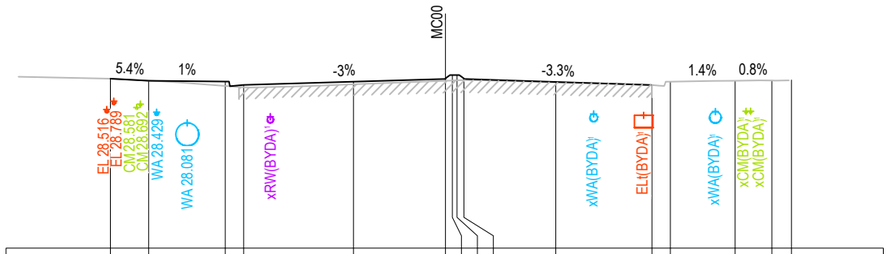
90



DATUM 25.0

CUT STRINGS	EV	EX	EW	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EW	EX	EV
DESIGN LEVELS	29.686	29.622	29.566	29.495	29.435	29.538	29.628	29.753	29.753	29.628	29.538	29.444	29.554	29.604	29.642	29.663
EXISTING LEVELS	29.686	29.617	29.519	29.493	29.452	29.479	29.573	29.577	29.581	29.586	29.51	29.444	29.549	29.531	29.532	
DESIGN OFFSETS	-10.926	-9.200	-7.700	-7.303	-6.403	-3.000	0.000	0.225	0.375	0.600	3.600	6.771	7.371	9.048	10.548	11.248

70



DATUM 24.0

CUT STRINGS	EV	EX	CB	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	FP1	FP2	EJ
DESIGN LEVELS	29.521	29.453	29.428	29.318	29.425	29.515	29.640	29.640	29.515	29.417	29.314	29.424	29.453	29.462	29.481
EXISTING LEVELS	29.521	29.459	29.286	29.244	29.338	29.454	29.463	29.469	29.478	29.398	29.314	29.426	29.453	29.462	
DESIGN OFFSETS	-10.929	-9.682	-7.182	-6.582	-3.000	0.000	0.225	0.375	0.600	3.600	6.734	7.334	9.447	10.647	11.285

80

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY	CLIENT
s:\300332\DWG\engineering\DD\300332-DD-RC-0004.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:26 AM	stevenz	

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8

HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email.coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD

A3

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS

BERNERA ROAD - SHEET 4

DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0004	3

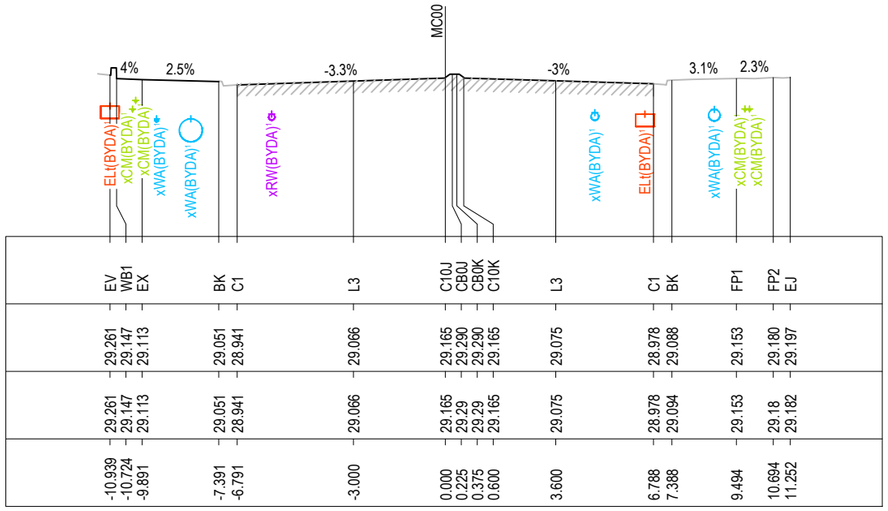
© Roads and Maritime Services

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

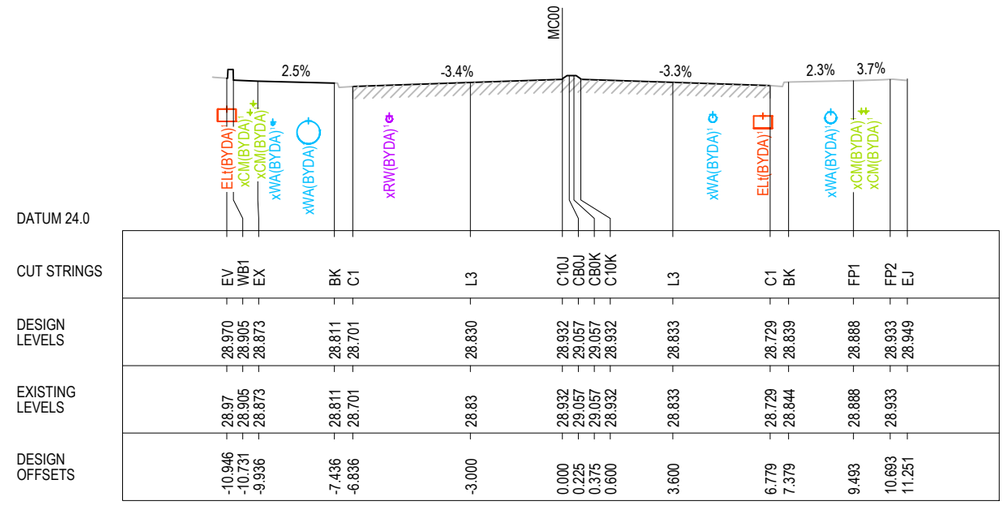
NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

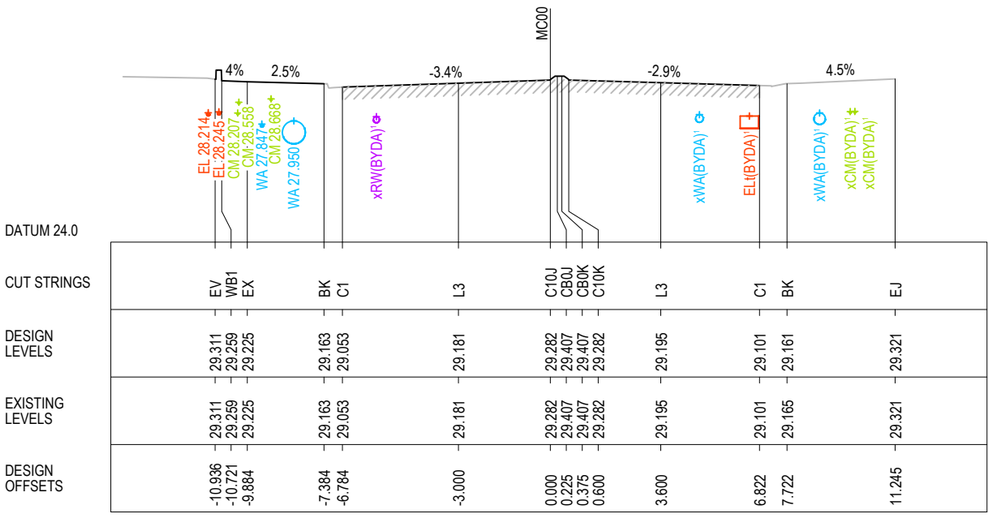
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



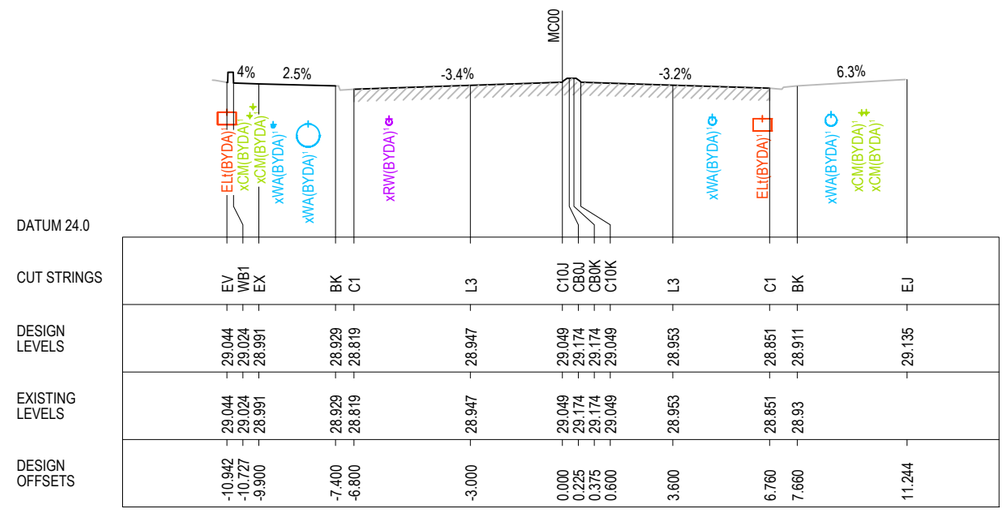
110



130



100



120

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RC-0005.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 2 4 6 8 HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS

BERNERA ROAD - SHEET 5

A3

DESIGN PROJECT No.: 300332

PART: -

ISSUE STATUS: DETAILED DESIGN

EDMS No.: -

SHEET No.: RC-0005

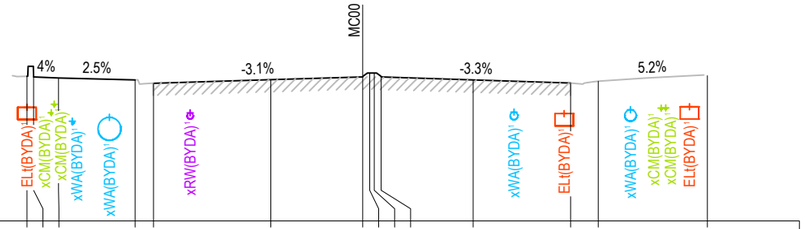
ISSUE: 3

© Roads and Maritime Services

NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

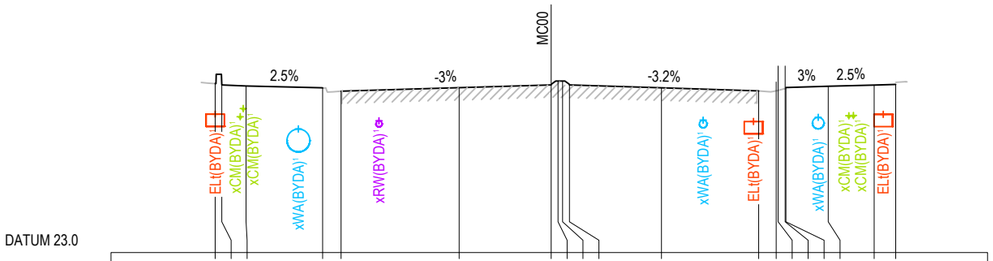
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



DATUM 24.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK	EJ
DESIGN LEVELS	28.720	28.695	28.662	28.600	28.490	28.607	28.698	28.823	28.823	28.698	28.600	28.496	28.556	28.739
EXISTING LEVELS	28.72	28.695	28.662	28.6	28.49	28.607	28.698	28.823	28.823	28.698	28.6	28.496	28.556	
DESIGN OFFSETS	-10.952	-10.737	-9.926	-7.426	-6.826	-3.000	0.000	0.225	0.375	0.600	3.600	6.781	7.681	11.241

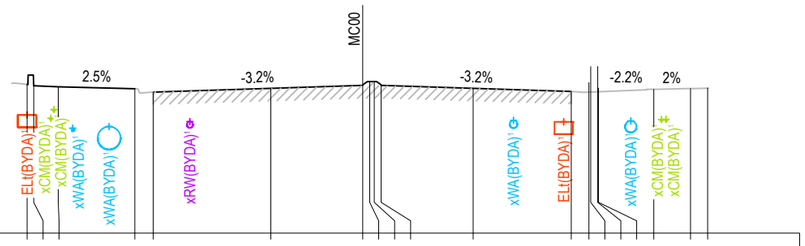
150



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	PBRK	PBRK2	PBRK3	BK	EW	EX	EV
DESIGN LEVELS	28.507	28.462	28.431	28.368	28.258	28.374	28.465	28.590	28.590	28.465	28.370	28.270	28.560	29.080	29.080	28.380	28.421	28.458	28.479
EXISTING LEVELS	28.507	28.462	28.431	28.368	28.258	28.374	28.465	28.59	28.59	28.465	28.37	28.27	28.272	28.285	28.341	28.38	28.421	28.458	28.479
DESIGN OFFSETS	-10.959	-10.744	-9.952	-7.452	-6.852	-3.000	0.000	0.225	0.375	0.600	3.600	6.768	7.343	7.403	7.633	7.658	9.039	10.539	11.239

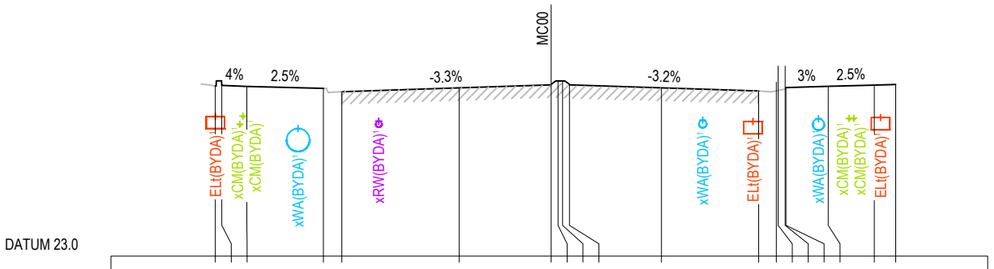
170



DATUM 24.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	PBRK	PBRK2	PBRK3	BK	FP1	FP2	EJ
DESIGN LEVELS	28.845	28.800	28.769	28.706	28.596	28.719	28.815	28.940	28.940	28.815	28.720	28.618	28.908	29.428	29.428	28.728	28.688	28.712	28.728
EXISTING LEVELS	28.845	28.8	28.769	28.706	28.596	28.719	28.815	28.94	28.94	28.815	28.72	28.618	28.595	28.597	28.606	28.607	28.688	28.712	28.723
DESIGN OFFSETS	-10.949	-10.734	-9.935	-7.435	-6.835	-3.000	0.000	0.225	0.375	0.600	3.600	6.801	7.376	7.436	7.666	7.691	9.492	10.692	11.250

140



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	PBRK	PBRK2	PBRK3	BK	EW	EX	EV
DESIGN LEVELS	28.545	28.564	28.531	28.469	28.359	28.484	28.581	28.706	28.706	28.581	28.485	28.384	28.674	29.194	29.194	28.494	28.535	28.572	28.593
EXISTING LEVELS	28.545	28.564	28.531	28.469	28.359	28.484	28.581	28.706	28.706	28.581	28.485	28.384	28.387	28.399	28.443	28.494	28.535	28.572	28.593
DESIGN OFFSETS	-10.956	-10.741	-9.927	-7.427	-6.827	-3.000	0.000	0.225	0.375	0.600	3.600	6.771	7.346	7.406	7.636	7.661	9.040	10.540	11.240

160

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RC-0006.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:26 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 2 4 6 8 HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS

BERNERA ROAD - SHEET 6

A3

DESIGN PROJECT No. 300332

PART -

ISSUE STATUS: DETAILED DESIGN

EDMS No. -

SHEET No. RC-0006

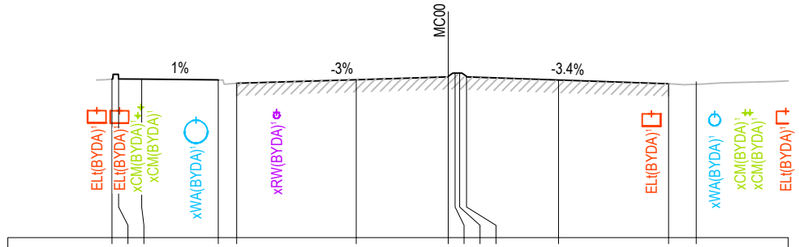
ISSUE 3

© Roads and Maritime Services

NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

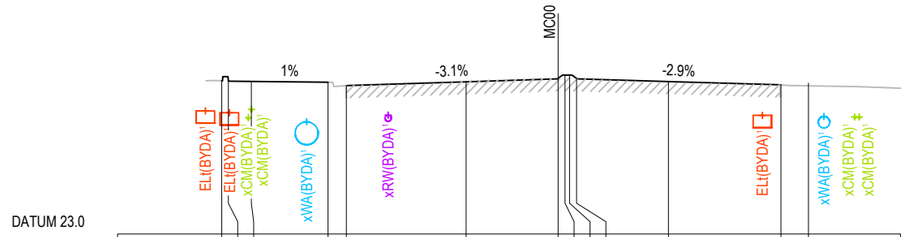
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK
DESIGN LEVELS	28.170	28.173	28.166	28.141	28.031	28.148	28.238	28.363	28.363	28.238	28.138	28.017	28.077
EXISTING LEVELS	28.17	28.173	28.166	28.141	28.031	28.148	28.238	28.363	28.363	28.238	28.138	28.017	27.999
DESIGN OFFSETS	-10.965	-10.750	-9.998	-7.498	-6.898	-3.000	0.000	0.225	0.375	0.600	3.600	7.192	8.092

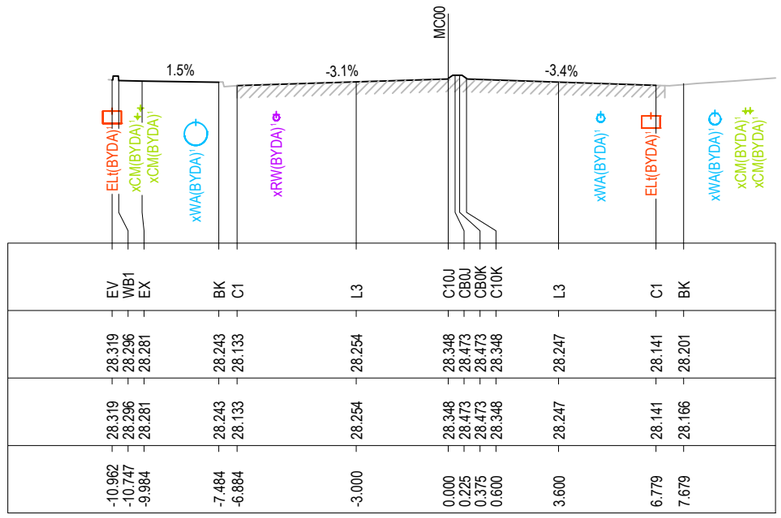
190



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK
DESIGN LEVELS	27.993	27.981	27.974	27.949	27.839	27.962	28.056	28.181	28.181	28.056	27.968	27.861	27.921
EXISTING LEVELS	27.993	27.981	27.974	27.949	27.839	27.962	28.056	28.181	28.181	28.056	27.968	27.861	27.83
DESIGN OFFSETS	-10.972	-10.757	-10.006	-7.506	-6.906	-3.000	0.000	0.225	0.375	0.600	3.600	7.267	8.167

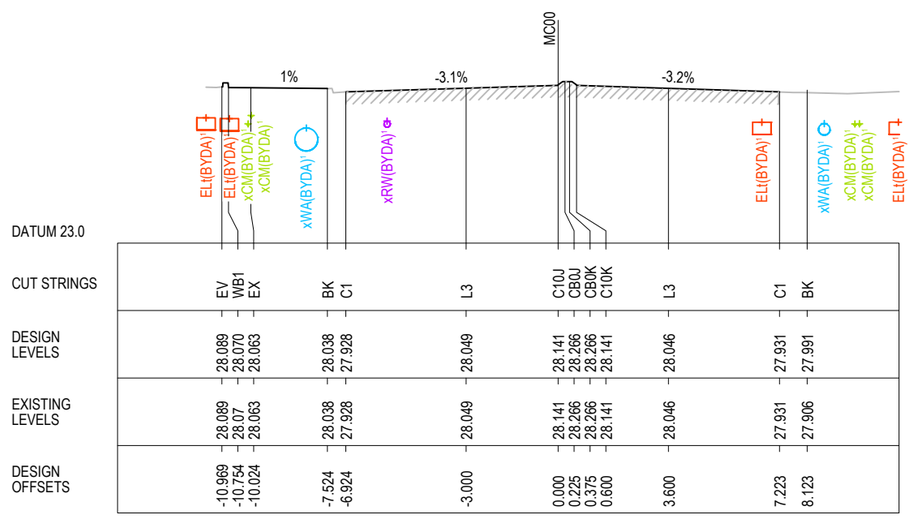
210



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK
DESIGN LEVELS	28.319	28.296	28.281	28.243	28.133	28.254	28.348	28.473	28.473	28.348	28.247	28.141	28.201
EXISTING LEVELS	28.319	28.296	28.281	28.243	28.133	28.254	28.348	28.473	28.473	28.348	28.247	28.141	28.166
DESIGN OFFSETS	-10.962	-10.747	-9.984	-7.484	-6.884	-3.000	0.000	0.225	0.375	0.600	3.600	6.779	7.679

180



DATUM 23.0

CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	BK
DESIGN LEVELS	28.089	28.070	28.063	28.038	27.928	28.049	28.141	28.266	28.266	28.141	28.046	27.931	27.991
EXISTING LEVELS	28.089	28.07	28.063	28.038	27.928	28.049	28.141	28.266	28.266	28.141	28.046	27.931	27.906
DESIGN OFFSETS	-10.969	-10.754	-10.024	-7.524	-6.924	-3.000	0.000	0.225	0.375	0.600	3.600	7.223	8.123

200

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY	CLIENT
s:\300332\DWG\engineering\DD\300332-DD-RC-0007.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:26 AM	stevenz	

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8

HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson

Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS
BERNERA ROAD - SHEET 7

A3

DESIGN PROJECT No.	PART
300332	-

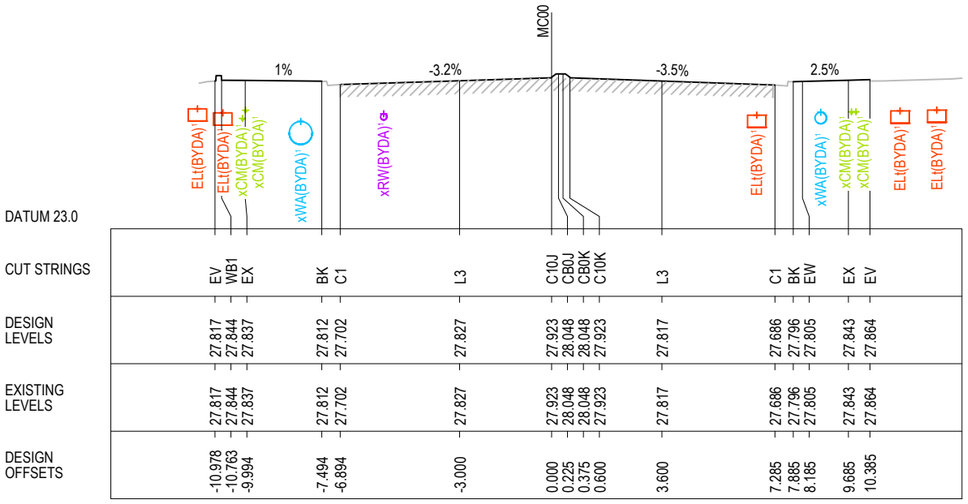
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0007	3

© Roads and Maritime Services

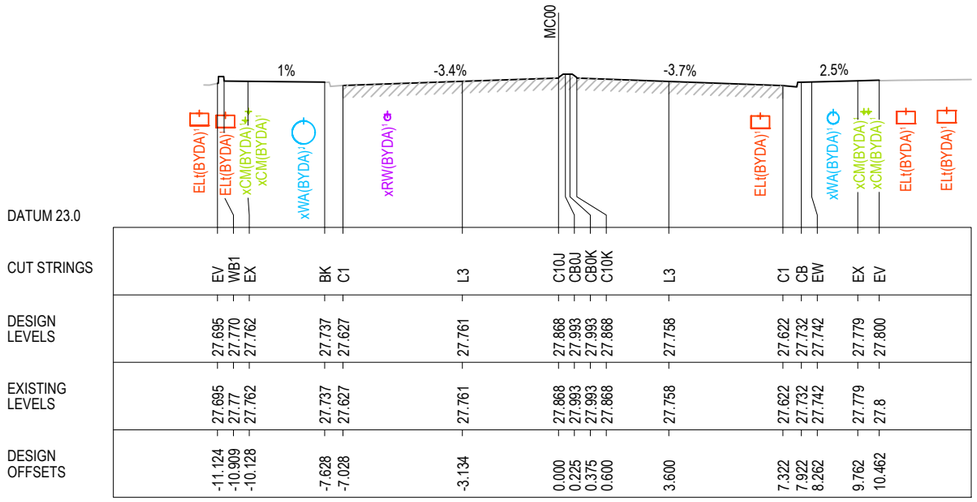
NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

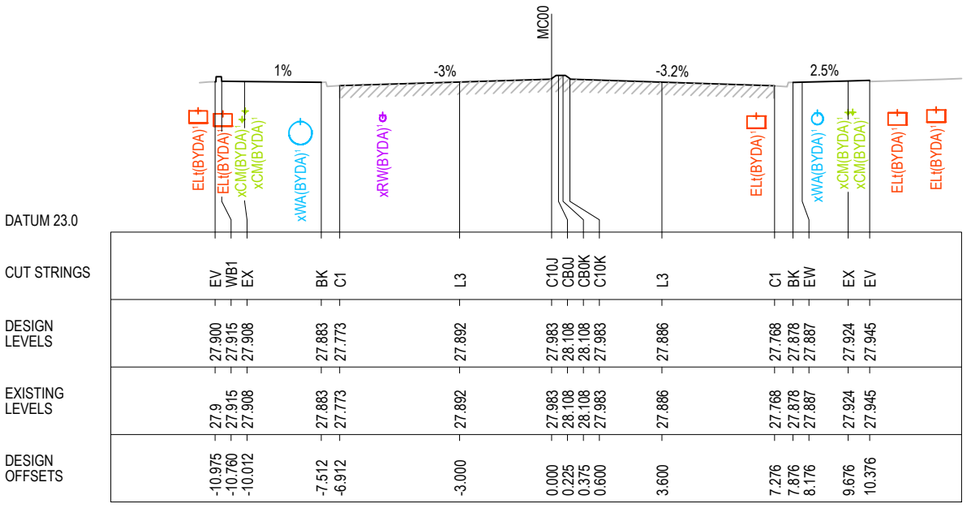
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



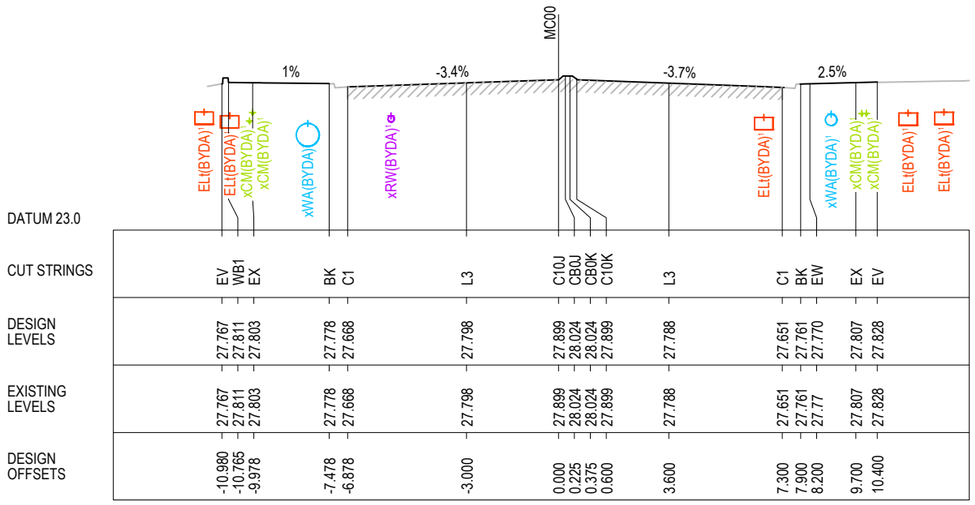
230



240



220



234.402

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
s:\300332\DWG\engineering\DD\300332-DD-RC-0008.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:27 AM	stevenz

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8

HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson

Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD

A3

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS

BERNERA ROAD - SHEET 8

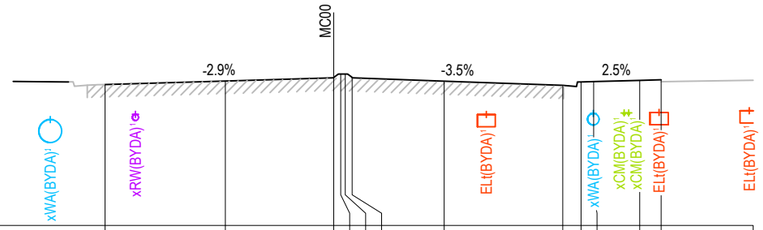
DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0008	3

© Roads and Maritime Services

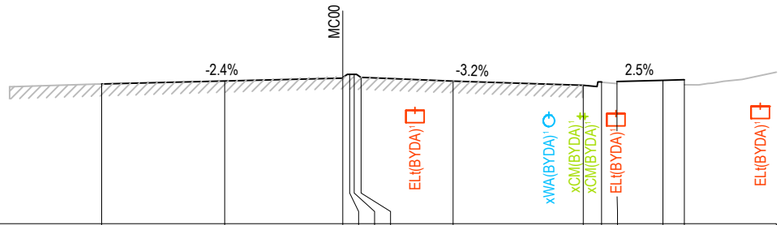
NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



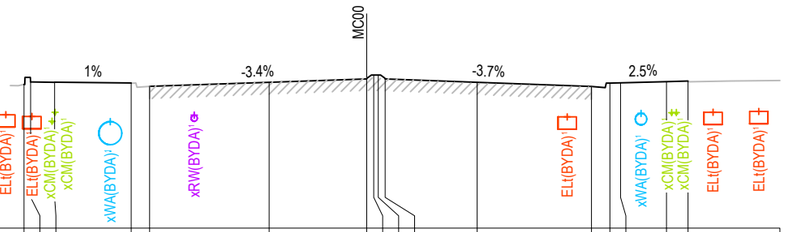
DATUM 23.0											
CUT STRINGS	LA	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	27.596	27.710	27.813	27.938	27.938	27.813	27.707	27.570	27.680	27.692	27.730	27.751
EXISTING LEVELS	27.596	27.71	27.813	27.938	27.938	27.813	27.707	27.57	27.68	27.692	27.73	27.751
DESIGN OFFSETS	-7.460	-3.537	0.000	0.225	0.375	0.600	3.600	7.468	8.068	8.479	9.979	10.679

250



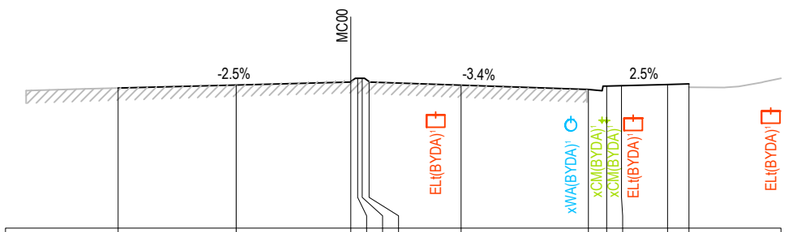
DATUM 23.0											
CUT STRINGS	LA	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	27.555	27.651	27.744	27.869	27.869	27.744	27.648	27.512	27.622	27.637	27.674	27.695
EXISTING LEVELS	27.555	27.651	27.744	27.869	27.869	27.769	27.648	27.512	27.622	27.637	27.674	27.695
DESIGN OFFSETS	-7.863	-3.850	0.000	0.225	0.375	0.600	3.600	7.844	8.444	8.944	10.444	11.144

262.536



DATUM 23.0											
CUT STRINGS	EV	WB1	EX	BK	C1	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	27.682	27.762	27.754	27.729	27.619	27.753	27.863	27.988	27.988	27.863	27.753	27.616	27.726	27.737	27.774	27.795
EXISTING LEVELS	27.682	27.762	27.754	27.729	27.619	27.753	27.863	27.988	27.988	27.888	27.753	27.616	27.726	27.737	27.774	27.795
DESIGN OFFSETS	-11.181	-10.966	-10.185	-7.685	-7.085	-3.184	0.000	0.225	0.375	0.600	3.600	7.330	7.930	8.277	9.777	10.477

241.016



DATUM 23.0											
CUT STRINGS	LA	L3	C10J	CB0J	CB0K	C10K	L3	C1	CB	EW	EX	EV
DESIGN LEVELS	27.567	27.664	27.758	27.883	27.883	27.758	27.658	27.518	27.628	27.643	27.680	27.701
EXISTING LEVELS	27.567	27.664	27.758	27.883	27.883	27.758	27.658	27.518	27.628	27.643	27.68	27.701
DESIGN OFFSETS	-7.590	-3.737	0.000	0.225	0.375	0.600	3.600	7.751	8.351	8.833	10.333	11.033

260

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY	CLIENT
s:\300332\DWG\engineering\DD\300332-DD-RC-0009.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:27 AM	stevenz	

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8

HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD

ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS

BERNERA ROAD - SHEET 9

A3

DESIGN PROJECT No.	PART
300332	-

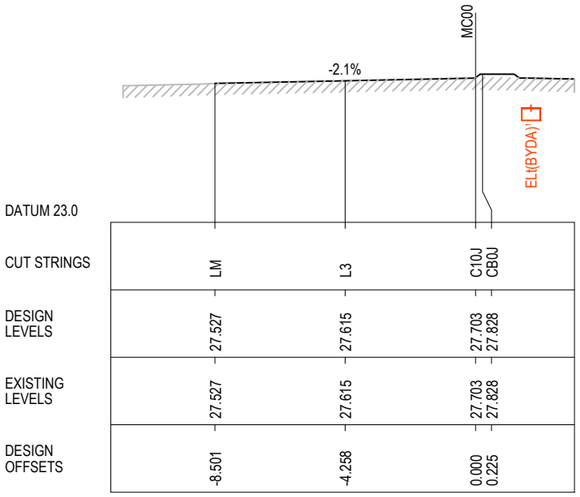
ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0009	3

© Roads and Maritime Services

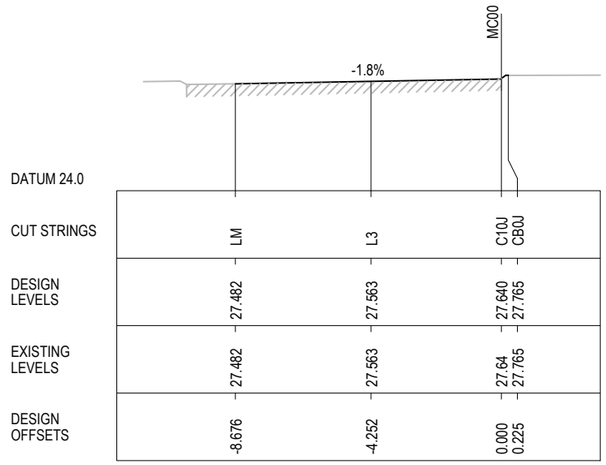
NOTE

1. BEFORE YOU DIG AUSTRALIA (BYDA) HAS BEEN USED FOR SOME SERVICES. HORIZONTAL LOCATION IS INDICATIVE ONLY, TO BE CONFIRMED BY SERVICE LOCATION.

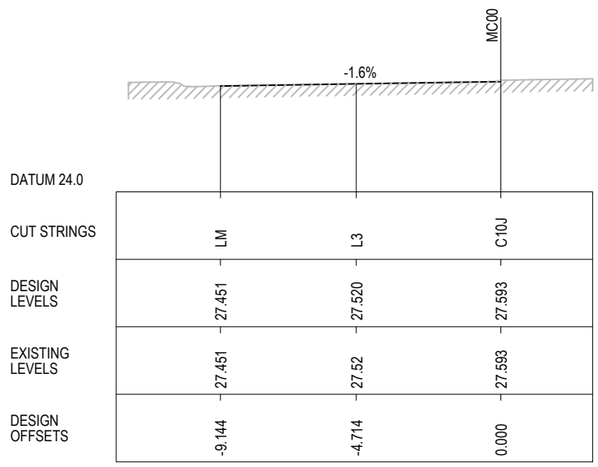
2. ALL SERVICES SHOWN ARE AT INDICATIVE DEPTHS ONLY, TO BE CONFIRMED BY SERVICE LOCATION.



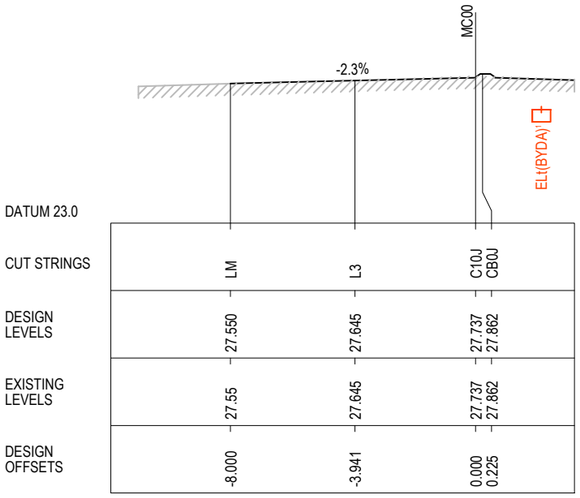
270



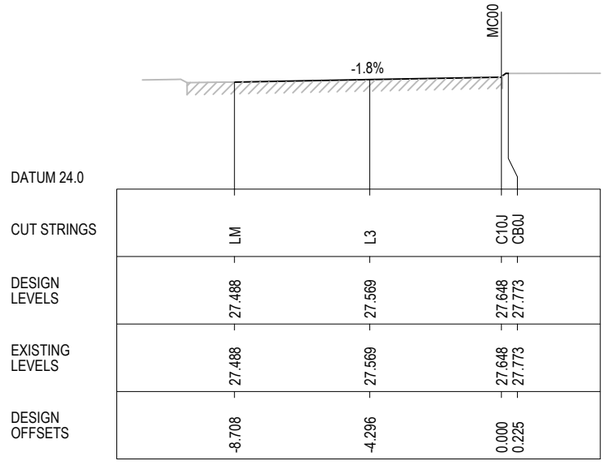
281.478



290



263.789



280

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
s:\300332\DWG\engineering\DD\300332-DD-RC-0010.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:27 AM	stevenz

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 2 4 6 8

HORIZONTAL SCALE 1:200m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson

Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROAD CROSS SECTIONS
BERNERA ROAD - SHEET 10

A3

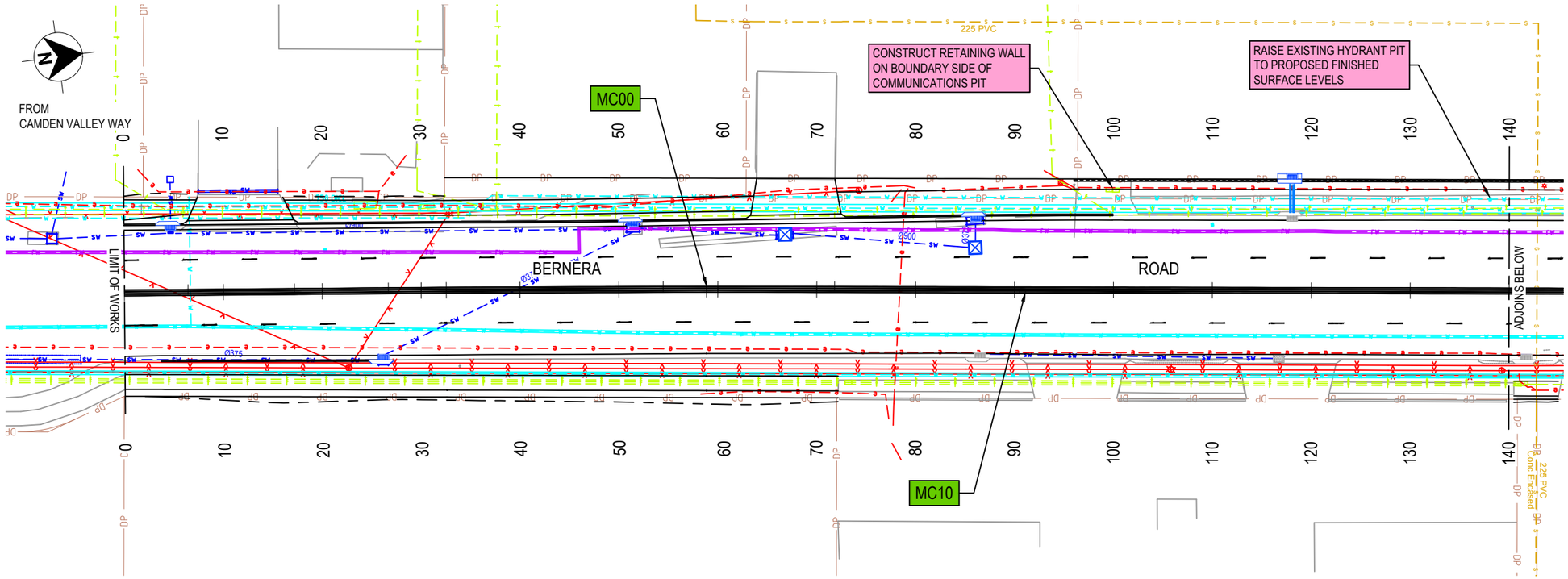
DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	RC-0010	3

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

© Roads and Maritime Services



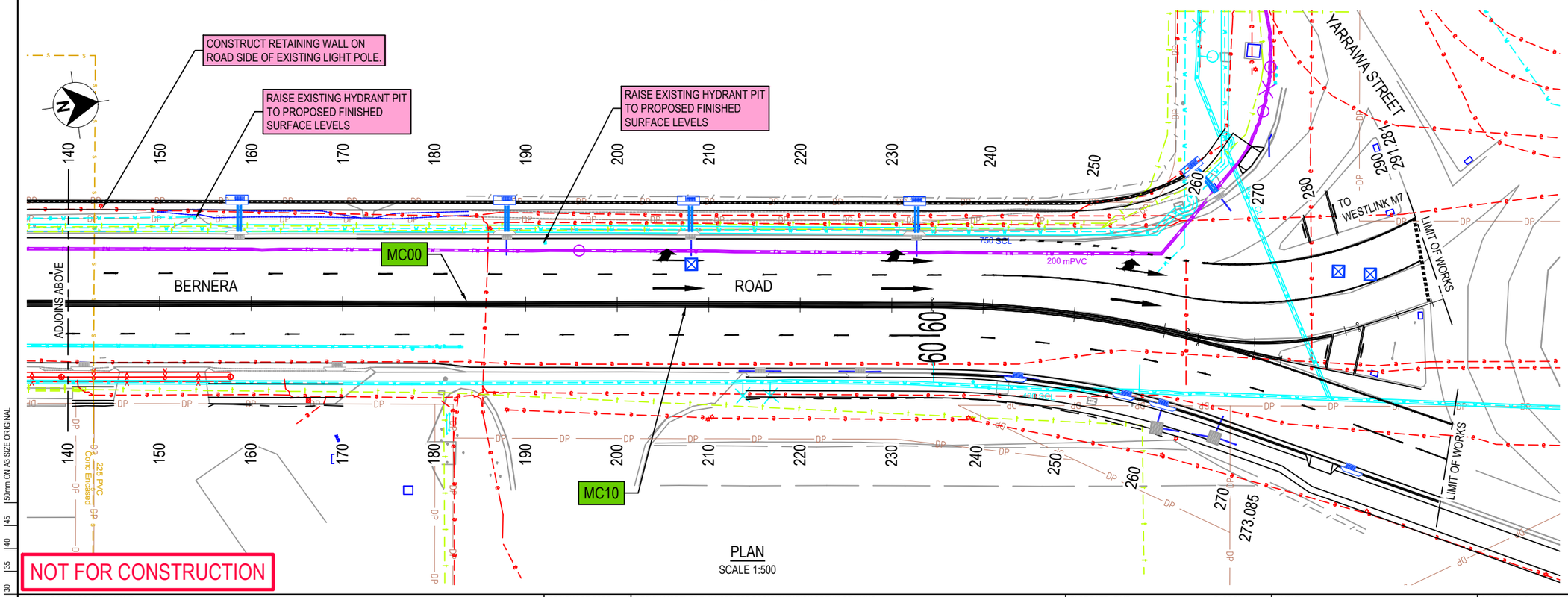
PLAN
SCALE 1:500

LEGEND

- DP — DP OVERLAY BOUNDARY
- MC10 — CONTROL ALIGNMENT LABEL
- PROPOSED STORMWATER
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING STORMWATER
- 400 SCL — EXISTING WATER MAIN
- 200 mPVC — EXISTING RECYCLED WATER MAIN
- EXISTING OVERHEAD ELECTRICAL
- EXISTING UNDERGROUND ELECTRICAL

NOTES

1. REFER TO SM SERIES SHEETS FOR DRAINAGE PLANS AND DETAILS.
2. LOCATIONS OF EXISTING UTILITIES SHOWN ARE INDICATIVE ONLY. FINAL LOCATIONS AND LEVELS ARE TO BE CONFIRMED BY SERVICE LOCATION.
3. DETAILS OF UTILITIES TO BE REMOVED AND RELOCATED SUBJECT TO DETAILED DESIGN.



PLAN
SCALE 1:500

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-UT-0001.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT: LIVERPOOL COUNCIL — THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
UTILITIES
UTILITY PLAN

A3

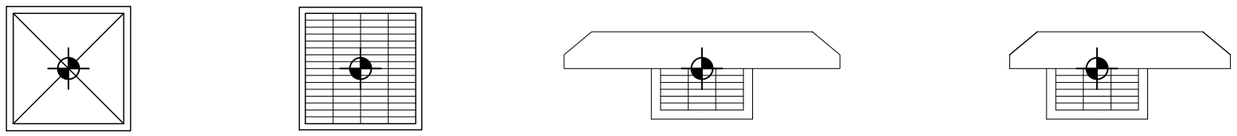
DESIGN PROJECT No. 300332 — PART -

ISSUE STATUS: DETAILED DESIGN — EDMS No. - — SHEET No. UT-0001 — ISSUE 3

© Roads and Maritime Services

DRAINAGE PIT SCHEDULE

PIT ID	PIT TYPE	EASTING	NORTHING	DETAILS
01	1.8m LINTEL	302980.294	6242775.946	CONSTRUCT NEW PIT OVER EXISTING KERB INLET PIT
02	1.8m LINTEL	302996.659	6242795.496	CONSTRUCT NEW PIT OVER EXISTING GRATED INLET PIT
03	1.8m LINTEL	302986.176	6242822.327	CONSTRUCT NEW PIT OVER EXISTING GRATED INLET PIT
04	1200 x 1200 JUNCTION	302989.523	6242837.426	CONTRUCT NEW TRAFFICABLE CLASS 'D' LID OVER EXISTING GRATED INLET PIT
05	1.8m LINTEL	302990.287	6242856.786	CONSTRUCT NEW PIT OVER EXISTING GRATED INLET PIT
06	1200 x 1200 JUNCTION	302993.424	6242856.303	RAISE EXISTING JUNCTION PIT TO PROPOSED FINISHED SURFACE LEVELS
07	1.8m LINTEL	303004.526	6242855.280	RETAIN EXISTING KERB INLET PIT
08	V-GRATE	303008.674	6242885.216	RETAIN EXISTING GRATED INLET PIT
09	1.8m LINTEL	302994.524	6242888.483	RETAIN EXISTING KERB INLET PIT
10	1.8m LINTEL	303012.108	6242910.013	RETAIN EXISTING KERB INLET PIT
11	1.8m LINTEL	303000.020	6242928.741	RETAIN EXISTING KERB INLET PIT
12	1.8m LINTEL	303015.840	6242937.410	RETAIN EXISTING KERB INLET PIT
13	1.8m LINTEL	303003.929	6242957.716	RETAIN EXISTING KERB INLET PIT
14	1.8m LINTEL	303006.650	6242977.621	RETAIN EXISTING KERB INLET PIT
15	1200 x 1200 JUNCTION	303009.883	6242977.269	RAISE EXISTING JUNCTION PIT TO PROPOSED FINISHED SURFACE LEVELS
16	1.8m LINTEL	303022.628	6242983.124	RETAIN EXISTING KERB INLET PIT
17	1.8m LINTEL	303024.119	6242993.951	RETAIN EXISTING KERB INLET PIT
18	1.8m LINTEL	303010.033	6243002.113	RETAIN EXISTING KERB INLET PIT
19	1.8m LINTEL	303026.938	6243010.943	CONSTRUCT NEW PIT OVER EXISTING KERB INLET PIT
20	1.8m LINTEL	303030.451	6243022.410	CONSTRUCT NEW PIT OVER EXISTING KERB INLET PIT
21	2.4m LINTEL SAG	303032.002	6243026.268	CONSTRUCT NEW PIT OVER EXISTING KERB INLET PIT
22	1200 x 1200 GRATED INLET PIT	303034.406	6243025.247	RETAIN EXISTING GRATED INLET PIT
23	1200 x 1200 GRATED INLET PIT	303036.278	6243031.338	RETAIN EXISTING GRATED INLET PIT
24	1.8m LINTEL	303041.689	6243045.572	CONSTRUCT NEW PIT OVER EXISTING KERB INLET PIT
25	1.8m LINTEL	303010.002	6243035.366	RETAIN EXISTING KERB INLET PIT
26	1200 x 1200 JUNCTION	303020.115	6243047.242	RAISE EXISTING JUNCTION PIT TO PROPOSED FINISHED SURFACE LEVELS
27	1200 x 1200 JUNCTION	303020.891	6243050.642	RAISE EXISTING JUNCTION PIT TO PROPOSED FINISHED SURFACE LEVELS
28	1.8m LINTEL	303006.608	6243033.169	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT
29	1.8m LINTEL	303006.421	6243002.608	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT
30	1.8m LINTEL	303003.067	6242978.113	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT
31	1.8m LINTEL	303000.341	6242958.209	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT
32	1.8m LINTEL	302996.374	6242929.241	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT
33	1.8m LINTEL	302990.862	6242888.984	CONSTRUCT NEW 1.8m LINTEL PRECAST ONE PIECE KERB ENTRY UNIT WITH 450mm DEEP PIT



DRAINAGE PIT SETOUT POINTS

NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-SM-0100.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 1 2 3 4 HORIZONTAL SCALE 1:100m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT: LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
STORMWATER MANAGEMENT
DRAINAGE SETOUT

A3

DESIGN PROJECT No. 300332

PART -

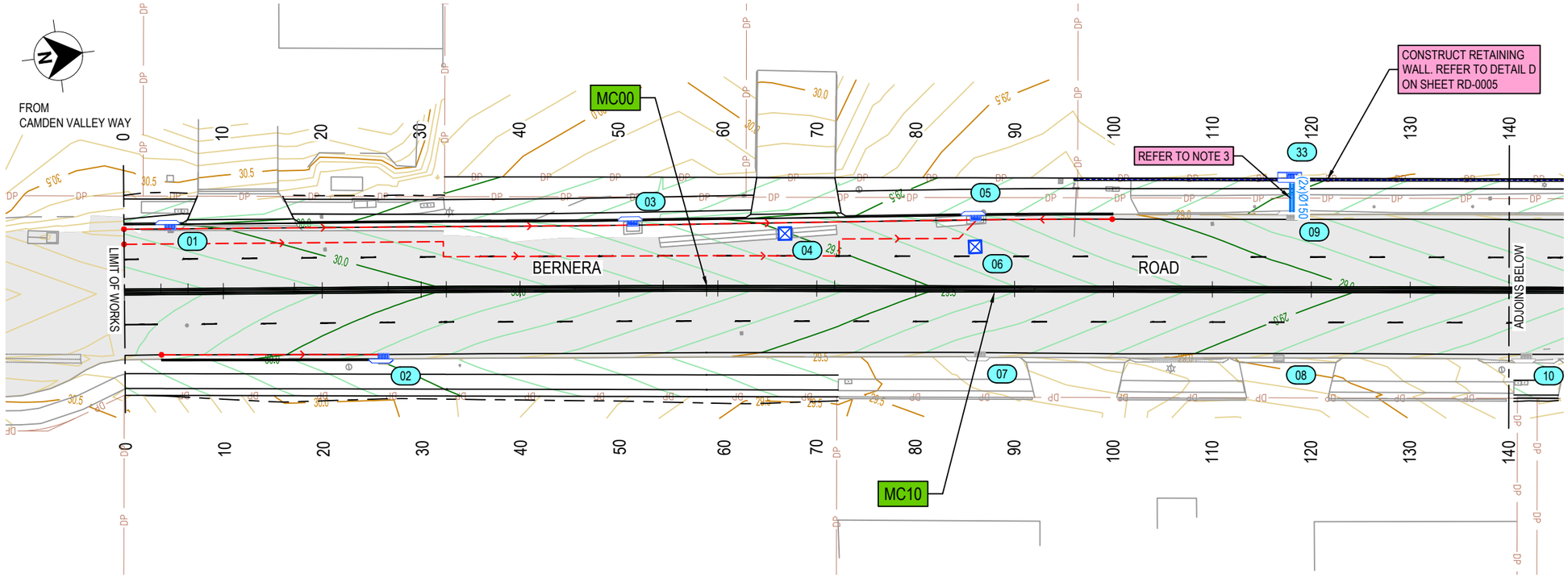
ISSUE STATUS: DETAILED DESIGN

EDMS No. -

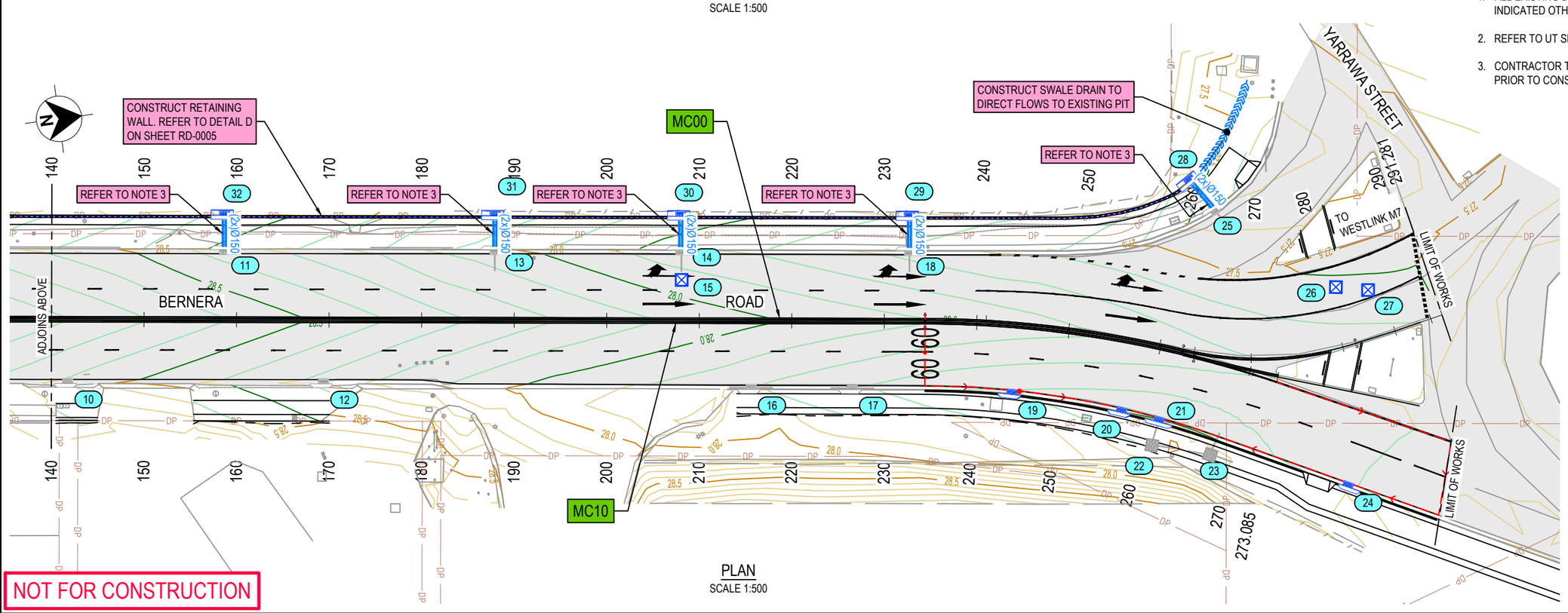
SHEET No. SM-0100

ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500



PLAN
SCALE 1:500

LEGEND

- DP OVERLAY BOUNDARY
- MC10 — CONTROL ALIGNMENT LABEL
- EXISTING MAJOR CONTOUR (1.0m INTERVALS)
- EXISTING MINOR CONTOUR (0.2m INTERVALS)
- DESIGN MAJOR CONTOUR (1.0m INTERVALS)
- DESIGN MINOR CONTOUR (0.2m INTERVALS)
- X — STORMWATER PIT LABEL
- JUNCTION PIT
- 1.8m LINTEL - ON-GRADE KERB INLET PIT
- 2.4m LINTEL - SAG KERB INLET PIT
- GRATED SURFACE INLET PIT
- GRATED SURFACE INLET PIT
- DESIGN SUBSOIL DRAINAGE (WITH FLUSHING POINT AND DIRECTION)
- DESIGN SUBSOIL OUTLET STRUCTURE

NOTES

1. ALL EXISTING DRAINAGE INFRASTRUCTURE TO BE RETAINED UNLESS INDICATED OTHERWISE.
2. REFER TO UT SERIES SHEETS FOR UTILITY PLANS AND DETAILS.
3. CONTRACTOR TO POTHOLE & CONFIRM DEPTHS OF EXISTING SERVICES PRIOR TO CONSTRUCTION OF STORMWATER PIPES.

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-SM-0101.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL THE GREAT SOUTH WEST

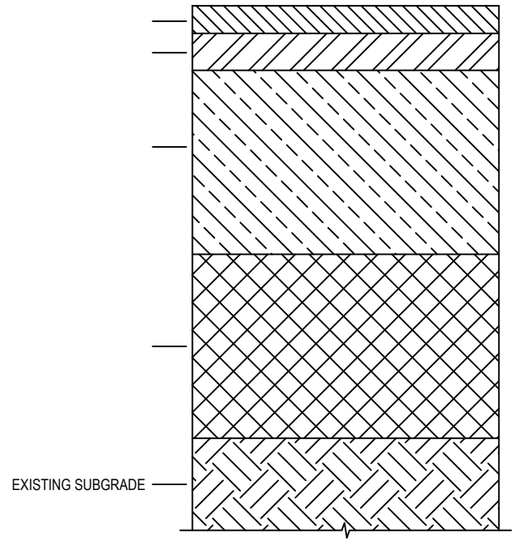
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
STORMWATER MANAGEMENT
STORMWATER DETAIL PLAN

A3

DESIGN PROJECT No. 300332 — PART -

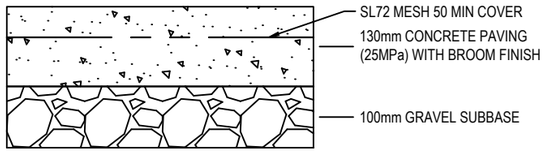
ISSUE STATUS: DETAILED DESIGN — EDMS No. - — SHEET No. SM-0101 — ISSUE 3

© Roads and Maritime Services



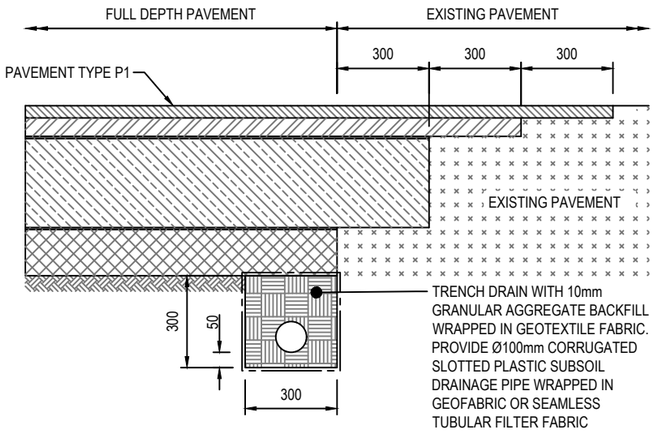
P1

PAVEMENT TYPE P1
FULL-DEPTH FLEXIBLE PAVEMENT
NOT TO SCALE

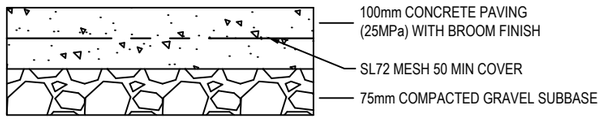


PAVEMENT TYPE P3
CONCRETE MEDIAN
NOT TO SCALE

P3



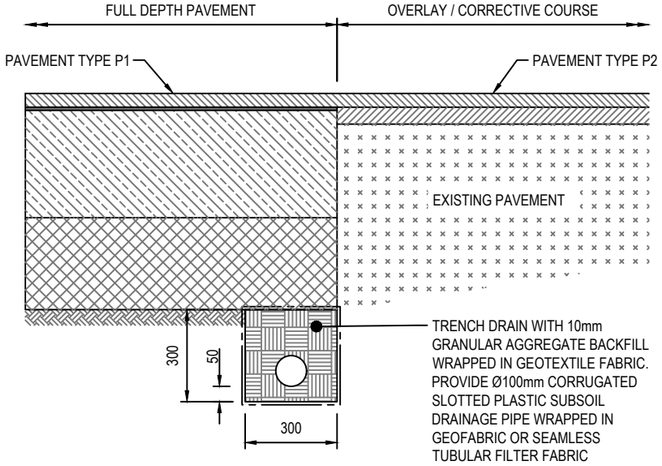
PAVEMENT JOINT PJ-A
(TYPE P1 / P2 TO EXISTING)
SCALE 1:20



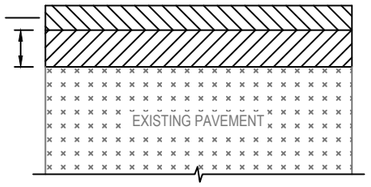
PAVEMENT TYPE P4
CONCRETE FOOTPATH
NOT TO SCALE

P4

REFER LIVERPOOL CITY COUNCIL STANDARD DRAWING
R23 CONSTRUCTION AND JOINTING DETAILS

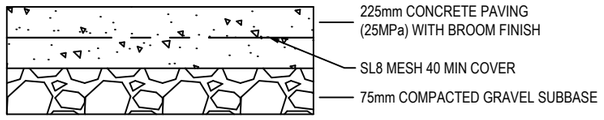


PAVEMENT JOINT PJ-B
(TYPE P1 TO TYPE P2)
SCALE 1:20



P2

PAVEMENT TYPE P2
OVERLAY / CORRECTIVE COURSE
NOT TO SCALE



PAVEMENT TYPE P5
COMMERCIAL DRIVEWAY
NOT TO SCALE

P5

REFER LIVERPOOL CITY COUNCIL STANDARD DRAWING
R25 CONSTRUCTION AND JOINTING DETAILS

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-PV-0100.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 1 2 3 4 HORIZONTAL SCALE 1:100m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
PAVEMENT
PAVEMENT DETAILS

A3

DESIGN PROJECT No. 300332

PART -

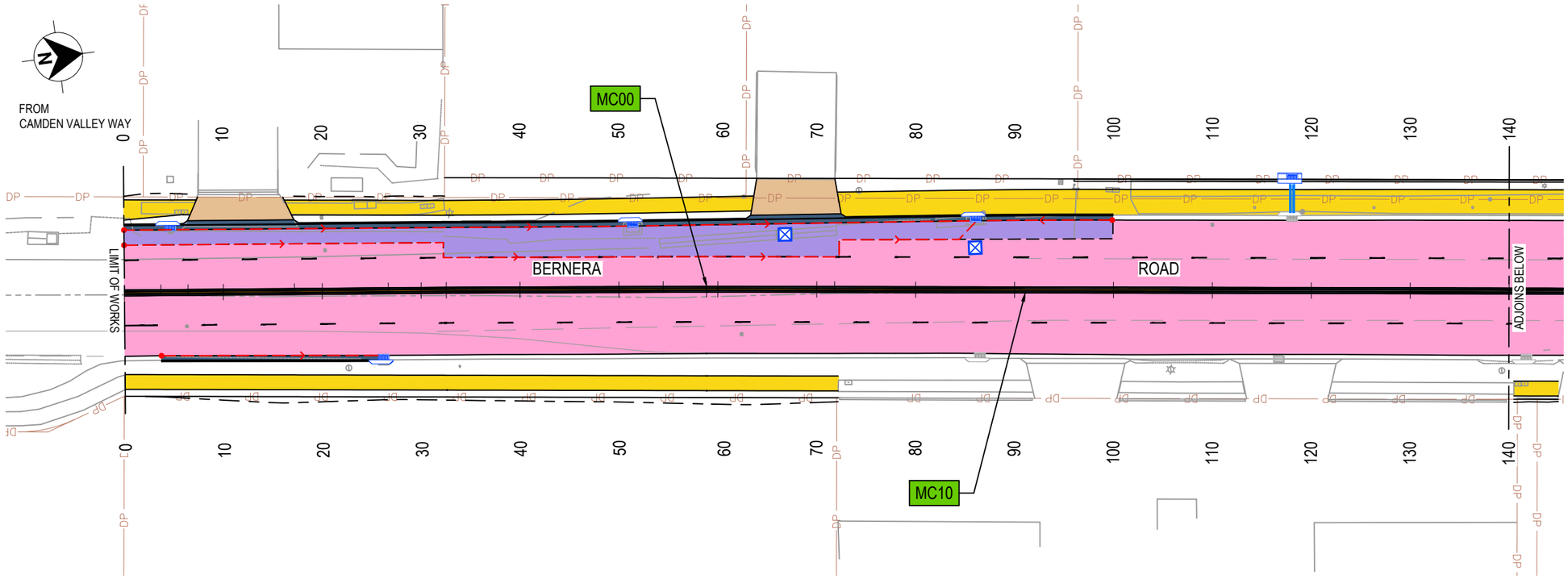
ISSUE STATUS: DETAILED DESIGN

EDMS No. -

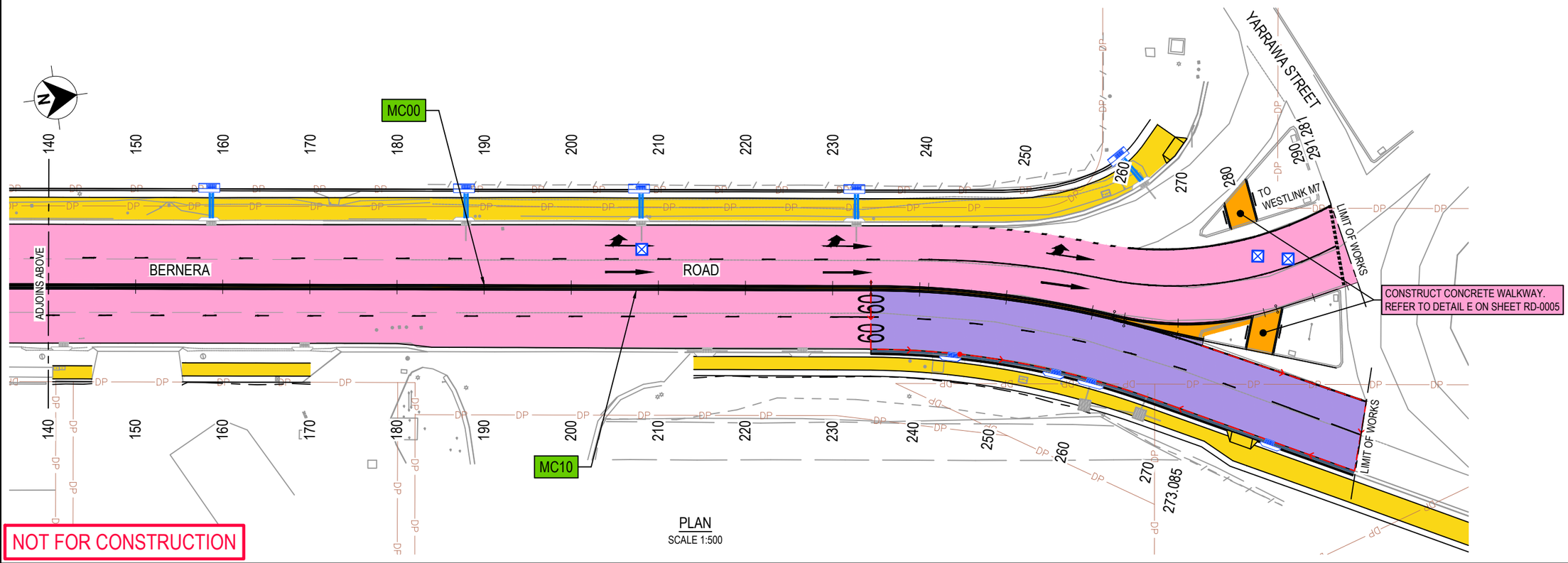
SHEET No. PV-0100

ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500



PLAN
SCALE 1:500

NOT FOR CONSTRUCTION

LEGEND

- DP OVERLAY BOUNDARY
- MC00 CONTROL ALIGNMENT LABEL
- PAVEMENT TYPE P1 - FULL DEPTH
- PAVEMENT TYPE P2 - MILL & RESHEET
- PAVEMENT TYPE P3 - CONCRETE MEDIAN
- PAVEMENT TYPE P4 - CONCRETE FOOTPATHS
- PAVEMENT TYPE P5 - DRIVEWAY PAVEMENT

NOTES

1. REFER TO SHEET RD-0001 FOR ROAD TYPICAL SECTIONS, AND RD-0003 FOR TYPICAL DETAILS.
2. REFER TO SHEETS RD-0011 TO RD-0012 FOR MASTER CONTROL AND KERB ALIGNMENT PLANS AND SCHEDULES.
3. REFER TO SHEET PV-0100 FOR PAVEMENT DETAILS.
4. ALL KERB RAMPS TO BE CONSTRUCTED 1.5m WIDE (UNLESS SPECIFIED DIFFERENTLY ON PLAN) IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL STANDARD DRAWINGS R17 & R23.

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-PV-0101.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
PAVEMENT
PAVEMENT PLAN

A3

DESIGN PROJECT No. 300332

PART -

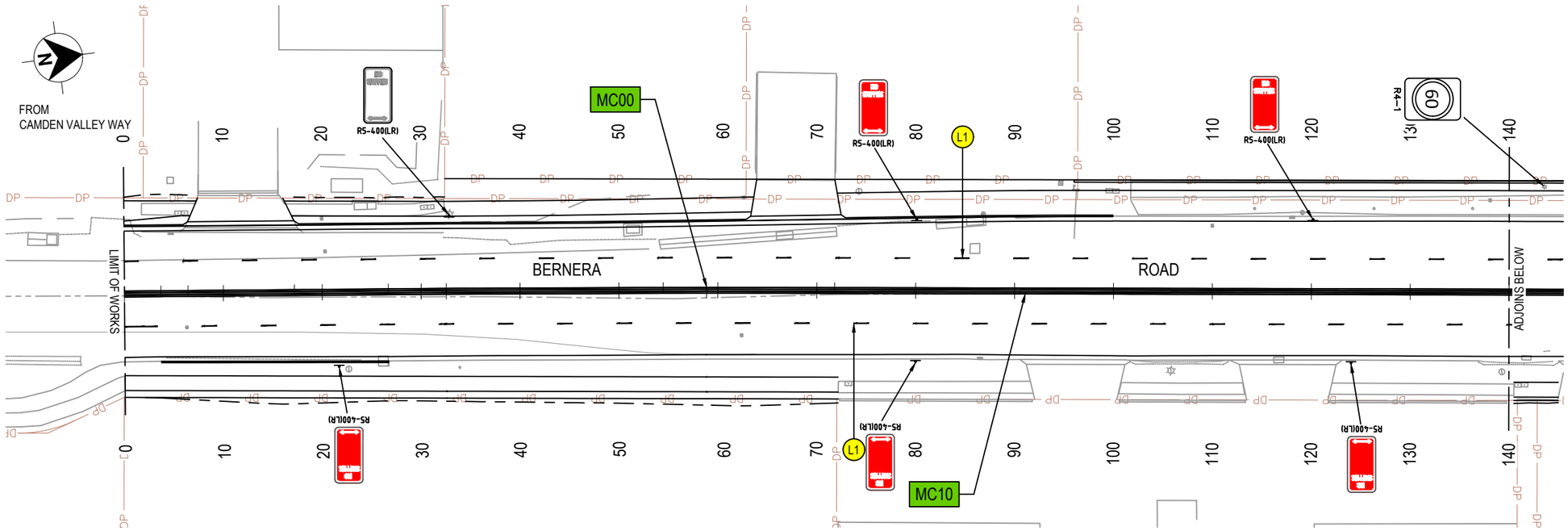
ISSUE STATUS: DETAILED DESIGN

EDMS No. -

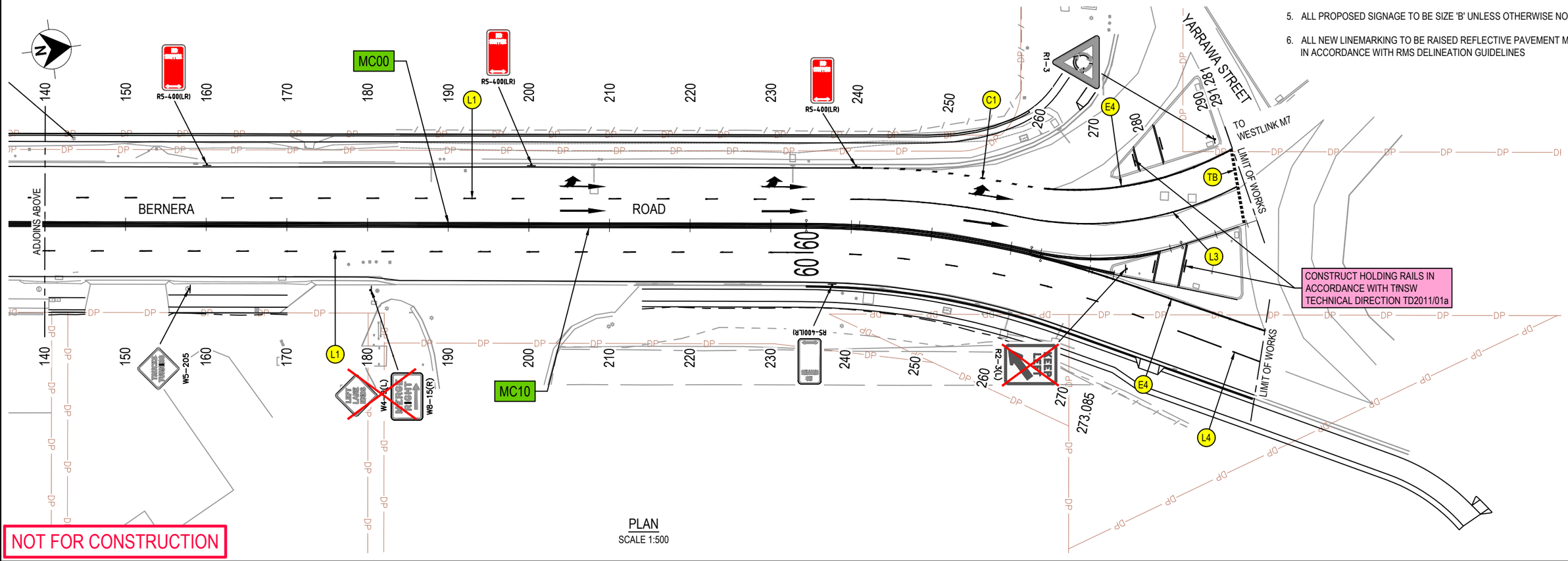
SHEET No. PV-0101

ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500



PLAN
SCALE 1:500

LEGEND

- DP OVERLAY BOUNDARY
- MC00 — CONTROL ALIGNMENT LABEL
- LM — LINEMARKING TYPE LABEL
- EXISTING SIGN & POST
- EXISTING SIGN TO BE REMOVED
- INSTALL NEW SIGN
- APPLY NEW LINEMARKING ARROW - ASR
- APPLY NEW LINEMARKING ARROW - UA3L
- APPLY NEW LINEMARKING ARROW - UA3R

NOTES

1. REFER TO SHEET RD-0001 FOR ROAD TYPICAL SECTIONS.
2. PAVEMENT MARKING & SIGNPOSTING TO BE IN ACCORDANCE WITH RMS GUIDELINES & SPECIFICATIONS
3. INSTALL PAINTED CHEVRONS IN ACCORDANCE WITH RMS DELINEATION GUIDELINES
4. ALL EXISTING LINEMARKING BETWEEN LIMITS OF WORKS WILL BE REMOVED AS PART OF PAVEMENT WORKS. REFER TO PV SERIES DRAWINGS FOR EXTENTS.
5. ALL PROPOSED SIGNAGE TO BE SIZE 'B' UNLESS OTHERWISE NOTED
6. ALL NEW LINEMARKING TO BE RAISED REFLECTIVE PAVEMENT MARKING IN ACCORDANCE WITH RMS DELINEATION GUIDELINES

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME: s:\300332\DWG\engineering\DD\300332-DD-RF-0001.dwg

DESIGN LOT CODE: ...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING: S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:27 AM

PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES: x_SHT, x_LABELS, x_DESIGN, x_SURVEY, x_DRAINAGE, x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING: 0 5 10 15 20 HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56

HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
ROADSIDE FURNITURE AND LINEMARKING
SIGNAGE AND MARKING PLAN

A3

DESIGN PROJECT No. 300332

PART -

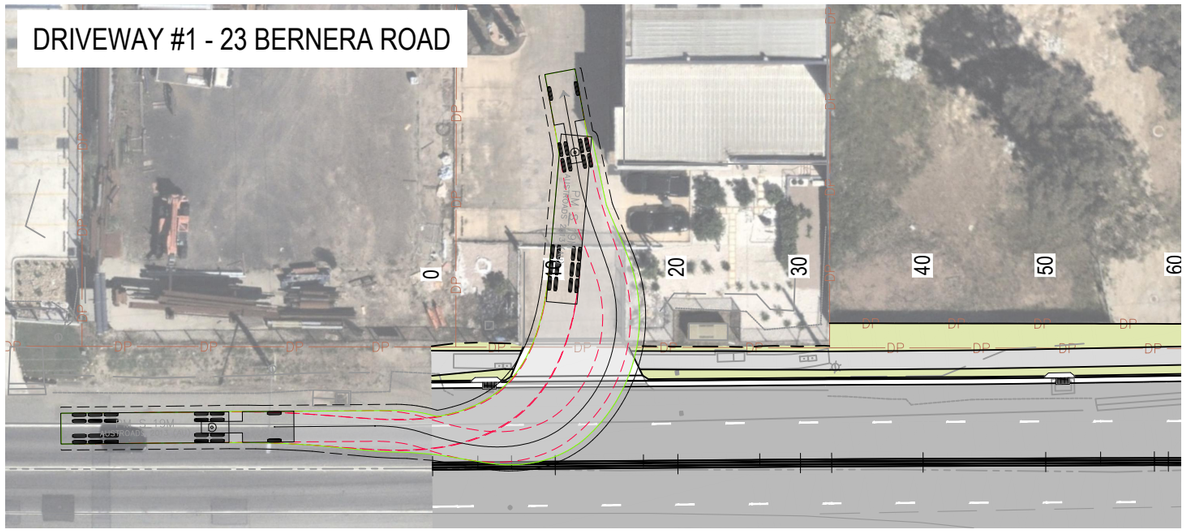
ISSUE STATUS: DETAILED DESIGN

EDMS No. -

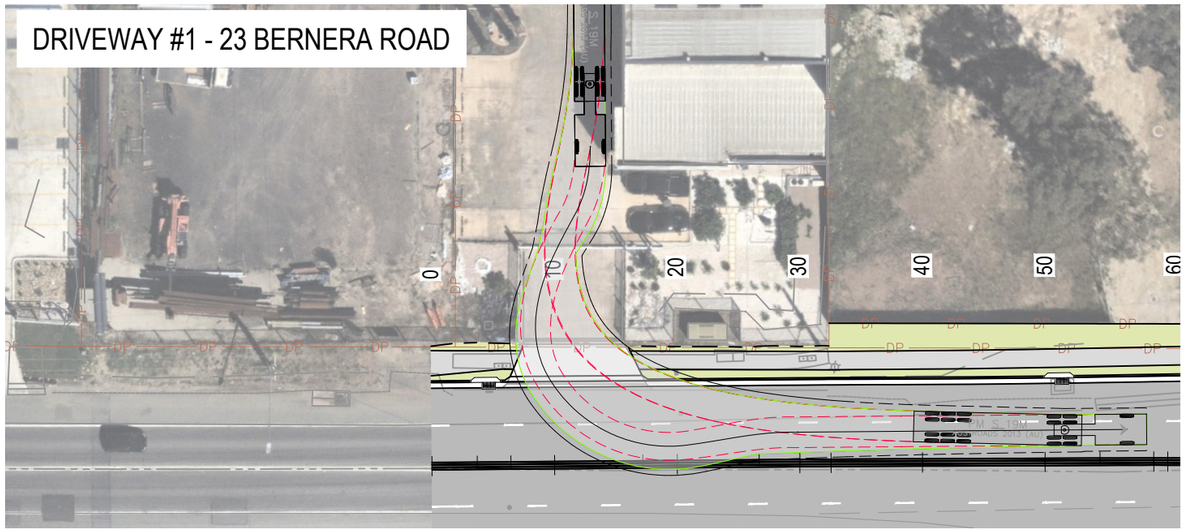
SHEET No. RF-0001

ISSUE 3

© Roads and Maritime Services



PLAN
SCALE 1:500

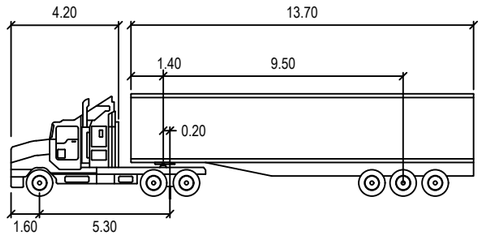


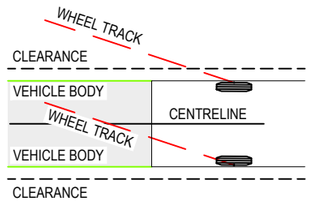
PLAN
SCALE 1:500

AUSTROADS 2013 PM S 19m

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		





NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME
s:\300332\DWG\engineering\DD\300332-DD-MS-0001.dwg

DESIGN LOT CODE
...

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN

PLOT DATE / TIME: 6/21/2023 9:28 AM
PLOT BY: stevenz

CLIENT

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING
0 5 10 15 20
HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

adw Johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

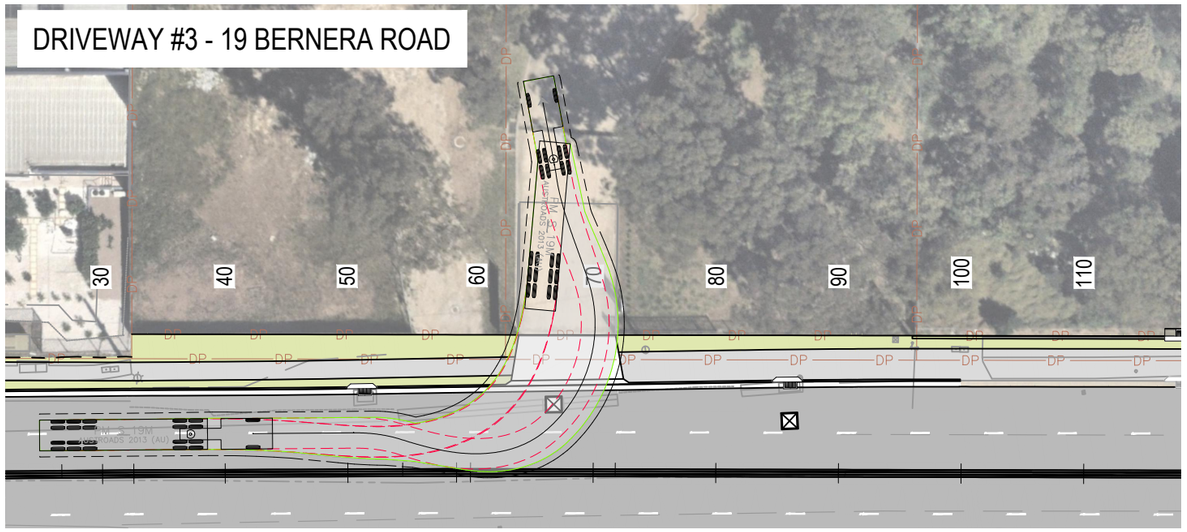
TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
MISCELLANEOUS
19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 1

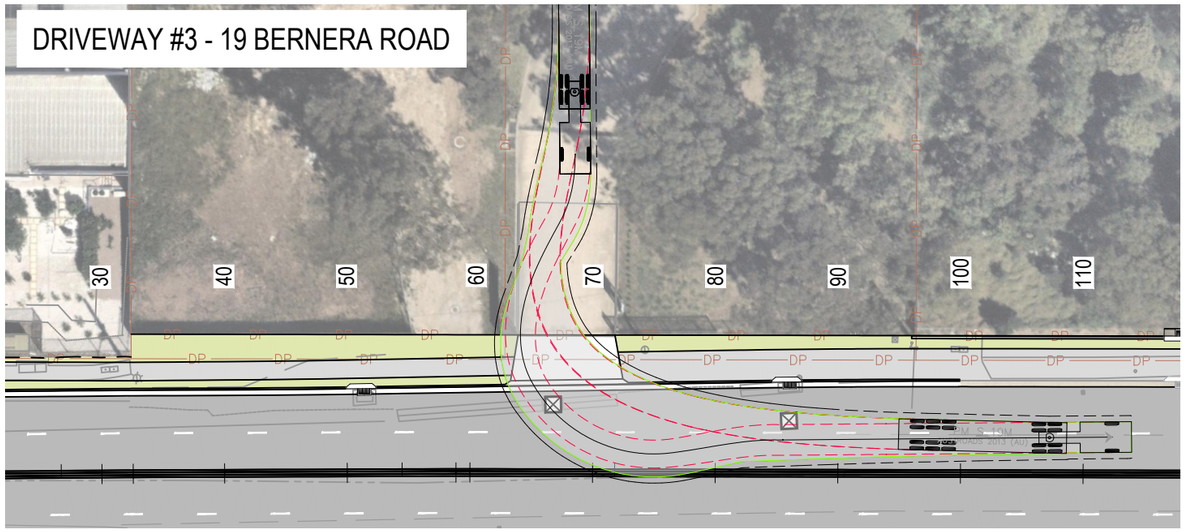
A3

DESIGN PROJECT No. 300332
PART -
ISSUE STATUS: DETAILED DESIGN
EDMS No. -
SHEET No. MS-0001
ISSUE 3

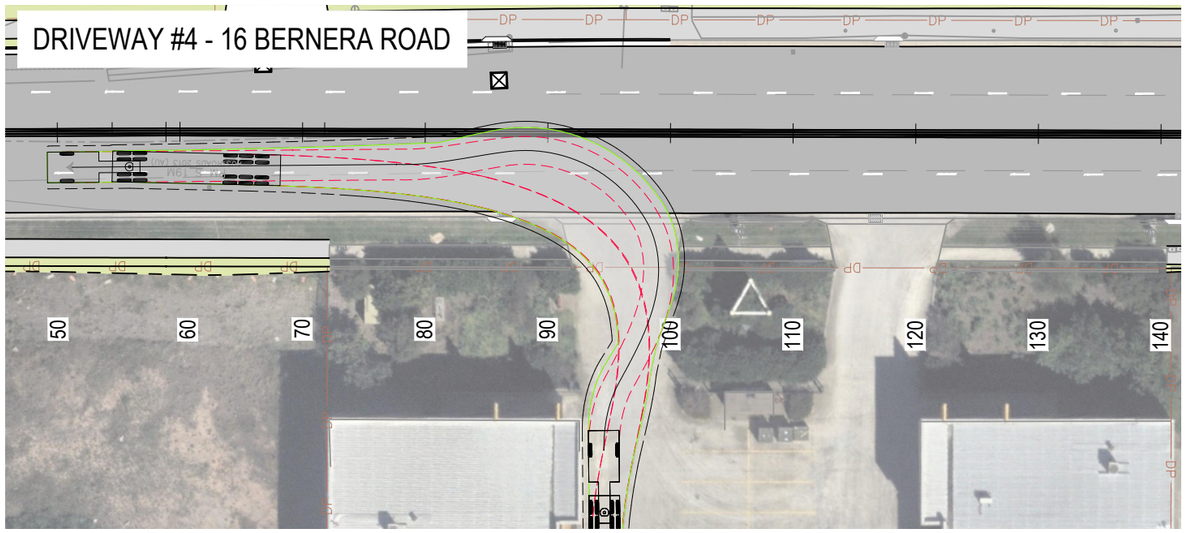
© Roads and Maritime Services



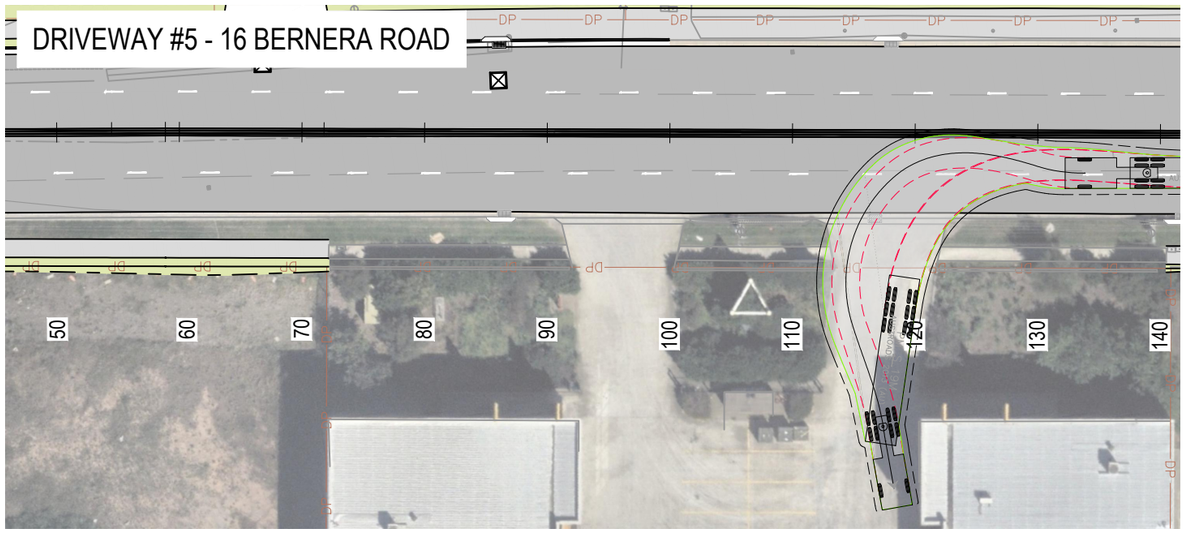
PLAN
SCALE 1:500



PLAN
SCALE 1:500



PLAN
SCALE 1:500

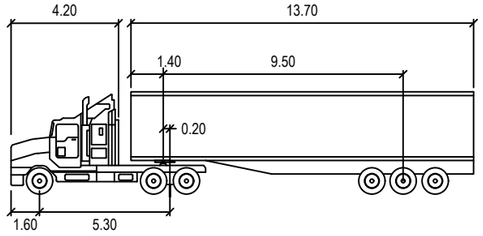


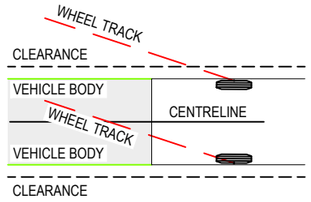
PLAN
SCALE 1:500

AUSTROADS 2013 PM S 19m

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		





NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
s:\300332\DWG\engineering\DD\300332-DD-MS-0002.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:28 AM	stevenz

EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
x_SHT	0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
x_LABELS	1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
x_DESIGN	2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
x_SURVEY	3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		
x_DRAINAGE					
x_UTILITIES					

SCALES ON A3 SIZE DRAWING

0 5 10 15 20

HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56	AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw johnson
Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT

LIVERPOOL THE GREAT SOUTH WEST

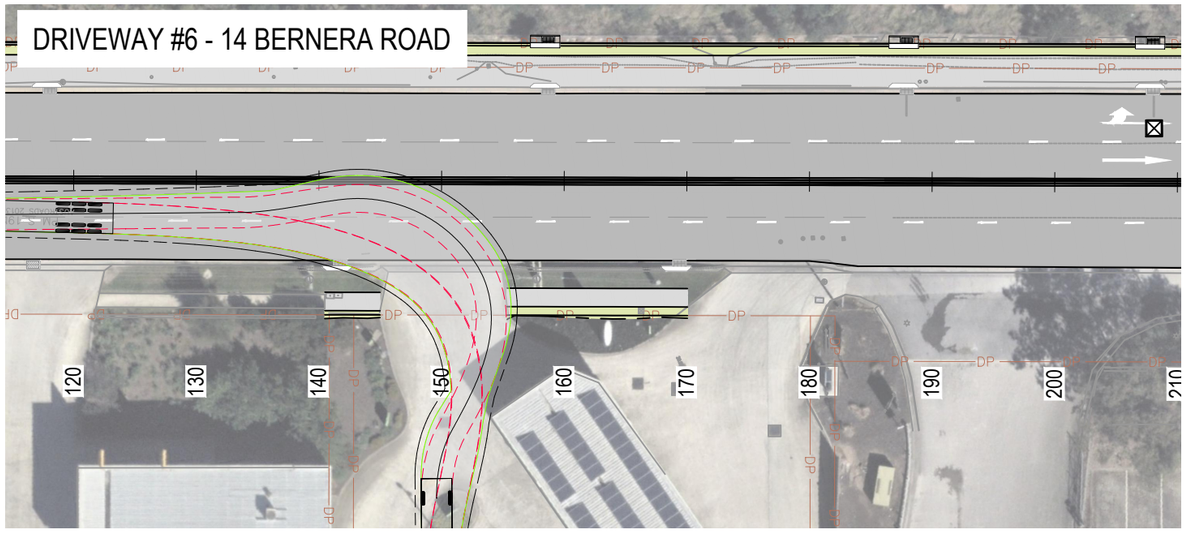
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
MISCELLANEOUS
19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 2

A3

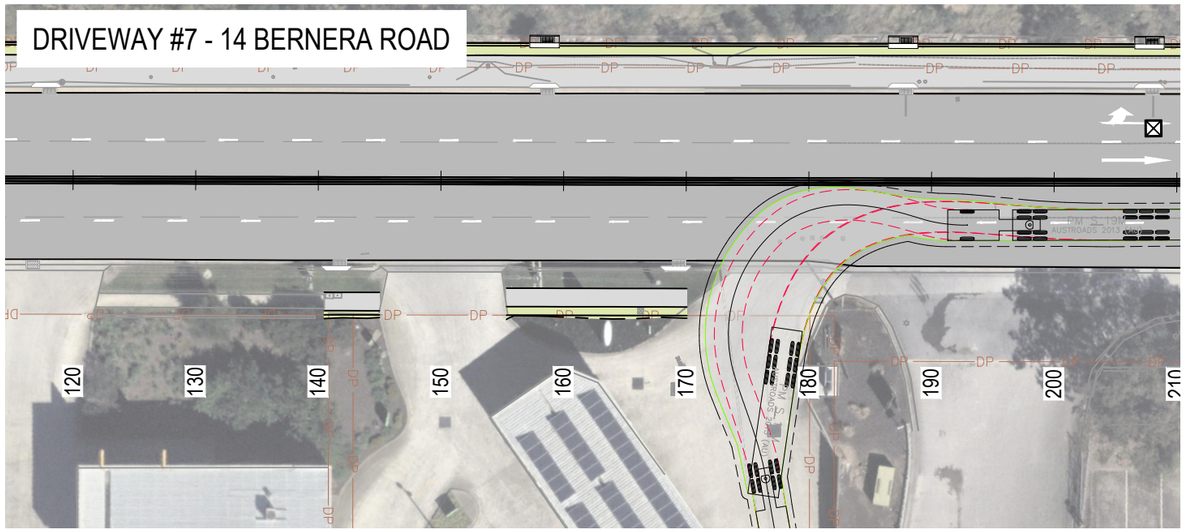
DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	MS-0002	3

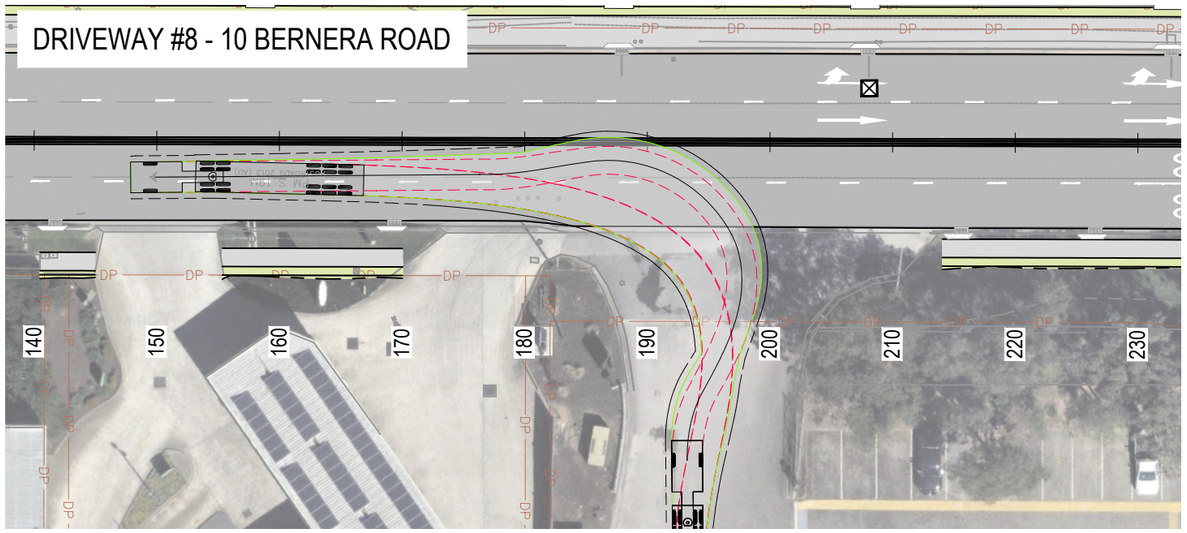
© Roads and Maritime Services



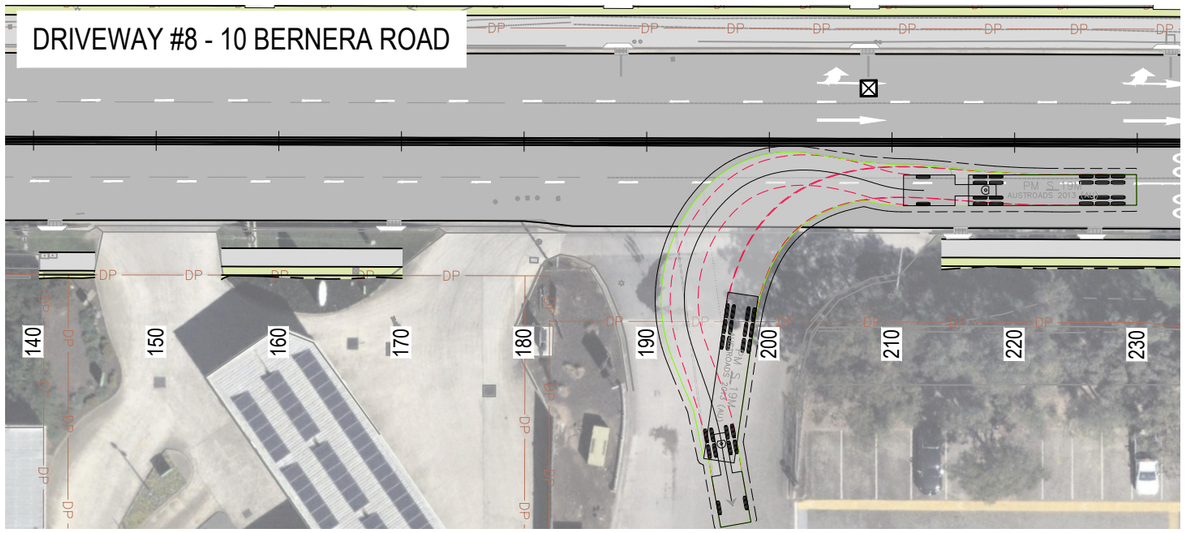
PLAN
SCALE 1:500



PLAN
SCALE 1:500



PLAN
SCALE 1:500

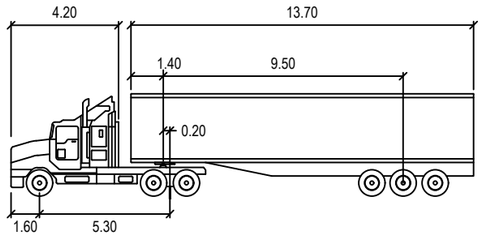


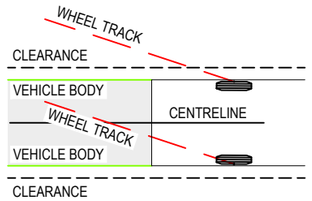
PLAN
SCALE 1:500

AUSTROADS 2013 PM S 19m

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		





NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME	DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME	PLOT BY
s:\300332\DWG\engineering\DD\300332-DD-MS-0003.dwg	...	S:\300332\DESIGN\12D\BERNERA ROAD\DESIGN	6/21/2023 9:28 AM	stevenz

EXTERNAL REFERENCE FILES
x_SHT
x_LABELS
x_DESIGN
x_SURVEY
x_DRAINAGE
x_UTILITIES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
0	16.12.22	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
1	10.02.23	CONCEPT DESIGN - ISSUED FOR REVIEW	-	-
2	10.03.23	DETAILED DESIGN - ISSUED FOR REVIEW		
3	21.06.23	DETAILED DESIGN - ISSUED FOR APPROVAL		

SCALES ON A3 SIZE DRAWING

0 5 10 15 20
HORIZONTAL SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY

COMPANY NAME / LOGO

adw Johnson

Central Coast
5 Pioneer Avenue,
P.O. Box 3717,
Tuggerah N.S.W. 2259
Phone: (02) 4305 4300
Fax: (02) 4305 4399
email:coast@adwjohnson.com.au
www.adwjohnson.com.au
ABN 62 129 445 398

TITLE	NAME	DATE
DRAWN	M.HOYLAND	16.12.22
DRG CHECK	I.BROWN	16.12.22
DESIGN	R.BROWN	16.12.22
DESIGN CHECK	I.BROWN	16.12.22
DESIGN MNGR	I.BROWN	16.12.22
PROJECT MNGR	I.BROWN	16.12.22

CLIENT

LIVERPOOL THE GREAT SOUTH WEST

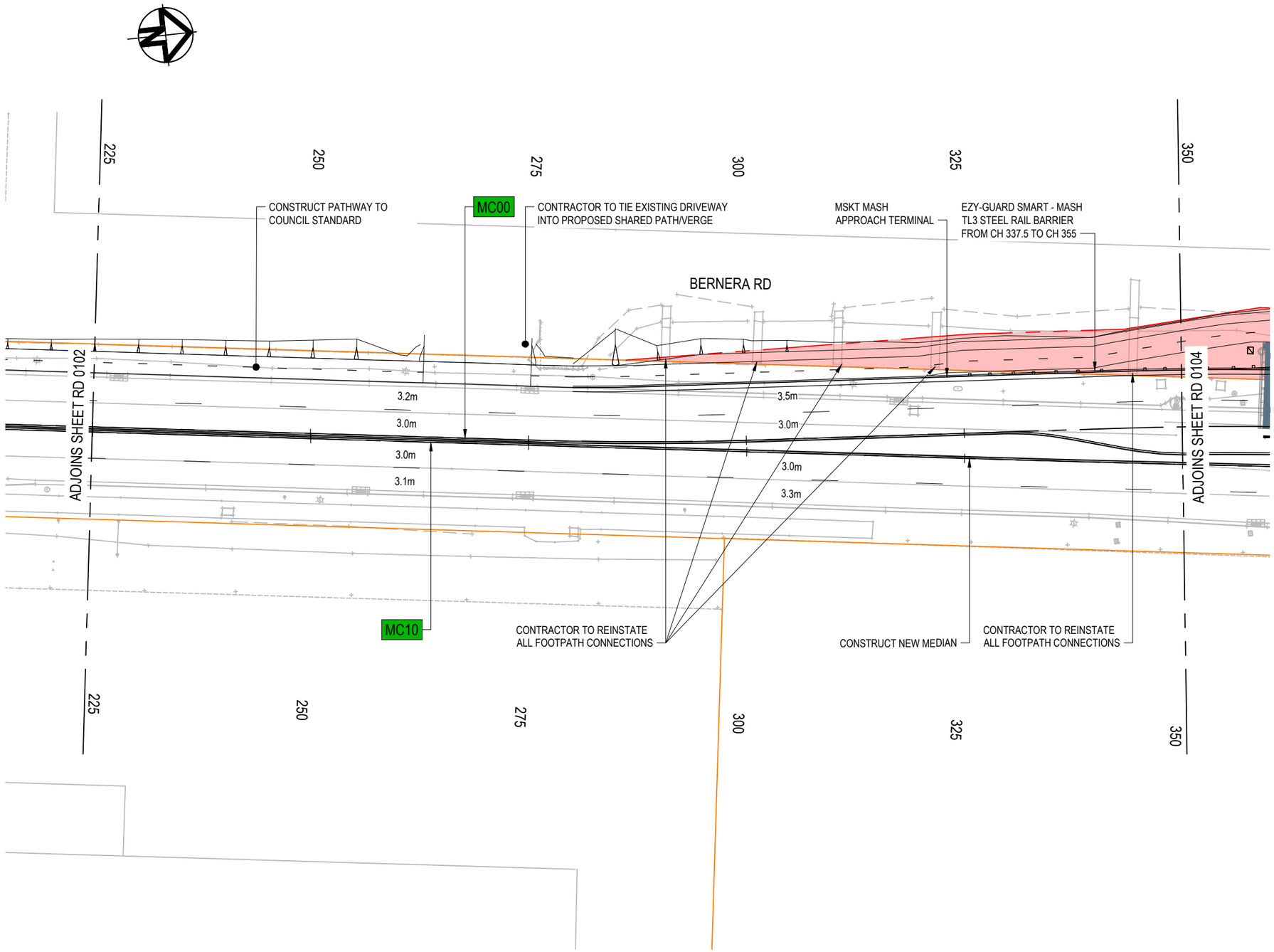
LIVERPOOL CITY COUNCIL
BERNERA ROAD
ROAD UPGRADE WORKS
YARRAWA STREET TO YARUNGA STREET, PRESTONS
MISCELLANEOUS
19m PRIME MOVE & SEMI-TRAILER - TURNING MOVEMENTS SHEET 3

A3

DESIGN PROJECT No.	PART
300332	-

ISSUE STATUS	EDMS No.	SHEET No.	ISSUE
DETAILED DESIGN	-	MS-0003	3

© Roads and Maritime Services

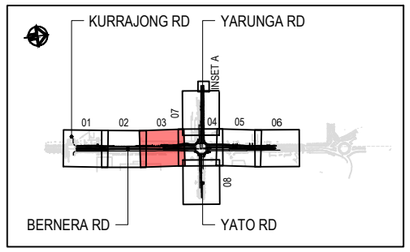


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0103.DWG
Last Plotted: 16/10/2022 9:57:50 PM By: BENZSON
Last Saved: 16/10/2022 9:03:40 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

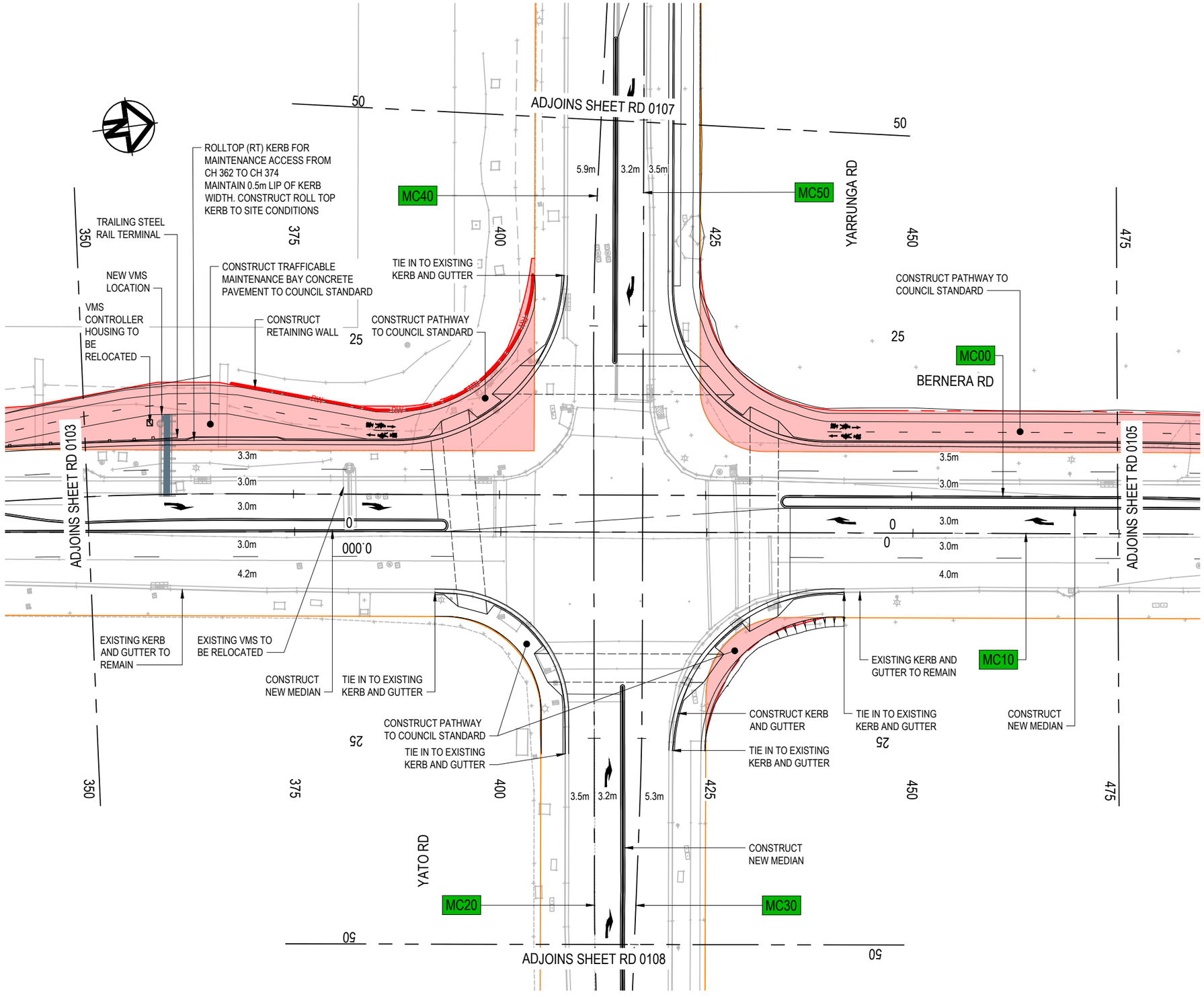
DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4, 23-33 MARY STREET, SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0103
ISSUE A

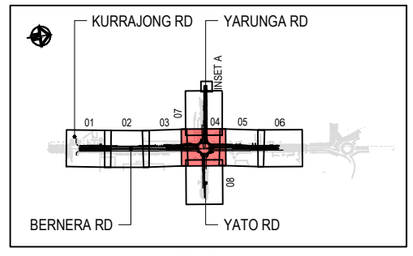


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0104.DWG
Last Plotted: 16/10/2022 9:58:07 PM By: BENZSON
Last Saved: 16/10/2022 9:03:56 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

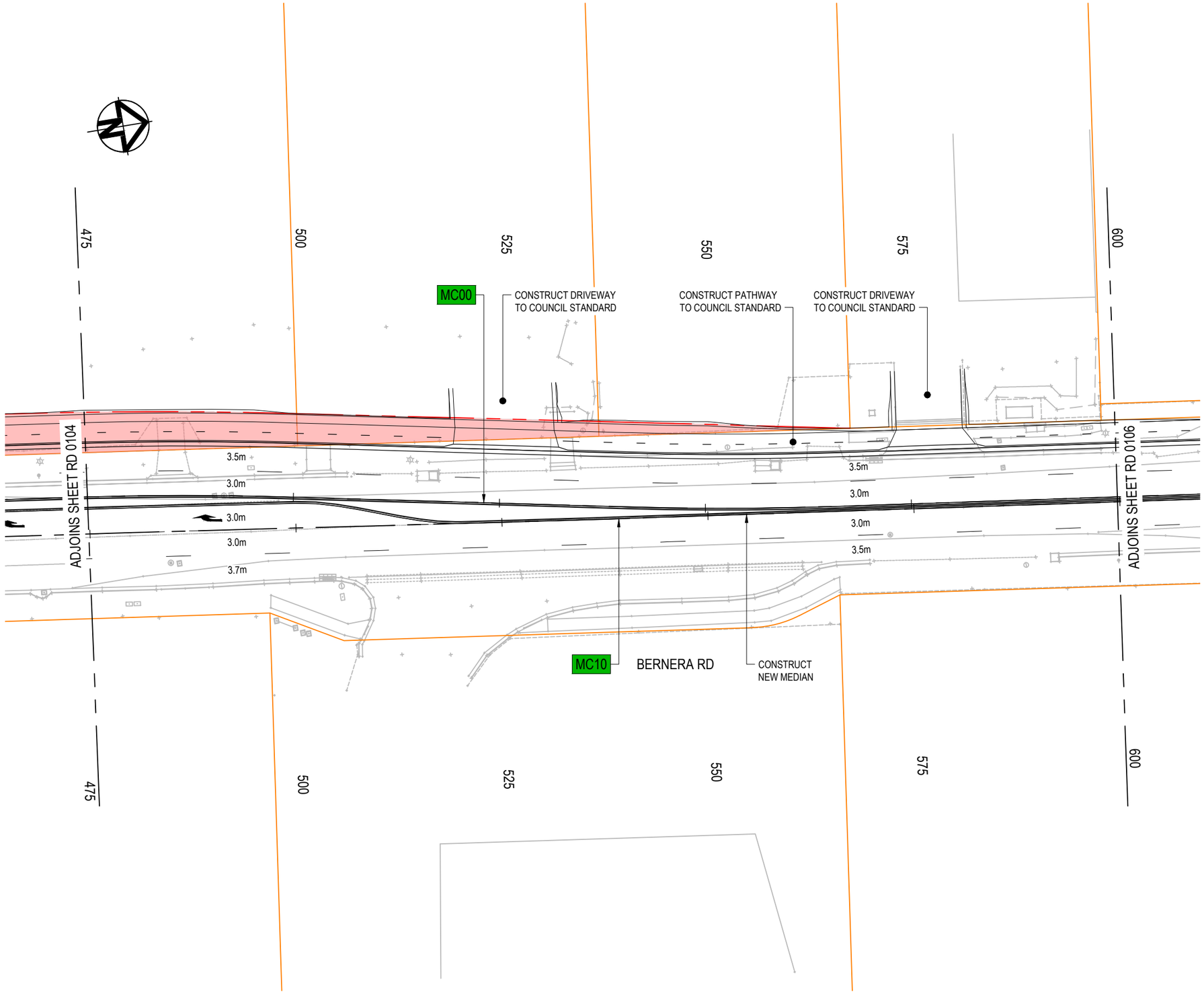
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 4

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0104
ISSUE A

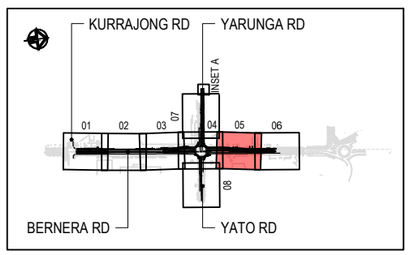


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0105.DWG

Last Plotted: 16/10/2022 9:58:23 PM By: BENZSON

Last Saved: 16/10/2022 9:04:13 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM:	HEIGHT DATUM:
GDA 2020 ZONE 56	AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

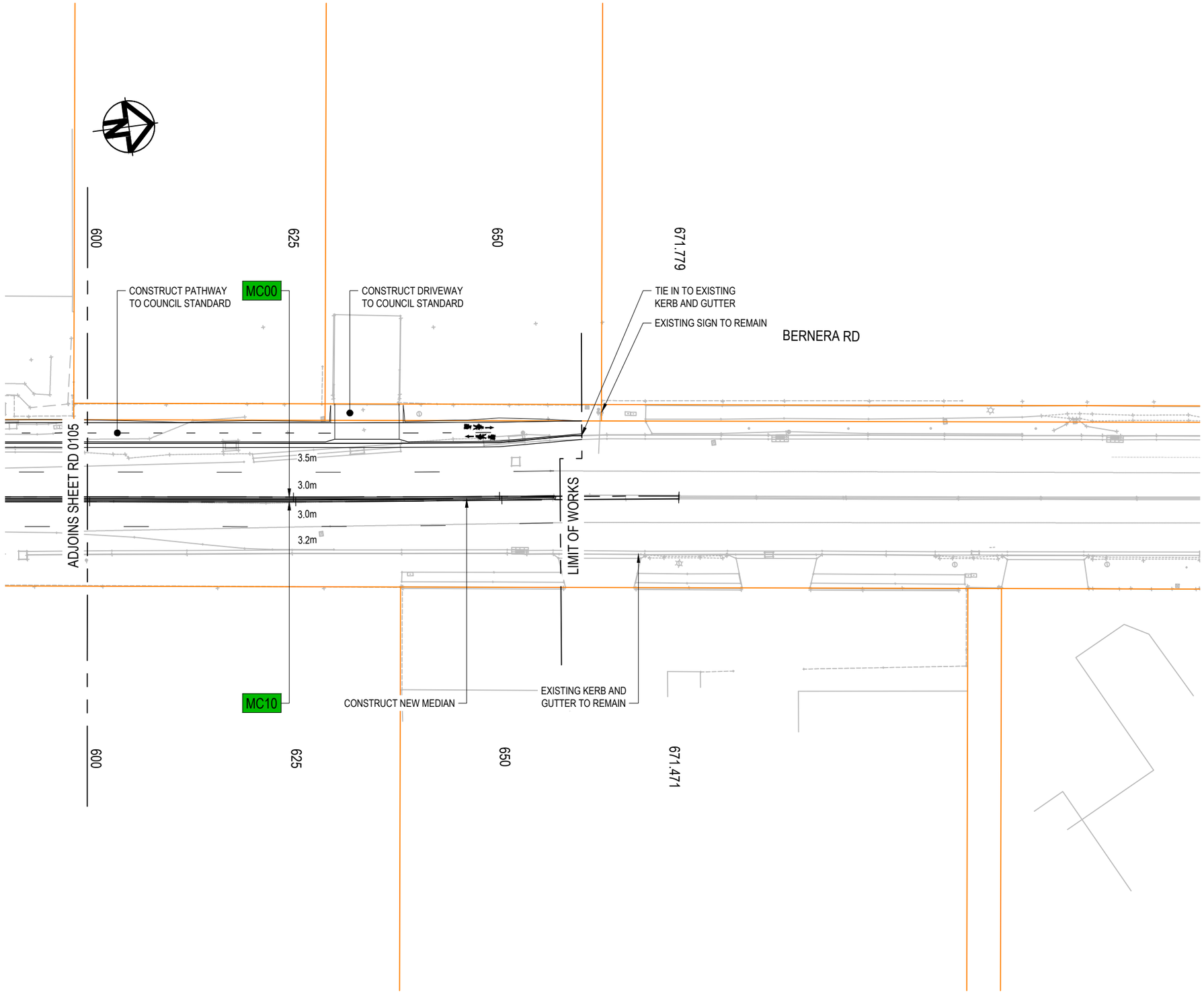
LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 5

A3

PROJECT NUMBER:		PART
2021 25 DD 001		
ISSUE STATUS:	SHEET No.	ISSUE
100% DETAILED DESIGN	RD 0105	A

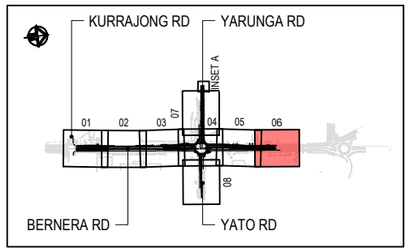


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0106.DWG

Last Plotted: 16/10/2022 9:58:39 PM By: BENZSON

Last Saved: 16/10/2022 9:04:30 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 6

A3

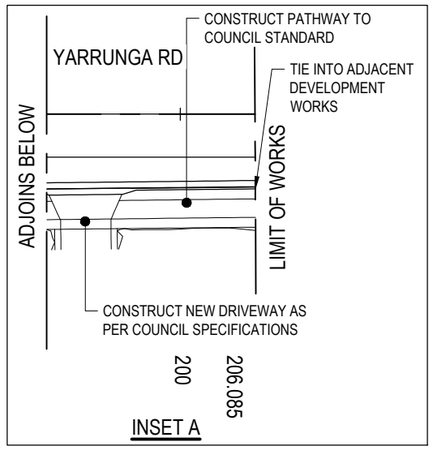
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0106

ISSUE A

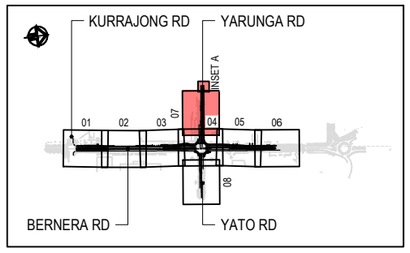


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0107.DWG
Last Plotted: 16/10/2022 9:58:56 PM By: BENZSON
Last Saved: 16/10/2022 9:04:46 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

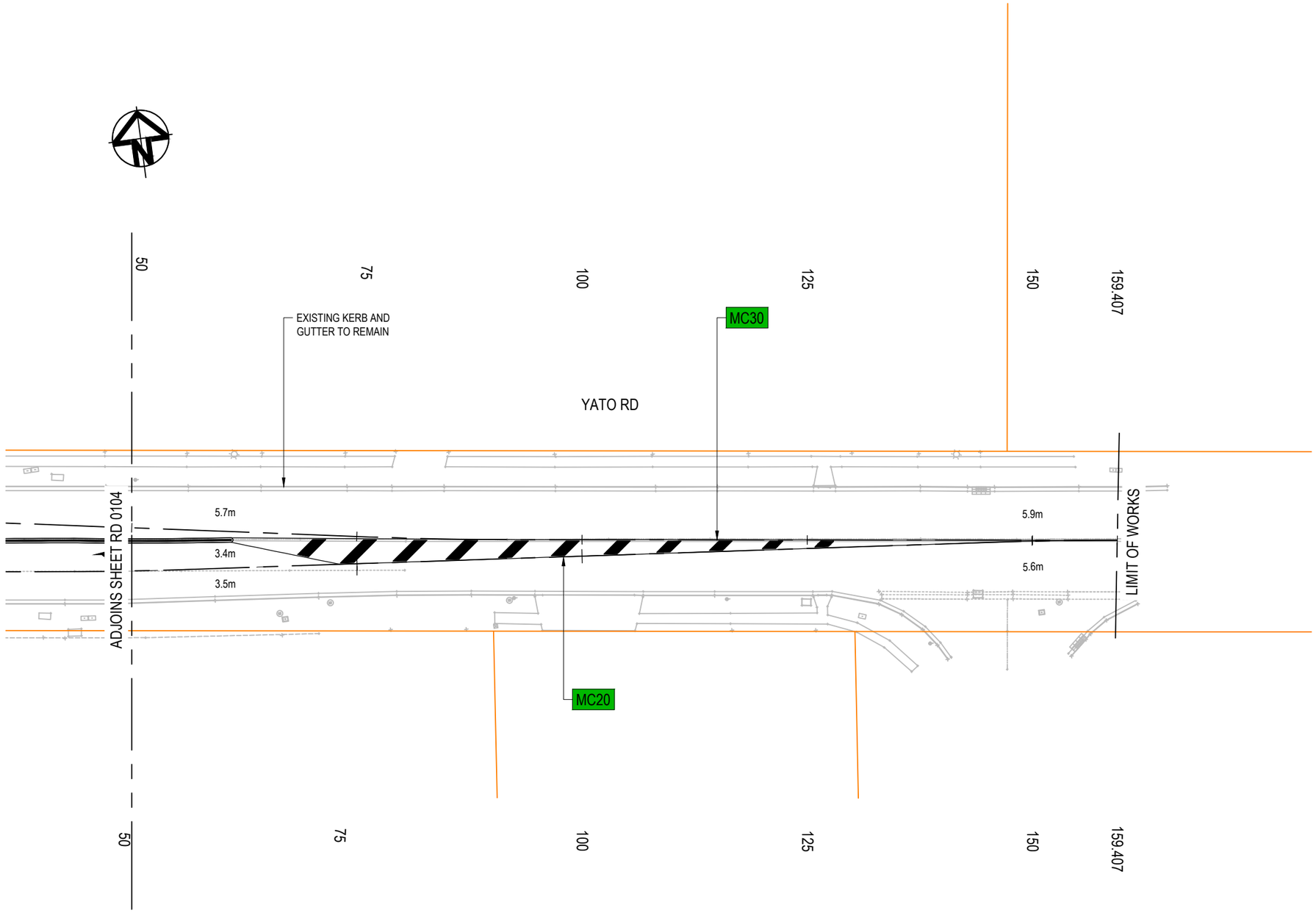
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 7

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0107
ISSUE A

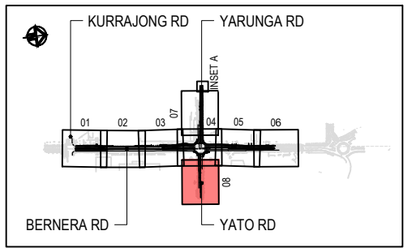


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS MEASURED TO FACE OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0108.DWG

Last Plotted: 16/10/2022 9:59:13 PM By: BENZSON

Last Saved: 16/10/2022 9:05:02 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	JK	17.10.2022

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	17.10.2022
DRG CHECK	F. BATHAN	17.10.2022
DESIGN BY	D. TALEVSKI	17.10.2022
DESIGN CHECK	T. LANCE	17.10.2022
DESIGN MGR	A. PAVLOVIC	17.10.2022
PROJECT MGR	J. KALANTZIS	17.10.2022

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 8

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0108

ISSUE A

Bernera Road
Median and Road Upgrades

DESIGNERS REPORT

Property:
Bernera Road, Prestons

Client:
Liverpool City Council

Date:
June 2023

Revision:
C

adw johnson

HUNTER OFFICE
7/335 Hillsborough Road,
Warners Bay NSW 2282
(02) 4978 5100

CENTRAL COAST OFFICE
5 Pioneer Avenue,
Tuggerah NSW 2259
(02) 4305 4300

SYDNEY OFFICE
Level 35 One International Towers
100 Barangaroo Avenue,
Sydney NSW 2000
(02) 8046 7411

www.adwjohnson.com.au

DOCUMENT CONTROL SHEET

Issue No.	Amendment	Date	Prepared By	Reviewed By
A	FOR REVIEW	10/02/2023	RB	IB
B	DRAFT DETAIL	12/03/2023	RB	IB
C	DETAIL	20/06/2023	RB	IB

Limitations Statement

This report has been prepared in accordance with and for the purposes outlined in the scope of services agreed between ADW Johnson Pty Ltd and the Client. It has been prepared based on the information supplied by the Client, as well as investigation undertaken by ADW Johnson and the sub-consultants engaged by the Client for the project.

Unless otherwise specified in this report, information and advice received from external parties during the course of this project was not independently verified. However, any such information was, in our opinion, deemed to be current and relevant prior to its use. Whilst all reasonable skill, diligence and care have been taken to provide accurate information and appropriate recommendations, it is not warranted or guaranteed and no responsibility or liability for any information, opinion or commentary contained herein or for any consequences of its use will be accepted by ADW Johnson or by any person involved in the preparation of this assessment and report.

This document is solely for the use of the authorised recipient. It is not to be used or copied (either in whole or in part) for any other purpose other than that for which it has been prepared. ADW Johnson accepts no responsibility to any third party who may use or rely on this document or the information contained herein.

The Client should be aware that this report does not guarantee the approval of any application by any Council, Government agency or any other regulatory authority.

TABLE OF CONTENTS

DOCUMENT CONTROL SHEET ..... **II**

TABLE OF CONTENTS ..... **III**

1 PROJECT DESCRIPTION **4**

2 GEOMETRIC DESIGN **5**

2.1 DESIGN STANDARDS 5
2.2 HORIZONTAL GEOMETRY AND CROSS SECTION 5
2.2.1 Horizontal Curves and Superelevation *5*
2.2.2 Typical Cross Sections *5*
2.3 VERTICAL GEOMETRY 5
2.4 PROPOSED DRAINAGE 5
2.5 PROVISION FOR CYCLISTS 5
2.6 PROVISION FOR PEDESTRIANS 5
2.7 LINEMARKING & SIGNPOSTING 6

3 NORTHBOUND FOOTWAY **6**

3.1 EXISTING DRAINAGE CHANNEL 6
3.2 PROPOSED DRAINAGE 7

LIST OF FIGURES

Figure 1 Existing Road
Figure 2 Proposed Typical Cross Section – Bernera Road
Figure 3 Existing Concrete Channel
Figure 4 Proposed Hob Wall

LIST OF TABLES

Table 3.1: Existing Channel Peak Flow Rates

1 PROJECT DESCRIPTION

ADW Johnson has been engaged by Liverpool City Council to prepare the concept and detailed design for Bernera Road upgrade at Prestons, NSW.

The upgrade includes the addition of a 600mm wide median island, road widening, kerb and footpath works and an offroad shared path.

The project objective is to improve road safety and active transport connections.

Figure 1 Existing Road
Aerial Source: Nearmap

2 GEOMETRIC DESIGN

2.1 Design Standards

The following design standards were used in the preparation of the geometric design;

- TfNSW - "Delineation"
- Austroads Guide to Road Design (2021) – Various Parts
- Australian Rainfall and Runoff
- Australian Standard 1742 – Manual of Uniform Traffic Control Devices

2.2 Horizontal Geometry and Cross Section

2.2.1 Horizontal Curves and Superelevation

The section of Bernera Road with proposed upgrades has a straight control alignment. No horizontal curves or superelevation is proposed.

2.2.2 Typical Cross Sections

The cross-section geometry for both Bernera Road is shown below.

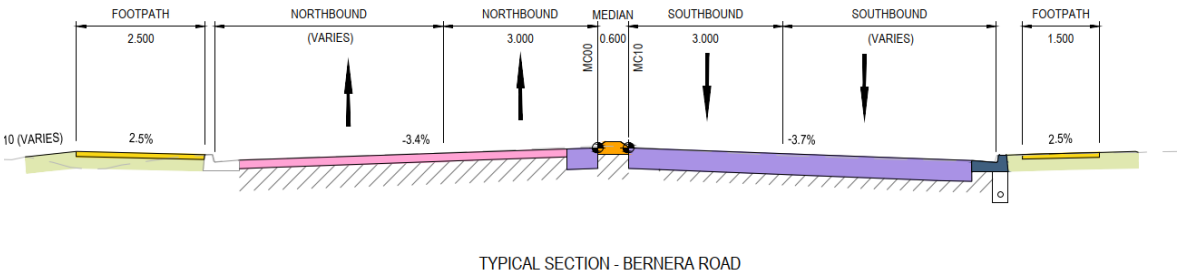


Figure 2 Proposed Typical Cross Section – Bernera Road

2.3 Vertical Geometry

Bernera Road vertical geometry has been designed to balance the crossfalls on the northbound and southbound carriageways and tie into the existing kerbs intended to be retained. Crossfalls vary from 2-4%.

2.4 Proposed Drainage

The existing subsurface network of stormwater pipes is proposed to be retained with only modification to pits where surface levels have changed. Surface inlets are proposed to be modified to suit proposed kerb and gutter.

2.5 Provision for Cyclists

There are no existing or proposed dedicated on-road facilities for cyclists.

A 2.5m shared path is proposed on the north-bound footway which will improve the safety for cyclists and provide active transport connectivity between employment zones in Prestons and Cartwright.

2.6 Provision for Pedestrians

The existing Bernera Road corridor features disjointed footpaths for pedestrians. The proposed design fills in the gap on both the northbound and southbound sides.

Pedestrian ramps and crossing facilities have been provided at the Yarrawa St roundabout.

Signalised pedestrian crosswalks are included at the signalised intersection immediately south of the proposed limit of works on Bernera Road.

2.7 Linemarking & Signposting

The extent and type of new line marking has been provided on the concept design plans. Any linemarking made redundant by the upgrade works will be removed in accordance with Liverpool City Council requirements.

Details of the proposed signposting have been provided on the concept design plans.

3 NORTHBOUND FOOTWAY

Special design consideration has been given to the proposed shared path upgrade on the Northbound footway.

3.1 Existing Drainage Channel

Between chainage 100 and 260 on Bernera Road, the Northbound footway features a varying concrete stormwater channel. A typical section of the existing channel is shown in Figure 3 below.

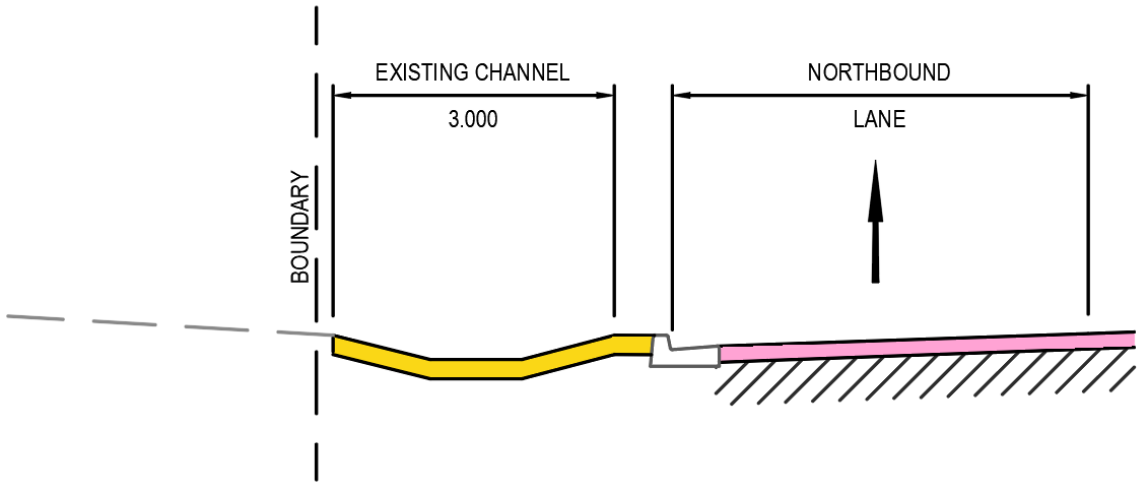


Figure 3 Existing Concrete Channel

The total catchment size of this channel was determined from LiDAR contours and estimated to be 3ha. A time of concentration was estimated and a peak flow rate using the Rational Method was calculated. The peak flow rates calculated are tabulated below.

Table 3.1: Existing Channel Peak Flow Rates

Annual Exceedance Probability (AEP)	C	Tc (min)	Intensity (mm/hr)	Flow (L/s)
10%	0.43	22.15	78.72	282
1%	0.52	22.15	118.97	516

The existing concrete channel has a capacity of 1091 L/s (no freeboard).

3.2 Proposed Drainage

Liverpool City Council has directed ADW Johnson to design a continuous masonry hob wall with intermediate inlet pits that drain to adjacent kerb inlet pits on Bernera road. A typical detail of this wall is shown in Figure 4 below.

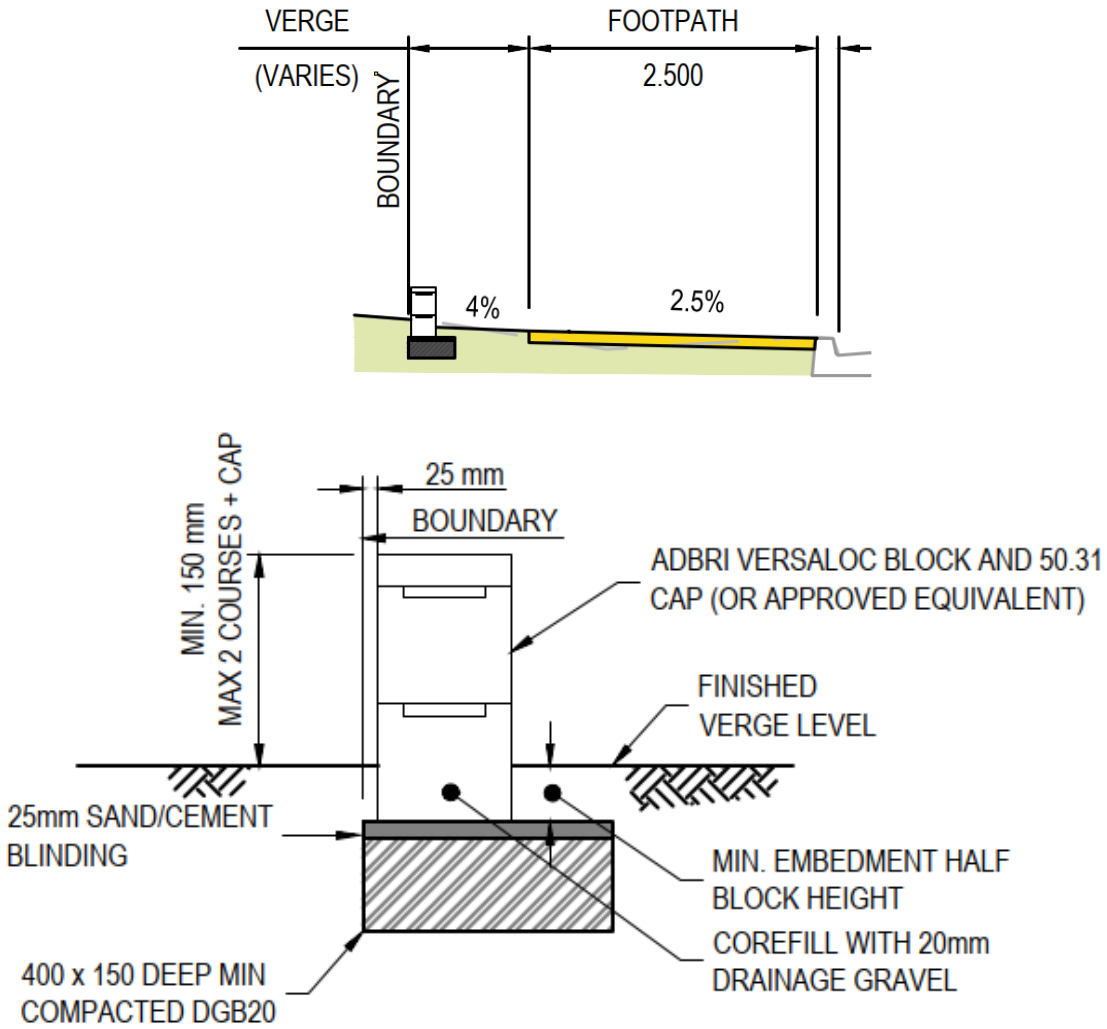


Figure 4 Proposed Hob Wall

MU GROUP
TRANSPORT AND INFRASTRUCTURE

MU GROUP CONSULTING

Draft Road Design Report – 100% Detail Design

Bernera Road Upgrade, Prestons

LIVERPOOL CITY COUNCIL

This report has been prepared by MU Group Consulting for Liverpool City Council and may only be used and relied on by Liverpool City Council for the purpose agreed as set out in the Consultancy Agreement.

The services undertaken by MU Group Consulting in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. MU Group Consulting has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

MU Group Consulting has prepared this report on the basis of information provided by Liverpool City Council and others who provided information to MU Group Consulting (including Government authorities), which MU Group Consulting has not independently verified or checked beyond the agreed scope of work. MU Group Consulting does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

DRAFT

Document Control

Revision History

Revision	Date	Prepared by	Reviewed by	Approval for issue by
1	21/09/2022	Sula Jayawickrama	John Kalantzis	Joekarl Diaz
2				
3				

Printed copies of this document are uncontrolled. Holders of uncontrolled copies must ensure that they have the latest version.

Content

Executive Summary 5
1 Introduction 6
1.1 Purpose of this document 6
1.2 Project Background 6
1.4 Project Location 7
1.5 Project Scope 9
2 Background and context 10
2.1 Existing Site Conditions 10
2.2 Reference Documents 14
2.3 Traffic Modelling 14
2.4 Crash History 14
3 Options 16
3.1 Description 16
3.2 Advantages 16
3.3 Disadvantages 16
3.4 Reasons for preferred options 16
4 Design Elements 17
4.1 Cross section 17
4.2 Horizontal Alignment 18
4.3 Vertical Alignment 19
4.4 Utilities 20
4.5 Drainage Design 21
4.6 Pavement Design 22
4.7 Property / Environmental Constraints 23
4.8 Intersections 24
4.9 Traffic Signals 24
4.10 Structures 25
4.11 Urban Design 26
4.12 Departures from current approved Design Standards 26
5 Finalisation 27
5.1 Design Reviews 27

DRAFT

5.2 Road Safety Audit 27
5.3 Health and Safety in Design 27
5.4 Quantities 27
Appendix A – 100% Detail Design Drawings 28
Appendix B – Design Issues and Change Register 29
Appendix C – HSiD Report and Risk Register 30
Appendix D –TCS 4477 Swept Path Analysis 31
Appendix E – TCS 4477 Technical Note 32
Appendix F – Utility Survey 33
Appendix G1 – Geotechnical and Pavement Test Results 34
Appendix G2 – Design asphalt modulus reports 35
Appendix H – Retaining Wall Design 36
Appendix I – VMS Footing Design 37
Appendix J – Background Drainage Information 38

DRAFT

Executive Summary

MU Group Consulting have been engaged by Liverpool City Council to provide engineering and design services for the proposed upgrade to Bernera Road between Kurrajong Road and about 120m North of the Yarrunga Street/ Yato Road intersection, Prestons. These works aim to improve traffic and safety along this segment of road and cater for future projected traffic volumes.

The scope of works includes developing the detailed design to upgrade this section of road from the existing two-lane road to a divided four lane road, including to upgrade the signalised intersection with Yarrunga Street and Yato Road to provide dedicated right turn lanes. Council has separately engaged a traffic signal designer to prepare the TCS design for this intersection, and our civil design is integrated with the TCS design that is developed.

Minor adjustments were also required at the Kurrajong Road and Bernera Road intersection, with a revised TCS design (TCS 4477) developed by MU Group taking into consideration TfNSW and Council comments.

The detailed design has been developed in two stages: 80% and 100% detailed design stages. This report refers to the 100% detailed design submission. This design has been developed based on the concept design provided by Liverpool City Council, and the 80% detailed design developed by MU Group.

There were no design review comments provided by Council on the 80% detailed design submission, and MU Group were instructed to proceed with developing the 100% detailed design.

This detailed design report covers the various design components and disciplines involved with the project that include road design, TCS design, utility relocations including streetlighting design, drainage design, pavement design, property adjustments, geotechnical investigations, and structural design. All these design elements have been developed in accordance with relevant Australian Standards, Austroads and Council specifications.

The road design includes widening on the approaches to the Yarrunga Street and Yato Road intersection, provision of a central median for the extent of the project, signs and line marking, and pavement design.

The existing VMS sign on Bernera Road is impacted by the proposed road widening and will need to be relocated within the land acquired on the southwestern corner of the Yarrunga Street and Yato Road intersection. A property adjustment plan has been developed for this property to reflect the proposed changes. Council will need to liaise with the property owner in regard to the proposed retaining wall, relocation of the existing fencing, and relocation of the existing hydrant and gas meter, and any changes to the landscaping within their property.

Utility relocation works including streetlighting are required. The utility design plans are being developed in accordance with relevant utility authorities and their requirements.

DRAFT

1 Introduction

1.1 Purpose of this document

This design report documents the design approach undertaken and describes the reasons for design decisions throughout the design process as shown on the drawings. This report is to be read in conjunction with the 100% detailed design drawings provided in Appendix A.

The objectives of this Design Report are to:

- Provide information on the background to design decisions.
- Provide a general understanding of issues with the design that may require investigation in the subsequent design phases
- Highlight any variations to approved design standards.

1.2 Project Background

MU Group Consulting have been engaged by Liverpool City Council to provide a detailed design for the proposed upgrades to Bernera Road from Kurrajong Road to about 120m North of its intersection with Yarrunga Street/ Yato Road, Prestons. The proposal involves providing a continuous four-lane divided road to service the local industrial area and improve traffic efficiency between Camden Valley Way and the M7 Motorway.

- Upgrading the existing two-lane road to a divided four-lane road
- Provision of a central median for the extent of the project
- Installation of new kerb and gutter
- Upgrade the signalised intersection with Yarrunga Street and Yato Road (TCS 4263) to provide dedicated right turn lanes (traffic signal design prepared by others)
- Localised road widening on the approaches to Yarrunga Street and Yato Road requiring land acquisition and property adjustment plans
- Minor adjustment works at the Kurrajong Road and Bernera Road intersection (TCS 4477). A technical note was prepared to assist TfNSW in reviewing the traffic signals design
- Relocation of the existing M7 Motorway VMS
- Provision of 2.5m shared path on one side and a 1.5m footpath on the other side.
- Road pavement rehabilitation
- Stormwater drainage
- Relocation of impacted utility services including streetlighting upgrade
- Preparation of a bill of quantities and a cost estimate at 100% detailed design

Design of the Bernera Road upgrade has been undertaken in two stages; 80% and 100% detail design.

DRAFT

1.3 Project Objectives

The project aims to improve traffic and safety along this segment of road and cater for future projected traffic volumes. The objectives include:

- Increased mid-block road capacity on Bernera Road by providing two additional traffic lanes.
- Improve the existing traffic signals at Bernera Road, Yarrunga Street and Yato Road to remove existing traffic pinch point and to meet future traffic needs.
- Restrict right turn movements in the Bernera Road section between Kurrajong Road and 120m North of the Yarrunga Street/ Yato Road intersection to improve road safety.

1.4 Project Location

The project is located within the City of Liverpool Local Government Area. Bernera road is a regional road under the control of Liverpool City Council, between Yarrawa Street/ M7 off-load ramps, Prestons, and Croatia Avenue/ Soldiers Parade, Edmondson Park. It provides access to Prestons Industrial area and links M7 Motorway with residential areas of Prestons, Edmondson Park, Carnes Hill, and Casula. Bernera Road has signposted 60km/h speed limit and will remain unchanged.

The project location is between Kurrajong Road/Bernera Road intersection to Bernera Road approx. 120m North of its intersection with Yarrunga Street/ Yato Road.

The site location is shown below in Figure 1.

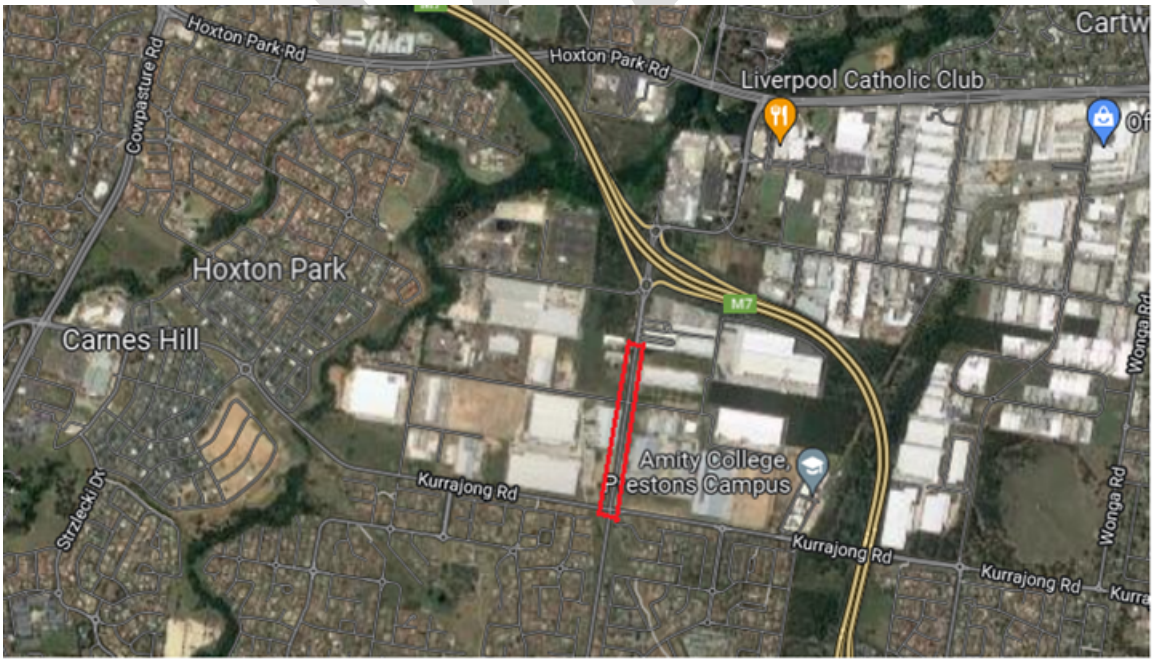


Figure 1: Site location [*Source: Google Maps 2022*]

DRAFT

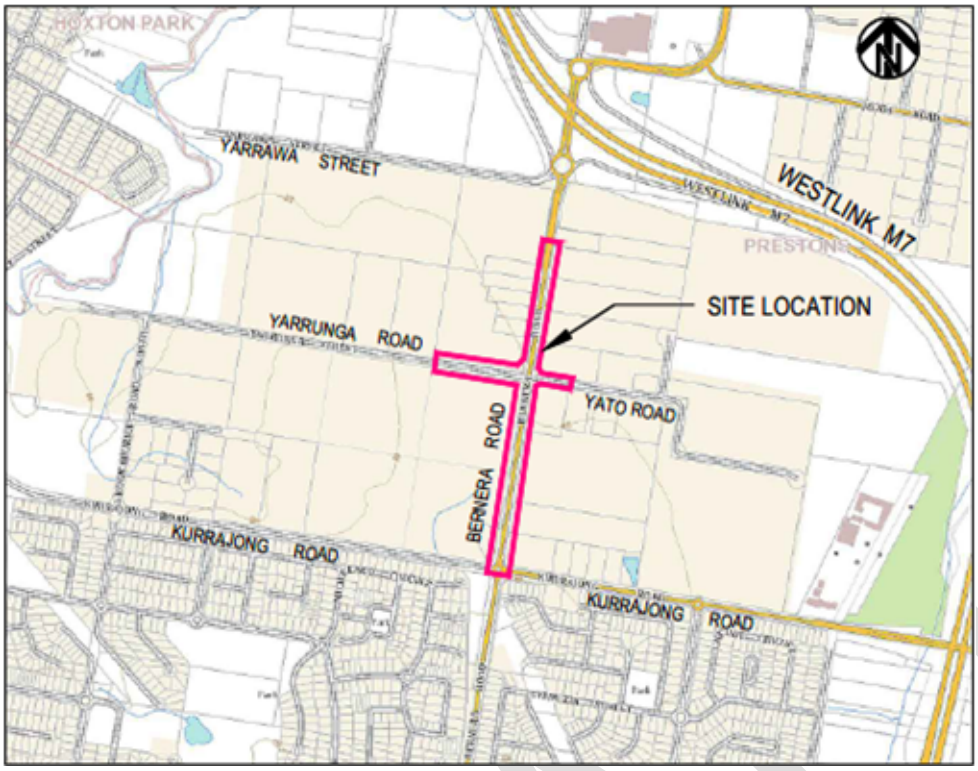


Figure 2: Locality Plan

DRAFT

1.5 Project Scope

The project scope is as follows:

1. Review of Concept Design drawings and background information.
2. Field and Desktop investigations works,
    - Geotechnical Investigations including pavement investigation
    - Additional topographic survey
    - Review of DBYD utility information and utility surveys provided by Council
    - Gather and review available information to identify and notify Council of gaps
3. Develop design drawings and documentation in two stages:
    - 80% - Detailed Design
    - 100% - Final Detailed Design
4. Develop design drawings and documentation including the following:
    - Geometric and drainage designs
    - Pavement design
    - Property adjustment works plan (LOGOS Site)
    - Utility co-ordination plan
    - Retaining wall design
    - VMS foundation and footing design (in consultation with Westlink and AECOM)
    - Turning path analysis
    - TCS design for the intersection of Kurrajong Road and Bernera Road (TCS 4477)
    - Electrical and lighting relocation designs
    - Sydney Water watermain and sewer relocation designs
    - Project risk register
    - HSiD workshop and associated safety-in-design reporting.
5. Develop schedule of quantities and cost estimate at 100% detail design stage.

DRAFT

2 Background and context

2.1 Existing Site Conditions

The project is located along Bernera Road from the Kurrajong Road intersection to about 120m North of the Yarrunga Street/ Yato Road intersection. Bernera Road is classified as a B-Double route and has a posted speed limit of 60km/h.

Bernera Road is an existing two-lane road with a standard four-way intersection with Yarrunga Street and Yato Road. On approach to this intersection from Bernera Road there are two lanes in each direction. The approach to the intersection from Yato Road has through lane and dedicated right turn lane, whilst the approach from Yarrunga Street is a single lane approach.

At the southern extent of the project, it ties in with the Kurrajong Road intersection. On approach to the intersection, Bernera Road caters for two south bound lanes, and a dedicated right turn lane.

The adjacent land use consists of industrial development on both the eastern and western side of Bernera Road. The eastern side of Bernera Road includes Boral concrete, a BP Truckstop, OZ Grooming world, Western Pet supplies, Ingham cold store, and Fashion Biz warehousing. The western side of Bernera Road mainly includes warehousing and has undeveloped land close to the Yarrawa Street roundabout. There is an existing development by LOGOS property on the south-western corner of the Yarrunga Street and Yato Road intersection that requires road widening and property acquisition to be undertaken by Council. There is also a proposed development on the north-western corner where we understand Council is liaising with the property developer to ensure their works tie in in the proposed intersection upgrade.

A site inspection was undertaken on 2 September 2021 and again on 19 July 2022, for familiarisation of the site as part of the design development. Site photos taken at the site inspection and photos provided by Council have been attached below. Photos not captured on site have been obtained from Google Street images.

DRAFT

Figure 3: Facing North - Bernera Road and Kurrajong Road intersection [Source: Google Maps 2022]

Figure 4: Facing South - Bernera Road and Kurrajong Road intersection

[Source: Google Maps 2022]

Figure 5: Facing North - Bernera Road intersection with Yarrunga Street and Yato Road

[Source: Google Maps 2022]

Figure 6: Facing South - Bernera Road intersection with Yarrunga Street and Yato Road.

[Source: Google Maps 2022]

Figure 7: Facing North – M7 Motorway Variable Message sign (VMS) at CH374

Figure 8: Culvert structure passing under Bernera Road around CH270

2.2 Reference Documents

The standards, specifications, and reference documents applicable in this design include:

- Austroads Guide to Road Design
- TfNSW Supplements to Austroads Guide to Road Design
- TfNSW Supplements to Australian Standards
- TfNSW Traffic Signal Design Guide
- TfNSW Technical Specifications
- TfNSW Standard Drawings
- TfNSW Traffic and Transport Technical Directions
- TfNSW Delineation Manual
- Liverpool City Council's Technical Specifications
- Liverpool City Council Handbook for drainage design criteria

2.3 Traffic Modelling

Initial SIDRA traffic modelling was undertaken by Council to inform the concept design that was developed by others. MU Group have developed the detailed design based on the same intersection layouts as per the Concept Design provided by Council.

2.4 Crash History

Crash history for the site was not provided by Council.

2.5 Design Methodology and Approach

The design methodology applied for the 100% detailed design development has sought to:

- Review the relevant data as supplied by Council
- Identify any data gaps and liaise with Council to address
- Confirm design parameters (design speed(s) and design vehicles) Details shown in table below.
- Review proposed traffic arrangement as shown in the concept design developed by others
- Turning path check to ensure sufficient clearances in accordance with the TfNSW and other industry requirements
- Prepare detail design including:
    - General Arrangement plans
    - Long sections
    - Cross sections
    - Pavement plans
    - Road furniture plans
    - Stormwater management plans
    - Property adjustment plans
- Prepare a brief design report documenting design decisions made during the design process
- Liaise with key stakeholders regarding the VMS and traffic signal design

DRAFT

- Collaborate with Liverpool City Council.

The 100% detailed design has been developed based on the final concept design provided by Council and the 80% detailed design submission. Throughout design development, any requested changes to the scope of works, or comments provided by Council, and TfNSW, as well as any other findings have been incorporated into this final 100% detailed design.

The HSiD workshop was conducted on 11 August 2022 to inform the safety in design issues for the upgrade and any identified issues adopted into the 100% detailed design where applicable. A HSiD workshop report and HSiD risk register have been prepared and can be located in Appendix C.

No design review comments were provided by Council on the 80% detailed design submission, and MU Group were instructed to proceed with developing the 100% detailed design.

Identified design departures have been listed in Table 1 of Section 4.12 of this design report.

The following values from the design guidelines have been adopted in design development.

Location	Design Element	Criteria / Value	Reference
Bernera Road	Design Speed	70km/h	TfNSW Design Guidelines
	Posted Speed	60km/h	Existing condition
	Design Vehicle	B-Double 26m/ PM S 19m	TfNSW Design Guidelines
Kurrajong Road	Design Speed	70km/h	TfNSW Design Guidelines
	Posted Speed	60km/h	Existing condition
	Design Vehicle	B-Double 26m/ PM S 19m	TfNSW Design Guidelines
Yarrunga Street	Design Speed	60 km/h	TfNSW Design Guidelines
	Posted Speed	50 km/h	Existing condition
	Design Vehicle	B-Double 26m/ PM S 19m	TfNSW Design Guidelines
Yato Road	Design Speed	60 km/h	TfNSW Design Guidelines
	Posted Speed	50 km/h	Existing condition
	Design Vehicle	B-Double 26m/ PM S 19m	TfNSW Design Guidelines

Table 1: Design Speed Criteria

3 Options

3.1 Description

No optioneering exercise was undertaken for this project. The concept design was provided by Council, and the 100% detailed design has been developed based on the concept design.

3.2 Advantages

The advantages associated with the proposed design include:

- Increased mid-block road capacity on Bernera Road.
- Improved existing traffic signals at Bernera Road, Yarrunga Street and Yato Road to remove existing traffic pinch point.
- Restricted right turn movements in the Bernera Road section between Kurrajong Road and 230m south of the Yarrawa Street intersection.

3.3 Disadvantages

The disadvantages associated with the proposed design include:

- Property adjustments and property acquisition required
- Utility relocations/ protection required
- Potential disruption to traffic during construction.

3.4 Reasons for preferred options

The proposed design builds on the concept design taking into consideration the traffic requirements along the corridor, whilst also addressing the objectives of the project as outlined in the project brief.

DRAFT

4 Design Elements

4.1 Cross section

The image below shows the typical cross section at Bernera Road.

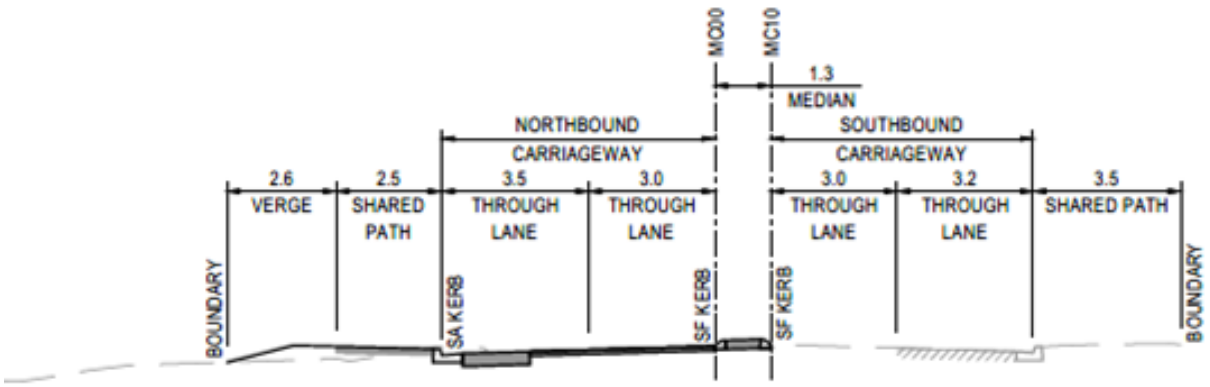
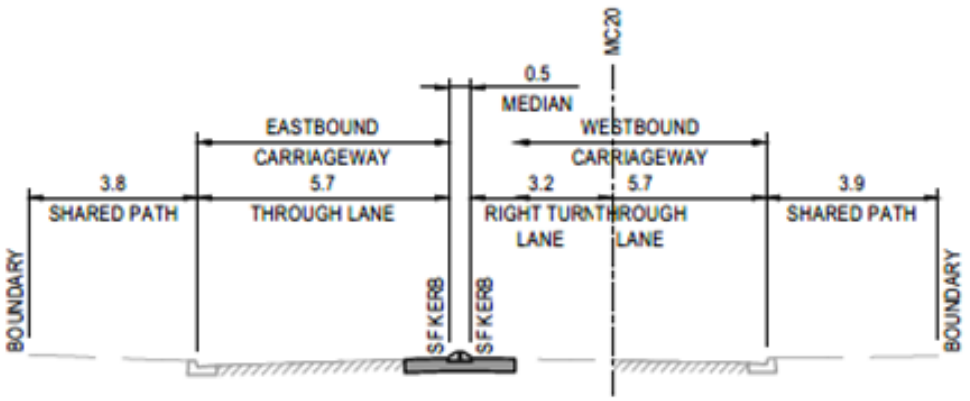


Figure 9: Bernera Road cross section at CH300.000

The cross section at Bernera Road allows two north bound lanes, two south bound lanes with a 600mm central median. A dedicated shared path on the northern side of Bernera Road runs from Kurrajong Road to the northern limit of works at CH 660.000

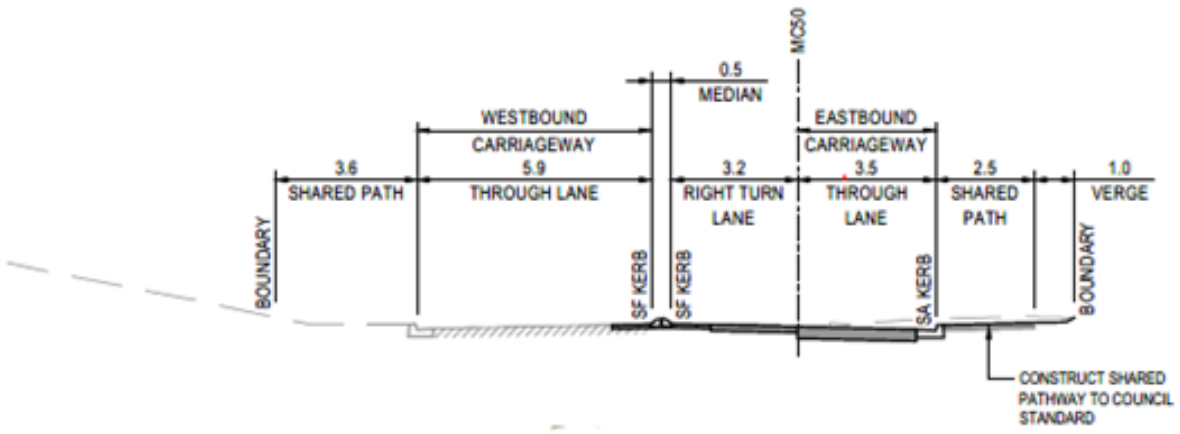
- Constrained lane widths along Bernera Road have been the result of Council's request to minimise additional kerb widening and acquisition during detailed design.
- Lane widths along Bernera Rd, Yarrunga Road and Yato Road are below the desirable 3.5m. The minimum lane width is 3.0m in some locations along both the north and south bound carriageways.

<u>Typical Cross section Yato Road – CH20.000</u>



Yato Road allows one east bound lane, with a back to back SF kerb median. Turning out of Yato Road there is a dedicated right-turn lane into Bernera Road and one left turn or straight through west bound lane.

Typical Cross section Yarrunga Road – CH50.000



The cross section at Yarrunga Road allows two west bound lanes, with a back-to-back SF central median, one right turn lane into Bernera Road and one left-turn or straight through east bound lane.

- Council have acquired land for the purposes of the road widening at the intersection with Yato Road and Yarrunga Street based on the Concept Design plans.

4.2 Horizontal Alignment

Generally, the 100% detailed design maintains the existing horizontal alignment where there is currently two lanes northbound. There are two control strings along Bernera Road. MC00 is located on the base of the central median SF Kerb northbound. MC00 transitions over the intersection and continues along the edge of the central median.

MC10 is located along Bernera Road southbound C1 line from Kurrajong Road intersection then follows the median edge.

The horizontal geometry is primarily a straight alignment with minimum 400 radius curve to transition out at the intersection at CH 280.000 to provide two through lanes and develop the right turn at Yato and Yarrunga Rd. The alignment then continues and ties in with a 400-radius curve into the existing two lane configuration northbound.

Both Yato Road (MC20 and MC30) and Yarrunga Street (MC40 and MC50) are a straight alignment with minimal changes to the existing.

Vehicle swept path checks, included in the detail design package, have been undertaken at the intersection of Bernera Road with Kurrajong Road and Bernera Road with Yato and Yarrunga Road.

4.3 Vertical Alignment

Generally, the 100% detailed design maintains the existing vertical alignment. The vertical alignment adopts the existing grade from CH0.000 to 280.000

From CH 280.000 the design is a series of crest vertical curves, gradual grades and sag curves that satisfy 60-70km/h design speed with a minimum K value of 20.

Yarrunga Street longitudinal grades adopts the existing levels from CH 16.500. The vertical alignment is raised above the existing between CH 0.000 to CH 16.500 to improve the drainage of the intersection.

Yato Road design adopts the existing and has a relatively flat grade moving away from Bernera Road towards Burando Road.

DRAFT

4.4 Utilities

Utility Investigations were undertaken by Council to confirm the location of existing underground services. The utility survey provided by Council is attached as Appendix F. As part of their project familiarisation, MU Group reviewed the utility survey information provided by Council to confirm potentially affected utilities and to identify gap analysis where additional utility investigations were required.

Based on review of the utility survey provided by Council, MU Group identified the following utilities were impacted:

- Communication assets including Telstra, Optus, NBN and TPG.
- Jemena gas mains
- Endeavor Energy electrical and street lighting assets (overhead and underground)
- Sydney Water – water and sewer
- TfNSW traffic signal control infrastructure
- Westlink M7 Motorway assets – VMS & ITS

Upon review of the utility survey information provided by Council, MU Group identified a number of key locations where additional QL-A potholing was required. The additional QL-A potholing information received from Council was incorporated into our design model, however no existing utilities design model (QL-B) was provided by Council for the utility authorities/designers to utilise to develop utility relocation plans.

At time of writing this report status of the design relocations is as follows.

- Telecommunications – Designs have progressed with Optus, NBN and TPG, currently awaiting the Telstra design to finalise their own scope of works.
- Jemena gas – Awaiting the project utilities design model. It is understood due to the uncertainty around the process for Jemena to obtain ROA's from TfNSW, Jemena is unable to provide a cost for installation of the conduits, excavation and backfill, and applying for all applicable permits from TfNSW, and have therefore assigned all these works for the Bernera Road project to "Applicant", who in this instance is Liverpool City Council.
- Sydney Water – Qalchek our water services coordinator is awaiting Liverpool City Council to approve an outstanding variation to complete their ground survey check prior to issue to Sydney Water for certification. There is a high risk associated with review should there be a change in pit levels redesign of the mains being required.
- Endeavour Energy – There is a scope change associated with this works due to the impact to the overhead electrical at the intersection of Bernera Road and Yarrunga Street. The ASP3 designer will confirm revised scope of works to finalise the design
- VMS/ITS – to be relocated in coordination with the Westlink/M7 Motorway team. Noting the meetings had been held with Westlink M7 and Council on this matter.

MU Group will continue to liaise with each relevant utility authority to relocate/protect services as required. The scope of works for each utility authority will be incorporated into the 100% detailed design Proposed Utility Design Plans to be provided at a later date.

DRAFT

4.5 Drainage Design

The drainage design was a compilation of drains models supplied by Council and developed by J Wyndham Prince (JWP) consultants. JWP were provided a flood study and survey by Council to develop these drains models. The survey did not pick up all the invert levels and there were inconsistencies with the pipe size information.

It should be noted that there is a 1050mm pipeline discharging from the OSD basin located within the lot 20 in DP1173483, which has not been located in the survey, however, is identified within the JWP drains model.

The 12d drainage module combining the 3 provided drains models from JWP indicated there was no surcharging for the 1 in 5-year events. MU Group used Council's "Handbook for Drainage Design Criteria" document in checking councils drainage system. It should be noted that the document uses the ARR1987 methodology values, which were utilised for the design. Refer to Appendix J for the comparative values for ARR1987 and ARR2019.

The ARR1987 has a higher intensity runoff than the ARR 2019. Therefore, this worst-case scenario data was used in the determination of the drainage system.

There is an overall marginal increase in the impervious areas and the existing drainage system coped with the new runoff.

We have identified what appears to be an OSD/water quality pond within the Logos site on 5-35 Yarrunga Street (near the corner of Bernera Road and Yarrunga Street that will be impacted by the proposal, and the installation of the new retaining wall). There is a potential risk associated with the possible reduction in the size of this pond that may affect the discharge rates from the development. This has been raised with Council at progress meetings and via email, and MU Group was instructed to proceed on the advice from Council that this is not the case.

The drainage design has been revised since the 80% detailed design submission to provide additional surface flow inlets that will utilise the existing drainage system to reduce gutter flow widths and avoid potential constructability issues with the 1050mm drainage pipe running beneath the kerb and gutter along western side of Bernera Road.

DRAFT

4.6 Pavement Design

Geotechnical investigations (boreholes and pavement cores) have been undertaken by Geotechnique to inform the configuration of the existing pavement and the subgrade type and conditions. The geotechnical investigation report is provided in Appendix G1.

The pavement design was based on the principle of maintaining a consistent flexible pavement type. The new pavement has been designed to meet a design life of 20 years (Design ESA's = 8 x 106). A project reliability of 90% has been used based on the design traffic (refer to AGPT02-17 Table 2.1, Main Road: lane AADT > 500).

The material parameters that have been used in the pavement design are shown in Table 2.

Material	Heavy Vehicle Speed (km/h)	Material Behaviour	Poisson's Ratio	Modulus (MPa)
AC14 (PMB Class A15E)	60	Isotropic	0.40	2,400
AC20 (Bitumen Class 450)	60			3,500
Selected Material for SMZ	N/A	Anisotropic	0.35	150
Subgrade (CBR 3%)		Anisotropic	0.45	30

Table 2: Material Properties used in Mechanistic Empirical Analysis using CIRCLY

Design asphalt modulus reports are provided in Appendix G2-A.

The pavement design calculations were carried out using the pavement design software FPD2 Version 2.0 that runs CIRCLY in the background. The flexible pavement design summary report is provided in Appendix G2-B. A 10mm construction tolerance has been added to the design thickness of the critical pavement layer.

The configuration of the new pavement is shown in Table 3.

Layer	Material	Specification	Thickness
Wearing Course	AC14 (PMB Class A15E)	TfNSW R116	50
Intermediate Layer	AC20 (Bitumen Class 450)		90
Intermediate Layer	AC20 (Bitumen Class 450)		90
Pavement Foundation	Selected Material for SMZ (placed in two layers as per specification R44)	TfNSW R44	300
Note: A 7mm low-cutter seal must be placed on top of the Selected Material Zone.			

Table 3: Proposed New Full Depth Asphalt - Pavement Type 1

The new asphalt pavement has been designed for the asphalt to be placed by using a self-propelled paver. Nevertheless, hand placement of asphalt may be required for small areas where placement with a paver is impractical.

DRAFT

Pavement edge and interface trench drains have been specified in the drawings in accordance with TfNSW practice.

4.7 Property / Environmental Constraints

Based on information provided by Council, we understand there are 5 properties impacted by the proposed design that require partial acquisition.

1. 5-35 Yarrunga Street, Prestons
2. 2-10 Yarrunga Street, Prestons
3. 27 Bernera Road, Prestons
4. 25 Bernera Road, Prestons
5. 28 Bernera Road, Prestons

MU Group have been requested to develop a property adjustment plan for the LOGOS site located at 5-35 Yarrunga Street, Prestons to reflect the proposed changes. Council needs to liaise with the property owner regarding the proposed retaining wall, relocation of the existing fencing, relocation of the existing water hydrant and gas meter, as well as any other design features such landscaping contained within their property.

A Review of Environmental Factors (REF) under Part 5 of the Environmental Planning and Assessment Act 1979 will be prepared by Council to address environmental considerations applicable to the project. Council has not advised MU Group of any environmental issues to be considered in developing the 100% detail design.

DRAFT

4.8 Intersections

Bernera Road/ Kurrajong Road Intersection

Minor central median and lane width adjustments are required at the intersection, including amendments to the TCS 4477.

Yato Road/ Yarrunga Street Intersection

The works at this intersection include widening of existing kerbs to cater for the additional turning movements in accordance with the project description and client brief. The proposed lane configuration will cater for two lanes in each direction along Bernera Road and dedicated right turn lanes. Yato Road and Yarrunga Road both allow for single lanes in each direction including dedicated right turn bays.

The left turn movement for B-Double semi-trailers turning from Yato Road into Bernera Road requires the vehicles to straddle both lanes - left turn and right turn only. This issue was raised with Council who advised this was not a concern as Council are looking to minimise the number of heavy vehicles traveling south along Bernera Road towards Kurrajong Road and would rather these heavy vehicles turn right to access the M7 on ramp.

4.9 Traffic Signals

The proposed works will require upgrades to two existing traffic signals being TCS 4477 (Kurrajong Road/ Bernera Road) and TCS 4263 (Yarrunga Street/ Yato Road).

The proposed traffic signals adjustment works at TCS 4477 include:

- Incorporate the proposed central median in Bernera Road and amend lane widths
- New detectors 5,6,7 and 8 on the northern approach to the intersection. Note: Detector 5 (southbound kerbside in Bernera Road) is located closer to the stop line to avoid services, similar to existing arrangement.
- Combined pedestrian and cycle lanterns have been provided on the western and northern crossings to connect the newly constructed and proposed shared paths.

To assist TfNSW with reviewing the traffic signals design plan, a Technical Note was developed and submitted in conjunction with the traffic signals design. The technical note is provided in Appendix E.

Kurrajong Road and the northern leg of Bernera Road are currently classified B-Double routes. The proposed median in the northern leg of Bernera Road will not have impact to existing turning capabilities at the intersection. A 26m B-Double has been used to check the turning path for the diamond D phase and G phase in consideration of potential future expansion of the B-Double network. The swept path analysis is provided in Appendix D.

TCS 4263 design has been developed by Council and reviewed by TfNSW. Review comments have been forwarded onto MU Group for consideration into the design. We understand Council will issue MU Group's 100% detail design plans to their TCS designer to update the TCS design to reflect our civil design plans.

DRAFT

4.10 Structures

Variable Message Sign (VMS)

The existing Variable Message Sign structure at CH374 which is owned by Westlink M7 is impacted by the road widening, and any adjustments to this structure requires their approval.

A draft VMS plan showing the proposed location including key elements such as retaining wall, guardrail, maintenance bay etc was submitted for review with the VMS shown at CH374 as reflected in the concept design plans provided by Council.

At the meeting held with TfNSW, Aecom, Westlink M7 and Council on 30 March 2022, feedback was provided regarding the proposed VMS location and associated footing design structure. The preferred VMS location has been reflected in the 100% detail design plans.

Aecom, Westlink's independent verifier for structures requested Council to undertake geotechnical investigations to inform the structural footing design. Council has undertaken these geotechnical investigations and provided the geotechnical borehole report on 25 August 2022. The geotechnical investigation findings located the bedrock slightly above the assumed depth at 80% detail design and is now updated in the 100% detail design documentation. The final (100%) footing design plans will now allow independent verification by Aecom.

The potential impacts of the VMS footing on existing utilities, in particular the 1050mm drainage was not raised by Council following their geotechnical investigation at the exact location of the proposed VMS footing. It is assumed that this issue is now resolved and there are no clashes.

VMS Footing Design drawings are provided in Appendix I.

Directional Signage structure

The existing directional signage structure at CH655 is not impacted by the proposed works.

Retaining Wall

The relocation of VMS structure at CH374 resulted in cuts in the existing earth mount which required the introduction of a retaining wall structure. Given the current and potential future utilities within and around the new diverted shared path, it was considered that wide pad footings for cantilever walls were not appropriate. A narrow footing with bored piles and reinforced concrete block wall was adopted which also allows for future trench excavations (around 500mm deep) in front of the retaining wall for utilities replacement.

The Retaining Wall Design drawings are provided in Appendix H.

DRAFT

4.11 Urban Design

Liverpool City Council are responsible for undertaking the environmental assessments (REF) for the project, and will take into consideration any urban design elements as required. Urban design was not part of MU Group's scope.

4.12 Departures from current approved Design Standards

Item	Standard Criteria	Standard Reference	Description of Departure	Rationale
1	Desirable 3.5m lane width	Austroads	Non-conforming lane widths of 3.0m	Constrained lane widths along Bernera Road as a result of Council's request to minimise additional kerb widening and avoid additional property acquisition.
2	Desirable 1.2m median width	Austroads Table 4.15 AGRD Part 3	The central median along the corridor is 0.6m wide and widens out on approach to the signalised intersections.	Restricted corridor width as a result of Council's request to minimise additional kerb widening and avoid any additional property acquisition.

DRAFT

5 Finalisation

5.1 Design Reviews

Design development has included regular oversight and review by experienced senior design and delivery engineers. This 100% detailed design has been developed in close liaison with Council with progressive advice from Council and TfNSW.

Prior to issue of the 100% detailed design, an internal review of the plans has been undertaken with comments incorporated into our Design Review Comments register and addressed.

5.2 Road Safety Audit

The Road Safety Audit has been undertaken by Council.

At the time of writing this report Council have not provided any findings from their Road Safety Audit.

5.3 Health and Safety in Design

Health and Safety-in-Design principles are integral in MU Group Integrated Management System.

The HSiD workshop was conducted on 11 August 2022 to inform the safety in design issues for the upgrade and any identified issues adopted into the 100% detailed design where applicable. A HSiD workshop report and HSiD risk register have been prepared and can be located in Appendix C.

5.4 Quantities

A schedule of quantities and cost estimate will be prepared by MU Group, issued to Council within a week of issuing the 100% detailed design.

DRAFT

Appendix A – 100% Detail Design Drawings

DRAFT

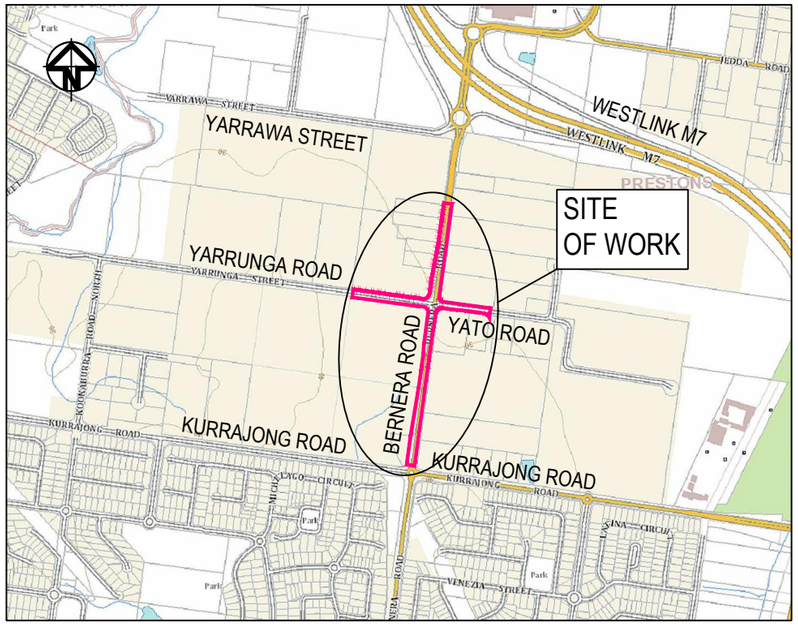
LIVERPOOL CITY COUNCIL

BERNERA ROAD

UPGRADE TO FOUR LANES

FROM KURRAJONG ROAD TO YARRAWA STREET, PRESTONS

100% DETAILED DESIGN



LOCALITY PLAN

NOT TO SCALE

PART INDEX

PART NUMBER	CODE	NAME
	GE	GENERAL
	RD	ROAD ALIGNMENT AND DETAIL
	CS	ROAD ALIGNMENT CROSS SECTIONS
	LS	ROAD ALIGNMENT LONG SECTIONS
	UT	UTILITIES
	SM	STORMWATER MANAGEMENT
	DL	STORMWATER PROFILES
	PV	PAVEMENT
	RF	ROADSIDE FURNITURE AND LINEMARKING
	PW	PROPERTY WORKS

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 GE 0101.DWG | Last Plotted: 19/09/2022 11:36:32 PM By: BENZSON | Last Saved: 19/09/2022 5:59:14 AM By: BENZSON

DESIGNED	REVIEWED	VERIFIED	APPROVED	PROJECT MANAGER
SIGNED	SIGNED	SIGNED	SIGNED	NAME
NAME	NAME	NAME	NAME	TITLE
TITLE	TITLE	TITLE	TITLE	VALIDATION AND ACCEPTANCE OF THESE DRAWINGS AND THE DESIGN SHOWN THEREON IS TO BE CARRIED OUT UNDER SEPARATE PROCESS
DATE	DATE	DATE	DATE	

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
COVER SHEET

A3

PROJECT NUMBER:		PART
2021 25 DD 001		
ISSUE STATUS: 100% DETAILED DESIGN	SHEET No. GE 0101	ISSUE A

DRAWING INDEX

DRAWING No.	DRAWING TITLE
2021 25 DD 001 GE 0101	COVER SHEET
2021 25 DD 001 GE 0102	DRAWING INDEX - SHEET 1
2021 25 DD 001 GE 0103	DRAWING INDEX - SHEET 2
2021 25 DD 001 GE 0104	OVERVIEW PLAN
2021 25 DD 001 GE 0110	GENERAL NOTES
2021 25 DD 001 RD 0051	TYPICAL CROSS SECTIONS - MC00
2021 25 DD 001 RD 0052	TYPICAL CROSS SECTIONS - MC00
2021 25 DD 001 RD 0053	TYPICAL CROSS SECTIONS - MC20 AND MC50
2021 25 DD 001 RD 0101	GENERAL ARRANGEMENT PLAN - SHEET 1
2021 25 DD 001 RD 0102	GENERAL ARRANGEMENT PLAN - SHEET 2
2021 25 DD 001 RD 0103	GENERAL ARRANGEMENT PLAN - SHEET 3
2021 25 DD 001 RD 0104	GENERAL ARRANGEMENT PLAN - SHEET 4
2021 25 DD 001 RD 0105	GENERAL ARRANGEMENT PLAN - SHEET 5
2021 25 DD 001 RD 0106	GENERAL ARRANGEMENT PLAN - SHEET 6
2021 25 DD 001 RD 0107	GENERAL ARRANGEMENT PLAN - SHEET 7
2021 25 DD 001 RD 0108	GENERAL ARRANGEMENT PLAN - SHEET 8
2021 25 DD 001 RD 0201	ALIGNMENT PLAN - SHEET 1
2021 25 DD 001 RD 0202	ALIGNMENT PLAN - SHEET 2
2021 25 DD 001 RD 0203	ALIGNMENT PLAN - SHEET 3
2021 25 DD 001 RD 0204	ALIGNMENT PLAN - SHEET 4
2021 25 DD 001 RD 0205	ALIGNMENT PLAN - SHEET 5
2021 25 DD 001 RD 0206	ALIGNMENT PLAN - SHEET 6
2021 25 DD 001 RD 0207	ALIGNMENT PLAN - SHEET 7
2021 25 DD 001 RD 0208	ALIGNMENT PLAN - SHEET 8
2021 25 DD 001 RD 0251	ALIGNMENT PLAN - KERB - SHEET 1
2021 25 DD 001 RD 0252	ALIGNMENT PLAN - KERB - SHEET 2
2021 25 DD 001 RD 0253	ALIGNMENT PLAN - KERB - SHEET 3
2021 25 DD 001 RD 0254	ALIGNMENT PLAN - KERB - SHEET 4
2021 25 DD 001 RD 0255	ALIGNMENT PLAN - KERB - SHEET 5
2021 25 DD 001 RD 0256	ALIGNMENT PLAN - KERB - SHEET 6
2021 25 DD 001 RD 0257	ALIGNMENT PLAN - KERB - SHEET 7
2021 25 DD 001 RD 0258	ALIGNMENT PLAN - KERB - SHEET 8

DRAWING INDEX

DRAWING No.	DRAWING TITLE
2021 25 DD 001 RD 0301	ALIGNMENT SCHEDULE - SHEET 1
2021 25 DD 001 RD 0302	ALIGNMENT SCHEDULE - SHEET 2
2021 25 DD 001 RD 0311	KERB SCHEDULE - SHEET 1
2021 25 DD 001 RD 0312	KERB SCHEDULE - SHEET 2
2021 25 DD 001 LS 0401	LONGITUDINAL SECTION - MC00 - BERNERA RD - CH 0 TO CH 150
2021 25 DD 001 LS 0402	LONGITUDINAL SECTION - MC00 - BERNERA RD - CH 150 TO CH 300
2021 25 DD 001 LS 0403	LONGITUDINAL SECTION - MC00 - BERNERA RD - CH 300 TO CH 450
2021 25 DD 001 LS 0404	LONGITUDINAL SECTION - MC00 - BERNERA RD - CH 450 TO CH 600
2021 25 DD 001 LS 0405	LONGITUDINAL SECTION - MC00 - BERNERA RD - CH 600 TO CH 671.779
2021 25 DD 001 LS 0411	LONGITUDINAL SECTION - MC10 - BERNERA RD - CH 0 TO CH 150
2021 25 DD 001 LS 0412	LONGITUDINAL SECTION - MC10 - BERNERA RD - CH 150 TO CH 300
2021 25 DD 001 LS 0413	LONGITUDINAL SECTION - MC10 - BERNERA RD - CH 300 TO CH 450
2021 25 DD 001 LS 0414	LONGITUDINAL SECTION - MC10 - BERNERA RD - CH 450 TO CH 600
2021 25 DD 001 LS 0415	LONGITUDINAL SECTION - MC10 - BERNERA RD - CH 600 TO CH 671.471
2021 25 DD 001 LS 0421	LONGITUDINAL SECTION - MC20 - YATO RD - CH 0 TO CH 159.457
2021 25 DD 001 LS 0431	LONGITUDINAL SECTION - MC30 - YATO RD - CH 0 TO CH 159.407
2021 25 DD 001 LS 0441	LONGITUDINAL SECTION - MC40 - YARRUNGA ST - CH 0 TO CH 153.275
2021 25 DD 001 LS 0451	LONGITUDINAL SECTION - MC50 - YARRUNGA ST - CH 0 TO CH 150
2021 25 DD 001 LS 0452	LONGITUDINAL SECTION - MC50 - YARRUNGA ST - CH 150 TO CH 206.085
2021 25 DD 001 LS 0461	LONGITUDINAL SECTION - MK2I, MK3I, MK51 AND MK41
2021 25 DD 001 LS 0462	LONGITUDINAL SECTION - MK5J - YARRUNGA ST - CH 0 TO CH 135.096
2021 25 DD 001 CS 0501	CROSS SECTION - MC00 - CH 0 TO CH 50
2021 25 DD 001 CS 0502	CROSS SECTION - MC00 - CH 75 TO CH 125
2021 25 DD 001 CS 0503	CROSS SECTION - MC00 - CH 150 TO CH 200
2021 25 DD 001 CS 0504	CROSS SECTION - MC00 - CH 225 TO CH 275
2021 25 DD 001 CS 0505	CROSS SECTION - MC00 - CH 300 TO CH 350
2021 25 DD 001 CS 0506	CROSS SECTION - MC00 - CH 375 TO CH 425
2021 25 DD 001 CS 0507	CROSS SECTION - MC00 - CH 450 TO CH 500
2021 25 DD 001 CS 0508	CROSS SECTION - MC00 - CH 525 TO CH 575
2021 25 DD 001 CS 0509	CROSS SECTION - MC00 - CH 600 TO CH 650
2021 25 DD 001 CS 0510	CROSS SECTION - MC00 - CH 672
2021 25 DD 001 CS 0511	CROSS SECTION - MC20 - CH 20 TO CH 60
2021 25 DD 001 CS 0512	CROSS SECTION - MC20 - CH 80 TO CH 120
2021 25 DD 001 CS 0513	CROSS SECTION - MC20 - CH 140 TO CH 159
2021 25 DD 001 CS 0514	CROSS SECTION - MC50 - CH 25 TO CH 75

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 GE 0102.DWG
Last Plotted: 19/09/2022 11:36:44 PM By: BENZSON
Last Saved: 19/09/2022 5:59:24 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
DRAWING INDEX
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. GE 0102
ISSUE A

DRAWING INDEX

DRAWING No.	DRAWING TITLE
2021 25 DD 001 CS 0515	CROSS SECTION - MC50 - CH 100 TO CH 150
2021 25 DD 001 CS 0516	CROSS SECTION - MC50 - CH 175 TO 206
2021 25 DD 001 UT 0101	EXISTING UTILITIES PLAN - SHEET 1
2021 25 DD 001 UT 0102	EXISTING UTILITIES PLAN - SHEET 2
2021 25 DD 001 UT 0103	EXISTING UTILITIES PLAN - SHEET 3
2021 25 DD 001 UT 0104	EXISTING UTILITIES PLAN - SHEET 4
2021 25 DD 001 UT 0105	EXISTING UTILITIES PLAN - SHEET 5
2021 25 DD 001 UT 0106	EXISTING UTILITIES PLAN - SHEET 6
2021 25 DD 001 UT 0107	EXISTING UTILITIES PLAN - SHEET 7
2021 25 DD 001 UT 0108	EXISTING UTILITIES PLAN - SHEET 8
2021 25 DD 001 SM 0101	STORMWATER MANAGEMENT PLAN - SHEET 1
2021 25 DD 001 SM 0102	STORMWATER MANAGEMENT PLAN - SHEET 2
2021 25 DD 001 SM 0103	STORMWATER MANAGEMENT PLAN - SHEET 3
2021 25 DD 001 SM 0104	STORMWATER MANAGEMENT PLAN - SHEET 4
2021 25 DD 001 SM 0105	STORMWATER MANAGEMENT PLAN - SHEET 5
2021 25 DD 001 SM 0106	STORMWATER MANAGEMENT PLAN - SHEET 6
2021 25 DD 001 SM 0107	STORMWATER MANAGEMENT PLAN - SHEET 7
2021 25 DD 001 SM 0108	STORMWATER MANAGEMENT PLAN - SHEET 8
2021 25 DD 001 DL 0201	STORMWATER PROFILE - SHEET 1
2021 25 DD 001 DL 0202	STORMWATER PROFILE - SHEET 2
2021 25 DD 001 DL 0203	STORMWATER PROFILE - SHEET 3
2021 25 DD 001 DL 0204	STORMWATER PROFILE - SHEET 4
2021 25 DD 001 DL 0205	STORMWATER PROFILE - SHEET 5
2021 25 DD 001 DL 0206	STORMWATER PROFILE - SHEET 6
2021 25 DD 001 DL 0207	STORMWATER PROFILE - SHEET 7
2021 25 DD 001 DL 0208	STORMWATER PROFILE - SHEET 8
2021 25 DD 001 DL 0209	STORMWATER PROFILE - SHEET 9
2021 25 DD 001 DL 0210	STORMWATER PROFILE - SHEET 10
2021 25 DD 001 DL 0211	STORMWATER PROFILE - SHEET 11
2021 25 DD 001 DL 0212	STORMWATER PROFILE - SHEET 12
2021 25 DD 001 DL 0213	STORMWATER PROFILE - SHEET 13
2021 25 DD 001 SM 0301	CATCHMENT PLAN

DRAWING INDEX

DRAWING No.	DRAWING TITLE
2021 25 DD 001 PV 0101	PAVEMENT PLAN - SHEET 1
2021 25 DD 001 PV 0102	PAVEMENT PLAN - SHEET 2
2021 25 DD 001 PV 0103	PAVEMENT PLAN - SHEET 3
2021 25 DD 001 PV 0104	PAVEMENT PLAN - SHEET 4
2021 25 DD 001 PV 0105	PAVEMENT PLAN - SHEET 5
2021 25 DD 001 PV 0106	PAVEMENT PLAN - SHEET 6
2021 25 DD 001 PV 0107	PAVEMENT PLAN - SHEET 7
2021 25 DD 001 PV 0108	PAVEMENT PLAN - SHEET 8
2021 25 DD 001 PV 0201	PAVEMENT PROFILE - SHEET 1
2021 25 DD 001 PV 0202	PAVEMENT PROFILE - SHEET 2
2021 25 DD 001 PV 0221	PAVEMENT INTERFACE DETAILS - SHEET 1
2021 25 DD 001 PV 0222	PAVEMENT INTERFACE DETAILS - SHEET 2
2021 25 DD 001 PV 0231	PAVEMENT EDGE DETAIL
2021 25 DD 001 RF 0101	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 1
2021 25 DD 001 RF 0102	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 2
2021 25 DD 001 RF 0103	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 3
2021 25 DD 001 RF 0104	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 4
2021 25 DD 001 RF 0105	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 5
2021 25 DD 001 RF 0106	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 6
2021 25 DD 001 RF 0107	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 7
2021 25 DD 001 RF 0108	SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN - SHEET 8
2021 25 DD 001 RF 0110	KERB AND BARRIER SCHEDULE
2021 25 DD 001 PW 0201	PROPERTY WORKS - LOT 33 / DP 2359

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 GE 0103.DWG
Last Plotted: 19/09/2022 11:36:54 PM By: BENZSON
Last Saved: 19/09/2022 5:59:33 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

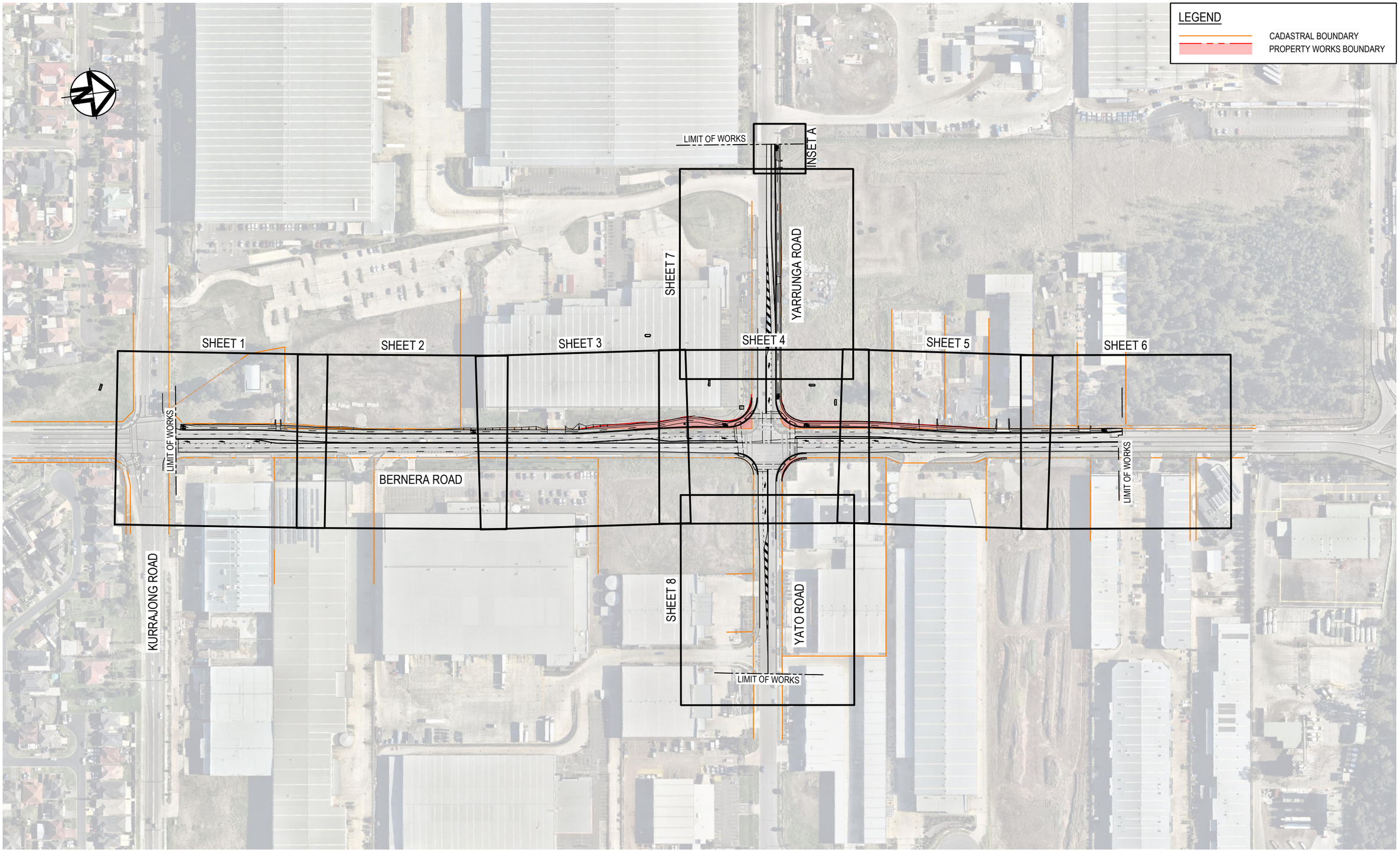
DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
DRAWING INDEX
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. GE 0103
ISSUE A



NOT FOR CONSTRUCTION

AERIAL IMAGERY UNDER LICENCE TO MU GROUP BY NEARMAP

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 GE 0104.DWG

Last Plotted: 19/09/2022 11:37:18 PM By: BENZSON

Last Saved: 19/09/2022 5:59:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 25 50 75 100

SCALE 1:2500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
OVERVIEW PLAN

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. GE 0104

ISSUE A

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

ROAD ALIGNMENT NOTES

1. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
2. PURSUANT TO THE SURVEYING AND SPATIAL INFORMATION ACT, ANY CADASTRAL REFERENCE MARKS THAT ARE ON KERBS, FOOTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
3. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
4. REFER TO SHEETS RD 0301 TO RD 0302 FOR ALIGNMENT SETOUT DETAILS.

DETAIL PLAN LEGEND NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TFNSW QA SPECIFICATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
2. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES, DRAINAGE WORKS AND UNDERGROUND INFRASTRUCTURE PRIOR TO COMMENCING WORK. CONTRACTOR TO ENSURE ADOPTED METHOD OF CONSTRUCTION AND PROPOSED WORKS WILL AVOID DAMAGE TO ALL SERVICES AND DRAINAGE WORKS, INCLUDING CLEARANCES TO OVERHEAD POWER LINES.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METERAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
4. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
5. PAVEMENT AREAS EXCLUDE PAVEMENT UNDER KERBS AND VERGES. REFER TO SHEETS PV 0221 TO PV 0222 FOR DETAILS.
6. REFER TO SHEETS PV 0201 TO PV 0202 FOR PAVEMENT PROFILES.
7. REFER TO MODEL DRAWING R0300-01 FOR KERB PROFILES.

GENERAL OVERVIEW PLAN NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TFNSW QA SPECIFICIATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
2. KURRAJONG ROAD AND BERNERA ROAD PRESTONS - TCS 4477 - REGISTRATION No. DS2014/004860 – DESIGNED BY MU GROUP.
3. BERNERA ROAD, YARRUNGA STREET AND YATO ROAD PRESTONS TCS4263 – REGISTRATION No. DS2014/004649 (DESIGNED BY OTHERS).
4. RETAINING WALL - 2021 25 DD 001 - 001-004.

ROADSIDE FURNITURE NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TFNSW QA SPECIFICATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
2. ALL REDUNDANT LINEMARKING TO BE REMOVED. REINSTATE EXISTING LINEMARKING AFFECTED BY PAVEMENT RE-SHEETING.
3. LINEMARKING AND RETRO REFLECTIVE PAVEMENT MARKERS (RRPM) TO BE INSTALLED IN ACCORDANCE WITH TFNSW DELINEATION GUIDELINES.
4. SIGNPOSING LOCATION AND ORIENTATION TO BE INSTALLED IN ACCORDANCE WITH AS1742.2 AND TFNSW SUPPLEMENTS.
5. EXISTING SIGNS TO BE REMOVED OR RELOCATED HAVE BEEN IDENTIFIED ONLY. EXISTING SIGNS WHICH ARE NOT NOTED ARE TO REMAIN UNLESS APPROVED BY THE PRINCIPALS REPRESENTATIVE.
6. FOR SIGN POST AND FOOTING DETAILS REFER TO TFNSW ACCEPTANCE DOCUMENT FOR FRANGIBLE SIGN POST PRODUCT.
7. REFER TO MODEL DRAWING R0300-01 FOR KERB PROFILES.
8. ALL TEMPORARY PAVEMENT MARKING TO BE WATERBORNE PAINT.
9. VMS FOOTING DESIGN – 2021 25 DD 001 ST 0802

PAVEMENT NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT TFNSW QA SPECIFICATIONS AND AUSTRALIAN STANDARDS UNLESS OTHERWISE STATED.
2. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES, DRAINAGE WORKS AND UNDERGROUND INFRASTRUCTURE PRIOR TO COMMENCING WORK. CONTRACTOR TO ENSURE ADOPTED METHOD OF CONSTRUCTION AND PROPOSED WORKS WILL AVOID DAMAGE TO ALL SERVICES AND DRAINAGE WORKS, INCLUDING CLEARANCES TO OVERHEAD POWER LINES.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METERAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
4. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
5. PAVEMENT AREAS EXCLUDE PAVEMENT UNDER KERBS AND VERGES. REFER TO SHEET (PAVEMENT TYPICAL DETAILS SHEET) FOR DETAILS.
6. REFER TO SHEETS PV 0201 TO PV 0202 FOR PAVEMENT PROFILES.
7. REFER TO MODEL DRAWING R0300-01 FOR KERB PROFILES.

SUB SURFACE DRAINAGE NOTES

1. SUBSURFACE DRAINAGE PLANS ONLY SHOW THE REQUIRED TYPE OF SUBSOIL DRAIN LAYOUT AND DO NOT REPRESENT THE EXACT LOCATION OF THE PIPES AND HEADWALLS. FOR DETAILED LOCATION REFER TO SHEETS PV 0101 TO PV 0108.
2. SUBSURFACE DRAINS ARE TO BE LAID IN ACCORDANCE WITH THE TFNSW QA SPECIFICATION R33 – TRENCH DRAINS.
3. DRAINS TO HAVE MINIMUM GRADE OF 0.5%.
4. ATTENTION IS DIRECTED TO THE POSSIBLE EXISTENCE OF UNDERGROUND UTILITIES NOT SHOWN OR WITH DIFFERENT LOCATIONS/ELEVATIONS FROM THOSE SHOWN ON THE DRAWINGS THE EXACT LOCATION OF EACH UNDERGROUND UTILITY SHALL BE VERIFIED ON SITE PRIOR TO DOING ANY WORK THAT MAY DAMAGE SUCH UTILITY.

DRAINAGE NOTES

1. FOR KERB SCHEDULES REFER SHEET TO RD 0311 TO RD 0312.
2. FOR DRAINAGE PROFILES REFER SHEETS TO DL 0201 TO DL 0213.

CHANNELS

1. DRAINAGE CHANNELS THAT DO NOT HAVE A LABEL, REFER TO DRAINAGE MODEL FOR SHAPE DETAIL.
2. THE FINAL CHANNEL LOCATION SHOULD BE DETERMINED ON SITE.

LINING

1. ALL CHANNELS NOT LINED WITH ROCK OR CONCRETE ARE GRASSED LINED AND ARE TO BE PREPARED AND VEGETATED IN ACCORDANCE WITH THE LANDSCAPE SPECIFICATION.

DUMPED RIP-RAP

1. UNLESS NOTED OTHERWISE ROCK LINED CHANNELS SHALL HAVE A D_{50} ROCK SIZE OF 150mm.
2. THE THICKNESS OF THE RIP-RAP LINING SHALL BE TWICE THE D_{50} STONE SIZE.
3. THE STONE SHALL BE REASONABLY GRADED THROUGHOUT THE RIP-RAP LAYER. EACH LOAD OF RIP RAP SHALL BE REASONABLY GRADED FROM THE SMALLEST TO THE MAXIMUM SPECIFIED. STONE SIZES SHALL BE DEPENDANT ON THE SPECIFIED D_{50} VALUE. D_{10} SHALL BE 0.5 X D_{50} AND D_{90} SHALL BE 1.35 X D_{50}. STONES SMALLER THAN D_{10} ARE NOT TO EXCEED 20% BY WEIGHT OF EACH LOAD.
4. ROCK IS TO BE HARD, DENSE, DURABLE, RESISTANT TO WEATHERING AND ANGULAR IN SHAPE. IT SHALL BE FREE FROM OVERBURDEN, SPOIL, SHALE AND ORGANIC MATTER. ROCK THAT IS LAMINATED, FRACTURED, POROUS, CONTAINS ACID SULPHATE OR IS OTHERWISE PHYSICALLY WEAK WILL BE UNACCEPTABLE.
5. TYPICALLY, THE BREADTH OR THICKNESS OF A SINGLE STONE SHOULD NOT BE LESS THAN ONE THIRD ITS LENGTH. ROUND MATERIAL CAN BE USED AS RIP-RAP ON SLOPES NO GREATER THAN 1(V) IN 3(H).
6. WHERE NEW CHANNELS CONNECT TO AN EXISTING WATERCOURSE, ROCKS SHOULD BE PLACED TO PROTECT THE BANKS OF THE RECEIVING WATERCOURSE AGAINST SCOUR.

GEOTEXTILE FILTER FABRIC

1. GEOTEXTILE FILTER FABRIC SHALL UNDERLIE ALL RIP-RAP AND RENO MATTRESS AND SHALL BE IN ACCORDANCE WITH TFNSW SPECIFICATION DCM R63 AND THE MANUFACTURERS SPECIFICATION UNLESS NOTED OTHERWISE.

CONCRETE

1. CONCRETE LINED CHANNELS SHALL HAVE SAW CUT JOINTS AT 4m INTERVALS.
2. CHANNELS WITH A BASE WIDTH EXCEEDING 2500mm SHALL INCLUDE F62 REINFORCEMENT MESH.
3. WHERE A CONCRETE CHANNEL DISCHARGES TO A GRASSED CHANNEL, A ROCK LINED TRANSITION SECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE DETAIL ON THIS DRAWING. (DOES NOT APPLY TO TABLE DRAIN OR BERM DRAIN TERMINATION).

LANDSCAPE NOTES

1. PLANTING TO AVOID IMPACT ON PROPOSED AND EXISTING UTILITIES TO BE CONFIRMED ONSITE.
2. EXTENT OF LANDSCAPING ON BATTERS IS MINIMUM 1.0M BEYOND THE TOE OF BATTER.
3. ALL CUT BATTERS ARE SHOWN AS EXPOSED ROCK.
4. BUSHLAND RECONSTRUCTION ON FILL BATTERS TO BE MANAGED AND MAINTAINED TO ALLOW SIGHTLINES TO SURROUNDING LANDSCAPE.
5. TREES OR NON-FRANGIBLE VEGETATION WITHIN THE CLEARZONE (11M) WHERE NOT PROTECTED BY BARRIER WILL BE REMOVED DURING THE MAINTENACE PERIOD.
6. BUILD BUSHLAND TOPSOIL AND MULCH STOCKPILES IN AREAS FROM WHERE THEY WERE SOURCED.
7. RECONSTRUCTED BUSHLAND AREAS : NOTE SOIL TES AND SOIL SUITABILITY.
8. ADDITIONAL HYDROSEEDED SEED MIX AND / OR COVER CROP, IF REQUIRED, IN ACCORDANCE WITH SPECIFICATION.

UTILITIES NOTES

1. SERVICES SHOWN ARE INDICATIVE ONLY. CONTRACTOR TO CONFIRM LOCATION OF ALL SERVICES PRIOR TO COMMENCING WORK.
2. FOR SERVICES THAT HAVE BEEN RELOCATED OR REQUIRE ADJUSTMENT FOR THE WORKS, REFER TO INDIVIDUAL UTILITY DIVERSION DRAWINGS AND DETAILS FROM THE RELEVANT AUTHORITY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CO-ORDINATING THE WORKS ADJACENT TO ANY SERVICE WITH THE RELEVANT AUTHORITY IN ACCORDANCE WITH THE AUTHORITY REQUIREMENTS. REFER TO THE SPECIFICATION.
4. THE CONTRACTOR SHALL CO-ORDINATE WITH THE RELEVANT UTILITY AUTHORITIES AND THE PRINCIPAL WITH RESPECT TO ANY TEMPORARY DIVERSIONS NECESSARY FOR CONSTRUCTION STAGING WORKS.

UTILITY INFORMATION SHOWN ON THE PLANS DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE, BASED ON AVAILABLE DOCUMENTARY EVIDENCE. THE PRESENCE OF A SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION, PRIOR TO THE COMMENCEMENT OF ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DAILLING PH 1100 OR FAX (DIAL BEFORE YOU DIG). CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.

DIAL BEFORE YOU DIG. WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 GE 0110.DWG
Last Plotted: 19/09/2022 11:37:30 PM By: BENZSON
Last Saved: 19/09/2022 6:00:00 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4, 23-33 MARY STREET, SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

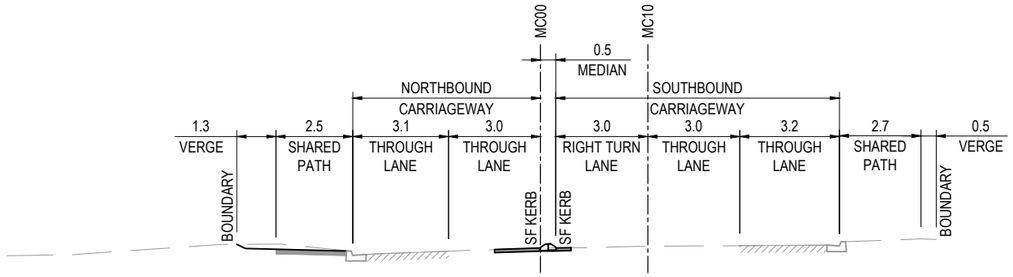
LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL NOTES

A3

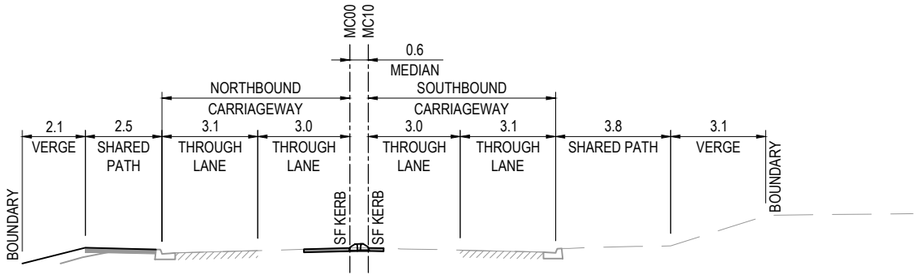
PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. GE 0110
ISSUE A

LEGEND

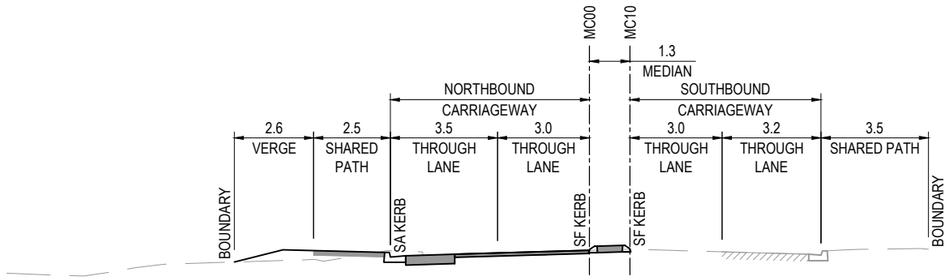
- PROPOSED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- PROPOSED PAVEMENT
- EXISTING PAVEMENT



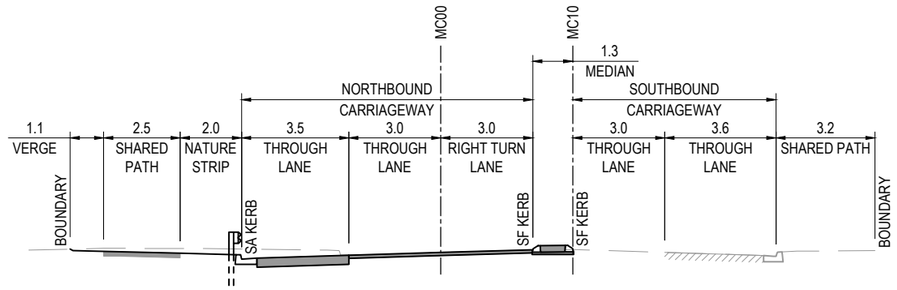
TYPICAL SECTION
BERNERA RD
MC00 - CH 25
SCALE 1:200



TYPICAL SECTION
BERNERA RD
MC00 - CH 250
SCALE 1:200



TYPICAL SECTION
BERNERA RD
MC00 - CH 300
SCALE 1:200



TYPICAL SECTION
BERNERA RD
MC00 - CH 350
SCALE 1:200

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0051.DWG

Last Plotted: 20/09/2022 12:22:18 AM By: BENZSON

Last Saved: 19/09/2022 6:06:40 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8
SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
TYPICAL CROSS SECTIONS
MC00

A3

PROJECT NUMBER: 2021 25 DD 001

PART

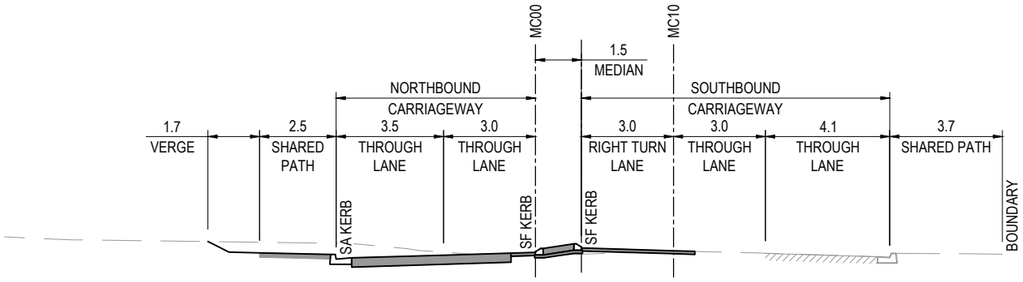
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0051

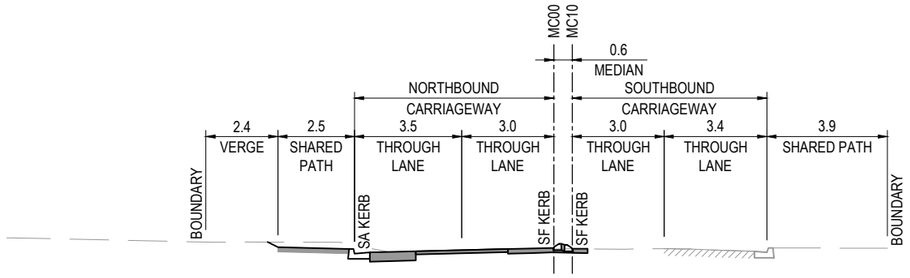
ISSUE A

LEGEND

- PROPOSED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- PROPOSED PAVEMENT
- EXISTING PAVEMENT



TYPICAL SECTION
BERNERA RD
MC00 - CH 450
SCALE 1:200



TYPICAL SECTION
BERNERA RD
MC00 - CH 600
SCALE 1:200

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0052.DWG

Last Plotted: 20/09/2022 12:22:36 AM By: BENZSON

Last Saved: 19/09/2022 6:06:49 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8
SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
TYPICAL CROSS SECTIONS
MC00

A3

PROJECT NUMBER: 2021 25 DD 001

PART

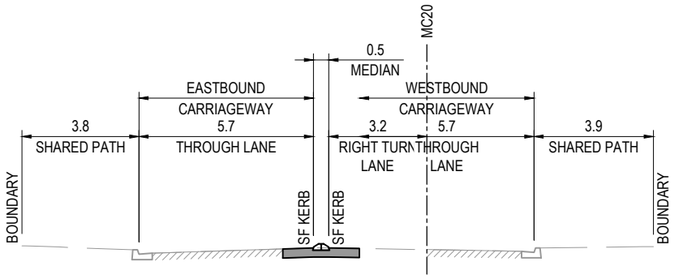
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0052

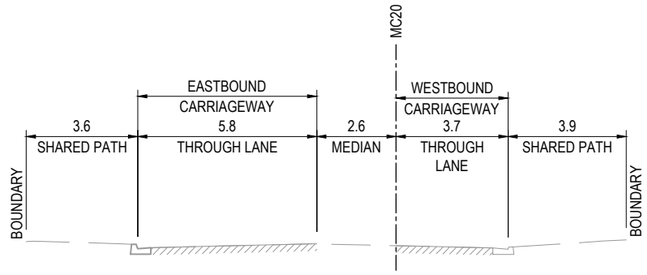
ISSUE A

LEGEND

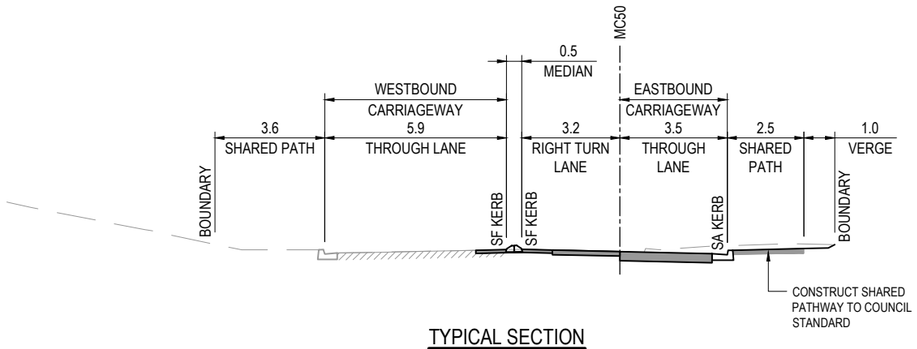
- PROPOSED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- PROPOSED PAVEMENT
- EXISTING PAVEMENT



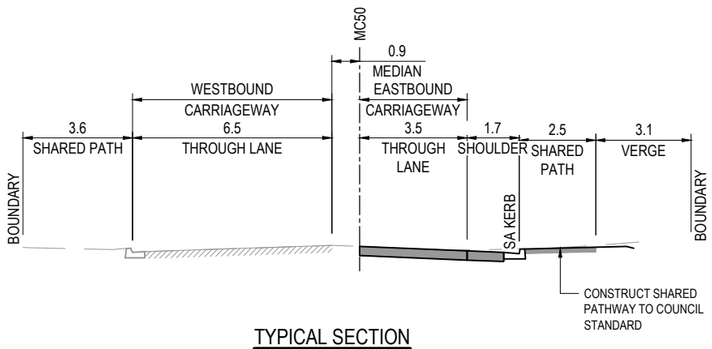
TYPICAL SECTION
YATO RD
MC20 - CH 50
SCALE 1:200



TYPICAL SECTION
YATO RD
MC20 - CH 100
SCALE 1:200



TYPICAL SECTION
YARRUNGA RD
MC50 - CH 50
SCALE 1:200



TYPICAL SECTION
YARRUNGA RD
MC50 - CH 125
SCALE 1:200

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0053.DWG

Last Plotted: 20/09/2022 12:23:01 AM By: BENZSON

Last Saved: 19/09/2022 6:06:58 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8
SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
TYPICAL CROSS SECTIONS
MC20 AND MC50

A3

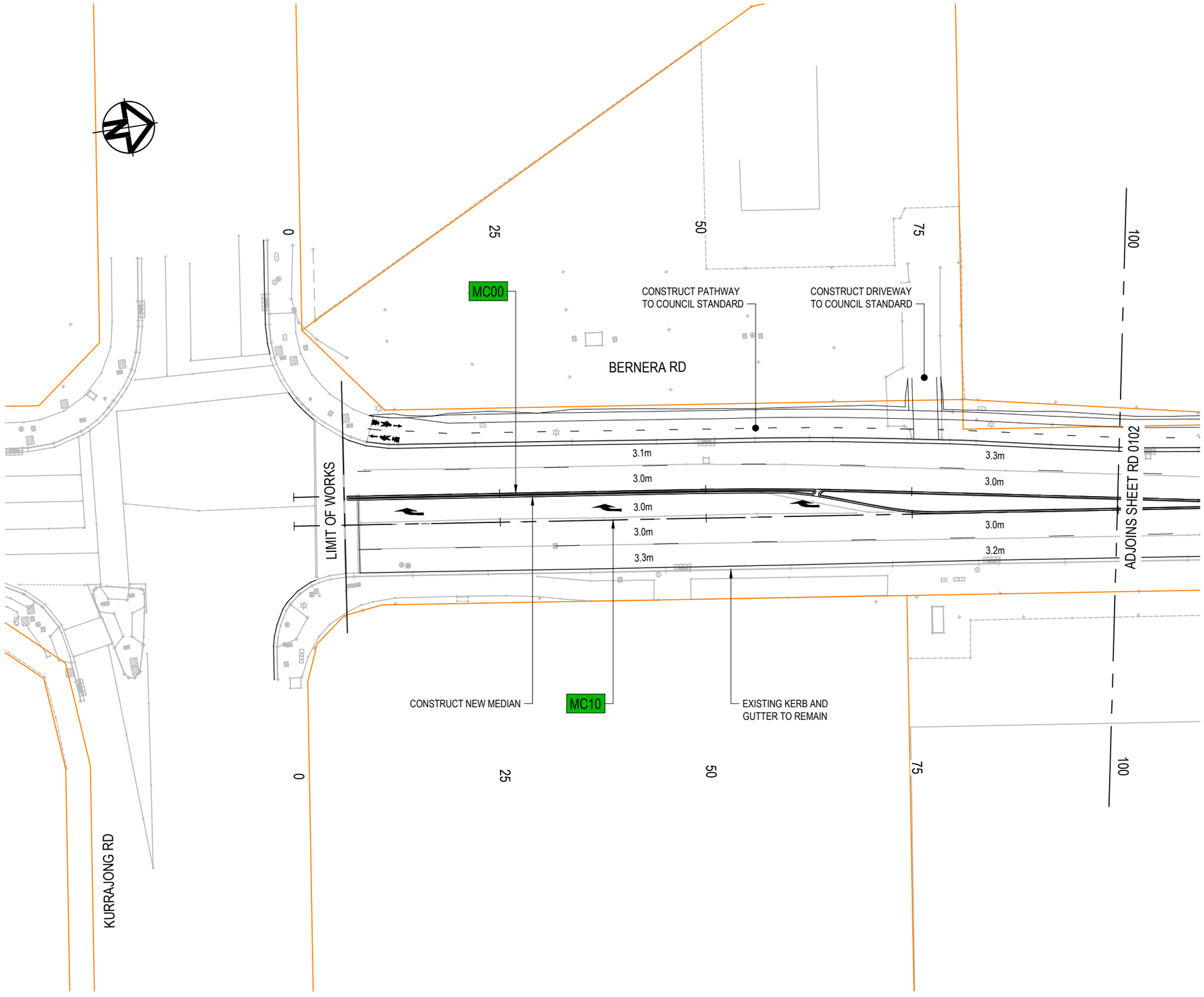
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0053

ISSUE A

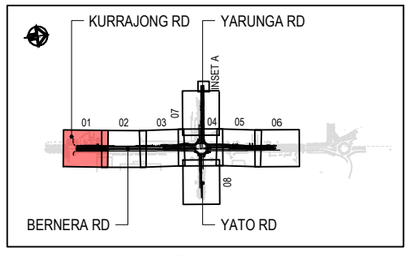


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0101.DWG

Last Plotted: 20/09/2022 12:23:46 AM By: BENZSON

Last Saved: 19/09/2022 6:07:15 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 1

A3

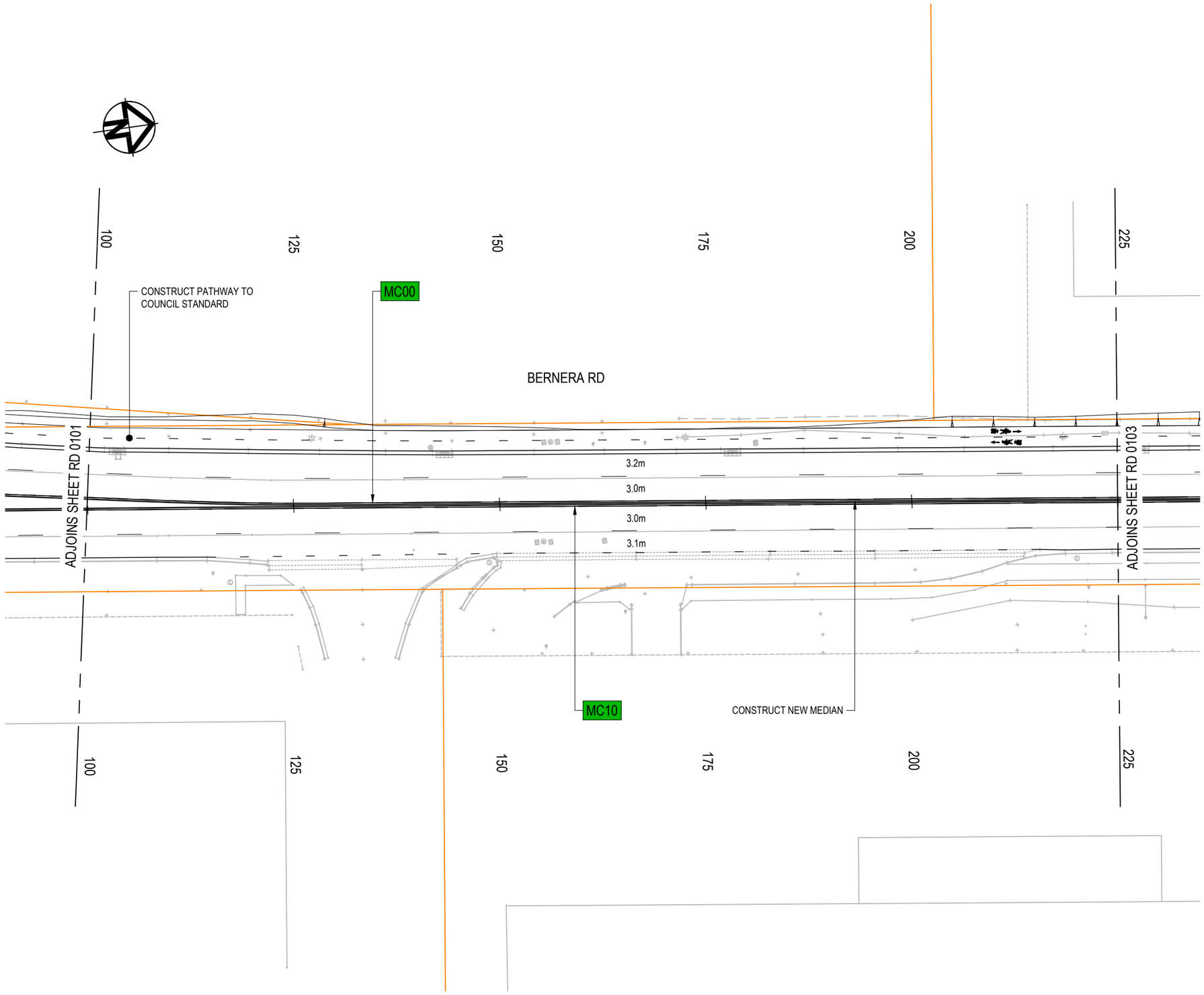
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0101

ISSUE A

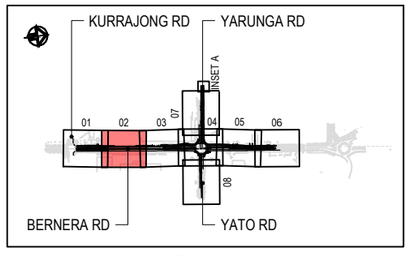


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0102.DWG
Last Plotted: 20/09/2022 12:24:35 AM By: BENZSON
Last Saved: 19/09/2022 6:07:30 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

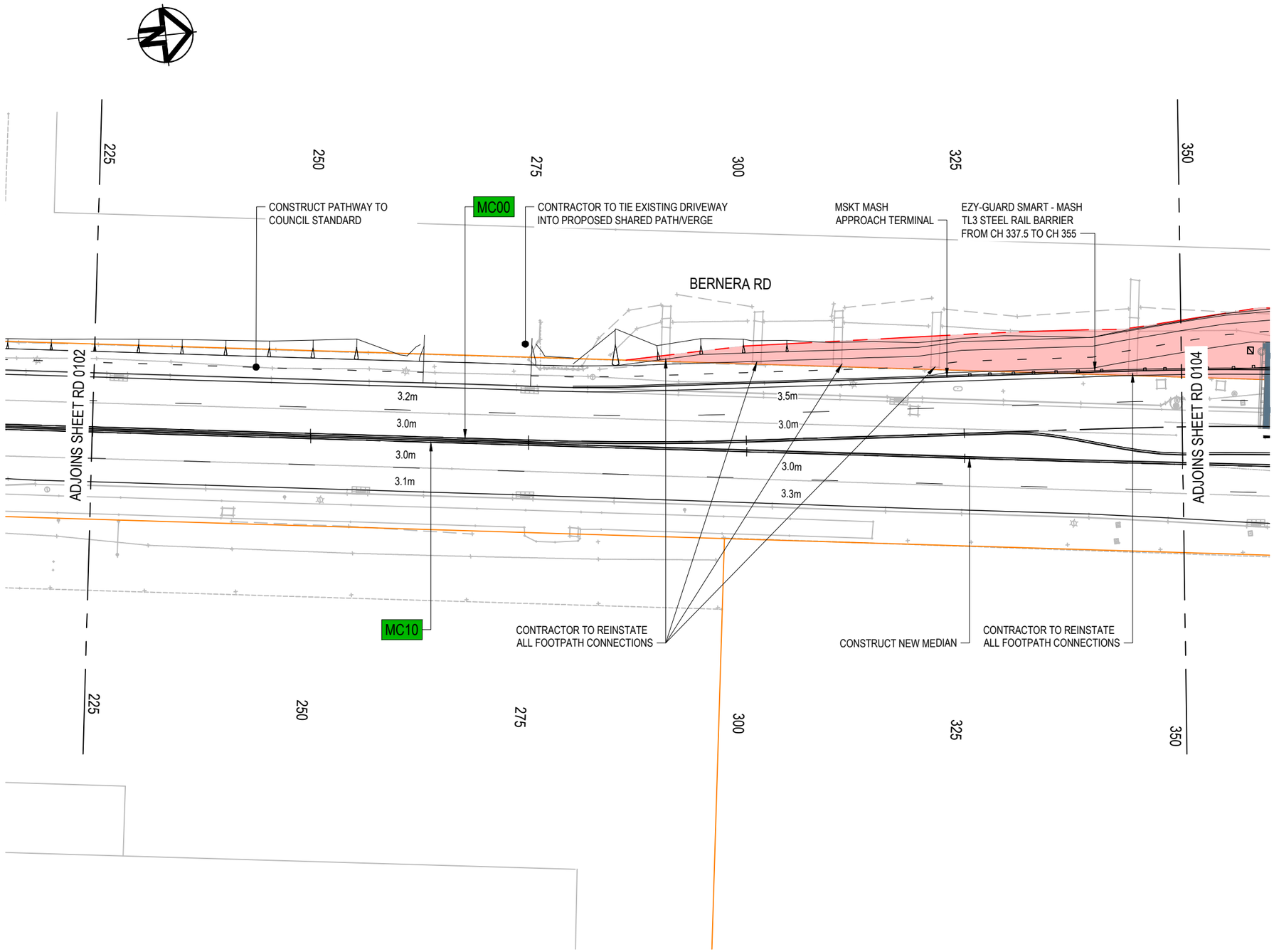
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0102
ISSUE A

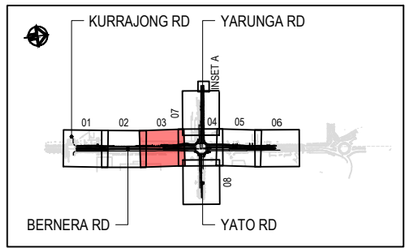


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0103.DWG
Last Plotted: 20/09/2022 12:25:18 AM By: BENZSON
Last Saved: 19/09/2022 6:07:46 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

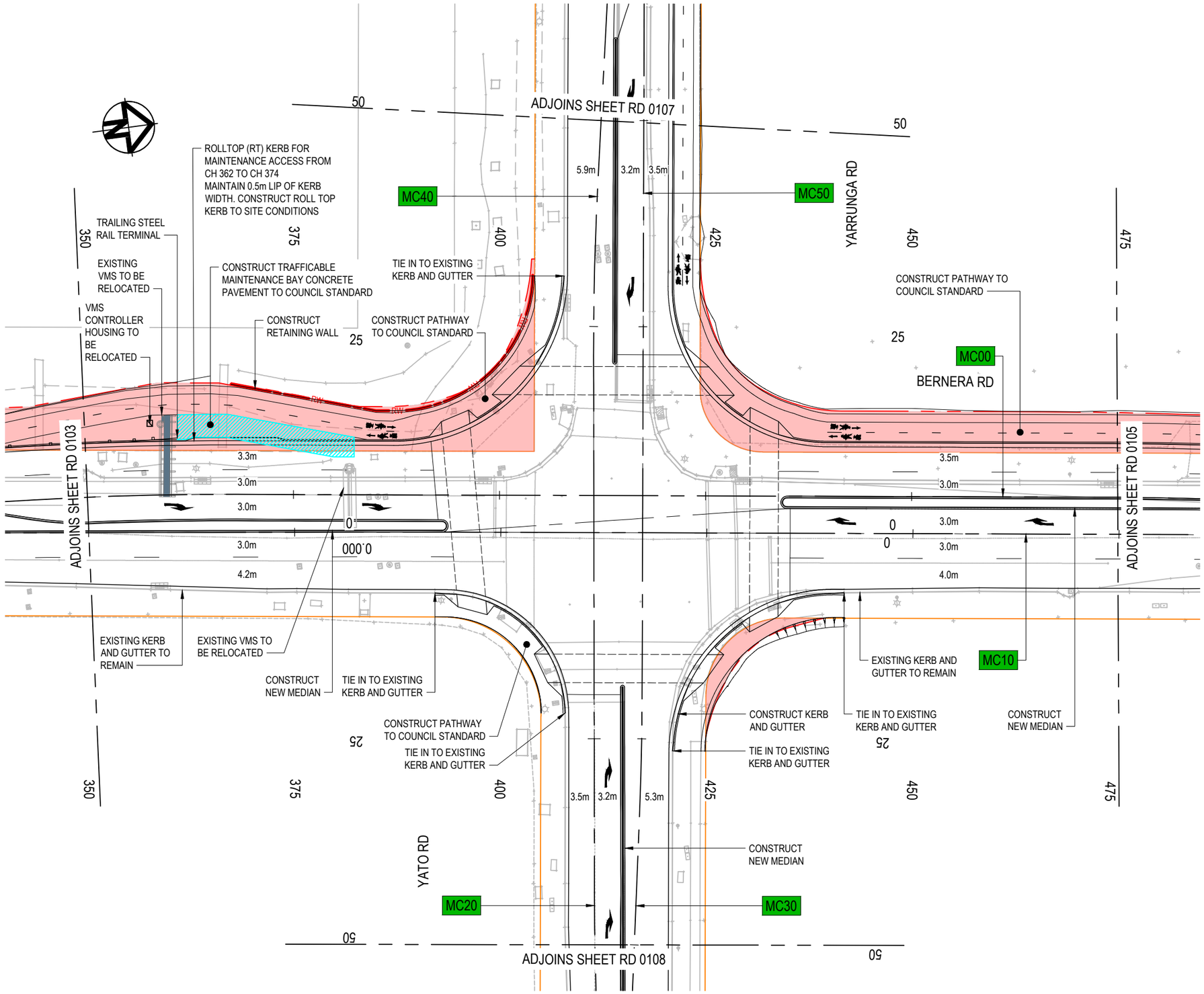
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0103
ISSUE A

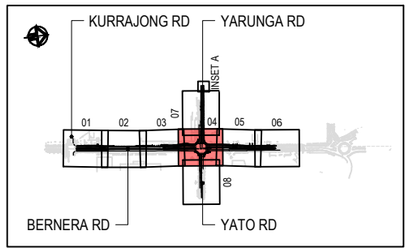


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0104.DWG
Last Plotted: 20/09/2022 12:26:04 AM By: BENZSON
Last Saved: 19/09/2022 6:08:03 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

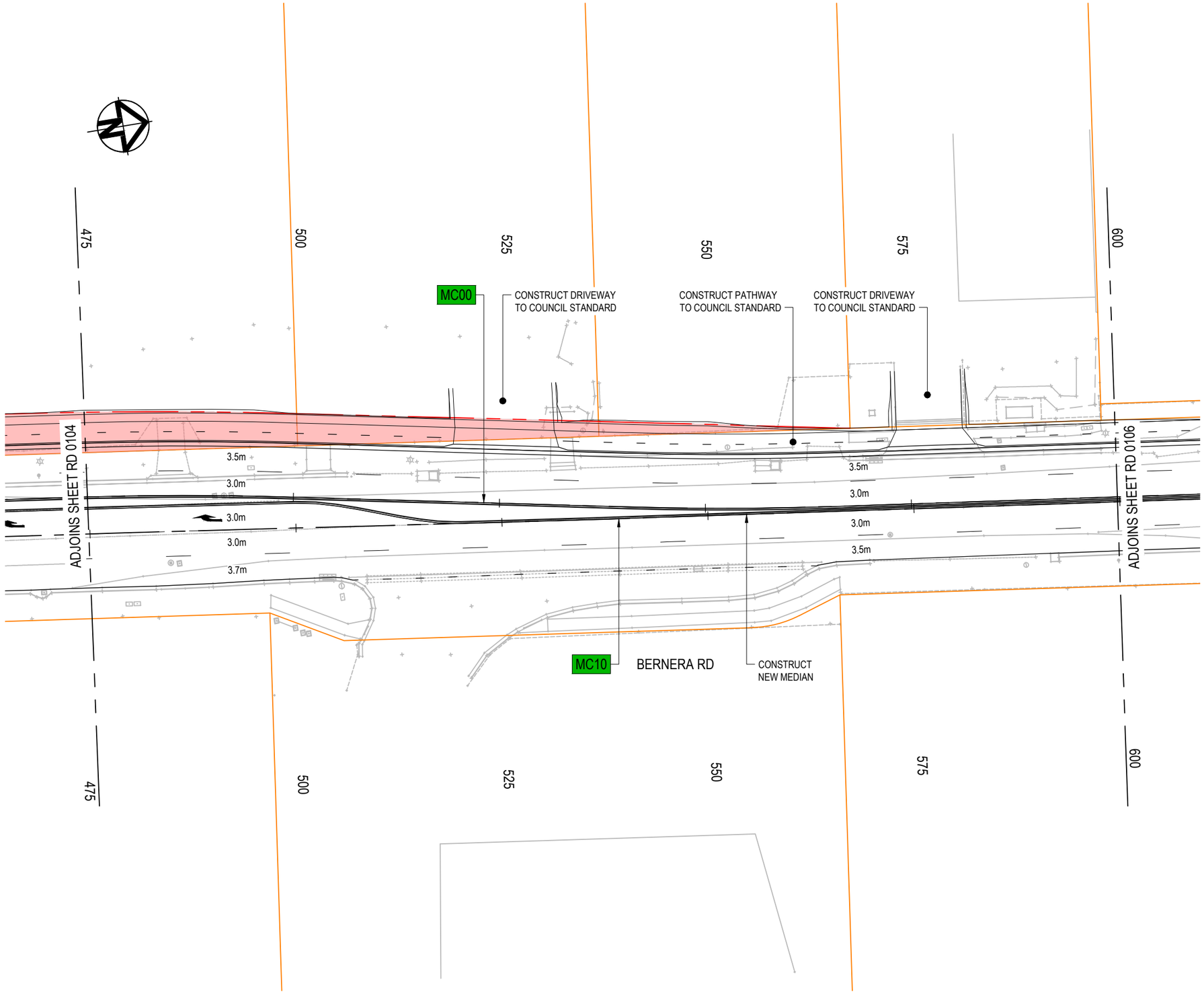
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 4

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0104
ISSUE A

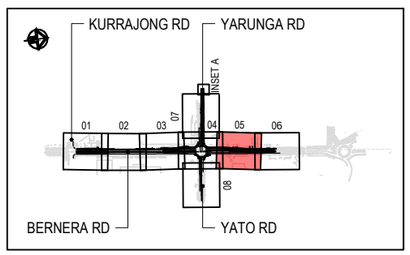


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0105.DWG

Last Plotted: 20/09/2022 12:26:46 AM By: BENZSON

Last Saved: 19/09/2022 6:08:19 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 5

A3

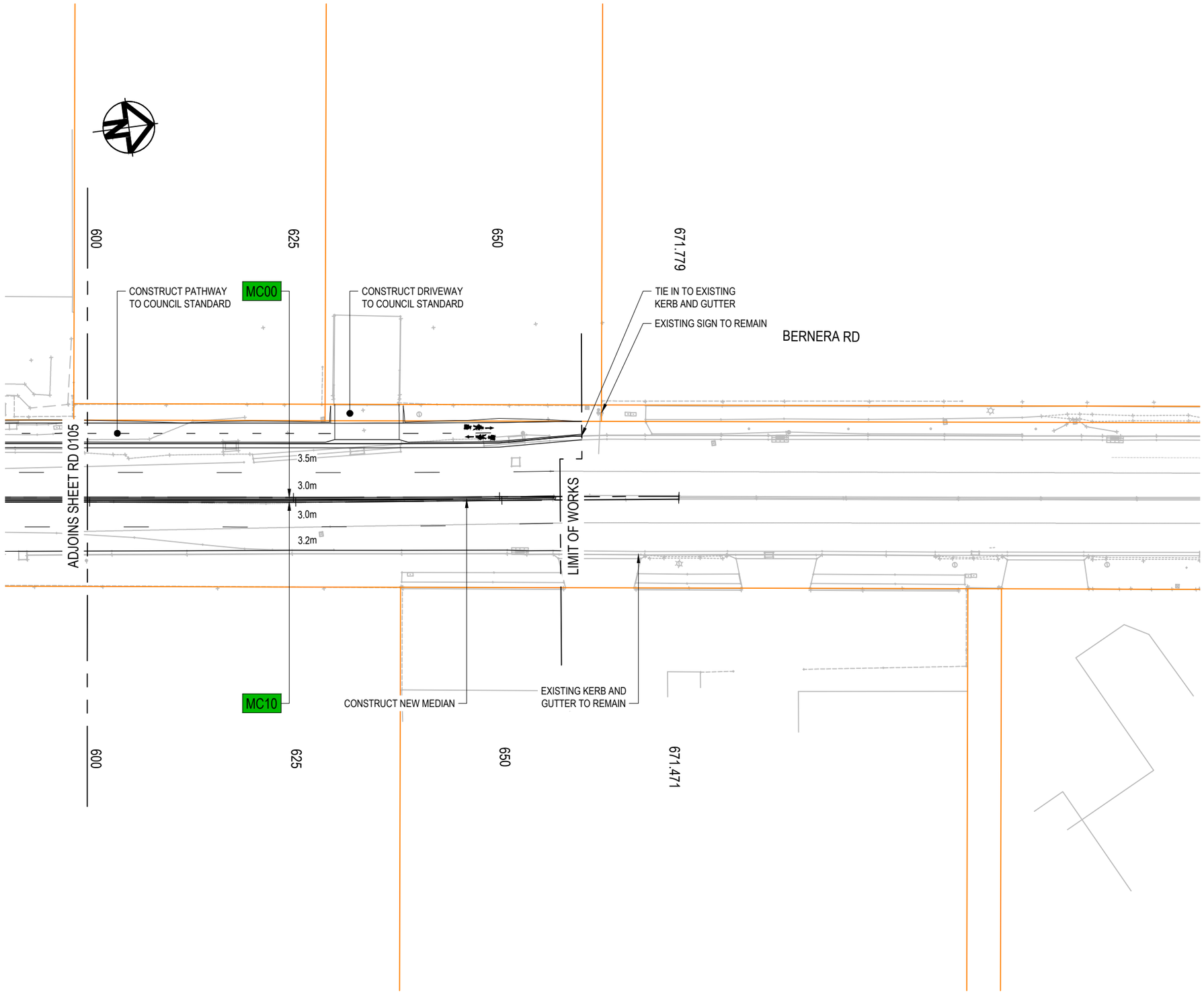
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0105

ISSUE A

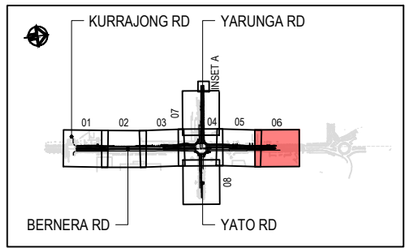


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0106.DWG

Last Plotted: 20/09/2022 12:27:22 AM By: BENZSON

Last Saved: 19/09/2022 6:08:33 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 6

A3

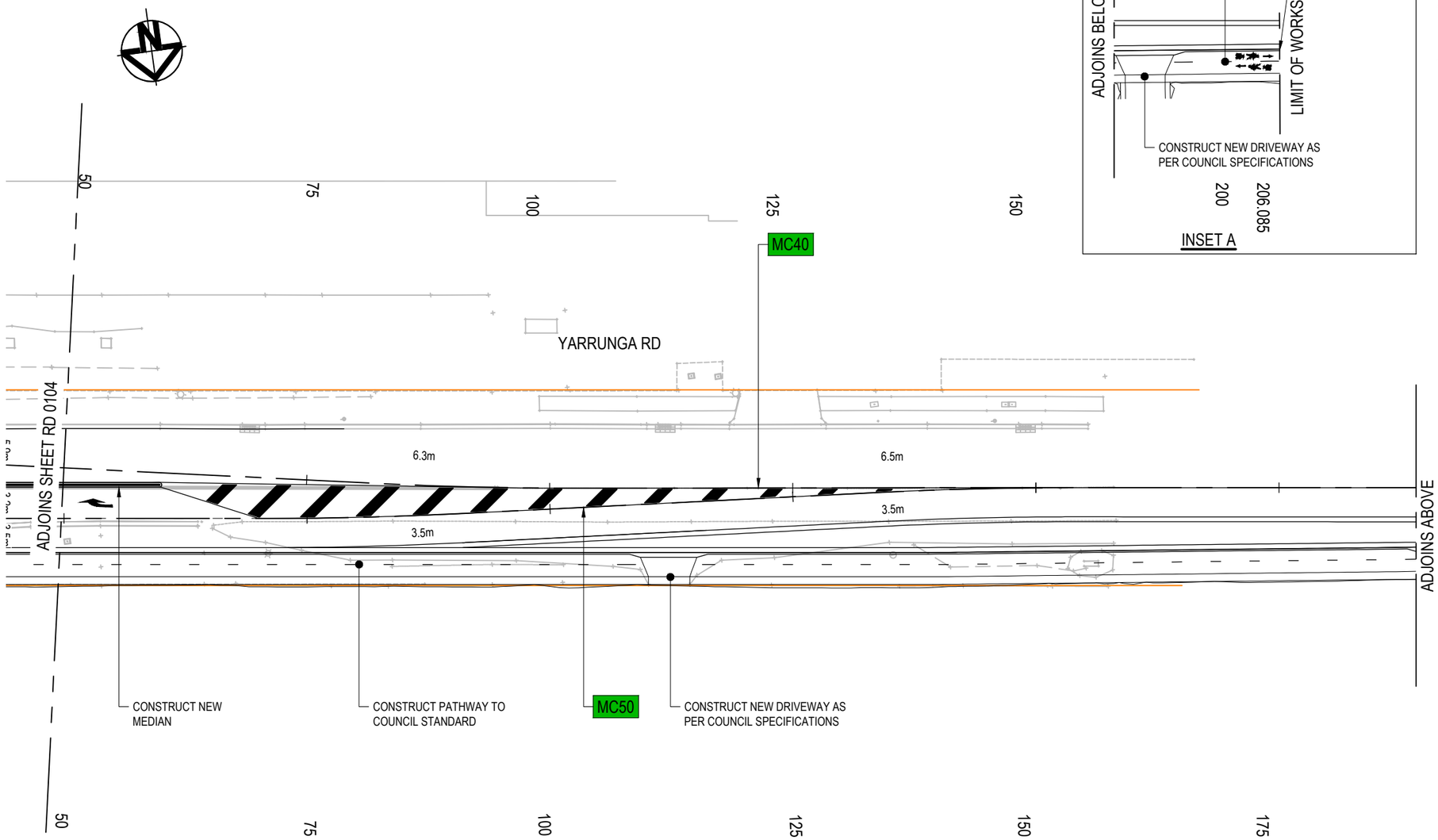
PROJECT NUMBER: 2021 25 DD 001

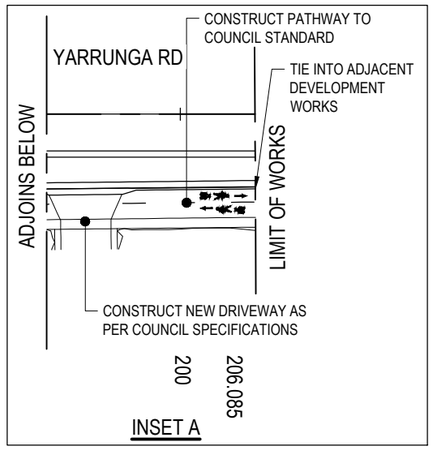
PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0106

ISSUE A





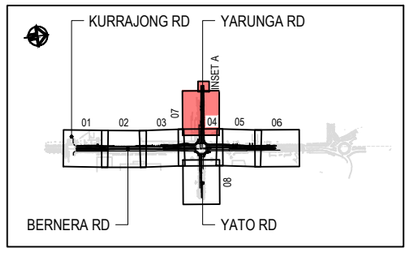
INSET A

LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL (RW)

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0107.DWG
Last Plotted: 20/09/2022 12:28:01 AM By: BENZSON
Last Saved: 19/09/2022 6:08:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

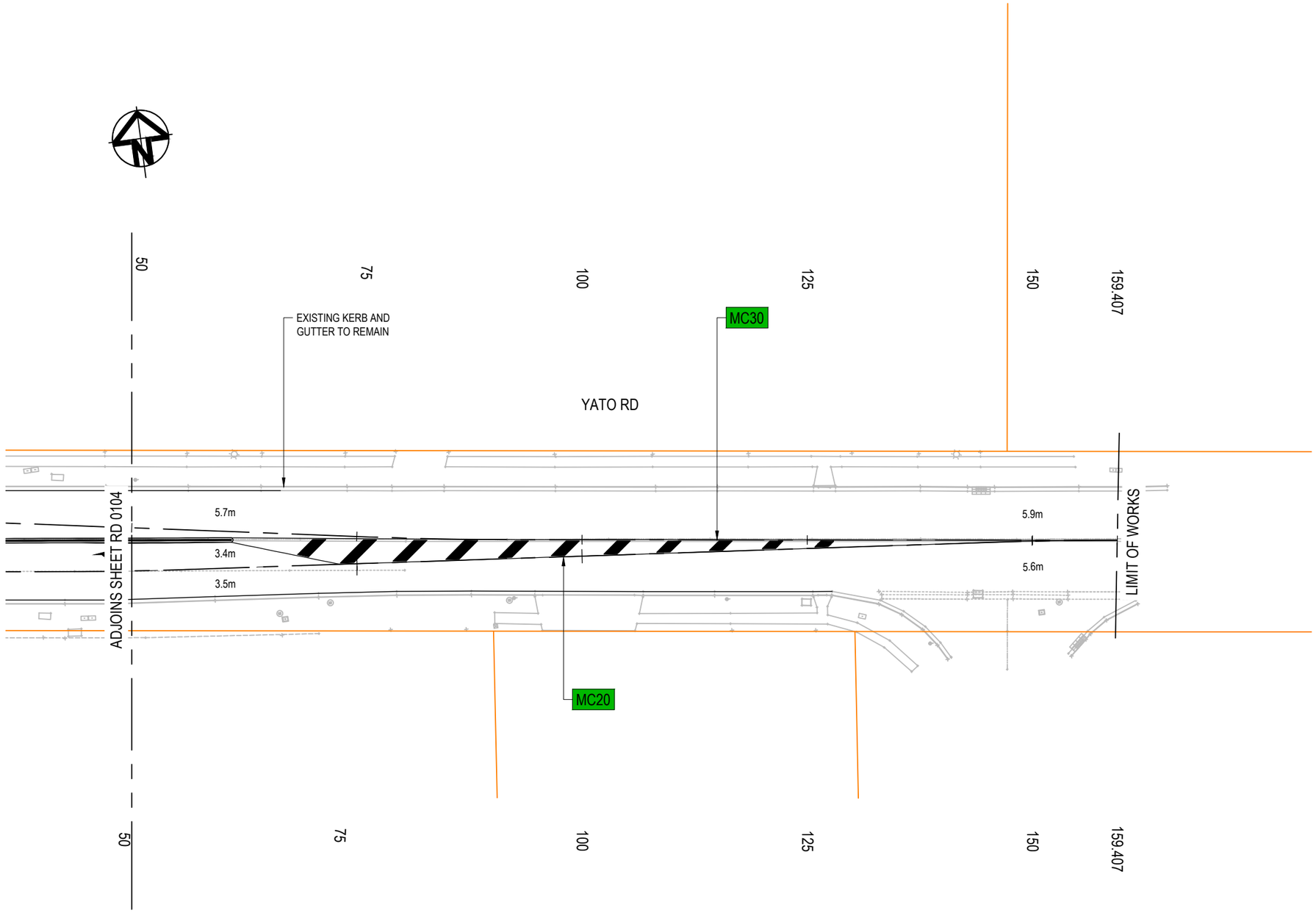
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 7

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0107
ISSUE A

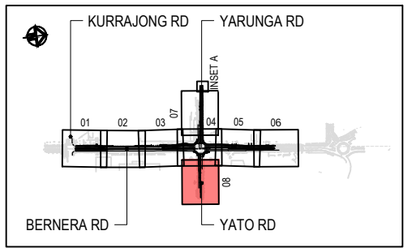


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- PROPERTY WORKS BOUNDARY
- RETAINING WALL

NOTES

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS, SPECIFICATIONS AND WRITTEN INSTRUCTIONS. ALWAYS REFER TO TECHNICAL SPECIFICATION FOR CLASSIFICATION AND DETAILS.
2. ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS TOGETHER WITH THE REQUIREMENTS OF ALL RELEVANT CODES OF PRACTICE REFERRED TO THEREIN AND THE REQUIREMENTS OF ALL STATUTORY AUTHORITIES.
3. ANY SURVEY PMS OR SSMS THAT ARE DESTROYED ARE TO BE REPLACED, CO-ORDINATED AND DOCUMENTED TO LANDS DEPARTMENT STANDARDS. REFER TO TFNSW TECHNICAL DIRECTION SD02. PENALTIES MAY APPLY FOR NON-CONFORMANCE.
4. ALL SURVEY CONTROL IS NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
5. PURSUANT TO THE SURVEYING AND SPACIAL INFORMATION ACT, ANY CADASTRAL REFERERNCE MARKS THAT ARE ON KERB, FORTPATHS OR SIMILAR THAT MAY BE AFFECTED BY CONSTRUCTION OR MAINTENANCE, NEED TO BE IDENTIFIED AND SURVEYED BY A REGISTERED SURVEYOR BEFORE THEY ARE DESTROYED OR DISTURBED. PERSONAL FINES APPLY FOR BREACH OF THE ACT.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS, METREAGES, CHAINAGES AND CO-ORDINATES ARE EXPRESSED IN METRES.
7. ACCESS TO PROPERTIES TO BE MADE AVAILABLE BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.
8. WHEN REFERENCING LEFT HAND SIDE AND RIGHT HAND SIDE OF ROADWAY IT IS ALWAYS DONE LOOKING IN DIRECTION OF INCREASING CHAINAGE.
9. ALL BERNERA ROAD MAIN CARRIAGEWAY CHAINAGES AND DESIGN ELEMENTS ARE REFERENCED TO THE DESIGN CONTROL ALIGNMENT (MC01).
10. FOR PAVEMENT DETAILS REFER TO DRAWING Nos. PV-0101 TO PV-0108.
11. FOR STORMWATER DRAINAGE DETAILS REFER TO DRAWING Nos. SM-0101 TO SM-0108.
12. FOR ROAD ALIGNMENT DETAILS REFER TO DRAWING Nos. RD-0201 TO RD-0208.
13. FOR UTILITIES DESIGN DETAILS REFER TO DRAWING Nos. UT-0101 TO UT-0108.
14. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0108.DWG

Last Plotted: 20/09/2022 12:28:32 AM By: BENZSON

Last Saved: 19/09/2022 6:09:07 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
GENERAL ARRANGEMENT PLAN
SHEET 8

A3

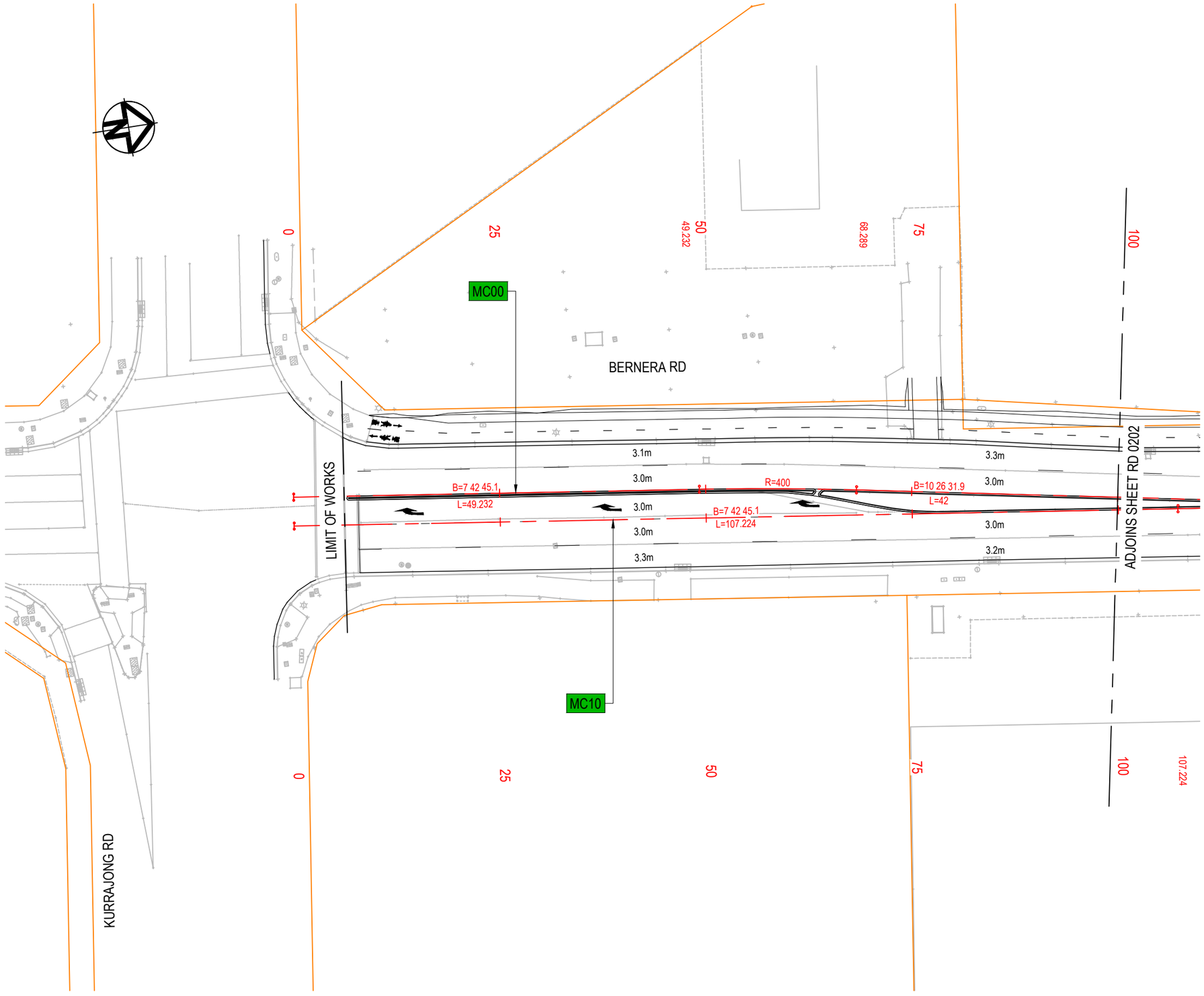
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0108

ISSUE A

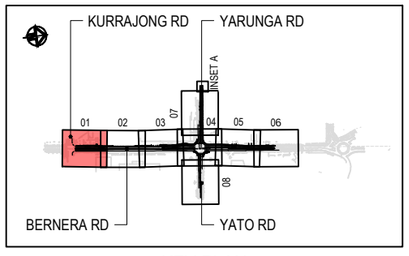


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
RW	RETAINING WALL
MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0201.DWG
Last Plotted: 20/09/2022 12:29:04 AM By: BENZSON
Last Saved: 19/09/2022 6:09:20 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

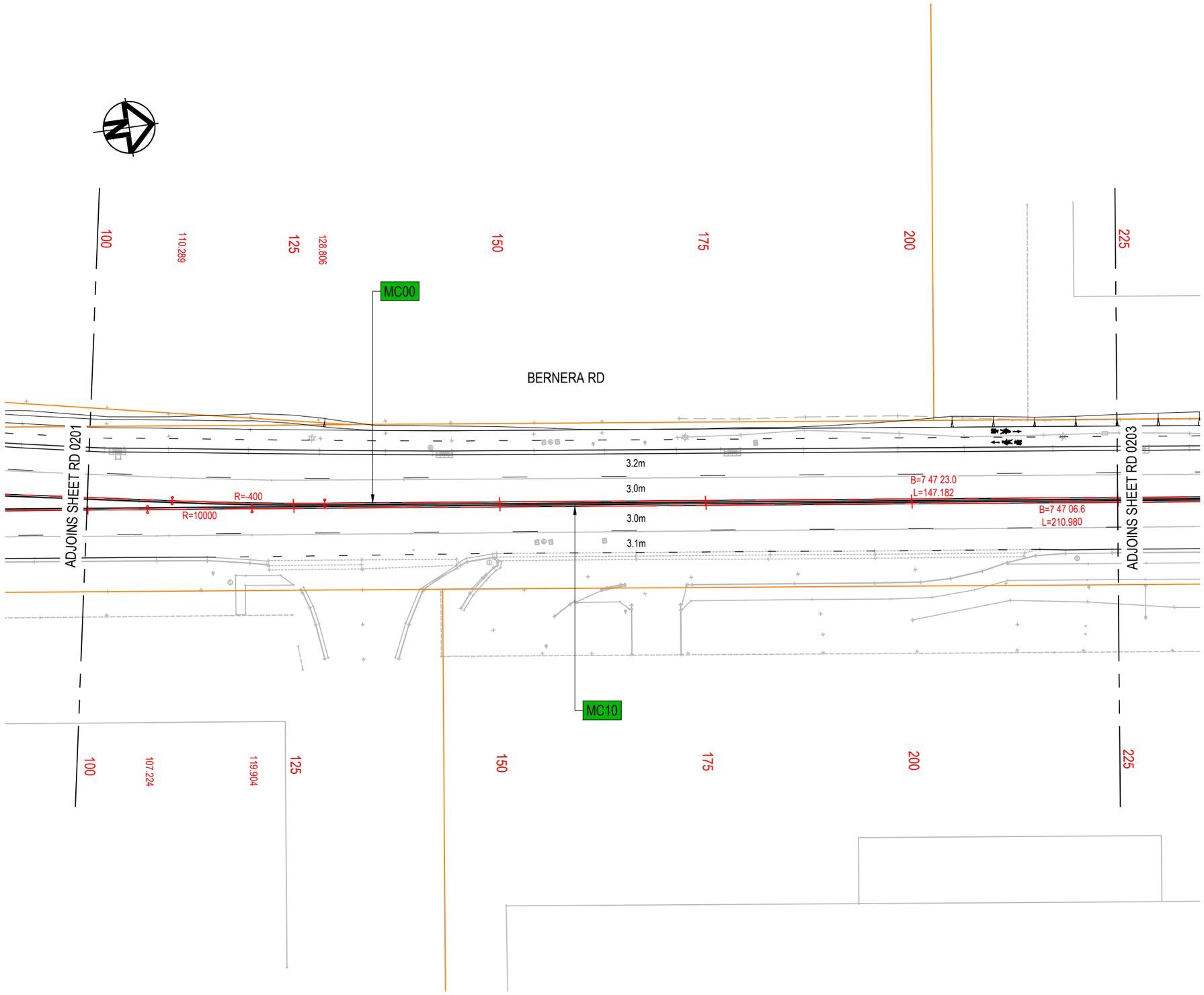
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0201
ISSUE A

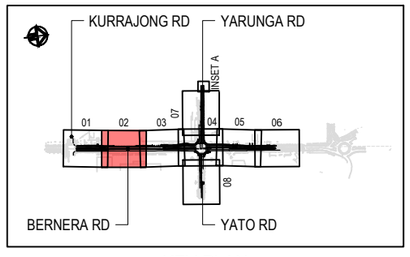


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0202.DWG

Last Plotted: 20/09/2022 12:29:31 AM By: BENZSON

Last Saved: 19/09/2022 6:09:34 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 2

A3

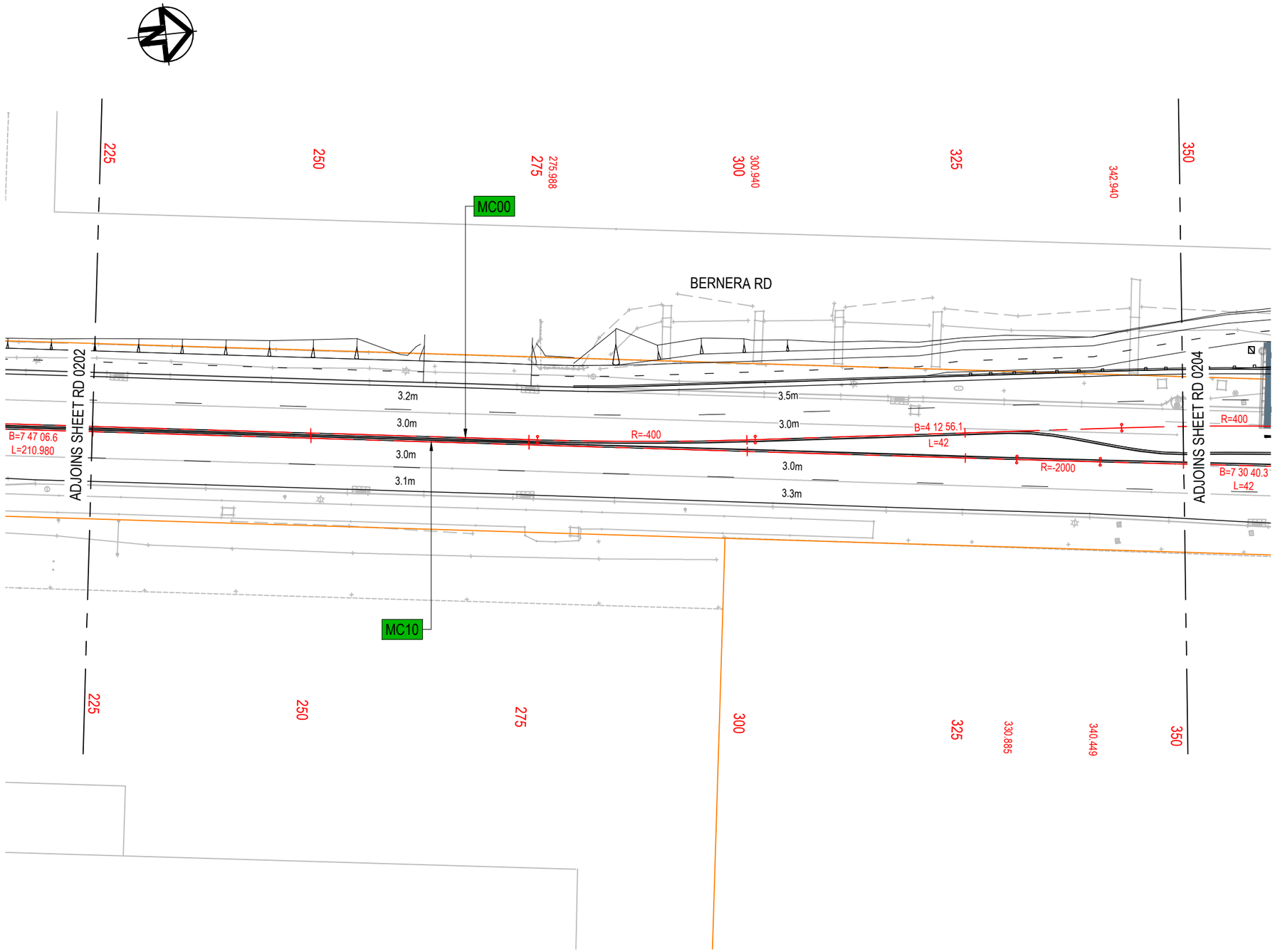
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0202

ISSUE A

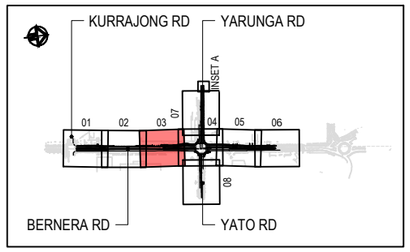


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0203.DWG
Last Plotted: 20/09/2022 12:30:09 AM By: BENZSON
Last Saved: 19/09/2022 6:09:48 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

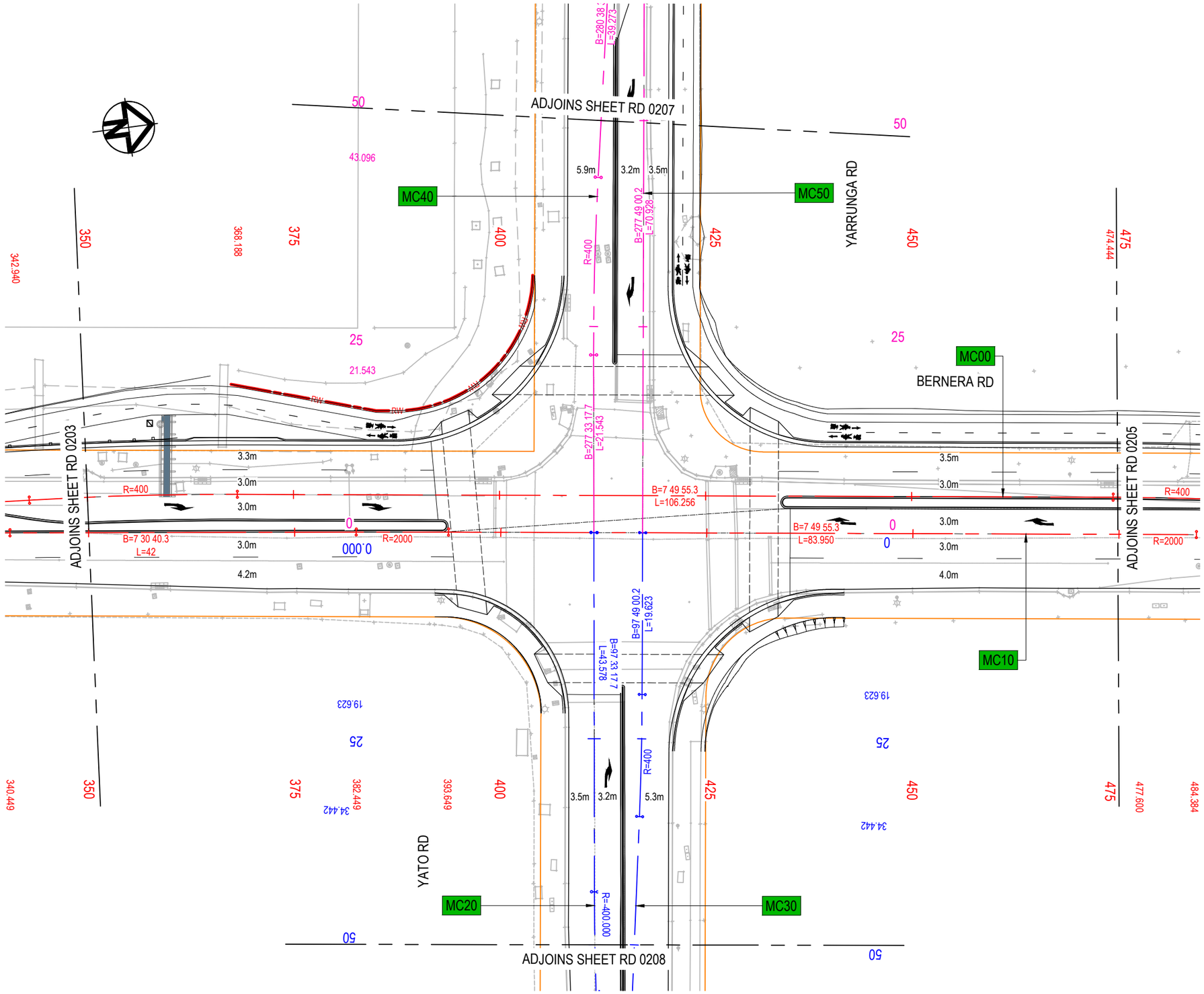
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0203
ISSUE A

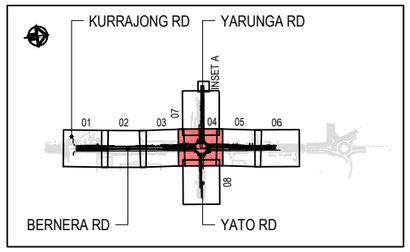


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0204.DWG

Last Plotted: 20/09/2022 12:30:46 AM By: BENZSON

Last Saved: 19/09/2022 6:10:04 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 4

A3

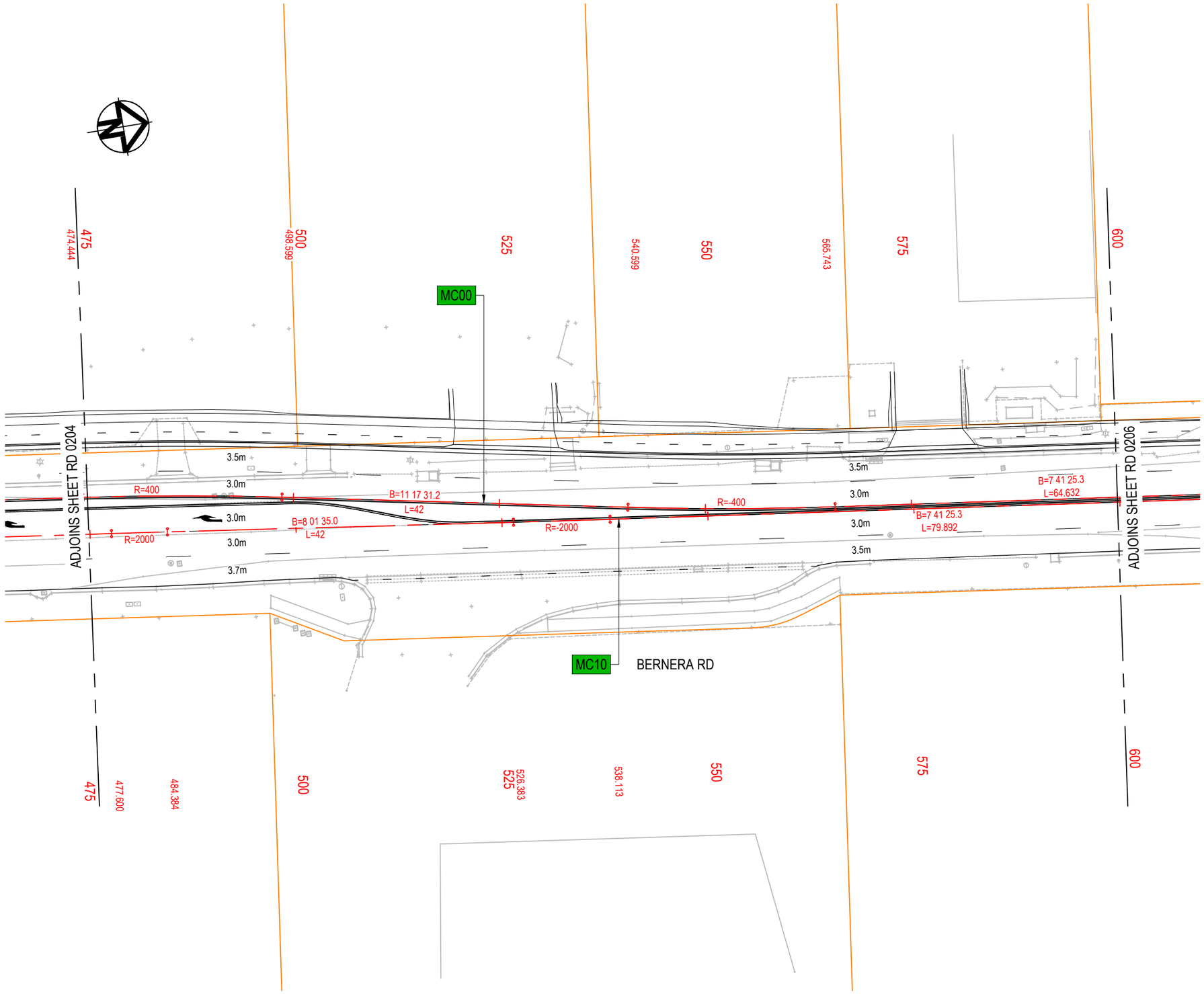
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0204

ISSUE A

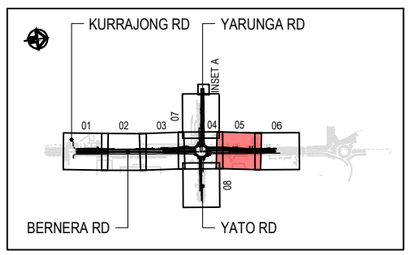


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
RW	RETAINING WALL
MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0205.DWG

Last Plotted: 20/09/2022 12:31:23 AM By: BENZSON

Last Saved: 19/09/2022 6:10:17 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 5

A3

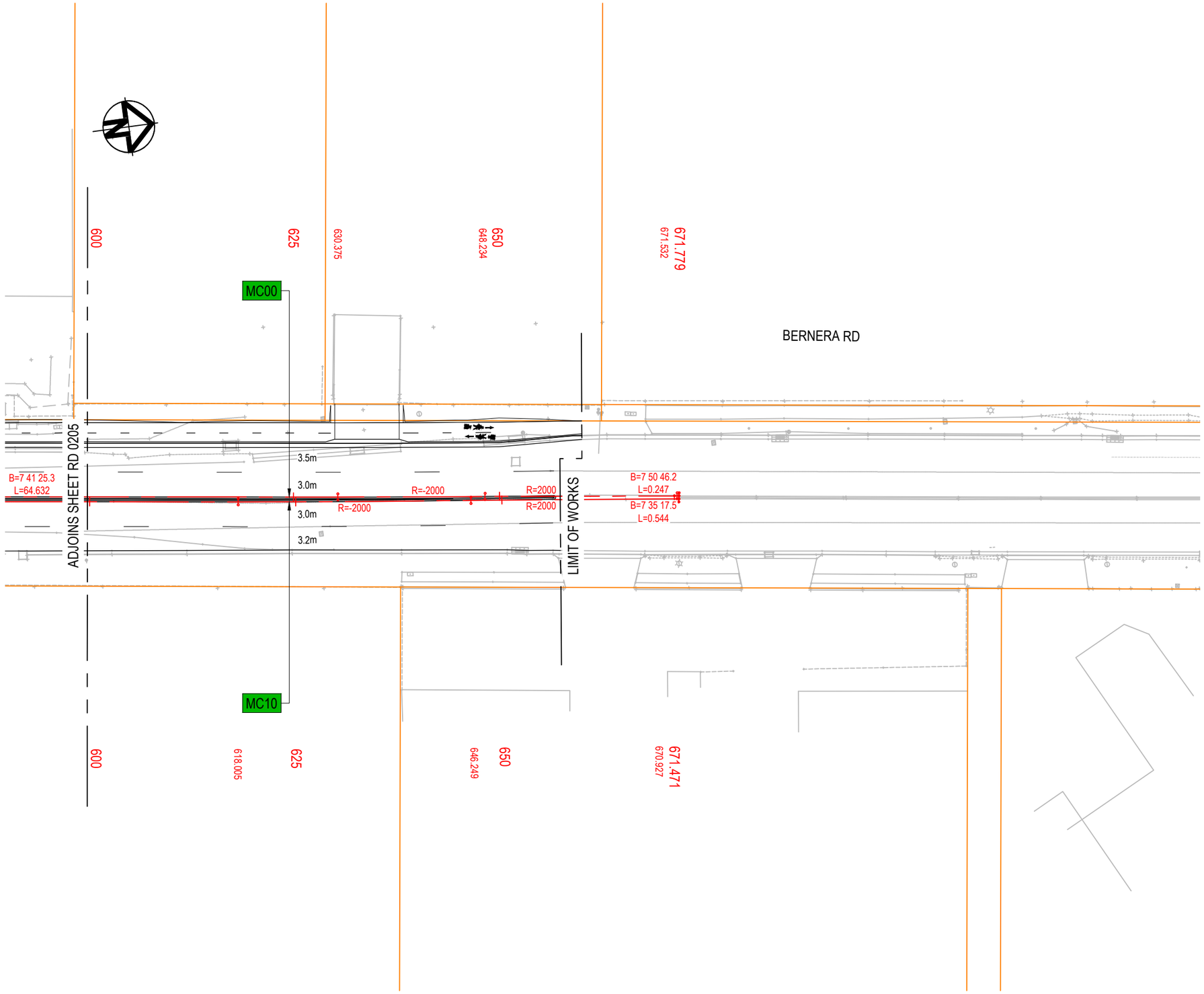
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0205

ISSUE A

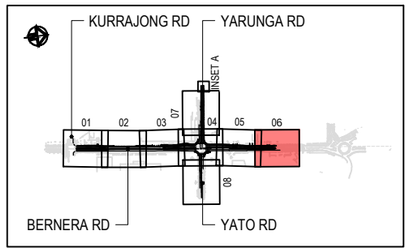


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0206.DWG

Last Plotted: 20/09/2022 12:31:59 AM By: BENZSON

Last Saved: 19/09/2022 6:10:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 6

A3

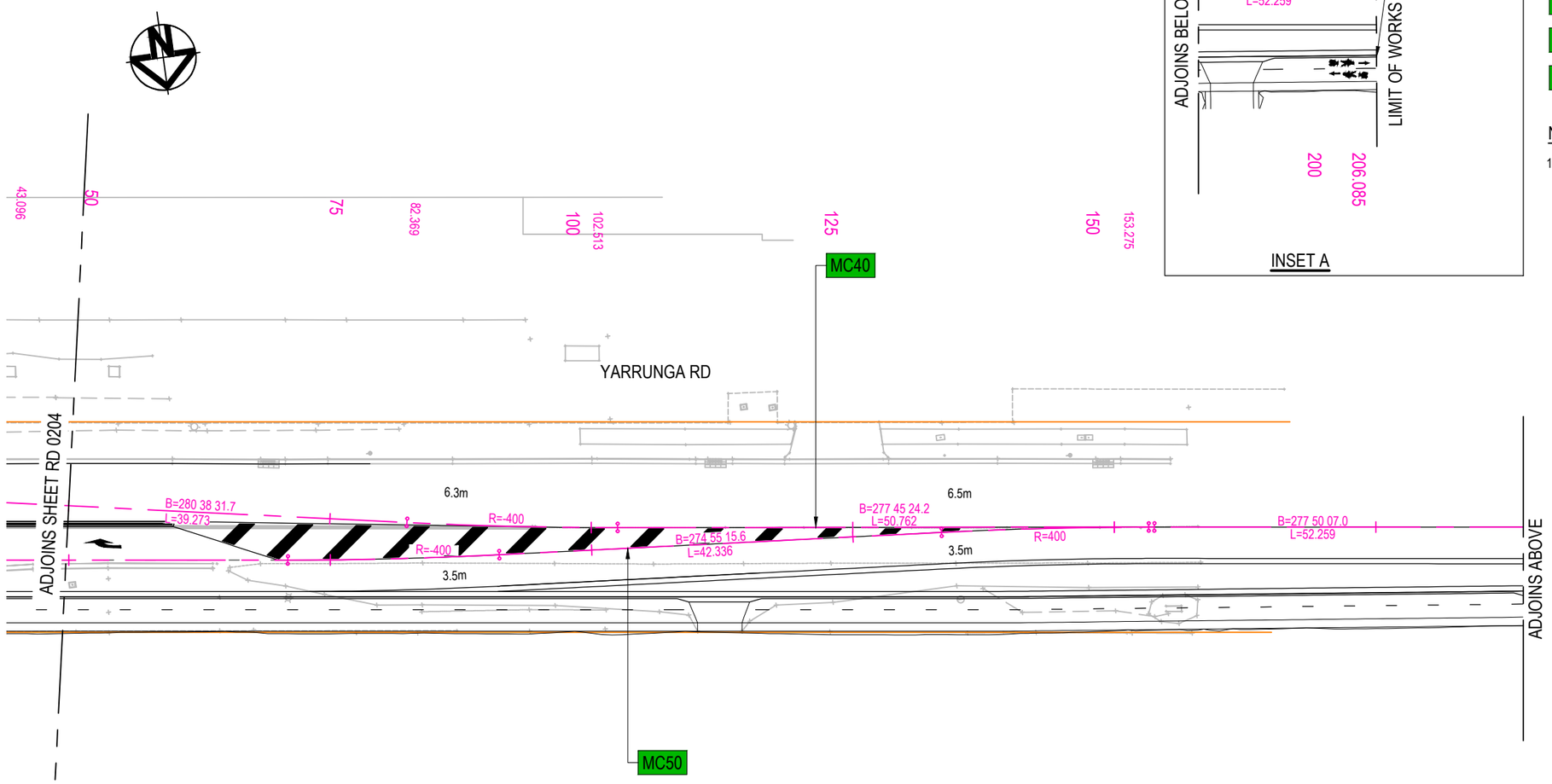
PROJECT NUMBER: 2021 25 DD 001

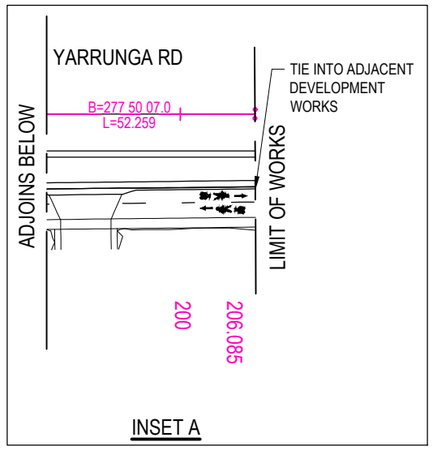
PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0206

ISSUE A





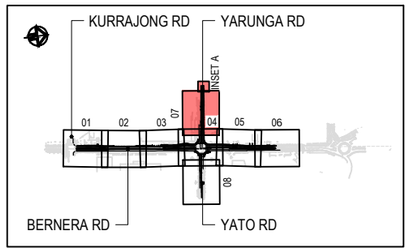
INSET A

LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW RETAINING WALL
- MC00 MC10 BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0207.DWG
Last Plotted: 20/09/2022 12:32:31 AM By: BENZSON
Last Saved: 19/09/2022 6:10:46 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

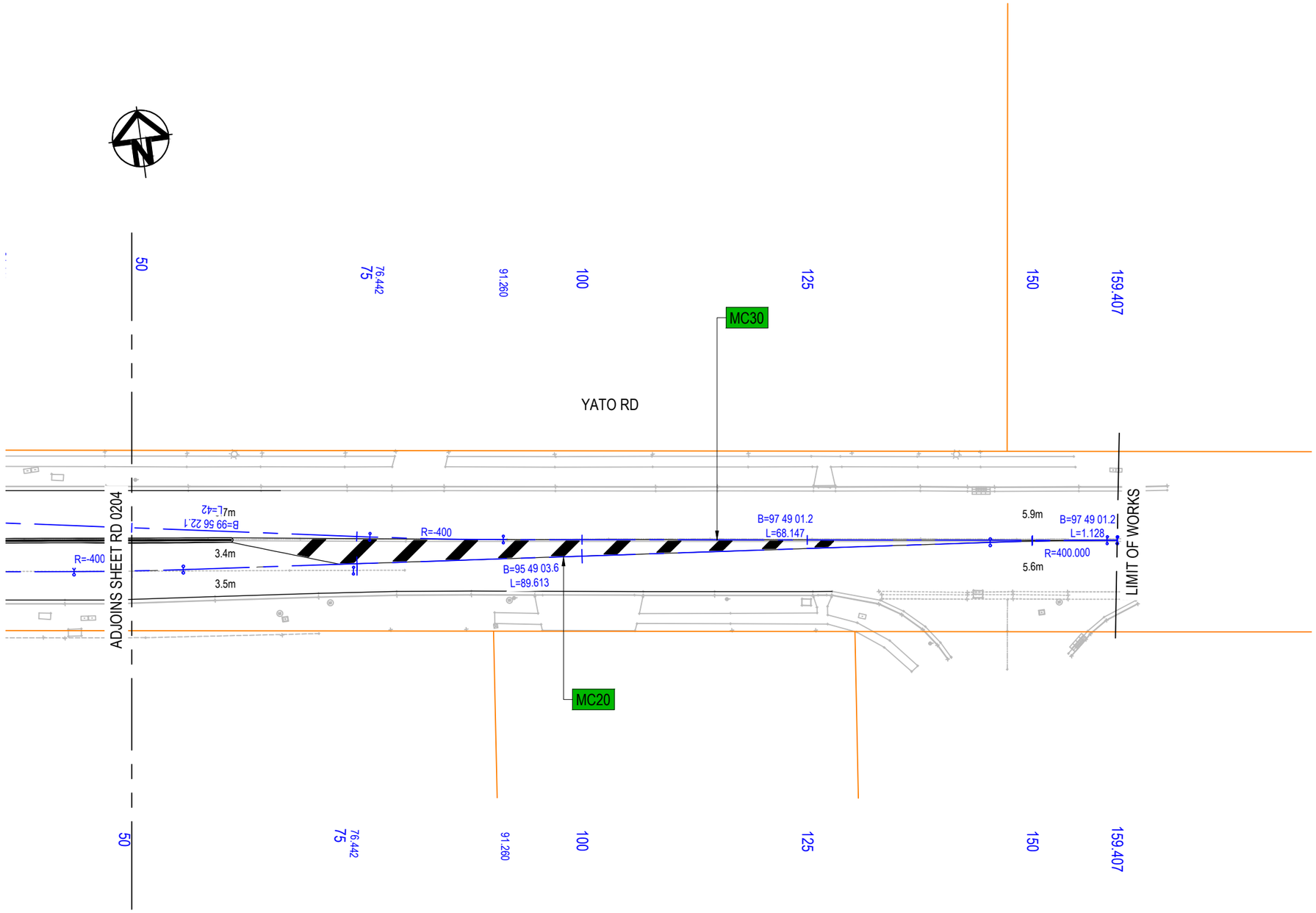
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 7

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0207
ISSUE A

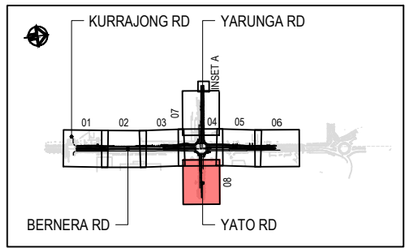


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0208.DWG

Last Plotted: 20/09/2022 12:33:12 AM By: BENZSON

Last Saved: 19/09/2022 6:10:59 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN
SHEET 8

A3

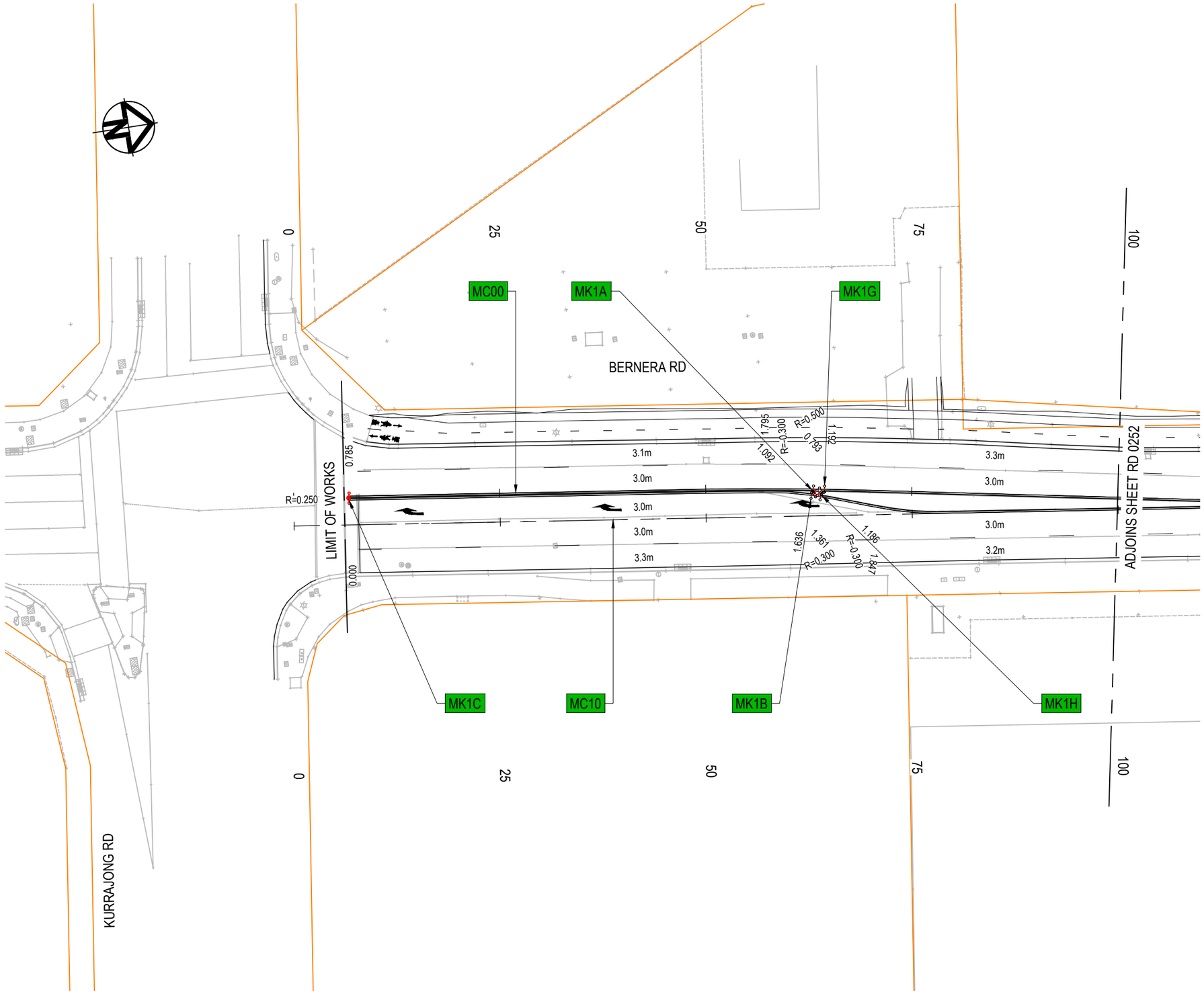
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0208

ISSUE A

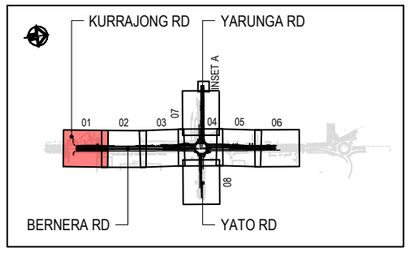


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0251.DWG
Last Plotted: 20/09/2022 12:33:58 AM By: BENZSON
Last Saved: 19/09/2022 11:16:10 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

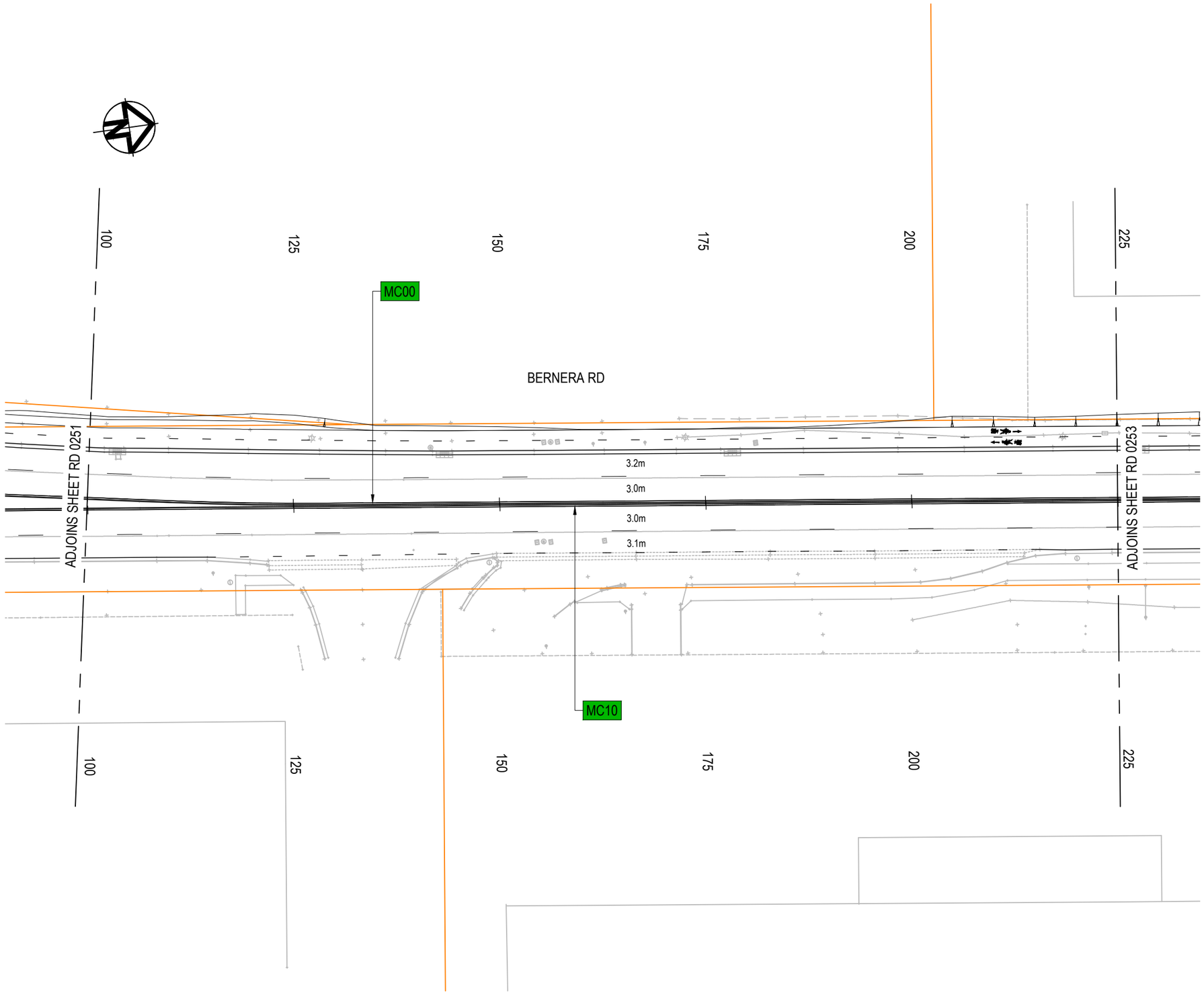
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0251
ISSUE A

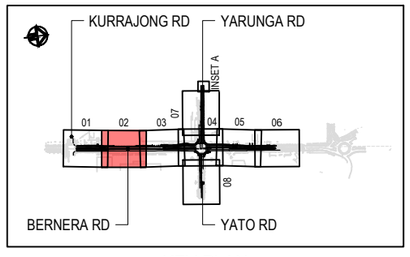


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0252.DWG
Last Plotted: 20/09/2022 12:34:44 AM By: BENZSON
Last Saved: 19/09/2022 6:11:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

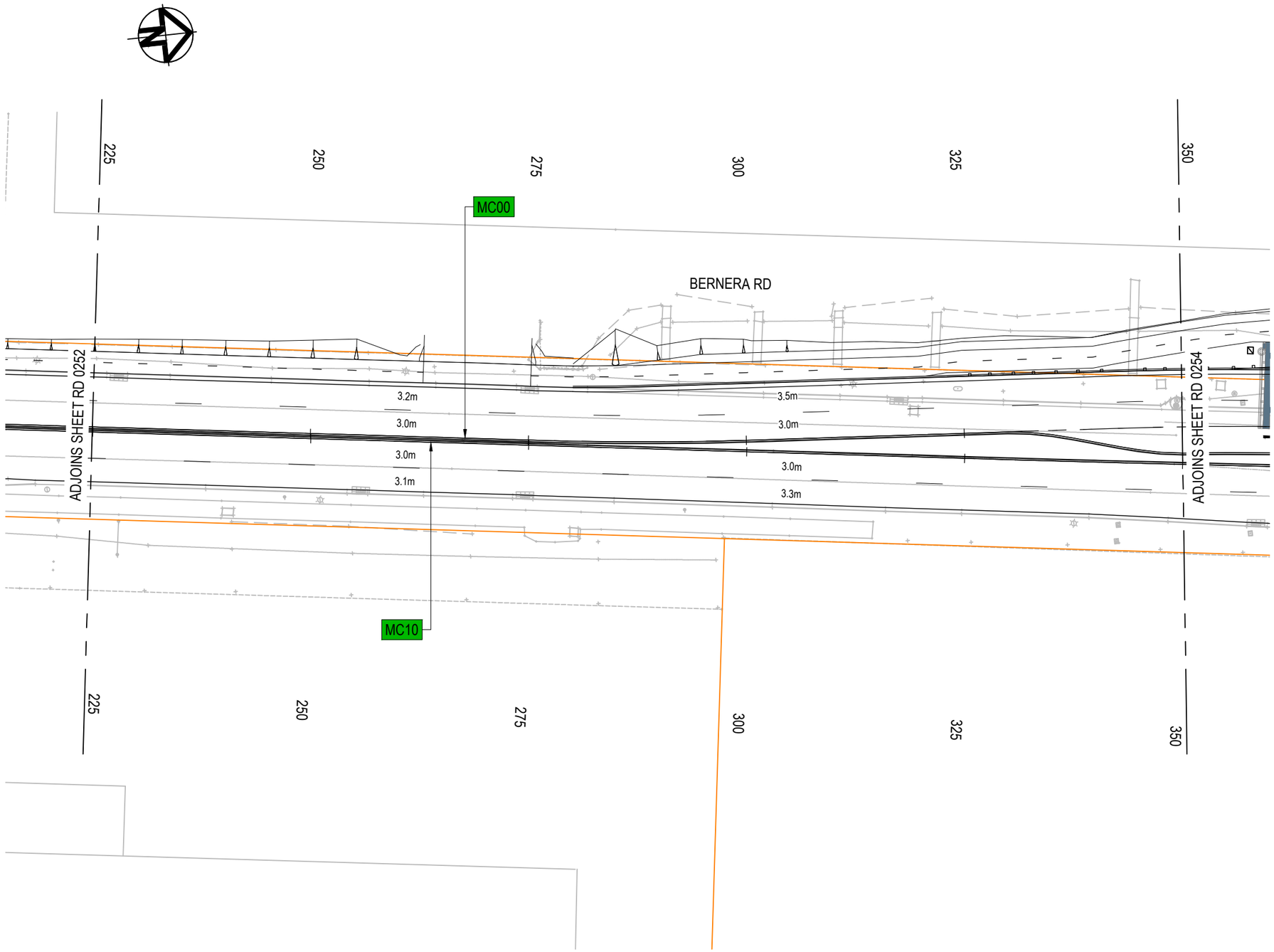
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0252
ISSUE A

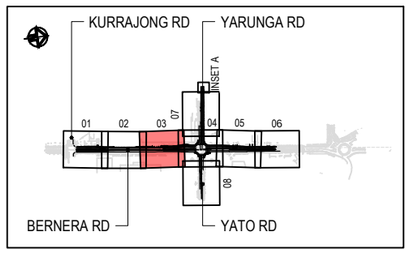


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0253.DWG
Last Plotted: 20/09/2022 12:35:36 AM By: BENZSON
Last Saved: 19/09/2022 6:11:45 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

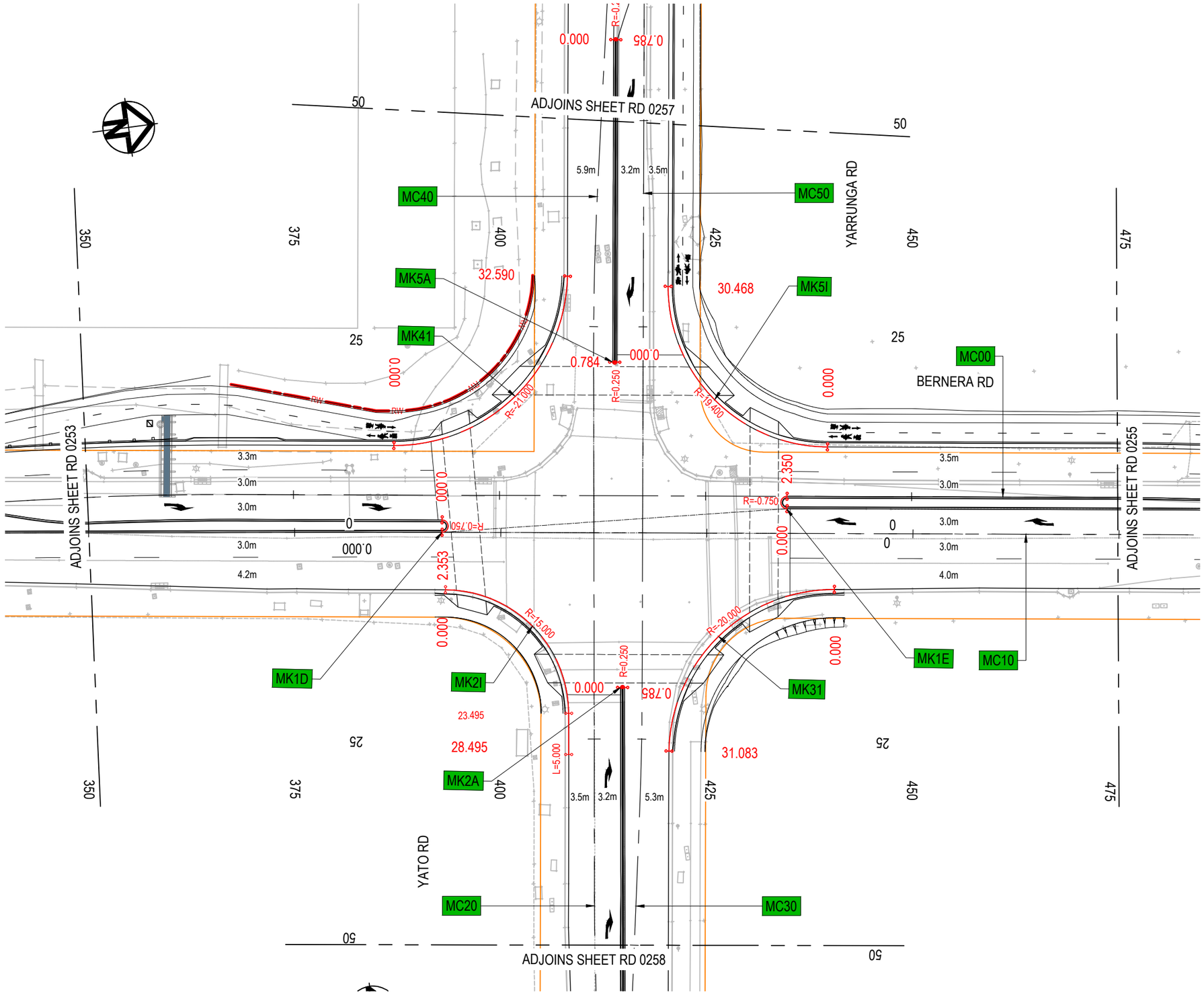
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0253
ISSUE A

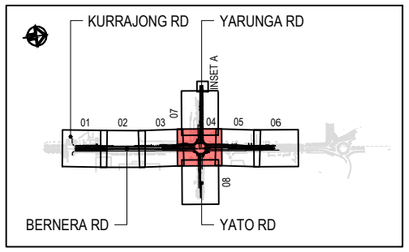


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0254.DWG

Last Plotted: 20/09/2022 12:36:25 AM By: BENZSON

Last Saved: 19/09/2022 11:26:57 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 4

A3

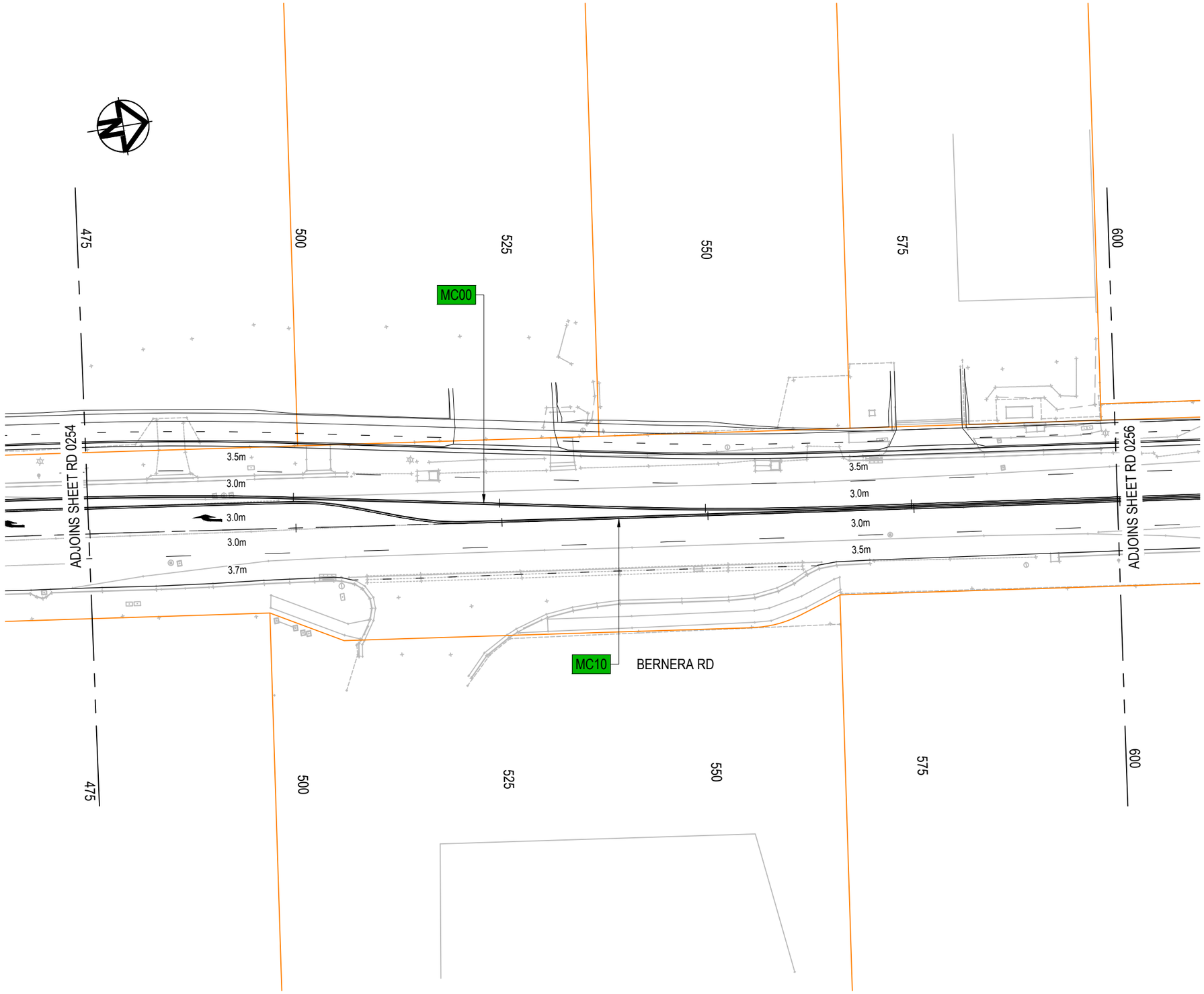
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0254

ISSUE A

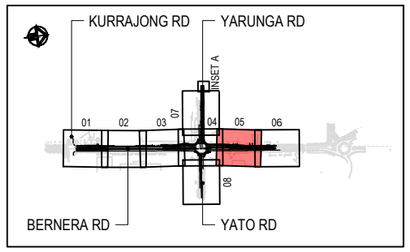


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
RW	RETAINING WALL
MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
MKXX	KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0255.DWG

Last Plotted: 20/09/2022 12:37:00 AM By: BENZSON

Last Saved: 19/09/2022 6:12:15 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 5

A3

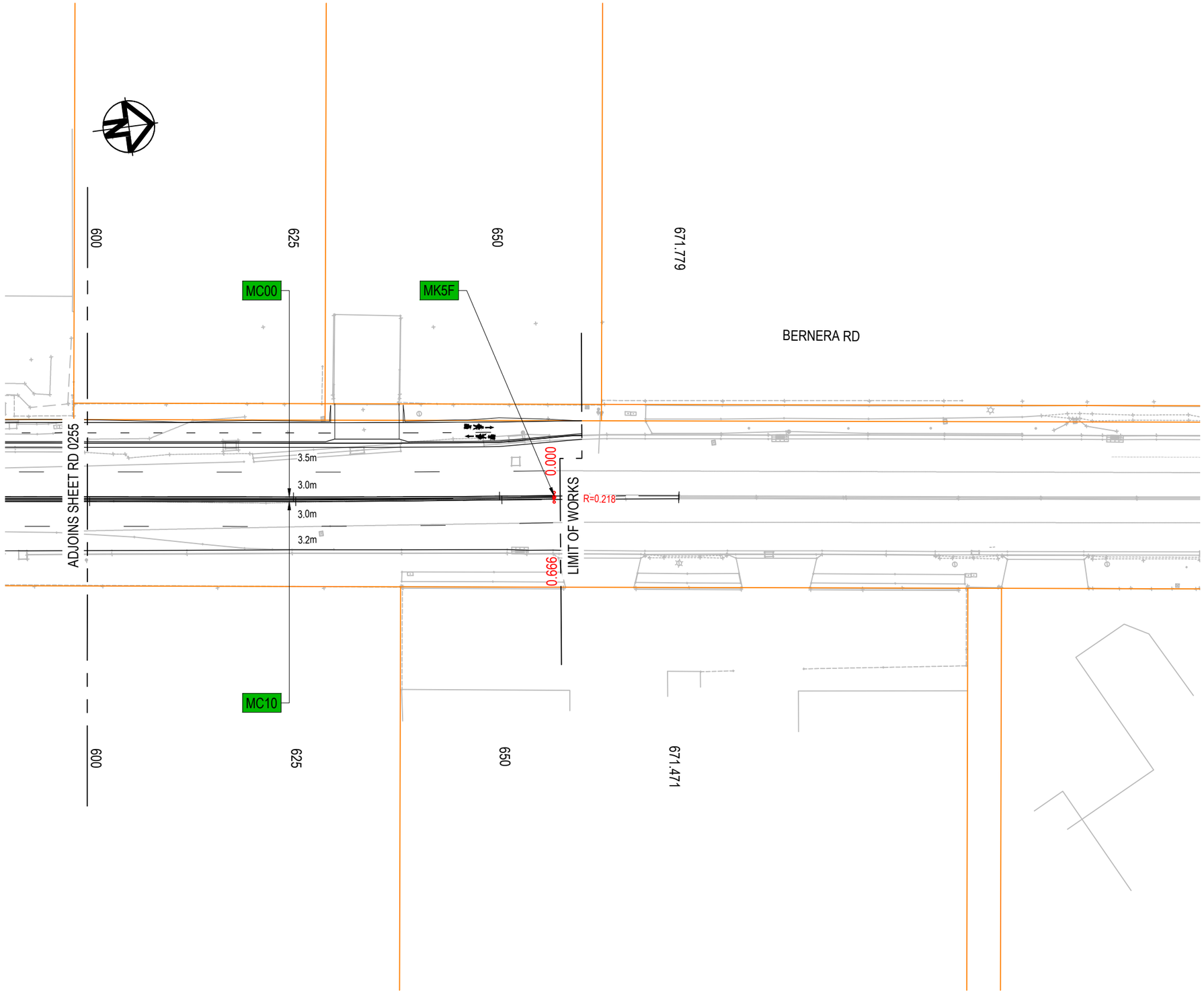
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0255

ISSUE A

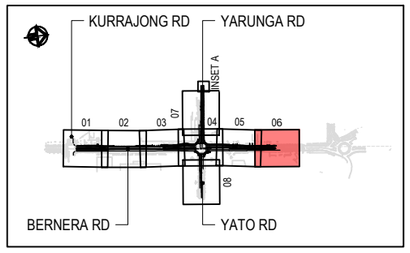


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0256.DWG

Last Plotted: 20/09/2022 12:37:47 AM By: BENZSON

Last Saved: 19/09/2022 6:12:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 6

A3

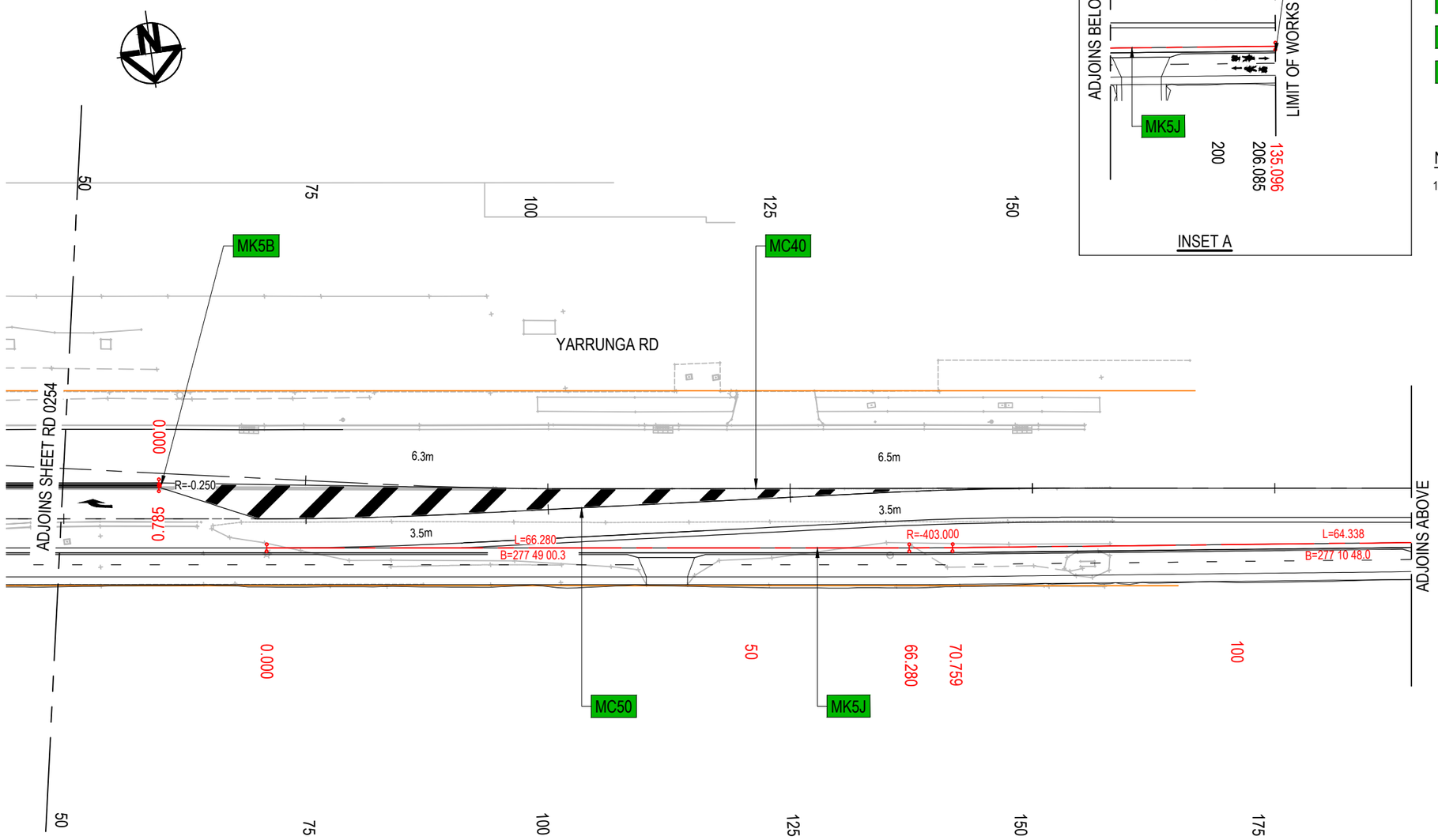
PROJECT NUMBER: 2021 25 DD 001

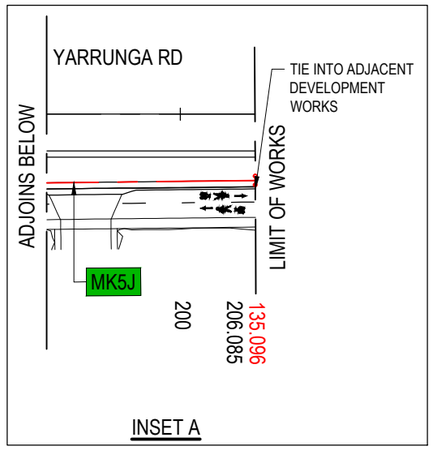
PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0256

ISSUE A





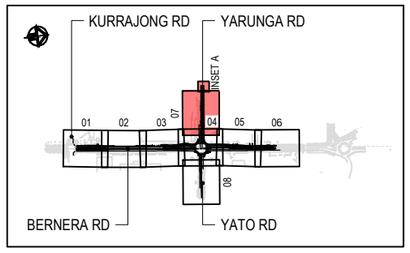
INSET A

LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0257.DWG

Last Plotted: 20/09/2022 12:38:40 AM By: BENZSON

Last Saved: 19/09/2022 6:12:48 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 7

A3

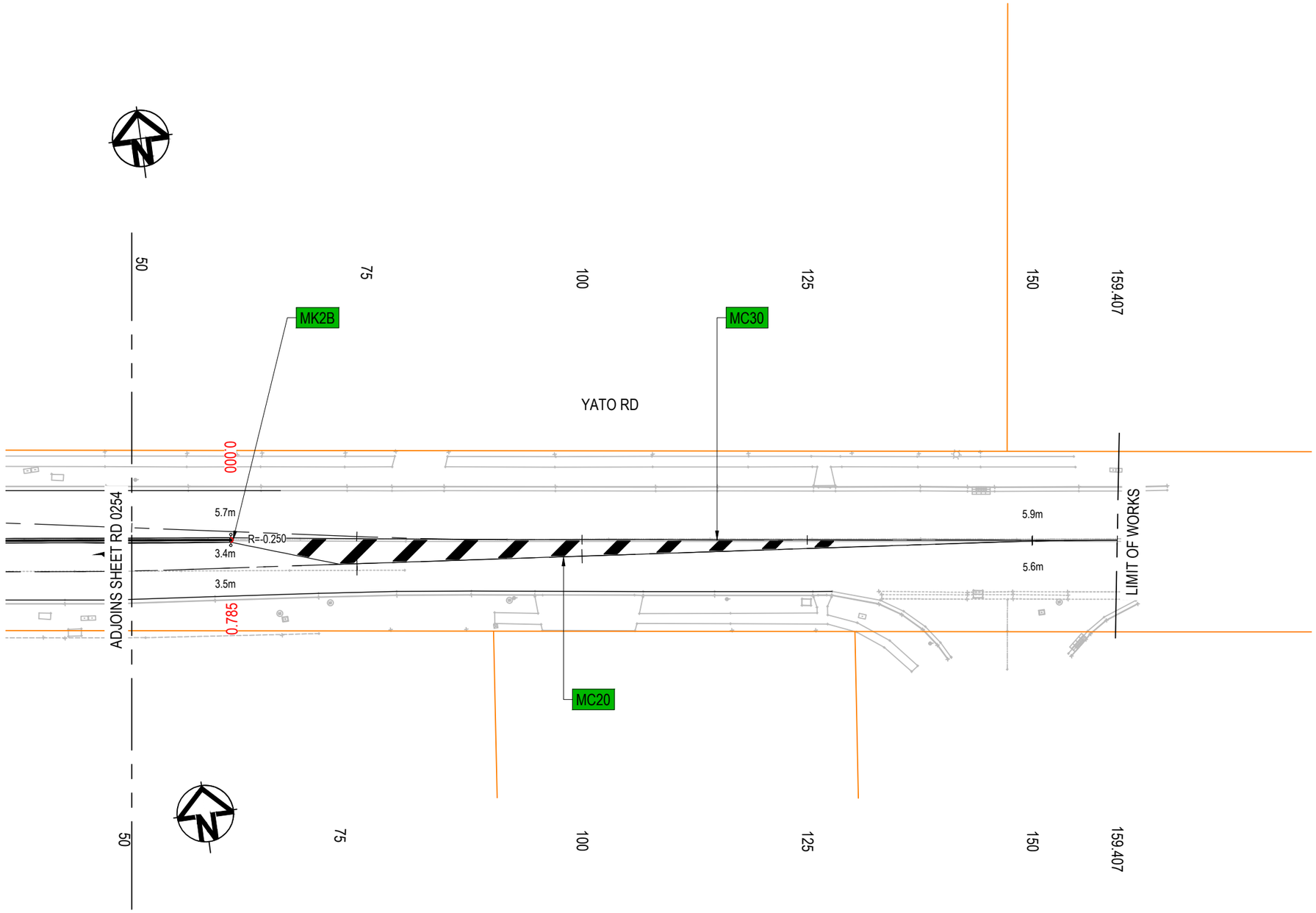
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0257

ISSUE A

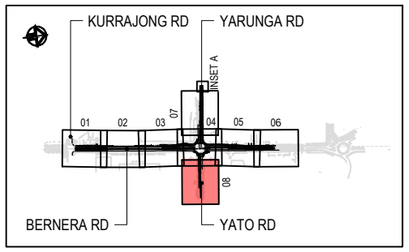


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- RW — RETAINING WALL
- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- MKXX — KERB CONTROL LINE

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0258.DWG

Last Plotted: 20/09/2022 12:39:39 AM By: BENZSON

Last Saved: 19/09/2022 11:30:46 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	B. PAKINGAN	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT PLAN - KERB
SHEET 8

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0258

ISSUE A

HORIZONTAL ALIGNMENT REPORT - MC00

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302906.810	6242210.374	0.000			
					STRAIGHT	49.232	7°42'45.1"
TC	49.232	302913.417	6242259.160	0.000			7°42'45.1"
CC		303309.798	6242205.479		R = +400.000	19.057	
CT	68.289	302916.423	6242277.977	0.000			10°26'31.9"
					STRAIGHT	42.000	10°26'31.9"
TC	110.289	302924.035	6242319.281	0.000			10°26'31.9"
CC		302530.660	6242391.779		R = -400.000	18.518	
CT	128.806	302926.969	6242337.563	0.000			7°47'23.0"
					STRAIGHT	147.182	7°47'23.0"
TC	275.988	302946.918	6242483.387	0.000			7°47'23.0"
CC		302550.609	6242537.602		R = -400.000	24.952	
CT	300.940	302949.526	6242508.198	0.000			4°12'56.1"
					STRAIGHT	42.000	4°12'56.1"
TC	342.940	302952.614	6242550.085	0.000			4°12'56.1"
CC		303351.532	6242520.681		R = +400.000	25.248	
CT	368.188	302955.263	6242575.189	0.000			7°49'55.3"
					STRAIGHT	106.256	7°49'55.3"
TC	474.444	302969.742	6242680.454	0.000			7°49'55.3"
CC		303366.011	6242625.946		R = +400.000	24.155	
CT	498.599	302973.754	6242704.270	0.000			11°17'31.2"
					STRAIGHT	42.000	11°17'31.2"
TC	540.599	302981.978	6242745.457	0.000			11°17'31.2"
CC		302589.721	6242823.780		R = -400.000	25.144	
CT	565.743	302986.124	6242770.252	0.000			7°41'25.3"
					STRAIGHT	64.632	7°41'25.3"
TC	630.375	302994.773	6242834.303	0.000			7°41'25.3"
CC		301012.761	6243101.942		R = -2000.000	17.859	
CTC	648.234	302997.084	6242852.012	0.000			7°10'43.4"
CC		304981.406	6242602.082		R = +2000.000	23.298	
CT	671.532	303000.130	6242875.110	0.000			7°50'46.2"
					STRAIGHT	0.247	7°50'46.2"
END	671.779	303000.163	6242875.354	0.000			

HORIZONTAL ALIGNMENT REPORT - MC10

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302910.278	6242209.903	0.000			
					STRAIGHT	107.224	7°42'45.1"
TC	107.224	302924.668	6242316.157	0.000			7°42'45.1"
CC		312834.207	6240974.129		R = +10000.000	12.680	
CT	119.904	302926.377	6242328.722	0.000			7°47'06.6"
					STRAIGHT	210.980	7°47'06.6"
TC	330.885	302954.957	6242537.757	0.000			7°47'06.6"
CC		300973.391	6242808.676		R = -2000.000	9.564	
CT	340.449	302956.229	6242547.237	0.000			7°30'40.3"
					STRAIGHT	42.000	7°30'40.3"
TC	382.449	302961.720	6242588.876	0.000			7°30'40.3"
CC		304944.558	6242327.437		R = +2000.000	11.200	
CT	393.649	302963.215	6242599.976	0.000			7°49'55.3"
					STRAIGHT	83.950	7°49'55.3"
TC	477.600	302974.655	6242683.143	0.000			7°49'55.3"
CC		304955.998	6242410.604		R = +2000.000	6.784	
CT	484.384	302975.591	6242689.863	0.000			8°01'35.0"
					STRAIGHT	42.000	8°01'35.0"
TC	526.383	302981.455	6242731.451	0.000			8°01'35.0"
CC		301001.047	6243010.709		R = -2000.000	11.730	
CT	538.113	302983.059	6242743.070	0.000			7°41'25.3"
					STRAIGHT	79.892	7°41'25.3"
TC	618.005	302993.750	6242822.244	0.000			7°41'25.3"
CC		301011.738	6243089.883		R = -2000.000	28.244	
CTC	646.249	302997.332	6242850.260	0.000			6°52'52.4"
CC		304982.925	6242610.636		R = +2000.000	24.678	
CT	670.927	303000.439	6242874.741	0.000			7°35'17.5"
					STRAIGHT	0.544	7°35'17.5"
END	671.471	303000.511	6242875.280	0.000			

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0301.DWG

Last Plotted: 20/09/2022 12:40:10 AM By: BENZSON

Last Saved: 19/09/2022 6:13:12 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT SCHEDULE
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0301

ISSUE A

HORIZONTAL ALIGNMENT REPORT - MC20

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302965.619	6242617.453	0.000			
					STRAIGHT	43.578	97°33'17.7"
TC	43.578	303008.819	6242611.724	0.000			97°33'17.7"
CC		303061.410	6243008.252		R = -400.000	12.128	
CT	55.707	303020.864	6242610.312	0.000			95°49'03.6"
					STRAIGHT	89.613	95°49'03.6"
TC	145.319	303110.015	6242601.228	0.000			95°49'03.6"
CC		303069.470	6242203.289		R = +400.000	13.958	
CT	159.277	303123.874	6242599.572	0.000			97°49'01.2"
					STRAIGHT	0.156	97°49'01.2"
END	159.433	303124.029	6242599.550	0.000			

HORIZONTAL ALIGNMENT REPORT - MC30

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302966.425	6242623.311	0.000			
					STRAIGHT	19.623	97°49'00.2"
TC	19.623	302985.865	6242620.642	0.000			97°49'00.2"
CC		302931.463	6242224.359		R = +400.000	14.819	
CT	34.442	303000.506	6242618.355	0.000			99°56'22.1"
					STRAIGHT	42.000	99°56'22.1"
TC	76.442	303041.876	6242611.106	0.000			99°56'22.1"
CC		303110.919	6243005.102		R = -400.000	14.818	
CT	91.260	303056.515	6242608.819	0.000			97°49'01.2"
					STRAIGHT	68.147	97°49'01.2"
END	159.407	303124.029	6242599.550	0.000			

HORIZONTAL ALIGNMENT REPORT - MC40

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302965.619	6242617.453	0.000			
					STRAIGHT	21.543	277°33'17.7"
TC	21.543	302944.263	6242620.286	0.000			277°33'17.7"
CC		302996.853	6243016.814		R = +400.000	21.553	
CT	43.096	302922.984	6242623.694	0.000			280°38'31.7"
					STRAIGHT	39.273	280°38'31.7"
TC	82.369	302884.386	6242630.946	0.000			280°38'31.7"
CC		302810.516	6242237.826		R = -400.000	20.144	
CT	102.513	302864.503	6242634.166	0.000			277°45'24.2"
					STRAIGHT	50.762	277°45'24.2"
END	153.275	302814.205	6242641.018	0.000			

HORIZONTAL ALIGNMENT REPORT - MC50

POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302966.425	6242623.311	0.000			
					STRAIGHT	70.928	277°49'00.2"
TC	70.928	302896.156	6242632.958	0.000			277°49'00.2"
CC		302841.754	6242236.674		R = -400.000	20.216	
CT	91.144	302876.067	6242635.200	0.000			274°55'15.6"
					STRAIGHT	42.336	274°55'15.6"
TC	133.480	302833.887	6242638.832	0.000			274°55'15.6"
CC		302868.200	6243037.357		R = +400.000	20.346	
CT	153.825	302813.670	6242641.091	0.000			277°50'07.0"
					STRAIGHT	52.259	277°50'07.0"
END	206.085	302761.898	6242648.216	0.000			

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0302.DWG
Last Plotted: 20/09/2022 12:40:34 AM By: BENZSON
Last Saved: 19/09/2022 6:13:23 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
ALIGNMENT SCHEDULE
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0302
ISSUE A

HORIZONTAL ALIGNMENT REPORT - MK1A							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	1.092	302916.048	6242272.955	0.000			324°07'43.5"
CC		302915.805	6242272.780		R = -0.300	0.704	
END	1.795	302915.509	6242272.830	0.000			189°41'36.5"

HORIZONTAL ALIGNMENT REPORT - MK1B							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	1.361	302916.206	6242272.737	0.000			144°07'43.5"
CC		302915.963	6242272.561		R = +0.300	0.275	
END	1.636	302916.251	6242272.476	0.000			196°33'23.6"

HORIZONTAL ALIGNMENT REPORT - MK1C							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302908.205	6242216.949	0.000			187°45'29.8"
CC		302907.957	6242216.982		R = +0.250	0.785	
END	0.785	302907.709	6242217.016	0.000			7°45'29.8"

HORIZONTAL ALIGNMENT REPORT - MK1D							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302961.622	6242599.403	0.000			8°08'11.9"
CC		302962.365	6242599.297		R = +0.750	2.353	
END	2.353	302963.107	6242599.194	0.000			187°53'32.2"

HORIZONTAL ALIGNMENT REPORT - MK1E							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302964.351	6242641.260	0.000			187°49'55.3"
CC		302965.094	6242641.158		R = -0.750	2.350	
END	2.350	302965.836	6242641.050	0.000			8°18'19.1"

HORIZONTAL ALIGNMENT REPORT - MK1F							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302998.110	6242860.322	0.000			9°29'04.7"
CC		302998.326	6242860.286		R = +0.218	0.666	
END	0.666	302998.543	6242860.268	0.000			184°35'21.0"

HORIZONTAL ALIGNMENT REPORT - MK1G							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.793	302915.825	6242273.776	0.000			324°07'43.6"
CC		302916.230	6242274.069		R = +0.500	0.399	
END	1.192	302915.738	6242274.154	0.000			9°53'09.5"

HORIZONTAL ALIGNMENT REPORT - MK1H							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	1.186	302916.056	6242273.457	0.000			144°07'43.5"
CC		302916.299	6242273.632		R = -0.300	0.661	
END	1.847	302916.584	6242273.540	0.000			17°57'03.0"

HORIZONTAL ALIGNMENT REPORT - MK2A							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302984.644	6242618.158	0.000			277°33'17.2"
CC		302984.677	6242618.406		R = +0.250	0.785	
END	0.785	302984.709	6242618.654	0.000			97°33'17.2"

HORIZONTAL ALIGNMENT REPORT - MK2B							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	303026.512	6242612.605	0.000			96°56'57.3"
CC		303026.542	6242612.853		R = -0.250	0.785	
END	0.785 R1	303026.573	6242613.101	0.000			276°56'57.3"

HORIZONTAL ALIGNMENT REPORT - MK2I							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302970.076	6242598.672	0.000			7°48'41.4"
CC		302984.937	6242596.633		R = +15.000	23.495	
CT	23.495	302986.909	6242611.503	0.000			97°33'17.7"
					STRAIGHT	5.000	97°33'17.7"
END	28.495	302991.866	6242610.845	0.000			

HORIZONTAL ALIGNMENT REPORT - MK31							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302976.310	6242645.447	0.000			187°49'55.3"
CC		302996.124	6242642.722		R = -20.000	31.083	
END	31.083	302993.069	6242622.956	0.000			98°47'09.3"

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0311.DWG

Last Plotted: 20/09/2022 12:40:50 AM By: BENZSON

Last Saved: 19/09/2022 6:13:33 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
KERB SCHEDULE
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RD 0311

ISSUE A

HORIZONTAL ALIGNMENT REPORT - MK41							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302951.905	6242594.808	0.000			7°49'55.3"
CC		302931.101	6242597.670		R = -21.000	32.590	
END	32.590	302934.355	6242618.416	0.000			278°54'54.8"

HORIZONTAL ALIGNMENT REPORT - MK5A							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302945.481	6242622.956	0.000			97°49'00.5"
CC		302945.447	6242622.709		R = +0.250	0.785	
END	0.785	302945.413	6242622.461	0.000			277°49'00.5"

HORIZONTAL ALIGNMENT REPORT - MK5B							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302906.747	6242628.274	0.000			277°51'44.5"
CC		302906.713	6242628.026		R = -0.250	0.785	
END	0.785	302906.679	6242627.778	0.000			97°51'44.5"

HORIZONTAL ALIGNMENT REPORT - MK5I							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302959.074	6242646.925	0.000			187°49'55.3"
CC		302939.855	6242649.569		R = +19.400	30.468	
END	30.468	302937.216	6242630.349	0.000			277°49'00.2"

HORIZONTAL ALIGNMENT REPORT - MK5J							
POINT	CHAINAGE	EASTING	NORTHING	ELEVATION	ELEMENT	LENGTH	BEARING
START	0.000	302896.564	6242635.930	0.000			
					STRAIGHT	66.280	277°49'00.3"
TC	66.280	302830.899	6242644.944	0.000			277°49'00.3"
CC		302776.089	6242245.689		R = -403.000	4.479	
CT	70.759	302826.459	6242645.529	0.000			277°10'48.0"
					STRAIGHT	64.338	277°10'48.0"
END	135.096	302762.626	6242653.570	0.000			

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RD 0312.DWG
Last Plotted: 20/09/2022 12:41:05 AM By: BENZSON
Last Saved: 19/09/2022 6:13:43 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
KERB SCHEDULE
SHEET 2

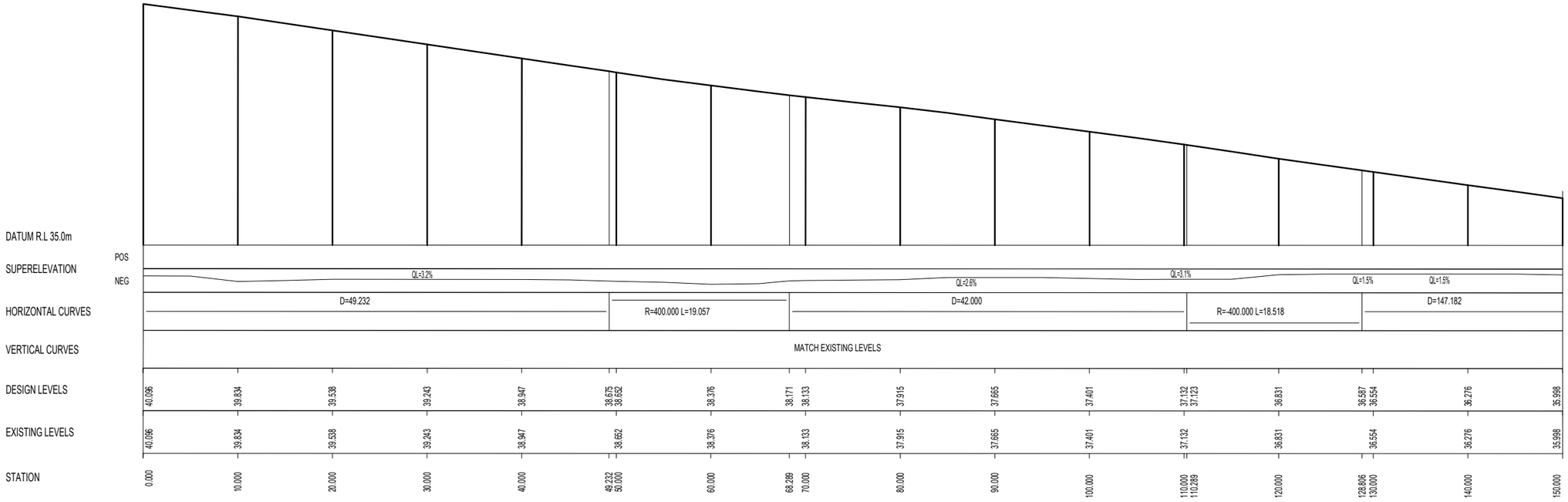
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RD 0312
ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC00 - BERNERA RD

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0401.DWG

Last Plotted: 19/09/2022 11:37:40 PM By: BENZSON

Last Saved: 19/09/2022 6:00:10 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC00 - BERNERA RD - CH 0 TO CH 150

A3

PROJECT NUMBER: 2021 25 DD 001

PART

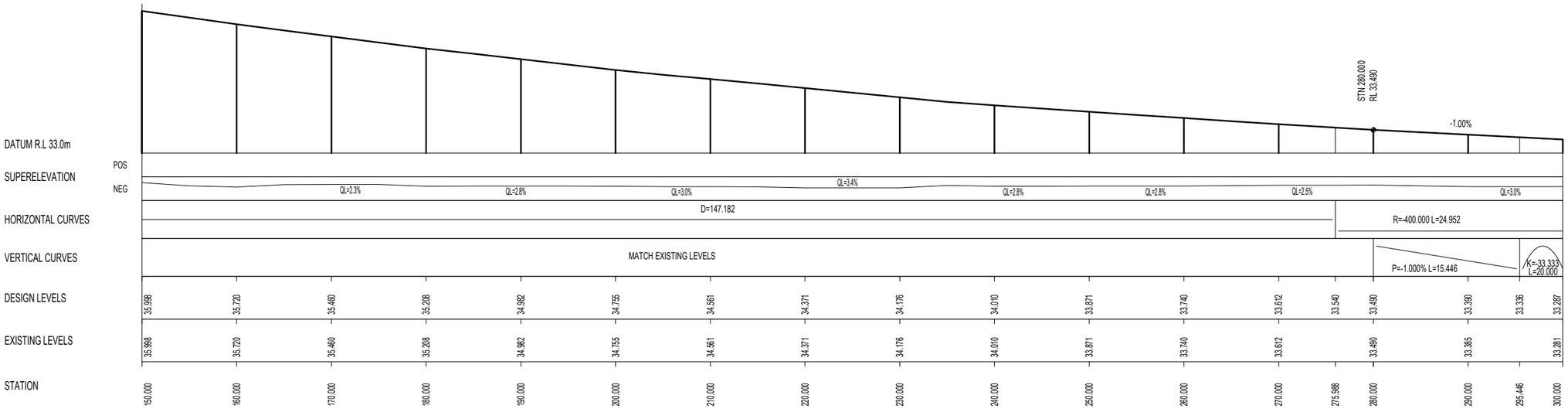
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0401

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC00 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0402.DWG

Last Plotted: 19/09/2022 11:38:41 PM By: BENZSON

Last Saved: 19/09/2022 6:00:18 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC00 - BERNERA RD - CH 150 TO CH 300

A3

PROJECT NUMBER: 2021 25 DD 001

PART

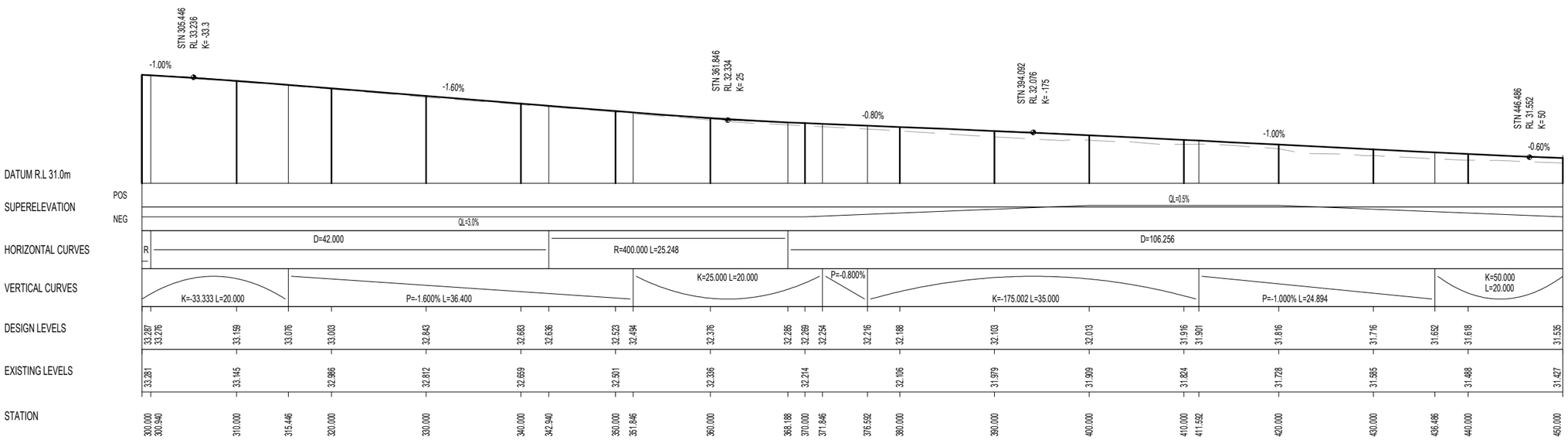
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0402

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC00 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0403.DWG

Last Plotted: 19/09/2022 11:39:00 PM By: BENZSON

Last Saved: 19/09/2022 6:00:27 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC00 - BERNERA RD - CH 300 TO CH 450

A3

PROJECT NUMBER: 2021 25 DD 001

PART

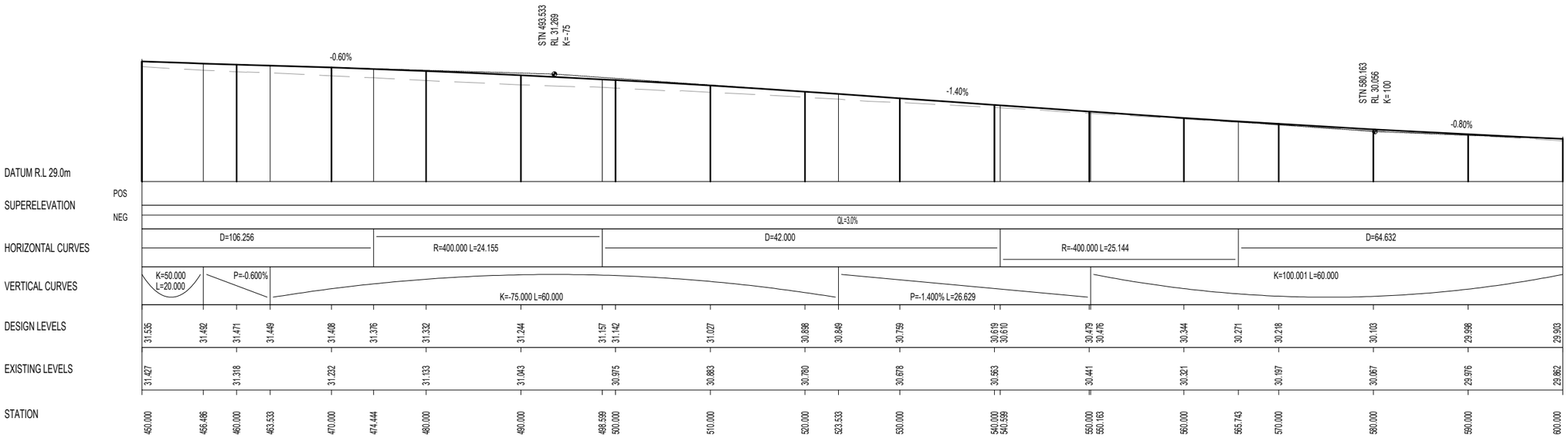
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0403

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC00 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0404.DWG

Last Plotted: 19/09/2022 11:39:19 PM By: BENZSON

Last Saved: 19/09/2022 6:00:36 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL
THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC00 - BERNERA RD - CH 450 TO CH 600

A3

PROJECT NUMBER: 2021 25 DD 001

PART

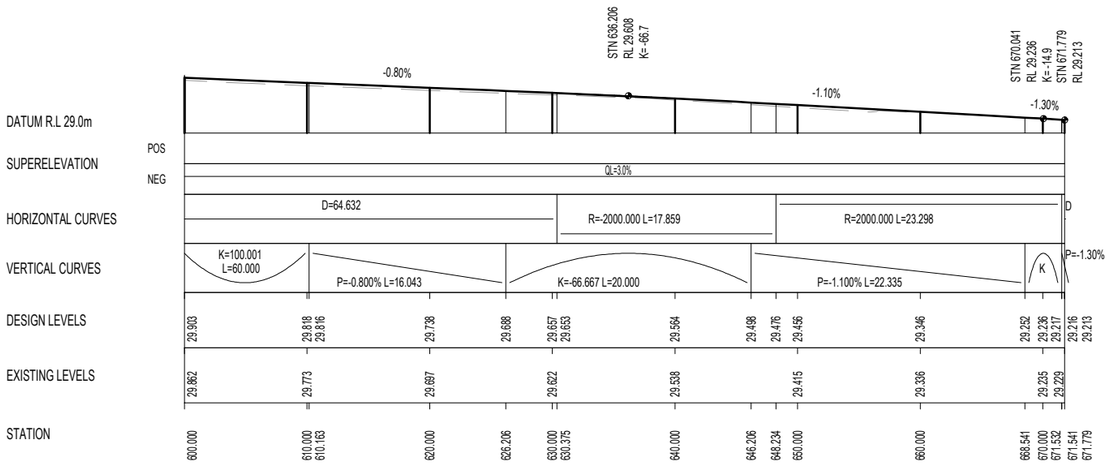
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0404

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC00 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0405.DWG
Last Plotted: 19/09/2022 11:39:37 PM By: BENZSON
Last Saved: 19/09/2022 6:00:45 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m
0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC00 - BERNERA RD - CH 600 TO CH 671.779

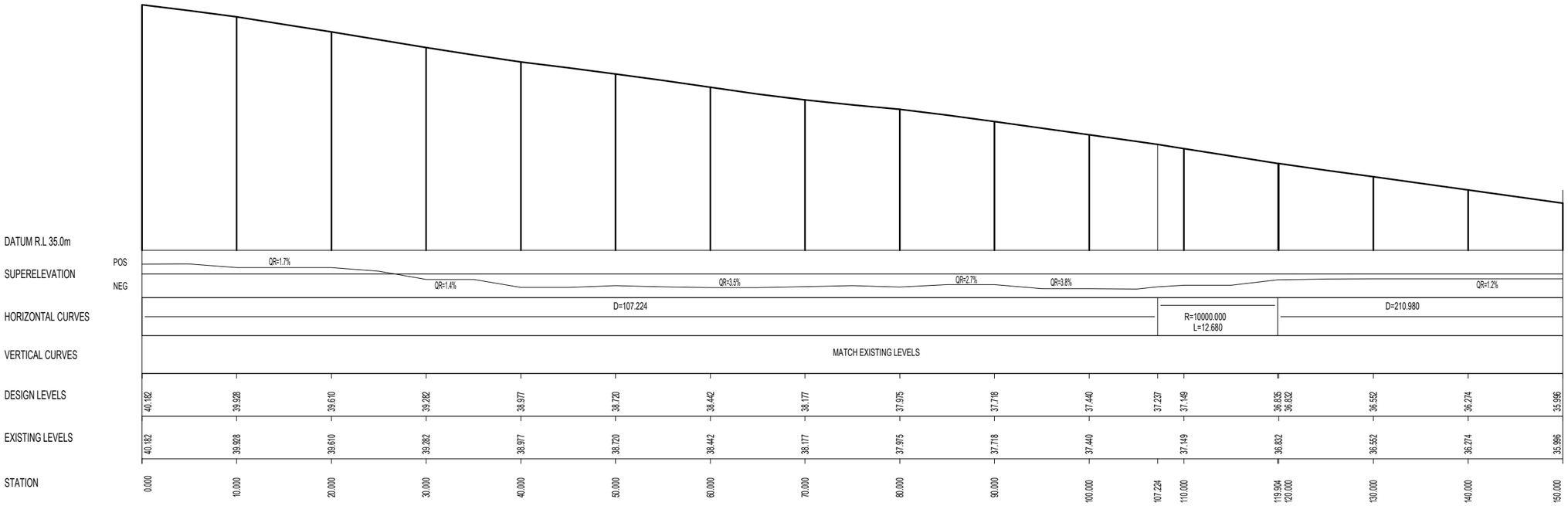
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. LS 0405
ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC10 - BERNERA RD

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0411.DWG

Last Plotted: 19/09/2022 11:40:01 PM By: BENZSON

Last Saved: 19/09/2022 6:00:55 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC10 - BERNERA RD - CH 0 TO CH 150

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

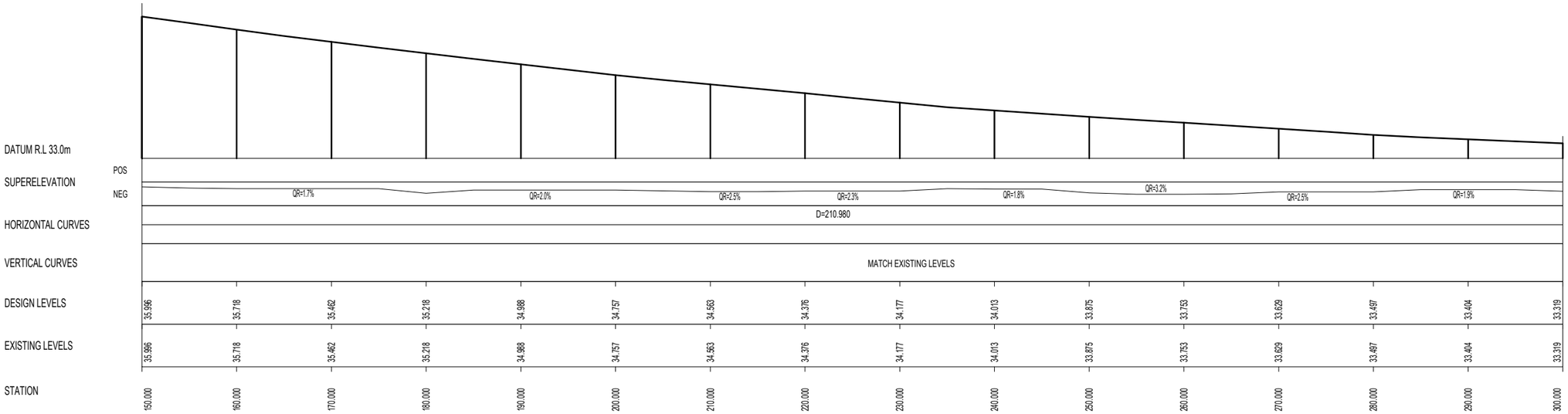
SHEET No. LS 0411

ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC10 - BERNERA RD

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0412.DWG

Last Plotted: 19/09/2022 11:40:12 PM By: BENZSON

Last Saved: 19/09/2022 6:01:04 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC10 - BERNERA RD - CH 150 TO CH 300

A3

PROJECT NUMBER: 2021 25 DD 001

PART

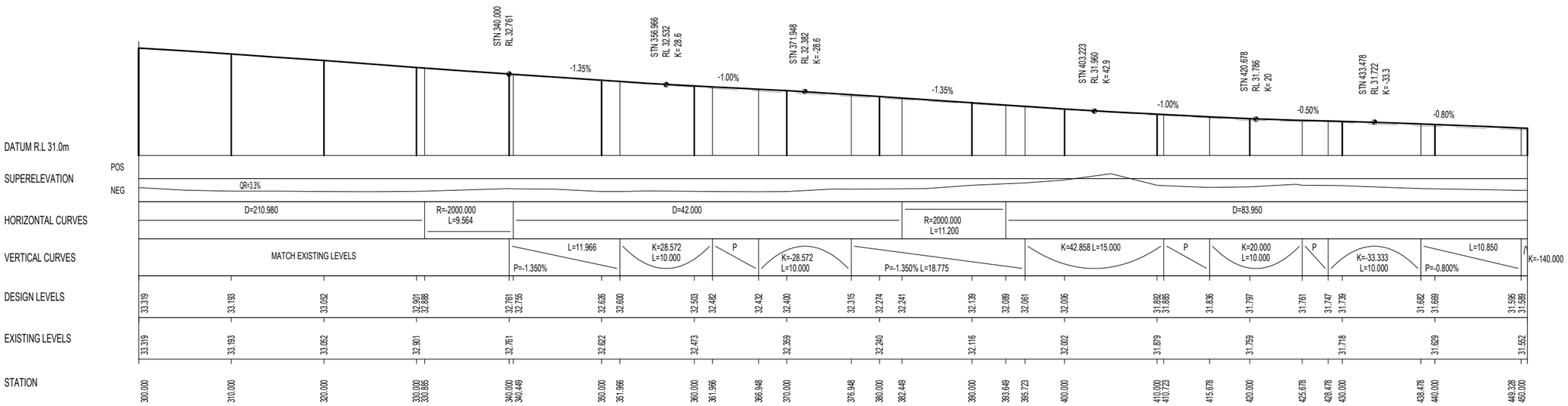
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0412

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC10 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0413.DWG
Last Plotted: 19/09/2022 11:40:22 PM By: BENZSON
Last Saved: 19/09/2022 6:01:14 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20 SCALE 1:500m
0 1 2 3 4 SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

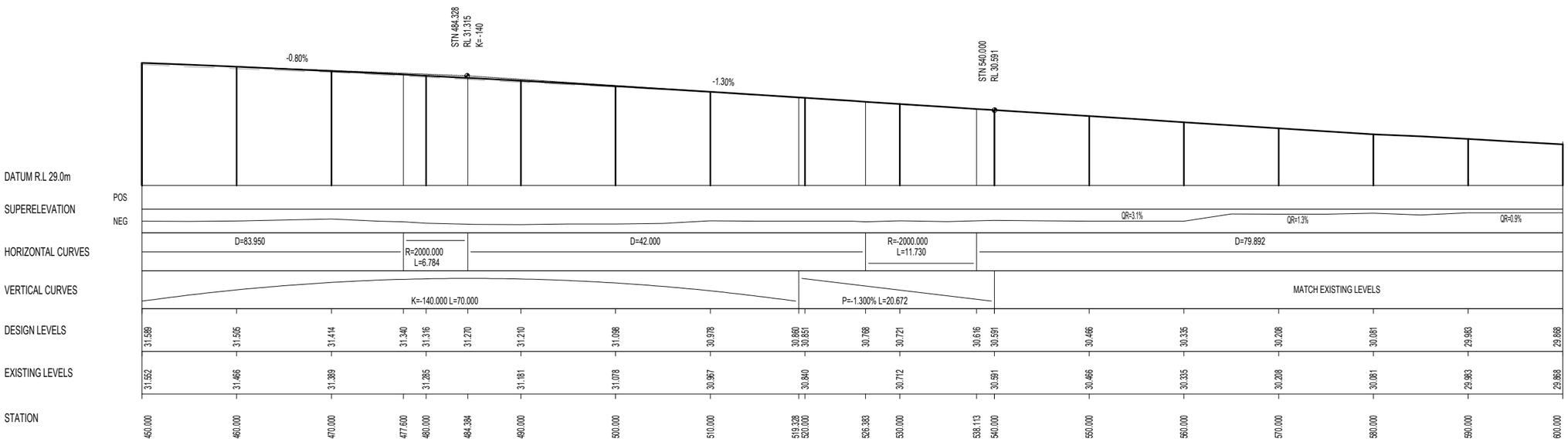
LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC10 - BERNERA RD - CH 300 TO CH 450

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. LS 0413
ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC10 - BERNERA RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0414.DWG
Last Plotted: 20/09/2022 12:14:39 AM By: BENZSON
Last Saved: 19/09/2022 6:01:24 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m
0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC10 - BERNERA RD - CH 450 TO CH 600

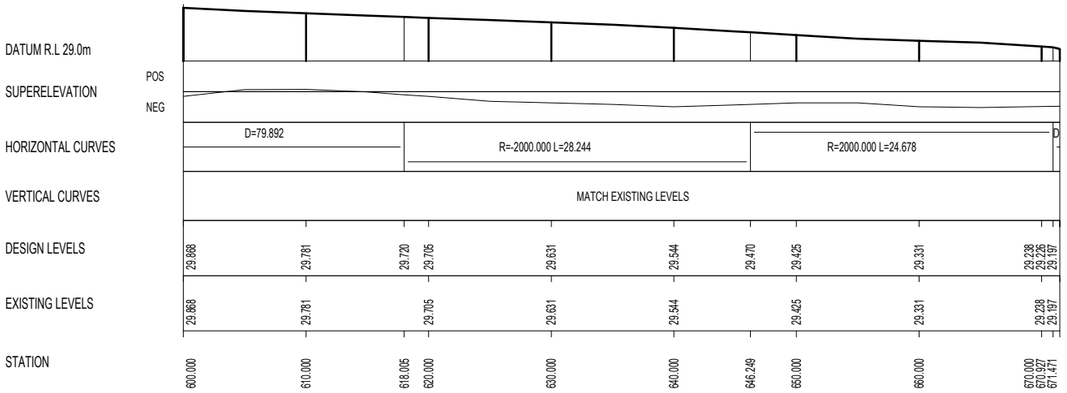
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. LS 0414
ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC10 - BERNERA RD

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0415.DWG

Last Plotted: 20/09/2022 12:14:50 AM By: BENZSON

Last Saved: 19/09/2022 6:01:35 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC10 - BERNERA RD - CH 600 TO CH 671.471

A3

PROJECT NUMBER: 2021 25 DD 001

PART

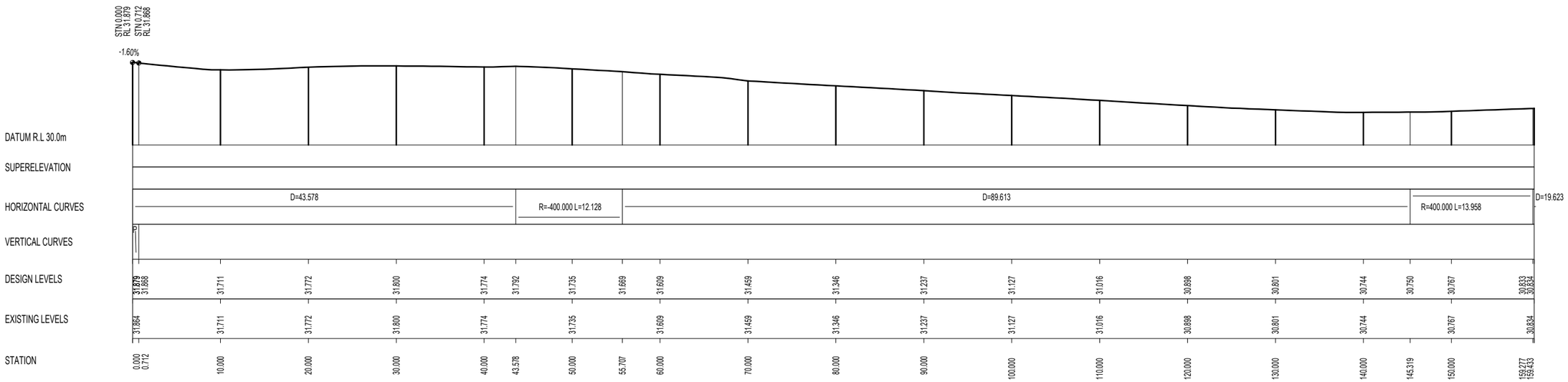
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0415

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC20 - YATO RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0421.DWG

Last Plotted: 20/09/2022 12:14:58 AM By: BENZSON

Last Saved: 19/09/2022 6:01:44 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL
THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC20 - YATO RD - CH 0 TO CH 159.457

A3

PROJECT NUMBER: 2021 25 DD 001

PART

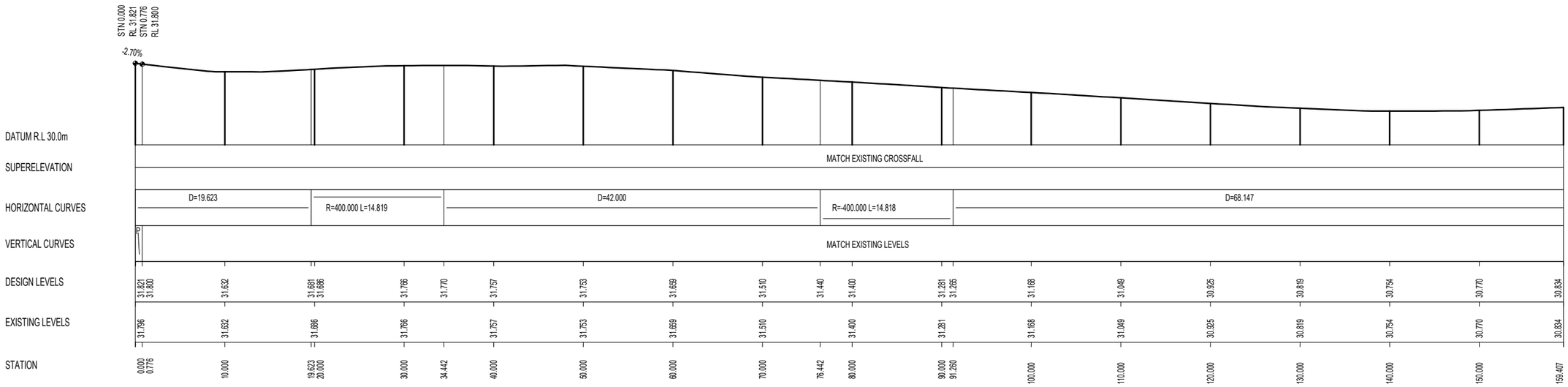
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0421

ISSUE A

LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC30 - YATO RD

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0431.DWG
Last Plotted: 20/09/2022 12:15:08 AM By: BENZSON
Last Saved: 19/09/2022 6:01:54 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m
0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC30 - YATO RD - CH 0 TO CH 159.407

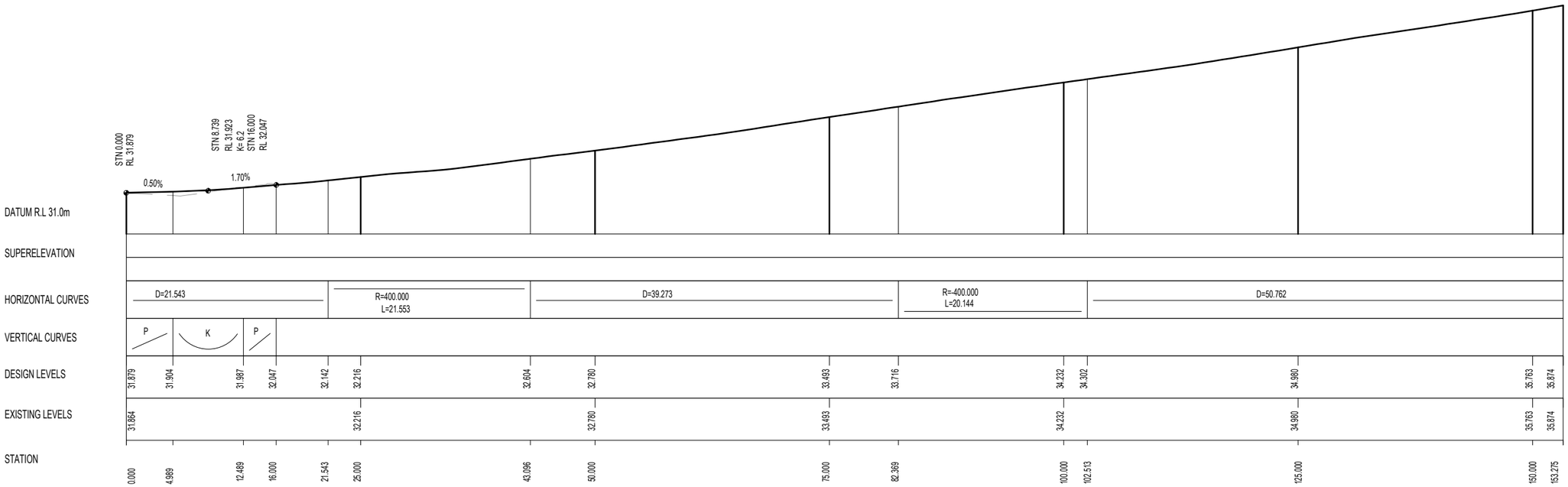
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. LS 0431
ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC40 - YARRUNGA ST

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0441.DWG

Last Plotted: 20/09/2022 12:15:18 AM By: BENZSON

Last Saved: 19/09/2022 6:02:02 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC40 - YARRUNGA ST - CH 0 TO CH 153.275

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

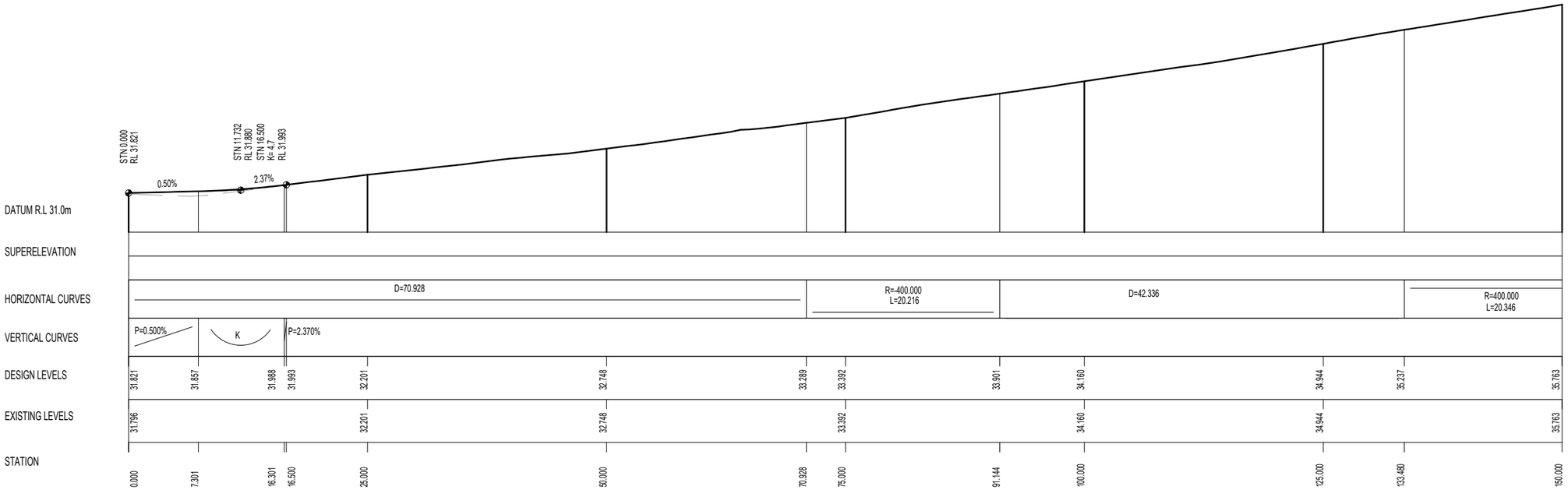
SHEET No. LS 0441

ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC50 - YARRUNGA ST

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0451.DWG

Last Plotted: 20/09/2022 12:15:27 AM By: BENZSON

Last Saved: 19/09/2022 6:02:12 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC50 - YARRUNGA ST - CH 0 TO CH 150

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

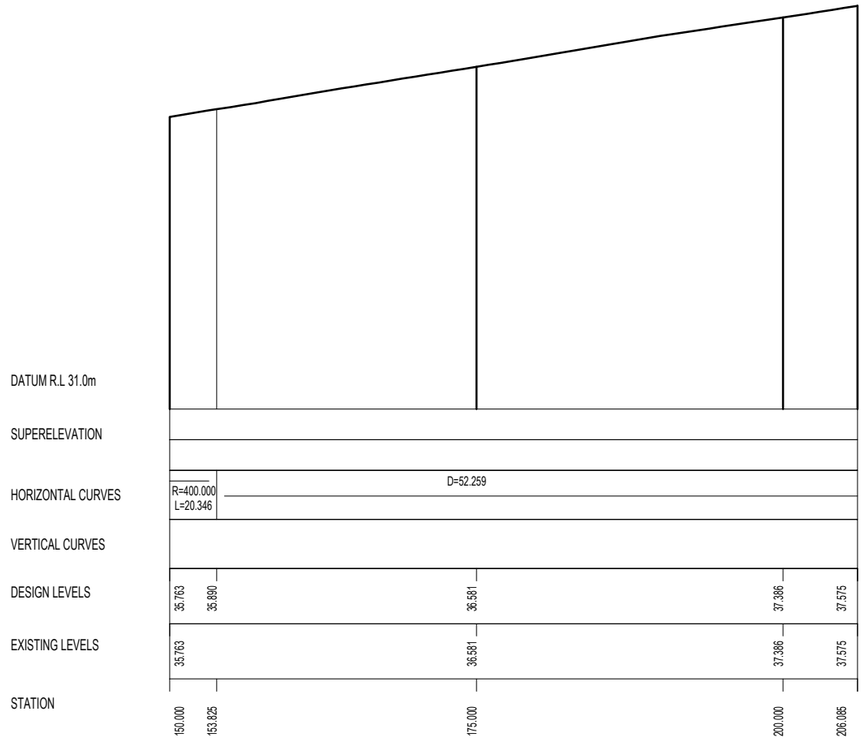
SHEET No. LS 0451

ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



LONGITUDINAL SECTION ALONG CONTROL MC50 - YARRUNGA ST

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0452.DWG

Last Plotted: 20/09/2022 12:15:36 AM By: BENZSON

Last Saved: 19/09/2022 6:02:22 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MC50 - YARRUNGA ST - CH 150 TO CH 206.085

A3

PROJECT NUMBER: 2021 25 DD 001

PART

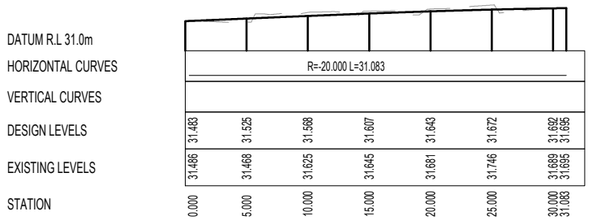
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0452

ISSUE A

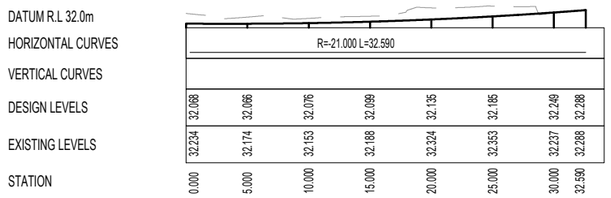
LEGEND

EXISTING SURFACE LEVEL
PROPOSED SURFACE LEVEL



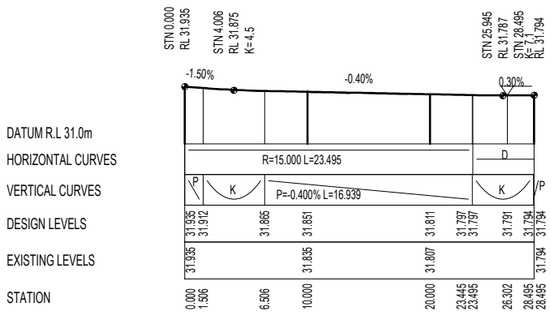
LONGITUDINAL SECTION ALONG CONTROL MK31

HOR : 1 IN 500
VERT: 1 IN 100



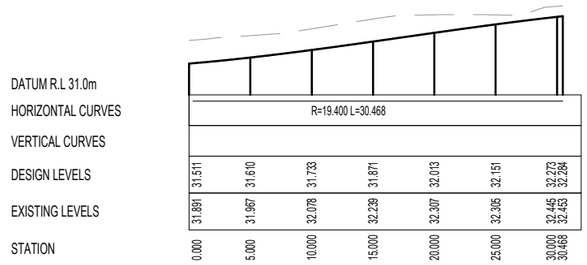
LONGITUDINAL SECTION ALONG CONTROL MK41

HOR : 1 IN 500
VERT: 1 IN 100



LONGITUDINAL SECTION ALONG CONTROL MK2I

HOR : 1 IN 500
VERT: 1 IN 100



LONGITUDINAL SECTION ALONG CONTROL MK5I

HOR : 1 IN 500
VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0461.DWG

Last Plotted: 20/09/2022 12:15:50 AM By: BENZSON

Last Saved: 19/09/2022 6:02:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

0 1 2 3 4
SCALE 1:100m

CO-ORDINATE SYSTEM:	HEIGHT DATUM:
GDA 2020 ZONE 56	AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MK2I, MK3I, MK51 AND MK41

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

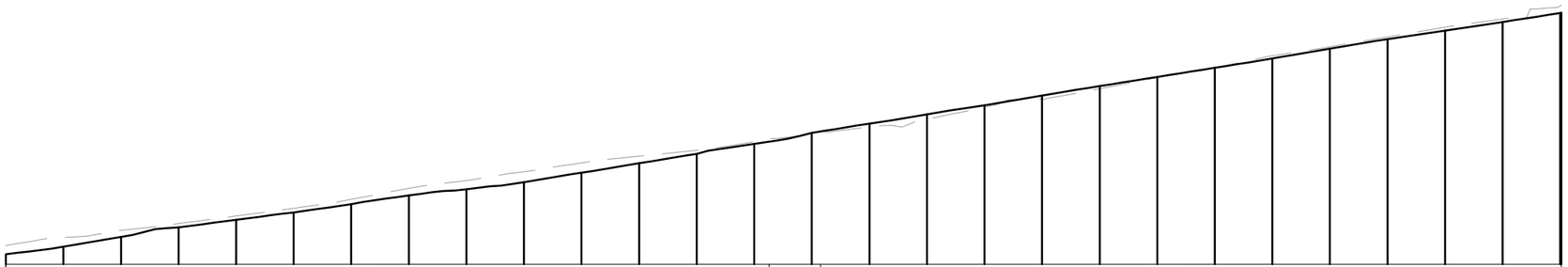
SHEET No. LS 0461

ISSUE A

LEGEND

EXISTING SURFACE LEVEL

PROPOSED SURFACE LEVEL



DATUM R.L 33.0m

HORIZONTAL CURVES: D=66.280 | R=403.0m | D=64.338

VERTICAL CURVES: EXTENSION OF EXISTING CROSSFALL

STATION	DESIGN LEVELS	EXISTING LEVELS
0.000	33.172	33.325
5.000	33.305	33.463
10.000	33.475	33.588
15.000	33.640	33.704
20.000	33.770	33.836
25.000	33.898	33.969
30.000	34.041	34.124
35.000	34.193	34.315
40.000	34.300	34.452
45.000	34.423	34.605
50.000	34.588	34.756
55.000	34.750	34.874
60.000	34.915	34.975
65.000	35.088	35.127
66.280		
70.000	35.277	35.256
70.759		
75.000	35.437	35.383
80.000	35.599	35.515
85.000	35.757	35.722
90.000	35.926	35.860
95.000	36.089	36.043
100.000	36.247	36.229
105.000	36.405	36.404
110.000	36.569	36.616
115.000	36.737	36.770
120.000	36.902	36.943
125.000	37.052	37.112
130.000	37.201	37.254
135.000	37.356	37.479
135.096	37.359	37.490

LONGITUDINAL SECTION ALONG CONTROL MK5J - YARRUNGA ST

HOR : 1 IN 500

VERT: 1 IN 100

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 LS 0462.DWG

Last Plotted: 20/09/2022 12:16:01 AM By: BENZSON

Last Saved: 19/09/2022 6:02:40 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20 — SCALE 1:500m

0 1 2 3 4 — SCALE 1:100m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
LONGITUDINAL SECTION
MK5J - YARRUNGA ST - CH 0 TO CH 135.096

A3

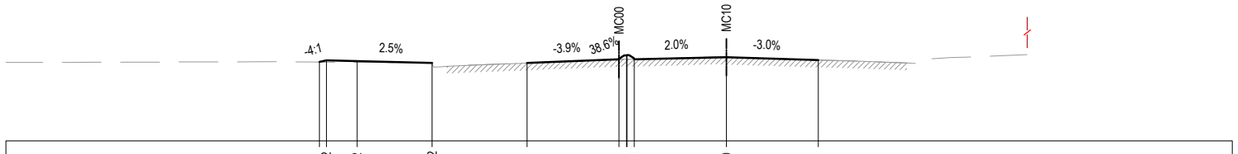
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. LS 0462

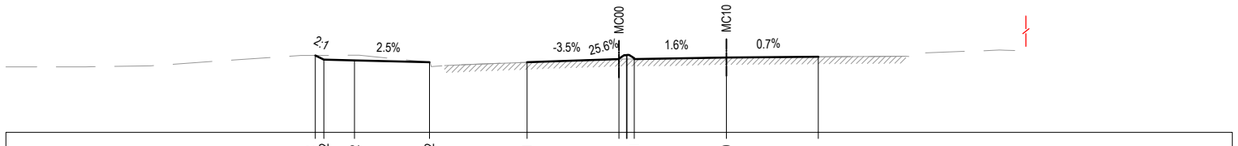
ISSUE A



R.L 36.0

CUT STRINGS	IA02 EV02	E902	CB02	L301	LE01	LE11	LA10	L311
DESIGN LEVELS	38.568 38.624	38.599	38.538	38.534	38.652	38.659	38.721	38.632
EXISTING LEVELS	38.568 38.566	38.558	38.537	38.534	38.652	38.659	38.721	38.632
DESIGN OFFSETS	-9.774 -9.548	-8.548	-6.098	-3.000	0.000	0.499	3.499	6.499

CH 50



R.L 37.0

CUT STRINGS	IA02 EV02	E902	CB02	L301	LE01	LE11	LA10	L311
DESIGN LEVELS	39.513 39.374	39.349	39.288	39.287	39.391	39.396	39.445	39.466
EXISTING LEVELS	39.513 39.514	39.517	39.288	39.287	39.391	39.396	39.445	39.466
DESIGN OFFSETS	-9.906 -9.630	-8.630	-6.180	-3.000	0.000	0.500	3.500	6.500

CH 25

R.L 38.0

CUT STRINGS	
DESIGN LEVELS	
EXISTING LEVELS	
DESIGN OFFSETS	

CH 0

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0501.DWG

Last Plotted: 19/09/2022 11:31:27 PM By: BENZSON

Last Saved: 19/09/2022 5:54:07 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 0 TO CH 50

A3

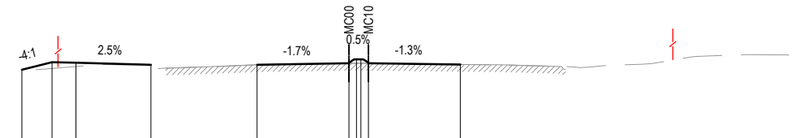
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0501

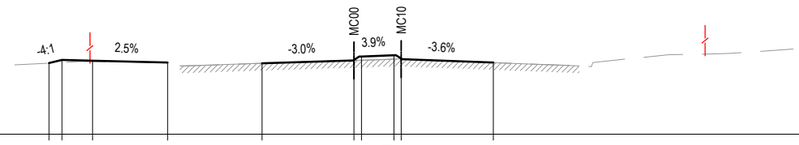
ISSUE A



R.L 34.0

CUT STRINGS	IA02	EV02	E902	CB02	L301	LE01 CB11 LE11		L311
DESIGN LEVELS	36.485	36.727	36.708	36.646	36.643	36.693	36.693	36.656
EXISTING LEVELS	-999.000	36.526	36.592	36.646	36.643	36.693	36.693	36.656
DESIGN OFFSETS	-10.670	-9.688	-8.911	-6.461	-3.000	0.000	0.630	3.630

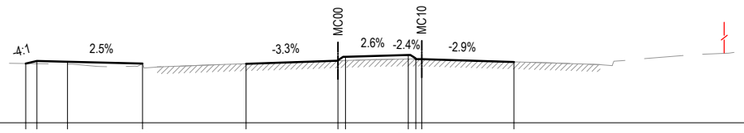
CH 125



R.L 35.0

CUT STRINGS	IA02 EV02		E902	CB02	L301	LE01 CB01	CB11 LE11	L311
DESIGN LEVELS	37.316	37.422	37.397	37.334	37.310	37.401 37.531	37.573 37.443	37.334
EXISTING LEVELS	37.316	37.339	37.365	37.334	37.310	37.401 37.407	37.449 37.443	37.334
DESIGN OFFSETS	-9.953	-9.530	-8.530	-6.079	-3.000	-0.000 0.240	1.297 1.538	4.541

CH 100



R.L 36.0

CUT STRINGS	IA02	EV02	E902	CB02	L301	LE01 CB01	CB11 LA10	L311
DESIGN LEVELS	37.927	38.018	37.994	37.933	37.924	38.024 38.154	38.208 38.073	37.986
EXISTING LEVELS	37.930	37.926	37.914	37.932	37.924	38.024 38.032	38.079 38.073	37.986
DESIGN OFFSETS	-10.191	-9.828	-8.828	-6.378	-3.000	-0.000 0.240	2.293 2.730	5.733

CH 75

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0502.DWG

Last Plotted: 19/09/2022 11:31:37 PM By: BENZSON

Last Saved: 19/09/2022 5:54:15 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 75 TO CH 125

A3

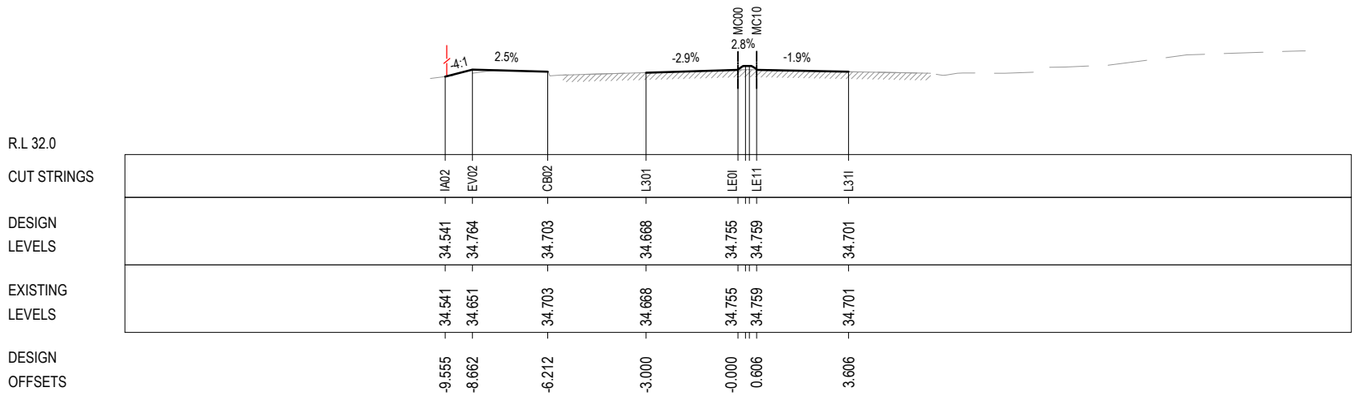
PROJECT NUMBER: 2021 25 DD 001

PART

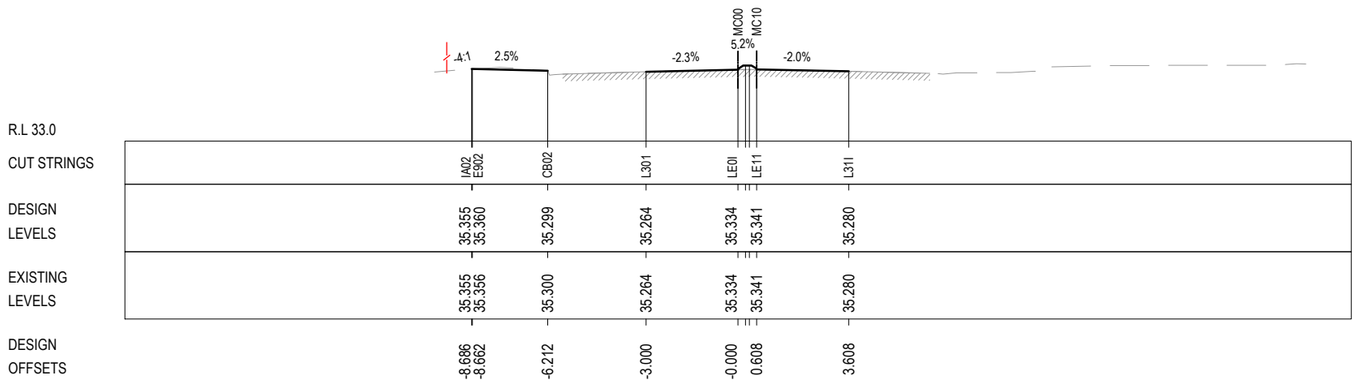
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0502

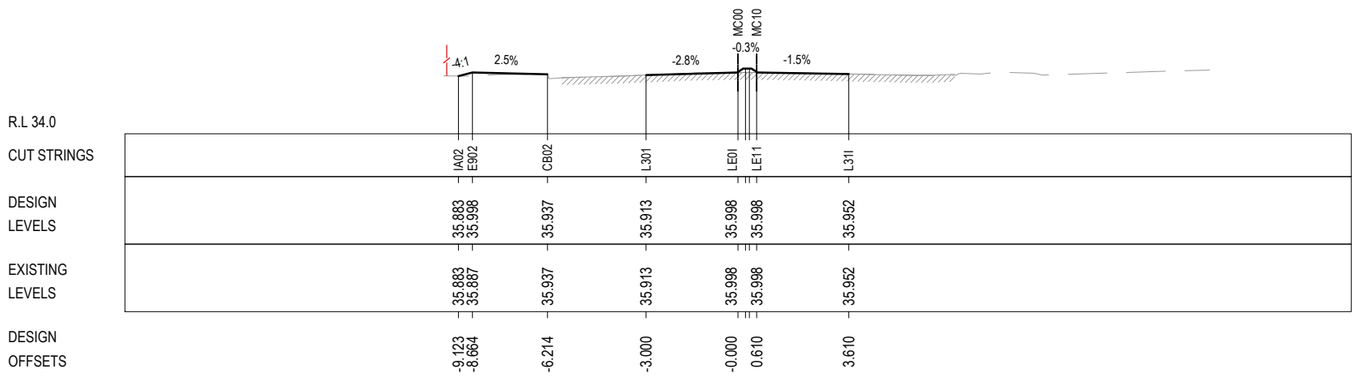
ISSUE A



CH 200



CH 175



CH 150

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0503.DWG

Last Plotted: 19/09/2022 11:31:46 PM By: BENZSON

Last Saved: 19/09/2022 5:54:24 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 150 TO CH 200

A3

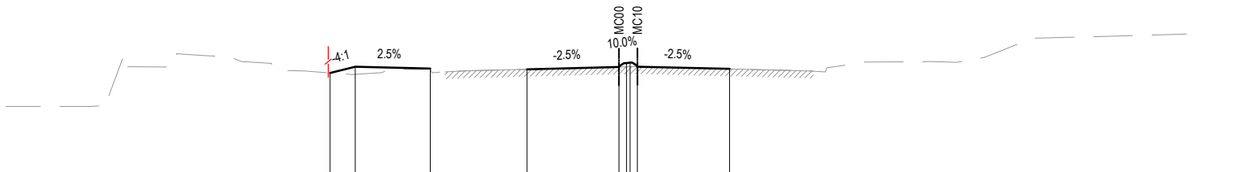
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

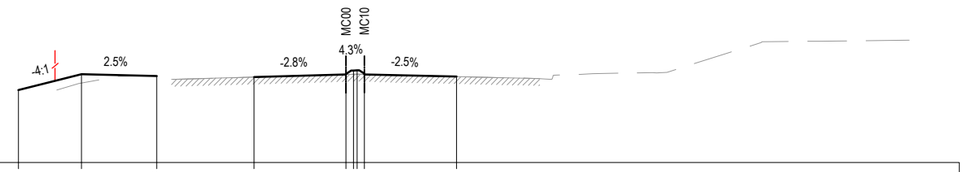
SHEET No. CS 0503

ISSUE A



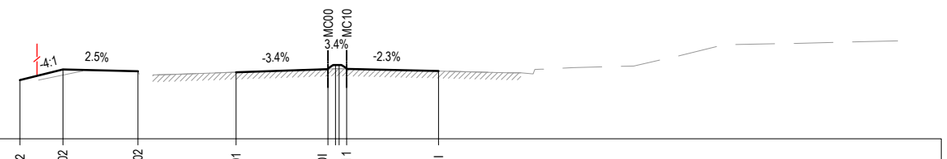
	IA02	E902	CB02	L301	LE0I	LE11	L31I
R.L 30.0							
CUT STRINGS							
DESIGN LEVELS	33.359	33.563	33.502	33.475	33.552	33.564	33.489
EXISTING LEVELS	33.359	33.315	33.502	33.475	33.552	33.564	33.489
DESIGN OFFSETS	-9.426	-8.609	-6.159	-3.000	-0.000	0.600	3.600

CH 275



	IA02	E902	CB02	L301	LE0I	LE11	L31I
R.L 31.0							
CUT STRINGS							
DESIGN LEVELS	33.368	33.882	33.821	33.787	33.871	33.876	33.801
EXISTING LEVELS	-999.000	33.590	33.821	33.787	33.871	33.876	33.801
DESIGN OFFSETS	-10.685	-8.626	-6.176	-3.000	-0.000	0.602	3.602

CH 250



	IA02	EV02	CB02	L301	LE0I	LE11	L31I
R.L 32.0							
CUT STRINGS							
DESIGN LEVELS	33.911	34.261	34.200	34.173	34.274	34.278	34.208
EXISTING LEVELS	-999.000	34.075	34.194	34.173	34.274	34.278	34.208
DESIGN OFFSETS	-10.050	-8.650	-6.200	-3.000	-0.000	0.604	3.604

CH 225

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0504.DWG

Last Plotted: 19/09/2022 11:31:56 PM By: BENZSON Last Saved: 19/09/2022 5:54:34 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 225 TO CH 275

A3

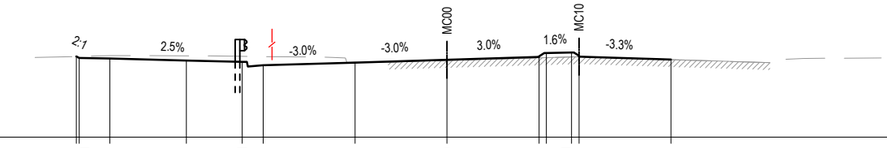
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0504

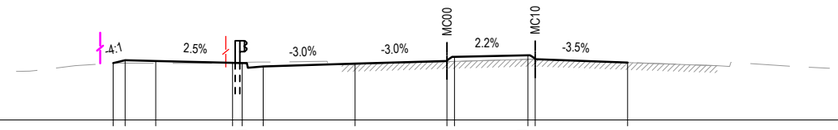
ISSUE A



R.L 30.0

CUT STRINGS	IA01	EV01	E901	E801	CB01	LE01	L301	LA00	LE0I	CB0I	CB11	LE11	L311
DESIGN LEVELS	32.631	32.586	32.561	32.499	32.453	32.343	32.433	32.523	32.613	32.743	32.756	32.626	32.527
EXISTING LEVELS	32.631	32.634	32.660	32.653	32.638	32.629	32.444	32.501	32.583	32.590	32.614	32.621	32.527
DESIGN OFFSETS	-12.092	-12.000	-11.000	-8.500	-6.680	-6.000	-3.000	0.000	3.000	3.240	4.064	4.304	7.306

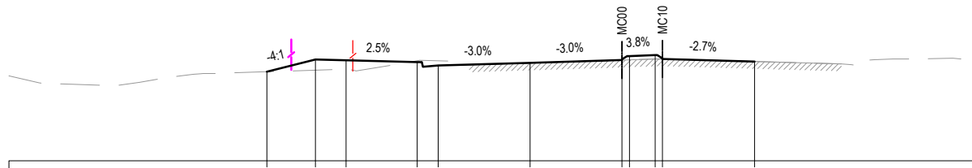
CH 350



R.L 31.0

CUT STRINGS	IA01	EV01	E901	E801	CB01	LE01	L301	LE0I	CB0I	CB11	LE11	L311
DESIGN LEVELS	32.851	32.949	32.924	32.861	32.853	32.743	32.833	32.923	33.053	33.106	32.976	32.870
EXISTING LEVELS	32.851	32.849	32.846	32.858	32.872	32.886	32.812	32.901	32.908	32.975	32.976	32.870
DESIGN OFFSETS	-10.889	-10.500	-9.500	-7.000	-6.680	-6.000	-3.000	-0.000	0.240	2.639	2.880	5.885

CH 325



R.L 30.0

CUT STRINGS	IA01	EV01	E901	CB01	LE01	L301	LE0I	CB0I	CB11	LE11	L311
DESIGN LEVELS	32.904	33.300	33.275	33.217	33.107	33.197	33.287	33.417	33.449	33.319	33.238
EXISTING LEVELS	32.903	32.954	32.987	33.261	33.259	33.188	33.281	33.289	33.316	33.319	33.239
DESIGN OFFSETS	-11.585	-9.999	-8.999	-6.679	-5.999	-3.000	-0.000	0.240	1.081	1.321	4.326

CH 300

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0505.DWG

Last Plotted: 19/09/2022 11:32:06 PM By: BENZSON Last Saved: 19/09/2022 5:54:44 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 300 TO CH 350

A3

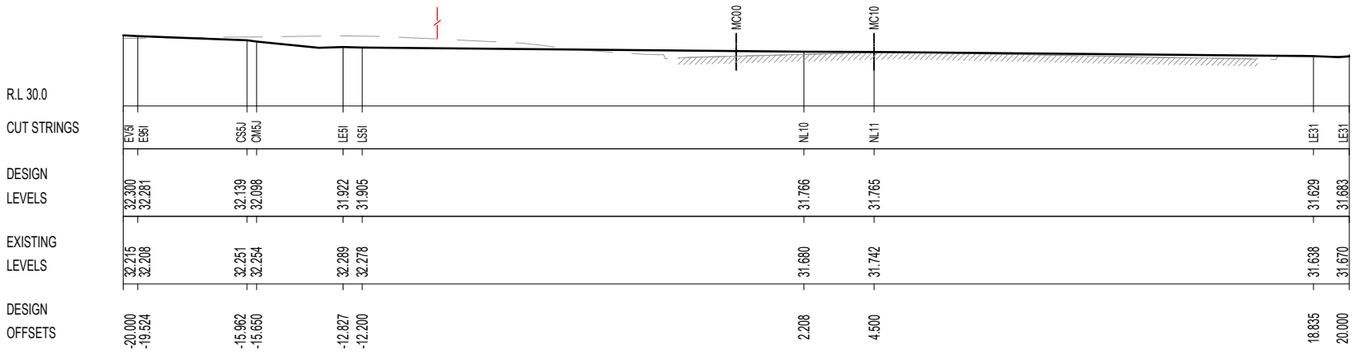
PROJECT NUMBER: 2021 25 DD 001

PART

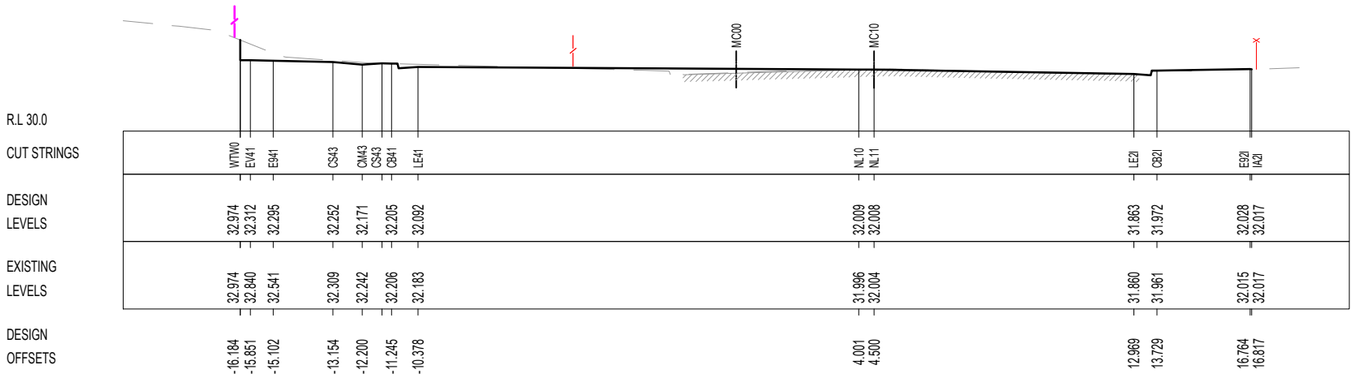
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0505

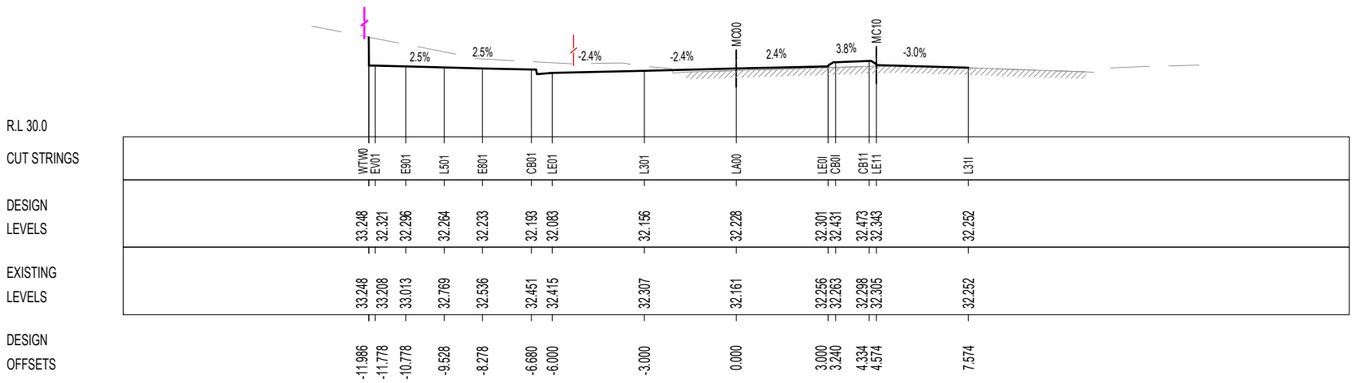
ISSUE A



CH 425



CH 400



CH 375

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0506.DWG

Last Plotted: 19/09/2022 11:32:18 PM By: BENZSON

Last Saved: 19/09/2022 5:54:53 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 375 TO CH 425

A3

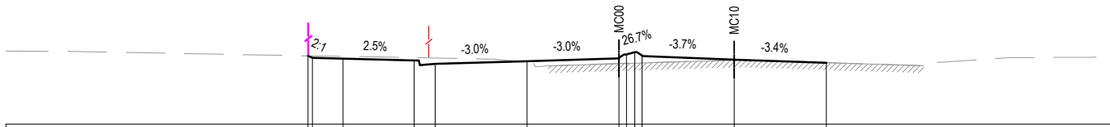
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0506

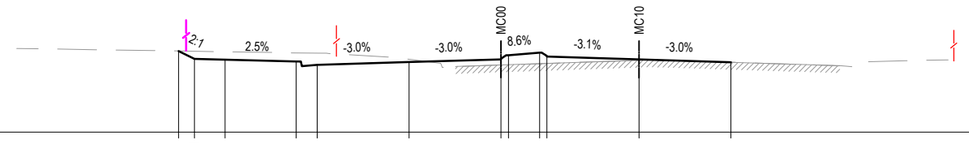
ISSUE A



R.L 29.0

CUT STRINGS	IA01	EV01	E901	CB01	LE01	L301	LE0I	CB1I	LE1I	LA1I	L31I
DESIGN LEVELS	31.227	31.155	31.130	31.072	30.962	31.052	31.142	31.344	31.214	31.103	30.999
EXISTING LEVELS	31.227	31.224	31.207	31.169	31.156	31.024	30.975	30.992	31.000	31.083	30.999
DESIGN OFFSETS	-10.144	-10.000	-9.000	-6.680	-6.000	-3.000	-0.000	0.511	0.751	3.756	6.761

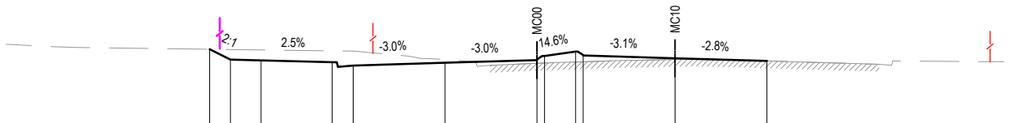
CH 500



R.L 29.0

CUT STRINGS	IA01	EV01	E901	CB01	LE01	L301	LE0I	CB0I	CB1I	LE1I	LA1I	L31I
DESIGN LEVELS	31.642	31.385	31.360	31.302	31.192	31.282	31.372	31.502	31.589	31.459	31.368	31.277
EXISTING LEVELS	31.642	31.634	31.618	31.580	31.570	31.372	31.186	31.194	31.229	31.237	31.340	31.277
DESIGN OFFSETS	-10.514	-10.000	-9.000	-6.680	-6.000	-3.000	-0.000	0.240	1.260	1.500	4.500	7.500

CH 475



R.L 29.0

CUT STRINGS	IA01	EV01	E901	CB01	LE01	L301	LE0I	CB0I	CB1I	LE1I	LA1I	L31I
DESIGN LEVELS	31.889	31.548	31.523	31.465	31.355	31.445	31.535	31.665	31.813	31.683	31.591	31.506
EXISTING LEVELS	31.889	31.880	31.867	31.837	31.828	31.554	31.427	31.437	31.470	31.477	31.553	31.506
DESIGN OFFSETS	-10.683	-10.000	-9.000	-6.680	-6.000	-3.000	0.000	0.240	1.260	1.500	4.500	7.500

CH 450

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0507.DWG

Last Plotted: 19/09/2022 11:32:27 PM By: BENZSON

Last Saved: 19/09/2022 5:55:02 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 450 TO CH 500

A3

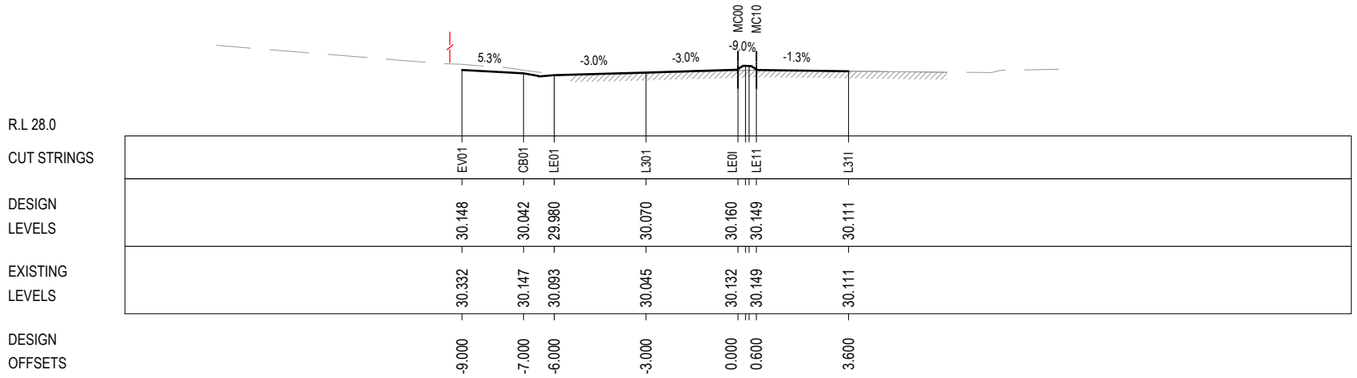
PROJECT NUMBER: 2021 25 DD 001

PART

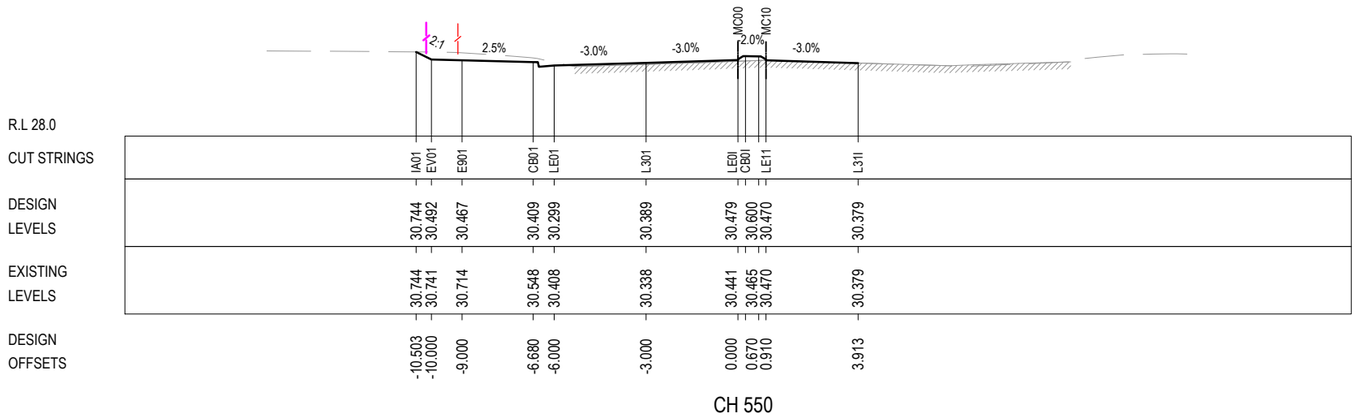
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0507

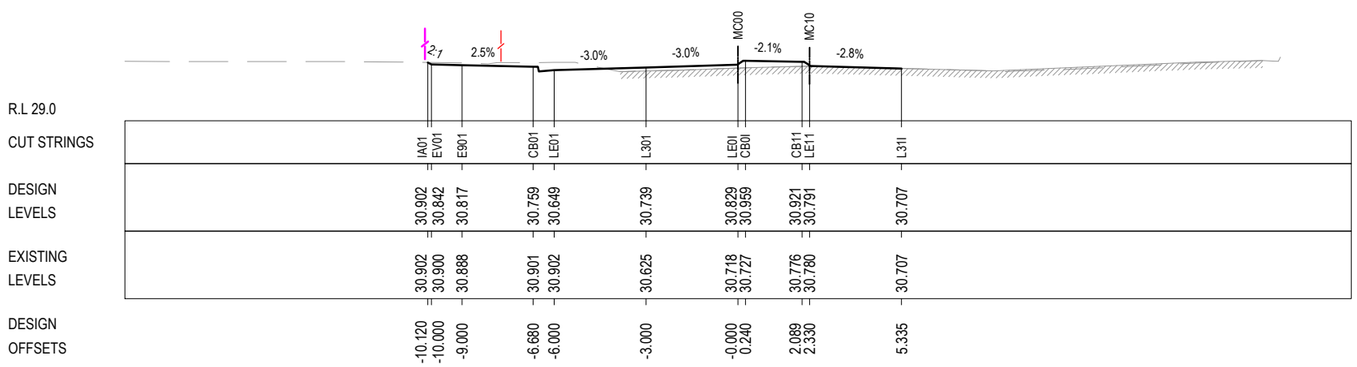
ISSUE A



CH 575



CH 550



CH 525

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0508.DWG

Last Plotted: 19/09/2022 11:32:37 PM By: BENZSON

Last Saved: 19/09/2022 5:55:11 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 525 TO CH 575

A3

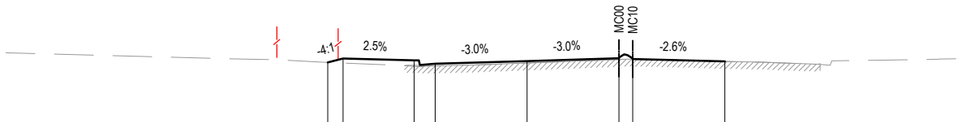
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

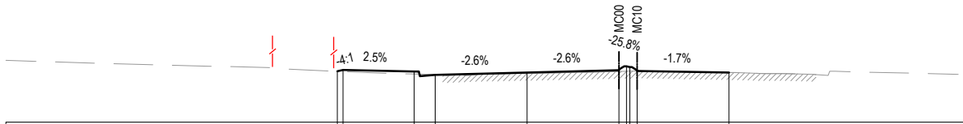
SHEET No. CS 0508

ISSUE A



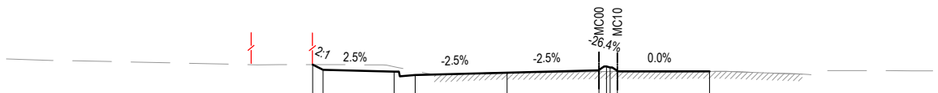
R.L 27.0							
CUT STRINGS	IA01	EB01	CB01	LE01	L301	LE01 LE11	L311
DESIGN LEVELS	29.319	29.444	29.386	29.276	29.366	29.456 29.429	29.351
EXISTING LEVELS	29.319	29.300	29.196	29.211	29.300	29.415 29.429	29.351
DESIGN OFFSETS	-9.501	-9.000	-6.681	-6.000	-3.000	0.000 0.450	3.450

CH 650



R.L 28.0							
CUT STRINGS	IA01	EV01	CB01	LE01	L301	LE01 LE11	L311
DESIGN LEVELS	29.660	29.708	29.650	29.540	29.619	29.698 29.670	29.619
EXISTING LEVELS	29.660	29.652	29.574	29.562	29.594	29.657 29.670	29.619
DESIGN OFFSETS	-9.192	-9.000	-6.680	-6.000	-3.000	0.000 0.588	3.588

CH 625



R.L 28.0							
CUT STRINGS	IA01	EV01	CB01	LE01	L301	LE01 LE11	L311
DESIGN LEVELS	30.090	29.921	29.863	29.753	29.828	29.903 29.871	29.872
EXISTING LEVELS	30.090	30.090	30.025	29.888	29.813	29.862 29.871	29.872
DESIGN OFFSETS	-9.338	-9.000	-6.680	-6.000	-3.000	0.000 0.600	3.600

CH 600

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0509.DWG

Last Plotted: 19/09/2022 11:32:47 PM By: BENZSON

Last Saved: 19/09/2022 5:55:24 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 600 TO CH 650

A3

PROJECT NUMBER: 2021 25 DD 001

PART

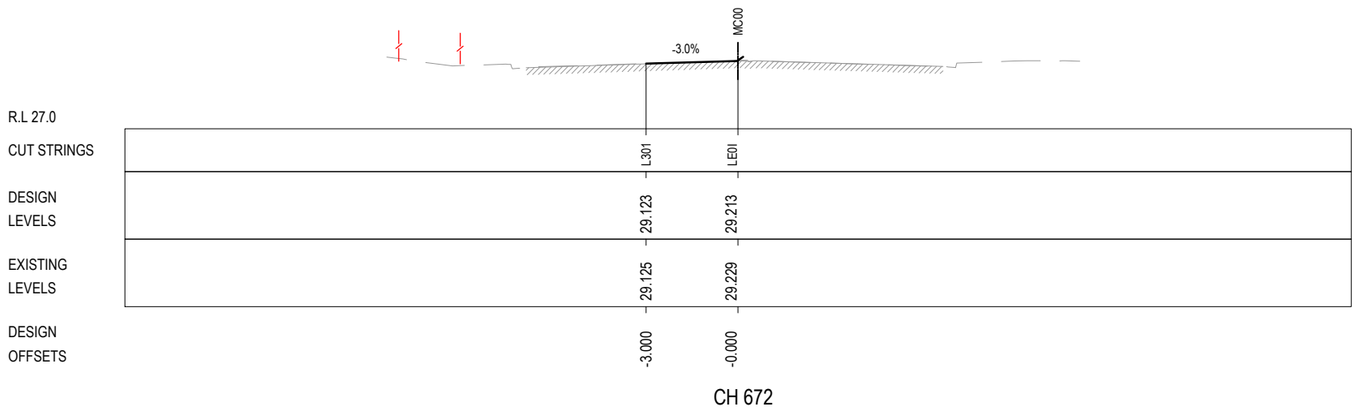
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0509

ISSUE A

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY



NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0510.DWG

Last Plotted: 19/09/2022 11:32:57 PM By: BENZSON

Last Saved: 19/09/2022 5:55:35 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC00 - CH 672

A3

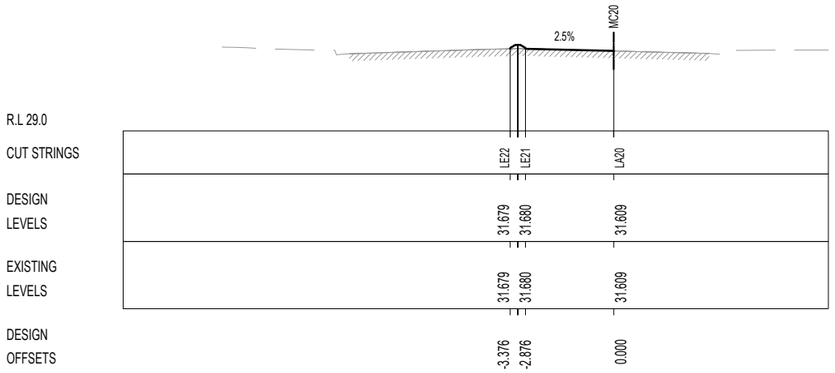
PROJECT NUMBER: 2021 25 DD 001

PART

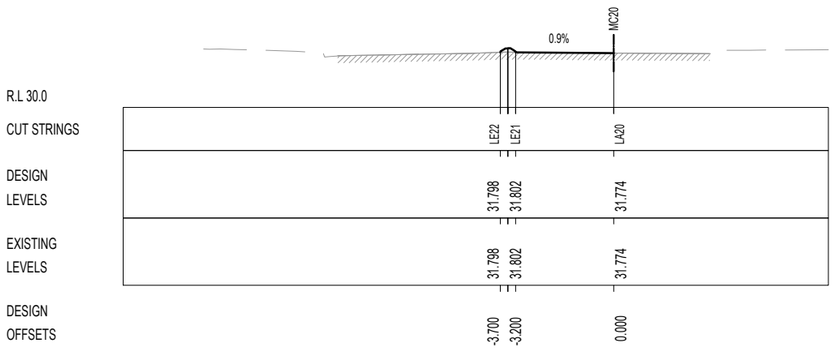
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0510

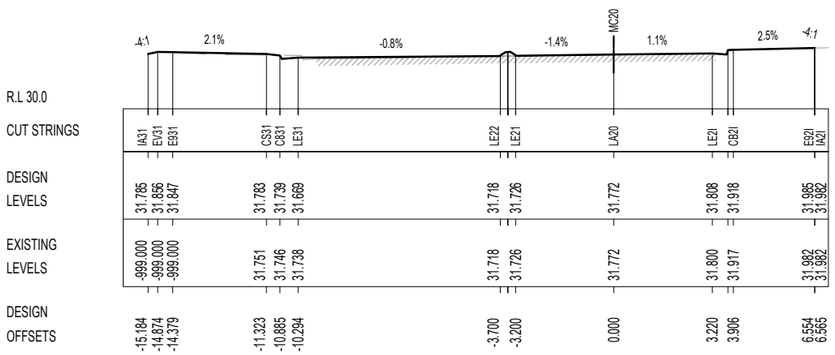
ISSUE A



CH 60



CH 40



CH 20

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0511.DWG

Last Plotted: 19/09/2022 11:33:07 PM By: BENZSON

Last Saved: 19/09/2022 5:55:46 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC20 - CH 20 TO CH 60

A3

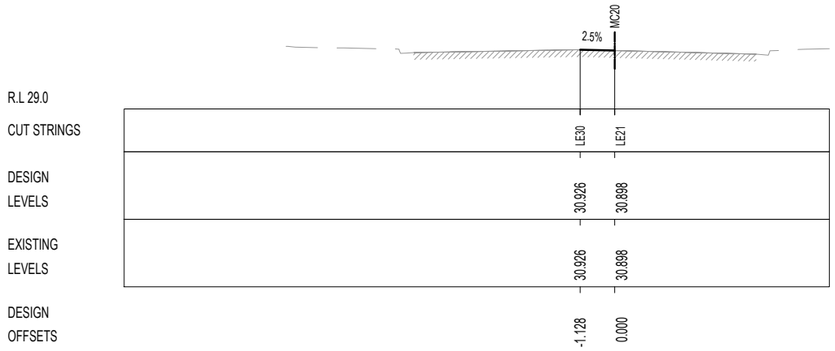
PROJECT NUMBER: 2021 25 DD 001

PART

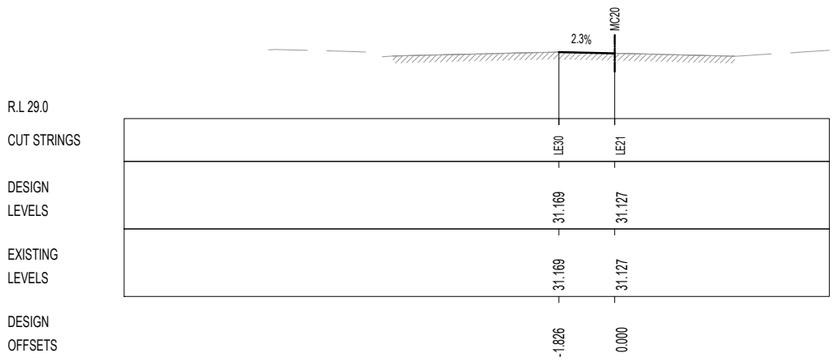
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0511

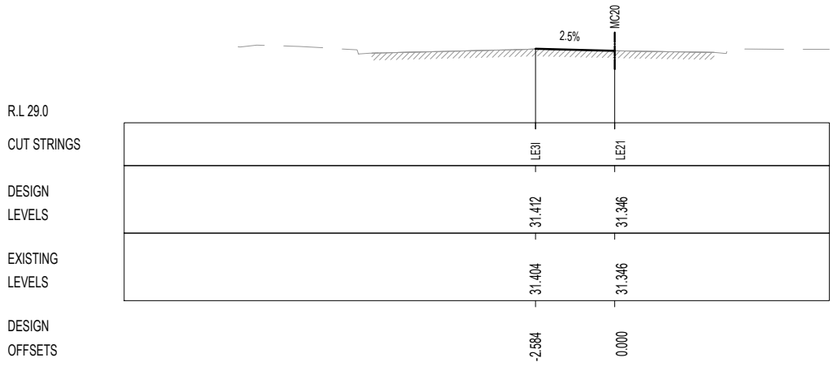
ISSUE A



CH 120



CH 100



CH 80

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0512.DWG

Last Plotted: 19/09/2022 11:33:17 PM By: BENZSON

Last Saved: 19/09/2022 5:55:56 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC20 - CH 80 TO CH 120

A3

PROJECT NUMBER: 2021 25 DD 001

PART

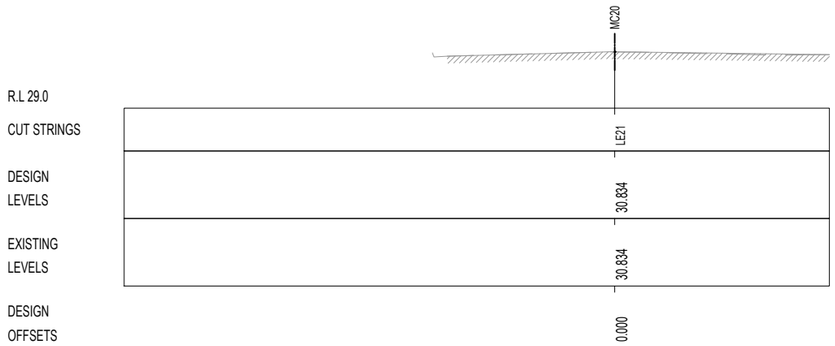
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0512

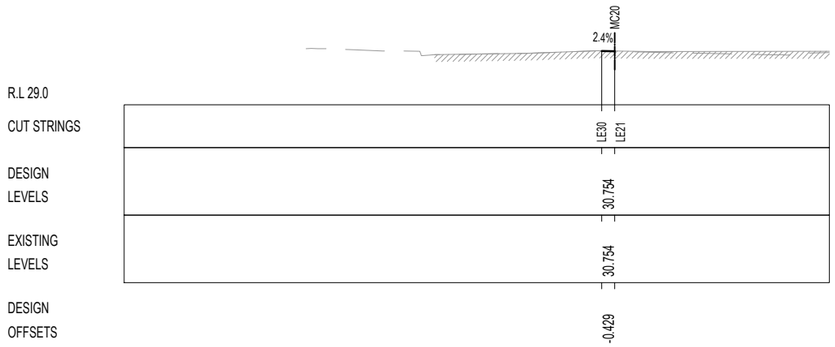
ISSUE A

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY



CH 159



CH 140

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0513.DWG

Last Plotted: 19/09/2022 11:33:26 PM By: BENZSON

Last Saved: 19/09/2022 5:56:07 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC20 - CH 140 TO CH 159

A3

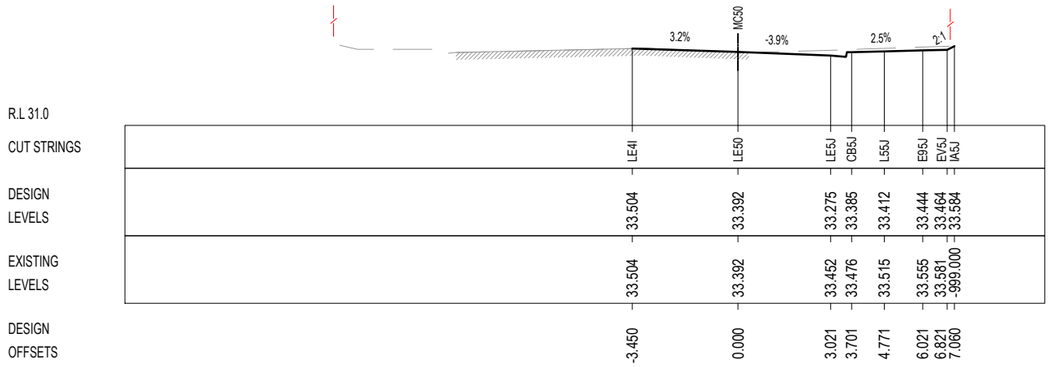
PROJECT NUMBER: 2021 25 DD 001

PART

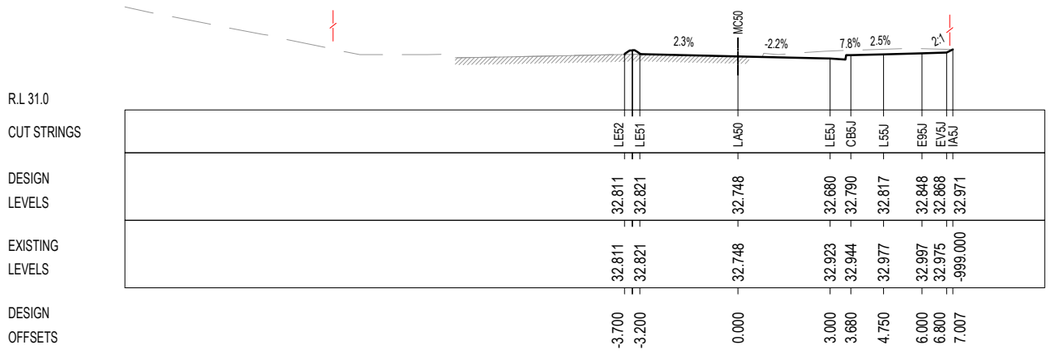
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0513

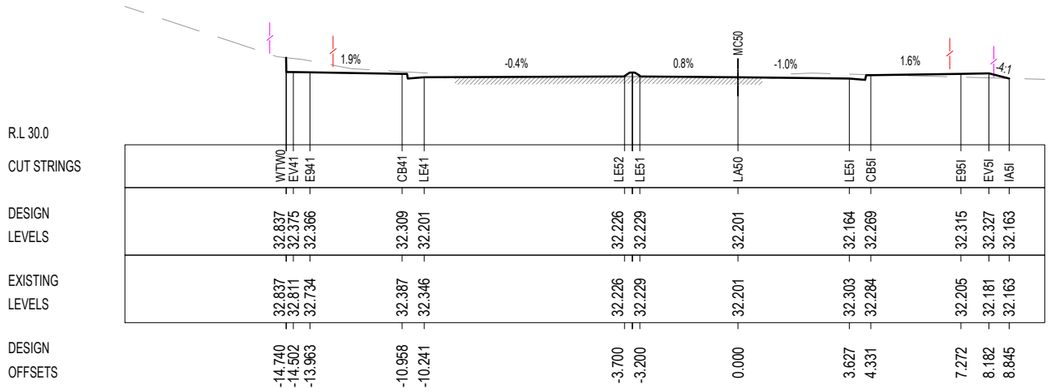
ISSUE A



CH 75



CH 50



CH 25

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0514.DWG

Last Plotted: 19/09/2022 11:33:35 PM By: BENZSON

Last Saved: 19/09/2022 5:56:16 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC50 - CH 25 TO CH 75

A3

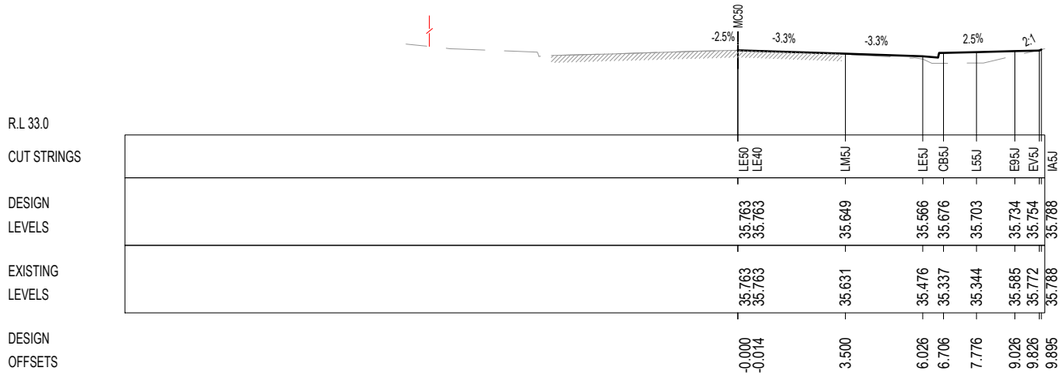
PROJECT NUMBER: 2021 25 DD 001

PART

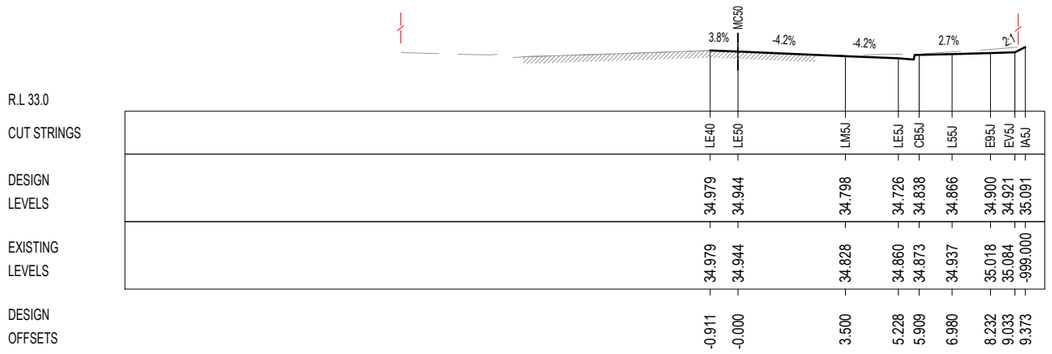
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0514

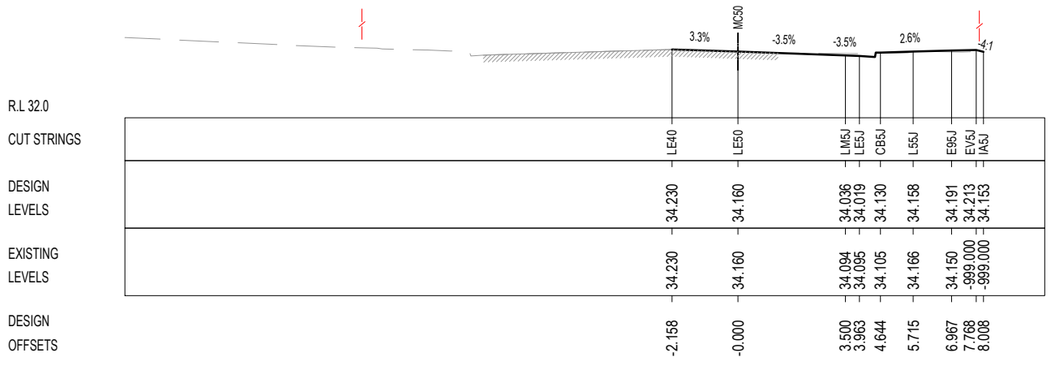
ISSUE A



CH 150



CH 125



CH 100

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0515.DWG

Last Plotted: 19/09/2022 11:33:46 PM By: BENZSON

Last Saved: 19/09/2022 5:56:26 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC50 - CH 100 TO CH 150

A3

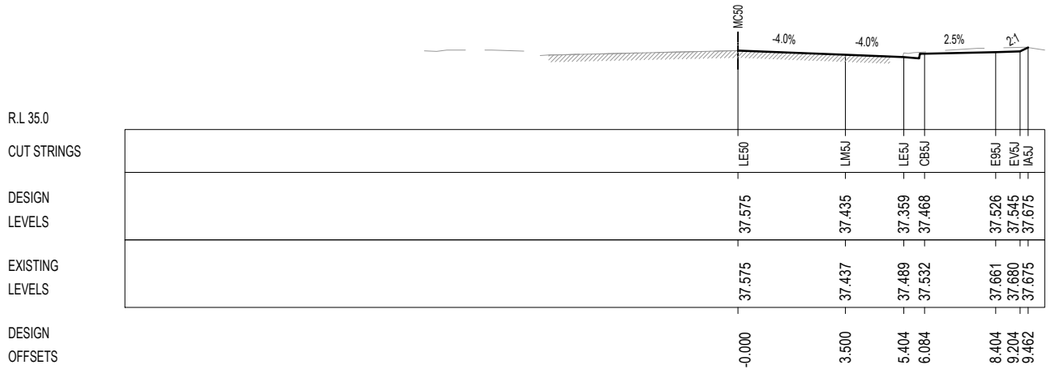
PROJECT NUMBER: 2021 25 DD 001

PART

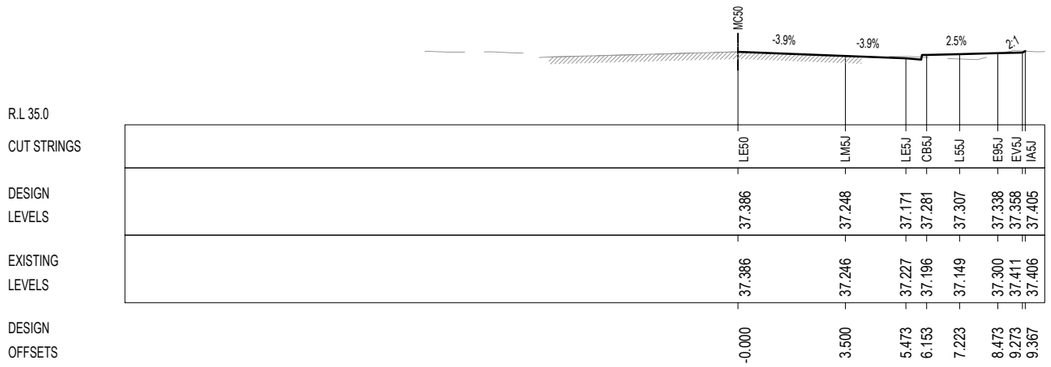
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0515

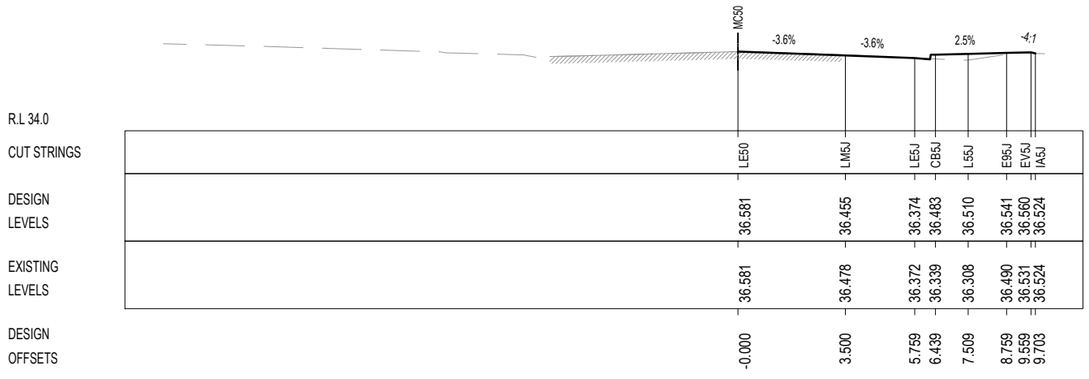
ISSUE A



CH 206



CH 200



CH 175

LEGEND

- EXISTING SURFACE LEVEL
- PROPOSED SURFACE LEVEL
- EXISTING PAVEMENT
- PROPOSED BOUNDARY
- EXISTING BOUNDARY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 CS 0516.DWG

Last Plotted: 19/09/2022 11:33:56 PM By: BENZSON

Last Saved: 19/09/2022 5:56:37 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CROSS SECTION
MC50 - CH 175 TO CH 206

A3

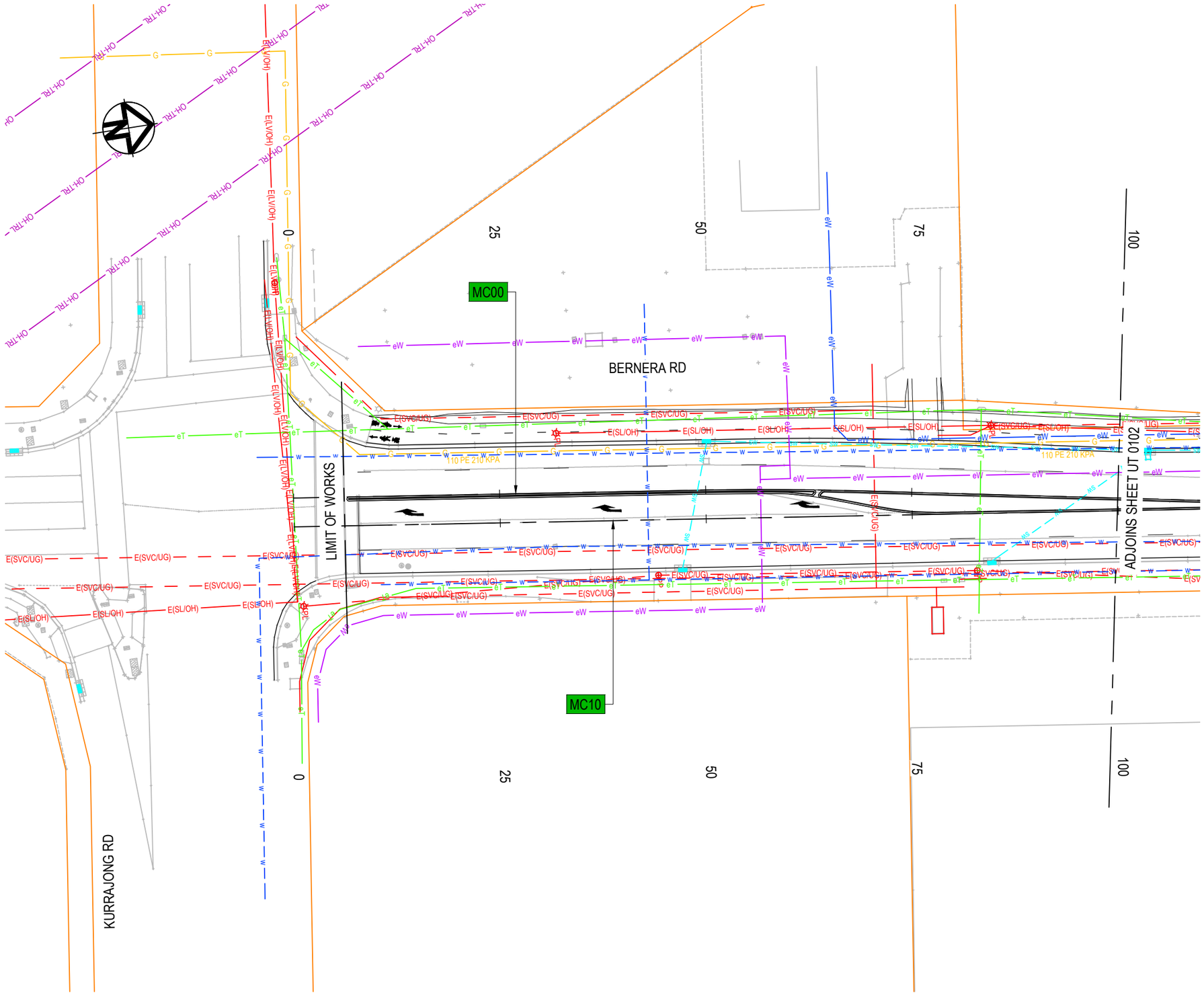
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. CS 0516

ISSUE A



LEGEND

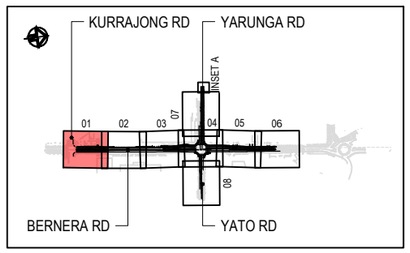
	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE

EXISTING UTILITIES

OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG.
WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINCITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0101.DWG
Last Plotted: 20/09/2022 12:52:29 AM By: BENZSON
Last Saved: 19/09/2022 6:19:28 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

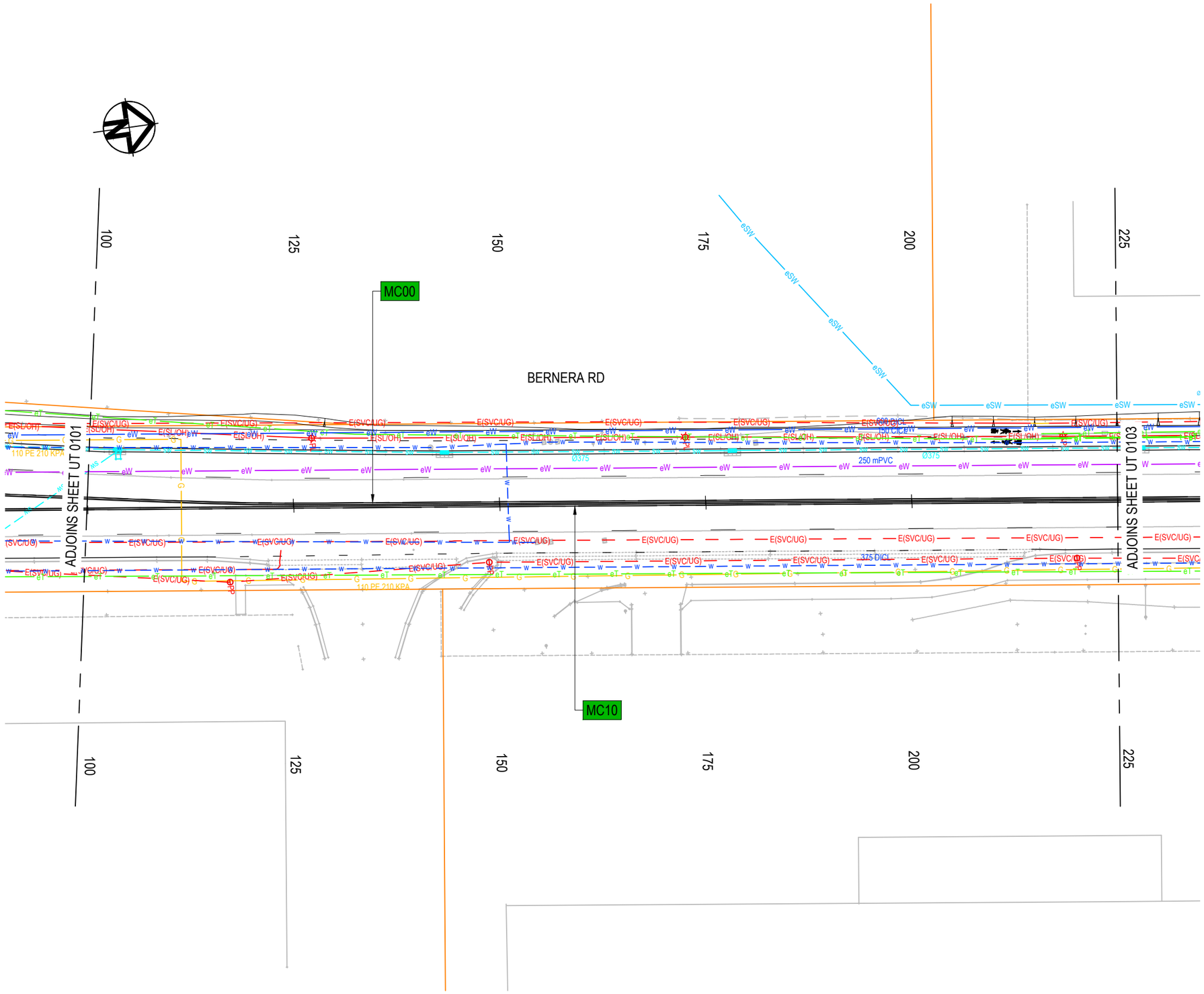
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0101
ISSUE A



LEGEND

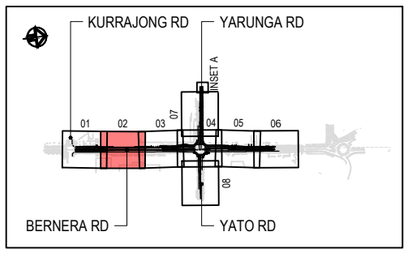
- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE

EXISTING UTILITIES

- OH-TRL — 330Kv TRANSMISSION LINE
- E(LV/OH) — EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
- E(SL/OH) — EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
- E(SVC/UG) — UNDERGROUND ELECTRICAL
- eT — EXISTING TELSTRA
- eW — EXISTING WATER MAIN
- w — EXISTING WATER
- eW — EXISTING RECYCLED WATER
- eSW — EXISTING STORMWATER
- sw — EXISTING Ø1050 STORMWATER
- eS — EXISTING SEWER
- eG, G — EXISTING GAS
- e — EXISTING ELECTRICAL POTHOLED
- t — EXISTING TELECOM POTHOLED
- g — EXISTING GAS POTHOLED
- PL — EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
- PP — EXISTING ELECTRICAL POWER POLE
- LP — EXISTING ELECTRICAL LIGHT POLE
- EXISTING WATER HYDRANT
- EXISTING VMS
- CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG. WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0102.DWG
Last Plotted: 20/09/2022 12:52:52 AM By: BENZSON
Last Saved: 19/09/2022 6:19:48 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

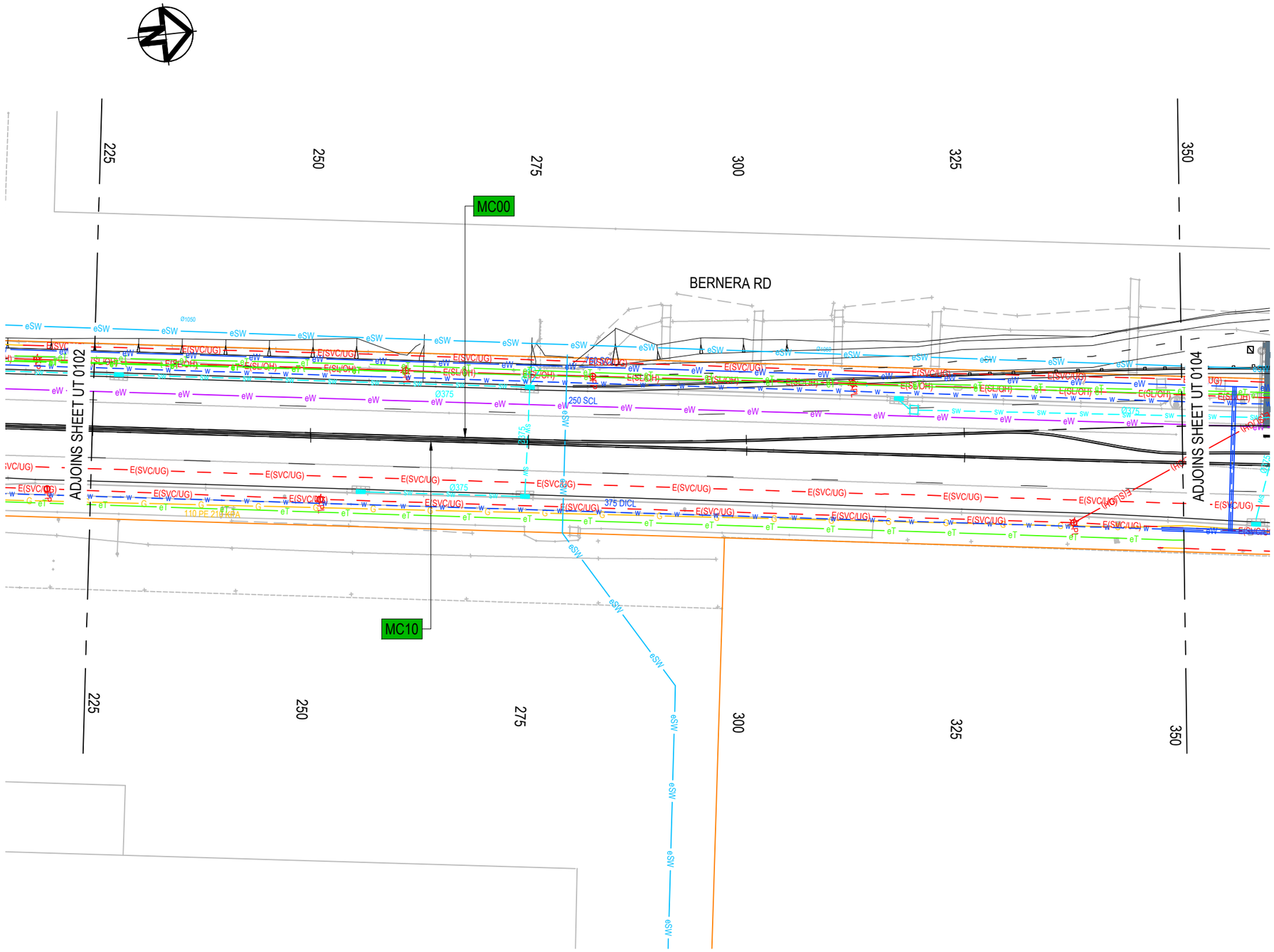
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0102
ISSUE A

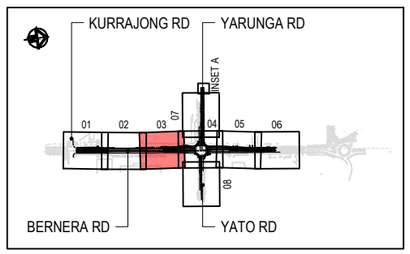


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE
EXISTING UTILITIES	
OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG.
WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0103.DWG
Last Plotted: 20/09/2022 12:53:17 AM By: BENZSON
Last Saved: 19/09/2022 6:20:05 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

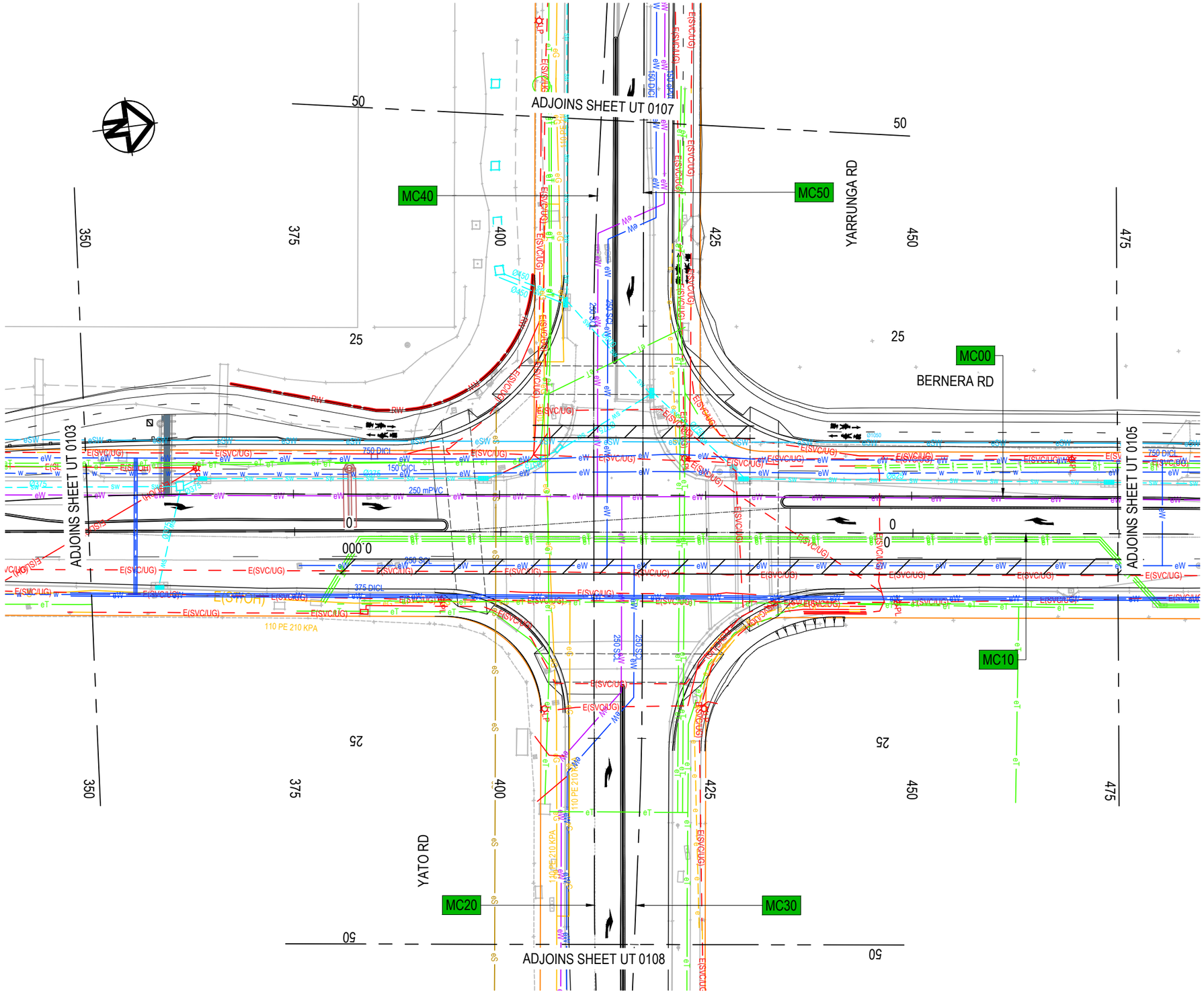
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0103
ISSUE A

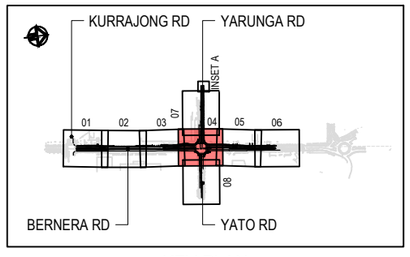


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE
EXISTING UTILITIES	
OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG. WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINCITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0104.DWG
Last Plotted: 20/09/2022 12:53:44 AM By: BENZSON
Last Saved: 19/09/2022 6:20:24 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

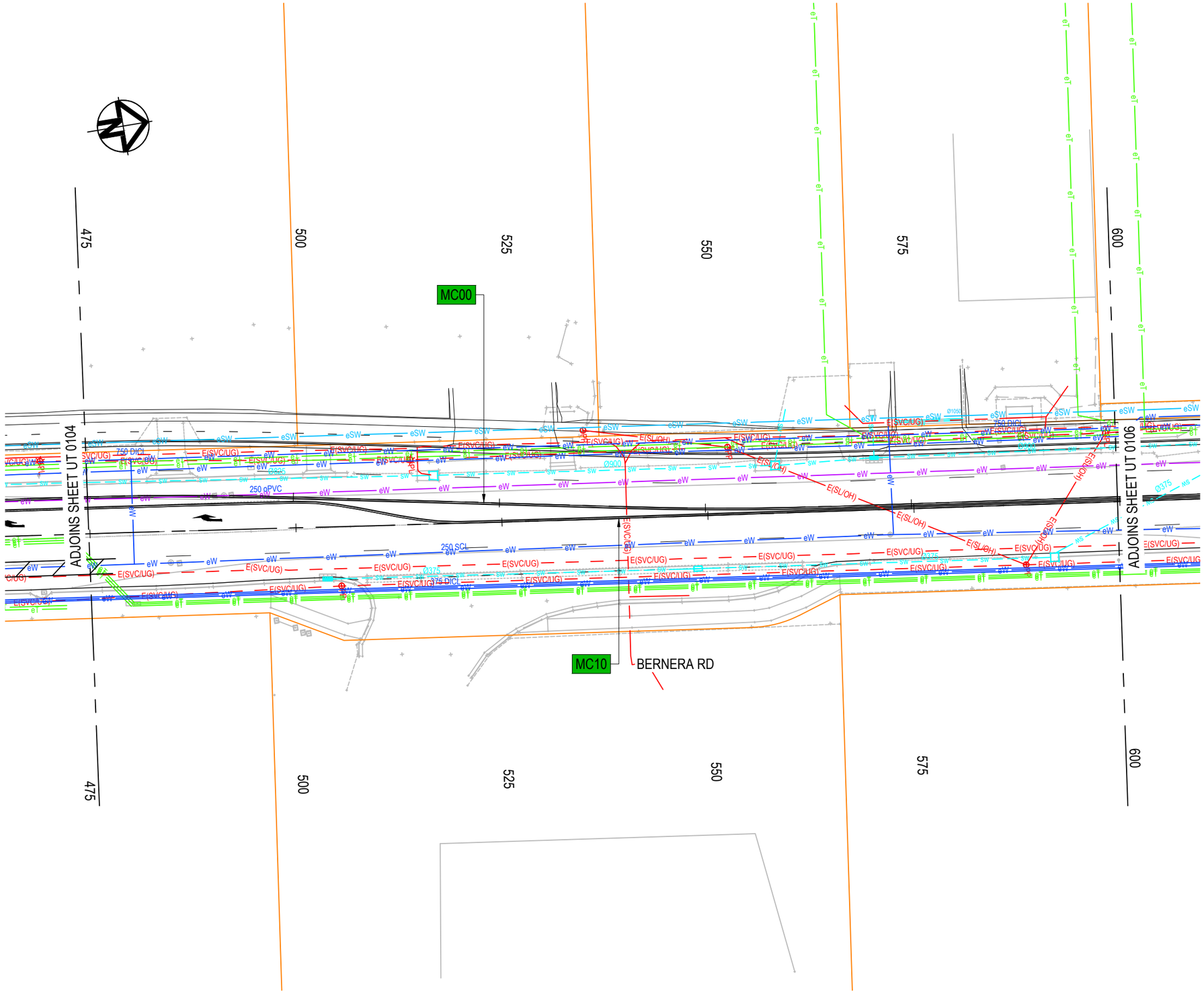
DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 4

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0104
ISSUE A



LEGEND

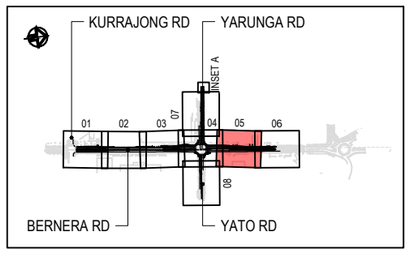
	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE

EXISTING UTILITIES

OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG.
WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0105.DWG
Last Plotted: 20/09/2022 12:54:09 AM By: BENZSON
Last Saved: 19/09/2022 6:20:41 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

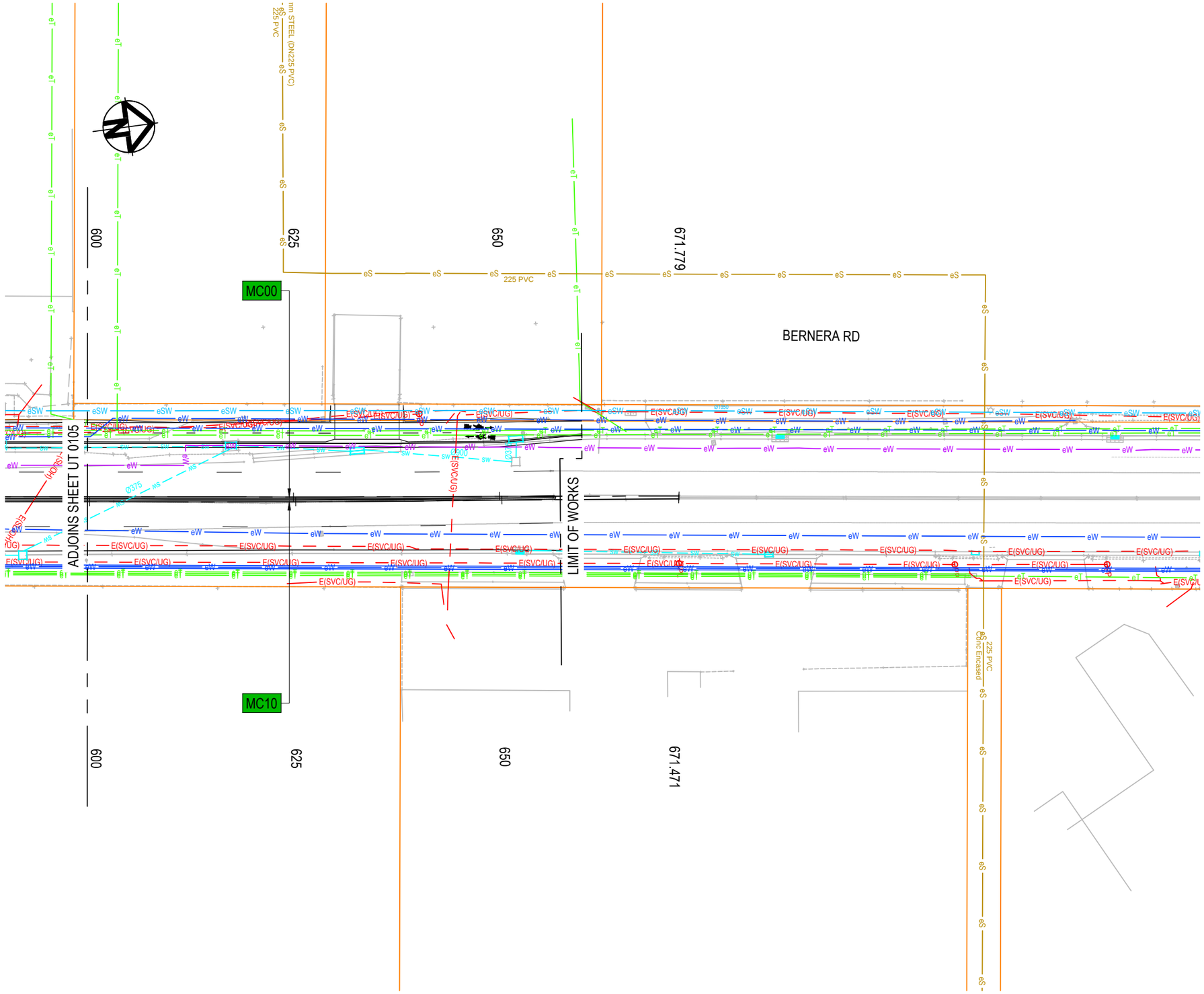
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 5

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0105
ISSUE A



LEGEND

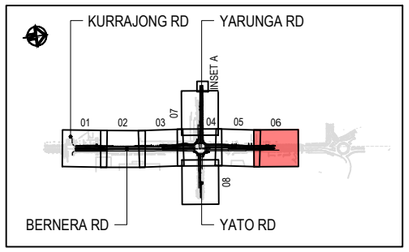
- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE

EXISTING UTILITIES

- OH-TRL — 330Kv TRANSMISSION LINE
- E(LV/OH) — EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
- E(SL/OH) — EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
- E(SVC/UG) — UNDERGROUND ELECTRICAL
- eT — EXISTING TELSTRA
- eW — EXISTING WATER MAIN
- w — EXISTING WATER
- eW — EXISTING RECYCLED WATER
- eSW — EXISTING STORMWATER
- sw — EXISTING Ø1050 STORMWATER
- eS — EXISTING SEWER
- eG / G — EXISTING GAS
- e — EXISTING ELECTRICAL POTHOLED
- t — EXISTING TELECOM POTHOLED
- g — EXISTING GAS POTHOLED
- PL — EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
- PP — EXISTING ELECTRICAL POWER POLE
- LP — EXISTING ELECTRICAL LIGHT POLE
- EXISTING WATER HYDRANT
- EXISTING VMS
- CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG. WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0106.DWG

Last Plotted: 20/09/2022 12:54:33 AM By: BENZSON

Last Saved: 19/09/2022 6:20:59 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 6

A3

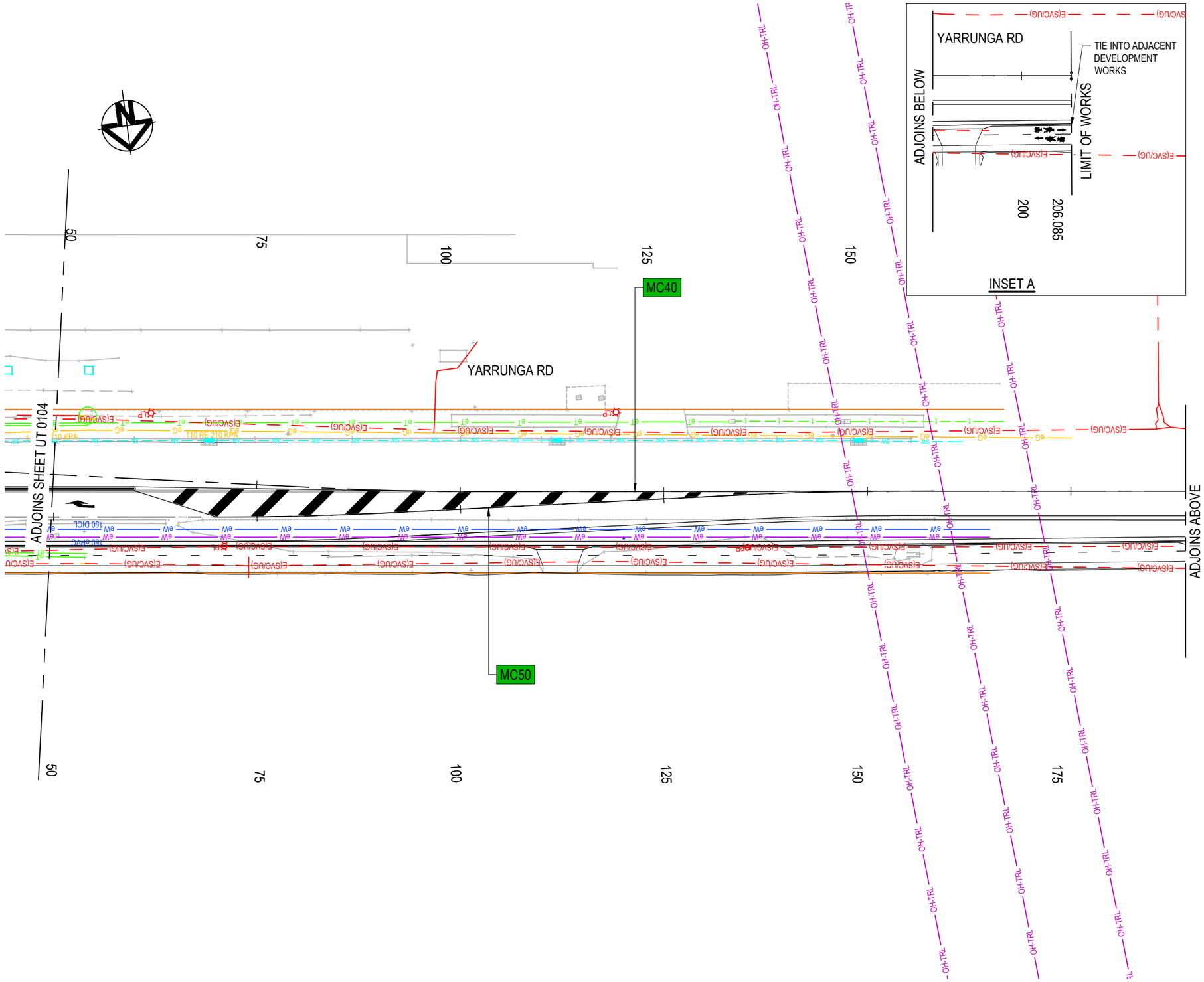
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. UT 0106

ISSUE A

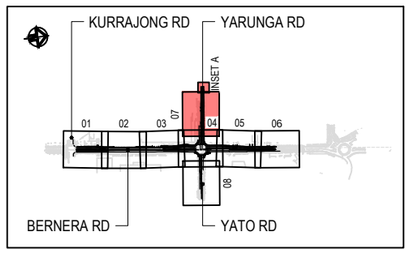


LEGEND

	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE
EXISTING UTILITIES	
OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG.
WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0107.DWG
Last Plotted: 20/09/2022 12:55:02 AM By: BENZSON
Last Saved: 19/09/2022 6:21:16 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

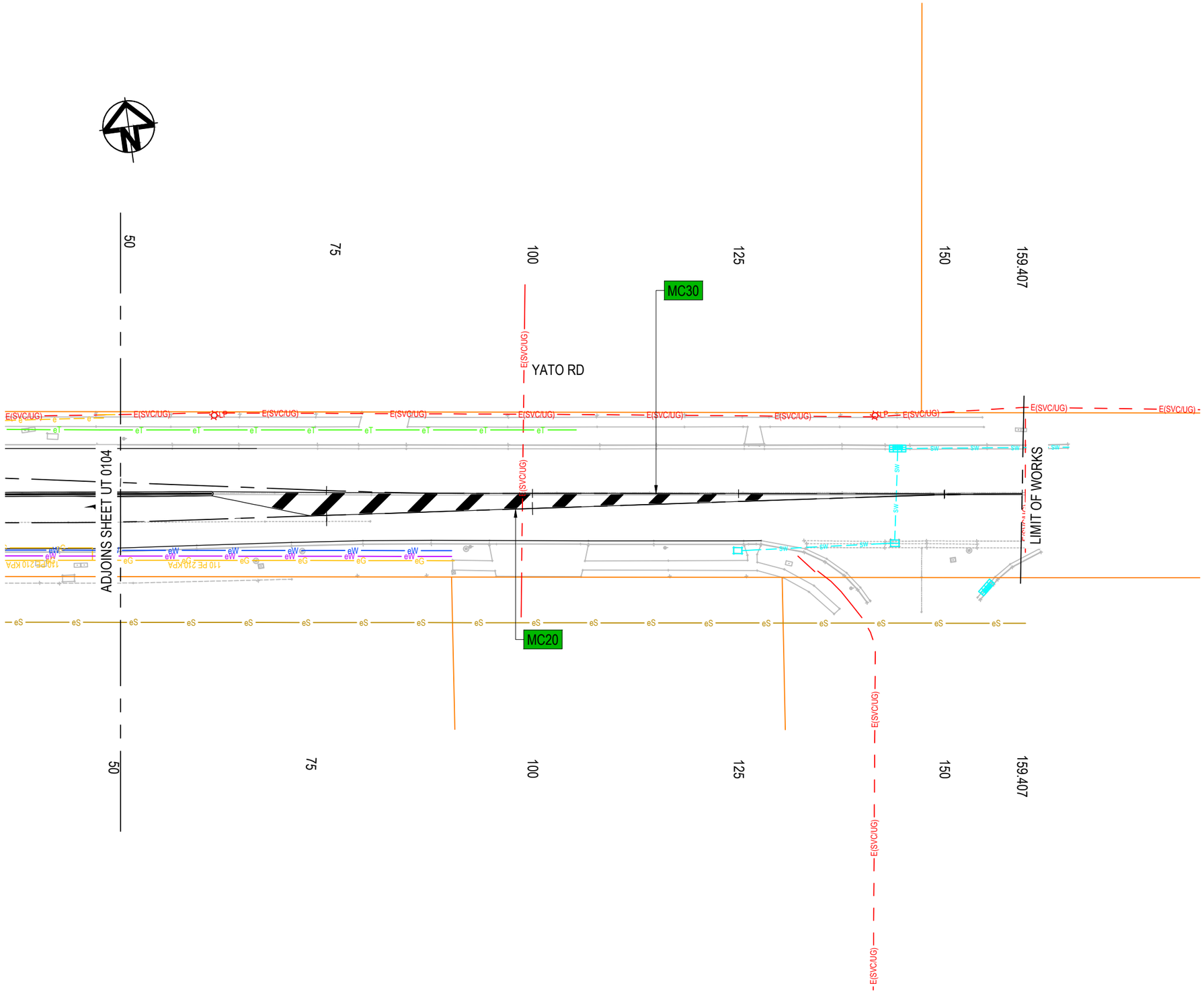
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 7

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. UT 0107
ISSUE A



LEGEND

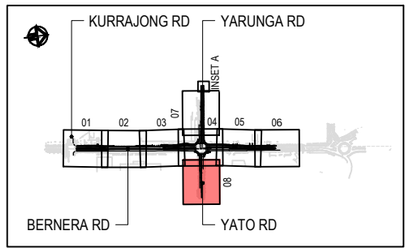
	SURVEY
	CADASTRAL BOUNDARY
	CONTROL LINE

EXISTING UTILITIES

OH-TRL	330Kv TRANSMISSION LINE
E(LV/OH)	EXISTING LOW VOLTAGE OVERHEAD ELECTRICAL
E(SL/OH)	EXISTING SWITCH LIVE OVERHEAD ELECTRICAL
E(SVC/UG)	UNDERGROUND ELECTRICAL
eT	EXISTING TELSTRA
eW	EXISTING WATER MAIN
w	EXISTING WATER
eW	EXISTING RECYCLED WATER
eSW	EXISTING STORMWATER
sw	EXISTING Ø1050 STORMWATER
eS	EXISTING SEWER
eG / G	EXISTING GAS
e	EXISTING ELECTRICAL POTHOLED
t	EXISTING TELECOM POTHOLED
g	EXISTING GAS POTHOLED
PL	EXISTING ELECTRICAL POWER POLE AND LIGHT POLE
PP	EXISTING ELECTRICAL POWER POLE
LP	EXISTING ELECTRICAL LIGHT POLE
	EXISTING WATER HYDRANT
	EXISTING VMS
	CONCRETE ENCASEMENT

DIAL BEFORE YOU DIG. WWW.1100.COM.AU

WARNING
UNDERGROUND SERVICE CABLES IN VINICITY LOCATION ON PLANS SHOWN ON THESE PLANS ARE INDICATIVE ONLY. SERVICES TO BE PHYSICALLY LOCATED PRIOR TO CONSTRUCTION



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 UT 0108.DWG

Last Plotted: 20/09/2022 12:55:35 AM By: BENZSON

Last Saved: 19/09/2022 6:21:34 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
EXISTING UTILITIES PLAN
SHEET 8

A3

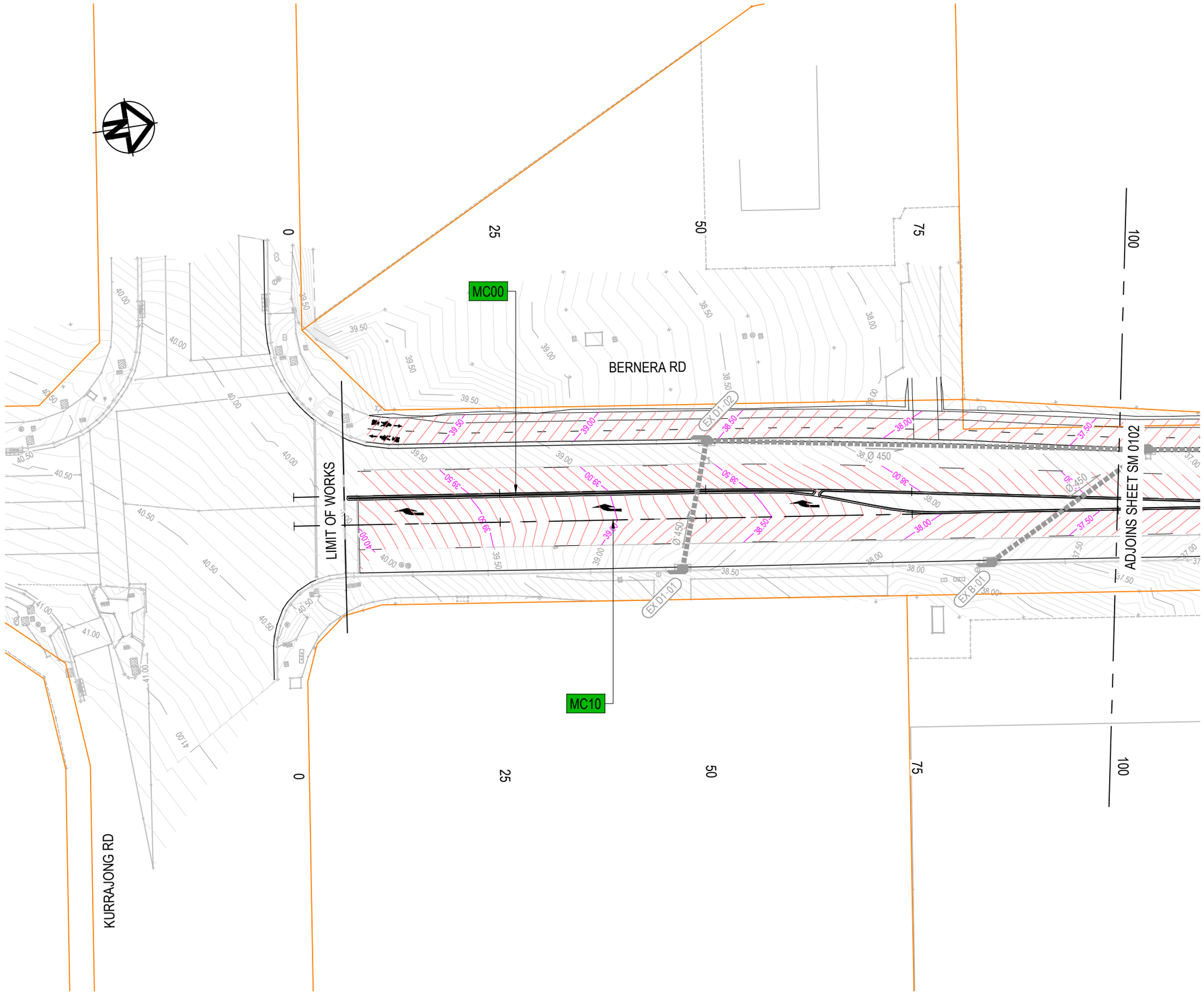
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

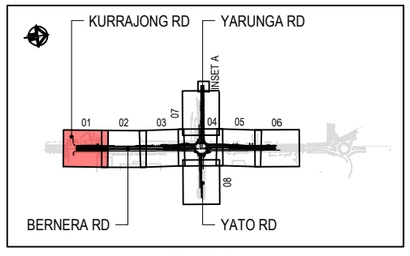
SHEET No. UT 0108

ISSUE A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A·1 PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A·1 EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 EXISTING STORMWATER PIPE
- Ø 600 STORMWATER PIPE & PIPE SIZE
- 32.00 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0101.DWG
Last Plotted: 20/09/2022 12:47:12 AM By: BENZSON
Last Saved: 19/09/2022 6:16:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

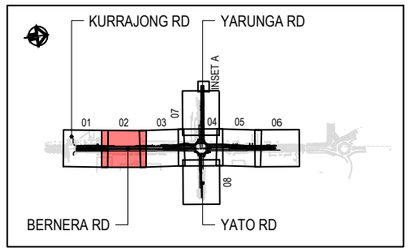
LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. SM 0101
ISSUE A

LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A·1 — PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A·1 — EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 — EXISTING STORMWATER PIPE
- Ø 600 — STORMWATER PIPE & PIPE SIZE
- 32.00 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0102.DWG

Last Plotted: 20/09/2022 12:47:47 AM By: BENZSON

Last Saved: 19/09/2022 6:16:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 2

A3

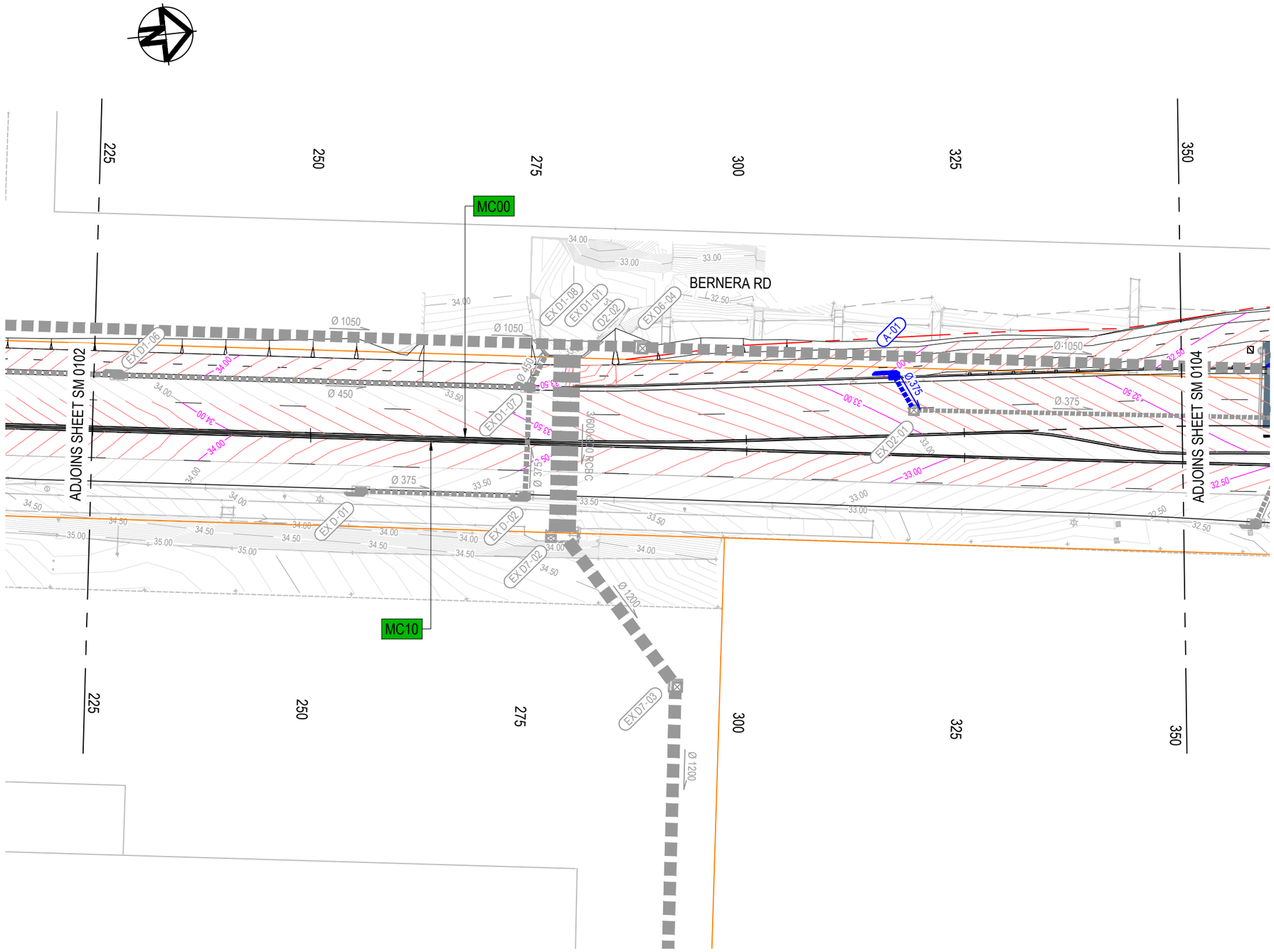
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

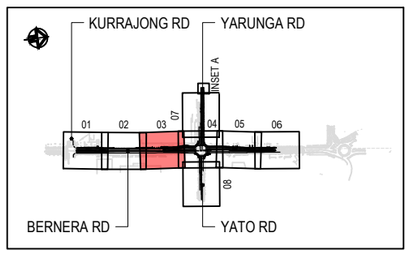
SHEET No. SM 0102

ISSUE A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A-1 — PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A-1 — EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 — EXISTING STORMWATER PIPE
- Ø 600 — STORMWATER PIPE & PIPE SIZE
- 32.00 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0103.DWG
Last Plotted: 20/09/2022 12:48:19 AM By: BENZSON
Last Saved: 19/09/2022 6:17:11 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

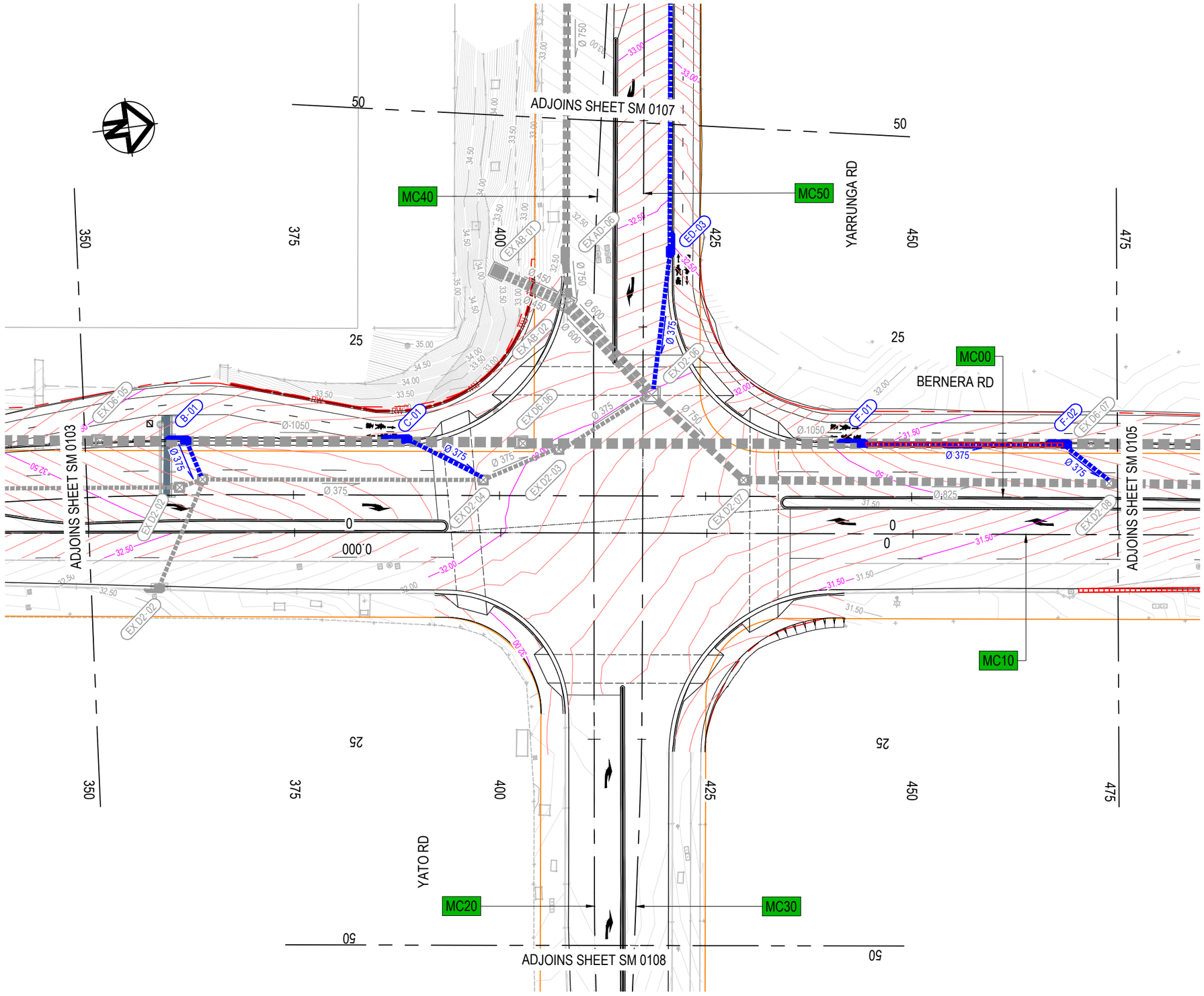
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 3

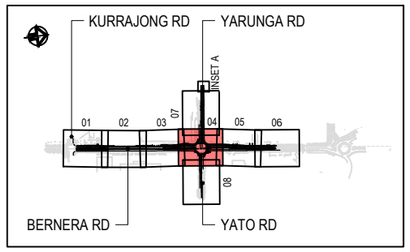
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. SM 0103
ISSUE A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A-1 — PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A-1 — EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 — EXISTING STORMWATER PIPE
- Ø 600 — STORMWATER PIPE & PIPE SIZE
- 32.00 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0104.DWG
Last Plotted: 20/09/2022 12:49:02 AM By: BENZSON
Last Saved: 19/09/2022 6:17:33 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

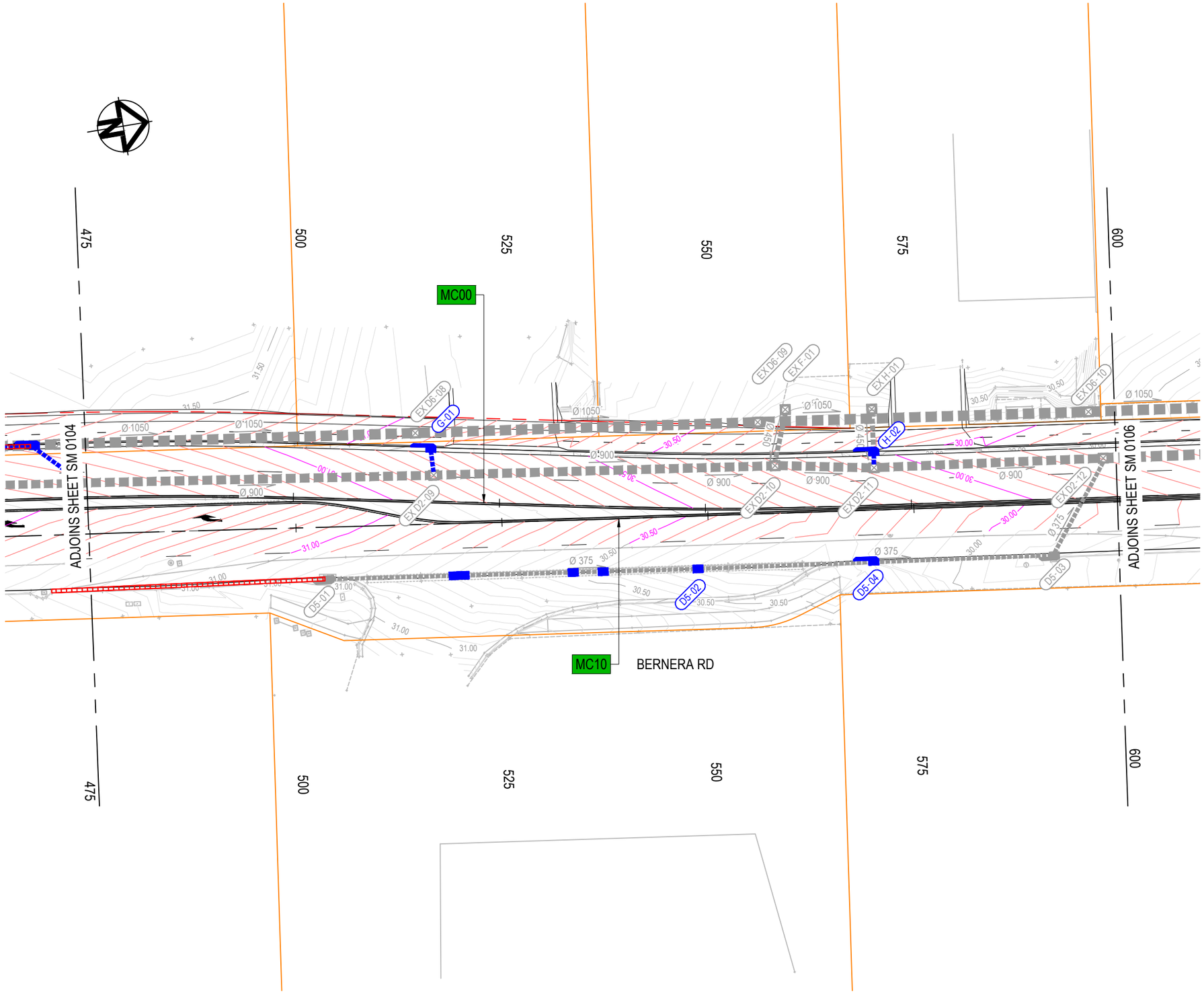
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 4

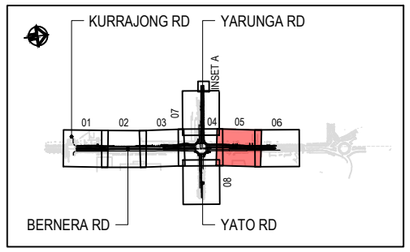
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. SM 0104
ISSUE A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A-1 PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A-1 EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 EXISTING STORMWATER PIPE
- Ø 600 STORMWATER PIPE & PIPE SIZE
- 32.00 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0105.DWG

Last Plotted: 20/09/2022 12:49:39 AM By: BENZSON

Last Saved: 19/09/2022 6:17:52 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20

SCALE 1:500m

CO-ORDINATE SYSTEM:	HEIGHT DATUM:
GDA 2020 ZONE 56	AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

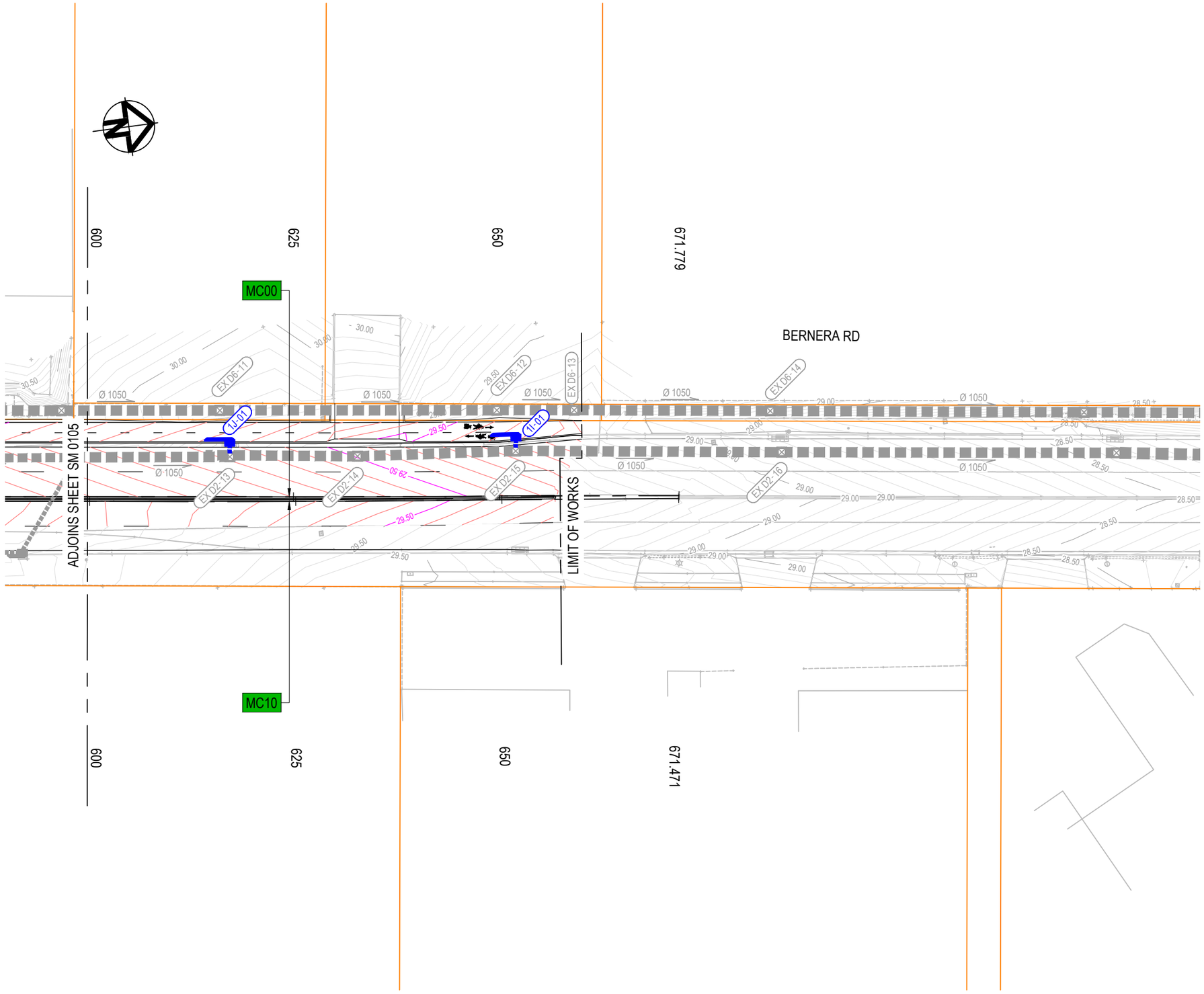
LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 5

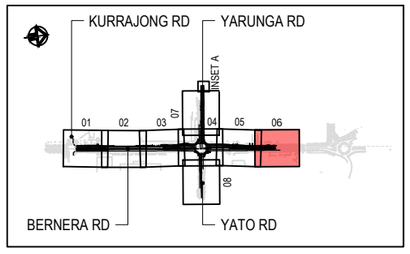
A3

PROJECT NUMBER:		PART
2021 25 DD 001		
ISSUE STATUS:	SHEET No.	ISSUE
100% DETAILED DESIGN	SM 0105	A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A·1 — PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A·1 — EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 — EXISTING STORMWATER PIPE
- Ø 600 — STORMWATER PIPE & PIPE SIZE
- 32.00 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0106.DWG
Last Plotted: 20/09/2022 12:50:20 AM By: BENZSON
Last Saved: 19/09/2022 6:18:10 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

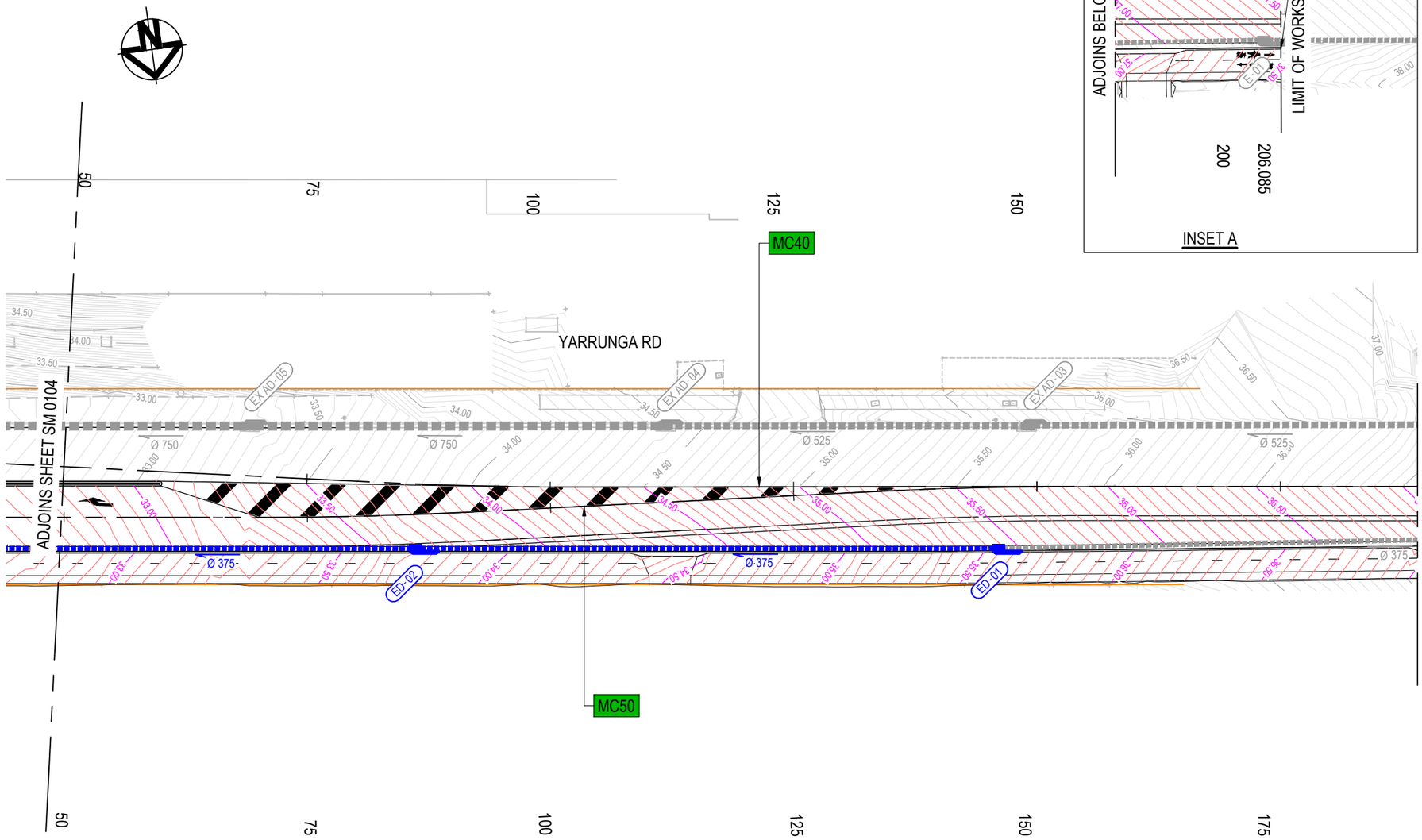
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

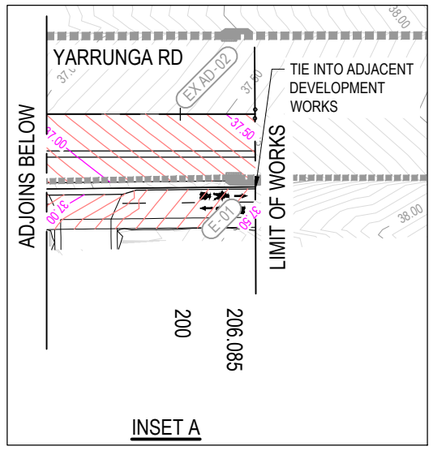
CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 6

A3

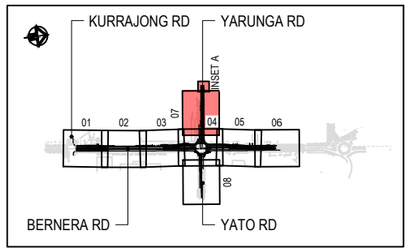
PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. SM 0106
ISSUE A





LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A·1 PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A·1 EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 EXISTING STORMWATER PIPE
- Ø 600 STORMWATER PIPE & PIPE SIZE
- 32.00 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0107.DWG
Last Plotted: 20/09/2022 12:50:57 AM By: BENZSON
Last Saved: 19/09/2022 6:18:31 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

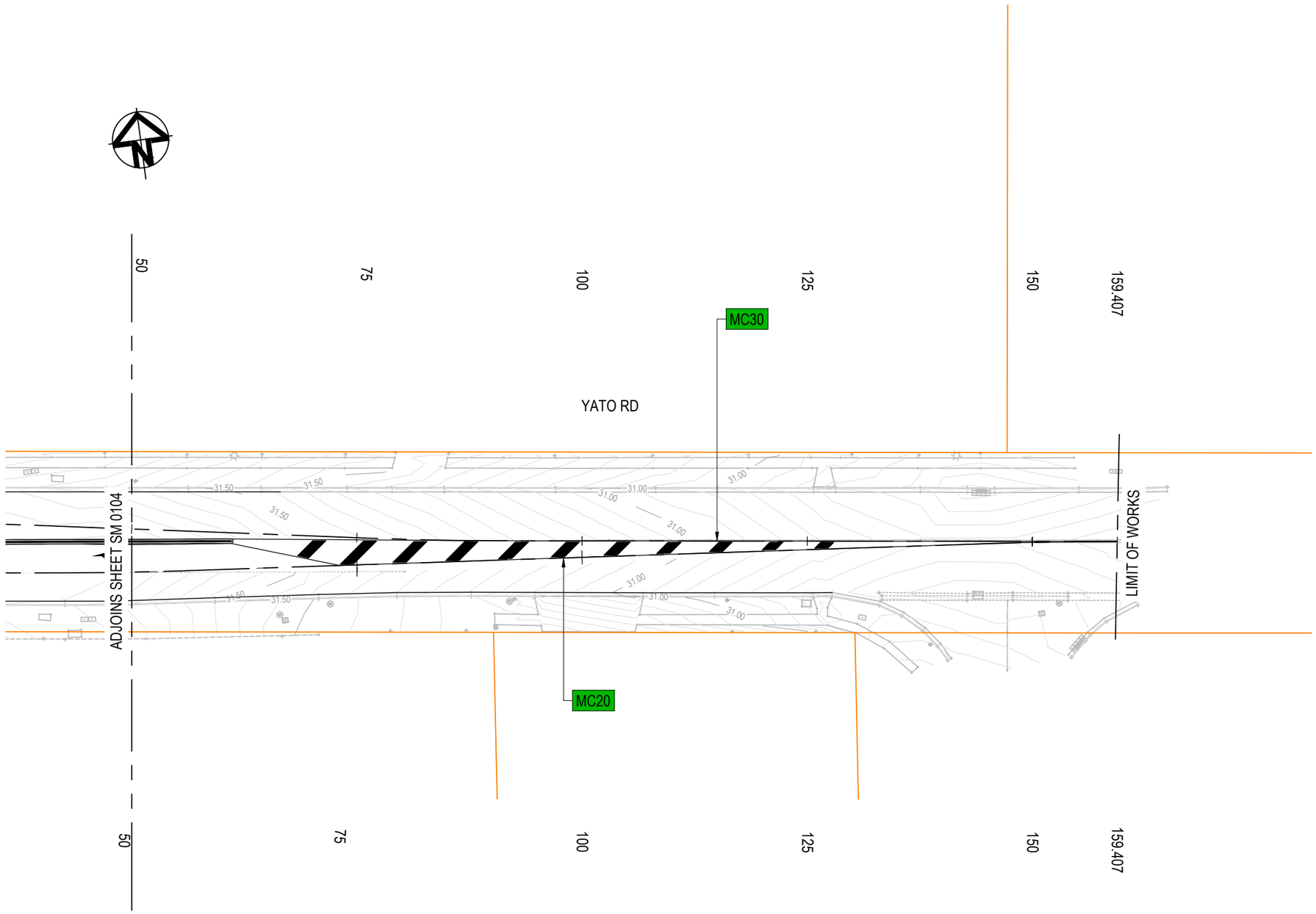
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 7

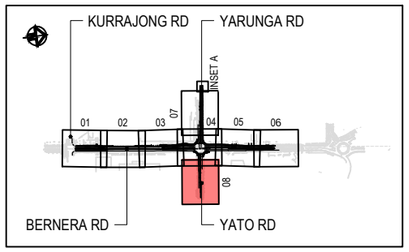
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. SM 0107
ISSUE A



LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- ACO DRAIN
- A·1 PIT TAG IDENTIFICATION
- PROPOSED MEDIAN INLET PIT
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED INLET PIT
- PROPOSED PIPED OUTLET
- PROPOSED SAG PIT
- A·1 EXISTING PIT TAG IDENTIFICATION
- EXISTING INLET PIT
- EXISTING PIPE OUTLET
- EXISTING GRATED INLET
- EXISTING SAG PIT
- EXISTING JUNCTION PIT
- Ø 600 EXISTING STORMWATER PIPE
- Ø 600 STORMWATER PIPE & PIPE SIZE
- 32.00 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 32.00 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0108.DWG

Last Plotted: 20/09/2022 12:51:32 AM By: BENZSON

Last Saved: 19/09/2022 6:18:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER MANAGEMENT PLAN
SHEET 8

A3

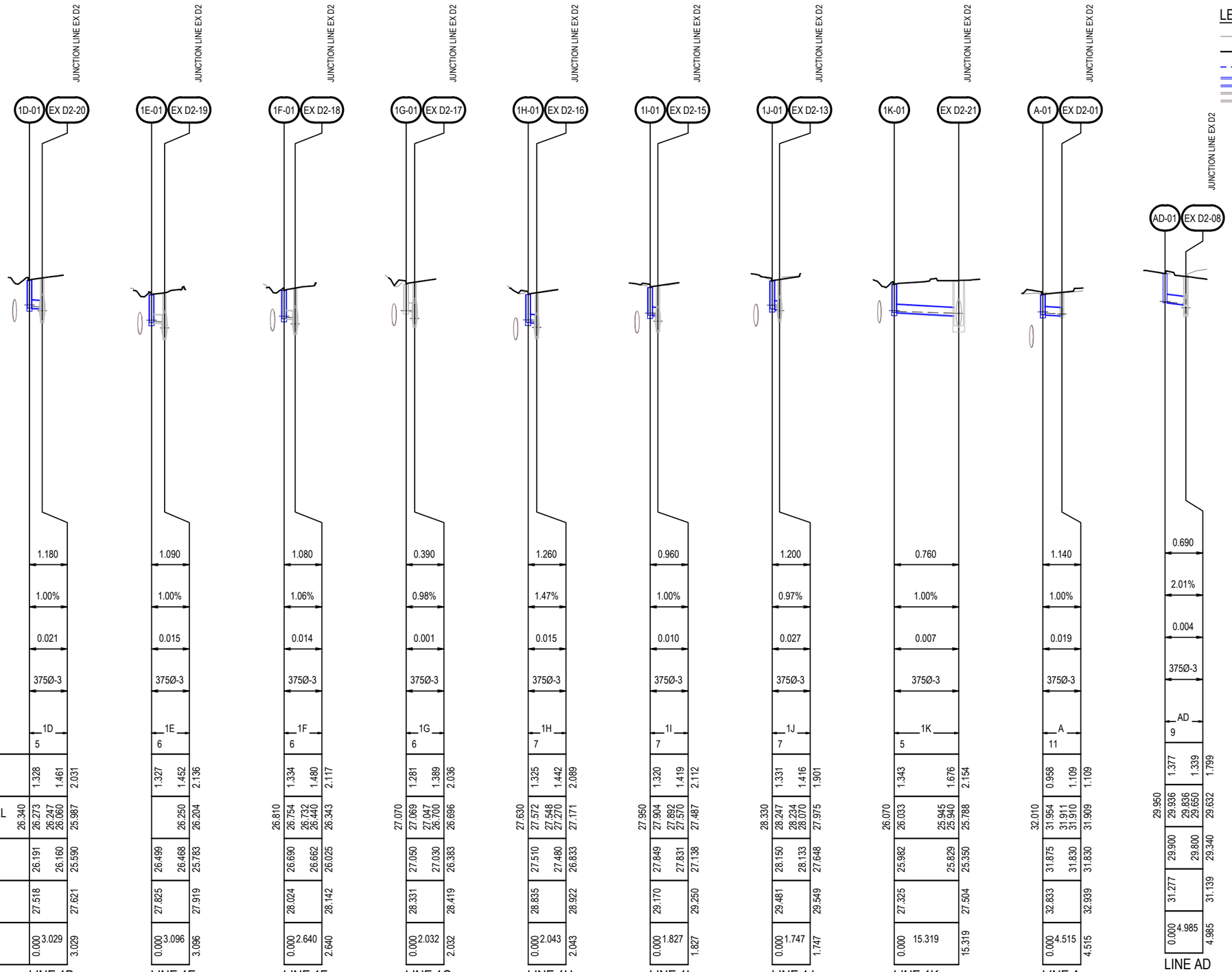
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. SM 0108

ISSUE A



LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

	LINE 1D	LINE 1E	LINE 1F	LINE 1G	LINE 1H	LINE 1I	LINE 1J	LINE 1K	LINE A	LINE AD
VELOCITY (m/s) 20% AEP	1.180	1.090	1.080	0.390	1.260	0.960	1.200	0.760	1.140	0.690
GRADE (%)	1.00%	1.00%	1.06%	0.98%	1.47%	1.00%	0.97%	1.00%	1.00%	2.01%
PIPE FLOW (m3/s) 20% AEP	0.021	0.015	0.014	0.001	0.015	0.010	0.027	0.007	0.019	0.004
PIPE SIZE(mm) & CLASS	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3
DRAINAGE LINE	1D	1E	1F	1G	1H	1I	1J	1K	A	AD
DATUM	5	6	6	6	7	7	7	5	11	9
DEPTH TO INVERT	1.328, 1.461, 2.031	1.327, 1.452, 2.136	1.334, 1.480, 2.117	1.281, 1.389, 2.036	1.325, 1.442, 2.089	1.320, 1.419, 2.112	1.331, 1.416, 1.901	1.343, 1.676, 2.154	0.958, 1.109, 1.109	1.377, 1.339, 1.799
HYDRAULIC GRADE LEVEL	26.340, 26.273, 26.247, 26.060, 25.987	26.250, 26.204	26.810, 26.754, 26.732, 26.440, 26.343	27.070, 27.069, 27.047, 26.700, 26.696	27.630, 27.572, 27.548, 27.270, 27.171, 2.089	27.950, 27.904, 27.892, 27.570, 27.487, 2.112	28.330, 28.247, 28.234, 28.070, 27.975, 1.901	26.070, 26.033, 25.945, 25.940, 25.788, 2.154	32.010, 31.954, 31.911, 31.910, 31.909, 1.109	29.950, 29.936, 29.836, 29.650, 29.632, 1.799
INVERT LEVEL	26.191, 26.160, 25.590	26.499, 26.468, 25.783	26.690, 26.662, 26.025	27.050, 27.030, 26.383	27.510, 27.480, 26.833	27.849, 27.831, 27.138	28.150, 28.133, 27.648	25.982, 25.829, 25.350	31.875, 31.830, 31.830	29.900, 29.800, 29.340
DESIGN SURFACE LEVEL	27.518, 27.621	27.825, 27.919	28.024, 28.142	28.331, 28.419	28.835, 28.922	29.170, 29.250	29.481, 29.549	27.325, 27.504	32.833, 32.939	31.277, 31.139
CHAINAGE	0.000, 3.029, 3.029	0.000, 3.096, 3.096	0.000, 2.640, 2.640	0.000, 2.032, 2.032	0.000, 2.043, 2.043	0.000, 1.827, 1.827	0.000, 1.747, 1.747	0.000, 15.319, 15.319	0.000, 4.515, 4.515	0.000, 4.985, 4.985

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0201.DWG

Last Plotted: 19/09/2022 11:34:07 PM By: BENZSON

Last Saved: 19/09/2022 5:56:48 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 1

A3

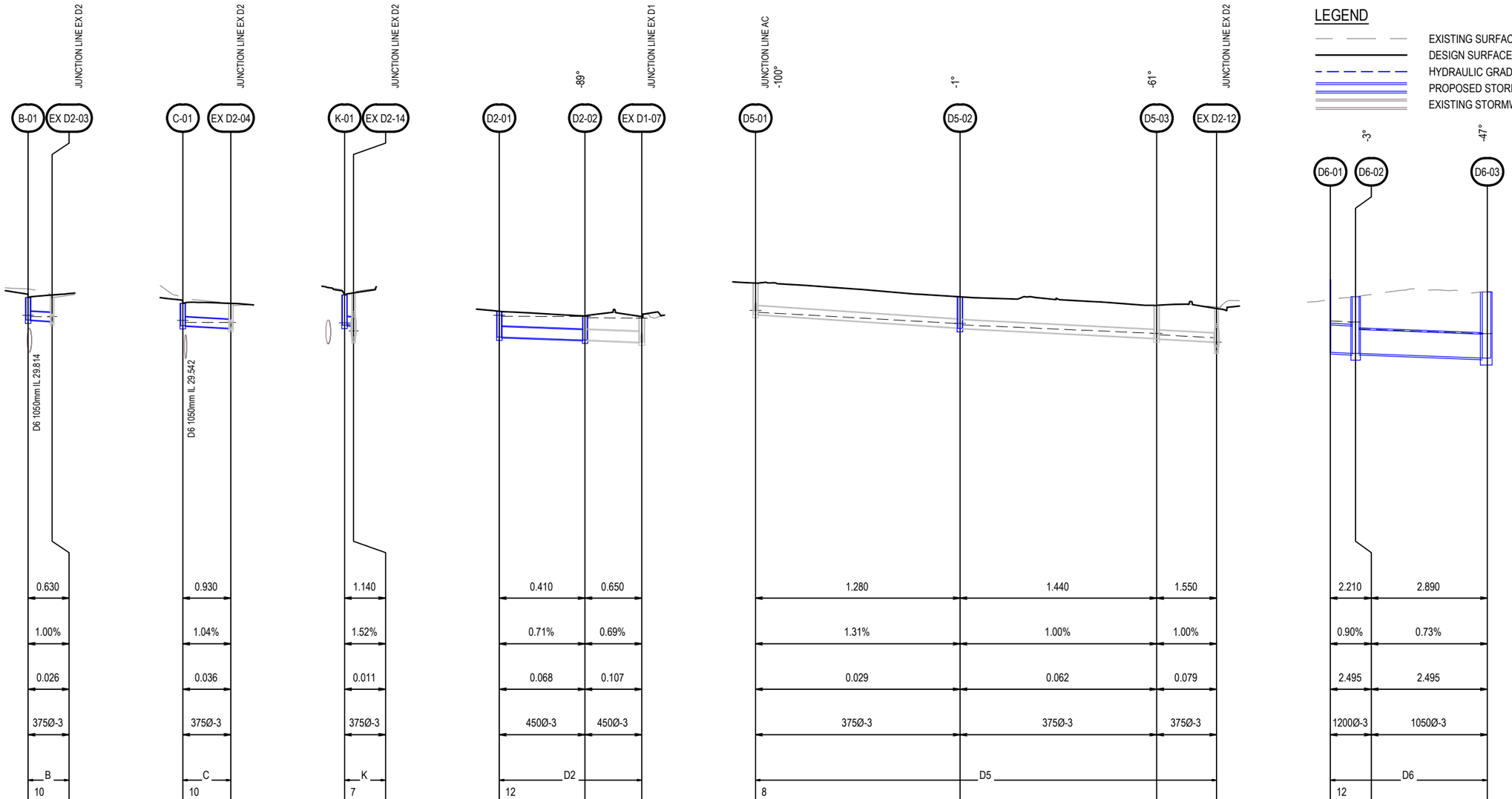
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0201

ISSUE A



LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

VELOCITY (m/s) 20% AEP	0.630			0.930			1.140			0.410		0.650			1.280			1.440			1.550			2.210		2.890			
GRADE (%)	1.00%			1.04%			1.52%			0.71%		0.69%			1.31%			1.00%			1.00%			0.90%		0.73%			
PIPE FLOW (m3/s) 20% AEP	0.026			0.036			0.011			0.068		0.107			0.029			0.062			0.079			2.495		2.495			
PIPE SIZE(mm) & CLASS	375Ø-3			375Ø-3			375Ø-3			450Ø-3		450Ø-3			375Ø-3			375Ø-3			375Ø-3			1200Ø-3		1050Ø-3			
DRAINAGE LINE	B			C			K			D2					D5									D6					
DATUM	10			10			7			12					8									12					
DEPTH TO INVERT	0.983	1.151	1.246	0.975	1.085 1.145	1.125	1.334	1.449	2.099	1.131	1.057	1.057	1.102	1.102	1.384	1.367		1.392	1.441		1.466	1.467	1.880	3.190	2.498	2.498	2.917		
HYDRAULIC GRADE LEVEL	31.430 31.380	31.377 31.380	31.281	31.210 31.125	31.117 31.120	31.019	28.100 28.052	28.027 27.750	27.666	33.430 33.391	33.381 33.380	33.324	33.311 33.310	32.660	29.650 29.567	29.075 29.080		29.013	28.641 28.640		28.578	28.446 28.260	28.181	33.187	33.137 33.140	32.837	32.629 32.630		
INVERT LEVEL	31.228	31.175	31.080	30.980	30.870 30.810	30.830	28.000	27.970	27.320	32.480	32.346	32.346	32.260	32.260	29.470	28.883		28.858	28.426		28.401	28.269	27.856	31.810	31.760	31.760	31.550		
DESIGN SURFACE LEVEL	32.211		32.326	31.955		31.955	29.334		29.419	33.611		33.403		33.362	30.854			30.250			29.867		29.736	35.000		34.258			34.467
CHAINAGE	0.000	5.280	5.280	0.000	10.568	10.568	0.000	1.972	1.972	0.000	18.842	18.842	12.487	31.329	0.000	44.961		44.961	43.231		88.193	13.174	101.367	0.000	5.563	5.563	28.941		34.504
	LINE B			LINE C			LINE K			LINE D2					LINE D5									LINE D6					

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0202.DWG

Last Plotted: 19/09/2022 11:34:19 PM By: BENZSON

Last Saved: 19/09/2022 5:56:58 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 2

A3

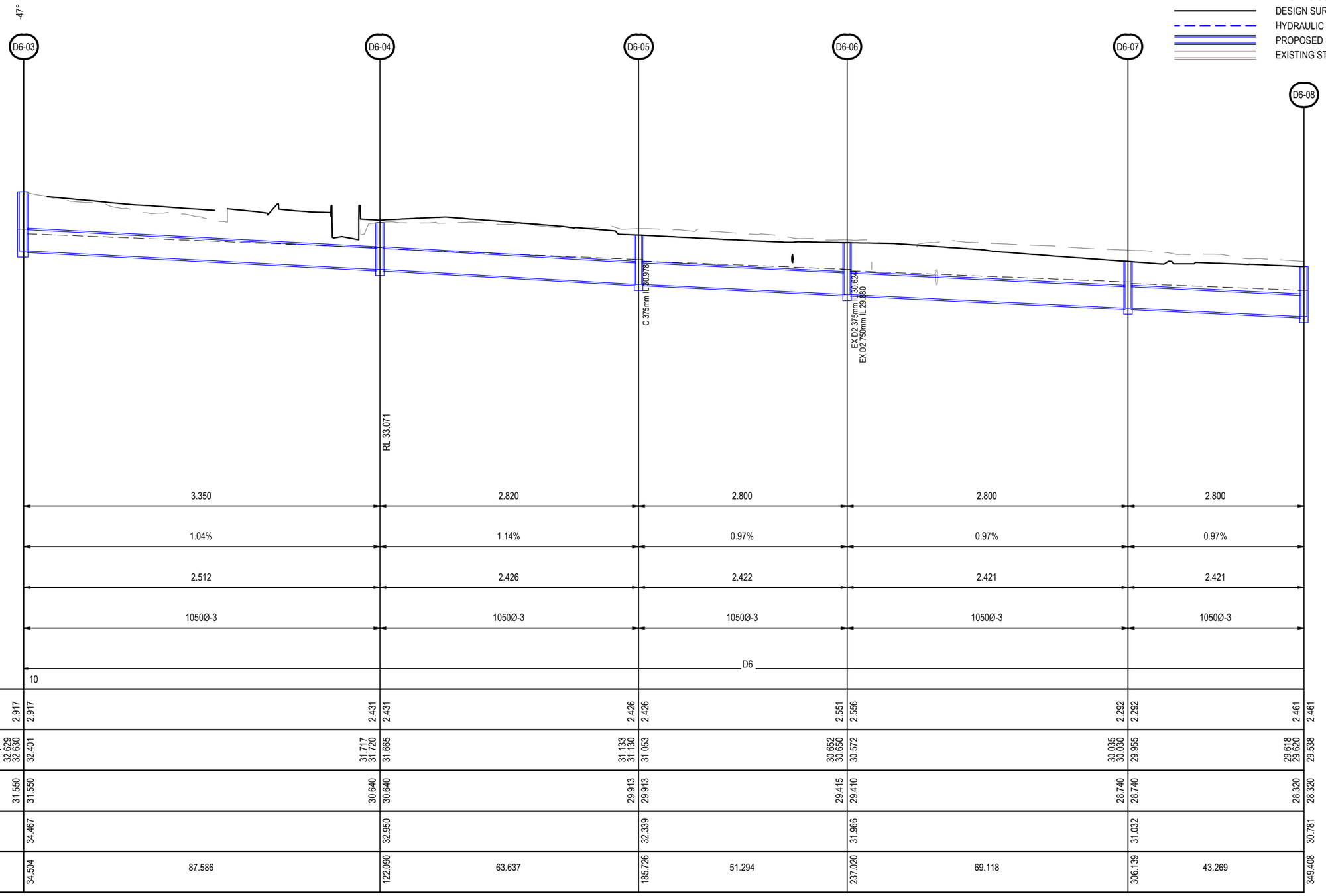
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0202

ISSUE A



	D6-03	D6-04	D6-05	D6-06	D6-07	D6-08
VELOCITY (m/s) 20% AEP	3.350	2.820	2.800	2.800	2.800	
GRADE (%)	1.04%	1.14%	0.97%	0.97%	0.97%	
PIPE FLOW (m3/s) 20% AEP	2.512	2.426	2.422	2.421	2.421	
PIPE SIZE(mm) & CLASS	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	
DRAINAGE LINE			D6			
DATUM	10					
DEPTH TO INVERT	2.917 / 2.917	2.431 / 2.431	2.426 / 2.426	2.551 / 2.556	2.292 / 2.292	2.461 / 2.461
HYDRAULIC GRADE LEVEL	32.629 / 32.630 / 32.401	31.717 / 31.720 / 31.665	31.133 / 31.130 / 31.053	30.652 / 30.650 / 30.572	30.035 / 30.030 / 29.955	29.618 / 29.620 / 29.538
INVERT LEVEL	31.550 / 31.550	30.640 / 30.640	29.913 / 29.913	29.415 / 29.410	28.740 / 28.740	28.320 / 28.320
DESIGN SURFACE LEVEL	34.467	32.950	32.339	31.966	31.032	30.781
CHAINAGE	34.504	122.090	185.726	237.020	306.139	349.408

3.350	87.586	2.820	63.637	2.800
2.800	51.294	2.800	69.118	2.800
43.269				

LINE D6

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0203.DWG

Last Plotted: 19/09/2022 11:34:29 PM By: BENZSON

Last Saved: 19/09/2022 5:57:08 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 3

A3

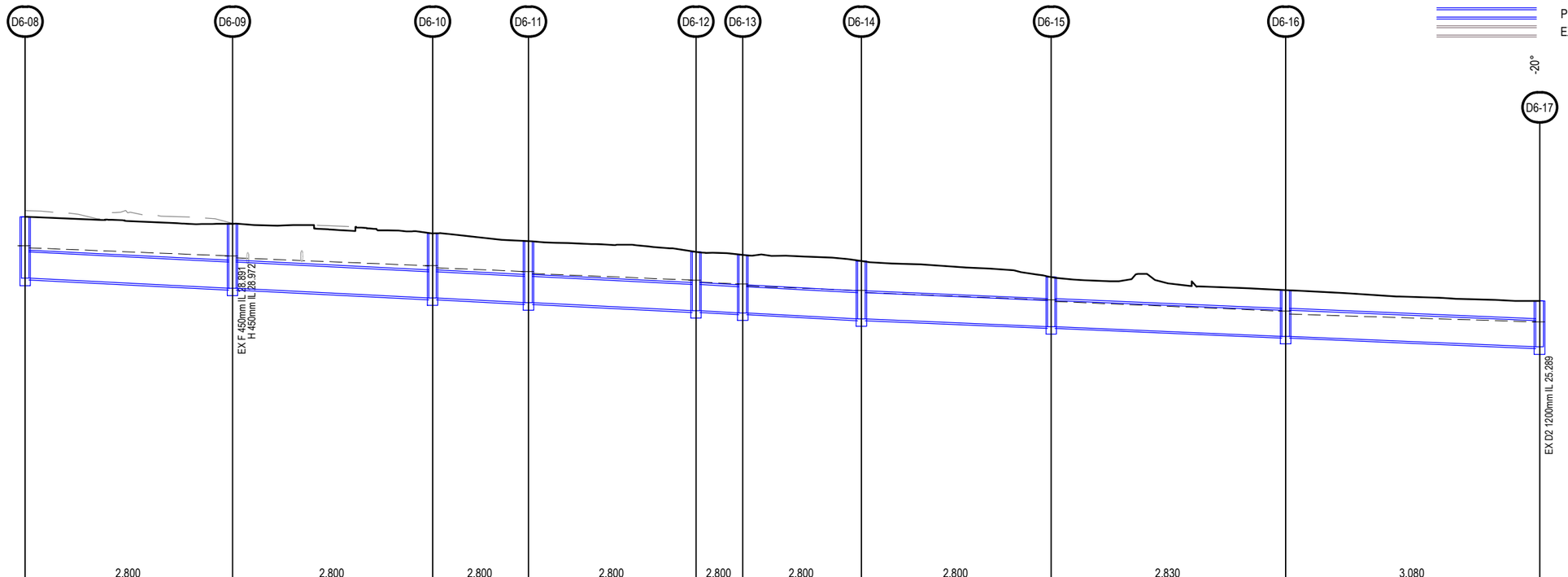
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0203

ISSUE A



	D6-08	D6-09	D6-10	D6-11	D6-12	D6-13	D6-14	D6-15	D6-16	D6-17
VELOCITY (m/s) 20% AEP	2.800	2.800	2.800	2.800	2.800	2.800	2.800	2.830	3.080	
GRADE (%)	0.96%	0.97%	0.99%	0.95%	0.96%	1.01%	0.81%	0.83%	0.82%	
PIPE FLOW (m3/s) 20% AEP	2.420	2.420	2.419	2.418	2.417	2.416	2.416	2.412	2.412	
PIPE SIZE(mm) & CLASS	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	
DRAINAGE LINE							D6			
DATUM	7									
DEPTH TO INVERT	2.461 / 2.461	2.584 / 2.584	2.583 / 2.583	2.466 / 2.466	2.355 / 2.355 / 2.322	2.322 / 2.316	2.316 / 1.983	1.983 / 1.852	1.852 / 1.838	1.838
HYDRAULIC GRADE LEVEL	29.620 / 29.538	29.213 / 29.210	29.133 / 28.818 / 28.820	28.738 / 28.586 / 28.590	28.507 / 28.244 / 28.240	28.165 / 28.092 / 28.090	28.012 / 27.826 / 27.830	27.747 / 27.448 / 27.450	27.388 / 27.000	26.881 / 26.569 / 26.570 / 26.422
INVERT LEVEL	28.320 / 28.320	27.920 / 27.920	27.530 / 27.530	27.340 / 27.340	27.020 / 27.020 / 26.930	26.930 / 26.690	26.690 / 26.380	26.380 / 25.990	25.990 / 25.570	25.570
DESIGN SURFACE LEVEL	30.781	30.504	30.113	29.806	29.375	29.252	29.006	28.363	27.842	27.408
CHAINAGE	349.408	41.571 / 390.979	40.130 / 431.109	19.233 / 450.342	33.594 / 483.936	9.374 / 493.310	23.800 / 517.110	38.067 / 555.177	47.009 / 602.187	50.954 / 653.140

LINE D6

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0204.DWG
Last Plotted: 19/09/2022 11:34:40 PM By: BENZSON
Last Saved: 19/09/2022 5:57:18 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 2 4 6 8
SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

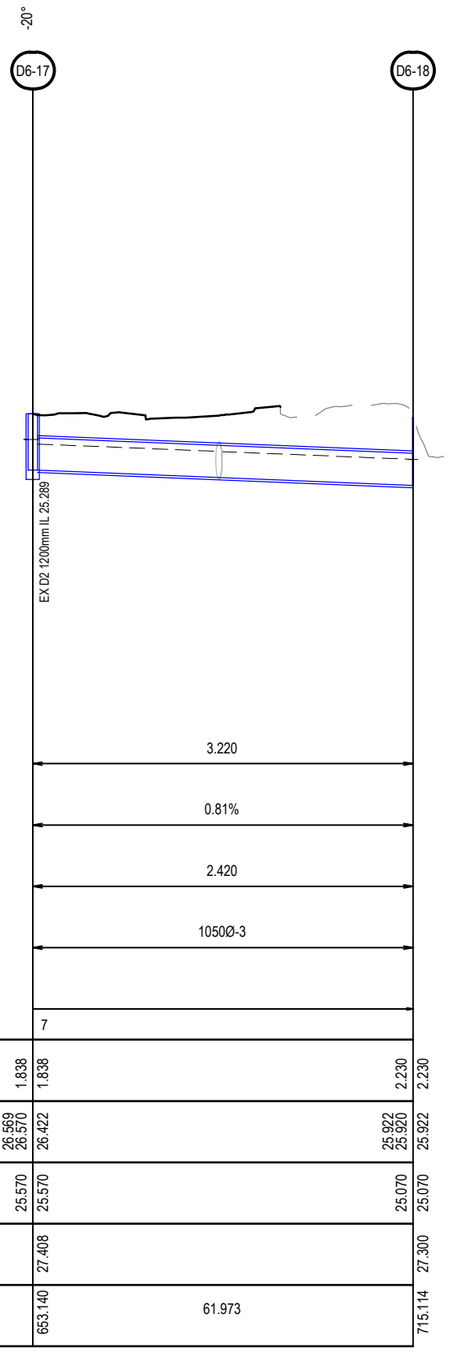
LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 4

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. DL 0204
ISSUE A

LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE



VELOCITY (m/s) 20% AEP		3.220		
GRADE (%)		0.81%		
PIPE FLOW (m3/s) 20% AEP		2.420		
PIPE SIZE(mm) & CLASS		1050Ø-3		
DRAINAGE LINE				
DATUM		7		
DEPTH TO INVERT	1.838	1.838	2.230	2.230
HYDRAULIC GRADE LEVEL	26.569 26.570	26.422	25.922 25.920	25.922
INVERT LEVEL	25.570	25.570	25.070	25.070
DESIGN SURFACE LEVEL		27.408		27.300
CHAINAGE		653.140	61.973	715.114

LINE D6

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0205.DWG

Last Plotted: 19/09/2022 11:34:51 PM By: BENZSON

Last Saved: 19/09/2022 5:57:28 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 5

A3

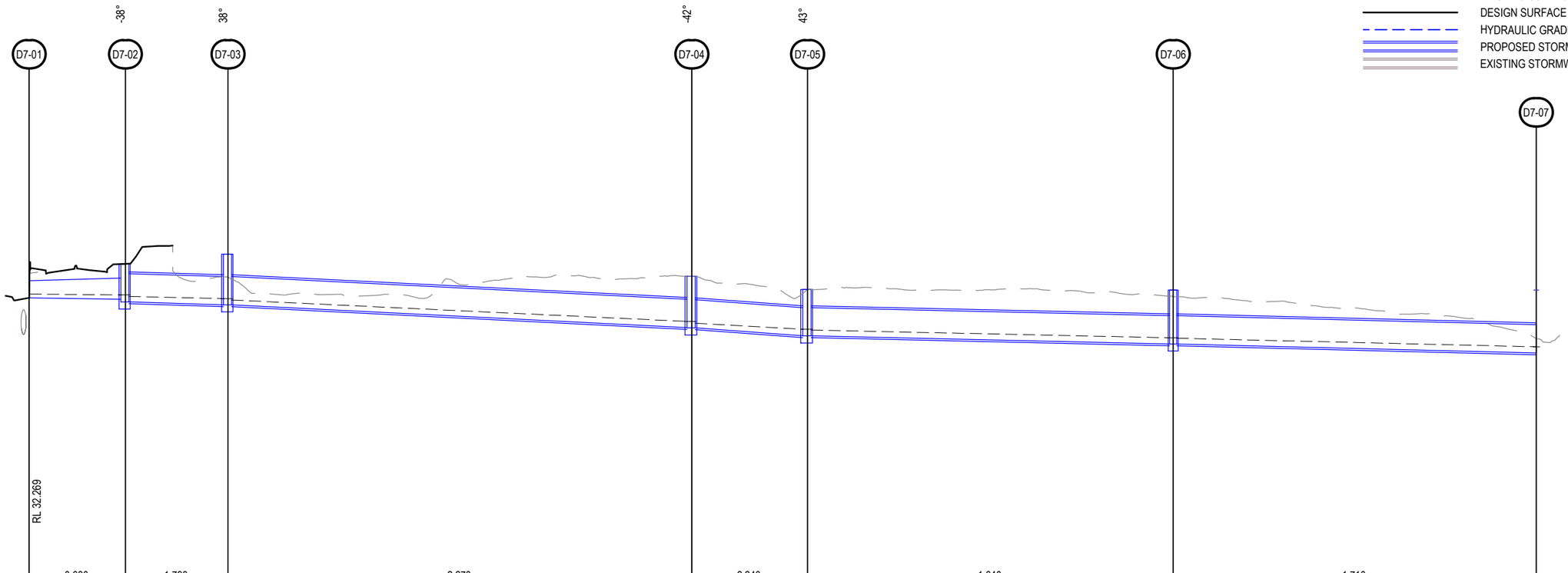
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0205

ISSUE A



	D7-01	D7-02	D7-03	D7-04	D7-05	D7-06	D7-07
VELOCITY (m/s) 20% AEP	0.630	1.790	2.270	2.240	1.640	1.710	
GRADE (%)	0.29%	0.55%	0.99%	1.38%	0.44%	0.49%	
PIPE FLOW (m3/s) 20% AEP	0.280	0.280	0.290	0.278	0.278	0.277	
PIPE SIZE(mm) & CLASS	(3x)900Ø-BC	1200Ø-3	1200Ø-3	1200Ø-3	1200Ø-3	1200Ø-3	
DRAINAGE LINE				D7			
DATUM	11						
DEPTH TO INVERT	-0.001 / 1.505	1.615 / 2.150	2.150 / 2.188	2.198 / 1.970	1.970 / 2.280	2.280 / 1.200	1.200
HYDRAULIC GRADE LEVEL	32.435 / 32.396 32.400	32.335 / 32.243 32.240	32.184 / 31.271 31.270	31.200 / 30.940	30.909 / 30.582 30.580	30.562 / 30.198 30.200	30.198
INVERT LEVEL	32.270 / 32.210	32.100 / 31.980	31.980 / 31.010	31.000 / 30.660	30.660 / 30.320	30.320 / 29.940	29.940
DESIGN SURFACE LEVEL	32.271	33.715	34.130	33.198	32.630	32.600	31.140
CHAINAGE	0.000 / 20.411	20.411 / 21.768	42.178 / 98.412	140.590 / 24.570	165.160 / 77.591	242.752 / 77.031	319.782

LINE D7

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0206.DWG

Last Plotted: 19/09/2022 11:35:01 PM By: BENZSON

Last Saved: 19/09/2022 5:57:40 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL
THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 6

A3

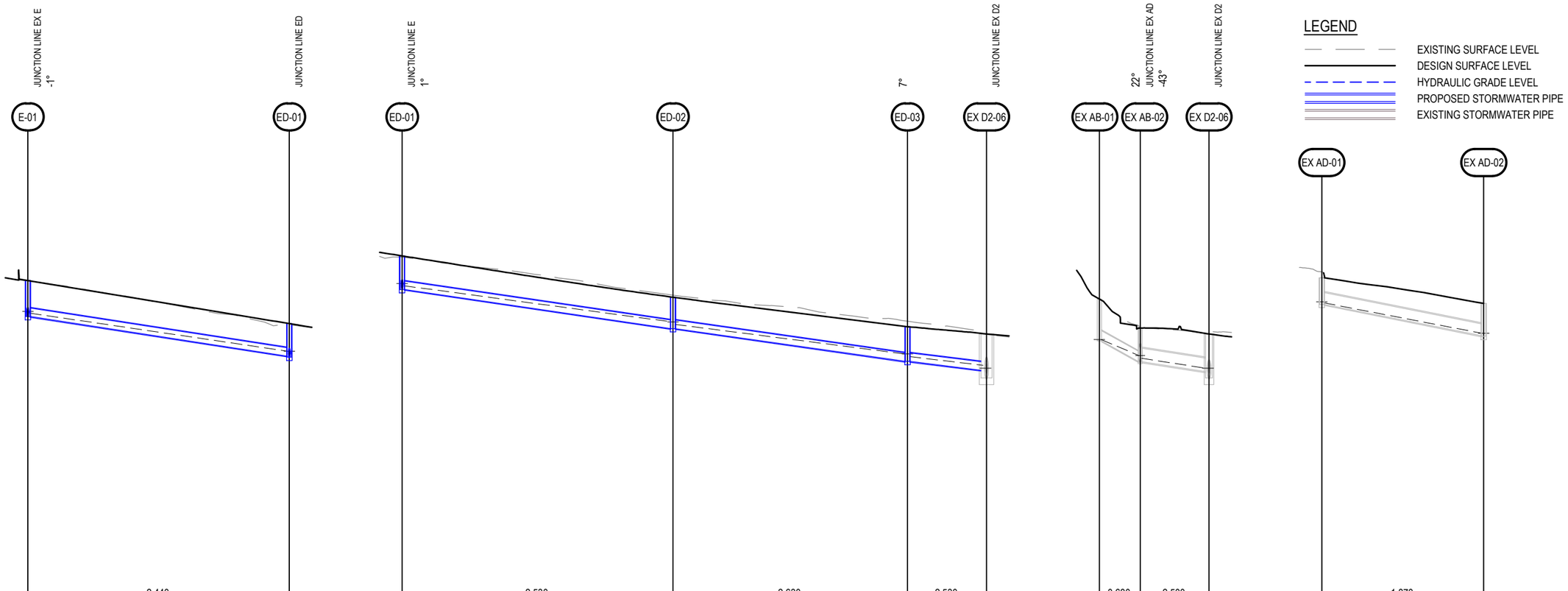
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0206

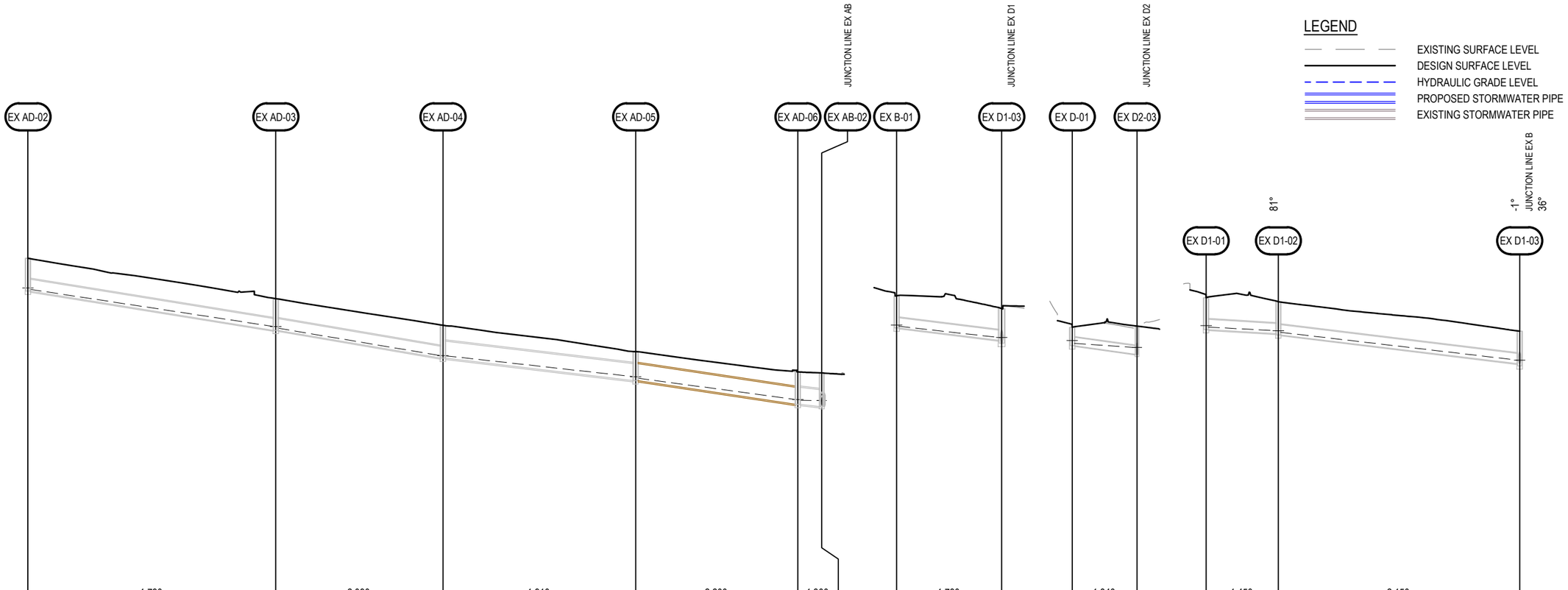
ISSUE A



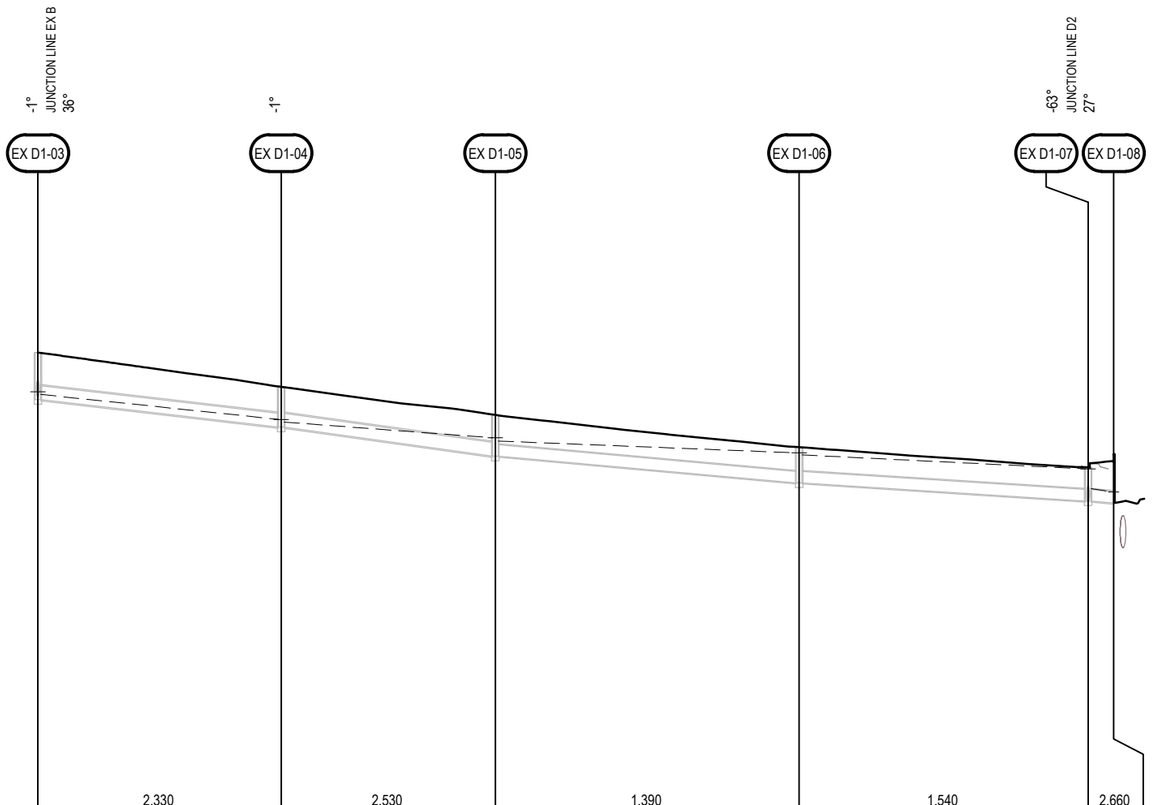
LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

| | | |


JUNCTION LINE EX AB
JUNCTION LINE EX D1
JUNCTION LINE EX D2
LEGEND
EXISTING SURFACE LEVEL
DESIGN SURFACE LEVEL
HYDRAULIC GRADE LEVEL
PROPOSED STORMWATER PIPE
EXISTING STORMWATER PIPE
EX AD-02
EX AD-03
EX AD-04
EX AD-05
EX AD-06
EX AB-02
EX B-01
EX D1-03
EX D-01
EX D2-03
81°
-1°
JUNCTION LINE EX B
36°
EX D1-01
EX D1-02
EX D1-03

| | | |



LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

VELOCITY (m/s) 20% AEP	2.330	2.530	1.390	1.540	2.660
GRADE (%)	2.26%	2.71%	1.76%	1.25%	1.56%
PIPE FLOW (m3/s) 20% AEP	0.128	0.136	0.148	0.165	0.280
PIPE SIZE(mm) & CLASS	450Ø-3	450Ø-3	375Ø-3	375Ø-3	375Ø-3
DRAINAGE LINE			EX D1		
DATUM	13				

DEPTH TO INVERT	1.443	1.536	1.313	1.313	1.345	1.345	1.166	1.166	1.102	1.102	1.334	1.334
HYDRAULIC GRADE LEVEL	35.819 35.820	35.735	34.923 34.920	34.835	34.322 34.320	34.215	33.831 33.830	33.763	33.311 33.310	32.660	32.549 32.550	32.549
INVERT LEVEL	35.660	35.566	34.670	34.670	33.723	33.723	32.850	32.850	32.260	32.260	32.195	32.195
DESIGN SURFACE LEVEL		37.102		35.983		35.068		34.016		33.362		33.529
CHAINAGE		69.492	39.673	109.165	34.919	144.085	49.554	193.638	47.135	240.773	4.167	244.940

LINE EX D1

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0209.DWG
Last Plotted: 19/09/2022 11:35:39 PM By: BENZSON
Last Saved: 19/09/2022 5:58:17 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 2 4 6 8
SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

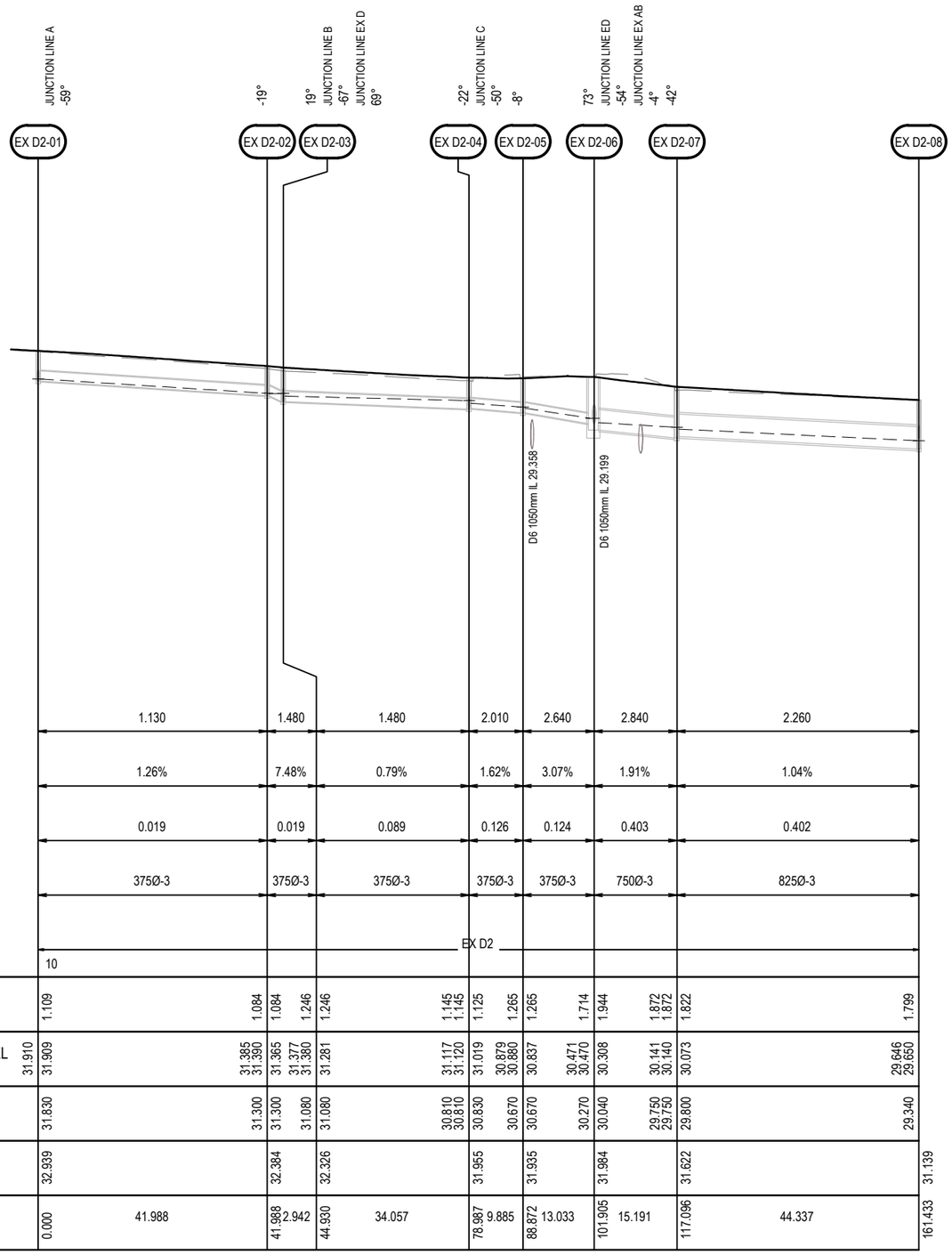
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 9

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. DL 0209
ISSUE A



LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

VELOCITY (m/s) 20% AEP	1.130	1.480	1.480	2.010	2.640	2.840	2.260
GRADE (%)	1.26%	7.48%	0.79%	1.62%	3.07%	1.91%	1.04%
PIPE FLOW (m3/s) 20% AEP	0.019	0.019	0.089	0.126	0.124	0.403	0.402
PIPE SIZE(mm) & CLASS	375Ø-3	375Ø-3	375Ø-3	375Ø-3	375Ø-3	750Ø-3	825Ø-3
DRAINAGE LINE	EX D2						
DATUM	10						

DEPTH TO INVERT		1.109							1.084	1.084	1.246	1.246					1.145	1.145	1.125	1.265	1.265			1.714	1.944			1.872	1.872	1.822								1.799	
HYDRAULIC GRADE LEVEL	31.910	31.909							31.385	31.390	31.365	31.377	31.380	31.281			31.117	31.120	31.019	30.879	30.880	30.837		30.471	30.470	30.308		30.141	30.140	30.073								29.646	29.650
INVERT LEVEL		31.830							31.300		31.300	31.080		31.080			30.810	30.810	30.830	30.670		30.670		30.270	30.040			29.750	29.750	29.800								29.340	
DESIGN SURFACE LEVEL		32.939									32.384			32.326					31.955			31.935			31.984					31.622									31.139
CHAINAGE	0.000		41.988					41.988	42.942				44.930		34.057			78.987	9.885		88.872		13.033		101.905		15.191		117.096		44.337							161.433	

LINE EX D2

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0210.DWG

Last Plotted: 19/09/2022 11:35:49 PM By: BENZSON

Last Saved: 19/09/2022 5:58:29 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 10

A3

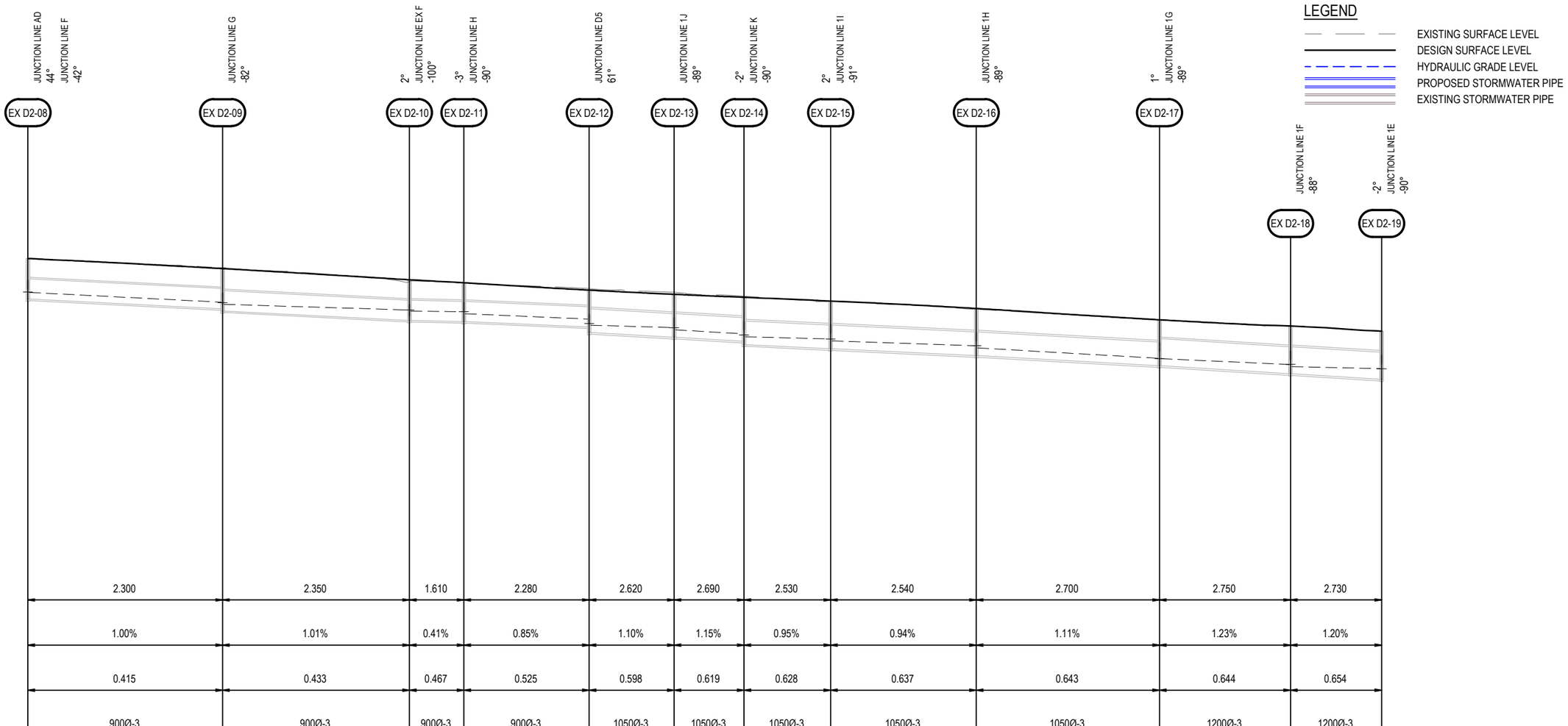
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0210

ISSUE A



VELOCITY (m/s) 20% AEP	2.300	2.350	1.610	2.280	2.620	2.690	2.530	2.540	2.700	2.750	2.730
GRADE (%)	1.00%	1.01%	0.41%	0.85%	1.10%	1.15%	0.95%	0.94%	1.11%	1.23%	1.20%
PIPE FLOW (m3/s) 20% AEP	0.415	0.433	0.467	0.525	0.598	0.619	0.628	0.637	0.643	0.644	0.654
PIPE SIZE(mm) & CLASS	900Ø-3	900Ø-3	900Ø-3	900Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1050Ø-3	1200Ø-3	1200Ø-3
DRAINAGE LINE							EX D2				
DATUM	7										

DEPTH TO INVERT	1.799	1.799	1.781	1.881	1.804	1.804	1.723	1.723	1.631	1.880	1.901	1.901	1.949	2.099	2.112	2.112	2.089	2.089	2.036	2.036	2.117	2.117	2.136	2.136
HYDRAULIC GRADE LEVEL	29.646 29.650	29.632	29.202 29.180	29.106	28.855 28.860	28.806	28.777 28.780	28.689	28.454 28.260	28.181	28.073 28.070	27.975	27.798 27.750	27.666	27.572 27.570	27.487	27.267 27.270	27.171	26.718 26.700	26.696	26.438 26.440	26.343	26.254 26.250	26.204
INVERT LEVEL	29.340	29.340	28.910	28.810	28.390	28.390	28.340	28.340	28.105	27.856	27.648	27.648	27.470	27.320	27.138	27.138	26.833	26.833	26.383	26.383	26.025	26.025	25.783	25.783
DESIGN SURFACE LEVEL		31.139		30.691		30.194		30.063		29.736		29.549		29.419		29.250		28.922		28.419		28.142		27.919
CHAINAGE		161.433	43.136	204.569	41.426	245.994	12.067	258.061	27.781	285.842	18.829	304.671	15.494	320.165	19.191	339.356	32.280	371.635	40.612	412.248	29.050	441.297	20.193	461.491

LINE EX D2

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0211.DWG

Last Plotted: 19/09/2022 11:36:00 PM By: BENZSON

Last Saved: 19/09/2022 5:58:41 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4, 23-33 MARY STREET, SURRY HILLS NSW 2010

T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170

T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 11

A3

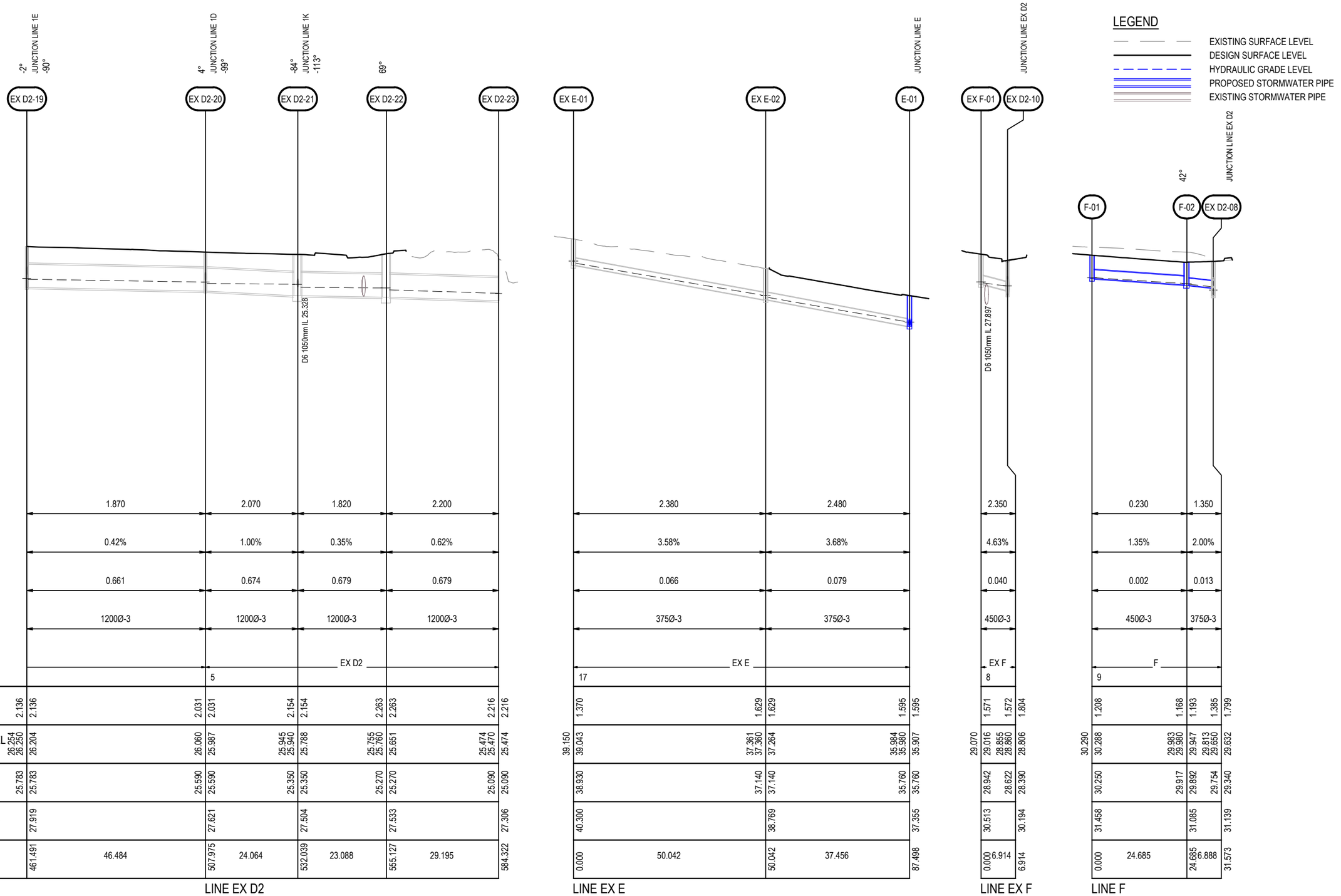
PROJECT NUMBER: 2021 25 DD 001

PART

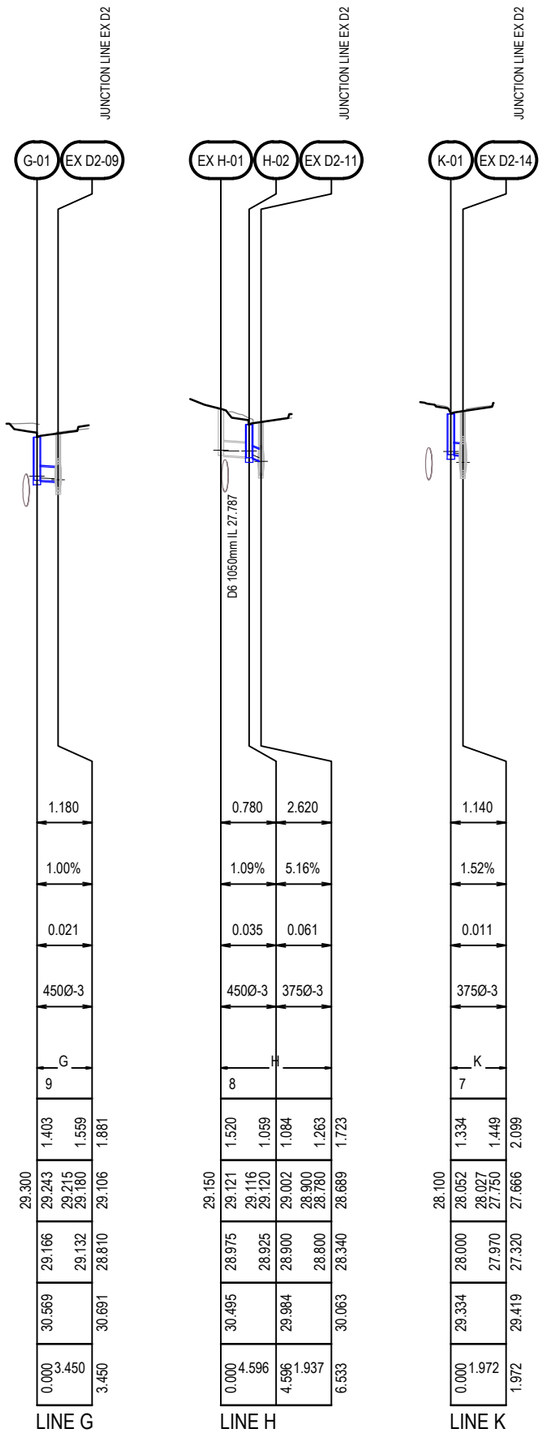
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0211

ISSUE A


-2°
JUNCTION LINE 1E
-90°
4°
JUNCTION LINE 1D
-99°
-84°
JUNCTION LINE 1K
-113°
69°
JUNCTION LINE E
JUNCTION LINE EX D2
42°
JUNCTION LINE EX D2
EX D2-19
EX D2-20
EX D2-21
EX D2-22
EX D2-23
EX E-01
EX E-02
E-01
EX F-01
EX D2-10
F-01
F-02
EX D2-08
D6 1050mm IL 25.328
D6 1050mm IL 27.897
LEGEND
EXISTING SURFACE LEVEL
DESIGN SURFACE LEVEL
HYDRAULIC GRADE LEVEL
PROPOSED STORMWATER PIPE
EXISTING STORMWATER PIPE

| | | |



LEGEND

- EXISTING SURFACE LEVEL
- DESIGN SURFACE LEVEL
- HYDRAULIC GRADE LEVEL
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 DL 0213.DWG

Last Plotted: 19/09/2022 11:36:22 PM By: BENZSON

Last Saved: 19/09/2022 5:59:04 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 2 4 6 8

SCALE 1:200m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
STORMWATER PROFILE
SHEET 13

A3

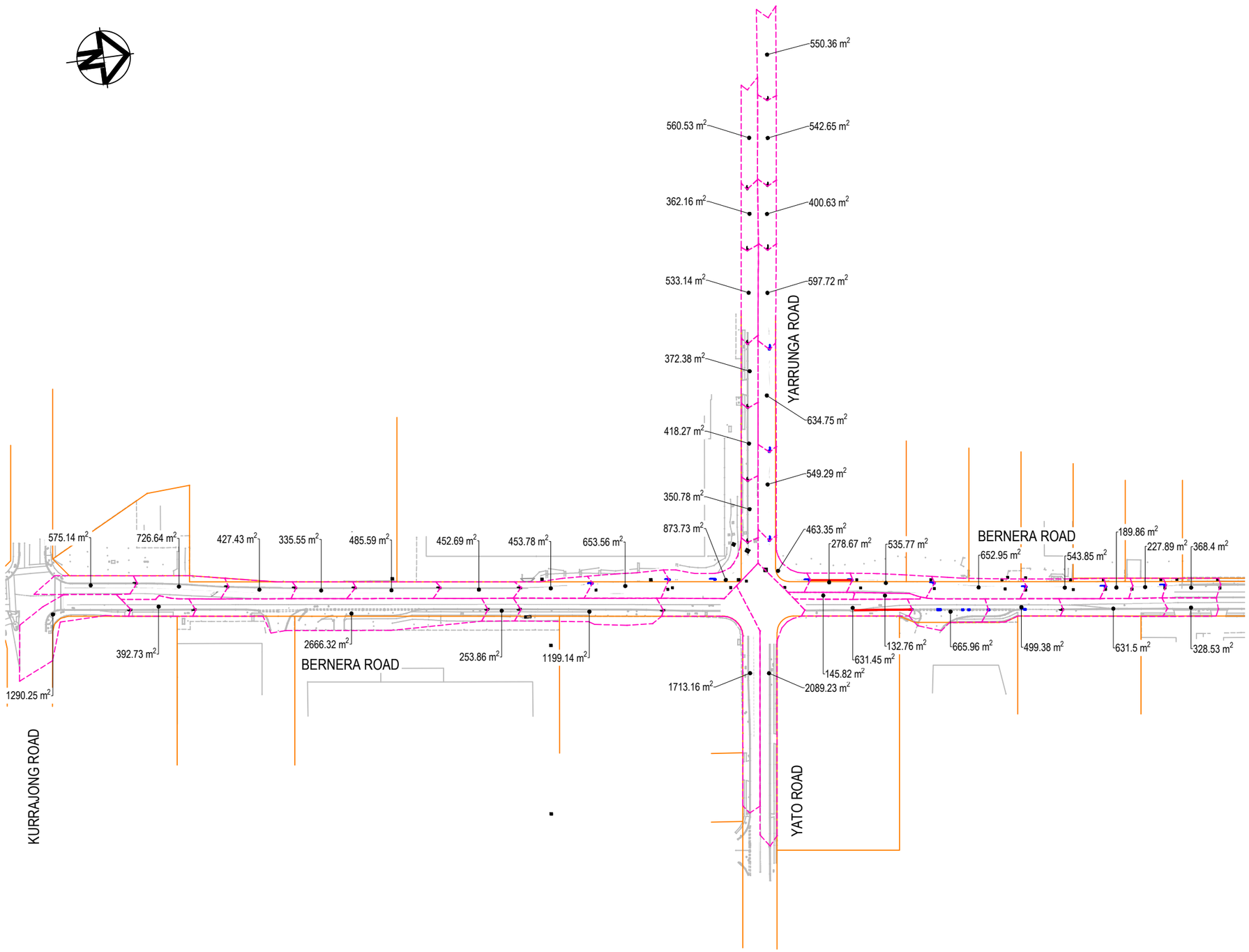
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. DL 0213

ISSUE A



NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 SM 0301.DWG

Last Plotted: 20/09/2022 12:52:03 AM By: BENZSON

Last Saved: 19/09/2022 9:32:38 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 25 50 75 100
SCALE 1:2500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
CATCHMENT PLAN

A3

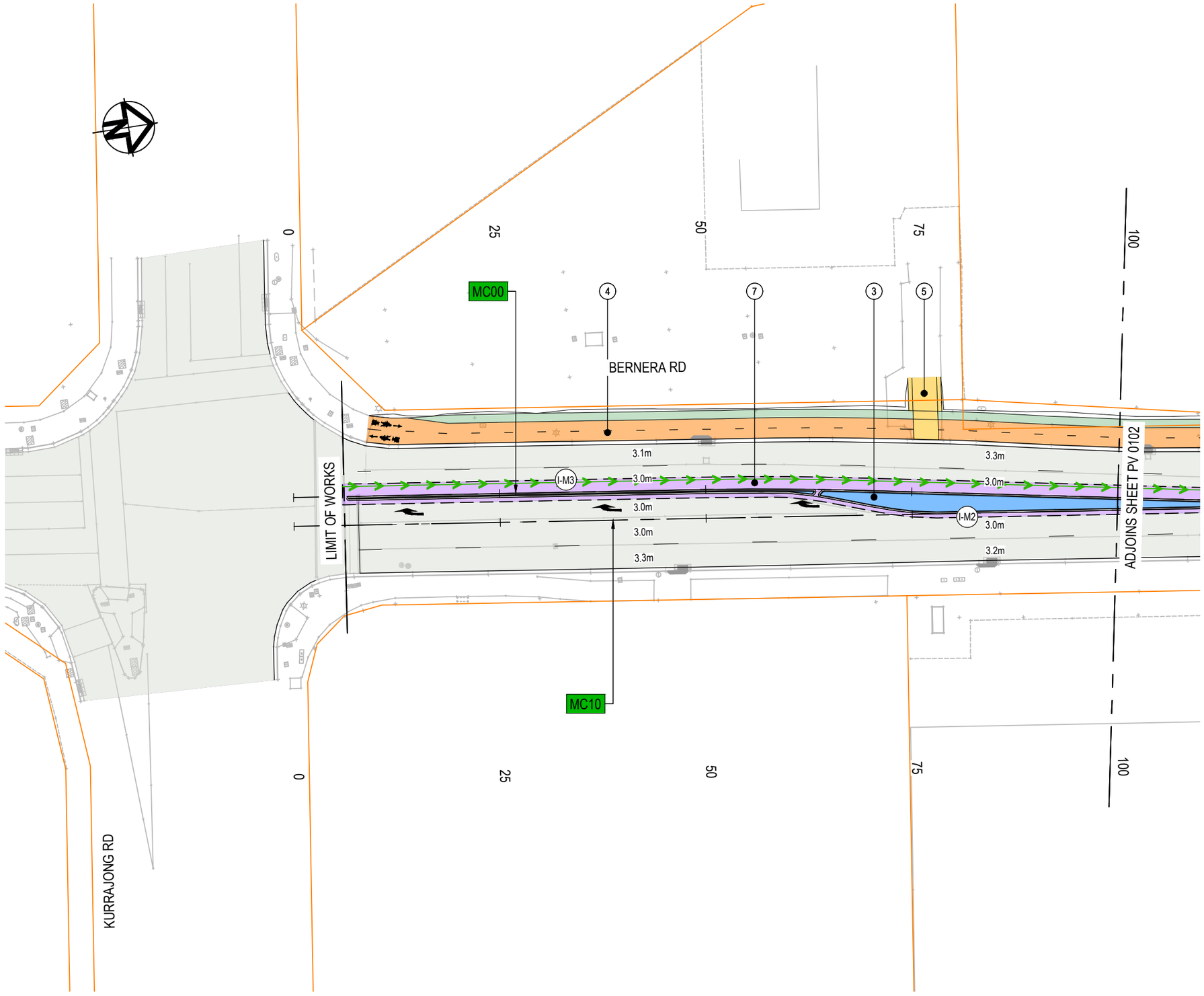
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. SM 0301

ISSUE A

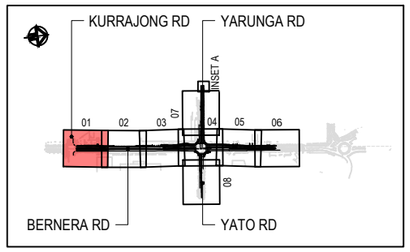


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0101.DWG

Last Plotted: 20/09/2022 12:16:34 AM By: BENZSON

Last Saved: 19/09/2022 6:03:05 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 1

A3

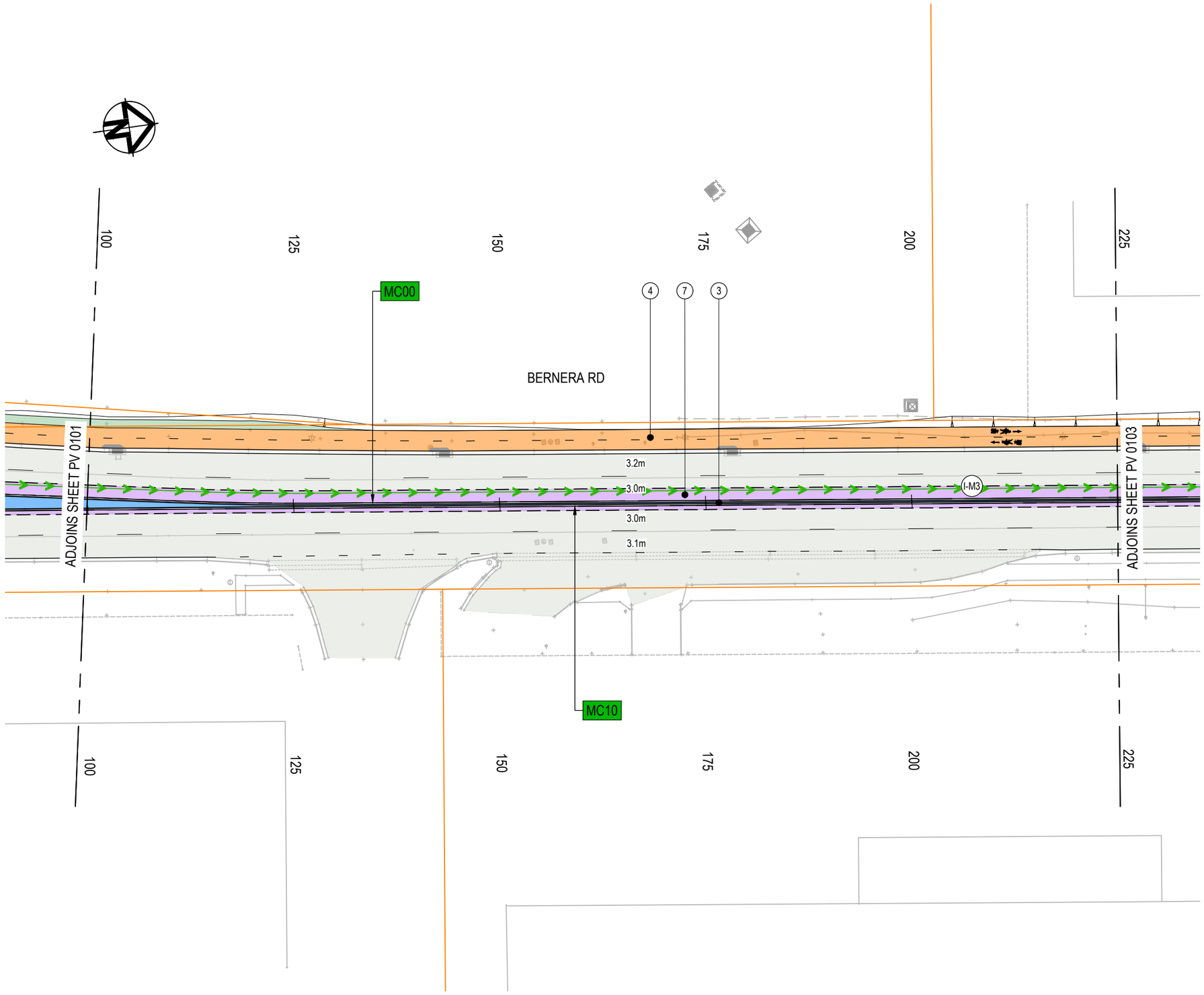
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. PV 0101

ISSUE A

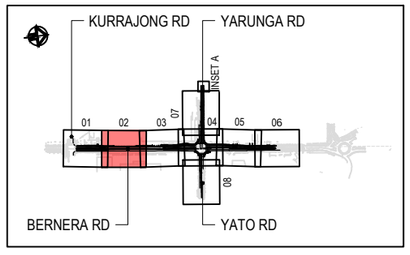


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT
  EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1
  PAVEMENT WIDENING
- PAVEMENT TYPE 2
  MILL 50 AND OVERLAY
- PAVEMENT TYPE 3
  CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4
  SHARED USE PATH
- PAVEMENT TYPE 5
  COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6
  MILL AND RESHEET
- PAVEMENT TYPE 7
  MILL AND INLAY
- LANDSCAPING
  REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0102.DWG
Last Plotted: 20/09/2022 12:17:18 AM By: BENZSON
Last Saved: 19/09/2022 6:03:28 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

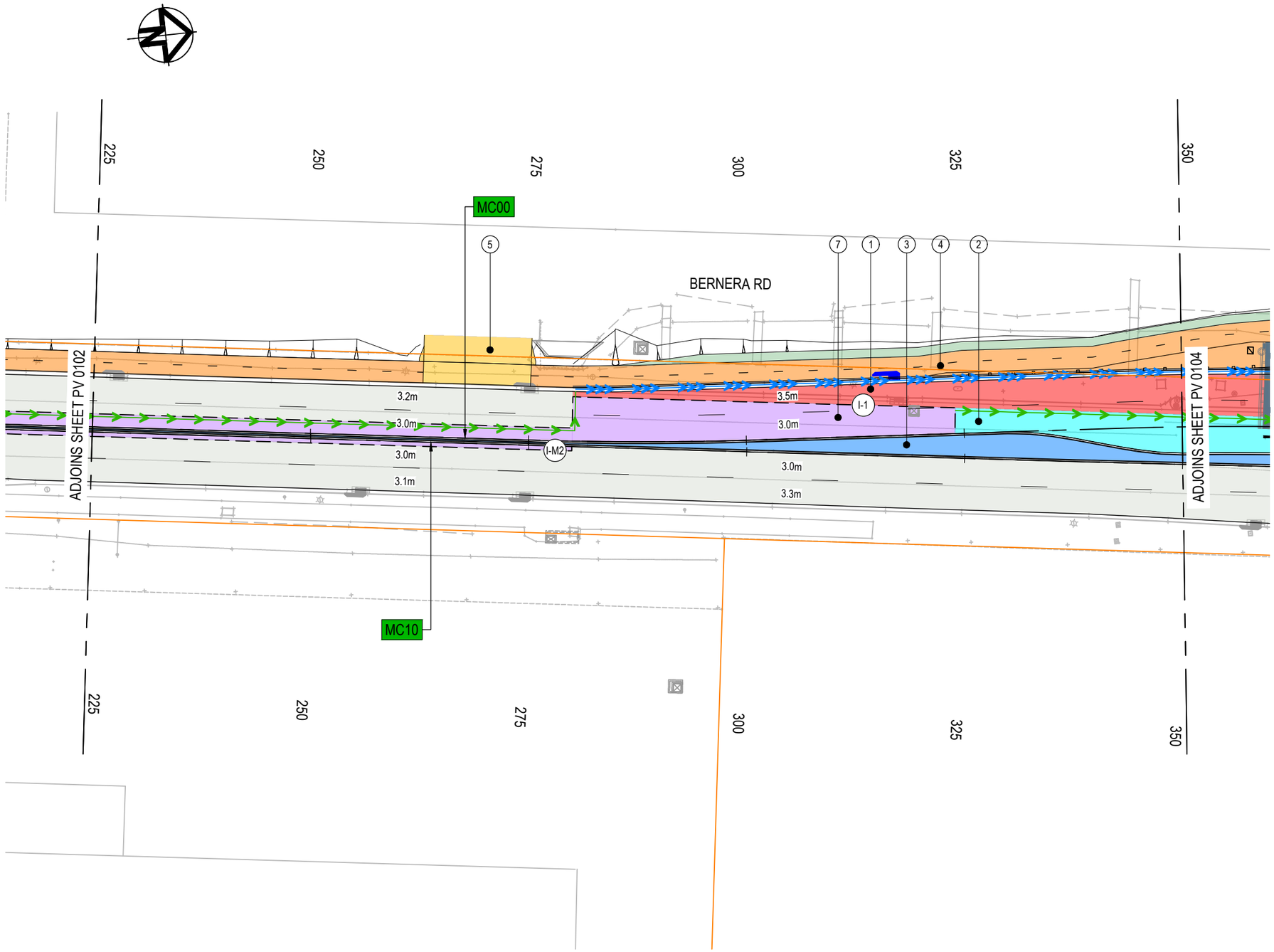
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0102
ISSUE A

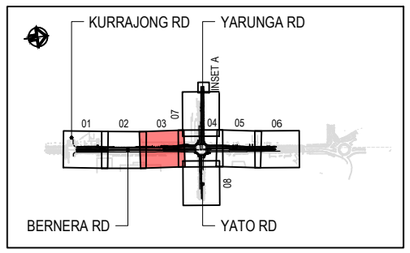


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0103.DWG
Last Plotted: 20/09/2022 12:17:58 AM By: BENZSON
Last Saved: 19/09/2022 6:03:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

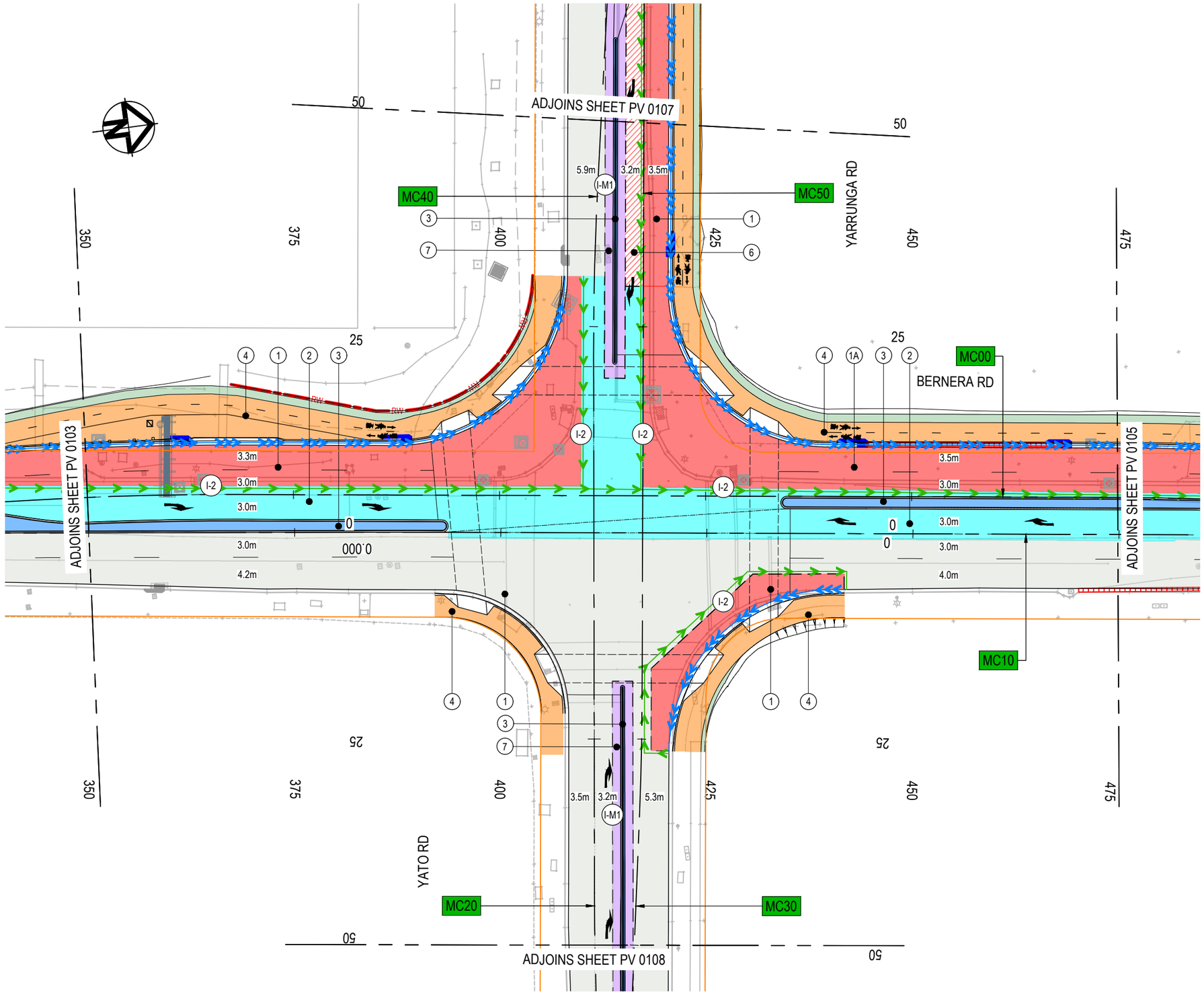
DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 3

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0103
ISSUE A

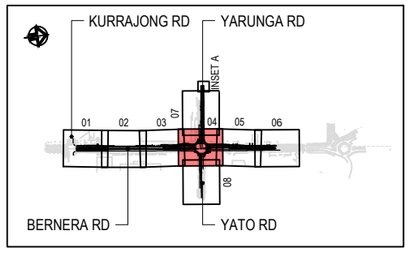


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0104.DWG
Last Plotted: 20/09/2022 12:18:34 AM By: BENZSON
Last Saved: 19/09/2022 6:04:13 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

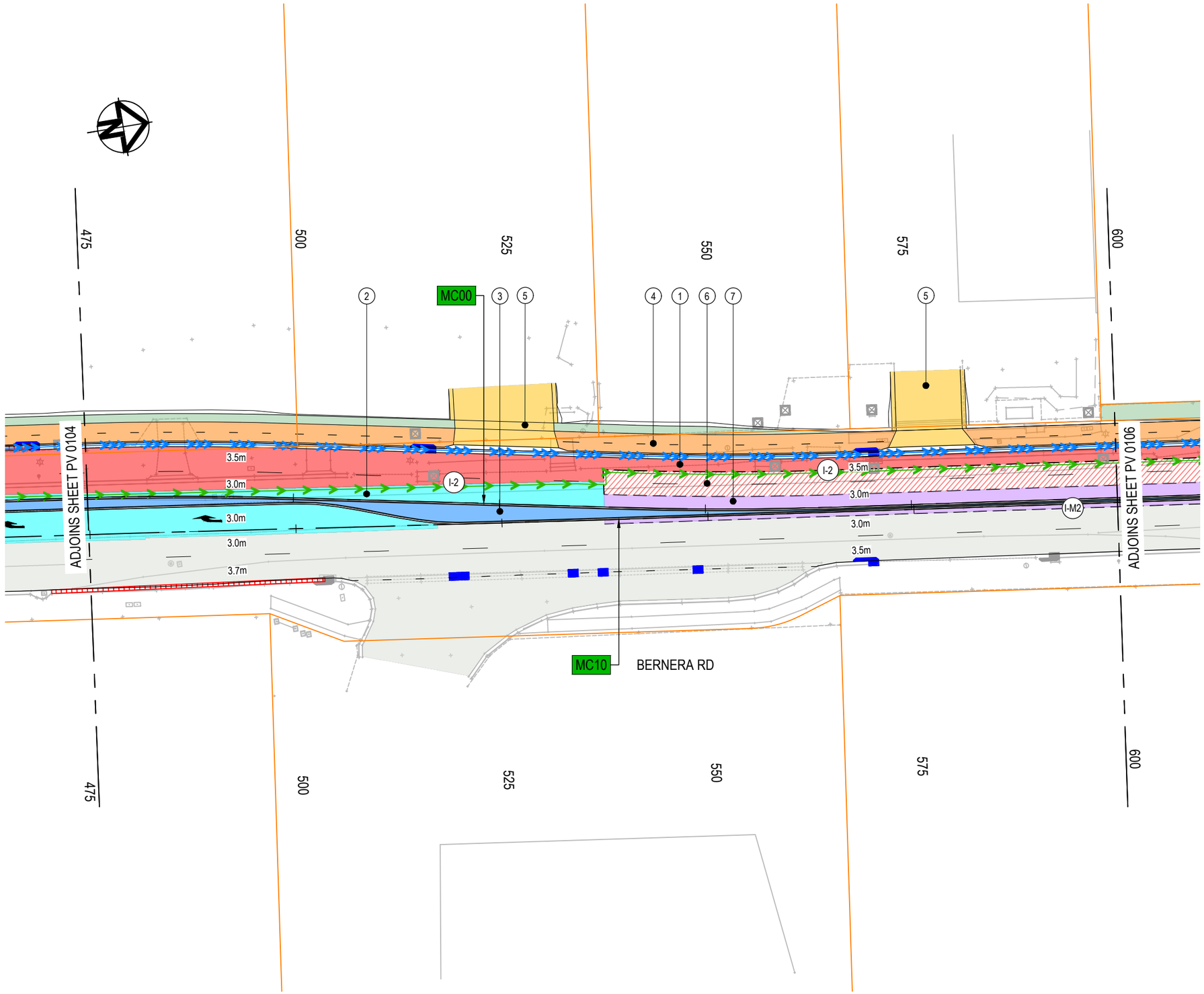
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 4

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0104
ISSUE A

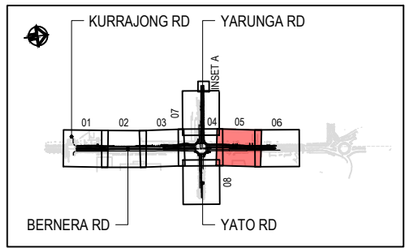


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0105.DWG
Last Plotted: 20/09/2022 12:19:08 AM By: BENZSON
Last Saved: 19/09/2022 6:04:32 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

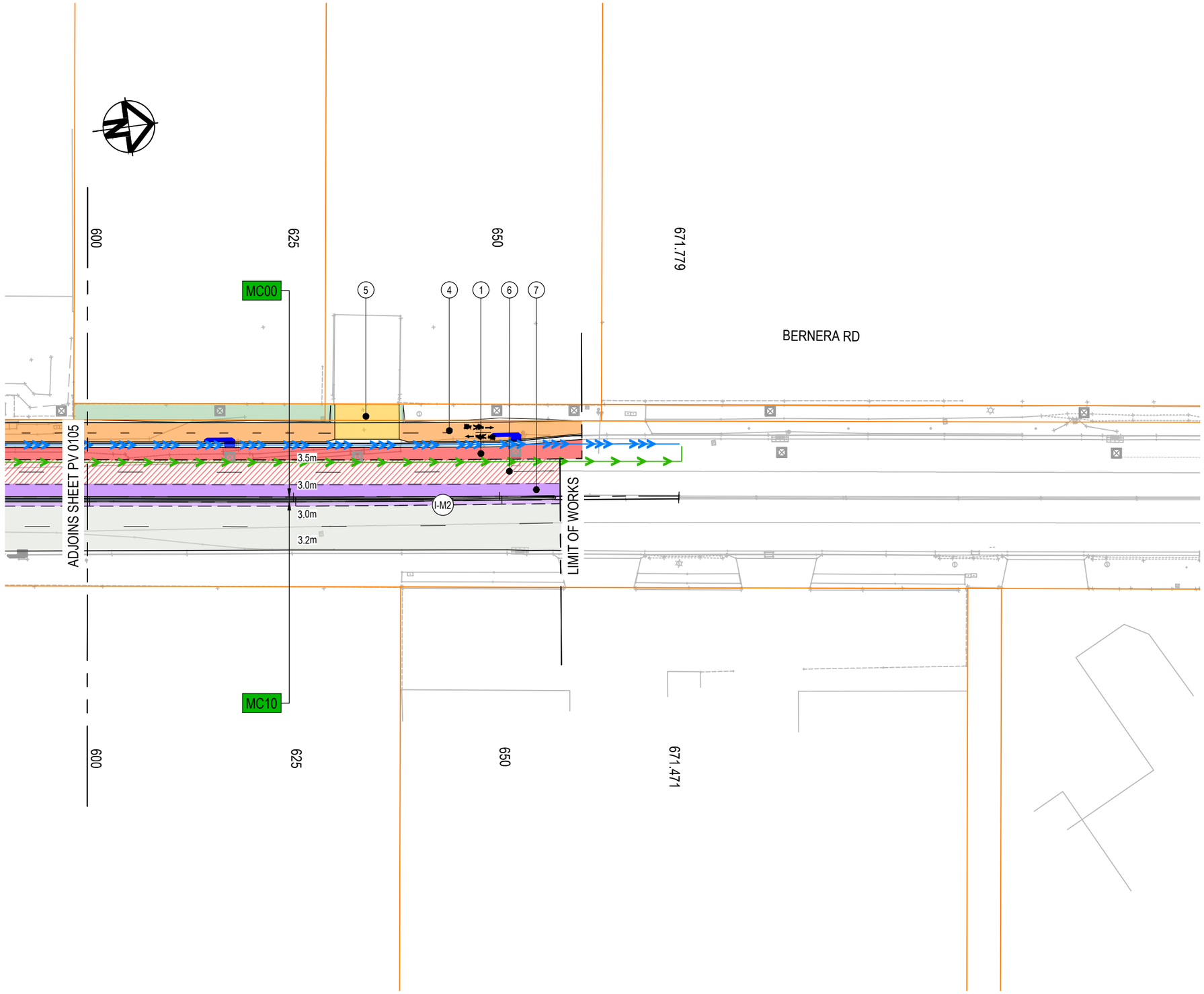
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 5

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0105
ISSUE A

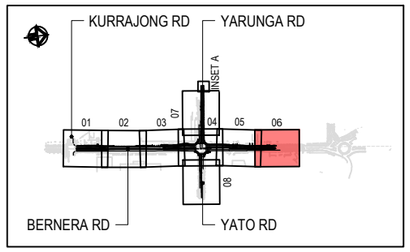


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0106.DWG
Last Plotted: 20/09/2022 12:19:39 AM By: BENZSON
Last Saved: 19/09/2022 6:04:51 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

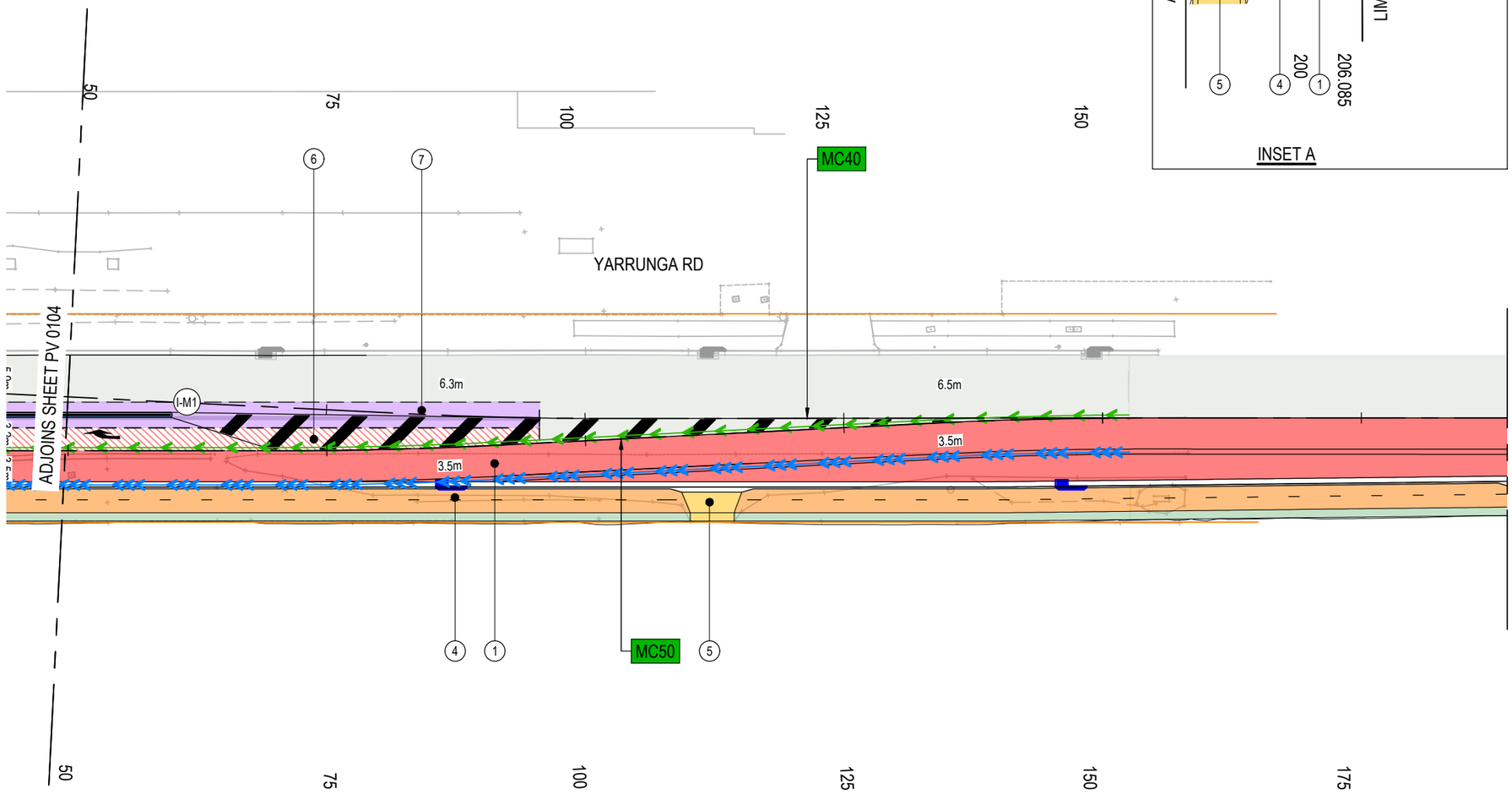
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

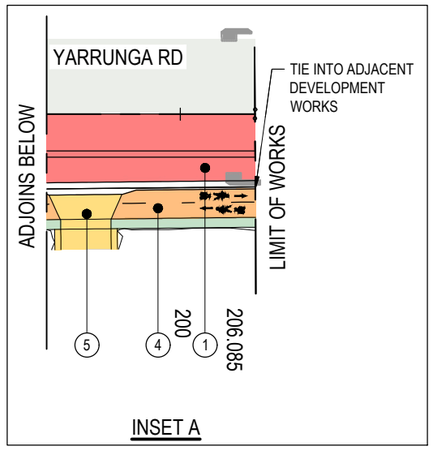
CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 6

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0106
ISSUE A



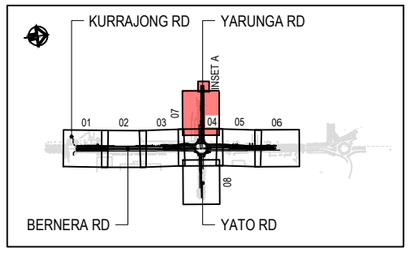


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- XX — PAVEMENT TAG
- X-XX — PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 — PAVEMENT WIDENING
- PAVEMENT TYPE 2 — MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 — CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 — SHARED USE PATH
- PAVEMENT TYPE 5 — COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 — MILL AND RESHEET
- PAVEMENT TYPE 7 — MILL AND INLAY
- LANDSCAPING — REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0107.DWG

Last Plotted: 20/09/2022 12:20:18 AM By: BENZSON

Last Saved: 19/09/2022 6:05:11 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 7

A3

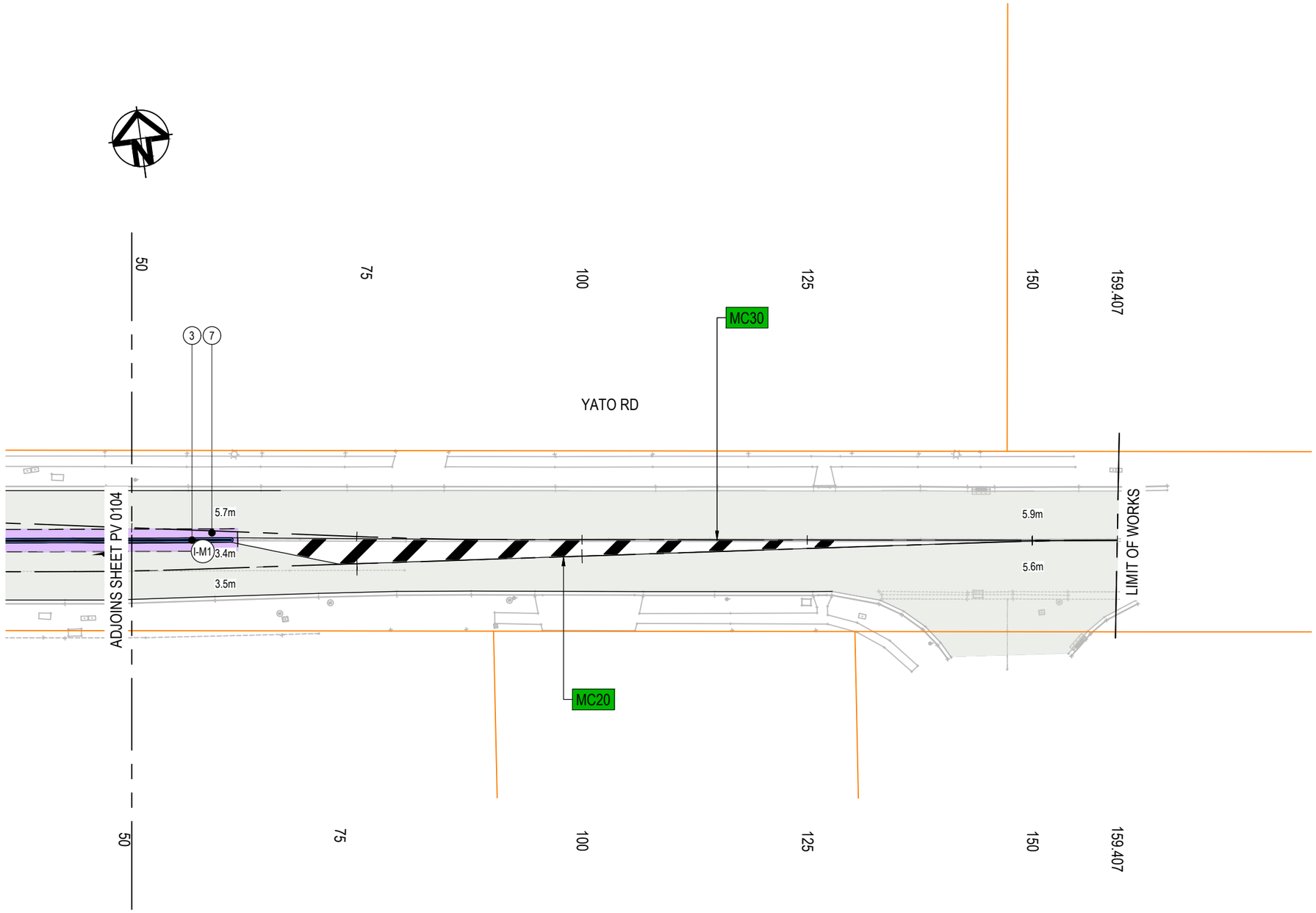
PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. PV 0107

ISSUE A

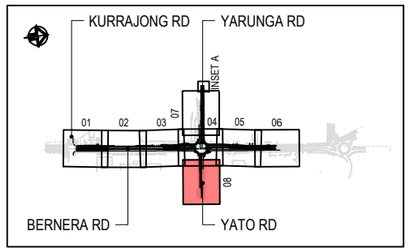


LEGEND

- SURVEY
- CADASTRAL BOUNDARY
- CONTROL LINE
- RETAINING WALL
- PAVEMENT INTERFACE
- PROPOSED SUBSURFACE TRENCH DRAIN
- EXISTING SUBSURFACE TRENCH DRAIN
- PAVEMENT TAG
- PAVEMENT INTERFACE TAG
- EXISTING PAVEMENT / EXISTING PAVEMENT TO REMAIN
- PAVEMENT TYPE 1 / PAVEMENT WIDENING
- PAVEMENT TYPE 2 / MILL 50 AND OVERLAY
- PAVEMENT TYPE 3 / CONCRETE MEDIAN OR TRAFFIC ISLAND
- PAVEMENT TYPE 4 / SHARED USE PATH
- PAVEMENT TYPE 5 / COMMERCIAL DRIVEWAY
- PAVEMENT TYPE 6 / MILL AND RESHEET
- PAVEMENT TYPE 7 / MILL AND INLAY
- LANDSCAPING / REFER TO LIVERPOOL COUNCIL STANDARD DRAWINGS

NOTE

1. LANE WIDTHS INCLUDE LIP OF KERB.



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0108.DWG
Last Plotted: 20/09/2022 12:20:50 AM By: BENZSON
Last Saved: 19/09/2022 6:05:29 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	J. DIZON	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

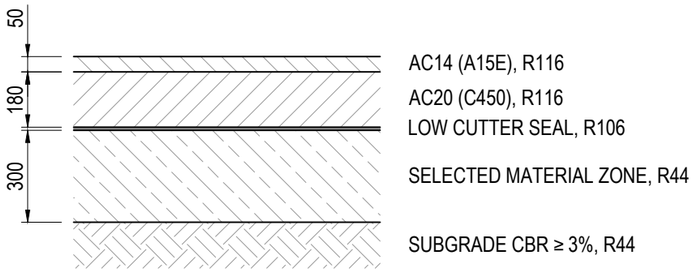
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

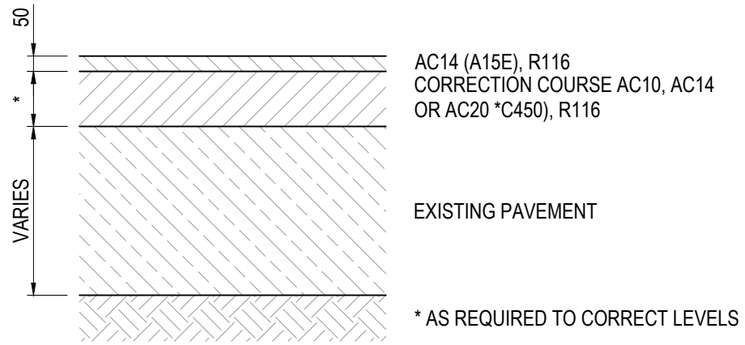
LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PLAN
SHEET 8

A3

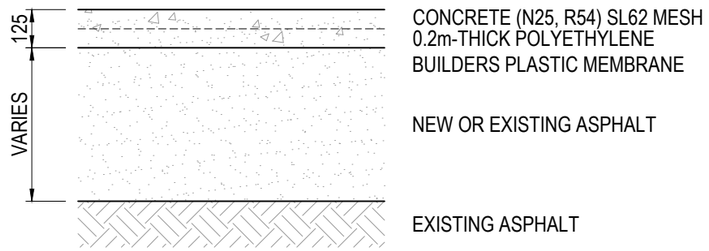
PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0108
ISSUE A



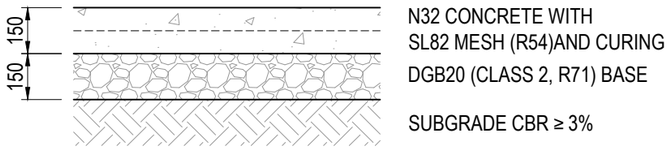
PAVEMENT TYPE 1
PAVEMENT WIDENING
SCALE 1:20



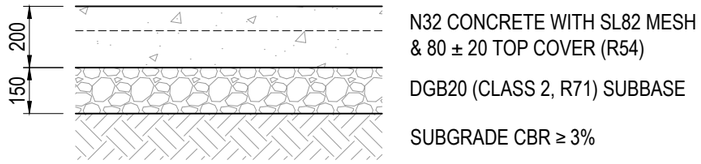
PAVEMENT TYPE 2
MILL 50 AND OVERLAY
SCALE 1:20



PAVEMENT TYPE 3
CONCRETE MEDIAN OR TRAFFIC ISLAND
SCALE 1:20



PAVEMENT TYPE 4
SHARED USE PATH
SCALE 1:20



PAVEMENT TYPE 5
COMMERCIAL DRIVEWAY
SCALE 1:20

PAVEMENT TYPE 6
MILL AND RESHEET
SCALE 1:20

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0201.DWG
Last Plotted: 20/09/2022 12:21:05 AM By: BENZSON
Last Saved: 19/09/2022 6:05:39 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 0.2 0.3 0.6 0.8
SCALE 1:20m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

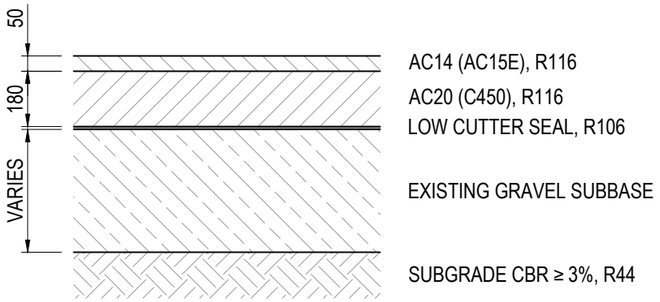
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PROFILE
SHEET 1

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0201
ISSUE A



PAVEMENT TYPE 7
MILL AND INLAY
SCALE 1:20

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0202.DWG

Last Plotted: 20/09/2022 12:21:14 AM By: BENZSON

Last Saved: 19/09/2022 6:05:48 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 0.2 0.3 0.6 0.8
SCALE 1:20m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT PROFILE
SHEET 2

A3

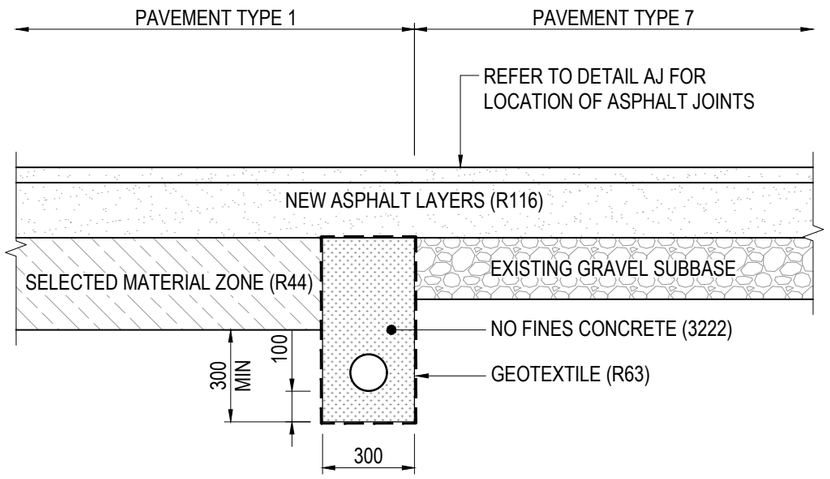
PROJECT NUMBER: 2021 25 DD 001

PART

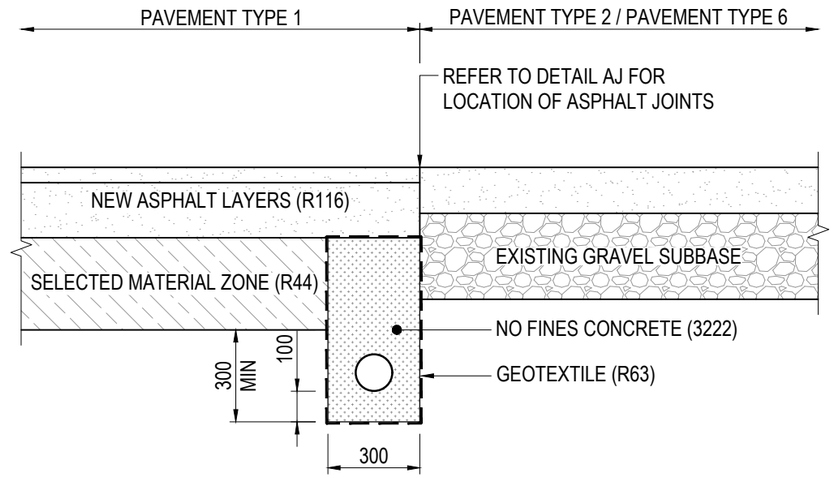
ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. PV 0202

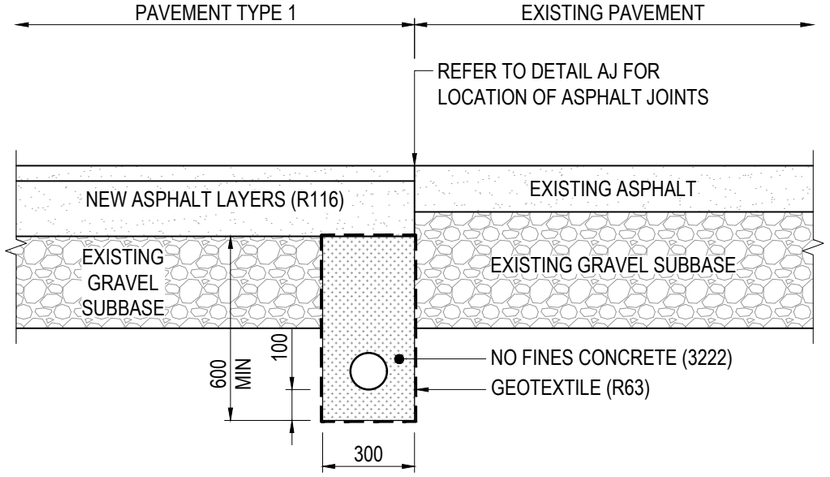
ISSUE A



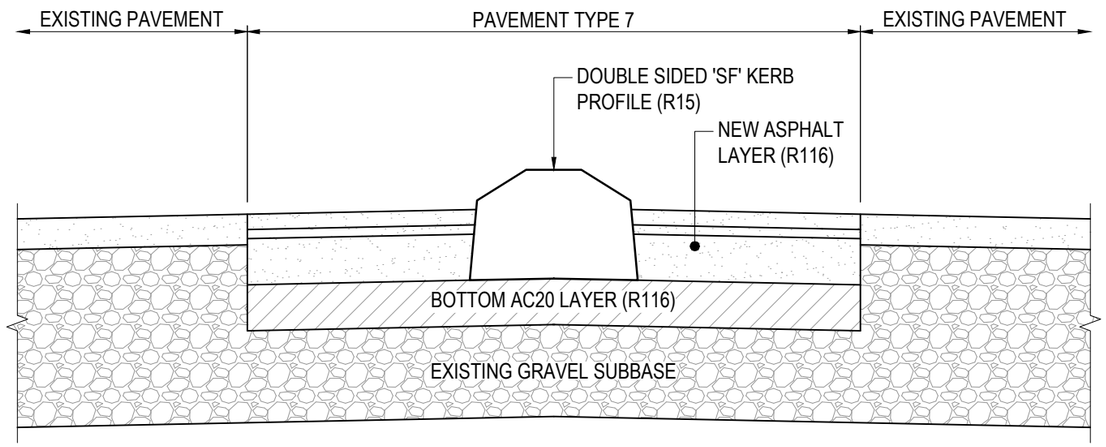
PAVEMENT LONGITUDINAL INTERFACE DRAIN
PAVEMENT INTERFACE DETAIL I-1
NOT TO SCALE



PAVEMENT TRANSVERSE INTERFACE DRAIN
PAVEMENT INTERFACE DETAIL I-2
NOT TO SCALE



PAVEMENT LONGITUDINAL / TRANSVERSE INTERFACE DRAIN - NO PIPE
PAVEMENT INTERFACE DETAIL I-3
NOT TO SCALE



PAVEMENT LONGITUDINAL INTERFACE DETAIL AT NEW MEDIAN
PAVEMENT INTERFACE DETAIL I-M1
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0221.DWG
Last Plotted: 20/09/2022 12:21:25 AM By: BENZSON
Last Saved: 19/09/2022 6:05:56 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM:	HEIGHT DATUM:
GDA 2020 ZONE 56	AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

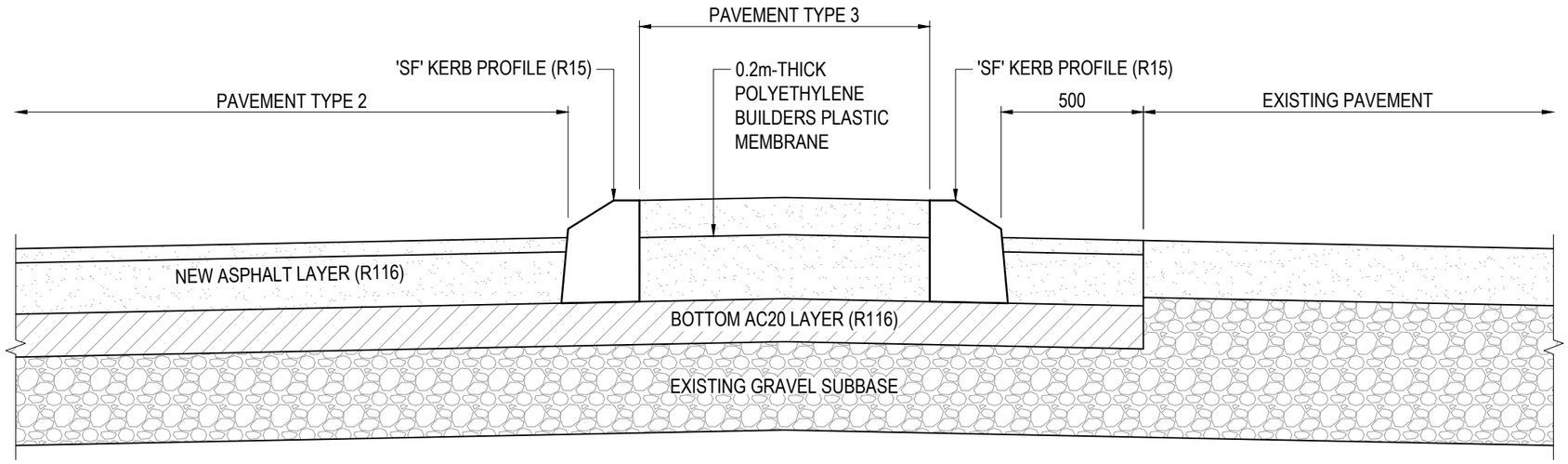
CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT INTERFACE DETAILS
SHEET 1

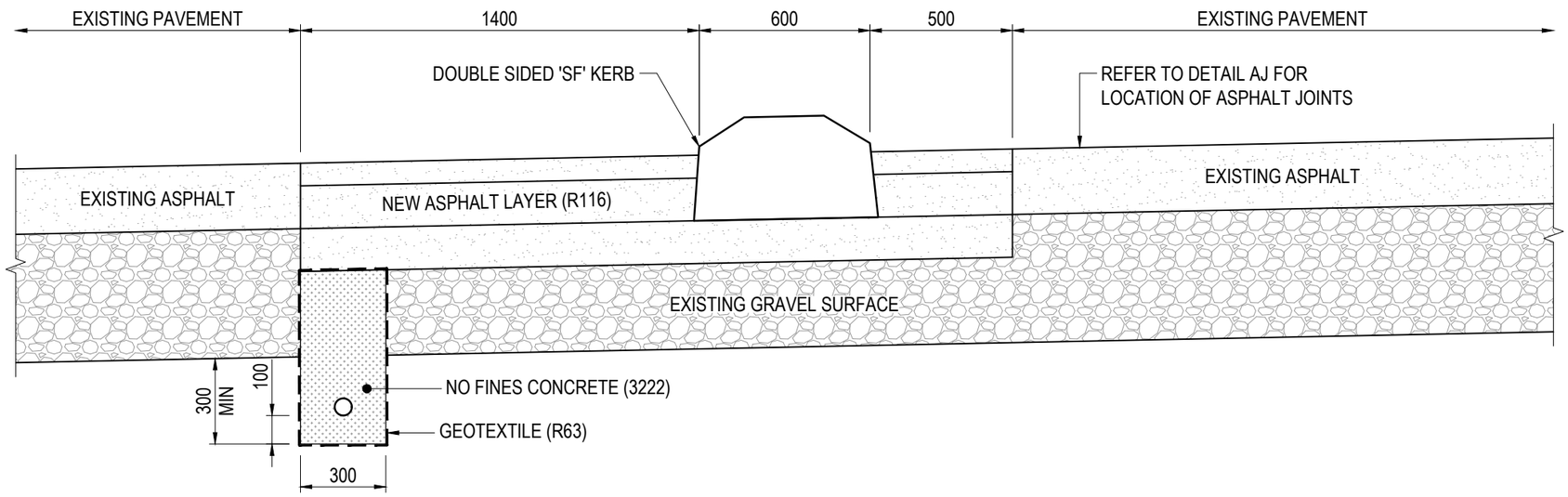
A3

PROJECT NUMBER:	PART
2021 25 DD 001	

ISSUE STATUS:	SHEET No.	ISSUE
100% DETAILED DESIGN	PV 0221	A



PAVEMENT LONGITUDINAL INTERFACE DETAIL AT NEW MEDIAN
PAVEMENT INTERFACE DETAIL I-M2
NOT TO SCALE



PAVEMENT LONGITUDINAL INTERFACE DETAIL AT NEW MEDIAN
PAVEMENT INTERFACE DETAIL I-M3
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0222.DWG
Last Plotted: 20/09/2022 12:21:36 AM By: BENZSON
Last Saved: 19/09/2022 6:06:06 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

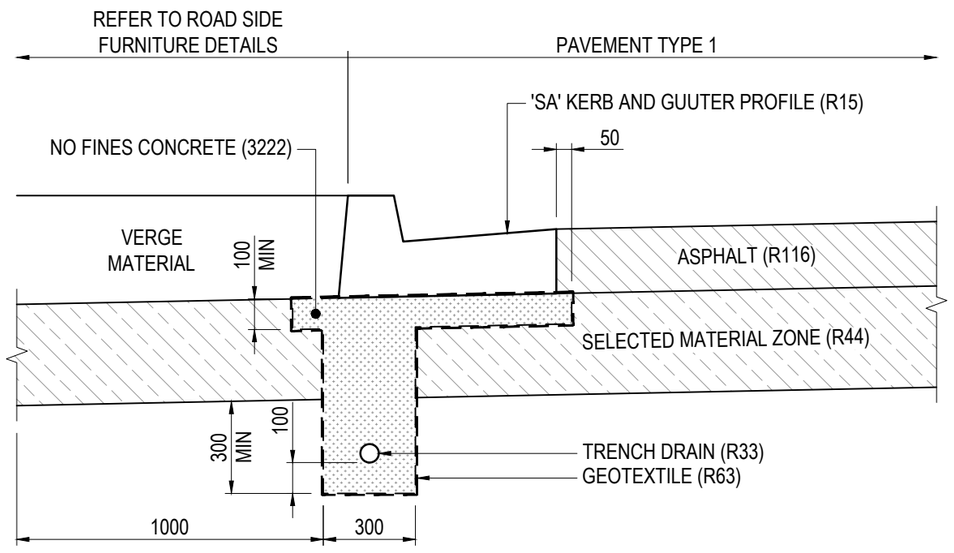
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT INTERFACE DETAILS
SHEET 2

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0222
ISSUE A



TRENCH DRAIN UNDER LOW 'SA' KERB
PAVEMENT EDGE DETAIL E-1
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PV 0231.DWG
Last Plotted: 20/09/2022 12:21:45 AM By: BENZSON
Last Saved: 19/09/2022 6:06:15 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

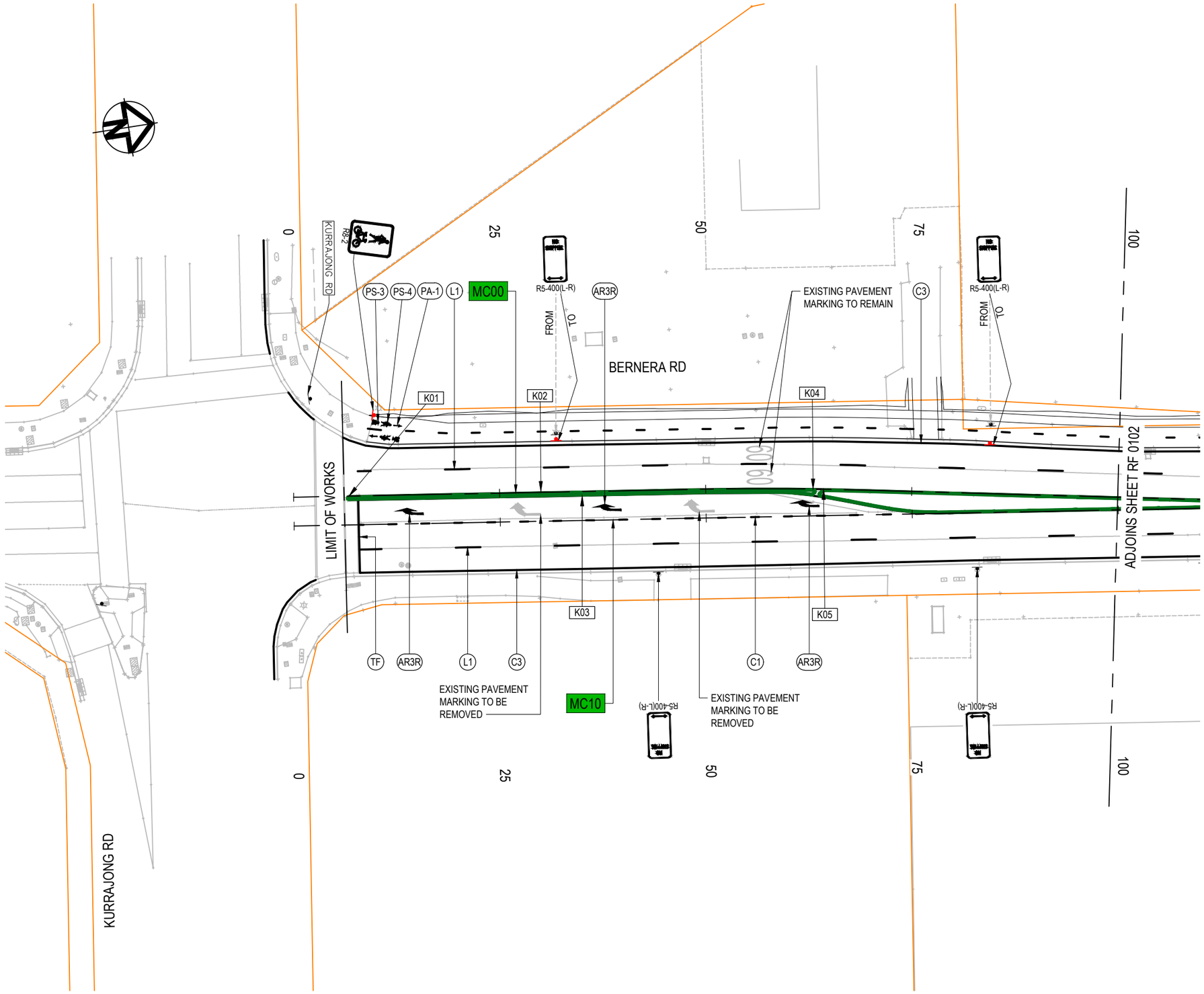
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PAVEMENT EDGE DETAIL

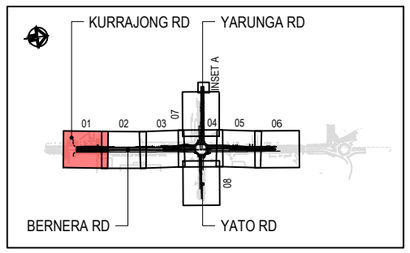
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. PV 0231
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0101.DWG
Last Plotted: 20/09/2022 12:41:38 AM By: BENZSON
Last Saved: 19/09/2022 11:19:53 PM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

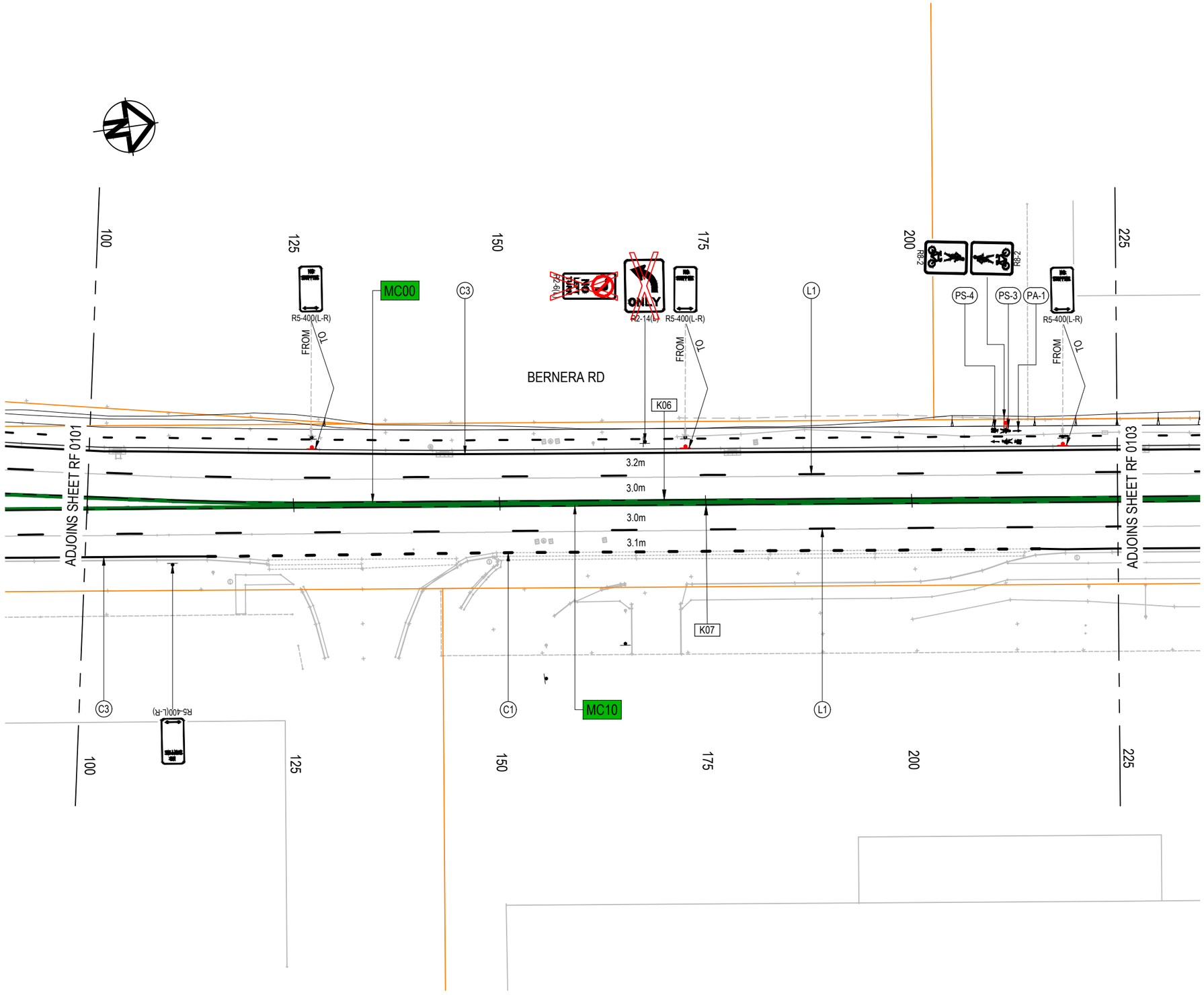
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 1

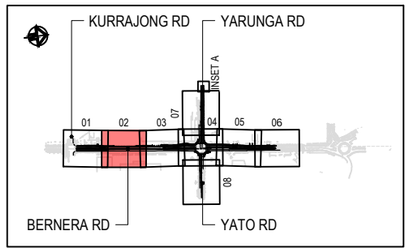
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0101
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0102.DWG
Last Plotted: 20/09/2022 12:42:43 AM By: BENZSON
Last Saved: 19/09/2022 6:14:21 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

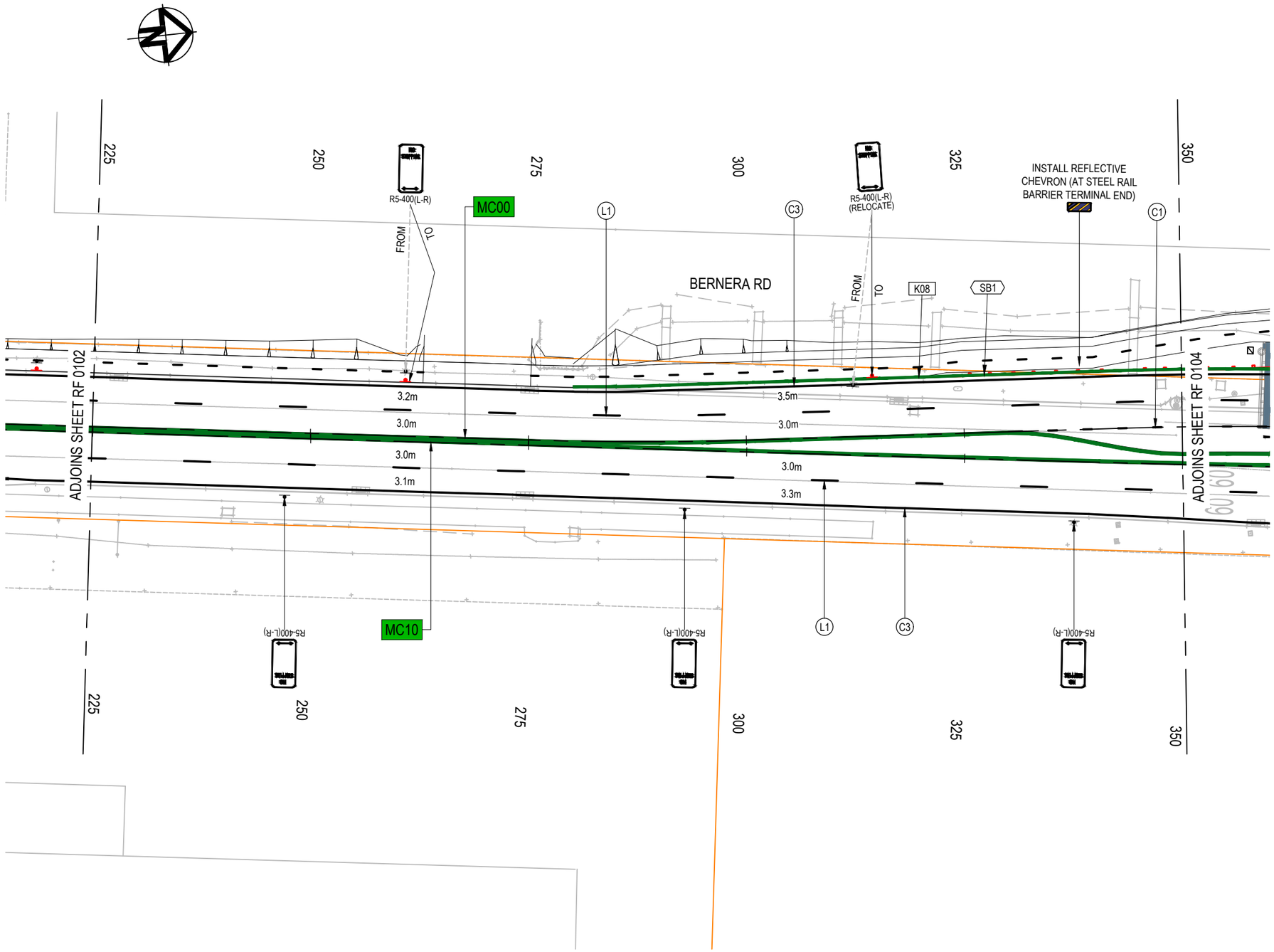
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 2

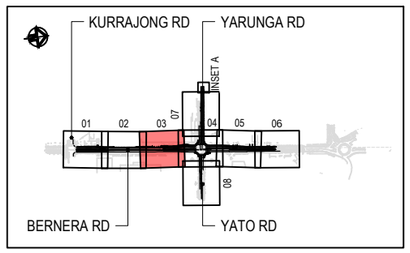
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0102
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0103.DWG
Last Plotted: 20/09/2022 12:43:32 AM By: BENZSON
Last Saved: 19/09/2022 6:14:41 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

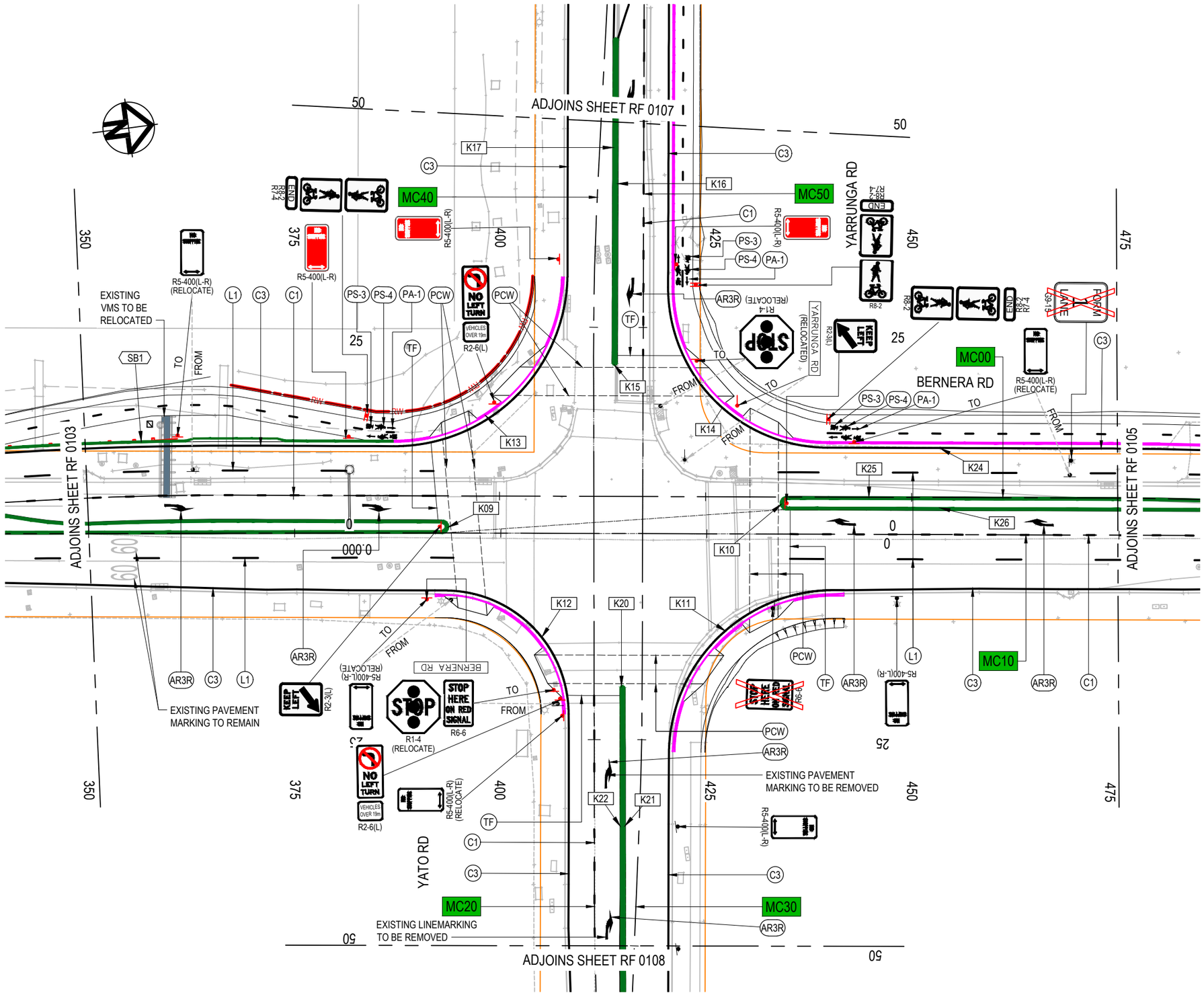
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 3

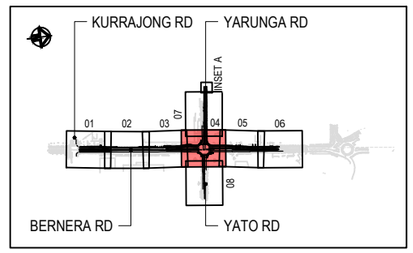
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0103
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME:D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0104.DWG
Last Plotted: 20/09/2022 12:44:21 AM By: BENZSON
Last Saved: 19/09/2022 6:14:57 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

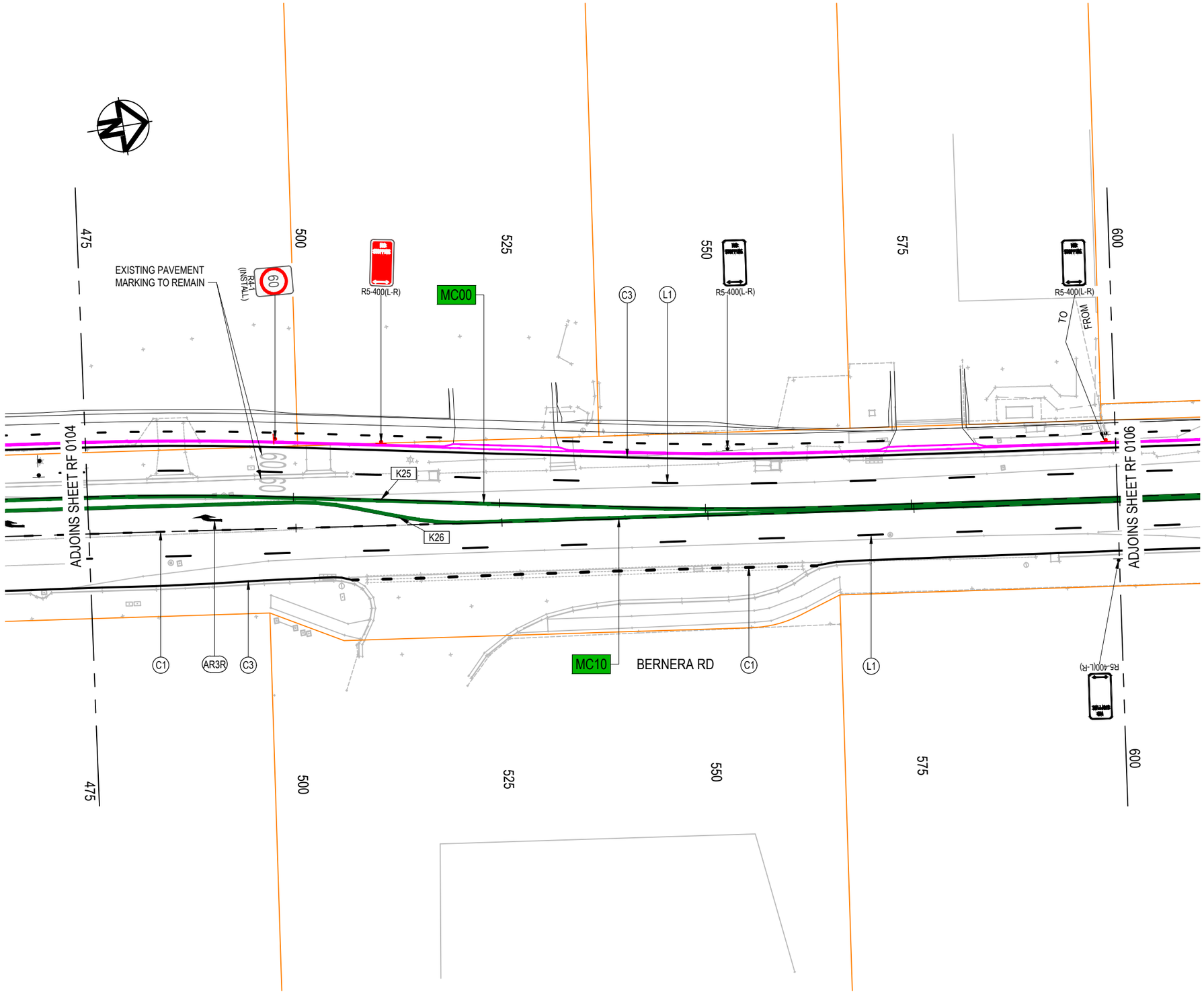
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 4

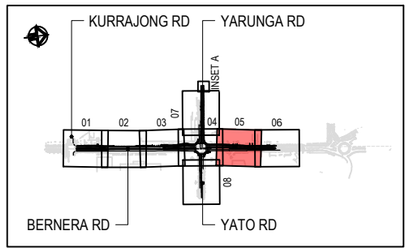
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0104
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0105.DWG
Last Plotted: 20/09/2022 12:44:54 AM By: BENZSON
Last Saved: 19/09/2022 6:15:15 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

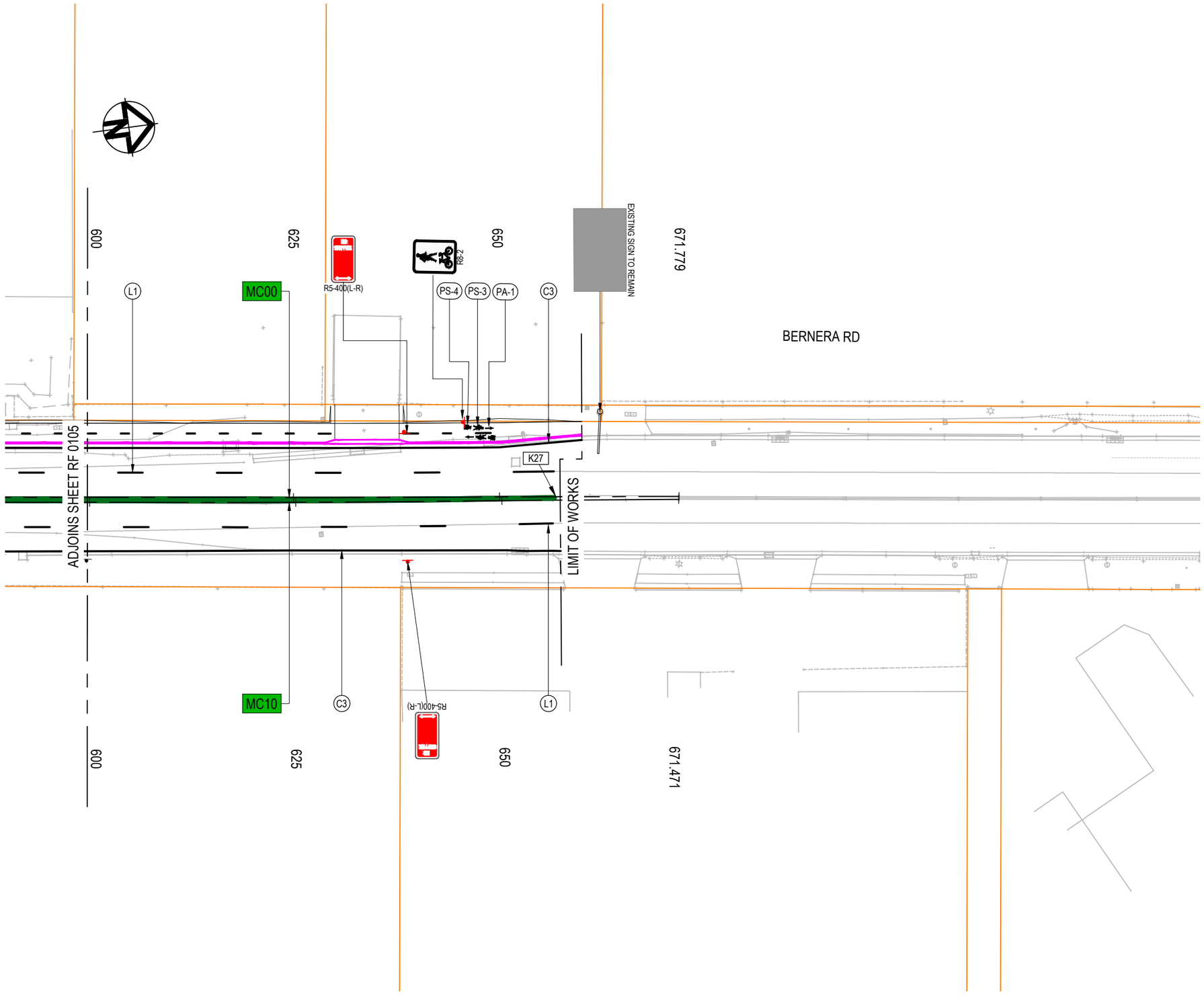
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 5

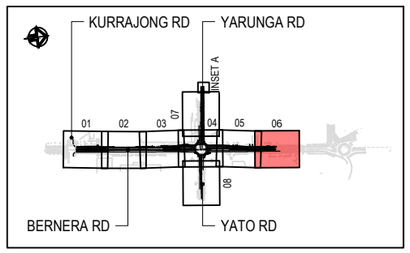
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0105
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0106.DWG
Last Plotted: 20/09/2022 12:45:24 AM By: BENZSON
Last Saved: 19/09/2022 6:15:30 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

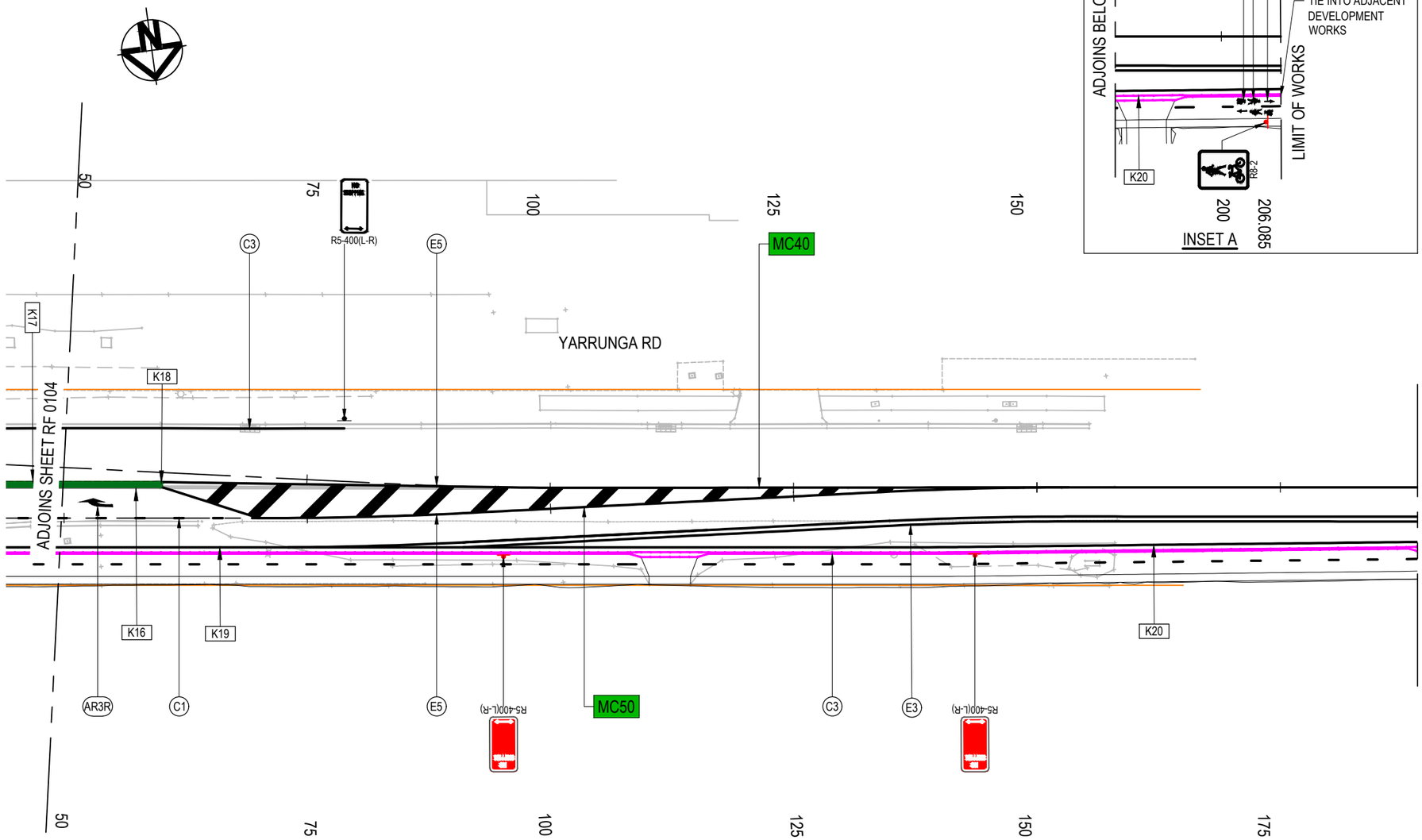
DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

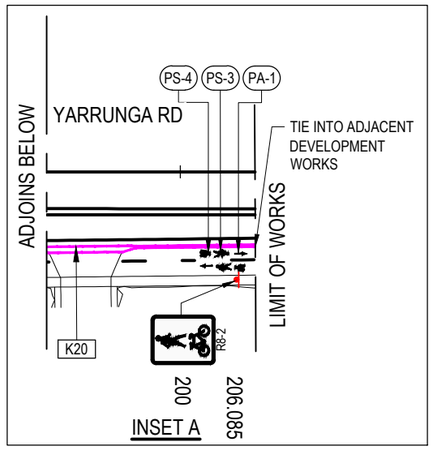
CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 6

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0106
ISSUE A

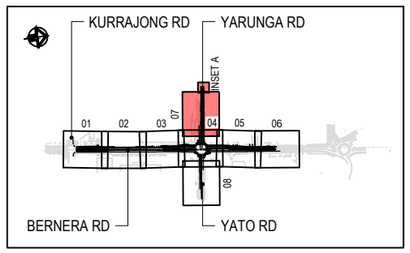




INSET A

LEGEND

- MC00 MC10 — BERNERA ROAD DESIGN CONTROL LINE
- MC40 MC50 — YARRUNGA ROAD DESIGN CONTROL LINE
- MC20 MC30 — YATO ROAD DESIGN CONTROL LINE
- C1 — LINEMARKING TAG
- AR3R — PAVEMENT MARKING TAG
- K01 — KERB TAG
- SB1 — BARRIER TAG
- SA KERB
- SF KERB
- STEEL RAIL BARRIER
- EXISTING SIGN POST
- PROPOSED SIGN POST
- R5-400(L) — PROPOSED SIGN
- R5-400(L-R) — EXISTING SIGN
- R5-400(L-R) — EXISTING SIGN TO BE REMOVED
- R5-400(L-R) TO FROM — EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
60mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0107.DWG
Last Plotted: 20/09/2022 12:45:57 AM By: BENZSON
Last Saved: 19/09/2022 6:15:46 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

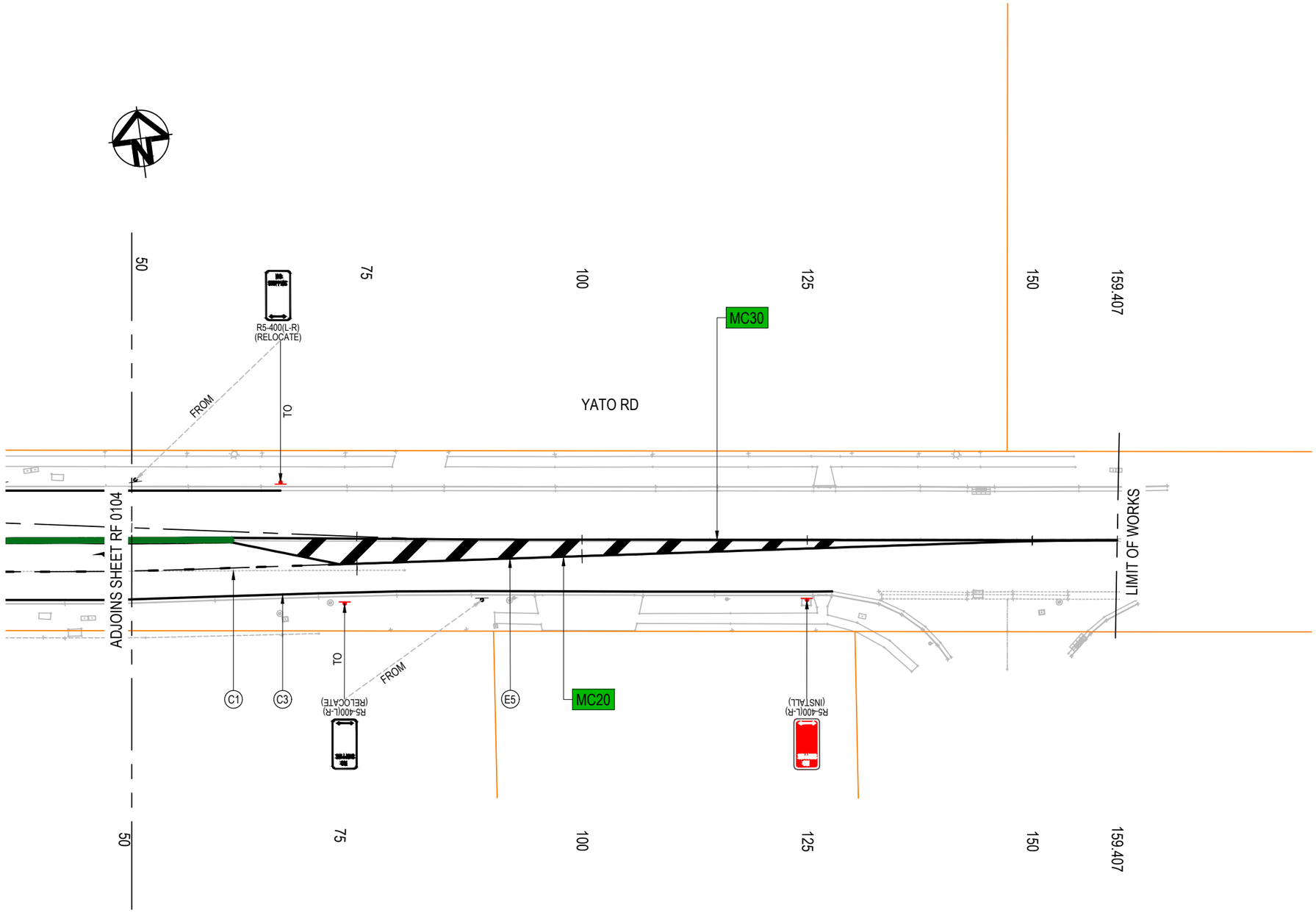
DRAWING/DESIGN PREPARED BY:
MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4, 23-33 MARY STREET, SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 7

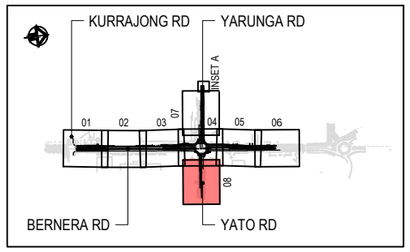
A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0107
ISSUE A



LEGEND

MC00 MC10	BERNERA ROAD DESIGN CONTROL LINE
MC40 MC50	YARRUNGA ROAD DESIGN CONTROL LINE
MC20 MC30	YATO ROAD DESIGN CONTROL LINE
C1	LINEMARKING TAG
AR3R	PAVEMENT MARKING TAG
K01	KERB TAG
SB1	BARRIER TAG
	SA KERB
	SF KERB
	STEEL RAIL BARRIER
	EXISTING SIGN POST
	PROPOSED SIGN POST
R5-400(L)	PROPOSED SIGN
R5-400(L-R)	EXISTING SIGN
R5-400(L-R)	EXISTING SIGN TO BE REMOVED
R5-400(L-R) TO FROM	EXISTING SIGN TO BE RELOCATED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0108.DWG

Last Plotted: 20/09/2022 12:46:27 AM By: BENZSON

Last Saved: 19/09/2022 6:16:03 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
SIGNAGE, LINEMARKING, KERB AND BARRIER PLAN
SHEET 8

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. RF 0108

ISSUE A

KERB SCHEDULE

LABEL	TYPE	LOCATION		LENGTH (m)
		FROM	TO	
K01	SF	0.000 R (MK1C)	0.785 R (MK1C)	0.785
K02	SF	6.702 R (MC00)	63.061 R (MC00)	56.359
K03	SF	6.704 L (MC10)	62.808 L (MC10)	56.127
K04	SF	1.795 L (MK1A) +0.270	1.636 R (MK1B)	1.248
K05	SF	1.192R (MK1G) +0.394	1.847 L (MK1H)	1.454
K06	SF	64.405 R (MC00)	393.040 R (MC00)	328.715
K07	SF	63.908 L (MC10)	392.857 L (MC10)	329.158
K08	SA	280.000 L (MC00)	387.167 L (MC00)	107.243
K09	SF	0.000 R (MK1D)	2.353 R (MK1D)	2.353
K10	SF	0.000 L (MK1E)	2.350 L (MK1E)	2.350
K11	SA	0.000 L (MK31) +1.193	31.083 L (MK31)	32.276
K12	SA	0.000 R (MK2I) +1.263	28.495 R (MK2I)	29.758
K13	SA	0.000 L (MK41)	32.590 L (MK41)	32.590
K14	SA	0.000 R (MK5I)	30.468 R (MK5I)	30.468
K15	SF	0.000 R (MK5A)	0.784 R (MK5A)	0.784
K16	SF	20.701 L (MC50)	59.798 L (MC50)	39.097
K17	SF	20.689 R (MC40)	59.874 R (MC40)	39.097
K18	SF	0.000 L (MK5B)	0.785 L (MK5B)	0.785
K19	SA	0.000 R (MK5J) +41.034	135.096 R (MK5J)	176.130
K20	SF	0.000 R (MK2A)	0.785 R (MK2A)	0.785
K21	SF	18.748 R (MC30)	61.015 R (MC30)	42.221
K22	SF	18.767 L (MC20)	61.093 L (MC20)	42.236
K23	SF	0.000 L (MK2B)	0.785 L (MK2B)	0.785
K24	SA	439.774 L (MC00)	660.000 L (MC00)	220.229
K25	SF	434.882 R (MC00)	656.607 R (MC00)	221.725
K26	SF	434.697 L (MC10)	656.331 L (MC10)	221.909
K27	SF	0.000 R (MK1F)	0.666 R (MK1F)	0.666

SAFETY BARRIER SCHEDULE

LABEL	TYPE	FROM			TO			LENGTH (m)
		CHAINAGE	CONTROL	END TREATMENT	CHAINAGE	CONTROL	END TREATMENT	
SB01	G-4 BARRIER	337.500	MC00	MSKT MASH TERMINAL	355.000	MC00	TRAILING STEEL RAIL TERMINAL	17.500

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 RF 0110.DWG
Last Plotted: 20/09/2022 12:46:41 AM By: BENZSON
Last Saved: 19/09/2022 6:16:12 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. ROMARATE	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	D. TALEVSKI	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
KERB AND BARRIER SCHEDULE

A3

PROJECT NUMBER: 2021 25 DD 001
PART
ISSUE STATUS: 100% DETAILED DESIGN
SHEET No. RF 0110
ISSUE A

FACING NORTHBOUND

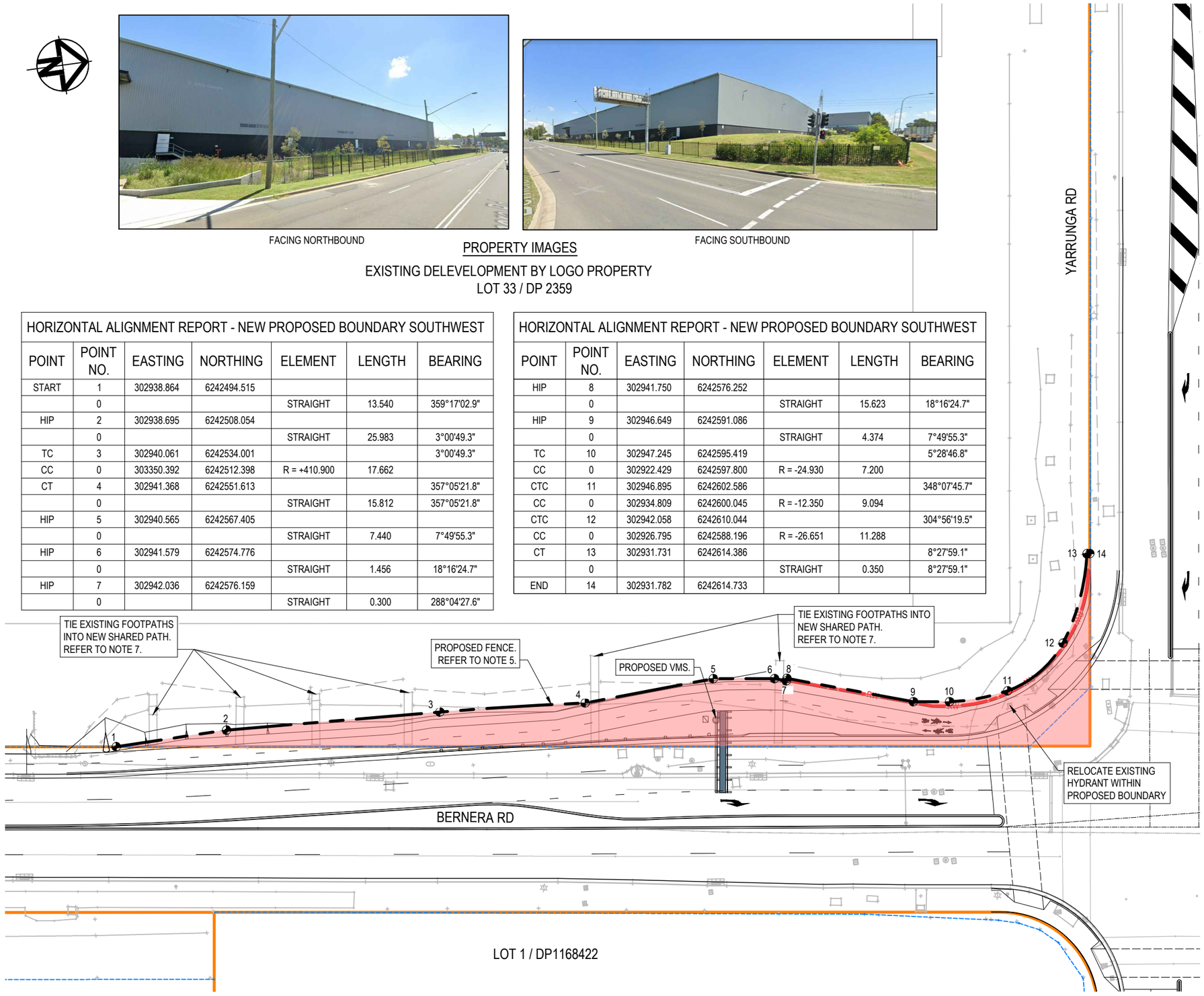
FACING SOUTHBOUND

PROPERTY IMAGES

EXISTING DELEVELOPMENT BY LOGO PROPERTY
LOT 33 / DP 2359

HORIZONTAL ALIGNMENT REPORT - NEW PROPOSED BOUNDARY SOUTHWEST						
POINT	POINT NO.	EASTING	NORTHING	ELEMENT	LENGTH	BEARING
START	1	302938.864	6242494.515			
	0			STRAIGHT	13.540	359°17'02.9"
HIP	2	302938.695	6242508.054			
	0			STRAIGHT	25.983	3°00'49.3"
TC	3	302940.061	6242534.001			3°00'49.3"
CC	0	303350.392	6242512.398	R = +410.900	17.662	
CT	4	302941.368	6242551.613			357°05'21.8"
	0			STRAIGHT	15.812	357°05'21.8"
HIP	5	302940.565	6242567.405			
	0			STRAIGHT	7.440	7°49'55.3"
HIP	6	302941.579	6242574.776			
	0			STRAIGHT	1.456	18°16'24.7"
HIP	7	302942.036	6242576.159			
	0			STRAIGHT	0.300	288°04'27.6"

HORIZONTAL ALIGNMENT REPORT - NEW PROPOSED BOUNDARY SOUTHWEST						
POINT	POINT NO.	EASTING	NORTHING	ELEMENT	LENGTH	BEARING
HIP	8	302941.750	6242576.252			
	0			STRAIGHT	15.623	18°16'24.7"
HIP	9	302946.649	6242591.086			
	0			STRAIGHT	4.374	7°49'55.3"
TC	10	302947.245	6242595.419			5°28'46.8"
CC	0	302922.429	6242597.800	R = -24.930	7.200	
CTC	11	302946.895	6242602.586			348°07'45.7"
CC	0	302934.809	6242600.045	R = -12.350	9.094	
CTC	12	302942.058	6242610.044			304°56'19.5"
CC	0	302926.795	6242588.196	R = -26.651	11.288	
CT	13	302931.731	6242614.386			8°27'59.1"
	0			STRAIGHT	0.350	8°27'59.1"
END	14	302931.782	6242614.733			



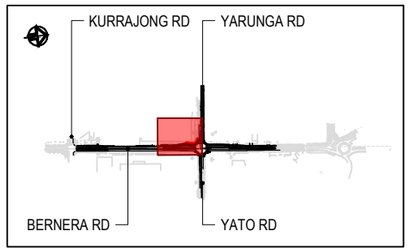
LEGEND

- PROPOSED BOUNDARY
- PROPERTY ACQUISITION
- EXISTING FENCE
- CADASTRAL BOUNDARY
- RETAINING WALL (RW)
- SETOUT POINT
- EXISTING SURVEYS

NOTES

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH RMS PROPERTY ADJUSTMENT QUALITY SPECIFICATION R204. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER DESIGN DRAWINGS AND ALL DISCREPANCIES REFERRED TO THE PRINCIPAL FOR DECISION BEFORE PROCEEDING WITH THE WORK.
2. ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION AND FABRICATION IS COMMENCED.
3. IF SITE CONDITIONS ENCOUNTERED APPEAR TO DIFFER SUBSTANTIALLY FROM THE CONDITIONS DEPICTED ON THESE PLANS, THE PRINCIPAL SHALL BE NOTIFIED IMMEDIATELY.
4. REMOVE TREES AND SHRUBS TO EXTENT REQUIRED FOR PROPOSED PERMANENT WORKS. REMOVE EXISTING FENCE AND REPLACE WITH SIMILAR TO SUIT NEW ROAD BOUNDARY.
5. CONSTRUCT NEW FENCE TO MATCH EXISTING FENCE TYPE AND COLOUR.
6. EXISTING FOOTPATHS TO BE TIED INTO PROPOSED WORKS. FOOTPATHS TO BE DESIGN AND MANAGED ON SITE BY CONTRACTOR DURING CONSTRUCTION. FOOTPATHS AND EARTHWORKS TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS & AUSTROADS GUIDELINES.
7. TEMPORARY CONSTRUCTION DISTURBANCES YO BE LIMITED TO WITHIN 2m OF PERMANENT WORKS SHOWN. ERECT TEMPORARY FENCING AND OPEN CHANNELS IN THIS SPACE IF REQUIRED. REINSTATE EXISTING LANDSCAPE ON COMPLETION OF WORKS.
8. MAKE GOOD ANY DISTURBANCE CREATED DURING THE ADJUSTMENT WORK.
9. CLEAN UP AND REMOVE BUILDERS WASTE FROM SITE CREATED DURING THE ADJUSTMENT WORK.

ACQUISITION AREA = 640.204m²



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION & NAME: D:\D_TAL\ONEDRIVE - D-TAL CONSULTING PTY LTD\02-CAD\2021 25 DD 001 PW 0201.DWG

Last Plotted: 20/09/2022 12:22:02 AM By: BENZSON

Last Saved: 19/09/2022 6:06:29 AM By: BENZSON

REV.	DESCRIPTION	APPROVED	DATE
A	100% DETAILED DESIGN	-	XX.XX.XX

SCALES ON A3 DRAWING:
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 2020 ZONE 56

HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	D. MARCELINO	XX.XX.XX
DRG CHECK	F. BATHAN	XX.XX.XX
DESIGN BY	J. KALANTZIS	XX.XX.XX
DESIGN CHECK	T. LANCE	XX.XX.XX
DESIGN MGR	A. PAVLOVIC	XX.XX.XX
PROJECT MGR	J. KALANTZIS	XX.XX.XX

DRAWING/DESIGN PREPARED BY:

MU GROUP
TRANSPORT AND INFRASTRUCTURE

GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:

LIVERPOOL CITY COUNCIL

2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
PROPERTY WORKS
LOT 33 / DP 2359

A3

PROJECT NUMBER: 2021 25 DD 001

PART

ISSUE STATUS: 100% DETAILED DESIGN

SHEET No. PW 0201

ISSUE A

Appendix B – Design Issues and Change Register

DRAFT

Project: Bernera Road Upgrade

Suburb: Prestons NSW 2170

Registration Number	P_21_25_LCC_BRUP_DD
Client Registration Number	NA
Design Stage	100% Detail Design

ID	Date raised	Where issue/change originates from?	Summary of Issue	Type of Issue	Action Required?	Action to close-out (include evidence)	Comments	Status
1	5/08/2021	Quality Observation	Request CDR and RSA from the Concept Design	Quality	Yes	RFI sent to Council	MU Group to inform Council of any non-conformances within the Design Report	Closed
2	5/08/2021	Quality Observation	Turning paths at Yato Road - left turn uses Semi-trailers not B-Doubles?	Quality	Yes	Clarify with Council	Council advised this is not an issue as they prefer heavy vehicles tur right to access the M7	Closed
3	5/08/2021	Quality Observation	Streetlight at CH160 appears within clearzone	Quality	Yes	Clarify with Council	Inform Council	Closed
4	5/08/2021	Quality Observation	Lane widths - Non-conforming	Quality	Yes	Raise non conformance		Closed
5	5/08/2021	Client	Concrete culvert drainage channel at CH 270 - impacted by sharepath	Scope	Yes	Survey to confirm location	Survey confirmed not impacted	Closed
6	5/08/2021	Quality Observation	Existing Directional Sign	Scope	Yes	Assess impact	No changes to existing kerb therefore its not considered to be impacted	Closed
7	5/08/2021	Client	LOGOS Property- Water Hydrant and Gas Meter (utilities)	Scope	Yes	Liaise with utility authorities. Check whether impacted first	Impacted, needs to be considered in design of utilities	Open - in progress
8	5/08/2021	Client	Drain Model required. Flood report from J Wyndam Prince.	Scope	Yes	Drain Model and report provided by Council		Closed
9	5/08/2021	Quality Observation	Drainage pipe outlet and headwall clarification on network and pipe size.	Scope	Yes			Open - in progress
10	5/08/2021	Client	Seek survey to M7 Roundabout.	Scope	Yes	MU Group to only design up to extent shown on Concept designs done by AT&L	Roundabout with M7 and Yarrawa Street is out of scope	Closed
11	5/08/2021	Quality Observation	Median widths in some places are non-conforming	Scope	Yes	Raise non conformance		Closed
12	5/08/2021	Quality Observation	Foot path widths down to 2.5m are non-conforming in some places (near substaion)	Scope	Yes	Assess widths	2.5m satifies requirements	Closed
13	7/09/2021	Client	Survey information provided in GDA 94 - convertion to GDA 2020	Scope	Yes			Closed
14	28/08/2021	Quality Observation	Impact on 750 watermain - location is critical for retaining wall/ culvert design	Scope	Yes	Qalchek to apply for WAE plans from Sydney Water		Open - in progress
15	1/09/2021	Quality Observation	LOGOS Property Adjustments - landscaping at the front maybe used for water quality treatment	Scope	Yes	Clarify with LCC	Council confirmed LOGOS is aware of property adjustments and advised it to be unlikely it was used for water quality treatment	Closed
16	9/05/2022	Quality Observation	1050mm potentially impacted by VMS footing design	Scope	Yes	Investigate when carrying out geotechnical investigations		Open - in progress

Appendix C – HSiD Report and Risk Register

DRAFT

MU GROUP
TRANSPORT AND INFRASTRUCTURE

HSiD Workshop Report

Bernera Road Upgrade, Prestons

Issue 1: September 2022

Reference: P_21_25_LCC_BRUP_DD

LIVERPOOL CITY COUNCIL

This report has been prepared by MU Group Consulting for Liverpool City Council and may only be used and relied on by Liverpool City Council for the purpose agreed as set out in the Consultancy Agreement.

The services undertaken by MU Group Consulting in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. MU Group Consulting has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

MU Group Consulting has prepared this report on the basis of information provided by Liverpool City Council and others who provided information to MU Group Consulting (including Government authorities), which MU Group Consulting has not independently verified or checked beyond the agreed scope of work. MU Group Consulting does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

DOCUMENT CONTROL

Revision History

Revision	Date	Prepared by	Reviewed by	Approval for issue by
1	21/09/2022	Sula Jayawickrama	John Kalantzis	Joekarl Diaz
2				
3				

Printed copies of this document are uncontrolled. Holders of uncontrolled copies must ensure that they have the latest version.

DRAFT

Contents

Executive Summary 4
1 Introduction 5
1.1 Purpose of this document 5
1.2 Project Background 5
1.3 Project Objectives 6
1.4 Project Location 6
1.5 Project Scope 8
2 Background and context 9
2.1 Existing Site Conditions 9
2.2 Approach to Construction Phase review of HSiD risks 13
3 Health and Safety in Design (HSiD) Risks 14
3.1 Purpose 14
3.1 HSiD Workshop 14
3.2 Summary of HSiD Risks 15
4 Sustainability 16
4.1 Purpose 16
4.2 Sustainability Considerations 16
4.3 Sustainability Targets and Tracking 16
5 Constructability 17
5.1 Purpose 17
5.2 Constructability Workshop 17
5.3 Staging of Works 17
5.2 Summary of Constructability Risks 17
6 Transferred or Residual Risks 18
6.1 Purpose 18
6.2 Commentary on Residual Risks 18
6.3 Conclusions and Recommendations 18
Appendix A – HSiD Presentation 19
Appendix B – HSiD Risk Register 20

DRAFT

Executive Summary

Health and Safety in Design (HSiD) is the process of integrating safety within the design development. This includes the process of identifying hazards and managing them throughout the life of the item being designed.

The intent of HSiD is to eliminate safety risks, or if not possible, minimise them so far as is reasonably practicable through the application of safety controls.

MU Group Consulting have been engaged by Liverpool City Council to provide engineering and design services for the proposed upgrade to Bernera Road between Kurrajong Road and about 120m North of the Yarrunga Street/ Yato Road intersection, Prestons. These works aim to improve traffic and safety along this segment of road and cater for future projected traffic volumes.

The scope of works includes developing the detailed design to upgrade this section of road from the existing two-lane road to a divided four lane road, including to upgrade the signalised intersection with Yarrunga Street and Yato Road to provide dedicated right turn lanes. Council has separately engaged a traffic signal designer to prepare the TCS design for this intersection, and our civil design will be integrated with the TCS design that is developed.

Minor adjustments were also required at the Kurrajong Road and Bernera Road intersection, with a revised TCS design developed (TCS 4477), taking into consideration comments received from TfNSW and Council.

The design has been developed in two stages, as 80% and 100% detailed design stages and was based on the concept design provided by Liverpool City Council. The HSiD workshop was conducted on 11 August 2022, to inform the safety in design issues for the upgrade and identified issues have been adopted into the 100% detailed design.

This HSiD workshop report covers the Health and Safety in Design risks, Sustainability, Constructability, and the transferred or residual risks of the upgrade project.

The HSiD presentation and risk register have been included as Appendices within this report.

DRAFT

1 Introduction

1.1 Purpose of this document

This report has been prepared to fulfill MU Group Consulting's requirements in accordance with:

- TfNSW Procedure ILC-MI-TP0-520-G01 Guidelines for Health and Safety in Design ver1.1 24-Dec-15
- SafeWork NSW Safe Design of structures Code of Practice Jul-14.

This HSiD Report has been prepared to provide a summary of closed and transferred risks and is intended to be used as a high-level snapshot only. For full detail refer to the HSiD Risk Register.

1.2 Project Background

MU Group Consulting have been engaged by Liverpool City Council to provide a detailed design for the proposed upgrades to Bernera Road from Kurrajong Road to about 120m North of its intersection with Yarrunga Street/ Yato Road, Prestons. The proposal involves providing a continuous four-lane divided road to service the local industrial area and improve traffic efficiency between Camden Valley Way and the M7 Motorway.

- Upgrading the existing two-lane road to a divided four-lane road
- Provision of a central median for the extent of the project
- Installation of new kerb and gutter
- Upgrade the signalised intersection with Yarrunga Street and Yato Road (TCS 4263) to provide dedicated right turn lanes (traffic signal design prepared by others)
- Minor adjustment works at the Kurrajong Road and Bernera Road intersection (TCS 4477). A technical note was prepared to assist TfNSW in reviewing the traffic signals design
- Localised road widening on the approaches to Yarrunga Street and Yato Road requiring land acquisition and property adjustment plans
- Relocation of existing the M7 Motorway VMS
- Provision of 2.5m shared path on one side and a 1.5m footpath on the other side.
- Road pavement rehabilitation
- Stormwater drainage
- Relocation of impacted utility services including streetlighting upgrade
- Preparation of a bill of quantities and a cost estimate at 100% detailed design
- The design of Bernera Road upgrade will be undertaken in two stages as 80% and 100% detail design.

DRAFT

1.3 Project Objectives

The project aims to improve traffic and safety along this segment of road and cater for future projected traffic volumes. The objectives include:

- Increased mid-block road capacity on Bernera Road by providing two additional traffic lanes.
- Improve the existing traffic signals at Bernera Road, Yarrunga Street and Yato Road to remove existing traffic pinch point and to meet future traffic needs.
- Restrict right turn movements in the Bernera Road section between Kurrajong Road and 120m North of the Yarrunga Street/ Yato Road intersection to improve road safety

1.4 Project Location

The project is located within the City of Liverpool Local Government Area. Bernera road is a regional road under the control of Liverpool City Council, between Yarrawa Street/ M7 off-load ramps, Prestons, and Croatia Avenue/ Soldiers Parade, Edmondson Park. It provides access to Prestons Industrial area and links M7 Motorway with residential areas of Prestons, Edmondson Park, Carnes Hill, and Casula. Bernera Road has signposted 60km/h speed limit and will remain unchanged.

The project location is between Kurrajong Road/Bernera Road intersection to Bernera Road approx. 120m North of its intersection with Yarrunga Street/ Yato Road.

The site location is shown below in Figure 1.

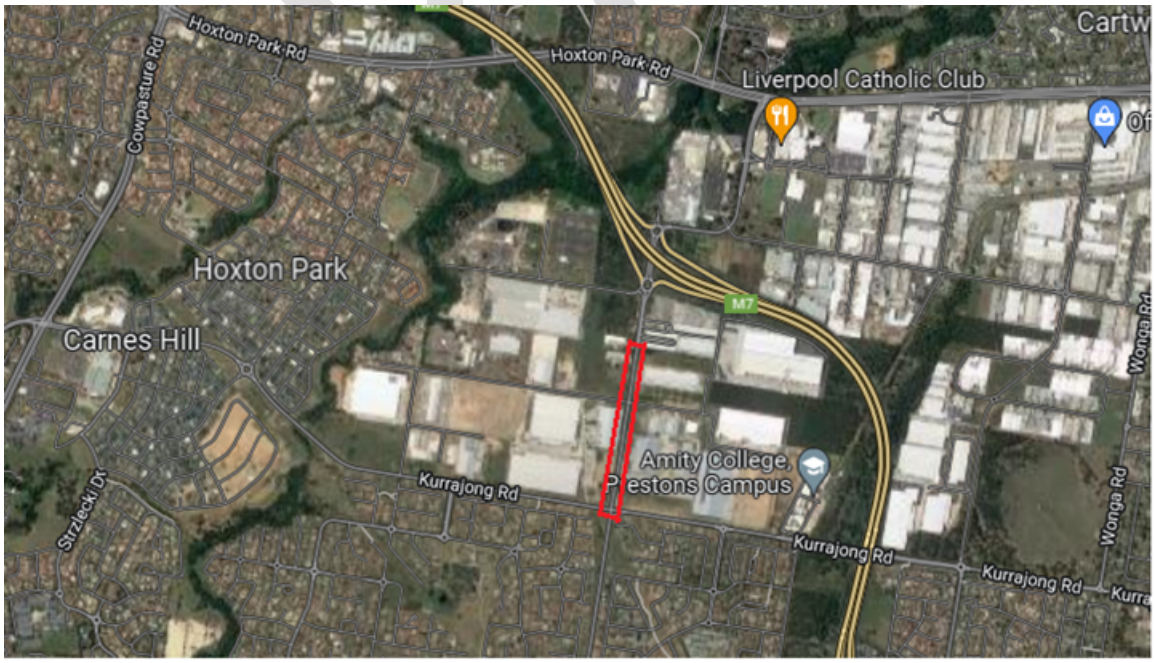


Figure 1: Site location [*Source: Google Maps 2022*]

DRAFT

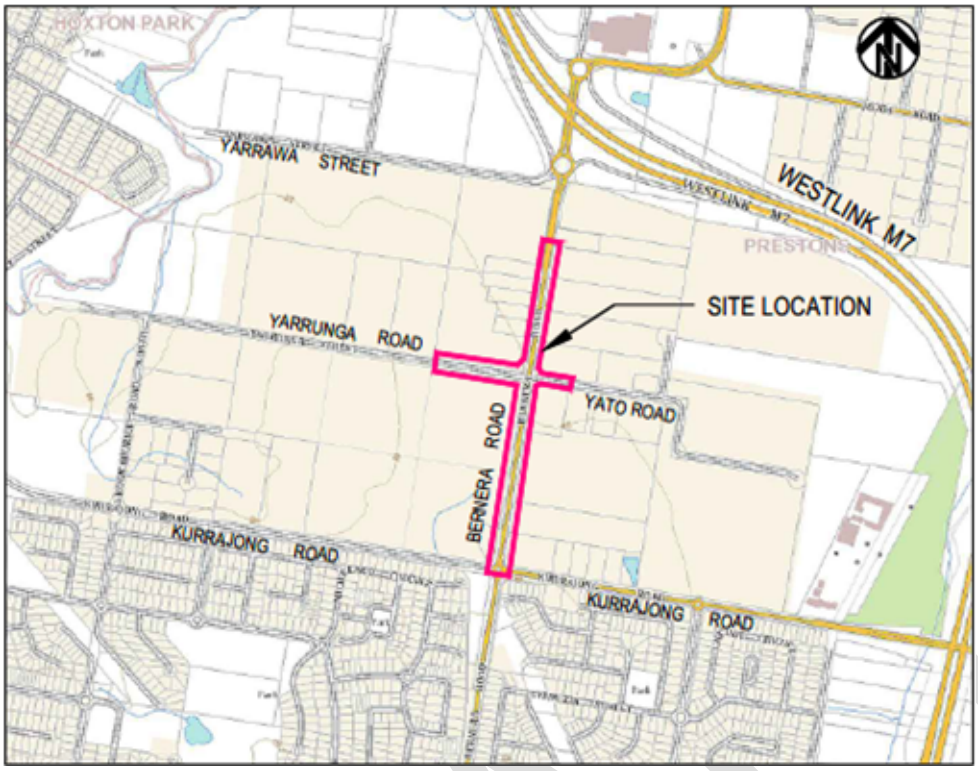


Figure 2: Locality Plan

DRAFT

1.5 Project Scope

The project scope is as follows:

1. Review of Concept Design drawings and background information.
2. Field and Desktop investigations works,
    - Geotechnical Investigations including pavement investigation
    - Additional topographic survey
    - Review of DBYD utility information and utility surveys provided by Council
    - Gather and review available information to identify and notify Council of gaps
3. Develop design drawings and documentation in two stages:
    - 80% - Detailed Design
    - 100% - Final Detailed Design
4. Develop design drawings and documentation including following:
    - Geometric and drainage designs
    - Pavement design
    - Property adjustment works plans (LOGOS Site)
    - Utility Co-ordination plan
    - Retaining Wall design
    - VMS Foundation and footing design (in consultation with Westlink and AECOM)
    - Turning path analysis
    - TCS design for the intersection of Kurrajong Road and Bernera Road (TCS 4477)
    - Electrical and Lighting relocations designs
    - Sydney Water watermain and sewer relocation designs
    - Project Risk Register
    - HSiD Workshop and associated safety-in-design reporting.
5. Develop Schedule of Quantities and Cost estimate at 100% Detail Design stage.

DRAFT

2 Background and context

2.1 Existing Site Conditions

The project is located along Bernera Road from the Kurrajong Road intersection to about 120m North of the Yarrunga Street/ Yato Road intersection. Bernera Road is classified as a B-Double route and has a posted speed limit of 60km/h.

Bernera Road is an existing two-lane road with a standard four-way intersection with Yarrunga Street and Yato Road. On approach to this intersection from Bernera Road there are two lanes in each direction. The approach to the intersection from Yato Road has through lane and dedicated right turn lane, whilst the approach from Yarrunga Street is a single lane approach.

At the southern extent of the project, it ties in with the Kurrajong Road intersection. On approach to the intersection, Bernera Road caters for two south bound lanes, and a dedicated right turn lane.

The adjacent land use consists of industrial development on both the eastern and western side of Bernera Road. The eastern side of Bernera Road includes Boral concrete, a BP Truckstop, OZ Grooming world, Western Pet supplies, Ingham cold store, and Fashion Biz warehousing. The western side of Bernera Road mainly includes warehousing and has undeveloped land close to the Yarrawa Street roundabout. There is an existing development by LOGOS property on the south-western corner of the Yarrunga Street and Yato Road intersection that requires road widening and property acquisition to be undertaken by Council. There is also a proposed development on the north-western corner where we understand Council is liaising with the property developer to ensure their works tie in in the proposed intersection upgrade.

A site inspection was undertaken on 2 September 2021 and again on 19 July 2022, for familiarisation of the site as part of the design development. Site photos taken at the site inspection and photos provided have been provided. Photos not captured on site have been obtained from Google Street images.

DRAFT

Figure 3: Facing North - Bernera Road and Kurrajong Road intersection [Source: Google Maps 2022]

Figure 4: Facing South - Bernera Road and Kurrajong Road intersection

[Source: Google Maps 2022]

Figure 5: Facing North - Bernera Road intersection with Yarrunga Street and Yato Road

[Source: Google Maps 2022]

Figure 6: Facing South - Bernera Road intersection with Yarrunga Street and Yato Road.

[Source: Google Maps 2022]

Figure 7: Facing North – M7 Motorway Variable Message sign (VMS) at CH374

Figure 8: Culvert structure passing under Bernera Road around CH270

2.2 Approach to Construction Phase review of HSiD risks

The process for the ongoing management of HSiD risks during construction phase of the Bernera Road upgrade project is as follows:

- In the event there is a design clarification or a proposal to modify the detailed design by the construction contractor, Liverpool City Council issues a Request For Information (RFI) for MU Group Consulting to respond – either by providing additional detail or to agree or otherwise to a modified design proposal.
- As part of the RFI deliberations MU Group Consulting Project Management and Design Team undertake an initial review of the RFI to ascertain whether the change is likely to generate a new HSiD risk
- The outcome of this review is captured in the MU Group Consulting RFI Register
- Depending on the number of RFI generated HSiD risks, these will either be grouped together to be reviewed in a workshop format or reviewed individually with the respective Design Team member
- Outcomes from the HSiD risk review will be incorporated into the HSiD Register for either closure or transfer in accordance with Design Phase risk reviews.

DRAFT

3 Health and Safety in Design (HSiD) Risks

3.1 Purpose

The aim of Health and Safety in Design (HSiD) is to identify potential health and safety hazards associated with the project or design element described in this report during its construction, operational life, maintenance, and de-commissioning and to identify the mitigation measures that can be put in place through the preparation of the design, documentation and (where applicable) operational and maintenance procedures to effectively manage the risks.

Only additional, exceptional, or unique hazards were discussed in the workshop and the standard items were added in after the workshop for record and completeness.

This HSiD report will be based on guidance provided by Safe Work Australia's Code of Practice for Safe Design of Structures.

3.1 HSiD Workshop

The SFAIRP (so far as is reasonably practicable) principle was applied and extensively tested at the HSiD Workshop. This HSiD report has been produced after collating the comments of the Health and Safety-in-Design Workshop.

A record of the key outcomes identified have been included in the HSiD Risk Register. Only additional, exceptional, or unique hazards were discussed in the workshop and the standard items were added in after the workshop for the record and for completeness. There may be unidentified risks and this register should be treated with the appropriate level of care. It does not relieve the contractors/owners of their obligations under the relevant Australian standards, Legislation, and Industry Codes of Practice.

Some key actions identified may require further work beyond the current status of the design to address the issues raised. These will be identified in the columns titled "Risk status" and "Transfer risk to".

This HSiD report should be reviewed by Liverpool City Council and forwarded to all relevant construction contractors prior to the commencement of any construction. The risks identified as requiring further consideration should be incorporated into future safety documentation such as safe work method statements (SWMS), daily checklists, hazard assessment checklists (HAC) and the like.

DRAFT

3.2 Summary of HSiD Risks

The following HSiD risks were identified and discussed during the HSiD workshop

- As directed by Council, MU Group to maintain existing kerbs along Bernera Road to avoid the need for additional property acquisition. There is a risk of a vehicle side swiping other vehicles due to narrow 3m lane widths in some locations along the corridor. There is also a risk of pedestrians standing on median being struck by moving vehicles due to the narrow central median in some locations along the corridor. Council to accept these non-conformances. The risk has been transferred to Council.
- Pedestrian struck/vehicle collision due to maintenance vehicle accessing VMS sign for maintenance purposes. Recommended risk mitigation includes installing mountable kerb to access the dedicated maintenance bay that is separated from the shared path. Guard rail to be installed between the trafficable lane and the dedicated maintenance bay. The M7 maintenance crew to adopt appropriate SWMS for maintenance of the VMS. The risk has been closed.
- Vehicle collision due to the maintenance vehicle accessing the VMS. Recommended risk minimisation measures include installing mountable kerb, guard rail, maintenance bay and M7 maintenance crew to adopt appropriate SWMS. The risk has been closed, however transferred onto Council for any further actioning.
- Fall from heights due to the construction of the proposed retaining wall. It is recommended Council liaise with the property owner to discuss an appropriate treatment such as installation of a pedestrian fence. The risk is transferred to Council.
- Errant vehicle hitting the electrical substation near 23-25 Bernera Road due to proposed kerb moving slightly closer to the electrical substation. Recommended Council undertake a road safety audit of the project. SA kerb also considered a barrier for this purpose. The risk is transferred to Council.
- Workers struck by machinery/plant due to inadequate controls during construction and working next to traffic. MU Group have developed the design that allows the construction contractor to implement appropriate construction methodologies for safe work practices. The risk is transferred to Council.

DRAFT

4 Sustainability

4.1 Purpose

MU Group was not engaged to undertake the Review of Environmental Factors (REF). We anticipate any sustainability considerations for the project would be undertaken by Liverpool City Council as part of their environmental assessment.

4.2 Sustainability Considerations

To be taken into consideration by Liverpool City Council as part of their environmental assessment.

4.3 Sustainability Targets and Tracking

To be taken into consideration by Liverpool City Council as part of their environmental assessment.

DRAFT

5 Constructability

5.1 Purpose

The purpose of conducting a constructability review is to optimise a design to ensure efficient project construction and maintenance, in order to meet project life cycle objectives for cost, time, quality, WHS and environmental management.

5.2 Constructability Workshop

A Constructability workshop was not within the MU Group scope of works.

MU Group have developed a design that allows the construction contractor to implement appropriate construction methodologies for safe work practices.

Any identified constructability risks have been captured as part of the HSiD Risk Register. The HSiD Risk Register is a living document which will grow as the project is developed. All designs risks have been actioned or transferred to a later phase with any residual risks passed onto Council.

5.3 Staging of Works

Construction staging of works will be managed by Council and the construction contractor.

5.2 Summary of Constructability Risks

Any identified Constructability HSiD risks have been transferred to Council and construction contractor to address.

DRAFT

6 Transferred or Residual Risks

6.1 Purpose

The project Design Team, Council, TfNSW and all other stakeholders are required to use the SFAIRP (so far as is reasonably practicable) principle to minimise the HSiD, and Constructability risks including adopting sustainability targets. Any risks that can't be designed out or eliminated need to be transferred to the next designer, Council, or construction contractor as Residual Risks to be addressed by them.

6.2 Commentary on Residual Risks

The HSiD risks that have been identified during the HSiD workshop, have a residual risk component to each of them. These will be transferred to Council for careful and safe management during the next stages of project development.

6.3 Conclusions and Recommendations

As discussed during the HSiD workshop attended by Council and MU Group, any key HSiD risks and outcomes have been agreed with recommended risk minimisation safeguards and actions.

The HSiD risk register located in Appendix B of this report lists all the HSiD risks that were discussed during the workshop. The majority of HSiD risks have an unlikely occurrence, with moderate to major consequences. This results in risks that have a risk rating of moderate to high threat. These risks have either been closed or transferred to Council to take responsibility of managing any residual risks throughout the post design stages.

DRAFT

Appendix A – HSiD Presentation

DRAFT

LIVERPOOL CITY COUNCIL

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Bernera Road Upgrade

Health and Safety in Design workshop

Note:
The following slides are prepared by individual presenters in the conference and may not be used/distributed without prior consent from them.

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Acknowledgment of Country

MU Group would like to acknowledge the Gadigal People of the Eora Nation, the traditional custodians of this land and pay my respects to the Elders both past and present.

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/00

Agenda

01 Overview of Health and Safety in Design Obligations

02 Project Scope/ design overview

03 Review drawings

04 Discuss risks

05 Discuss mitigation options

06 Populate HSiD register

07 Agree on actions to address risks if practical during workshop

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/01 Overview of Health and Safety in Design Obligations

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Why Health and Safety in Design?

It's the law…

AUSTRALIA

Work Health and Safety Regulations 2011

Select Legislative Instrument No. 262, 2011

made under the

Work Health and Safety Act 2011 and the *Work Health and Safety (Transitional and Consequential Provisions) Act 2011*

Work Health and Safety (Safe Design of Structures) Code of Practice 2015

made under the

***Work Health and Safety Act 2011*, section 274 (Approved Codes of Practice)**

What does the WHS Act say?

MU GROUP
TRANSPORT AND INFRASTRUCTURE

22 Duties of persons conducting businesses or undertakings that design plant, substances or structures

1. Applies to a person (the designer) who conducts a business or undertaking that designs a structure that is to be used, or could reasonably be expected to be used, as, or at, a workplace.

2. The designer must ensure, so far as is reasonably practicable, that the plant, substance or structure is designed to be without risks to the health and safety of persons.

3. The designer must carry out, or arrange the carrying out of, any calculations, analysis, testing or examination that may be necessary for the performance of the duty imposed by subsection (2).

4. The designer must give adequate information to each person who is provided with the design.

5. The designer, on request, must, so far as is reasonably practicable, give current relevant information to persons that may require this information.

More information – download the Act - https://www.legislation.gov.au/Details/C2018C00293/Download

What else?

MU GROUP
TRANSPORT AND INFRASTRUCTURE

AUSTRALIA

Work Health and Safety Regulations 2011

Select Legislative Instrument No. 262, 2011

made under the

Work Health and Safety Act 2011 and the *Work Health and Safety (Transitional and Consequential Provisions) Act 2011*

*Legislative Instruments including 'Regulations and iiCode of Practices'.
*Admissible in court.

WHS Regulations 2011

https://www.legislation.gov.au/Details/F2019C00898

Work Health and Safety (Safe Design of Structures) Code of Practice 2015

made under the

***Work Health and Safety Act 2011*, section 274 (Approved Codes of Practice)**

WHS (Safe Design of Structures) Code of Practice 2015

https://www.legislation.gov.au/Details/F2016L00410

Control Measures

MU GROUP
TRANSPORT AND INFRASTRUCTURE

ELIMINATION

Remove the hazard completely.
Eliminating the hazard is the most effective way to manage risks.

Where it is not practical to eliminate a hazard, risk must be minimised.

Use one or more of the following:

Engineering	Substitute the hazard	Isolate the hazard
Change the design	Replace the hazard with	Separate the hazard from people

Minimise any remaining risk by using administrative controls.

ADMINISTRATION

Health and safety procedures and policies,
e.g. safe work procedures, staff training.

If risks remain, the possible impact on people must be controlled using PPE.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

e.g. safety glasses, had hats, protective clothing.
This is the least effective way to manage risks.

More information at:

www.safework.nsw.gov.au

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/02 Project Background/ Project Scope

Project Background

MU GROUP
TRANSPORT AND INFRASTRUCTURE

MU Group Consulting have been engaged by Liverpool City Council to provide a detailed design for the proposed upgrades to Bernera Road from Kurrajong Road to about 120m North of its intersection with Yarrunga Street/ Yato Road, Prestons. The proposal involves providing a continuous four-lane divided road to service the local industrial area and improve traffic efficiency between Camden Valley Way and the M7 Motorway.

- Upgrading the existing two-lane road to a divided four-lane road
- Provision of a central median for the extent of the project
- Upgrade the signalised intersection with Yarrunga Street and Yato Road (TCS 4263) to provide dedicated right turn lanes
- Localised road widening on the approaches to Yarrunga Street and Yato Road requiring land acquisition and property adjustment plans
- Relocation of existing M7 Motorway VMS
- Provision of 2.5m shared path on one side and a 1.5m footpath on the other side
- Road pavement rehabilitation
- Relocation of impacted utility services
- Minor adjustment works at the Kurrajong Road and Bernera Road intersection (TCS 4477).
- Preparation of a cost estimate at 100% detailed design
- The design of Bernera Road upgrade will be undertaken in two stages as 80% and 100% detail design.

Project Scope

MU GROUP
TRANSPORT AND INFRASTRUCTURE

1. **Review of Concept Design drawings and background information.**
2. **Field and Desktop investigations works.**
    - Geotechnical Investigations including pavement investigation
    - Additional topographic survey
    - Review of DBYD utility information and utility surveys provided by Council
    - Gather and review available information to identify and notify Council of gaps

3. **Develop design drawings and documentation in two stages:**
    - 80% - Detailed Design
    - 100% - Final Detailed Design

4. **Develop design drawings and documentation including following**:
    - Geometric and drainage designs
    - Pavement design
    - Property adjustment works plans
    - Utility Co-ordination plan
    - Retaining Wall design
    - VMS Foundation and footing design (in consultation with Westlink and AECOM)
    - Turning path analysis
    - TCS design for the intersection of Kurrajong Road and Bernera Road (TCS 4477)
    - Electrical and Lighting relocations designs
    - Sydney Water watermain relocation designs
    - Project Risk Register
    - HSiD Workshop and associated safety-in-design reporting.

5. **Develop Schedule of Quantities and Cost estimate at 100% Detail Design stage**.

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/03 Discuss HSiD Risks

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Review Drawings

/04

LIVERPOOL CITY COUNCIL

BERNERA ROAD

UPGRADE TO FOUR LANES

FROM KURRAJONG ROAD TO YARRAWA STREET, PRESTONS

DETAILED DESIGN

LOCALITY PLAN

NOT TO SCALE

PART INDEX

PART NUMBER	CODE	NAME
	GN	GENERAL
	RW	ROAD ALIGNMENT AND DETAIL, ROAD CROSS SECTIONS
	UT	UTILITIES
	SD	STORMWATER MANAGEMENT
	PV	PAVEMENT
	FN	ROADSIDE FURNITURE, SIGNPOSTING AND PAVEMENT MARKING

NOT FOR CONSTRUCTION

MU GROUP

LIVERPOOL CITY COUNCIL

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
COVER SHEET

A3

2021.25 DD 0001

TECH DETAILED DESIGN

GDA 2020 ZONE 56

AHD

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/05 Discuss Mitigation Options

MU GROUP
TRANSPORT AND INFRASTRUCTURE

/06 Agree on actions to address risks if practical during workshop

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Any Questions?

MU GROUP
TRANSPORT AND INFRASTRUCTURE

Thank you!

Appendix B – HSiD Risk Register

DRAFT

HSID Risk Register

Project Name : Bernera Road Upgrade
Project Number : P_21_25_LCC_BRUP_DD
Project Manager: John Kalantzis
Design Manager : Amy Pavlovic

Risk No.	Life Cycle Stage	Location	Description	Cause	Consequances	Likelihood (Refer to table below)	Consequances (Refer to table below)	Risk Rating (Refer to table below)	Elimination Posible? Y/N	Justification if Elimination not possible	Recommended Risk Minimisation: Safeguard/ Action	Risk Status	Transfer risk to (post design phase)	Comments
example	***CONSTRUCTION***	***Ch 000***	***Pedestrians/workers on foot struck by moving trucks/plant***	***Staff unaware of risks*** ***Staff unprepared before going on site*** ***No WHS procedures in place***	***Fatality***	***Possible***	***Substantial***	***Very high threat***	***Yes***		***No staff goes on site prior to filling a SWMS. Ect..***	***TRANSFERRED***	***Construction Contractor***	***Contractor is responsible for staff awareness in relation to construction activities post design phase.***
1	Detailed Design	Various locations	Vehicle side swiping other vehicle	3m lane widths in some locations along corridor	Possible injury	Possible	Moderate	Moderate threat	Yes	As directed by Council, existing kerbs to remain along Bernera Road, to avoid need for additional land acquisition Council are planning to remove the existing B-Double route along Bernera Road	Council to accept non conforming lane widths	TRANSFERRED	Council	
2	Detailed Design	Various locations	Pedestrians standing on median struck by moving vehicles	Narrow central median widths in some locations along the corridor	Serious Injury	Possible	Major	High threat	Yes	As directed by Council, existing kerbs to remain along Bernera Road, to avoid need for additional land acquisition Council are planning to remove the existing B-Double route along Bernera Road	A minimum 600mm central medians have been provided along the corridor for a length of 260m. Council to accept non conformance. Closer to the signalised intersections we have 500mm in accordance with Austroads design guide Council to accept non conforming median width	TRANSFERRED	Council	
3	Detailed Design	CH374	Pedestrians/foot struck by moving vehicles	Maintenance vehicle mounting the kerb to access and maintain VMS sign	Possible injury	Possible	Major	High threat	Yes		Install mountable kerb to access the dedicated maintenance bay that s separated from the shared path. Guard rail to be installed between the trafficable lane and the dedicated maintenance bay. Th M7 maintenance crew to adopt appropriate SWMS for maintenance of the VMS	CLOSED	Council	
4	Detailed Design	CH374	Vehicle collision	Maintanence vehicle accessing the VMS	Possible injury	Possible	Moderate	Moderate threat	Yes		Install mountable kerb to access the dedicated maintenance bay that s separated from the shared path. Guard rail to be installed between the trafficable lane and the dedicated maintenance bay. Th M7 maintenance crew to adopt appropriate SWMS for maintenance of the VMS	CLOSED	Council	
5	Detailed Design	CH375	Fall from heights	Construction of the proposed retaining wall	Possible injury	Possible	Moderate	Moderate threat	Yes		Council to liaise with proeprty owner to discuss installation of appropriate treatment measure such as installing pedestrian fencing	TRANSFERRED	Council	
6	Detailed Design	CH575 - CH600	Errant vehicle hitting substation near 23-25 Bernera Road	Proposed kerb moving slightly closer to the electrical substation	Serious Injury	Unlikely	Major	Moderate threat	Yes		Speed limit 60km/h road - clear zone >3m SA kerb considered a barrier Council are proposing to undertake a Road Safety Audit	TRANSFERRED	Council	
7	CONSTRUCTION	Various locations	Workers struck by machinerry/plant	Inadequate traffic control during construction/ working next to traffic	Serious Injury	Possible	Major	High threat	Yes		The design developed to allow construction contractor to implement appropriate construction methodologies for safe work practices	TRANSFERRED	Council	
Right Click and select Insert to add lines														

	Assessment Prioritisation Table				
	Negligable	**Minor**	**Moderate**	**Major**	**Substantial**
Almost Certain	**Low threat**	**Low threat**	**High threat**	**Very high threat**	**Extreme threat**
Likely	**Low threat**	**Low threat**	**High threat**	**Very high threat**	**Very high threat**
Possible	**Low threat**	**Low threat**	**Moderate threat**	**High threat**	**Very high threat**
Unlikely	**Low threat**	**Low threat**	**Moderate threat**	**Moderate threat**	**Very high threat**
Rare	**Low threat**	**Low threat**	**Low threat**	**Moderate threat**	**Moderate threat**

Extreme threat	
Very high threat	
High threat	
Moderate threat	
Low threat	

Appendix D –TCS 4477 Swept Path Analysis

Not used – shown in Appendix E TCS 4477 Technical Note.

DRAFT

Appendix E – TCS 4477 Technical Note

DRAFT

MU GROUP
TRANSPORT AND INFRASTRUCTURE

MU GROUP CONSULTING

TECHNICAL NOTE

TCS4477 – Bernera Road Upgrade

Issue1: September 2021

Ref: P_21_25_LCC_BRUPP_DD

This report has been prepared by MU Group Consulting for Liverpool City Council and may only be used and relied on by Liverpool City Council for the purpose agreed as set out in the Consultancy Agreement.

The services undertaken by MU Group Consulting in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. MU Group Consulting has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

MU Group Consulting has prepared this report on the basis of information provided by Liverpool City Council and others who provided information to MU Group (including Government authorities), which MU Group has not independently verified or checked beyond the agreed scope of work. MU Group Consulting does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Report Control Form

Revision History

Revision	Date	Prepared by	Reviewed by	Approval for issue by
1	3/09/2021	Steven Ludenia	Terry Lance	Matt Murphy
2				
3				

TCS 4477

Summary

This technical note has been prepared by MU Group to document design decisions made during the development of the project and record any non-standard treatments at the signalised intersection. The technical note covers:

- Project Background
- Proposed Design
- Other Plan Amendments
- Site Photos
- Appendix A – TCS 4477 Design Layout
- Appendix B – Traffic Signal Design Plan Checklist
- Appendix C – Turning Path Checks

Project Background

MU Group Consulting has been engaged by Liverpool City Council to provide a detailed design for the upgrade of Bernera Road from Kurrajong Road to Yarrawa Street, Prestons. The proposal involves providing a continuous four-lane divided road to service the local industrial area and improve traffic efficiency between Camden Valley Way and the M7 Motorway. The Bernera Road upgrade is split into 3 stages:

- **Stage 1** – Kurrajong Road to approximately 100m south of Yarrunga Street/ Yato Road intersection
- **Stage 2** – Signalised intersection upgrade at Yarrunga Street/ Yato Road
- **Stage 3** – Bernera Road approximately 120m north of its intersection with Yarrunga Street/ Yato Road to its intersection with Yarrawa street.

The design for TCS 4263 at Bernera Road, Yarrunga Street and Yato Road has been prepared by others and submitted by Liverpool Council for TfNSW review, separately to this proposal. This technical note pertains only to TCS 4477 at Bernera Road and Kurrajong Road, incorporating the TCS changes required to accommodate the proposed median in Bernera Road.

Design Speed

For the purpose of the TCS design, the design speed is as per the existing posted speed:

- Bernera Road – 60km/h
- Kurrajong – 60km/h

Proposed Design

The proposed works at the traffic signals involves the following:

- Incorporate the proposed central median in Bernera Road and amend lane widths.
- New detectors 5, 6, 7 and 8 on the northern approach to the intersection. Note: Detector 5 (southbound kerbside in Bernera Road) is located closer to the stop line to avoid services, similar to existing arrangement.
- Cycle lanterns provided on the western and northern crossings to connect the newly constructed and proposed shared paths

Kurrajong Road and the northern leg of Bernera Road are currently classified B-double routes. The proposed median in the northern leg of Bernera Road will not have impact to existing turning capabilities at the intersection. A 26m B-Double has been used to check the turning path for the diamond D phase and G phase in consideration of potential future expansion of the B-double network. The turning path checks are attached to this technical note as Appendix C.

Other Plan Amendments

The TCS plan also incorporates the following changes to suit current site conditions:

- Eastbound Merge in Kurrajong Road per site conditions.
- Recently constructed shared path on the eastern leg of Kurrajong Road (northern footway).
- Western pedestrian crossing updated to reflect site conditions (rotated anticlockwise to MFC shown on VV4477_1B).

Site Photos

The design team has undertaken a site inspection during development of the design. Some photos of the inspection have been included below however, to minimise duration of the site inspection during Covid-19 restrictions, Google Street images have also been used for site familiarisation purposes.

Bernera Road looking south towards the signalised intersection at Kurrajong Road.

Bernera Road looking north towards the signalised intersection at Kurrajong Road.

Kurrajong Road looking east towards the signalised intersection at Bernera Road.

Looking north over Kurrajong Road Pedestrian crossing, east leg.

Looking west over Bernera Road pedestrian crossing, south leg.

Kurrajong Road looking west towards the signalised intersection at Bernera Road.

Kurrajong Road looking west towards the HAE left turn slip.

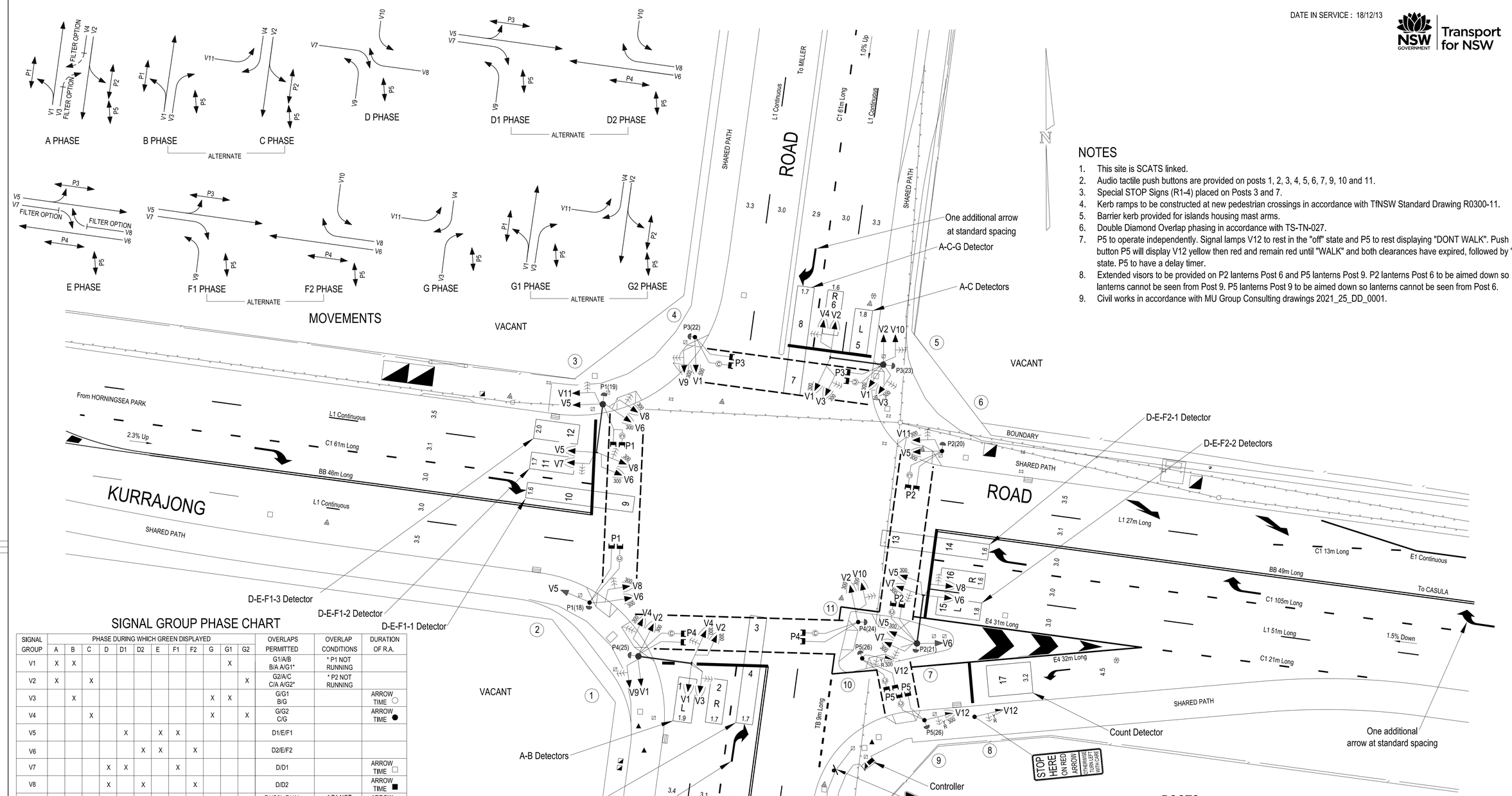
Kurrajong Road looking towards the eastbound merge.

Appendix A – TCS 4477 Design Layout

TCS 4477

DATE IN SERVICE : 18/12/13

NSW GOVERNMENT | Transport for NSW



NOTES

1. This site is SCATS linked.
2. Audio tactile push buttons are provided on posts 1, 2, 3, 4, 5, 6, 7, 9, 10 and 11.
3. Special STOP Signs (R1-4) placed on Posts 3 and 7.
4. Kerb ramps to be constructed at new pedestrian crossings in accordance with TfNSW Standard Drawing R0300-11.
5. Barrier kerb provided for islands housing mast arms.
6. Double Diamond Overlap phasing in accordance with TS-TN-027.
7. P5 to operate independently. Signal lamps V12 to rest in the "off" state and P5 to rest displaying "DONT WALK". Push button P5 will display V12 yellow then red and remain red until "WALK" and both clearances have expired, followed by "off" state. P5 to have a delay timer.
8. Extended visors to be provided on P2 lanterns Post 6 and P5 lanterns Post 9. P2 lanterns Post 6 to be aimed down so lanterns cannot be seen from Post 9. P5 lanterns Post 9 to be aimed down so lanterns cannot be seen from Post 6.
9. Civil works in accordance with MU Group Consulting drawings 2021_25_DD_0001.

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED												OVERLAPS PERMITTED	OVERLAP CONDITIONS	DURATION OF R.A.
	A	B	C	D	D1	D2	E	F1	F2	G	G1	G2			
V1	X	X									X		G1/A/B B/A A/G1*	* P1 NOT RUNNING	
V2	X		X									X	G2/A/C C/A A/G2*	* P2 NOT RUNNING	
V3		X								X	X		G/G1 B/G		ARROW TIME ○
V4			X							X		X	G/G2 C/G		ARROW TIME ●
V5					X		X	X					D1/E/F1		
V6						X	X		X				D2/E/F2		
V7				X	X			X					D/D1		ARROW TIME □
V8				X		X			X				D/D2		ARROW TIME ■
V9				X	X			X					F1/G2* F1/A* D/D1*	* P1 NOT DEMANDED	ARROW TIME ●
V10				X		X			X				F2/G1* F2/A* D/D2	* P2 NOT DEMANDED	ARROW TIME ○
V11			X							X		X	G/G2 C/D1* C/E*	* P3 NOT DEMANDED	ARROW TIME ■
V12															
P1	X	X									X		G1/A/B		
P2	X		X									X	G2/A/C		
P3					X		X	X					D1/E/F1		
P4						X	X		X				D2/E/F2		
P5	X	X	X	X	X	X	X	X	X	X	X	X			

■ R.A. PROTECTION EXTENDED BY P.B. ON POST 5 SUBJECT TO TIMER
○ R.A. PROTECTION EXTENDED BY P.B. ON POST 7 SUBJECT TO TIMER
● R.A. PROTECTION EXTENDED BY P.B. ON POST 3 SUBJECT TO TIMER
□ R.A. PROTECTION EXTENDED BY P.B. ON POST 1 SUBJECT TO TIMER

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	5XL	-	1.0	EXISTING
2	2	4.1	1.2	EXISTING
3	5L	-	0.9	EXISTING
4	2	4.1	1.0	EXISTING
5	5XL	-	1.0	EXISTING
6	2	4.1	1.5	EXISTING
7	5L	-	2.0	EXISTING
8	2	4.1	1.0	EXISTING
9	2	4.1	1.0	EXISTING
10	2	4.1	1.0	EXISTING
11	2	4.1	1.0	EXISTING

A ORIGINAL ISSUE

PUBLIC UTILITY LEGEND	
HYDRANT	□
STOP VALVE	▲
GAS VALVE	#
SEWER MANHOLE	⊕
COMMS PIT	◪
ELECT LIGHT POLE	○
POWER POLE	○
STAY POLE	⊘
TELEPHONE BOX	T
COMMS PILLAR	◪

REFERENCE PLANS	
SYMBOLS/ABRVS	VD003-6
STD POSN CMPT	VD001-5
INSTL STOP DET	VC005-17
VEH GROUP OP	TS-TN-019
DET LOGIC OP	TS-TN-020
PED MVT OP	TS-TN-021
SURVEYOR : LCC	
DATE : TBC	

U.B.D. Ref. Map 267 P12
I.S.G. CO-ORDS E : 287 630 N : 1 242 775

DESIGNED : STEVEN LUDENIA
CHECKED : TERRY LANCE
CLEMENTS SOOSAPILLA
SITE CHECKED
TERRY LANCE
RECOMMENDED

DESIGN APPROVAL
APPROVED
MATT MURPHY
NAME MATT MURPHY
POSITION MANAGING DIRECTOR
DATE 03/09/2021
DESIGN PREPARED BY
MU GROUP CONSULTING

TFNSW RECOMMENDATION
ROAD DESIGN ENGINEERING
NAME
POSITION
DATE
NETWORK OPERATIONS
NAME
POSITION
DATE

TFNSW ACCEPTANCE
ACCEPTED
NAME
POSITION
DATE
ACCEPTED BY
SECTION

TRANSPORT FOR NEW SOUTH WALES

LIVERPOOL COUNCIL AREA
TRAFFIC SIGNALS AT
KURRAJONG ROAD AND
BERNERA ROAD
PRESTONS

DESIGN LAYOUT

EXISTING ☐ PROPOSED ☒
CADD FILE: TFNSW TCS - BORDER_A1 - TFNSW.DGN
SCALE 5 0 (1:200) 5 10
ISSUE A
FILE SF2014/014736
SUPERSEDES SHEET/ISSUE 1/B
REG No. DS2014/004860
TCS No. 4477
SHEET X

16/09/2021 9:49:59 AM

Revision 7 - August 2021

© COPYRIGHT TRANSPORT FOR NSW

Appendix B – Traffic Signal Design Plan Checklist

TCS 4477 - Bernera Rd / Kurrajong Rd

 MU Group 3-9-21

DESIGN PLAN CHECKLIST

Evaluation
- ☐ Warrants
- ☐ Flows
- ☐ Delays
- ☐ Queue lengths
- ☐ Accidents
- ☐ Pedestrians
- ☐ Future development
- ☐ Political
- ☐ Alternatives (roundabout, signs, channelisation)

Phasing
- ☐ Recent traffic count
- ☐ Accident correction
- ☐ Pedestrian needs
- ☐ Conflicts
- ☐ Left turn on red
- ☐ Future implications (other sites)
- ☐ Suits controller
- ☐ Bus needs
- ☐ Bicycle needs

Turn bans
- ☐ Alternative routes
- ☐ Effect on other locations
- ☐ Bus route
- ☐ Effect on other users (pedestrians/bicycles)

Simulation
- ☐ Phase/cycle times
- ☐ Delays
- ☐ Queue lengths
- ☐ Blockages
- ☐ Capacity

Title block
- ☑ Registration No.
- ☑ Sheet No. (TFNSW to issue)
- ☑ Issue No.
- ☑ Superseded plan or sheet No.
- ☑ Amendment details (for job instruction)
- ☑ File No.
- ☑ LGA, Shire, municipality or city
- ☑ Main Road No. and street names
- ☑ Suburb
- ☑ Region or Division
- ☑ UBD reference
- ☑ Reference plans

Job Instruction details
- ☐ Issue No.
- ☐ Job Instruction No.
- ☐ Amendment details
- ☐ Date
- ☐ Initials

Base plan
- ☑ Kerb lines and/or edge of pavement
- ☑ Gutter crossings
- ☑ Stormwater grates and inlets
- ☑ Property boundaries, fences
- ☑ Footpaths
- ☑ Poles, pillars, pits, public utilities
- ☑ Bus stops, shelters, seats, telephone booths, gardens, garbage bins
- ☒ Awnings
- ☑ Overhead wires
- ☑ Tree trunks and spread of foliage
- ☑ North point
- ☑ Main Road Nos. and street names
- ☑ Approach grades
- ☑ "To" and "From"
- ☑ Date in Service
- ☑ Compare road construction plan
- ☒ Compare old traffic signal plan
- ☒ Transparency for cable installation and duct plan

Locality sketch
- ☐ Orientation
- ☐ North point
- ☐ Other sites
- ☐ ISG coordinates

Movement diagrams
per existing
- ☑ Movements
- ☑ Approach numbers
- ☑ Phase labels
- ☑ Future phasing
- ☑ Normal and alternative sequence

Medians
- ☑ Alignment
- ☑ Length
- ☑ Width at post
- ☒ Nose radius
- ☒ Widths for pedestrian/bicycle movements
- ☒ Width for pedestrian/bicycle storage
- ☒ Minimum length of nose

Appendix C

- ☑ Turning paths (clearance width for opposed turns)
- ☑ Setting out dimensions

Islands

- ☑ Turning paths
- ☑ Offsets
- ☑ Clearance for posts
- ☑ Pedestrian/bicycle storage and passage
- ☑ Barrier kerb (type 6 post or mast arm)
- ☒ Setting out dimensions

Marked foot crossings

- ☑ Warrants (flows, schools, shops)
- ☑ Clearance from vehicular conflict
- ☑ Width (flows, platoons)
- ☑ Length (two-stage - corner island or mid-block staggered)
- ☑ Angle
- ☒ Pedestrian crossings (zebra)
- ☒ Setting out dimensions

Stop lines

- ☑ Distance apart (clearance times)
- ☑ Clearance from marked foot crossing
- ☑ Clearance from vehicular conflict
- ☑ Distance to starter lantern
- ☑ Angle
- ☒ Setting out dimensions
- ☒ Bicycle storage area

Pavement marking

- ☑ Lane lines (approach, departure, width, length)
- ☑ Barrier lines
- ☑ Continuity lines
- ☑ Edge lines
- ☒ Turn lines
- ☒ Painted islands and medians
- ☑ Chevrons
- ☑ Arrows
- ☒ Bicycle pavement markings

Lanterns

- ☑ Number per approach
- ☑ Obstructions (trees, poles)
- ☑ Sight distance (curve, crest)
- ☑ Size
- ☑ Phase label or signal group number
- ☒ Identification of signal groups for lamp monitoring
- ☑ Visors (type, length, cut-off angle, trains)
- ☒ Louvres (horizontal or vertical)
- ☒ Special mounting height
- ☒ Special mounting straps or brackets
- ☑ Pedestrian lanterns
- ☒ Bus lanterns
- ☒ Bicycle lanterns — added to connect shared paths
- ☒ Tram lanterns
- ☑ Special signal group display sequence table or signal group/phase chart or sequence table

Posts

- ☑ Position (stop line, marked foot crossing, clearance from kerb)
- ☑ Height (awning, overhead wires)
- ☑ Numbering
- ☑ Type (need for mast arm or type 6)
- ☒ Special footing
- ☒ Post chart (reconstruction)
- ☒ Concurrence for joint use of poles
- ☒ Setting out dimensions — no new posts

Signs

- ☒ No right turn
- ☒ No left turn
- ☒ No U-Turn
- ☒ No entry
- ☒ One-way streets
- ☒ Left turn on red
- ☑ Turn left at any time with care
- ☒ Give way to pedestrians
- ☒ Turn bans
- ☑ Special stop signs
- ☑ Stop here on red signal
- ☒ Scramble crossing
- ☒ Signs on type 6 posts and mast arms

Vehicle detectors

- ☑ Type (stop line, queue, advance, violation, special counting, microwave)
- ☑ Phase label
- ☑ Lane label
- ☑ Numbering
- ☑ Orientation
- ☑ Width
- ☑ Distance from stop line — Det 5 located to avoid services
- ☑ Detector Specification Schedule
- ☒ Logic special notes

Pedestrian push-button detectors

- ☑ Orientation
- ☑ Audio-tactile (one per post)
- ☑ Phase label
- ☑ Numbering

Controller

- ☑ Supply
- ☑ Type (ground-mounted or post-mounted)
- ☑ View of approaches
- ☐ Access for maintenance
- ☐ Safe from accidents
- ☐ Noise (residential)
- ☐ Above flood level
- ☐ Telecom access for SCATS
- ☐ Clear of future roadworks
- ☐ Clear of high voltage earthed situations
- ☐ Not obstructing road reserve

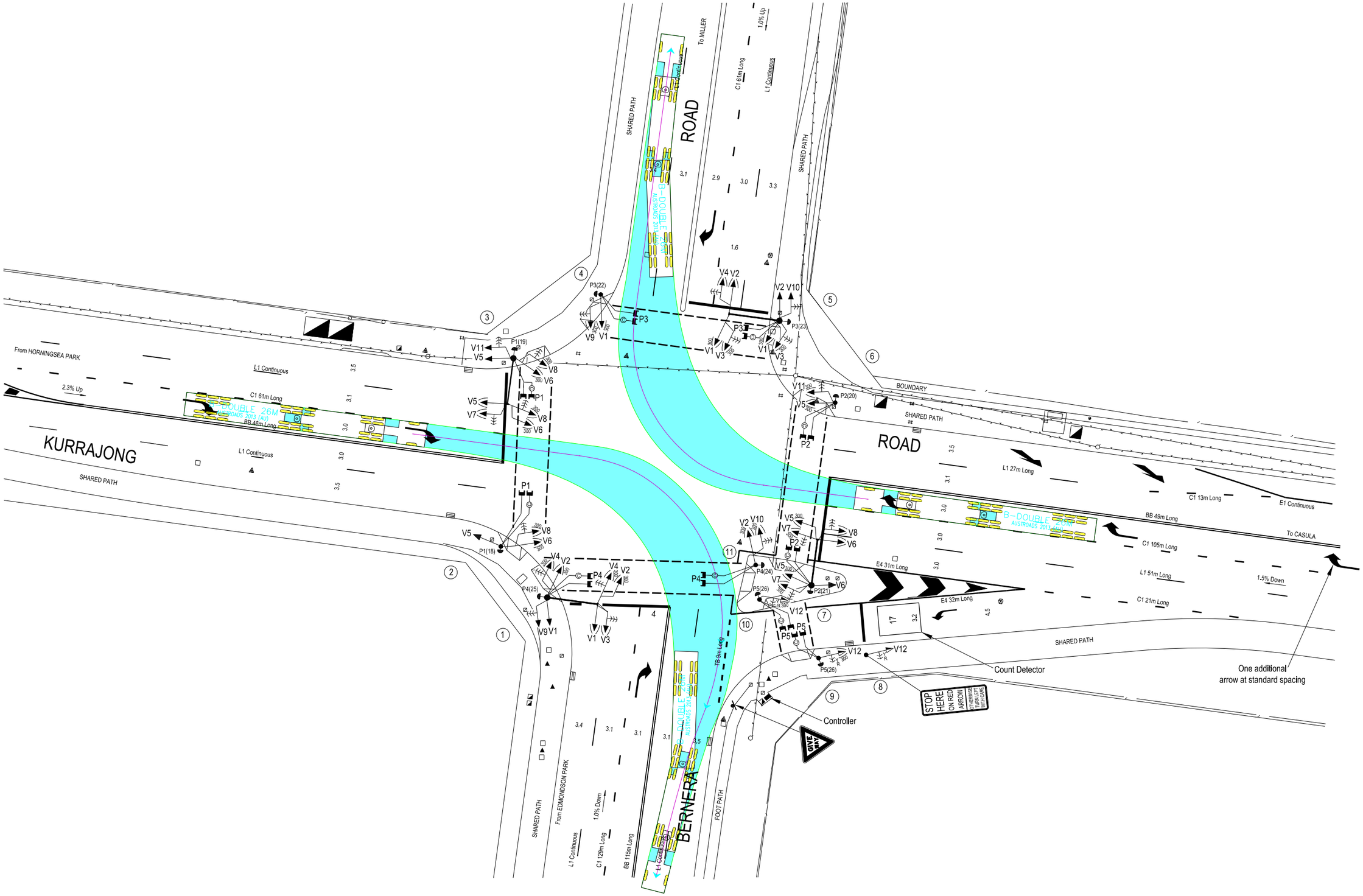
Special facilities

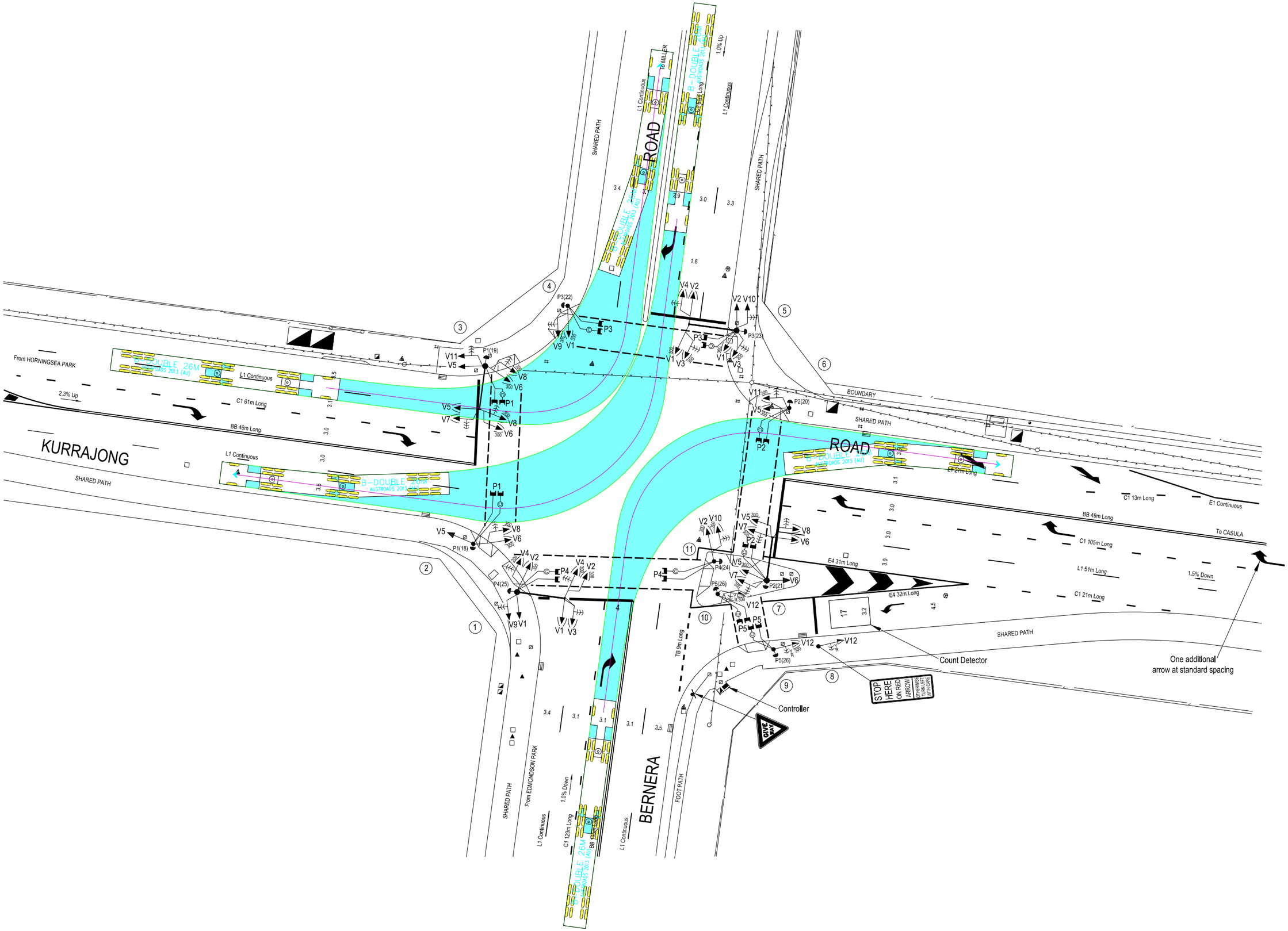
- ☐ Emergency service (fire/ambulance) facilities
- ☐ Railway level crossing
- ☐ Bicycles/cycleways
- ☐ Buses
- ☐ Transitways
- ☐ Trams

Notes

- ☑ Reference to road construction plans
- ☒ Reference to other sheets
- ☒ Adjustment to kerbs, medians, islands
- ☒ Pavement improvement or resheeting
- ☑ Construction of kerb ramps
- ☒ Special post details
- ☑ Special lantern details
- ☒ Asterisk for lamp monitoring
- ☑ Location of audio-tactile push buttons
- ☑ Location of special stop signs
- ☑ Coordination details
- ☒ Arterial
- ☒ Provision for future facilities

Appendix C – Turning Path Checks

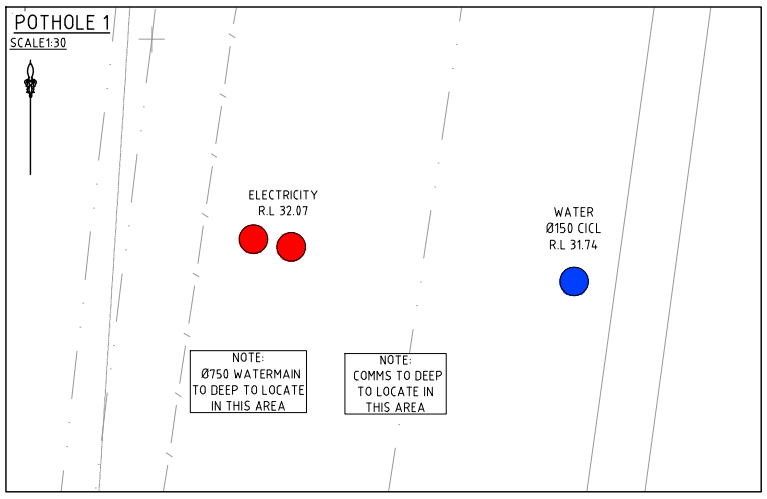

KURRAJONG
ROAD
BERNERA
ROAD
From HORNINGSEA PARK
From EDMONDSON PARK
To MILLER
To CASULA
SHARED PATH
FOOT PATH
BOUNDARY
L1 Continuous
C1 61m Long
BB 46m Long
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE
AUSTROADS 2013 (AU)
C1 129m Long
BB 115m Long
TB 9m Long
L1 27m Long
C1 13m Long
E1 Continuous
BB 49m Long
C1 105m Long
L1 51m Long
C1 21m Long
E4 31m Long
E4 32m Long
2.3% Up
1.0% Up
1.0% Down
1.5% Down
Count Detector
One additional
arrow at standard spacing
Controller
STOP
HERE
ON RED
ARROW
OTHERWISE
PROCEED
WITH
CARE
GIVE
WAY


KURRAJONG
ROAD
BERNERA
ROAD
From HORNINGSEA PARK
From EDMONDSON PARK
To MILLER
To CASULA
BOUNDARY
SHARED PATH
FOOT PATH
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE 26M
AUSTROADS 2013 (AU)
B-DOUBLE 26M
AUSTROADS 2013 (AU)
L1 Continuous
C1 61m Long
BB 46m Long
C1 128m Long
BB 53m Long
TB 9m Long
E1 27m Long
C1 13m Long
BB 49m Long
C1 105m Long
L1 51m Long
C1 21m Long
E4 31m Long
E4 32m Long
2.3% Up
1.0% Up
1.0% Down
1.5% Down
P1(18)
P1(19)
P2(20)
P2(21)
P3(22)
P3(23)
P4(24)
P4(25)
P5(26)
Count Detector
Controller
One additional arrow at standard spacing
STOP HERE ON RED ARROW
OTHERWISE PROCEED WITH CARE
GIVE WAY

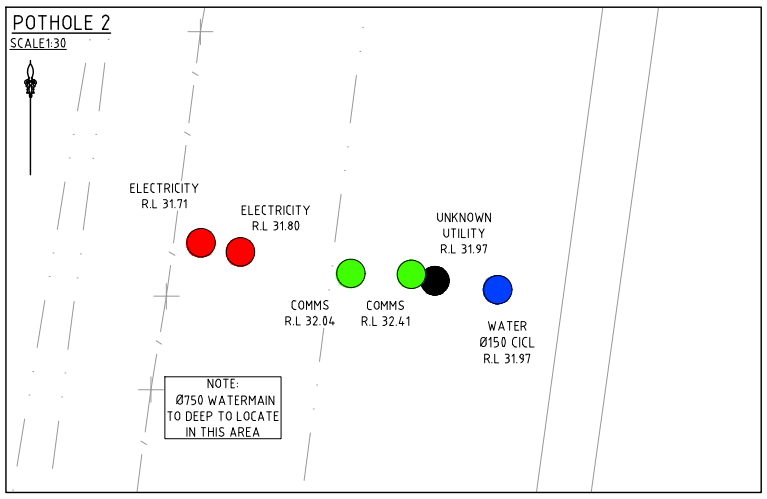
Appendix F – Utility Survey

DRAFT

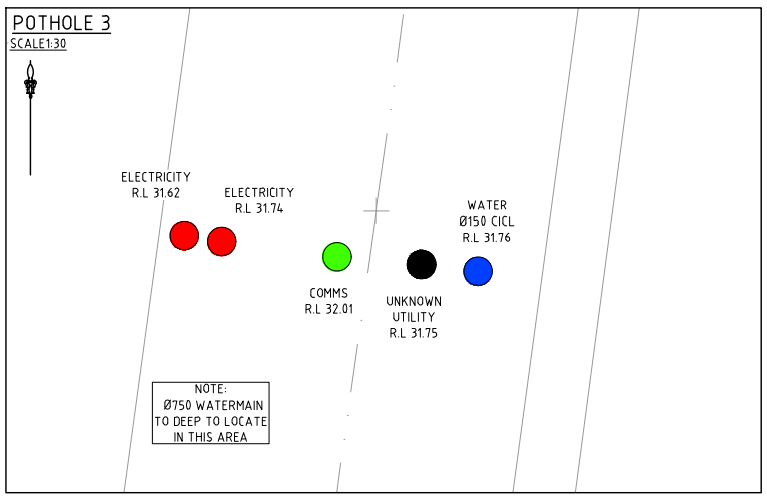
POTHOLE 1
SCALE1:30



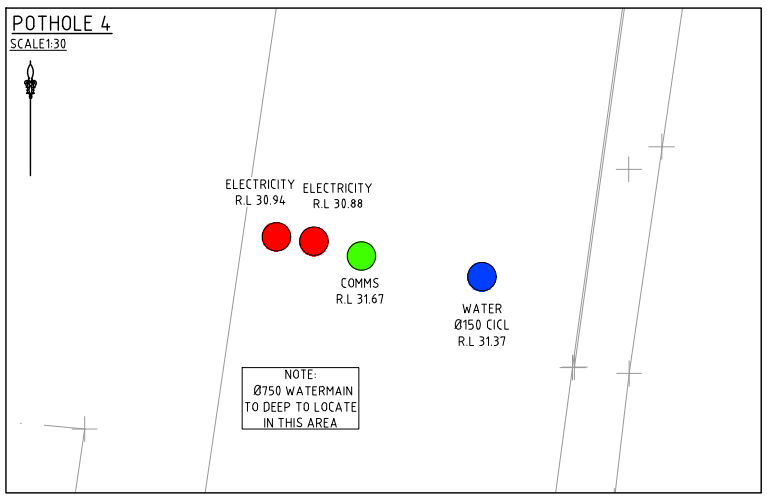
POTHOLE 2
SCALE1:30



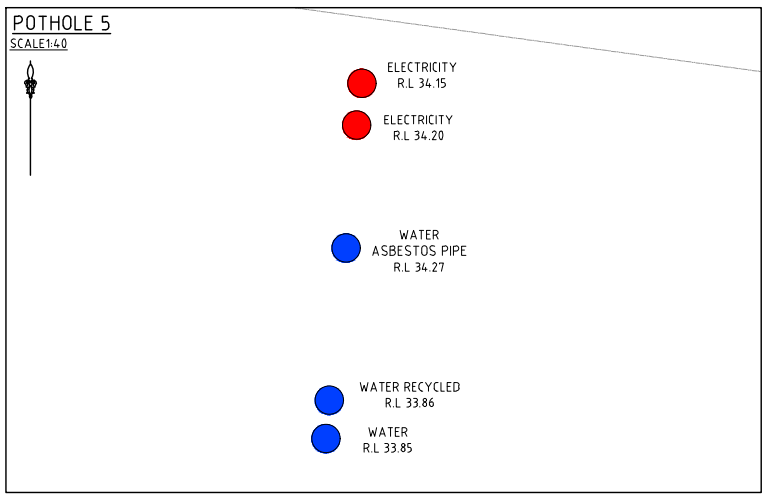
POTHOLE 3
SCALE1:30



POTHOLE 4
SCALE1:30



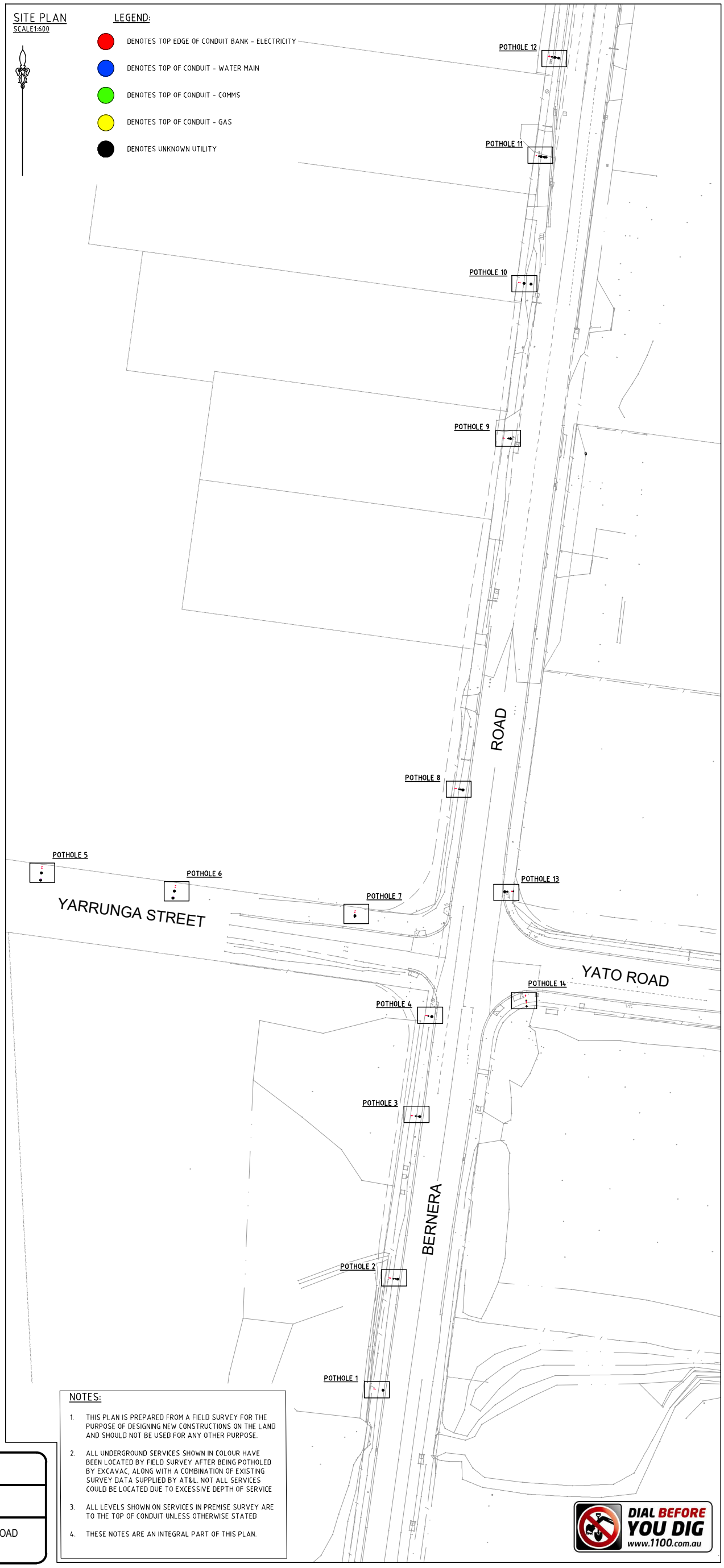
POTHOLE 5
SCALE1:40



SITE PLAN
SCALE1:600

LEGEND:

- DENOTES TOP EDGE OF CONDUIT BANK - ELECTRICITY
- DENOTES TOP OF CONDUIT - WATER MAIN
- DENOTES TOP OF CONDUIT - COMMS
- DENOTES TOP OF CONDUIT - GAS
- DENOTES UNKNOWN UTILITY



NOTES:

1. THIS PLAN IS PREPARED FROM A FIELD SURVEY FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. ALL UNDERGROUND SERVICES SHOWN IN COLOUR HAVE BEEN LOCATED BY FIELD SURVEY AFTER BEING POTHOLED BY EXCAVAC, ALONG WITH A COMBINATION OF EXISTING SURVEY DATA SUPPLIED BY AT&L. NOT ALL SERVICES COULD BE LOCATED DUE TO EXCESSIVE DEPTH OF SERVICE
3. ALL LEVELS SHOWN ON SERVICES IN PREMISE SURVEY ARE TO THE TOP OF CONDUIT UNLESS OTHERWISE STATED
4. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

DRAWING SCALE

REFER TO INDIVIDUAL
DRAWING/SECTION SCALES

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: LIVERPOOL CITY COUNCIL

CLIENT: EXCAVAC POTHOLING

PROJECT: INTERSECTION OF BERNERA & YATO ROAD
PRESTONS

REV.	DATE	DFTD.	APPD.	DETAILS
A	17/01/2022	AS	WS	ISSUED FOR INFORMATION

	FILE	INITIALS	DATE
SURVEY	319184 D220114.DWG	AS	14/01/2022
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

STRUCTURAL, CIVIL, PLANNING, SURVEYING, ARCHITECTURE & ENVIRONMENTAL

Premise

SUITE 301, LEVEL 3
ORAN PARK PODIUM
351 ORAN PARK DRIVE,
ORAN PARK, NSW 2570
Ph. (02) 4632 6500

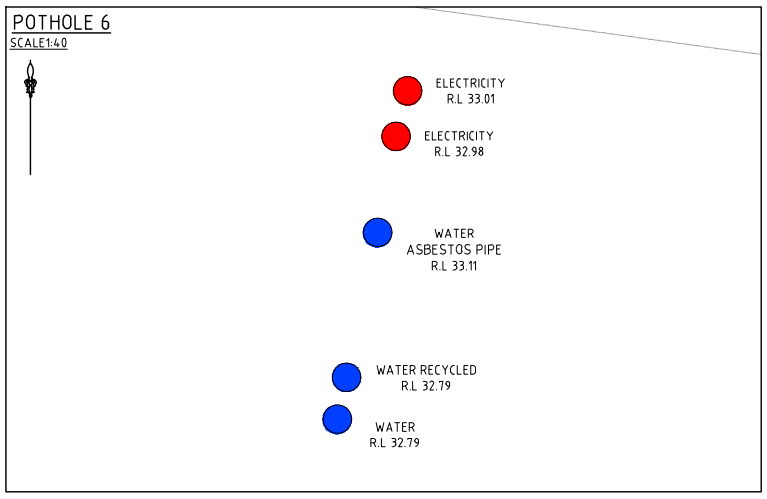
www.premise.com.au

DRAWING

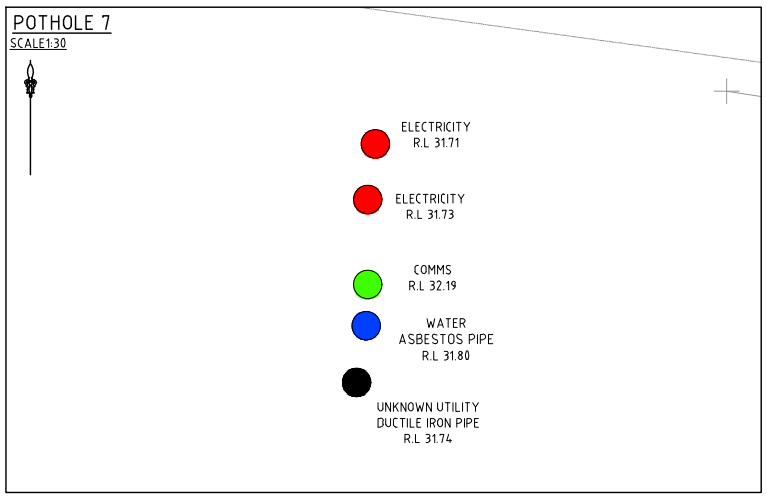
SURVEY OF POTHOLED SERVICES
CNR BERNERA & YATO ROAD

PROJECT NUMBER 319184	DRAWING FILE 319184_02A DS01-DS03.dwg	ORIGINAL A1
SURVEY MARK SSM 167936	R.L. 31.78 DATUM A.H.D.	
IMAGE SOURCE		SET 02
STATUS FOR REVIEW	SHEET DS01 OF DS03	

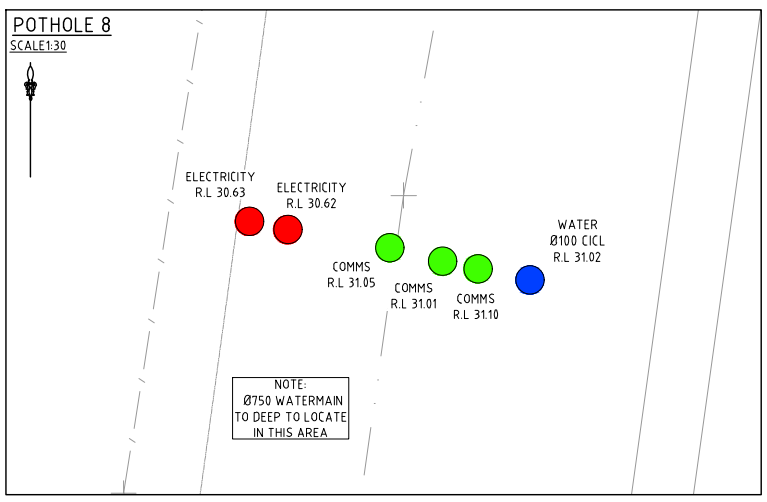
POTHOLE 6
SCALE1:40



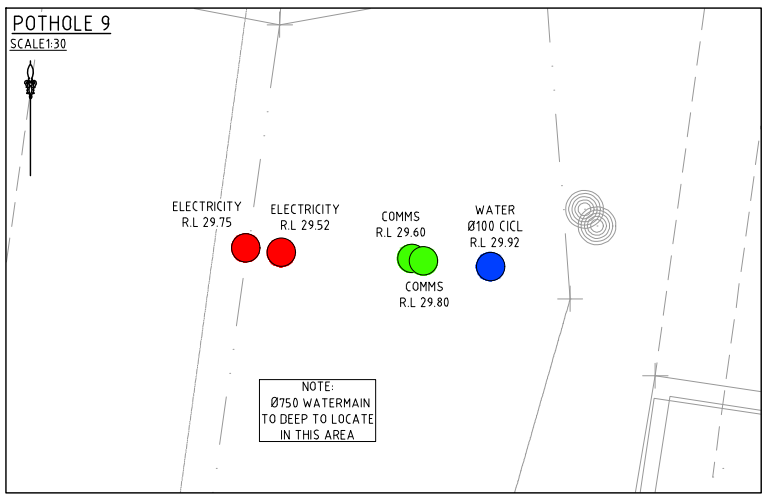
POTHOLE 7
SCALE1:30



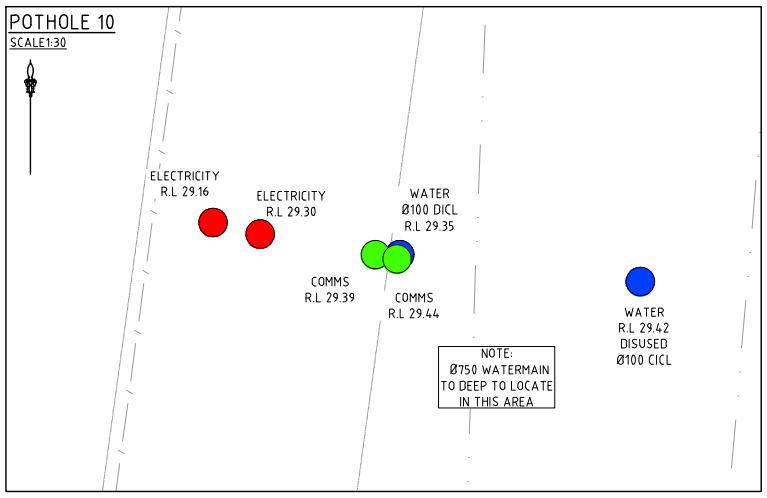
POTHOLE 8
SCALE1:30



POTHOLE 9
SCALE1:30



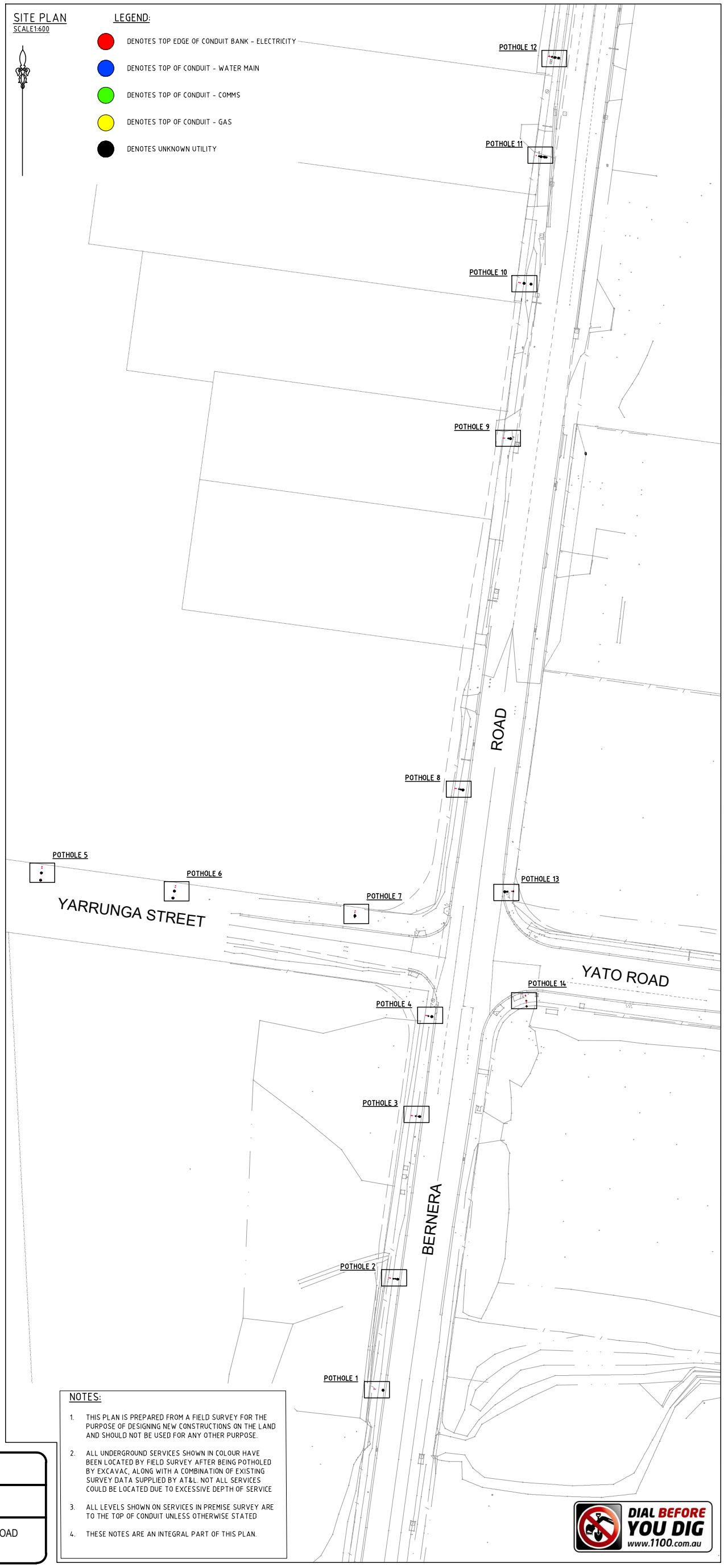
POTHOLE 10
SCALE1:30



SITE PLAN
SCALE1:600

LEGEND:

- DENOTES TOP EDGE OF CONDUIT BANK - ELECTRICITY
- DENOTES TOP OF CONDUIT - WATER MAIN
- DENOTES TOP OF CONDUIT - COMMS
- DENOTES TOP OF CONDUIT - GAS
- DENOTES UNKNOWN UTILITY



NOTES:

1. THIS PLAN IS PREPARED FROM A FIELD SURVEY FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. ALL UNDERGROUND SERVICES SHOWN IN COLOUR HAVE BEEN LOCATED BY FIELD SURVEY AFTER BEING POTHOLED BY EXCAVAC, ALONG WITH A COMBINATION OF EXISTING SURVEY DATA SUPPLIED BY AT&L. NOT ALL SERVICES COULD BE LOCATED DUE TO EXCESSIVE DEPTH OF SERVICE
3. ALL LEVELS SHOWN ON SERVICES IN PREMISE SURVEY ARE TO THE TOP OF CONDUIT UNLESS OTHERWISE STATED
4. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

DRAWING SCALE

REFER TO INDIVIDUAL DRAWING/SECTION SCALES

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: LIVERPOOL CITY COUNCIL

CLIENT: EXCAVAC POTHOLING

PROJECT: INTERSECTION OF BERNERA & YATO ROAD PRESTONS

REV.	DATE	DFTD.	APPD.	DETAILS
A	17/01/2022	AS	WS	ISSUED FOR INFORMATION

	FILE	INITIALS	DATE
SURVEY	319184 D220114.DWG	AS	14/01/2022
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL	AWSaunders	-	-

STRUCTURAL, CIVIL, PLANNING, SURVEYING, ARCHITECTURE & ENVIRONMENTAL

Premise

SUITE 301, LEVEL 3
ORAN PARK PODIUM
351 ORAN PARK DRIVE,
ORAN PARK, NSW 2570
Ph. (02) 4632 6500

www.premise.com.au

DRAWING: SURVEY OF POTHOLED SERVICES CNR BERNERA & YATO ROAD

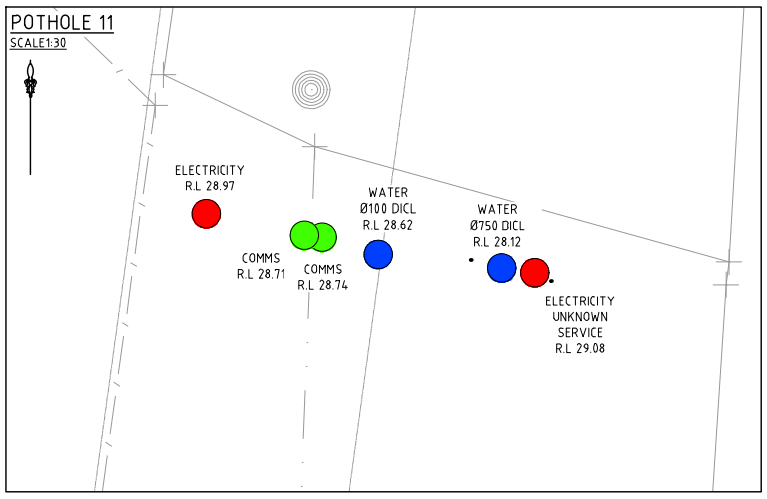
PROJECT NUMBER 319184 | DRAWING FILE 319184_02A DS01-DS03.dwg | ORIGINAL A1

SURVEY MARK SSM 167936 | R.L. 31.78 | DATUM A.H.D.

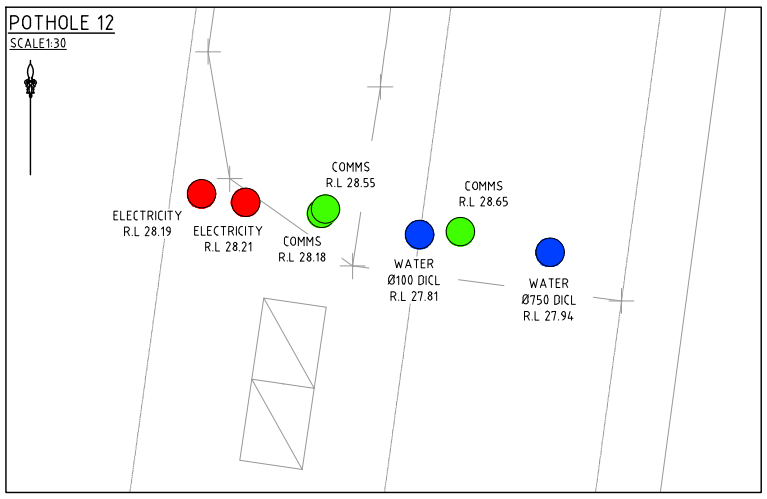
IMAGE SOURCE

STATUS FOR REVIEW | SHEET DS02 OF DS03 | SET 02

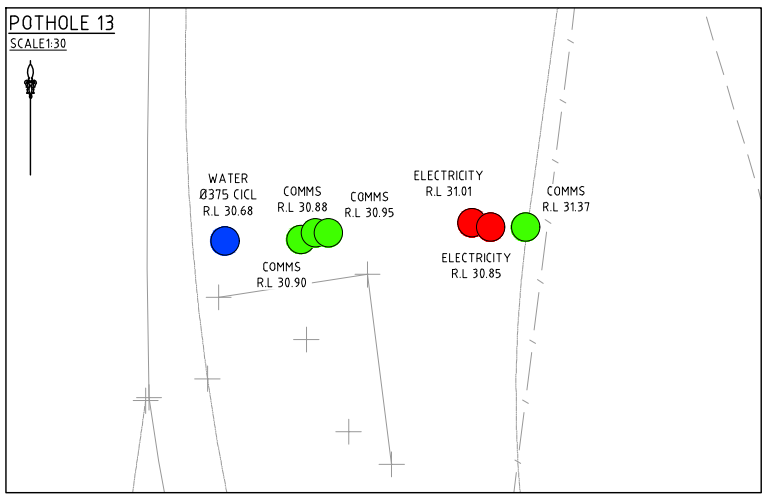
POTHOLE 11
SCALE1:30



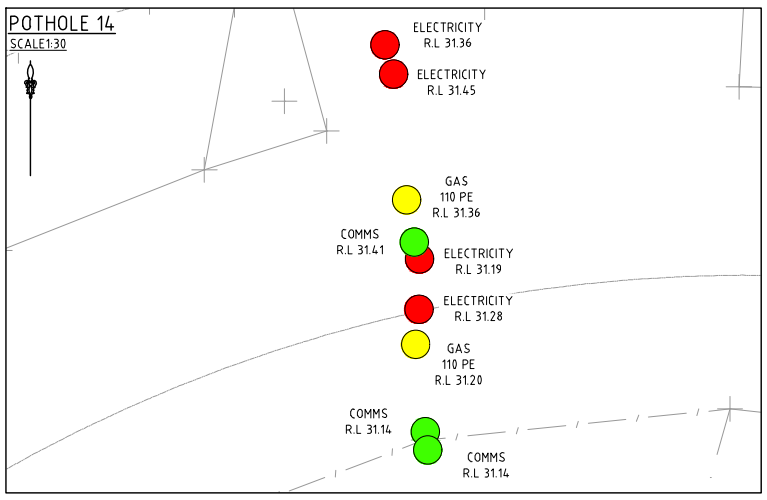
POTHOLE 12
SCALE1:30



POTHOLE 13
SCALE1:30



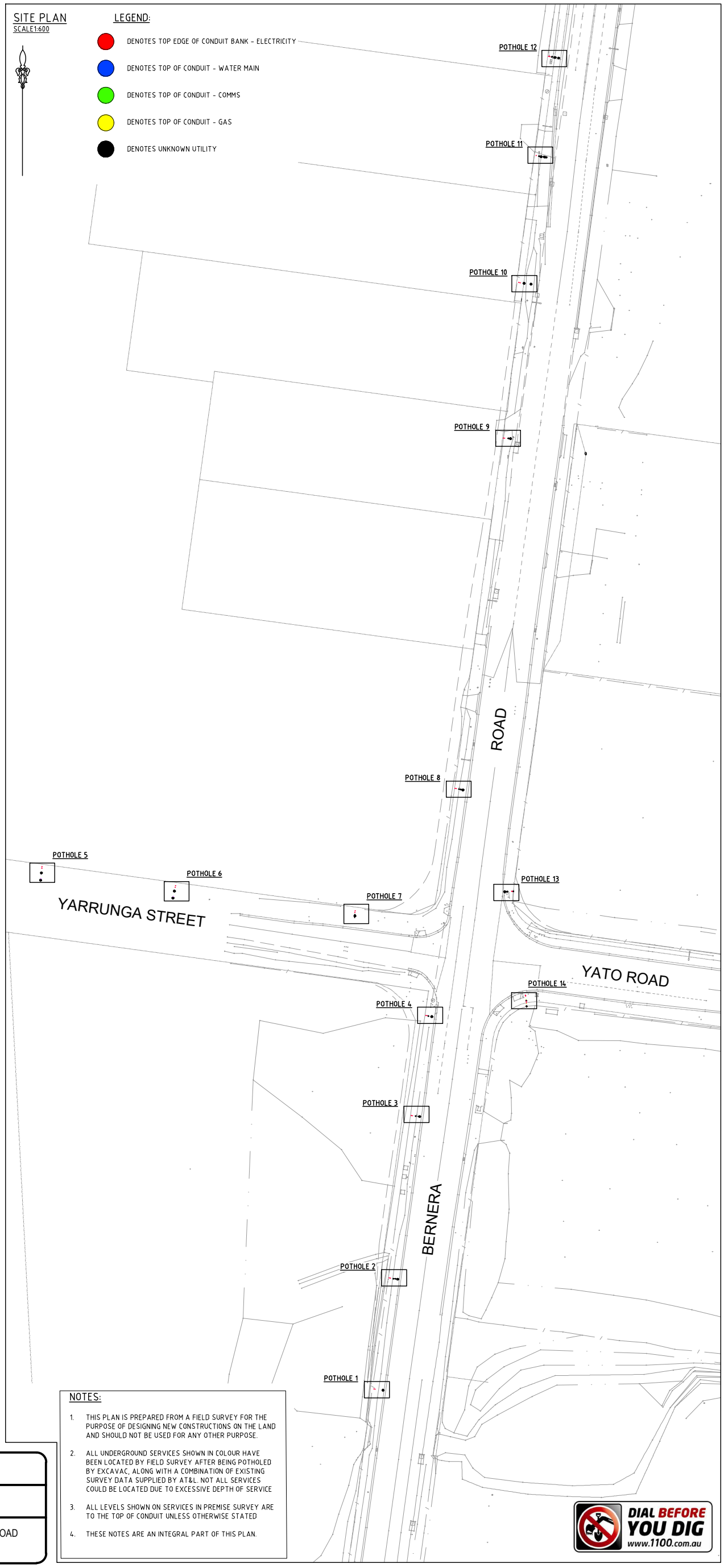
POTHOLE 14
SCALE1:30



SITE PLAN
SCALE1:600

LEGEND:

- DENOTES TOP EDGE OF CONDUIT BANK - ELECTRICITY
- DENOTES TOP OF CONDUIT - WATER MAIN
- DENOTES TOP OF CONDUIT - COMMS
- DENOTES TOP OF CONDUIT - GAS
- DENOTES UNKNOWN UTILITY



NOTES:

1. THIS PLAN IS PREPARED FROM A FIELD SURVEY FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS ON THE LAND AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. ALL UNDERGROUND SERVICES SHOWN IN COLOUR HAVE BEEN LOCATED BY FIELD SURVEY AFTER BEING POTHOLED BY EXCAVAC, ALONG WITH A COMBINATION OF EXISTING SURVEY DATA SUPPLIED BY AT&L. NOT ALL SERVICES COULD BE LOCATED DUE TO EXCESSIVE DEPTH OF SERVICE
3. ALL LEVELS SHOWN ON SERVICES IN PREMISE SURVEY ARE TO THE TOP OF CONDUIT UNLESS OTHERWISE STATED
4. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

DIAL BEFORE YOU DIG
www.1100.com.au

DRAWING SCALE

REFER TO INDIVIDUAL DRAWING/SECTION SCALES

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: LIVERPOOL CITY COUNCIL

CLIENT: EXCAVAC POTHOLING

PROJECT: INTERSECTION OF BERNERA & YATO ROAD PRESTONS

REV.	DATE	DFTD.	APPD.	DETAILS
A	17/01/2022	AS	WS	ISSUED FOR INFORMATION

	FILE	INITIALS	DATE
SURVEY	319184 D220114.DWG	AS	14/01/2022
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

STRUCTURAL, CIVIL, PLANNING, SURVEYING, ARCHITECTURE & ENVIRONMENTAL

Premise

SUITE 301, LEVEL 3
ORAN PARK PODIUM
351 ORAN PARK DRIVE,
ORAN PARK, NSW 2570
Ph. (02) 4632 6500

www.premise.com.au

DRAWING: SURVEY OF POTHOLED SERVICES CNR BERNERA & YATO ROAD

PROJECT NUMBER 319184 | DRAWING FILE 319184_02A DS01-DS03.dwg | ORIGINAL A1

SURVEY MARK SSM 167936 | R.L. 31.78 | DATUM A.H.D.

IMAGE SOURCE | SET 02

STATUS FOR REVIEW | SHEET DS03 OF DS03

Appendix G1 – Geotechnical and Pavement Test Results

DRAFT

GEOTECHNIQUE®
PTY LTD

ABN 64 002 841 063

Job No: 14954/1
Our Ref: 14954/1-AA
26 November 2021

MU Group Consulting
Level 4, 23-33 Mary Street
SURRY HILLS NSW 2010
Email: john.kalantzis@mugroup.com.au

Attention: Mr J Kalantziz

Dear Sir

re: **Proposed Road Upgrade**
Bernera Road (Between Kurrajong Road and Yarrunga Street/Yato Road), Prestons
Fee Proposal – Geotechnical Investigation

This report provides the results of a geotechnical investigation carried out for the proposed upgrade of Bernera Road, Prestons, hereafter referred to as the site.

We understand that Liverpool City Council is proposing to upgrade about 680.0m long section of Bernera Road (Between Kurrajong Road and Yarrunga Street/Yato Road), and about 250.0m long section of Yarrunga Street/Yato Road at Prestons. The upgrade works will include widening the roads as well as upgrading the intersection between Bernera Road and Yarrunga Street/Yato Road and construction of retaining walls. Maps showing approximate extent of proposed upgrade works was provided for preparation of this report.

A geotechnical investigation was required for the following:

- To assess composition and thickness of existing pavement for the sections of roads proposed to be upgraded.
- To assess conditions of subgrades within the extent of proposed road widening in order to provide an indicative California Bearing Ratio (CBR) for design of pavement.
- To provide recommended pavement designs for the proposed road widening.
- To assess foundation conditions for the proposed retaining wall and provide geotechnical recommendation on design of retaining wall footings.

Scope of Works
The scope of works for the proposed pavement investigation included the following:

- Reviewing available geological and soil landscape maps relevant to the site.
- Reviewing conceptual design drawings for the proposed road upgrade works.
- Carrying out a walk over survey to assess existing site conditions.

- Reviewing services plans to determine locations of services within the section of road to be widened.
- Preparing a Traffic Management Plan (TMP) and obtaining Road Occupancy Licence (ROL) and Road Opening Licence (ROP) with permission to drill boreholes.
- Drilling boreholes to assess subsurface conditions.
- Carrying out laboratory tests on representative soil samples to determine properties of subgrade soils.
- Preparation of a report with geotechnical recommendations for the proposed road upgrade works.

Available Information

Reference to the Geological Map of Penrith (scale 1:100,000) indicates that the bedrock at the site is Bringelly Shale, belonging to the Wianamatta Group of rocks and comprising shale, carbonaceous claystone, laminite, fine to medium grained lithic sandstone, and rare coal.

Reference to the Soil Landscape Map of Penrith (scale 1:100,000) indicates that the landscape at the site belongs to Blacktown Group, which is characterised with gently undulating rises on Wianamatta Group shales, with local relief to 30.0m, ground slope of less than 5 percent and broad rounded crests. The sub-surface soil within this landscape is likely to be up to 3.0m thick, moderately reactive, highly plastic and with poor drainage.

Reference to Map showing Salinity Potential in Western Sydney (Scale Approximate 1:143,000) prepared by Department of Infrastructures, Planning and Natural Resources (2002) indicates moderate salinity potential at the site.

Field Works

Field works for the proposed geotechnical investigation were carried out 28 September and 5 October 2021 and involved the following:

- Tool box meetings every working day to brief Safe Work Method statement (SWMS) and scope of works to sub-contractors including traffic controller, services locator, concrete corer, excavator operator etc.
- Reviewing services plans obtained from “Dial Before You Dig” to identify locations of existing underground services within and in the vicinity of the site.
- Managing traffic along the Bernera Road and Yarrunga Street/Yato Road in accordance with approved TMP and ROL during entire field work duration. A specialist traffic controller, who prepared the TMP and obtained the ROL, was responsible for managing the traffic.
- Carrying out a walkover survey to assess existing site conditions and locate borehole locations nominated by MU Group. A Google Map showing nominated borehole locations was provided for preparation of this report. Borehole locations were nominated with aim of assessing: (1) existing road pavement; (2) subgrade for proposed road widening; and (3) foundation conditions for proposed retaining wall.
- Scanning nominated borehole locations with aim of avoiding damages to existing underground services during borehole drilling. We engaged a specialist services locator for this purpose. Some of MU Group nominated borehole locations had to be relocated (moved) due to presence of underground services.

- Drilling 12 boreholes (BH1 to BH13, excluding BH9) using an auger mounted on a bobcat. Borehole BH9 was abandoned due to proximity to underground services. Boreholes were terminated at depth of about 1.5m to 1.7m from existing ground surface. Approximate borehole locations are indicated on attached Drawing No 14954/1-AA1. Borehole logs are also attached.
- Carrying out Dynamic Cone Penetrometer (DCP) tests adjacent boreholes to assess strength of subgrade materials. DCP tests were terminated at refusal at depth of about 1.0m from existing ground/road surface. DCP test results are included in appropriate borehole logs.
- Collecting representative samples from boreholes for visual assessment and laboratory tests.
- Measuring the depths to groundwater levels or seepages in boreholes, where encountered.
- Backfilling the boreholes with recovered materials after logging and sampling. However, the cored holes were backfilled with about 300mm of cold mix compacted in several layers.

Field works were carried out in accordance with Safe Work Method Statement (SWMS) and supervised by a Field Engineer from this company, responsible for identifying borehole locations, conducting DCP testing, sampling and preparation of field logs.

Subsurface Conditions

The subsurface profiles encountered in cored holes and boreholes are detailed in attached borehole logs and summarised below in Table 1.

Table 1 – Subsurface Profiles encountered in Boreholes

Borehole No	Easting (m)	Northing (m)	Ground Surface RL (m AHD)	Termination Depth (m)	Thickness of AC (mm)	Depth Range for Fill (m)	Depth to Natural Soils (m)
BH1	302770.6	6242650	37.252	1.5	-	0.00-1.2	1.2
BH2	302812.6	6242641	35.968	1.5	100.0	0.10-1.3	1.3
BH3	302864.1	6242637	34.260	1.5	-	0.00-1.3	1.3
BH4	302898.9	6242632	33.276	1.7	-	0.00-1.3	1.3
BH5	302912.2	6242629	32.962	1.7	100.0	0.10-1.3	1.3
BH6	302971.6	6242669	31.443	1.6	70.0	0.07-1.0	1.0
BH7	302974.2	6242703	31.039	1.5	200.0	0.20-1.1	1.1
BH8	302990.8	6242810	29.827	1.5	200.0	0.20-0.7	0.7
BH10	303015.8	6242617	31.798	1.7	50.0	0.05-1.5	1.5
BH11	302961.5	6242573	32.431	1.7	50.0	0.05-1.3	1.3
BH12	302946.7	6242464	33.779	1.8	80.0	0.08->1.8	-
BH13	302920.1	6242292	37.879	1.5	80.0	0.08-0.7	0.7

Boreholes BH6 to BH8 and BH11 to BH13 were drilled along Bernera Road and remaining boreholes, BH1 to BH5 and BH10, were drilled along Yarrunga Street/Yato Road.

Boreholes indicate that the Bernera Road pavement as well as Yarrunga Street/Yato Road pavement has been constructed on filled subgrade. Thickness of fill along Bernera Road varies from about 1.0m to more than 1.8m from road surface and that along Yarrunga Street/Yato Road is about 1.3m from road surface. The subsurface profile within the footprint of proposed road widening comprises about 1.5m to 2.0m thick fill underlain by natural soils. In general, the subsurface materials encountered in boreholes may be described as follows.

Fill	Clayey GRAVEL, Sandy GRAVEL, fine to medium grained, sub-angular gravel, low plasticity clay, fine to medium grained sand Gravelly CLAY, Silty CLAY, medium to high plasticity, grey, orange, brown Crushed SANDSTONE
Natural Soils	Silty CLAY, Sandy CLAY, high plasticity, grey, moisture content equal to/or higher than plastic limit, firm to very stiff.

Fill encountered in boreholes include roadbase materials, sub-base materials and subgrade. Assessed thicknesses of each fill material types are presented below in Table 2.

Table 2 – Subsurface Profiles encountered in Boreholes

Borehole No	Ground Surface RL (m AHD)	Termination Depth (m)	Thickness of AC(mm)	Thickness of Road Base (mm)	Thickness of Sub-Base (mm)	Depth to Natural Soils (m)
BH1	37.252	1.5	-	100	200	1.2
BH2	35.968	1.5	100.0	200	1000	1.3
BH3	34.260	1.5		100	1200	1.3
BH4	33.276	1.7	-		500	1.3
BH5	32.962	1.7	100.0	100	400	1.3
BH6	31.443	1.6	70.0	550	450	1.0
BH7	31.039	1.5	200.0	200	400	1.1
BH8	29.827	1.5	200.0	500	-	0.7
BH10	31.798	1.7	50.0	450	-	1.5
BH11	32.431	1.7	50.0	150	-	1.3
BH12	33.779	1.8	80.0	220	900	-
BH13	37.879	1.5	80.0	320	300	0.7

Groundwater

Groundwater level was not encountered up to borehole termination depths of 1.5m to 1.8m from existing ground surface. However, minor seepage was encountered in two boreholes (BH3 and BH4) at the depths of 0.7m to 0.9m. It is our assessment that observed seepage indicates surface water infiltration and not a regional groundwater. The depth to groundwater level within the footprint of the proposed road upgrade works is anticipated to be more than 1.5m under normal climatic conditions. However, it should be noted that fluctuations in the level of groundwater/seepage might occur due to variations in rainfall and/or other factors not evident during drilling.

Laboratory Test

Representative samples of subsurface soils recovered from boreholes were tested in NATA Accredited laboratories of Geotech Testing Pty Ltd and SGS Environmental Services, to determine the following:

- Physical properties to assess nature of soils in terms of reactivity, maximum dry density, optimum moisture content and California Bearing Ratio (CBR).
- Chemical properties to assess salinity and aggressivity of soils in terms of Electrical Conductivity (EC), pH and sulphate.

Detailed laboratory test results are attached and summaries are presented below in Tables 3 and 4.

Table 3 – Results of Physical Properties Tests

Borehole No	Sample Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Linear Shrinkage (%)	Field Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density (t/m^3)	California Bearing Ratio (%)
BH2	0.3-0.5	Non-Plastic			13.3	18.5	1.71	70.0
BH3	1.3-1.5	58	21	14	23.7	23.5	1.64	3.0
BH8	1.0-1.2	55	19	12	25.4	25.5	1.62	3.0
BH10	0.2-0.4	Non-Plastic			8.1	11.0	1.94	80.0
BH11	0.3-0.5	62	22	15	28.6	28.5	1.59	4.0
BH13	0.7-1.0	57	20	13.5	23.8	22.6	1.63	3.0

CBR tests were carried out on samples compacted to about maximum dry density at about optimum moisture content and soaked for 10 days under surcharge of 6.75kg.

Table 4 – Results of Chemical Tests for Salinity Assessment

Borehole No	Depth (m)	EC (µS/cm)	pH	Chloride (ppm)	Sulphate (ppm)	Resistivity (ohm-cm)
BH1	0.1-0.2	330	10.5	22	150	2200
BH1	0.3-0.5	310	8.7	150	270	1500
BH1	1.3-1.5	370	5.2	450	210	1300
BH2	0.5-1.0	530	10.6	170	240	1400
BH2	1.3-1.5	460	5.1	530	290	1000
BH3	0.2-0.3	510	10.5	68	270	1400
BH3	1.3-1.5	520	6.9	500	590	790
BH4	0.2-0.3	310	7.6	53	210	1700
BH4	1.4-1.5	230	6.0	63	270	2100
BH5	0.2-0.4	520	10.8	25	180	1300
BH5	0.5-0.6	180	8.7	81	87	3000
BH6	0.6-0.7	330	9.4	310	160	1500
BH6	1.2-1.3	530	4.5	830	150	810
BH7	0.8 -0.9	320	9.7	220	190	1600
BH7	1.1-1.3	850	6.2	730	390	750
BH8	0.7-0.8	1100	5.8	2000	570	360
BH8	1.2-1.3	1200	8.3	1400	840	400
BH10	0.4-0.5	410	10.6	28	180	1600
BH10	0.6-0.7	320	10.5	32	150	1800
BH10	1.5-1.7	200	5.9	190	140	2500
BH11	0.5-0.6	970	4.5	2000	6.7	450
BH11	1.3-1.5	940	4.0	2100	7.3	430
BH12	0.8-1.0	140	9.0	42	33	4400
BH12	1.3-1.4	250	5.9	310	7.8	1800
BH13	0.4-0.5	440	6.2	540	210	1100
BH13	0.7-0.8	750	4.5	730	370	820

Composition and Thicknesses of Existing Pavements

Proposed road upgrade works will include widening of Bernera Road as well as upgrading intersection between Bernera Road and Yarrunga Street/Yato Road and construction of retaining walls. Attached Drawing No 14954/1-AA1 shows approximate extent of the proposed upgrade works. Boreholes drilled during current investigation indicate the following:

- Exiting pavement for Bernera Road comprises about 200mm thick AC over sandy gravel fill, which appears to vary from roadbase quality to subbase type materials. However, outside the traffic lanes the thickness of AC varies from about 50mm to 80mm. Assessed thicknesses of roadbase encountered in boreholes are presented in Table 2 and varies from about 200mm to 500mm. The depth to natural soil, assessed to be alluvium, varies from about 1.0m to more than 1.8m from road surface.
- Exiting pavement for Yarrunga Street/Yato Road comprises about 50.0m to 100mm thick AC over sandy gravel fill, which appears to vary from roadbase quality to subbase type materials. Assessed thickness of roadbase materials encountered in boreholes is presented in Table 2 and varies from about 100mm to 450mm. The depth to natural soil is about 1.3m from road surface.
- The subsurface profile within the footprint of proposed road widening, including retaining wall, comprises about 1.5m to 2.0m thick fill underlain by natural soils.

Therefore, it is our assessment that the total thickness of existing pavement (including AC layer, roadbase and subbase) for Bernera Road as well as Yarrunga Street/Yato Road are variable.

Subgrade Conditions – Existing Pavement and Road Reserve

Boreholes drilled in existing pavements as well as road reserves indicate that the existing Bernera Road as well as Yarrunga Street/Yato Road pavements have been constructed on fill subgrade, earth embankment constructed on alluvial soils.

Fill subgrade comprises layers or mixture of clayey gravels, sandy gravel, gravelly clay, silty clay and crushed sandstone placed on alluvial deposits comprising firm to very stiff silty clay and sandy clay. Fill is assessed to be well compacted. Therefore, it is our assessment that existing fill forming subgrade for pavement within sections of existing Bernera Road as well as Yarrunga Street/Yato Road proposed to be upgraded are suitable for construction of road pavement.

Existing site conditions are such that the earth embankment will have to be widened in order to construct pavement for the proposed road widening. This means pavement for proposed road widening will also be constructed on fill subgrade. Widened earth embankment will be suitable subgrade for construction of pavement for proposed road widening of fill placement is carried out in accordance with recommendations provided in this report.

Geotechnical Models

Based on site observation and information obtained from boreholes, Geotechnical Model has been developed for the site where proposed road upgrade, including construction of retaining walls, will occur. Recommended Geotechnical Units constituting Geotechnical Model is provided below in Table 5. Each Geotechnical Unit represents a specific nature of soil anticipated at the site.

Table 5 – Geotechnical Model for Proposed Retaining Wall

Geotechnical Unit	Material Description	Depth Range to Top of Unit (m)
Unit 1	Fill – Gravelly	0.0
Unit 2	Fill – Clayey	0.3-0.5
Unit 3	Alluvial Soil	1.0-2.0

Assessed strength parameters for the above Geotechnical Units in terms of cohesion and internal friction angle as well as modulus are presented below in Table 6. Controlled fill placed in accordance with recommendations provided below in this report may be considered to be Unit 2.

Table 6 – Strength Parameters for Various Geotechnical Units (Soil Types)

Geotechnical Units	Unit Weight (kN/m^3)	Undrained Cohesion (kPa)	Drained Condition			
			Cohesion (kPa)	Friction Angle (deg)	Young's Modulus (MPa)	Poisson's Ratio
Unit 1- Fill – Gravelly	18.5	50.0	0.0	32.0	200.0	0.2
Unit 2 -Fill – Clayey	18.0	75.0	3.0	28.0	30.0	0.3
Unit 3 - Alluvial Soil	19.0	100.0	5.0	26.0	10.0	0.3

Soil Salinity

Salinity refers to the presence of excess salt in the environment, either in soil or water. Soil salinity is generally assessed by measuring Electrical Conductivity (EC) of a soil sample made up of 1:5 soil water suspension. Thus, determined Electrical Conductivity (EC) is multiplied by a factor varying from 6 to 23, based on the texture of the soil sample, to obtain Equivalent Electrical Conductivity designated as ECe (Reference 1). Alternatively, ECe may be directly measured in soil saturation extracts. Soils are classified as saline if ECe of the saturated extracts exceed 4.0dS/m. The criteria for assessment of soil salinity classes are shown in the following Table 7 (Reference 1).

Table 7 – Criteria for Soil Salinity Classification

Classification	EC_e (dS/m)	Comments
Non-saline	<2	Salinity effects mostly negligible
Slightly saline	2 – 4	Yields of very sensitive crops may be affected
Moderately saline	4 – 8	Yields of many crops affected
Very saline	8 – 16	Only tolerant crops yield satisfactorily
Highly saline	>16	Only a few tolerant crops yield satisfactorily

For gravely soils encountered across the site, multiplying factors of 12 to 14 are assessed to be appropriate and for clayey soils factors of 9 to 10 are assessed to be appropriate. Even for a multiplying factor of 9, estimates of ECe values for representative soil samples presented in Table 4 vary from about 1.3dS/m to 10.5dS/m and 12 of 26 samples show ECe values of more than 4.0dS/m.

Therefore, even of localized non-saline soils may be encountered, it is our assessment that the soils likely to be disturbed or excavated during proposed upgrade works should be considered saline. That means earthworks for the proposed upgrade works (including preparation of subgrade for road widening and preparation of foundation for proposed retaining wall etc) should be carried out in accordance with a Saline Soil Management Plan (SSMP). Recommended SSMP is presented below in this report.

Exposure Classification

Australian Standard AS2870 (Reference 2) provides guidelines to assess Exposure Classification for saline and sulphate soils. Table 8 provides exposure classification for saline soils and Table 9 provides exposure classification for sulphate soils (Reference 2).

Table 8 – Exposure Classifications for Saline Soils

Electrical Conductivity, EC_e (dS/m)	Exposure Classification	Salinity Classification
<2	A1	Non-saline
2 – 4	A1	Slightly saline
4 – 8	A2	Moderately saline
8 – 16	B1	Very saline
>16	B2	Highly saline

Table 9 – Exposure Classifications for Sulphate Soils

Sulphate expressed as SO_3		pH	Exposure Classification*	
In Soil (ppm)	In Groundwater (ppm)		Soil Condition A	Soil Condition B
<5000	<1000	>5.5	A2	A1
5000-10000	1000-3000	4.5-5.5	B1	A2
10000-20000	3000-10000	4.0-4.5	B2	B1
>20000	>10000	<4.0	C2	B2

Approximately 100ppm of SO_4 = 80ppm of SO_3
*Soil Condition A = high permeability soils (e.g. sands and gravels) which are below groundwater
*Soil Condition B = low permeability soils (e.g. silts and clays) and all soils above groundwater

The appropriate site condition for gravelly soils is “Conditions A” and that for clayey soils is “Condition B”. Soils across the site vary from clayey to gravelly and therefore appropriate Soil Condition also varies from “Condition A to B”. Therefore, based on laboratory test results presented in Tables 3 and guidelines on Exposure Classifications presented in Tables 8 and 9, it is our assessment that the site for proposed road upgrade belongs to Exposure Classes A1 to B2. pH values are dominant factor.

Therefore, we recommend that the proposed upgrade works use construction materials (such as concrete, bricks etc) and construction methods appropriate for Exposure Class B2, in accordance with Australian Standard AS2870 (Reference 2).

Aggressivity Classification

Australian Standard AS2159 (Reference 3) provides guidelines to assess Aggressivity Classification for soils. The Aggressivity Classification of soils applicable to iron/steel and concrete piles, in accordance with Reference 3, are given below in Tables 10 and 11 respectively.

Table 10 – Aggressivity Classification for Steel/Iron

Chloride		pH	Resistivity (ohm cm)	Soil Condition A*	Soil Condition B#
In Soil (ppm)	In Water (ppm)				
<5000	<1000	>5.0	>5000	Non-aggressive	Non-aggressive
5000-20000	1000-10000	4.0-5.0	2000-5000	Mild	Non-aggressive
20000-50000	10000-20000	3.0-4.0	1000-2000	Moderate	Mild
>50000	>20000	<3.0	<1000	Severe	Moderate

*Soil Condition A = high permeability soils (e.g. sands and gravels) which are below groundwater
#Soil Condition B = low permeability soils (e.g. silts and clays) and all soils above groundwater

Table 11 – Aggressivity Classification for Concrete

Sulphate expressed as SO_4		pH	Chloride in Water (ppm)	Soil Condition A	Soil Condition B
In Soil (ppm)	In Groundwater (ppm)				
<5000	<1000	>5.5	<6000	Mild	Non-aggressive
5000-10000	1000-3000	4.5-5.5	6000-12000	Moderate	Mild
10000-20000	3000-1000	4.0-4.5	12000-30000	Severe	Moderate
>20000	>10000	<4.0	>30000	Very Severe	Severe

Approximately 100ppm of SO_4 = 80ppm of SO_3

As indicated above, appropriate Soil Condition across the site varies form "Condition A to B". Therefore, based on laboratory test results presented in Tables 3 and guidelines on Aggressivity Classifications presented in Tables 10 and 11, it is our assessment that the site for proposed road upgrade belongs to None to Moderately Aggressive to steel piles and Mildly Aggressive to concrete piles. Resistivity values are dominant factor for steel pile.

Therefore, we recommend that the proposed development works use steel or concrete piles, if required, appropriate for Moderately Aggressive and Mildly Aggressive site respectively in accordance with Australian Standard AS2159 (Reference 3).

Saline Soil Management Plan

Although localized non-saline soils may be encountered, it is our assessment that the soils likely to be disturbed or excavated during proposed upgrade works should be considered saline. Therefore, we recommend that the excavations and/or disturbance of soils during proposed upgrade works should be carried out in accordance with a Saline Soil Management Plan (SSMP), aimed at minimising impacts of soil salinity. The following should be considered in developing a SSMP.

- Minimise erosion and sediment loss before, during, and after construction.
- Minimise water pollution due to erosion, siltation, and sedimentation.
- Reduce and manage salinity within the site so that impacts on future structures (including buildings, roads, etc.) are minimised and acceptable.

We recommend the following as part of the SSMP to manage impacts from saline soils during the proposed upgrade works:

- Erosion and Sediment Control Plans must be developed and implemented by the earthworks contractors, in accordance with recommendations provided by the NSW Department of Housing (Reference 4). All sediment and erosion controls proposed by the Erosion and Sediment Control Plan are to be installed prior to commencement of any construction works.
- Develop the best use of the existing topography in order to minimise cut and fill operations.
- Ensure that earthworks and construction activities do not affect the natural flow of groundwater. Where groundwater is intercepted during upgrade works, the flow should be diverted to stormwater drains or creeks by providing appropriate surface and sub-surface drainage.
- Retaining walls, where required, should be provided with adequate and appropriate drainage.
- Prevent water ponding, waterlogging and infiltration of rainwater into the ground.

- Reduce groundwater recharge through appropriate land use and land management practices. This can be achieved by minimising deep infiltration by providing well compacted impermeable liners along surfaces of waterways (drains, channels, creeks etc) and maximising vegetation cover, planting of deep rooted trees and use of salt tolerant plants.
- Select construction materials and techniques suitable for a Exposure Class B2 in accordance with Australian Standard AS2870 (Reference 2) and/or Moderatelyaggressive sites in accordance with Australian Standard AS2159 (Reference 3).

Excavation Conditions

Subgrade preparation for construction and widening of road pavements is anticipated to involve some excavations that may include stripping of unsuitable subgrade materials including alluvial soils. However, depending on nature of foundation materials and method of construction, significant excavations may occur during foundation preparation for proposed retaining wall.

The materials to be excavated during subgrade preparation for pavement and foundation preparation of retaining wall are anticipated to comprise fill and alluvial soils. Therefore, it is our assessment that the excavation for the proposed road upgrade works can be achieved using conventional earthmoving equipment such as excavators and dozers.

Observations during this investigation indicated that the depth to groundwater level within the footprint of proposed upgrade works is more than 1.8m from existing road surface. Although fluctuations in the level of groundwater might occur due to variations in rainfall and/or other factors not evident during field works, we do not anticipate any significant groundwater inflow if excavations for proposed upgrade works are limited to depth of about 2.0m from road surface. Minor seepage and inflow of groundwater in excavations deeper than 2.0m may be managed by a conventional sump and pump method.

Fill Placement

Proposed upgrade works are anticipated to include placement of controlled fill: (1) as part of subgrade preparation, including construction of fill embankment, for widening of road; (2) as replacement of unsuitable materials during foundation or subgrade preparation for construction of earth embankment and retaining walls; and (3) as backfill for retaining walls. We recommend the following procedures for placement of controlled fill:

- Strip existing topsoil and fill and stockpile separately for possible future uses or dispose off the site.
- Undertake proof rolling (using an 8 to 10 tonne roller) of the exposed alluvial soils to detect potentially weak spots (ground heave). Excavate areas of localised heaving to depth of about 300mm and replace with crushed sandstone, compacted to achieve a Minimum Dry Density Ratio (MDDR) of 100% Standard, at moisture content within 2% of Optimum Moisture Content (OMC).
- Undertake proof rolling of soft spots backfilled with crushed sandstone, as described above. If the backfilled area shows movement during further proof rolling this office should be contacted for additional recommendations. We anticipate this situation may arise within the footprint of proposed retaining wall and additional works may include removing additional soft materials and/or providing Geogrid reinforced bridging layer/s of gravel.

- Once satisfactory proof rolling is achieved with or without Geogrid reinforced layer/s, place suitable fill materials on proof rolled surface. Controlled fill materials should preferably include non-reactive materials (e.g. crushed sandstone with a maximum particle size not exceeding 75mm) or low plasticity clay. Fill materials and alluvial soils obtained from excavations within the site may also be selectively used in controlled fill, after moisture conditioning, removal of unsuitable materials and blending with other suitable material. Controlled fill materials should be placed in horizontal layers of 200mm to 250mm maximum loose thickness, and compacted as follows;
    - General embankment fill and backfill for retaining wall should be compacted to a Minimum Dry Density Ratio (MDDR) of 98% Standard, at moisture content within 2% of Optimum Moisture Content (OMC).
    - Upper 500mm of fill forming subgrade for construction of pavement, including road widening, should be compacted to a MDDR of 100% Standard, at moisture content within 2% of OMC.
- Proof rolling of subgrade, subgrade replacement, construction of Geogrid reinforced layers (if required) and compaction subgrade, fill and pavement materials should be supervised and tested by a Geotechnical professional to ensure that material quality, layer thickness, testing frequency and compaction criteria conform to the design specifications in accordance with Australian Standard AS3798 (Reference 5).

Batter Slopes and Retaining Structures

Earth embankment will have to be constructed for the proposed road widening. There may also be need for excavations for the proposed upgrade works. We anticipate most cut slope will be of temporary nature. All cut and fill slopes should be battered for stability or retained by engineered retaining structures. All cut and fill slopes for the proposed upgrade works will occur within controlled fill and alluvial soils. If cut and fill slopes are battered for stability, we recommend the following batter slopes:

- For short term stability of cut and fill slopes = 1 vertical to 1 horizontal
- For long term stability of cut and ill slopes = 1 vertical to 2.5 horizontal

However, if battered slope steeper than those recommended above are required for whatever reason, the slopes should be retained with engineered retaining walls. Appropriate retaining wall for the proposed upgrade works may comprise gravity walls (including geogrid reinforced earth wall) or cantilever walls. Earth pressure distribution on such retaining wall may be assumed to be triangular in shape and estimated as follows:

$$p_h = \gamma k H$$

Where,

p_h= Horizontal pressure (kN/m^2)
γ = Unit weight of materials retained (kN/m^3)
k = Coefficient of earth pressure (k_a or k_o)
H= Retained height (m)

For design of flexible retaining structures where some lateral movement is acceptable, use of an active earth pressure coefficient (k_a) is recommended. If it is critical to limit the horizontal deformation of retaining structure, use of an earth pressure coefficient at rest (k_o) is recommended. Recommended earth pressure coefficients for design of retaining wall based on Geotechnical Model presented in Table 4 are presented in the following Table 12.

Table 12 – Recommended Earth Pressure Parameters

Retained Materials	Unit Weight (kN/m^3)	Active Earth Pressure Coefficient	Earth Pressure Coefficient At Rest	Passive Earth Pressure Coefficient
Unit 1 - Fill – Gravelly	18.5	0.35	0.45	3.25
Unit 2 - Fill – Clayey	18.0	0.40	0.50	2.75
Unit 3 - Alluvial Soil	19.0	0.30	0.55	2.55

The above coefficients are based on the assumptions that the ground level behind the retaining wall is horizontal and the retained material is effectively drained. Additional earth pressures resulting from surcharge load (traffic, infrastructures, etc) on retained materials and groundwater pressure, if any, should also be allowed for in design of retaining structures.

Footings

Proposed upgrade works may include construction of retaining wall which may be required to retain earth embankment. Loading conditions from the retaining wall are not known at this stage. However, we consider that the appropriate footings for retaining walls would comprise shallow footings (pad and strip) founded on controlled fill or alluvial soils within depth of 1.5m from existing ground surface or deep footings (bored piers or screw piles) socketed into alluvial soils at depth exceeding 3.0m from the surface of alluvial soils. Recommended allowable bearing pressures for design of shallow and deep footings for retaining walls are presented in the following Table 13.

Table 13 – Recommended Allowable Bearing Pressures

Founding Material	Founding Depth from Top of Alluvium (m)	Allowable Bearing Pressure (kPa)	Allowable Shaft Adhesion (kPa)
Units 1 and 2 - Fill	-	100.0	-
Unit 3 - Alluvium	0.5-1.5	150.0	-
Unit 3 - Alluvium	>3.0	250.0	5.0

The recommended allowable shaft adhesions against uplift pressures are halves the shaft adhesions for compressive loads presented in Table 13.

Founding depths presented in Table 12 are approximate and measured from the upper surface of alluvium ignoring overlying fill, if any. As depths to various soil units with the recommended allowable bearing pressures could vary across the site, the founding depths of footings to be constructed will also vary. Therefore, an experienced Geotechnical Engineer should confirm allowable bearing pressures at founding levels during construction, on the basis of assessment made during footing excavation or pier hole drilling.

For footings founded in controlled fill and alluvial soils, the total settlements under the recommended allowable bearing pressures are estimated to be about 2.0% of minimum footing dimension or pier diameter. Differential settlements are estimated to be about half the estimated total settlements.

Pavement Design

Design of all types of road pavements depends on traffic load and strength of subgrade, which is usually represented by CBR value and traffic load.

We understand Liverpool Council specifies that the pavements for trunk collector roads in urban areas are designed for traffic load of 8.0 x 10^6 Equivalent Standard Axles (ESA). We anticipate this traffic load to be appropriate for the proposed road upgrade.

Laboratory tests on representative soil samples recovered from boreholes indicate CBR values in range of 3.0% to 80.0% (Table 2). However, it is noted that the CBR value of subgrade materials vary from 3.0% to 4.0% and that for roadbase/subbase vary from 70.0% to 80.0%. Therefore, we recommend an indicative subgrade CBR value of 3.0% for design of pavements for the proposed upgrade works provided the subgrade preparation is carried out in accordance with the recommendations provided in this report.

Existing pavements are considered to be full depth asphaltic pavement. For traffic load of 8.0 x 10^6 ESA and subgrade CBR value of 3% CIRCLY (Reference 6) analyses indicate that the design full depth asphaltic pavement should comprise at least 200mm of thick asphalt (Modulus 2800MPa) over 500mm or thicker roadbase material.

It is noted that the existing pavement comprises about 50mm to 200mm and about 100mm to 500mm thick roadbase materials. Therefore, the sections of existing pavement comprising at least 200mm of asphalt (assessed Modulus = 1000MPa) and at least 500mm of roadbase materials may be retained as part of upgraded pavement. For the remaining sections of existing pavement, the upgrade works should include reconstruction of the pavement or provision of overlay or re-sheeting. For reconstruction, we recommend the following three options:

Option 1 – Full depth asphaltic pavement

Option 2 – Granular pavement

Option 3 – Concrete pavement

The following options may also be considered for upgrading existing pavement:

Option 4 – Overlay

Option 5 – Milling re-sheeting

Based on CIRCLY Analyses, recommended pavement designs for reconstruction options are presented below in Table 14.

Table 14 – Recommended Pavement Designs for Reconstruction

Option 1 Full Depth Asphalt	Option 2 Granular Pavement	Option 3 Concrete Pavement
Asphalt (Modulus 2800MPa)=190.0mm	Asphalt = 50.0mm	Concrete (50MPa) = 210.0mm
RoadBase=300.0mm	Roadbase DGB20=150.00mm	Subbase (CBR=30%)=300.0m
	Subbase DGS40=490.00mm	

Pavement designs recommended in Table 14 are also applicable for widening of existing pavement and/or construction of new pavement.

Recommended pavement thicknesses presented in Table 14 are valid only if the subgrade and pavement materials are compacted to the following Minimum Dry Density Ratios.

Basecourse	98% Modified
Sub-basecourse	98% Modified
Subgrade	100% Standard

Providing an overlay on existing pavement as upgrade work may not be appropriate due to changes in grade. If grade is not an issue, Falling Weight Deflectometer (FWD) tests should be carried out for overlay design. Therefore, Option 4 is not considered at this stage.

Milling and re-sheeting (Option 5) may be considered as part of upgrade work for the section of existing pavement where thickness of existing asphalt is at least 90mm and thickness of roadbase is 200mm or more. For this section, based on CIRCLY Analyses, we recommend milling of existing asphalt to leave about 90mm of existing asphalt at existing condition and then re-sheet with 110mm of asphalt with modulus of 2800MPa so that upgraded pavement comprise 110mm of new asphalt, 90mm of existing asphalt and at least 200mm of road base. This becomes Option 5 for the upgrade work.

Results of CIRCLY analyses are attached.

These pavement designs assume provision of adequate surface and sub-surface drainage of the pavement and adjacent areas.

Limitations

Assessments and recommendations presented in this report are based on site observations and information from a limited number of boreholes. Although we believe the composition and thicknesses of existing pavement as well as subsurface profiles encountered at boreholes and presented in this report are indicative of the general site conditions, it is should be noted that significant variations in thickness and composition of existing pavement are possible along the length of road to be upgraded. This also applies to the nature and strength of foundation materials for proposed retaining wall. Therefore, we recommend that this company is contacted for further advice if actual subsurface conditions encountered during construction works differ from that detailed in this report.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

INDRA JWORCHAN
Principal Geotechnical Engineer

Attached Drawing No 14954/1-AA1 – Borehole Locations Plan
Borehole Logs
Laboratory Test Results
Results of CIRCLY Analyses

References

1. Lillicrap, A and McGhie, S., Site Investigation for Urban Salinity, Department of Land and Water Conservation, 2002.
2. Australian Standard AS2870-2011, Residential Slabs and Footings, 2011.
3. Australian Standard AS2159-2009, Piling – Design and Installation, 2009.
4. NSW Department of Housing, Managing Urban Stormwater, Soils and Construction, 1998.
5. Australian Standard AS3798-2007, Guidelines on Earthworks for Commercial and Residential Developments, 2007.
6. Mincad System Pty Ltd, CIRCLY 5, 2012.

PREPARED BY:

GEOTECHNIQUE® PTY LTD

PO Box 880
Penrith NSW 2750
Tel: 02 4722 2700
Fax: 02 4722 2777
e-mail:info@geotech.com.au
www.geotech.com.au

MU Group
Proposed Road Upgrade
Bernera Road
Prestons

Borehole Locations

Drawing No: 14954/1-AA1
Job No: 14954/1
Drawn By: MH
Date: 25 October 2021
Checked By: IJ

File No: 14954-1
Layers: 0, AA1

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH1
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 37.252

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry				CONE 20	0			FILL: Clayey Gravel, fine to medium gravel, sub angular, with clay, low plasticity, dry	M<OMC			Roadbase Gravel
				DS	CONE 60/R				FILL: Sandy Gravel, fine to medium gravel, sub angular, brown, with fine to medium grained sand, dry	M<OMC			Well Compacted Possible subbase
				DS		0.5			FILL: Gravelly Clay, high plasticity, grey, with sub angular gravel, moist				
						1							
				DS				CH	Silty CLAY, high plasticity, grey	M≥PL	F		Alluvium Soil
						1.5			Borehole BH1 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH2
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 35.968

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry				CONE 20 / 20/R	0			ASPHALT PAVEMENT 100mm				
									FILL: Clayey Gravel, fine to medium gravel, sub angular, with clay low plasticity, dry	M<OMC			Roadbase Gravel Possible subbase
				DB		0.5			FILL: Sandy Gravely, fine to medium gravel, sub angular, brown, with crushed sandstone gravel and cobbles, sand fine to medium grained, moist				Well Compacted
				DS		1							
				DS		1.5		CH	Silty CLAY, high plasticity, grey	M≥PL	F		Alluvium Soil
									Borehole BH2 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH3
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 34.260

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger					CONE 42	0			FILL: Clayey Gravel, fine to medium gravel, sub angular, brown, with clay, low plasticity, dry	M<OMC			Roadbase Gravel
					8				FILL: Sandy Gravel, fine to medium gravel, sub angular, brown, with fine to medium grained sand, moist, with clay, low to medium plasticity	M<OMC			Well Compacted Possible subbase
					10								
				DS	12								
					8	0.5							
					6								
					5								
					4								
					4								
					3	1							Groundwater seepage at 0.9m
					7								
					4								
					4								
				DS	4			CH	Silty CLAY, high plasticity, orange grey	M>PL	St		Alluvium Soil
					4	1.5			Borehole BH3 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH4
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 33.276

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger					CONE 55	0			FILL: Clayey Gravel, fine to medium gravel, sub angular, brown, with clay, low plasticity, dry	M<OMC			Well Compacted Roadbase gravel
				DS	25, 6, 3, 3				FILL: Gravelly Clay, medium to high plasticity, brown, with fine to medium sub angular gravel, moist				
					2, 3, 5, 4, 5, 5, 10, 20	0.5, 1			FILL: Gravelly Clay, medium to high plasticity, brown orange-grey, with sub angular, wet				Groundwater seepage at 0.7m
				DS	20	1.5		CH	Silty CLAY, high plasticity, orange-grey, wet	M>PL	VSt-H		Alluvium Soil
						2, 2.5, 3, 3.5, 4, 4.5			Borehole BH4 terminated at 1.7m				

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH5
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 32.962

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry					0			ASPHALT PAVEMENT 100mm				
					CONE 30/R				FILL: Clayey Gravel, fine to medium gravel, brown, with clay, low plasticity, moist	M<OMC			Well Compacted Roadbase gravel
				DB					FILL: Sandy Gravel, fine to medium gravel, sub angular, brown, with fine to medium grained sand				Possible subbase
				DS		0.5			FILL: Crushed Sandstone, pale brown, moist				
						1							
						1.5		CH	Silty CLAY, high plasticity, orange-grey, moist	M	St-VSt		Alluvium Soil
						2			Borehole BH5 terminated at 1.7m				
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH6
Date : 05/10/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 31.443

hole diameter : 125 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry					0			A/C PAVEMENT 70mm				
									FILL: Sandy Gravel, fine to medium gravel, sub angular, brown, with fine to medium grained sand	M<OMC			Well Compacted
					CONE 13, 13	0.5							
				DS	30, 4, 3, 3				FILL: Crushed Sandstone, pale brown	M<OMC			
						1							
				DB	3, 2			CI	Silty CLAY, medium plasticity, grey-orange	M≤PL	St-VSt		Alluvium Soil
				DS	3, 4, 7, 7	1.5							
									Borehole BH6 terminated at 1.6m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH7
Date : 04/10/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 31.039

hole diameter : 125 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry					0			A/C PAVEMENT 200mm				
									GRAVEL, sub angular, grey	D			Basecourse Material
						0.5			FILL: Sandy Gravel, fine to medium gravel, sub angular, brown-grey, with fine to medium grained sand	M<OMC			Sub base Well compacted
				DS	CONE 8, 14				FILL: Crushed Sandstone, pale brown, cobbles	M<OMC			
					8, 7	1							
				DB	4, 2			CH	Silty CLAY, high plasticity, orange-grey	M≤PL	F-St		Alluvium Soil
				DS	3, 4								
					4, 4, 3, 8, 8	1.5			Borehole BH7 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

form no. 002 version 04 - 05/11

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH8
Date : 04/10/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 29.827

hole diameter : 125 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			A/C PAVEMENT 200mm				
						0.5			FILL: Sandy Gravel, fine to medium gravel, sub angular, grey, with fine to medium grained sand	D			Basecourse material Well compacted
Auger	Dry			DS	CONE 4, 4, 3, 3, 3, 5, 3, 4, 3, 6	1		CH	Silty CLAY, high plasticity, orange-grey	M>PL	VSt		Alluvium Soil
				DB									
				DS									
					12, 11, 10	1.5			Borehole BH8 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

form no. 002 version 04 - 05/11

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH10
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 31.798

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry			DB DS DS	CONE 30/R	0 0.5 1 1.5		CI	A/C PAVEMENT 50mm with bitumen FILL: Sandy Gravel, fine to medium gravel, sub angular, brown, with fine to medium grained sand, dry FILL: Crushed Sandstone, brown, moist, with sand fine to medium grained Sandy CLAY, medium plasticity, orange-grey, with sand fine to medium grained	M<OMC M≤PL	St		Well Compacted Basecourse material Alluvium Soil
						2 2.5 3 3.5 4 4.5			Borehole BH10 terminated at 1.7m				

form no. 002 version 04 - 05/11

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH11
Date : 28/09/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 32.431

hole diameter : 250 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry					0			A/C ASPHALT PAVEMENT 50mm				
									FILL: Gravel, sub angular, grey				Basecourse
					CONE 12				FILL: Silty Clay, medium to high plasticity, orange-brown-grey, with fine gravel, moist	M<OMC			Well Compacted
					4								
				DB	9								
					7	0.5							
				DS	5								
					3								
					3								
					3								
					3	1							
					4								
					7								
					8								
				DS	12			CI-CH	Silty CLAY, medium to high plasticity, orange-grey	M<PL	VSt-H		Alluvium Soil
					18	1.5							
									Borehole BH11 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH12
Date : 05/10/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 33.779

hole diameter : 125 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			A/C PAVEMENT 80mm				
									GRAVEL, sub angular, grey	D			Basecourse
Auger					CONE 13, 17, 17, 9, 15, 20, 26/R	0.5			FILL: Crushed Sandstone, pale brown, cobbles	M<OMC			
				DS		1							
				DS					FILL: Silty Clay, high plasticity, dark grey-orange, with silt, decomposing organics (tree bark)	M≤OMC	S-F		
				DB		1.5							
									Borehole BH12 terminated at 1.8m				Groundwater seepage at 1.8m
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

engineering log - borehole

Client : MU Group
Project : Proposed Road Upgrade
Location : Bernera Road (between Kurrajong Road, Yarunga Street/Yato Road), Prestons

Job No. : 14954/1
Borehole No. : BH13
Date : 05/10/2021
Logged/Checked by: AA

drill model and mounting : Yanmar 5 Ton Excavator **slope :** **deg.** **R.L. surface :** 37.879

hole diameter : 125 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
Auger	Dry					0			A/C PAVEMENT 80mm				
									GRAVEL, sub angular, grey				Basecourse
				DS	CONE 2 2 2 2	0.5			FILL: Crushed Sandstone, pale brown, cobble	M<OMC			
				DS	2			CH	Silty CLAY, high plasticity, orange-grey	M>PL	S-St		Alluvial Soil
				DB	2 3 3 3 4 4 5	1							
						1.5			Borehole BH13 terminated at 1.5m				
						2							
						2.5							
						3							
						3.5							
						4							
						4.5							

GEOTECHNIQUE PTY LTD

Log Symbols & Abbreviations (Non-cored Borehole Log)

Log Column	Symbol/Value	Description
Drilling Method	V-bit TC-bit RR DB BB	Hardened steel 'V' shaped bit attached to auger Tungsten Carbide bit attached to auger Tricone (Rock Roller) bit Drag bit Blade bit
Groundwater	Dry ▼ ▶	Groundwater not encountered to the drilled or auger refusal depth Groundwater level at depths shown on log Groundwater seepage at depths shown on log
Environment Sample	GP G P	Glass bottle and plastic bag sample over depths shown on log Glass bottle sample over depths shown on log Plastic bag sample over depths shown on log
PID Reading	100	PID reading in ppm
Geotechnical Sample	DS DB U_{50}	Disturbed Small bag sample over depths shown on log Disturbed Bulk sample over depths shown on log Undisturbed 50mm tube sample over depths shown on log
Field Test	N=10 3,5,5 N=R 10,15/100	Standard Penetration Test (SPT) 'N' value. Individual numbers indicate blows per 150mm penetration. 'R' represents refusal to penetration in hard/very dense soils or in cobbles or boulders. The first number represents10 blows for 150mm penetration whereas the second number represents 15 blows for 100mm penetration where SPT met refusal
	DCP/PSP: 5 6 R/10	Dynamic Cone Penetration (DCP) or Perth Sand Penetrometer (PSP). Each number represents blows per 100mm penetration. 'R/10' represents refusal after 10mm penetration in hard/very dense soils or in gravels or boulders.
Classification	GP GW GM GC SP SW SM SC ML MI MH CL CI CH	Poorly Graded GRAVEL Well graded GRAVEL Silty GRAVEL Clayey GRAVEL Poorly graded SAND Well graded SAND Silty SAND Clayey SAND SILT / Sandy SILT / clayey SILT, low plasticity SILT / Sandy SILT / clayey SILT, medium plasticity SILT / Sandy SILT / clayey SILT, high plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, low plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, medium plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, high plasticity
Moisture Condition Cohesive soils	M<PL M=PL M>PL	Moisture content less than Plastic Limit Moisture content equal to Plastic Limit Moisture content to be greater than Plastic Limit
Cohesionless soils	D M W	Dry - Runs freely through hand Moist - Tends to cohere Wet - Tends to cohere
Consistency Cohesive soils	VS S F St VSt H	**Term** / **Undrained shear strength, C_u (kPa)** / **Hand Penetrometer (Qu)** Very Soft / ≤12 / <25 Soft / >12 & ≤25 / 25 – 50 Firm / >25 & ≤50 / 50 – 100 Stiff / >50 & ≤100 / 100 – 200 Very Stiff / >100 & ≤200 / 200 – 400 Hard / >200 / >400
Density Index Cohesionless soils	VL L M D VD	**Term** / **Density Index, I_D (%)** / **SPT 'N' (blows/300mm)** Very Loose / ≤15 / ≤5 Loose / >15 & ≤35 / >5 & ≤10 Medium Dense / >35 & ≤65 / >10 & ≤30 Dense / >65 & ≤85 / >30 & ≤50 Very Dense / >85 / >50
Hand Penetrometer	100 200	Unconfined compressive strength (q_u) in kPa determined using pocket penetrometer, at depths shown on log
Remarks	Residual Alluvium Colluvial Aeolian Marine	Geological origin of soils Residual soils above bedrock River deposited Alluvial soils Gravity deposited Colluvial soils Wind deposited Aeolian soils Marine Soils

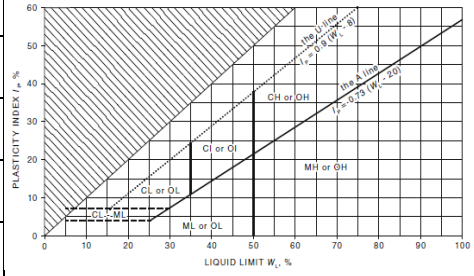
GEOTECHNIQUE PTY LTD

AS1726 : 2017– Unified Soil Classification System

Major Divisions		Particle size (mm)	Group Symbol	Typical Names	Field Identifications Sand and Gravels			Laboratory classification				
								% Fines (2)	Plasticity of Fine Fraction	$C_u = D_{60}/D_{10}$	$C_c = (D_{30})^2/(D_{10}D_{60})$	Notes
OVERSIZE	BOULDERS	>200										
	COBBLES	63										
COARSE GRAINED SOIL (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	Coarse 19	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength			≤5	-	>4	between 1 and 3	1. Identify lines by the method given for fine grained soils
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength			≤5	-	Fails to comply with above		
		Medium 6.7	GM	Silty gravels, gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength			≥12	Below 'A' line or I_p<4	-	-	2. Borderline classifications occur when the percentage of fines (fraction smaller than 0.075mm size) is greater than 5% and less than 12%. Borderline classifications require the use of dual symbols e.g. SP-SM, GW-GC
		Fine 2.36	GC	Clayey gravels, gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength			≥12	Above 'A' line or I_p>7	-	-	
	SAND (more than half of coarse fraction is smaller than 2.36mm)	Coarse 0.6	SW	Well-graded sands, gravelly sands, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength			≤5	-	>6	between 1 and 3	
		Medium 0.21	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength			≤5	-	Fails to comply with above		
			SM	Silty sands, sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength			≥12	Below 'A' line or I_p<4	-	-	
		Fine 0.075	SC	Clayey sand, sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength			≥12	Above 'A' line of I_p>7	-	-	
FINE GRAINED SOIL (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit<50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	**Dry Strength**	**Dilatancy**	**Toughness**					
					None to low	Slow to rapid	Low					
			CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium to high	None to very slow	Medium		Below 'A' line Above 'A' line			
			OL	Organic silts and organic silty clays of low plasticity	Low to medium	Slow	Low		Below 'A' line			
	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit>50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Low to medium	None to slow	Low to medium		Below 'A' line			
			CH	Inorganic clays of medium to high plasticity, fat clays	High to very high	None	High		Above 'A' line			
			OH (1)	Organic clays of medium to high plasticity, organic silts	Medium to high	None to very slow	Low to medium		Below 'A' line			
	HIGHLY ORGANIC SOILS		Pt (1)	Peat and highly organic soils	Identified by colour, odour, spongy feel and generally by fibrous texture				Effervesces with H_2O_2			

Use the gradation of material passing 63mm for classification of fractions according to the criteria given in 'Major Divisions'

More than 35% passing 0.075mm



Log Symbols & Abbreviations (Cored Borehole Log)

Log Column	Symbol / Abbreviation	Description	
Core Size		Nominal Core Size (mm)	
	NQ	47	
	NMLC	52	
	HQ	63	
Water Loss	◀	Complete water loss	
	◁	Partial water loss	
Weathering (AS1726:2017)	RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported
	XW	Extremely Weathered	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
	HW	Highly Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
	MW	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock
	SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change in strength from fresh rock
	FR	Fresh	Rock shows no sign of decomposition of individual minerals or colour changes
		Note : Where it is not possible to distinguish between HW and MW rock the term Distinctly Weathered (DW) may be used. DW is defined as 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased by deposition of weathering products in pores'	
Strength (AS1726:2017)		**Term**	**Point Load Strength Index (I_{s50}, MPa)**
	VL	Very Low	≥0.03 ≤0.1
	L	Low	>0.1 ≤0.3
	M	Medium	>0.3 ≤1
	H	High	>1 ≤3
	VH	Very High	>3 ≤10
	EH	Extremely High	>10
Defect Spacing		**Description**	**Spacing (mm)**
		Extremely closely spaced	<20
		Very closely spaced	20 to 60
		Closely spaced	60 to 200
		Medium spaced	200 to 600
		Widely spaced	600 to 2000
		Very widely spaced	2000 to 6000
		Extremely widely spaced	>6000
Defect Description (AS1726:2017) Type			
	Pt	Parting	
	Jo	Joint	
	Sh	Sheared Surface	
	Sz	Sheared Zone	
	Ss	Sheared Seam	
	Cs	Crushed Seam	
	Is	Infilled Seam	
	Ews	Extremely Weathered Seam	
Macro-surface geometry	St	Stepped	
	Cu	Curved	
	Un	Undulating	
	Ir	Irregular	
	Pl	Planar	
Micro-surface geometry	Vro	Very Rough	
	Ro	Rough	
	Sm	Smooth	
	Po	Polished	
	Sl	Slickensided	
Coating or infilling	cn	clean	
	sn	stained	
	vn	veneer	
	cg	coating	

GEOTECHNIQUE PTY LTD

AS1726 – Identification of Sedimentary Rocks for Engineering Purposes

Grain Size mm		Bedded rocks (mostly sedimentary)								
More than 20	20	Grain Size Description				At least 50% of grains are of carbonate			At least 50% of grains are of fine-grained volcanic rock	
	6	RUDACEOUS		CONGLOMERATE Rounded boulders, cobbles and gravel cemented in a finer matrix		LIMESTONE and DOLOMITE (undifferentiated)		Calcirudite	Fragments of volcanic ejecta in a finer matrix	SALINE ROCKS
	2			Breccia Irregular rock fragments in a finer matrix					Rounded grains AGGLOMERATE Angular grains VOLCANIC BRECCIA	Halite Anhydrite
	0.6	ARENACEOUS	Coarse	SANDSTONE Angular or rounded grains, commonly cemented by clay, calcite or iron minerals				Calcarenite	Cemented volcanic ash	Gypsum
	0.2		Medium	Quartzite Quartz grains and siliceous cement					TUFF	
	0.06		Fine	Arkose Many feldspar grains Greywacke Many rock chips						
	0.002	ARGILLACEOUS		MUDSTONE	SILTSTONE Mostly silt	Calcareous Mudstone		Calcisiltite	CHALK	Fine-grained TUFF
	Less than 0.002			SHALE Fissile	CLAYSTONE Mostly clay			Calcilutite		Very fine-grained TUFF
Amorphous or crypto-crystalline				Flint: occurs as hands of nodules in the chalk Chert: occurs as nodules and beds in limestone and calcareous sandstone						COAL LIGNITE
				Granular cemented – except amorphous rocks						
				SILICEOUS		CALCAREOUS			SILICEOUS	CARBONACEOUS
				SEDIMENTARY ROCKS Granular cemented rocks vary greatly in strength, some sandstones are stronger than many Igneous rocks. Bedding may not show in hand specimens and is best seen in outcrop. Only sedimentary rocks, and some metamorphic rocks derived from them, contain fossils Calcareous rocks contain calcite (calcium carbonate) which effervesces with dilute hydrochloric acid						

AS1726 – Identification of Metamorphic and Igneous Rocks for Engineering Purposes

Obviously foliated rocks (mostly metamorphic)		Rocks with massive structure and crystalline texture (mostly igneous)						Grain size (mm)
Grain size description			Grain size description	Pegmatite			Pyrosenite	More than 20
COARSE	GNEISS Well developed but often widely spaced foliation sometimes with schistose bands Migmatite Irregularly foliated: mixed schists and gneisses	MARBLE QUARTZITE Granulite HORNFELS	COARSE	GRANITE These rocks are sometimes phorphyritic and are then described, for example, as porphyritic granite	Diorite	GABBRO	Peridorite	20 6 2
MEDIUM	SCHIST Well developed undulose foliation; generally much mica	Amphibolite Serpentine	MEDIUM	Micorgranite These rocks are sometimes phorphyritic and are then described as porphyries	Microdiorite	Dolerite		0.6 0.2 0.06
FINE	PHYLLITE Slightly undulose foliation; sometimes 'spotted' SLATE Well developed plane cleavage (foliation)		FINE	RHYOLITE These rocks are sometimes phorphyritic and are then described as porphyries	ANDESITE	BASALT		0.002 Less than 0.002
	Mylonite Found in fault zones, mainly in igneous and metamorphic areas			Obsidian	Volcanic glass			Amorphous or cryptocrystalline
CRYSTALLINE				Pale<----------->Dark				
SILICEOUS		Mainly SILICEOUS		ACID Much quartz	INTERMEDIATE Some quartz	BASIC Little or no quartz	ULTRA BASIC	
METAMORPHIC ROCKS Most metamorphic rocks are distinguished by foliation which may impart fissility. Foliation in gneisses is best observed in outcrop. Non-foliated metamorphics are difficult to recognize except by association. Any rock baked by contact metamorphism is described as 'hornfels' and is generally somewhat stronger than the parent rock Most fresh metamorphic rocks are strong although perhaps fissile			IGNEOUS ROCKS Composed of closely interlocking mineral grains. Strong when fresh; not porous Mode of occurrence : 1 Batholith; 2 Laccoliths; 3 Sills; 4 Dykes; 5 Lava Flows; 6 Veins					

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**14954/1 Prestons**
Order Number	**14954/1**
Samples	26

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE224314 R0**
Date Received	6/10/2021
Date Reported	13/10/2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Shane MCDERMOTT
Inorganic/Metals Chemist

Conductivity and TDS by Calculation - Soil [AN106] Tested: 11/10/2021

PARAMETER	UOM	LOR	BH1 SOIL 0.1-0.2 29/9/2021 SE224314.001	BH1 SOIL 0.3-0.5 29/9/2021 SE224314.002	BH1 SOIL 1.3-1.5 29/9/2021 SE224314.003	BH2 SOIL 0.5-1.0 29/9/2021 SE224314.004	BH2 SOIL 1.3-1.5 29/9/2021 SE224314.005
Conductivity of Extract (1:5 as received)	µS/cm	1	330	310	370	530	460
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	370	350	440	590	540

PARAMETER	UOM	LOR	BH3 SOIL 0.2-0.3 29/9/2021 SE224314.006	BH3 SOIL 1.3-1.5 29/9/2021 SE224314.007	BH4 SOIL 0.2-0.3 29/9/2021 SE224314.008	BH4 SOIL 1.4-1.5 29/9/2021 SE224314.009	BH5 SOIL 0.2-0.4 29/9/2021 SE224314.010
Conductivity of Extract (1:5 as received)	µS/cm	1	510	520	310	230	520
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	640	670	380	280	550

PARAMETER	UOM	LOR	BH5 SOIL 0.5-0.6 29/9/2021 SE224314.011	BH6 SOIL 0.6-0.7 29/9/2021 SE224314.012	BH6 SOIL 1.2-1.3 29/9/2021 SE224314.013	BH7 SOIL 0.8-0.9 29/9/2021 SE224314.014	BH7 SOIL 1.1-1.3 29/9/2021 SE224314.015
Conductivity of Extract (1:5 as received)	µS/cm	1	180	330	530	320	850
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	210	360	660	360	1100

PARAMETER	UOM	LOR	BH8 SOIL 0.7-0.8 29/9/2021 SE224314.016	BH8 SOIL 1.2-1.3 29/9/2021 SE224314.017	BH10 SOIL 0.4-0.5 29/9/2021 SE224314.018	BH10 SOIL 0.6-0.7 29/9/2021 SE224314.019	BH10 SOIL 1.5-1.7 29/9/2021 SE224314.020
Conductivity of Extract (1:5 as received)	µS/cm	1	1100	1200	410	320	200
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	1400	1500	440	370	230

PARAMETER	UOM	LOR	BH11 SOIL 0.5-0.6 29/9/2021 SE224314.021	BH11 SOIL 1.3-1.5 29/9/2021 SE224314.022	BH12 SOIL 0.8-1.0 29/9/2021 SE224314.023	BH12 SOIL 1.3-1.4 29/9/2021 SE224314.024	BH13 SOIL 0.4-0.5 29/9/2021 SE224314.025
Conductivity of Extract (1:5 as received)	µS/cm	1	970	940	140	250	440
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	1300	1200	150	310	480

PARAMETER	UOM	LOR	BH13 SOIL 0.7-0.8 29/9/2021 SE224314.026
Conductivity of Extract (1:5 as received)	µS/cm	1	750
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	920

Moisture Content [AN002] Tested: 11/10/2021

PARAMETER	UOM	LOR	BH1 SOIL 0.1-0.2 29/9/2021 SE224314.001	BH1 SOIL 0.3-0.5 29/9/2021 SE224314.002	BH1 SOIL 1.3-1.5 29/9/2021 SE224314.003	BH2 SOIL 0.5-1.0 29/9/2021 SE224314.004	BH2 SOIL 1.3-1.5 29/9/2021 SE224314.005
% Moisture	%w/w	1	11.6	13.4	16.9	10.5	15.5

PARAMETER	UOM	LOR	BH3 SOIL 0.2-0.3 29/9/2021 SE224314.006	BH3 SOIL 1.3-1.5 29/9/2021 SE224314.007	BH4 SOIL 0.2-0.3 29/9/2021 SE224314.008	BH4 SOIL 1.4-1.5 29/9/2021 SE224314.009	BH5 SOIL 0.2-0.4 29/9/2021 SE224314.010
% Moisture	%w/w	1	19.4	22.0	20.3	19.0	6.6

PARAMETER	UOM	LOR	BH5 SOIL 0.5-0.6 29/9/2021 SE224314.011	BH6 SOIL 0.6-0.7 29/9/2021 SE224314.012	BH6 SOIL 1.2-1.3 29/9/2021 SE224314.013	BH7 SOIL 0.8-0.9 29/9/2021 SE224314.014	BH7 SOIL 1.1-1.3 29/9/2021 SE224314.015
% Moisture	%w/w	1	11.9	8.8	18.7	9.3	19.3

PARAMETER	UOM	LOR	BH8 SOIL 0.7-0.8 29/9/2021 SE224314.016	BH8 SOIL 1.2-1.3 29/9/2021 SE224314.017	BH10 SOIL 0.4-0.5 29/9/2021 SE224314.018	BH10 SOIL 0.6-0.7 29/9/2021 SE224314.019	BH10 SOIL 1.5-1.7 29/9/2021 SE224314.020
% Moisture	%w/w	1	21.3	20.4	8.0	14.0	14.6

PARAMETER	UOM	LOR	BH11 SOIL 0.5-0.6 29/9/2021 SE224314.021	BH11 SOIL 1.3-1.5 29/9/2021 SE224314.022	BH12 SOIL 0.8-1.0 29/9/2021 SE224314.023	BH12 SOIL 1.3-1.4 29/9/2021 SE224314.024	BH13 SOIL 0.4-0.5 29/9/2021 SE224314.025
% Moisture	%w/w	1	23.0	20.9	6.0	18.1	8.0

PARAMETER	UOM	LOR	BH13 SOIL 0.7-0.8 29/9/2021 SE224314.026
% Moisture	%w/w	1	19.0

pH in soil (1:2) [AN101] Tested: 11/10/2021

PARAMETER	UOM	LOR	BH1 SOIL 0.1-0.2 29/9/2021 SE224314.001	BH1 SOIL 0.3-0.5 29/9/2021 SE224314.002	BH1 SOIL 1.3-1.5 29/9/2021 SE224314.003	BH2 SOIL 0.5-1.0 29/9/2021 SE224314.004	BH2 SOIL 1.3-1.5 29/9/2021 SE224314.005
pH (1:2)	pH Units	-	10.5	8.7	5.2	10.6	5.1

PARAMETER	UOM	LOR	BH3 SOIL 0.2-0.3 29/9/2021 SE224314.006	BH3 SOIL 1.3-1.5 29/9/2021 SE224314.007	BH4 SOIL 0.2-0.3 29/9/2021 SE224314.008	BH4 SOIL 1.4-1.5 29/9/2021 SE224314.009	BH5 SOIL 0.2-0.4 29/9/2021 SE224314.010
pH (1:2)	pH Units	-	10.5	6.9	7.6	6.0	10.8

PARAMETER	UOM	LOR	BH5 SOIL 0.5-0.6 29/9/2021 SE224314.011	BH6 SOIL 0.6-0.7 29/9/2021 SE224314.012	BH6 SOIL 1.2-1.3 29/9/2021 SE224314.013	BH7 SOIL 0.8-0.9 29/9/2021 SE224314.014	BH7 SOIL 1.1-1.3 29/9/2021 SE224314.015
pH (1:2)	pH Units	-	8.7	9.4	4.5	9.7	6.2

PARAMETER	UOM	LOR	BH8 SOIL 0.7-0.8 29/9/2021 SE224314.016	BH8 SOIL 1.2-1.3 29/9/2021 SE224314.017	BH10 SOIL 0.4-0.5 29/9/2021 SE224314.018	BH10 SOIL 0.6-0.7 29/9/2021 SE224314.019	BH10 SOIL 1.5-1.7 29/9/2021 SE224314.020
pH (1:2)	pH Units	-	5.8	8.3	10.6	10.5	5.9

PARAMETER	UOM	LOR	BH11 SOIL 0.5-0.6 29/9/2021 SE224314.021	BH11 SOIL 1.3-1.5 29/9/2021 SE224314.022	BH12 SOIL 0.8-1.0 29/9/2021 SE224314.023	BH12 SOIL 1.3-1.4 29/9/2021 SE224314.024	BH13 SOIL 0.4-0.5 29/9/2021 SE224314.025
pH (1:2)	pH Units	-	4.5	4.0	9.0	5.9	6.2

PARAMETER	UOM	LOR	BH13 SOIL 0.7-0.8 29/9/2021 SE224314.026
pH (1:2)	pH Units	-	4.5

Conductivity (1:2) in soil [AN106] Tested: 11/10/2021

PARAMETER	UOM	LOR	BH1 SOIL 0.1-0.2 29/9/2021 SE224314.001	BH1 SOIL 0.3-0.5 29/9/2021 SE224314.002	BH1 SOIL 1.3-1.5 29/9/2021 SE224314.003	BH2 SOIL 0.5-1.0 29/9/2021 SE224314.004	BH2 SOIL 1.3-1.5 29/9/2021 SE224314.005
Conductivity (1:2) @25 C*	µS/cm	1	460	660	780	730	960
Resistivity (1:2)*	ohm cm	-	2200	1500	1300	1400	1000

PARAMETER	UOM	LOR	BH3 SOIL 0.2-0.3 29/9/2021 SE224314.006	BH3 SOIL 1.3-1.5 29/9/2021 SE224314.007	BH4 SOIL 0.2-0.3 29/9/2021 SE224314.008	BH4 SOIL 1.4-1.5 29/9/2021 SE224314.009	BH5 SOIL 0.2-0.4 29/9/2021 SE224314.010
Conductivity (1:2) @25 C*	µS/cm	1	700	1300	580	490	760
Resistivity (1:2)*	ohm cm	-	1400	790	1700	2100	1300

PARAMETER	UOM	LOR	BH5 SOIL 0.5-0.6 29/9/2021 SE224314.011	BH6 SOIL 0.6-0.7 29/9/2021 SE224314.012	BH6 SOIL 1.2-1.3 29/9/2021 SE224314.013	BH7 SOIL 0.8-0.9 29/9/2021 SE224314.014	BH7 SOIL 1.1-1.3 29/9/2021 SE224314.015
Conductivity (1:2) @25 C*	µS/cm	1	330	690	1200	620	1300
Resistivity (1:2)*	ohm cm	-	3000	1500	810	1600	750

PARAMETER	UOM	LOR	BH8 SOIL 0.7-0.8 29/9/2021 SE224314.016	BH8 SOIL 1.2-1.3 29/9/2021 SE224314.017	BH10 SOIL 0.4-0.5 29/9/2021 SE224314.018	BH10 SOIL 0.6-0.7 29/9/2021 SE224314.019	BH10 SOIL 1.5-1.7 29/9/2021 SE224314.020
Conductivity (1:2) @25 C*	µS/cm	1	2800	2500	610	560	400
Resistivity (1:2)*	ohm cm	-	360	400	1600	1800	2500

PARAMETER	UOM	LOR	BH11 SOIL 0.5-0.6 29/9/2021 SE224314.021	BH11 SOIL 1.3-1.5 29/9/2021 SE224314.022	BH12 SOIL 0.8-1.0 29/9/2021 SE224314.023	BH12 SOIL 1.3-1.4 29/9/2021 SE224314.024	BH13 SOIL 0.4-0.5 29/9/2021 SE224314.025
Conductivity (1:2) @25 C*	µS/cm	1	2200	2300	230	560	950
Resistivity (1:2)*	ohm cm	-	450	430	4400	1800	1100

PARAMETER	UOM	LOR	BH13 SOIL 0.7-0.8 29/9/2021 SE224314.026
Conductivity (1:2) @25 C*	µS/cm	1	1200
Resistivity (1:2)*	ohm cm	-	820

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography [AN245] Tested: 11/10/2021

PARAMETER	UOM	LOR	BH1 SOIL 0.1-0.2 29/9/2021 SE224314.001	BH1 SOIL 0.3-0.5 29/9/2021 SE224314.002	BH1 SOIL 1.3-1.5 29/9/2021 SE224314.003	BH2 SOIL 0.5-1.0 29/9/2021 SE224314.004	BH2 SOIL 1.3-1.5 29/9/2021 SE224314.005
Chloride	mg/kg	0.25	22	150	450	170	530
Sulfate	mg/kg	0.5	150	270	210	240	290

PARAMETER	UOM	LOR	BH3 SOIL 0.2-0.3 29/9/2021 SE224314.006	BH3 SOIL 1.3-1.5 29/9/2021 SE224314.007	BH4 SOIL 0.2-0.3 29/9/2021 SE224314.008	BH4 SOIL 1.4-1.5 29/9/2021 SE224314.009	BH5 SOIL 0.2-0.4 29/9/2021 SE224314.010
Chloride	mg/kg	0.25	68	500	53	63	25
Sulfate	mg/kg	0.5	270	590	210	270	180

PARAMETER	UOM	LOR	BH5 SOIL 0.5-0.6 29/9/2021 SE224314.011	BH6 SOIL 0.6-0.7 29/9/2021 SE224314.012	BH6 SOIL 1.2-1.3 29/9/2021 SE224314.013	BH7 SOIL 0.8-0.9 29/9/2021 SE224314.014	BH7 SOIL 1.1-1.3 29/9/2021 SE224314.015
Chloride	mg/kg	0.25	81	310	830	220	730
Sulfate	mg/kg	0.5	87	160	150	190	390

PARAMETER	UOM	LOR	BH8 SOIL 0.7-0.8 29/9/2021 SE224314.016	BH8 SOIL 1.2-1.3 29/9/2021 SE224314.017	BH10 SOIL 0.4-0.5 29/9/2021 SE224314.018	BH10 SOIL 0.6-0.7 29/9/2021 SE224314.019	BH10 SOIL 1.5-1.7 29/9/2021 SE224314.020
Chloride	mg/kg	0.25	2000	1400	28	32	190
Sulfate	mg/kg	0.5	570	840	180	150	140

PARAMETER	UOM	LOR	BH11 SOIL 0.5-0.6 29/9/2021 SE224314.021	BH11 SOIL 1.3-1.5 29/9/2021 SE224314.022	BH12 SOIL 0.8-1.0 29/9/2021 SE224314.023	BH12 SOIL 1.3-1.4 29/9/2021 SE224314.024	BH13 SOIL 0.4-0.5 29/9/2021 SE224314.025
Chloride	mg/kg	0.25	2000	2100	42	310	540
Sulfate	mg/kg	0.5	6.7	7.3	33	7.8	210

PARAMETER	UOM	LOR	BH13 SOIL 0.7-0.8 29/9/2021 SE224314.026
Chloride	mg/kg	0.25	730
Sulfate	mg/kg	0.5	370

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:2 and the pH determined and reported on the extract after 1 hour extraction (pH 1:2) or after 1 hour extraction and overnight aging (pH (1:2) aged). Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN106	Resistivity of the extract is reported on the extract basis and is the reciprocal of conductivity. Salinity and TDS can be calculated from the extract conductivity and is reported back to the soil basis.
AN245	Anions by Ion Chromatography: A water sample or extract is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or

STATEMENT OF QA/QC PERFORMANCE

SE224314 R0

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**14954/1 Prestons**
Order Number	**14954/1**
Samples	26

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE224314 R0**
Date Received	06 Oct 2021
Date Reported	13 Oct 2021

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Conductivity (1:2) in soil	26 items
	Conductivity and TDS by Calculation - Soil	26 items
	pH in soil (1:2)	26 items
	Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography	26 items
Analysis Date	Conductivity (1:2) in soil	26 items
	Conductivity and TDS by Calculation - Soil	52 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	Client	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	26 Soil
Date documentation received	6/10/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	22°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE224314 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Conductivity (1:2) in soil — Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE224314.001	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH1	SE224314.002	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH1	SE224314.003	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH2	SE224314.004	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH2	SE224314.005	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH3	SE224314.006	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH3	SE224314.007	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH4	SE224314.008	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH4	SE224314.009	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH5	SE224314.010	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH5	SE224314.011	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH6	SE224314.012	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH6	SE224314.013	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH7	SE224314.014	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH7	SE224314.015	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH8	SE224314.016	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH8	SE224314.017	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH10	SE224314.018	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH10	SE224314.019	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH10	SE224314.020	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH11	SE224314.021	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH11	SE224314.022	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH12	SE224314.023	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH12	SE224314.024	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH13	SE224314.025	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†
BH13	SE224314.026	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	11 Oct 2021†

Conductivity and TDS by Calculation - Soil — Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE224314.001	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH1	SE224314.002	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH1	SE224314.003	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH2	SE224314.004	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH2	SE224314.005	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH3	SE224314.006	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH3	SE224314.007	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH4	SE224314.008	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH4	SE224314.009	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH5	SE224314.010	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH5	SE224314.011	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH6	SE224314.012	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH6	SE224314.013	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH7	SE224314.014	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH7	SE224314.015	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH8	SE224314.016	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH8	SE224314.017	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH10	SE224314.018	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH10	SE224314.019	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH10	SE224314.020	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH11	SE224314.021	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH11	SE224314.022	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH12	SE224314.023	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH12	SE224314.024	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH13	SE224314.025	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†
BH13	SE224314.026	LB234451	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	06 Oct 2021	12 Oct 2021†

Moisture Content — Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE224314.001	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH1	SE224314.002	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH1	SE224314.003	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Moisture Content (continued) — Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH2	SE224314.004	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH2	SE224314.005	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH3	SE224314.006	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH3	SE224314.007	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH4	SE224314.008	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH4	SE224314.009	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH5	SE224314.010	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH5	SE224314.011	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH6	SE224314.012	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH6	SE224314.013	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH7	SE224314.014	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH7	SE224314.015	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH8	SE224314.016	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH8	SE224314.017	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH10	SE224314.018	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH10	SE224314.019	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH10	SE224314.020	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH11	SE224314.021	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH11	SE224314.022	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH12	SE224314.023	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH12	SE224314.024	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH13	SE224314.025	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021
BH13	SE224314.026	LB234447	29 Sep 2021	06 Oct 2021	13 Oct 2021	11 Oct 2021	16 Oct 2021	12 Oct 2021

pH in soil (1:2) — Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE224314.001	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH1	SE224314.002	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH1	SE224314.003	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH2	SE224314.004	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH2	SE224314.005	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH3	SE224314.006	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH3	SE224314.007	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH4	SE224314.008	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH4	SE224314.009	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH5	SE224314.010	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH5	SE224314.011	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH6	SE224314.012	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH6	SE224314.013	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH7	SE224314.014	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH7	SE224314.015	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH8	SE224314.016	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH8	SE224314.017	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH10	SE224314.018	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH10	SE224314.019	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH10	SE224314.020	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH11	SE224314.021	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH11	SE224314.022	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH12	SE224314.023	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH12	SE224314.024	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH13	SE224314.025	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021
BH13	SE224314.026	LB234452	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	12 Oct 2021	11 Oct 2021

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography — Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE224314.001	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH1	SE224314.002	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH1	SE224314.003	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH2	SE224314.004	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH2	SE224314.005	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH3	SE224314.006	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography (continued) — Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH3	SE224314.007	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH4	SE224314.008	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH4	SE224314.009	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH5	SE224314.010	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH5	SE224314.011	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH6	SE224314.012	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH6	SE224314.013	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH7	SE224314.014	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH7	SE224314.015	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH8	SE224314.016	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH8	SE224314.017	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH10	SE224314.018	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH10	SE224314.019	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH10	SE224314.020	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH11	SE224314.021	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH11	SE224314.022	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH12	SE224314.023	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH12	SE224314.024	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH13	SE224314.025	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021
BH13	SE224314.026	LB234454	29 Sep 2021	06 Oct 2021	06 Oct 2021	11 Oct 2021†	08 Nov 2021	13 Oct 2021

SURROGATES

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB234452.001	Conductivity (1:2) @25 C*	µS/cm	1	<1

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB234451.001	Conductivity of Extract (1:5 as received)	µS/cm	1	<1
	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	0.74

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB234454.001	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	0.5	<0.5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE224314.010	LB234452.014	Conductivity (1:2) @25 C*	µS/cm	1	760	770	30	1
		Resistivity (1:2)*	ohm cm	-	1300	1300	31	1
SE224314.020	LB234452.025	Conductivity (1:2) @25 C*	µS/cm	1	400	420	30	4
		Resistivity (1:2)*	ohm cm	-	2500	2400	30	4
SE224314.026	LB234452.035	Conductivity (1:2) @25 C*	µS/cm	1	1200	1400	30	16
		Resistivity (1:2)*	ohm cm	-	820	700	31	16

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE224314.010	LB234451.014	Conductivity of Extract (1:5 as received)	µS/cm	1	520	540	30	5
		Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	550	580	30	5
SE224314.020	LB234451.025	Conductivity of Extract (1:5 as received)	µS/cm	1	200	200	31	1
		Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	230	230	31	1
SE224314.026	LB234451.035	Conductivity of Extract (1:5 as received)	µS/cm	1	750	670	30	10
		Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	920	830	30	10

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE224314.010	LB234447.011	% Moisture	%w/w	1	6.6	8.1	44	20
SE224314.020	LB234447.022	% Moisture	%w/w	1	14.6	14.1	37	3
SE224314.026	LB234447.029	% Moisture	%w/w	1	19.0	18.9	35	0

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE224314.010	LB234452.014	pH (1:2)	pH Units	-	10.8	10.8	31	0
SE224314.020	LB234452.025	pH (1:2)	pH Units	-	5.9	5.4	32	9
SE224314.026	LB234452.035	pH (1:2)	pH Units	-	4.5	4.2	32	6

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE224314.010	LB234454.014	Chloride	mg/kg	0.25	25	25	31	2
		Sulfate	mg/kg	0.5	180	170	31	10
SE224314.020	LB234454.028	Chloride	mg/kg	0.25	190	190	30	1
		Sulfate	mg/kg	0.5	140	140	31	0
SE224314.026	LB234454.035	Chloride	mg/kg	0.25	730	730	30	1
		Sulfate	mg/kg	0.5	370	360	31	1

LABORATORY CONTROL SAMPLES

SE224314 R0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB234452.002	Conductivity (1:2) @25 C*	µS/cm	1	310	303	70 - 130	102

Conductivity and TDS by Calculation - Soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB234451.002	Conductivity of Extract (1:5 as received)	µS/cm	1	310	303	85 - 115	103
	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	103

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB234452.003	pH (1:2)	pH Units	-	7.4	7.415	98 - 102	100

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB234454.002	Chloride	mg/kg	0.25	38	40	70 - 130	95
	Sulfate	mg/kg	0.5	37	40	70 - 130	93

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE224314 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

This test report shall not be reproduced, except in full.

source: Sydney.pdf page: 1 SGS Ref: SE224314_COC

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499
ATTN: Ms Emily Yin

Sampling By: AA
Job No 14954/1
Project: Proposed Road Upgrade - Bernera Road
Project Manager: IJ
Location: Prestons

Sampling details

Results required by: 15 /10/2021

	Location	Depth	Soil	Water	EC (1:5)	Aggressivity							Notes	Keep Sample
1	BH1	0.1-0.2	DSP		✓	✓								
2	BH1	0.3-0.5	DSP		✓	✓							Aggressivity test includes	
3	BH1	1.3-1.5	DSP		✓	✓								
4	BH2	0.5-1.0	DSP		✓	✓							pH, chlorise, sulphate	
5	BH2	1.3-1.5	DSP		✓	✓							and Resistivity	
6	BH3	0.2-0.3	DSP		✓	✓								
7	BH3	1.3-1.5	DSP		✓	✓								
8	BH4	0.2-0.3	DSP		✓	✓								
9	BH4	1.4-1.5	DSP		✓	✓								
10	BH5	0.2-0.4	DSP		✓	✓								
11	BH5	0.5-0.6	DSP		✓	✓								
12	BH 6	0.6-0.7	DSP		✓	✓								
13	BH 6	1.2-1.3	DSP		✓	✓								
14	BH 7	0.8 -0.9	DSP		✓	✓								
15	BH 7	1.1-1.3	DSP		✓	✓								
16	BH 8	0.7-0.8	DSP		✓	✓								
17	BH 8	1.2-1.3	DSP		✓	✓								
18	BH10	0.4-0.5	DSP		✓	✓								
19	BH10	0.6-0.7	DSP		✓	✓								
20	BH10	1.5-1.7	DSP		✓	✓								
21	BH11	0.5-0.6	DSP		✓	✓								
22	BH11	1.3-1.5	DSP		✓	✓								
23	BH12	0.8-1.0	DSP		✓	✓								
24	BH12	1.3-1.4	DSP		✓	✓								
25	BH13	0.4-0.5	DSP		✓	✓								
26	BH13	0.7-0.8	DSP		✓	✓								

SGS EHS Sydney COC
SE224314

Please Use Geotechnical Engineering Templete for Reporting

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	
Indra. J		29/09/2021	George Zhi	Zhi	6/10/21 @ 4pm

Legend:

WG	USG	Undisturbed soil sample (glass j	DSP	Disturbed soil sample (small plastic bag)	* Purge & Trap
WP	DSG	Disturbed soil sample (glass jar)	✓	Test required	# Geotechnique Screen

Form No 4.7F2-5 SGS

SAMPLE RECEIPT ADVICE

SE224314

CLIENT DETAILS

Contact	Indra Jworchan
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	indra.jworchan@geotech.com.au
Project	**14954/1 Prestons**
Order Number	**14954/1**
Samples	26

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 6/10/2021
Report Due	Wed 13/10/2021
SGS Reference	**SE224314**

SUBMISSION DETAILS

This is to confirm that 26 samples were received on Wednesday 6/10/2021. Results are expected to be ready by COB Wednesday 13/10/2021. Please quote SGS reference SE224314 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	Client	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	26 Soil
Date documentation received	6/10/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	22°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

Sampling date was not provided. It is assumed to be as date samples were relinquished.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

SAMPLE RECEIPT ADVICE

SE224314

CLIENT DETAILS

Client Geotechnique

Project 14954/1 Prestons

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity (1:2) in soil	Conductivity and TDS by Calculation - Soil	Moisture Content	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion
001	BH1 0.1-0.2	2	2	1	1	2
002	BH1 0.3-0.5	2	2	1	1	2
003	BH1 1.3-1.5	2	2	1	1	2
004	BH2 0.5-1.0	2	2	1	1	2
005	BH2 1.3-1.5	2	2	1	1	2
006	BH3 0.2-0.3	2	2	1	1	2
007	BH3 1.3-1.5	2	2	1	1	2
008	BH4 0.2-0.3	2	2	1	1	2
009	BH4 1.4-1.5	2	2	1	1	2
010	BH5 0.2-0.4	2	2	1	1	2
011	BH5 0.5-0.6	2	2	1	1	2
012	BH6 0.6-0.7	2	2	1	1	2
013	BH6 1.2-1.3	2	2	1	1	2
014	BH7 0.8-0.9	2	2	1	1	2
015	BH7 1.1-1.3	2	2	1	1	2
016	BH8 0.7-0.8	2	2	1	1	2
017	BH8 1.2-1.3	2	2	1	1	2
018	BH10 0.4-0.5	2	2	1	1	2
019	BH10 0.6-0.7	2	2	1	1	2
020	BH10 1.5-1.7	2	2	1	1	2
021	BH11 0.5-0.6	2	2	1	1	2
022	BH11 1.3-1.5	2	2	1	1	2
023	BH12 0.8-1.0	2	2	1	1	2
024	BH12 1.3-1.4	2	2	1	1	2

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE224314

CLIENT DETAILS

Client Geotechnique

Project 14954/1 Prestons

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity (1:2) in soil	Conductivity and TDS by Calculation - Soil	Moisture Content	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion
025	BH13 0.4-0.5	2	2	1	1	2
026	BH13 0.7-0.8	2	2	1	1	2

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

GEOTECH TESTING PTY LTD ®
ABN 71 076 676 321

MU GROUP CONSULTING PTY LTD
LEVEL 4, 23-33 MARY STREET
SURRY HILLS NSW 2010

GEOTECHNICAL INVESTIGATION
ROAD UPGRADE, BERNERA ROAD (BETWEEN KURRAJONG ROAD & YARRUNGA STREET/YATO ROAD)

TEST RESULTS - ATTERBERG LIMITS

Test Procedure AS1289 3.1.1, 3.2.1, 3.3.1, 3.4.1

Job No:	14954/1	Tested By:	DP
Laboratory	Prestons	Checked By:	MM
Date Tested	3-Nov-21		

Bore Hole Number	2	10	11
Laboratory Number	14954/1-1	14954/1-2	14954/1-3
Depth (m)	0.3-0.5	0.2-0.4	0.3-0.5
Test Description			
Liquid Limit (W_L)	Not Obtainable	Not Obtainable	62%
Plastic Limit (W_P)	Non Plastic	Non Plastic	22%
Plastic Index (I_P)	0%	0%	40%
Linear Shrinkage (LS)	NA	NA	15.0%
Mould Length (mm)	NA	NA	250
Sample History	Oven Dried Dry Sieved	Oven Dried Dry Sieved	Oven Dried Dry Sieved
Material Description	Fill, Sandy Gravel, fine to medium gravel, brown, with crushed sandstone gravel and cobbles	Fill, Sandy Gravel, fine to medium gravel, brown, with fine to medium grained sand.	Fill, Silty Clay, high plasticity, orange-brown-grey, fine gravel.

Form No R004 Version 12 - 06/13 - Issued by ER

M Morley 26/11/2021
Approved Signatory

Accredited for compliance with ISO/IEC 17025 - Testing.

NATA
Nata Accreditation Number 2734
Corporate Site Number 14227

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744

Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111

email: info@geotech.com.au www.geotech.com.au

GEOTECH TESTING PTY LTD ®
ABN 71 076 676 321

MU GROUP CONSULTING PTY LTD
LEVEL 4, 23-33 MARY STREET
SURRY HILLS NSW 2010

GEOTECHNICAL INVESTIGATION
ROAD UPGRADE, BERNERA ROAD (BETWEEN KURRAJONG ROAD & YARRUNGA STREET/YATO ROAD)

TEST RESULTS - ATTERBERG LIMITS

Test Procedure AS1289 3.1.1, 3.2.1, 3.3.1, 3.4.1

Job No:	14954/1	Tested By:	DP
Laboratory	Prestons	Checked By:	MM
Date Tested	3-Nov-21		

Bore Hole Number	13	8	3
Laboratory Number	14954/1-4	14954/1-5	14954/1-6
Depth (m)	0.7-1.0	1.0-1.2	1.3-1.5
Test Description			
Liquid Limit (W_L)	57%	55%	58%
Plastic Limit (W_P)	20%	19%	21%
Plastic Index (I_P)	37%	36%	37%
Linear Shrinkage (LS)	13.5%	12.0%	14.0%
Mould Length (mm)	250	250	250
Sample History	Oven Dried Dry Sieved	Oven Dried Dry Sieved	Oven Dried Dry Sieved
Material Description	Silty CLAY, high plasticity, orange-grey	Silty CLAY, high plasticity, orange-grey	Silty CLAY, high plasticity, orange-grey

Form No R004 Version 12 - 06/13 - Issued by ER

M Morley 26/11/2021
Approved Signatory

Accredited for compliance with ISO/IEC 17025 - Testing.

NATA
Nata Accreditation Number 2734
Corporate Site Number 14227

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744

Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111

email: info@geotech.com.au www.geotech.com.au

GEOTECH TESTING PTY LTD®
ABN 71 076 676 321

CALIFORNIA BEARING RATIO TEST REPORT

MU GROUP CONSULTING PTY LTD
LEVEL 4, 23-33 MARY STREET
SURRY HILLS NSW 2010

Laboratory: Prestons
Job No: 14954/1

PROJECT: GEOTECHNICAL INVESTIGATION
PROPOSED ROAD UPGRADE, BERNERA ROAD (BETWEEN KURRAJONG ROAD & YARRUNGA STREET/YATO ROAD) PRESTONS

CBR Test Procedure	Laboratory Compaction Method		Sampling Method	
AS1289 6.1.1	AS1289 5.1.1		AS1289 1.2.1 Clause 6.5.4	
Tested By: DP	Checked By: MM		CBR Test Date: 30/10/2021	
Laboratory Number	14954/1-1	14954/1-2	14954/1-3	14954/1-4
Drawing No.	14954/1-AA1	14954/1-AA1	14954/1-AA1	14954/1-AA1
Borehole No	2	10	11	13
Depth (m)	0.3-0.5	0.2-0.4	0.3-0.5	0.7-1.0
Date Sampled	28/09/2021	28/09/2021	28/09/2021	28/09/2021
Compaction Test Date	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Sample Description	Fill, Sandy Gravel, fine to medium gravel, brown, with crushed sandstone gravel and cobbles	Fill, Sandy Gravel, fine to medium gravel, brown, with fine to medium grained sand.	Fill, Silty Clay, high plasticity, orange-brown-grey, fine gravel.	Silty CLAY, high plasticity, orange-grey
Maximum Dry Density t/m3	1.71	1.94	1.59	1.63
Optimum Moisture Content %	18.5	11.0	28.5	22.5
Field Moisture Content %	13.3	8.2	28.6	23.8
% Retained 19mm	12	8	0.0	0.0
Excluded (Yes / No / Not Applicable)	Yes	Yes	Not Applicable	Not Applicable

CBR TEST RESULTS

Dry Density t/m^3	Before soaking	1.72	1.95	1.58	1.66
	After soaking	1.72	1.96	1.54	1.63
Density Ratio %	Before soaking	100.5	100.5	99.5	102.0
Moisture Content %	Before soaking	18.5	11.1	28.5	22.4
	After soaking	19.1	12.9	29.8	26.3
Moisture Ratio %	Before soaking	100.0	101.0	100.0	99.5
Number of Days Soaked		4	4	4	4
Surcharge	kg	6.75	6.75	6.75	6.75
Moisture Content after test %	Top 30mm	18.2	12.4	30.3	25.4
	Whole Sample	18.8	12.1	29.6	26.2
Swell after soaking %		0.0	0.0	2.5	1.5
Penetration mm		5.0	5.0	5.0	5.0
CBR VALUE %		**70**	**80**	**4.0**	**3.0**

Form No R003 Version 05 07/21 - issued by ER

Report Date
M Morley 2/11/2021

NATA
Accredited for compliance with ISO/IEC 17025 - Testing.

Nata Accreditation Number 2734
Corporate Site Number 14227

Approved Signatory

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744

Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111

email: info@geotech.com.au www.geotech.com.au

GEOTECH TESTING PTY LTD®
ABN 71 076 676 321

CALIFORNIA BEARING RATIO TEST REPORT

MU GROUP CONSULTING PTY LTD
LEVEL 4, 23-33 MARY STREET
SURRY HILLS NSW 2010

Laboratory: Prestons
Job No: 14954/1

PROJECT: GEOTECHNICAL INVESTIGATION
PROPOSED ROAD UPGRADE, BERNERA ROAD (BETWEEN KURRAJONG ROAD & YARRUNGA STREET/YATO ROAD) PRESTONS

CBR Test Procedure		Laboratory Compaction Method		Sampling Method	
AS1289 6.1.1		AS1289 5.1.1		AS1289 1.2.1 Clause 6.5.4	
Tested By: DP		Checked By: MM		CBR Test Date: 30/10/2021	
Laboratory Number		14954/1-5	14954/1-6		
Drawing No.		14954/1-AA1	14954/1-AA1		
Borehole No		8	3		
Depth (m)		1.0-1.2	1.3-1.5		
Date Sampled		28/09/2021	28/09/2021		
Compaction Test Date		25/10/2021	25/10/2021		
Sample Description		Silty CLAY, high plasticity, orange-grey	Silty CLAY, high plasticity, orange-grey		
Maximum Dry Density	t/m3	1.62	1.64		
Optimum Moisture Content	%	25.5	23.5		
Field Moisture Content	%	25.4	23.7		
% Retained 19mm		0.0	0.0		
Excluded (Yes / No / Not Applicable)		Not Applicable	Not Applicable		
CBR TEST RESULTS					
Dry Density t/m^3	Before soaking	1.60	1.64		
	After soaking	1.57	1.61		
Density Ratio %	Before soaking	99.0	100.0		
Moisture Content %	Before soaking	25.6	23.4		
	After soaking	27.5	25.6		
Moisture Ratio %	Before soaking	100.5	99.5		
Number of Days Soaked		4	4		
Surcharge	kg	6.75	6.75		
Moisture Content after test %	Top 30mm	26.8	25.7		
	Whole Sample	27.3	25.5		
Swell after soaking	%	2.0	2.5		
Penetration	mm	5.0	2.5		
CBR VALUE	**%**	**3.0**	**3.0**		

Form No R003 Version 05 07/21 - issued by ER

Report Date
M Morley 2/11/2021

NATA
Accredited for compliance with ISO/IEC 17025 - Testing.

Nata Accreditation Number 2734
Corporate Site Number 14227

Approved Signatory

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744

Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111

email: info@geotech.com.au www.geotech.com.au

```
CIRCLY Version 5.0u (8 April 2013)

Job Title: Proposed Road Upgrade-MU Group

Damage Factor Calculation

Assumed number of damage pulses per movement:
   One pulse per axle (i.e. use NROWS)

Traffic Spectrum Details:

   ID: 8e6 Title: 8e6

   Load   Load         Movements
    No.   ID
    1     ESA75-Full   8.00E+06

Details of Load Groups:

   Load   Load        Load        Load            Radius    Pressure/    Exponent
    No.   ID          Category    Type                      Ref. stress
    1     ESA75-Full  SA750-Full  Vertical Force     92.1    0.75         0.00

   Load Locations:
   Location   Load        Gear          X          Y      Scaling     Theta
    No.       ID          No.                             Factor
    1         ESA75-Full   1          -165.0        0.0   1.00E+00      0.00
    2         ESA75-Full   1           165.0        0.0   1.00E+00      0.00
    3         ESA75-Full   1          1635.0        0.0   1.00E+00      0.00
    4         ESA75-Full   1          1965.0        0.0   1.00E+00      0.00

Layout of result points on horizontal plane:
   Xmin:  0   Xmax:  165   Xdel:  165
   Y:     0

Details of Layered System:

   ID: 14954-1-4 Title: 14954-1-4 Existing Pavement with 200mm base course

   Layer  Lower    Material     Isotropy   Modulus    P.Ratio
    No.   i/face   ID                      (or Ev)    (or vvh)  F          Eh         vh
    1     rough    Exstng Pav   Iso.       1.00E+03   0.40
    2     rough    Gran_250     Aniso.     2.50E+02   0.35      1.90E+02   1.25E+02   0.35
    3     rough    Gran_150     Aniso.     1.50E+02   0.35      1.11E+02   7.50E+01   0.35
    4     rough    Sub_CBR3     Aniso.     3.00E+01   0.45      2.07E+01   1.50E+01   0.45

   Performance Relationships:
   Layer  Location Performance  Component  Perform.   Perform.  Traffic
    No.            ID                      Constant   Exponent  Multiplier
    1     bottom   Exstng Pav   ETH         0.006040    5.000     1.100
    4     top      Sub_2004     EZZ         0.009300    7.000     1.600

   Reliability Factors: Not Used.

   Details of Layers to be sublayered:
   Layer no.  2:  Austroads (2004) sublayering
   Layer no.  3:  Austroads (2004) sublayering

Results:

   Layer  Thickness  Material     Load          Critical       CDF
    No.              ID           ID            Strain
    1      200.00    Exstng Pav   ESA75-Full    -2.75E-04      1.71E+00
    2      200.00    Gran_250                    n/a           n/a
    3      300.00    Gran_150                    n/a           n/a
    4        0.00    Sub_CBR3     ESA75-Full     5.42E-04      2.93E-02
```

```
CIRCLY Version 5.0u (8 April 2013)

Job Title: Proposed Road Upgrade-MU Group

Damage Factor Calculation

Assumed number of damage pulses per movement:
   One pulse per axle (i.e. use NROWS)

Traffic Spectrum Details:

   ID: 8e6 Title: 8e6

   Load   Load         Movements
    No.   ID
    1     ESA75-Full   8.00E+06

Details of Load Groups:

   Load   Load        Load        Load            Radius    Pressure/    Exponent
    No.   ID          Category    Type                      Ref. stress
    1     ESA75-Full  SA750-Full  Vertical Force     92.1    0.75         0.00

   Load Locations:
   Location   Load        Gear          X          Y      Scaling     Theta
    No.       ID          No.                             Factor
    1         ESA75-Full   1          -165.0        0.0   1.00E+00      0.00
    2         ESA75-Full   1           165.0        0.0   1.00E+00      0.00
    3         ESA75-Full   1          1635.0        0.0   1.00E+00      0.00
    4         ESA75-Full   1          1965.0        0.0   1.00E+00      0.00

Layout of result points on horizontal plane:
   Xmin:  0   Xmax:  165   Xdel:  165
   Y:     0

Details of Layered System:

   ID: 14954-1-1 Title: 14954-1-1 Existing Pavement

   Layer  Lower    Material     Isotropy   Modulus    P.Ratio
    No.   i/face   ID                      (or Ev)    (or vvh)  F          Eh         vh
    1     rough    Exstng Pav   Iso.       1.00E+03   0.40
    2     rough    Gran_250     Aniso.     2.50E+02   0.35      1.90E+02   1.25E+02   0.35
    3     rough    Gran_150     Aniso.     1.50E+02   0.35      1.11E+02   7.50E+01   0.35
    4     rough    Sub_CBR3     Aniso.     3.00E+01   0.45      2.07E+01   1.50E+01   0.45

   Performance Relationships:
   Layer  Location Performance  Component  Perform.   Perform.  Traffic
    No.            ID                      Constant   Exponent  Multiplier
    1     bottom   Exstng Pav   ETH         0.006040    5.000     1.100
    4     top      Sub_2004     EZZ         0.009300    7.000     1.600

   Reliability Factors: Not Used.

   Details of Layers to be sublayered:
   Layer no.  2:  Austroads (2004) sublayering
   Layer no.  3:  Austroads (2004) sublayering

Results:

   Layer  Thickness  Material     Load          Critical       CDF
    No.              ID           ID            Strain
    1      200.00    Exstng Pav   ESA75-Full    -2.29E-04      6.86E-01
    2      500.00    Gran_250                    n/a           n/a
    3      300.00    Gran_150                    n/a           n/a
    4        0.00    Sub_CBR3     ESA75-Full     3.09E-04      5.66E-04
```

CIRCLY Version 5.0u (8 April 2013)

Job Title: Proposed Road Upgrade-MU Group

Damage Factor Calculation

Assumed number of damage pulses per movement:
One pulse per axle (i.e. use NROWS)

Traffic Spectrum Details:

ID: 8e6 Title: 8e6

Load No.	Load ID	Movements
1	ESA75-Full	8.00E+06

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA75-Full	SA750-Full	Vertical Force	92.1	0.75	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA75-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA75-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA75-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA75-Full	1	1965.0	0.0	1.00E+00	0.00

Layout of result points on horizontal plane:
Xmin: 0 Xmax: 165 Xdel: 165
Y: 0

Details of Layered System:

ID: 14954-1-2 Title: 14954-1-2 New Deep Lift AC

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Asph2800	Iso.	2.80E+03	0.40			
2	rough	Gran_300	Aniso.	3.00E+02	0.35	2.20E+02	1.50E+02	0.35
3	rough	Sub_CBR3	Aniso.	3.00E+01	0.45	2.07E+01	1.50E+01	0.45

Performance Relationships:

Layer No.	Location	Performance ID	Component	Perform. Constant	Perform. Exponent	Traffic Multiplier
1	bottom	ShellA12.9	ETH	0.005889	5.000	1.100
3	top	Sub_2004	EZZ	0.009300	7.000	1.600

Reliability Factors: Not Used.

Details of Layers to be sublayered:
Layer no. 2: Austroads (2004) sublayering

Results:

Layer No.	Thickness	Material ID	Load ID	Critical Strain	CDF
1	185.00	Asph2800	ESA75-Full	-2.30E-04	7.94E-01
2	300.00	Gran_300		n/a	n/a
3	0.00	Sub_CBR3	ESA75-Full	6.22E-04	7.65E-02

CIRCLY Version 5.0u (8 April 2013)

Job Title: Proposed Road Upgrade-MU Group

Damage Factor Calculation

Assumed number of damage pulses per movement:
One pulse per axle (i.e. use NROWS)

Traffic Spectrum Details:

ID: 8e6 Title: 8e6

Load No.	Load ID	Movements
1	ESA75-Full	8.00E+06

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA75-Full	SA750-Full	Vertical Force	92.1	0.75	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA75-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA75-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA75-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA75-Full	1	1965.0	0.0	1.00E+00	0.00

Layout of result points on horizontal plane:
Xmin: 0 Xmax: 165 Xdel: 165
Y: 0

Details of Layered System:

ID: 14954-1-3 Title: 14954-1-3 Flexible Pavement

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_300	Aniso.	3.00E+02	0.35	2.20E+02	1.50E+02	0.35
2	rough	Gran_250	Aniso.	2.50E+02	0.35	1.90E+02	1.25E+02	0.35
3	rough	Sub_CBR3	Aniso.	3.00E+01	0.45	2.07E+01	1.50E+01	0.45

Performance Relationships:

Layer No.	Location	Performance ID	Component	Perform. Constant	Perform. Exponent	Traffic Multiplier
3	top	Sub_2004	EZZ	0.009300	7.000	1.600

Reliability Factors: Not Used.

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Results:

Layer No.	Thickness	Material ID	Load ID	Critical Strain	CDF
1	150.00	Gran_300		n/a	n/a
2	490.00	Gran_250		n/a	n/a
3	0.00	Sub_CBR3	ESA75-Full	8.98E-04	1.00E+00

CIRCLY Version 5.0u (8 April 2013)

Job Title: Proposed Road Upgrade-MU Group

Damage Factor Calculation

Assumed number of damage pulses per movement:
One pulse per axle (i.e. use NROWS)

Traffic Spectrum Details:

ID: 8e6 Title: 8e6

Load No.	Load ID	Movements
1	ESA75-Full	8.00E+06

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA75-Full	SA750-Full	Vertical Force	92.1	0.75	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA75-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA75-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA75-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA75-Full	1	1965.0	0.0	1.00E+00	0.00

Layout of result points on horizontal plane:
Xmin: 0 Xmax: 165 Xdel: 165
Y: 0

Details of Layered System:

ID: 14954-1-5 Title: 14954-1-5 Existing Pavement with 200mm base course & mill & resheet

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Asph2800	Iso.	2.80E+03	0.40			
2	rough	Exstng Pav	Iso.	1.00E+03	0.40			
3	rough	Gran_250	Aniso.	2.50E+02	0.35	1.90E+02	1.25E+02	0.35
4	rough	Gran_150	Aniso.	1.50E+02	0.35	1.11E+02	7.50E+01	0.35
5	rough	Sub_CBR3	Aniso.	3.00E+01	0.45	2.07E+01	1.50E+01	0.45

Performance Relationships:

Layer No.	Location	Performance ID	Component	Perform. Constant	Perform. Exponent	Traffic Multiplier
1	bottom	ShellA12.9	ETH	0.005889	5.000	1.100
2	bottom	Exstng Pav	ETH	0.006040	5.000	1.100
5	top	Sub_2004	EZZ	0.009300	7.000	1.600

Reliability Factors: Not Used.

Details of Layers to be sublayered:
Layer no. 3: Austroads (2004) sublayering
Layer no. 4: Austroads (2004) sublayering

Results:

Layer No.	Thickness	Material ID	Load ID	Critical Strain	CDF
1	110.00	Asph2800	ESA75-Full	-1.49E-04	9.24E-02
2	90.00	Exstng Pav	ESA75-Full	-2.45E-04	9.59E-01
3	200.00	Gran_250		n/a	n/a
4	300.00	Gran_150		n/a	n/a
5	0.00	Sub_CBR3	ESA75-Full	4.72E-04	1.12E-02

Appendix G2 – Design asphalt modulus reports

DRAFT

APPENDIX G2-A

ASPHALT MODULUS VERSION 6B REPORTS

DESIGN ASPHALT MODULUS

Project details:	Bernera Road Upgrade
Date:	14 May 2022
Designer:	JF
AC Modulus version:	6B (01 March 2018)
Design references:	Roads and Maritime Supplement to Austroads Part 2 Roads and Maritime asphalt and material specifications Austroads Part 2: Pavement Structural Design (AGPT02-17)

Inputs

Mix type:	AC14
Binder grade:	A15E
Modulus adjustment factor:	0.75
Total binder content (by mass):	5.2%
Binder absorption:	0.3%
Binder density:	1.043 tonnes/m3
Insitu air voids:	6.0%
Combined bulk density of mineral aggregate:	2.65 tonnes/m3
Bitumen penetration at 25° C (0.1 mm):	31 (after RTFO)
Bitumen viscosity at 60° C:	970 Pa.s (after RTFO)
Loading speed:	60 km/h
WMAPT:	28.0° C

Results

Time of loading:	0.02 seconds
Bitumen T800 pen:	58.1° C
Bitumen Penetration Index:	-0.4
Binder stiffness:	20.7 MPa
Binder volume:	10.9%
Aggregate volume:	83.1%
Nominal mix modulus:	2,392 MPa
Adjusted mix modulus:	2,400 MPa
CIRCLY (k) value:	0.004371

DESIGN ASPHALT MODULUS

Project details:	Bernera Road Upgrade
Date:	14 May 2022
Designer:	JF
AC Modulus version:	6B (01 March 2018)
Design references:	Roads and Maritime Supplement to Austroads Part 2 Roads and Maritime asphalt and material specifications Austroads Part 2: Pavement Structural Design (AGPT02-17)

Inputs

Mix type:	AC20
Binder grade:	C450
Modulus adjustment factor:	1
Total binder content (by mass):	4.9%
Binder absorption:	0.3%
Binder density:	1.043 tonnes/m3
Insitu air voids:	6.0%
Combined bulk density of mineral aggregate:	2.65 tonnes/m3
Bitumen penetration at 25° C (0.1 mm):	31 (after RTFO)
Bitumen viscosity at 60° C:	970 Pa.s (after RTFO)
Loading speed:	60 km/h
WMAPT:	28.0° C

Results

Time of loading:	0.02 seconds
Bitumen T800 pen:	58.1° C
Bitumen Penetration Index:	-0.4
Binder stiffness:	20.7 MPa
Binder volume:	10.3%
Aggregate volume:	83.7%
Nominal mix modulus:	3,451 MPa
Adjusted mix modulus:	3,500 MPa
CIRCLY (k) value:	0.003628

APPENDIX G2-B

FLEXIBLE PAVEMENT DESIGN

FPD 2.0 SUMMARY REPORTS

PAVEMENT TRAFFIC LOADING 2 - TRAFFIC LOADING RESULTS

Input Details

Project title :	Bernera Road
Analysis by :	JF
Analysis date :	14 May 2022
Design Year 1 :	2023
Year 1 AADT :	6,410 Vehicles
DF - Direction Factor :	0.5
N_{HVAG} :	2.71 HVAG/HV
%HV - Heavy Vehicles :	10.00%
LDF - Lane Distribution Factor :	1.00
Lane capacity flow rate :	1,850 Passenger cars per hour
Number of lanes in direction of design lane :	2
Average Passenger Cars per Heavy Vehicle :	2.50
Design period :	20 years
Number of design period phases :	1

Phase	Start Year	End Year	Growth Rate	Incremental HV in first year of phase
1	1	20	2.00%	N/A
2	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A

ESA analysis method :	TLD data
ESA per HVAG :	N/A
TLD Title:	Table 17: Urban presumptive TLD
TLD workbook filename:	C:\Users\john\OneDrive - johnfigueroaconsulting.com\JFC\Projects\MU Group\Bernera Road\Urban presumptive TLD.xlsx
TLD worksheet name:	Bernera Road TLD 2020
HVAG proportions:	TLD

SAST	SADT	TAST	TADT	TRDT	QADT
0.3474	0.1665	0.0214	0.3116	0.1515	0.0016

Analysis Details

PTL2 design filename :	C:\Users\john\OneDrive - johnfigueroaconsulting.com\JFC\Projects\MU Group\Bernera Road\Bernera Road.ptl2
PTL2 software version :	1C (December 2021)
Design reference :	Austroads Guide AGPT02-17

Pavement Design Loadings

	Total at Year 20 (2042)
N_{DT} (HVAG) :	7.70E+06
DESA :	8.00E+06

Heavy Vehicle Capacity Details

Annual HV capacity of design lane :	2.82E+06
HV capacity reached in Design Period? :	NO
Design Year of HV capacity :	N/A

General Details

ESA per Heavy Vehicle :	2.814
ESA per HVAG :	1.039

Table 17: Urban presumptive TLD

Axle group load (kN)	Axle group type					
	SAST %	SADT %	TAST %	TADT %	TRDT %	QADT %
10	0	1.6515	0	0.0231	0	0
20	0.3561	4.004	0	0.3002	0.015	0.0111
30	13.3571	12.9448	0.0994	0.8502	0.0543	0
40	12.7317	19.902	0.2239	2.4396	0.2766	0.0111
50	21.098	16.829	1.101	4.5192	0.8964	0.0222
60	37.5276	14.0346	4.4791	6.8	2.0169	0.1441
70	14.159	10.8988	11.8182	8.5507	3.639	0.8646
80	0.6755	8.4266	17.1939	8.9734	5.1633	2.2611
90	0.067	6.1059	18.02	7.9581	6.4251	5.1984
100	0.028	3.4667	17.6748	6.3826	6.629	8.3906
110	0	1.2478	13.865	5.3969	5.9452	9.8647
120	0	0.3592	7.4612	5.1905	4.9118	9.2552
130	0	0.1064	3.0661	5.5013	4.4113	6.2625
140	0	0.0227	1.8617	6.2101	4.193	3.9459
150	0	0	1.8641	6.8837	4.3453	3.9348
160	0	0	1.2716	7.285	4.5746	3.6134
170	0	0	0	7.177	4.8813	3.1368
180	0	0	0	5.4063	5.2969	3.2698
190	0	0	0	2.7516	5.7355	3.4915
200	0	0	0	0.9769	6.2336	4.09
210	0	0	0	0.2961	6.465	4.4779
220	0	0	0	0.0899	6.0455	4.7218
230	0	0	0	0.0294	4.825	4.0789
240	0	0	0	0.0082	3.2879	3.0814
250	0	0	0	0	1.9568	2.3055
260	0	0	0	0	1.0135	2.1281
270	0	0	0	0	0.4719	2.0727
280	0	0	0	0	0.1916	2.1392
290	0	0	0	0	0.0806	1.8843
300	0	0	0	0	0.0181	1.8732
310	0	0	0	0	0	1.1527
320	0	0	0	0	0	0.7537
330	0	0	0	0	0	0.6096
340	0	0	0	0	0	0.4323
350	0	0	0	0	0	0.4101
360	0	0	0	0	0	0.1108
370	0	0	0	0	0	0
380	0	0	0	0	0	0
390	0	0	0	0	0	0
400	0	0	0	0	0	0
Total	100.00	100.00	100.00	100.00	100.00	100.00

Group proportions	0.3474	0.1665	0.0214	0.3116	0.1515	0.0016

Flexible Pavement Design 2.0 - Summary Report

Design Filename: C:\Users\john\OneDrive - johnfigueroaconsulting.com\JFC\Projects\MU Group\Bernera Road\Bernera Road.fpd2
FPD software verion: FPD 2.0 Version 1B (12 March 2020)
CIRCLY software version: 5.1d (7 September 2016)

Project Details

Project Title: Bernera Road Upgrade
Location: Prestons
Pavement Tag: F1
Comments:
Date of Design: 14/05/2022
Designer: JFC
Project Reliability (%): 90
WMAPT (°C): 28
Design Speed (km/h): 60

Load Details

Single Axle Single Tyre (SAST)	Standard Axle Load: 53 kN	Tyre Contact Stress: 800 kPa
Single Axle Dual Tyre (SADT)	Standard Axle Load: 80 kN	Tyre Contact Stress: 750 kPa

Traffic Details

PTL report: C:\Users\john\OneDrive - johnfigueroaconsulting.com\JFC\Projects\MU Group\Bernera Road\Working Folder\Bernera Rd_PTLexpo
TLD Title: Table 17: Urban presumptive TLD

Design Period (yrs): 20	Design Traffic - N_{DT} (HVAG): 7.70E+06	N_{DT} (ESAs): 8.00E+06
Annual growth rate (%): 2.0	N_{DT} for asphalt fatigue (HVAG): 7.70E+06	ESA/HVAG: 1.039

Axle Group	SAST	SADT	TAST	TADT	TRDT	QADT
Proportions	0.3474	0.1665	0.0214	0.3116	0.1515	0.0016

From PTL Report

Layer Details

Layer No.	Description	Material	Thickness (mm)	Ev (MPa)	Ev / Eh	Poisson's Ratio	Lower Interface	% Vol. Bitumen	Sublayer?
1	AC14 A15E	Asphalt	50	2,400	1.0	0.40	Rough	10.9	N/A
2	AC20 C450	Asphalt	170	3,500	1.0	0.40	Rough	10.3	N/A
3	Selected Material (SMZ)	Selected Subgrade	300	150	2.0	0.35	Rough	N/A	Yes
4	Cohesive Subgrade	Subgrade	S/Inf	30	2.0	0.45	N/A	N/A	N/A

Layer Results

Layer No.	Description	Thickness (mm)	Vertical Modulus (MPa)	Stress Param. f (MPa)	k Factor	Failure Criterion	Maximum Microstrains			Expected Reps (ESAs)	Allowable Reps (ESAs)	CDF (Damage)	Estimated Life in Years
							SAST	SADT					
							Hor.	Hor.	Vert.				
1	AC14 A15E	50	2,400	N/A	4371	Fatigue	-16.07	-19.52	N/A	8.00E+06	N/A	0.00	>50
2	**AC20 C450**	**170**	**3,500**	**N/A**	**3628**	**Fatigue**	**-139.6**	**-171**	**N/A**	**8.00E+06**	**N/A**	**0.87**	**22.4**
3.1	S/L Selected Material (SMZ)	60	120	89	9150	Rutting	N/A	N/A	276.7	8.00E+06	4.32E+10	0.00	>50
3.2	S/L Selected Material (SMZ)	60	91	67	9150	Rutting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.3	S/L Selected Material (SMZ)	60	69	51	9150	Rutting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.4	S/L Selected Material (SMZ)	60	52	39	9150	Rutting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3.5	S/L Selected Material (SMZ)	60	40	29	9150	Rutting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Cohesive Subgrade	S/Inf	30	21	9150	Rutting	N/A	N/A	473.1	8.00E+06	1.01E+09	0.01	>50

Note: For construction purposes, an additional 10mm must be added to the critical layer, the damage for which is highlighted in bold above.

Non-conformances

No non-conformances have been detected.

Table 17: Urban presumptive TLD

Axle group load (kN)	Axle group type					
	SAST %	SADT %	TAST %	TADT %	TRDT %	QADT %
10	0.0000	1.6515	0.0000	0.0231	0.0000	0.0000
20	0.3561	4.0040	0.0000	0.3002	0.0150	0.0111
30	13.3571	12.9448	0.0994	0.8502	0.0543	0.0000
40	12.7317	19.9020	0.2239	2.4396	0.2766	0.0111
50	21.0980	16.8290	1.1010	4.5192	0.8964	0.0222
60	37.5276	14.0346	4.4791	6.8000	2.0169	0.1441
70	14.1590	10.8988	11.8182	8.5507	3.6390	0.8646
80	0.6755	8.4266	17.1939	8.9734	5.1633	2.2611
90	0.0670	6.1059	18.0200	7.9581	6.4251	5.1984
100	0.0280	3.4667	17.6748	6.3826	6.6290	8.3906
110	0.0000	1.2478	13.8650	5.3969	5.9452	9.8647
120	0.0000	0.3592	7.4612	5.1905	4.9118	9.2552
130	0.0000	0.1064	3.0661	5.5013	4.4113	6.2625
140	0.0000	0.0227	1.8617	6.2101	4.1930	3.9459
150	0.0000	0.0000	1.8641	6.8837	4.3453	3.9348
160	0.0000	0.0000	1.2716	7.2850	4.5746	3.6134
170	0.0000	0.0000	0.0000	7.1770	4.8813	3.1368
180	0.0000	0.0000	0.0000	5.4063	5.2969	3.2698
190	0.0000	0.0000	0.0000	2.7516	5.7355	3.4915
200	0.0000	0.0000	0.0000	0.9769	6.2336	4.0900
210	0.0000	0.0000	0.0000	0.2961	6.4650	4.4779
220	0.0000	0.0000	0.0000	0.0899	6.0455	4.7218
230	0.0000	0.0000	0.0000	0.0294	4.8250	4.0789
240	0.0000	0.0000	0.0000	0.0082	3.2879	3.0814
250	0.0000	0.0000	0.0000	0.0000	1.9568	2.3055
260	0.0000	0.0000	0.0000	0.0000	1.0135	2.1281
270	0.0000	0.0000	0.0000	0.0000	0.4719	2.0727
280	0.0000	0.0000	0.0000	0.0000	0.1916	2.1392
290	0.0000	0.0000	0.0000	0.0000	0.0806	1.8843
300	0.0000	0.0000	0.0000	0.0000	0.0181	1.8732
310	0.0000	0.0000	0.0000	0.0000	0.0000	1.1527
320	0.0000	0.0000	0.0000	0.0000	0.0000	0.7537
330	0.0000	0.0000	0.0000	0.0000	0.0000	0.6096
340	0.0000	0.0000	0.0000	0.0000	0.0000	0.4323
350	0.0000	0.0000	0.0000	0.0000	0.0000	0.4101
360	0.0000	0.0000	0.0000	0.0000	0.0000	0.1108
370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
380	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
390	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000
Group proportions	0.3474	0.1665	0.0214	0.3116	0.1515	0.0016

Appendix H – Retaining Wall Design

DRAFT

LIVERPOOL CITY COUNCIL

BERNERA ROAD AND
YARRUNGA ROAD

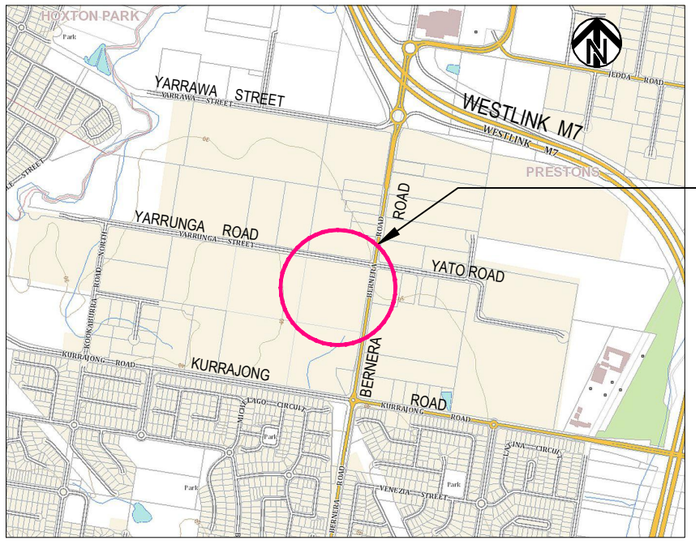
CITY OF LIVERPOOL

BERNERA ROAD UPGRADE

KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
RETAINING WALL AT LOGOS SITE

NEW RETAINING WALL - 2022

DESIGN STANDARD : AS 4678



LOCALITY PLAN

SCHEDULE OF DRAWINGS

1. COVER SHEET
2. GENERAL ARRANGEMENT - SHEET A
3. GENERAL ARRANGEMENT - SHEET B
4. GENERAL ARRANGEMENT - SHEET C

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	01/11/2021	CONCEPT		
02	26/04/2022	80% DETAIL DESIGN		
03	20/09/2022	100% DETAIL DESIGN		J.KALANTZIS

SCALES ON A3 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: GDA2020

MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, Level 4,
23/33 Mary Street,
Surry Hills NSW 2010
T 02 9016 7272 www.mugroup.com.au

PLOT DATE / TIME: 20/09/2022 8:38:36 AM
PLOT BY: Luigi Luongo

TITLE	NAME	DATE
DRAWN	D.GIBBS	20/09/22
DRG CHECK	J.KALANTZIS	20/09/22
DESIGN	BAC MAI	20/09/22
DESIGN CHECK	C SOOSAPILLA	20/09/22
DESIGN MNGR	A.PAVLOVIC	20/09/22
PROJECT MNGR	J.KALANTZIS	20/09/22

CLIENT

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET UPGRADE
RETAINING WALL AT LOGOS SITE
COVER SHEET

A3

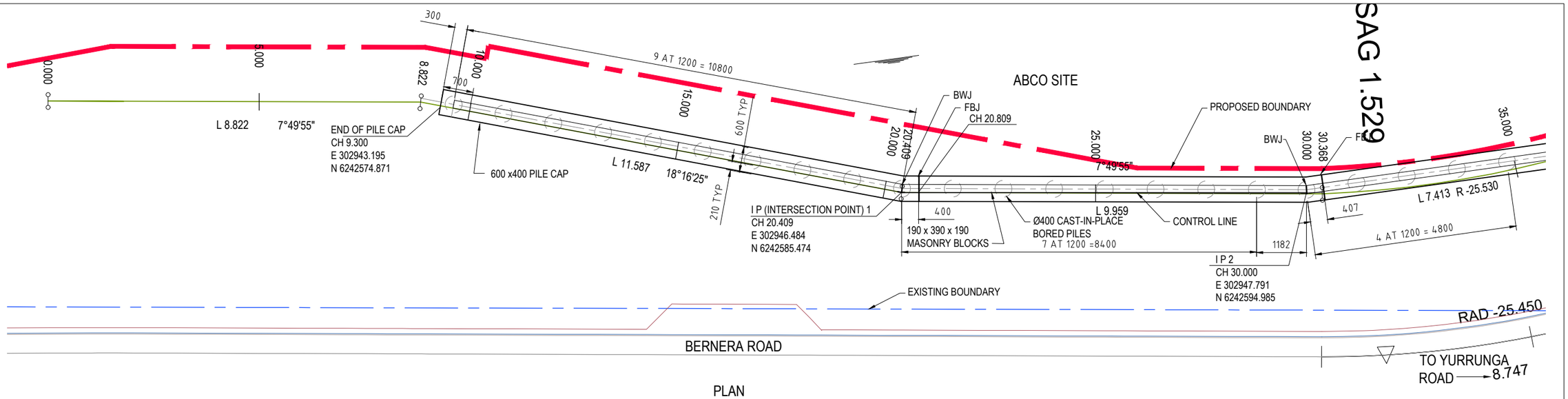
RMS REGISTRATION No. 2021_25_DD_ 0001

PART

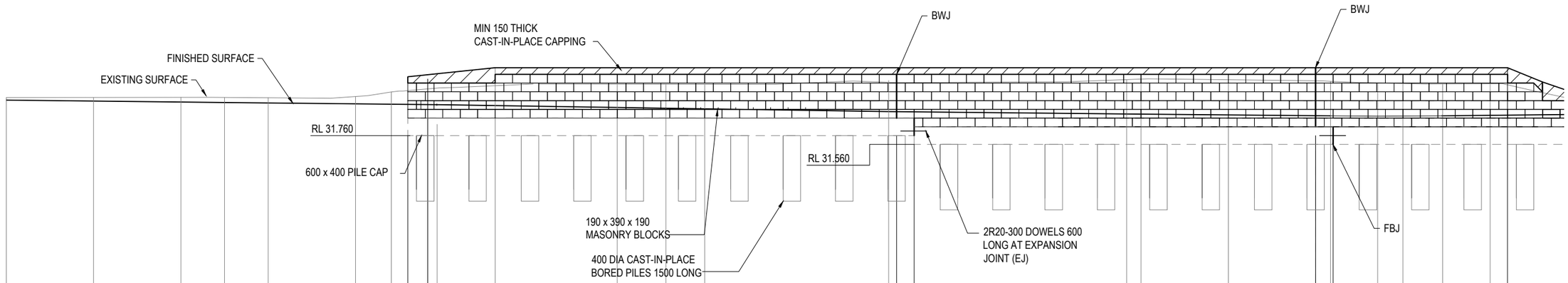
ISSUE STATUS: 100% DETAIL DESIGN

SHEET No. 01

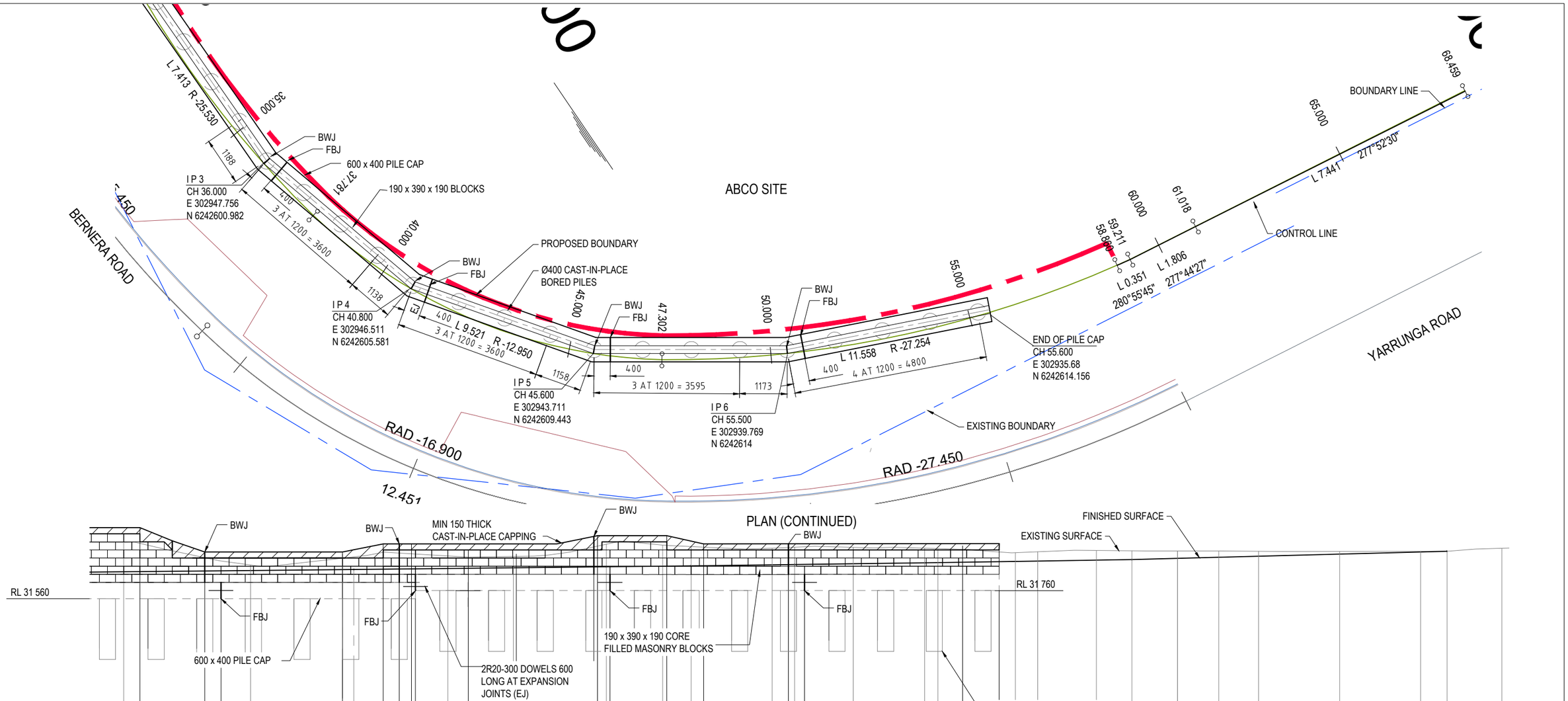
ISSUE 03


SAG 1.529
ABCO SITE
PROPOSED BOUNDARY
9 AT 1200 = 10800
300
700
10.000
15.000
20.000
25.000
30.000
35.000
8.822
L 8.822
7°49'55"
END OF PILE CAP
CH 9.300
E 302943.195
N 6242574.871
600 x400 PILE CAP
L 11.587
18°16'25"
600 TYP
210 TYP
I P (INTERSECTION POINT) 1
CH 20.409
E 302946.484
N 6242585.474
BWJ
FBJ
CH 20.809
20.409
400
190 x 390 x 190
MASONRY BLOCKS
Ø400 CAST-IN-PLACE
BORED PILES
7 AT 1200 =8400
L 9.959
CONTROL LINE
30.368
407
1182
L 7.413 R -25.530
4 AT 1200 = 4800
I P 2
CH 30.000
E 302947.791
N 6242594.985
EXISTING BOUNDARY
RAD -25.450
BERNERA ROAD
TO YURRUNGA
ROAD
8.747

PLAN


MIN 150 THICK
CAST-IN-PLACE CAPPING
FINISHED SURFACE
EXISTING SURFACE
BWJ
BWJ
RL 31.760
600 x 400 PILE CAP
RL 31.560
190 x 390 x 190
MASONRY BLOCKS
400 DIA CAST-IN-PLACE
BORED PILES 1500 LONG
2R20-300 DOWELS 600
LONG AT EXPANSION
JOINT (EJ)
FBJ

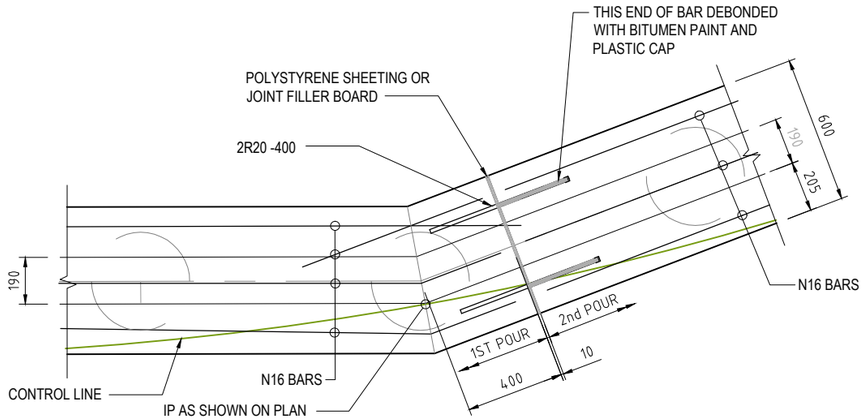
| | | |



PLAN (CONTINUED)

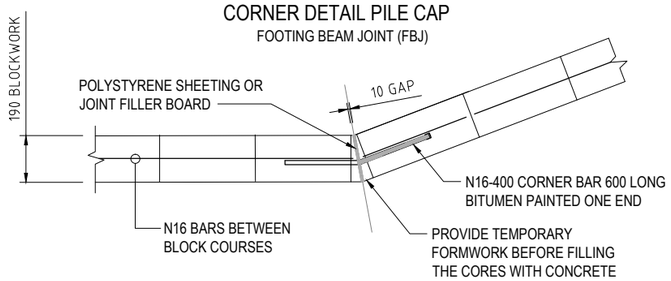
Datum RL 26.000

| | | |



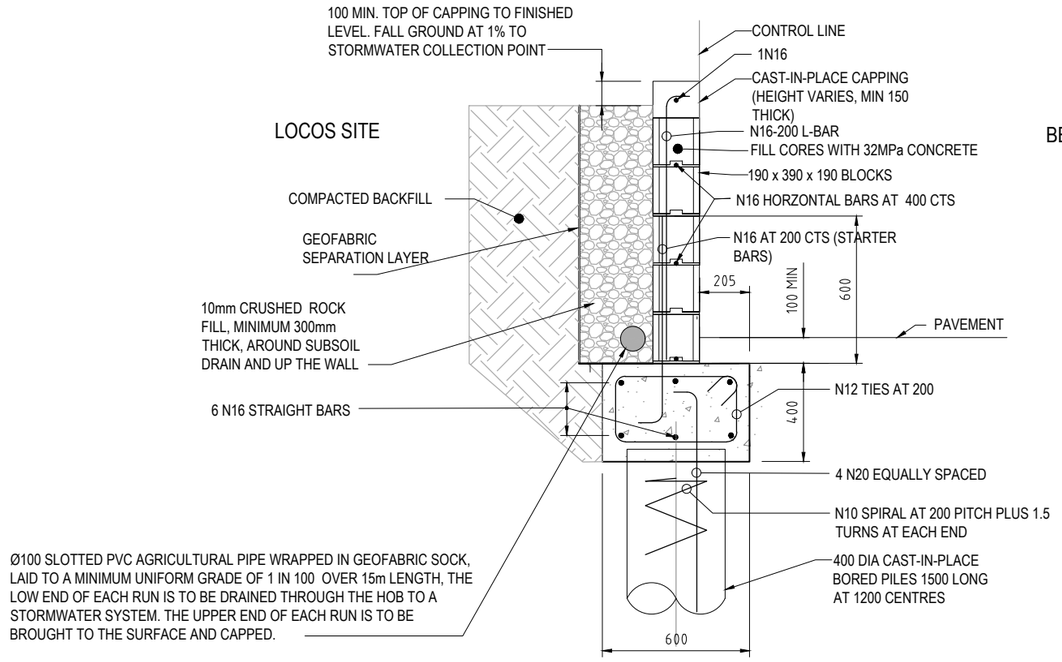
CORNER DETAIL PILE CAP

FOOTING BEAM JOINT (FBJ)



CORNER DETAIL BLOCKWORK

BLOCKWORK JOINT (BWJ)



TYPICAL SECTION

CONCRETE MASONRY NOTES

M1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AUS-SPEC 'MASONARY WALLS' AS3700, AND THE CONCRETE MASONRY ASSOCIATION OF AUSTRALIA'S "REINFORCED CONCRETE MASONRY CANTILEVER RETAINING WALLS - DESIGN AND CONSTRUCTION GUIDE".

M2 CONCRETE BLOCKS TO HAVE A MINIMUM CHARACTERISTIC UNCONFINED COMPRESSIVE STRENGTHS OF f'uc = 12MPa UNO.

M3 ALL CORES ARE TO BE FILLED WITH GROUT, MORTAR SHALL BE MIXED IN THE PROPORTIONS OF 1 CEMENT, 1 LIME, 6 SAND BY VOLUME UNO. ALL ADDITIVES TO BE APPROVED BY THE SUPERINTENDENT.

M4 GROUT FOR CORE FILLING SHALL HAVE STRENGTH GRADE S20 WITH A SLUMP OF 230mm AND A MAXIMUM AGGREGATE SIZE OF 10mm UNO. TESTING SHALL COMPLY WITH AS3600.

M5 CLEANOUT OPENINGS SHALL BE PROVIDED AT THE BASE OF ALL CORES. ADDITIONAL CLEANOUT OPENINGS ARE REQUIRED AT ALL HORIZONTAL BREAKS IN CONSTRUCTION.

M6 MORTAR FINS PROTRUDING FROM JOINTS SHALL BE REMOVED BEFORE GROUTING CORES.

M7 GROUT SHALL NOT BE POURED INTO CORES FROM ANY HEIGHT GREATER THAN 3m. STOP POUR 50mm BELOW TOP OF BLOCK TO PROVIDE KEY FOR THE FOLLOWING POUR.

M8 RODDING OR OTHER APPROVED MEANS SHALL BE USED TO ENSURE PROPER COMPACTION OF GROUT IN CORES.

M9 TEMPORARY BRACING SHALL BE PROVIDED TO WALLS AS NECESSARY TO MAINTAIN STABILITY DURING CONSTRUCTION.

M10 SUBSOIL DRAINAGE PIPES TO BE LAID TO A MINIMUM UNIFORM GRADE OF 1% OF 15m LENGTHS. THE LOW END OF EACH RUN IS TO DRAINED THROUGH THE PIPE OUTLET. THE UPPER END IS TO BROUGHT TO THE SURFACE AND CAPPED.

M11 PROVIDE 50mm DIA WEEP HOLES AT 1200mm CENTRES THROUGH HOB

M12 PROVIDE 10mm VERTICAL CONTROL JOINTS USING ELASTIC JOINT SEALANT AT MAXIMUM CENTRES OF 16000mm.

GENERAL NOTES

SCALE AS SHOWN.
MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 32MPa.
COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SURFACE SHALL BE 45mm (75mm IF IN CONTACT WITH GROUND)
RETAINING WALL SHALL BE IN ACCORDANCE WITH AS 4678.

NOT FOR CONSTRUCTION

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
01	01/11/2021	CONCEPT		
02	26/04/2022	80% DETAIL DESIGN		
03	20/09/2022	100% DETAIL DESIGN		J.KALANTZIS

SCALES ON A3 SIZE DRAWING: 0 250 500mm (100)

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: GDA2020

MU GROUP TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, Level 4, 23/33 Mary Street, Surry Hills NSW 2010
T 02 9016 7272 www.mugroup.com.au

PLOT DATE / TIME: 20/09/2022 8:42:11 AM
PLOT BY: Luigi Luongo

TITLE	NAME	DATE
DRAWN	D.GIBBS	20/09/22
DRG CHECK	J.KALANTZIS	20/09/22
DESIGN	BAC MAI	20/09/22
DESIGN CHECK	C SOOSAPILLA	20/09/22
DESIGN MNGR	A.PAVLOVIC	20/09/22
PROJECT MNGR	J.KALANTZIS	20/09/22

CLIENT: LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET UPGRADE
RETAINING WALL AT LOGOS SITE
GENERAL ARRANGEMENT - SHEET C

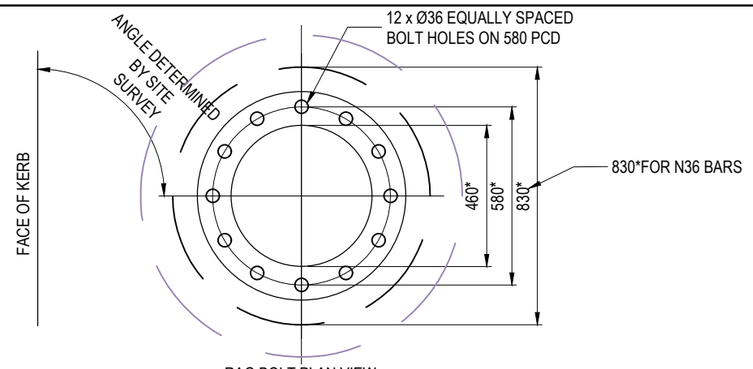
A3

RMS REGISTRATION No. 2021_25_DD_0001
PART
ISSUE STATUS: 100% DETAIL DESIGN
SHEET No. 04
ISSUE 03

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

Appendix I – VMS Footing Design

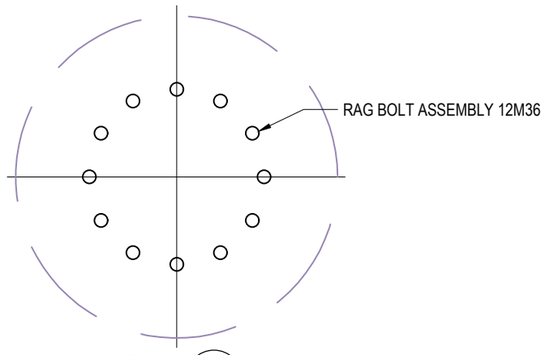
DRAFT



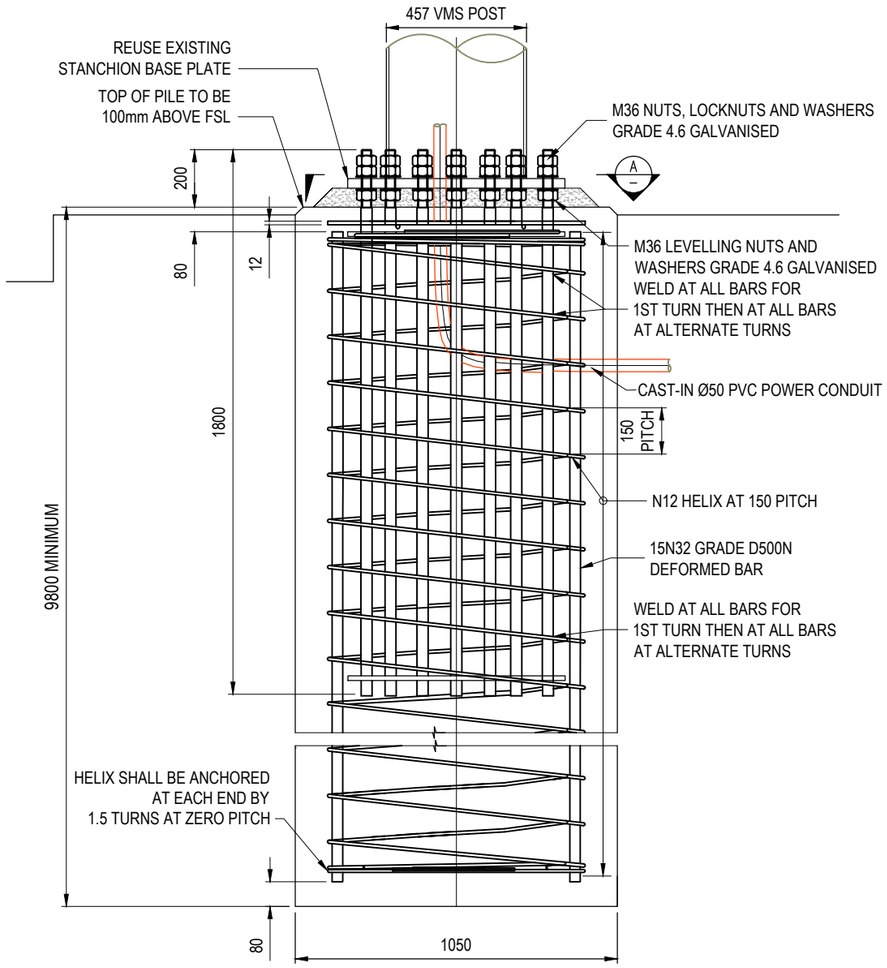
RAG BOLT PLAN VIEW
SCALE 1:20

SECTION A
SCALE 1:25

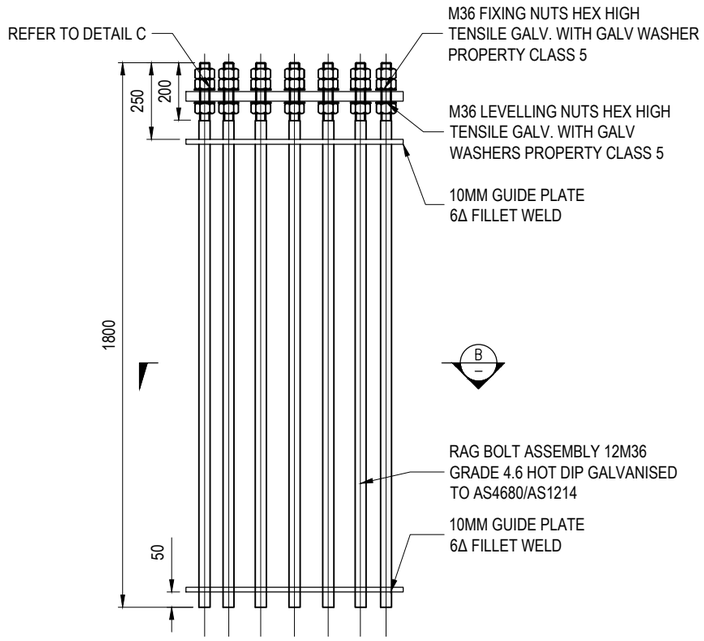
* TO BE CONFIRMED WITH SITE MEASUREMENTS.
DRAWING REFERENCE: EIC0034/DAM/009
REV. 4 DATED 22-09-2004.



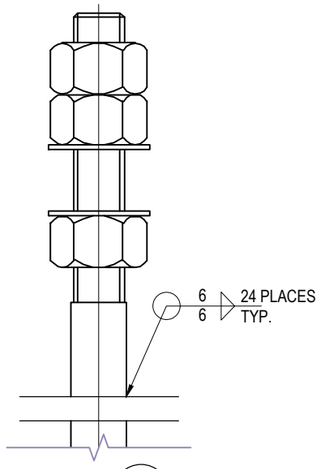
SECTION B
SCALE 1:25



ELEVATION VIEW
SCALE 1:20



RAG BOLT FRONT VIEW
SCALE 1:20



DETAIL C
SCALE 1:25

NOTES:

1. CONCRETE STRENGTH 40 MPa.
2. CONCRETE COVER 65mm.
3. PILE POSITION TOLERANCE ± 75mm TO AS2159.
4. ALL STEELWORK, RAG BOLTS, NUTS AND WASHERS TO BE HOT DIP GALVANISED TO AS4680 AND AS1214.
5. ALL REINFORCEMENT TO BE GRADE D500.
6. PILE SHALL BE SOCKETED INTO MINIMUM 1.5m CLASS IV SHALE.
7. CONTRACTOR SHALL ENSURE THAT RAG BOLT ASSEMBLY CAST IN SITU IS ORIENTED CORRECTLY, SO THAT THE VMS DISPLAY IS PERPENDICULAR TO BERNERA ROAD ALIGNMENT.
8. DESIGN LOADS FOR FOUNDATION ARE IN ACCORDANCE WITH DRAWING EIC0034/DAM/005

NOT FOR CONSTRUCTION

AERIAL IMAGERY UNDER LICENCE TO MU GROUP BY NEARMAP

DRAWING FILE LOCATION & NAME: C:\USERS\LOULUONGO\MU GROUP\PROJECTS - DOCUMENTS\P_21_25_LCC_BRUP_DD\04 DESIGNS\03 DETAILED DESIGN\100PC DETAILED DESIGN\CAD\01 CURRENT DRAWINGS\2021 25 DD 0001 ST 0802.DWG 15/09/2022 1:10:18 PM By: LUIGI LUONGO Last Saved: 15/09/2022 1:10:15 PM By: LUIGI LUONGO

REV.	DESCRIPTION	APPROVED	DATE
A	80% DETAIL DESIGN	SB	8/30/2021
B	80% DETAIL DESIGN REISSUED	DS	29/03/2022
C	100% DETAIL DESIGN ISSUE	AM	14/09/2022

SCALES ON A3 DRAWING:
0 1 2 3 4
2 1
1:100 @ A3

CO-ORDINATE SYSTEM: MGA 2020 ZONE 56
HEIGHT DATUM: AHD

TITLE	NAME	DATE
DRAWN BY	S. Bahrow	30/08/2021
DRG CHECK	T. Lance	30/08/2021
DESIGN BY	S. Bahrow	30/08/2021
DESIGN CHECK	T. Lance	30/08/2021
DESIGN MGR	S. Ludenia	30/08/2021
PROJECT MGR	J. Kalantzis	30/08/2021

DRAWING/DESIGN PREPARED BY:
MU GROUP
TRANSPORT AND INFRASTRUCTURE
GADIGAL COUNTRY, LEVEL 4,
23-33 MARY STREET,
SURRY HILLS NSW 2010
T (02) 9016 7272 www.mugroup.com.au

CLIENT:
LIVERPOOL CITY COUNCIL
2/33 MOORE ST, LIVERPOOL NSW 2170
T 1300 362 170 www.liverpool.nsw.gov.au

LIVERPOOL CITY COUNCIL
BERNERA ROAD UPGRADE
KURRAJONG ROAD TO YARRAWA STREET, PRESTONS
RELOCATION OF VMS SIGN FOOTING DETAILS
BERNERA ROAD

A3

PROJECT NUMBER: 2021 25 DD 0001
PART 1
ISSUE STATUS: 100% DETAIL DESIGN
SHEET No. ST 0802
ISSUE C

THIS DRAWING MAY BE PREPARED IN COLOUR AND MY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL

Appendix J – Background Drainage Information

The above figure shows the comparative values for ARR1987 and ARR2019 for the rainfall intensity in mm/h for various durations and return periods.

ARR1987

RETURN PERIOD (YEARS)							
DURATION	1	2	5	10	20	50	100
5 mins	82.5	106	134	150	171	199	219
10 mins	63.1	80.8	102	114	131	152	168
20 mins	46.3	59.2	74.6	83.4	95.2	110	122
30 mins	37.6	48.1	60.7	67.8	77.4	89.7	99.1
1 hour	25.4	32.4	41	45.8	52.4	60.8	67.2
2 hours	16.4	21	26.7	30	34.3	39.9	44.1
3 hours	12.6	16.2	20.6	23.1	26.5	30.9	34.2

ARR2019

Annual Exceedance Probability (AEP)							
Duration	0.632	50%	20%*	0.1	0.05	0.02	0.01
5 min	80.2	89.9	121	143	164	192	215
10 min	63.9	72.2	98.2	116	134	157	175
20 min	45.6	51.6	70.2	82.9	95.5	112	125
30 min	35.9	40.5	54.9	64.8	74.6	87.6	97.7
1 hour	22.9	25.6	34.3	40.4	46.5	54.7	61.1
2 hours	14.3	15.9	21.2	24.9	28.6	33.8	37.9
3 hours	11	12.2	16.2	19	21.9	25.9	29.2

DRAFT