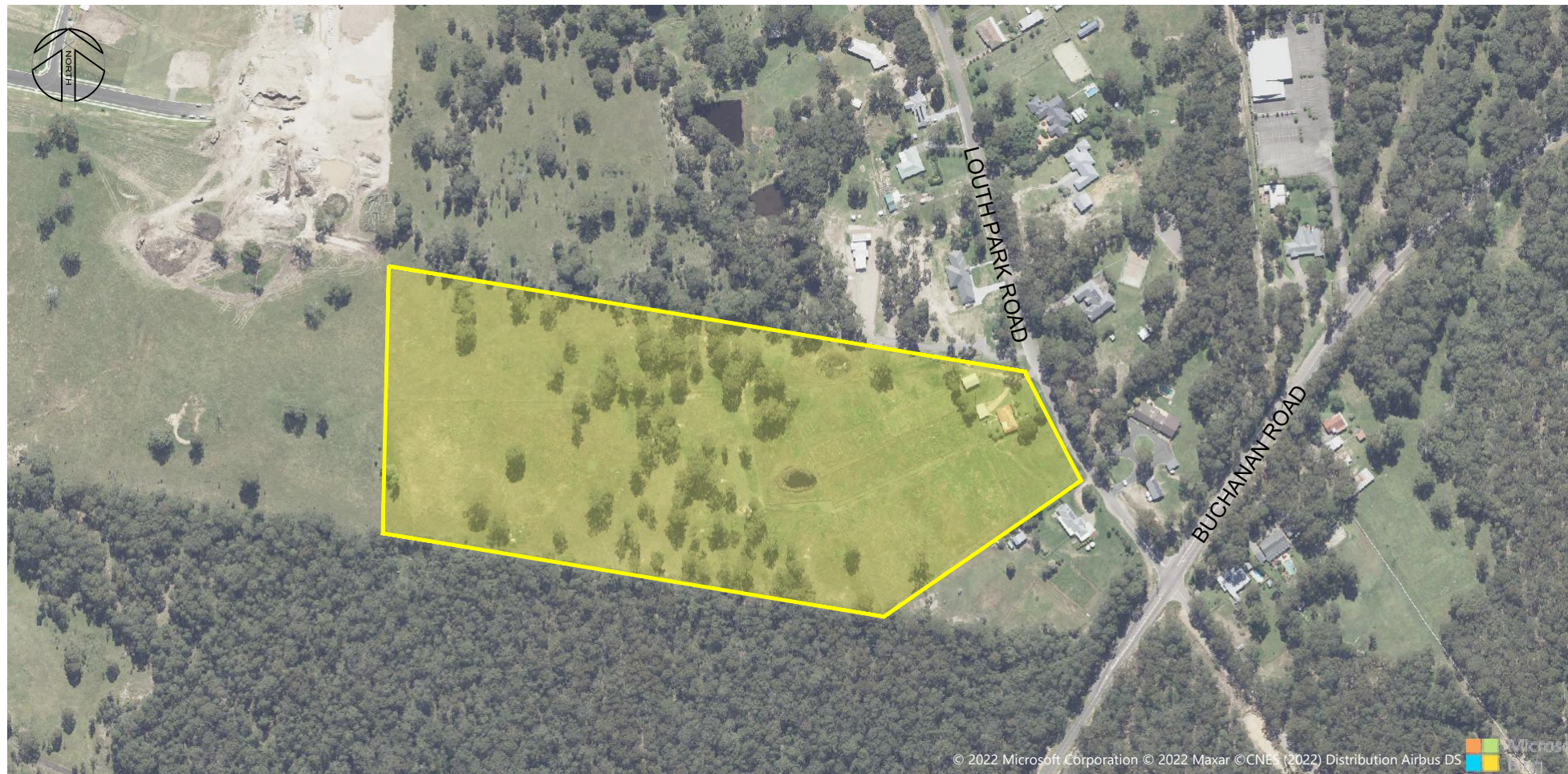


# MAITLAND CITY COUNCIL 526 LOUTH PARK ROAD LOUTH PARK PRELIMINARY ENGINEERING PLANS



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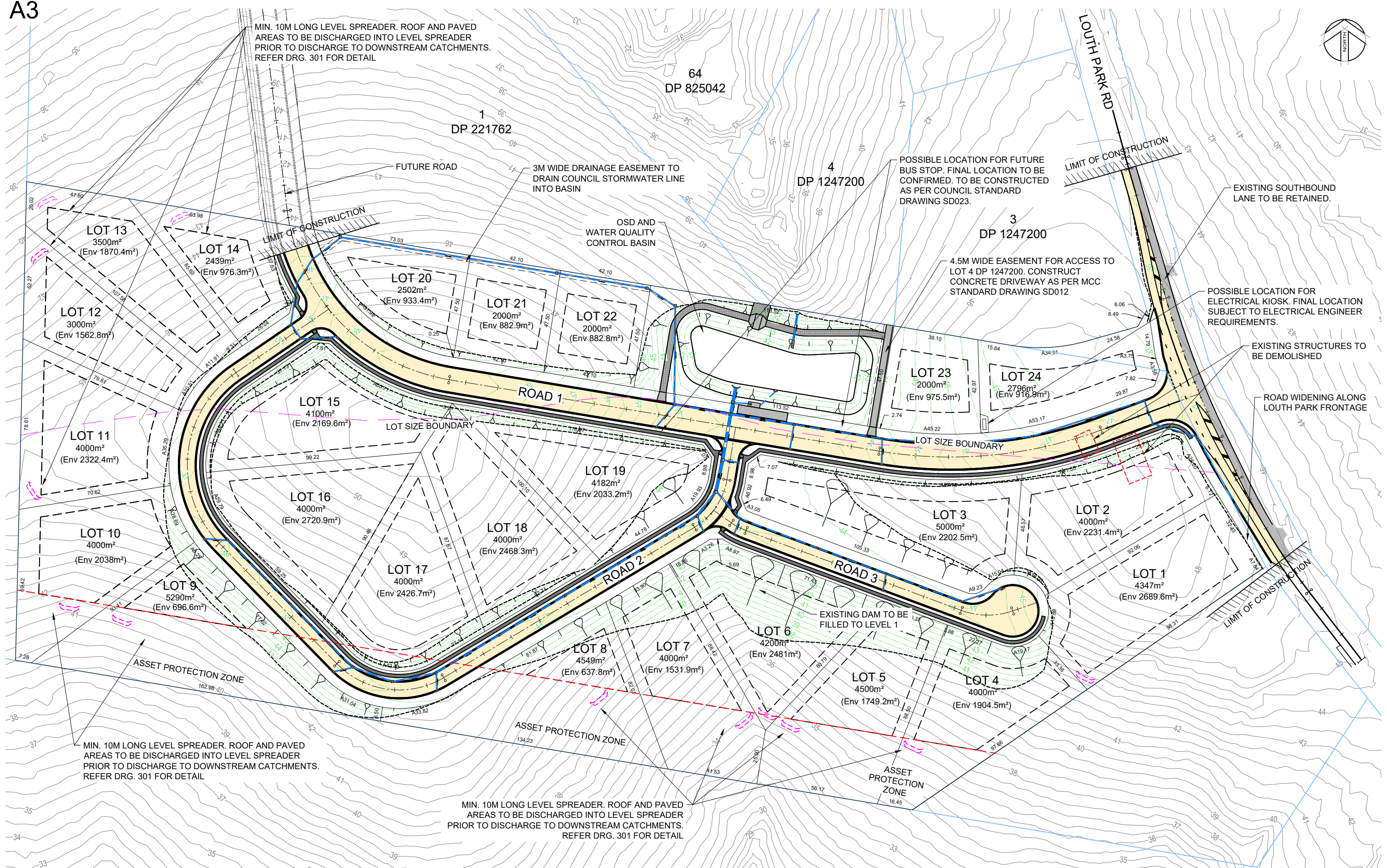
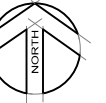


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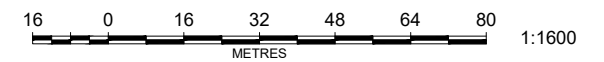
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PLAN  
SCALE 1:1600



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005  
 CENTRAL COAST P: 02 4325 5255

HUNTER P: 02 4966 8388  
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526 LOUTH PARK ROAD  
 LOUTH PARK  
 DETAIL ENGINEERING PLAN

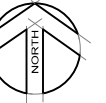
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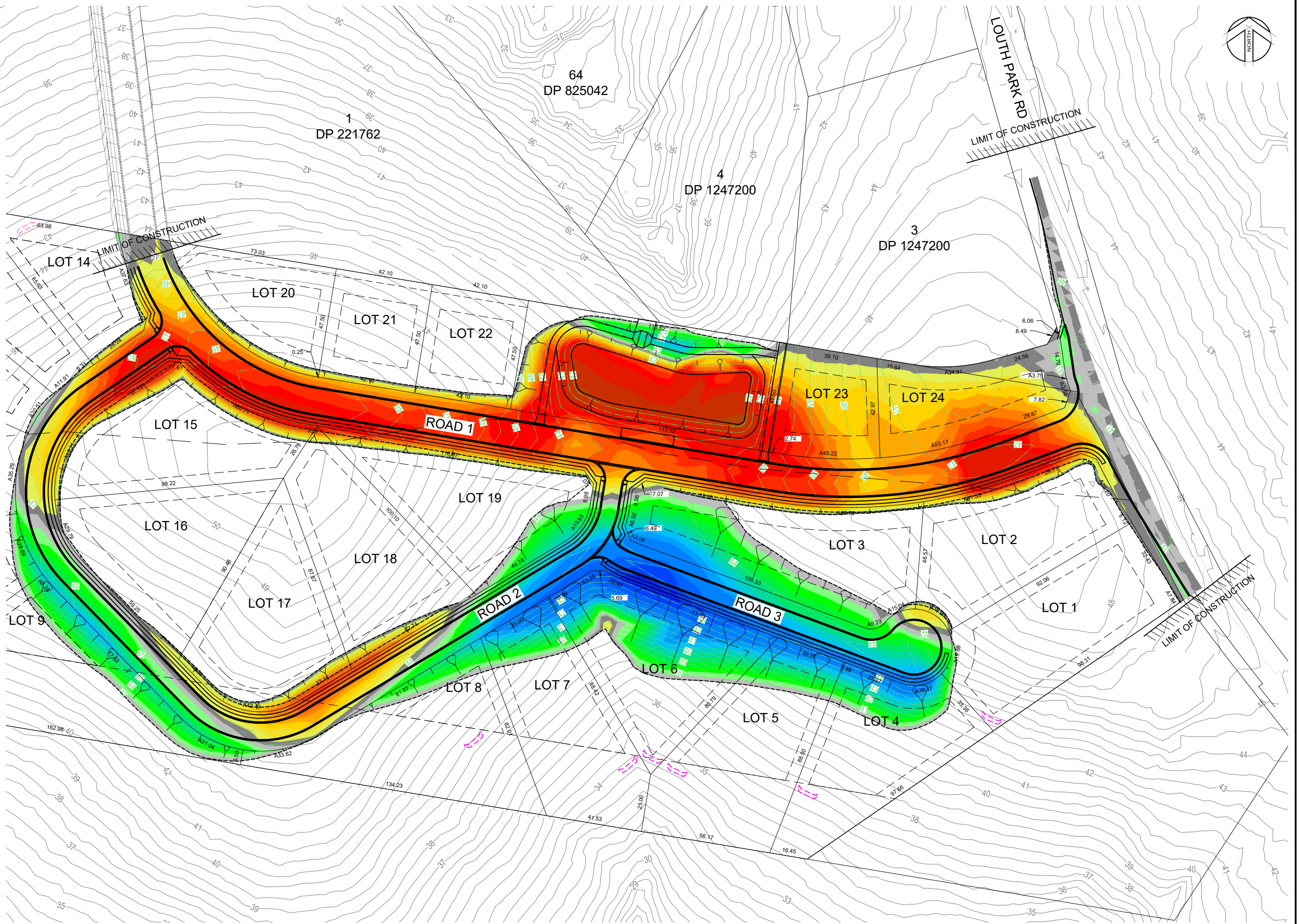
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Plan No. 180093-01-101  
 File Ref. 180093  
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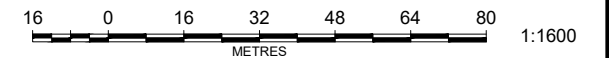




| CUT/FILL LEGEND |             |        |               |
|-----------------|-------------|--------|---------------|
| Lower_value     | Upper_value | Colour |               |
| -6.0            | to          | -4.5 m | Dark Brown    |
| -4.5            | to          | -3.6 m | Brown         |
| -3.6            | to          | -3 m   | Dark Red      |
| -3              | to          | -2.4 m | Red           |
| -2.4            | to          | -1.8 m | Dark Orange   |
| -1.8            | to          | -1.6 m | Orange        |
| -1.6            | to          | -1.4 m | Light Orange  |
| -1.4            | to          | -1.2 m | Yellow-Orange |
| -1.2            | to          | -1.0 m | Yellow        |
| -1.0            | to          | -0.8 m | Light Yellow  |
| -0.8            | to          | -0.6 m | Light Green   |
| -0.6            | to          | -0.4 m | Green         |
| -0.4            | to          | -0.2 m | Light Green   |
| -0.2            | to          | 0 m    | White         |
| 0               | to          | 0.2 m  | Light Green   |
| 0.2             | to          | 0.4 m  | Green         |
| 0.4             | to          | 0.6 m  | Light Green   |
| 0.6             | to          | 0.8 m  | Green         |
| 0.8             | to          | 1 m    | Light Green   |
| 1               | to          | 1.2 m  | Green         |
| 1.2             | to          | 1.4 m  | Light Green   |
| 1.4             | to          | 1.6 m  | Green         |
| 1.6             | to          | 1.8 m  | Light Green   |
| 1.8             | to          | 2.4 m  | Green         |
| 2.4             | to          | 3 m    | Light Green   |
| 3               | to          | 3.6 m  | Green         |
| 3.6             | to          | 4.5 m  | Light Green   |
| 4.5             | to          | 6 m    | Green         |



PLAN  
SCALE 1:1600



| REV | AMENDMENT                    | ISSUED | DATE       |
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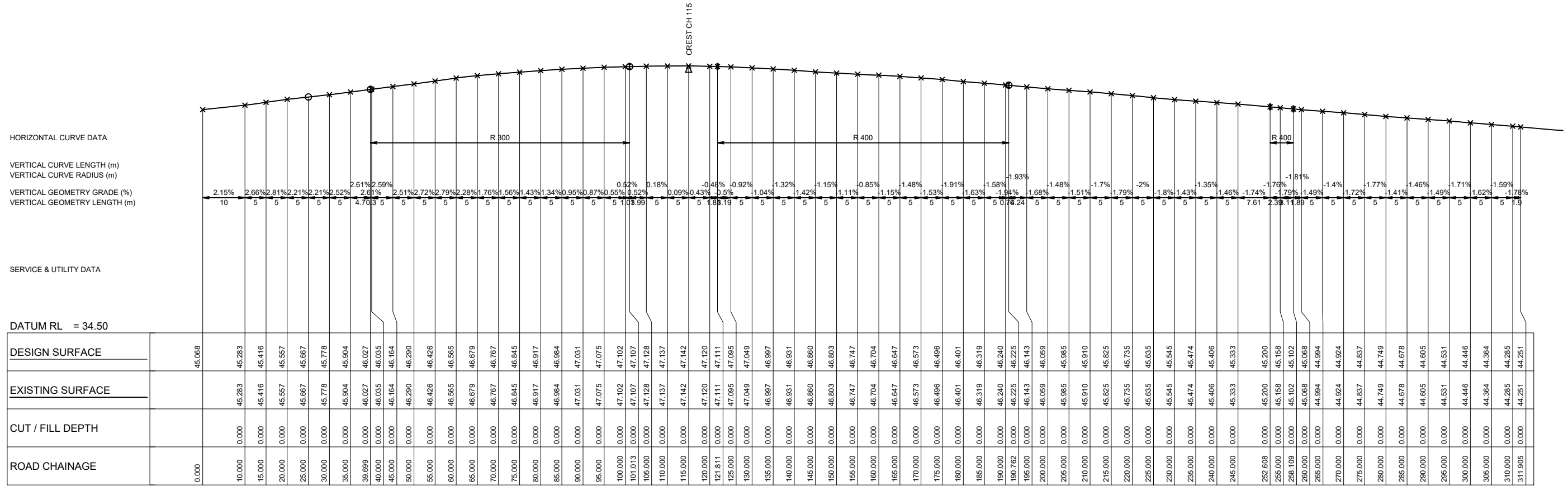
SYDNEY P: 02 9659 0005  
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526 LOUTH PARK ROAD  
LOUTH PARK  
BULK EARTHWORKS

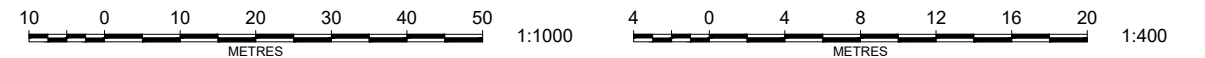
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X-Sect. -  
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Plan No.  
**180093-01-111**  
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A1 SCALE: H 1:500, V 1:100

LONGITUDINAL SECTION LOUTH PARK ROAD



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
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LOUTH PARK**

LONGITUDINAL SECTION - LOUTH PARK ROAD

Designed: AS  
Drawn: RG  
Checked: AS

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Horiz. 1:1000  
Vert. 1:400  
X-Sect. -

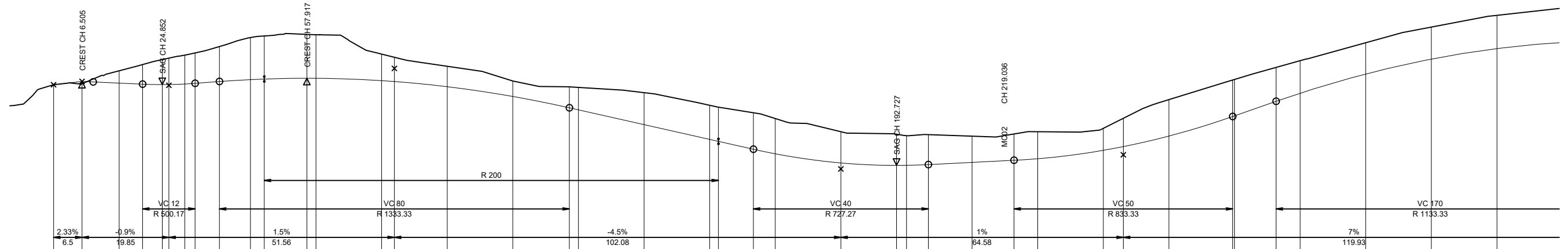
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Plan No.  
**180093-01-201**

File Ref.  
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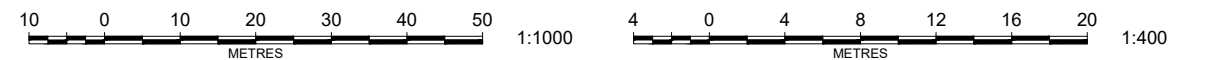
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|                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |        |        |        |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| DESIGN SURFACE   | 0.000  | 6.505  | 15.000 | 20.354 | 24.852 | 26.354 | 30.000 | 32.354 | 37.917 | 45.000 | 48.157 | 57.917 | 60.000 | 75.000 | 77.917 | 90.000 | 105.000 | 117.917 | 120.000 | 135.000 | 150.000 | 151.891 | 160.000 | 165.000 | 180.000 | 182.727 | 195.000 | 200.000 | 210.000 | 219.583 | 225.000 | 240.000 | 244.583 | 255.000 | 269.583 | 270.000 | 279.510 | 285.000 | 300.000 | 315.000 | 330.000 |        |        |        |
| EXISTING SURFACE | 46.872 | 46.918 | 47.509 | 47.793 | 48.021 | 48.087 | 48.223 | 48.325 | 48.618 | 49.028 | 49.100 | 49.173 | 49.155 | 48.271 | 48.126 | 47.713 | 47.043  | 46.774  | 46.748  | 46.510  | 45.933  | 45.848  | 45.590  | 45.328  | 44.725  | 44.611  | 44.546  | 44.592  | 44.623  | 44.725  | 44.880  | 45.339  | 46.192  | 47.089  | 47.114  | 47.664  | 47.972  | 48.791  | 49.505  | 50.041  | 48.872  | 47.385 | 46.044 | 48.525 |
| CUT / FILL DEPTH | -0.000 | 0.106  | -0.562 | -0.894 | -1.142 | -1.206 | -1.318 | -1.390 | -1.599 | -1.922 | -1.987 | -2.004 | -1.988 | -1.212 | -1.108 | -0.930 | -0.705  | -0.955  | -1.023  | -1.460  | -1.558  | -1.562  | -1.665  | -1.611  | -1.425  | -1.423  | -1.354  | -1.367  | -1.202  | -1.232  | -1.005  | -1.293  | -1.664  | -1.668  | -1.664  | -1.548  | -1.485  | -1.426  | -1.461  | -1.516  | -1.487  | -1.385 | -1.461 | -1.516 |
| ROAD CHAINAGE    | 0.000  | 6.505  | 15.000 | 20.354 | 24.852 | 26.354 | 30.000 | 32.354 | 37.917 | 45.000 | 48.157 | 57.917 | 60.000 | 75.000 | 77.917 | 90.000 | 105.000 | 117.917 | 120.000 | 135.000 | 150.000 | 151.891 | 160.000 | 165.000 | 180.000 | 182.727 | 195.000 | 200.000 | 210.000 | 219.583 | 225.000 | 240.000 | 244.583 | 255.000 | 269.583 | 270.000 | 279.510 | 285.000 | 300.000 | 315.000 | 330.000 |        |        |        |

A1 SCALE: H 1:500, V 1:100  
LONGITUDINAL SECTION MC01



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
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526 LOUTH PARK ROAD  
LOUTH PARK

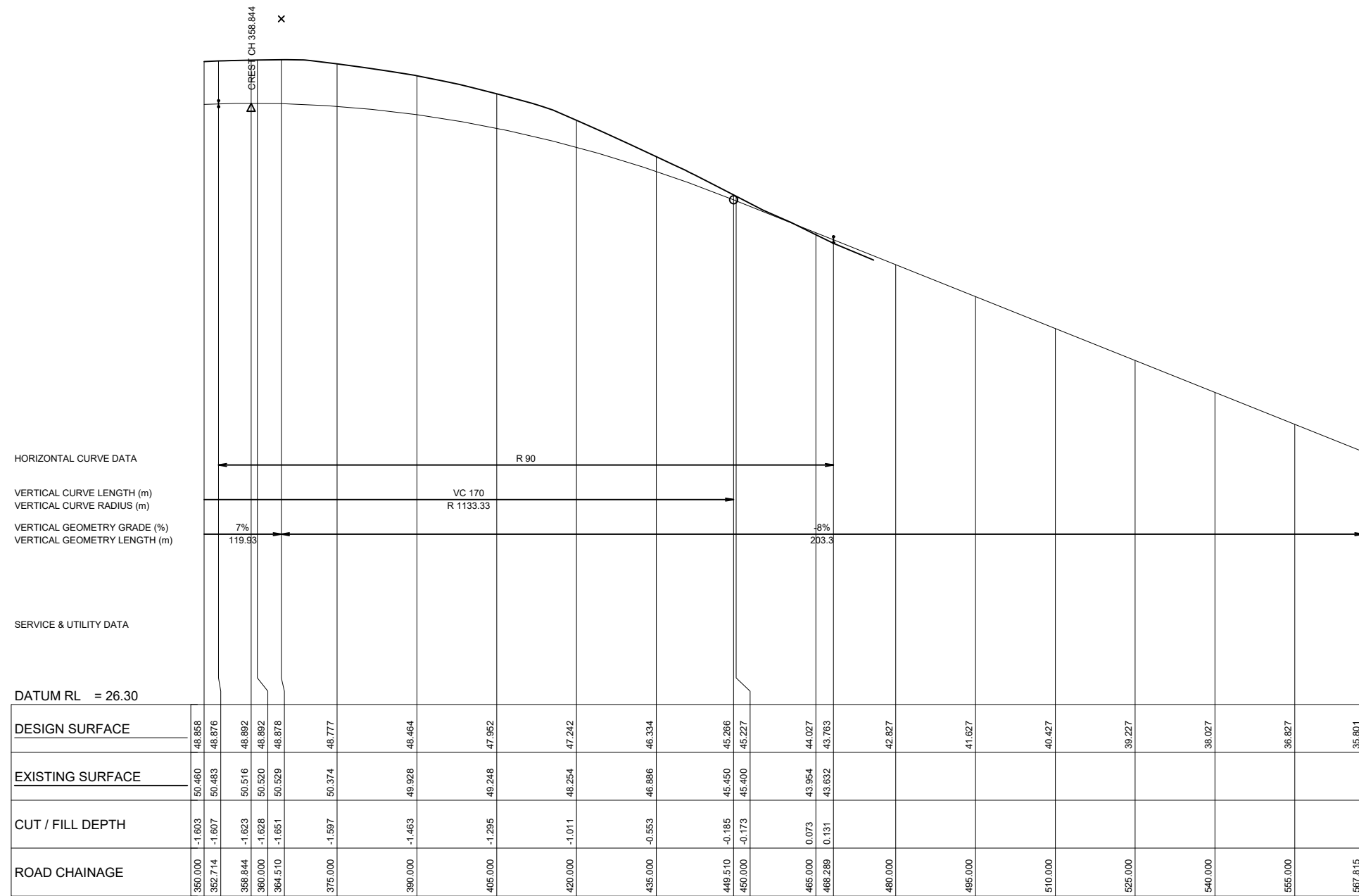
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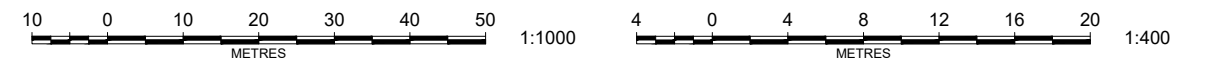
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Plan No.  
**180093-01-202**  
File Ref.  
180093  
REV.  
**E**





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LONGITUDINAL SECTION MC01



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
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LOUTH PARK

LONGITUDINAL SECTION - MC01 - SHEET 2

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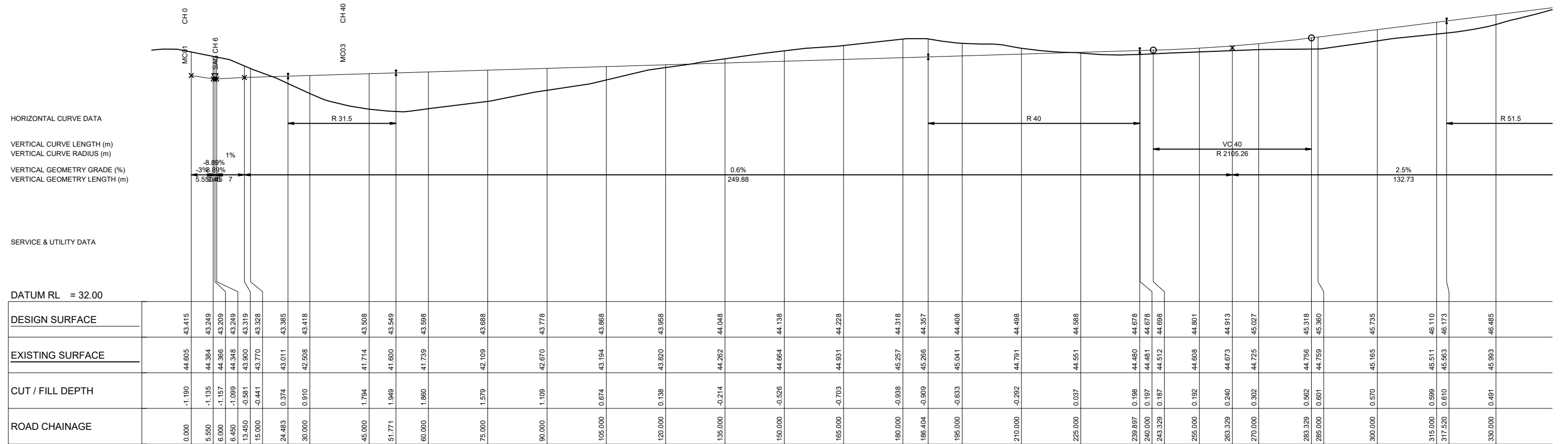
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Plan No.  
**180093-01-203**

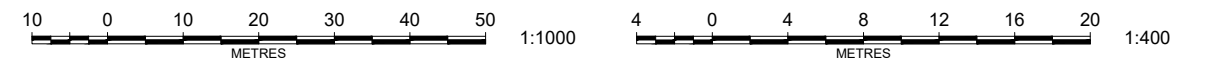
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REV.  
**E**





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LONGITUDINAL SECTION MC02



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
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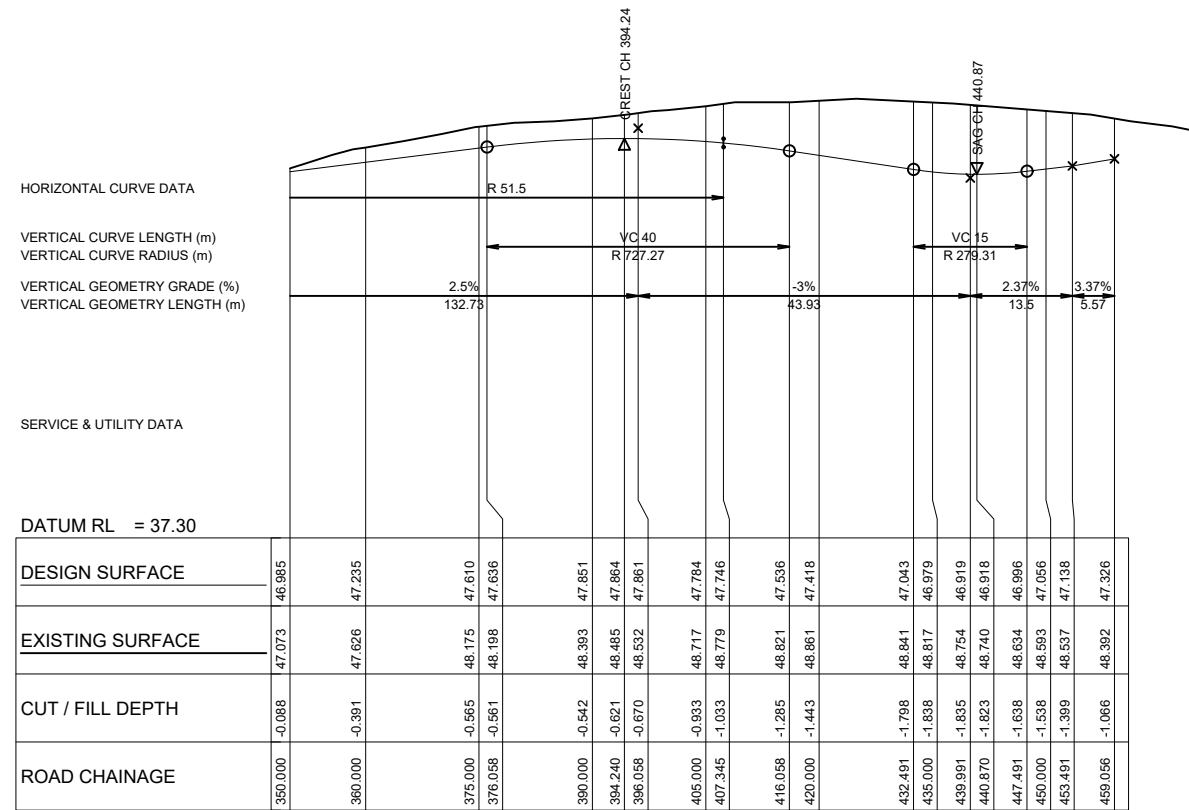
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526 LOUTH PARK ROAD  
LOUTH PARK  
LONGITUDINAL SECTION - MC02 - SHEET 1

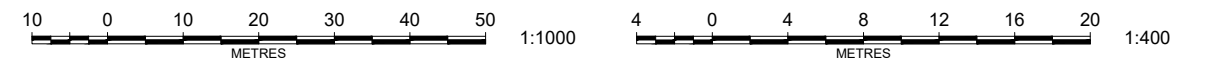
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Datum: A.H.D.

Plan No.  
180093-01-204  
File Ref.  
180093  
REV.  
E





A1 SCALE: H 1:500, V 1:100  
LONGITUDINAL SECTION MC02



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
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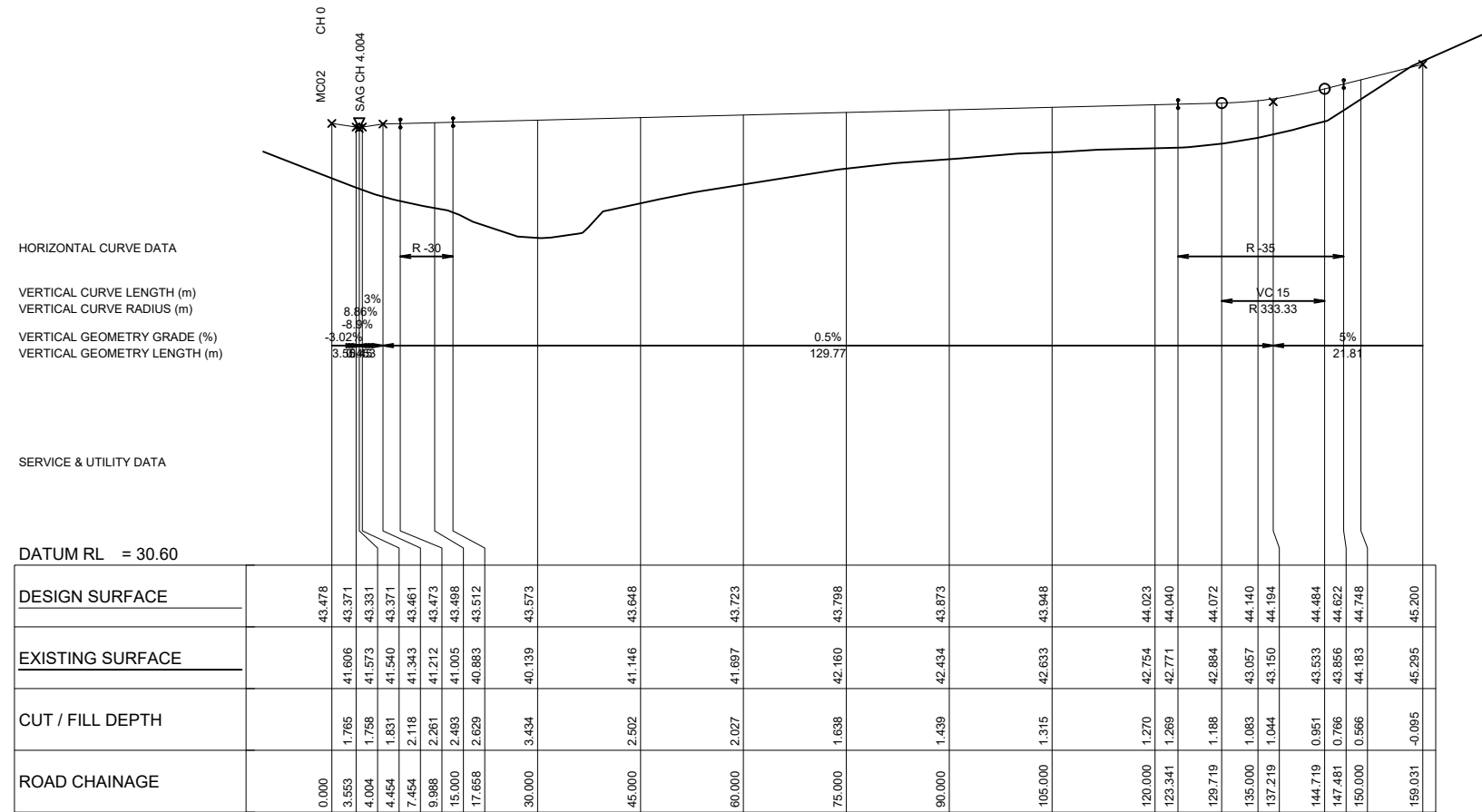
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526 LOUTH PARK ROAD  
LOUTH PARK  
LONGITUDINAL SECTION - MC02 - SHEET 2

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Checked: AS

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X-Sect. -  
Datum: A.H.D.

Plan No.  
**180093-01-205**  
File Ref.  
180093  
REV.  
**E**



A1 SCALE: H 1:500, V 1:100  
 LONGITUDINAL SECTION MC03



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
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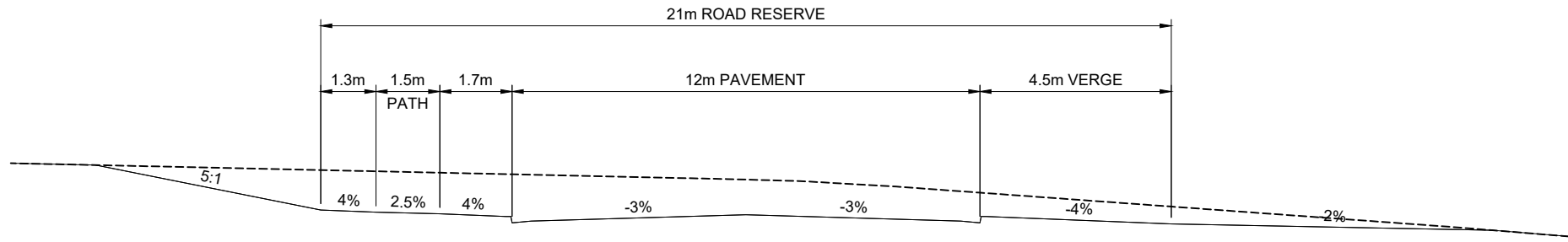
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 LOUTH PARK  
 LONGITUDINAL SECTION - MC03

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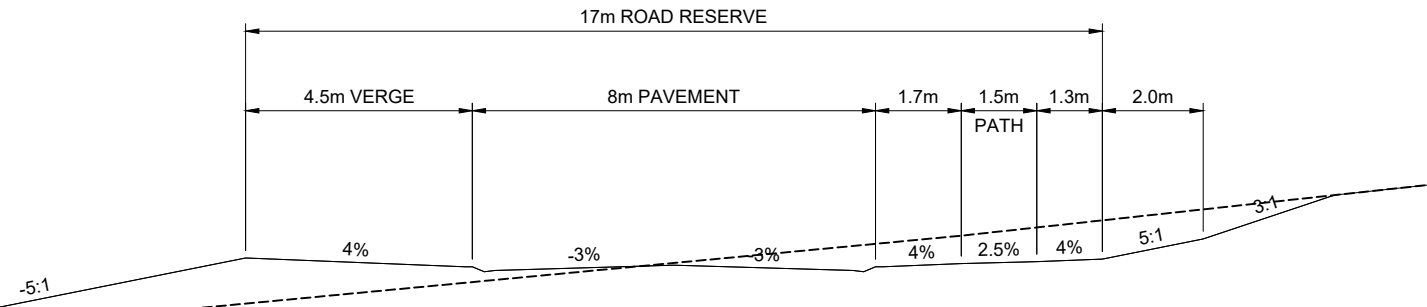
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Plan No.  
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 File Ref.  
 180093  
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**E**

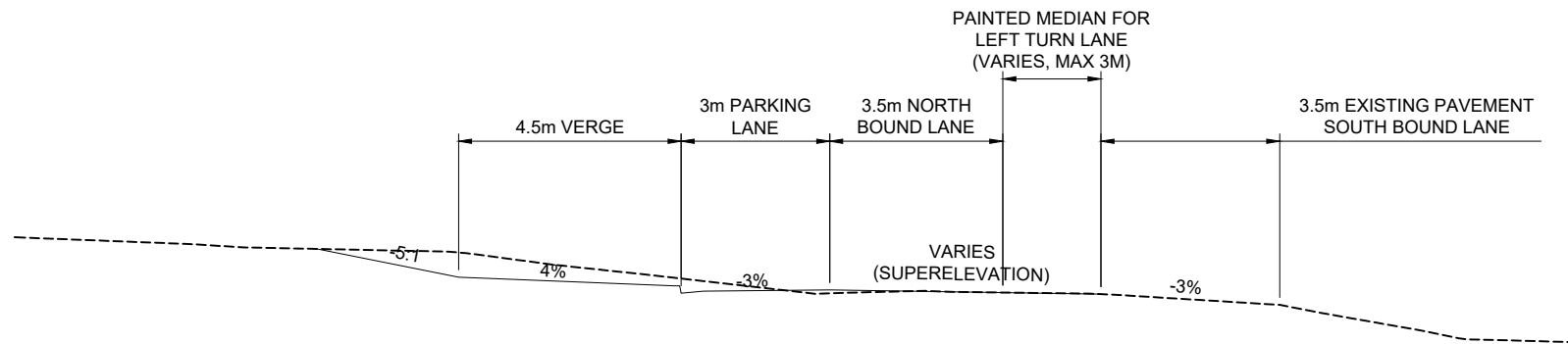




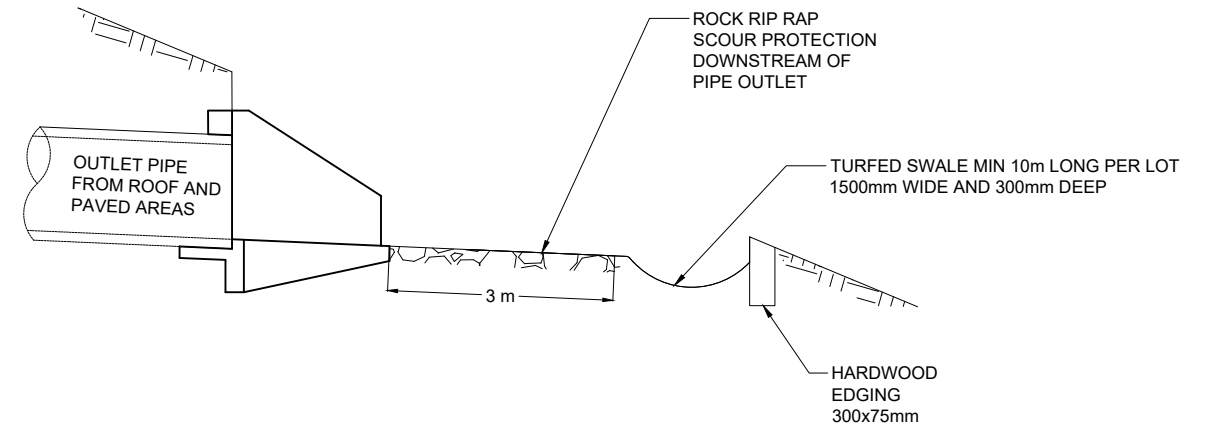
ROAD 1 TYPICAL SECTION  
NTS



ROAD 2 AND 3 TYPICAL SECTION  
NTS



LOUTH PARK ROAD TYPICAL SECTION  
NTS



LEVEL SPREADER OUTLET DETAIL  
NOT TO SCALE

| REV | AMENDMENT                    | ISSUED | DATE       |
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TOTAL PROJECT SOLUTIONS

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LOUTH PARK

TYPICAL SECTIONS

Designed: AS  
Drawn: RG  
Checked: AS

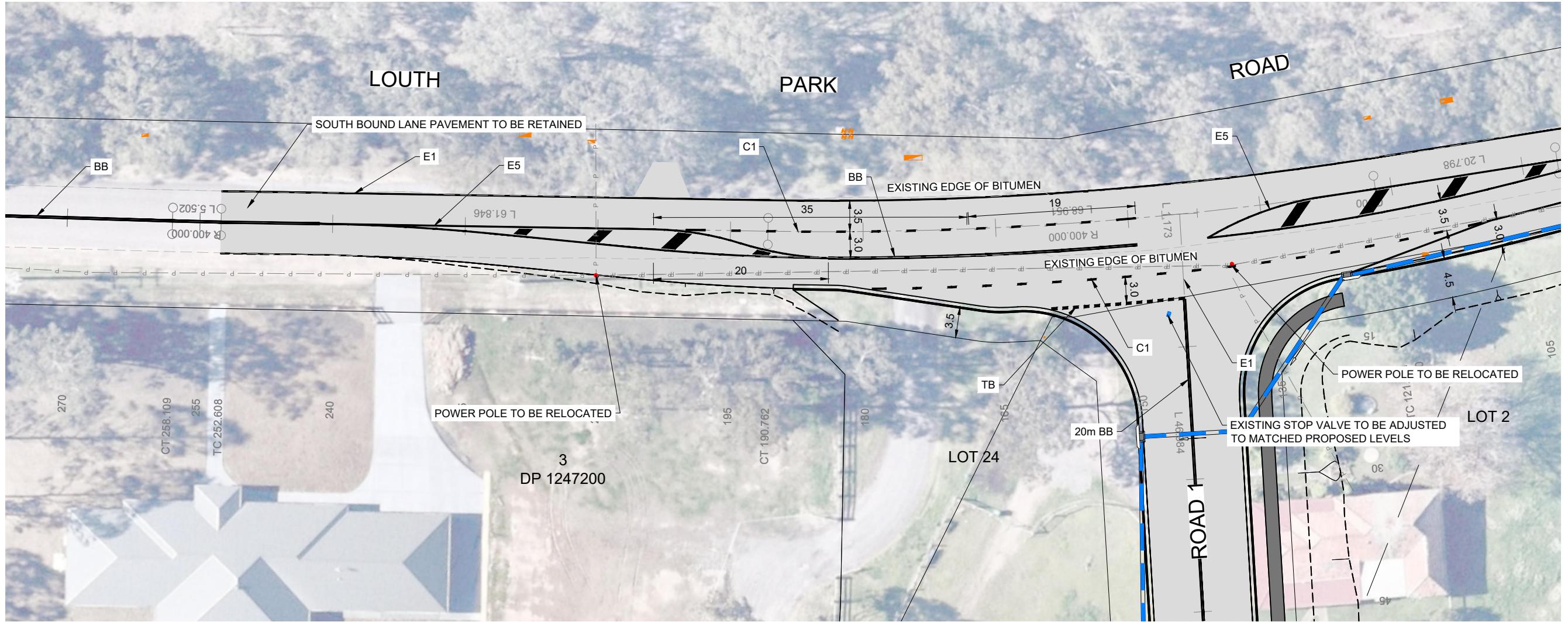
Scales: Plan -  
Horiz. -  
Vert. -  
X-Sect. -  
Datum: A.H.D.

Plan No.  
180093-01-301

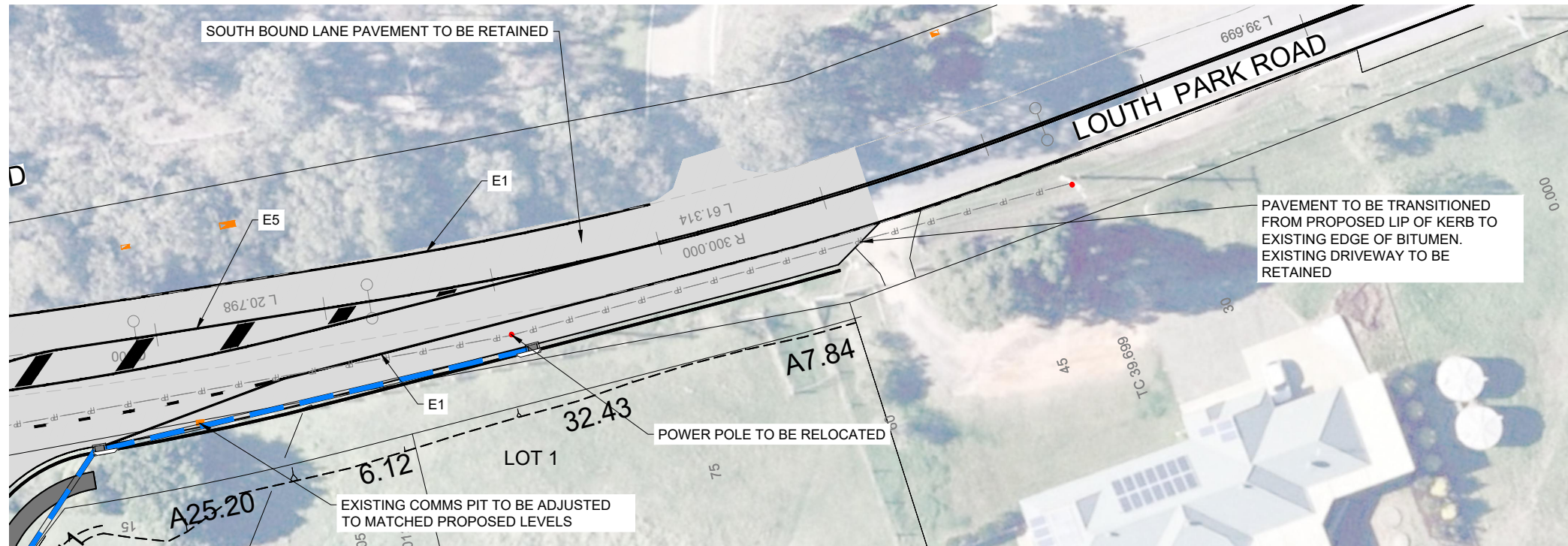
File Ref.  
180093

REV.  
E



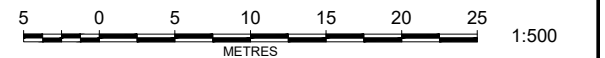


REFER BELOW FOR CONTINUATION



REFER ABOVE FOR CONTINUATION

PLAN  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P: 02 9659 0005  
CENTRAL COAST P: 02 4325 5255  
HUNTER P: 02 4966 8388  
S.E. QLD P: 07 5582 6555  
www.brs.com.au  
mail@brs.com.au  
AS/N: 26 134 067 842

Client: TULIP PROPERTIES PTY LTD

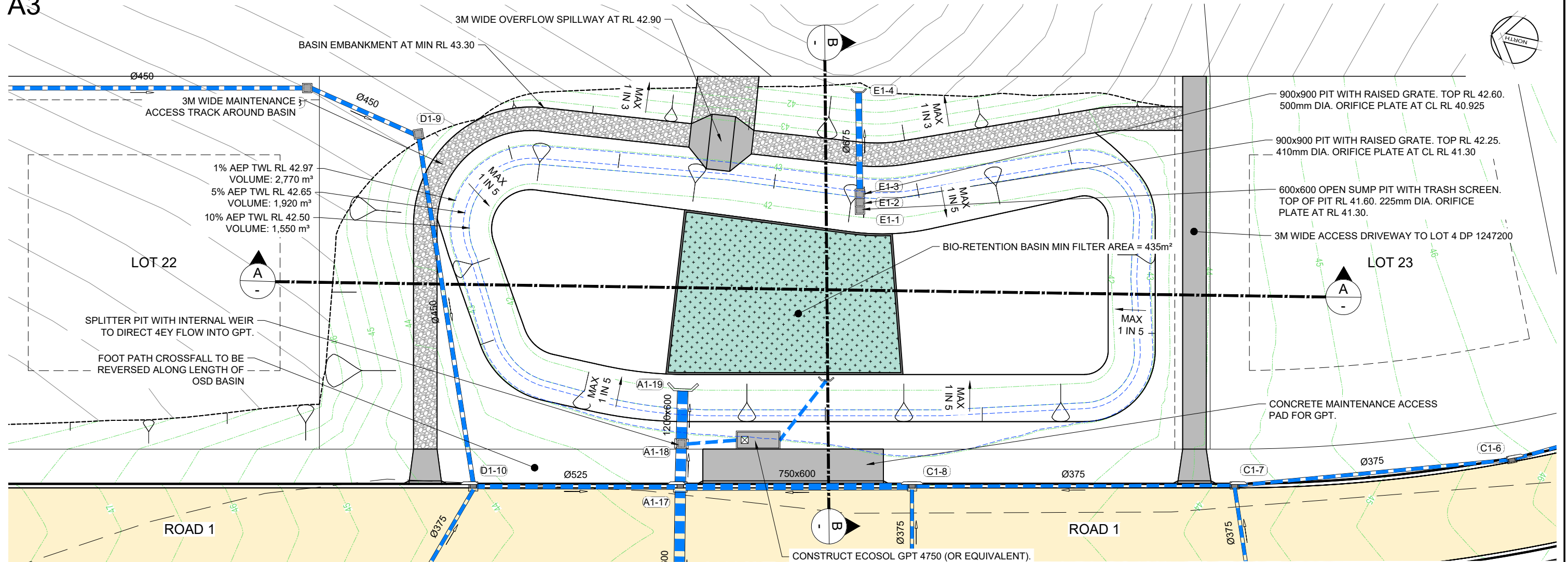
526 LOUTH PARK ROAD  
LOUTH PARK

INTERSECTION PLAN

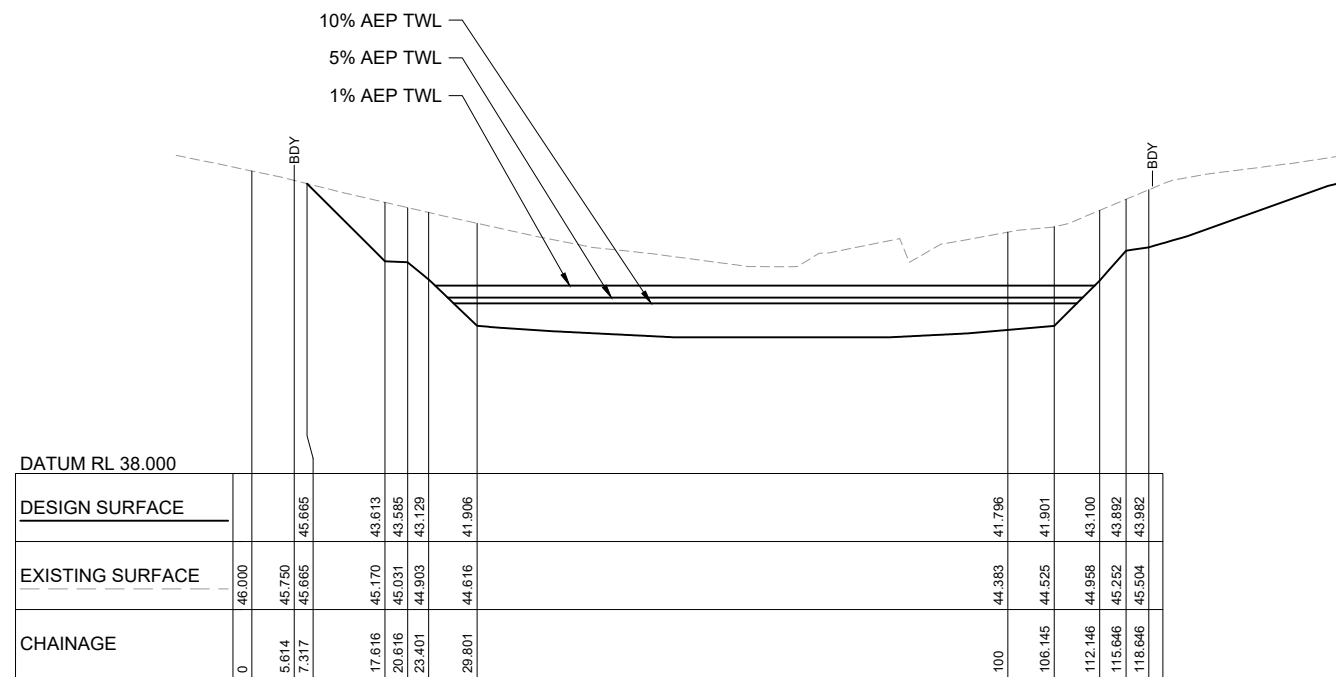
Designed: AS  
Drawn: RG  
Checked: AS  
Scales: Plan 1:500  
Horiz. -  
Vert. -  
X-Sept. -  
Datum: A.H.D.

Plan No. 180093-01-401  
File Ref. 180093  
REV. E

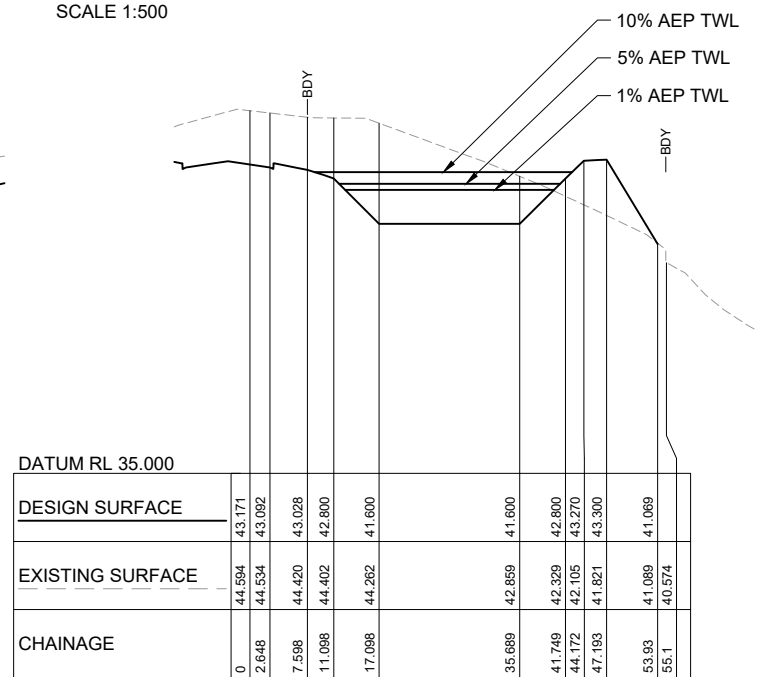




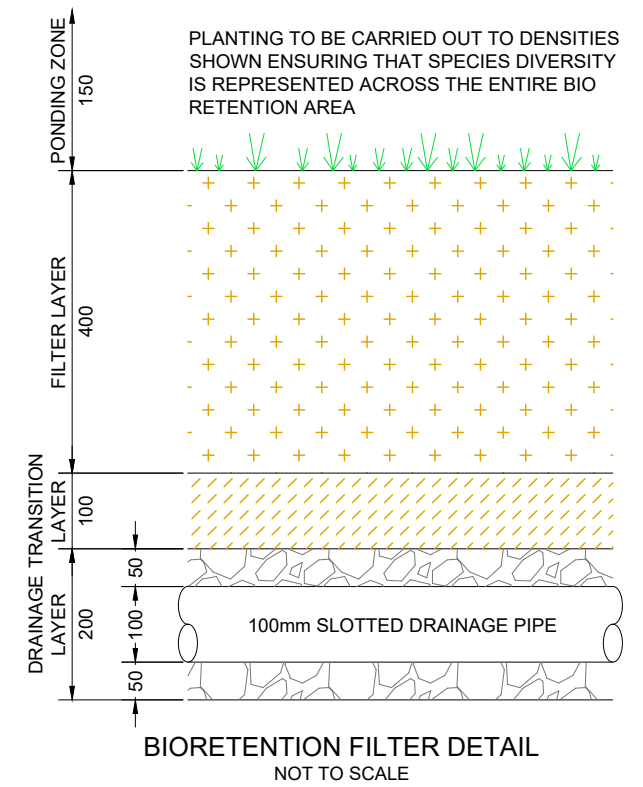
PLAN  
SCALE 1:500



SECTION B - LONGITUDINAL SECTION  
HORZ SCALE 1:500  
VERT SCALE 1:100



SECTION A - LONGITUDINAL SECTION  
HORZ SCALE 1:500  
VERT SCALE 1:100



BIORETENTION FILTER DETAIL  
NOT TO SCALE



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
TOTAL PROJECT SOLUTIONS  
ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005  
CENTRAL COAST P: 02 4325 5255  
HUNTER P: 02 4966 8388  
S.E. QLD P: 07 5582 6555

www.brs.com.au  
mail@brs.com.au  
ABN: 26 134 067 842

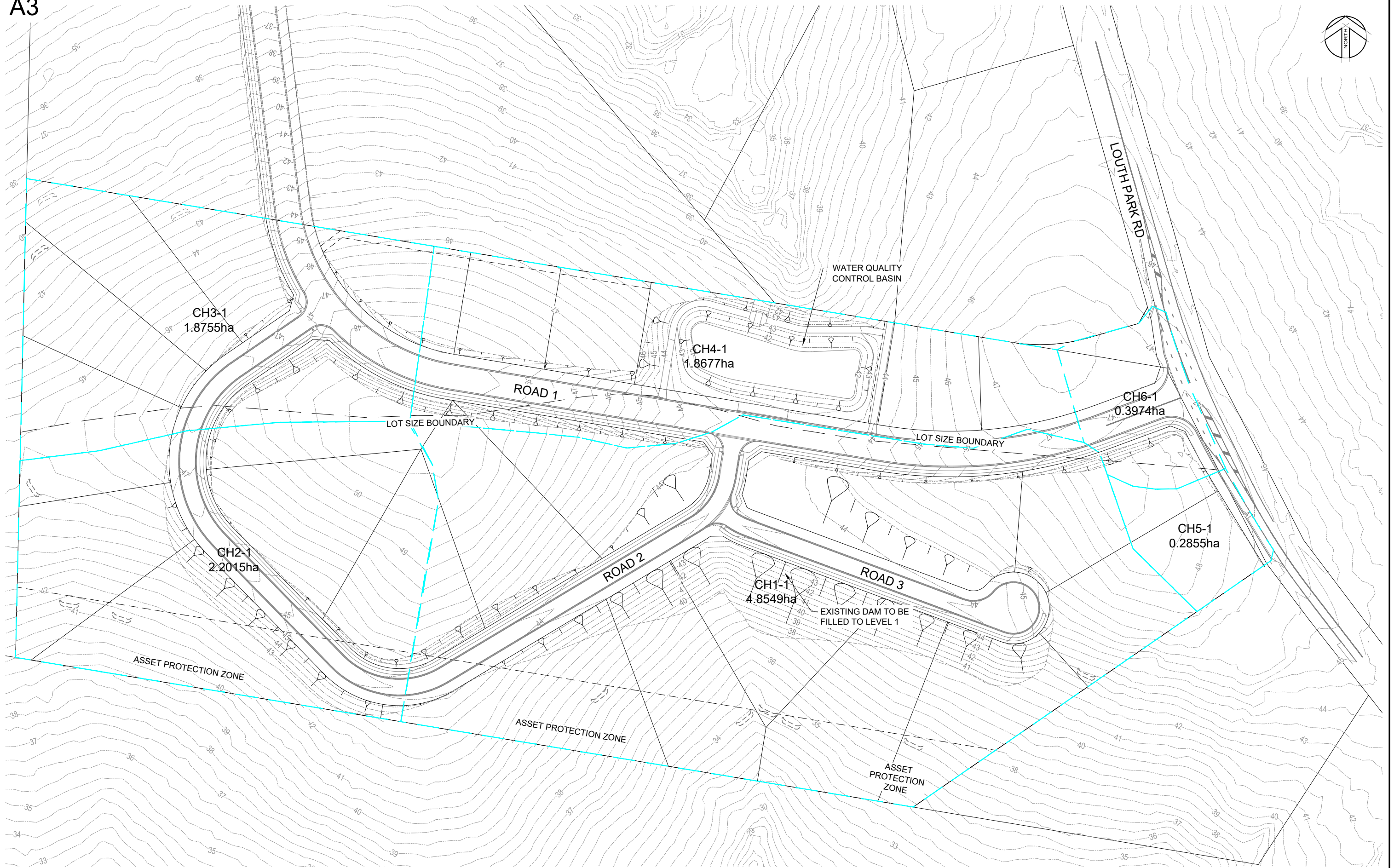
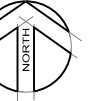
Client: TULIP PROPERTIES PTY LTD  
526 LOUTH PARK ROAD  
LOUTH PARK  
WATER QUALITY CONTROL BASIN DETAILS

Designed: AS  
Drawn: RG  
Checked: AS

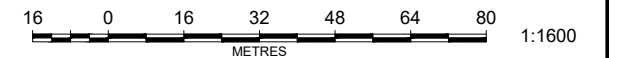
Scales: Plan 1:500  
Horiz. 1:1000  
Vert. 1:200  
X-Sect. -

Datum: A.H.D.

Plan No. **180093-01-501**  
File Ref. 180093  
REV. **E**



PLAN  
SCALE 1:1600



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



TOTAL PROJECT SOLUTIONS

SYDNEY P. 02 9659 0005  
CENTRAL COAST P. 02 4325 5255  
HUNTER P. 02 4966 8388  
S.E. QLD P. 07 5582 6555

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Client:  
TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
LOUTH PARK

PREDEVELOPED CATCHMENT PLAN

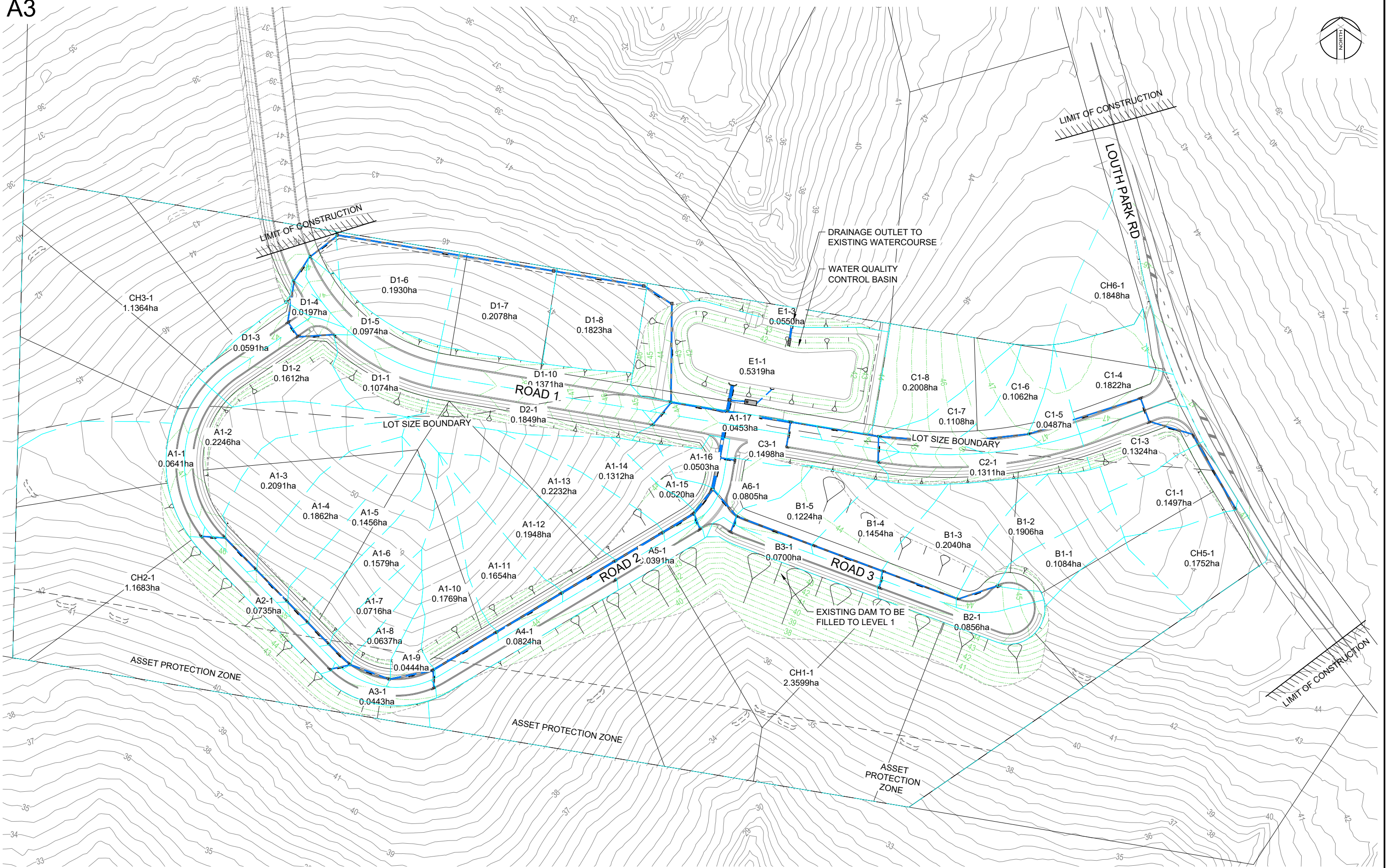
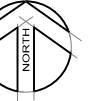
Designed: AS  
Drawn: RG  
Checked: AS

Scales: Plan 1:1600  
Horiz. -  
Vert. -  
X-Sect. -

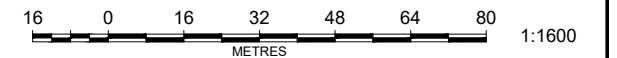
Datum: A.H.D.

Plan No.  
**180093-01-511**  
File Ref.  
180093  
REV.  
**E**





PLAN  
SCALE 1:1600



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



TOTAL PROJECT SOLUTIONS  
ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005  
CENTRAL COAST P: 02 4325 5255  
HUNTER P: 02 4966 8388  
S.E. QLD P: 07 5582 6555  
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mail@brs.com.au  
ABN: 26 134 067 842

Client:  
TULIP PROPERTIES PTY LTD

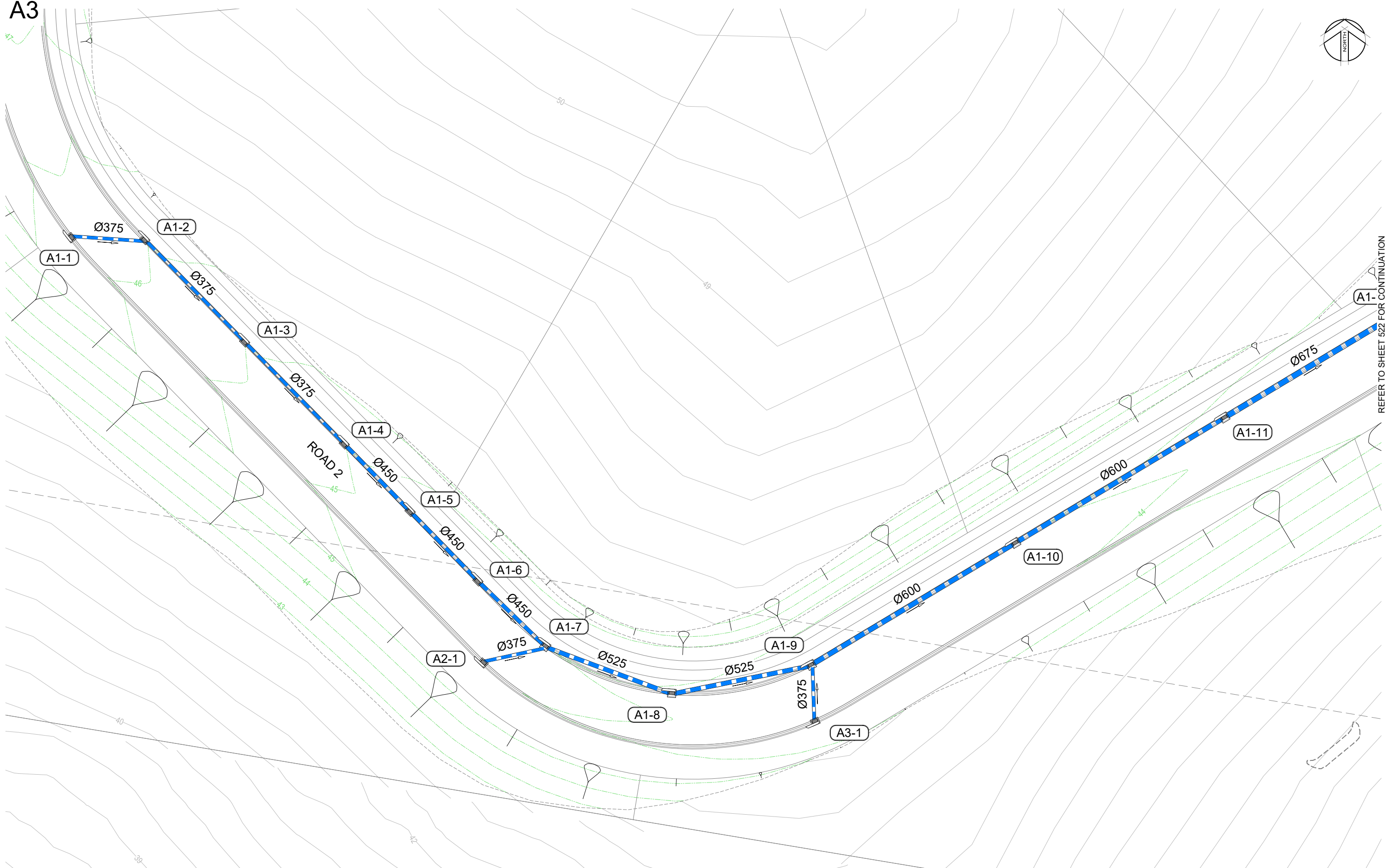
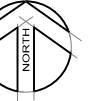
526 LOUTH PARK ROAD  
LOUTH PARK  
POSTDEVELOPED CATCHMENT PLAN

Designed: AS  
Drawn: RG  
Checked: AS  
Scales: Plan 1:1600  
Horiz. -  
Vert. -  
X-Sept. -  
Datum: A.H.D.

Plan No.  
**180093-01-512**  
File Ref.  
180093  
REV.  
**E**

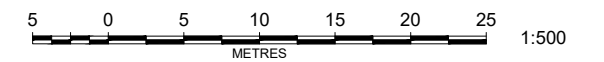


A3



REFER TO SHEET 522 FOR CONTINUATION

PLAN  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P. 02 9559 0005  
CENTRAL COAST P. 02 4325 5255  
HUNTER P. 02 4966 8388  
S.E. QLD P. 07 5582 6555  
www.brs.com.au  
mail@brs.com.au  
AS/NZS 25 134 067 842

Client:  
TULIP PROPERTIES PTY LTD

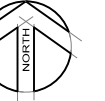
526 LOUTH PARK ROAD  
LOUTH PARK  
STORMWATER PLAN SHEET 1

Designed: AS  
Drawn: RG  
Checked: AS

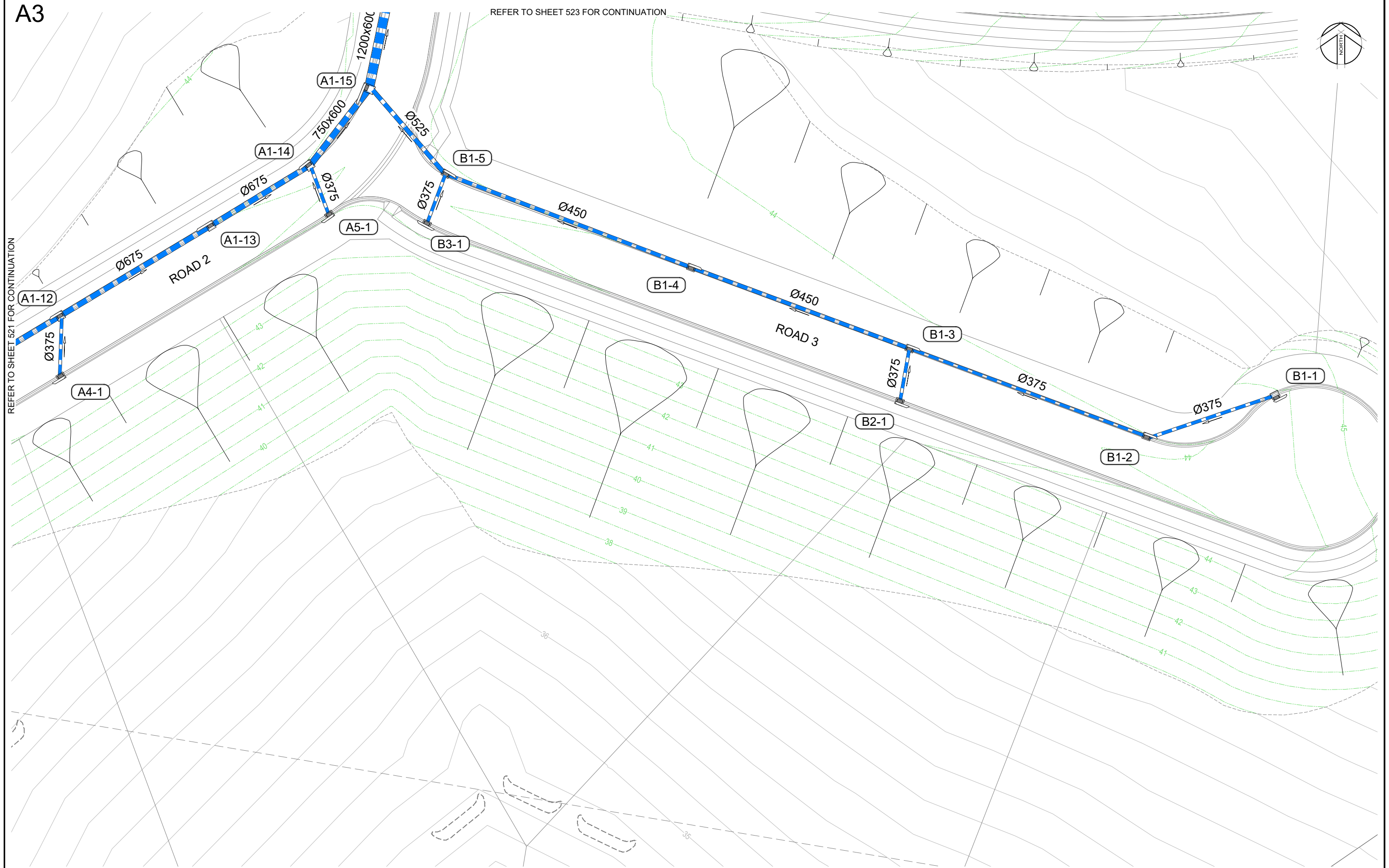
Scales: Plan 1:500  
Horiz. -  
Vert. -  
X-Sept. -  
Datum: A.H.D.

Plan No.  
**180093-01-521**  
File Ref.  
180093  
REV.  
**E**

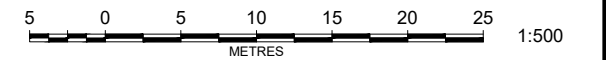




REFER TO SHEET 521 FOR CONTINUATION



PLAN  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



TOTAL PROJECT SOLUTIONS

SYDNEY P: 02 9659 0005  
CENTRAL COAST P: 02 4325 5255  
HUNTER P: 02 4966 8388  
S.E. QLD P: 07 5582 6555

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mail@brs.com.au  
ASBN: 26 134 067 842

Client:  
TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
LOUTH PARK

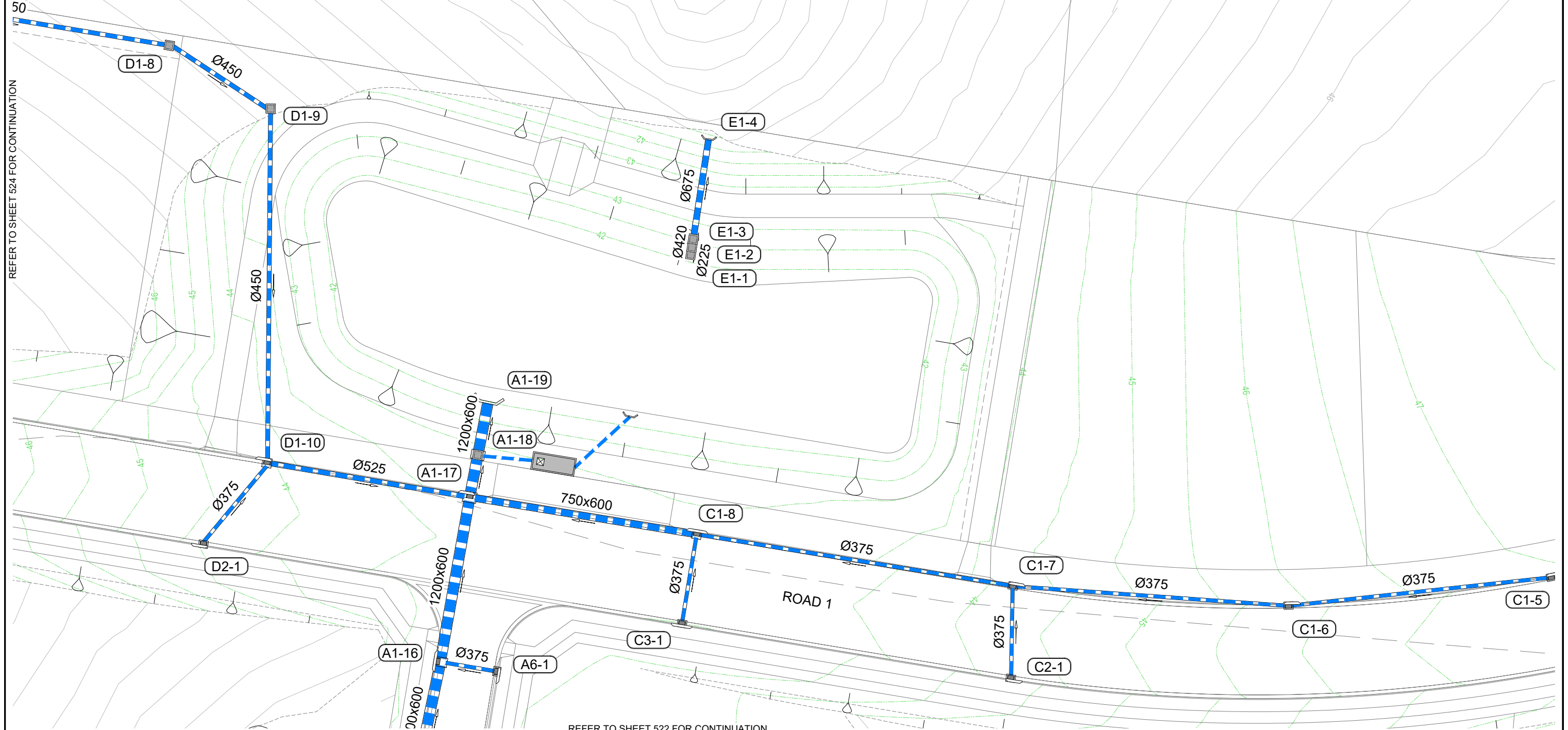
STORMWATER PLAN SHEET 2

Designed: AS  
Drawn: RG  
Checked: AS

Scales: Plan 1:500  
Horiz. -  
Vert. -  
X-Sept. -

Datum: A.H.D.

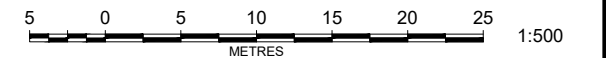
Plan No.  
**180093-01-522**  
File Ref.  
180093  
REV.  
**E**



REFER TO SHEET 524 FOR CONTINUATION

REFER TO SHEET 522 FOR CONTINUATION

**PLAN**  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P. 02 9559 0005  
CENTRAL COAST P. 02 4325 5255  
HUNTER P. 02 4966 8388  
S.E. QLD P. 07 5582 6555  
www.brs.com.au  
mail@brs.com.au  
ABN: 26 134 067 842

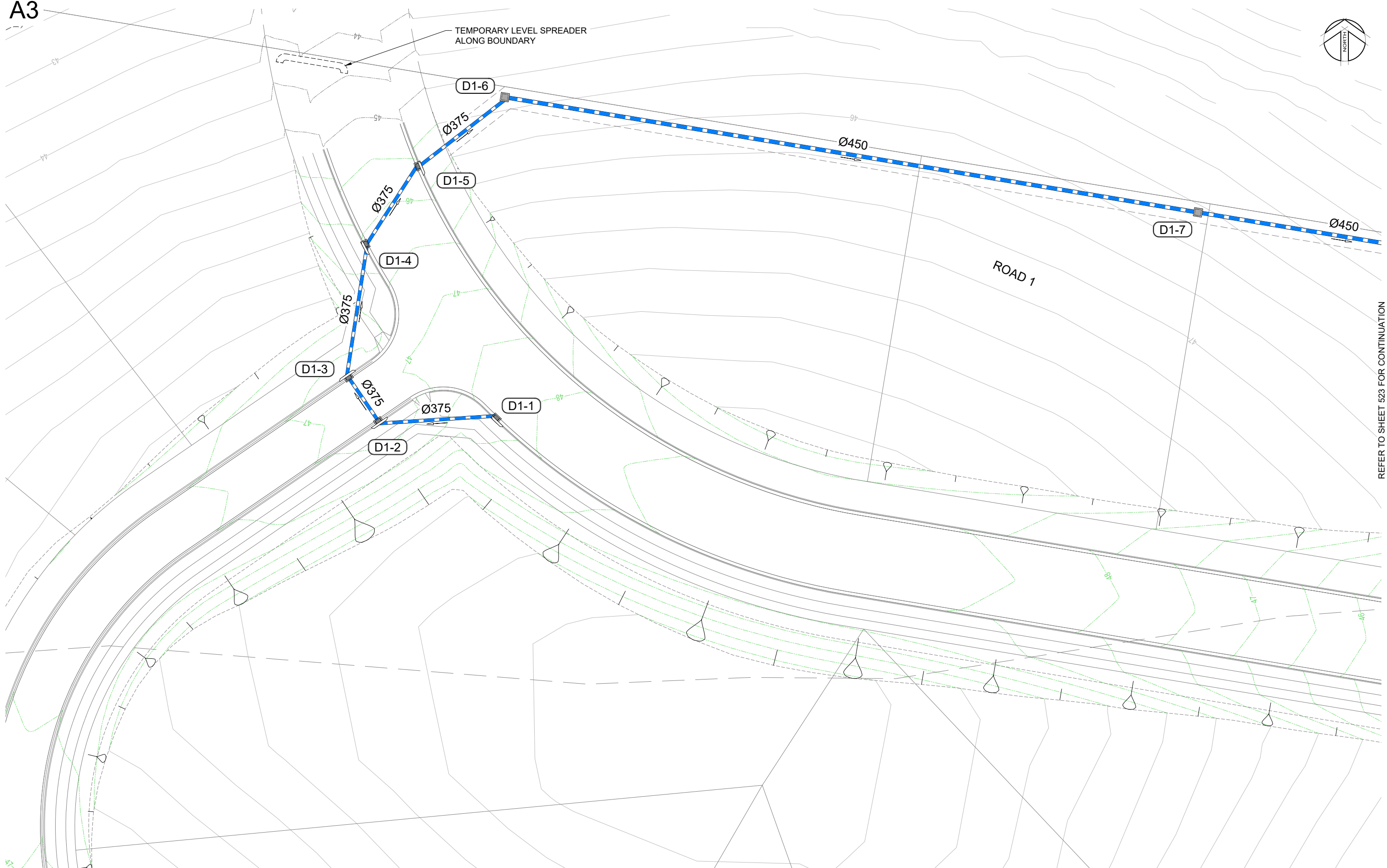
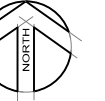
Client:  
TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
LOUTH PARK  
STORMWATER PLAN SHEET 3

Designed: AS  
Drawn: RG  
Checked: AS

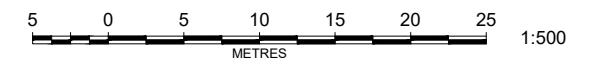
Scales: Plan 1:500  
Horiz. -  
Vert. -  
X-Sect. -  
Datum: A.H.D.

Plan No.  
**180093-01-523**  
File Ref.  
180093  
REV.  
**E**



REFER TO SHEET 523 FOR CONTINUATION

PLAN  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



TOTAL PROJECT SOLUTIONS

SYDNEY P: 02 9659 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555  
 www.brs.com.au  
 mail@brs.com.au  
 AEN: 26 134 067 842

Client:  
 TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
 LOUTH PARK

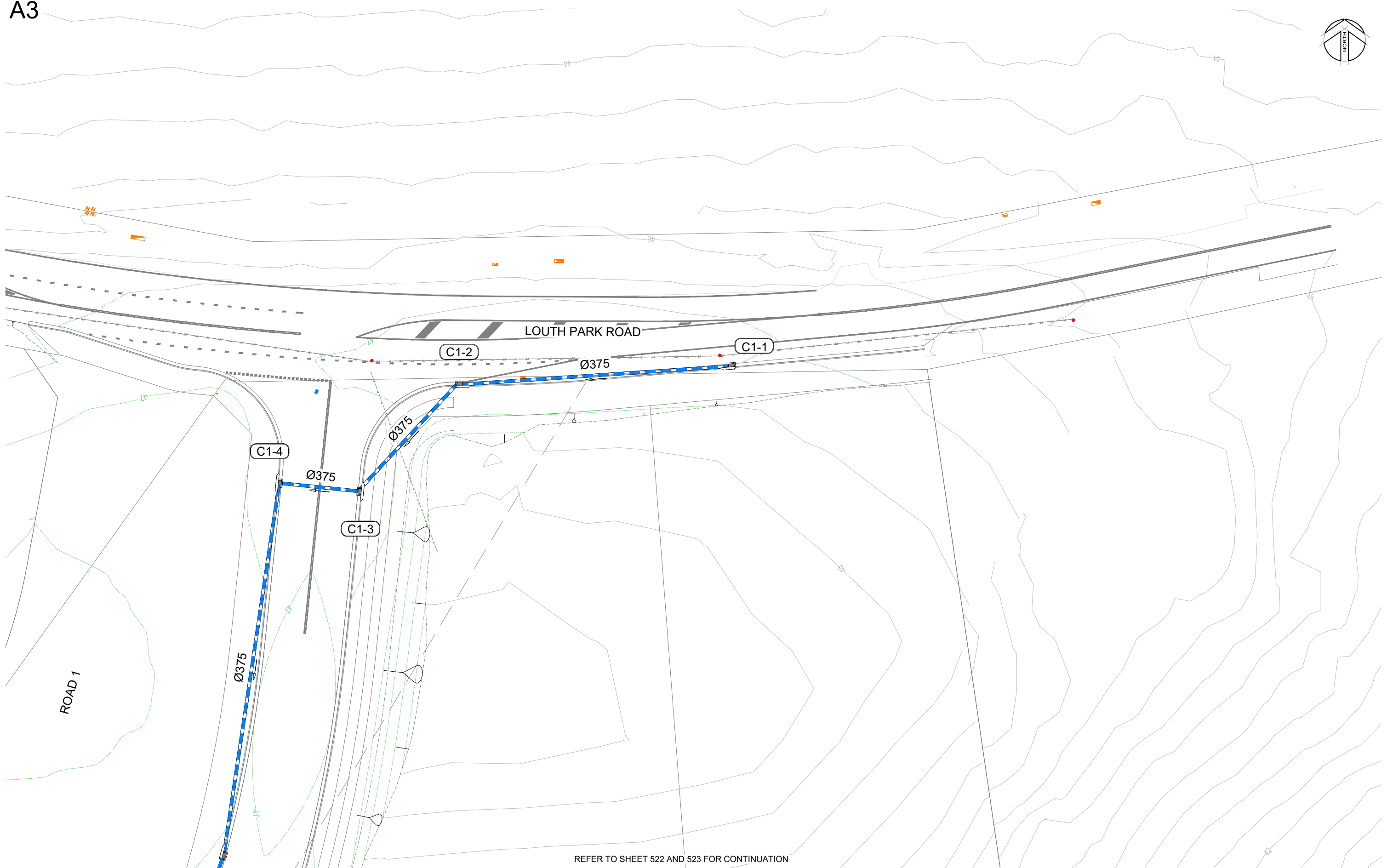
STORMWATER PLAN SHEET 4

Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan 1:500  
 Horiz. -  
 Vert. -  
 X-Sept. -  
 Datum: A.H.D.

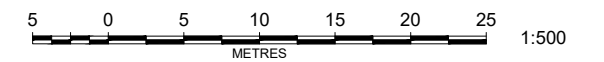
Plan No.  
**180093-01-524**  
 File Ref.  
 180093  
 REV.  
**E**





REFER TO SHEET 522 AND 523 FOR CONTINUATION

**PLAN**  
SCALE 1:500



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



TOTAL PROJECT SOLUTIONS

SYDNEY P. 02 9659 0005  
CENTRAL COAST P. 02 4325 5255  
HUNTER P. 02 4966 8388  
S.E. QLD P. 07 5582 6555

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AS/N: 26 134 067 842

Client:  
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526 LOUTH PARK ROAD  
LOUTH PARK

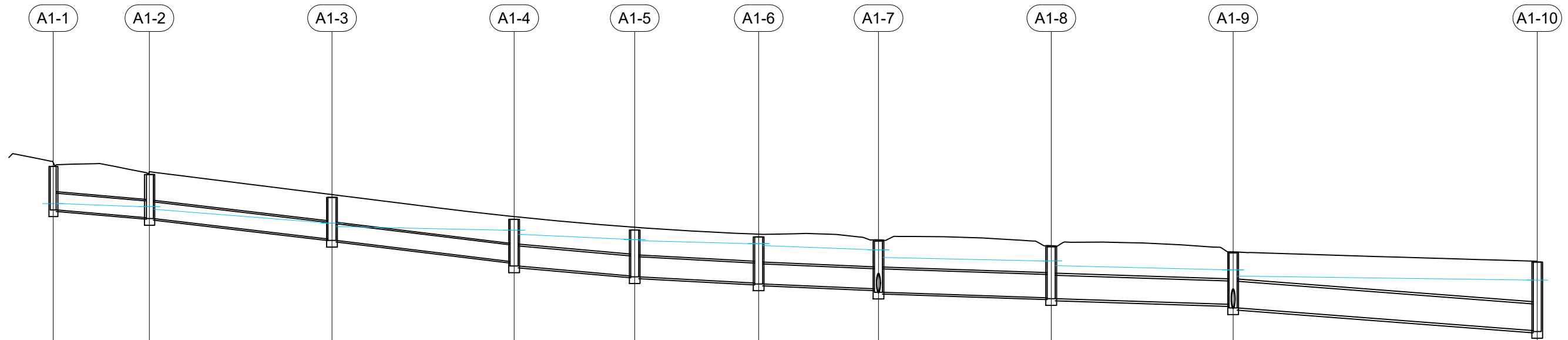
STORMWATER PLAN SHEET 5

Designed: AS  
Drawn: RG  
Checked: AS

Scales: Plan 1:500  
Horiz. -  
Vert. -  
X-Sect. -

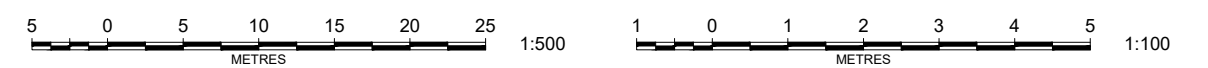
Datum: A.H.D.

Plan No.  
**180093-01-525**  
File Ref.  
180093  
REV.  
**E**



|                  |                       |                       |                       |                       |                       |                       |                       |                       |                       |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| FLOW (L/s)       | 24                    | 82                    | 136                   | 177                   | 218                   | 261                   | 306                   | 322                   | 346                   |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| VELOCITY (m/s)   | 0.6                   | 1.3                   | 1.4                   | 1.6                   | 1.4                   | 1.6                   | 1.4                   | 1.5                   | 1.2                   |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| PIPE SIZE/TYPE   | Ø375<br>RCP (Class 4) | Ø375<br>RCP (Class 4) | Ø375<br>RCP (Class 4) | Ø450<br>RCP (Class 4) | Ø450<br>RCP (Class 4) | Ø450<br>RCP (Class 4) | Ø525<br>RCP (Class 3) | Ø525<br>RCP (Class 4) | Ø600<br>RCP (Class 4) |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| GRADE (%)        | 1.61%                 | 2.24%                 | 2.31%                 | 1.65%                 | 1.01%                 | 0.80%                 | 0.64%                 | 0.62%                 | 1.49%                 |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| DATUM            | 34                    |                       |                       |                       |                       |                       |                       |                       |                       |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| DEPTH TO INVERT  | 0.977                 | 0.971                 | 0.937                 | 0.948                 | 1.033                 | 1.058                 | 1.075                 | 1.148                 | 1.158                 | 1.542  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| HGL LEVELS       | 45.333                | 45.256                | 44.891                | 44.728                | 44.524                | 44.427                | 44.290                | 44.036                | 43.839                | 43.609 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| INVERT LEVELS    | 45.188                | 45.013                | 44.534                | 44.027                | 43.703                | 43.543                | 43.415                | 43.212                | 43.065                | 42.474 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| FINISHED SURFACE | 46.165                | 45.985                | 45.471                | 44.976                | 44.736                | 44.580                | 44.490                | 44.360                | 44.223                | 44.016 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| CHAINAGE         | 0                     | 10.826                | 20.559                | 31.386                | 42.213                | 53.040                | 63.867                | 74.694                | 85.521                | 96.348 | 107.175 | 118.002 | 128.829 | 139.656 | 150.483 | 161.310 | 172.137 | 182.964 | 193.791 | 204.618 | 215.445 | 226.272 | 237.099 | 247.926 | 258.753 | 269.580 | 280.407 | 291.234 | 302.061 | 312.888 | 323.715 | 334.542 | 345.369 | 356.196 | 367.023 | 377.850 | 388.677 | 399.504 | 410.331 | 421.158 | 431.985 | 442.812 | 453.639 | 464.466 | 475.293 | 486.120 | 496.947 | 507.774 | 518.601 | 529.428 | 540.255 | 551.082 | 561.909 | 572.736 | 583.563 | 594.390 | 605.217 | 616.044 | 626.871 | 637.698 | 648.525 | 659.352 | 670.179 | 681.006 | 691.833 | 702.660 | 713.487 | 724.314 | 735.141 | 745.968 | 756.795 | 767.622 | 778.449 | 789.276 | 800.103 | 810.930 | 821.757 | 832.584 | 843.411 | 854.238 | 865.065 | 875.892 | 886.719 | 897.546 | 908.373 | 919.200 | 929.027 | 939.854 | 950.681 | 961.508 | 972.335 | 983.162 | 993.989 | 1004.816 | 1015.643 | 1026.470 | 1037.297 | 1048.124 | 1058.951 | 1069.778 | 1080.605 | 1091.432 | 1102.259 | 1113.086 | 1123.913 | 1134.740 | 1145.567 | 1156.394 | 1167.221 | 1178.048 | 1188.875 | 1200.000 |

LINE A1



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6565

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 mail@brs.com.au  
 AEN: 26 134 067 842

Client: TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
 LOUTH PARK  
 STORMWATER LONGITUDINAL SECTION SHEET 1

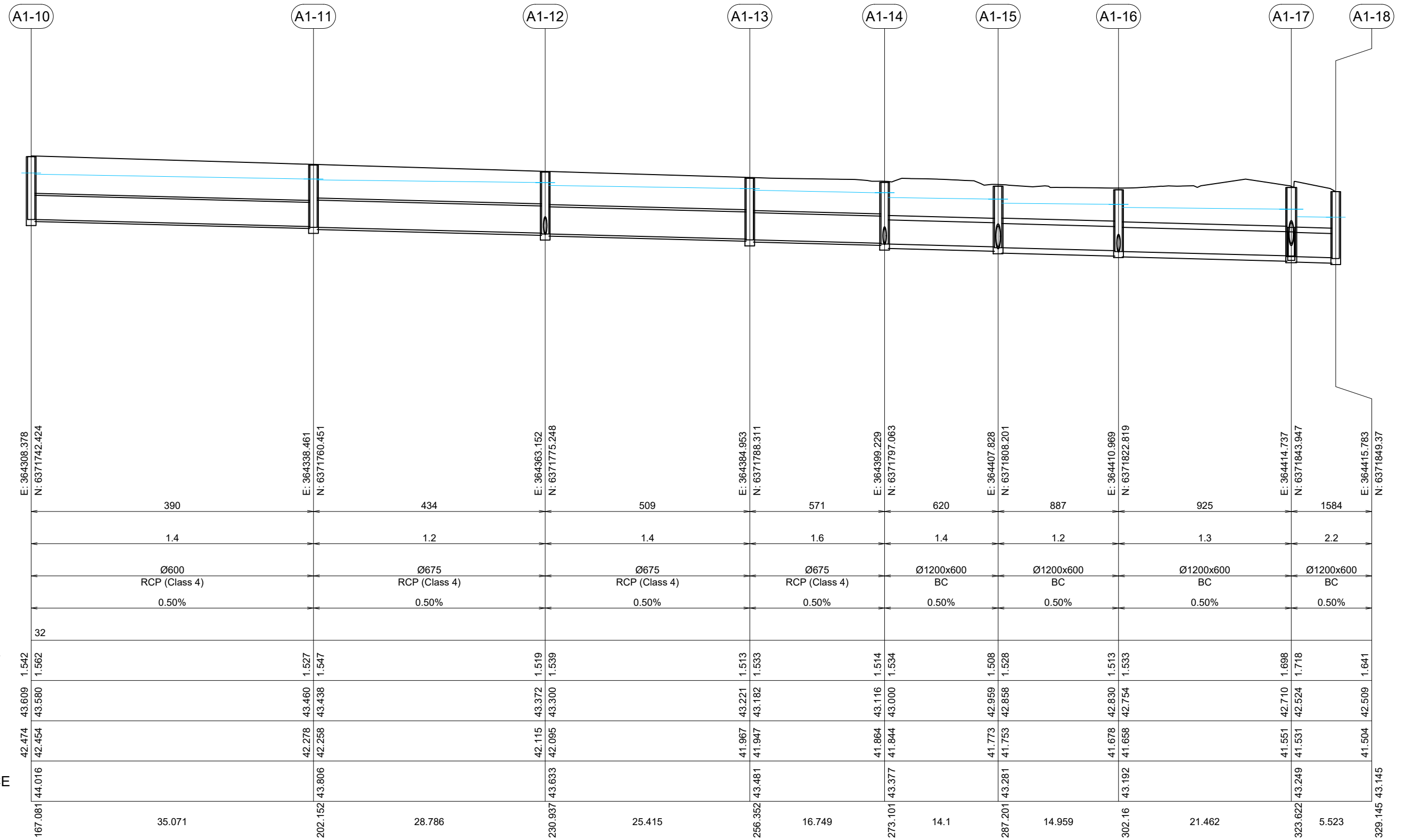
Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -

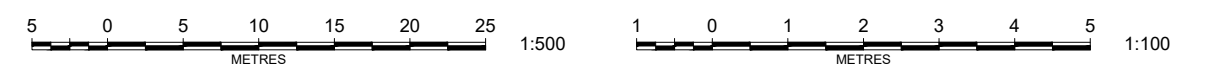
Datum: A.H.D.

Plan No. 180093-01-531  
 File Ref. 180093  
 REV. E





LINE A1



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555

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 AEN: 26 134 067 842

Client: **TULIP PROPERTIES PTY LTD**

**526 LOUTH PARK ROAD  
 LOUTH PARK**

STORMWATER LONGITUDINAL SECTION SHEET 2

Designed: AS  
 Drawn: RG  
 Checked: AS

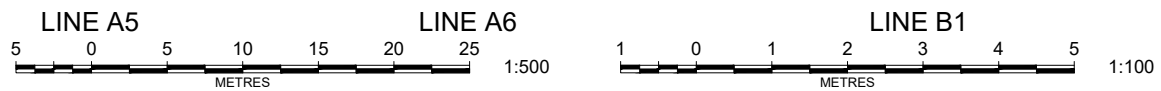
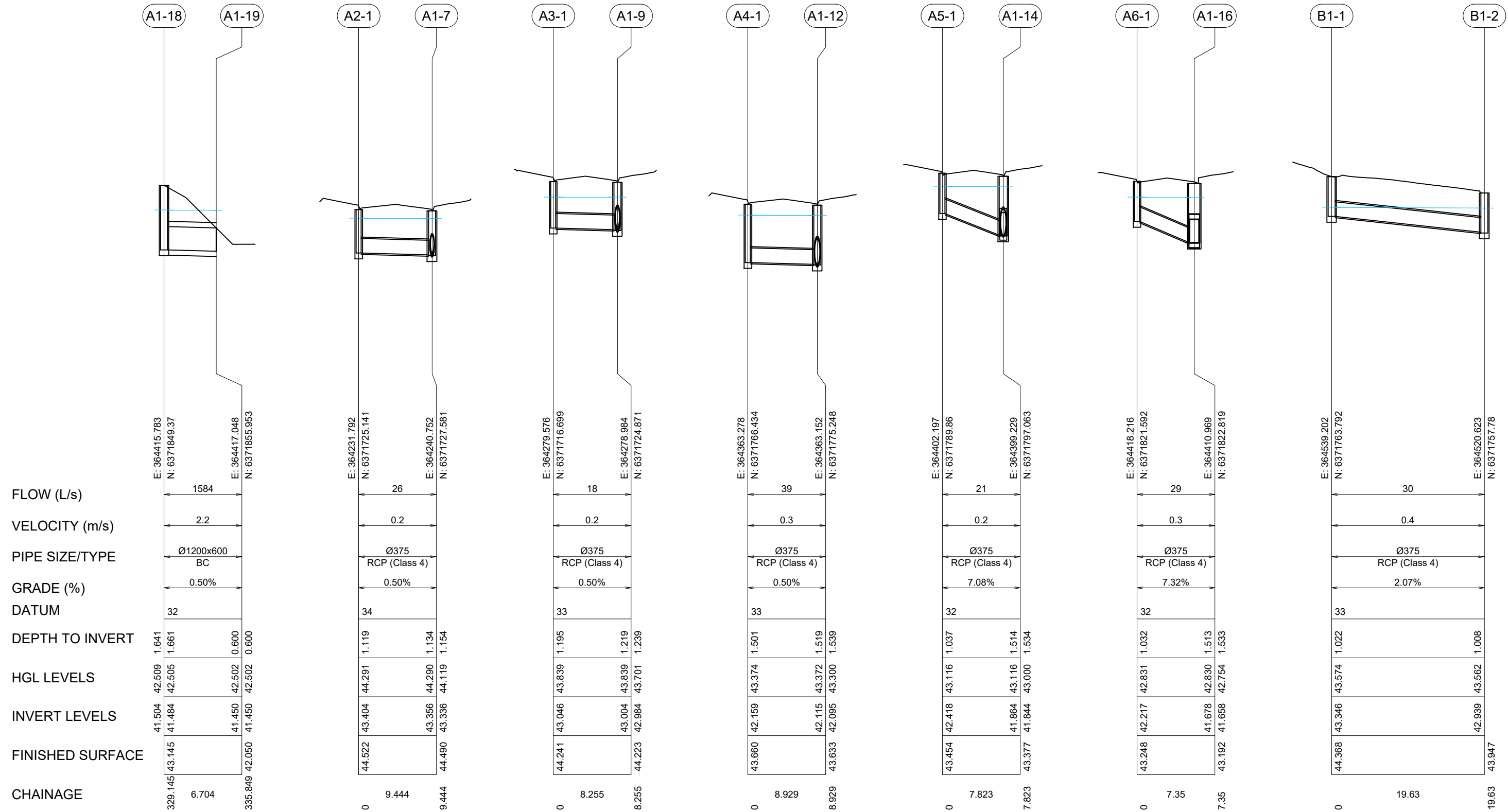
Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -

Datum: A.H.D.

Plan No. **180093-01-532**

File Ref. 180093

REV. **E**



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555

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526 LOUTH PARK ROAD  
 LOUTH PARK  
 STORMWATER LONGITUDINAL SECTION SHEET 3

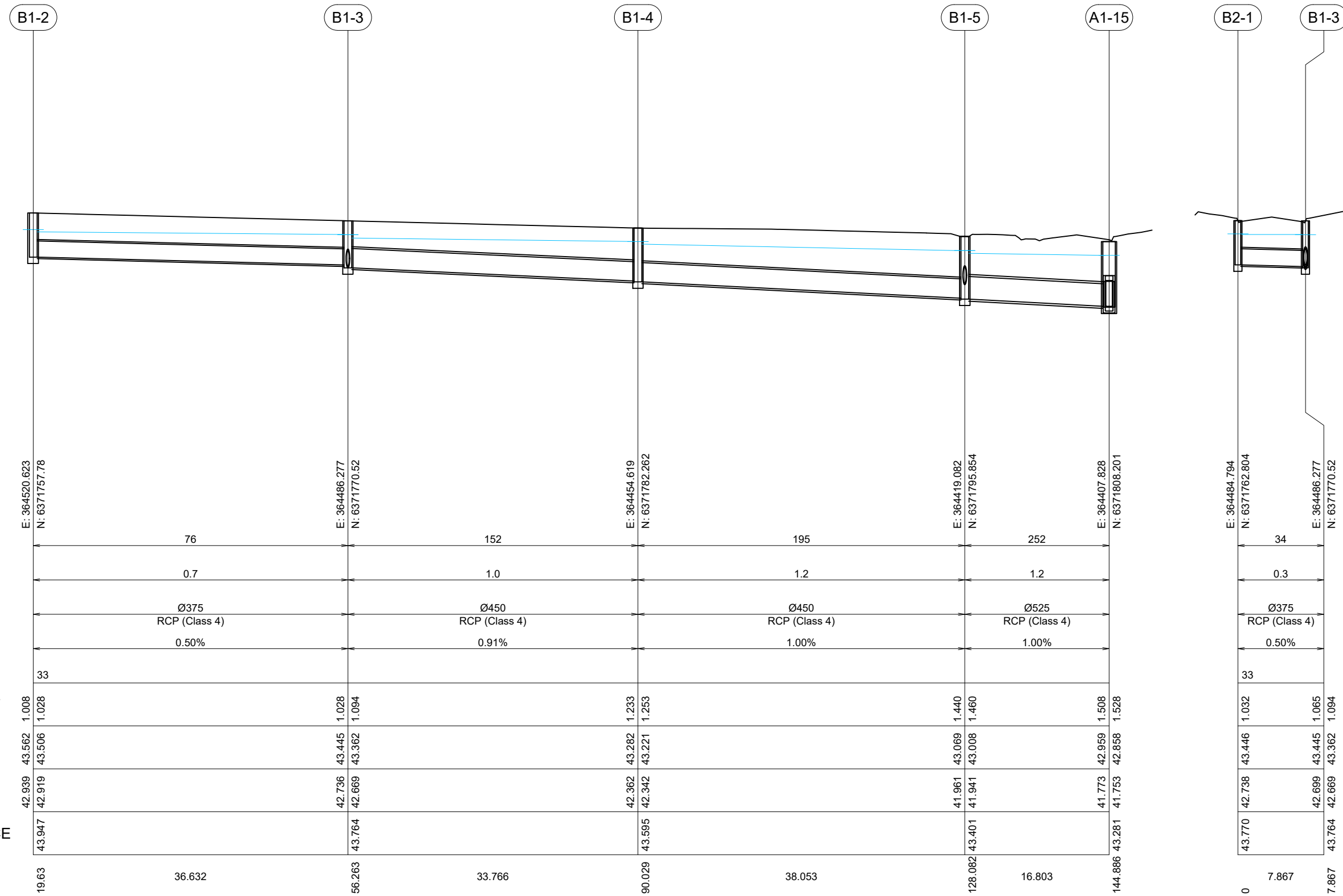
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Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sept. -

Datum: A.H.D.

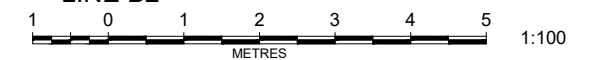
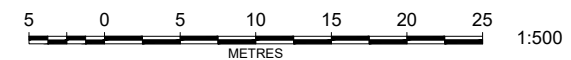
Plan No. 180093-01-533  
 File Ref. 180093  
 REV. E





LINE B1

LINE B2



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
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 AEN: 25 134 067 842

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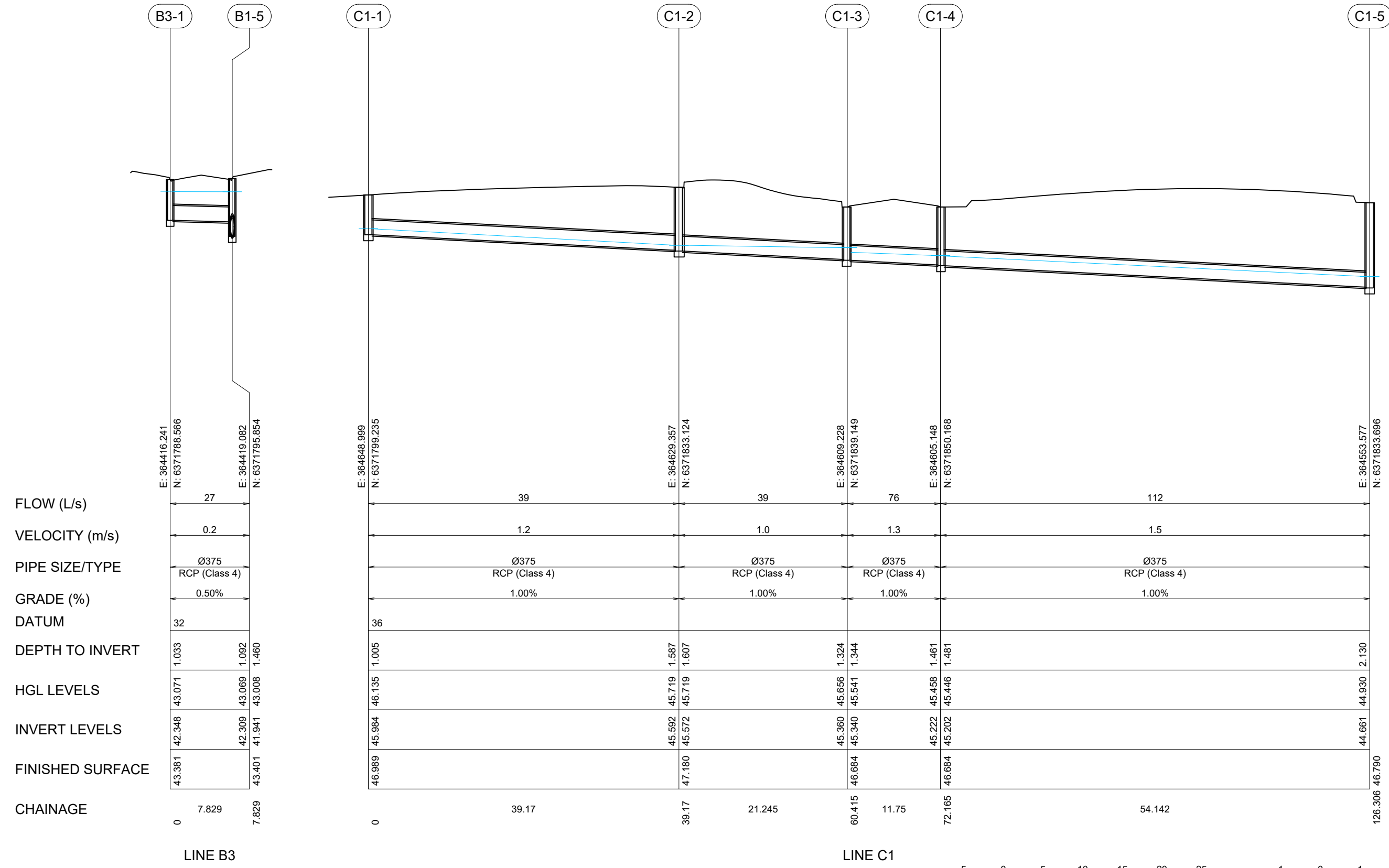
526 LOUTH PARK ROAD  
 LOUTH PARK

STORMWATER LONGITUDINAL SECTION SHEET 4

Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -  
 Datum: A.H.D.

Plan No. 180093-01-534  
 File Ref. 180093  
 REV. E



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555

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Client: **TULIP PROPERTIES PTY LTD**

**526 LOUTH PARK ROAD  
 LOUTH PARK**

STORMWATER LONGITUDINAL SECTION SHEET 5

Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -

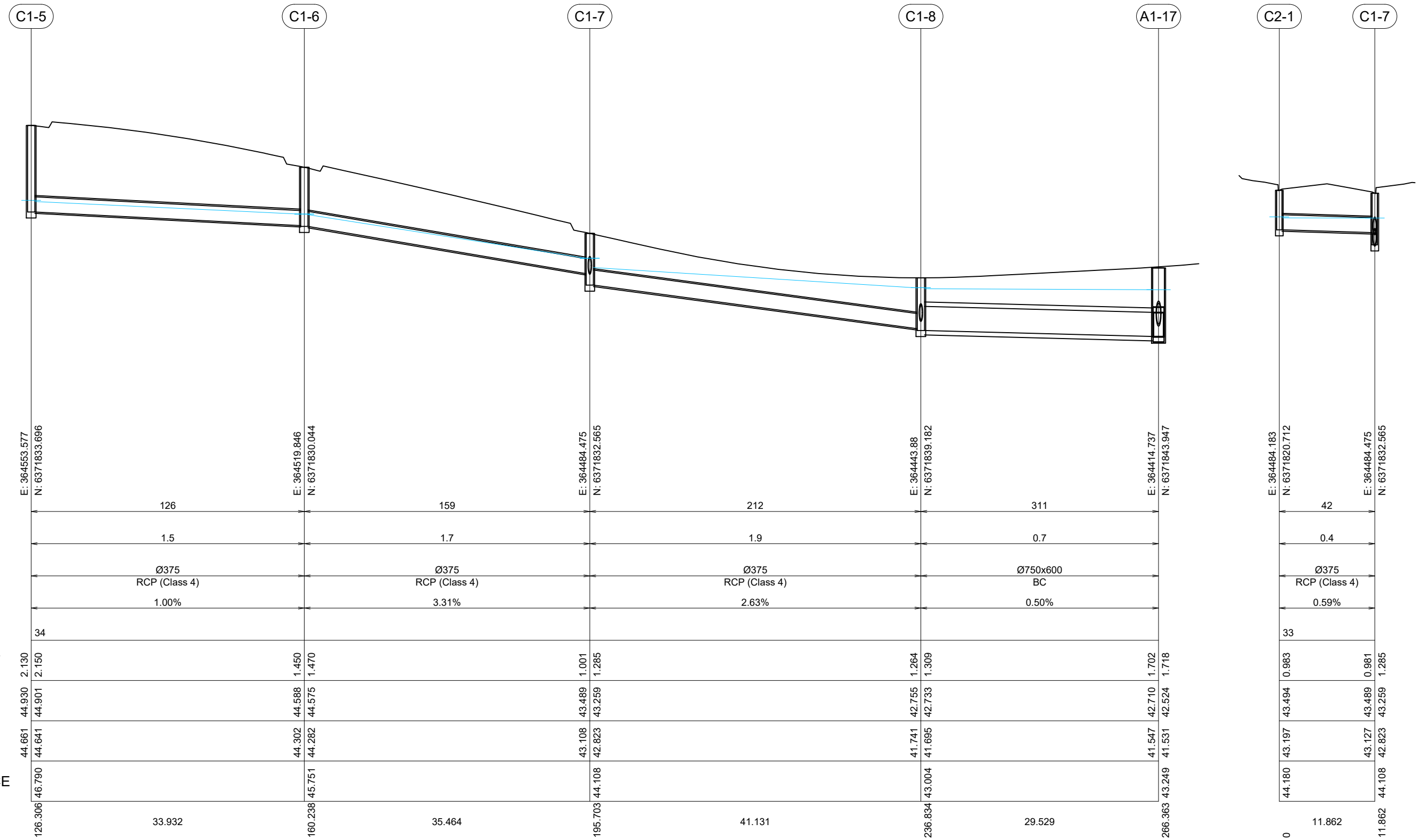
Datum: A.H.D.

Plan No. **180093-01-535**

File Ref. 180093

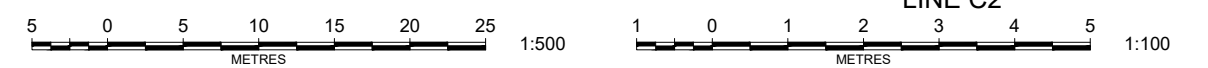
REV. **E**





LINE C1

LINE C2



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555

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 ABN: 26 134 067 842

Client: **TULIP PROPERTIES PTY LTD**

**526 LOUTH PARK ROAD  
 LOUTH PARK**

STORMWATER LONGITUDINAL SECTION SHEET 6

Designed: AS  
 Drawn: RG  
 Checked: AS

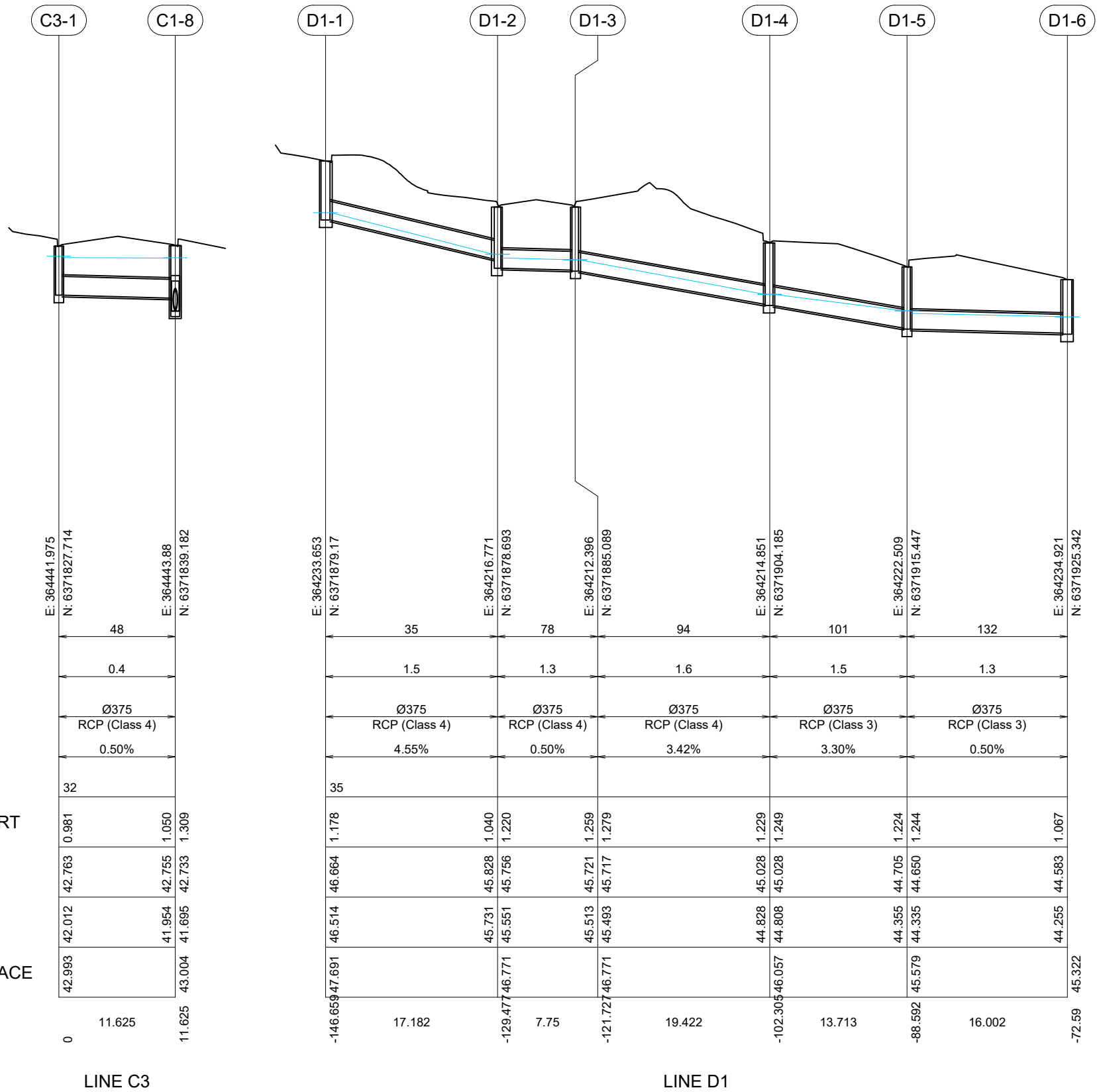
Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -

Datum: A.H.D.

Plan No. **180093-01-536**

File Ref. 180093

REV. **E**



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
 TOTAL PROJECT SOLUTIONS  
 ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
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526 LOUTH PARK ROAD  
 LOUTH PARK  
 STORMWATER LONGITUDINAL SECTION SHEET 7

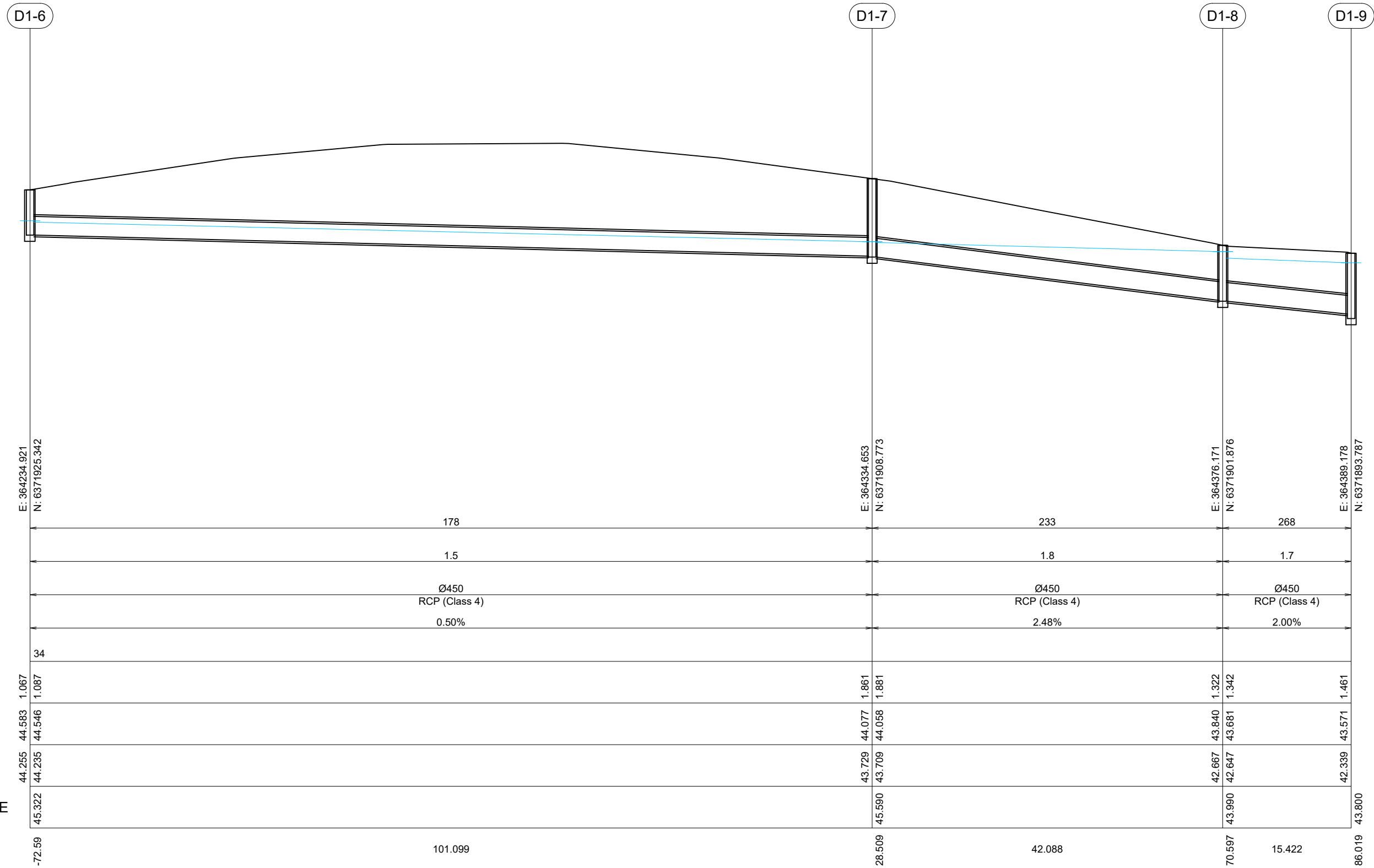
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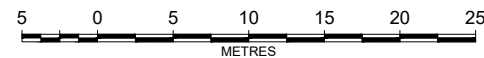
Datum: A.H.D.

Plan No. 180093-01-537  
 File Ref. 180093  
 REV. E





LINE D1



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555  
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 ABN: 26 134 067 842

Client: TULIP PROPERTIES PTY LTD

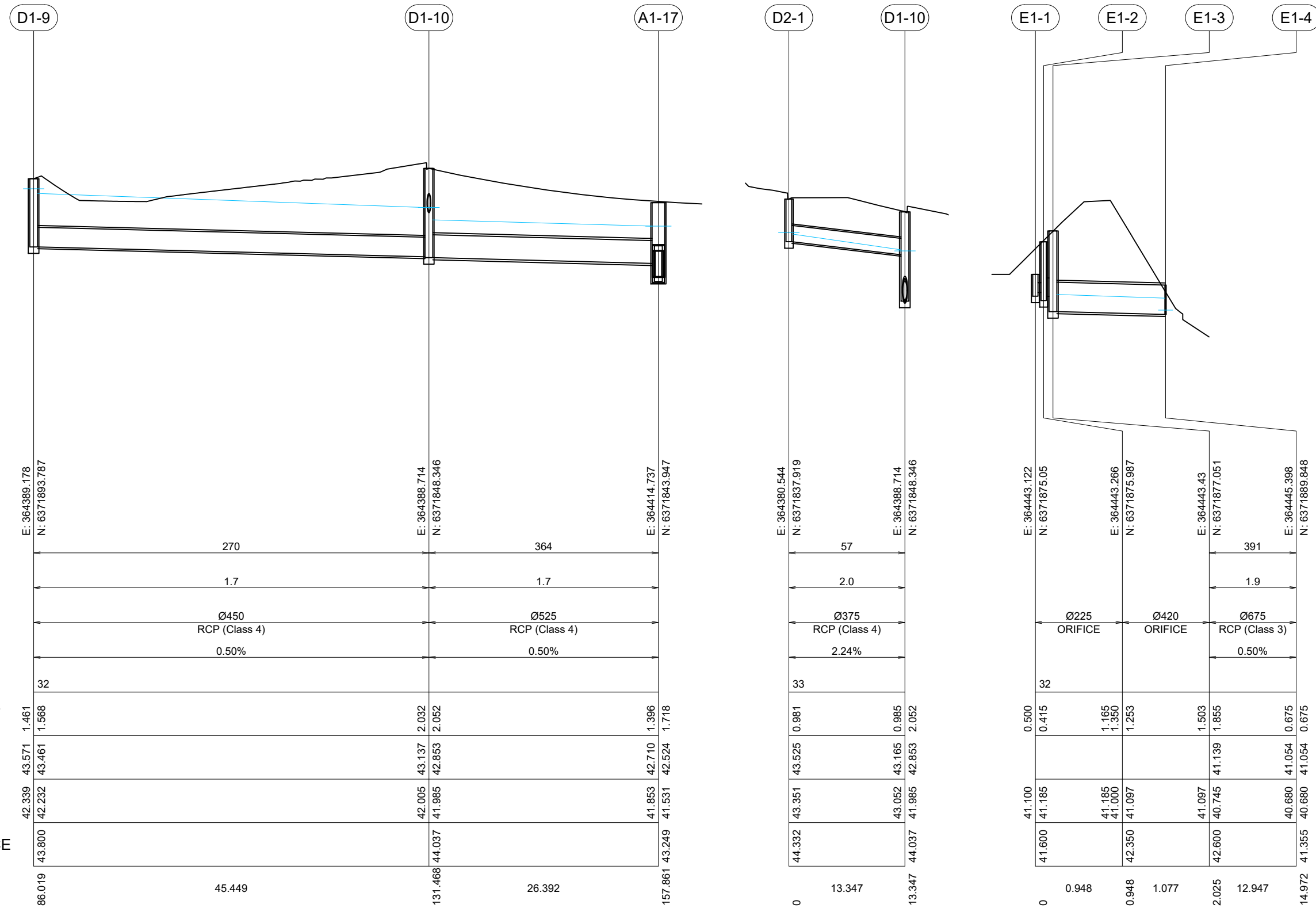
526 LOUTH PARK ROAD  
 LOUTH PARK

STORMWATER LONGITUDINAL SECTION SHEET 8

Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -  
 Datum: A.H.D.

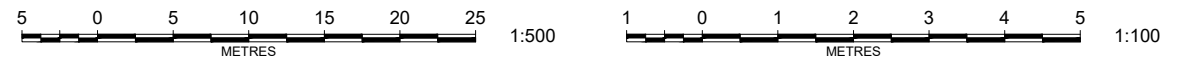
Plan No. 180093-01-538  
 File Ref. 180093  
 REV. E



LINE D1

LINE D2

LINE E1



| REV | AMENDMENT                    | ISSUED | DATE       |
|-----|------------------------------|--------|------------|
| A   | COUNCIL DA COMMENTS          | AS     | 29/04/2022 |
| B   | MINOR UPDATES                | AS     | 06/05/2022 |
| C   | COUNCIL DA COMMENTS 20.06.22 | JT     | 02/08/2022 |
| D   | UPDATED TREE REMOVAL PLANS   | JT     | 30/09/2022 |
| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |



SYDNEY P: 02 9559 0005  
 CENTRAL COAST P: 02 4325 5255  
 HUNTER P: 02 4966 8388  
 S.E. QLD P: 07 5582 6555  
 www.brs.com.au  
 mail@brs.com.au  
 ABN: 26 134 067 842

Client: TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
 LOUTH PARK

STORMWATER LONGITUDINAL SECTION SHEET 9

Designed: AS  
 Drawn: RG  
 Checked: AS

Scales: Plan -  
 Horiz. 1:500  
 Vert. 1:100  
 X-Sect. -

Datum: A.H.D.

Plan No. 180093-01-539

File Ref. 180093

REV. E

| PIT NAME | SUB-CATCHMENT AREA (ha) | LAND-USE               | TIME AND RUNOFF |                              |  | INLET DESIGN                 |                                    |                          |                          | PIPE SYSTEM DESIGN         |   |                       |            |                            |                      |                |                     |                          |                  |                | PIT RESULTS        |                           |                           |                     |                     |                          |                             |                             |                   |                |
|----------|-------------------------|------------------------|-----------------|------------------------------|--|------------------------------|------------------------------------|--------------------------|--------------------------|----------------------------|---|-----------------------|------------|----------------------------|----------------------|----------------|---------------------|--------------------------|------------------|----------------|--------------------|---------------------------|---------------------------|---------------------|---------------------|--------------------------|-----------------------------|-----------------------------|-------------------|----------------|
|          |                         |                        | Percentage      | Constant Flow Time (minutes) | Kinematic Wave Formula Parameters Length (m) Slope (%) Roughness | Total Time to Peak (minutes) | Peak Sub-Catchment Flowrate (m³/s) | Origin of Approach Flows | Overflow Flowrate (m³/s) | Approaching Flow Width (m) | Pit Depth x Velocity (m/s)                | Inlet Family          | Inlet Size | Total Approach Flow (m³/s) | Overflow Flow (m³/s) | Flow Depth (m) | Flow Velocity (m/s) | Peak Flow in Pipe (m³/s) | Reach Length (m) | Pipe Slope (m) | Pipe Diameter (mm) | U/S Pipe Invert Level (m) | D/S Pipe Invert Level (m) | U/S HGL in Pipe (m) | D/S HGL in Pipe (m) | Pipe Flow Velocity (m/s) | Pressure Change Coeff. (Ku) | Water Surface Elevation (m) | Surface Level (m) | Free-board (m) |
| A1-1     | 0.041                   | Paved Supp. 70.0 0.0 6 | 70.0            | 5                            | 6.00   | 0.024                        |                                    |                          |                          |                            | Kerb Inlet Pit, 3% cross fall, 2.0% grade | G.G.P 1.8m Lintel EKI | 0.024      | 0.000                      | 1.77                 | 0.04           | 0.024               | 10.826                   | 1.62             | 375            | 45.188             | 45.013                    | 45.333                    | 45.256              | 0.60                | 3.5                      | 45.33                       | 45.165                      | 0.83              | A1-1           |

| REV | AMENDMENT                    | ISSUED | DATE       |
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| E   | COUNCIL DA COMMENTS          | JT     | 30/11/2022 |

**BARKER RYAN STEWART**  
TOTAL PROJECT SOLUTIONS  
ENGINEERING | PLANNING | PROJECT MANAGEMENT | SURVEYING | CERTIFICATION

SYDNEY P: 02 9659 0005  
CENTRAL COAST P: 02 4325 5255  
HUNTER P: 02 4966 8388  
S.E. QLD P: 07 5582 6555  
www.brs.com.au  
mail@brs.com.au  
ABN: 26 134 067 842

Client: TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD  
LOUTH PARK  
STORMWATER CALCULATIONS SHEET 1

Designed: AS  
Drawn: RG  
Checked: AS

Scales: Plan - 1:500  
Horiz. - 1:100  
Vert. - 1:100  
X-Sept. -

Datum: A.H.D.

Plan No. **180093-01-541**  
File Ref. **180093**  
REV. **E**



Table with columns: LAND USE, TIME AND RUNOFF, INLET DESIGN, PIPE SYSTEM DESIGN, and PIT RESULTS. It contains detailed data for various catchment areas and pipe segments, including flow rates, pipe diameters, and elevations.

Revision table with columns: REV, AMENDMENT, ISSUED, DATE. Rows include COUNCIL DA COMMENTS, MINOR UPDATES, COUNCIL DA COMMENTS 20.06.22, UPDATED TREE REMOVAL PLANS, and COUNCIL DA COMMENTS.



SYDNEY P: 02 9659 0005 CENTRAL COAST P: 07 5582 5255 HUNTER P: 02 4966 8388 S.E. QLD P: 07 5582 6555 www.brs.com.au mail@brs.com.au AEN: 26 134 067 542

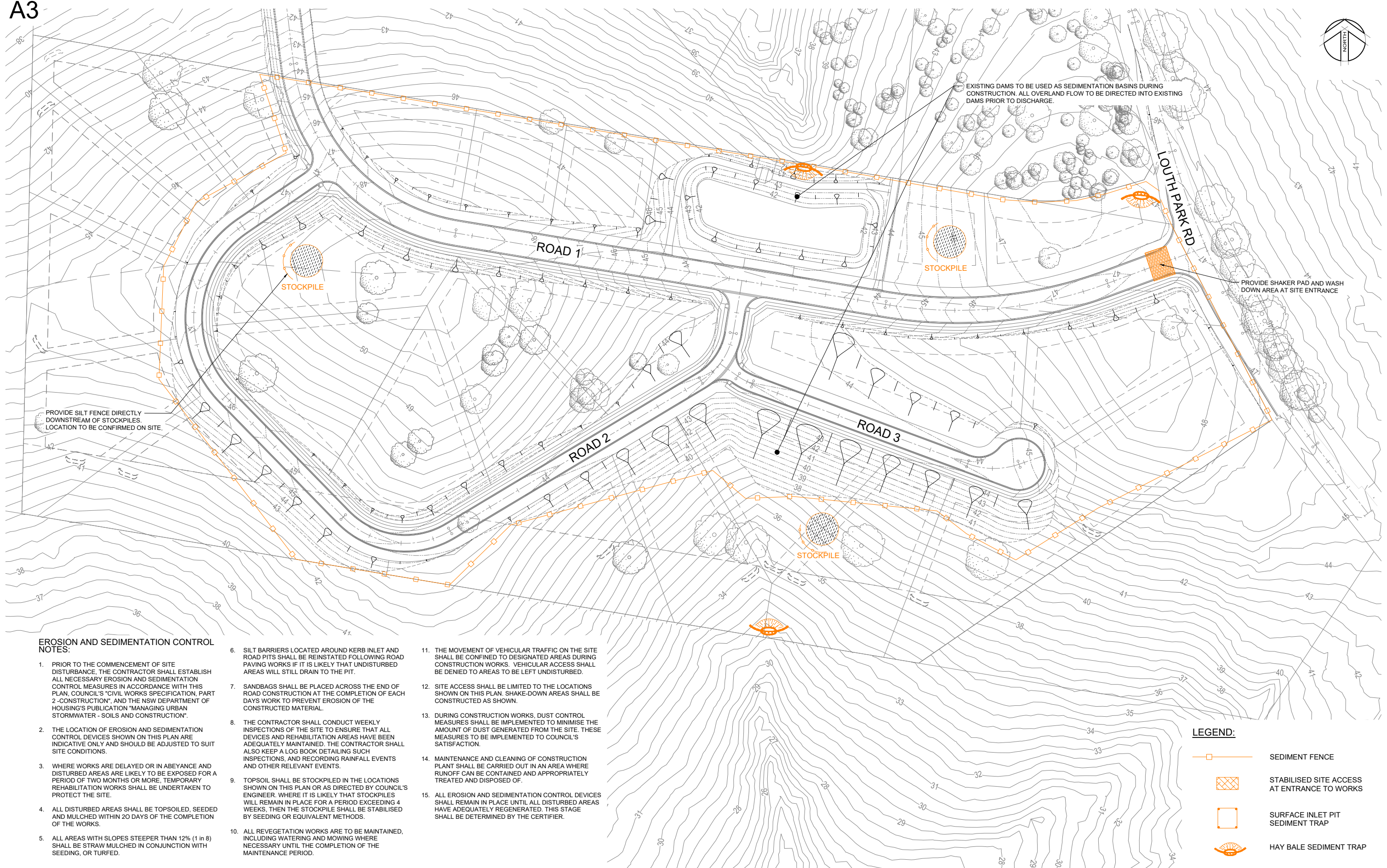
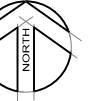
Client: TULIP PROPERTIES PTY LTD

526 LOUTH PARK ROAD LOUTH PARK STORMWATER CALCULATIONS SHEET 2

Designed: AS Drawn: RG Checked: AS Scales: Plan - 1:500 Horiz. - 1:100 Vert. - 1:100 X-Sect. - Datum: A.H.D.

Plan No. 180093-01-542 File Ref. 180093 REV. E





EXISTING DAMS TO BE USED AS SEDIMENTATION BASINS DURING CONSTRUCTION. ALL OVERLAND FLOW TO BE DIRECTED INTO EXISTING DAMS PRIOR TO DISCHARGE.

STOCKPILE

STOCKPILE

STOCKPILE

PROVIDE SHAKER PAD AND WASH DOWN AREA AT SITE ENTRANCE

PROVIDE SILT FENCE DIRECTLY DOWNSTREAM OF STOCKPILES. LOCATION TO BE CONFIRMED ON SITE.

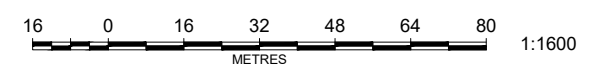
**EROSION AND SEDIMENTATION CONTROL NOTES:**

1. PRIOR TO THE COMMENCEMENT OF SITE DISTURBANCE, THE CONTRACTOR SHALL ESTABLISH ALL NECESSARY EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH THIS PLAN, COUNCIL'S "CIVIL WORKS SPECIFICATION, PART 2 - CONSTRUCTION", AND THE NSW DEPARTMENT OF HOUSING'S PUBLICATION "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION".
2. THE LOCATION OF EROSION AND SEDIMENTATION CONTROL DEVICES SHOWN ON THIS PLAN ARE INDICATIVE ONLY AND SHOULD BE ADJUSTED TO SUIT SITE CONDITIONS.
3. WHERE WORKS ARE DELAYED OR IN ABEYANCE AND DISTURBED AREAS ARE LIKELY TO BE EXPOSED FOR A PERIOD OF TWO MONTHS OR MORE, TEMPORARY REHABILITATION WORKS SHALL BE UNDERTAKEN TO PROTECT THE SITE.
4. ALL DISTURBED AREAS SHALL BE TOPSOILED, SEEDED AND MULCHED WITHIN 20 DAYS OF THE COMPLETION OF THE WORKS.
5. ALL AREAS WITH SLOPES STEEPER THAN 12% (1 in 8) SHALL BE STRAW MULCHED IN CONJUNCTION WITH SEEDING, OR TURFED.
6. SILT BARRIERS LOCATED AROUND KERB INLET AND ROAD PITS SHALL BE REINSTATED FOLLOWING ROAD PAVING WORKS IF IT IS LIKELY THAT UNDISTURBED AREAS WILL STILL DRAIN TO THE PIT.
7. SANDBAGS SHALL BE PLACED ACROSS THE END OF ROAD CONSTRUCTION AT THE COMPLETION OF EACH DAYS WORK TO PREVENT EROSION OF THE CONSTRUCTED MATERIAL.
8. THE CONTRACTOR SHALL CONDUCT WEEKLY INSPECTIONS OF THE SITE TO ENSURE THAT ALL DEVICES AND REHABILITATION AREAS HAVE BEEN ADEQUATELY MAINTAINED. THE CONTRACTOR SHALL ALSO KEEP A LOG BOOK DETAILING SUCH INSPECTIONS, AND RECORDING RAINFALL EVENTS AND OTHER RELEVANT EVENTS.
9. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY COUNCIL'S ENGINEER. WHERE IT IS LIKELY THAT STOCKPILES WILL REMAIN IN PLACE FOR A PERIOD EXCEEDING 4 WEEKS, THEN THE STOCKPILE SHALL BE STABILISED BY SEEDING OR EQUIVALENT METHODS.
10. ALL REVEGETATION WORKS ARE TO BE MAINTAINED, INCLUDING WATERING AND MOWING WHERE NECESSARY UNTIL THE COMPLETION OF THE MAINTENANCE PERIOD.
11. THE MOVEMENT OF VEHICULAR TRAFFIC ON THE SITE SHALL BE CONFINED TO DESIGNATED AREAS DURING CONSTRUCTION WORKS. VEHICULAR ACCESS SHALL BE DENIED TO AREAS TO BE LEFT UNDISTURBED.
12. SITE ACCESS SHALL BE LIMITED TO THE LOCATIONS SHOWN ON THIS PLAN. SHAKE-DOWN AREAS SHALL BE CONSTRUCTED AS SHOWN.
13. DURING CONSTRUCTION WORKS, DUST CONTROL MEASURES SHALL BE IMPLEMENTED TO MINIMISE THE AMOUNT OF DUST GENERATED FROM THE SITE. THESE MEASURES TO BE IMPLEMENTED TO COUNCIL'S SATISFACTION.
14. MAINTENANCE AND CLEANING OF CONSTRUCTION PLANT SHALL BE CARRIED OUT IN AN AREA WHERE RUNOFF CAN BE CONTAINED AND APPROPRIATELY TREATED AND DISPOSED OF.
15. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE ADEQUATELY REGENERATED. THIS STAGE SHALL BE DETERMINED BY THE CERTIFIER.

**LEGEND:**

- SEDIMENT FENCE
- STABILISED SITE ACCESS AT ENTRANCE TO WORKS
- SURFACE INLET PIT SEDIMENT TRAP
- HAY BALE SEDIMENT TRAP

**PLAN**  
SCALE 1:1600



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Client: **TULIP PROPERTIES PTY LTD**

**526 LOUTH PARK ROAD  
LOUTH PARK**

EROSION AND SEDIMENT CONTROL PLAN

Designed: AS  
Drawn: RG  
Checked: AS

Scales: Plan 1:1600  
Horiz. -  
Vert. -  
X-Sect. -

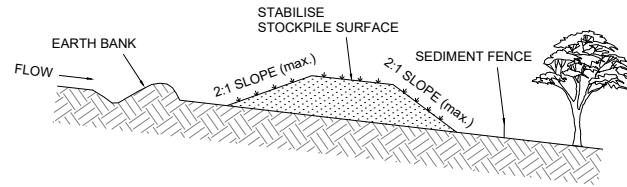
Datum: A.H.D.

Plan No. **180093-01-801**

File Ref. 180093

REV. **E**

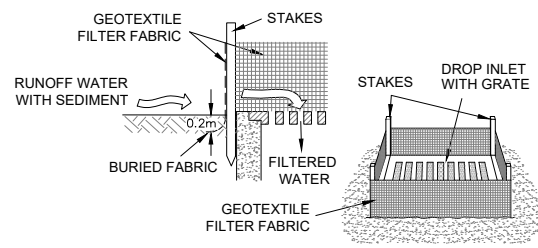




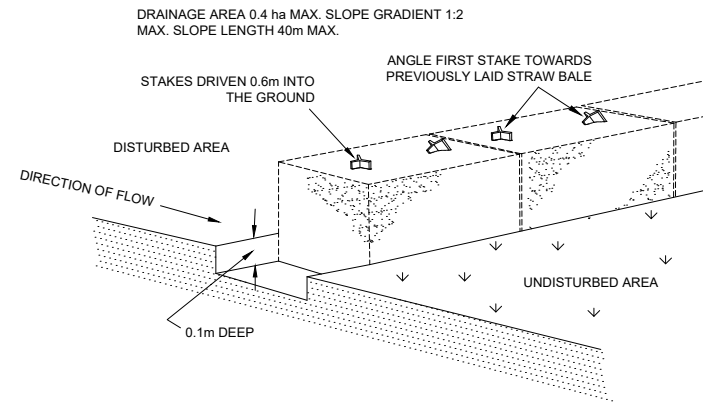
**CONSTRUCTION NOTES**

1. WHERE POSSIBLE LOCATE STOCKPILE AT LEAST 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOWS, ROADS, HAZARD AREAS AND MIN. 1.5m AWAY FROM EMBANKMENTS.
2. CONSTRUCT ON THE CONTOUR AS A LOW, FLAT ELONGATED MOUND.
3. WHERE THERE IS SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.
5. CONSTRUCT EARTH BANK (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE (STANDARD DRAWING 6-8) 1 TO 2 METRES DOWNSLOPE OF STOCKPILE.

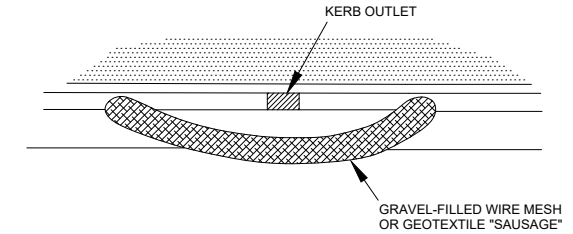
TOPSOIL STOCKPILE



SURFACE INLET PIT SEDIMENT TRAP



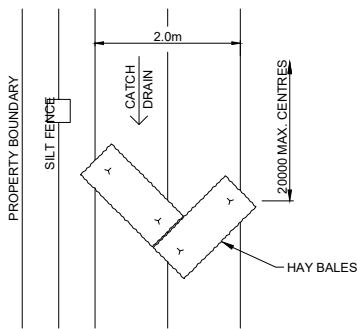
STRAW BALE SEDIMENT FILTER



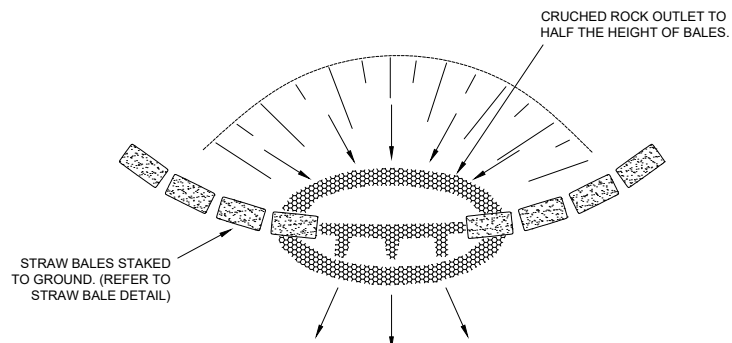
**CONSTRUCTION NOTES**

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH X 400mm WIDE.
3. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING FILTER.
4. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

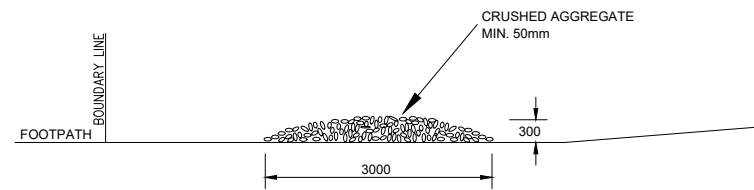
MESH & GRAVEL FILTER "SAUSAGE" BARRIER



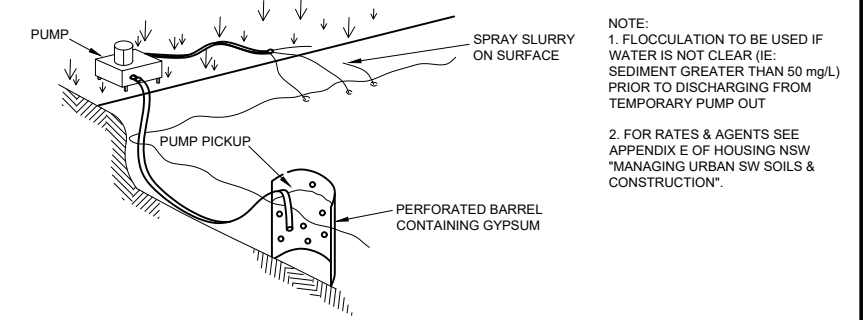
CATCH DRAIN DETAIL



STRAW BALE & CRUSHED ROCK SEDIMENT FILTER

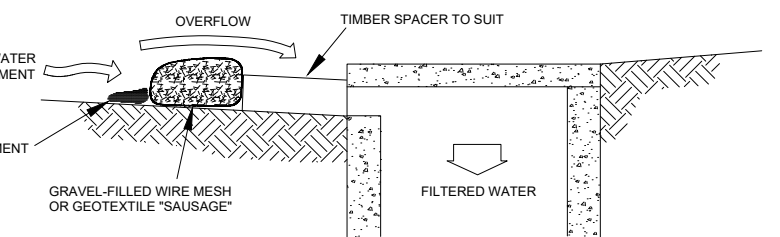
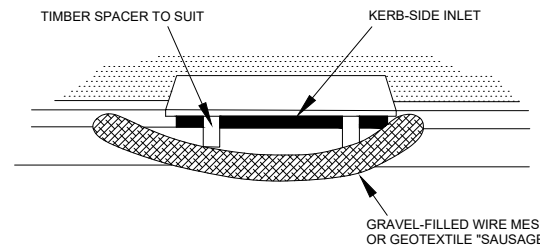


VEHICLE DUST SHAKE DOWN DETAIL



**FLOCCULATION DETAIL**

- NOTE:
1. FLOCCULATION TO BE USED IF WATER IS NOT CLEAR (IE: SEDIMENT GREATER THAN 50 mg/L) PRIOR TO DISCHARGING FROM TEMPORARY PUMP OUT
  2. FOR RATES & AGENTS SEE APPENDIX E OF HOUSING NSW "MANAGING URBAN SW SOILS & CONSTRUCTION".



**CONSTRUCTION NOTES**

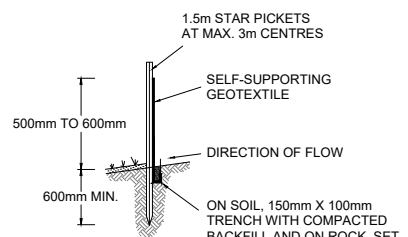
1. INSTALL FILTERS TO KERB INLET ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH X 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET "SAUSAGE" FILTER

**CONSTRUCTION NOTES**

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARRALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND 2.5 METRES APART (MAX.)
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

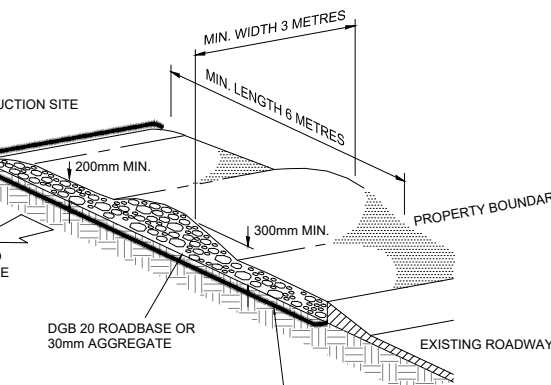
SEDIMENT FENCE



**SECTION DETAIL**

**CONSTRUCTION NOTES**

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE.
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMPS IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.



STABILISED SITE ACCESS

GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS.

GEOFABRIC MAY BE A WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N



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EROSION AND SEDIMENT CONTROL DETAILS

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