

**STORMWATER PHILOSOPHY**

- ALL ROOFWATER IS DIRECTED TO 2 X 4000L ABOVE GROUND TANKS MADE UP OF 2500L OSD & 1500L RAINWATER. THE STORED RAINWATER WILL BE REUSED INTERNALLY.
- OVERFLOW FROM THE RAINWATER TANKS WILL BE DIRECTED TO STORMWATER PITS. A LOW FLOW PIPE WILL RESTRICT DISCHARGE FROM THE TANK TO 0.9 L/s. THE SIZE OF THE TANK AND ALLOWABLE DISCHARGE HAS BEEN PROPORTIONED TO THE IMPERVIOUS PERCENTAGE OF THE ROOF AREA FOR EACH LOT.
- REMAINING IMPERVIOUS AREAS ON THE HIGH SIDE OF THE DRIVEWAY WILL SHEET FLOW TO THE ROAD & CAPTURED IN SURFACE INLET PITS. REMAINING IMPERVIOUS AREAS ON THE LOW SIDE OF THE DRIVEWAY WILL BE CAPTURED BY A GRATED DRAIN AND DIRECTED TO STORMWATER PITS AT THE REAR OF THE LOT.
- SUFFICIENT VOLUME HAS BEEN PROVIDED TO LIMIT THE POST-DEVELOPMENT DISCHARGE FROM ALL STORM EVENTS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT.
- DISCHARGE TO THE SURFACE INLET PITS IN ALL STORM EVENTS WILL BE LIMITED TO THE 1 IN 10 YEAR PRE-DEVELOPED FLOWS. STORM EVENTS GREATER THAN 1 IN 10 YEAR WILL BE SAFELY CONVEYED VIA SHEET FLOW DOWN THE PROPOSED DRIVEWAY FOR LOTS 1-4 & AS SHEET FLOW TO THE SOUTHERN BOUNDARY FOR LOTS 5-7.

**STORMWATER CALCULATIONS**

|                             |   |                        |
|-----------------------------|---|------------------------|
| SITE AREA                   | = | 4789.00 m <sup>2</sup> |
| ROOF AREA                   | = | 1610.10 m <sup>2</sup> |
| BYPASS AREA 1 DRIVEWAY AREA | = | 1593.50 m <sup>2</sup> |
| PERVIOUS AREA               | = | 432.76 m <sup>2</sup>  |
| IMPERVIOUS %                | = | 1160.74 m <sup>2</sup> |
| BYPASS AREA 2 DRIVEWAY AREA | = | 1587.66 m <sup>2</sup> |
| PERVIOUS AREA               | = | 546.00 m <sup>2</sup>  |
| IMPERVIOUS %                | = | 1041.66 m <sup>2</sup> |

**Onsite Detention Calculations (OSD)**

|                        |   |                               |
|------------------------|---|-------------------------------|
| Q <sub>PRE(10Y)</sub>  | = | C I A (t <sub>c</sub> = 5min) |
|                        | = | 0.4 x 162 x 4789              |
|                        | = | 86.22 L/s                     |
| Q <sub>PRE(100Y)</sub> | = | C I A (t <sub>c</sub> = 5min) |
|                        | = | 0.48 x 266 x 4789             |
|                        | = | 169.88 L/s                    |

ROOF WATER IS THE ONLY STORM WATER THAT WILL BE CAPTURED & STORED WITHIN THIS SITE. ALL OTHER FLOW WILL BE BYPASS FLOW. THE BYPASS FLOW WILL BE CONVEYED TO THE DRIVEWAY & DISCHARGED TO THE STREET OR THE FLOW WILL MAINTAIN PREDEVELOPMENT FLOW CONDITIONS.

|                                  |   |                               |
|----------------------------------|---|-------------------------------|
| Q <sub>BYPASS AREA 1 (10Y)</sub> | = | C I A (t <sub>c</sub> = 5min) |
|                                  | = | 0.54 x 162 x 1593.5           |
|                                  | = | 38.42 L/s                     |
| Q <sub>BYPASS AREA 2 (10Y)</sub> | = | C I A (t <sub>c</sub> = 5min) |
|                                  | = | 0.57 x 162 x 1587.66          |
|                                  | = | 40.87 L/s                     |
| Q <sub>BYPASS TOTAL (10Y)</sub>  | = | 38.42 + 40.87                 |
|                                  | = | 79.29 L/s                     |

THEREFORE THE ALLOWABLE DISCHARGE FROM THE SITE IN THE 10 YEAR STORM EVENT IS

|                              |   |   |
|------------------------------|---|---|
| Q <sub>ALLOWABLE (10Y)</sub> | = | Q <sub>PRE(10Y)</sub> - Q <sub>BYPASS TOTAL (10Y)</sub> |
|                              | = | 86.22 - 79.29   |
|                              | = | 6.93 L/s  |

EACH LOT WILL BE ABLE TO DISCHARGE AN EQUAL PORTION OF THIS (7 LOTS)

|                                      |   |                               |
|--------------------------------------|---|-------------------------------|
| Q <sub>ALLOWABLE PER LOT (10Y)</sub> | = | 0.99 L/s                      |
| Q <sub>BYPASS AREA 1 (100Y)</sub>    | = | C I A (t <sub>c</sub> = 5min) |
|                                      | = | 0.64 x 266 x 1593.5           |
|                                      | = | 75.71 L/s                     |
| Q <sub>BYPASS AREA 2 (100Y)</sub>    | = | C I A (t <sub>c</sub> = 5min) |
|                                      | = | 0.69 x 266 x 1587.66          |
|                                      | = | 80.52 L/s                     |
| Q <sub>BYPASS TOTAL (100Y)</sub>     | = | 75.71 + 80.52                 |
|                                      | = | 156.23 L/s                    |

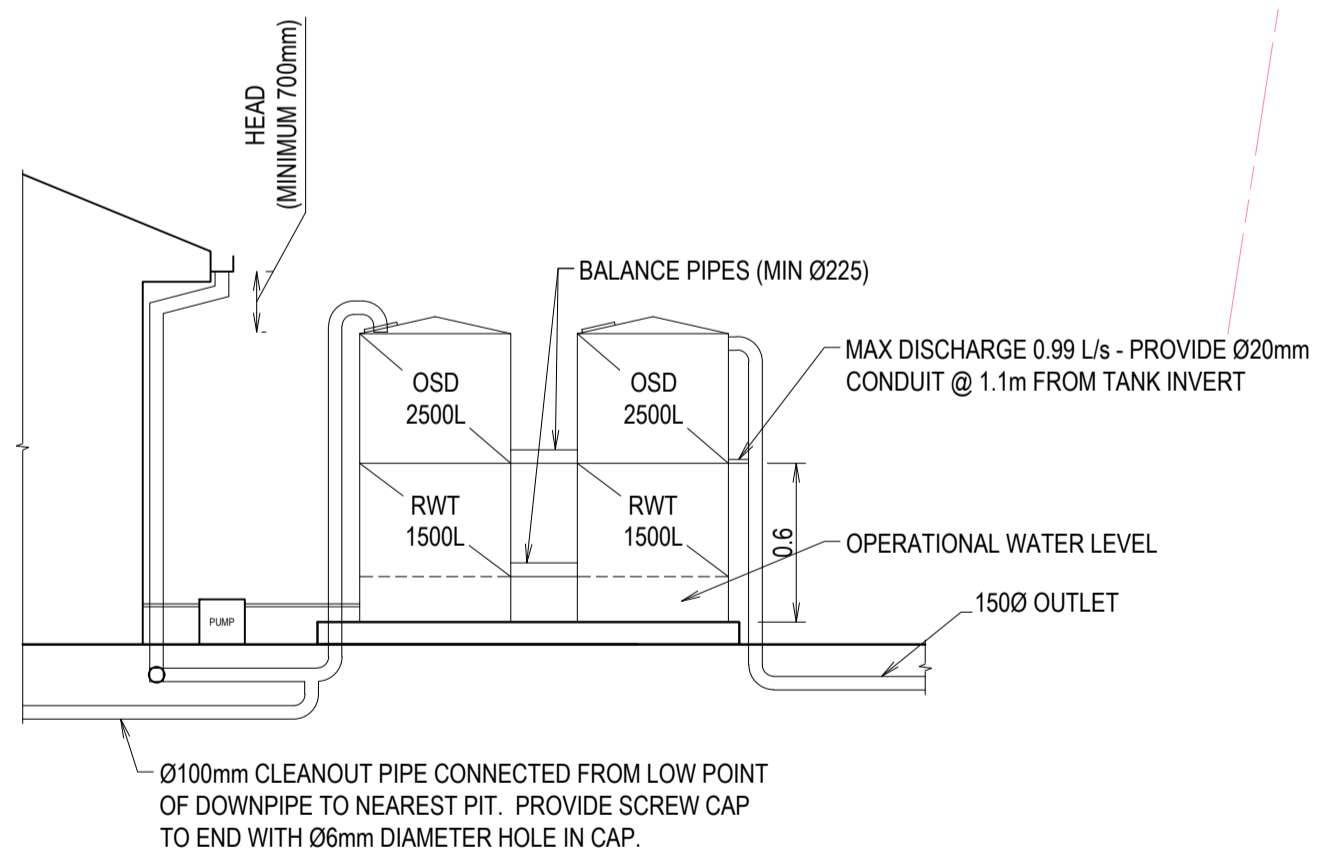
ALLOWABLE DISCHARGE<sub>(100Y)</sub> = 169.88 - 6.93 = 13.65 L/s

THE OSD STORAGE FOR EACH LOT IS DETERMINED BY THE 100 Yr STORM EVENT.

|                               |   |                               |
|-------------------------------|---|-------------------------------|
| Q <sub>ROOF AREA (100Y)</sub> | = | C I A (t <sub>c</sub> = 5min) |
|                               | = | 1 x 266 x 1610.10             |
|                               | = | 118.97 L/s                    |

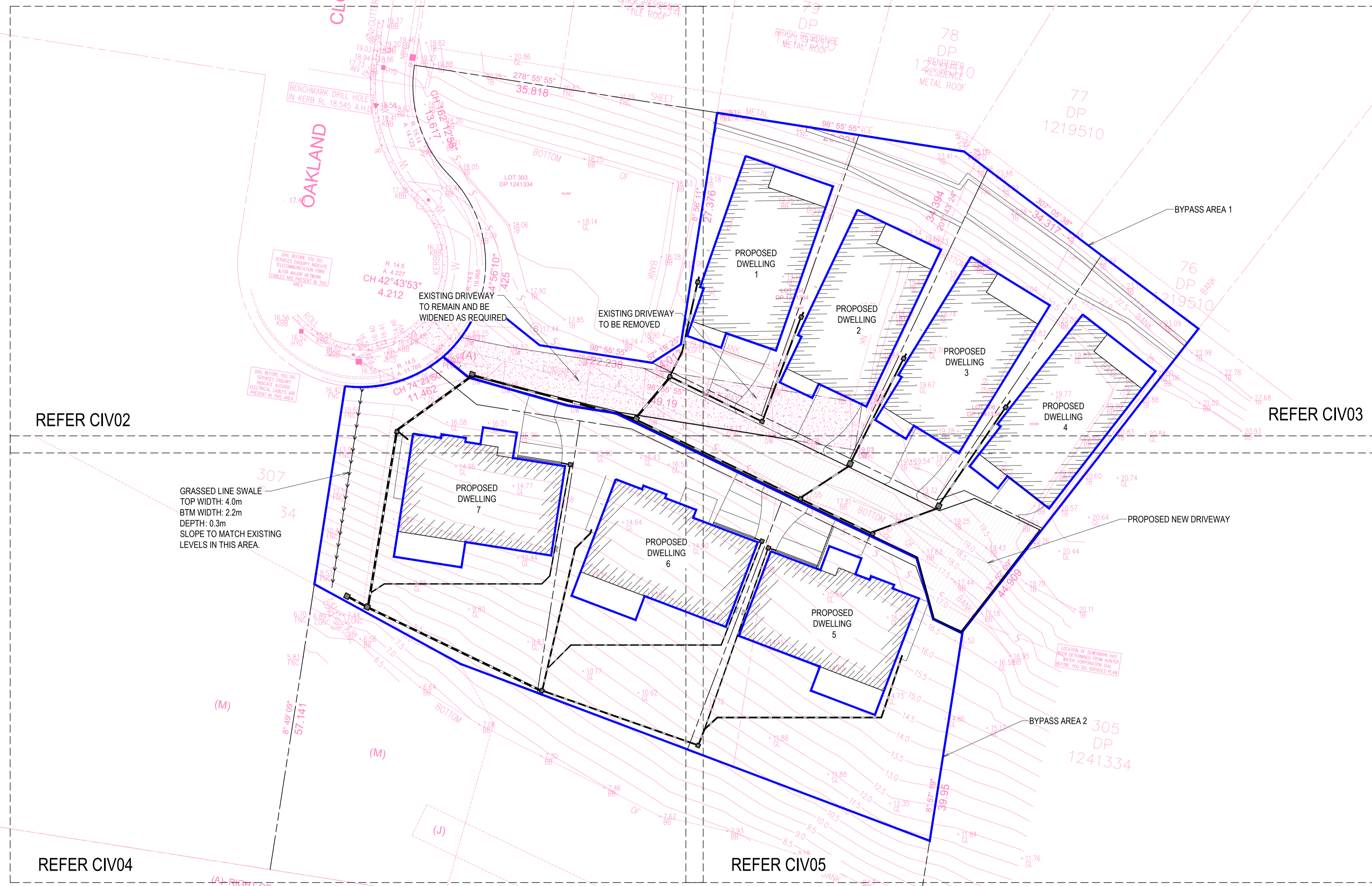
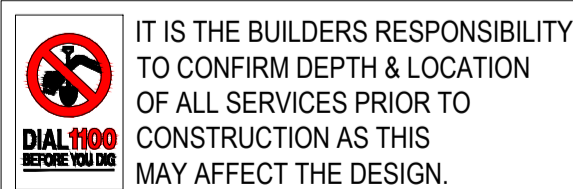
VOLUME FOR OSD = 118.97 - 6.93 (t<sub>c</sub> = 5min) = 112.04 L/s = 33.61 m<sup>3</sup>

VOLUME FOR OSD PER LOT (7 LOTS) = 4.8 m<sup>3</sup>



**RWT SCHEMATIC SECTION**  
NTS

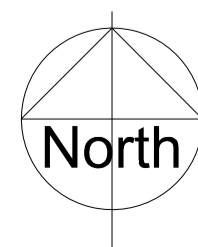
REFER TO HYDRAULIC ENGINEERS DRAWING FOR TANK DETAILS



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Mathew McLennans  
BEing (Civil) Hons MIE (Aust)

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OVERALL PLAN & CIVIL DETAILS  
80 (LOTS 304 & 306) OAKLANDS CLOSE,  
BOLWARRA  
PERCEPTION PLANNING

DRAWING STATUS

**NOT FOR CONSTRUCTION**

PROJECT REF No.  
210695

DRAWING No.  
CIV01

SHEET SIZE

**A1**

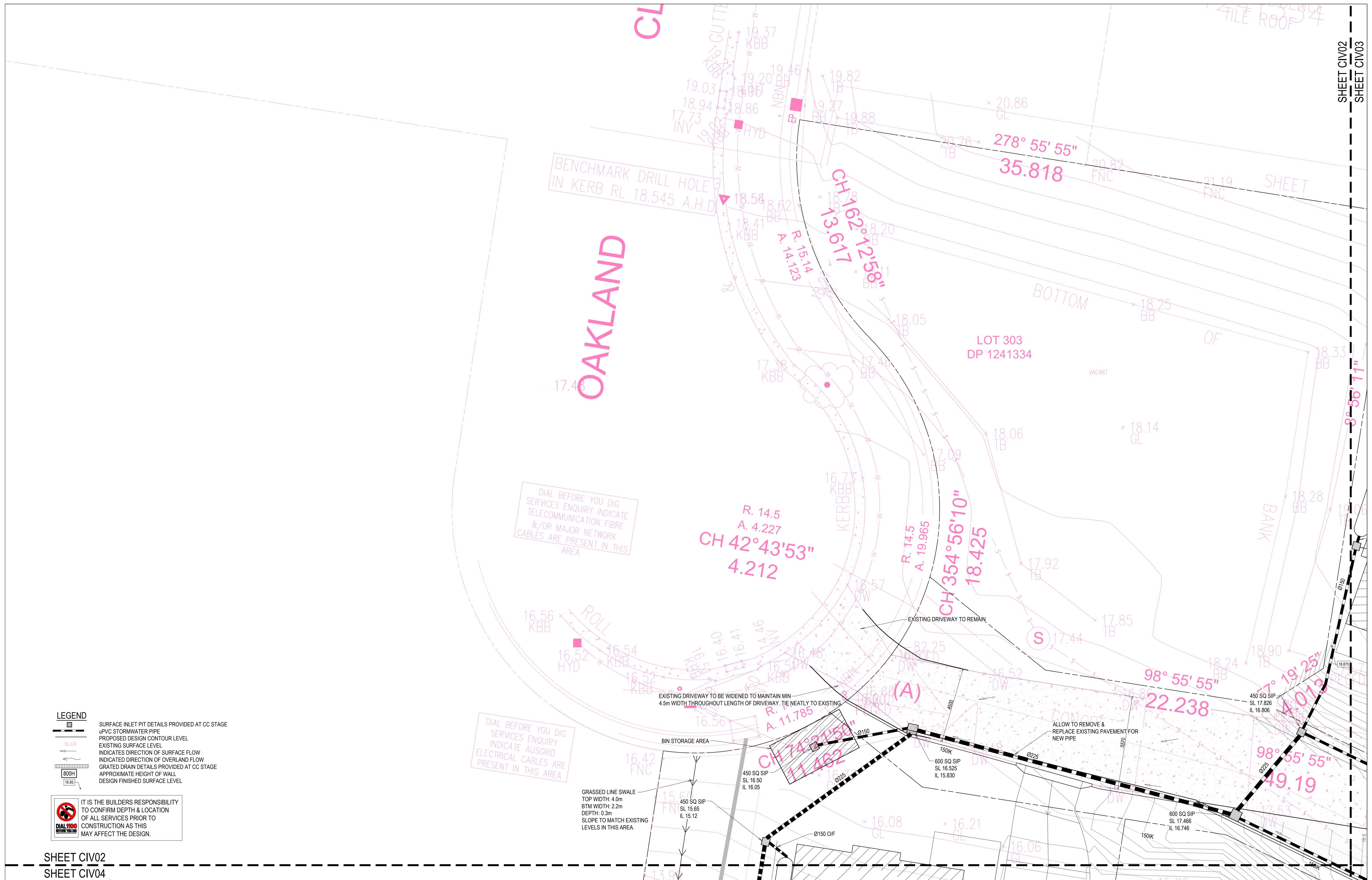
SCALE

1:300

REVISION

**G**





**LEGEND**

|  |  |
|--|--|
|  | SURFACE INLET PIT DETAILS PROVIDED AT CC STAGE |
|  | uPVC STORMWATER PIPE                           |
|  | PROPOSED DESIGN CONTOUR LEVEL                  |
|  | EXISTING SURFACE LEVEL                         |
|  | INDICATES DIRECTION OF SURFACE FLOW            |
|  | INDICATED DIRECTION OF OVERLAND FLOW           |
|  | GRATED DRAIN DETAILS PROVIDED AT CC STAGE      |
|  | APPROXIMATE HEIGHT OF WALL                     |
|  | DESIGN FINISHED SURFACE LEVEL                  |

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DIAL BEFORE YOU DIG SERVICES ENQUIRY INDICATE AUSGRID ELECTRICAL CABLES ARE PRESENT IN THIS AREA

DIAL BEFORE YOU DIG SERVICES ENQUIRY INDICATE TELECOMMUNICATION FIBRE &/OR MAJOR NETWORK CABLES ARE PRESENT IN THIS AREA

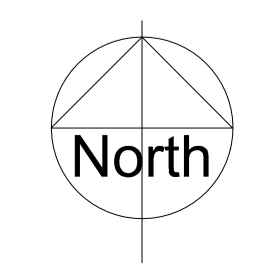
SHEET CIV02  
SHEET CIV04

| REV | DATE     | DRN  | CHK  | APP  | DRAWING STATUS       |
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| G   | 09.12.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| F   | 07.12.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| E   | 08.11.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| D   | 20.08.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| C   | 07.06.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| B   | 10.05.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| A   | 28.04.21 | J.T. | M.M. | M.M. | ISSUED FOR DA        |

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Mathew McNamara  
BEng (Civil) Hon MIE (Aust)

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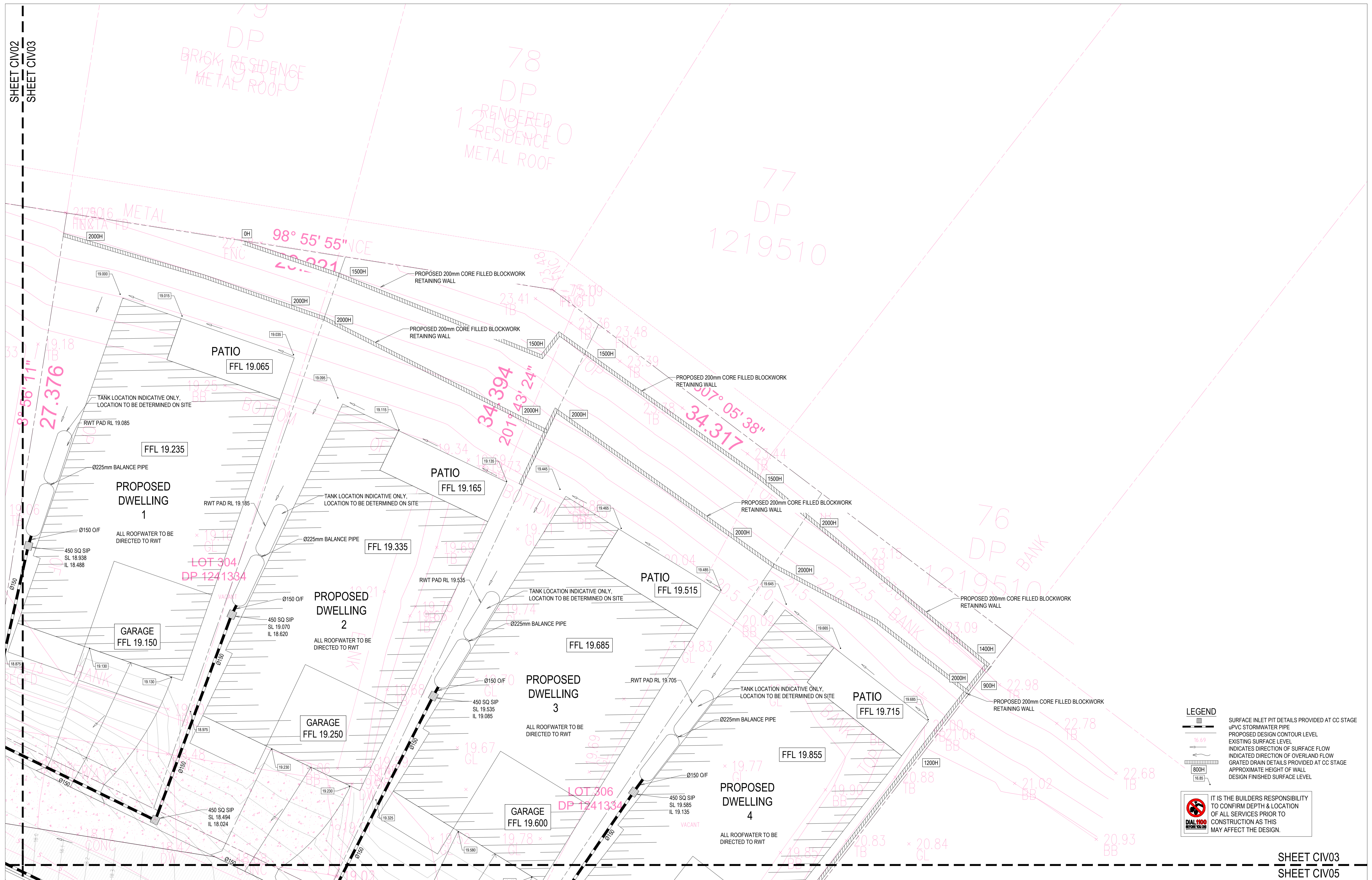
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0402 915 549  
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STORMWATER MANAGEMENT PLAN - SHEET 1  
80 (LOTS 304 & 306) OAKLANDS CLOSE,  
BOLWARRA  
PERCEPTION PLANNING

|                             |             |            |
|-----------------------------|-------------|------------|
| DRAWING STATUS              |             | SHEET SIZE |
| <b>NOT FOR CONSTRUCTION</b> |             | <b>A1</b>  |
| PROJECT REF No.             | DRAWING No. | SCALE      |
| 210695                      | CIV02       | 1:100      |
|                             |             | REVISION   |
|                             |             | G          |





**LEGEND**

- SURFACE INLET PIT DETAILS PROVIDED AT CC STAGE
- pPVC STORMWATER PIPE
- PROPOSED DESIGN CONTOUR LEVEL
- EXISTING SURFACE LEVEL
- INDICATES DIRECTION OF SURFACE FLOW
- INDICATED DIRECTION OF OVERLAND FLOW
- GRATED DRAIN DETAILS PROVIDED AT CC STAGE
- APPROXIMATE HEIGHT OF WALL
- DESIGN FINISHED SURFACE LEVEL

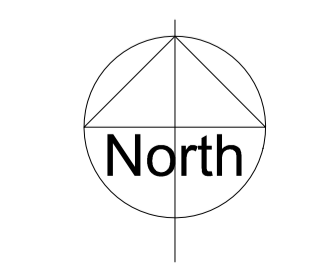
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| REV | DATE     | DRN  | CHK  | APP  | DRAWING STATUS       |
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| F   | 07.12.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| E   | 08.11.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| D   | 20.08.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| C   | 07.06.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| B   | 10.05.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| A   | 28.04.21 | J.T. | M.M. | M.M. | ISSUED FOR DA        |

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STORMWATER MANAGEMENT PLAN - SHEET 2  
80 (LOTS 304 & 306) OAKLANDS CLOSE,  
BOLWARRA  
PERCEPTION PLANNING

|                             |             |            |
|-----------------------------|-------------|------------|
| DRAWING STATUS              |             | SHEET SIZE |
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| PROJECT REF No.             | DRAWING No. | SCALE      |
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| REVISION                    |             | REVISION   |
|                             |             | F          |



307  
DP  
124133

(M)

(M)

(J)

8° 49' 09"  
57.141

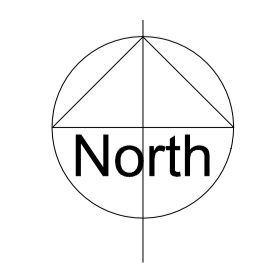
**LEGEND**

|  |  |
|--|--|
|  | SURFACE INLET PIT DETAILS PROVIDED AT CC STAGE |
|  | PVC STORMWATER PIPE                            |
|  | PROPOSED DESIGN CONTOUR LEVEL                  |
|  | EXISTING SURFACE LEVEL                         |
|  | INDICATES DIRECTION OF SURFACE FLOW            |
|  | INDICATED DIRECTION OF OVERLAND FLOW           |
|  | GRATED DRAIN DETAILS PROVIDED AT CC STAGE      |
|  | APPROXIMATE HEIGHT OF WALL                     |
|  | DESIGN FINISHED SURFACE LEVEL                  |

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STORMWATER MANAGEMENT PLAN - SHEET 3  
80 (LOTS 304 & 306) OAKLANDS CLOSE,  
BOLWARRA  
PERCEPTION PLANNING

|                             |             |            |
|-----------------------------|-------------|------------|
| DRAWING STATUS              |             | SHEET SIZE |
| <b>NOT FOR CONSTRUCTION</b> |             | <b>A1</b>  |
| PROJECT REF No.             | DRAWING No. | SCALE      |
| 210695                      | CIV04       | 1:100      |
| REVISION                    |             | REVISION   |
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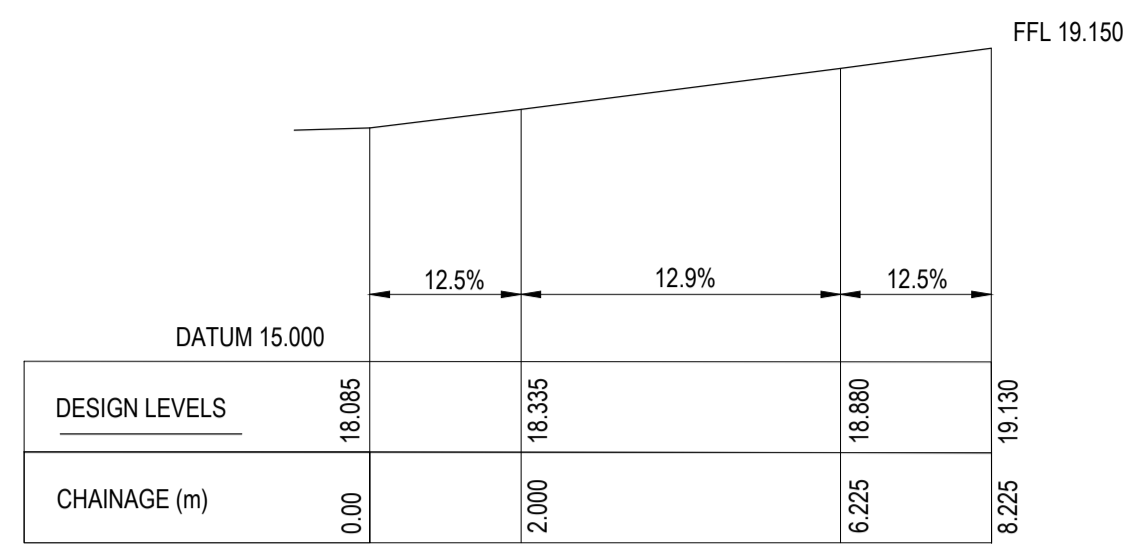
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| E   | 08.11.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| D   | 20.08.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| C   | 07.06.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| B   | 10.05.21 | J.T. | M.M. | M.M. | REVISED ISSUE FOR DA |
| A   | 28.04.21 | J.T. | M.M. | M.M. | ISSUED FOR DA        |

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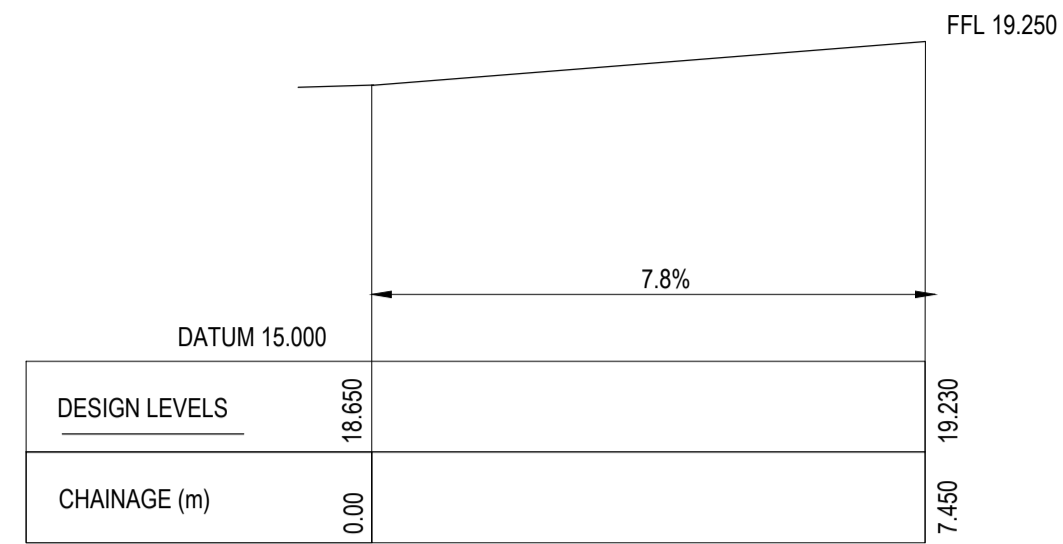




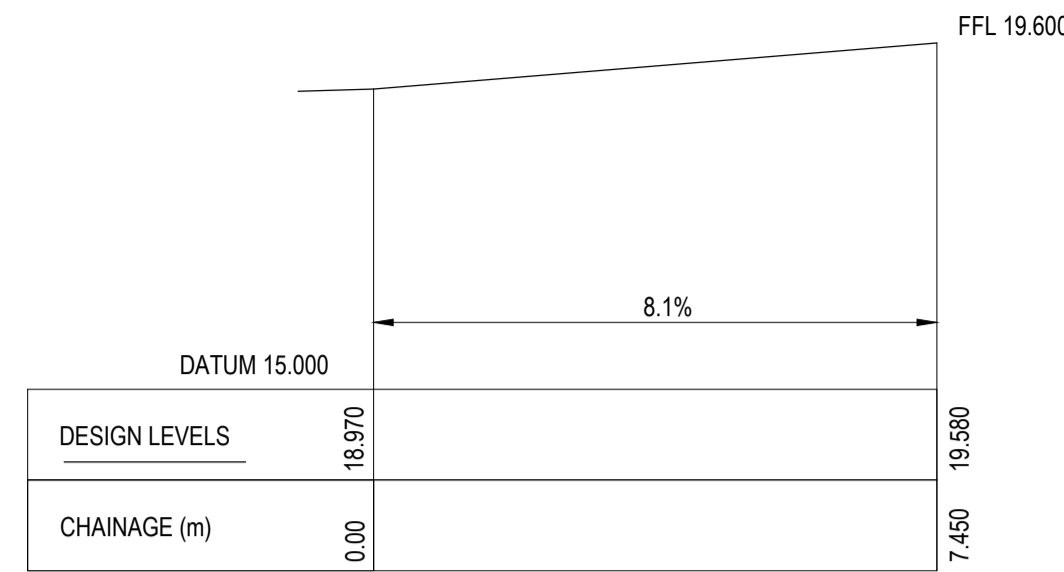




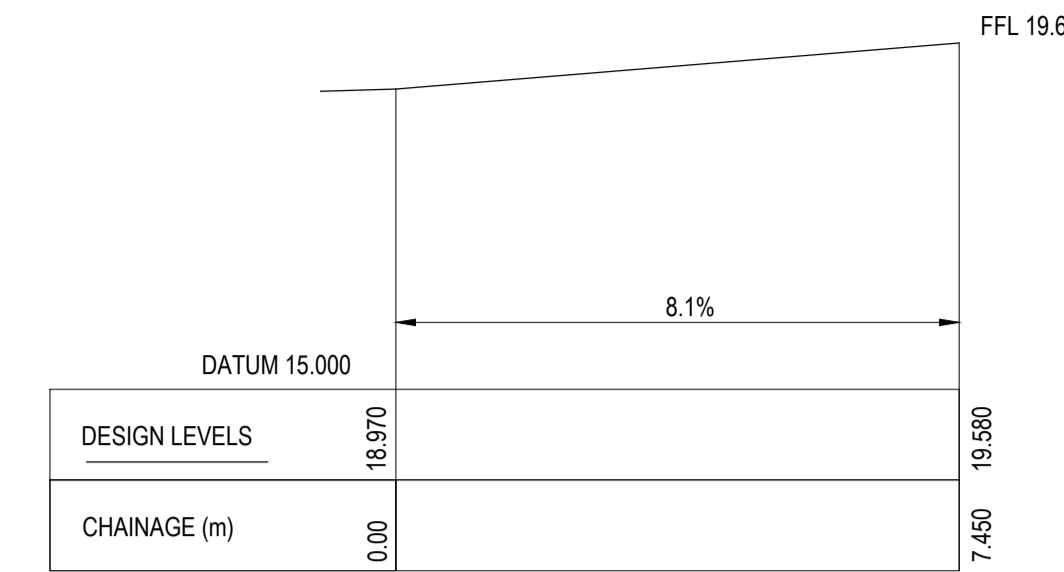
ACCESS DRIVEWAY DWELLING 1 LONGITUDINAL SECTION  
VERT 1:100  
HORIZ 1:100



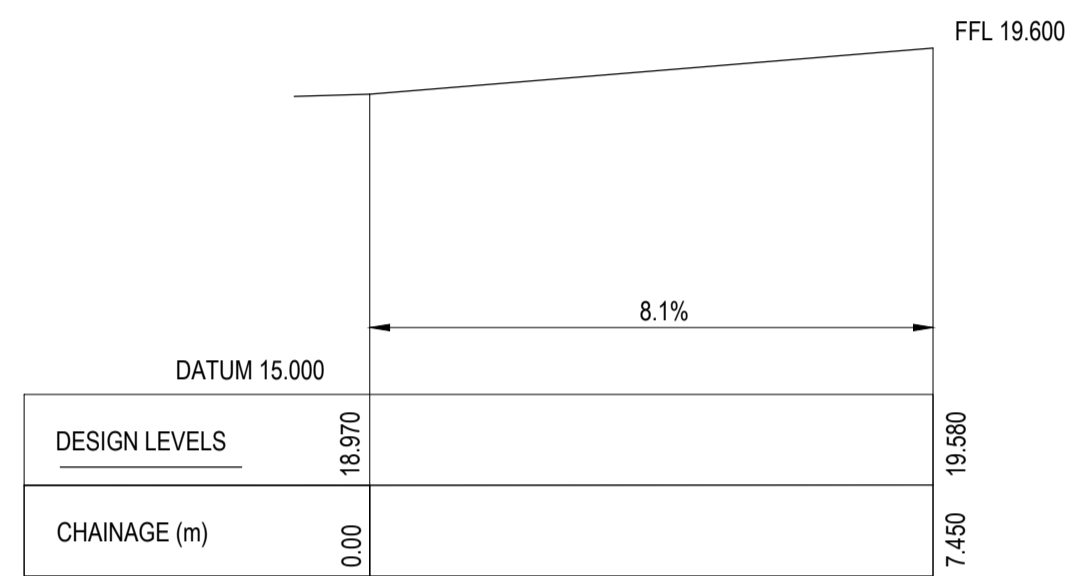
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VERT 1:100  
HORIZ 1:100



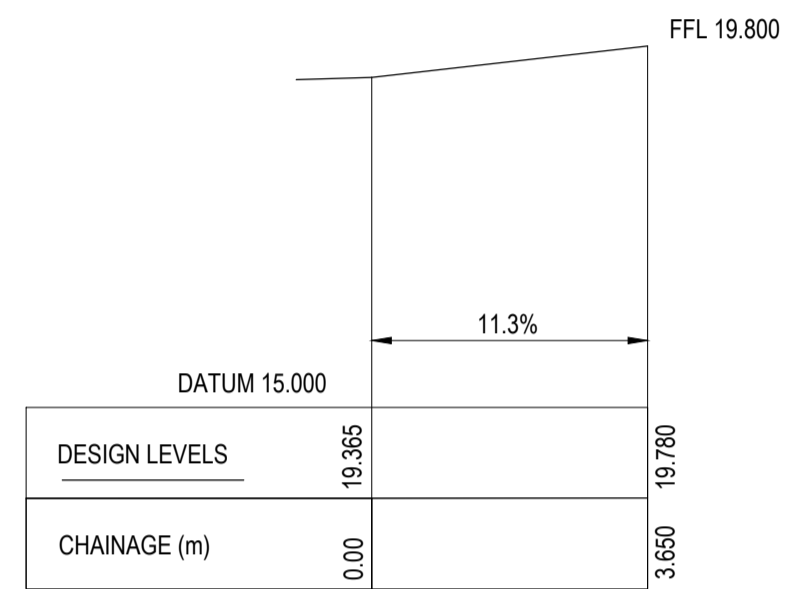
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VERT 1:100  
HORIZ 1:100



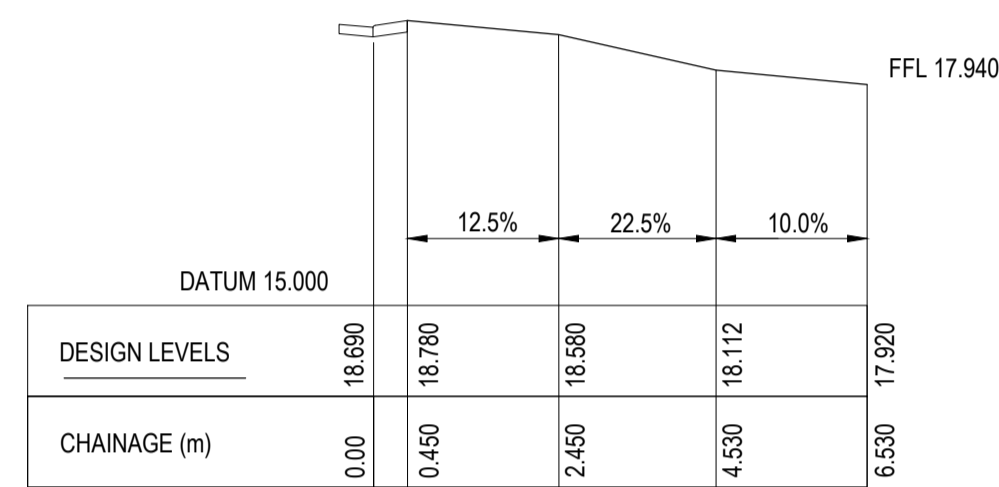
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VERT 1:100  
HORIZ 1:100



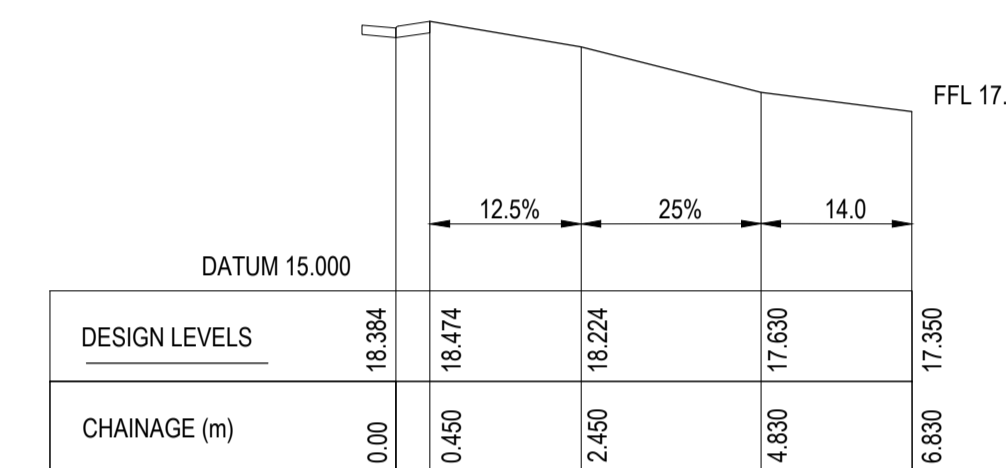
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VERT 1:100  
HORIZ 1:100



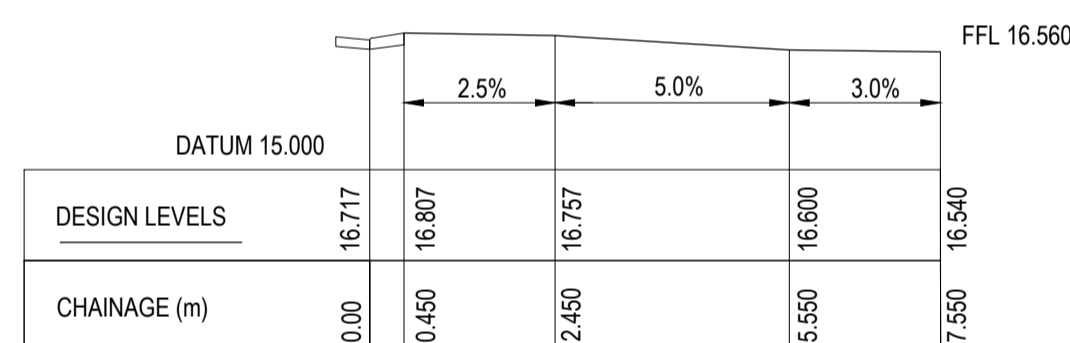
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VERT 1:100  
HORIZ 1:100



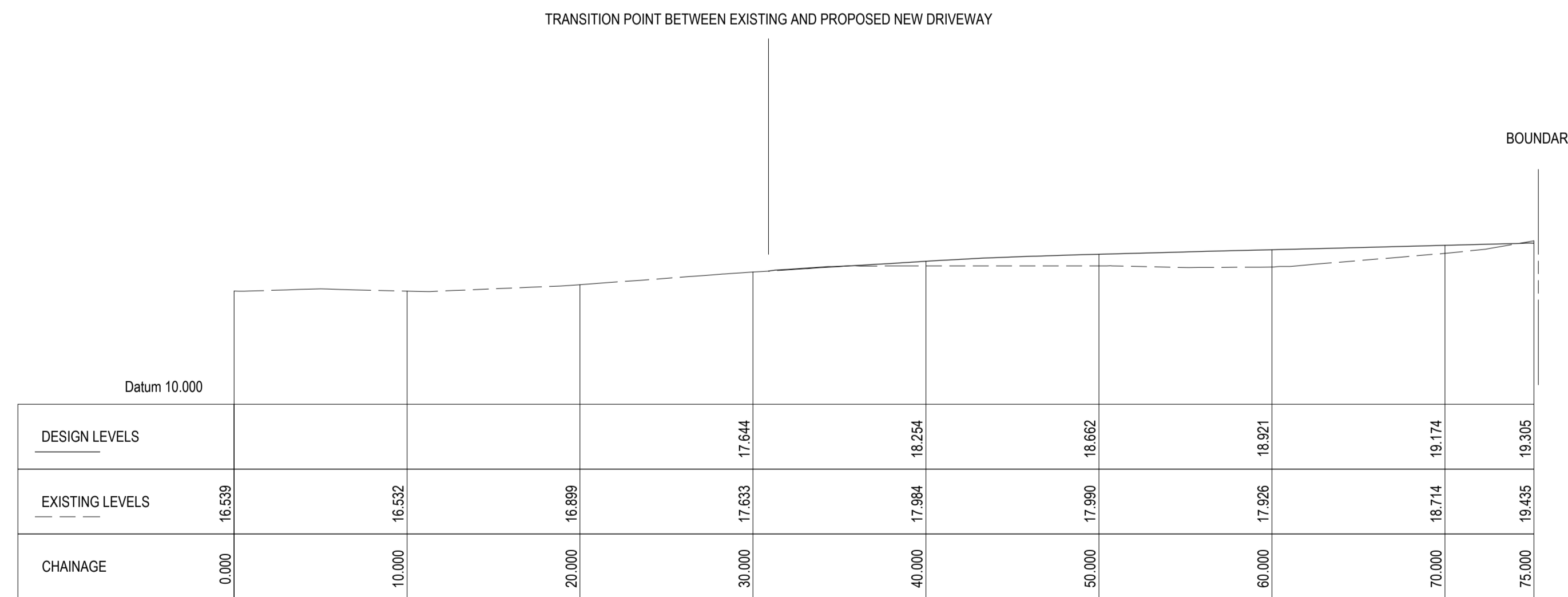
ACCESS DRIVEWAY DWELLING 5 LONGITUDINAL SECTION  
VERT 1:100  
HORIZ 1:100



ACCESS DRIVEWAY DWELLING 6 LONGITUDINAL SECTION  
VERT 1:100  
HORIZ 1:100



ACCESS DRIVEWAY DWELLING 7 LONGITUDINAL SECTION  
VERT 1:100  
HORIZ 1:100

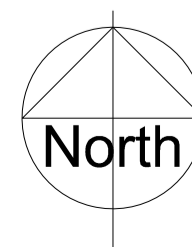


COMMUNITY DRIVEWAY LONGITUDINAL SECTION  
VERT 1:250  
HORIZ 1:250

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DRIVEWAY LONG SECTIONS  
80 (LOTS 304 & 306) OAKLANDS CLOSE,  
BOLWARRA  
PERCEPTION PLANNING

DRAWING STATUS

NOT FOR CONSTRUCTION

PROJECT REF No.  
210695

DRAWING No.  
CIV06

SHEET SIZE

A1

SCALE

1:100

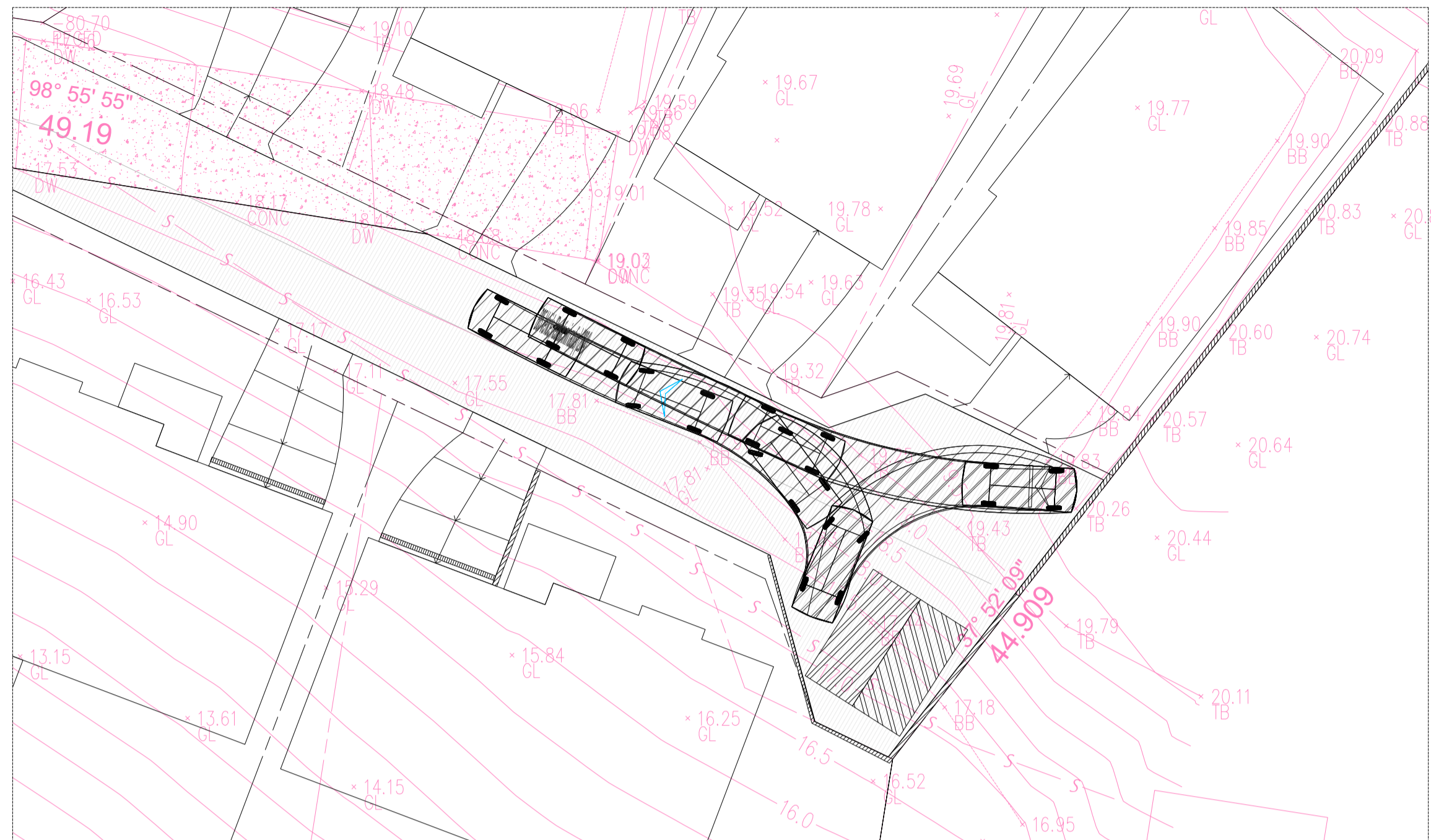
REVISION

B

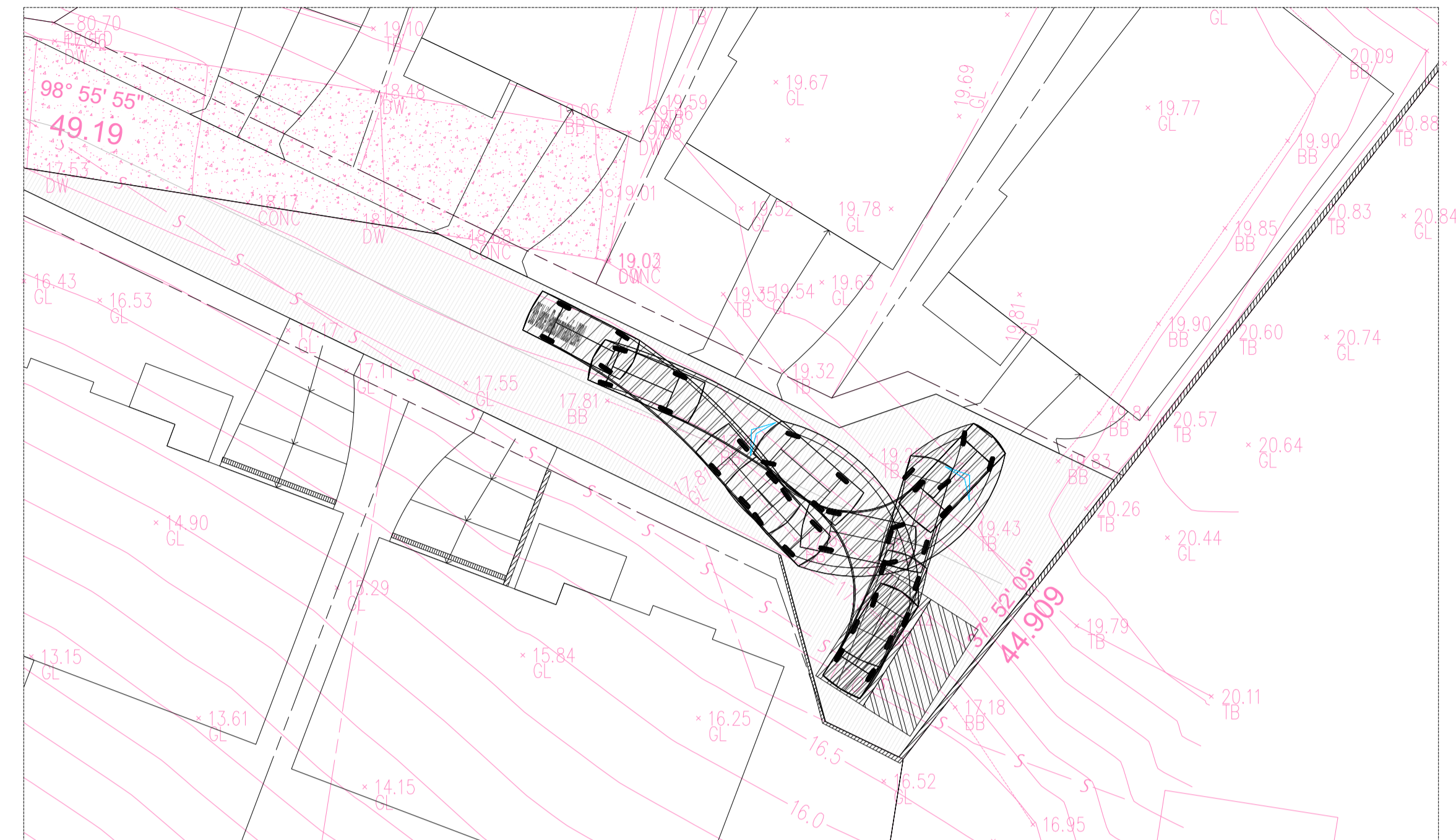
REVISIONS

|     |          |      |      |      |                |
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|     |          |      |      |      |                |
|     |          |      |      |      |                |
|     |          |      |      |      |                |
|     |          |      |      |      |                |
| B   | 08.11.21 | J.T. | M.M. | M.M. | ISSUED FOR DA  |
| A   | 20.08.21 | J.T. | M.M. | M.M. | ISSUED FOR DA  |
| REV | DATE     | DRN  | CHK  | APP  | DRAWING STATUS |

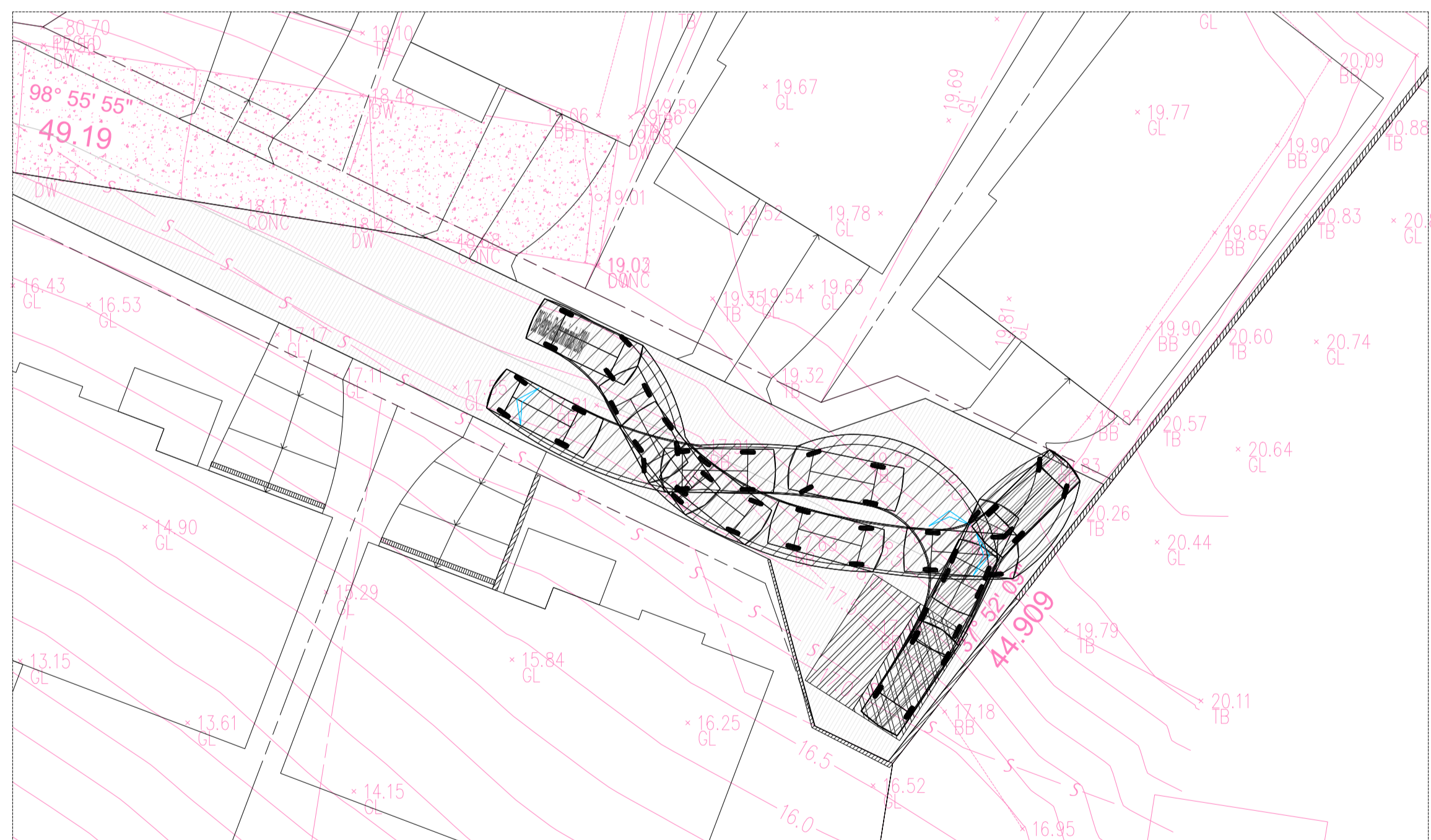




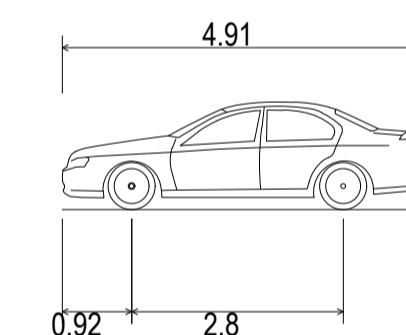
**B85 TURNING PATH - VEHICLE ENTER/EXIT**  
1:200



**B85 TURNING PATH - VISITOR PARK 1**  
1:200



**B85 TURNING PATH - VISITOR PARK 2**  
1:200



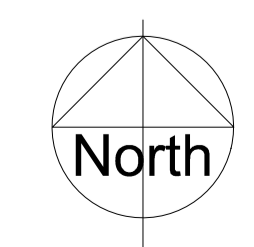
**B85 Vehicle (Realistic min radius) (2004)**  
 Overall Length 4.910m  
 Overall Width 1.870m  
 Overall Body Height 1.421m  
 Min Body Ground Clearance 0.159m  
 Track Width 1.770m  
 Lock-to-lock time 4.00s  
 Curb to Curb Turning Radius 5.750m

| REV | DATE     | DRN  | CHK  | APP  | DRAWING STATUS   |
|-----|----------|------|------|------|------------------|
| B   | 08.11.21 | J.T. | M.M. | M.M. | RE-ISSUED FOR DA |
| A   | 20.08.21 | J.T. | M.M. | M.M. | ISSUED FOR DA    |

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**B85 DRIVEWAY SWEEP PATHS**  
 80 (LOTS 304 & 306) OAKLANDS CLOSE,  
 BOLWARRA  
 PERCEPTION PLANNING

| DRAWING STATUS              |  | SHEET SIZE        |
|-----------------------------|--|-------------------|
| <b>NOT FOR CONSTRUCTION</b> |  | <b>A1</b>         |
| PROJECT REF No. 210695      |  | SCALE 1:200       |
| DRAWING No. CIV07           |  | REVISION <b>B</b> |