# SHIRE OF DENMARK

# STANDARD DRAWINGS

Compiled by
ENGINEERING SERVICES

ISSUED - DECEMBER 2006
REVISION - NIL

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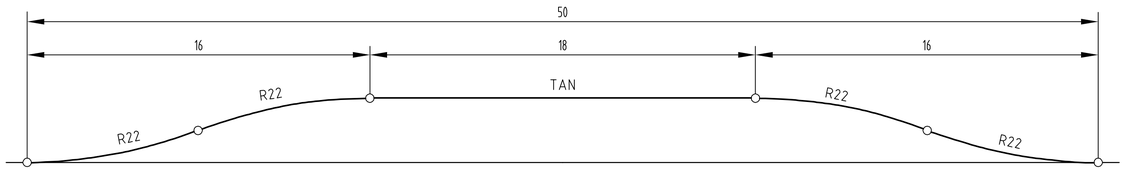
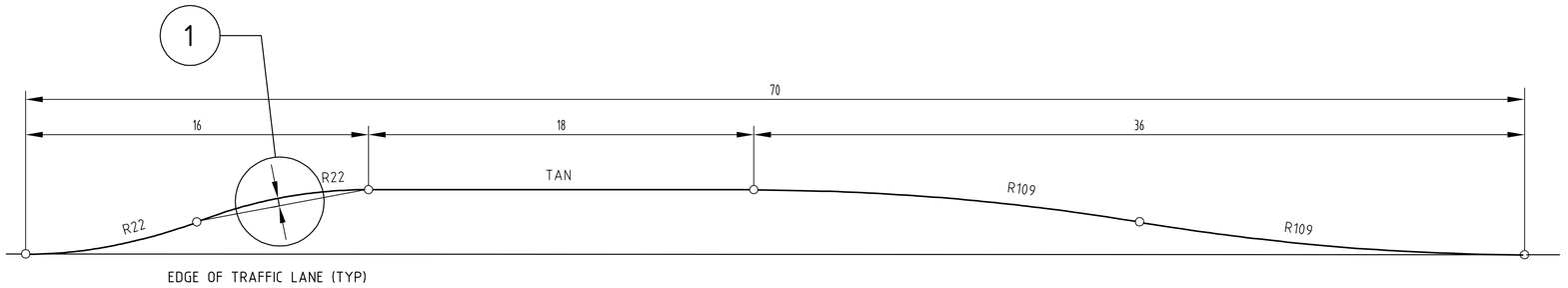
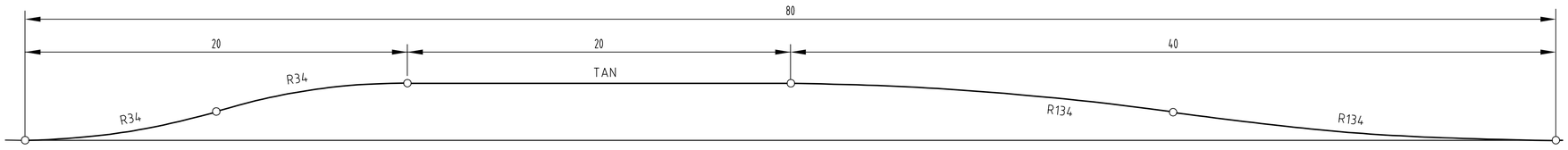



## ABSOLUTE MINIMUM LAYOUT
(SEE NOTE 2)

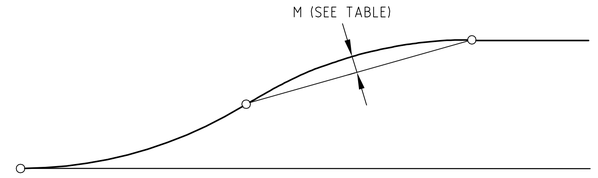



## MINIMUM LAYOUT
(SEE NOTE 2)



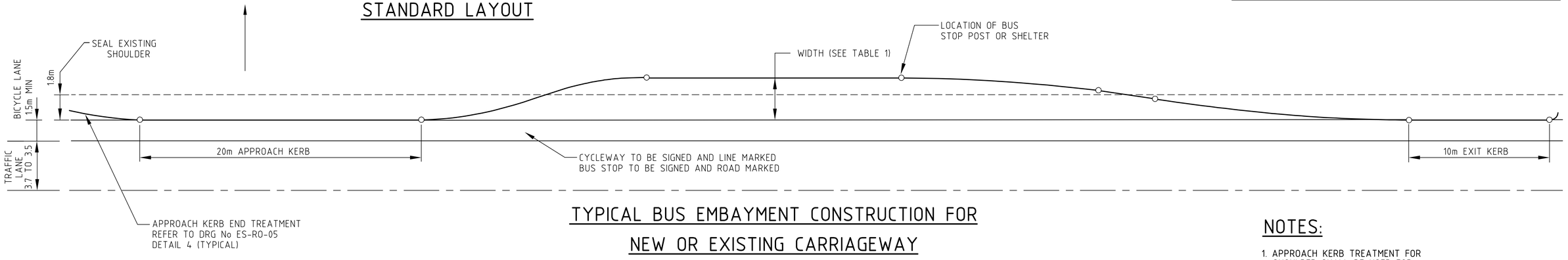

## TABLE 1

| WIDTH / TYPE | ENTRY | | | | EXIT | | | |
|---|---|---|---|---|---|---|---|---|
| | 3.0 | | 2.5 (SEE NOTE 3) | | 3.0 | | 2.5 (SEE NOTE 3) | |
| | R | M | R | M | R | M | R | M |
| STANDARD | 34 | 0.38 | 41 | 0.31 | 134 | 0.38 | 161 | 0.31 |
| MINIMUM | 22 | 0.38 | 26 | 0.31 | 109 | 0.38 | 130 | 0.31 |
| ABSOLUTE MINIMUM | 22 | 0.38 | 26 | 0.31 | 22 | 0.38 | 26 | 0.31 |




## DETAIL 1 - ARC TO CHORD DISTANCE

## STANDARD LAYOUT




## TYPICAL BUS EMBAYMENT CONSTRUCTION FOR NEW OR EXISTING CARRIAGEWAY

## NOTES:

1. APPROACH KERB TREATMENT FOR SHOULDER SHALL BE USED FOR NEW AND EXISTING SHOULDERS.
2. MINIMUM AND ABSOLUTE MINIMUM BUS EMBAYMENTS SHALL ONLY BE USED WITH ENGINEERING SERVICES APPROVAL.
3. 2.5m WIDE BUS EMBAYMENTS SHALL ONLY BE USED WITH ENGINEERING SERVICES APPROVAL.
4. BUS EMBAYMENT AND CYCLEWAY MUST BE LINEMARKED AND SIGNED TO AUSTROADS STANDARDS.

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

| | |
|---|---|
| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

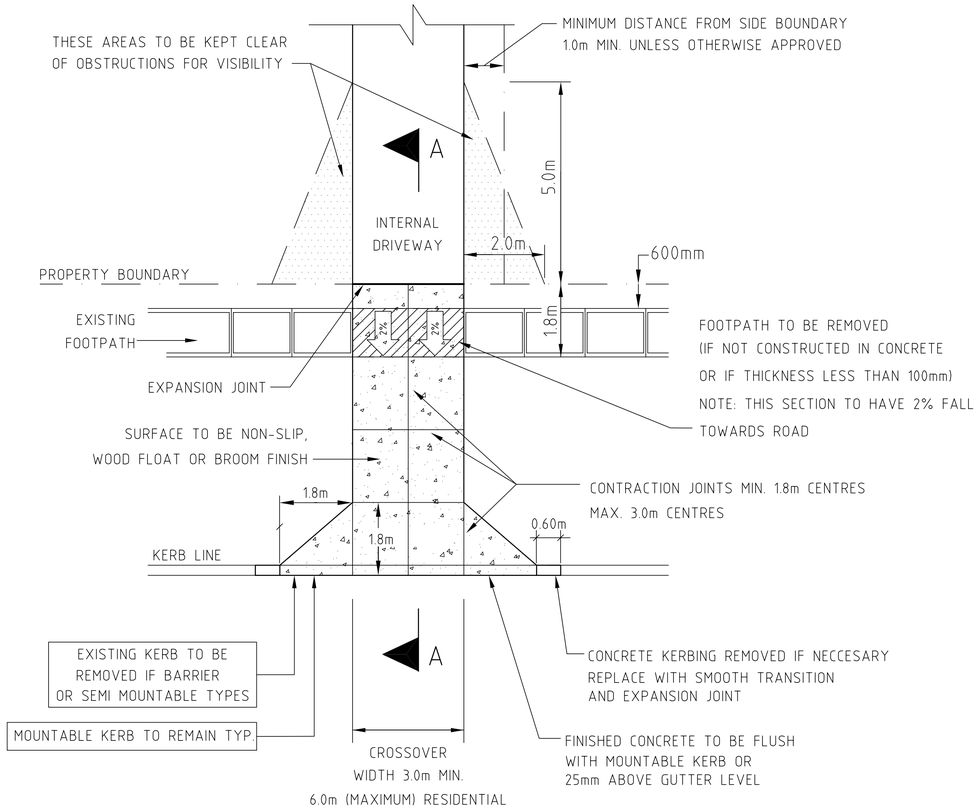
| | | |
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

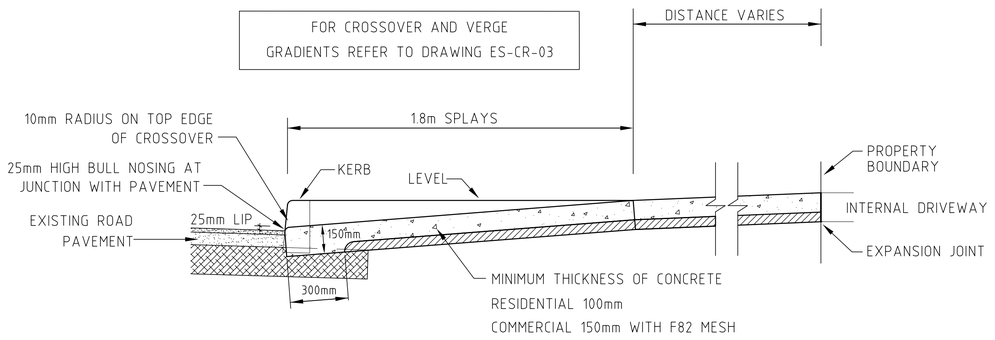
# BUS EMBAYMENT DETAILS

SHEET OF
DRAWING No. ES-BU-01
Job No.

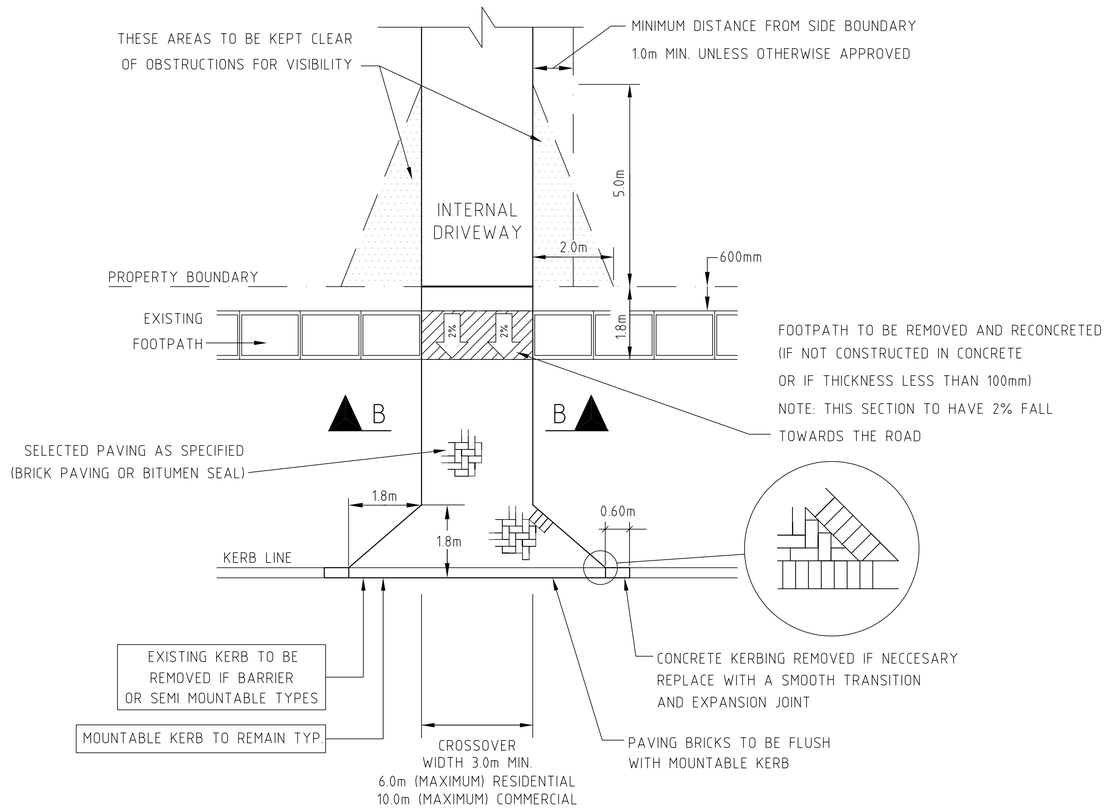
A 1



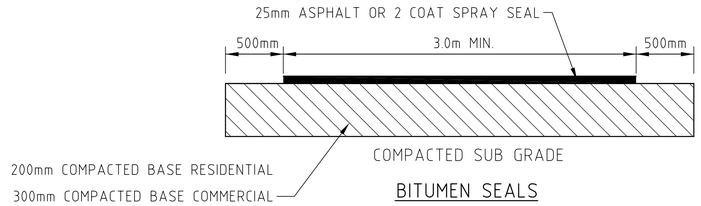

## CONCRETE CROSSOVER PLAN

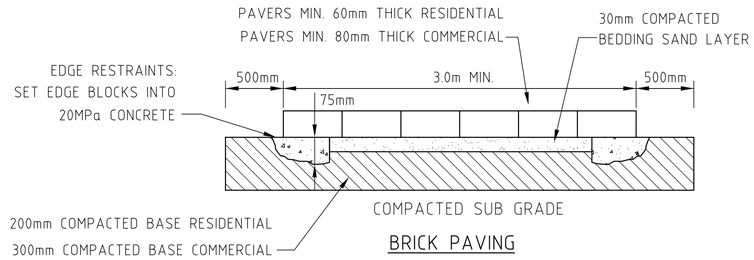



## SECTION A - A




## BITUMEN SEAL OR BRICK PAVED CROSSOVER PLAN




## SECTION B - B

## NOTES

1. ALL CROSSOVERS SHALL BE AT RIGHT ANGLES TO THE KERB & BOUNDARY UNLESS APPROVED OTHERWISE.
2. SHOULD ANY TREE, POWER POLE, SIGN, PIT, MANHOLE OR ANY OTHER OBSTRUCTION BE LOCATED ON THE PROPOSED ALIGNMENT OF THE CROSSOVER THE APPLICANT SHALL BE LIABLE FOR THE COSTS ASSOCIATED WITH THE REMOVAL OR ALTERATION OF THE ITEM. ANY REMOVAL OR ALTERATION REQUIRES PRIOR APPROVAL OF COUNCIL.
3. IF CONSIDERED NECESSARY, TRENCH GRATING & SOAK WELL SHALL BE CONSTRUCTED BY THE APPLICANT TO CUT OFF WATER ENTERING THE PROPERTY, OR ENTERING THE ROAD FROM INTERNAL DRIVEWAYS.
4. VEHICLE CROSSOVERS ABUTTING SOUTH COAST HIGHWAY AND MT BARKER ROAD SHALL ALSO BE SUBJECT TO APPROVAL BY MAIN ROADS WA.
5. FOR CULVERT INSTALLATIONS REFER TO DRG ES-CR-04.
6. FOR CROSSOVER LAYOUTS IN CUL-DE-SACS & APPROVED BRICK PAVING PATTERNS REFER TO DRG ES-CR-02.
7. FOR KERB DETAILS REFER TO DWG ES-RO-09.
7. FOR CROSSOVER GRADIENTS REFER TO DWG ES-CR-03.

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

| | |
|---|---|
| Tax Sheet | |
| Survey No | |
| F'B | p |
| File No | |

Shire of Denmark

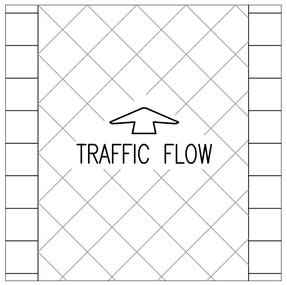
| | | |
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

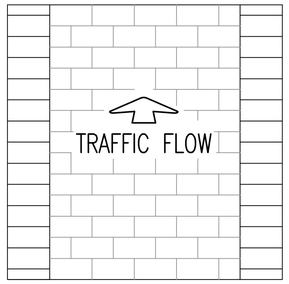
# RESIDENTIAL CROSSOVER TYPICAL PLANS AND SECTIONS

SHEET OF
DRAWING No. ES-CR-01
Job No.

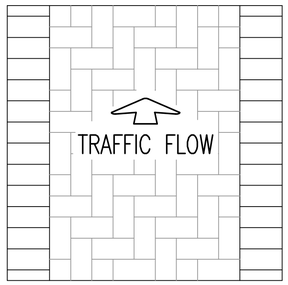
A
1



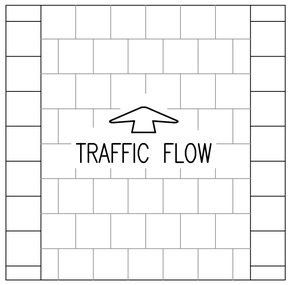

45 DEGREE DIAMOND
(190 x 190mm BLOCKS)



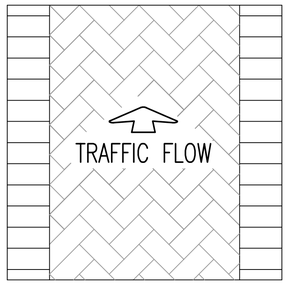

STRETCHER BOND (RECTANGULAR)
(230 x 115mm STANDARD)



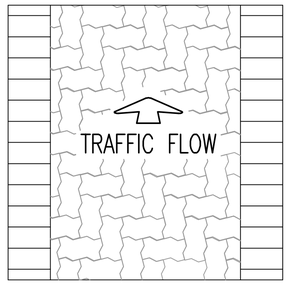

90 DEGREE HERRINGBONE
(230 x 115mm STANDARD
& 230 x 152mm PAVERS)



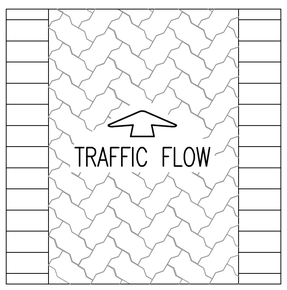

STRETCHER BOND (BLOCKS)
(190 x 190mm BLOCKS)




45 DEGREE HERRINGBONE
(230 x 115mm STANDARD
& 230 x 152mm PAVERS)



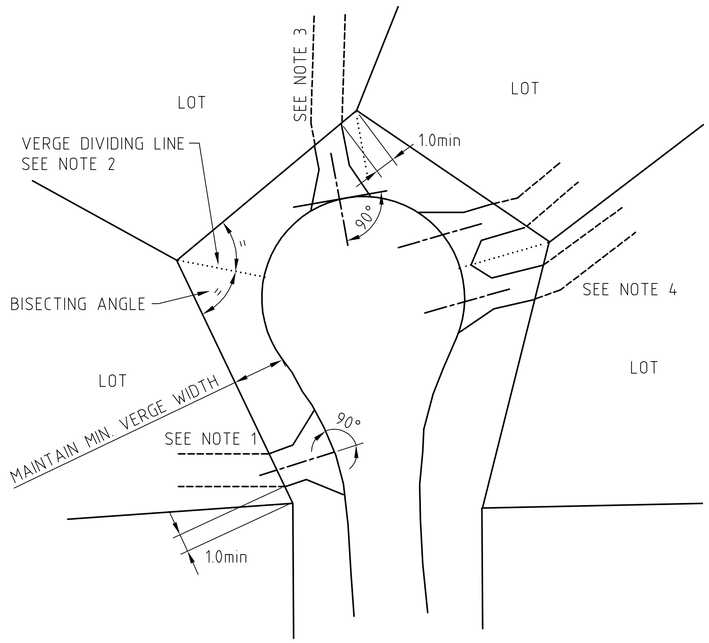

90 DEGREE HERRINGBONE
(230 x 115mm INTERLOCK)




45 DEGREE HERRINGBONE
(230 x 115mm INTERLOCK)

RESIDENTIAL BRICK PAVED VEHICLE CROSSING

## APPROVED LAYING PATTERNS




MIN. RADIUS 9m

## RESIDENTIAL CUL-DE-SAC HEAD

## LOCATION OF CROSSOVER IN CUL-DE-SACS

1 CROSSOVER TO BE INSTALLED AT APPROXIMATELY 90° TO THE KERB AND TO BE A MINIMUM OF 1.0 METRE FROM THE BOUNDARY, UNLESS APPROVED OTHERWISE.

2 DIVIDING THE VERGE BETWEEN NEIGHBOURING PROPERTIES IS ACHIEVED BY BISECTING THE ANGLE OF THE TWO FRONT BOUNDARIES.

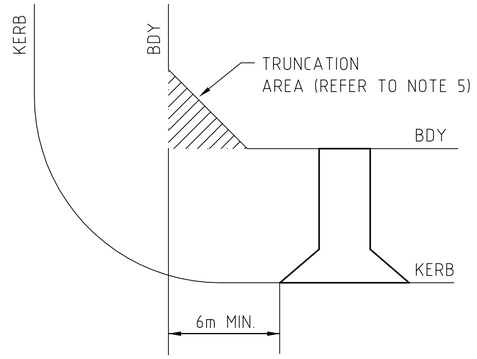
3 CROSSOVER MAY ENCROACH THE VERGE ADJACENT TO NEIGHBOURING PROPERTY.

4 CROSSOVERS MAY INTERSECT WHEN THEY ARE CONSTRUCTED ALONG THE SAME SIDE BOUNDARY. 90° RULE NOT ENFORCED IN FAVOUR OF CROSSOVERS PARALLEL TO VERGE DIVIDING LINE TO GIVE BEST ACCESS TO EACH LOT.

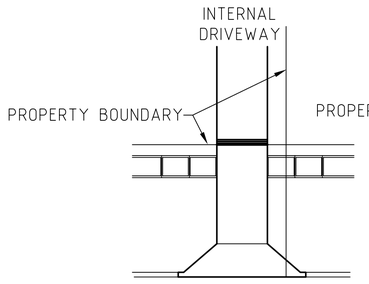
## LOCATION OF CROSSOVER AT INTERSECTIONS:

5 CROSSOVERS NOT PERMITTED WITHIN THE LOT TRUNCATION AREA.

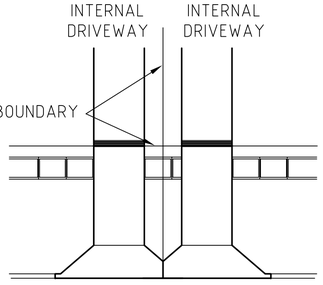
6 CROSSOVERS SHOULD BE LOCATED IN A POSITION TO AVOID TRAFFIC ISLANDS.
REMOVAL OR ALTERATION WILL NOT BE CONSIDERED.




## LOCATION OF CROSSOVERS AT CORNER SITES




SINGLE CROSSOVER




ADJOINING CROSSOVERS

## LOCATION OF CROSSOVERS AT BOUNDARY

| Amendments | | | | | | |
|---|---|---|---|---|---|---|
| No | Date | REVISION | By | App'd | | |

| | |
|---|---|
| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

| | | |
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

# CROSSOVER LAYOUTS & APPROVED BRICK PAVING PATTERNS

| | |
|---|---|
| SHEET | OF |
| DRAWING No. | ES-CR-02 |
| Job No. | |

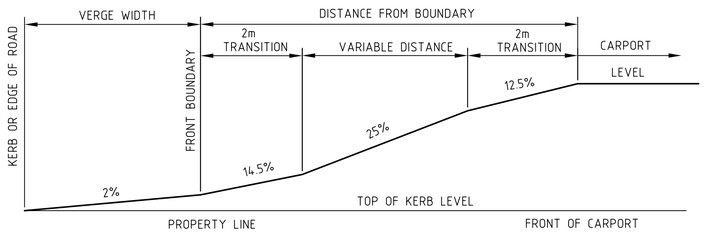
A
1

# STANDARD 2% VERGE GRADING

VERGE WIDTH (m)

| DISTANCE FROM BOUNDARY (m) | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2 | 0.19 | 0.20 | 0.21 | 0.22 | 0.23 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | 0.29 | 0.30 |
| 1.6 | 0.24 | 0.25 | 0.26 | 0.27 | 0.28 | 0.29 | 0.30 | 0.31 | 0.32 | 0.33 | 0.34 | 0.35 |
| 2.0 | 0.29 | 0.30 | 0.31 | 0.32 | 0.33 | 0.34 | 0.35 | 0.36 | 0.37 | 0.38 | 0.39 | 0.40 |
| 2.4 | 0.35 | 0.36 | 0.37 | 0.38 | 0.39 | 0.40 | 0.41 | 0.42 | 0.43 | 0.44 | 0.45 | 0.46 |
| 2.8 | 0.41 | 0.42 | 0.43 | 0.44 | 0.45 | 0.46 | 0.47 | 0.48 | 0.49 | 0.50 | 0.51 | 0.52 |
| 3.2 | 0.46 | 0.47 | 0.48 | 0.49 | 0.50 | 0.51 | 0.52 | 0.53 | 0.54 | 0.55 | 0.56 | 0.57 |
| 3.6 | 0.52 | 0.53 | 0.54 | 0.55 | 0.56 | 0.57 | 0.58 | 0.59 | 0.60 | 0.61 | 0.62 | 0.63 |
| 4.0 | 0.58 | 0.59 | 0.60 | 0.61 | 0.62 | 0.63 | 0.64 | 0.65 | 0.66 | 0.67 | 0.68 | 0.69 |
| 4.4 | 0.68 | 0.69 | 0.70 | 0.71 | 0.72 | 0.73 | 0.74 | 0.75 | 0.76 | 0.77 | 0.78 | 0.79 |
| 4.8 | 0.78 | 0.79 | 0.80 | 0.81 | 0.82 | 0.83 | 0.84 | 0.85 | 0.86 | 0.87 | 0.88 | 0.89 |
| 5.2 | 0.88 | 0.89 | 0.90 | 0.91 | 0.92 | 0.93 | 0.94 | 0.95 | 0.96 | 0.97 | 0.98 | 0.99 |
| 5.6 | 0.98 | 0.99 | 1.00 | 1.01 | 1.02 | 1.03 | 1.04 | 1.05 | 1.06 | 1.07 | 1.08 | 1.09 |
| 6.0 | 1.08 | 1.09 | 1.10 | 1.11 | 1.12 | 1.13 | 1.14 | 1.15 | 1.16 | 1.17 | 1.18 | 1.19 |
| 6.4 | 1.18 | 1.19 | 1.20 | 1.21 | 1.22 | 1.23 | 1.24 | 1.25 | 1.26 | 1.27 | 1.28 | 1.29 |
| 6.8 | 1.28 | 1.29 | 1.30 | 1.31 | 1.32 | 1.33 | 1.34 | 1.35 | 1.36 | 1.37 | 1.38 | 1.39 |
| 7.2 | 1.38 | 1.39 | 1.40 | 1.41 | 1.42 | 1.43 | 1.44 | 1.45 | 1.46 | 1.47 | 1.48 | 1.49 |
| 7.6 | 1.48 | 1.49 | 1.50 | 1.51 | 1.52 | 1.53 | 1.54 | 1.55 | 1.56 | 1.57 | 1.58 | 1.59 |
| 8.0 | 1.58 | 1.59 | 1.60 | 1.61 | 1.62 | 1.63 | 1.64 | 1.65 | 1.66 | 1.67 | 1.68 | 1.69 |
| 8.4 | 1.68 | 1.69 | 1.70 | 1.71 | 1.72 | 1.73 | 1.74 | 1.75 | 1.76 | 1.77 | 1.78 | 1.79 |
| 8.8 | 1.78 | 1.79 | 1.80 | 1.81 | 1.82 | 1.83 | 1.84 | 1.85 | 1.86 | 1.87 | 1.88 | 1.89 |
| 9.2 | 1.88 | 1.89 | 1.90 | 1.91 | 1.92 | 1.93 | 1.94 | 1.95 | 1.96 | 1.97 | 1.98 | 1.99 |
| 9.6 | 1.98 | 1.99 | 2.00 | 2.01 | 2.02 | 2.03 | 2.04 | 2.05 | 2.06 | 2.07 | 2.08 | 2.09 |
| 10.0 | 2.08 | 2.09 | 2.10 | 2.11 | 2.12 | 2.13 | 2.14 | 2.15 | 2.16 | 2.17 | 2.18 | 2.19 |
| 10.4 | 2.18 | 2.19 | 2.20 | 2.21 | 2.22 | 2.23 | 2.24 | 2.25 | 2.26 | 2.27 | 2.28 | 2.29 |
| 10.8 | 2.28 | 2.29 | 2.30 | 2.31 | 2.32 | 2.33 | 2.34 | 2.35 | 2.36 | 2.37 | 2.38 | 2.39 |
| 11.2 | 2.38 | 2.39 | 2.40 | 2.41 | 2.42 | 2.43 | 2.44 | 2.45 | 2.46 | 2.47 | 2.48 | 2.49 |
| 11.6 | 2.48 | 2.49 | 2.50 | 2.51 | 2.52 | 2.53 | 2.54 | 2.55 | 2.56 | 2.57 | 2.58 | 2.59 |
| 12.0 | 2.58 | 2.59 | 2.60 | 2.61 | 2.62 | 2.63 | 2.64 | 2.65 | 2.66 | 2.67 | 2.68 | 2.69 |
| 12.4 | 2.68 | 2.69 | 2.70 | 2.71 | 2.72 | 2.73 | 2.74 | 2.75 | 2.76 | 2.77 | 2.78 | 2.79 |
| 12.8 | 2.78 | 2.79 | 2.80 | 2.81 | 2.82 | 2.83 | 2.84 | 2.85 | 2.86 | 2.87 | 2.88 | 2.89 |
| 13.2 | 2.88 | 2.89 | 2.90 | 2.91 | 2.92 | 2.93 | 2.94 | 2.95 | 2.96 | 2.97 | 2.98 | 2.99 |
| 13.6 | 2.98 | 2.99 | 3.00 | 3.01 | 3.02 | 3.03 | 3.04 | 3.05 | 3.06 | 3.07 | 2.08 | 3.09 |
| 14.0 | 3.08 | 3.09 | 3.10 | 3.11 | 3.12 | 3.13 | 3.14 | 3.15 | 3.16 | 3.17 | 3.18 | 3.19 |

## MAXIMUM FINISHED CARPORT LEVEL ABOVE KERB

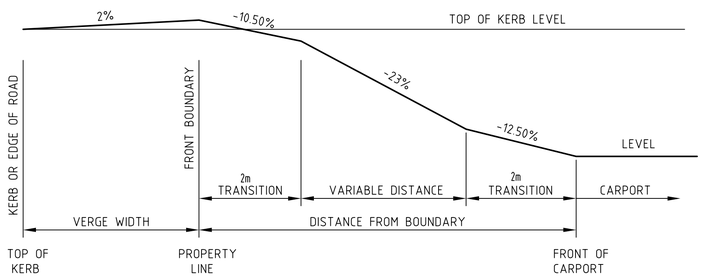



## TYPICAL PROFILE OF TREATMENT ABOVE KERB

VERGE WIDTH (m)

| DISTANCE FROM BOUNDARY (m) | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2 | −0.09 | −0.08 | −0.07 | −0.06 | −0.05 | −0.04 | −0.03 | −0.02 | −0.01 | 0.00 | 0.01 | 0.02 |
| 1.6 | −0.13 | −0.12 | −0.11 | −0.10 | −0.09 | −0.08 | −0.07 | −0.06 | −0.05 | −0.04 | −0.03 | −0.02 |
| 2.0 | −0.17 | −0.16 | −0.15 | −0.14 | −0.13 | −0.12 | −0.11 | −0.10 | −0.09 | −0.08 | −0.07 | −0.06 |
| 2.4 | −0.22 | −0.21 | −0.20 | −0.19 | −0.18 | −0.17 | −0.16 | −0.15 | −0.14 | −0.13 | −0.12 | −0.11 |
| 2.8 | −0.27 | −0.26 | −0.25 | −0.24 | −0.23 | −0.22 | −0.21 | −0.20 | −0.19 | −0.18 | −0.17 | −0.16 |
| 3.2 | −0.32 | −0.31 | −0.30 | −0.29 | −0.28 | −0.27 | −0.26 | −0.25 | −0.24 | −0.23 | −0.22 | −0.21 |
| 3.6 | −0.37 | −0.36 | −0.35 | −0.34 | −0.33 | −0.32 | −0.31 | −0.30 | −0.29 | −0.28 | −0.27 | −0.26 |
| 4.0 | −0.42 | −0.41 | −0.40 | −0.39 | −0.38 | −0.37 | −0.36 | −0.35 | −0.34 | −0.33 | −0.32 | −0.31 |
| 4.4 | −0.51 | −0.50 | −0.49 | −0.48 | −0.47 | −0.46 | −0.45 | −0.44 | −0.43 | −0.42 | −0.41 | −0.40 |
| 4.8 | −0.60 | −0.59 | −0.58 | −0.57 | −0.56 | −0.55 | −0.54 | −0.53 | −0.52 | −0.51 | −0.50 | −0.49 |
| 5.2 | −0.70 | −0.69 | −0.68 | −0.67 | −0.66 | −0.65 | −0.64 | −0.63 | −0.62 | −0.61 | −0.60 | −0.59 |
| 5.6 | −0.79 | −0.78 | −0.77 | −0.76 | −0.75 | −0.74 | −0.73 | −0.72 | −0.71 | −0.70 | −0.69 | −0.68 |
| 6.0 | −0.88 | −0.87 | −0.86 | −0.85 | −0.84 | −0.83 | −0.82 | −0.81 | −0.80 | −0.79 | −0.78 | −0.77 |
| 6.4 | −0.97 | −0.96 | −0.95 | −0.94 | −0.93 | −0.92 | −0.91 | −0.90 | −0.89 | −0.88 | −0.87 | −0.86 |
| 6.8 | −1.06 | −1.05 | −1.04 | −1.03 | −1.02 | −1.01 | −1.00 | −0.99 | −0.98 | −0.97 | −0.96 | −0.95 |
| 7.2 | −1.16 | −1.15 | −1.14 | −1.13 | −1.12 | −1.11 | −1.10 | −1.09 | −1.08 | −1.07 | −1.06 | −1.05 |
| 7.6 | −1.25 | −1.24 | −1.23 | −1.22 | −1.21 | −1.20 | −1.19 | −1.18 | −1.17 | −1.16 | −1.15 | −1.14 |
| 8.0 | −1.34 | −1.33 | −1.32 | −1.31 | −1.30 | −1.29 | −1.28 | −1.27 | −1.26 | −1.25 | −1.24 | −1.23 |
| 8.4 | −1.43 | −1.42 | −1.41 | −1.40 | −1.39 | −1.38 | −1.37 | −1.36 | −1.35 | −1.34 | −1.33 | −1.32 |
| 8.8 | −1.52 | −1.51 | −1.50 | −1.49 | −1.48 | −1.47 | −1.46 | −1.45 | −1.44 | −1.43 | −1.42 | −1.41 |
| 9.2 | −1.62 | −1.61 | −1.60 | −1.59 | −1.58 | −1.57 | −1.56 | −1.55 | −1.54 | −1.53 | −1.52 | −1.51 |
| 9.6 | −1.71 | −1.70 | −1.69 | −1.68 | −1.67 | −1.66 | −1.65 | −1.64 | −1.63 | −1.62 | −1.61 | −1.60 |
| 10.0 | −1.80 | −1.79 | −1.78 | −1.77 | −1.76 | −1.75 | −1.74 | −1.73 | −1.72 | −1.71 | −1.70 | −1.69 |
| 10.4 | −1.89 | −1.88 | −1.87 | −1.86 | −1.85 | −1.84 | −1.83 | −1.82 | −1.81 | −1.80 | −1.79 | −1.78 |
| 10.8 | −1.98 | −1.97 | −1.96 | −1.95 | −1.94 | −1.93 | −1.92 | −1.91 | −1.90 | −1.89 | −1.88 | −1.87 |
| 11.2 | −2.08 | −2.07 | −2.06 | −2.05 | −2.04 | −2.03 | −2.02 | −2.01 | −2.00 | −1.99 | −1.98 | −1.97 |
| 11.6 | −2.17 | −2.16 | −2.15 | −2.14 | −2.13 | −2.12 | −2.11 | −2.10 | −2.09 | −2.08 | −2.07 | −2.06 |
| 12.0 | −2.26 | −2.25 | −2.24 | −2.23 | −2.22 | −2.21 | −2.20 | −2.19 | −2.18 | −2.17 | −2.16 | −2.15 |
| 12.4 | −2.35 | −2.34 | −2.33 | −2.32 | −2.31 | −2.30 | −2.29 | −2.28 | −2.27 | −2.26 | −2.25 | −2.24 |
| 12.8 | −2.44 | −2.43 | −2.42 | −2.41 | −2.40 | −2.39 | −2.38 | −2.37 | −2.36 | −2.35 | −2.34 | −2.33 |
| 13.2 | −2.54 | −2.53 | −2.52 | −2.51 | −2.50 | −2.49 | −2.48 | −2.47 | −2.46 | −2.45 | −2.44 | −2.43 |
| 13.6 | −2.63 | −2.62 | −2.61 | −2.60 | −2.59 | −2.58 | −2.57 | −2.56 | −2.55 | −2.54 | −2.53 | −2.52 |
| 14.0 | −2.72 | −2.71 | −2.70 | −2.69 | −2.68 | −2.67 | −2.66 | −2.65 | −2.64 | −2.63 | −2.62 | −2.61 |

## MAXIMUM FINISHED CARPORT LEVEL BELOW KERB




## TYPICAL PROFILE OF TREATMENT BELOW KERB

CROSSOVER AND DRIVEWAY GRADIENTS
STANDARD APPROVAL

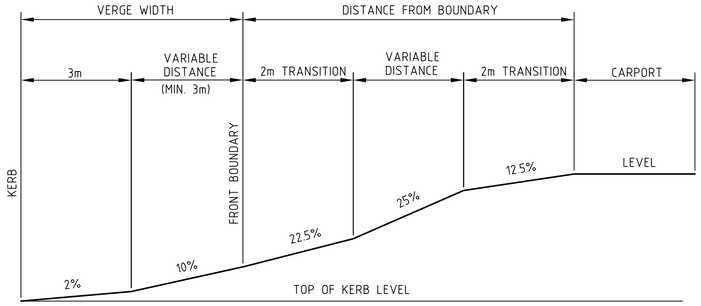
# MODIFIED 2% - 10% VERGE GRADING

NOTE
1. A NEGATIVE VERGE GRADING SHALL NEVER BE ADOPTED WITHOUT THE APPROVAL OF MANAGER ENGINEERING SERVICES

VERGE WIDTH (m)

| DISTANCE FROM BOUNDARY (m) | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2 | 0.19 | 0.20 | 0.21 | 0.26 | 0.31 | 0.36 | 0.41 | 0.46 | 0.51 | 0.56 | 0.61 | 0.66 |
| 1.6 | 0.24 | 0.25 | 0.26 | 0.31 | 0.36 | 0.41 | 0.46 | 0.51 | 0.56 | 0.61 | 0.66 | 0.71 |
| 2.0 | 0.29 | 0.30 | 0.31 | 0.36 | 0.41 | 0.46 | 0.51 | 0.56 | 0.61 | 0.66 | 0.71 | 0.76 |
| 2.4 | 0.35 | 0.36 | 0.37 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 |
| 2.8 | 0.41 | 0.42 | 0.43 | 0.54 | 0.59 | 0.64 | 0.69 | 0.74 | 0.79 | 0.84 | 0.89 | 0.94 |
| 3.2 | 0.46 | 0.47 | 0.48 | 0.63 | 0.68 | 0.73 | 0.78 | 0.83 | 0.88 | 0.93 | 0.98 | 1.03 |
| 3.6 | 0.52 | 0.53 | 0.54 | 0.72 | 0.77 | 0.82 | 0.87 | 0.92 | 0.97 | 1.02 | 1.07 | 1.12 |
| 4.0 | 0.58 | 0.59 | 0.60 | 0.81 | 0.86 | 0.91 | 0.96 | 1.01 | 1.06 | 1.11 | 1.16 | 1.21 |
| 4.4 | 0.68 | 0.69 | 0.70 | 0.91 | 0.96 | 1.01 | 1.06 | 1.11 | 1.16 | 1.21 | 1.26 | 1.31 |
| 4.8 | 0.78 | 0.79 | 0.80 | 1.01 | 1.06 | 1.11 | 1.16 | 1.21 | 1.26 | 1.31 | 1.36 | 1.41 |
| 5.2 | 0.88 | 0.89 | 0.90 | 1.11 | 1.16 | 1.21 | 1.26 | 1.31 | 1.36 | 1.41 | 1.46 | 1.51 |
| 5.6 | 0.98 | 0.99 | 1.00 | 1.21 | 1.26 | 1.31 | 1.36 | 1.41 | 1.46 | 1.51 | 1.56 | 1.61 |
| 6.0 | 1.08 | 1.09 | 1.10 | 1.31 | 1.36 | 1.41 | 1.46 | 1.51 | 1.56 | 1.61 | 1.66 | 1.71 |
| 6.4 | 1.18 | 1.19 | 1.20 | 1.41 | 1.46 | 1.51 | 1.56 | 1.61 | 1.66 | 1.71 | 1.76 | 1.81 |
| 6.8 | 1.28 | 1.29 | 1.30 | 1.51 | 1.56 | 1.61 | 1.66 | 1.71 | 1.76 | 1.81 | 1.86 | 1.91 |
| 7.2 | 1.38 | 1.39 | 1.40 | 1.61 | 1.66 | 1.71 | 1.76 | 1.81 | 1.86 | 1.91 | 1.96 | 2.01 |
| 7.6 | 1.48 | 1.49 | 1.50 | 1.71 | 1.76 | 1.81 | 1.86 | 1.91 | 1.96 | 2.01 | 2.06 | 2.11 |
| 8.0 | 1.58 | 1.59 | 1.60 | 1.81 | 1.86 | 1.91 | 1.96 | 2.01 | 2.06 | 2.11 | 2.16 | 2.21 |
| 8.4 | 1.68 | 1.69 | 1.70 | 1.91 | 1.96 | 2.01 | 2.06 | 2.11 | 2.16 | 2.21 | 2.26 | 2.31 |
| 8.8 | 1.78 | 1.79 | 1.80 | 2.01 | 2.06 | 2.11 | 2.16 | 2.21 | 2.26 | 2.31 | 2.36 | 2.41 |
| 9.2 | 1.88 | 1.89 | 1.90 | 2.11 | 2.16 | 2.21 | 2.26 | 2.31 | 2.36 | 2.41 | 2.46 | 2.51 |
| 9.6 | 1.98 | 1.99 | 2.00 | 2.21 | 2.26 | 2.31 | 2.36 | 2.41 | 2.46 | 2.51 | 2.56 | 2.61 |
| 10.0 | 2.08 | 2.09 | 2.10 | 2.31 | 2.36 | 2.41 | 2.46 | 2.51 | 2.56 | 2.61 | 2.66 | 2.71 |
| 10.4 | 2.18 | 2.19 | 2.20 | 2.41 | 2.46 | 2.51 | 2.56 | 2.61 | 2.66 | 2.71 | 2.76 | 2.81 |
| 10.8 | 2.28 | 2.29 | 2.30 | 2.51 | 2.56 | 2.61 | 2.66 | 2.71 | 2.76 | 2.81 | 2.86 | 2.91 |
| 11.2 | 2.38 | 2.39 | 2.40 | 2.61 | 2.66 | 2.71 | 2.76 | 2.81 | 2.86 | 2.91 | 2.96 | 3.01 |
| 11.6 | 2.48 | 2.49 | 2.50 | 2.71 | 2.76 | 2.81 | 2.86 | 2.91 | 2.96 | 3.01 | 3.06 | 3.11 |
| 12.0 | 2.58 | 2.59 | 2.60 | 2.81 | 2.86 | 2.91 | 2.96 | 3.01 | 3.06 | 3.11 | 3.16 | 3.21 |
| 12.4 | 2.68 | 2.69 | 2.70 | 2.91 | 2.96 | 3.01 | 3.06 | 3.11 | 3.16 | 3.21 | 3.26 | 3.31 |
| 12.8 | 2.78 | 2.79 | 2.80 | 3.01 | 3.06 | 3.11 | 3.16 | 3.21 | 3.26 | 3.31 | 3.36 | 3.41 |
| 13.2 | 2.88 | 2.89 | 2.90 | 3.11 | 3.16 | 3.21 | 3.26 | 3.31 | 3.36 | 3.41 | 3.46 | 3.51 |
| 13.6 | 2.98 | 2.99 | 3.00 | 3.21 | 3.26 | 3.31 | 3.36 | 3.41 | 3.46 | 3.51 | 3.56 | 3.61 |
| 14.0 | 3.08 | 3.09 | 3.10 | 3.31 | 3.36 | 3.41 | 3.46 | 3.51 | 3.56 | 3.61 | 3.66 | 3.71 |

## MAXIMUM FINISHED CARPORT LEVEL ABOVE KERB




## TYPICAL PROFILE OF TREATMENT ABOVE KERB

CROSSOVER AND DRIVEWAY GRADIENTS
SPECIAL APPROVAL REQUIRED

| Amendments | | | | |
|---|---|---|---|---|
| No | Date | REVISION | By | App'd |

| | |
|---|---|
| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

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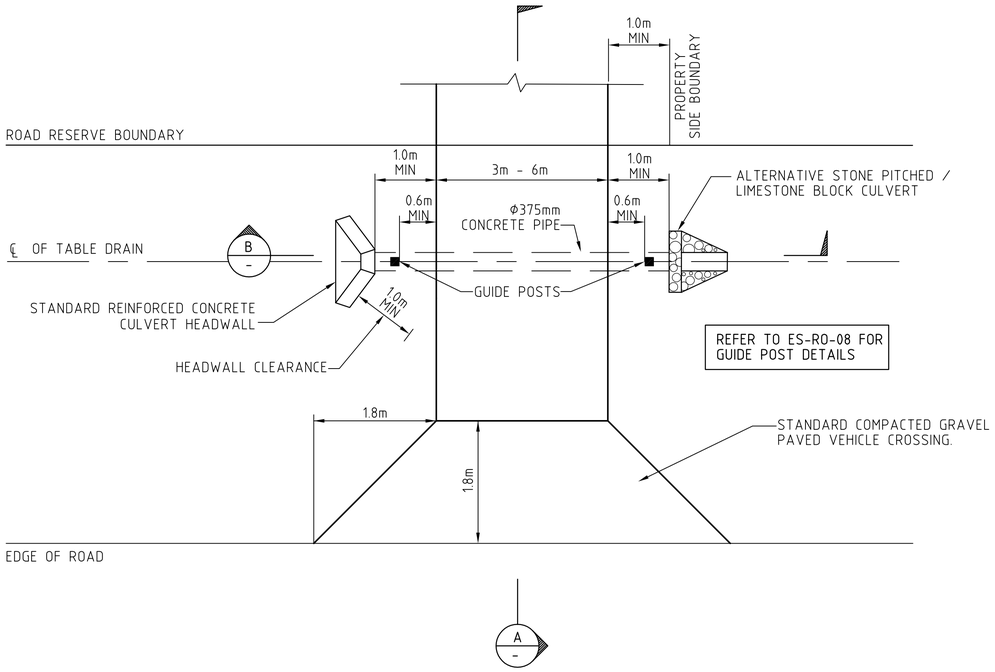
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

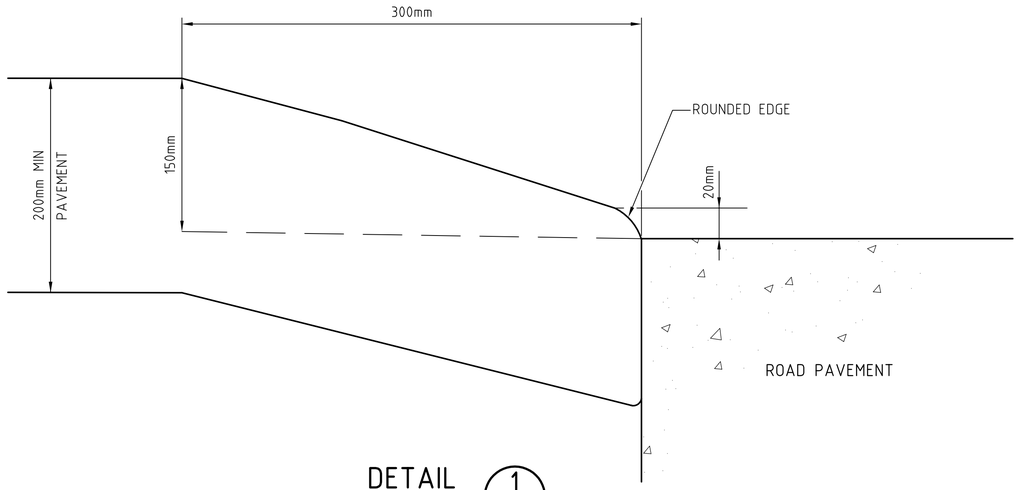
CROSSOVER GRADIENTS

| | |
|---|---|
| SHEET | OF |
| DRAWING No. | ES-CR-03 |
| Job No. | |

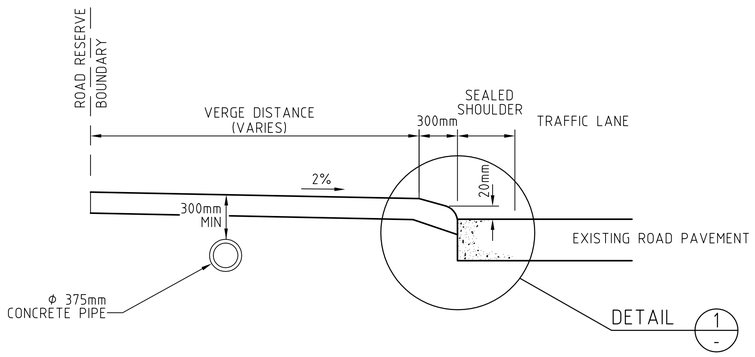
A
1



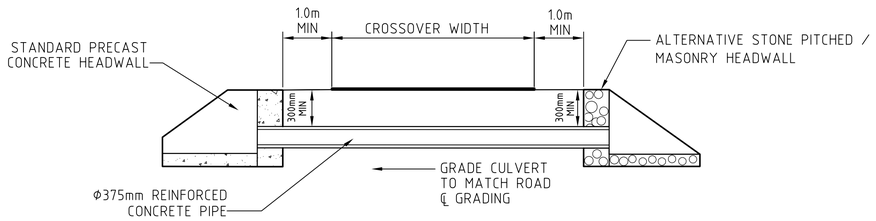

# RURAL GRAVEL VEHICLE CROSSING PLAN




DETAIL 1 -




SECTION A -




SECTION B -

## NOTES:

1. GRAVEL CROSSOVERS SHALL ONLY BE PERMITTED WHERE CONNECTING TO A GRAVEL ROAD.
2. REFER TO DWG ES-CR-01 AND ES-CR-02 FOR CROSSOVER DETAILS WHERE CONNECTING TO SEALED ROADS.
3. REFER TO DWG ES-CR-03 FOR CROSSOVER GRADIENTS.
4. ALTERNATIVE HEADWALL TREATMENTS:-
   a) PRECAST CONCRETE REFER DWG ES-DR-02
   b) Φ 200mm STONE / ROCK WALL OR MASONRY USING 6:1 SAND / CEMENT MORTAR.

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

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|---|---|
| Tax Sheet | |
| Survey No | |
| F'B | p |
| File No | |

Shire of Denmark

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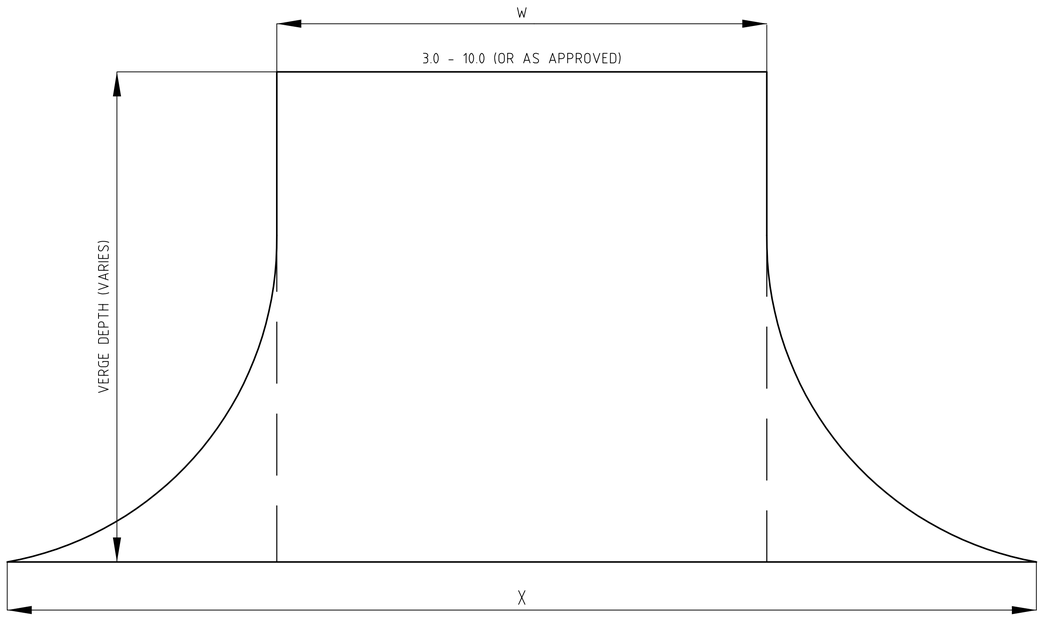
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

RURAL GRAVEL CROSSOVER
TYPICAL PLAN AND SECTIONS

SHEET OF
DRAWING No. ES-CR-04
Job No.

A
1

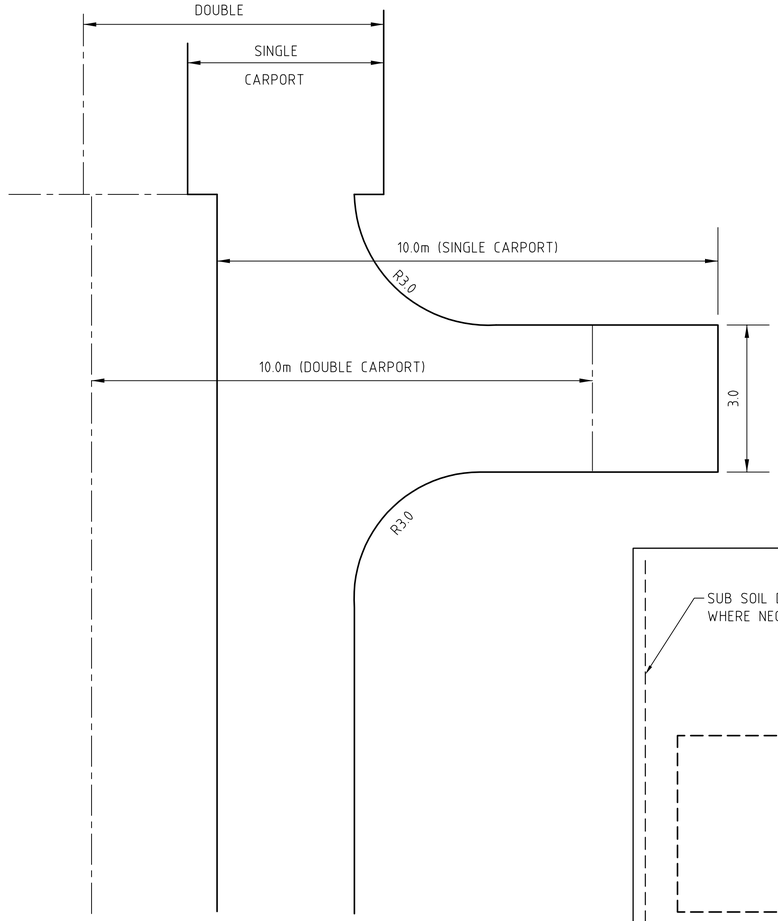



## COMMERCIAL CROSSOVER

| | |
|---|---|
| VEHICLE CROSSING WIDTH (W) | 4.0m ABSOLUTE MIN. (AT PROPERTY LINE) |
| VEHICLE CROSSING WIDTH (X) | 10.0m ABSOLUTE MIN. (AT KERBLINE) |
| CONCRETE THICKNESS | 150mm MIN. - BROOM FINISH |
| REINFORCEMENT | F82 MESH |

## NOTES:

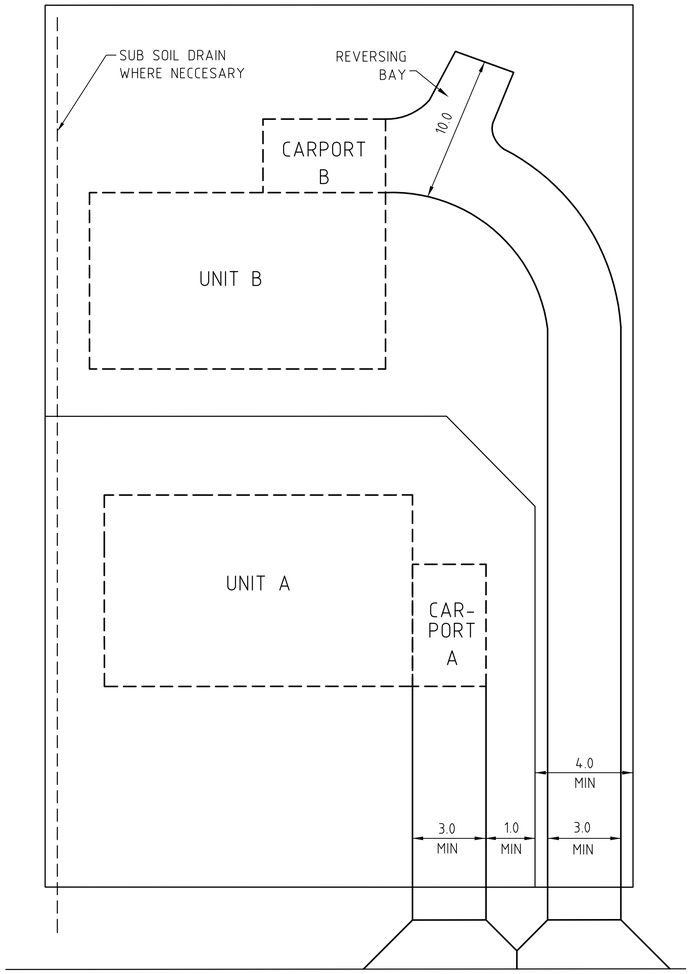
1. SHOULD ANY TREE, POLE, PIT, MANHOLE, SIGN OR ANY OTHER OBSTRUCTION BE LOCATED ON THE PROPOSED ALIGNMENT OF THE CROSSING, THE DEVELOPER SHALL BE RESPONSIBLE FOR THE COSTS ASSOCIATED WITH ITS REMOVAL/ALTERATION.
2. THE GRADIENT OF THE VEHICLE CROSSING SHALL BE A POSITIVE 2% TO THE PROPERTY LINE.
3. VEHICLE CROSSINGS TO BE CONSTRUCTED AT 90° TO THE KERB OR AS DIRECTED BY THE MANAGER ENGINEERING SERVICES.
4. MAXIMUM SPACING BETWEEN CONTRACTION JOINTS SHALL BE 3.0m.
5. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE TO BE 20Mpa AT 28 DAYS.
6. VEHICLE CROSSINGS SHOULD BE LCOATED TO ALLOW FOR ADEQUATE HORIZONTAL AND VERTICAL SIGHT DISTANCES AND CLEARANCES FROM INTERSECTIONS.
7. VEHICLE CROSSINGS ARE NOT TO BE LOCATED OPPOSITE A ROAD JUNCTION OR OTHER MAJOR VEHICLE CROSSING.




## REVERSING BAY

## NOTES:

1. REVERSING BAY IS REQUIRED FOR REAR DRIVEWAY IF LENGTH OF DRIVEWAY FROM PROPERTY LINE TO FRONT OF CARPORT IS GREATER THAN 15m OR IF THERE IS A SIGNIFICANT DIFFERENCE IN LEVEL ALONG REAR DRIVEWAY.
2. VEHICLE CROSSING AND DRIVEWAY FOR AN EXISTING UNIT SHALL BE TO SHIRE OF DENMARK SPECIFICATION. IF CURRENTLY NONCONFORMING MUST BE RECONSTRUCTED.
3. IF AN ACCESS RESTRICTION APPLIES, VEHICLE CROSSING TO FUTURE UNIT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SHIRE OF DENMARK SPECIFICATIONS.
4. FOR CROSSOVER CONSTRUCTION DETAILS REFER TO DRAWINGS ES-CR-01, ES-CR-02 AND ES-CR-03.




## VEHICLE CROSSING - FRONT AND REAR UNITS

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

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| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

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|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# COMMERCIAL & DEVELOPMENT CROSSOVER DETAILS

SHEET OF
DRAWING No. ES-CR-05
Job No.

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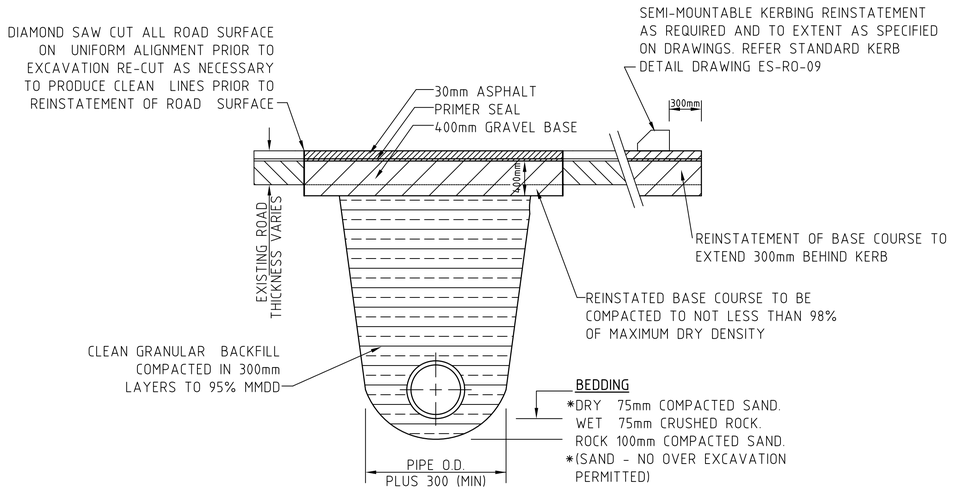
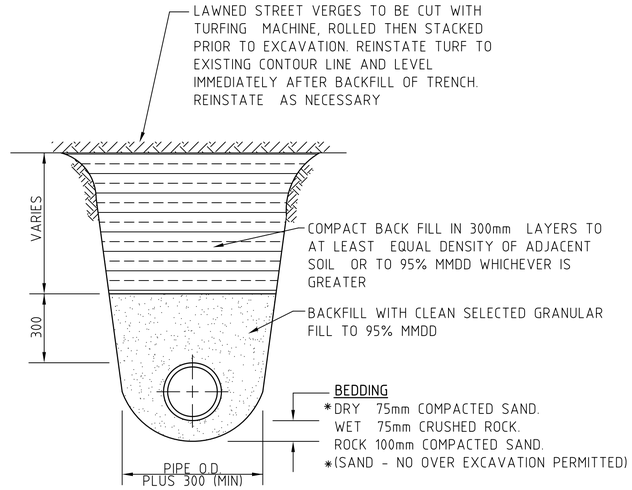
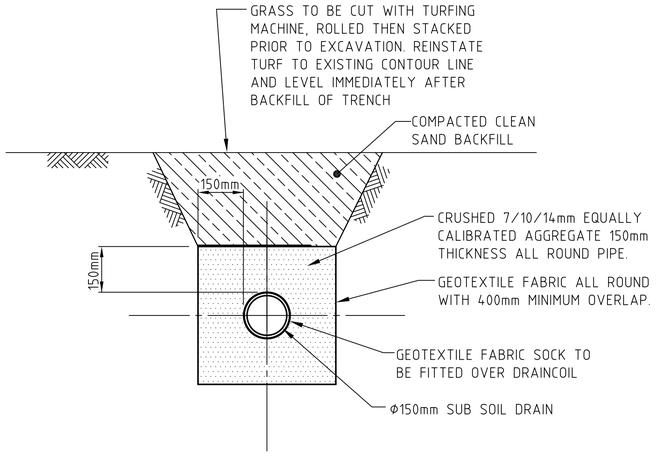
1



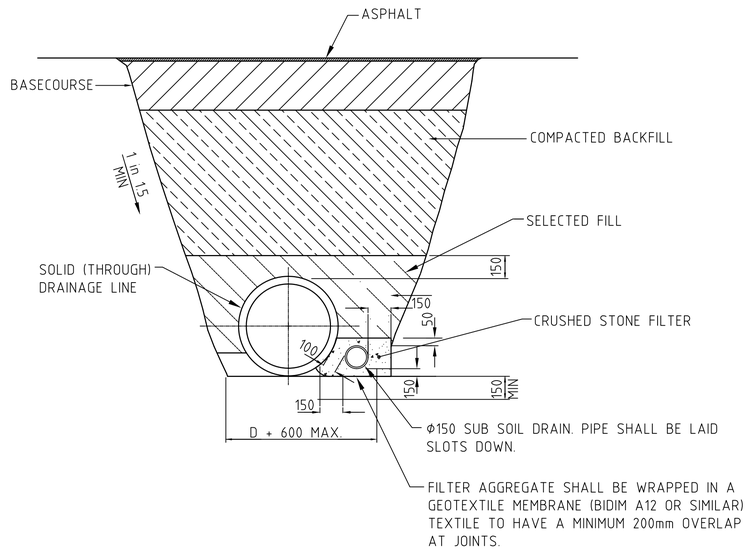

## PIPE IN ROADWAY




## PIPE IN VERGE




## SUBSOIL PIPE




## SUB-SOIL PIPE WITH STORMWATER PIPE SHARED TRENCH

| Amendments | | | | | |
|---|---|---|---|---|---|
| No | Date | REVISION | By | App'd | |

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| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

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|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

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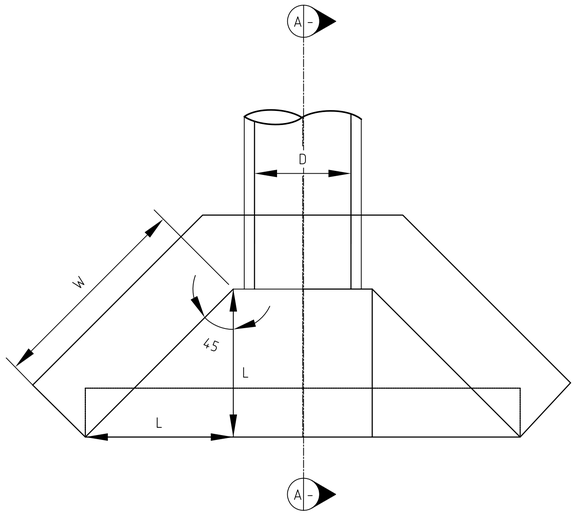
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

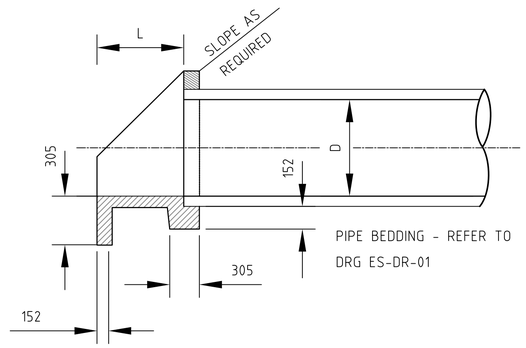
# PIPE BEDDING DETAILS

SHEET OF
DRAWING No.
ES-DR-01
Job No.

A
1



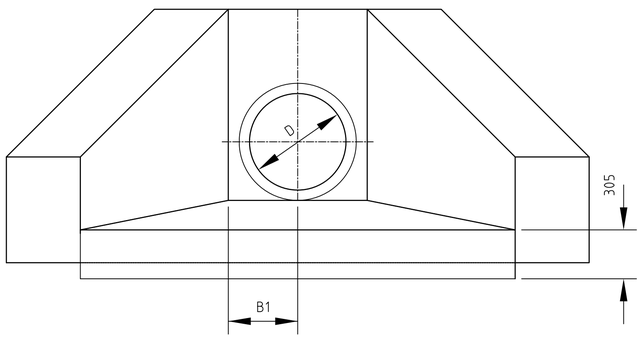

PLAN



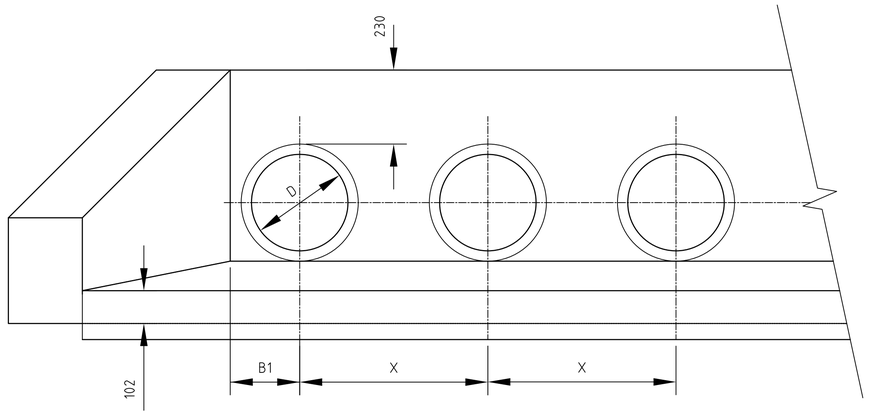

SECTION A

TABLE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D | 300 | 375 | 450 | 525 | 600 | 675 | 750 | 900 | 1050 | 1200 |
| X | 585 | 660 | 760 | 840 | 915 | 990 | 1090 | 1270 | 1420 | 1600 |
| X1 | 825 | 940 | 1080 | 1190 | 1295 | 1400 | 1550 | 1800 | 2010 | 2260 |
| B | 150 | 188 | 225 | 263 | 300 | 338 | 375 | 450 | 525 | 600 |
| B1 | 216 | 265 | 324 | 380 | 432 | 480 | 540 | 648 | 750 | 864 |
| L | 460 | 610 | 685 | 760 | 840 | 940 | 1065 | 1295 | 1525 | 1750 |
| M | 840 | 705 | 1220 | 1320 | 1450 | 1575 | 1855 | 2235 | 2640 | 2970 |
| W | 650 | 862 | 965 | 1080 | 1185 | 1329 | 1500 | 1830 | 2135 | 2440 |
| W1 | 915 | 1220 | 1370 | 1525 | 1680 | 1880 | 2185 | 2590 | 3050 | 3505 |




ELEVATION




ELEVATION

0° AND 15° SKEW

## NOTES:

1. FOR PIPE OVER 915mm Φ THE STRUCTURE SHALL BE REINFORCED WITH ONE LAYER OF WELDED MESH REINFORCEMENT COMPLYING WITH AS 1304-1973 HARD DRAWN STEEL REINFORCING FABRIC FOR CONCRETE.
2. CONCRETE SHALL BE MINIMUM 20 MPa COMPRESSIVE STRENGTH AT 28 DAYS.
3. FINISHED CONCRETE SURFACES SHALL NOT EXCEED THE TOLERANCES FOR CLASS 4 FORMWORK AS SPECIFIED IN AS 1510 PT 1 - 1974 CONTROL OF CONCRETE SURFACES - FORMWORK.
4. PRECAST UNITS SHALL ONLY BE USED WITH MANAGER ENGINEERING SERVICES APPROVAL.
5. ALL PIPES SHALL BE CLASS 2 REINFORCED CONCRETE.

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

Tax Sheet
Survey No
FB p
File No

Shire of Denmark

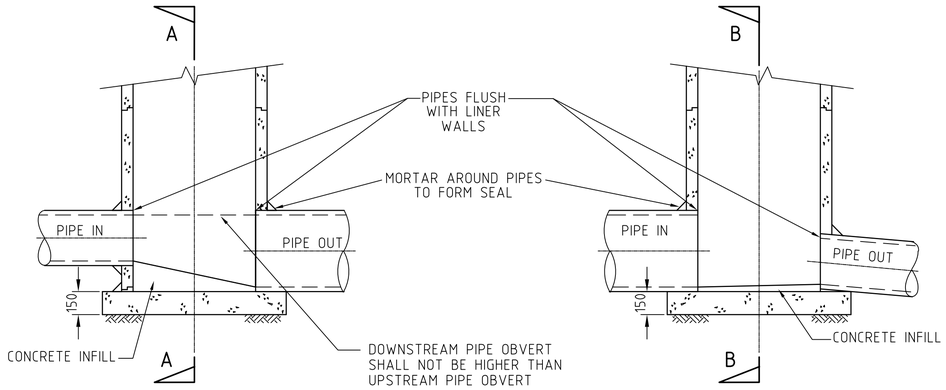
DESIGNED PL 10/06
DRAWN PL 10/06
CHECKED
RECOMMENDED

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# CULVERT HEADWALLS AND CONSTRUCTION DETAILS

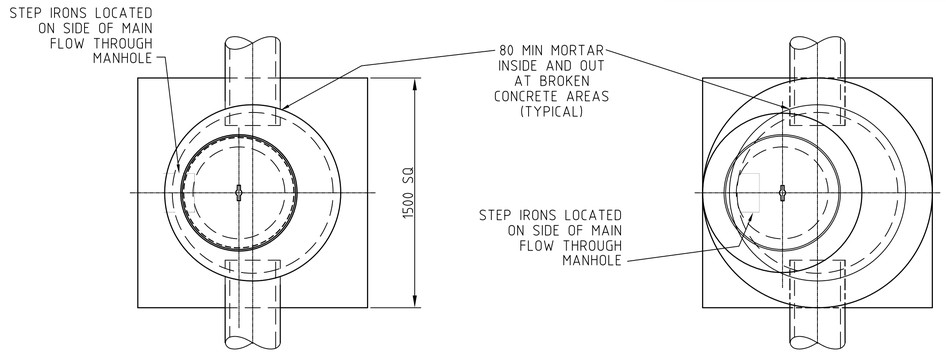
SHEET OF
DRAWING No.
ES-DR-02
Job No.

A
1



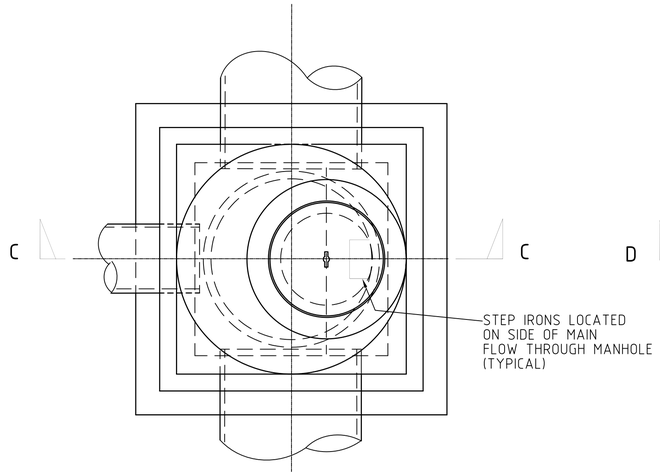

TYPICAL SECTION
SMALLER PIPE TO LARGER PIPE

TYPICAL SECTION
LARGER PIPE TO SMALLER PIPE




PLAN - PREFERRED LAYOUT

PLAN - OPTIONAL LAYOUT

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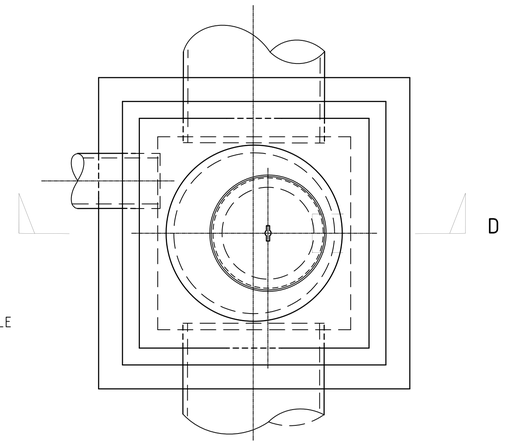


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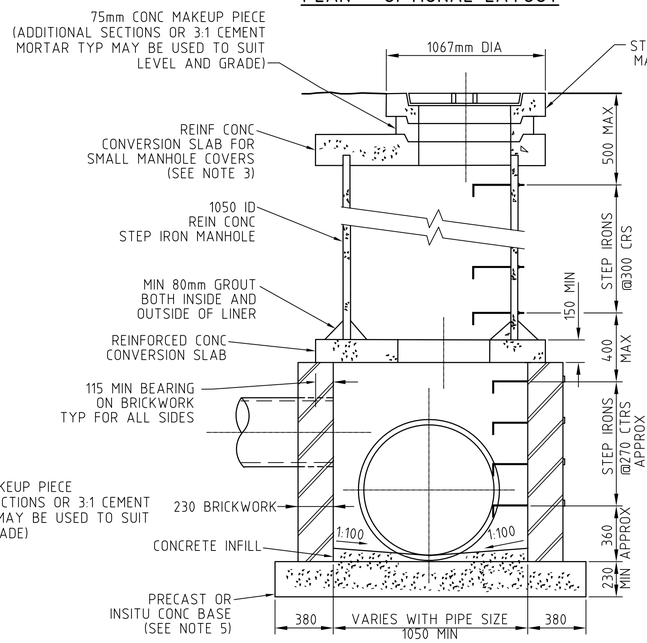
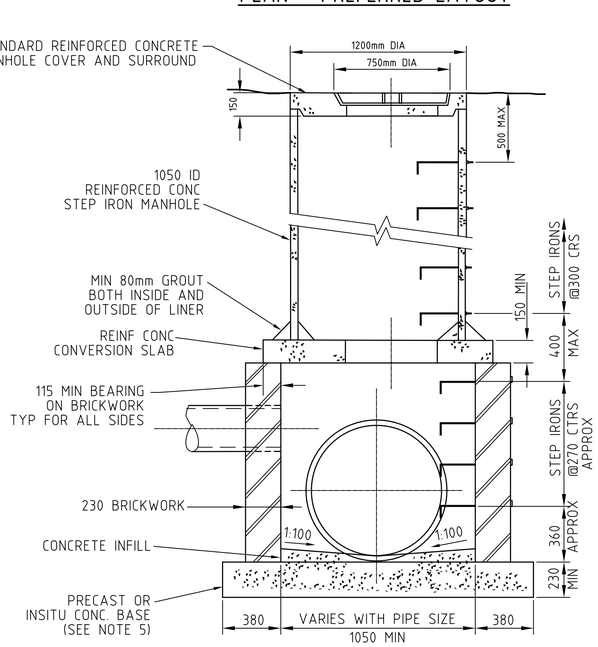


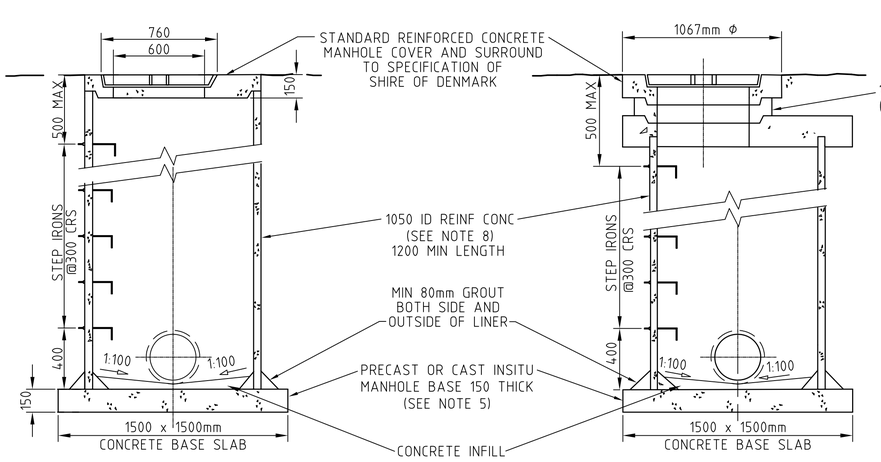

SECTION C-C




SECTION D-D

# BRICK MANHOLES DETAILS - WITH CONVERSION SLAB AND CHAMBER

## PIPES LARGER THAN 750mm




SECTION A-A




SECTION B-B

# MANHOLE DETAILS

## PIPES 225 - 750mm

## NOTES:

1. STEP IRONS NOT REQUIRED IN MANHOLES WITH A DEPTH LESS THAN 1000mm FROM THE TOP OF THE MANHOLE TO THE BASE.
2. STANDARD GALVANISED STEP IRONS TO BE USED WHEN THE DISTANCE BETWEEN THE MANHOLE BASE AND FINISHED GROUND LEVEL EXCEEDS 1000mm.
3. ALL COMPONENT TO BE DESIGNED TO ACCEPT A14 LOADING AUSTROADS STANDARD.
4. ALL BASES TO BE BEDDED ON COMPACTED SAND.
5. MORTAR TO BE 3:1 SAND - CEMENT MIXTURE
6. INSITU CONCRETE TO HAVE MIN STRENGTH OF 20 MPa AT 28 DAYS.
7. MANHOLES SHALL BE INTERLOCKING JOINT AND REINFORCED CONCRETE LINER OR EQUIVALENT TO TO CLASS 2 PIPE.

Amendments

| No | Date | REVISION | By | App'd |
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| DRAWN | PL | 10/06 |
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| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

DRAINAGE
MANHOLE CONSTRUCTION DETAILS

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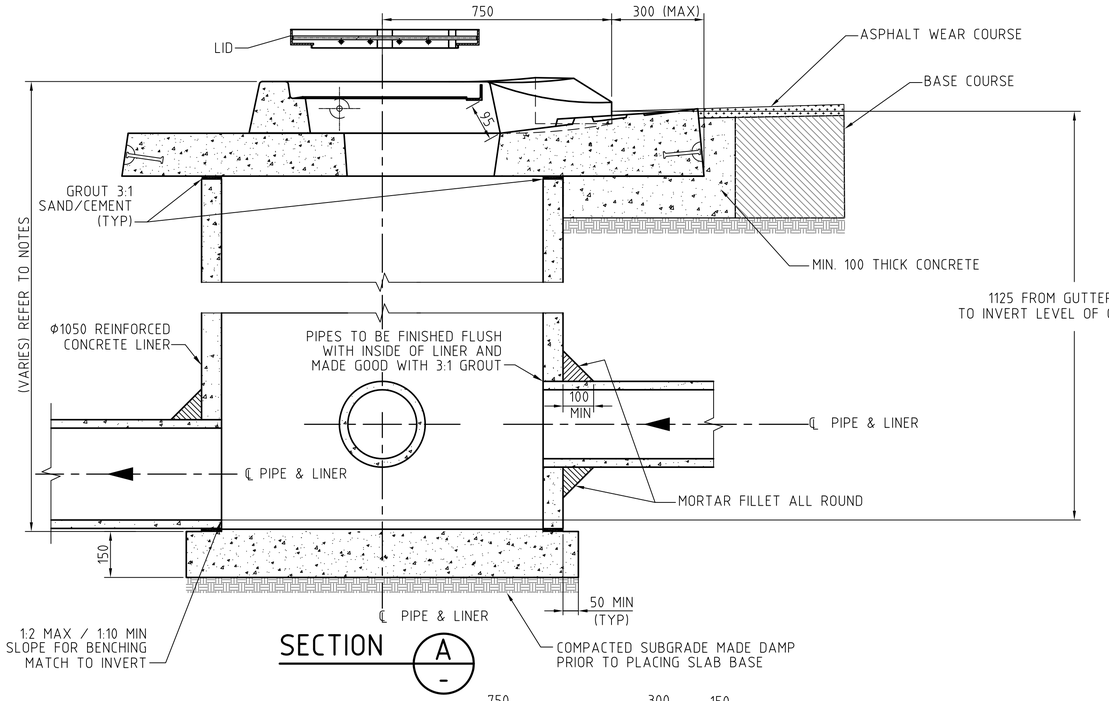
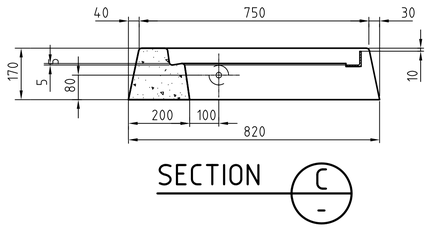
DRAWING No.
ES-DR-03
Job No.

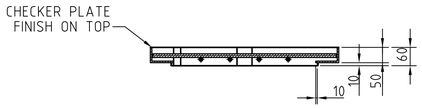
A
1



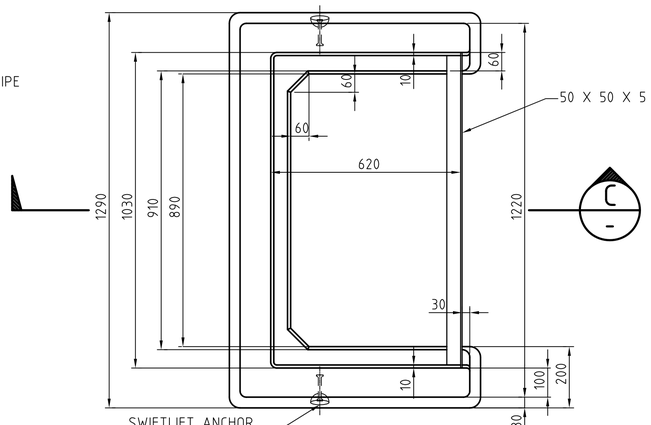

SECTION A



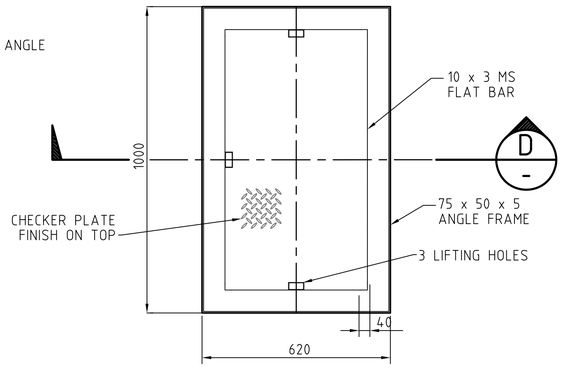

SECTION C



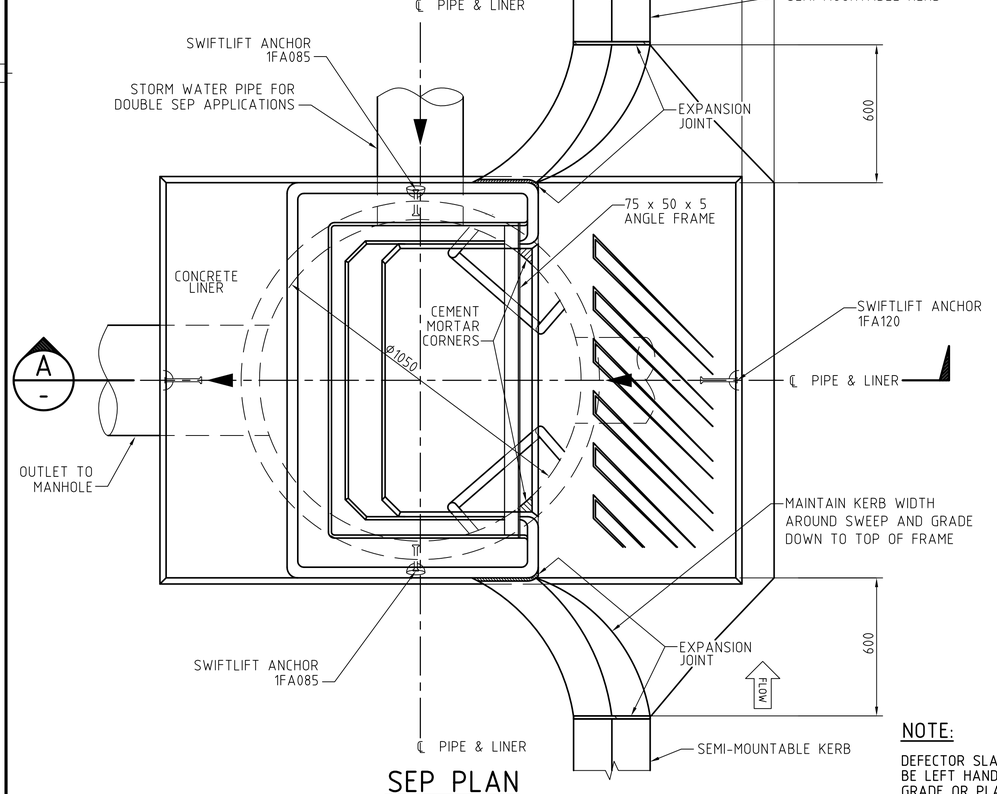

SECTION D



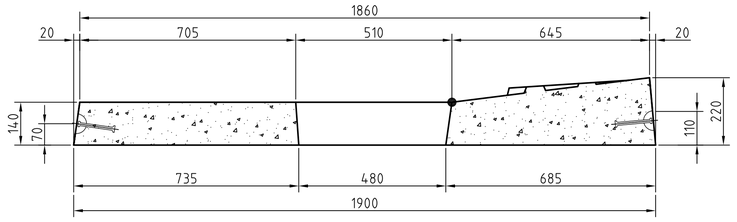

FRAME PLAN



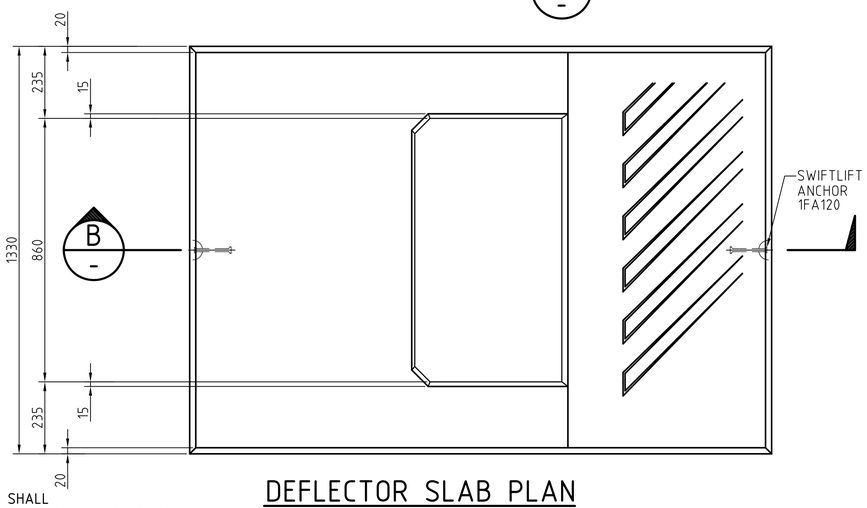

LID PLAN




SEP PLAN




SECTION B




DEFLECTOR SLAB PLAN

NOTE:

DEFECTOR SLAB SHALL
BE LEFT HAND OR RIGHT HAND TO SUIT
GRADE OR PLAIN SLAB IF AT LOW POINT

## NOTES:

1. S.E.P. DEPTHS GREATER THAN 1.2m MUST BE APPROVED BY MANAGER ENGINEERING SERVICES
2. CONCRETE TO BE 20mm NOM. AGGREGATE AND HAVE A MINIMUM STRENGTH AT 28 DAYS OF:
   INSITU BASE:20MPa
   PRECAST UNIT:40MPa
3. GROUT ( MORTAR ) TO BE 3 SAND : 1 CEMENT.
4. STEP IRONS REQUIRED IF DISTANCE BETWEEN BASE AND FINISHED GROUND LEVEL IS GREATER THAN 1.2m. LINER TO BE MADE GOOD AND SEALED USING CEMENT MORTAR FOLLOWING STEP IRON INSTALLATION.
5. STEP IRONS TO BE LOCATED ON SIDE WITH LEAST INTERFERENCE FROM PIPES ON ALL MANHOLES, GULLY'S, SIDE ENTRY AND COMBINATION SIDE ENTRY PITS WHERE DEPTH EXCEEDS 2.0m.
6. SUBGRADE TO BASE OF PRECAST LINER TO BE COMPACTED TO 95% MMDD
7. BACKFILL TO PIT TO BE COMPACTED TO 95% MMDD
8. SAND TRAP PIT REQUIRED PRIOR TO DISCHARGE INTO NATURAL WATERCOURSE, WEIR OR PUBLIC OPEN SPACE ETC.

Amendments

| No | Date | REVISION | By | App'd |
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| DRAWN | PL | 10/06 |
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| RECOMMENDED | | |

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# DRAINAGE
# SIDE ENTRY PIT & DEFLECTOR SLAB DETAILS

SHEET OF
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Job No.

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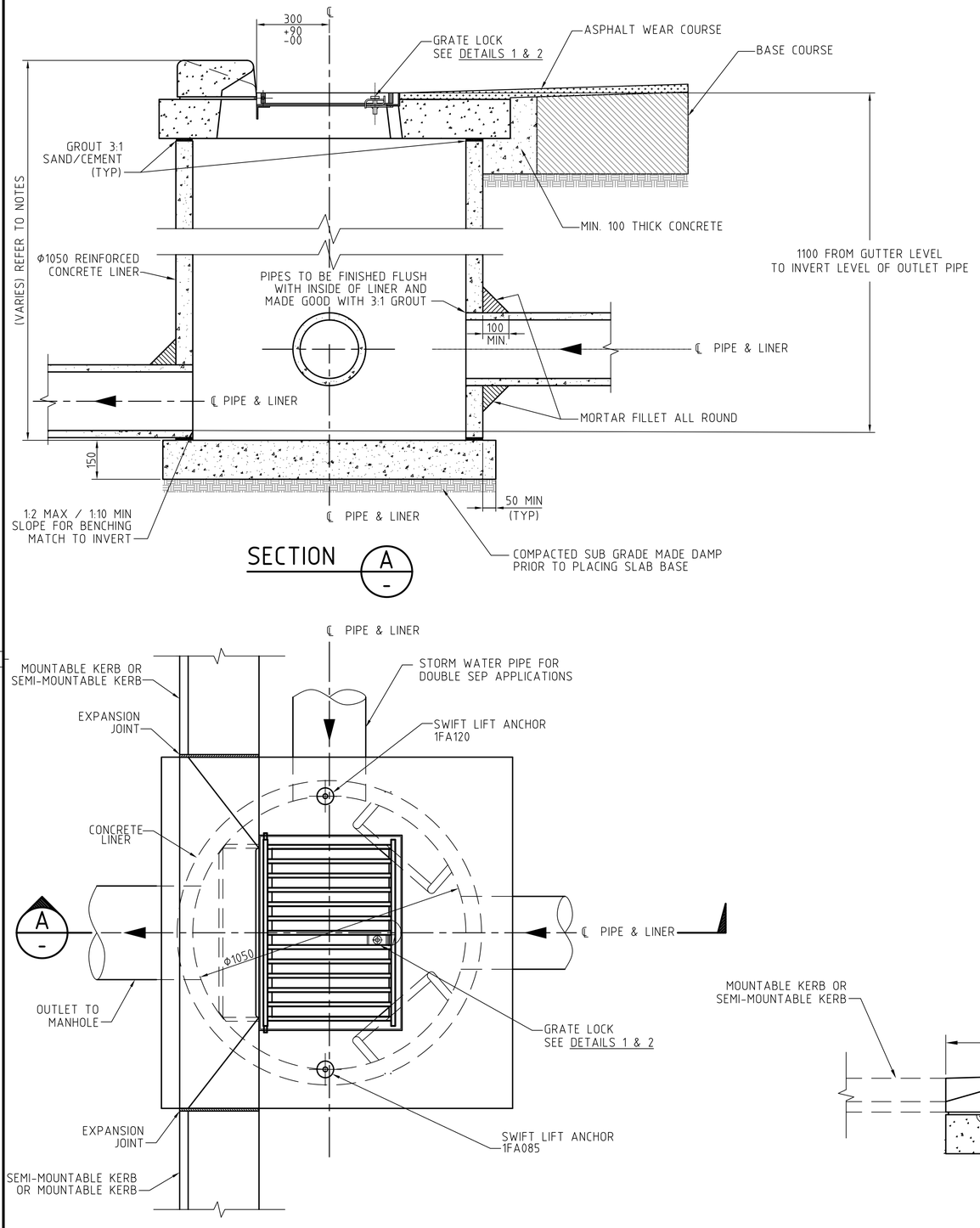
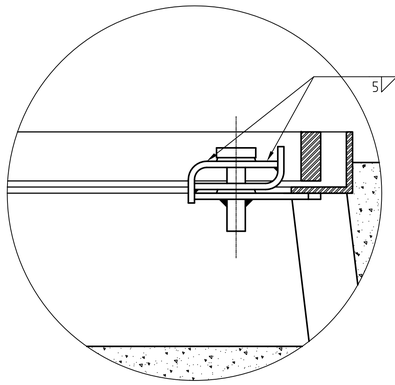



SECTION A

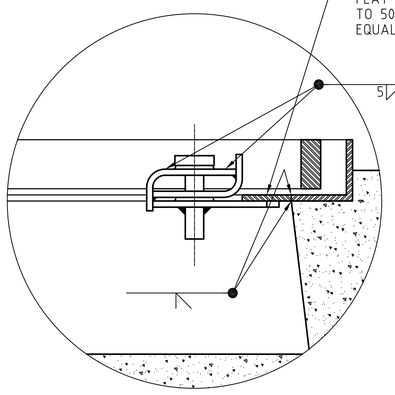



PLAN VIEW



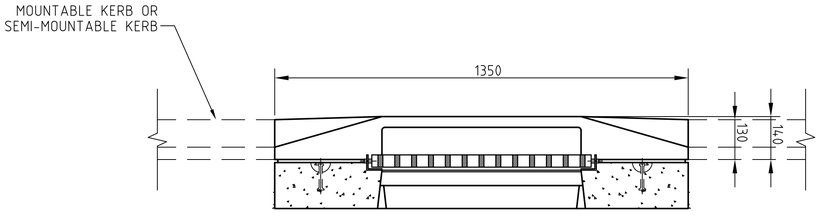

DETAIL 1
SEE NOTES:

GRATE LOCK (AS SUPPLIED)

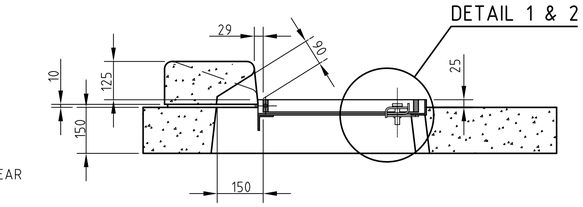



DETAIL 2
SEE NOTES:

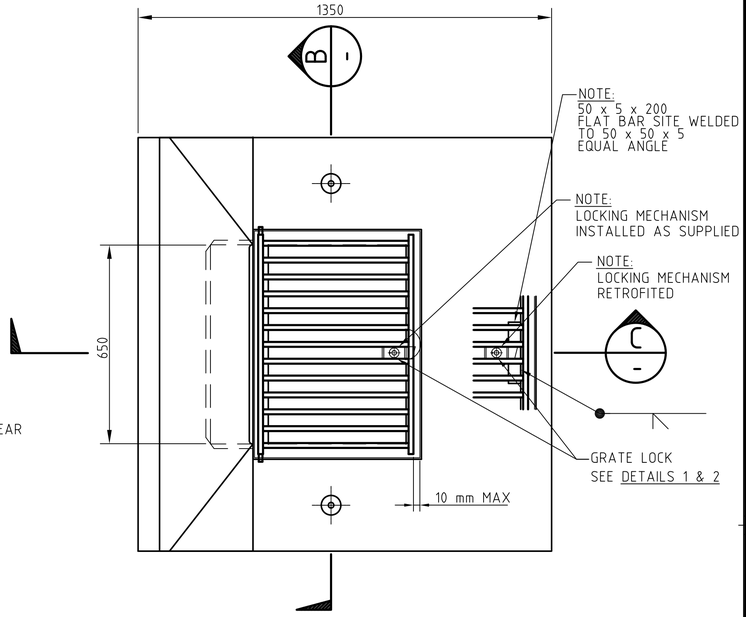
GRATE LOCK (RETRO FIT)



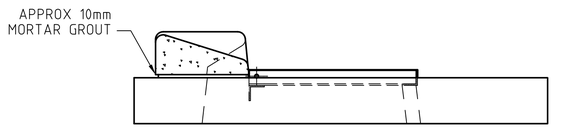

SECTION B




SECTION C




PLAN VIEW




END VIEW

## NOTES:

1. COMBINATION S.E.P TO BE USED ONLY FOR REPLACING EXISTING GULLY PITS. REFER TO ES-DR-04 FOR STANDARD NOTES.
2. COMBINATION S.E.P. DEPTHS GREATER THAN 1.2m MUST BE APPROVED BY MANAGER ENGINEERING SERVICES.
3. GRATE LOCK SUPPLIED BY WEMBLEY CEMENT.
4. GRATE LOCK (AS SUPPLIED) TO BE WELDED TO GRATE PRIOR TO DELIVERY ON SITE AS SHOWN IN DETAIL 1.
5. GRATE LOCK (RETROFIT) TO BE WELDED TO GRATE ON SITE AS SHOWN IN DETAIL 2.
6. ALL GRATE LOCKS PRIOR TO FIELD PLACEMENT TO BE WELL SOAKED IN OIL.
7. ALL WELDS TO BE 5 CFW UNO.

Amendments

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DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# DRAINAGE
# COMBINATION SIDE ENTRY PIT
# SPECIAL APPROVAL REQUIRED

SHEET OF
DRAWING No.
ES-DR-05
Job No.

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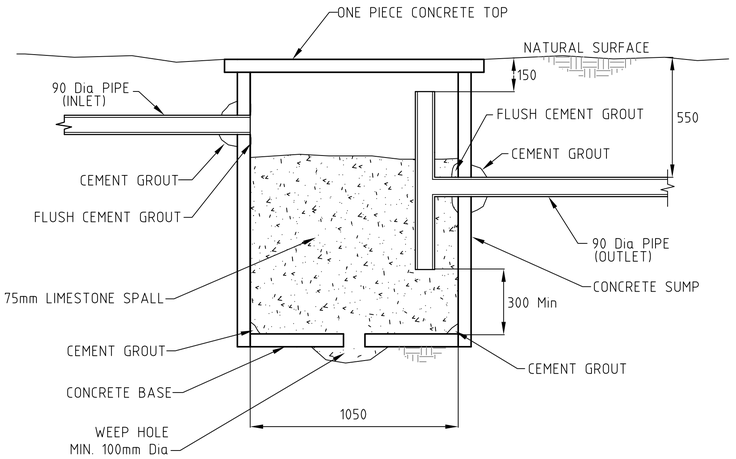
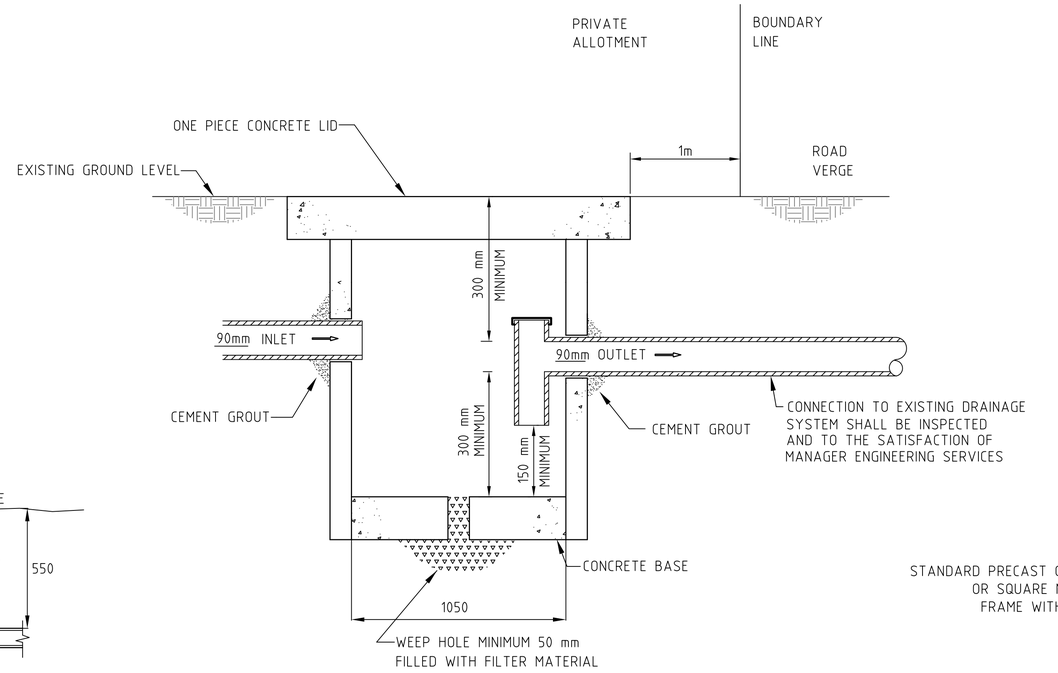



## DETAIL A



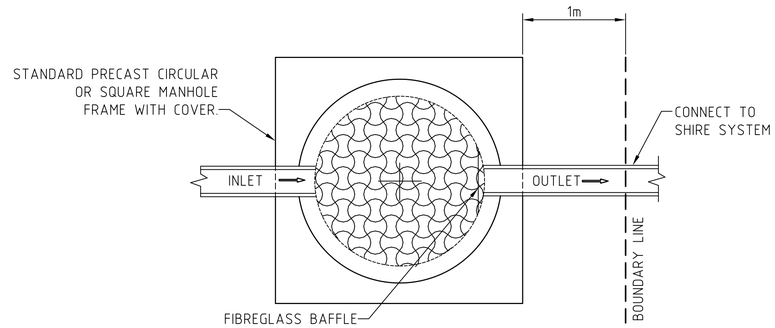

## STANDARD STORMWATER PIT FOR RESIDENTIAL CONNECTIONS

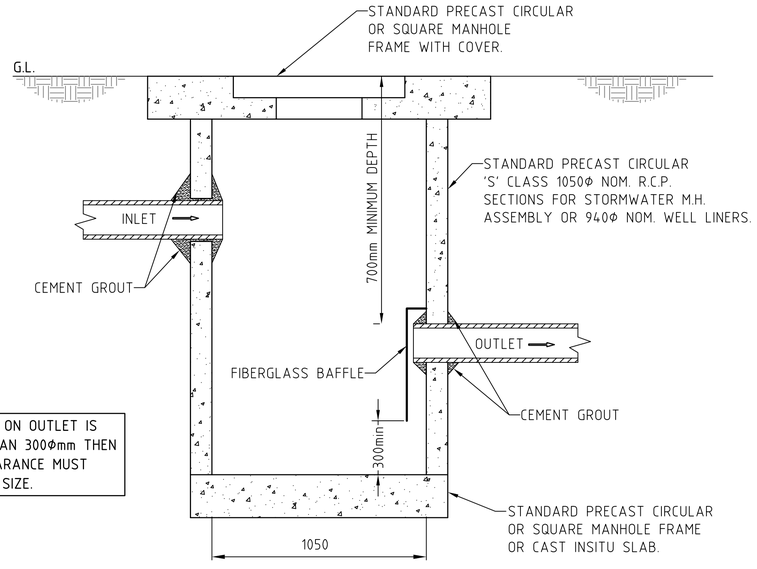

STORMWATER CONNECTION TO BE INSTALLED BY OWNER OR APPLICANT AND INSPECTED BY COUNCIL.

## STANDARD DRAINAGE OUTFALL FOR RESIDENTIAL CONNECTIONS ADJACENT TO NATURAL WATERCOURSES

## NOTES:

1. ON-SITE DRAINAGE SHALL BE PROVIDED WHEREVER POSSIBLE.
2. SPECIAL APPROVAL IS REQUIRED FOR CONNECTION TO THE SHIRE OF DENMARK STORMWATER DRAINAGE SYSTEM.
3. MINIMUM SIZE SOAKWELL FOR ROOF WATER DISPOSAL SHALL BE 900mm DIAMETER x 600mm DEEP.
4. ALL SOAKWELLS INSTALLED IN PAVED OR CONCRETED AREAS ARE TO BE INSTALLED WITH TRAFFICABLE LIDS AND MADE ACCESSIBLE FOR MAINTENANCE PURPOSES.
5. SOAKWELLS TO BE NO CLOSER THAN 1.0m TO A FOOTING OR BOUNDARY.
6. ALL SOAKWELLS SHALL BE OF AN APPROVED MANUFACTURE AND STANDARD.
7. ALL SOAKWELLS INSTALLED WITHIN FLEXIBLE PAVEMENT AREAS (BITUMEN OR BRICK PAVING) SHALL BE PROVIDED WITH AN APPROVED BASE TO PREVENT ANY SUBSIDENCE OF THE WELL LINERS.
8. OWNER SHALL REMAIN RESPONSIBLE FOR SOAKWELL / CONNECTION PIT MAINTENANCE.




IF PIPE SIZE ON OUTLET IS GREATER THAN 300Φmm THEN BAFFLE CLEARANCE MUST MATCH PIPE SIZE.

## STANDARD STORMWATER PIT FOR INDUSTRIAL CONNECTIONS

Amendments

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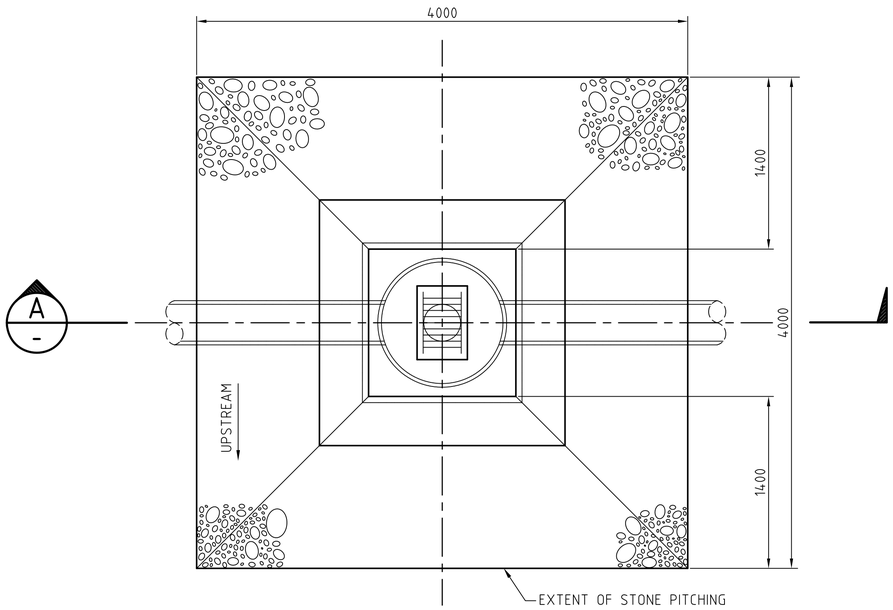
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

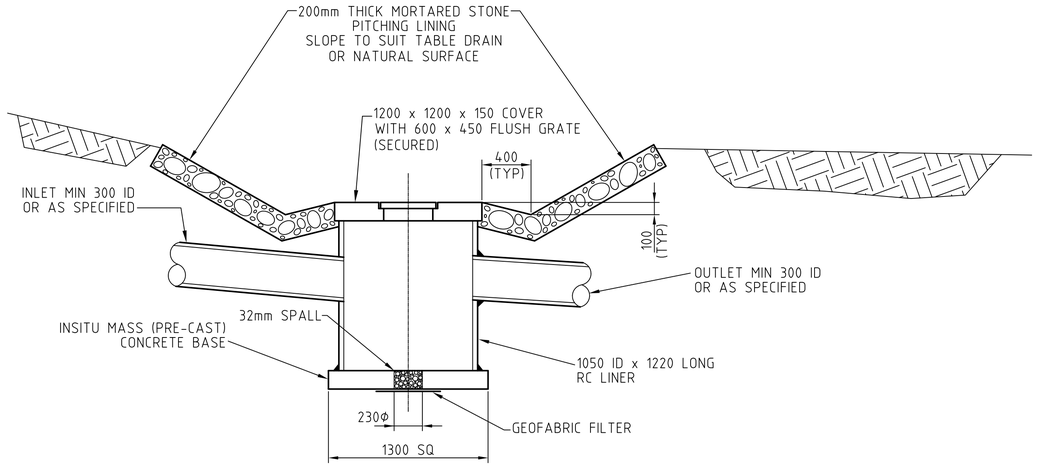
# DRAINAGE PROPERTY STORMWATER CONNECTION DETAILS

SHEET OF
DRAWING No. ES-DR-06
Job No.

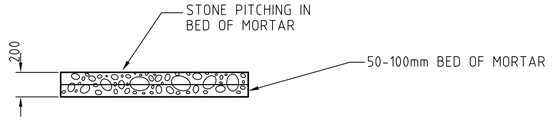
A 1



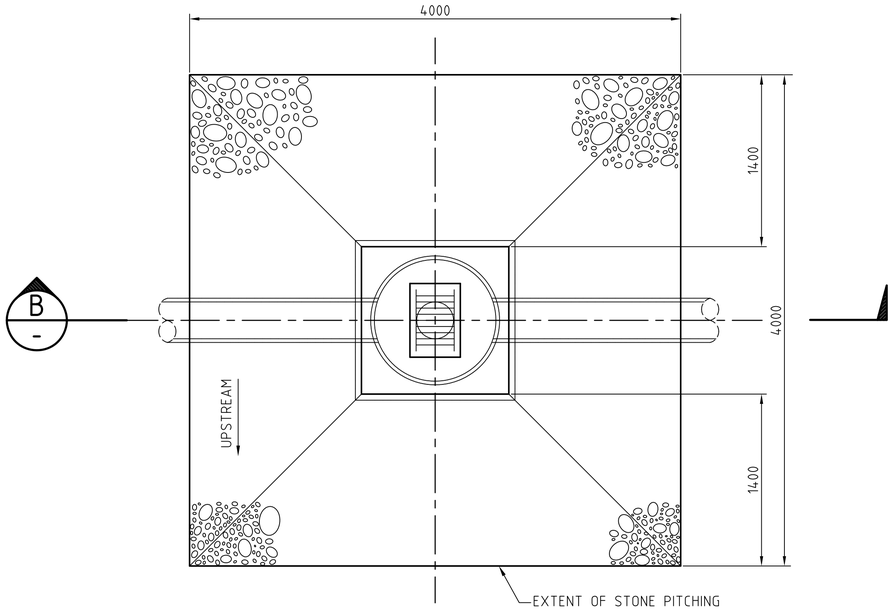

## TYPE 1 - UNSTABILIZED SURFACE
## PLAN



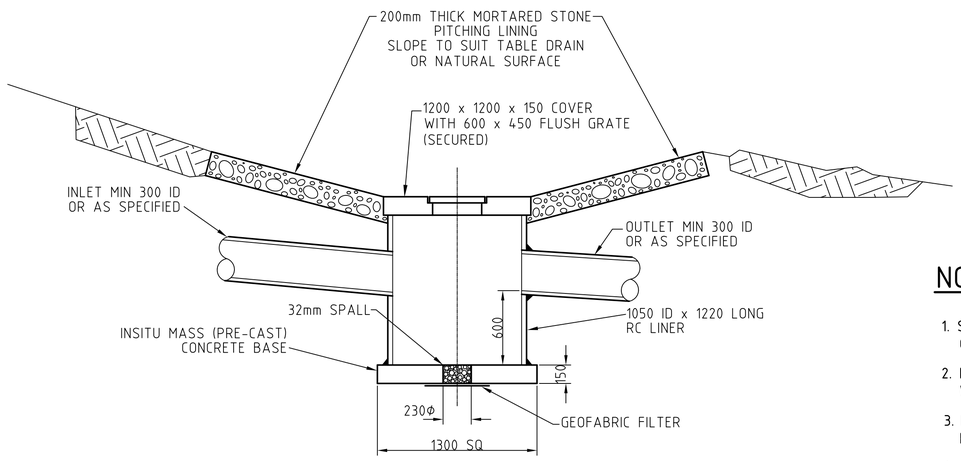

## SECTION A - -




## MORTARED STONE PITCHING DETAIL




## TYPE 2 - STABILIZED SURFACE
## PLAN




## SECTION B - -

## NOTES:

1. STONE PITCHING GRADES TO MATCH TABLE DRAIN OR NATURAL SURFACE AT OUTLET/INLET STRUCTURE.
2. EXTENT OF STONE PITCHING MAY BE VARIED TO SUIT SITE WITH MANAGER ENGINEERING SERVICES APPROVAL.
3. IF STRUCTURE IS LOCATED ON SHIRE CONTROLLED RESERVES, APPROVAL OF SHIRE OF DENMARK IS REQUIRED.
4. APPLICATION OF STRUCTURE TO DEPEND UPON SURFACE TYPE
   I.E. : STABILIZED SURFACES - GRASSED AND LANDSCAPED RESERVES, TABLE DRAINS AND VERGES.
   : UNSTABILIZED SURFACES - RECENTLY EARTHWORKED AND/OR RE-CUT TABLE DRAINS AND RESERVES.
5. STRUCTURE TYPE MAY ALSO BE VARIED BY THE APPROVAL OF ENGINEERING SERVICES.

Amendments

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DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# DRAINAGE
# AT GRADE / TABLE DRAIN
# INLET / OUTLET STRUCTURE

SHEET OF
DRAWING No.
ES-DR-07
Job No.

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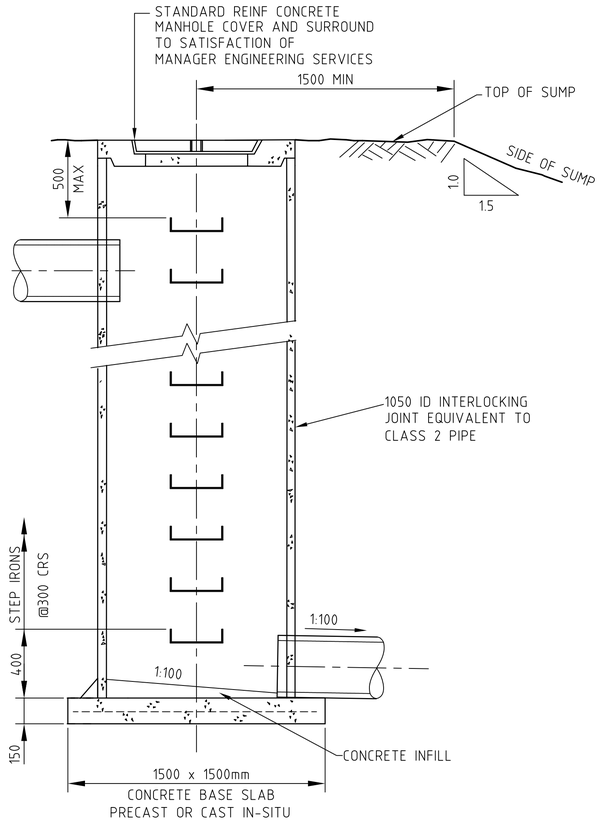
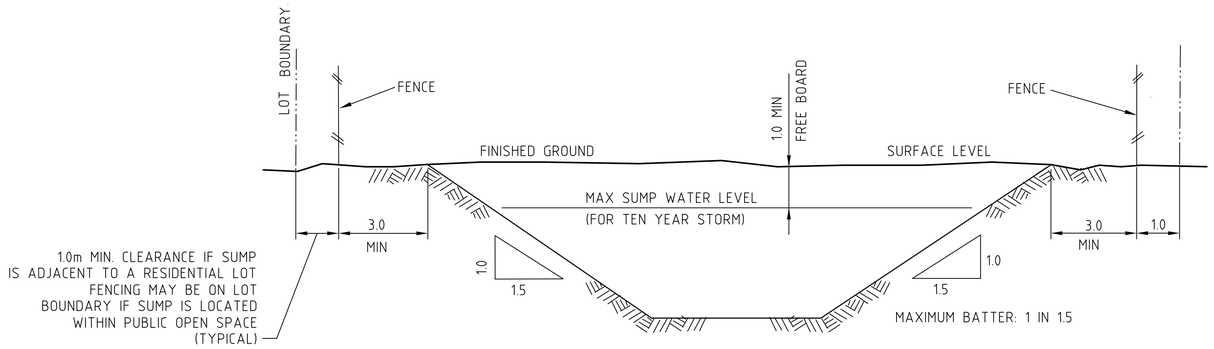
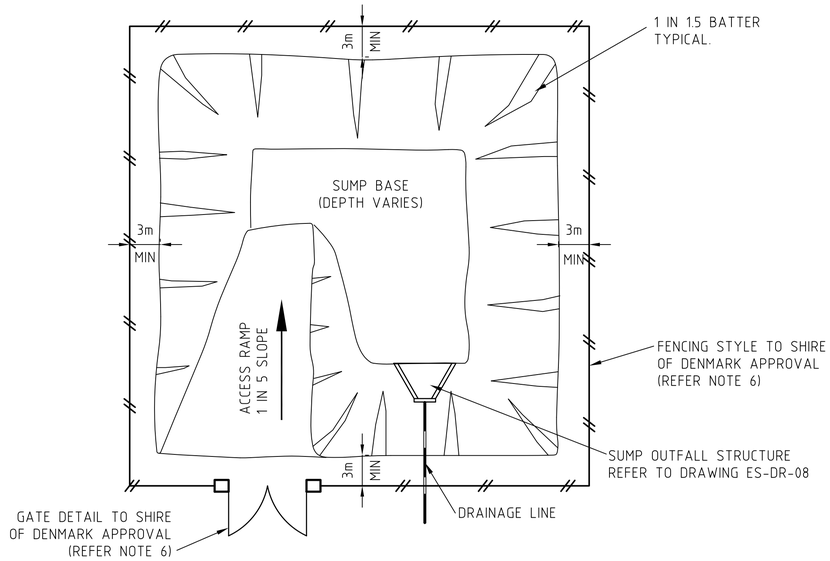



## TYPICAL SECTION THROUGH MANHOLE




## TYPICAL SECTION THROUGH SUMP




## TYPICAL SUMP PLAN

## NOTES:

1. CONCRETE SHALL BE MINIMUM 20 MPa COMPRESSIVE STRENGTH AT 28 DAYS.
2. FINISHED CONCRETE SURFACES SHALL NOT EXCEED THE TOLERANCES FOR CLASS 4 FORMWORK AS SPECIFIED IN AS 1510 PT 1-1974 CONTROL OF CONCRETE SURFACES-FORMWORK.
3. PRECAST UNITS SHALL BE USED ONLY WITH ENGINEERING SERVICES APPROVAL.
4. ALL PIPES SHALL BE CLASS 2 REINFORCED CONCRETE.
5. REFER TO ES-DR-04 FOR STANDARD PIT NOTES.

### FENCING

6. FENCING STYLE TYPES SHALL BE SUBJECT TO SHIRE OF DENMARK APPROVAL (A HIGH STANDARD OF FENCING IS REQUIRED). REFER TO STANDARD DRAWING ES-FE-01

Amendments

| No | Date | REVISION | By | App'd |
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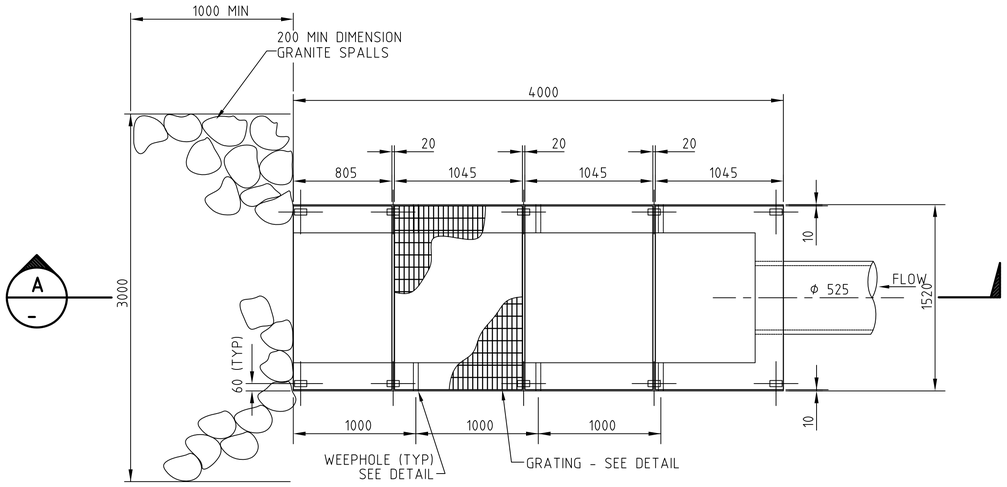
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

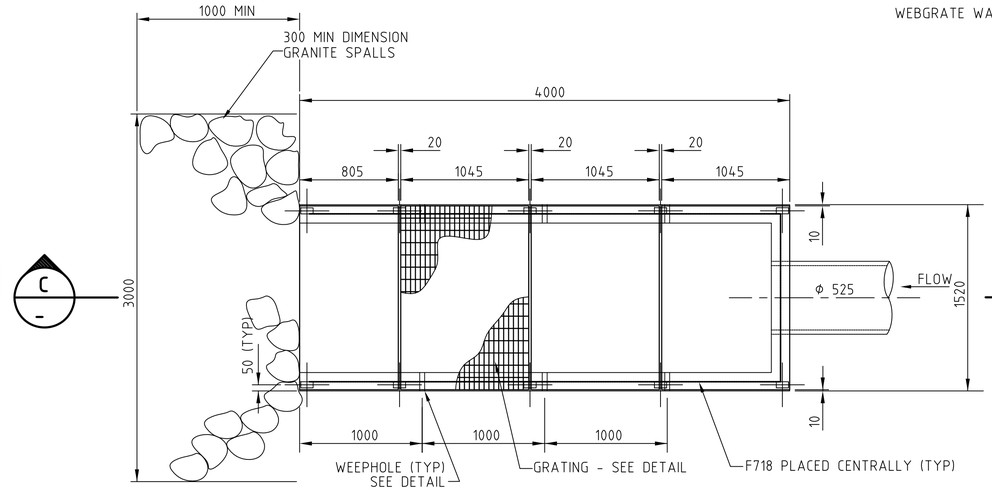
# DRAINAGE SUMP DETAILS

SHEET OF
DRAWING No.
ES-DR-08
Job No.

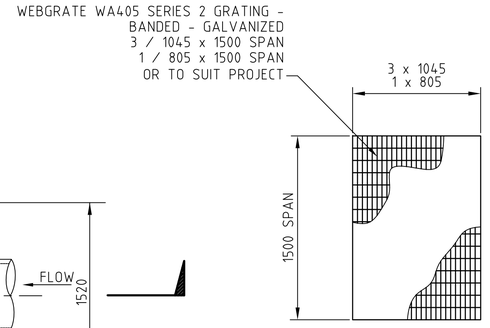
A
1



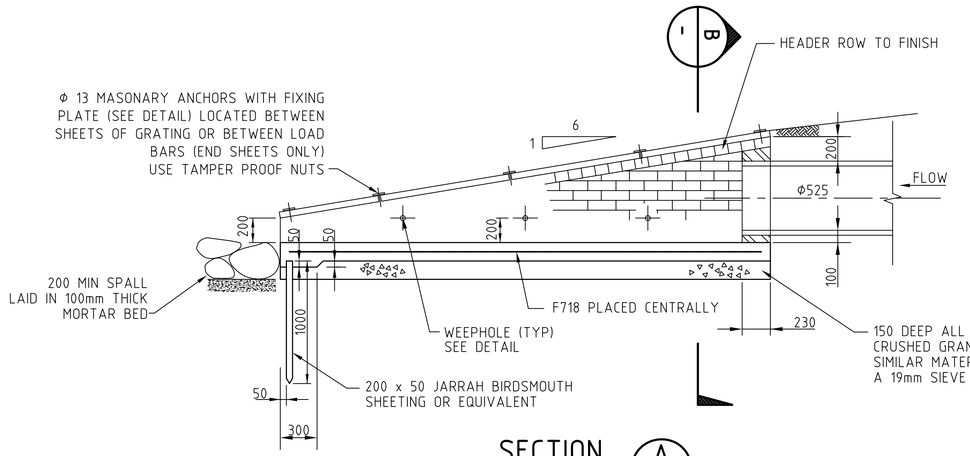

## PLAN - BRICK



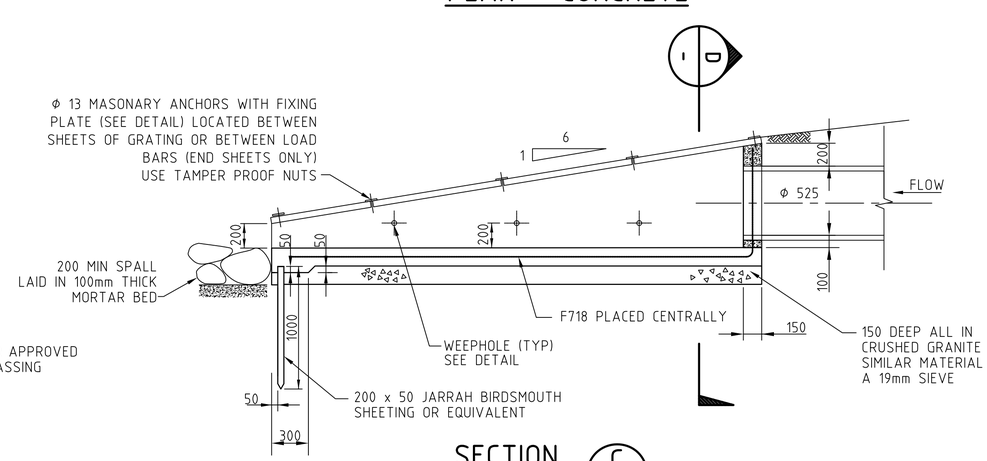

## PLAN - CONCRETE



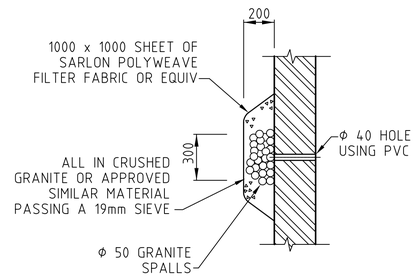

## GRATING DETAIL



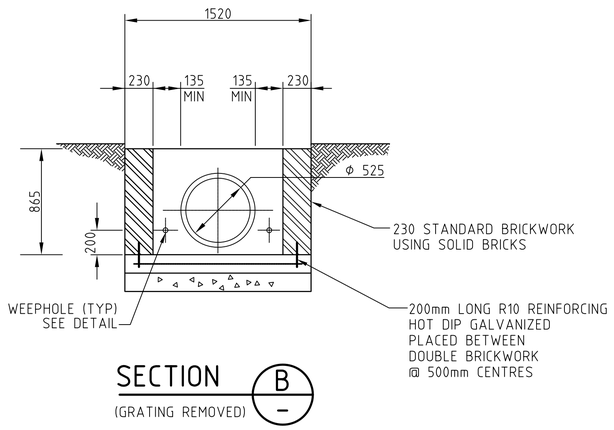

## SECTION A – (BRICK)



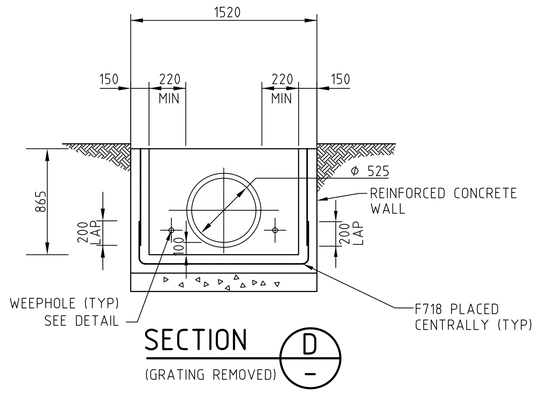

## SECTION C – (CONCRETE)



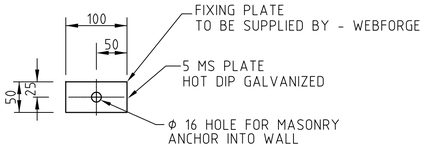

## WEEPHOLE DETAIL




## SECTION B – (GRATING REMOVED)




## SECTION D – (GRATING REMOVED)




## FIXING PLATE DETAIL

## NOTES

1. COVER TO REINFORCEMENT TO BE 60mm MINIMUM.
2. ALL CONCRETE WORKS TO BE IN ACCORDANCE WITH AS3600. CONCRETE TO BE N25.
3. BRICKS - 230 x 100 x 76 SOLIDS LAID IN A STRETCHER BOND PATTERN FOR WALLS WITH HEADER COURSE.
4. ALL BRICKWORK AND MORTAR TO COMPLY WITH AS3700. MORTAR TO BE A 1:1:6 MIX.
5. CUT PIPES TO FINISH FLUSH WITH INSIDE OF STRUCTURE WALL. CONNECTION OF PIPES TO STRUCTURE TO BE MADE GOOD WITH MORTAR.
6. CONCRETE TO BE 20 mpa AT 28 DAYS.
7. OVERALL DIMENSIONS OF STRUCTURE MAY VARY TO SUIT LOCAL PROJECT CONDITIONS.

Amendments

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# DRAINAGE
# OUTLET STRUCTURE DETAILS

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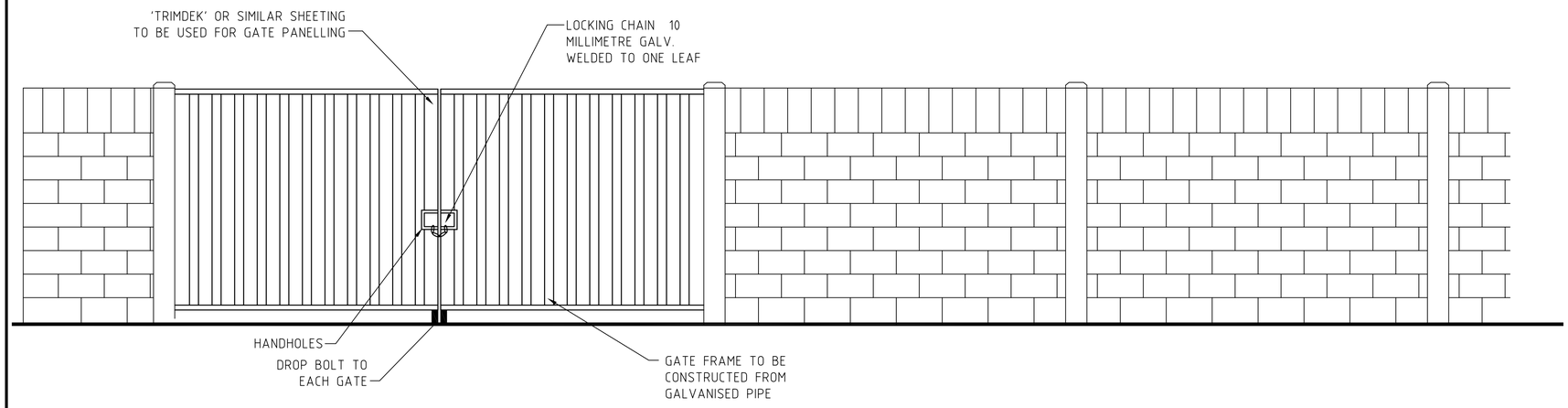
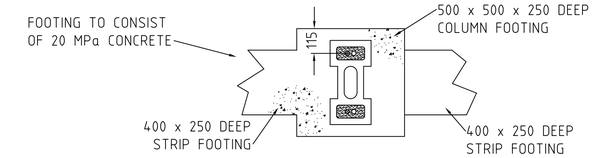
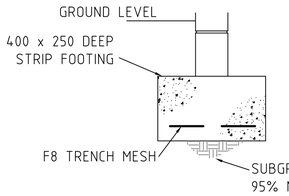


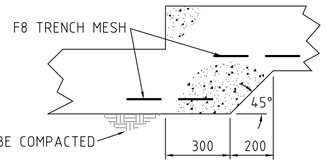

## TYPICAL WALL, FENCE AND GATE ELEVATION
## BORAL BESSER BLOCK OPTION




PIER FOOTING PLAN

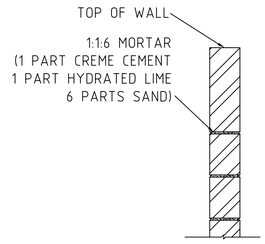



STRIP FOOTING SECTION

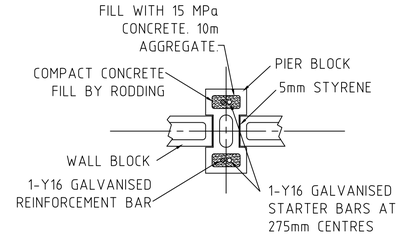



FOOTING STEP SECTION

## FOOTING DETAILS




## SECTION FOR WALL PANELS



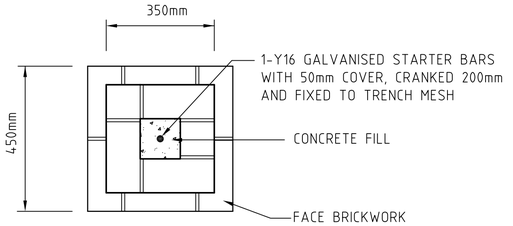

## PIER REINFORCEMENT DETAIL

### NOTES

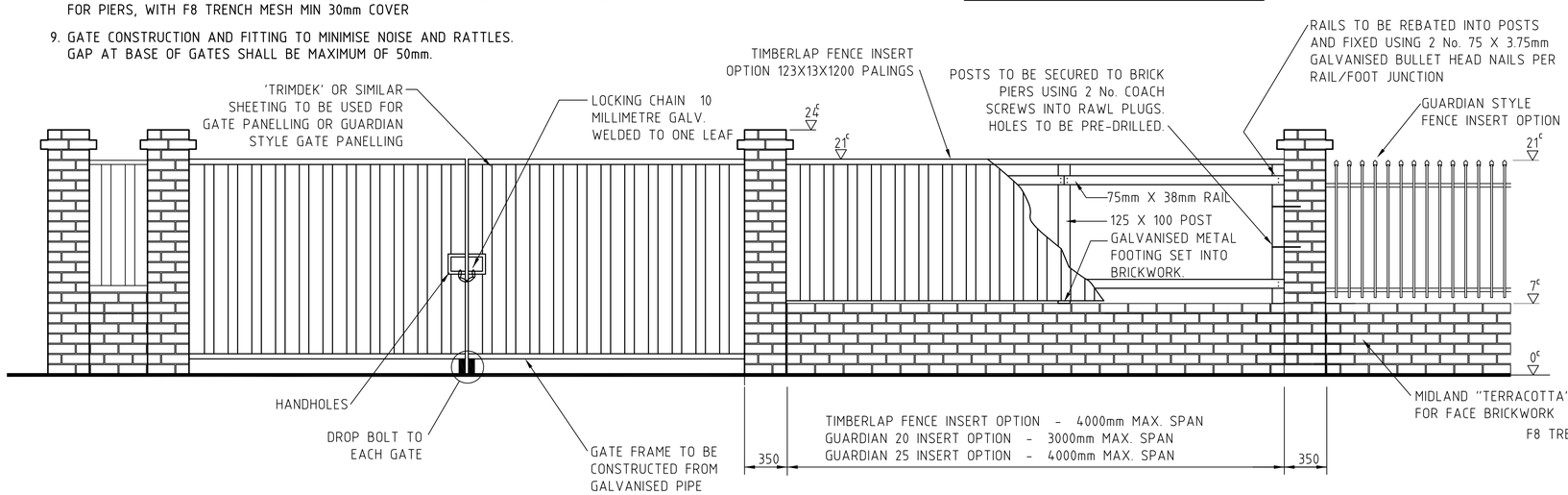
1. BORAL BESSER MASONRY BLOCKS TO BE USED TO CONSTRUCT WALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. WALL TO BE SPRAYED WITH ANTI GRAFFITI COATING.
3. ALL CADASTRAL BOUNDARIES TO BE RE-ESTABLISHED PRIOR TO CONSTRUCTION WORKS BEGINNING

### NOTES

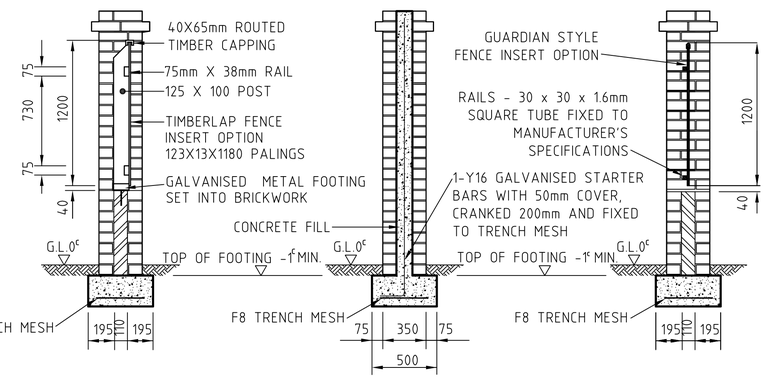
1. WHITE CEMENT TO BE OF ONE BRAND, BEING EITHER ONODA "WHITE" OR SWAN "OFF WHITE" CEMENT COMPLYING WITH AS 1315 OR A SIMILAR APPROVED NON-STAINING WHITE CEMENT.
2. ALL CEMENT TO BE DELIVERED TO THE SITE IN BRANDED SEALED BAGS. STORE ON SITE TO PREVENT DETERIORATION. REMOVE ADVERSLEY AFFECTED CEMENT FROM SITE
3. REINFORCEMENT SHALL COMPLY WITH AS1304.
4. FASTENERS, FIXINGS AND SIMILAR EXPOSED TO WEATHER, MORTAR OR PAINTS OR IN OTHER CORROSIVE SITUATIONS SHALL BE NON-FERROUS METAL OR HOT DIPPED GALVANISED STEEL DO NOT USE BOLTS LESS THAN 9mm DIAMETER.
5. ALL TIMBER SHALL BE SELECT GRADE, SAWN FINISHED JARRAH
6. PAINT TO ALL TIMBER TO BE DULUX "TIMBERCOLOUR" FEDERATION GREEN.
7. ANTI-GRAFFITI COATING SHALL BE A SOLVENT BASED POLYMER RESIN EQUIVALENT TO "ENVIROSHIELD G"
8. CONCRETE FOOTINGS TO BE 250mm DEEP, 300mm WIDE FOR WALLS AND 500mm WIDE FOR PIERS, WITH F8 TRENCH MESH MIN 30mm COVER
9. GATE CONSTRUCTION AND FITTING TO MINIMISE NOISE AND RATTLES. GAP AT BASE OF GATES SHALL BE MAXIMUM OF 50mm.




## TYPICAL PIER REINFORCEMENT DETAIL




## TYPICAL WALL, FENCE AND GATE ELEVATION
## STANDARD BRICK OPTION




TIMBERLAP INFILL | PIER SECTION | GUARDIAN STYLE INFILL

## TYPICAL WALL AND FENCE SECTIONS

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# SUMP FENCING OPTIONS

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| Job No. | |

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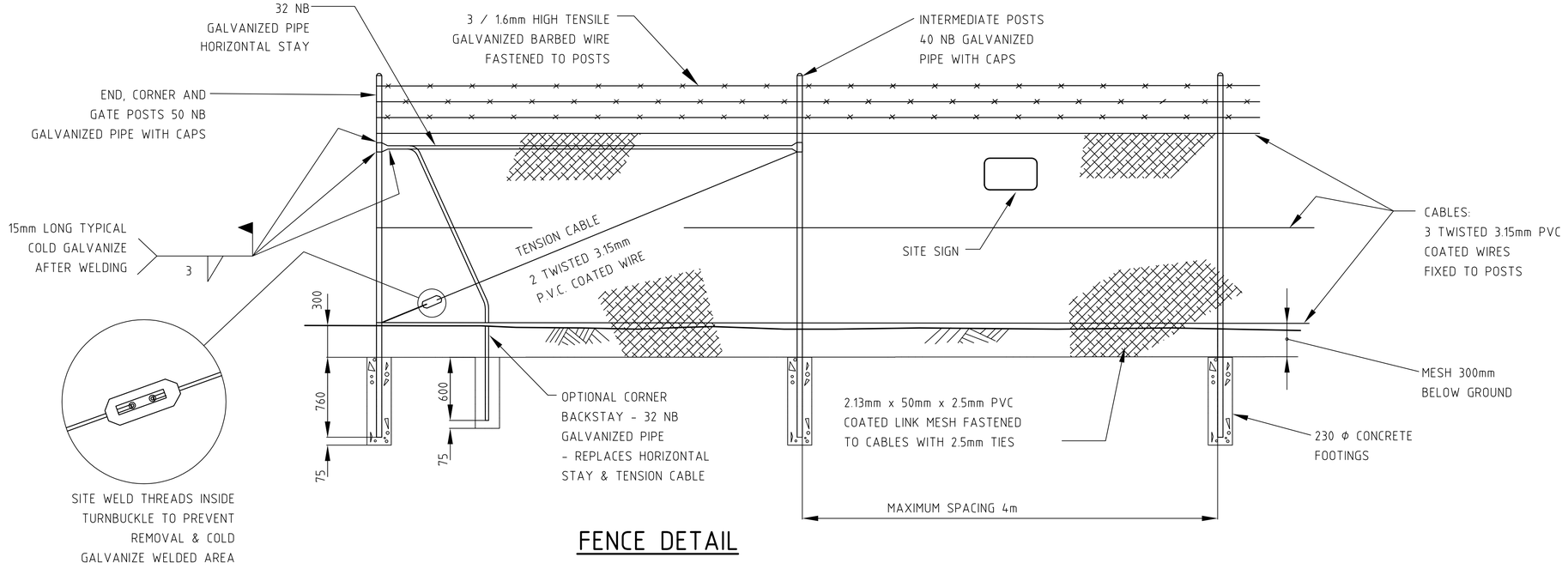
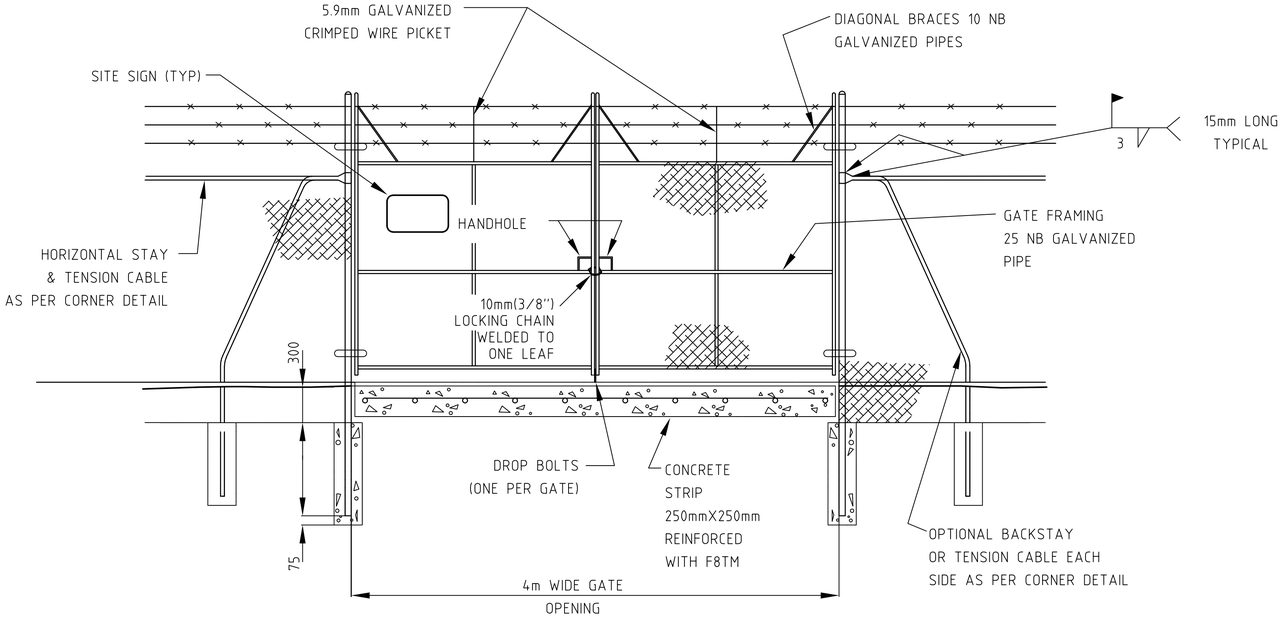
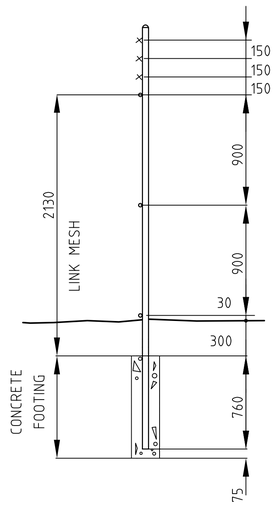



## FENCE DETAIL




## GATE DETAIL




## SECTION

## NOTES:

1. COUNCIL MAY REQUIRE FENCE TO BE SET 1000mm INSIDE RESERVE BOUNDARY ADJACENT TO PRIVATE PROPERTY OR ON RESERVE BOUNDARY ADJACENT TO RECREATION & ROAD RESERVES.
2. DROP BOLTS TO SLOT INTO STEEL OR PLASTIC SLEEVES IN CONCRETE STRIP.

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# INFRASTRUCTURE SECURITY FENCING SPECIFIC APPROVAL ONLY

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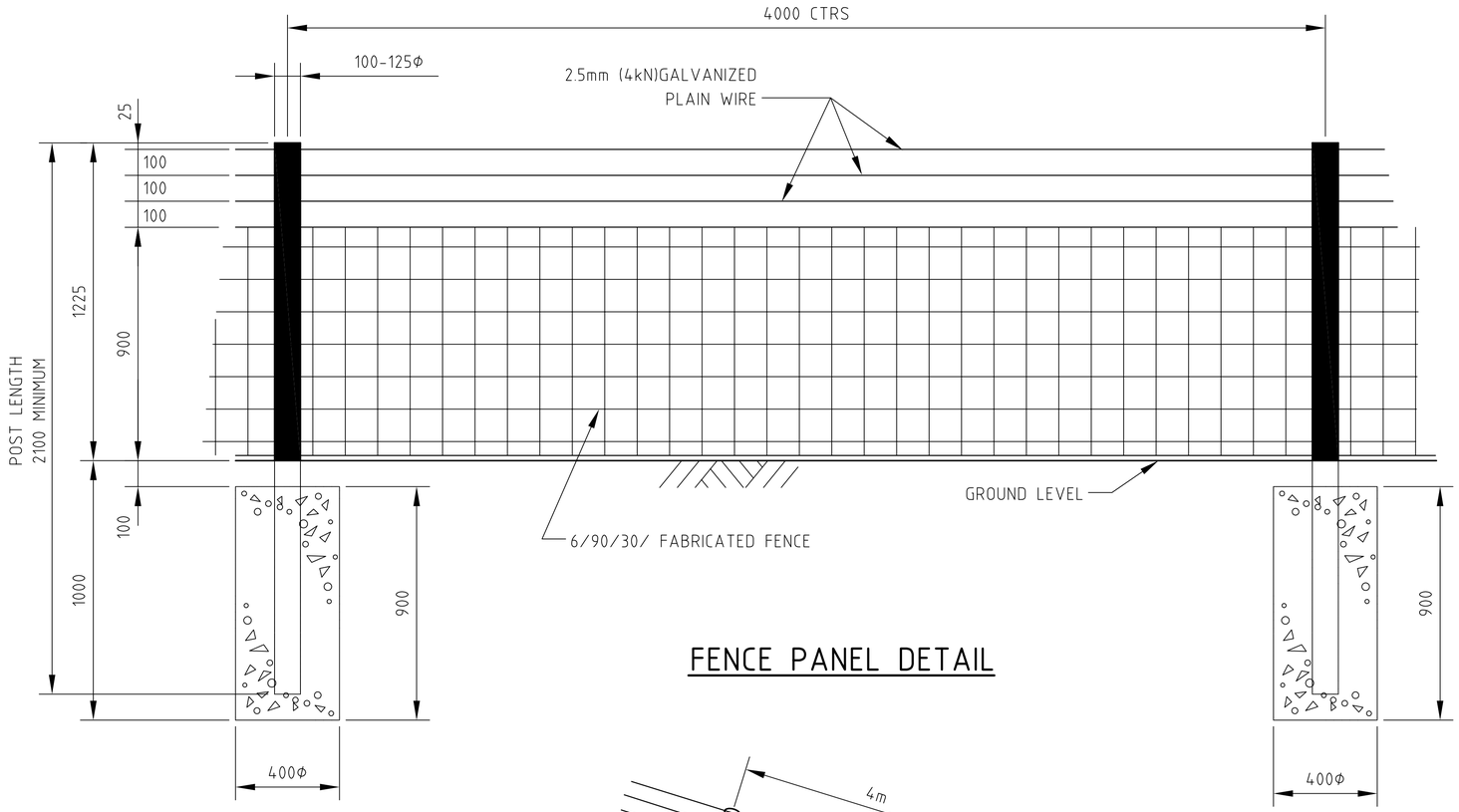
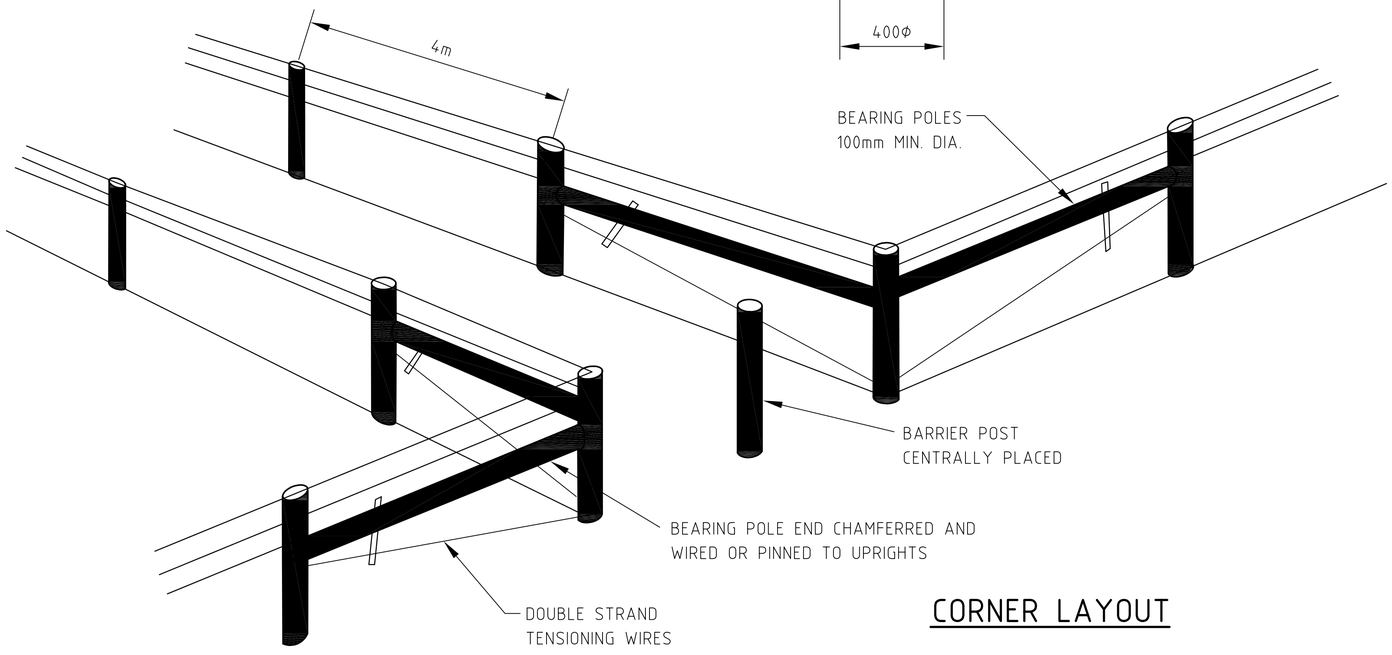



## FENCE PANEL DETAIL




## CORNER LAYOUT

## NOTES:

1. POST LENGTHS SHOWN ARE MINIMUM. LONGER POSTS MAY BE USED AND FOOTINGS REDUCED TO 300mm Φ FOR POSTS OVER 2.4m LONG. POSTS TO BE 1200mm OUT OF GROUND.
2. OPENINGS BETWEEN CORNER UNITS AND BARRIER POSTS TO BE MAXIMUM OF 1500mm.
3. BEARING POLES TO BE WIRED TO UPRIGHTS WITH 2 STRANDS PLAIN WIRE OR END-DRILLED AND PINNED. EITHER METHOD TO ENSURE SECURE FIXING.
4. MESH TO BE 6/90/30 RINGLOCK FABRICATED FENCING OR EQUIVALENT. WIRES TO BE AS SHOWN AND GALVANISED

Amendments

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# POST AND WIRE FENCING

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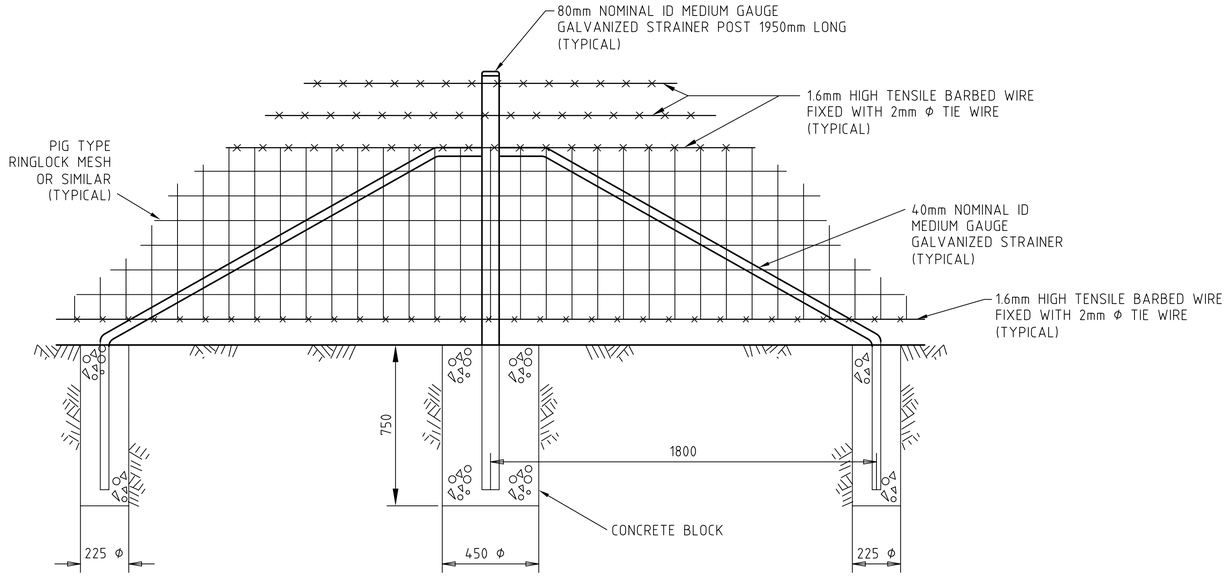
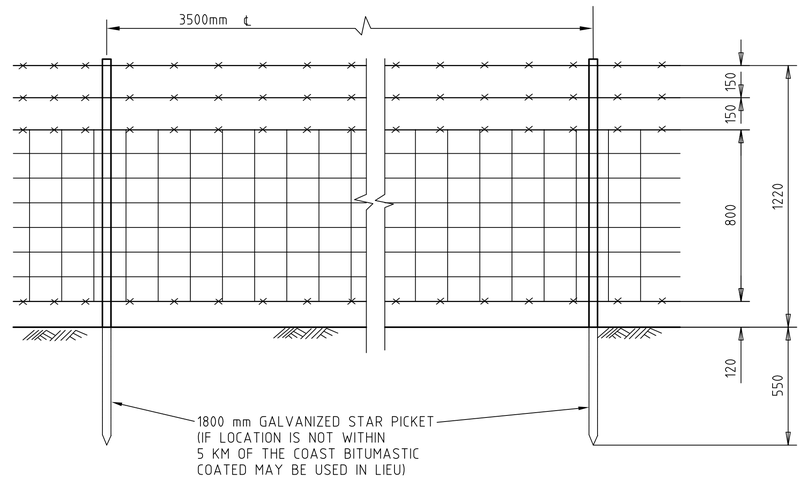
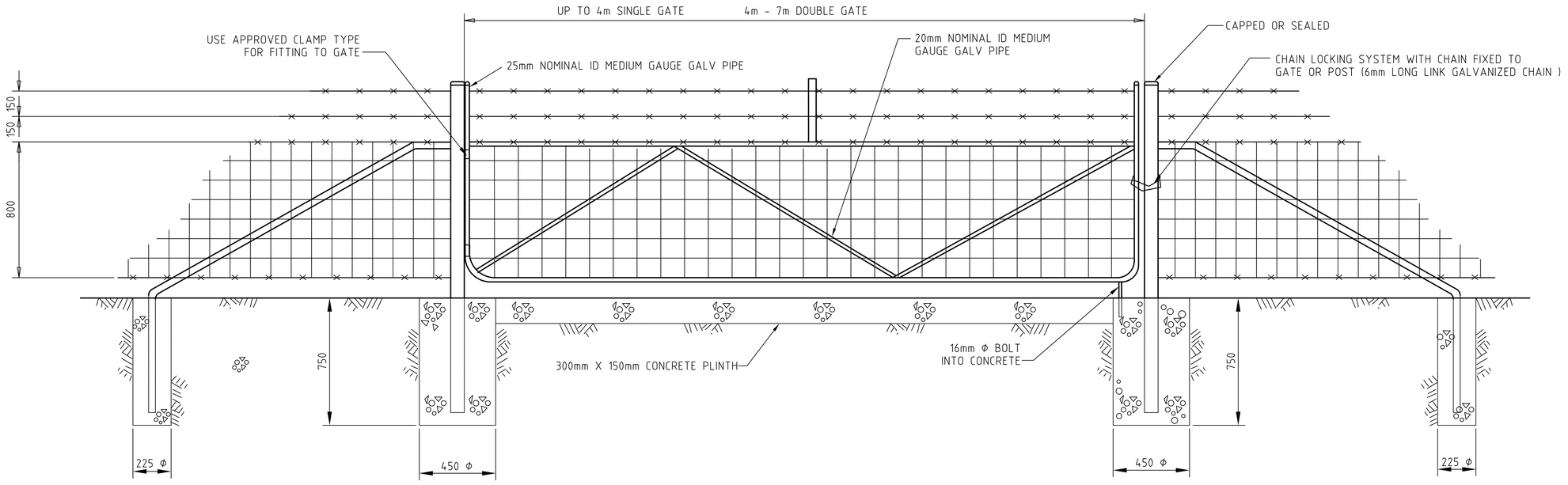



## STRAINER OR CORNER POST




## INTERMEDIATE POSTS




## GATE AND GATE POST DETAIL

## NOTE:

1. ALL POSTS TO BE FITTED WITH APPROVED CAPS.

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# EXTRACTIVE INDUSTRY FENCING

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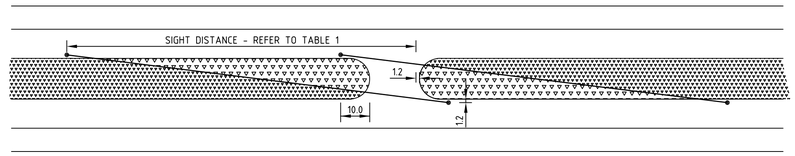
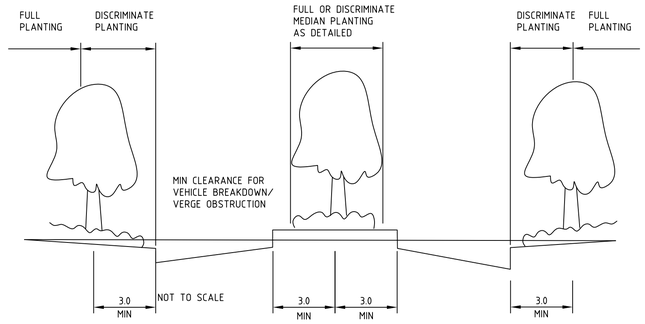



## TYPICAL MEDIAN OPENING LAYOUT




## TYPICAL CROSS SECTION




## TYPICAL INTERSECTION LAYOUT



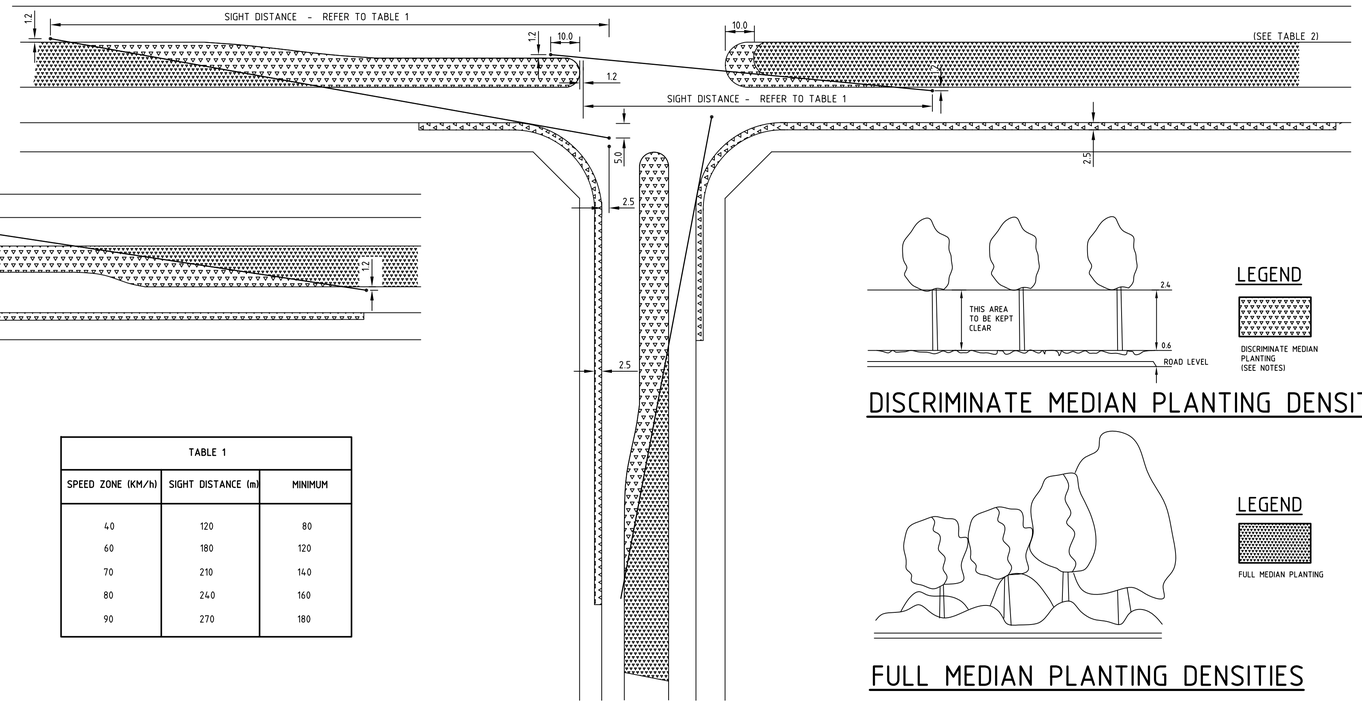

## REQUIREMENTS FOR SIGHT LINE ON CRESTS

| TABLE 1 | | |
|---|---|---|
| SPEED ZONE (KM/h) | SIGHT DISTANCE (m) | MINIMUM |
| 40 | 120 | 80 |
| 60 | 180 | 120 |
| 70 | 210 | 140 |
| 80 | 240 | 160 |
| 90 | 270 | 180 |

| TABLE 2 | |
|---|---|
| ROAD TYPE | OFFSET DISTANCE(m) |
| ARTERIAL | 3.0 |
| LOCAL DISTRIBUTOR & ACCESS WAYS | 1.5 |
| ACCESS LANES | ×× 1.0 |

×× SUBJECT TO MANAGER ENGINEERING SERVICES APPROVAL

TREE OFFSETS - FOR APPROVED SPECIFICATIONS




## TYPICAL "T" JUNCTION LAYOUT




LEGEND

DISCRIMINATE MEDIAN PLANTING (SEE NOTES)

## DISCRIMINATE MEDIAN PLANTING DENSITIES



LEGEND

FULL MEDIAN PLANTING

## FULL MEDIAN PLANTING DENSITIES

## NOTES

1. DISCRIMINATE MEDIAN PLANTING TO BE PROPERLY MANAGED TO MAINTAIN A CLEAR 600mm TO 2400mm STRATUM DURING GROWING PERIOD.
2. ALL PLANTING TO TAKE INTO ACCOUNT EXISTING AND FUTURE STREET LIGHTING.
3. ALL PLANTING TO TAKE INTO ACCOUNT EXISTING AND FUTURE DRAINAGE.

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# ROAD RESERVE LANDSCAPING SETBACKS & SIGHTLINES

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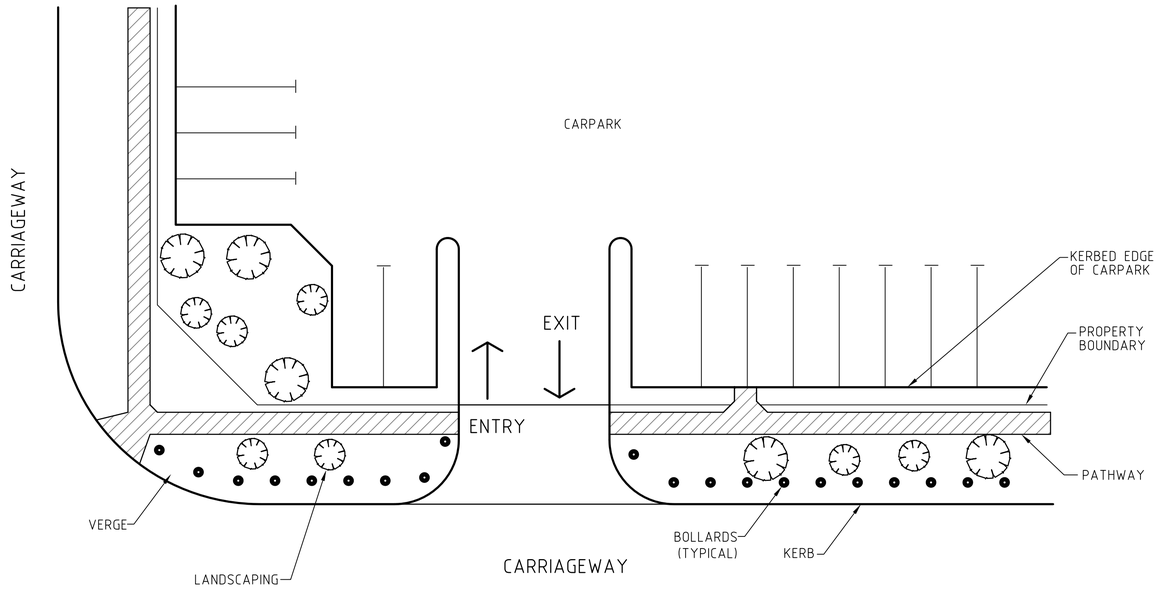
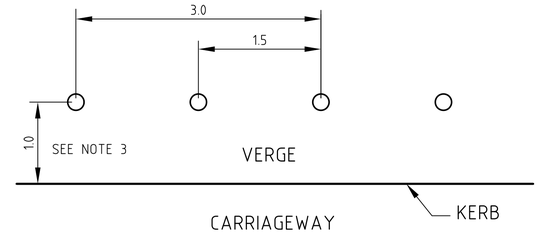
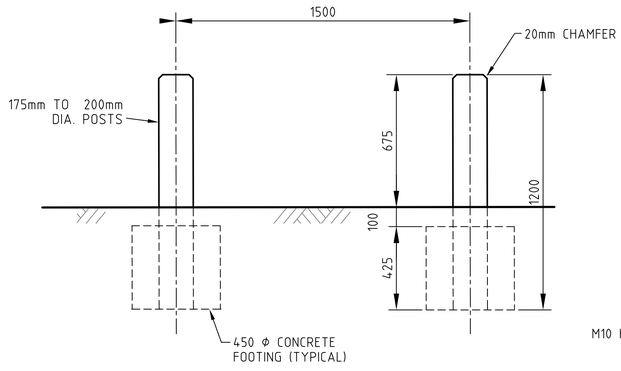


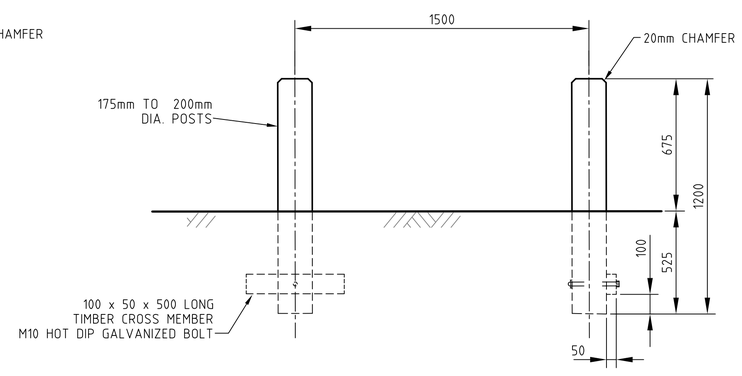

## LAYOUT PLAN



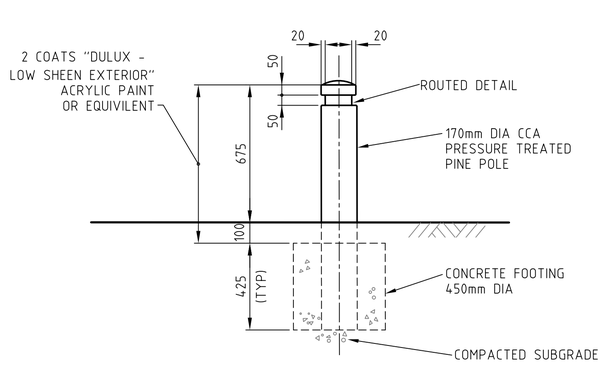

## BOLLARD DETAIL



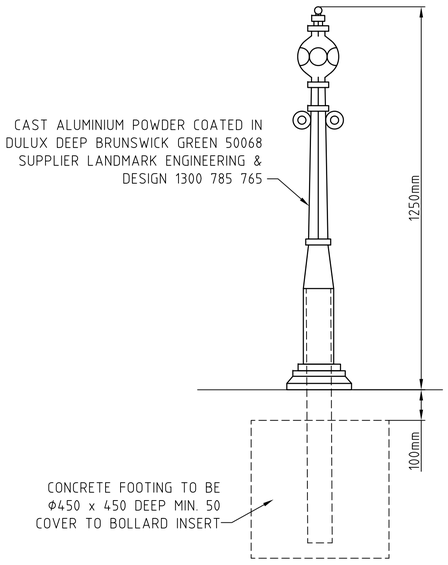

## TIMBER BOLLARD CONCRETE FOOTING




## TIMBER STRUT ALTERNATIVE INSTALLATION




## ROUTED TIMBER BOLLARD




DECORATIVE STYLE

## HIGHBURY BOLLARD

NOTES:

1. LANDSCAPING TO HAVE 600-2400mm CLEAR ZONE ABOVE PAVEMENT FOR UNOBSTRUCTED SIGHTLINE TO VEHICLES AND PEDESTRIANS.

CAUTION:

2. THE INSTALLATION OF BOLLARDS SHOULD NOT INTERFERE WITH EXISTING SERVICES INCLUDING STORMWATER DRAINAGE. INSTALLER IS RESPONSIBLE FOR CONTACTING SERVICE AUTHORITIES TO DETERMINE LOCATIONS AND DEPTHS OF SERVICES PRIOR TO BOLLARD INSTALLATION. ALWAYS SOFT DIG FOOTINGS FOR BOLLARD INSTALLATIONS.

3. OFFSET FROM KERB MAY VARY SUBJECT TO TRAFFIC TYPE, KERB TREATMENT AND POSTED SPEED LIMIT.

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# ROB WHOOLEY
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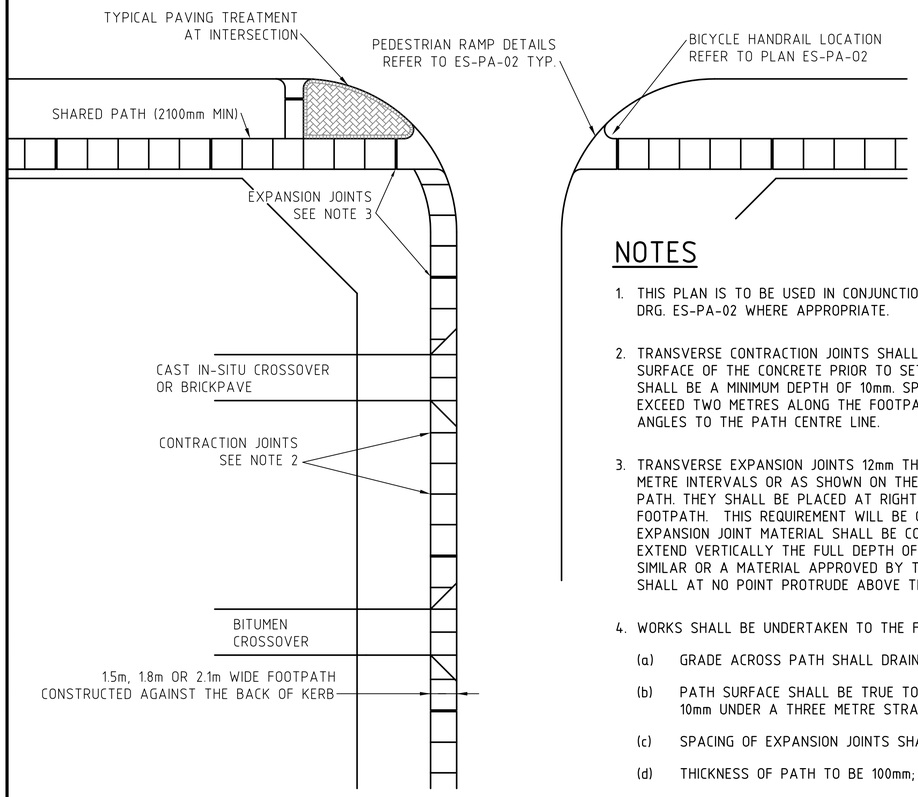
# LANDSCAPING VERGE BOLLARDS

SHEET OF
DRAWING No.
ES-LS-02
Job No.

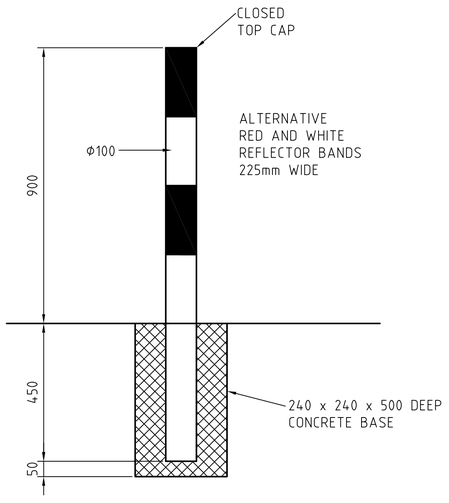
A 1



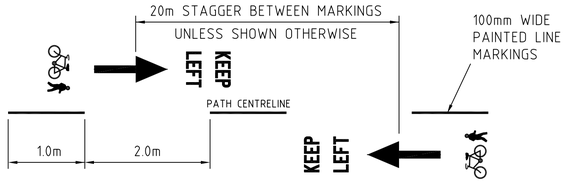

# STANDARD DETAILS FOR CAST IN-SITU CONCRETE FOOTPATHS

## NOTES

1. THIS PLAN IS TO BE USED IN CONJUNCTION WITH DRG. ES-PA-02 WHERE APPROPRIATE.
2. TRANSVERSE CONTRACTION JOINTS SHALL CONSIST OF GROOVES CUT IN THE SURFACE OF THE CONCRETE PRIOR TO SETTING WITH AN APPROVED TOOL. THEY SHALL BE A MINIMUM DEPTH OF 10mm. SPACING OF THE JOINTS SHALL NOT EXCEED TWO METRES ALONG THE FOOTPATH AND SHALL BE PLACED AT RIGHT ANGLES TO THE PATH CENTRE LINE.
3. TRANSVERSE EXPANSION JOINTS 12mm THICK ARE TO BE CONSTRUCTED AT 10 METRE INTERVALS OR AS SHOWN ON THE DRAWINGS FOR THE FULL DEPTH OF THE PATH. THEY SHALL BE PLACED AT RIGHT ANGLES TO THE CENTRE LINE OF THE FOOTPATH. THIS REQUIREMENT WILL BE CLOSELY SUPERVISED. THE EXPANSION JOINT MATERIAL SHALL BE CONTINUOUS FROM FORM TO FORM AND EXTEND VERTICALLY THE FULL DEPTH OF THE SLABS AND SHALL BE 'MELJOINT' OR SIMILAR OR A MATERIAL APPROVED BY THE SHIRE ENGINEER. THE JOINT MATERIAL SHALL AT NO POINT PROTRUDE ABOVE THE SURFACE OF THE PATH.
4. WORKS SHALL BE UNDERTAKEN TO THE FOLLOWING TOLERANCES:
   - (a) GRADE ACROSS PATH SHALL DRAIN 2% TO KERB LINE
   - (b) PATH SURFACE SHALL BE TRUE TO LINE AND NOT DEVIATE MORE THAN 10mm UNDER A THREE METRE STRAIGHT EDGE.
   - (c) SPACING OF EXPANSION JOINTS SHALL BE 10 METRES + 100mm.
   - (d) THICKNESS OF PATH TO BE 100mm; -0mm, +10mm.
   - (e) WIDTH OF PATH; -0mm, +20mm.
   - (f) SURFACE IRREGULARITIES, INCLUDING ABUTTING TO SERVICE AUTHORITY MANHOLES, ETC, SHALL NOT EXCEED 3mm
5. FORMS ARE NOT TO BE REMOVED FROM THE CONCRETE WITHIN A TIME PERIOD OF AT LEAST EIGHT HOURS SINCE PLACEMENT OF THE CONCRETE. THIS TIME PERIOD MAY BE REDUCED WITH APPROVAL OF MANAGER ENGINEERING SERVICES DEPENDING UPON WEATHER CONDITIONS.
6. WHERE A PATH IS 1m OR LESS FROM A PROPERTY BOUNDARY AND CROSSES AN EXISTING BITUMEN CROSSOVER OR PRIVATE PATH, THE AREA BETWEEN THE PATH AND THE PROPERTY BOUNDARY SHALL BE CAST IN-SITU CONCRETE.
7. PATHS SHALL BE 100mm THICK FOR GENERAL PURPOSE USE AND 150mm THICK FOR INDUSTRIAL AREAS SUBJECT TO VEHICLE USAGE AND THE SATISFACTION OF MANAGER ENGINEERING SERVICES.

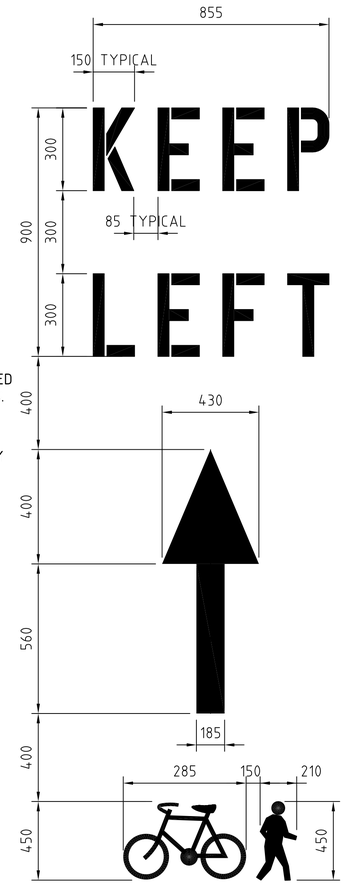



STEEL BOLLARD DETAIL



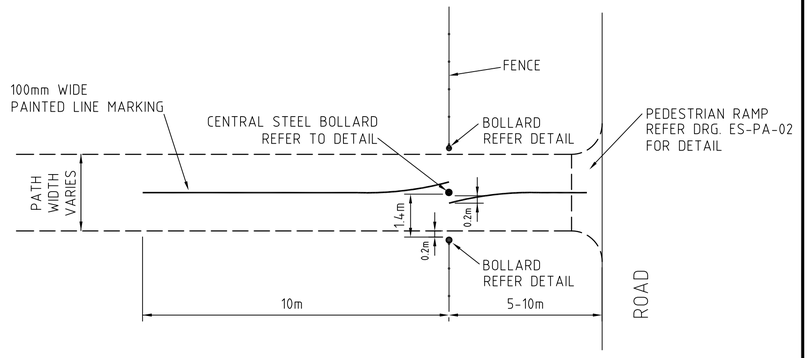

STANDARD KEEP LEFT AND CYCLEWAY MARKINGS.
REFER TO MARKING DIMENSION DETAIL, FOR DIMENSIONS.
MARKINGS TO BE SPACED EVERY 100m IN EACH DIRECTION OR AT PATH ENDS AND JUNCTIONS.

LAYOUT PLAN - SHARED PATH

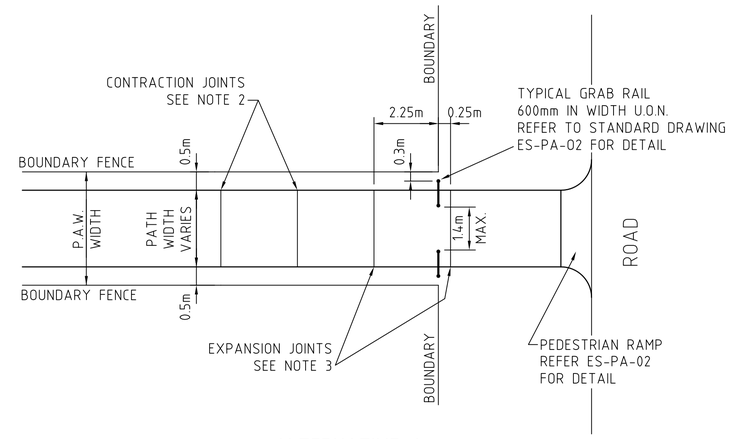



MARKING DIMENSIONS SHARED PATH

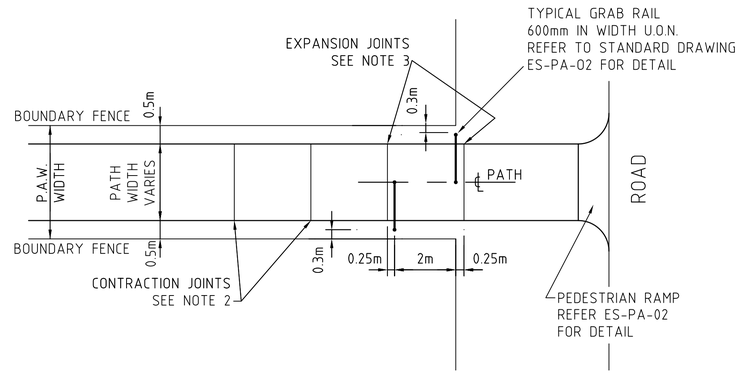
LINE MARKING DETAIL




CENTRAL PATH FIXTURE PROTECTION MEASURES (PREFERRED TREATMENT)




ALTERNATIVE A
(NOT FOR GENERAL USE, APPROVAL BY MANAGER ENGINEERING SERVICES)




ALTERNATIVE B
(NOT FOR GENERAL USE, APPROVAL BY MANAGER ENGINEER SERVICES)

STANDARD PUBLIC ACCESS WAY VEHICLE OBSTRUCTIONS

| Amendments | | | | | | |
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# FOOTPATH, SHARED PATH AND PUBLIC ACCESS WAY DETAILS

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| DRAWING No. | ES-PA-01 |
| Job No. | |

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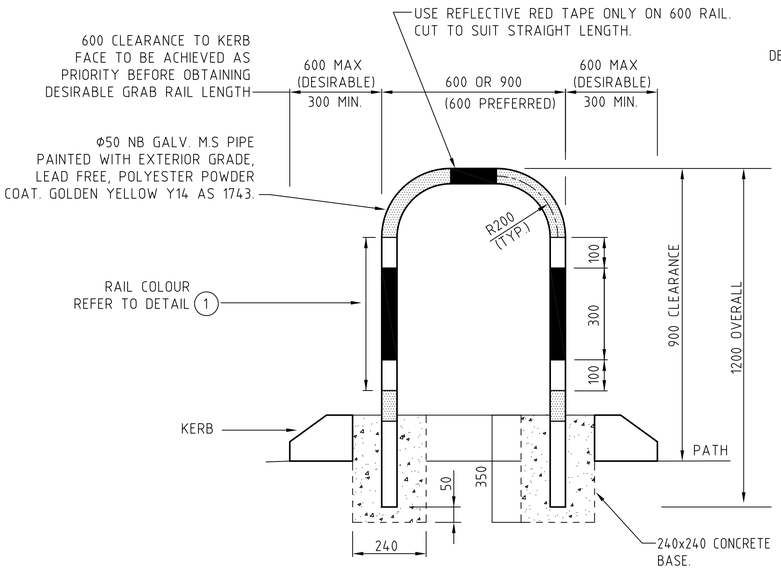
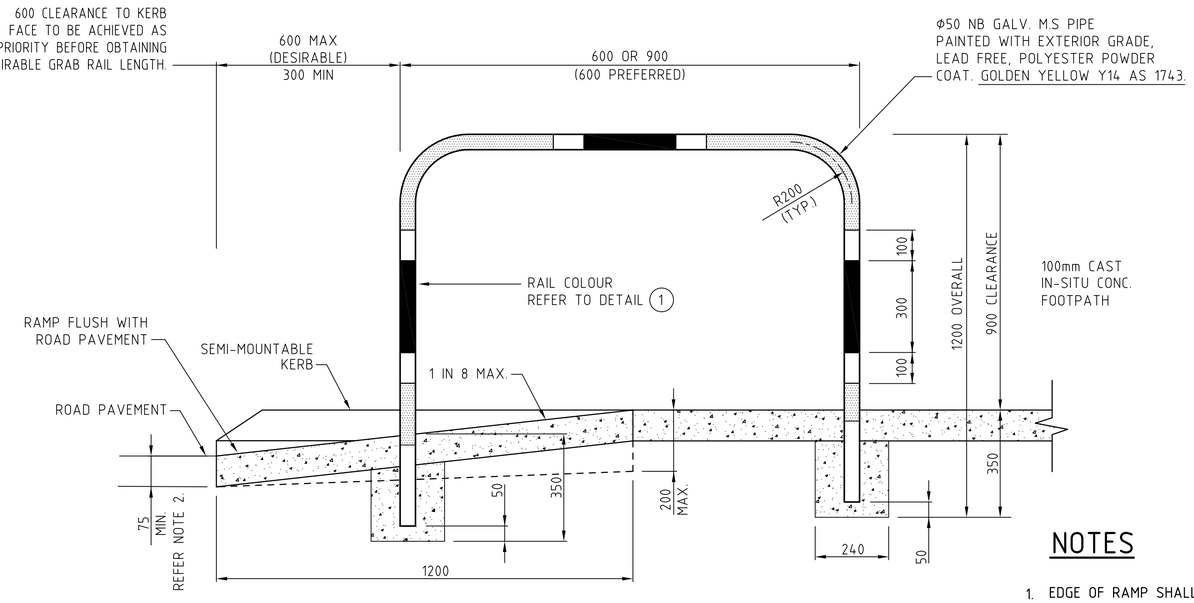
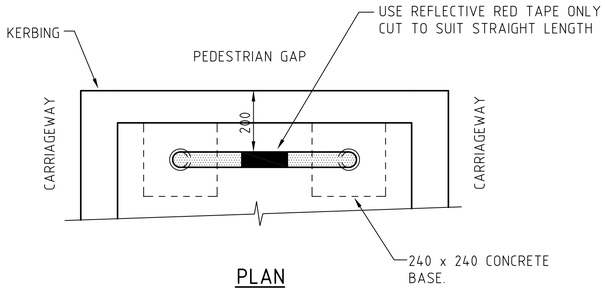


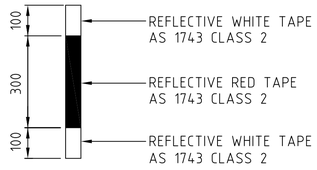

ELEVATION




SECTION A-A - RAMP (TYPES 1 AND 2)




PLAN

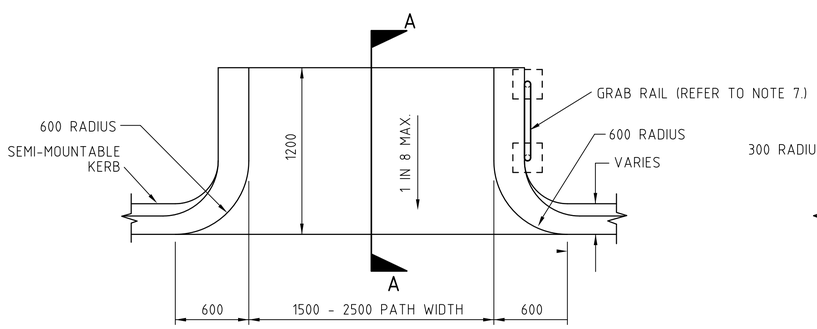



1 DETAIL - RAIL COLOUR

## NOTES

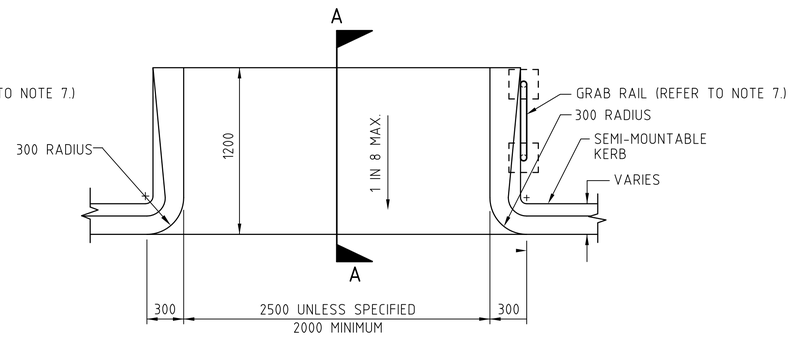
1. EDGE OF RAMP SHALL BE FLUSH WITH PAVEMENT (ASPHALT OR SEAL)
2. ALL CONCRETE SHALL BE BROOM FINISHED ACROSS THE DIRECTION OF PEDESTRIAN TRAFFIC TO PROVIDE A NON-SLIP SURFACE.
3. A MINIMUM OF 500mm OF KERB SHALL BE PROVIDED BETWEEN ADJACENT RAMPS. WHERE THIS MINIMUM CANNOT BE ACHIEVED A SINGLE WIDE RAMP SHALL BE PROVIDED.
4. PATHS PARALLEL TO THE KERB SHALL BE REALIGNED OR WIDENED TO PROVIDE A LEVEL SECTION 1.5m MINIMUM WIDTH BEHIND THE RAMP.
5. PEDESTRIAN GAPS SHALL BE A MINIMUM WIDTH OF 2.5m AND BE USED INSTEAD OF KERB RAMPS IN MEDIANS, MEDIAN ISLANDS AND ISLANDS WHERE THE DISTANCE BETWEEN KERB FACES IS LESS THAN 4.5m.
6. PEDESTRIAN GRAB RAILS SHALL BE PROVIDED AT MEDIANS AND MEDIAN ISLANDS GREATER THAN 1.2m WIDE. GRAB RAILS ARE TO BE LOCATED ON THE PEDESTRIAN EXIT LEFT HAND SIDE OF THE RAMP AS SHOWN IN KERB RAMPS- TYPE 1 & 2 DETAILS.
7. IF [MEDIAN] IS LESS THAN 1.2m WIDE, NO GRAB RAIL IS REQUIRED.
8. IF [MEDIAN] IS MORE THAN 1.2m WIDE, GRAB RAIL IS REQUIRED
9. CONSIDERATION SHOULD BE GIVEN TO THE PROVISION OF DIRECTIONAL AND TACTILE PAVING.
10. CONCRETE CLASS SHALL BE N20.
11. KERB RAMPS TO BE ALIGNED TO THE DIRECTION OF THE ROAD CROSSING.

## TYPICAL GRAB RAIL DETAILS - TYPE 2.
## AT MEDIAN AND MEDIAN ISLAND LOCATION



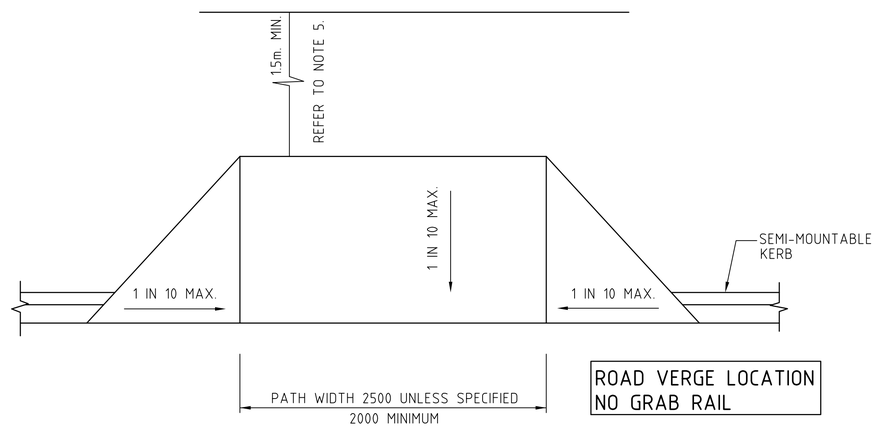

ROAD VERGE LOCATION

PLAN - RAMP (TYPE 1.)




MEDIAN LOCATION
MEDIAN ISLAND LOCATION

PLAN - RAMP (TYPE 2.)




ROAD VERGE LOCATION
NO GRAB RAIL

PLAN - SHARED PATH RAMP (TYPE 3.)

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# PEDESTRIAN RAMP AND GRAB RAIL DETAILS

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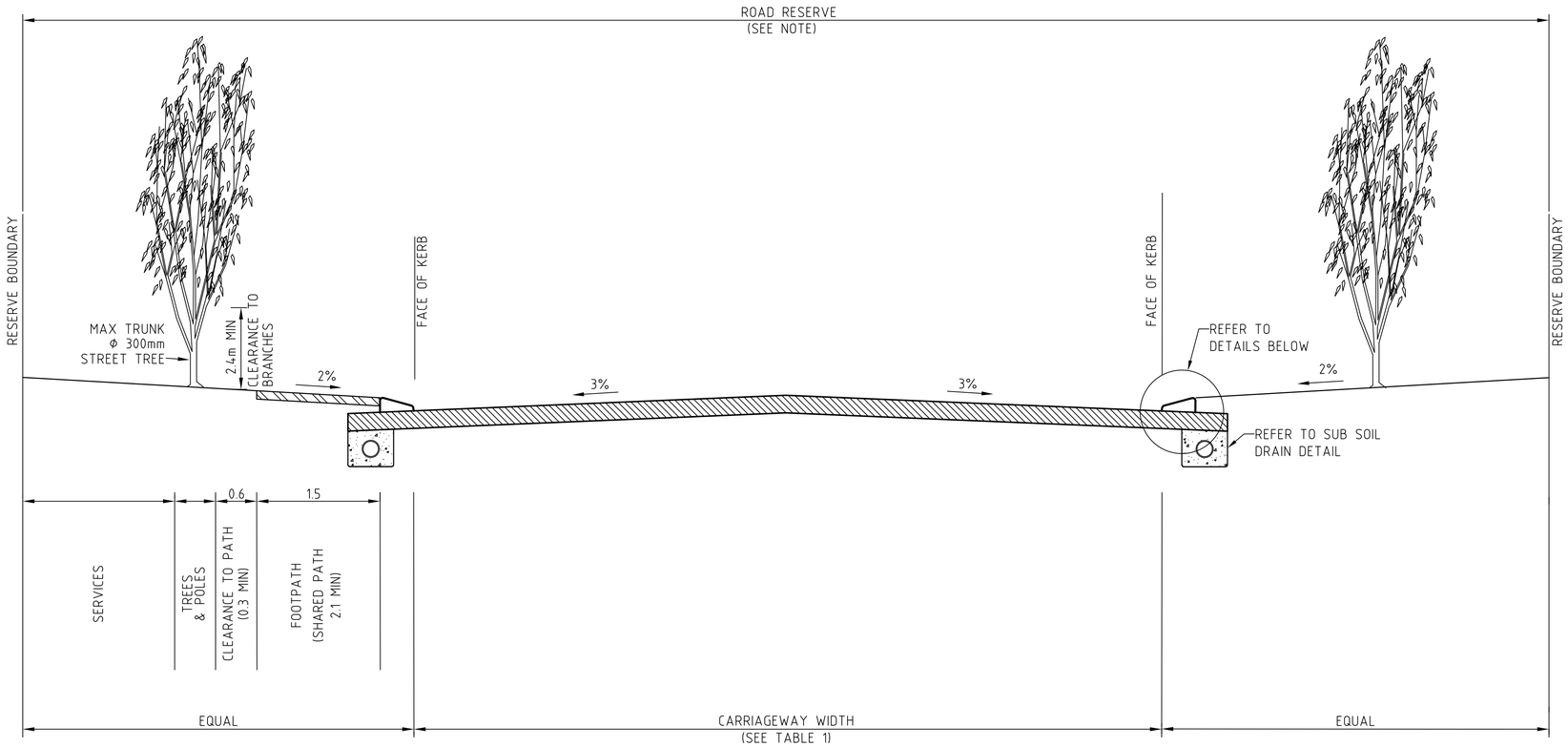
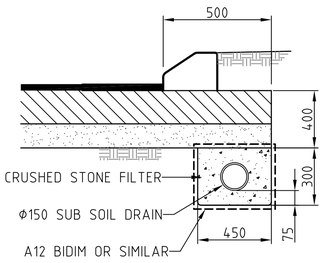
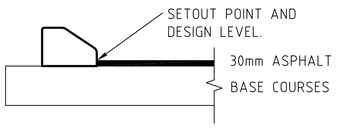
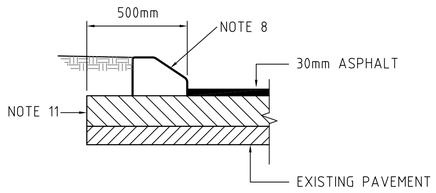


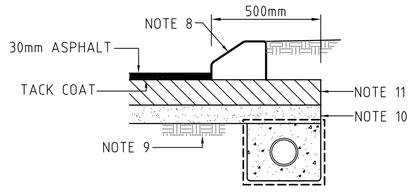

SUB SOIL DRAIN DETAIL




SETOUT DETAIL




PARTIAL ROAD RECONSTRUCTION AND KERB PROFILE




FULL DEPTH ROAD CONSTRUCTION

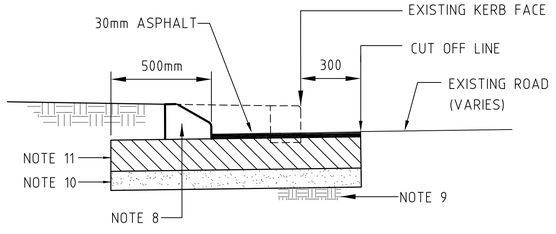
TABLE NOTES:

A. INCLUDES MIN. 2.5m WIDE TRAFFIC ISLAND.

B. REFER TO DRG No ES-BU-01 FOR BUS EMBAYMENT DETAILS.

## TABLE 1 CARRIAGEWAY AND RESERVE WIDTH

| TYPE | MINIMUM RES. WIDTH | MIN. CARRIAGEWAY WIDTH | MINIMUM VERGE WIDTHS | COMMENTS |
|---|---|---|---|---|
| TYPICAL SECTION | 16.0m | 6.2m | 4.5m | FOOTPATH REQUIRED |
| TRAFFIC ISLANDS | 18.0m | 10.0m (SEE NOTE A) | 4.0m | LOCALISED WIDENING |
| LOCAL DISTRIBUTOR | 20.0m | 7.4m | 6.0m | SHARED PATH REQUIRED |




TYPICAL PAVEMENT WIDENING

## NOTES:

1. DETAILS FOR LOCAL ROADS CARRYING UP TO 6000 VEHICLES PER DAY
2. ROAD HIERARCHY IS TO BE ESTABLISHED IN ACCORDANCE WITH MANAGER ENGINEERING SERVICES & MRWA.
3. THE DESIGN SPEED SHALL BE A MINIMUM OF 60 km/h AND MUST BE APPROVED BY THE MANAGER ENGINEERING SERVICES PRIOR TO DESIGNING ROAD GEOMETRY.
4. ROAD PAVEMENT, KERBING, VERGE TREATMENTS AND OTHER DETAILS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE SHIRE OF DENMARK STANDARDS AND SPECIFICATIONS.
5. ONE WAY CROSSFALL MAY BE ADOPTED SUBJECT TO DESIGN SPEED SUPERELEVATION REQUIREMENTS.
6. AN APPROPRIATE TRAFFIC CALMING STRATEGY, TYPICALLY INCLUDING TRAFFIC ISLANDS, ROUNDABOUTS, PEDESTRIAN CROSSINGS AND TRAFFIC TREATMENTS SHALL BE INCLUDED IN THE ROAD DESIGN.
7. MINIMUM OFFSET TO STREET TREES MAY BE REDUCED FOR LOWER ORDER ROADS.
8. KERBING SHALL BE SEMI MOUNTABLE KERB TYPE 1 FOR ALL SWEEPS AND MOUNTABLE KERB TYPE 1. REFER DRG ES-CR-09 FOR DETAILS.
9. SUBGRADE SHALL BE COMPACTED TO 95% MMDD.
10. SUB BASE TO BE 100mm CLEAN FREE DRAINING SAND OR CRUSHED LIMESTONE COMPACTED TO 95% MMDD.
11. BASE TO BE 300mm LATERITE GRAVEL, COMPACTED TO 98% MMDD IN TWO 150mm LAYERS.
12. COMPCATION SHALL BE IN ACCORDANCE WITH THE SHIRE OF DENMARK SPECIFICATION FOR THE CONSTRUCTION OF ROADS AND STORMWATER DRAINAGE.

Amendments

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# LOCAL ROADS TYPICAL CROSS SECTION AND DETAILS

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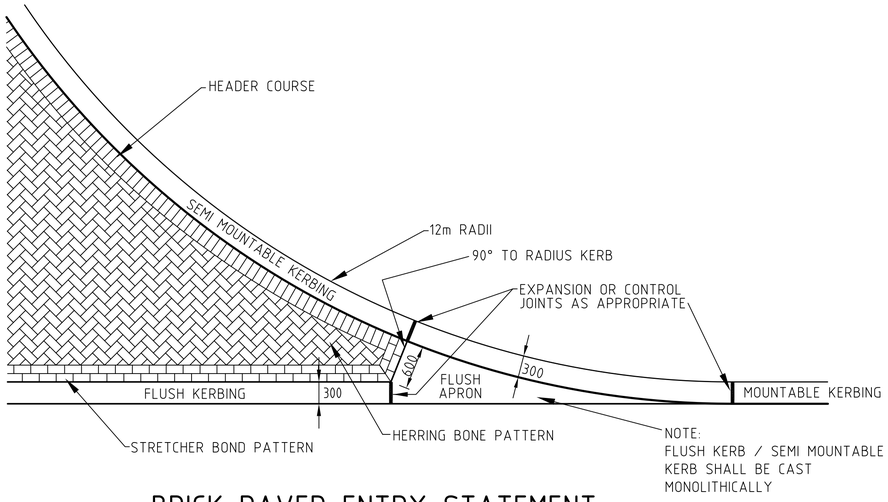
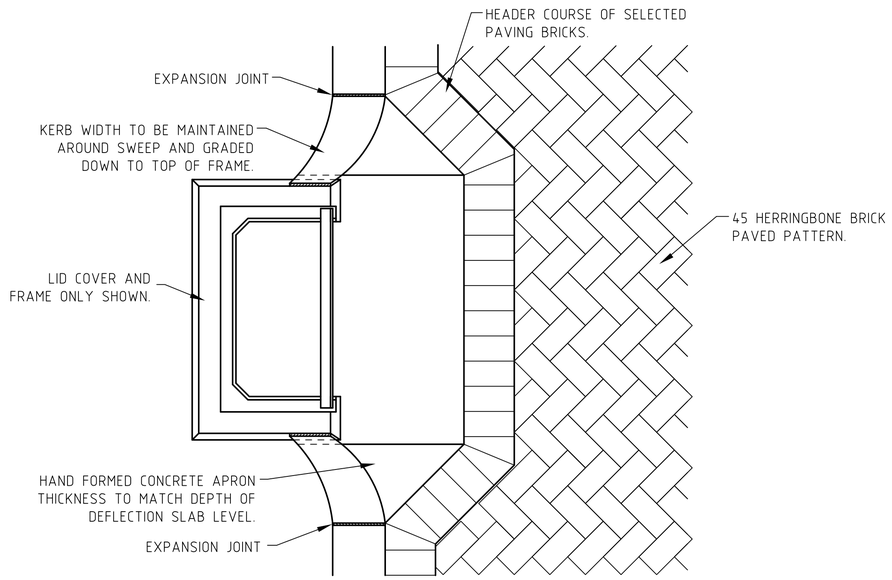
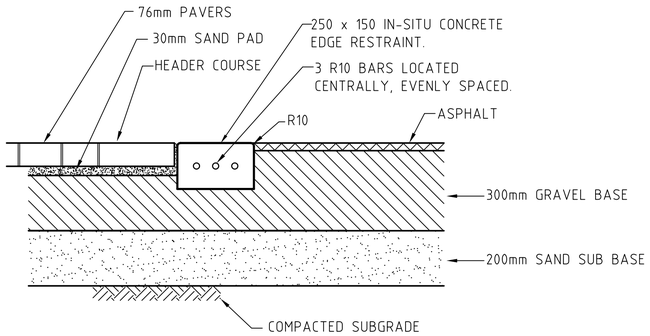


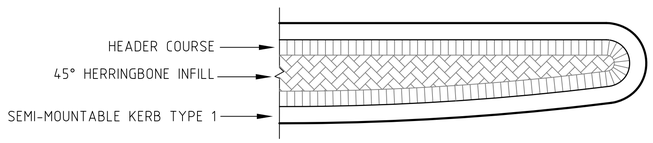

## BRICK-PAVED ENTRY STATEMENT (EYEBROW) KERB TRANSITION



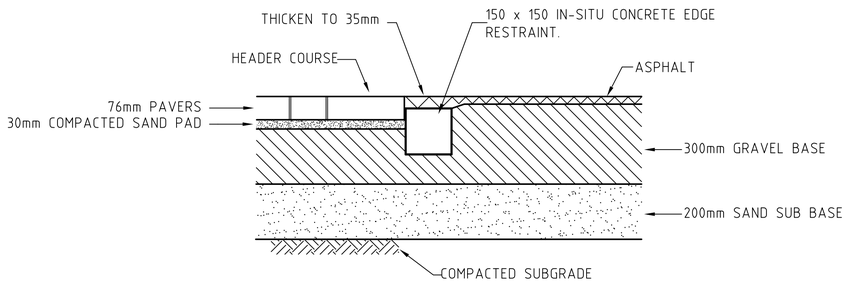

## TYPICAL PAVING AROUND SIDE ENTRY GULLY



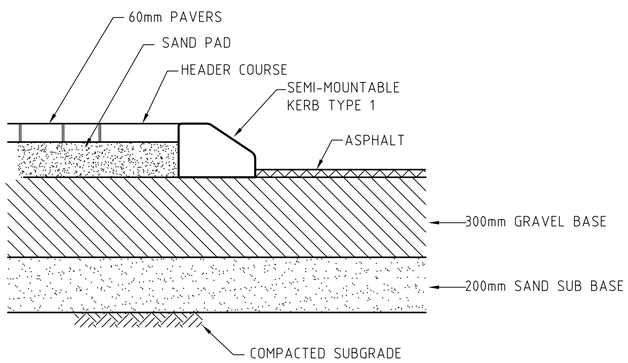

## FLUSH KERB AND BRICK PAVING



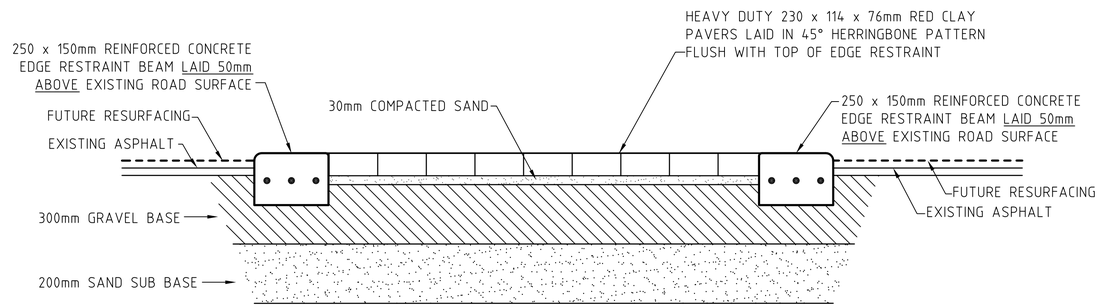

## BRICK PAVING DETAILS TO ISLANDS




## CONCEALED EDGE RESTRAINT




## RAISED BRICK PAVED ISLANDS




## TRAFFICABLE ISLAND DETAIL

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# BRICK PAVING IN ROAD DETAILS

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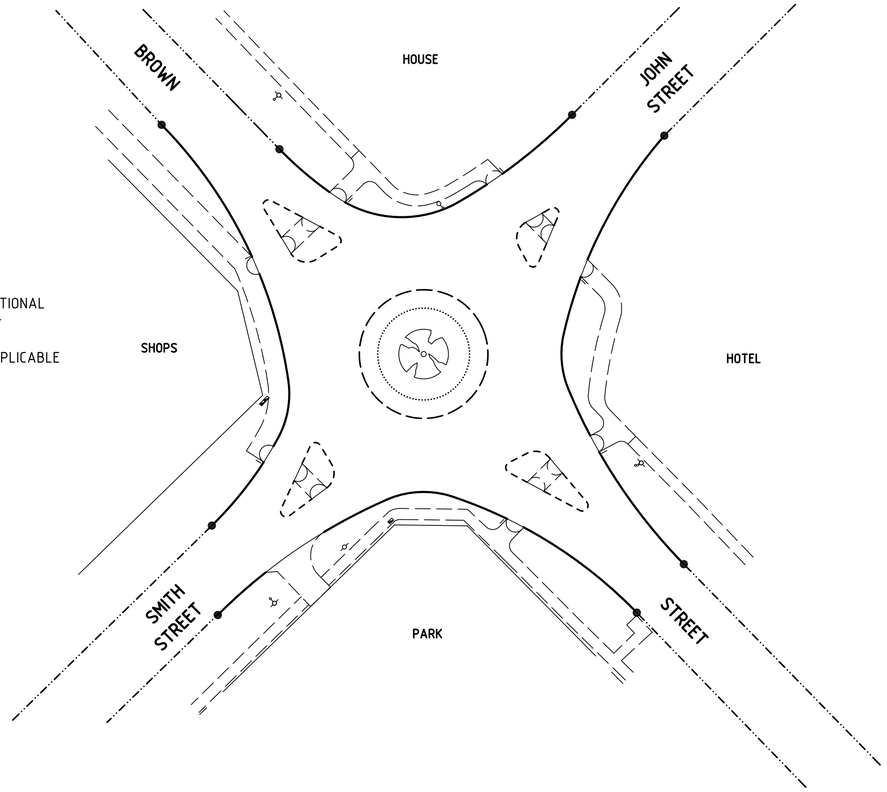
## LEGEND

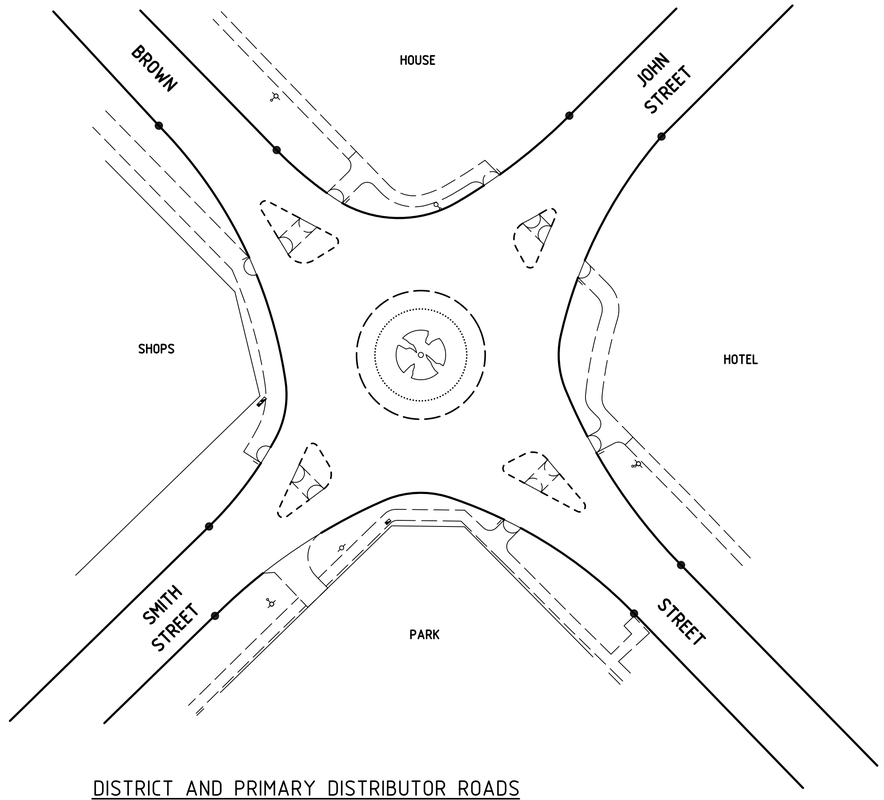
- SEMI MOUNTABLE KERB TYPE 1
- SEMI MOUNTABLE KERB TYPE 2
- MOUNTABLE KERB TYPE 1 PLUS ADDITIONAL 50mm TO 'KEY' KERB INTO PAVEMENT
- BARRIER KERB TYPE 3 OR 4 AS APPLICABLE
- MOUNTABLE KERB TYPE 1

## NOTES

1. REFER TO DRAWING ES-RO-09 FOR KERB TYPE DETAILS.
2. LANDSCAPING DESIGNS TO BE SUBMITTED FOR APPROVAL.

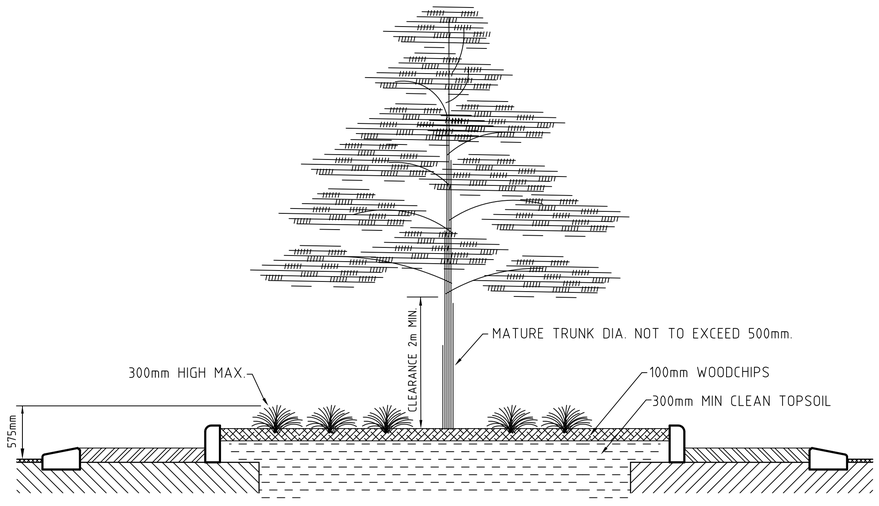



LOCAL AND LOCAL DISTRIBUTOR ROADS

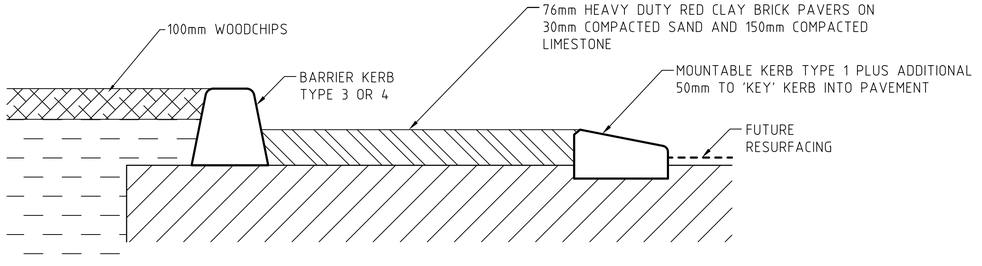



DISTRICT AND PRIMARY DISTRIBUTOR ROADS

# ROUNDABOUT STANDARD KERB TYPES




ROUNDABOUT LANDSCAPING DETAIL




ROUNDABOUT KERB DETAIL

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# ROUNDABOUT DETAILS

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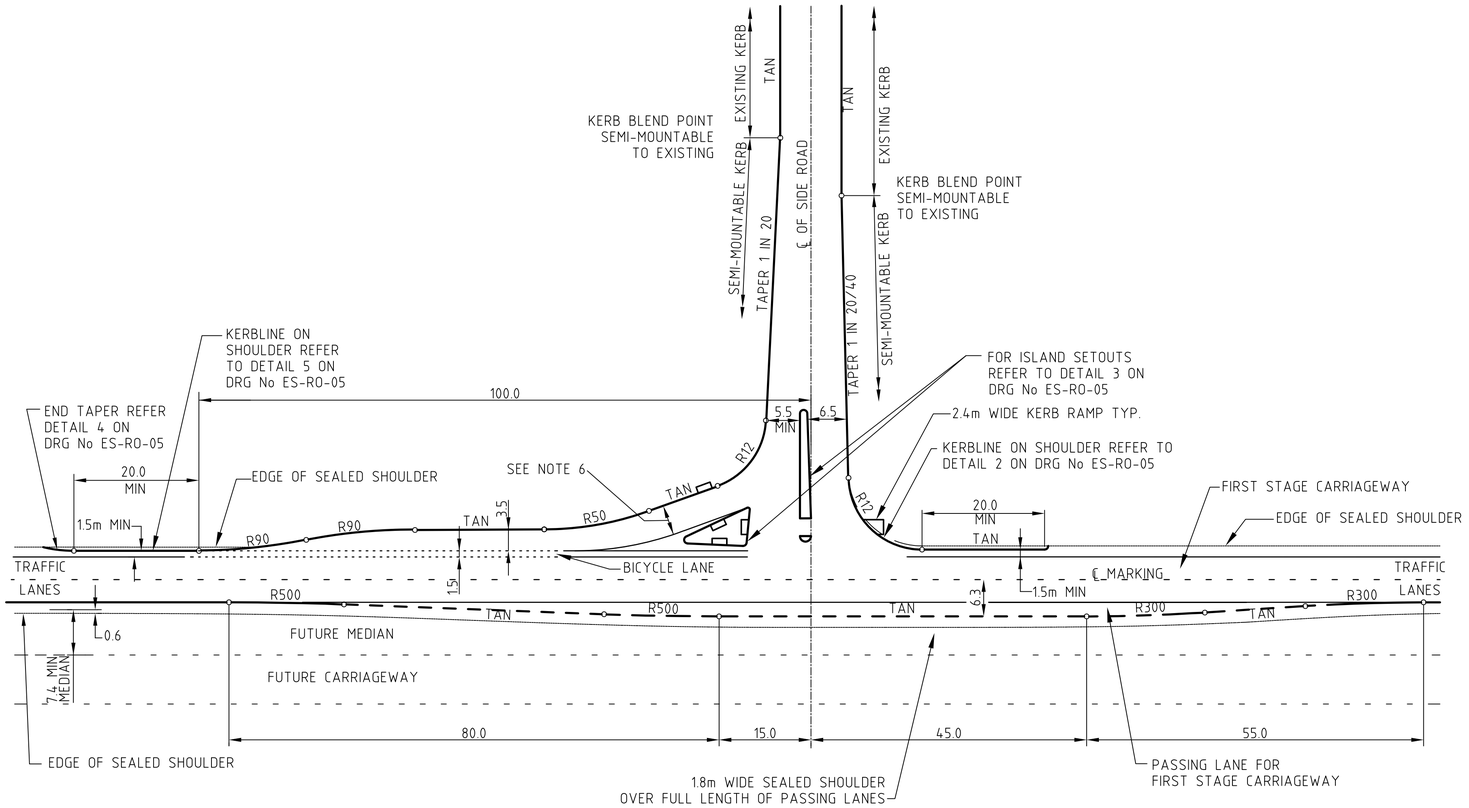
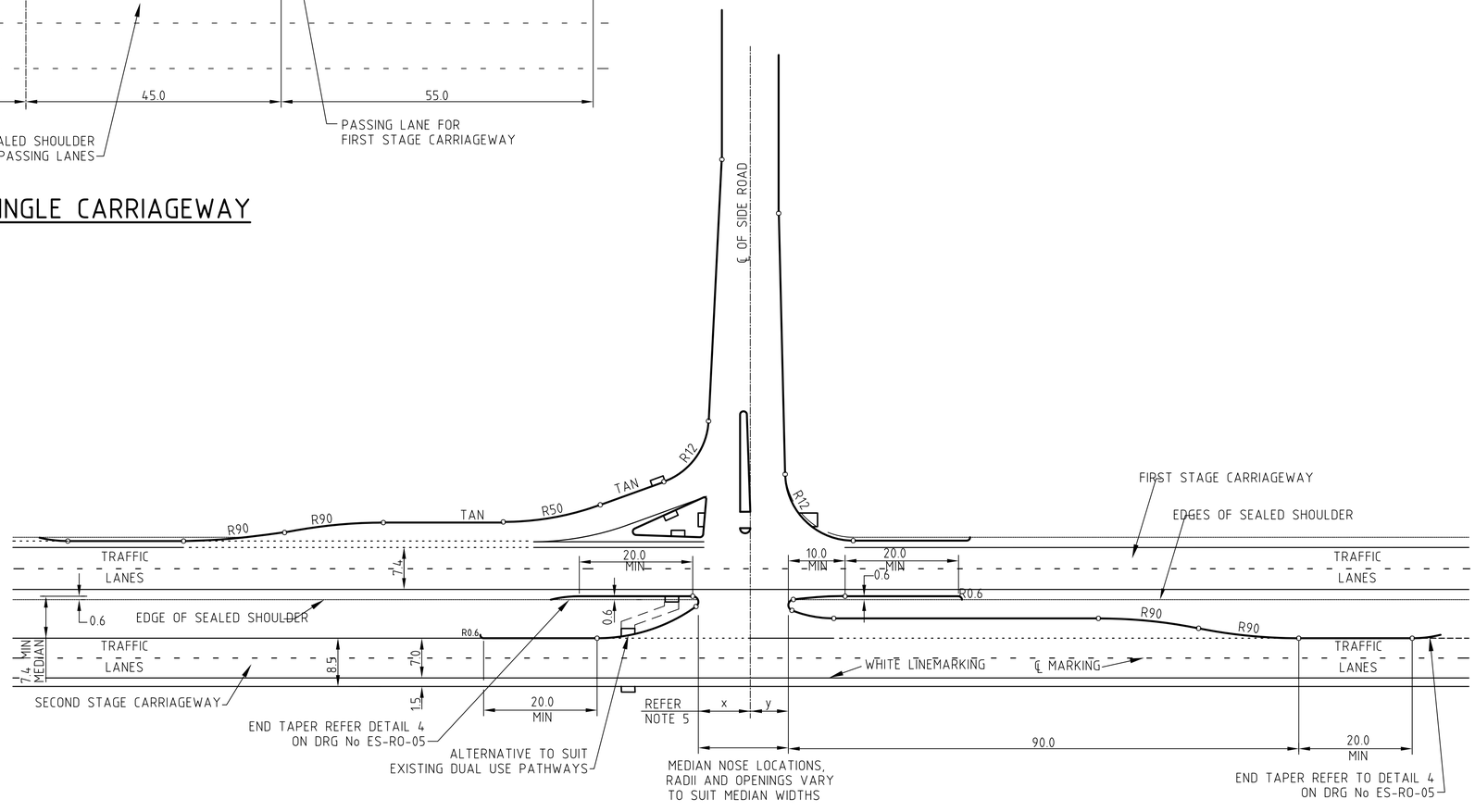



## FIRST STAGE - SINGLE CARRIAGEWAY

## NOTES

1. ALL KERB RAMPS TO BE 2.5m WIDE. REFER TO DRG No ES-PA-02 FOR KERB RAMP DETAILS.
2. STORMWATER DRAINAGE GULLIES TO BE LOCATED ON THE UPSTREAM SIDE OF KERB RAMPS.
3. ALL KERBING TO BE SEMI-MOUNTABLE TYPE 1. REFER TO DRG No ES-RO-09 FOR DETAILS.
4. AS A GENERAL GUIDE, AT ALL MEDIAN OPENINGS, DISTANCE "X" IS TO BE GREATER THAN DISTANCE "Y".
5. REFER TO DRG No ES-PA-02 FOR GRAB RAIL DETAILS.
6. LEFT TURN LANE MIN. WIDTH OF 4.6m. REFER TO AUSTROADS STANDARDS.




## SECOND STAGE - DUAL CARRIAGEWAY

| Amendments | | | | | |
|---|---|---|---|---|---|
| No | Date | REVISION | By | App'd | |

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|---|---|
| Tax Sheet | |
| Survey No | |
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| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

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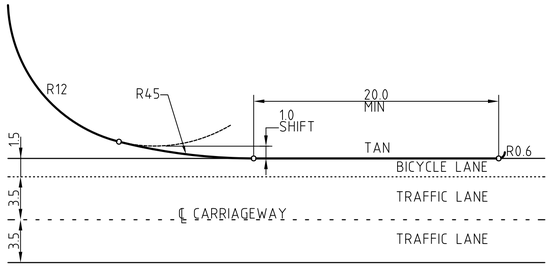
|---|---|
| DATUM | A.H.D. |
| SCALE | 1:500 |
| APPROVED | # ROB WHOOLEY |
| | # INDICATES ORIGINALS SIGNED |

# T-INTERSECTION TREATMENTS DISTRICT DISTRIBUTOR TO LOCAL DISTRIBUTOR

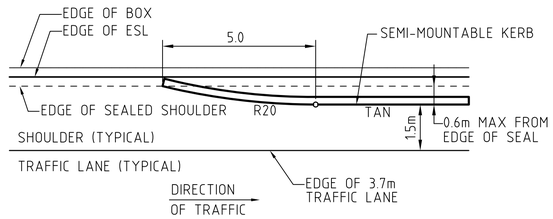
SHEET OF
DRAWING No.
ES-RO-04
Job No.

A
1

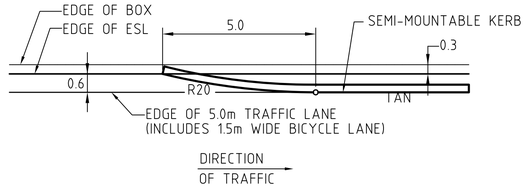



R12/R45 LEFT CURVE TO CARRIAGEWAY
WITH WIDENED TRAFFIC LANE

## DETAIL 1

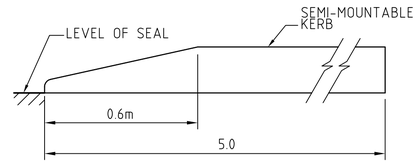



CARRIAGEWAY WITH SHOULDER

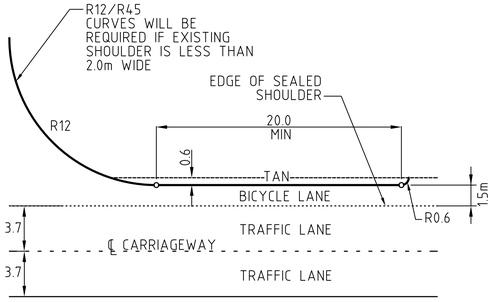



CARRIAGEWAY WITHOUT SHOULDER

## DETAIL 4 - END TAPER KERB APPROACH SIDE

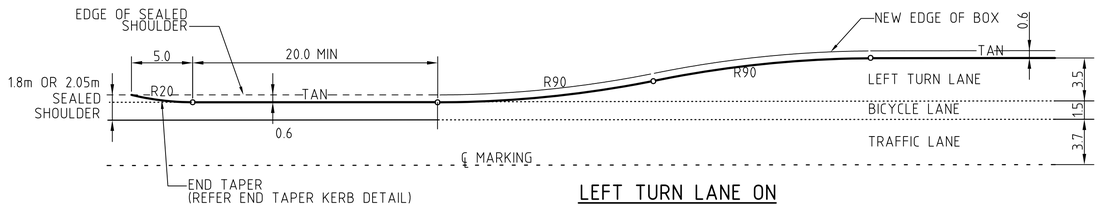



ELEVATION



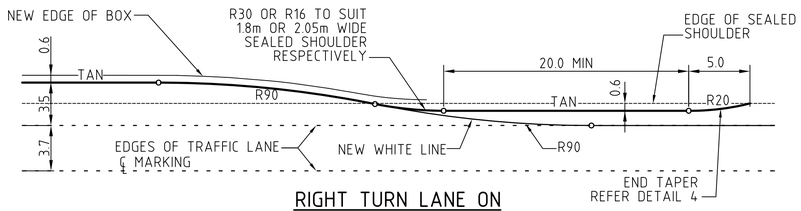

R12 LEFT CURVE TO CARRIAGEWAY
WITH SHOULDER

## DETAIL 2




LEFT TURN LANE ON
CARRIAGEWAY WITH SHOULDER

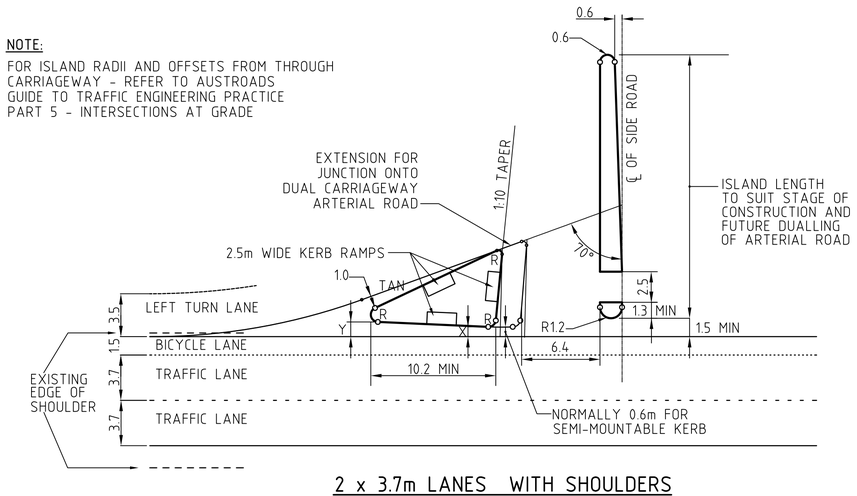
## DETAIL 5




RIGHT TURN LANE ON
CARRIAGEWAY WITH SHOULDER

## DETAIL 6

NOTE:
FOR ISLAND RADII AND OFFSETS FROM THROUGH CARRIAGEWAY - REFER TO AUSTROADS GUIDE TO TRAFFIC ENGINEERING PRACTICE PART 5 - INTERSECTIONS AT GRADE




2 x 3.7m LANES WITH SHOULDERS

## DETAIL 3 - SET OUT FOR ISLANDS

## NOTES

1. ALL DETAILS REFERENCE TO DRG ES-RO-04
2. ALL KERB RAMPS TO BE 2.5m WIDE. REFER TO DRG No ES-PA-02 FOR KERB RAMP DETAILS.
3. STORMWATER DRAINAGE GULLIES TO BE LOCATED ON THE UPSTREAM SIDE OF KERB RAMPS.
4. ALL KERBING TO BE SEMI-MOUNTABLE. REFER TO DRG No ES-RO-09 FOR DETAILS.

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

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| Survey No | |
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| File No | |

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| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
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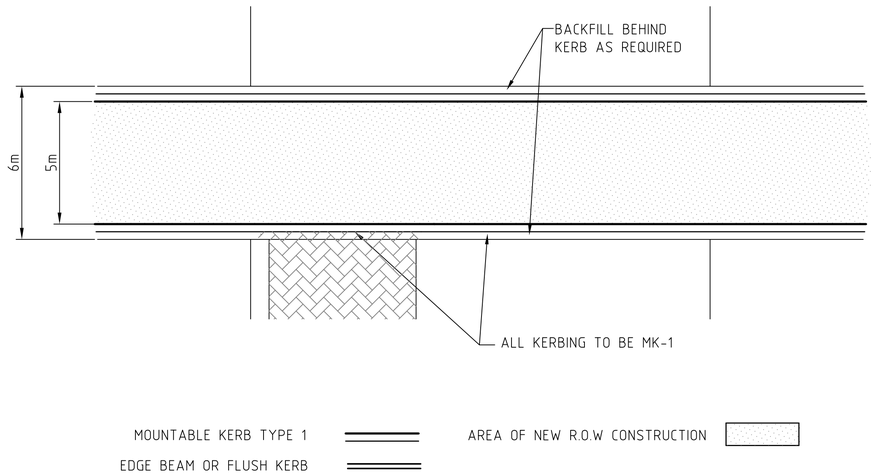
| RECOMMENDED | | |

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

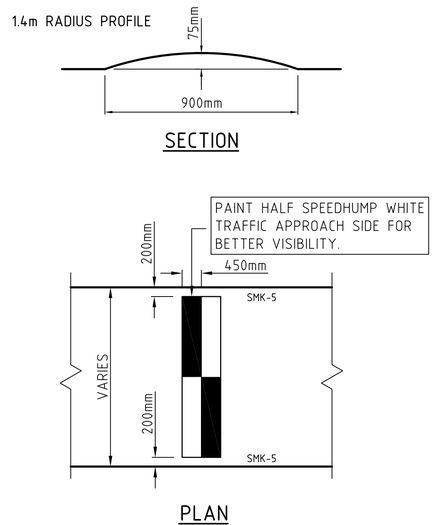
# ISLAND AND LANE SETOUTS

SHEET OF
DRAWING No. ES-RO-05
Job No.

A
1

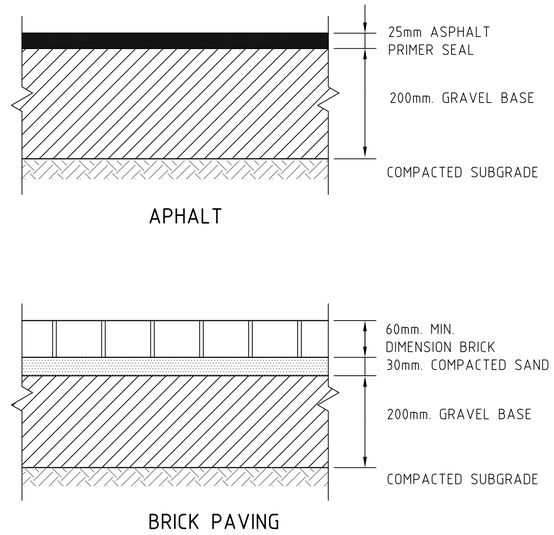



## RIGHT OF WAY CONSTRUCTION

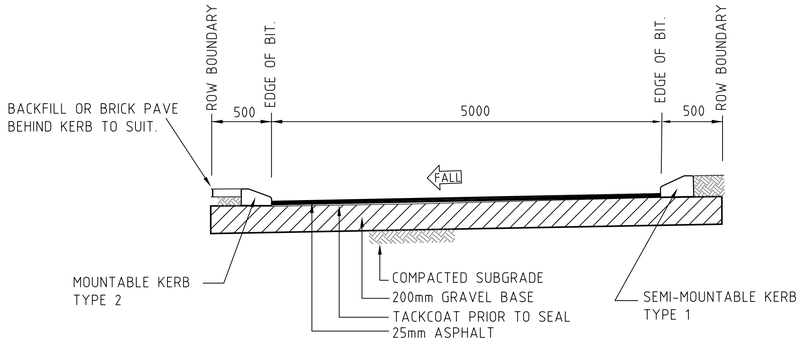



## TYPICAL SPEED HUMP DETAILS

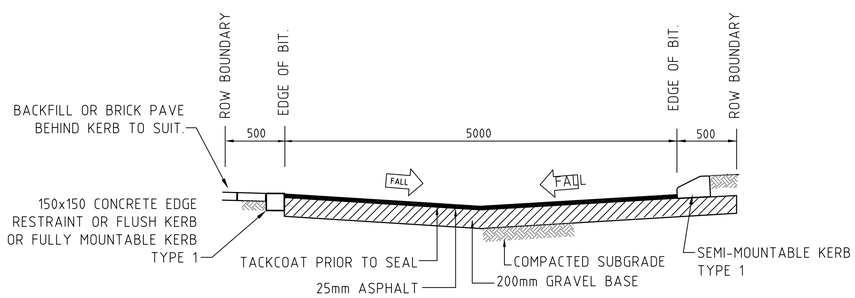
SPECIAL APPROVAL REQUIRED




## PERMISSABLE PAVEMENT OPTIONS




## TYPICAL SECTION - ONE WAY CROSSFALL




## TYPICAL SECTION - CENTRALLY DRAINED

## NOTE

1. REFER TO SE-RO-09 FOR KERB DETAILS

| Amendments | | | | | |
|---|---|---|---|---|---|
| No | Date | REVISION | By | App'd | |

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| Tax Sheet | |
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| DRAWN | PL | 10/06 |
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| RECOMMENDED | | |

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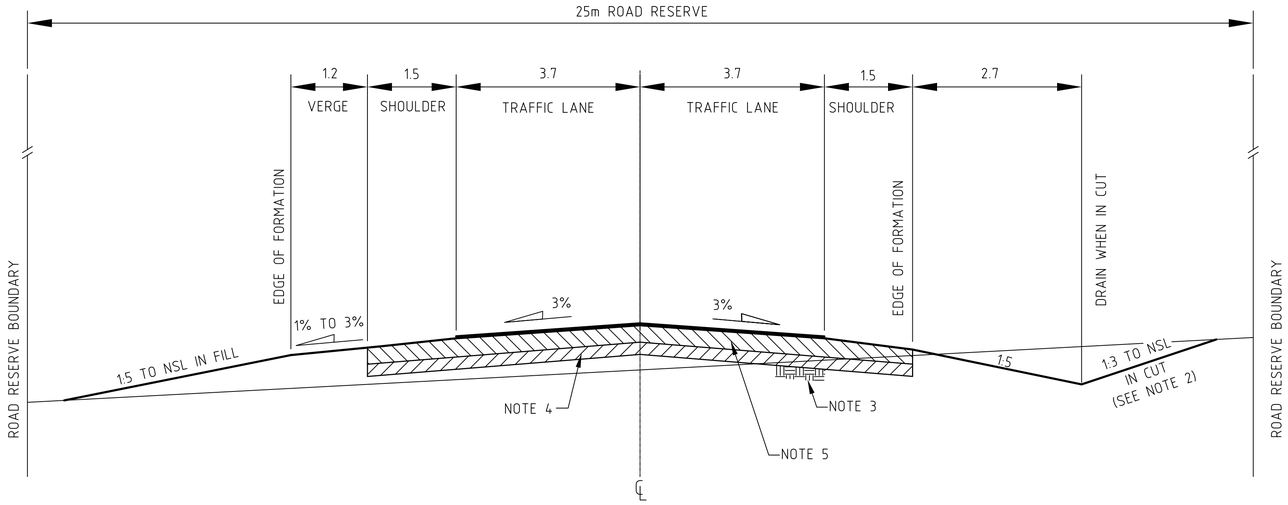
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

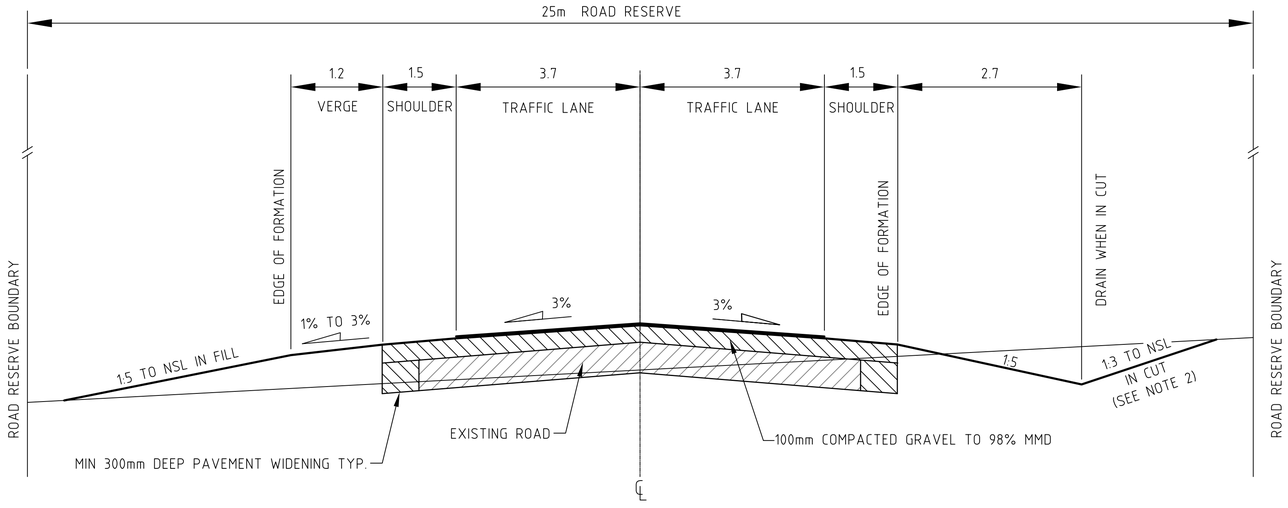
# RIGHT OF WAY DETAILS

SHEET OF
DRAWING No. ES-RO-06
Job No.

A1




## TYPICAL RURAL ROAD




## RECONSTRUCTION OF EXISTING PAVEMENTS

## NOTES:

1. ROAD TO BE CONSTRUCTED IN ACCORDANCE WITH SHIRE OF DENMARK STANDARDS AND SPECIFICATIONS.
2. BATTERS UP TO 1:2 IN CUT MAY BE USED WITH APPROVAL OF MANAGER ENGINEERING SERVICES.
3. SUBGRADE COMPACTED TO 95% MMDD.
4. SUB BASE TO BE 100mm CLEAN FREE DRAINING SAND COMPACTED TO 95% MMDD.
5. BASE TO BE 300mm LATERITE GRAVEL, COMPACTED TO 98% MMDD IN TWO 150mm LAYERS.
6. COMPACTION SHALL BE TO SHIRE OF DENMARK SPECIFICATION FOR THE CONSTRUCTION OF ROADS AND STORMWATER DRAINAGE

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

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| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
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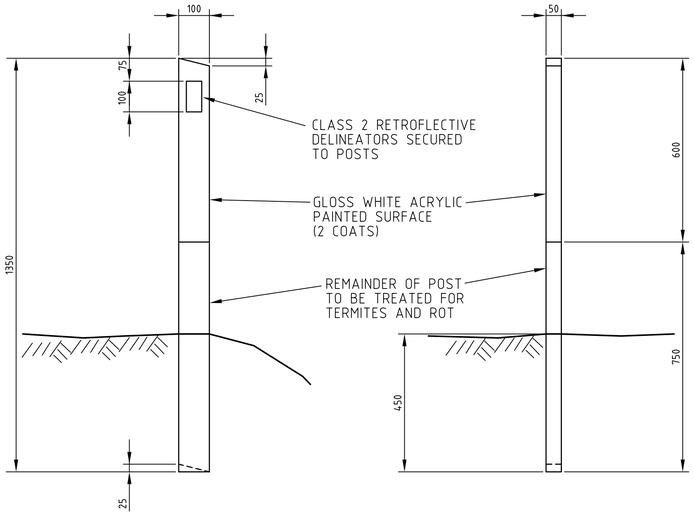
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

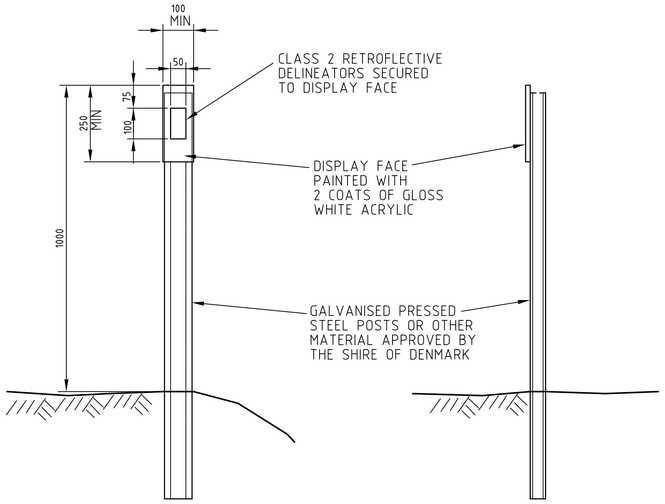
# RURAL ROAD
# TYPICAL CROSS SECTIONS

SHEET OF
DRAWING No. ES-RO-07
Job No.

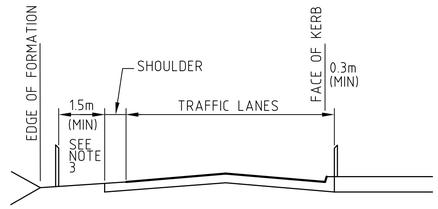
A
1



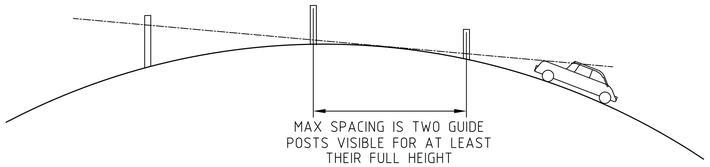

STANDARD TIMBER DESIGN



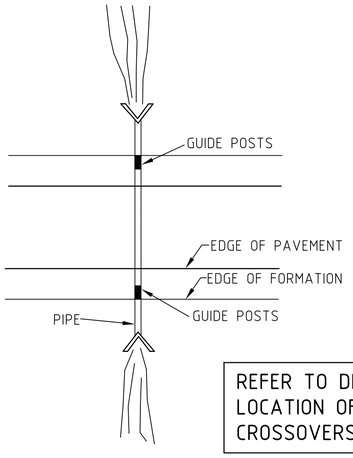

ALTERNATIVE DESIGN




# GUIDE POSTS




## GUIDE POST SPACING ON CRESTS HAVING A STRAIGHT ALIGNMENT




REFER TO DRAWING ES-CR-04 FOR LOCATION OF GUIDE POSTS AT CROSSOVERS WITH CULVERTS

## LOCATION OF GUIDE POSTS AT CULVERTS

| MAJOR RURAL & DISTRIBUTOR ROADS | |
|---|---|
| RADIUS(m) | SPACING OF GUIDE POSTS |
| UP TO 599 | OPPOSITE EVERY SECOND POST ON OUTSIDE OF CURVE |
| 600 - 1200 | 60m |
| 1200 + | OPPOSITE EVERY POST ON OUTSIDE OF CURVE |

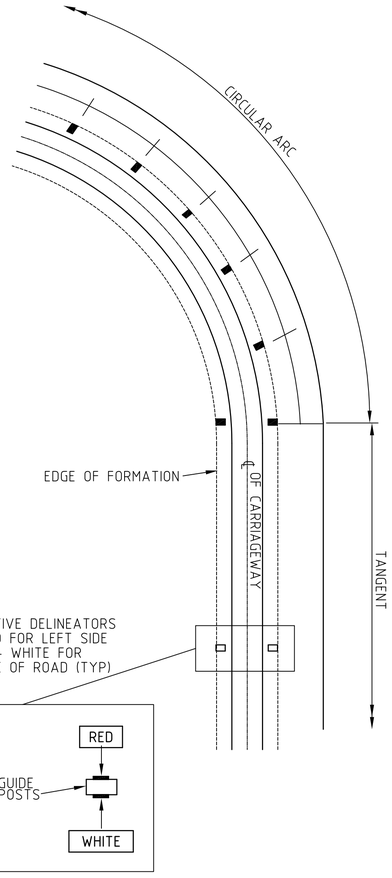
| SUBDIVISION & LOCAL RURAL ROADS | |
|---|---|
| RADIUS(m) | SPACING OF GUIDE POSTS |
| UP TO 400 | OPPOSITE EVERY SECOND POST ON OUTSIDE OF CURVE |
| 400 - 1000 | 70m |
| 1000 + | OPPOSITE EVERY POST ON OUTSIDE OF CURVE |

## SPACING ON INSIDE OF CURVE

| MAJOR RURAL & DISTRIBUTOR ROADS | |
|---|---|
| RADIUS(m) | SPACING ON CIRC. ARC(m) |
| UP TO 100 | 6 |
| 100 - 199 | 10 |
| 200 - 299 | 15 |
| 300 - 399 | 20 |
| 400 - 599 | 30 |
| 600 - 799 | 40 |
| 800 - 1199 | 60 |
| 1200 - 2000 | 90 |
| 2000 + | 150 |

| SUBDIVISION & LOCAL RURAL ROADS | |
|---|---|
| RADIUS(m) | SPACING ON CIRC. ARC(m) |
| 25 | 10 |
| 50 | 13 |
| 70 | 15 |
| 100 | 20 |
| 200 | 25 |
| 300 | 31 |
| 400 | 36 |
| 500 | 42 |
| 600 | 47 |
| 700 | 53 |
| 800 | 58 |
| 900 | 63 |
| 1000 | 69 |
| 1500 | 96 |
| 2000 | 123 |
| 2500 | 150 |

## SPACING ON OUTSIDE OF CURVE




## NOTES:

1. MAXIMUM SPACING ON OUTSIDE OF CURVES IS 150m.
2. GUIDE POSTS SHALL BE JARRAH OR TANOLITH TREATED PINE POSTS TO THE DIMENSIONS SPECIFIED OR GALVANISED PRESSED STEEL OR OTHER MATERIAL APPROVED BY ENGINEERING SERVICES.
3. WHERE PRACTICABLE MIN. OFFSET OF GUIDE POST TO PAVEMENT TO BE 1.5m.

Amendments

| No | Date | REVISION | By | App'd |
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Tax Sheet
Survey No
FB p
File No

Shire of Denmark

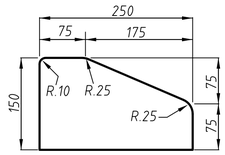
DESIGNED PL 10/06
DRAWN PL 10/06
CHECKED
RECOMMENDED

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# RURAL ROAD GUIDE POST DETAILS

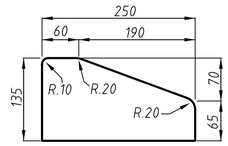
SHEET OF
DRAWING No. ES-RO-08
Job No.

A 1

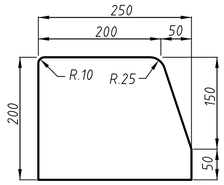

SEMI-MOUNTABLE KERB
TYPE 1

(FOR ALL PRIMARY AND DISTRICT DISTRIBUTOR TYPE ROADS.
FOR ALL CORNERS OF LOCAL DISTRIBUTOR AND LOCAL TYPE ROADS.)

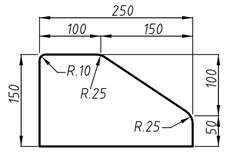



MOUNTABLE KERB
TYPE 1

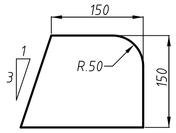
(FOR ALL LOCAL DISTRIBUTOR AND
LOCAL TYPE ROADS.)



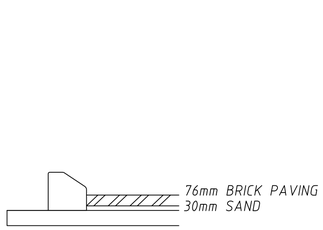

BARRIER KERB
TYPE 1

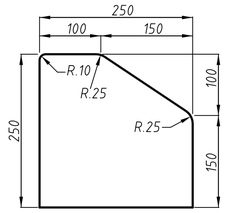




SEMI-MOUNTABLE KERB
TYPE 2

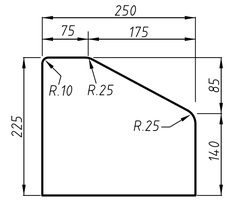



BARRIER KERB
TYPE 2

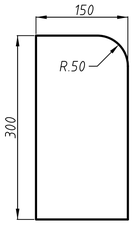



SEMI-MOUNTABLE KERB
TYPE 3



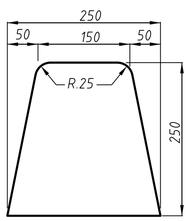

MOUNTABLE KERB
TYPE 3



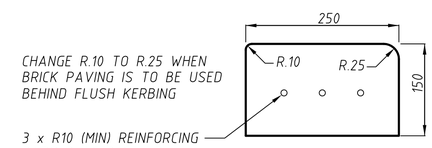

BARRIER KERB
TYPE 3

NOTE:

RIGHT HAND SIDE INDICATES
FACE OF KERB.




BARRIER KERB
TYPE 4
(SPECIAL APPLICATION)




FLUSH KERB

| Amendments | | | | | | |
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| No | Date | REVISION | By | App'd | | |

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| Tax Sheet | |
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| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

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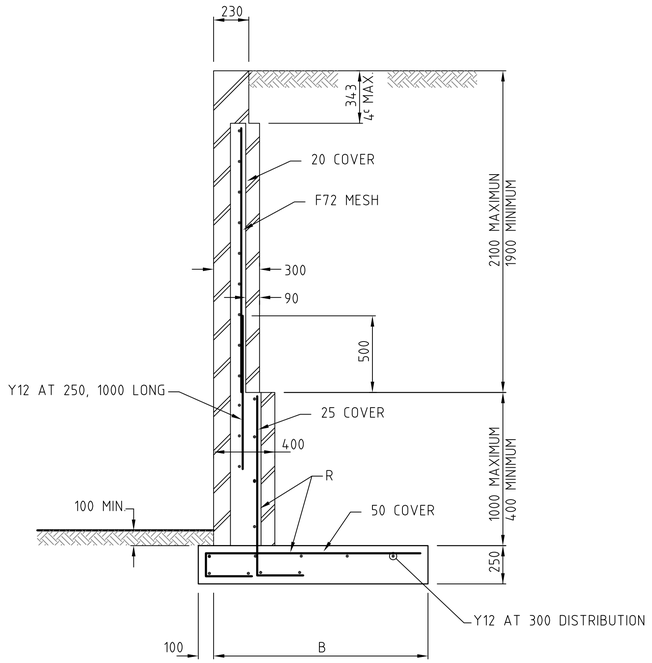
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | # ROB WHOOLEY |
| | # INDICATES ORIGINALS SIGNED |

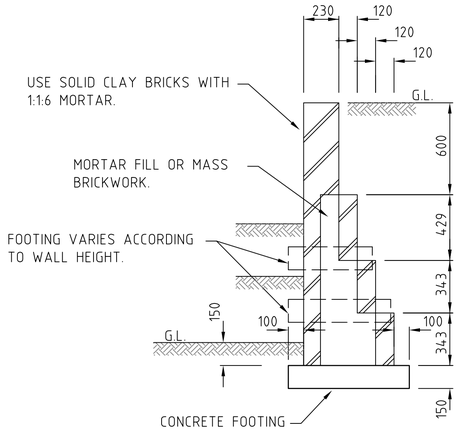
# EXTRUDED KERBING DETAILS

| | |
|---|---|
| SHEET | OF |
| DRAWING No. | ES-RO-09 |
| Job No. | |

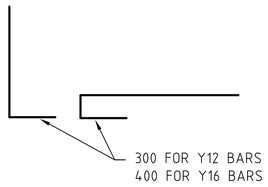
A
1




## 2100 TO 3100 HIGH BRICK RETAINING WALL



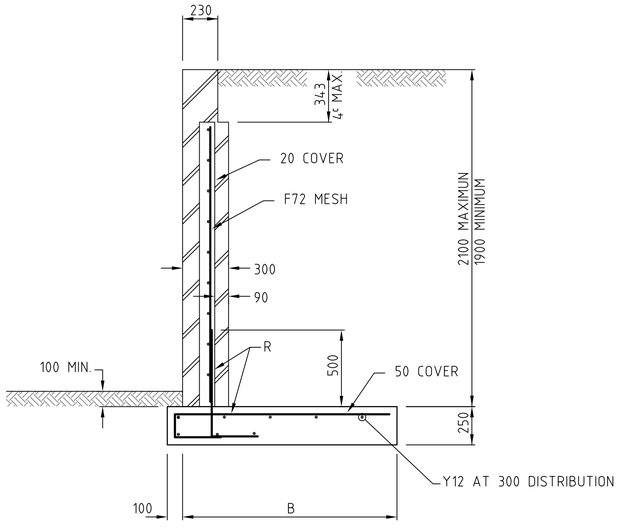

## MORTAR FILL OR MASS BRICK RETAINING WALL




## BAR ANCHORAGE

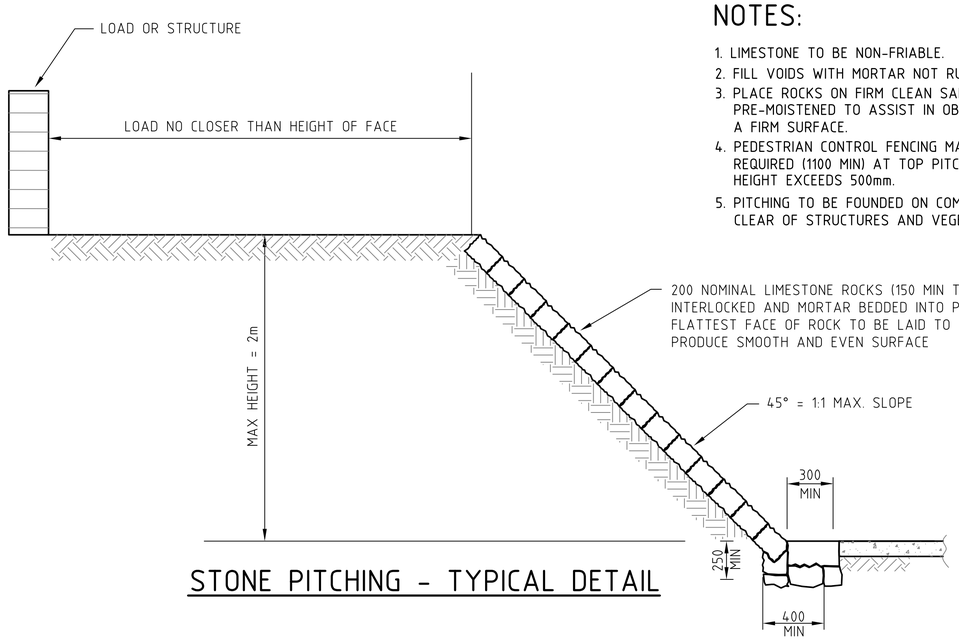
## NOTES:

1. SOIL UNDER FOOTING AND BEHIND THE WALL TO BE COMPACTED TO 95% MMDD
2. FOOTING CONCRETE: 28 DAY COMPRESSIVE STRENGTH 20 MPa.
3. BRICKWORK 20 MPa CRUSHING STRENGTH IN 4:1 MORTAR WITH FULL BED JOINTS AND PERPENDS. BUILD IN CAVITY TIES AT 4 x 400 CENTRES AND STAGGER. CAVITY FILL CONCRETE TO HAVE A 28 DAY CRUSHING STRENGTH OF 15 MPa.
4. NO BACKFILL TO BE PLACED UNTIL WALL HAS BEEN CONSTRUCTED FOR A MINIMUM OF 7 DAYS.
5. INSTALL 25mm WEEPHOLES AT 2m CENTERS AND SUBSOIL DRAINAGE.




| H (max) | B | R |
|---|---|---|
| 700 | 400 | NIL |
| 1000 | 400 | Y12 AT 600 |
| 1300 | 600 | Y12 AT 500 |
| 1600 | 700 | Y12 AT 400 |
| 1900 | 800 | Y12 AT 400 |
| B= 0.37 (H-250) | | |

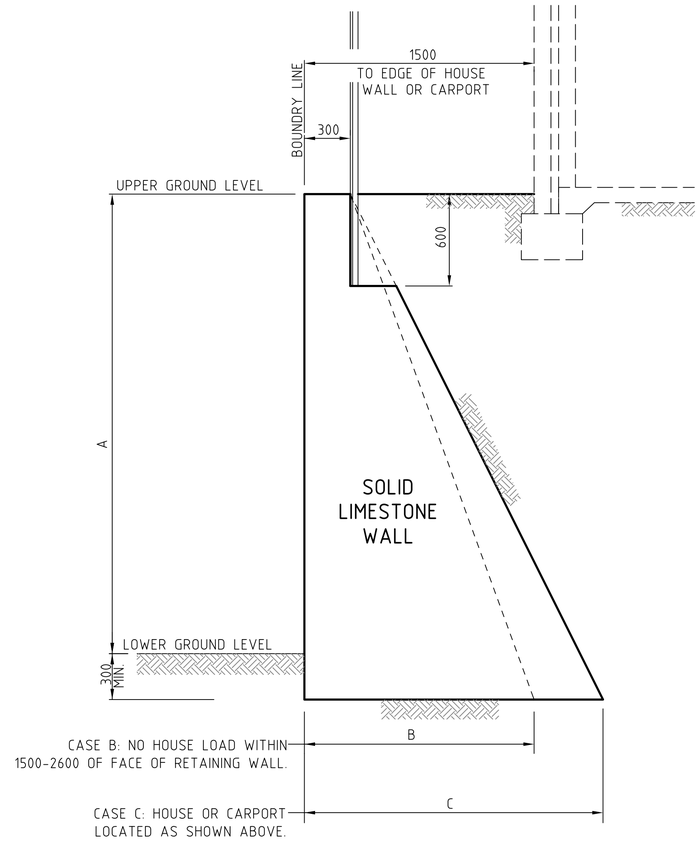
## 2100 MAXIMUM BRICK RETAINING WALL




## STONE PITCHING - TYPICAL DETAIL

## NOTES:

1. LIMESTONE TO BE NON-FRIABLE.
2. FILL VOIDS WITH MORTAR NOT RUBBLE.
3. PLACE ROCKS ON FIRM CLEAN SAND PRE-MOISTENED TO ASSIST IN OBTAINING A FIRM SURFACE.
4. PEDESTRIAN CONTROL FENCING MAY BE REQUIRED (1100 MIN) AT TOP PITCHING IF VERTICAL HEIGHT EXCEEDS 500mm.
5. PITCHING TO BE FOUNDED ON COMPACTED GROUND CLEAR OF STRUCTURES AND VEGETATION.




| HEIGHT SCHEDULE | | |
|---|---|---|
| HEIGHT A | BASE B | BASE C |
| 600 | 300 | 390 |
| 900 | 450 | 585 |
| 1200 | 600 | 780 |
| 1500 | 750 | 975 |
| 1800 | 900 | 1170 |
| 1 | 0.5 | 0.65 |

## NOTES:

1. SOIL UNDER FOOTING AND BEHIND THE WALL TO BE COMPACTED TO 95% MMDD
2. COMPACT GROUND IN FRONT OF LIMESTONE RETAINING WALL PRIOR TO BACKFILLING.
3. USE STONES AS LARGE AS PRACTICABLE.
4. TAKE CARE IN COMPACTING BACKFILL, USE LIGHT COMPACTING EQUIPMENT ONLY.
5. CONSTRUCT CASE C TYPE WALL PRIOR TO LOAD BEARING RESIDENTIAL BUILDING.
6. NO BACKFILL TO BE PLACED UNTIL WALL HAS BEEN CONSTRUCTED FOR A MINIMUM OF 5 DAYS.
7. INSTALL 25mm WEEP HOLES AT 2m CENTERS AND SUBSOIL DRAINAGE.

## LIMESTONE RETAINING WALL

Amendments

| No | Date | REVISION | By | App'd |
|---|---|---|---|---|

| | |
|---|---|
| Tax Sheet | |
| Survey No | |
| FB | p |
| File No | |

Shire of Denmark

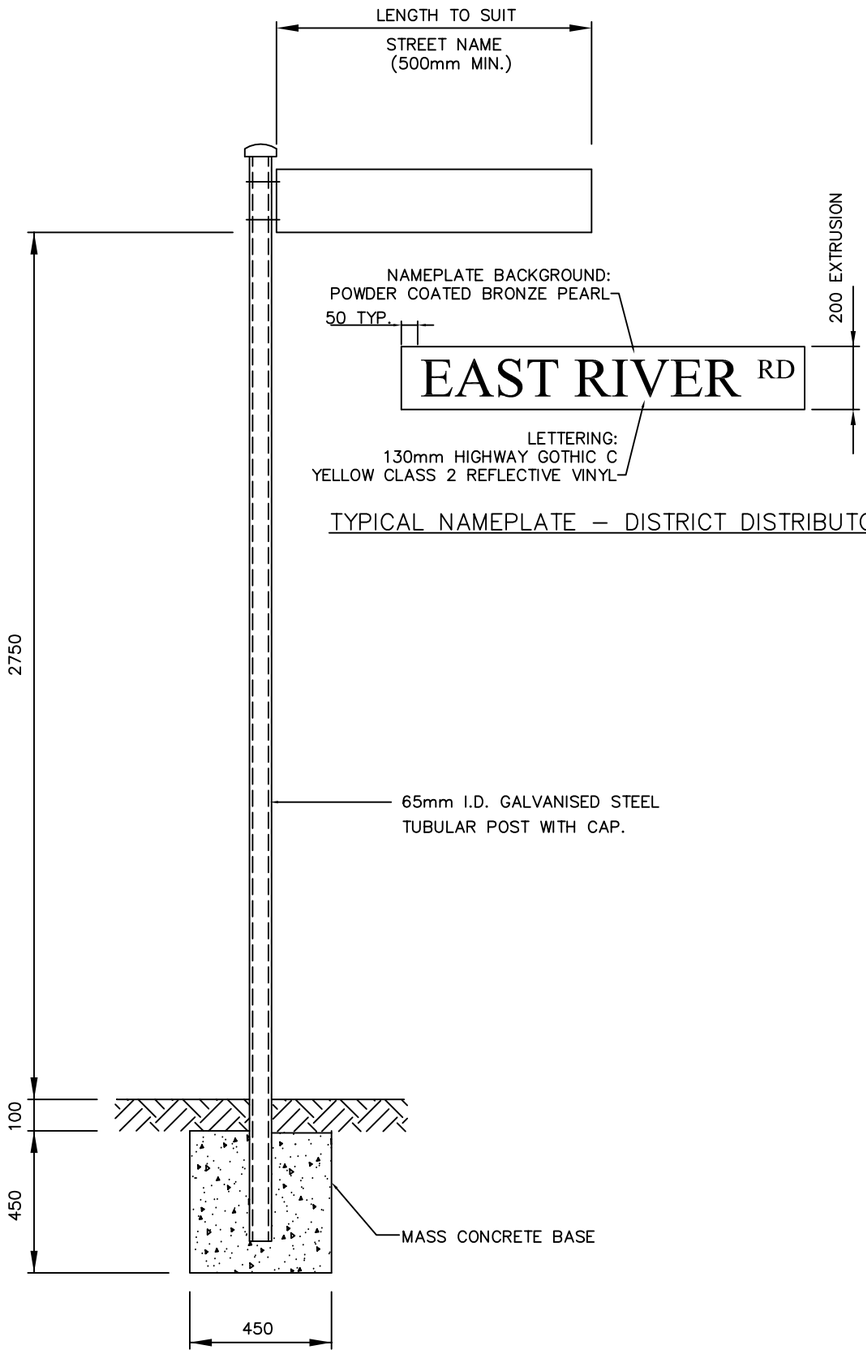
| | | |
|---|---|---|
| DESIGNED | PL | 10/06 |
| DRAWN | PL | 10/06 |
| CHECKED | | |
| RECOMMENDED | | |

DATUM A.H.D.
SCALE N.T.S.
APPROVED
# ROB WHOOLEY
# INDICATES ORIGINALS SIGNED

# TYPICAL RETAINING WALL DETAILS

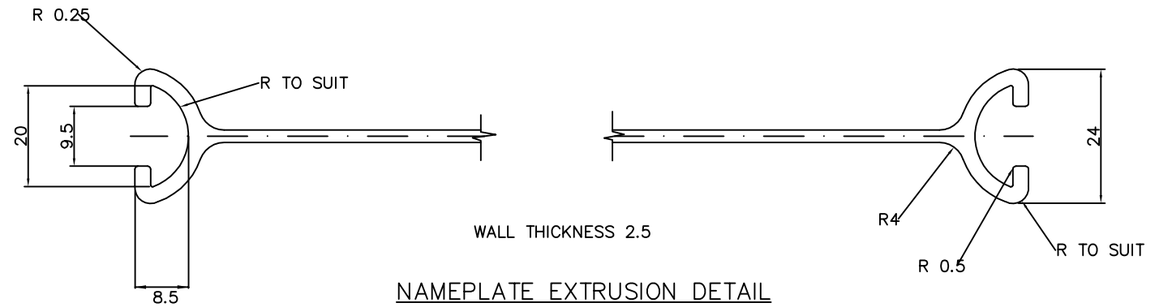
SHEET OF
DRAWING No.
ES-RT-01
Job No.

A
1

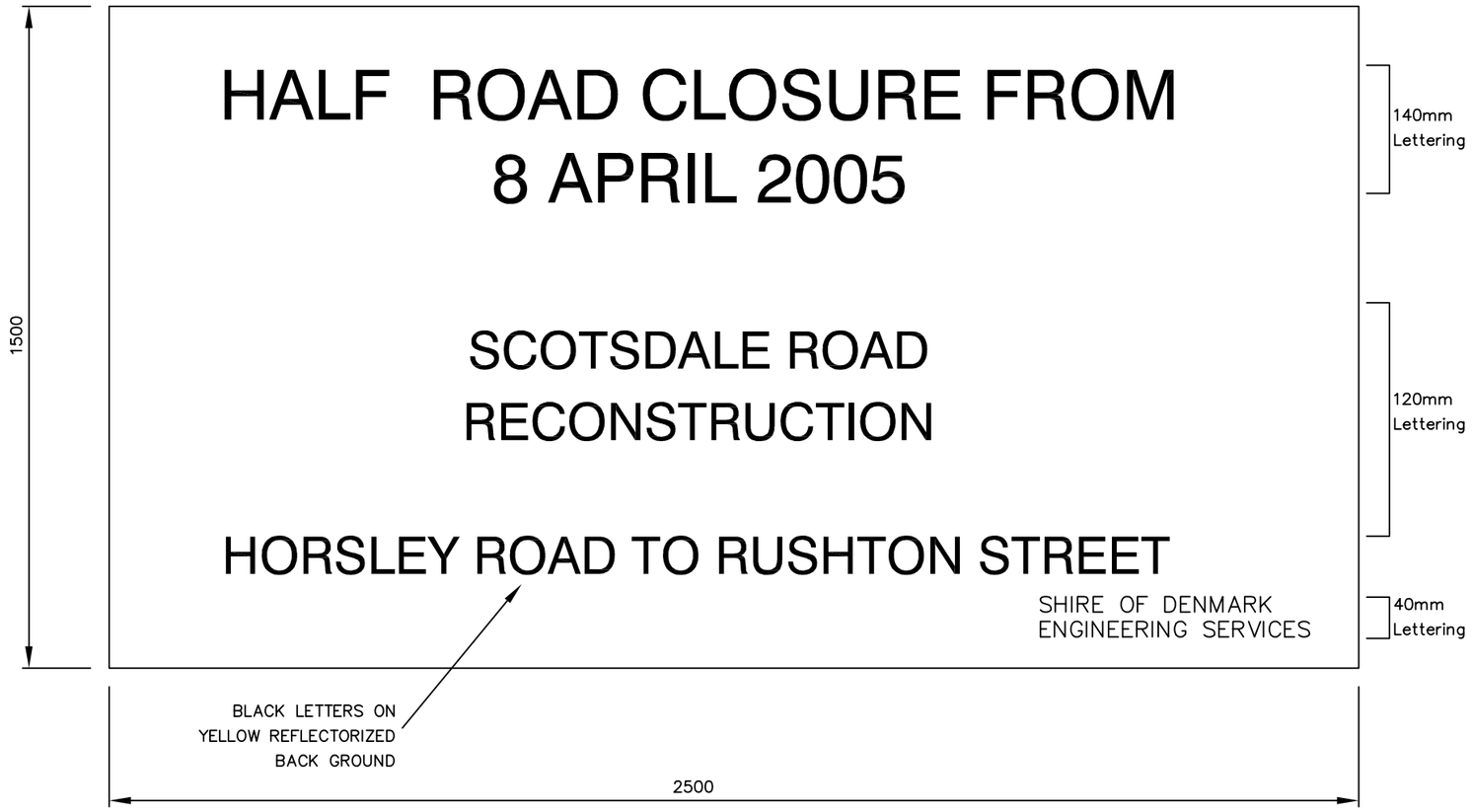



TYPICAL NAMEPLATE – DISTRICT DISTRIBUTOR ROADS

STREET SIGN DETAIL




NAMEPLATE EXTRUSION DETAIL




WORKS INFORMATION SIGN

| Amendments | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No | Date | REVISION | By | App'd | | | | | |

| | | | |
|---|---|---|---|
| Tax Sheet | | | |
| Survey No | | | |
| FB | p | | |
| File No | | | |

Shire of Denmark

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|---|---|---|---|
| DESIGNED | PL | 10/06 | |
| DRAWN | PL | 10/06 | |
| CHECKED | | | |
| RECOMMENDED | | | |

| | |
|---|---|
| DATUM | A.H.D. |
| SCALE | N.T.S. |
| APPROVED | #ROB WHOOLEY |
| # INDICATES ORIGINALS SIGNED | |

# STREET SIGN AND WORKS INFORMATION SIGN

| | |
|---|---|
| SHEET | OF |
| DRAWING No. | ES–SI–01 A 1 |
| Job No. | |