



- | PRE-DEV
RUNOFF
(L/s) | | POST-DEV
RUNOFF (L/s) | | | MAX. DEPTH OF
WATER IN TANK RL
(MAX. DEPTH (mm)) |
|----------------------------|----|--------------------------|-----|-------|--|
| | | UNCONTROLLED | | TOTAL | |
| | | CONTROLLED | OSD | | |
| 1yr | — | — | — | — | — |
| 5yr | 42 | 3 | 22 | 25 | 67.864 (917) |
| 20yr | 61 | 4 | 31 | 35 | 68.204 (1257) |
| 50yr | 68 | 5 | 35 | 40 | 68.380 (1433) |
| 100yr | 78 | 6 | 57 | 63 | 68.486 (1539) |

6. RAINWATER RE-USE
THERE IS NO BASIS COMMITMENT FOR RAINWATER RE-USE.

7. PIPES 300 DIA AND LARGER ARE TO BE REINFORCED CONCRETE CLASS 2, APPROVED SPIGOT AND SOCKET, RUBBER RING JOINTED, U.N.O.

8. UP TO 300 DIA PIPES SHALL BE SEWER GRADE UPVC, SOLVENT WELDED JOINTS, U.N.O.

9. EQUIVALENT STRENGTH VCP OR FCP PIPES MAY BE USED.

10. PIPES SHALL BE LAID ON A 75mm SAND BED.
THE TRENCH SHALL BE BACKFILLED WITH SAND TO 200mm ABOVE THE

- REMAINDER OF THE TRENCH WITH SAND OR APPROVED RIPPED SANDSTONE COMPACTED IN 150-mm LAYERS TO 98% STANDARD MAXIMUM DRY DENSITY

11. PRECAST PITS MAY BE USED EXTERNAL TO BUILDINGS AND SUBJECT TO APPROVAL.

12. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MINIMUM OF 100mm THICK CONCRETE UNDER THE BARREL OF THE PIPE.

13. WHERE PIPES ARE SMALLER THAN 300 IN DIA, ENLARGERS, CONNECTORS, AND JUNCTIONS TO BE USED SHALL BE PRECAST FITTINGS.

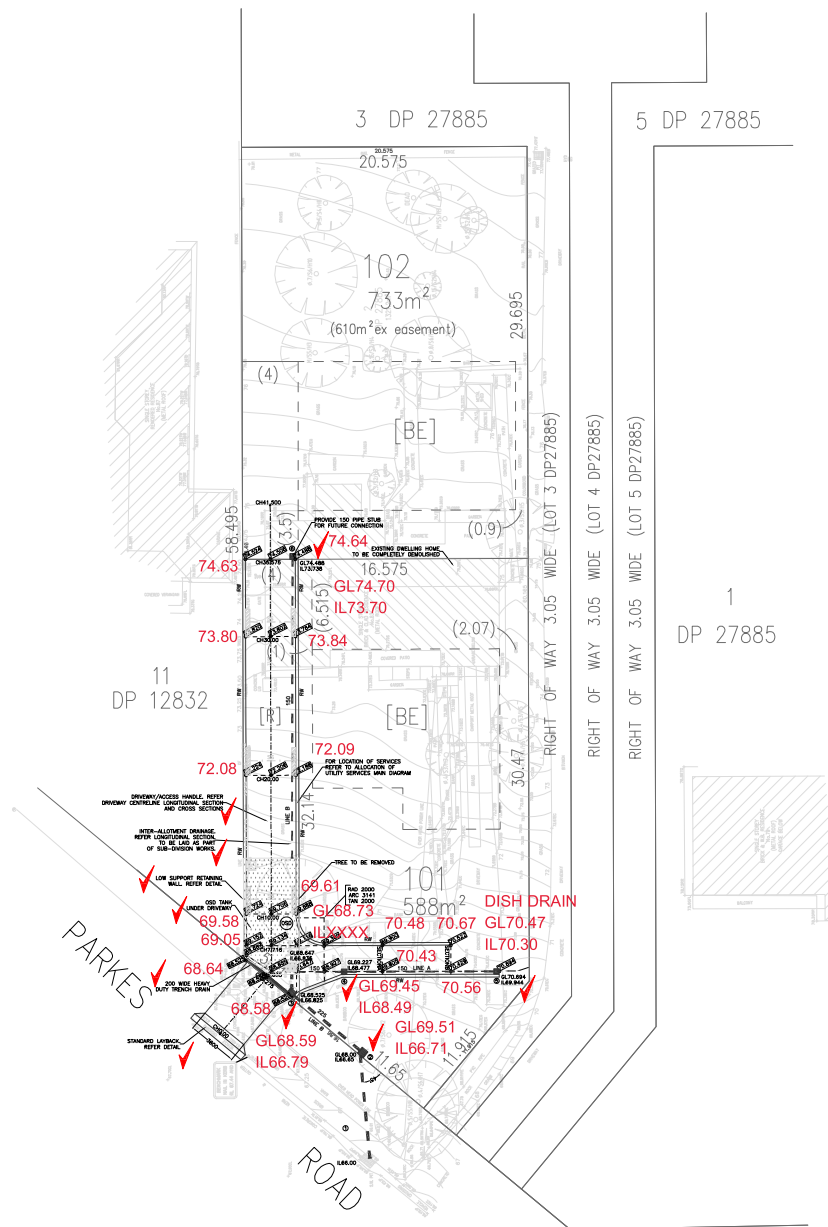
14. PIPES FOR RISING MAINS TO BE UPVC CLASS 4.5 AND TO AS 1477.

15. WHERE SUBSOIL DRAINS ARE TO PASS UNDER FLOOR SLABS AND PAVEMENTS, UNSLOTTED UPVC SEWER GRADE PIPES ARE TO BE USED.

16. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES, AND GRADES SHOWN ARE NOT TO BE REDUCED, LEVELS ARE NOT TO BE ALTERED, WITHOUT THE APPROVAL OF THE DESIGNER.

17. GRATES AND COVERS OF STORMWATER PITS SHALL BE ABLE TO SUPPORT THE FOLLOWING LOADS :

- (a) LIGHT DUTY.....1 TONNE WHEEL LOAD
(b) MEDIUM DUTY.....3.5 TONNE WHEEL LOAD
(c) HEAVY DUTY.....9 TONNE WHEEL LOAD



1100

DEVELOPERS AND EXCAVATORS MAY BE HELD FINANCIALLY RESPONSIBLE BY THE ASSET OWNER SHOULD THEY DAMAGE UNDERGROUND NETWORKS

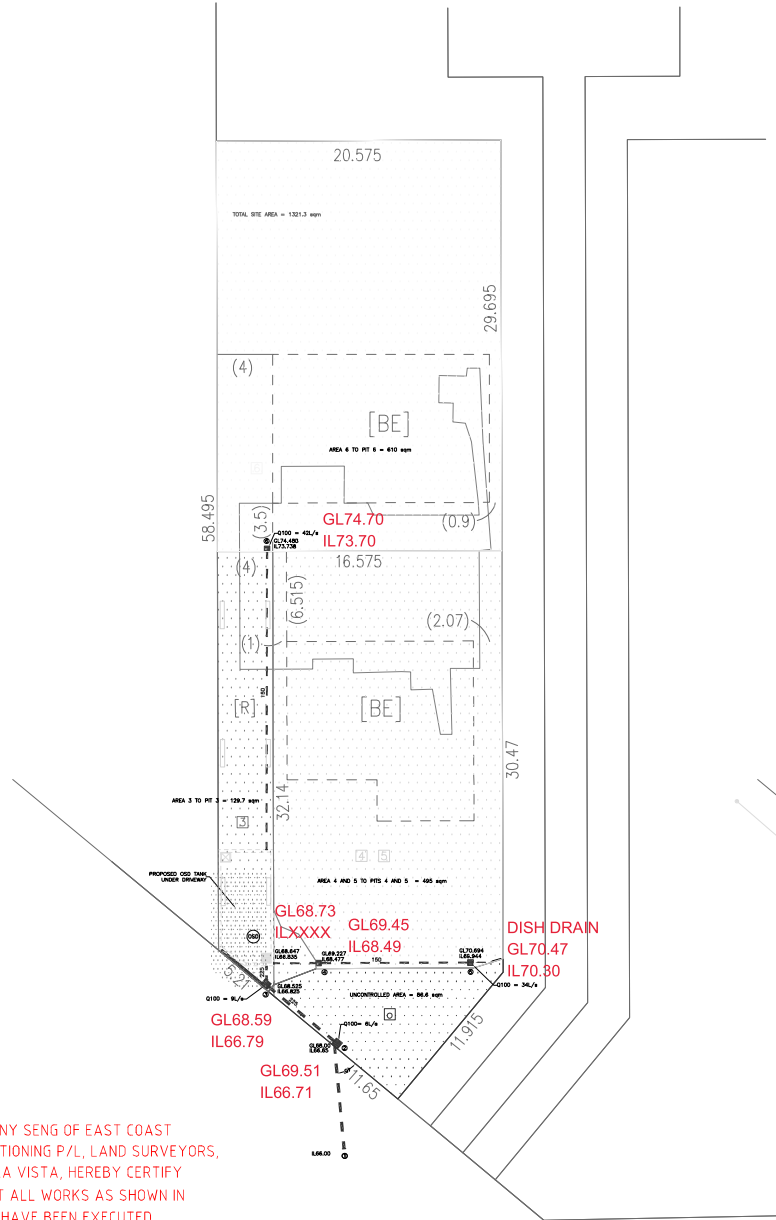
LEGEND

-
- 150
 STORMWATER PIPE AND SIZE LAID
 AT 1% IF NO GRADE SHOWN
- SS
 SUBSOIL DRAINAGE, SIZE AND
 EXTENT AS SPECIFIED
- GRATED TRENCH DRAIN, WIDTH AS SPECIFIED
- RW
 100 LOW CONCRETE BLOCKWORK
 RETAINING WALL OR EQUIVALENT
- IK
 150 HIGH INTEGRAL CONCRETE KERB
 ON CONCRETE SLAB
- ON-SITE STORMWATER DETENTION
 SYSTEM - REFER DETAILS
- LANDSCAPED AREA TO LANDSCAPE
 ARCHITECT'S DETAILS
- PROPOSED CONCRETE DRIVEWAY PAVEMENT
 TO COUNCIL'S SPECIFICATION
- OVERFLOW/GRADED SURFACE ROUTE
- INLET PIT WITH MEDIUM OR
 HEAVY DUTY GRATE AND FRAME OR
 SOLID COVER AS SPECIFIED
- FINISHED DESIGN LEVEL
- 62.237

I, MONY SENG OF EAST COAST
POSITIONING P/L, LAND SURVEYORS,
BELLA VISTA, HEREBY CERTIFY
THAT ALL WORKS AS SHOWN IN
RED HAVE BEEN EXECUTED.
13/09/2021

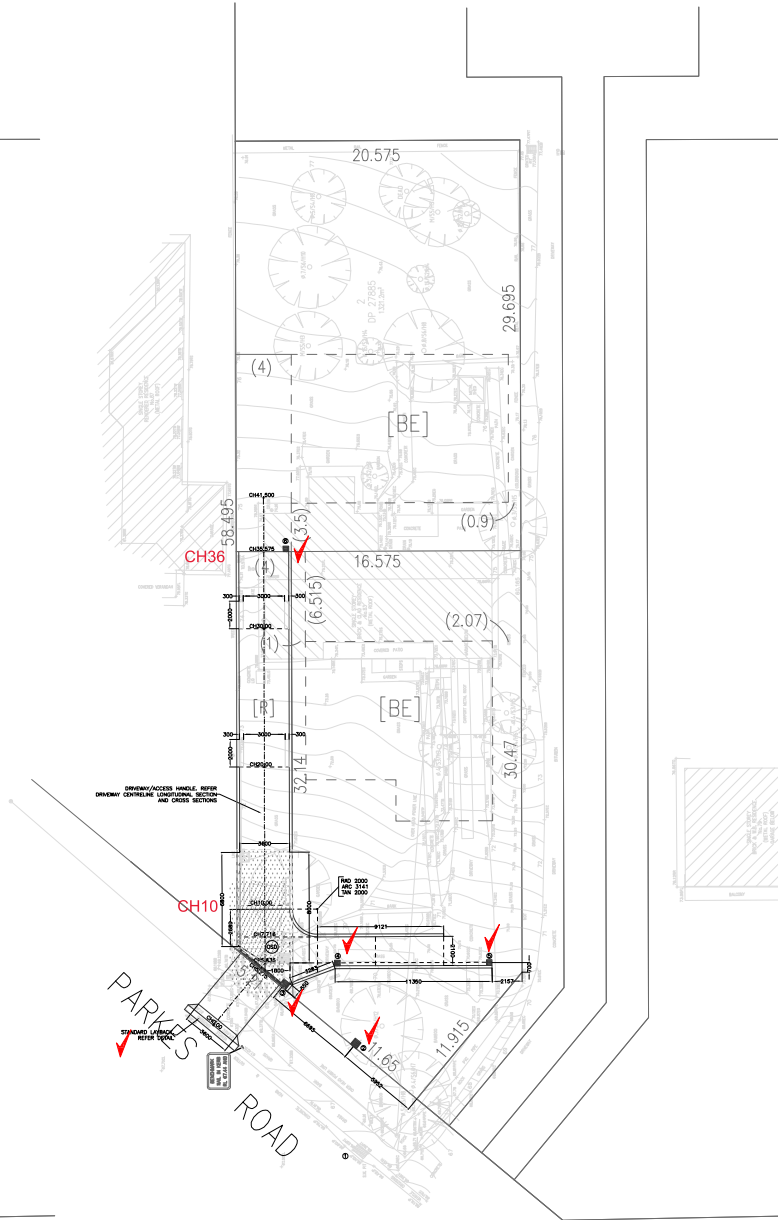
UNREDUCED SCALE @ A1 IS 1:200

B	ISSUED FOR CONSTRUCTION	05/18	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER		PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION ADDRESS: 83 PARKES ROAD, COLLAR	DESIGN: T.L.	DATE: AUGUST 2017
A	ISSUED FOR DEVELOPMENT APPROVAL	08/17	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER		DRAWING NO. PARKES83-SUB3.DWG DRAWING TITLE: STORMWATER DRAINAGE	DRAWN: D.K.	SHEET: 1 OF 11
A	ISSUE DESCRIPTION	08/17	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER		THOMAS LAU & CO. ENGINEERS 100-102 HONG KONG ROAD, HONG KONG TEL: (852) 2511 1111 FAX: (852) 2511 1112 WWW.TLCOENGINEERS.COM	SCALE	 0 2 4 6 8 10 METRES



SUB-CATCHMENT PLAN
UNREDUCED SCALE @ A1 IS 1:200

I, MONG SENG OF EAST COAST
POSITIONING P/L, LAND SURVEYORS,
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13/09/2021



SET-OUT PLAN
UNREDUCED SCALE @ A1 IS 1:200

WARNING — SERVICES



NO INVESTIGATION OF UNDERGROUND SERVICES
HAS BEEN MADE. ALL RELEVANT AUTHORITIES
SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION
ON OR NEAR THE SITE.

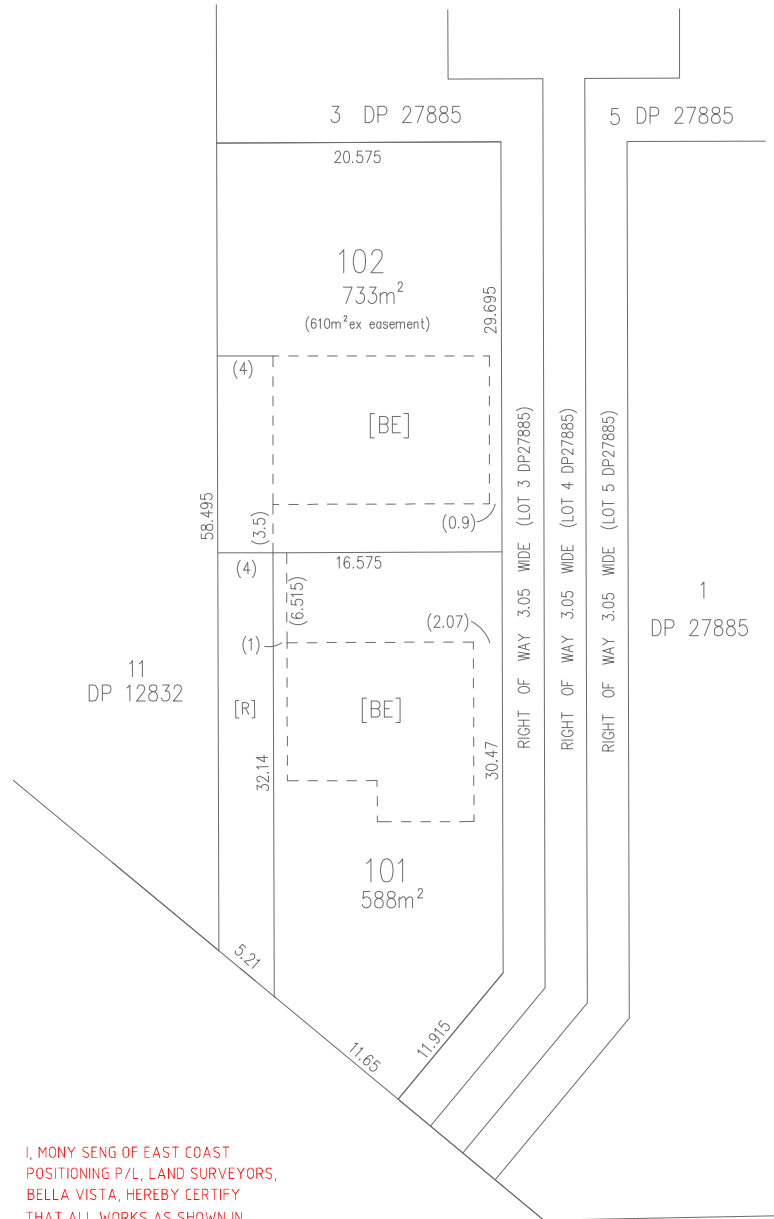
DEVELOPERS AND EXCAVATORS MAY BE HELD
FINANCIALLY RESPONSIBLE BY THE ASSET OWNER
SHOULD THEY DAMAGE UNDERGROUND NETWORKS.

LEGEND

- 150 PROPOSED UNDERGROUND STORMWATER PIPE AND SIZE LAID AT 1% IF NO GRADE SHOWN
- 55 SUBSOIL DRAINAGE, SIZE AND EXTENT AS SPECIFIED
- GRATED TRENCH DRAIN, WIDTH AS SPECIFIED
- RW 100 LOW CONCRETE BLOCKWORK RETAINING WALL OR EQUIVALENT
- IK 150 HIGH INTEGRAL CONCRETE KERB ON CONCRETE SLAB
- ON-SITE STORMWATER DETENTION SYSTEM — REFER DETAILS
- LANDSCAPED AREA TO LANDSCAPE ARCHITECT'S DETAILS
- PROPOSED CONCRETE DRIVEWAY PAVEMENT TO COUNCIL'S SPECIFICATION
- OVERFLOW/GRADED SURFACE ROUTE
- INLET PIT WITH MEDIUM OR HEAVY DUTY GRATE AND FRAME OR SOLID COVER AS SPECIFIED
- FINISHED DESIGN LEVEL

CATCHMENT LEGEND

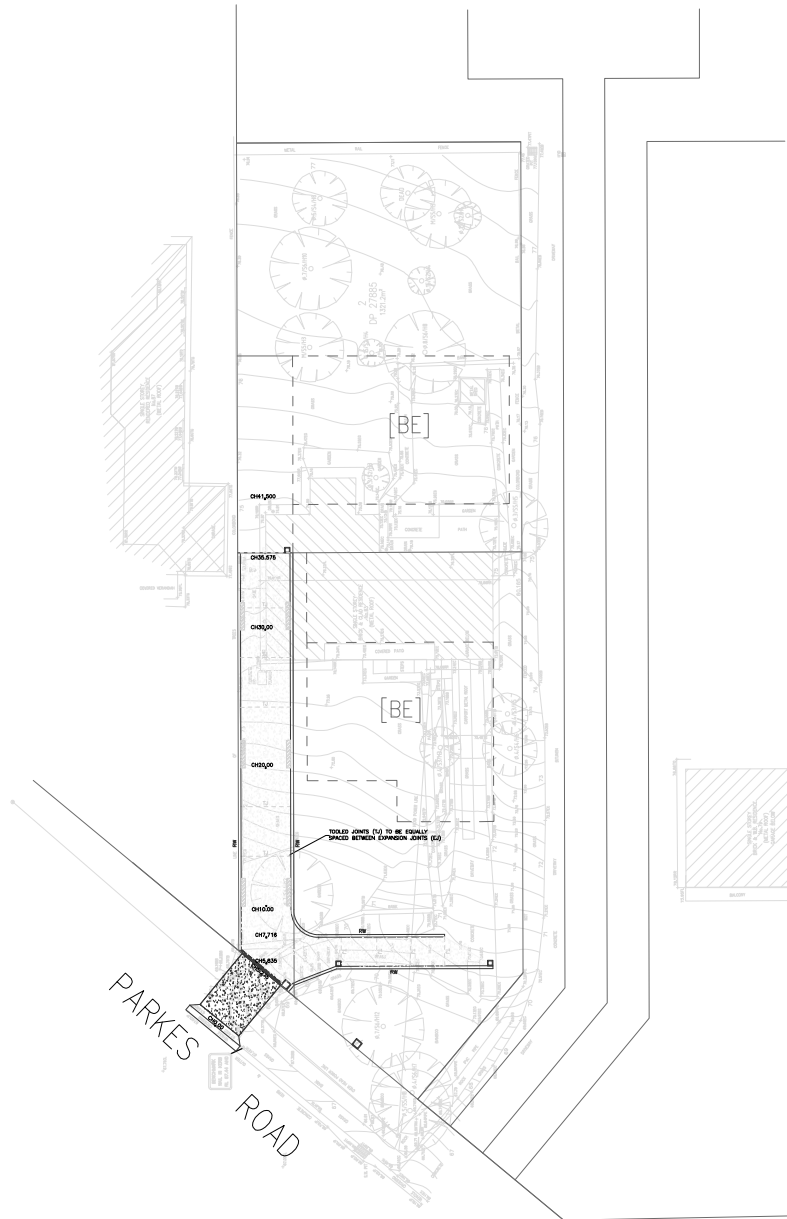
- SUB-CATCHMENT AREA 1
- SUB-CATCHMENT AREA 4 AND 5
- SUB-CATCHMENT AREA 3
- UNCONTROLLED SUB-CATCHMENT AREA



I, MONY SENG OF EAST COAST
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13/09/2021

SUB-DIVISION PLAN

UNREDUCED SCALE @ A1 IS 1:200



PAVEMENT PLAN

UNREDUCED SCALE @ A1 IS 1:200

WARNING — SERVICES



1100

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HAS BEEN MADE. ALL RELEVANT AUTHORITIES
SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION
ON OR NEAR THE SITE.

DEVELOPERS AND EXCAVATORS MAY BE HELD
FINANCIALLY RESPONSIBLE BY THE ASSET OWNER
SHOULD THEY DAMAGE UNDERGROUND NETWORKS.

LEGEND

- 150 PROPOSED UNDERGROUND
STORMWATER PIPE AND SIZE LAID
AT 1% IF NO GRADE SHOWN
- SS SUBSOIL DRAINAGE, SIZE AND
EXTENT AS SPECIFIED
- GRATED TRENCH DRAIN, WIDTH AS SPECIFIED
- RW 100 LOW CONCRETE BLOCKWORK
RETAINING WALL OR EQUIVALENT
- IK 150 HIGH INTEGRAL CONCRETE KERB
ON CONCRETE SLAB
- ON-SITE STORMWATER DETENTION
SYSTEM — REFER DETAILS
- LANDSCAPED AREA TO LANDSCAPE
ARCHITECT'S DETAILS
- PROPOSED CONCRETE DRIVEWAY PAVEMENT
TO COUNCIL'S SPECIFICATION
- OVERFLOW/GRADED SURFACE ROUTE
- INLET PIT WITH MEDIUM OR
HEAVY DUTY GRATE AND FRAME OR
SOLID COVER AS SPECIFIED
- FINISHED DESIGN LEVEL

PAVEMENT LEGEND

- PROPOSED DRIVEWAY AND ACCESS HANDLE
BASE COURSE 200 THICK CONCRETE (STRENGTH 25MPa)
WITH SL82 MESH PLACED CENTRALLY ON
SUB-BASE 100 THICK UNBOUND GRANULAR MATERIAL
(DGS40 TO RTA 3051 OR CRUSHED SANDSTONE
(MAX. PARTICLE SIZE 75mm) AND 95% MOD. COMPACTION)
NOTE: PAVEMENT DESIGN TO BE AMENDED FOLLOWING
FINAL GEOTECHNICAL REPORT
- EXPANSION JOINT — REFER DETAIL
- TOOLED JOINT — REFER DETAIL



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13/09/2021

WARNING — SERVICES



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ON OR NEAR THE SITE.

DEVELOPERS AND EXCAVATORS MAY BE HELD
FINANCIALLY RESPONSIBLE BY THE ASSET OWNER
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LEGEND

- 150 PROPOSED UNDERGROUND
STORMWATER PIPE AND SIZE LAID
AT 1% IF NO GRADE SHOWN
- SS SUBSOIL DRAINAGE, SIZE AND
EXTENT AS SPECIFIED
- GRATED TRENCH DRAIN, WIDTH AS SPECIFIED
- RW 100 LOW CONCRETE BLOCKWORK
RETAINING WALL OR EQUIVALENT
- IK 150 HIGH INTEGRAL CONCRETE KERB
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- ON-SITE STORMWATER DETENTION
SYSTEM — REFER DETAILS
- LANDSCAPED AREA TO LANDSCAPE
ARCHITECT'S DETAILS
- PROPOSED CONCRETE DRIVEWAY PAVEMENT
TO COUNCIL'S SPECIFICATION
- OVERFLOW/GRADED SURFACE ROUTE
- INLET PIT WITH MEDIUM OR
HEAVY DUTY GRATE AND FRAME OR
SOLID COVER AS SPECIFIED
- FINISHED DESIGN LEVEL

PAVEMENT LEGEND

- PROPOSED DRIVEWAY AND ACCESS HANDLE
BASE COURSE 200 THICK CONCRETE (STRENGTH 25MPa)
WITH SL82 MESH PLACED CENTRALLY ON
SUB-BASE 100 THICK UNBOUND GRANULAR MATERIAL
(DG540 TO RTA 3051 OR CRUSHED SANDSTONE
(MAX. PARTICLE SIZE 75mm) AND 95% MOD. COMPACTION)
NOTE: PAVEMENT DESIGN TO BE AMENDED FOLLOWING
FINAL GEOTECHNICAL REPORT
- EXPANSION JOINT — REFER DETAIL
- TOOLED JOINT — REFER DETAIL

B85 LEFT TURN IN
UNREDUCED SCALE @ A1 IS 1:200

B85 RIGHT TURN IN
UNREDUCED SCALE @ A1 IS 1:200

1:200 @ A1

PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION		DESIGN: T.L.		DATE: AUGUST 2017	
ADDRESS: 83 PARKES ROAD, COLLARBY		DRAWN: D.K.		SHEET: 4 OF 11	
DRAWING NO.: PARKES83-SUB3.DWG		SCALE: 0 2 4 6 8 10 METRES			
DRAWING TITLE: STORMWATER DRAINAGE					
THOMAS LAU CHARTERED PROFESSIONAL ENGINEER OFFICE: 83 PARKES ROAD, COLLARBY, NSW 2060 PO BOX 708 HARBOR NSW 2060 TELEPHONE: 02 9550 1111 FAX: 02 9550 1112 EMAIL: thomaslau@optusnet.com.au		05/18 08/17 DATE			
ISSUED FOR CONSTRUCTION					
ISSUED FOR DEVELOPMENT APPROVAL					
ISSUE DESCRIPTION					

**NORTHERN BEACHES COUNCIL
ON-SITE STORMWATER DETENTION CHECKLIST
LOT 101**

PART 1 – EXEMPTION FOR PROPERTIES THAT DRAIN NATURALLY AWAY FROM THE STREET

DOES THE SITE FALL NATURALLY AWAY FROM THE STREET? (YES/NO)
IF "YES", STORMWATER DRAINAGE MUST BE IN ACCORDANCE WITH COUNCIL'S
POLICY No. PDS-POLICY No. 136 "STORMWATER DRAINAGE FROM LOW LEVEL PROPERTIES" – NO

PART 2 – IS THE SITE AREA LESS THAN 450 sqm? (YES/NO)

IF "YES" THEN ON-SITE STORMWATER DETENTION (OSD) IS NOT REQUIRED – NO

PART 3 – EXEMPTION FOR DIRECT DISCHARGE TO OCEAN

DOES THE SITE OF THE DEVELOPMENT DRAIN DIRECTLY TO THE OCEAN WITHOUT THE NEED TO PASS
THROUGH A DRAINAGE CONTROL STRUCTURE SUCH AS A PIPE, BRIDGE, CULVERT, KERB AND GUTTER OR
NATURAL DRAINAGE SYSTEM? (YES/NO)
IF "YES" THEN OSD IS NOT REQUIRED – NO

PART 4 – EXEMPTION FOR FLOOD AFFECTED AREAS

IS THE SITE OF THE DEVELOPMENT LOCATED WITHIN AN ESTABLISHED FLOOD PRONE LAND AS REFERRED
TO IN THE WARRINGAH LOCAL ENVIRONMENTAL PLAN? (YES/NO)
REFER TO SECTION 2.6 OF COUNCIL'S OSD TECHNICAL SPECIFICATION.
IF YES, OSD IS NOT REQUIRED – NO

PART 5 – DETERMINATION OF OSD REQUIREMENTS

CALCULATIONS

(A) SITE AREA = 588 700 sqm x 0.40 = 235 sqm
(B) PROPOSED AND REMAINING IMPERVIOUS AREA
PROPOSED = 150 sqm
REMAINING = 0 sqm
TOTAL = 0 + 150 = 150 sqm (B)
OSD WILL NOT BE REQUIRED WHEN (A) IS GREATER THAN (B)

IS OSD REQUIRED FOR THIS DEVELOPMENT? (YES/NO)

IF "YES" THEN A DESIGN IN ACCORDANCE WITH COUNCIL'S OSD TECHNICAL SPECIFICATION IS TO BE
PROVIDED WITH THE DEVELOPMENT APPLICATION. IF "NO" THEN OSD IS NOT REQUIRED – NO

NOTES

NOTE 1: SITE AREA REFERS TO THE AREA OF THE LAND BOUNDED BY ITS EXISTING OR PROPOSED
BOUNDARIES.
NOTE 2: IMPERVIOUS AREAS REFER TO DRIVEWAYS, PATHWAYS, PAVED AREAS, HARDSTAND AREAS, ROOFED
AREAS, GARAGES AND OUTBUILDINGS THAT ARE PROPOSED AND TO BE RETAINED.
NOTE 3: WHERE AN EXISTING STRUCTURE IS TO BE DEMOLISHED TO MAKE WAY FOR A NEW DWELLING,
ONLY THE PROPOSED IMPERVIOUS AREAS AND REMAINING IMPERVIOUS AREAS ARE TO BE USED IN THE
CALCULATIONS.
NO CREDIT IS GIVEN FOR EXISTING IMPERVIOUS AREAS THAT ARE NOT RETAINED.
NOTE 4: A REDUCTION IN THE BASIC OSD VOLUME MAY BE PERMITTED. REFER TO COUNCIL'S "OSD
RAINWATER RE-USE POLICY FOR SINGLE RESIDENTIAL DWELLINGS".
NOTE 5: IF OSD IS REQUIRED, THEN A DESIGN FOR OSD IN ACCORDANCE WITH COUNCIL'S "OSD
TECHNICAL SPECIFICATION" IS TO BE PROVIDED WITH THE DEVELOPMENT APPLICATION.

**NORTHERN BEACHES COUNCIL
ON-SITE STORMWATER DETENTION CHECKLIST
LOT 102**

PART 1 – EXEMPTION FOR PROPERTIES THAT DRAIN NATURALLY AWAY FROM THE STREET

DOES THE SITE FALL NATURALLY AWAY FROM THE STREET? (YES/NO)
IF "YES", STORMWATER DRAINAGE MUST BE IN ACCORDANCE WITH COUNCIL'S
POLICY No. PDS-POLICY No. 136 "STORMWATER DRAINAGE FROM LOW LEVEL PROPERTIES" – NO

PART 2 – IS THE SITE AREA LESS THAN 450 sqm? (YES/NO)

IF "YES" THEN ON-SITE STORMWATER DETENTION (OSD) IS NOT REQUIRED – NO

PART 3 – EXEMPTION FOR DIRECT DISCHARGE TO OCEAN

DOES THE SITE OF THE DEVELOPMENT DRAIN DIRECTLY TO THE OCEAN WITHOUT THE NEED TO PASS
THROUGH A DRAINAGE CONTROL STRUCTURE SUCH AS A PIPE, BRIDGE, CULVERT, KERB AND GUTTER OR
NATURAL DRAINAGE SYSTEM? (YES/NO)
IF "YES" THEN OSD IS NOT REQUIRED – NO

PART 4 – EXEMPTION FOR FLOOD AFFECTED AREAS

IS THE SITE OF THE DEVELOPMENT LOCATED WITHIN AN ESTABLISHED FLOOD PRONE LAND AS REFERRED
TO IN THE WARRINGAH LOCAL ENVIRONMENTAL PLAN? (YES/NO)
REFER TO SECTION 2.6 OF COUNCIL'S OSD TECHNICAL SPECIFICATION.
IF YES, OSD IS NOT REQUIRED – NO

PART 5 – DETERMINATION OF OSD REQUIREMENTS

CALCULATIONS

(A) SITE AREA = 733 sqm x 0.40 = 293 sqm
(B) PROPOSED AND REMAINING IMPERVIOUS AREA
PROPOSED = 0 sqm
REMAINING = 0 sqm
TOTAL = 0 sqm (B)
OSD WILL NOT BE REQUIRED WHEN (A) IS GREATER THAN (B)

IS OSD REQUIRED FOR THIS DEVELOPMENT? (YES/NO)

IF "YES" THEN A DESIGN IN ACCORDANCE WITH COUNCIL'S OSD TECHNICAL SPECIFICATION IS TO BE
PROVIDED WITH THE DEVELOPMENT APPLICATION. IF "NO" THEN OSD IS NOT REQUIRED – NO

NOTES

NOTE 1: SITE AREA REFERS TO THE AREA OF THE LAND BOUNDED BY ITS EXISTING OR PROPOSED
BOUNDARIES.
NOTE 2: IMPERVIOUS AREAS REFER TO DRIVEWAYS, PATHWAYS, PAVED AREAS, HARDSTAND AREAS, ROOFED
AREAS, GARAGES AND OUTBUILDINGS THAT ARE PROPOSED AND TO BE RETAINED.
NOTE 3: WHERE AN EXISTING STRUCTURE IS TO BE DEMOLISHED TO MAKE WAY FOR A NEW DWELLING,
ONLY THE PROPOSED IMPERVIOUS AREAS AND REMAINING IMPERVIOUS AREAS ARE TO BE USED IN THE
CALCULATIONS.
NO CREDIT IS GIVEN FOR EXISTING IMPERVIOUS AREAS THAT ARE NOT RETAINED.
NOTE 4: A REDUCTION IN THE BASIC OSD VOLUME MAY BE PERMITTED. REFER TO COUNCIL'S "OSD
RAINWATER RE-USE POLICY FOR SINGLE RESIDENTIAL DWELLINGS".
NOTE 5: IF OSD IS REQUIRED, THEN A DESIGN FOR OSD IN ACCORDANCE WITH COUNCIL'S "OSD
TECHNICAL SPECIFICATION" IS TO BE PROVIDED WITH THE DEVELOPMENT APPLICATION.

**ILSAX PIPE FILE
STORMWATER DRAINAGE**

no 83 parkes road., collaray
* note filename is parkes83a.txt
* note existing site condition
* calculation of pre-development runoff
* note average slope is approx. 15%
pre 1 -1 2
1 1 1 1.0 0 -1
10 0 0 0 0
0.13213 18 35 5.0 8 5 0 82 35 15.0 0.33 0 1 0
out

* note this is post-development condition
* note with no On-Site Stormwater Detention (OSD)
* note post-dev impervious area taken as 60%
* note adopted post-dev imp area is 75% (+15%)

a 5 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 4 0
0.0495 75 15 10.0 8 5 0 25 15 15.0 0.33 0 0 0

a 4 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 3 0
0.0000 75 15 10.0 8 5 0 25 15 15.8 0.33 0 0 0

b 6 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 3 0
0.0610 75 15 8.0 8 5 0 25 15 8.0 0.33 0 0 0

add b to a

a 3 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 2 0
0.0130 100 30 18.0 8 5 0 0 0 0.0 0.33 0 0 0

a 2 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 1 0
0.0087 0 0 0.0 8 5 0 100 13 17.0 0.33 0 0 0

a 1 -1 -1
1 1 1 1.0 0 -1
10 0 0 0 0
0.0000 0 0 0 0 0 0 0

end

INTERMEDIATE OUTPUT FILE 100-YR ARI

no 83 parkes road., collaray
PEAK FLOWS AMONG RUNOFFS FROM 11 RAINFALL PATTERNS
(The following lines give Branch and Reach names;
Maximum surface flow arriving at an entry point or pit,
Maximum flow in the pit before routing through downstream reach,
Maximum surface overflow and Total flows to this point (m3/s);
Pipe Diameter or Normal Depth (open sections) (mm) & Capacity (m3/s).
Other information is given for non-circular reaches
– refer to the program code for details.)

```
pre 1 .078 .078 .000 .078 381. .226
a 5 .034 .034 .000 .034 381. .358
a 4 .000 .034 .000 .034 381. .358
b 6 .042 .042 .000 .042 381. .358
a 3 .009 .086 .000 .086 381. .358
a 2 .006 .092 .000 .092 381. .358
a 1 .000 .092 .000 .092 381. .226
END
```

I, MONY SENG OF EAST COAST
POSITIONING P/L, LAND SURVEYORS,
BELLA VISTA, HEREBY CERTIFY
THAT ALL WORKS AS SHOWN IN
RED HAVE BEEN EXECUTED.
13/09/2021



**ILSAX PIPE FILE
WITH ONSITE DETENTION (OSD)**

no 83 parkes road., collaray
* note filename is parkes83a.txt
* note existing site condition
* calculation of pre-development runoff
* note average slope is approx. 15%
pre 1 -1 2
1 1 1 1.0 0 -1
10 0 0 0 0
0.13213 18 35 5.0 8 5 0 82 35 15.0 0.33 0 1 0
out

* note this is post-development condition
* note with On-Site Stormwater Detention (OSD)
* note post-dev impervious area taken as 60%
* note adopted post-dev imp area is 75% (+15%)
* note assume all roofed areas controlled through OSD
* note orifice is 124mm--dia

a 5 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 4 0
0.0495 75 15 10.0 8 5 0 25 15 15.0 0.33 0 0 0

a 4 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 3 0
0.0000 75 15 13.8 8 5 0 25 15 15.8 0.33 0 0 0

b 6 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
a 3 0
0.0610 75 15 8.0 8 5 0 25 15 8.0 0.33 0 0 0

add b to a

a 3 -1 2
10 4 1 1 0 -1
a 1 0
3
66.947 0 0 0
68.447 42.00 0.039 0
68.647 45.00 0.0415 0.10
0

0.0130 100 30 18.0 8 5 0 0 0 0.0 0.33 0 0 0

* note this is area not OSD controlled
* note which is mainly pervious areas at front
* note the small area of the driveway assumed to OSD
a 2 -1 2
1 2 1 2.5 0 -1
10 0 0 0 0
0.0087 0 0 0.0 8 5 0 100 13 17.0 0.33 0 0 0

a 1 -1 -1
1 1 1 1.0 0 -1
10 0 0 0 0
0.0000 0 0 0 0 0 0 0

end

INTERMEDIATE OUTPUT OSD FILE 5-YR ARI

no 83 parkes road., collaray
PEAK FLOWS AMONG RUNOFFS FROM 11 RAINFALL PATTERNS
(The following lines give Branch and Reach names;
Maximum surface flow arriving at an entry point or pit,
Maximum flow in the pit before routing through downstream reach,
Maximum surface overflow and Total flows to this point (m3/s);
Pipe Diameter or Normal Depth (open sections) (mm) & Capacity (m3/s).
Other information is given for non-circular reaches
– refer to the program code for details.)

```
pre 1 .042 .042 .000 .042 381. .226
a 5 .022 .022 .000 .022 381. .358
a 4 .000 .022 .000 .022 381. .358
b 6 .027 .027 .000 .027 381. .358
a 3 .006 .000 .000 .054 381. .000
a 2 .003 .025 .000 .025 381. .358
a 1 .000 .025 .000 .025 381. .226
END
```

INTERMEDIATE OUTPUT OSD FILE 20-YR ARI

no 83 parkes road., collaray
PEAK FLOWS AMONG RUNOFFS FROM 10 RAINFALL PATTERNS
(The following lines give Branch and Reach names;
Maximum surface flow arriving at an entry point or pit,
Maximum flow in the pit before routing through downstream reach,
Maximum surface overflow and Total flows to this point (m3/s);
Pipe Diameter or Normal Depth (open sections) (mm) & Capacity (m3/s).
Other information is given for non-circular reaches
– refer to the program code for details.)

```
pre 1 .061 .061 .000 .061 381. .226
a 5 .029 .029 .000 .029 381. .358
a 4 .000 .029 .000 .029 381. .358
b 6 .035 .035 .000 .035 381. .358
a 3 .008 .000 .000 .071 381. .000
a 2 .004 .035 .000 .035 381. .358
a 1 .000 .035 .000 .035 381. .226
END
```

INTERMEDIATE OUTPUT OSD FILE 50-YR ARI

no 83 parkes road., collaray
PEAK FLOWS AMONG RUNOFFS FROM 11 RAINFALL PATTERNS
(The following lines give Branch and Reach names;
Maximum surface flow arriving at an entry point or pit,
Maximum flow in the pit before routing through downstream reach,
Maximum surface overflow and Total flows to this point (m3/s);
Pipe Diameter or Normal Depth (open sections) (mm) & Capacity (m3/s).
Other information is given for non-circular reaches
– refer to the program code for details.)

```
pre 1 .068 .068 .000 .068 381. .226
a 5 .031 .031 .000 .031 381. .358
a 4 .000 .031 .000 .031 381. .358
b 6 .038 .038 .000 .038 381. .358
a 3 .008 .000 .000 .078 381. .000
a 2 .005 .040 .000 .040 381. .358
a 1 .000 .040 .000 .040 381. .226
END
```

INTERMEDIATE OUTPUT OSD FILE 100-YR ARI

no 83 parkes road., collaray
PEAK FLOWS AMONG RUNOFFS FROM 11 RAINFALL PATTERNS
(The following lines give Branch and Reach names;
Maximum surface flow arriving at an entry point or pit,
Maximum flow in the pit before routing through downstream reach,
Maximum surface overflow and Total flows to this point (m3/s);
Pipe Diameter or Normal Depth (open sections) (mm) & Capacity (m3/s).
Other information is given for non-circular reaches
– refer to the program code for details.)

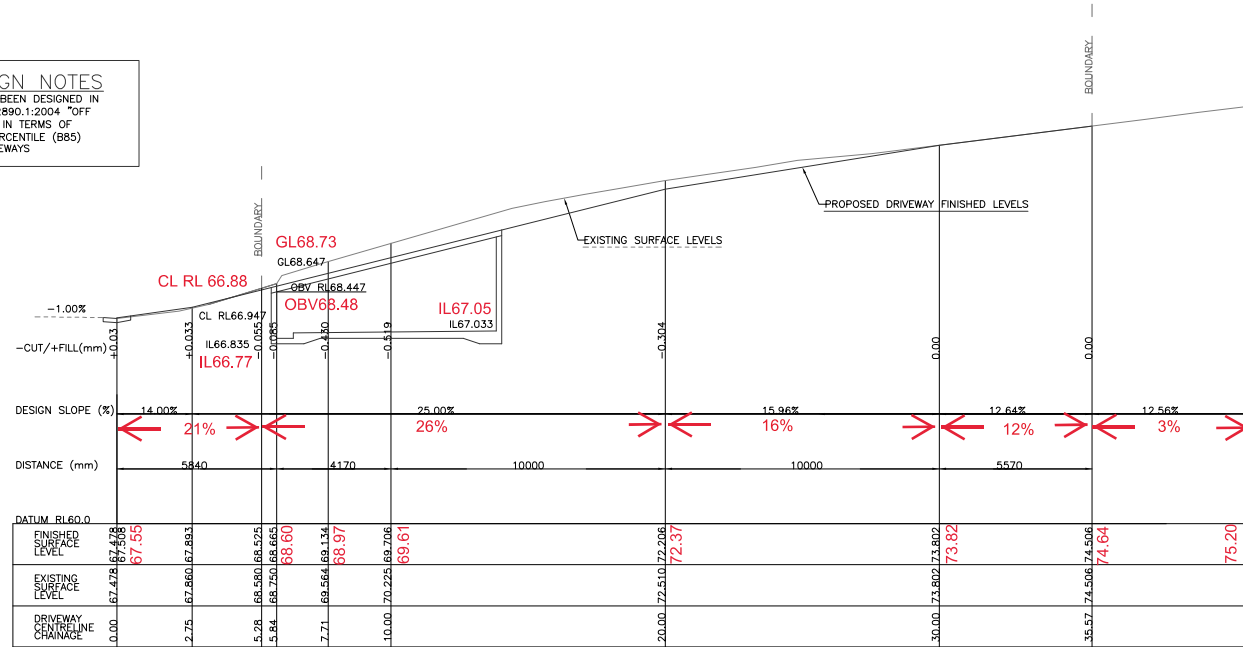
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pre 1 .078 .078 .000 .078 381. .226
a 5 .034 .034 .000 .034 381. .358
a 4 .000 .034 .000 .034 381. .358
b 6 .042 .042 .000 .042 381. .358
a 3 .009 .000 .020 .086 381. .000
a 2 .006 .044 .000 .044 381. .358
a 1 .020 .063 .000 .063 381. .226
END
```

**ON-SITE STORMWATER DETENTION DETERMINATION SHEETS
ILSAX STORMWATER CALCULATIONS AND OUTPUT FILES**

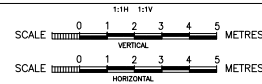
B ISSUED FOR CONSTRUCTION		05/18	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER OFFICE: 5/101-118 Collins Street, MELBOURNE PO BOX 708 WAREHOSE NEW YORK TELEPHONE: 03 9246 1616 FAX 03 9246 1615 EMAIL: tau@tauengineers.com.au		PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION ADDRESS: 83 PARKES ROAD, COLLARAY DRAWING NO. PARKES83-SUB83.DWG DRAWING TITLE: STORMWATER DRAINAGE	DESIGN: T.L. DRAWN: D.K. SCALE: 1:1000	DATE: AUGUST 2017 SHEET: 5 OF 11
A ISSUED FOR DEVELOPMENT APPROVAL		08/17					
ISSUE DESCRIPTION		DATE					

DRIVEWAY DESIGN NOTES

THE DRIVEWAY PROFILE HAS BEEN DESIGNED IN ACCORDANCE WITH AS/NZS 2890.1:2004 "OFF STREET CAR PARKING" CODE IN TERMS OF SCRAPING FOR THE 85TH PERCENTILE (885) VEHICLE FOR DOMESTIC DRIVEWAYS



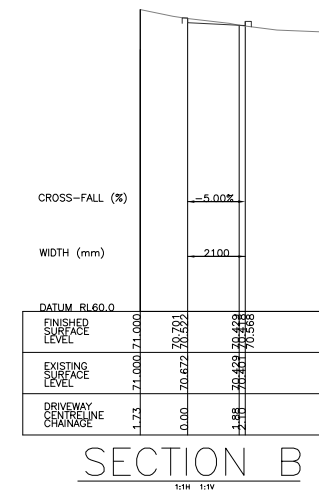
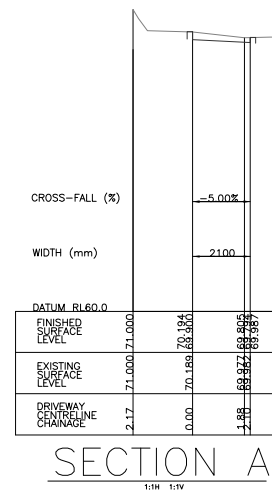
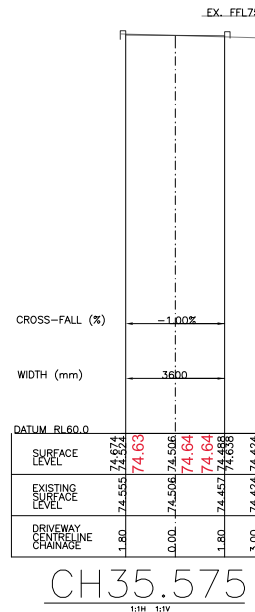
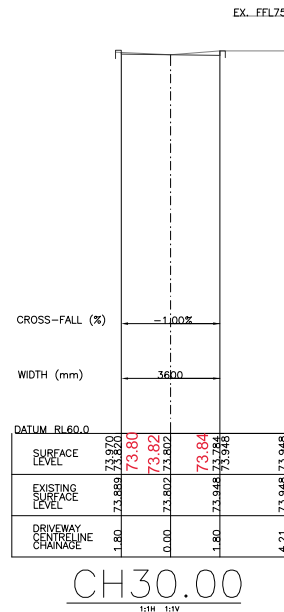
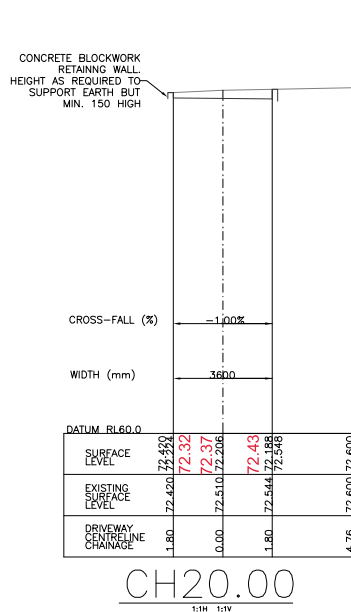
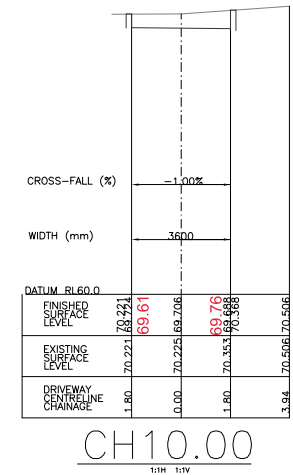
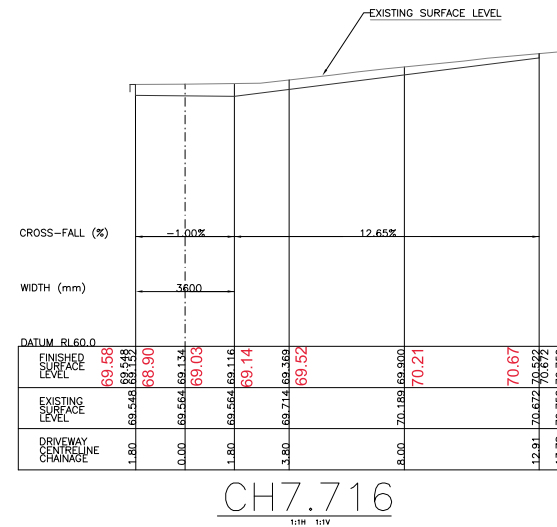
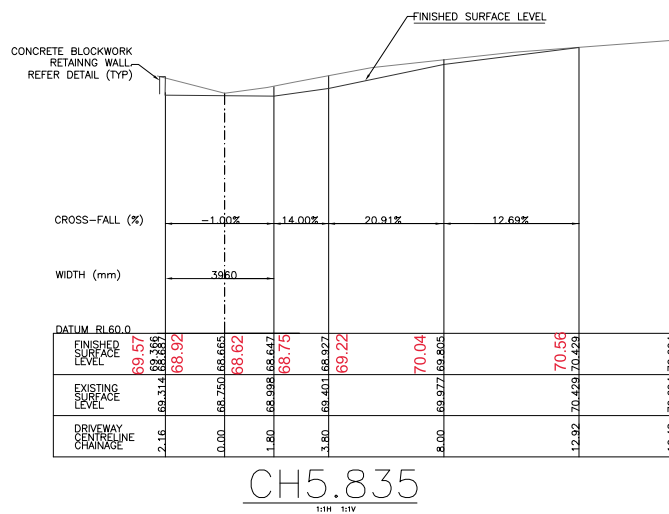
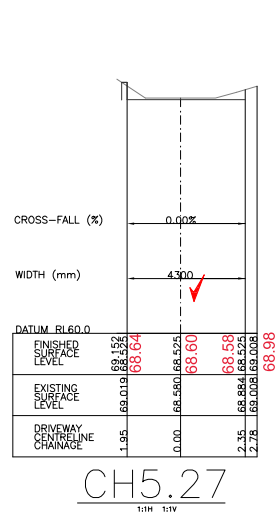
LONGITUDINAL SECTION THROUGH CENTRELINE DRIVEWAY/ACCESS HANDLE



I, MONY SENG OF EAST COAST POSITIONING P/L, LAND SURVEYORS, BELLA VISTA, HEREBY CERTIFY THAT ALL WORKS AS SHOWN IN RED HAVE BEEN EXECUTED. 13/09/2021

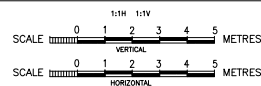
1:100 @ A1

B		ISSUED FOR CONSTRUCTION	05/18	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER 88 From Street, Collaroy NSW 2090 PO BOX 708 HARBOR NSW 2090 TELEPHONE/FACSIMILE 999 77 913 EMAIL: tla@tlaengineers.com.au	PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION ADDRESS: 83 PARKES ROAD, COLLAROY DRAWING NO. PARKES83-SUB3.DWG DRAWING TITLE: STORMWATER DRAINAGE	DESIGN: T.L.		DATE: AUGUST 2017	
A		ISSUED FOR DEVELOPMENT APPROVAL	08/17			DRAWN: D.K.		SHEET: 6 OF 11	
ISSUE		DESCRIPTION	DATE			SCALE 0 2 4 6 8 10 METRES			



I, MONY SENG OF EAST COAST POSITIONING P/L, LAND SURVEYORS, BELLA VISTA, HEREBY CERTIFY THAT ALL WORKS AS SHOWN IN RED HAVE BEEN EXECUTED.
13/09/2021

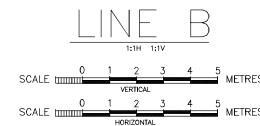
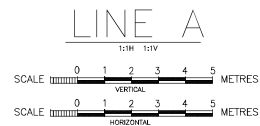
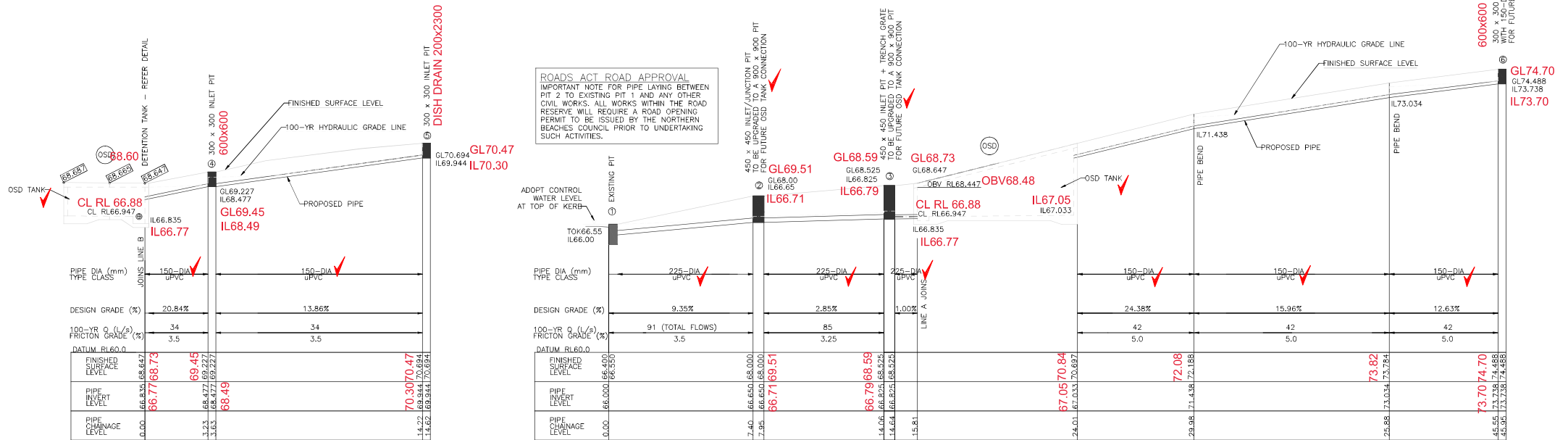
CROSS-SECTIONS ALONG DRIVEWAY/ACCESS HANDLE CL



STORMWATER DESIGN NOTES

1. THE INTER-ALLOTMENT STORMWATER DRAINAGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AUSTRALIAN RAINFALL AND RUNOFF (ARRR) VOLUME 1 - A GUIDE TO FLOOD ESTIMATION, URBAN DRAINAGE DESIGN SECTION. THE DESIGN FLOWS OBTAINED FROM THE ILSAX HYDROLOGICAL PROGRAM

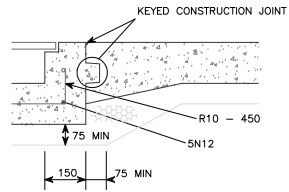
2. WARNING - NO SERVICE INVESTIGATION HAS BEEN UNDERTAKEN. A DBO AND PHYSICAL INVESTIGATION WOULD BE REQUIRED PRIOR TO ANY PIPE LAYING



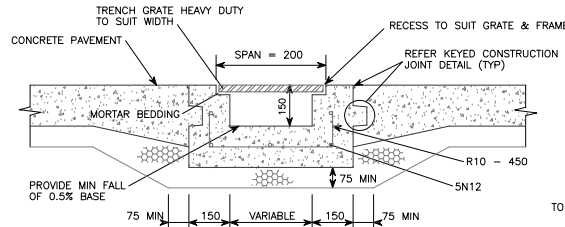
I, MONY SENG OF EAST COAST POSITIONING P/L, LAND SURVEYORS, BELLA VISTA, HEREBY CERTIFY THAT ALL WORKS AS SHOWN IN RED HAVE BEEN EXECUTED.
13/09/2021

LONGITUDINAL SECTIONS THROUGH STORMWATER LINE

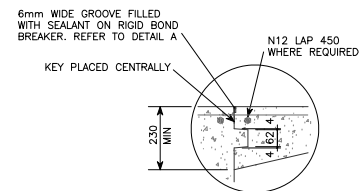
C	ROADS AUTHORITY NOTE ADDED	09/18	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER	PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION	DESIGN: T.L.	DATE: AUGUST 2017
B	ISSUED FOR CONSTRUCTION	05/18		ADDRESS: 83 PARKES ROAD, COLLAROY	DRAWN: D.K.	SHEET: 8 OF 11
A	ISSUED FOR DEVELOPMENT APPROVAL	08/17		DRAWING NO. PARKES83-SUB3.DWG	SCALE 0 2 4 6 8 10 METRES	
ISSUE	DESCRIPTION	DATE		DRAWING TITLE: STORMWATER DRAINAGE		



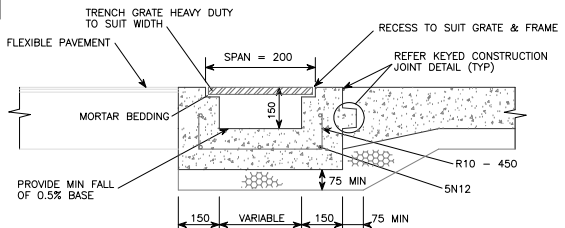
RIGID PAVEMENT INTERFACE
N.T.S.



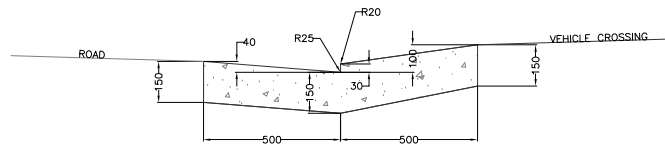
**GRATED TRENCH DRAIN DETAIL
CONCRETE/CONCRETE INTERFACE**
N.T.S.



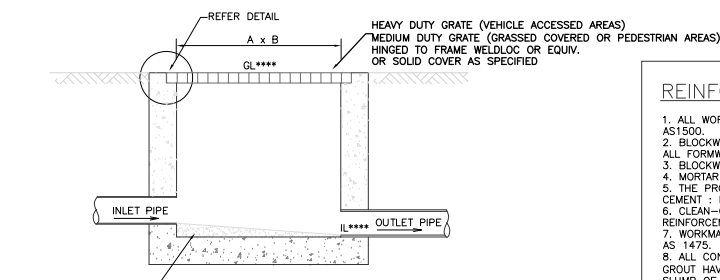
KEYED CONSTRUCTION JOINT DETAIL
N.T.S.



**GRATED TRENCH DRAIN DETAIL
CONCRETE/FLEXIBLE PAVEMENT INTERFACE**
N.T.S.



STANDARD DRIVEWAY LAYBACK DETAIL
N.T.S.



INLET/JUNCTION PIT DETAIL
N.T.S.

UNLESS OTHERWISE SPECIFIED PIT SIZE BASED ON DEPTH	
INTERNAL DIMENSIONS (A x B)	DEPTH TO INVERT (mm)
300 x 300	<300
450 x 450	300 TO 600
600 x 600	600 TO 1200
900 x 900	>1200

I, MONY SENG OF EAST COAST POSITIONING P/L, LAND SURVEYORS, BELLA VISTA, HEREBY CERTIFY THAT ALL WORKS AS SHOWN IN RED HAVE BEEN EXECUTED.
13/09/2021

REINFORCED CONCRETE BLOCK MASONRY

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3700 AND AS1500.
2. BLOCKWORK WHICH IS TO BE SUPPORTED BY SLAB SHALL NOT BE ERECTED UNTIL ALL FORMWORK OR PROPS HAVE BEEN REMOVED.
3. BLOCKWORK STRENGTH FOR LOAD BEARING SHALL BE MINIMUM OF 15MPa.
4. MORTAR SHALL CONFORM TO THE REQUIREMENTS OF AS 1123.
5. THE PROPORTION OF MORTAR MIX TO BE 1 : 0.1 : 3 VOLUME OF CEMENT : LIME : SAND.
6. CLEAN-OUT OPENINGS SHALL BE PROVIDED IN THE BOTTOM COURSE OF ALL REINFORCEMENT CONCRETE BLOCKWORK CORES.
7. WORKMANSHIP IN LAYING CONCRETE BLOCK MASONRY UNITS SHALL COMPLY WITH AS 1475.
8. ALL CONCRETE BLOCKWORK MASONRY CORES SHALL BE CLEANED AND FILLED WITH GROUT HAVING A CHARACTERISTIC STRENGTH AT 28 DAYS (F_c) OF 12MPa AND A SLUMP OF 180mm TO 230mm.
9. GROUT MIX TO BE USED FOR CORE FILLING SHALL HAVE A MINIMUM COURSE AGGREGATE SIZE OF 10mm.
10. BLOCKWORK CONTROL JOINTS TO BE PROVIDED AT 8 METER CENTRES AND ARE TO BE 16mm WIDE U.N.O. R16 @ 400 CENTRE DOWELS (600 LONG) TO BE USED AT CONTROL JOINTS.

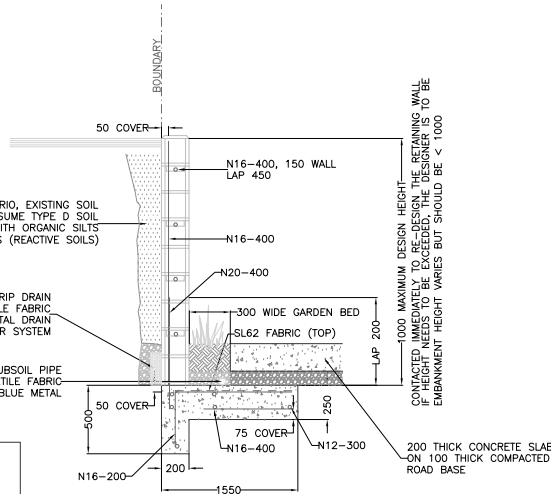
DETAILS SHEET 1

FOR WORST CASE SCENARIO, EXISTING SOIL TO REMAIN. THEREFORE ASSUME TYPE D SOIL - VERY SOFT CLAYS WITH ORGANIC SILTS OR SILTY SANDS (REACTIVE SOILS)

200 NYLEX STRIP DRAIN WRAPPED IN GEOTEXTILE FABRIC SURROUNDED BY 20-DIA BLUE METAL DRAIN INTO DOWNSTREAM STORMWATER SYSTEM

200 NYLEX STRIP DRAIN WRAPPED IN GEOTEXTILE FABRIC SURROUNDED BY 20-DIA BLUE METAL DRAIN INTO DOWNSTREAM STORMWATER SYSTEM

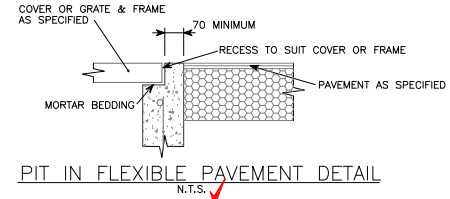
50-DIA SUBSOIL PIPE WRAPPED IN GEOTEXTILE FABRIC SURROUNDED BY BLUE METAL



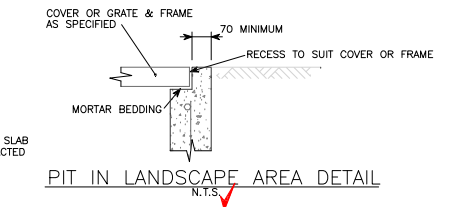
200 BLOCKWORK RETAINING WALL DETAIL ALONG ACCESS HANDLE
SCALE - NOT TO SCALE

CONCRETE BLOCKWORK NOTES (CONT'D)

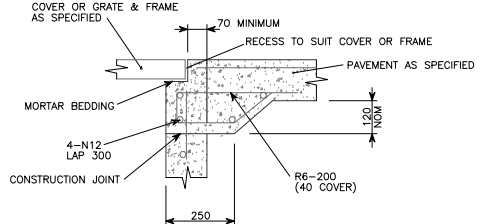
11. LIGHTWEIGHT BLOCKWORK MAY BE USED PROVIDED THEY HAVE THE CHARACTERISTIC COMPRESSIVE STRENGTH AS SPECIFIED.
12. 150mm BLOCKWORK WALLS IS NOT TO BE USED. ALL BLOCKWORK MIN. 200mm
13. THE FOLLOWING BACKFILL MATERIAL RECOMMENDED:
A. COARSE-GRAINED SOIL WITHOUT ADMIXTURE OF FINE SOIL PARTICLES, VERY PERMEABLE (CLEAN SAND OR GRAVEL)
14. MIN. DESIGN BASED ON SOFT CLAY, SILTY SANDS (REACTIVE SOIL) U.N.O.
15. ALTERNATIVE DETAIL CAN BE USED SUBJECT TO STRUCTURAL ENGINEER'S APPROVAL.
16. DETAIL SHOWN IS FOR MAXIMUM 5KPa BEHIND WALL AND INSITU BACKFILL.



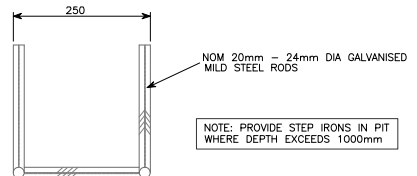
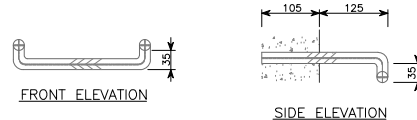
PIT IN FLEXIBLE PAVEMENT DETAIL
N.T.S.



PIT IN LANDSCAPE AREA DETAIL
N.T.S.



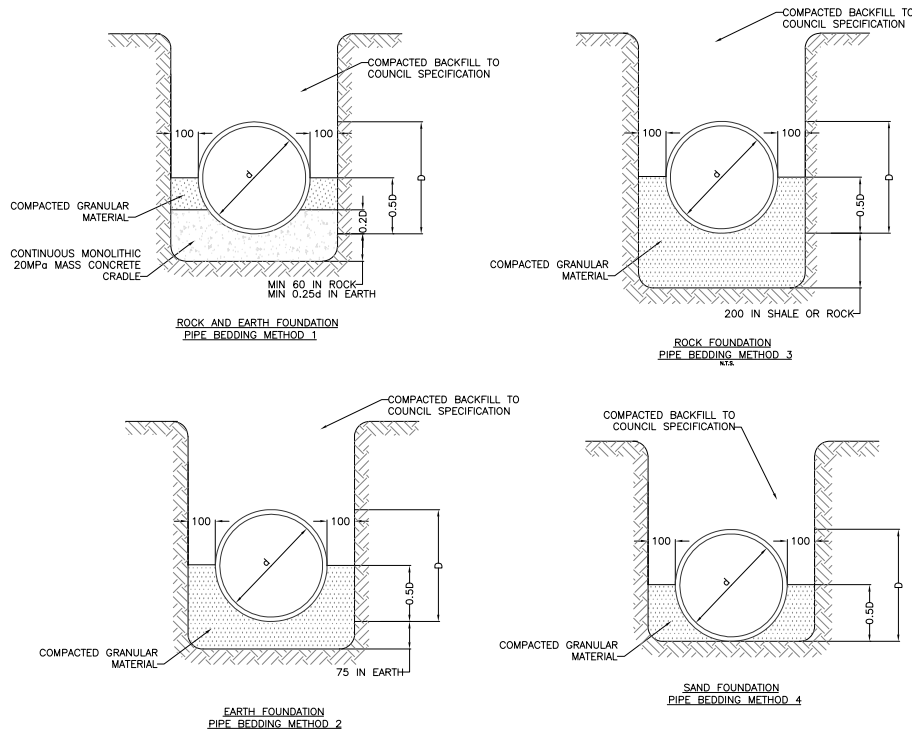
PIT IN CONCRETE PAVEMENT DETAIL
N.T.S.



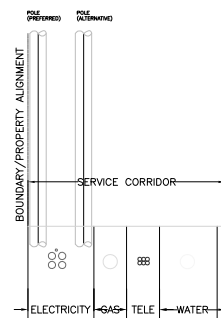
PLAN

STEP IRON DETAILS
N.T.S.

B	ISSUED FOR CONSTRUCTION	05/18	THOMAS LAU	PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION	DESIGN: T.L.	DATE: AUGUST 2017
A	ISSUED FOR DEVELOPMENT APPROVAL	08/17	CHARTERED PROFESSIONAL ENGINEER	ADDRESS: 83 PARKES ROAD, COLLAROY	DRAWN: D.K.	SHEET: 9 OF 11
ISSUE	DESCRIPTION	DATE	BY: [Signature]	DRAWING NO. PARKES3-SUB5.DWG	SCALE: 0 2 4 6 8 10 METRES	

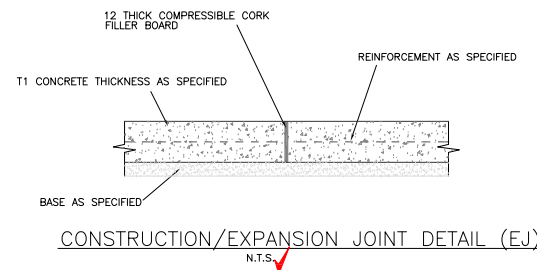


PIPE BEDDING DETAILS FOR VARIOUS INSITU FOUNDATIONS

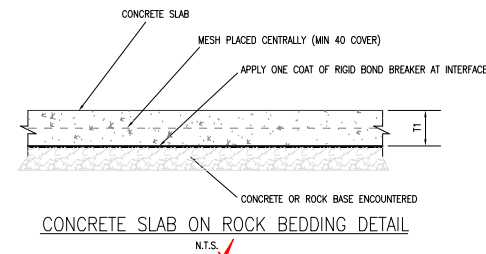


ALLOCATION OF UTILITY SERVICE MAINS IN EASEMENT

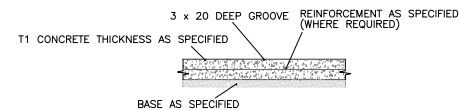
I, MONY SENG OF EAST COAST POSITIONING P/L, LAND SURVEYORS, BELLA VISTA, HEREBY CERTIFY THAT ALL WORKS AS SHOWN IN RED HAVE BEEN EXECUTED.
13/09/2021



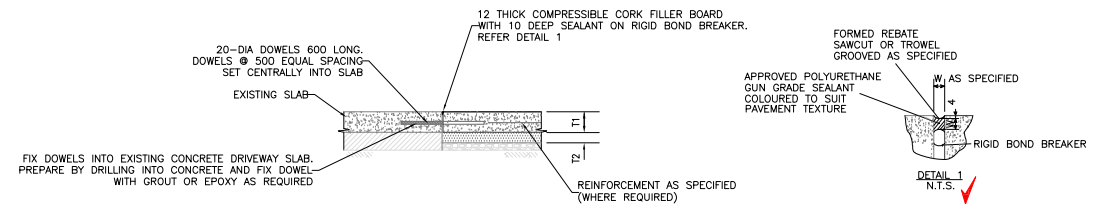
CONSTRUCTION/EXPANSION JOINT DETAIL (EJ)



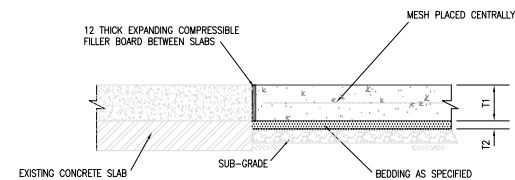
CONCRETE SLAB ON ROCK BEDDING DETAIL



WEAKENED PLANE TOOLED JOINT DETAIL (TJ)



CONCRETE SLAB DOWELLED EXPANSION JOINT DETAIL TO ADJOINING EXISTING DRIVEWAY (WHERE DIFFERENTIAL SETTLEMENT IS NOT TOLERATED)

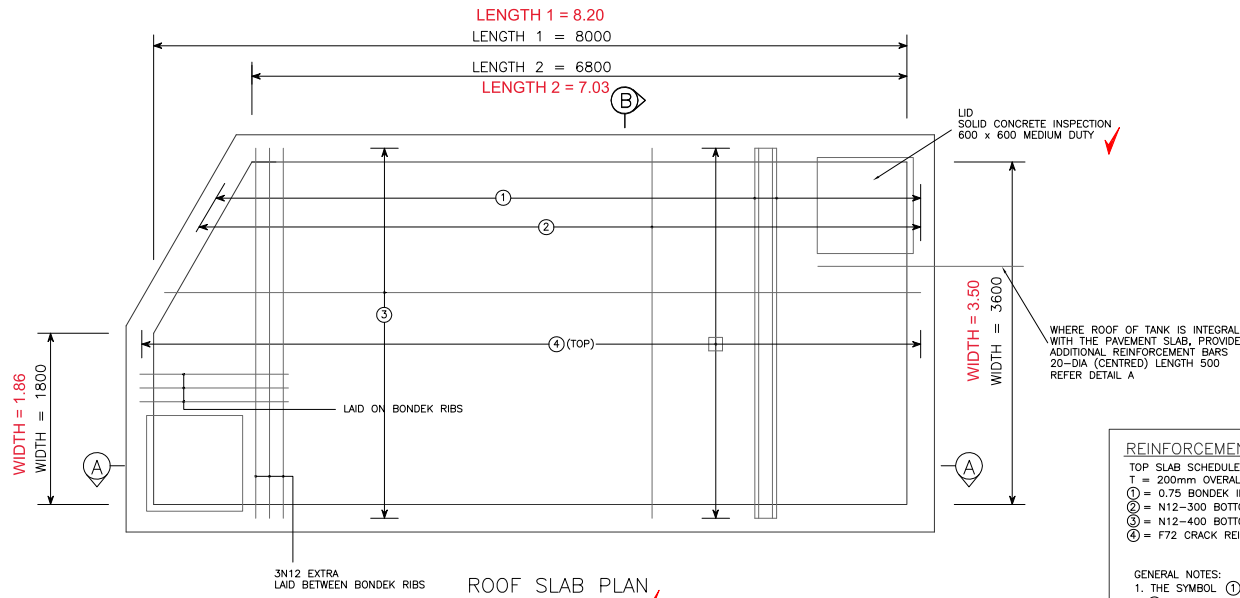


CONCRETE SLAB DETAIL - ADJOINING EXISTING STRUCTURES (WHERE DIFFERENTIAL SETTLEMENT IS TOLERABLE)

CONCRETE FOOTPATH AND DRIVEWAY CONSTRUCTION NOTES

- EXCAVATE TO MINIMUM CONCRETE SLAB THICKNESS AS SPECIFIED AND A BEDDING COURSE OF SPECIFIED THICKNESS OF COMPACTED GRANULAR MATERIAL (REF. PAVEMENT LEGEND).
- CONCRETE STRENGTH SHALL BE 20MPa MIN. OR AS SPECIFIED.
- CONCRETE COLOUR IS TO MATCH EXISTING SLAB OR AS SPECIFIED BY ARCHITECT.
- ENSURE THAT THE CONCRETE SLAB THICKNESS IS MAINTAINED AT UNIFORM THICKNESS THROUGHOUT THE WHOLE SECTION OF THE SLAB.
- WHERE THE SLAB IS TO BE POURED ONTO EXISTING ROCK OR ONTO A CONCRETE SUBGRADE, PROVIDE A COAT OF RIGID BOND BREAKER BETWEEN THE INTERFACE TO ENSURE THAT THE CONCRETE WILL SET EVENLY THROUGHOUT THE WHOLE SECTION OF THE SLAB.
- ONCE THE GROUND HAS BEEN EXCAVATED TO THE REQUIRED UNIFORM OVERALL THICKNESS IN PREPARATION FOR SLAB, PLACE THE SPECIFIED THICKNESS OF GRANULAR MATERIAL BEDDING AND COMPACT IN ACCORDANCE WITH AS 1289 ES.1. TO A DENSITY INDEX OF 70% (SAND) OR AS SPECIFIED.
- PLACE REINFORCEMENT FABRIC CENTRALLY (MIN. 40 COVER) USING SEATS AS PROPS AND ENSURING THAT THERE WILL BE AT LEAST 30mm MINIMUM COVER BETWEEN THE REINFORCEMENT AND EXTERNAL SURFACE OF THE SLAB.
- NOTE IT IS EXTREMELY IMPORTANT TO ENSURE THAT THE REINFORCEMENT IS PLACED CENTRALLY WITHIN THE SLAB THROUGHOUT THE WHOLE SECTION WITH MINIMUM COVER OF 30mm TOP, BOTTOM AND SIDES.
- ONCE THE REINFORCEMENT IS IN PLACE, THE CONCRETE SHALL BE POURED.
- IT IS IMPORTANT THAT THE CONCRETE BE ALLOWED TO CURE PROPERLY TO ENSURE THAT IT DOES NOT RESULT IN SHRINKAGE CRACKS. HIGHER STRENGTH CONCRETES TEND TO SET QUICKER AND SO PROPER CURING IS ESSENTIAL AT THIS STAGE.
- ALL CONCRETE WORKS SHALL BE IN ACCORDANCE WITH AS 3600.
- THE CONCRETE SHALL BE CURED BY KEEPING IT CONTINUOUSLY WET FOR A MINIMUM OF 7 DAYS IMMEDIATELY AFTER THE POUR OR BY COVERING WITH CLEAR PLASTIC SHEETS.
- COMPRESSIBLE FILLER BOARD USED AS CONSTRUCTION JOINTS SHALL BE BITUMEN IMPREGNATED FIBREBOARD.
- SAWN JOINTS WHERE REQUIRED ARE TO BE CUT AFTER THE CONCRETE HAS SUFFICIENTLY HARDENED THAT IT WILL NOT BE DAMAGED BY THE SAWING BUT BEFORE SHRINKAGE CRACKS CAN OCCUR.

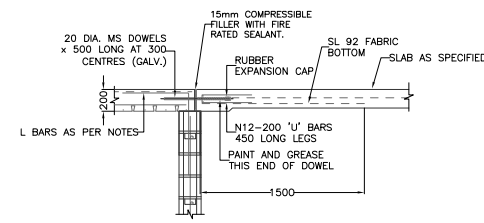
PROPOSED DRIVEWAY
T1 BASE COURSE 130 THICK CONCRETE (STRENGTH 25MPa) WITH SL72 MESH PLACED CENTRALLY ON
T2 SUB-BASE 100 THICK UNBOUND GRANULAR MATERIAL (DGS40 TO RTA 3051 OR CRUSHED SANDSTONE (MAX. PARTICLE SIZE 75mm) AND 95% MODIFIED COMPACTION)



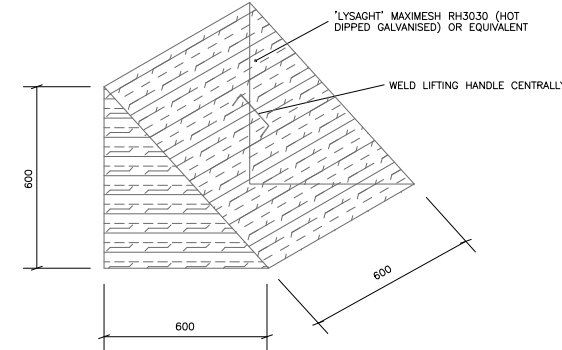
IMPORTANT NOTE
DETENTION TANK STRUCTURAL DETAIL TO BE
VERIFIED AND CERTIFIED BY QUALIFIED STRUCTURAL
ENGINEER

REINFORCEMENT
TOP SLAB SCHEDULE:
T = 200mm OVERALL SLAB THICKNESS
① = 0.75 BONDEK II PLACED ON BOTTOM
② = N12-300 BOTTOM REINFORCEMENT PLACED BETWEEN BONDEK RIBS
③ = N12-400 BOTTOM REINFORCEMENT PLACED ON BONDEK RIBS
④ = F72 CRACK REINFORCEMENT 60 COVER FROM TOP

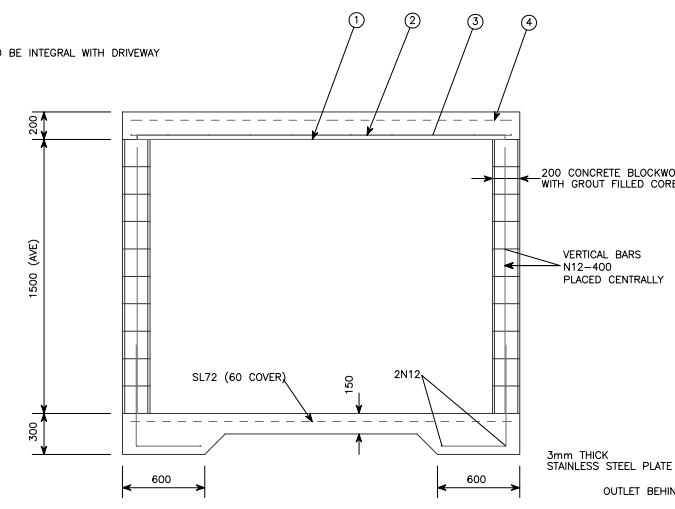
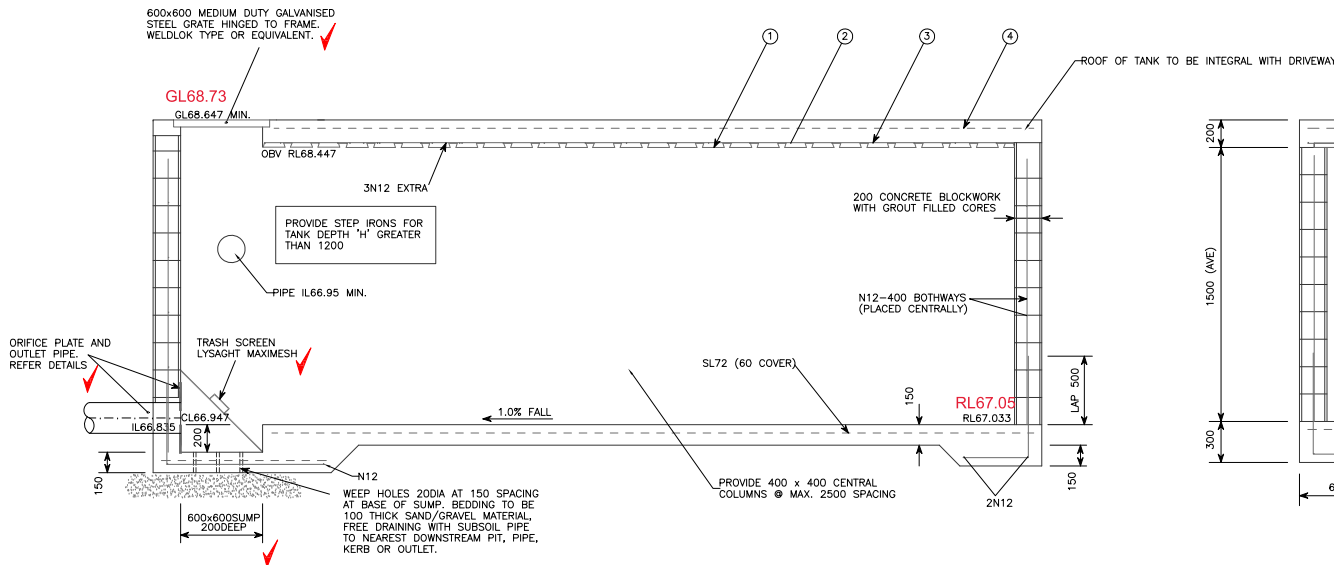
GENERAL NOTES:
1. THE SYMBOL: ① DENOTES SEQUENCE OF LAYING:
① MEANS LAID FIRST, ② LAID SECOND, ETC.
2. THE BLOCKWORK REINFORCEMENT SHOWN IS FOR
H<1500.
3. FOR H>1500 USE N16-400 BOTHWAYS AND LAP 600



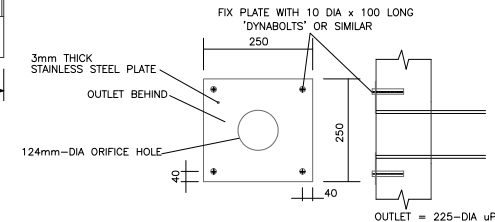
TRASH SCREEN NOTES
1. MAXIMESH SCREENS MUST BE
PLACED SUCH THAT THE LONG
AXIS OF THE OVAL SHAPED HOLES
ARE ORIENTATED HORIZONTALLY
WITH THE PORTRUDING UP ANGLED
UPWARDS AND FACING TOWARDS
THE OUTLET.
2. THE SCREEN IS TO BE FORMED BY
WELDING TWO TRIANGULAR MAXIMESH
(OR EQUIVALENT) PANELS TO A
RECTANGULAR FRONT MAXIMESH PANEL
(OR EQUIVALENT).



N.T.S.



I, MONY SENG OF EAST COAST
POSITIONING P/L, LAND SURVEYORS,
BELLA VISTA, HEREBY CERTIFY
THAT ALL WORKS AS SHOWN IN
RED HAVE BEEN EXECUTED.
13/09/2021



N.T.S.

ON-SITE DETENTION TANK DETAILS

B	ISSUED FOR CONSTRUCTION	05/18	THOMAS LAU CHARTERED PROFESSIONAL ENGINEER 88 From 18/05/24 Edition 18/05/24 (18/05/24) PO BOX 704 HARBORVIEW NEW 2006 TELEPHONE/FACSIMILE 999 77 913 EMAIL: tla@thomaslau.com.au	PROJECT: PROPOSED 1 INTO 2 LOT SUB-DIVISION ADDRESS: 83 PARKES ROAD, COLLAROY DRAWING NO. PARKES83-SUB3.DWG DRAWING TITLE: STORMWATER DRAINAGE	DESIGN: T.L. DRAWN: D.K.	DATE: AUGUST 2017 SHEET: 11 OF 11
A	ISSUED FOR DEVELOPMENT APPROVAL	05/17				
ISSUE	DESCRIPTION	DATE			SCALE 0 2 4 6 8 10 METRES	