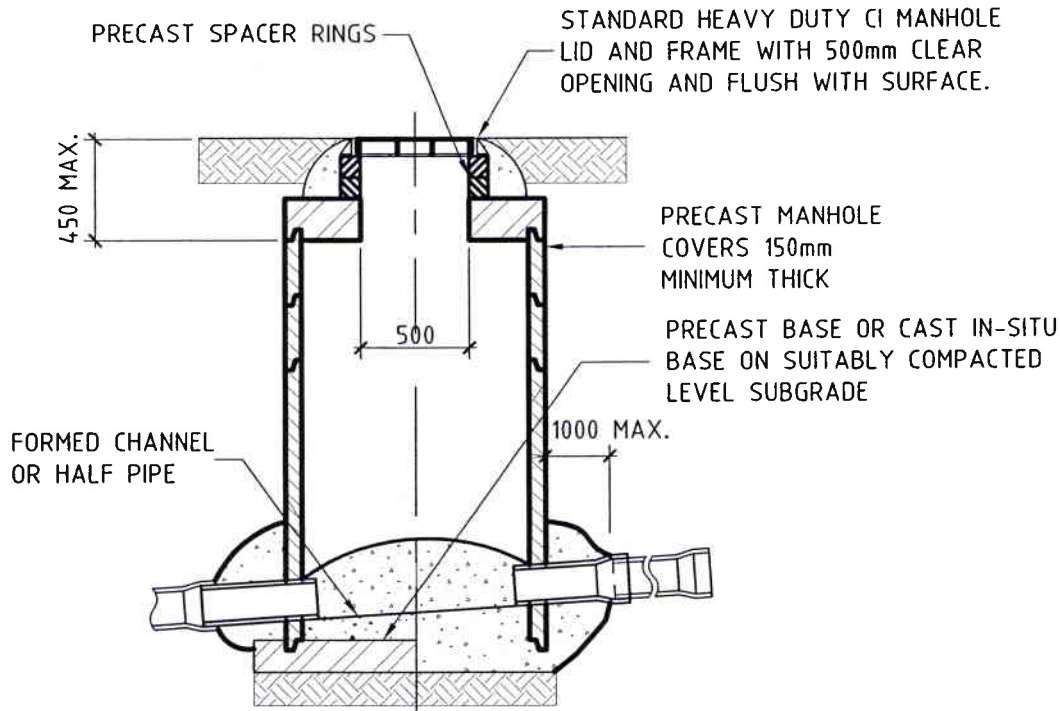
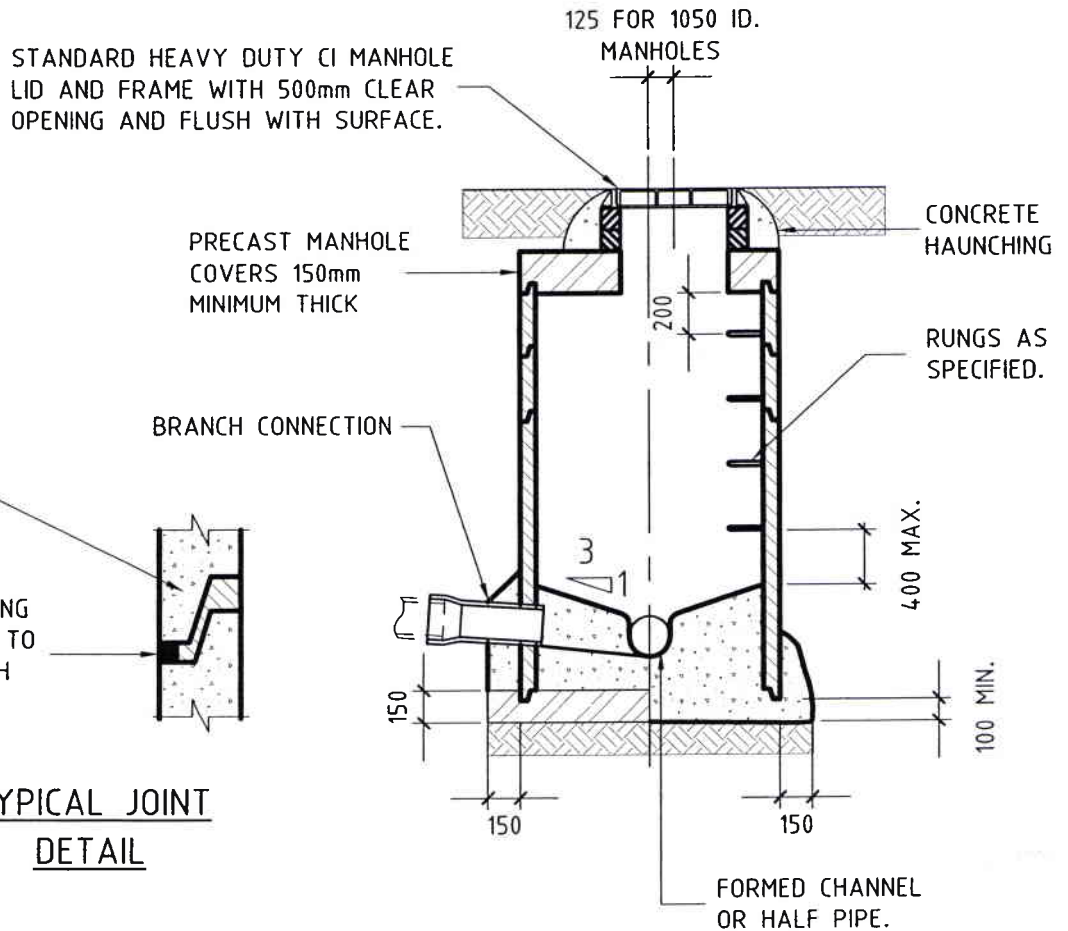


ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



SECTION ON A



SECTION ON B

TYPICAL JOINT
DETAIL

DATE : March 2005

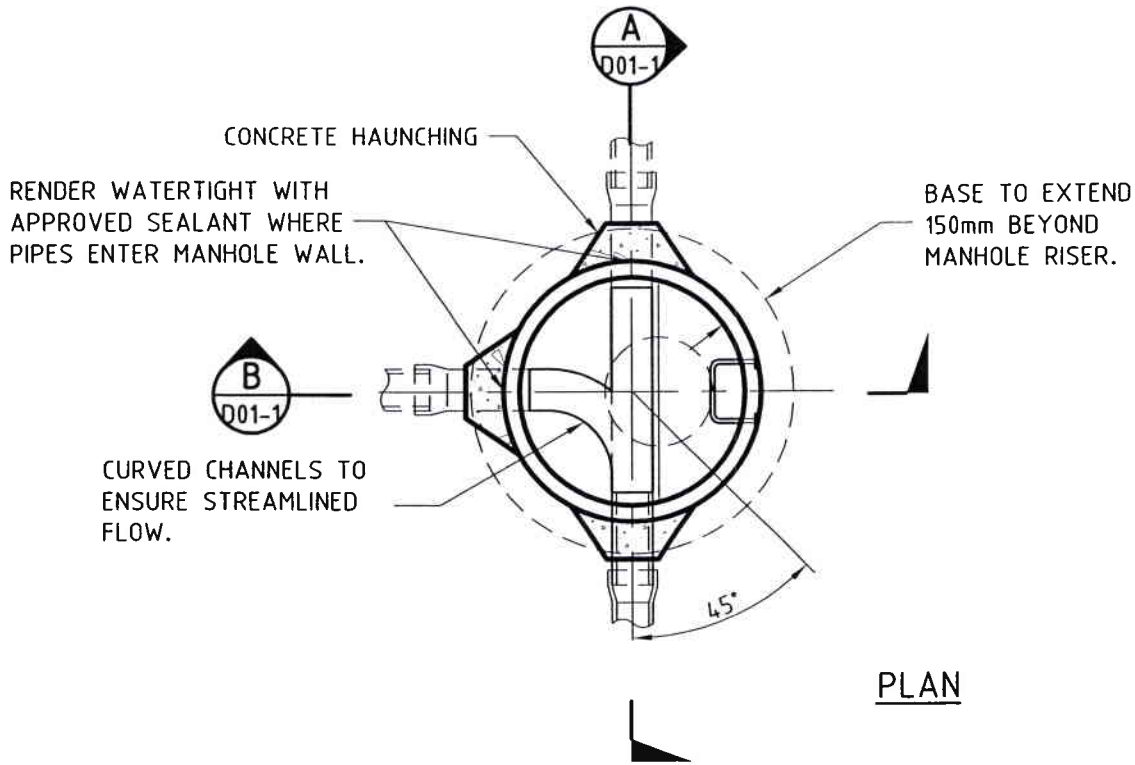


STANDARD MANHOLE
TYPICAL DETAILS
CROSS SECTIONS

SCALE : Not to Scale

D01-1

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT ASK



MINIMUM MANHOLE INTERNAL DIAMETER (mm)*				
OUTLET PIPE DIA. (mm)	PIPELINE DEVIATION ANGLE (θ)			
	0-15°	16°-45°	46°-75°	78°-90°
Up to 300	1050	1050	1050	1050
375-600	1050	1050	1050	1050
675-750	1200	1200	1500	1500
825-900	1500	1500	1800	1800

* TO BE USED AS A GUIDE ONLY. LARGER DIAMETERS MAY BE REQUIRED WHERE MORE THAN 1 INLET PIPE IS TO BE CONSTRUCTED.

NOTES

1. ALL IN SITU CONCRETE OTHER THAN SITE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 20MPa @ 28 DAYS.
2. ALL PRECAST MANHOLE UNITS (SHOWN SHADED) ARE STANDARD MANUFACTURED UNITS. (IE. HUMES OR SIMILAR APPROVED)
3. ALL BRANCHES SHALL BE CONSTRUCTED SUCH THAT THEY CAN BE READILY ACCESSED BY A CCTV CAMERA. THE HAUNCHING DETAIL (IE. CROSS SECTION) IS NOT TO BE COMPROMISED. IF REQUIRED, THE STRAIGHT THROUGH CHANNEL SHALL BE OFFSET FROM THE MANHOLE CENTRELINE AND THE BRANCH CHANNELLING LEFT STRAIGHT FOR A SUFFICIENT LENGTH TO ACHIEVE THE DESIRED RESULT.
4. ACCESS OPENING & RUNGS TO BE POSITIONED OVER THE UPSTREAM SIDE OF THE MANHOLE.

DATE : March 2005

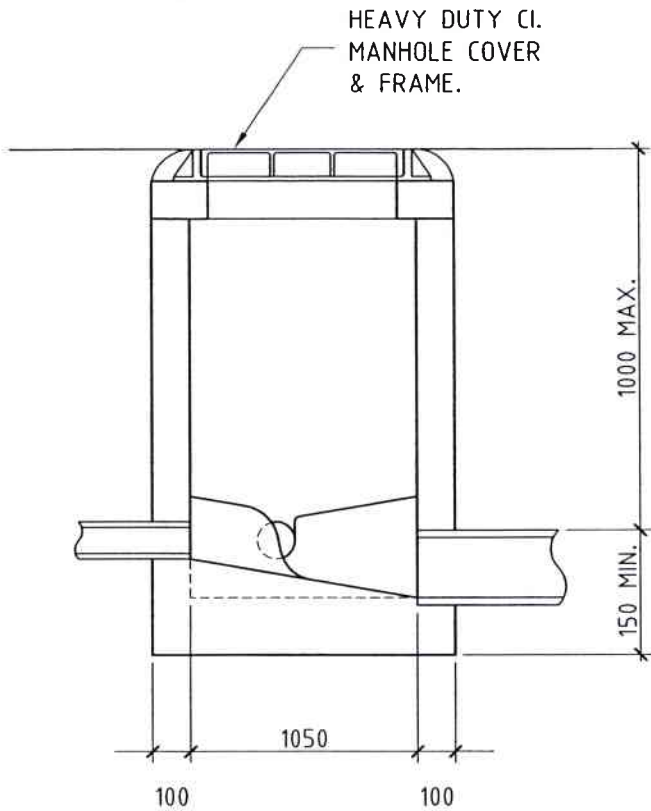


STANDARD MANHOLE TYPICAL DETAILS PLAN VIEW

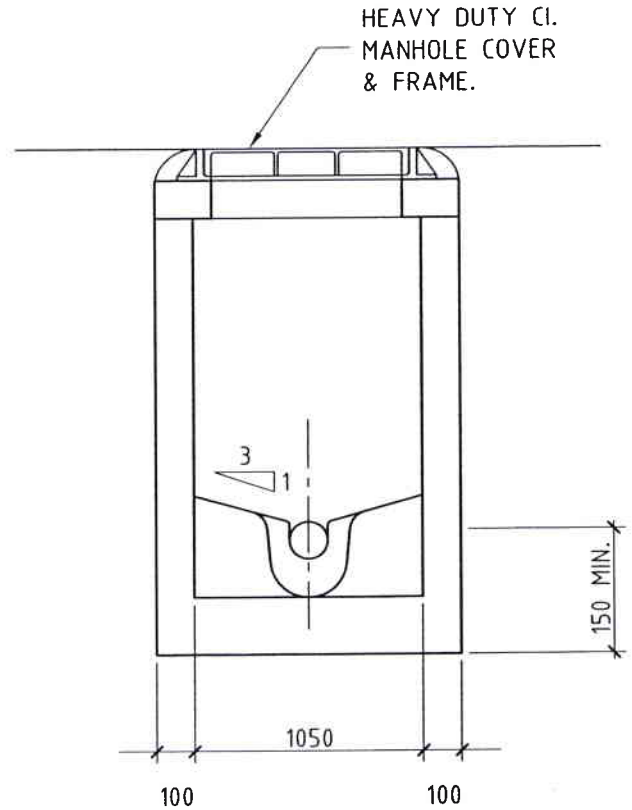
SCALE : Not to Scale

D01-2

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



SECTION A

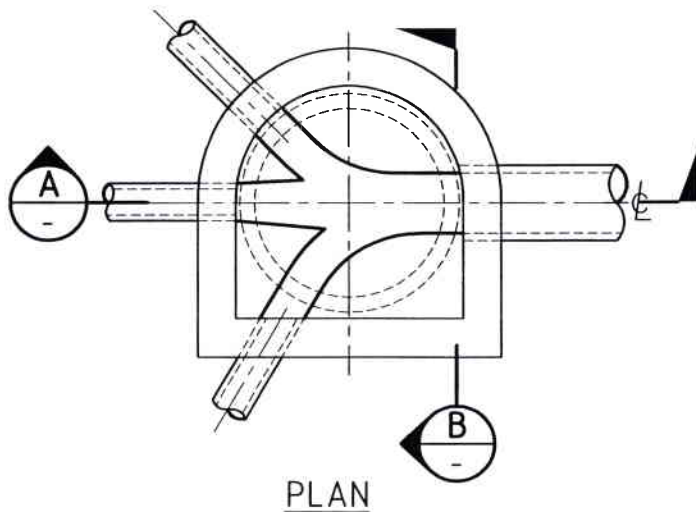


SECTION B

STEPS NOT REQUIRED FOR DEPTHS LESS THAN 1m.

A SMALLER DIAMETER MANHOLE MAY BE ALLOWED FOR SMALL DIAMETER PIPE LINES IF APPROVED BY THE ENGINEER.

NB: CHAMBERS MUST BE LARGE ENOUGH TO ALLOW FULL BENDING.



PLAN

ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 17.5MPa @ 28 DAYS.

DATE : March 2005

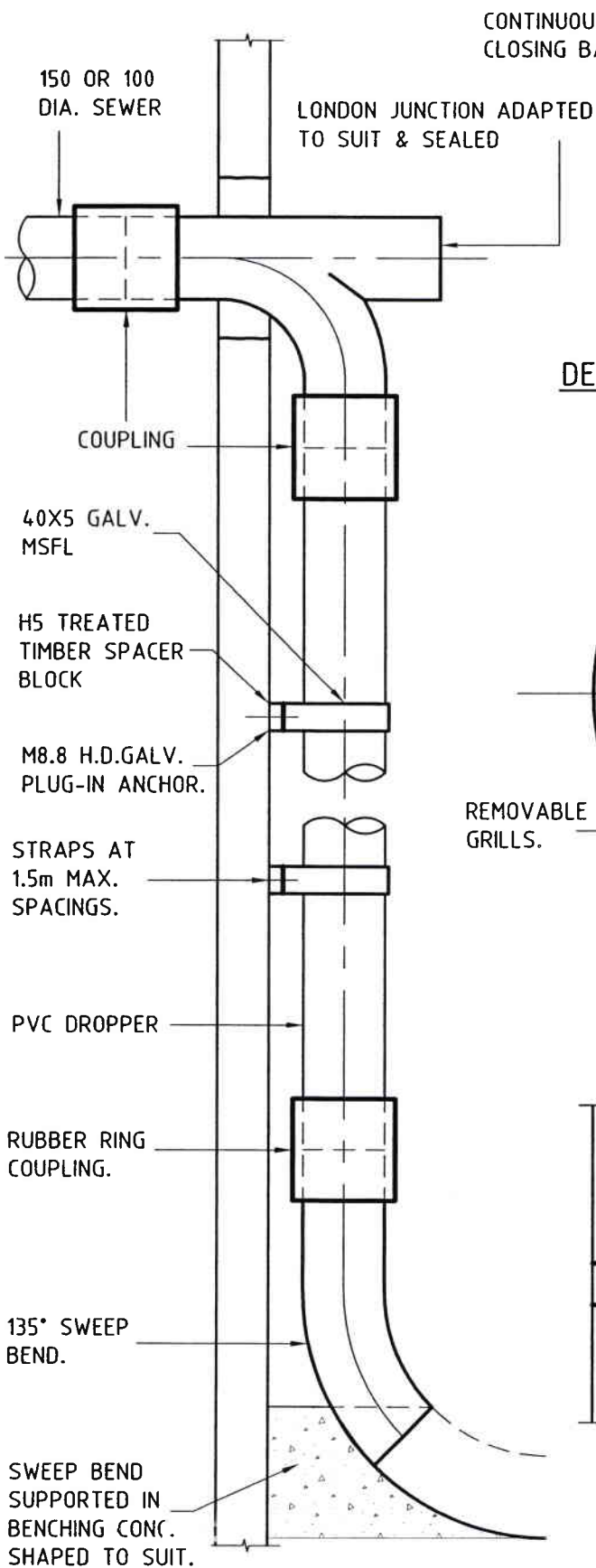
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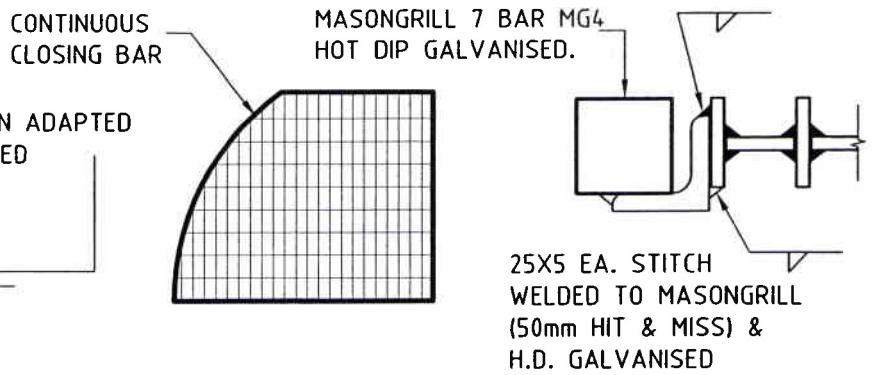
SHALLOW MANHOLES

D02

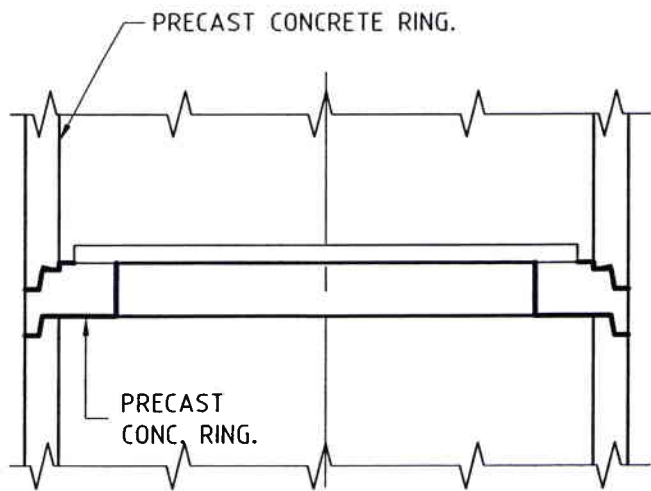
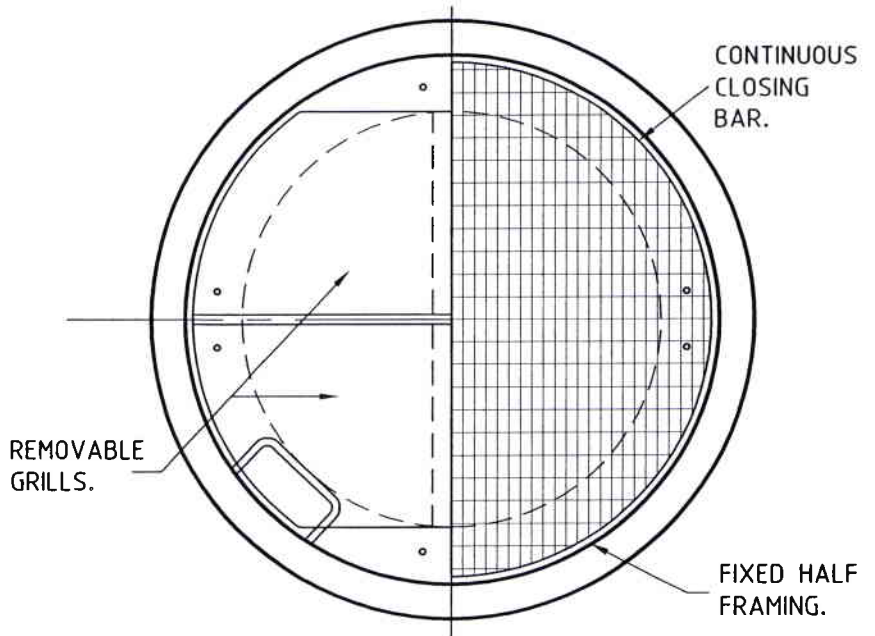
ORIGINAL SIZE A4
DO NOT SCALE, IF IN DOUBT AS



**INTERNAL MANHOLE
DROP INLET**



DETAIL REMOVABLE GRILL



SAFETY PLATFORM

(WHERE REQUIRED BY THE ENGINEER
-AT MAXIMUM 4m CRS.)

NOTE: THE INTERNAL DIA. TO BE INCREASED
WHERE INTERNAL DROPS ARE USED.

DATE : March 2005

MANHOLE DETAILS

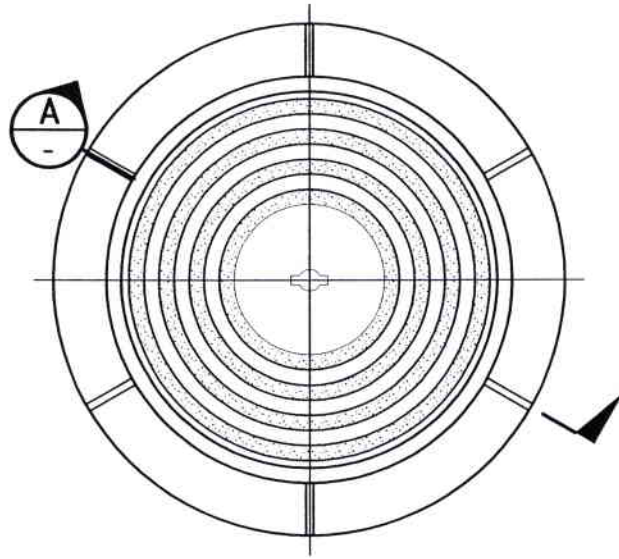
SCALE : 1:10



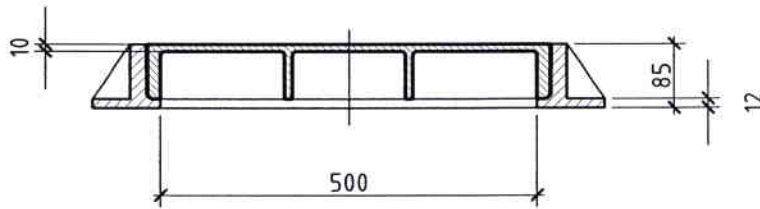
DROP INLET & SAFETY PLATFORM

D03

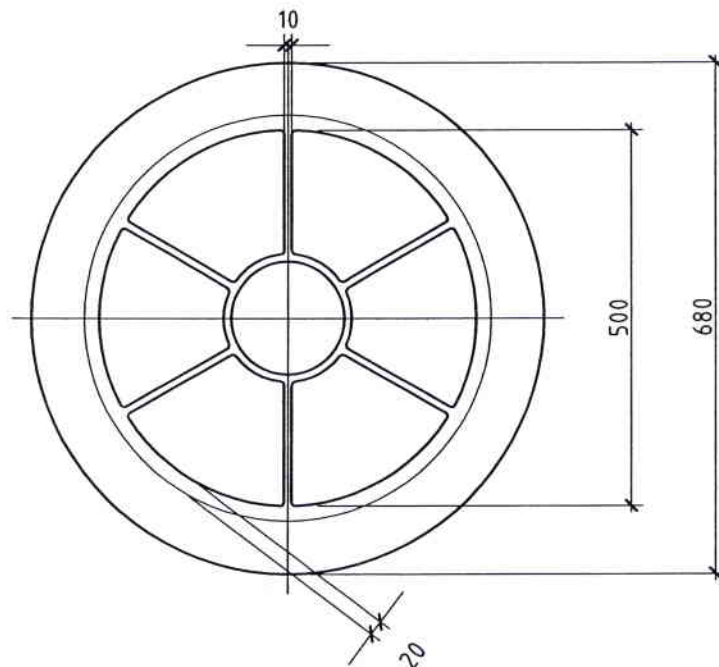
ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



PLAN



SECTION A



BOTTOM VIEW

APPROX. WEIGHTS

COVER 48 kg.

FRAME 40 kg.

DATE : March 2005

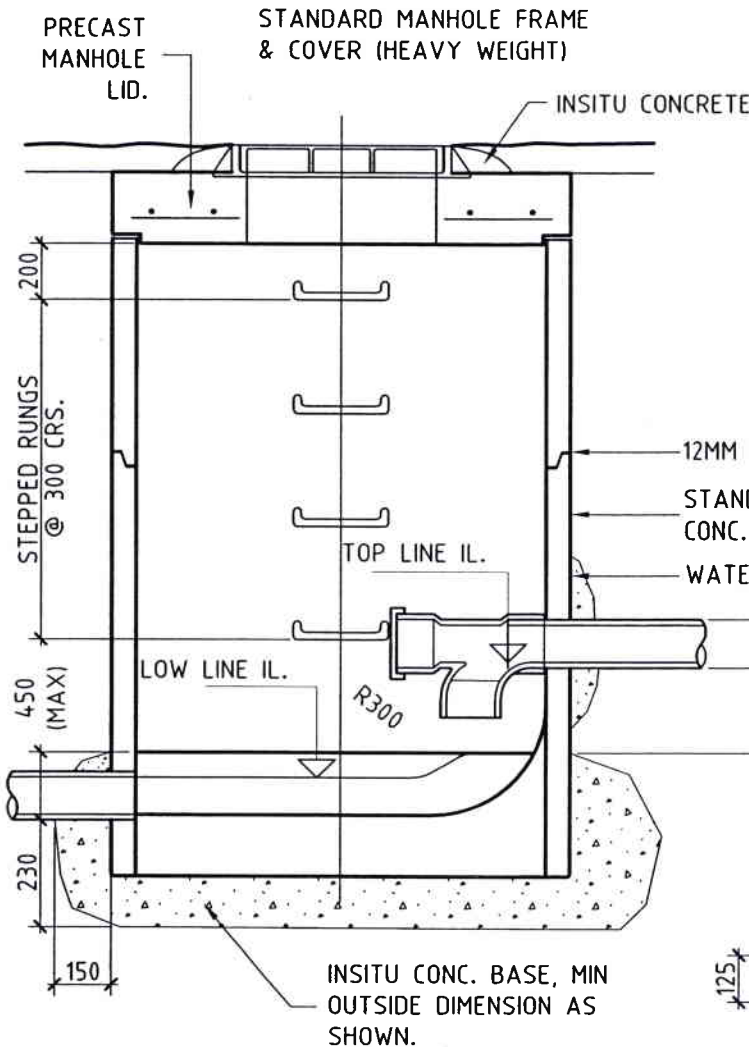


500mm HEAVY DUTY
MANHOLE COVER & FRAME

SCALE : 1:10

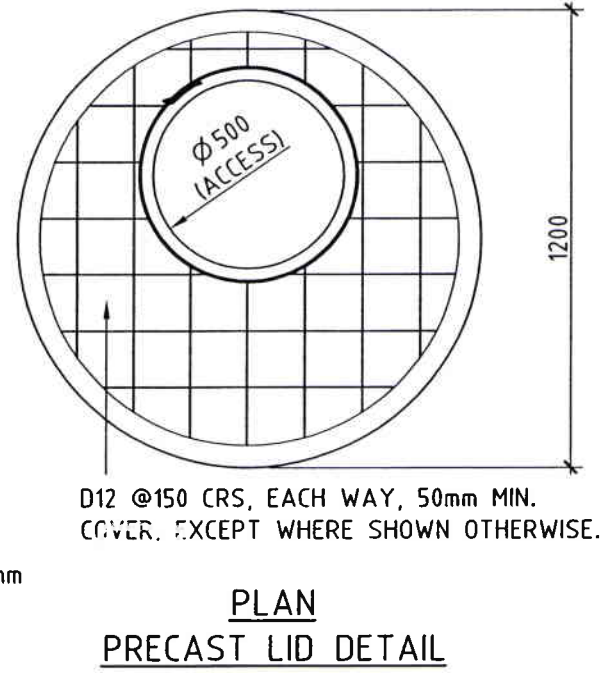
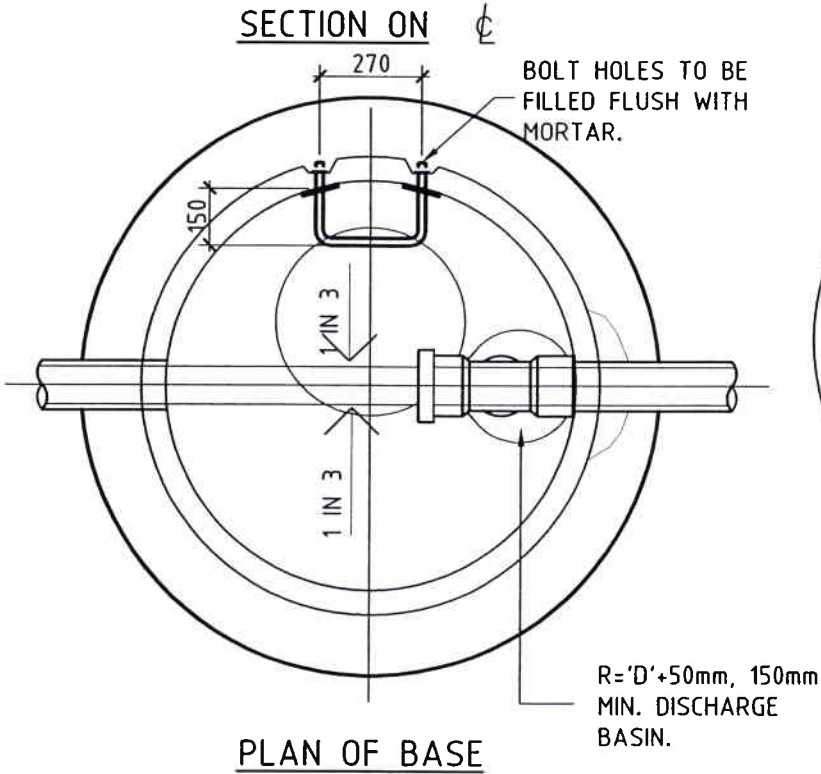
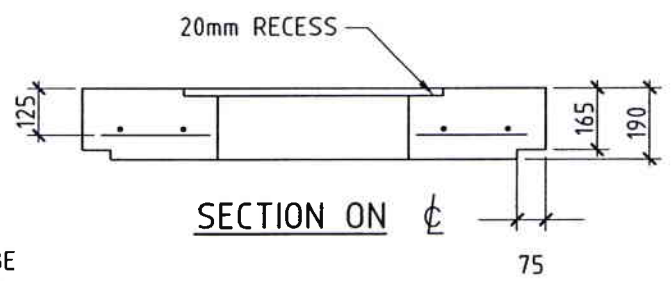
D04

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS

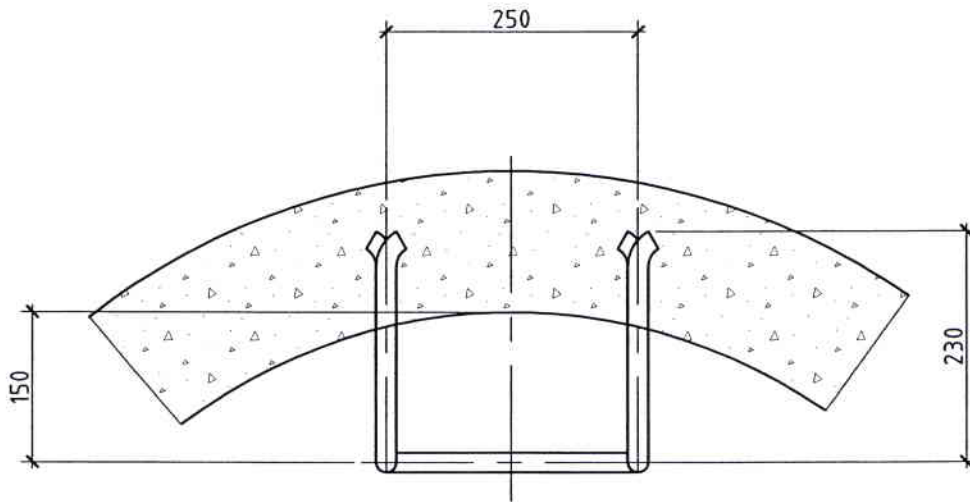


NOTE:
STANDARD MANHOLE DETAILS SHOWN ARE APPLICABLE TO INCOMING PIPE DIA. ('D') OF NOT GREATER THAN 300mm

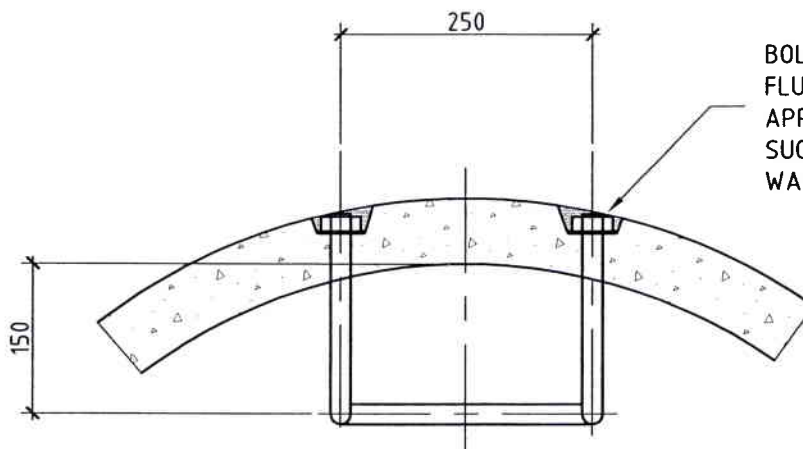
STEPPED RUNGS SHALL BE EITHER AS SHOWN - 20mm DIA. MILD STEEL RODS, H.D. GALVANISED OR 'HUMES' PLASTIC STRAIGHT RUNGS.



ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



PLAN VIEW
(CAST IN SITU MANHOLE)



BOLT HOLES TO BE FILLED
FLUSH WITH MORTAR OR AN
APPROPRIATE EPOXY RESIN,
SUCH THAT INGRESS OF
WATER IS NOT POSSIBLE.

PLAN VIEW
(PRE-CAST MANHOLE)

NOTE:

STEPPED RUNGS SHALL BE PLASTIC COATED 20mm DIA MILD STEEL WITH SAFETY LUGS.

DATE : March 2005

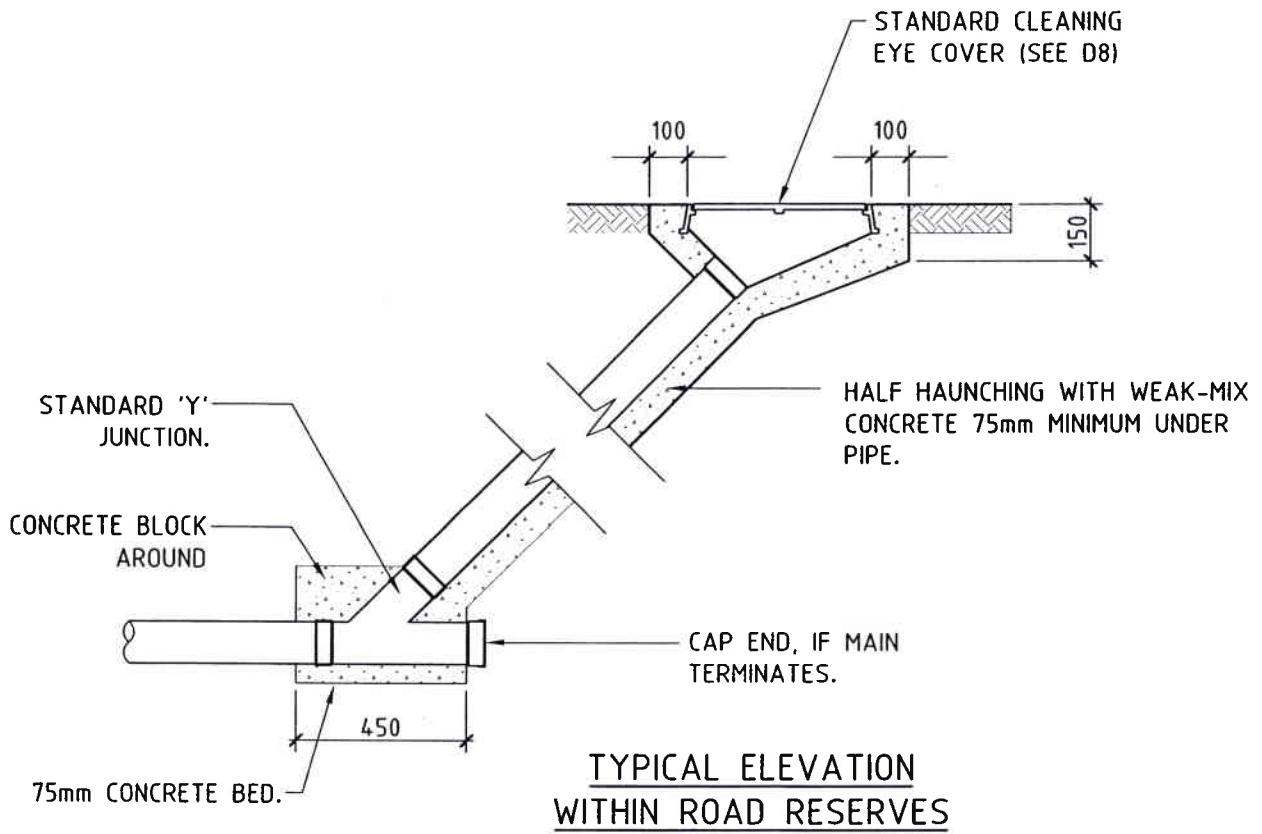


MANHOLE COMPONENTS
STEPPED RUNG DETAILS

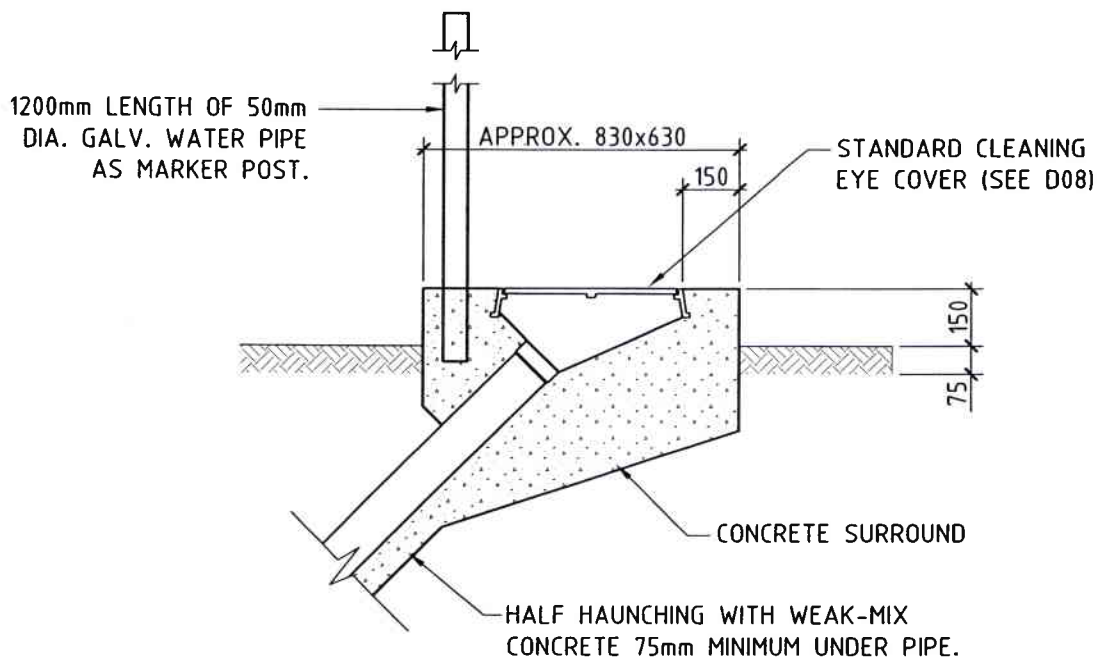
SCALE : Not to Scale

D06

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



TYPICAL ELEVATION
WITHIN ROAD RESERVES



TYPICAL ELEVATION (PART VIEW)
WITHIN FARM LAND

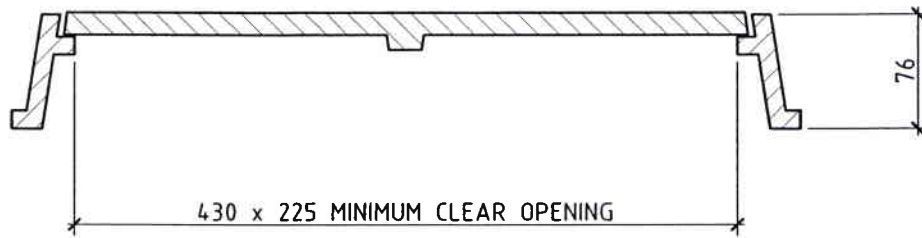
DATE : March 2005

STANDARD CLEANING EYE DETAILS

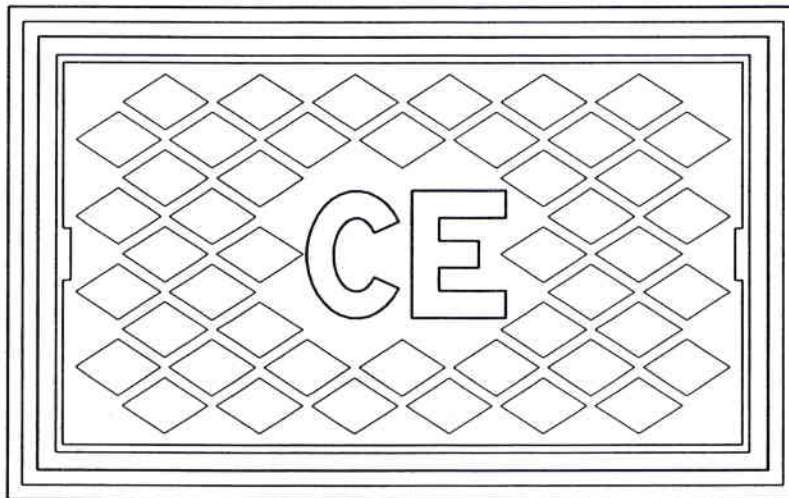
SCALE : 1:20



D07



SECTION THROUGH FRAME & COVER



PLAN VIEW

CAST IRON FRAME AND COVER. APPROXIMATE WEIGHT 19.0kg

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS

DATE : March 2005



CLEANING EYE COVER

SCALE : Not to Scale

D08

100mm NOMINAL DEPTH OF
TOPSOIL (200mm OF SCREENED
BASECOURSE IS REQUIRED
THROUGH ACCESS WAYS AND
PARKING AREAS).

WHERE APPROVED BACKFILL IS USED,
FREE OF ORGANIC MATERIAL.

COMPACTED GRANULAR
BEDDING (<20mm)

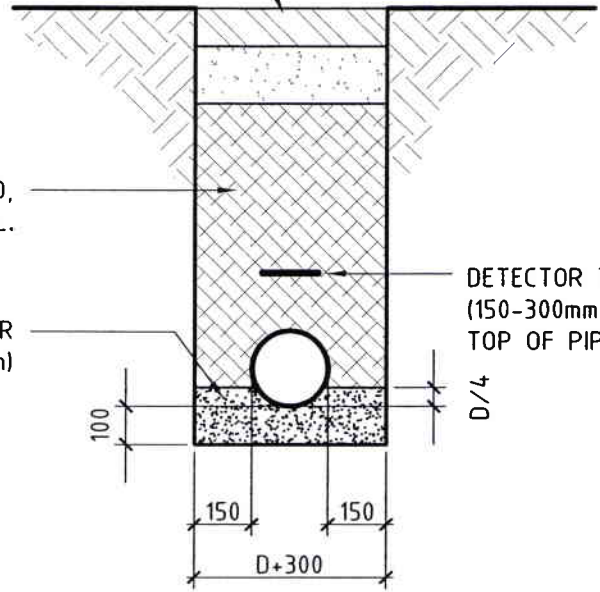
DETECTOR TAPE
(150-300mm ABOVE
TOP OF PIPE)

NOTES:

THE ZONE OF BACKFILL WITHIN 300mm OF
THE PIPE, SHALL NOT CONTAIN ANY
LUMPS LARGER THAN 20mm.

D = EXTERNAL DIAMETER OF PIPE.

**TRENCHING NOT IN ROAD
CROSS SECTION**



ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS

TRENCH TO BE REINSTATED
USING ASPHALTIC CONCRETE.

EXISTING SEAL TO BE CUT MINIMUM
100mm OUTSIDE ACTUAL TRENCHLINE.

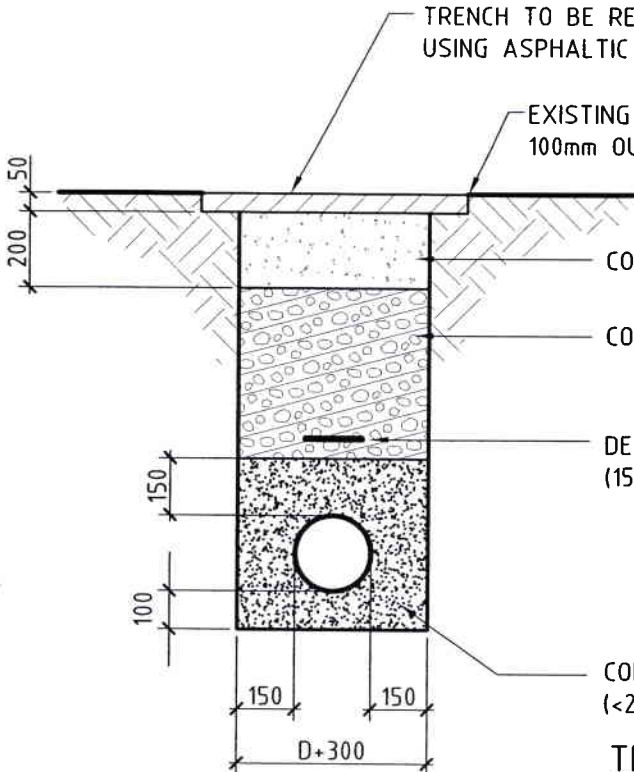
COMPACTED M4 BASECOURSE

COMPACTED RIVER-RUN GRAVEL.

DETECTOR TAPE
(150-300mm ABOVE TOP OF PIPE)

COMPACTED GRANULAR BEDDING
(<20mm)

**TRENCHING IN ROADS
CROSS SECTION**



DATE : March 2005

**TYPICAL DRAINAGE PIPE
BEDDING DETAILS**

SCALE : 1:20

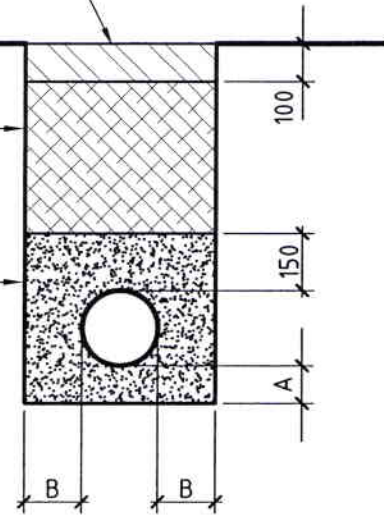
100mm NOMINAL DEPTH OF TOPSOIL OR SCREENED BASECOURSE THROUGH ACCESS WAYS AND PARKING AREAS. SURFACING OF ACCESSWAYS AND PARKING AREAS AS PER EXISTING OR AS SPECIFIED ON DRAWINGS

APPROVED BACKFILL TO BE FREE OF ORGANIC MATERIAL

COMPACTED GRANULAR BEDDING

THE TRENCH WIDTH AT THE TOP OF THE PIPE SHALL NOT EXCEED THE VALUES GIVEN BELOW WITHOUT THE PERMISSION OF THE ENGINEER.

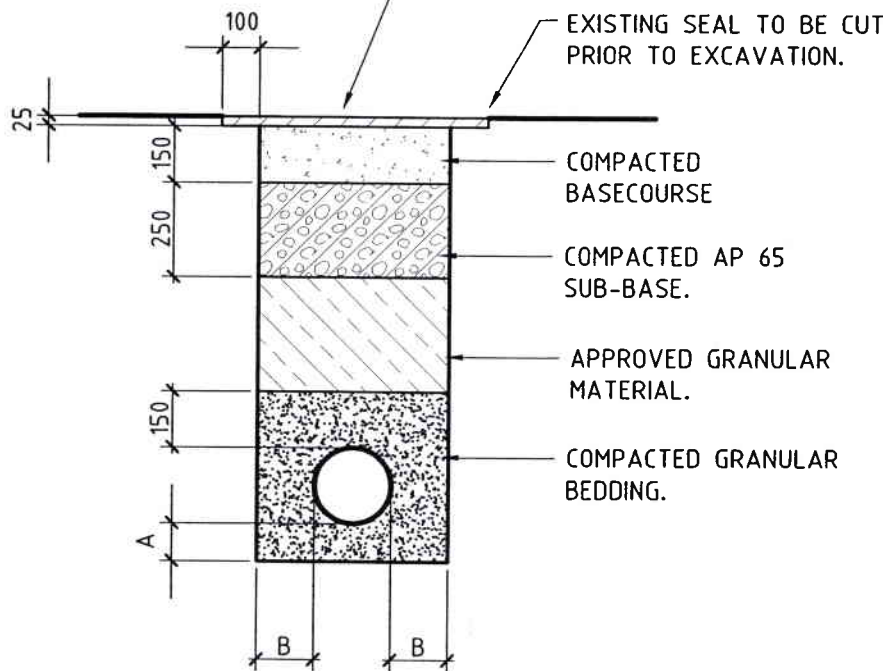
PIPE DIA.	WIDTH
100 & 150	600
200 - 300	750
375 - 625	O.D.+375
675 - 875	O.D.+450



TYPICAL TRENCH CROSS SECTION

TRENCH TO BE REINSTATED USING ASPHALTIC CONCRETE.

EXISTING SEAL TO BE CUT PRIOR TO EXCAVATION.



A = D if D < 100mm
A = 100mm otherwise

B = D/2 if D < 200mm
B = 100mm otherwise

D = EXTERNAL DIAMETER OF PIPE

FOR A TRENCH THROUGH A STATE HIGHWAY, FOR "APPROVED GRANULAR MATERIAL" SUBSTITUTE 'AP 65 SUB-BASE'.

TYPICAL ROAD CROSSING CROSS SECTION

DATE : March 2005



TYPICAL PRESSURE PIPE
BEDDING DETAILS

SCALE : 1:20

D10

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT A4

SYMMETRICAL ABOUT THIS POINT FOR DOUBLE SUMP WITH A 300mm DIA CONNECTING PIPE

STANDARD PRE CAST BACK INLET BLOCK
CAST INSITU KERBING

STANDARD SUMP GRATING AND FRAME (SEE D12)

SMOOTH CURVES AT 1.0m RADIUS EACH WAY.

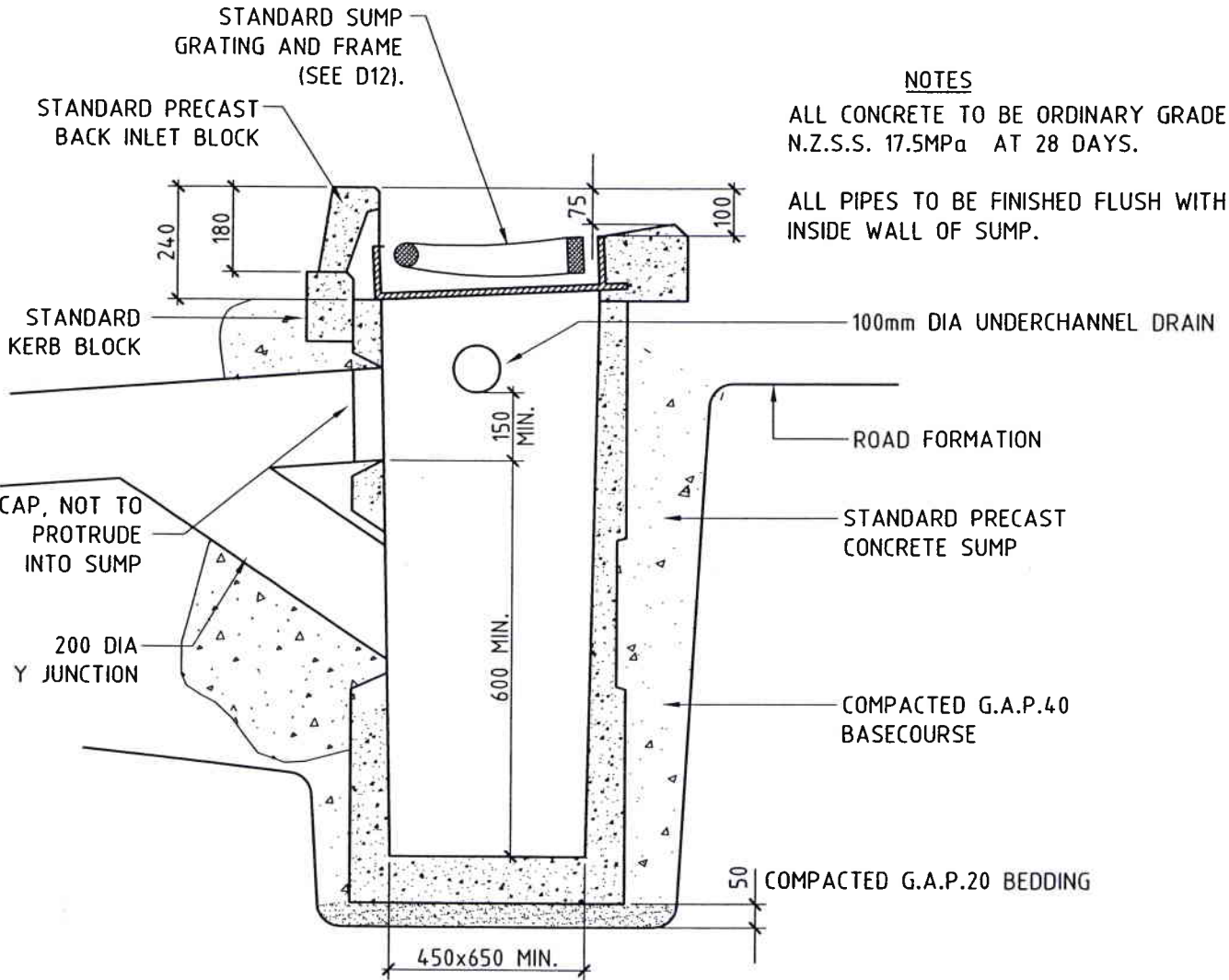
PLAN

SUMP - 650x450 MIN. INTERNALLY

NOTES

ALL CONCRETE TO BE ORDINARY GRADE N.Z.S.S. 17.5MPa AT 28 DAYS.

ALL PIPES TO BE FINISHED FLUSH WITH INSIDE WALL OF SUMP.



SECTION A

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS

DATE : March 2005

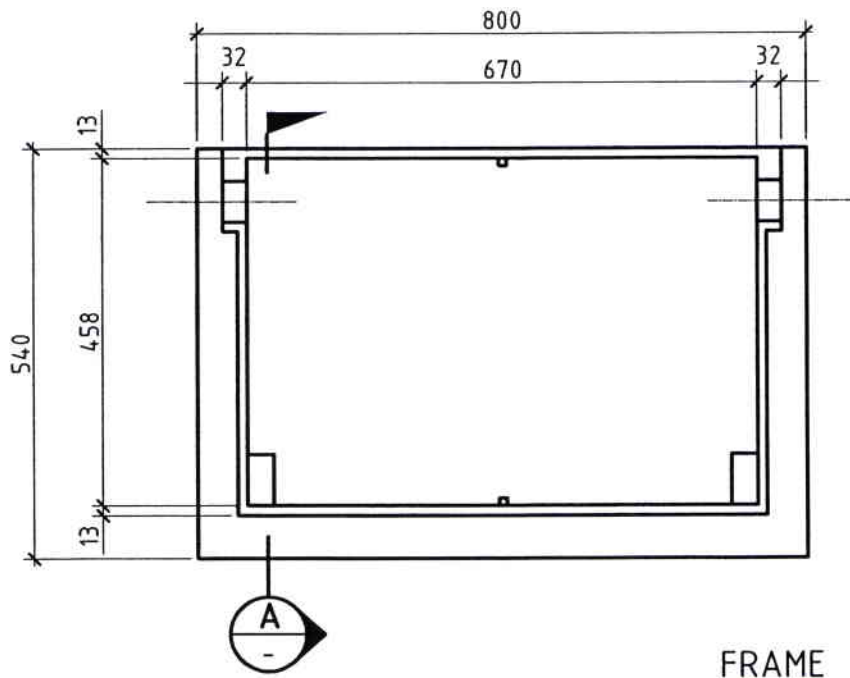
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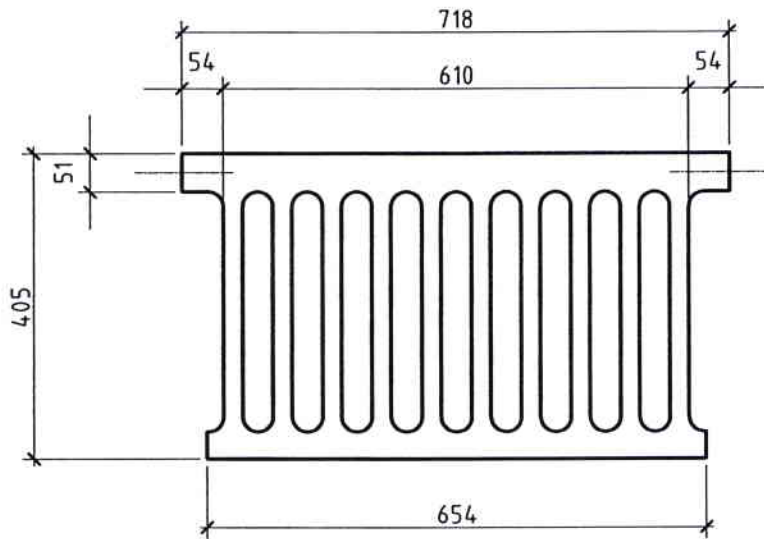
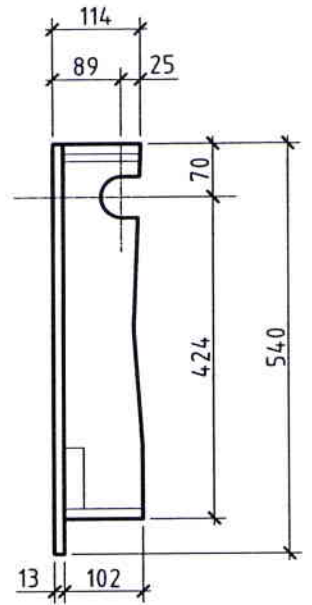
STANDARD ROAD SUMP

D11

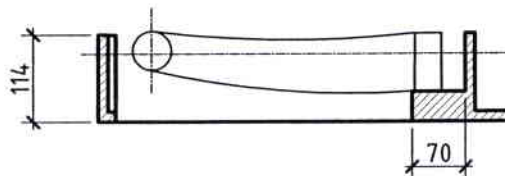
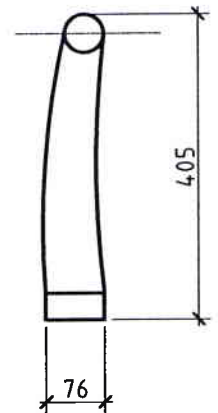
ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



FRAME



GRATE



SECTION ON A

APPROXIMATE WEIGHTS
GRATE: 75kg
FRAME: 45kg

DATE : March 2005

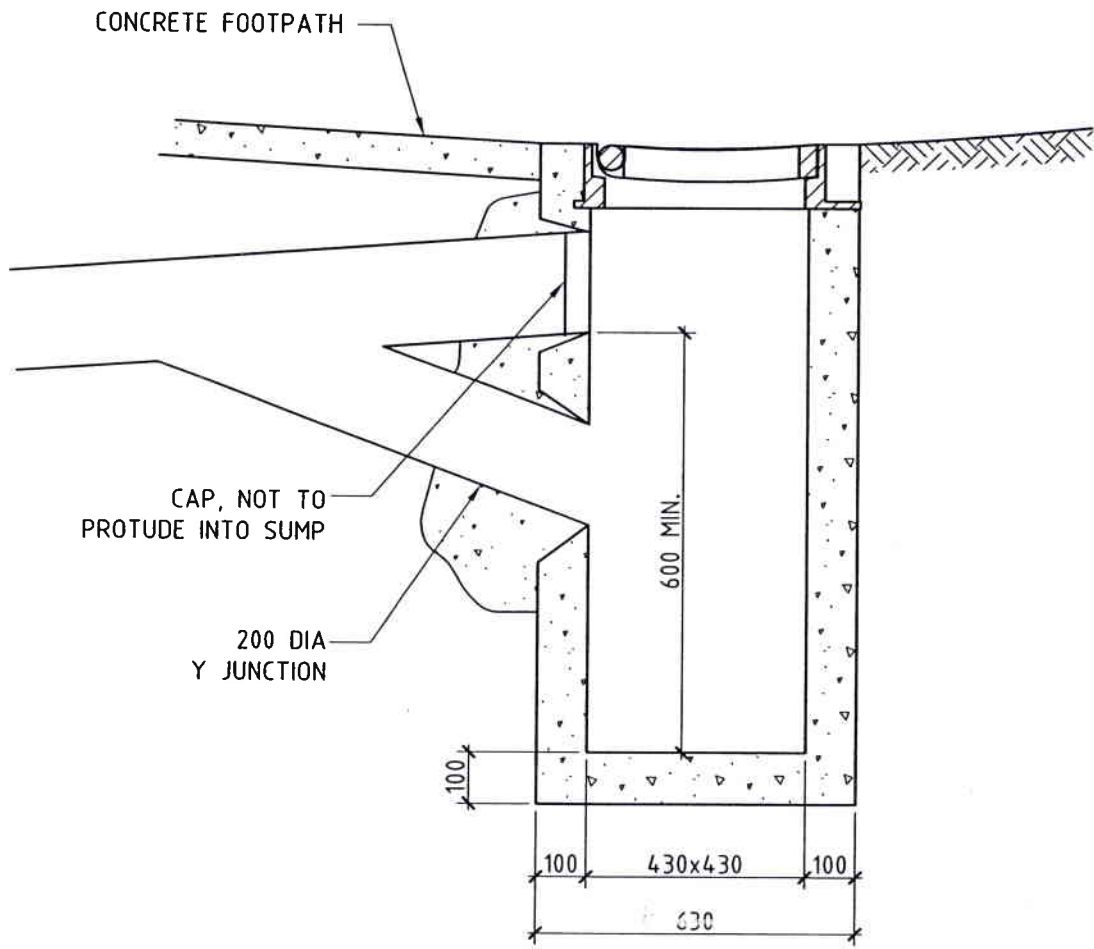
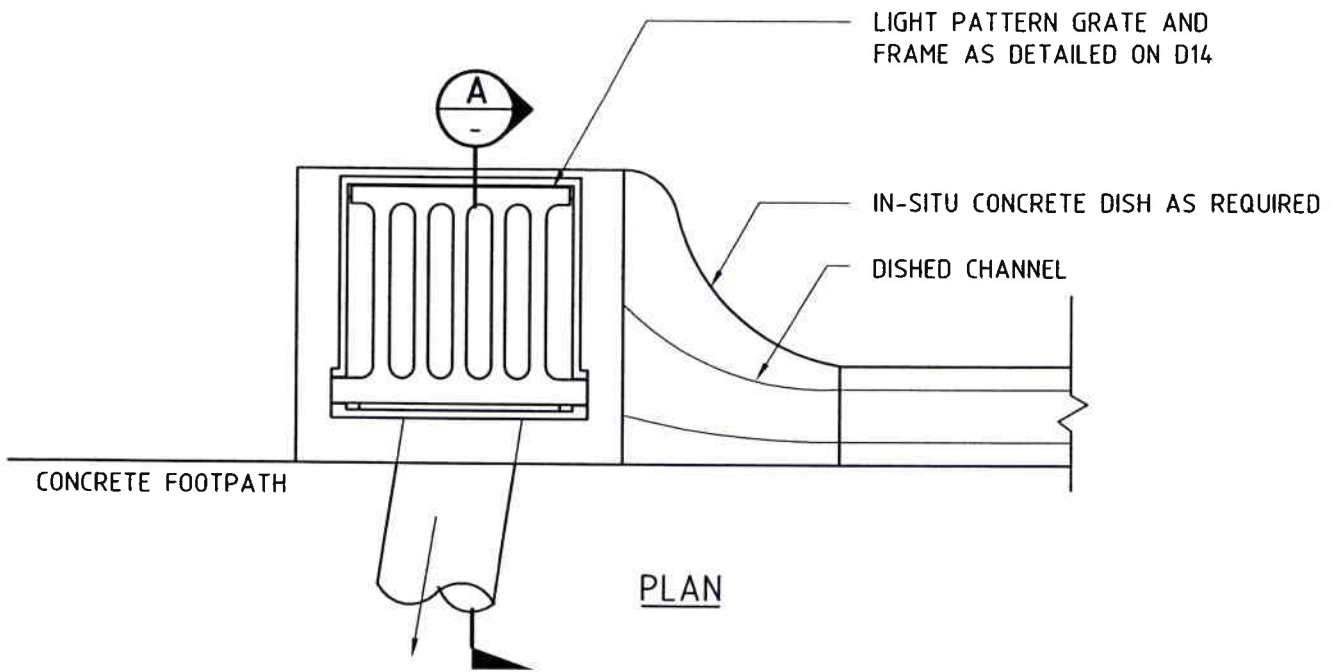


CAST IRON HEAVY SUMP FRAME & GRATE

SCALE : 1:10

D12

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



DATE : March 2005

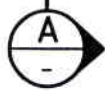
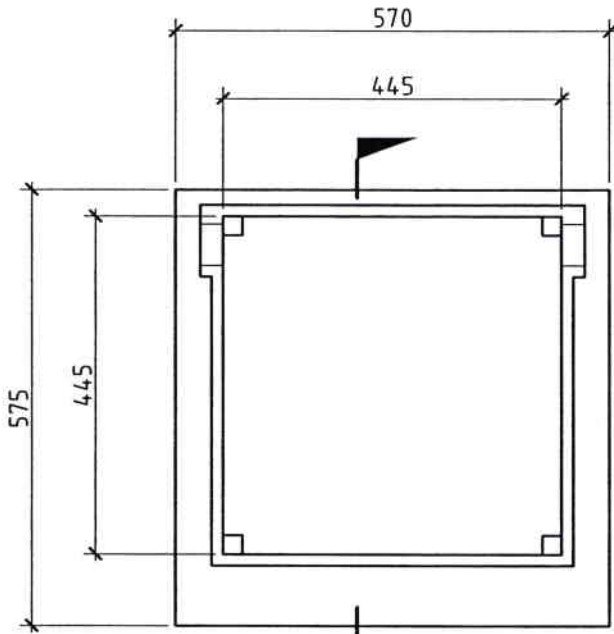
SCALE : Not to Scale



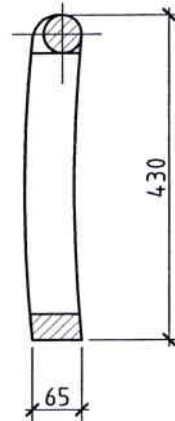
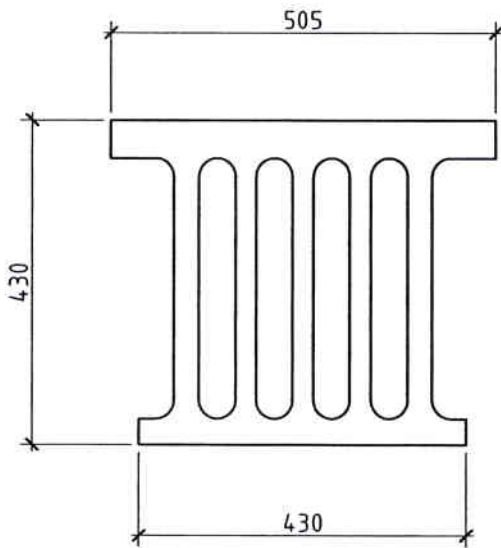
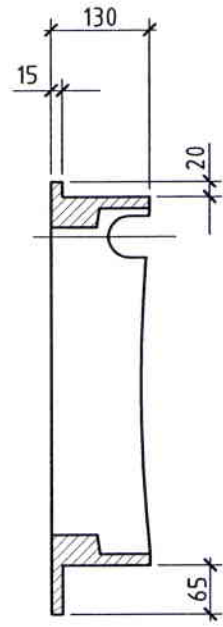
BERM SUMP

D13

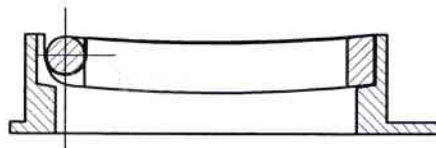
ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



FRAME



GRATE



SECTION ON A

<u>WEIGHTS</u>	
GRATE	60kg
FRAME	57kg
<u>TOTAL</u>	117kg

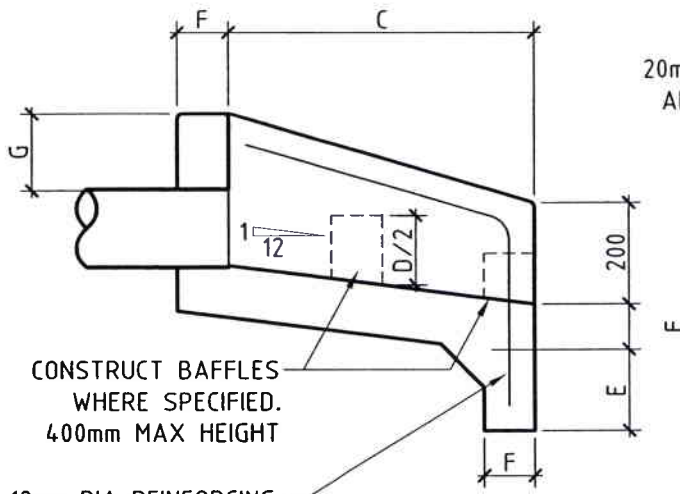
DATE : March 2005

CAST IRON LIGHT SUMP FRAME & GRATE

SCALE : 1:10

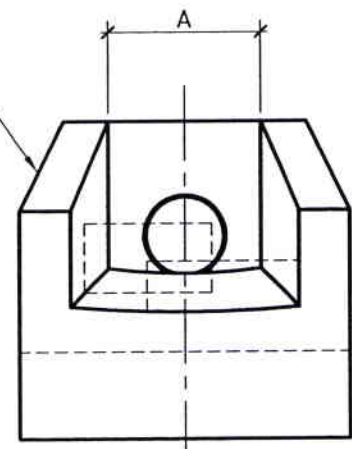


D14



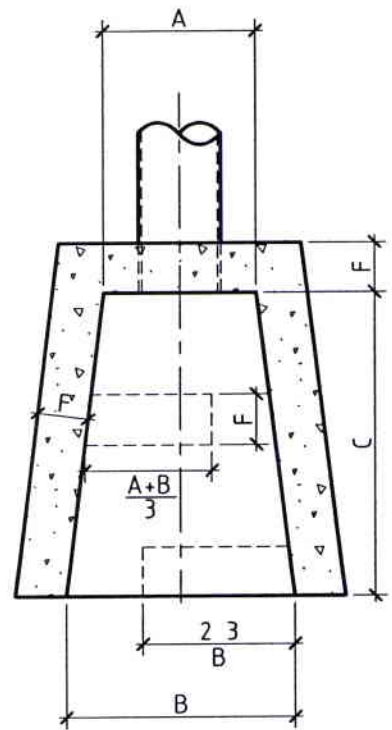
CROSS SECTION

20mm CHAMFER ALL CORNERS



FRONT ELEVATION

PIPE DIA.	PRINCIPAL DIMENSIONS (mm)						
	A	B	C	D	E	F	G
150	300	450	600	200	150	100	150
230	380	600	700	250	200	100	150
300	450	750	750	300	200	100	150
375	500	900	850	350	200	100	150
450	630	1100	900	400	230	150	230
525	700	1200	1000	450	230	150	230
600	800	1400	1100	550	230	150	230
750	1000	1700	1200	600	300	150	300
900	1170	2000	1450	650	300	150	300
1050	1380	2300	1700	750	450	150	300
1200	1520	2600	2100	750	450	150	450
1350	1680	2800	2400	750	450	150	450



PLAN VIEW

NOTES

- REINFORCING FLOOR AND WALLS WITH:
 150 TO 375 - 665 MESH
 450 TO 600 - 663 MESH OR 100 RODS @ 250 CRS
 675 TO 900 - 12Ø RODS @ 250 CRS
 1050 TO 1350 - 12Ø RODS @ 150 CRS
- ALL REINFORCEMENT SHALL BE PLACED CENTRAL IN WALLS & FLOOR, AND SHALL BE CONTINUOUS BETWEEN WALL AND FLOOR.
- LAPS IN STRUCTURAL GRADE BARS TO BE 300mm MINIMUM.
- THERE SHALL BE AT LEAST TWO BARS WHETHER MESH OR MILD STEEL, OVER THE TOP OF THE PIPE.
- CONCRETE COMPRESSIVE STRENGTH IS TO BE 17.5MPa @ 28 DAYS.
- BAFFLES ARE TO BE CONSTRUCTED AS SHOWN WHEN OUTLET VELOCITIES AND SOIL CONDITIONS DICTATE. IN EXTREME CASES SPECIFIC DESIGN MAY BE REQUIRED.
- INLET STRUCTURES SHALL HAVE REVERSE APRON FALL AND NO BAFFLES.

DATE : March 2005

INLET AND OUTLET
STRUCTURES
NORMAL STRUCTURE

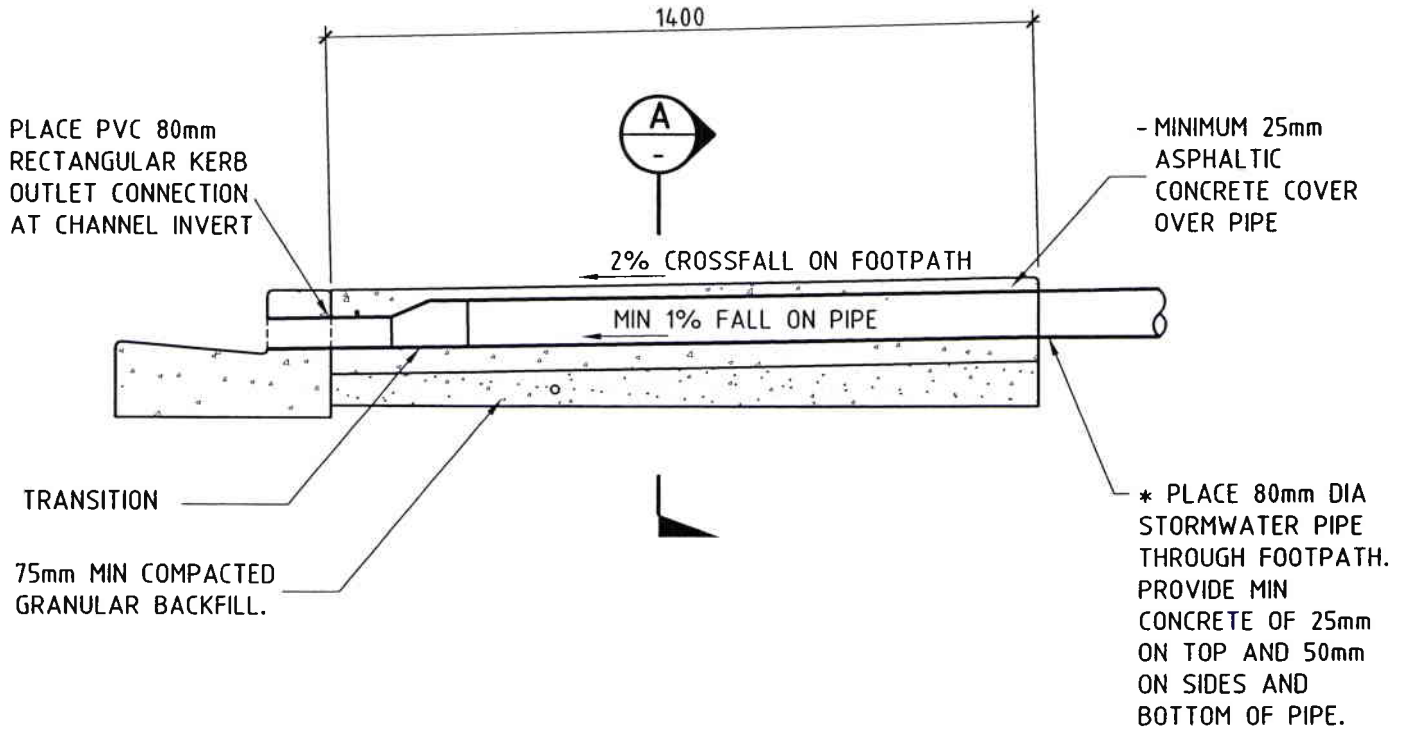
SCALE : Not to Scale



D15

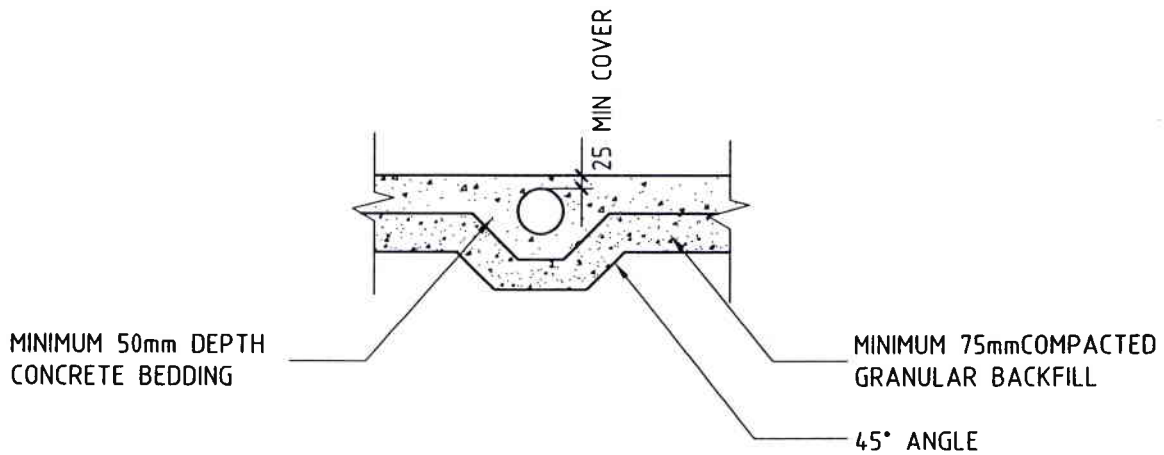
ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS

ORIGINAL SIZE A4 DO NOT SCALE, IF IN DOUBT AS



CONCRETE FOOTPATH

* PIPE TO BE RIGID STEEL OR SIMILAR



SECTION ON A

DATE : March 2005

STANDARD STORMWATER PIPE
CONNECTION TO KERB & CHANNEL

SCALE : 1:15



D16