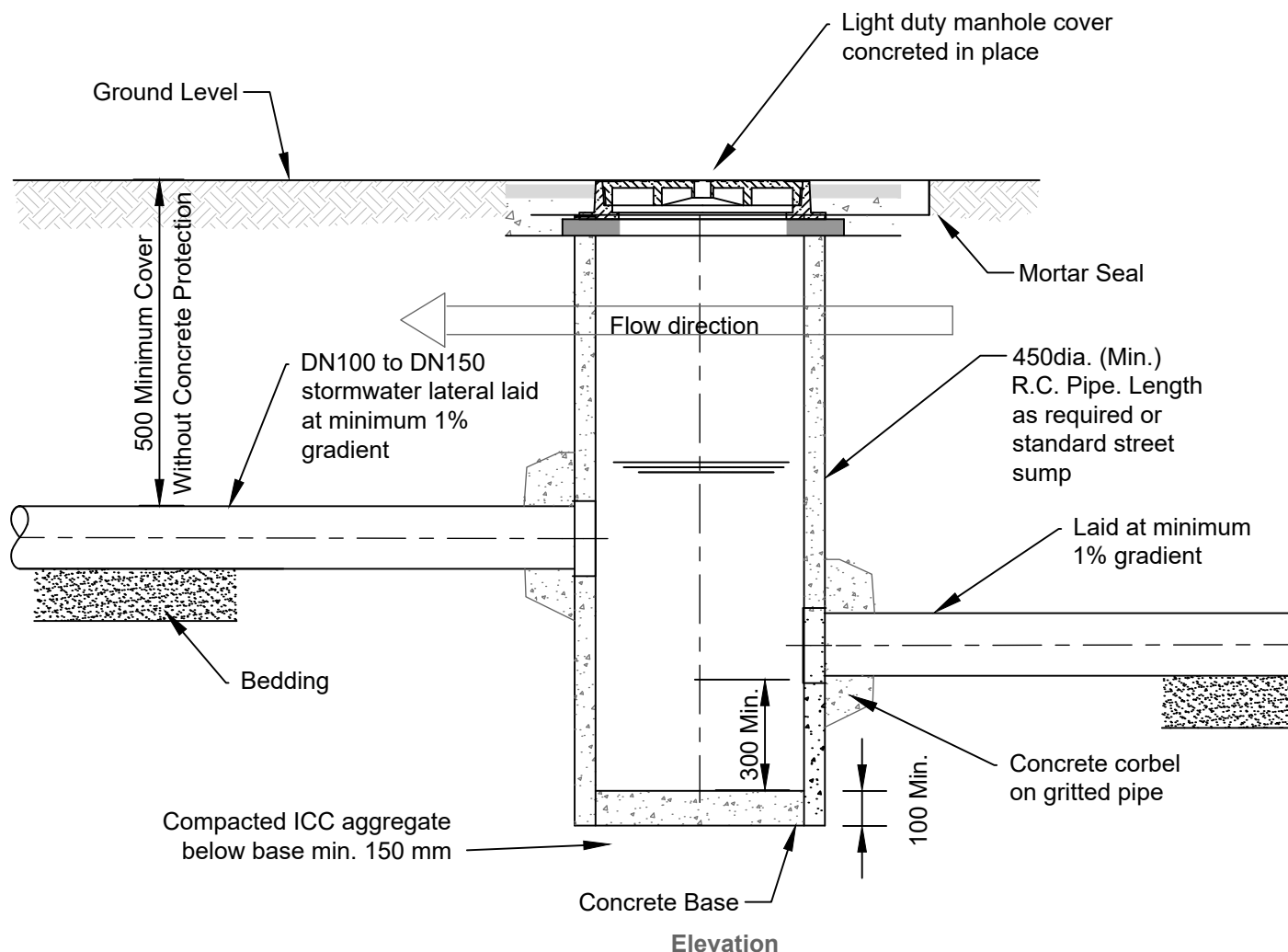
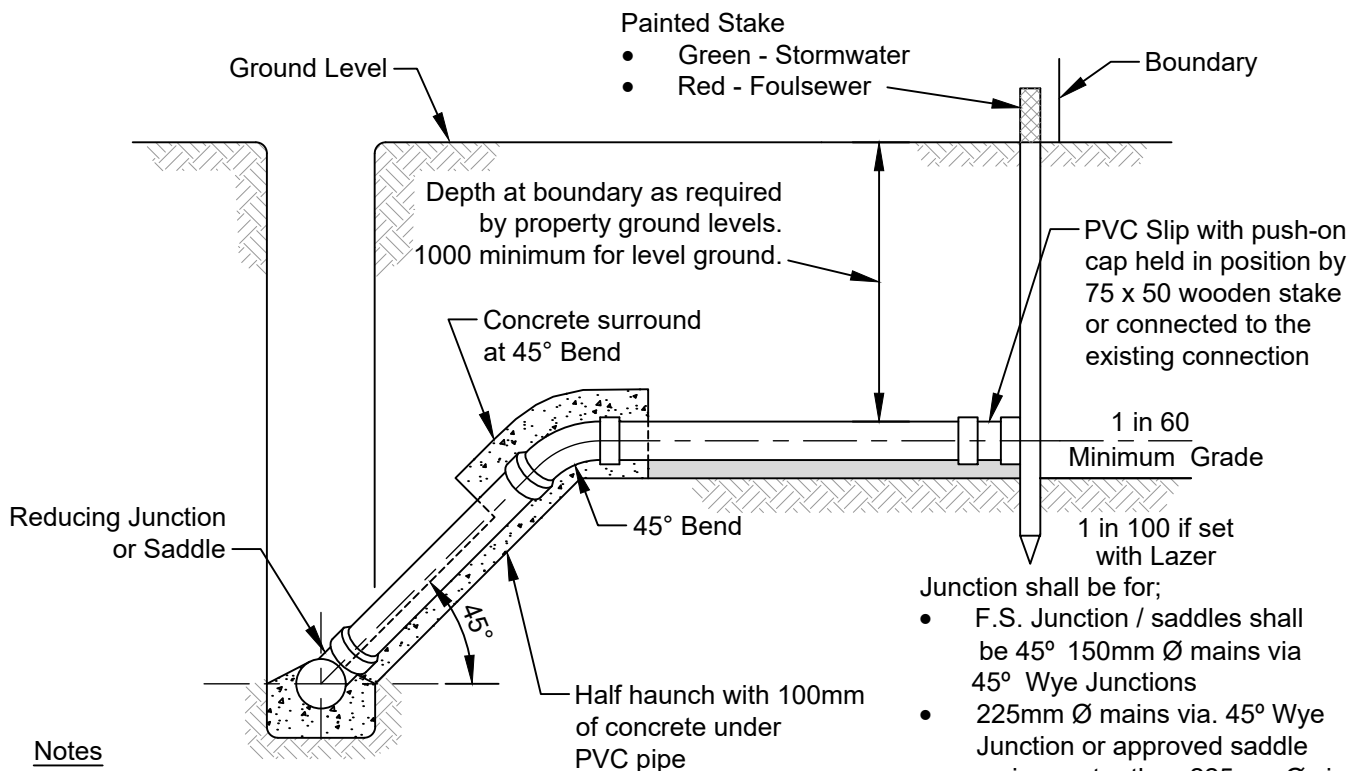




Notes.

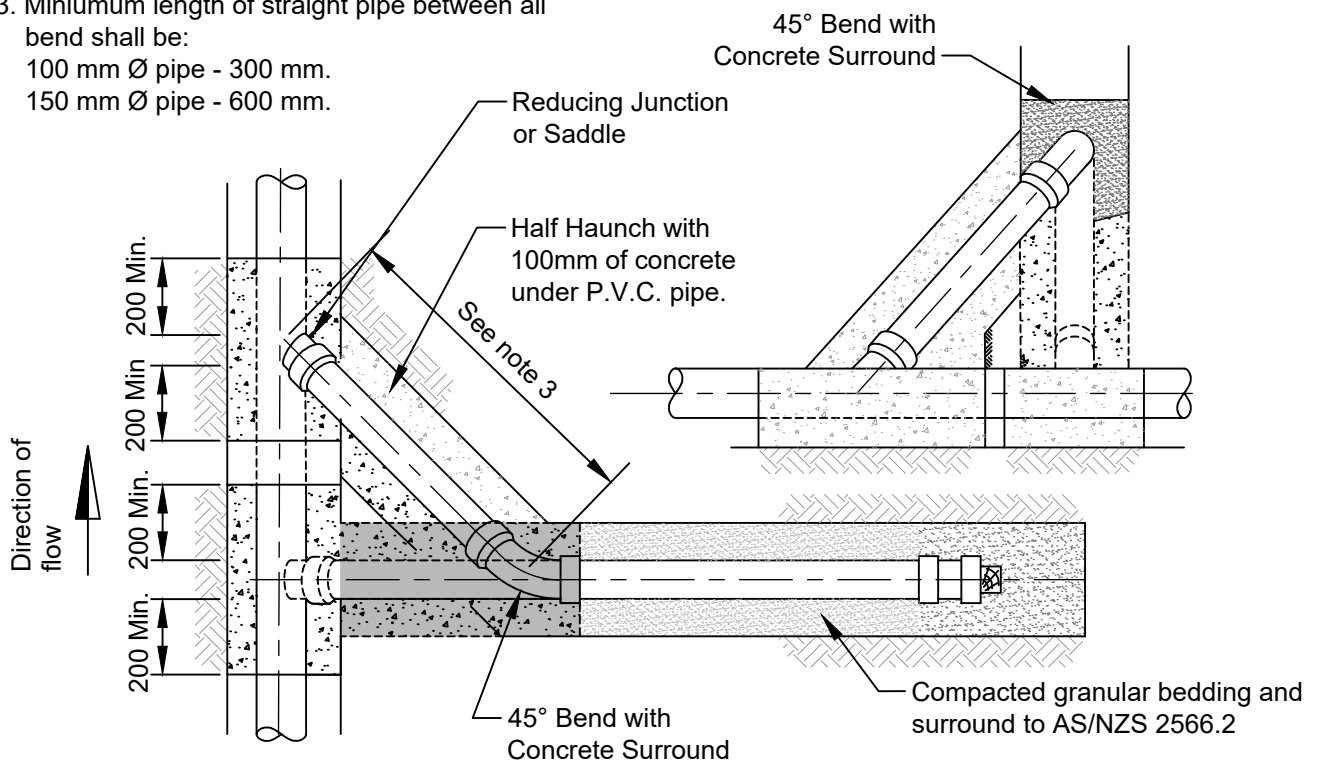
Concrete to be high grade 17.5 MPa to N.Z.S. 3104 Compacted granular bedding and surrounded to A.S./N.Z.S. 2566.2.

Not to scale

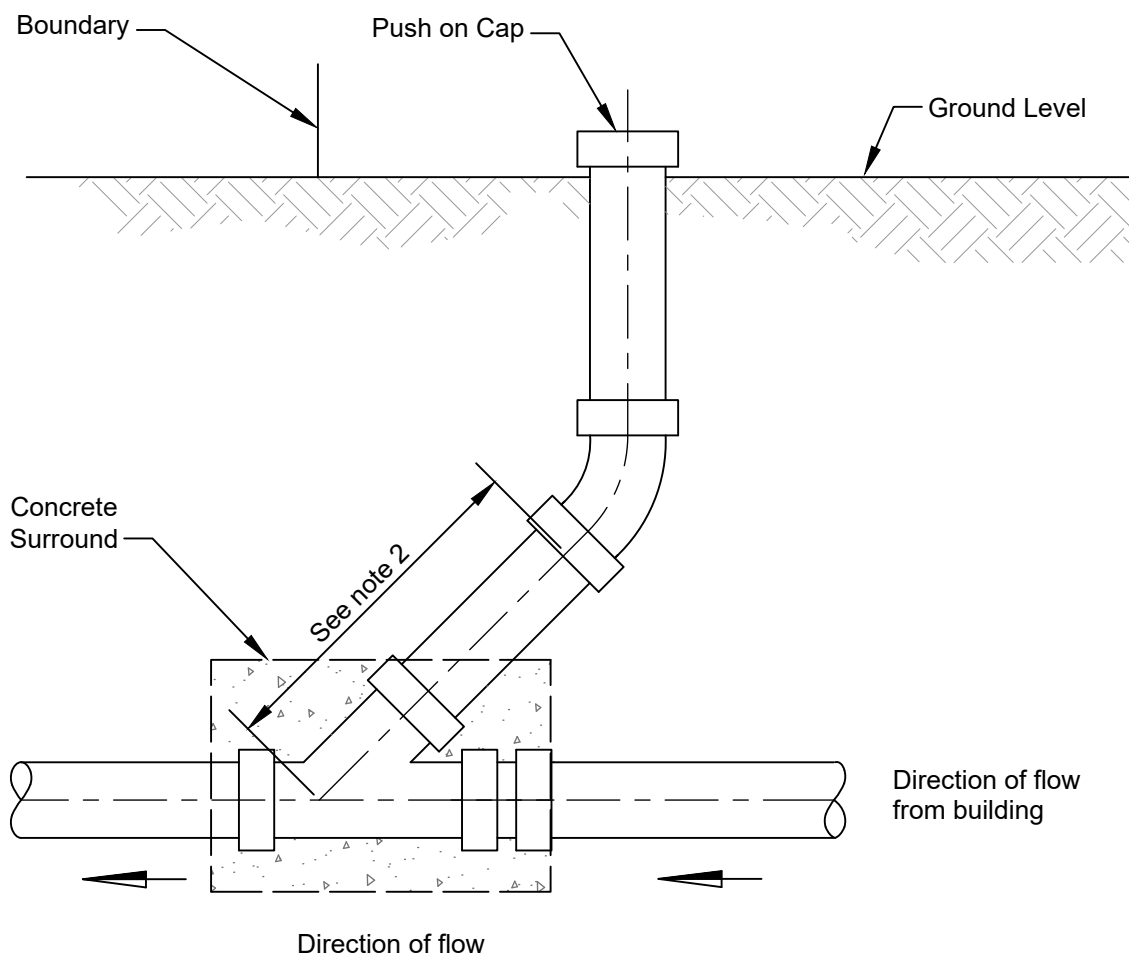


Notes

- Concrete to be 17.5MPa conforming to NZS 3104 and placed and compacted in accordance to NZS 3109.
- No concrete to be placed against uncompacted fill.
- Minimum length of straight pipe between all bend shall be:
100 mm Ø pipe - 300 mm.
150 mm Ø pipe - 600 mm.



Not to scale

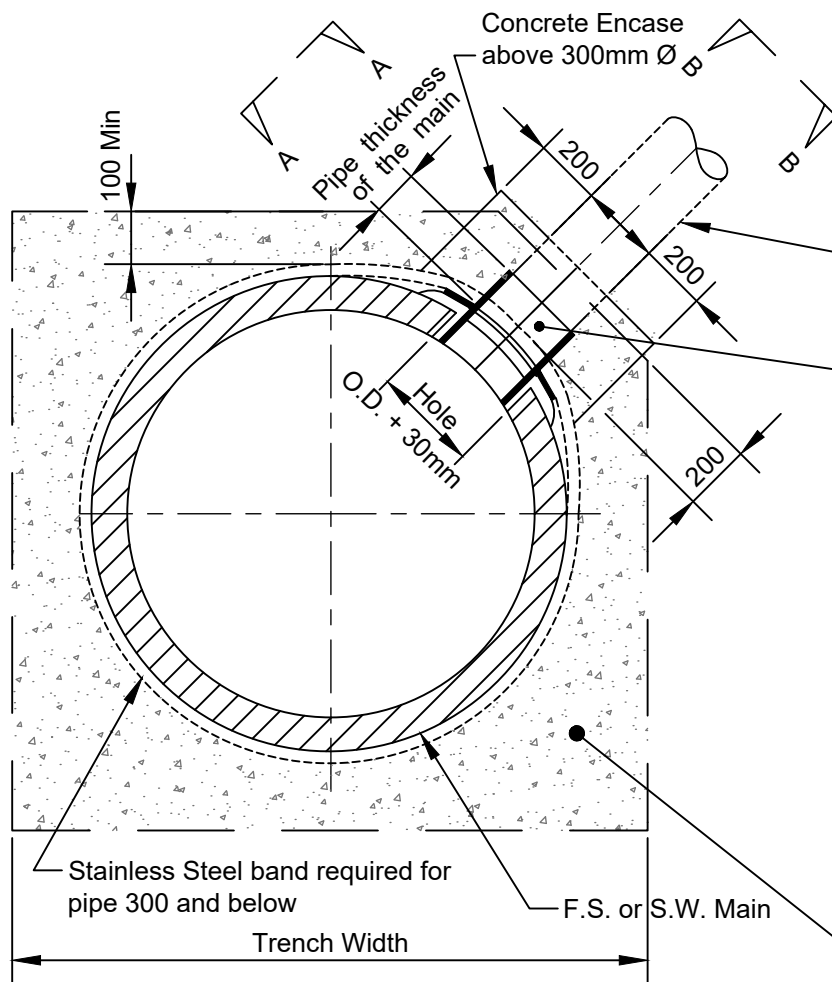


Foul Sewer and Stormwater System

NOTES

1. In sealed areas the pipe are to be extended and an approved cast iron cover is to be placed flush with surface
2. A minimum of 300mm (Ø100mm) and 600mm (Ø150mm) straight pipe between all bends.
3. For Ø150mm property connections use a 150mm x 100mm reducing 'Y' junction

Not to scale



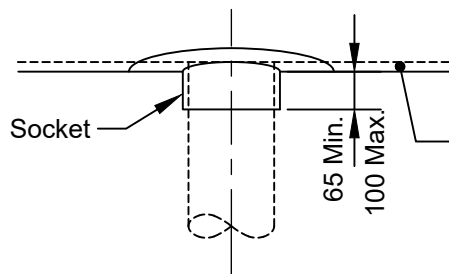
Branch pipework. Must not be connected to square saddle or 45° saddle until after epoxy mortar / glue joint has set or unless bands have been fitted round main

Socket for solvent cement joint

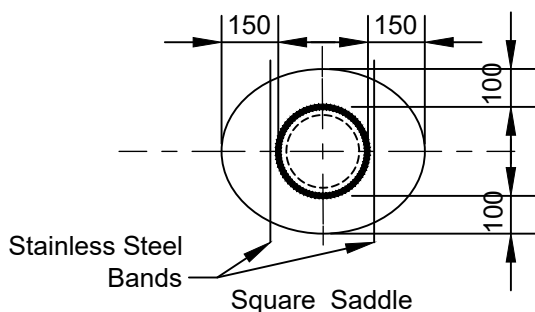
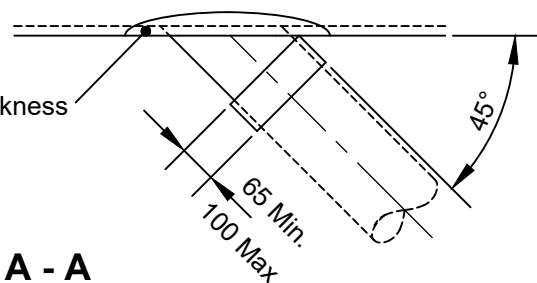
Notes

1. For 225mm Ø pipe and above
2. Pipe shall be cut with jigsaw or cone drilling equipment or similar method approved by the Drainage Manager
3. Saddle shall conform to AS / NZS 1260. P.V.C. pipes and fittings for drain waste and vent application or similar approved by the Drainage Manager
4. PVC to PVC shall be primed and glued

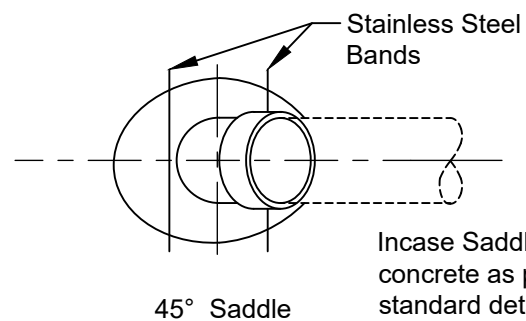
Concrete encased up to 300mm Ø



Section A - A

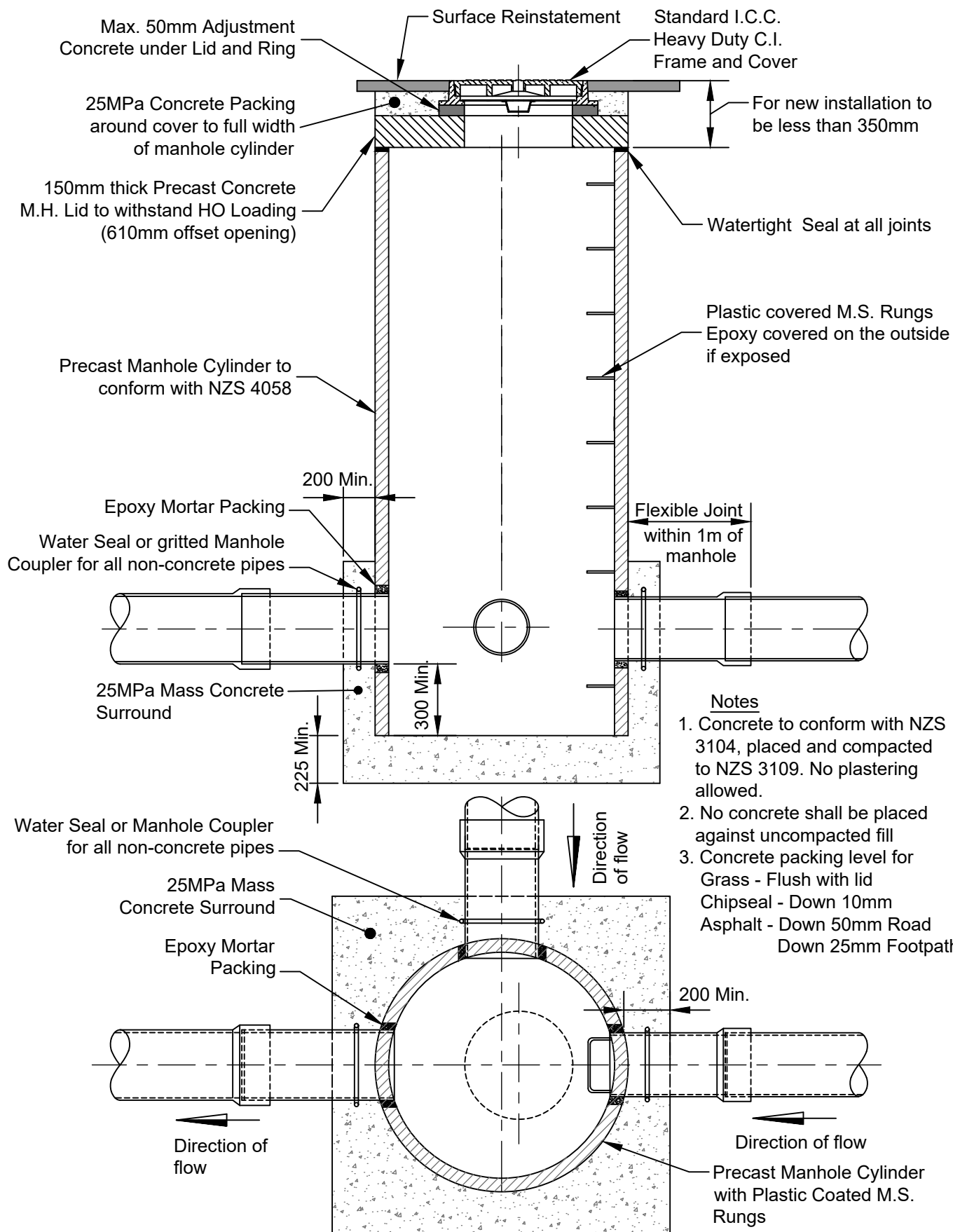


Section B - B

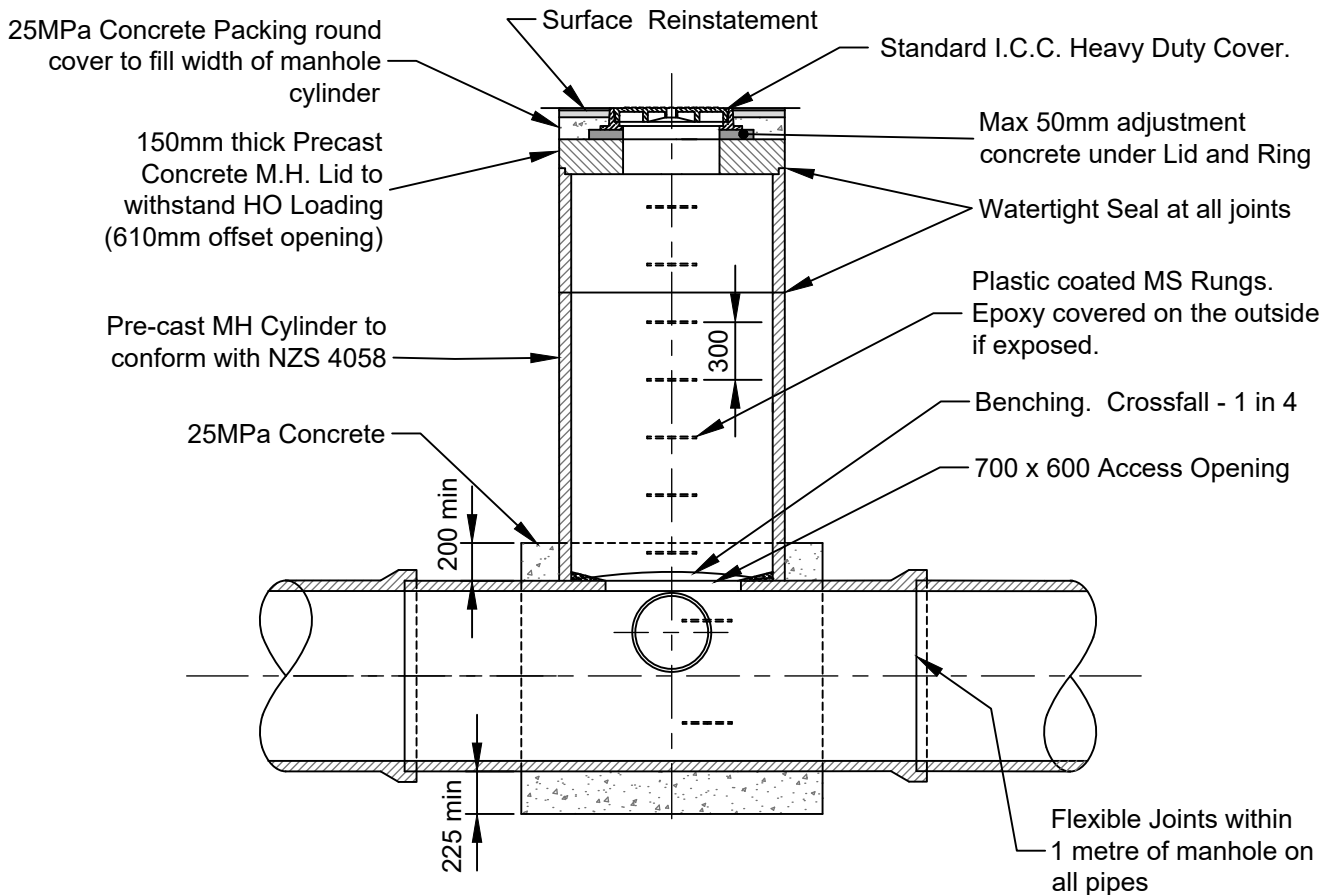


Approved for Construction

Not to scale

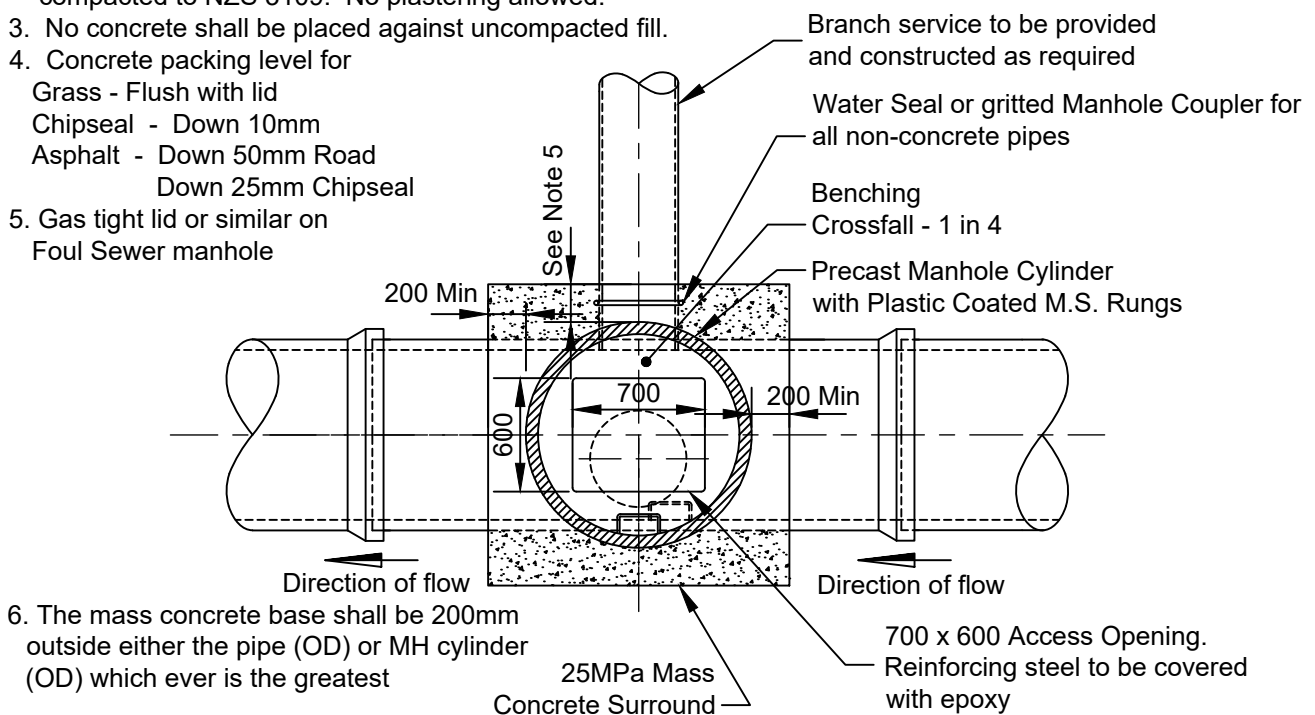


Not to scale



Notes

1. Pipe invert through the manhole shall be constructed with similar or compatible material to the connecting pipes.
2. Concrete to conform with NZS 3104, placed and compacted to NZS 3109. No plastering allowed.
3. No concrete shall be placed against uncompacted fill.
4. Concrete packing level for
Grass - Flush with lid
Chipseal - Down 10mm
Asphalt - Down 50mm Road
Down 25mm Chipseal
5. Gas tight lid or similar on Foul Sewer manhole



Not to scale

STANDARD EMBEDMENT & TRENCHFILL ARRANGEMENT

Not to scale

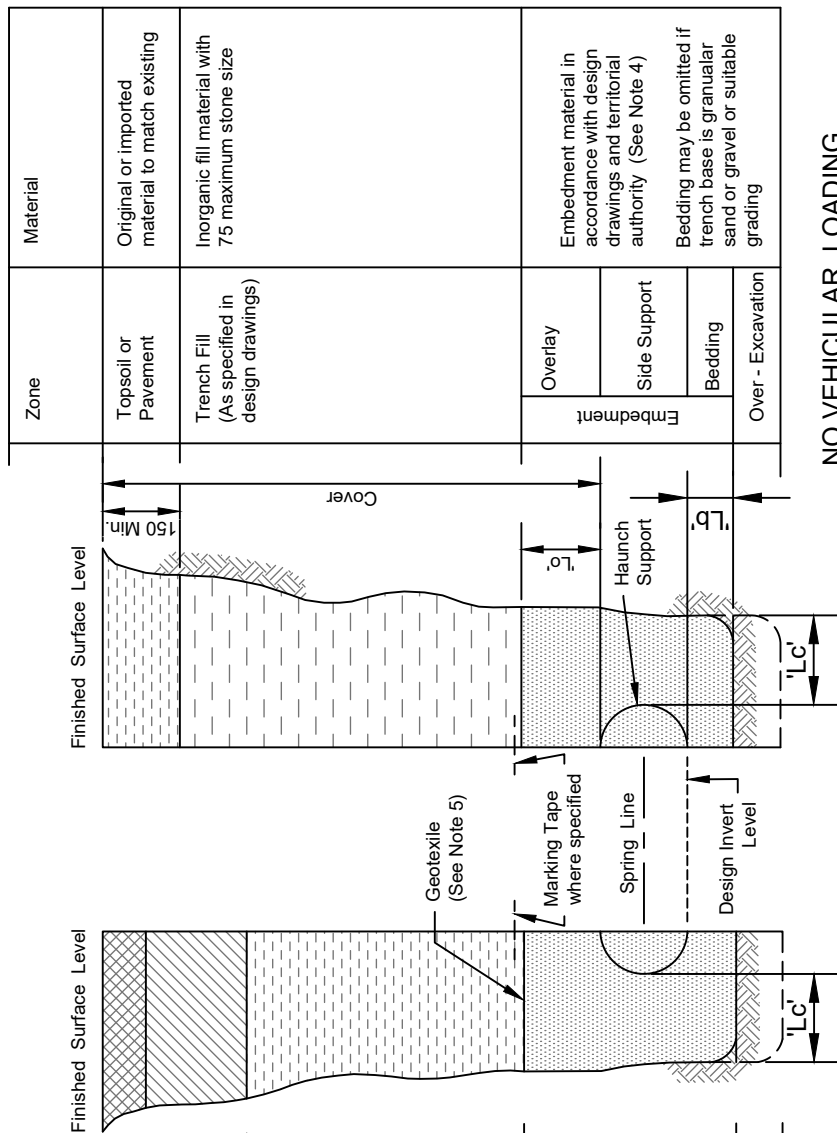
Material		Zone
Road Surface	Non Road Surface	Surface Course
Road Surface Layer	To Match Existing	Road Base
To match existing road base or to territorial authority requirements	Trench fill materials to be similar with National Code of Practice for Utility Operations' Access to Transport Corridors Section 5.5.3 Backfill Materials or to territorial authority requirements	Trench Fill (As specified in design drawings)
Trench fill materials to be similar with National Code of Practice for Utility Operations' Access to Transport Corridors Section 5.5.3 Backfill Materials or to territorial authority requirements	Or Inorganic fill materials with 75 maximum stone size	
Maximum stone size		
Embedment material in accordance with design drawings and territorial authority (See Note 4)		Embedment
Bedding may be omitted if trench base is granular sand or gravel or suitable grading		Overlay
		Side Support
		Bedding
		Over - Excavation

VEHICULAR LOADING

'Lo' - 300 mm Non-Trafficable and Trafficable
'Lb' - 100 mm min. Trafficable - Refer to D24

Note:

1. All Dimensions in millimetres.
2. Specify special bedding to suit the conditions if the trench floor has:
 - Irregular outcrops of rock or
 - Been disturbed by uncontrolled ground water.
3. Compact and evenly grade finished trench floor.
4. Embedment, trench fill and compaction to meet the requirement of design drawings or specifications.
5. Use Geotextile filter fabric where specified.
6. Sides of excavation to be kept vertical to at least 150 above the pipe.



SPRING LINE TRENCH CLEARANCE

Nominal Diameter Dn.	Minimum Clearance 'Lc'
≤150	100
>150 - ≤300	150
>300	300

Trench width to be sufficient to safely lay pipe and compact the side support zone

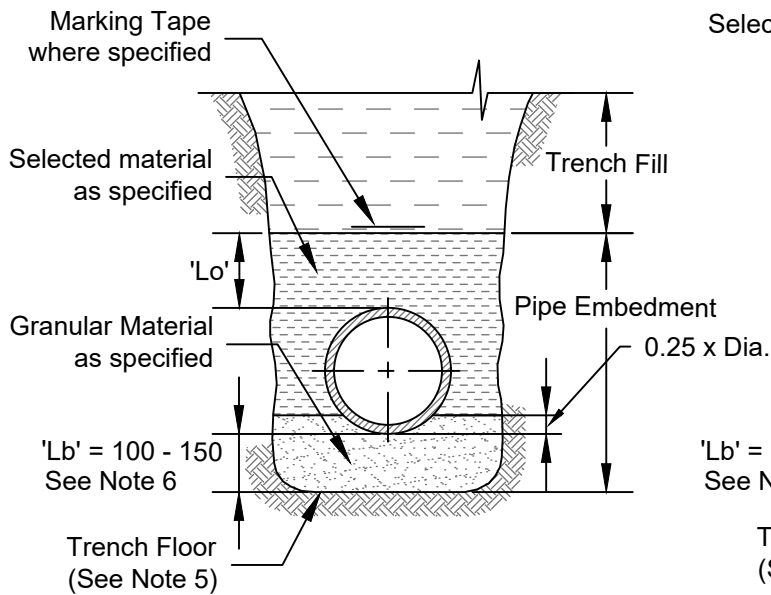
NO VEHICULAR LOADING

Includes locations where occasional vehicle loading occurs such as reserves and footways



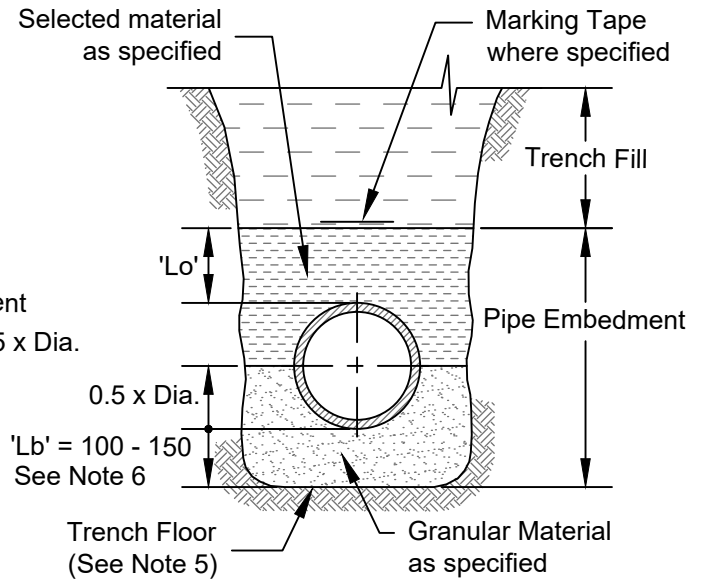
PIPE JOINT BEDDING POCKETS

For joint projections (Sockets, flanges and so on)



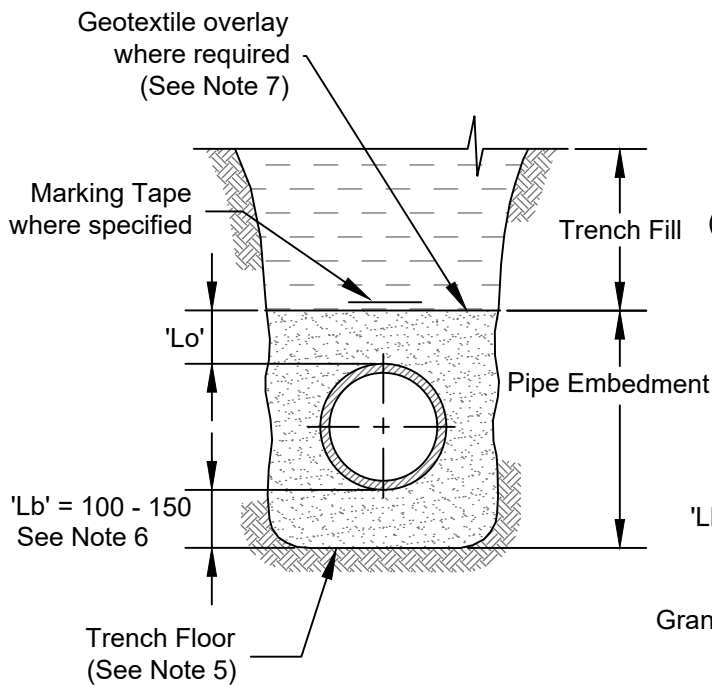
TYPE 2 SUPPORT

(See Note 9)



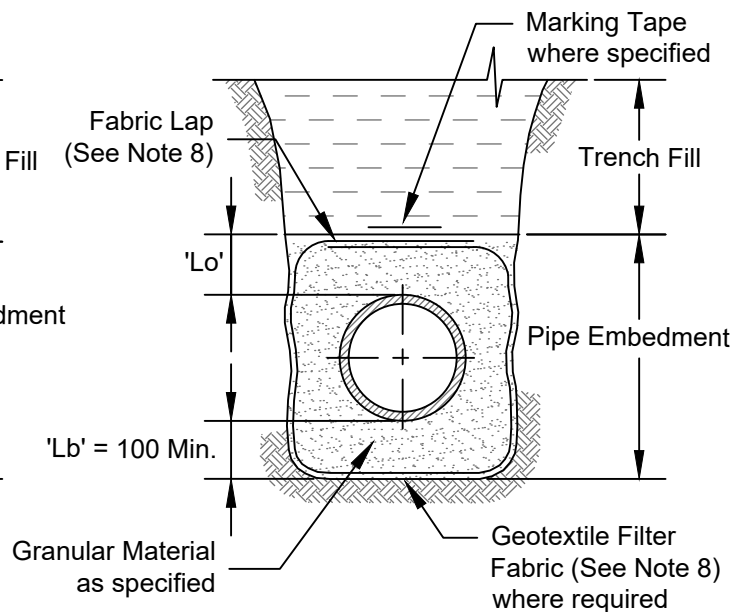
TYPE 2 SUPPORT

For rigid pipes only (See Note 3)
(See Note 9)



TYPE 3 SUPPORT

For Flexible and Rigid Pipes (See Note 3)



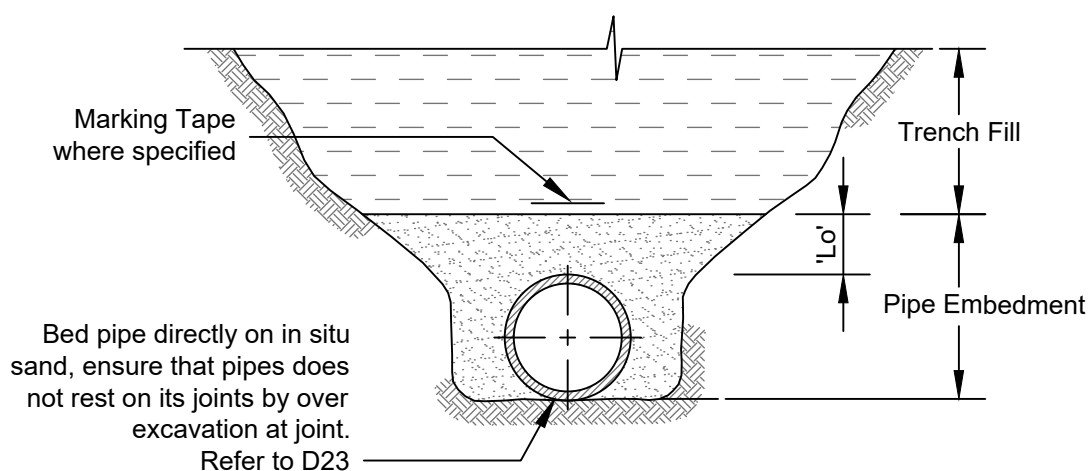
TYPE 4 SUPPORT

With Geotextile for flexible and
Rigid Pipes (See Note 3)

EMBEDMENT TYPES TO BE SPECIFIED
IN DESIGN DRAWINGS

Must be read in conjunction with D24A

Not to scale

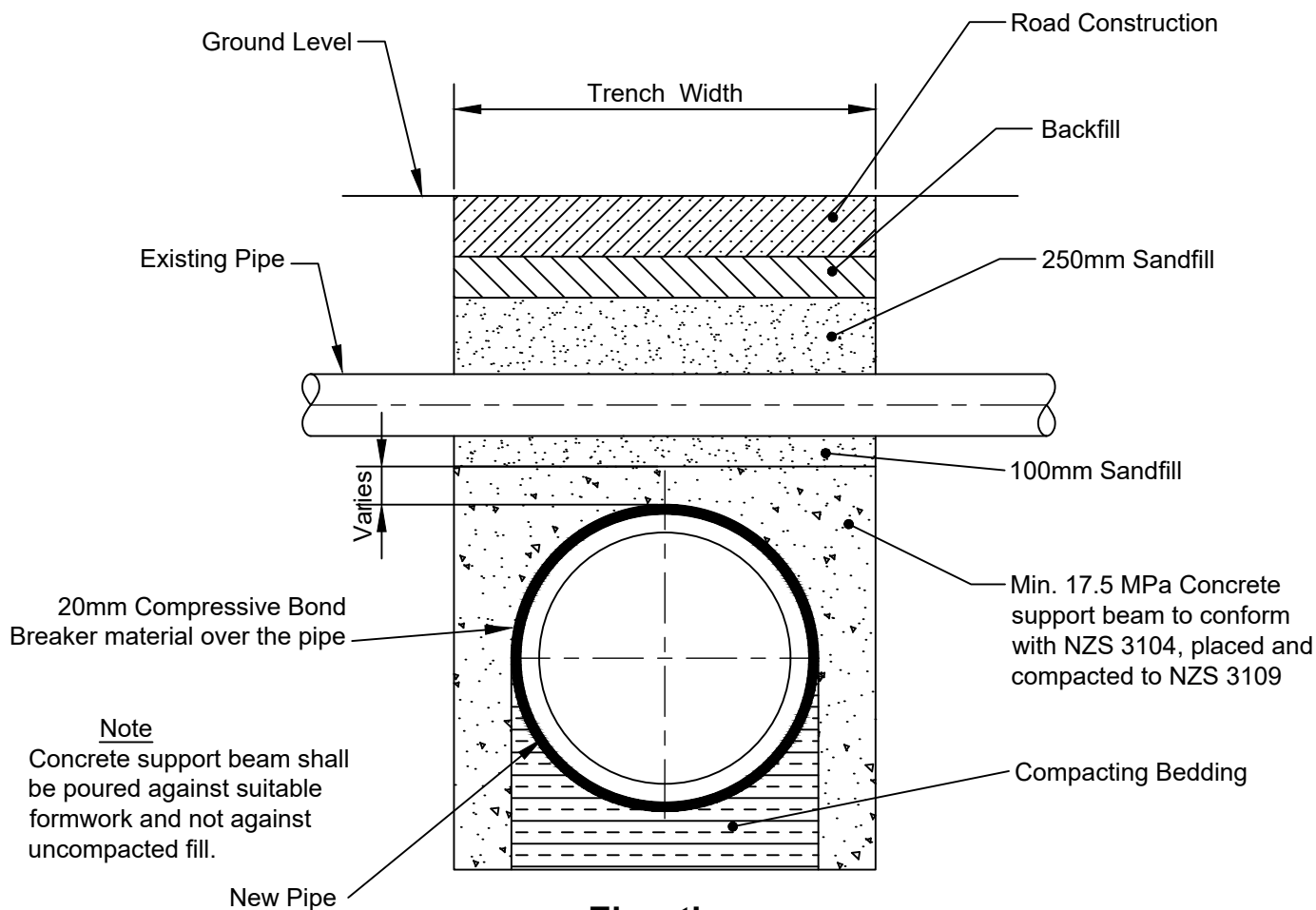


TRENCH IN SAND STRATA

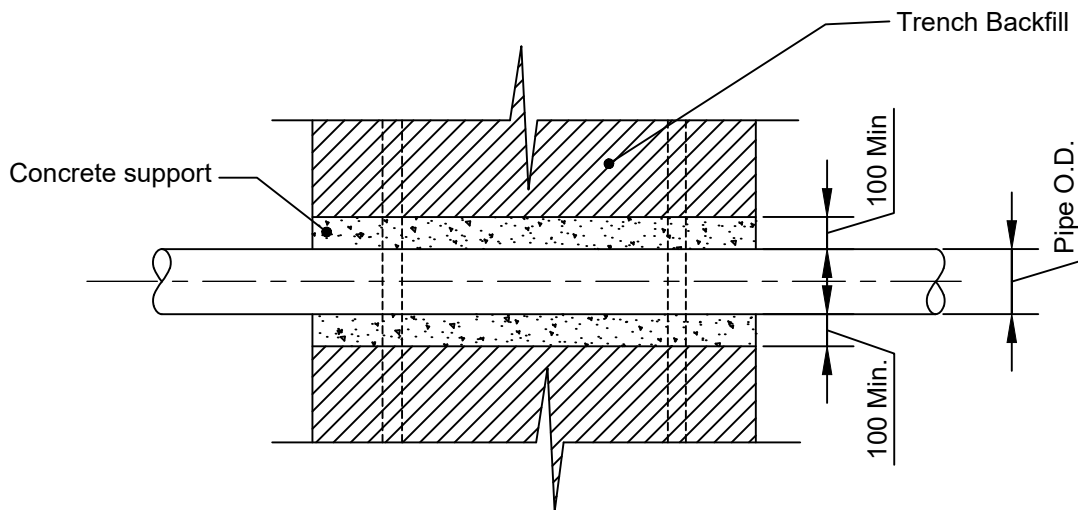
Note:

1. All dimensions in millimetres.
2. This drawing to be read in conjunction with D23
3. Pipe classification:
 - (a) Rigid pipes: VC, RC, Steel, and DI
 - (b) Flexible pipes: PVC, GRP and PE.
4. Placement of embedment, trenchfill, & compaction to meet the requirements of drawings and specifications.
5. Excavate or compact trench floor to provide a flat firm base to support bedding material and minimise pipeline settlement. When excavated, replace with granular material as specified for bedding or adopt type 1, 2, 3 or 4 support as required.
6. Ensure bedding is deep enough that pipe joint projections (Sockets, Flanges) do not touch trench floor - See Fig. D23
7. Type 4 support to be used where migratory native soils (Sands and clays) are encountered adjacent to the embedment zone and single size aggregate is used.
8. Geotextile overlay is required for coarse aggregate embedment ≥ 5 mm.
Lay Geotextile Filter Fabric against trench floor and walls such that it fully encases the embedment.
 - Press filter fabric into the voids before installing embedment to prevent fabric tearing.
 - Provide a minimum of 300 overlap at all filter fabric joints.
9. In some areas local practice may allow use of selected excavated material as pipe embedment.
10. In unsuitable ground conditions specific design is required. See WSA 03 and WSA 04 drawings for guidance.
11. Concrete pipes should be based on Figures 11 - 13 in AS/NZS 3725.

Not to scale

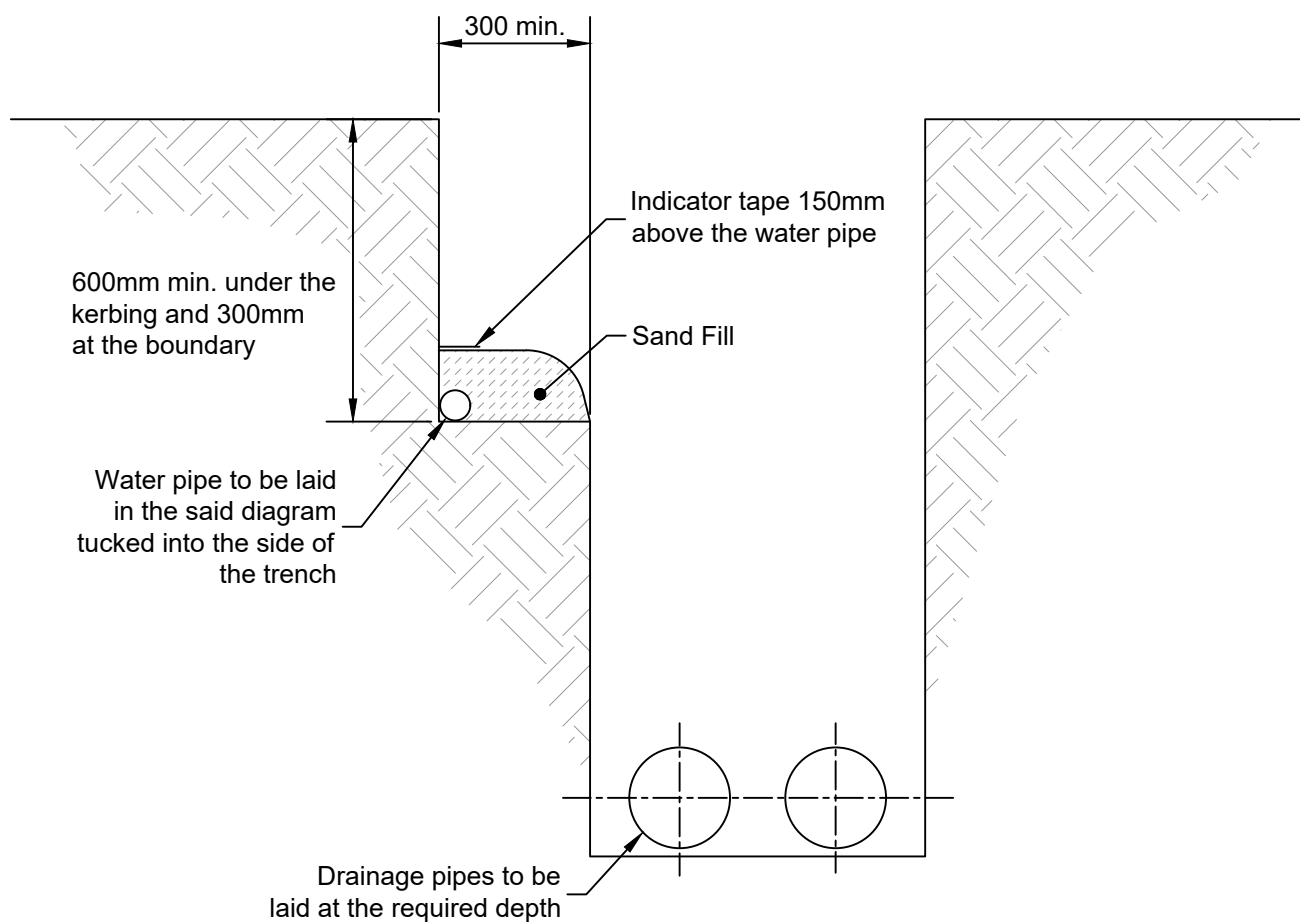


Elevation



Plan

Not to scale



Cross Section

N.T.S.

Not to scale

Soil Classification and allowable Horizontal bearing pressure or Ground. See Note 3

DN

For Horizontal Thrust on Trench Walls where cover over pipes is 450 or greater	'Y's and Dead Ends			11.25° Horizontal Bends			22.5° Horizontal Bends			45° & 30° Horizontal Bends			90° & 60° Horizontal Bends		
	Hard Clay Sound Rock	Very Stiff Clay Dense Sand Gravel Decomposed Rock	Stiff Clay Medium Dense Clean Sand	Hard Clay Sound Rock	Very Stiff Clay Dense Sand Gravel Decomposed Rock	Stiff Clay Medium Dense Clean Sand	Hard Clay Sound Rock	Very Stiff Clay Dense Sand Gravel Decomposed Rock	Stiff Clay Medium Dense Clean Sand	Hard Clay Sound Rock	Very Stiff Clay Dense Sand Gravel Decomposed Rock	Stiff Clay Medium Dense Clean Sand	Hard Clay Sound Rock	Very Stiff Clay Dense Sand Gravel Decomposed Rock	Stiff Clay Medium Dense Clean Sand
PBH kPa	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
DN	100	N	0.12	0.24	N	N	N	N	N	N	N	0.18	N	0.17	0.34

**MINIMUM THRUST AREA FOR BLOCKS IN SQUARE METRES (M²)
DESIGN PRESSURE 1000 kPa (NOM. 100 M HEAD)**

'N' Denotes nominal thrust area - (See notes 4 & 5)
PBH - Allowable Horizontal Bearing Pressure
DN - Nominal Diameter of Fitting

NOTE:

- All dimensions in millimetres unless otherwise specified.
- Cast the thrust area of all thrust blocks against a clean face of undisturbed natural soil.
Thrust blocks not to interfere with other services.
- Do not use standard thrust blocks as specified in this drawing in:
 - Very soft, soft, or firm clay.
 - Loose clean sand.
 - Uncompacted fill or refuse.
 A geotechnical assessment and individual design is required for these soils.
- The nominal thrust area 'N' to be achieved by pouring concrete the full length of the fitting and to a depth that ensures the thrust is vertically and horizontally centred on the resulting thrust block. See also note 7.
- Design pressures other than 1000 kPa reduce or increase the minimum thrust area by the ratio of the design pressures except where:
 - Minimum thrust area is <0.1m², and
 - 'N' appears in the table and design pressure is above 1000 kPa.
 Calculate the area.
- Finish thrust blocks approximately 100 above the top of the fitting or bearing pad and extend to the floor of the trench or deeper if necessary to achieve the required thrust area, maximum encasement to be 180°.
- The minimum thrust area for taper thrust blocks to be equal to the difference between the thrust areas for dead ends of equivalent diameter to those each side of taper.
- For downward vertical thrust, the allowable bearing pressures for various soils may be taken as twice that for horizontal thrust shown.
- When pouring concrete against fittings place a membrane of polyethylene, PVC or Felt between the fitting and concrete to prevent damage to the fitting. Joints to be clear of concrete.
- Concrete to be kept clear of bolts and flanges or gibault joints to allow fittings to be removed without interfering with anchor block.

Must be read in conjunction with D33

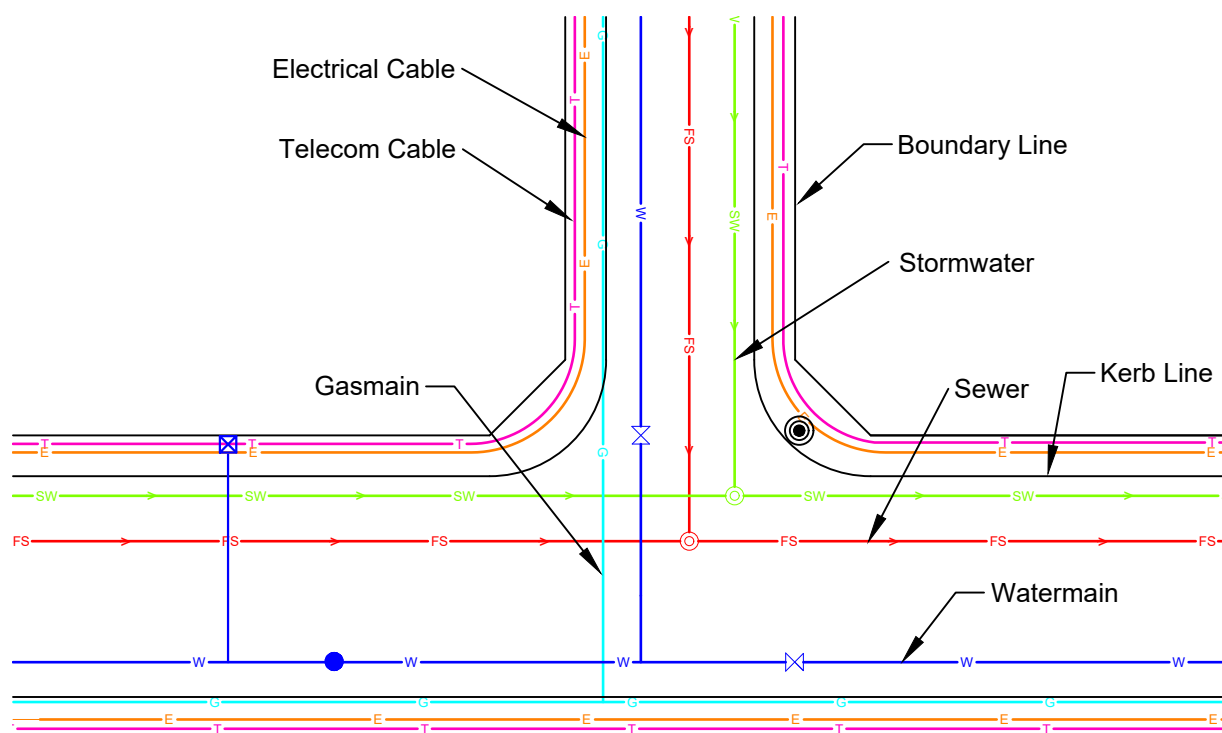
Not to scale



**FOUL SEWER PUMP LINES
TYPICAL DETAILS THRUST BLOCK
INSTALLATION 'Y's, BENDS & TAPERS - TABLE**

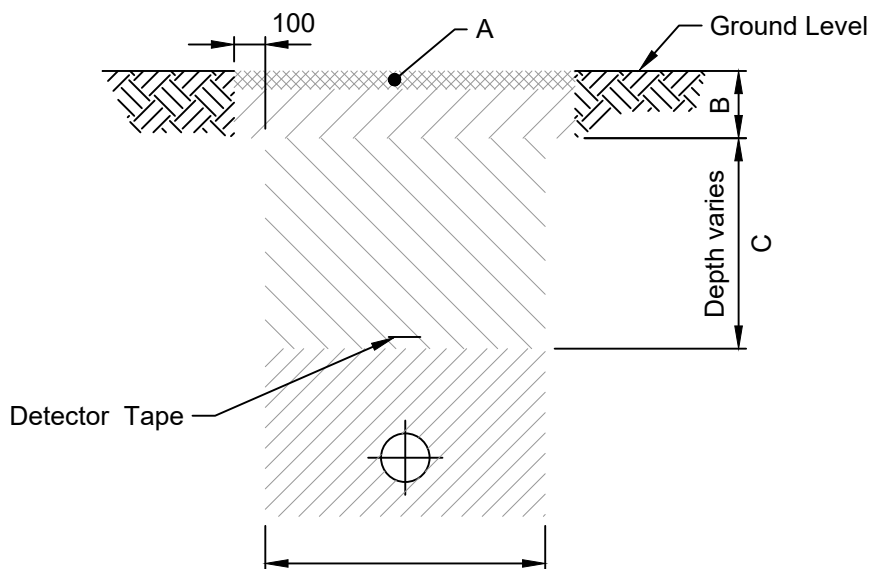


**Fig. D33A
Rev. 2
Date 03/23**



TYPE OF SERVICE	LINETYPE	SYMBOLS
Foul Sewer	FS	Manhole
Foul Sewer (Rising)	FS-R	Cleaning Eye
Foul Sewer (Abandoned)	FS-AB	Pump Station
Stormwater	SW	Manhole
Stormwater (Sealed)	SW-S	Cleaning Eye
Stormwater (Abandoned)	SW-AB	Pump Station
Watermain	W	Hydrant
Watermain (Supply)	W-SU	Valve
Watermain (Abandoned)	W-AB	Scour Valve
Gasmain	G	
Underground Electricity Cable	E	
Overhead Electricity Cables	E-OH	
Underground Telecom Cable	T	
Overhead Telecom Cable	T-OH	
		Standard Stone

Not to scale



Trench Width as per NZS 4404:2010 Appendix B CM-001 to CM-002

Location	A	B	C
Carriageway Trench	50mm Asphalt on crushed AP 40 basecourse pavement	200	AP 65 Basecourse
Vehicular Crossing / Footpath	30mm Asphalt on crushed AP 40 basecourse pavement	150	AP 65 Basecourse
Grass Berm	Compacted screened top soil or cut turfs ex. berm	75	Compacted excavated material

Not to scale