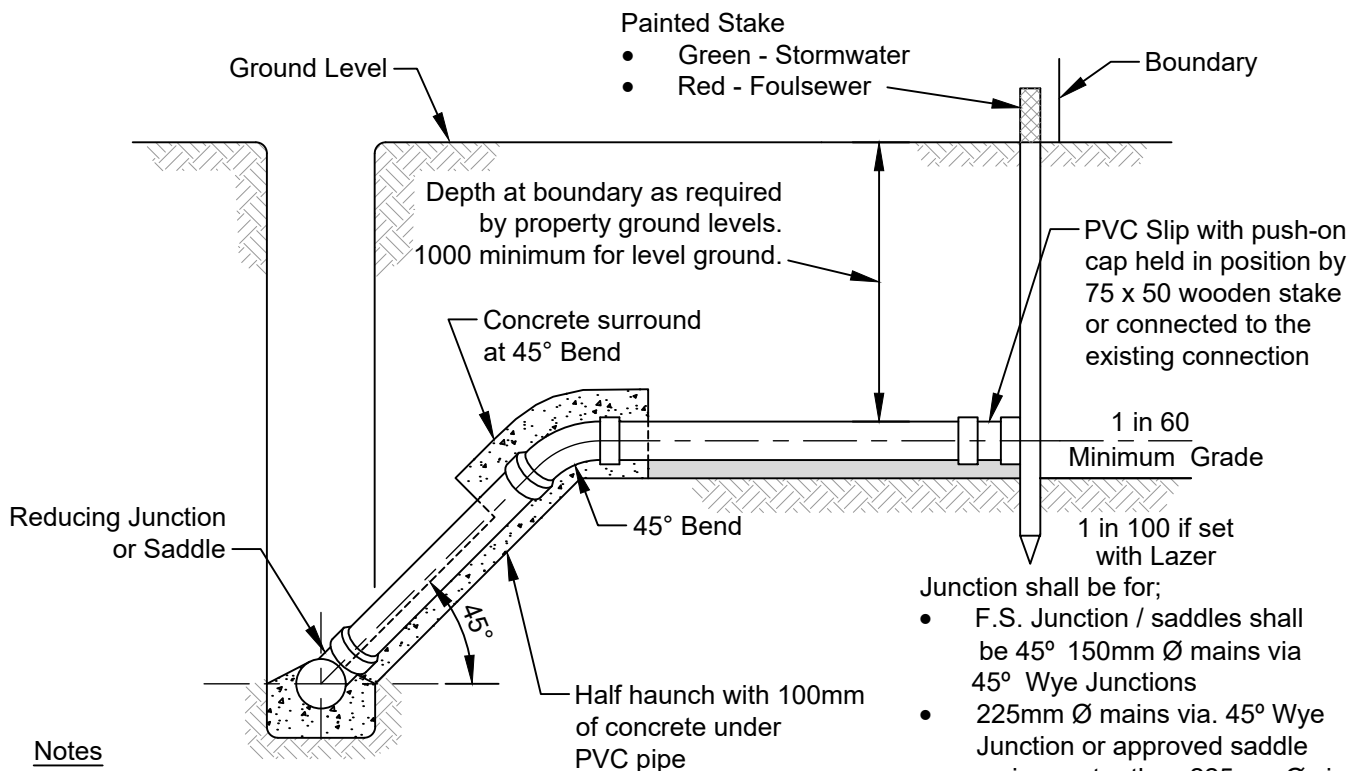


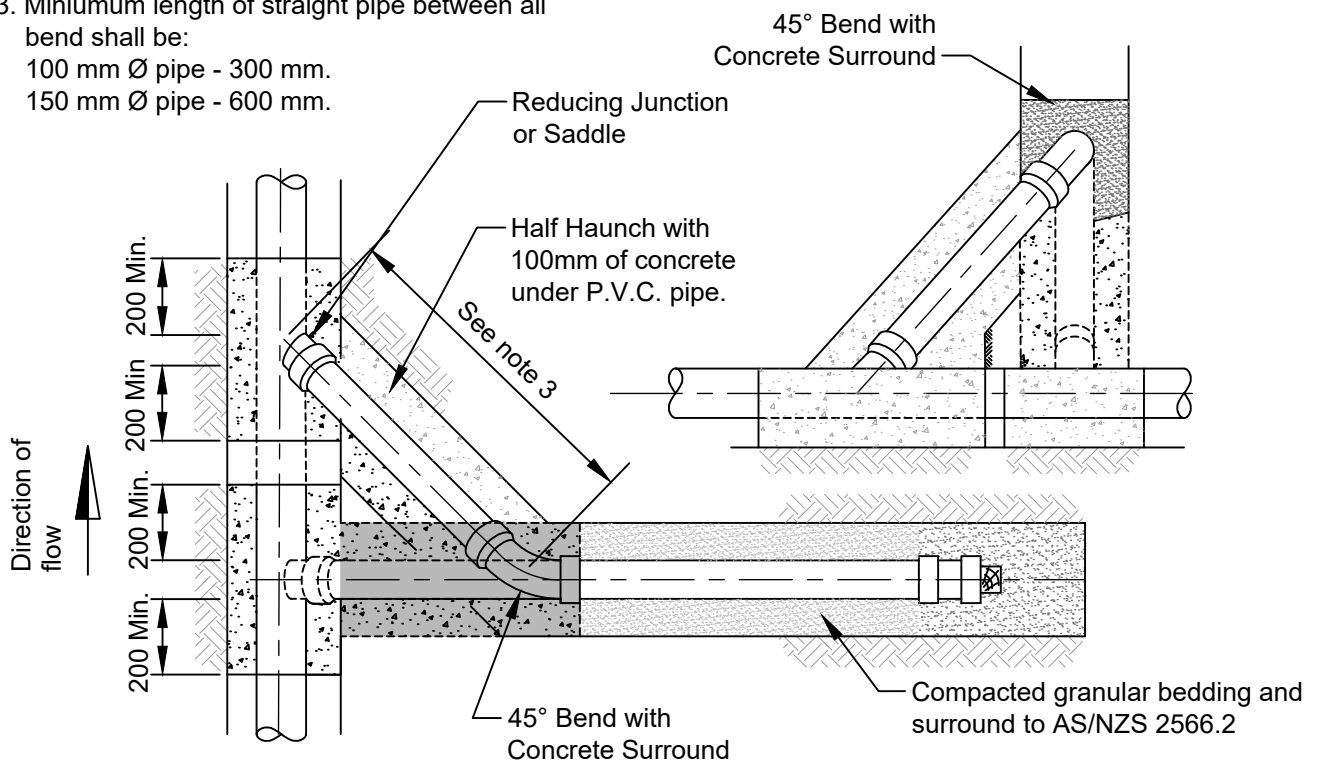


Notes

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

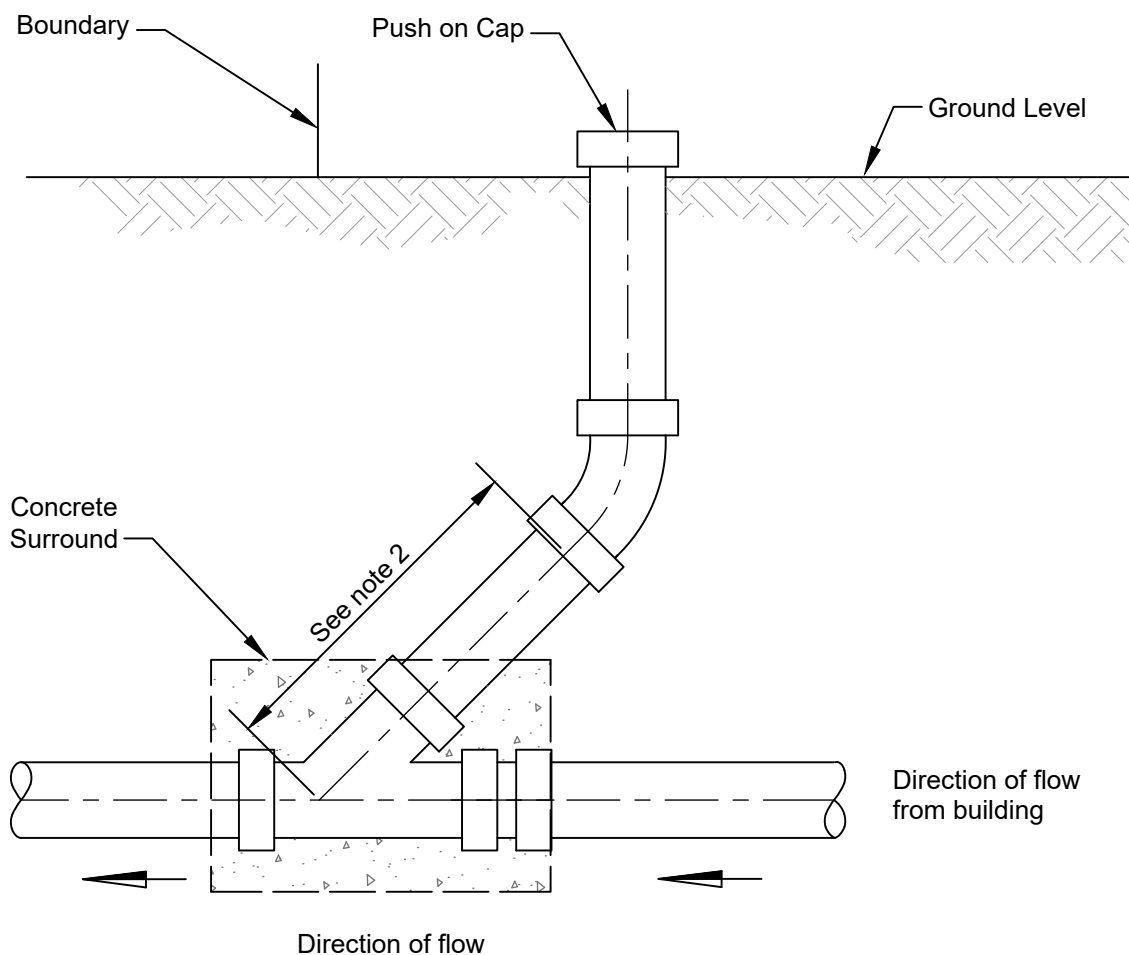
Junction shall be for;

- F.S. Junction / saddles shall be 45° 150mm Ø mains via 45° Wye Junctions
- 225mm Ø mains via. 45° Wye Junction or approved saddle
- main greater than 225mm Ø via. approved saddle
- Main greater than 300mm Ø may use 90° Junction or Saddles



Not to scale

Ø100 - Ø150 uPVC STANDARD CONNECTION SHOWING INCLINED RISER

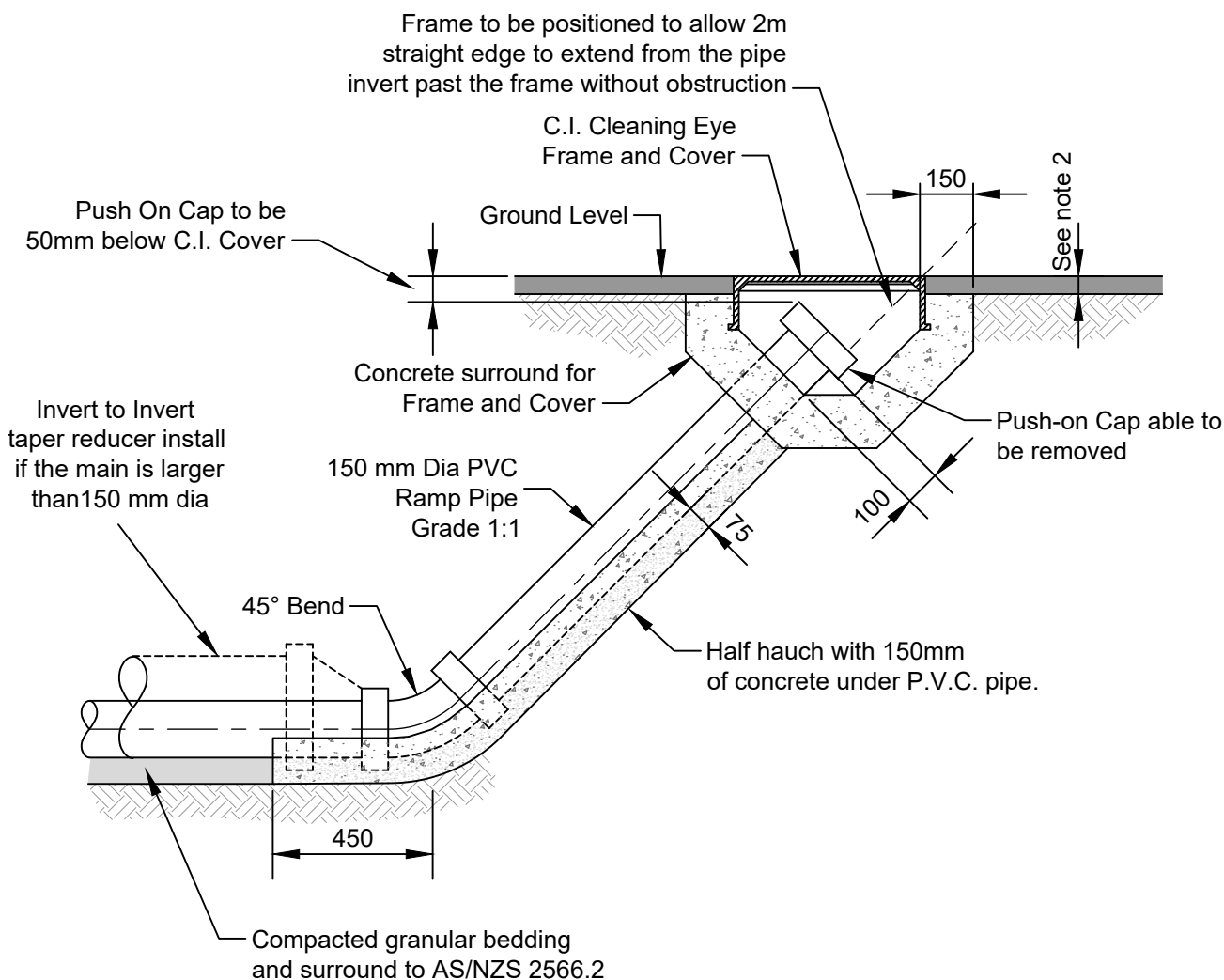


Foul Sewer and Stormwater System

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

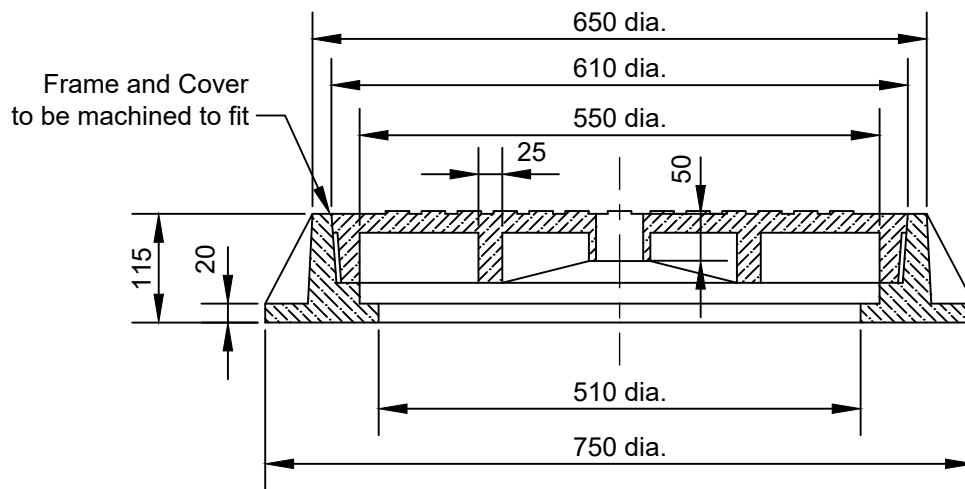
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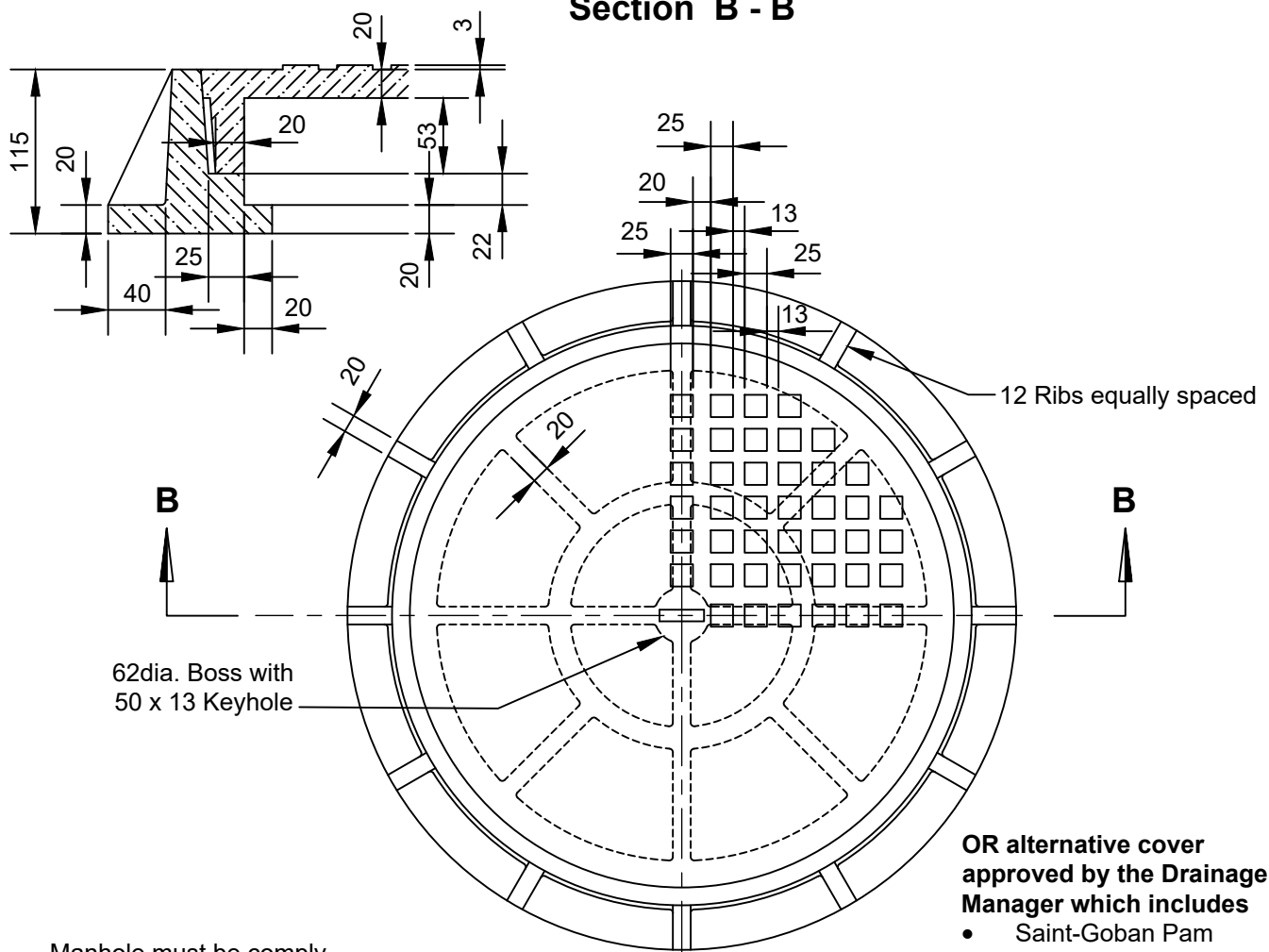
NOTES

1. All concrete to be 17.5 MPa conforming with NZS 3104, placed and compacted in accordance to NZS 3109
2. Concrete surround to be:
 - Gass - Flush with Lid
 - Chipseal - Down 10mm
 - Asphalt - Down 50mm Road
 - Down 25mm Footpath

Not to scale



Section B - B

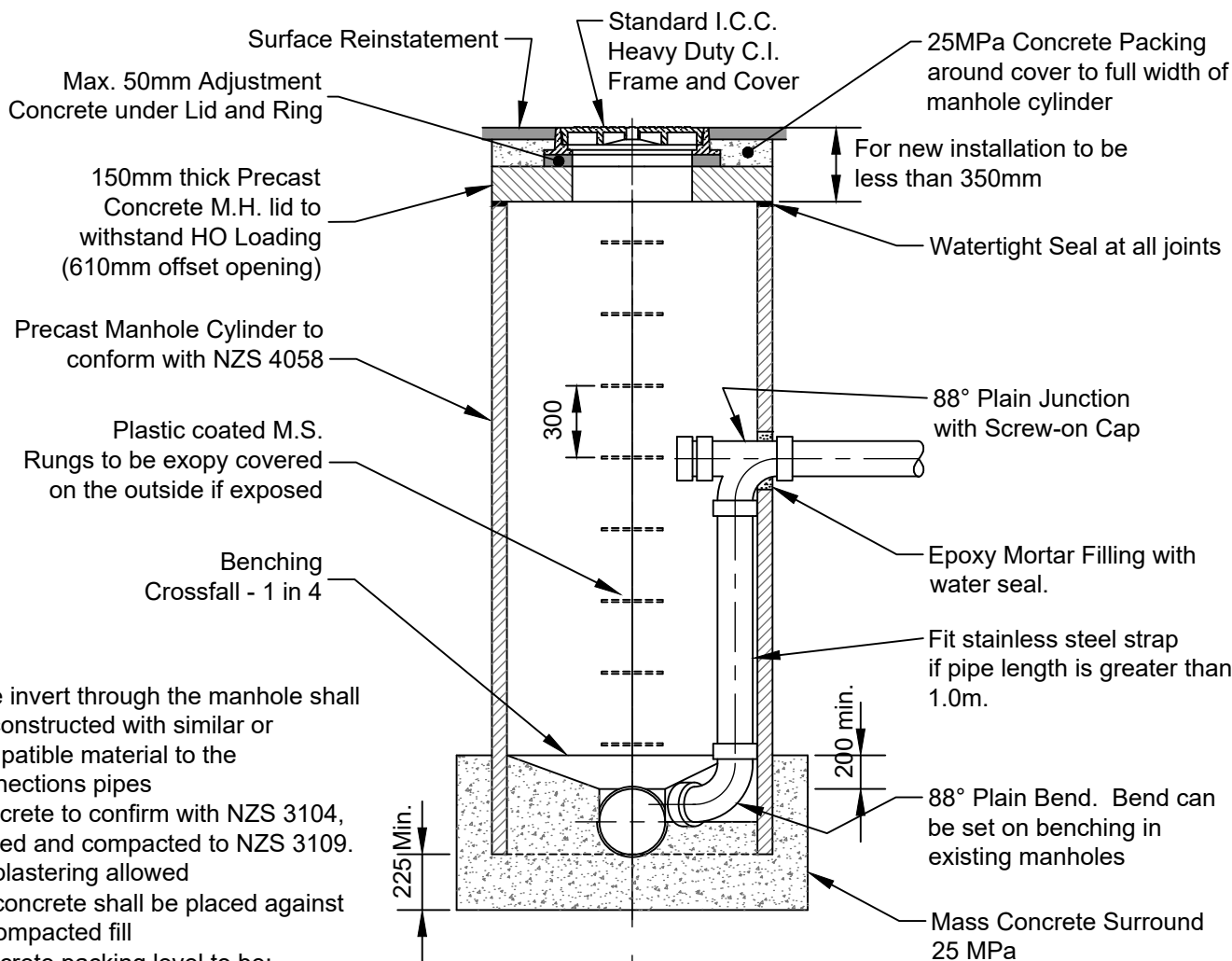


Manhole must be comply with TNZ HO Loading

OR alternative cover approved by the Drainage Manager which includes

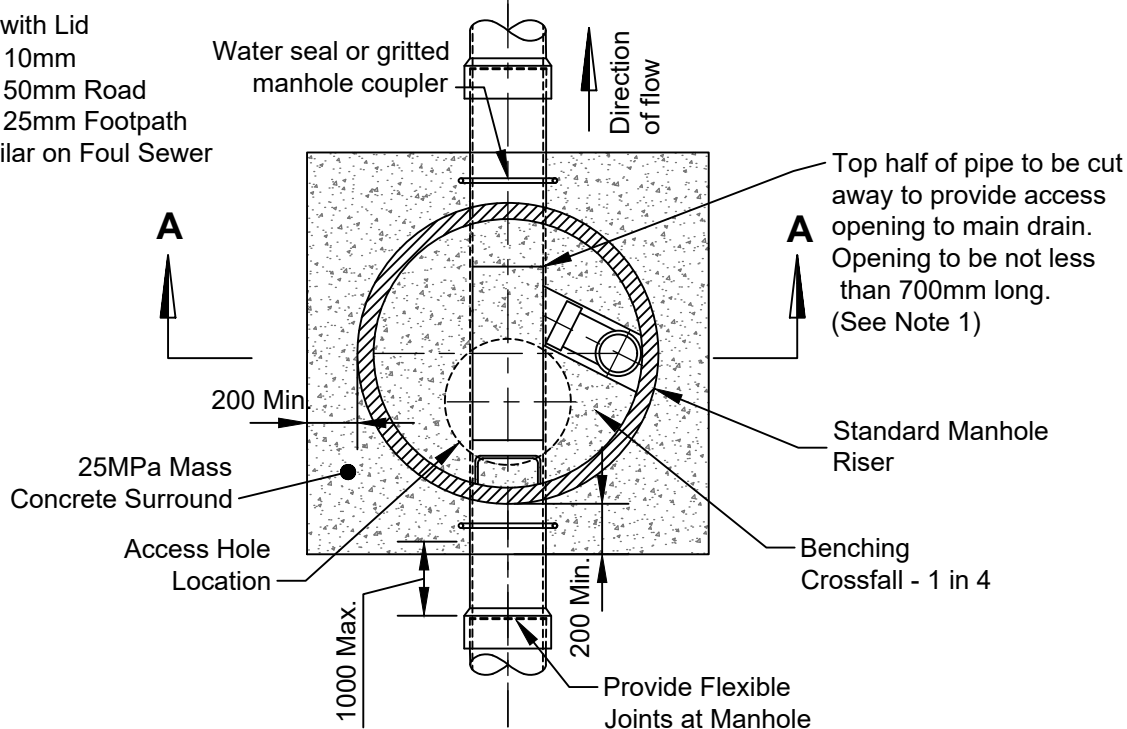
- Saint-Goban Pam uPEX Korum Class D 400
- Twino 600mm carriageway cover class D 400

Not to scale

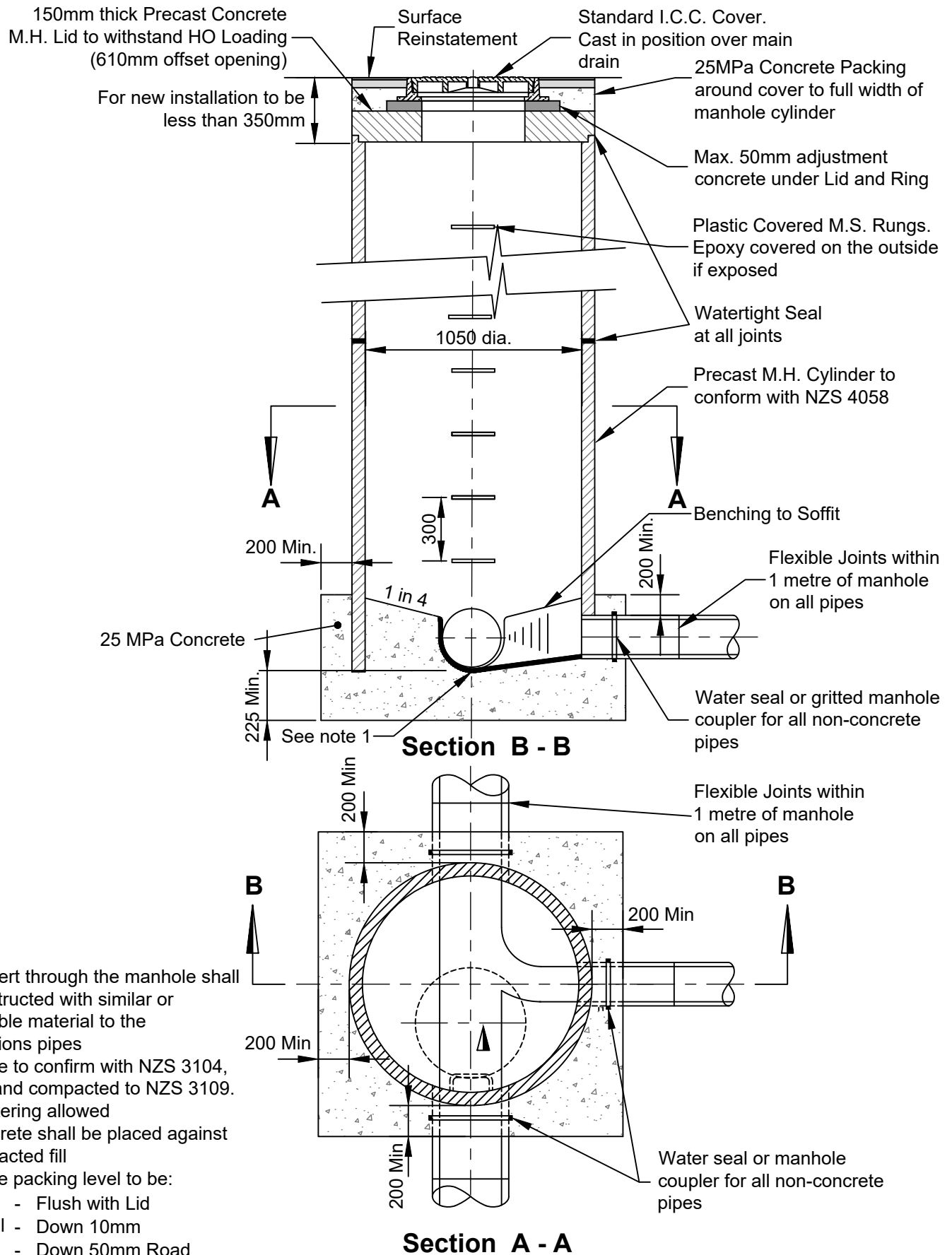


NOTES

- Pipe invert through the manhole shall be constructed with similar or compatible material to the connections pipes
- Concrete to confirm with NZS 3104, placed and compacted to NZS 3109. No plastering allowed
- No concrete shall be placed against uncompacted fill
- Concrete packing level to be:
 - Gass - Flush with Lid
 - Chipseal - Down 10mm
 - Asphalt - Down 50mm Road
 - Down 25mm Footpath
- Gas tight lid or similar on Foul Sewer Manhole



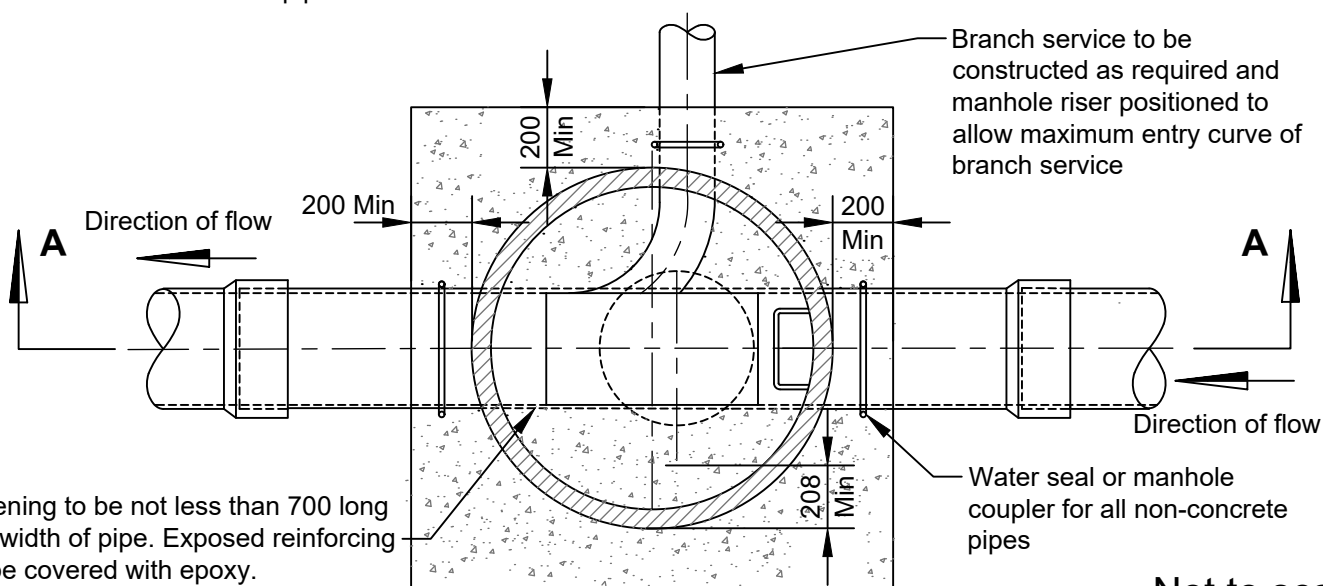
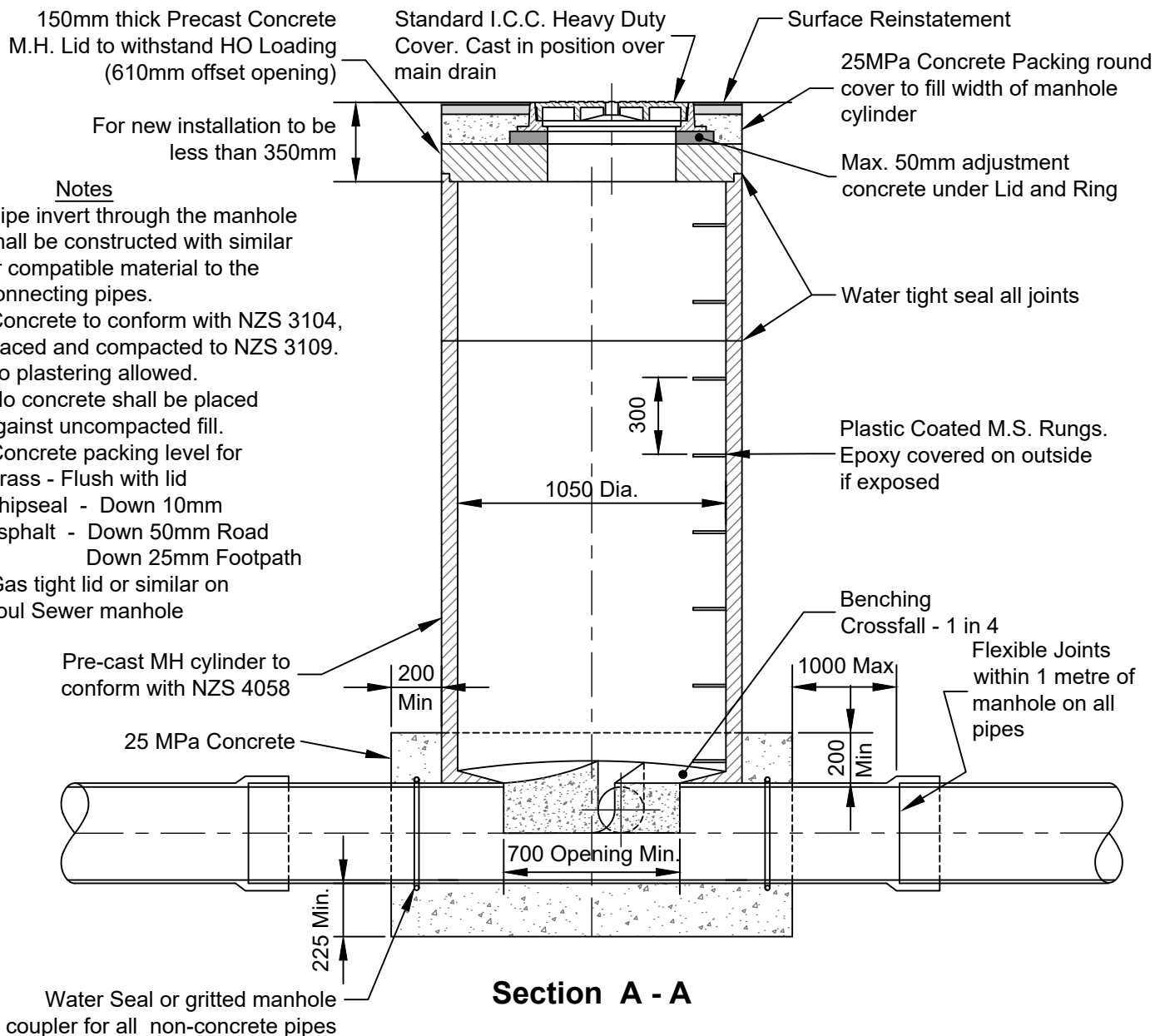
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NOTES

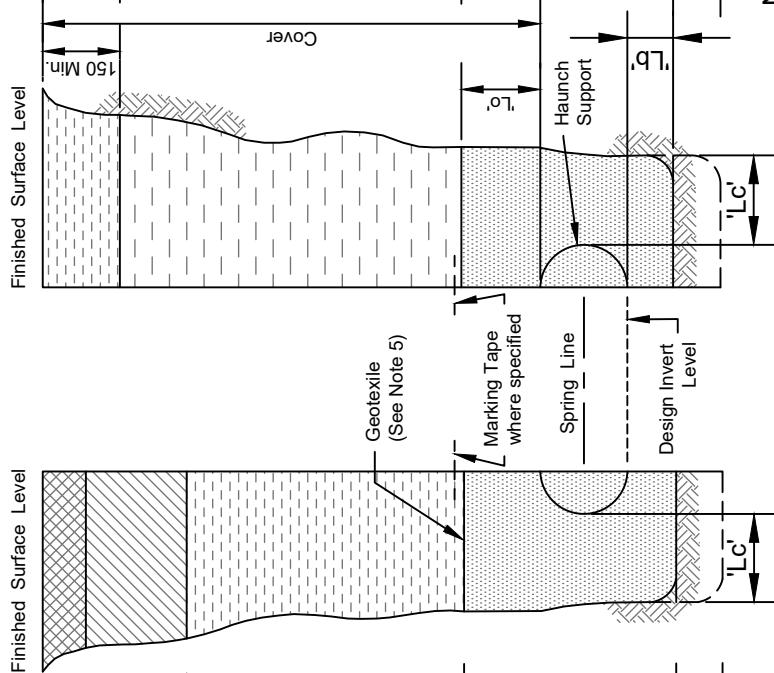
1. Pipe invert through the manhole shall be constructed with similar or compatible material to the connections pipes
2. Concrete to confirm with NZS 3104, placed and compacted to NZS 3109. No plastering allowed
3. No concrete shall be placed against uncompacted fill
4. Concrete packing level to be:
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

Not to scale



STANDARD EMBEDMENT & TRENCHFILL ARRANGEMENT

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	
Embedment material in accordance with design drawings and territorial authority (See Note 4)		Overlay
Bedding may be omitted if trench base is granular sand or gravel or suitable grading		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

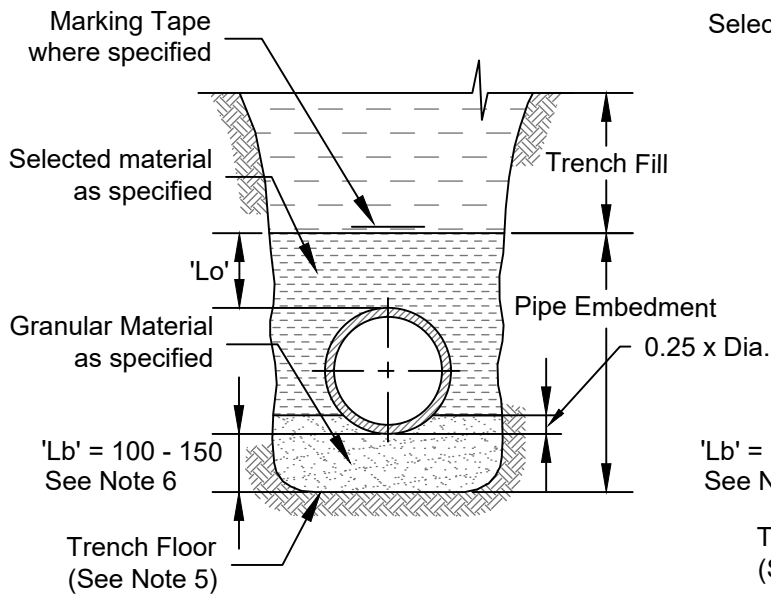
Includes locations where occasional vehicle loading occurs such as reserves and footways



PIPE JOINT BEDDING POCKETS

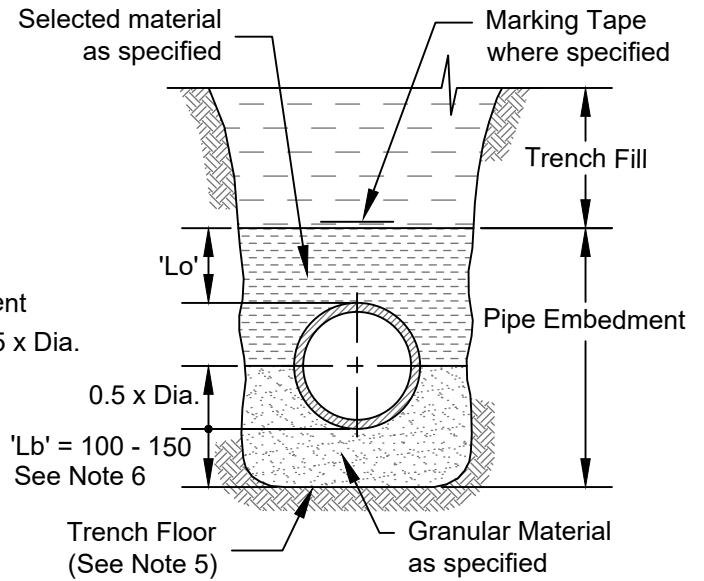
For joint projections (Sockets, flanges and so on)

Not to scale



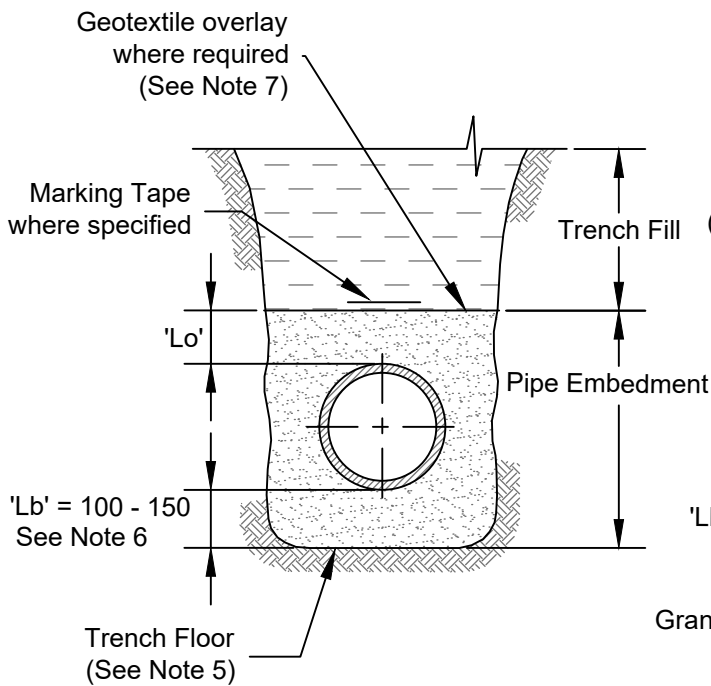
TYPE 2 SUPPORT

(See Note 9)



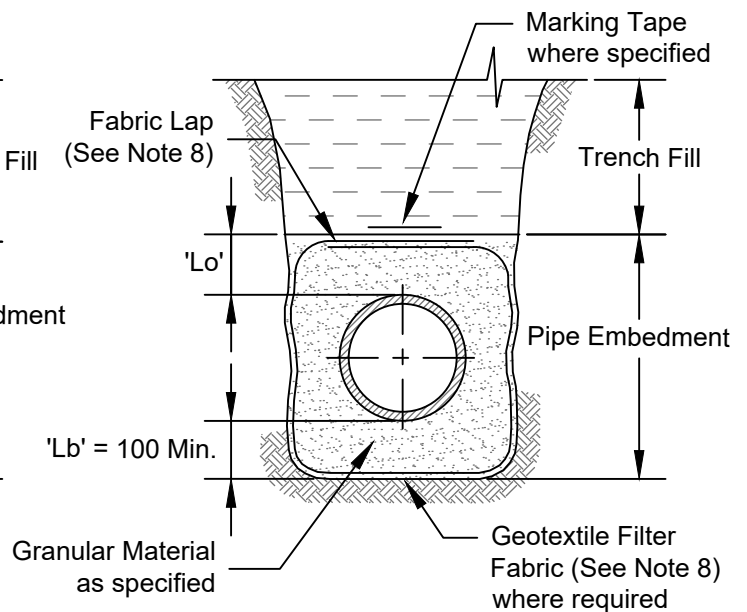
TYPE 2 SUPPORT

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



TYPE 3 SUPPORT

For Flexible and Rigid Pipes (See Note 3)



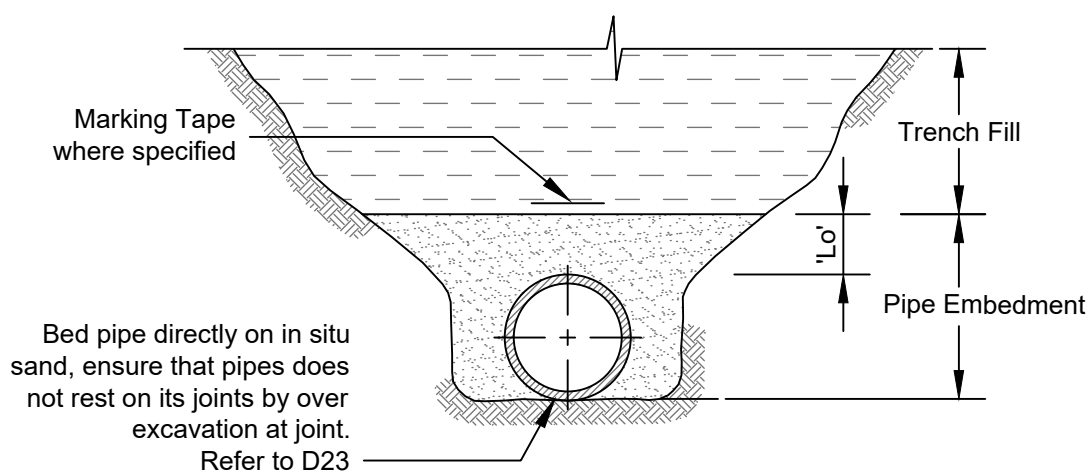
TYPE 4 SUPPORT

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

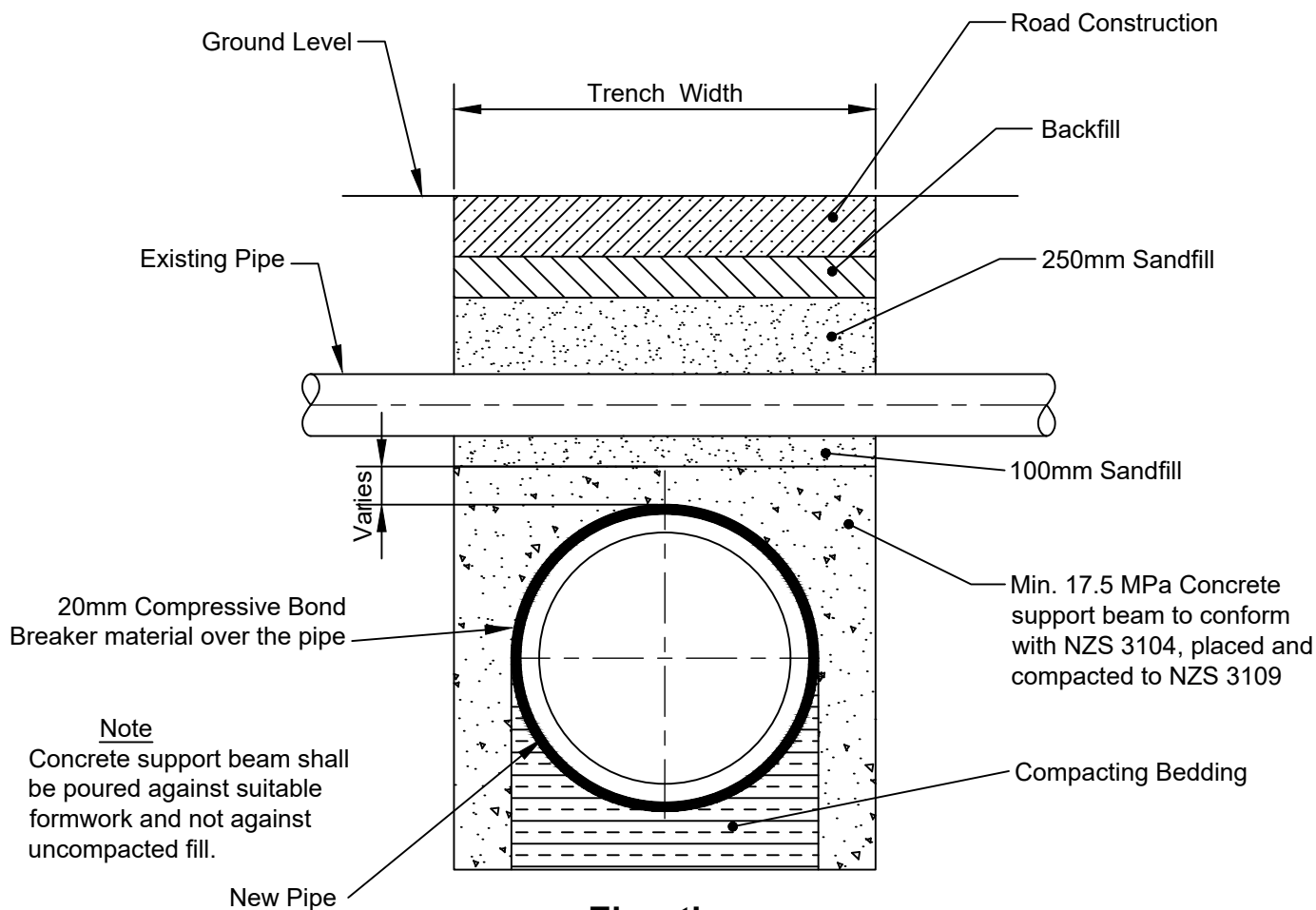


TRENCH IN SAND STRATA

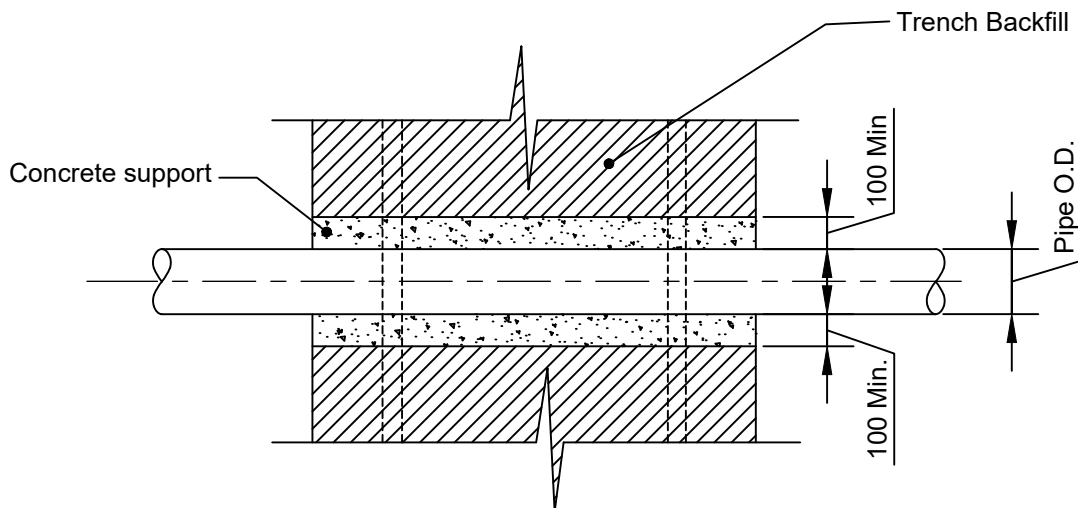
Note:

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.

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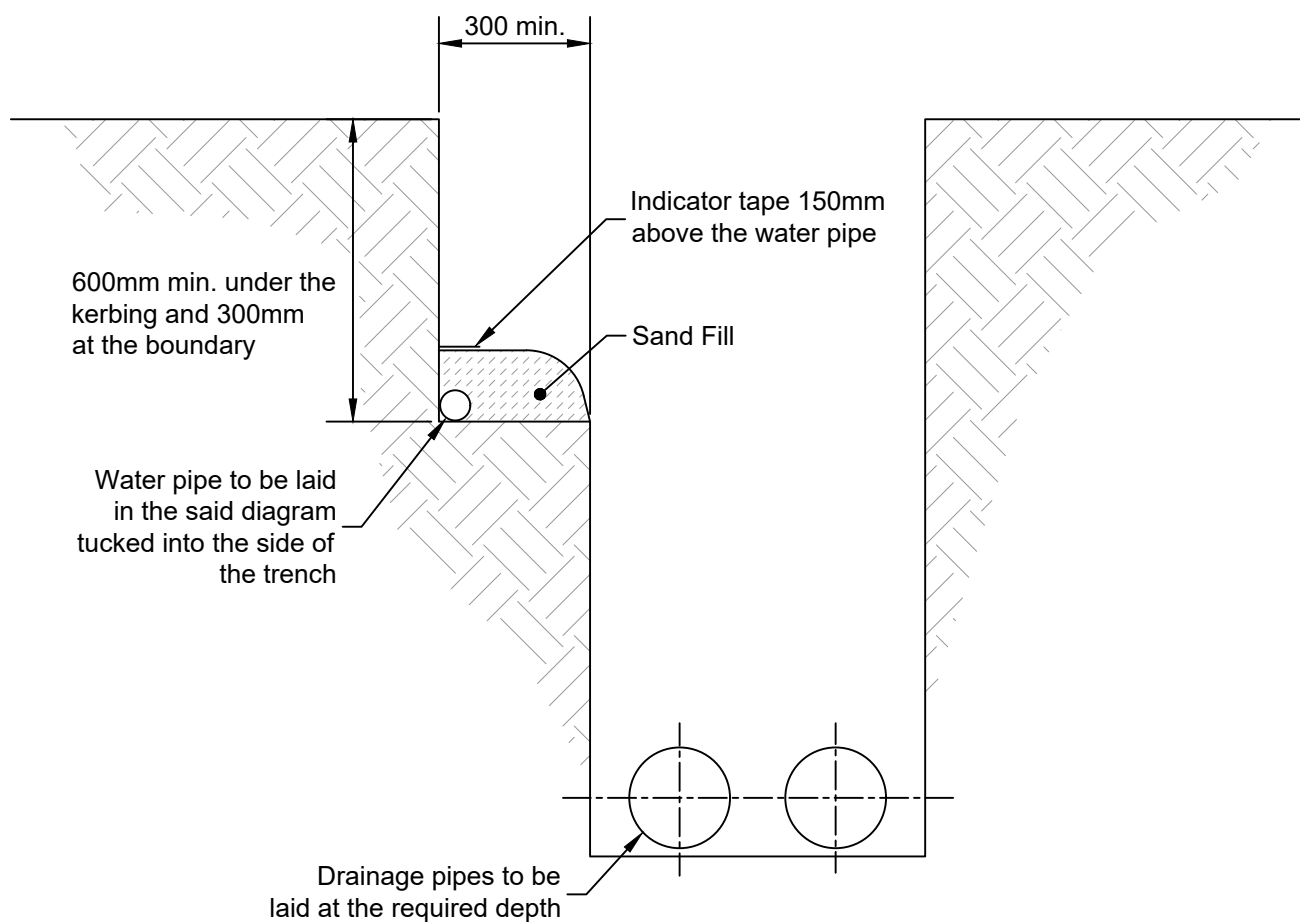


Elevation



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 gibbalt joints to allow fittings to be removed without interfering with anchor block.

Must be read in conjunction with D33

Not to scale

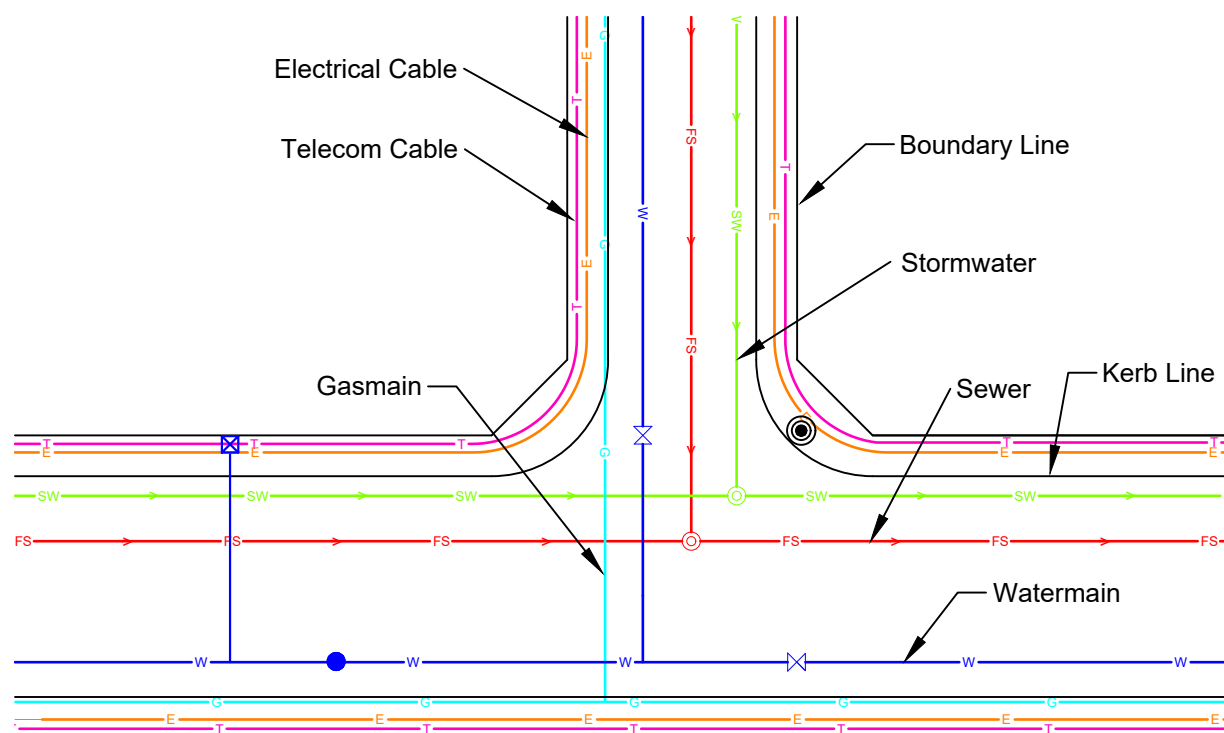


**FOUL SEWER PUMP LINES
TYPICAL DETAILS THRUST BLOCK**

INSTALLATION 'Y's, BENDS & TAPERS - TABLE

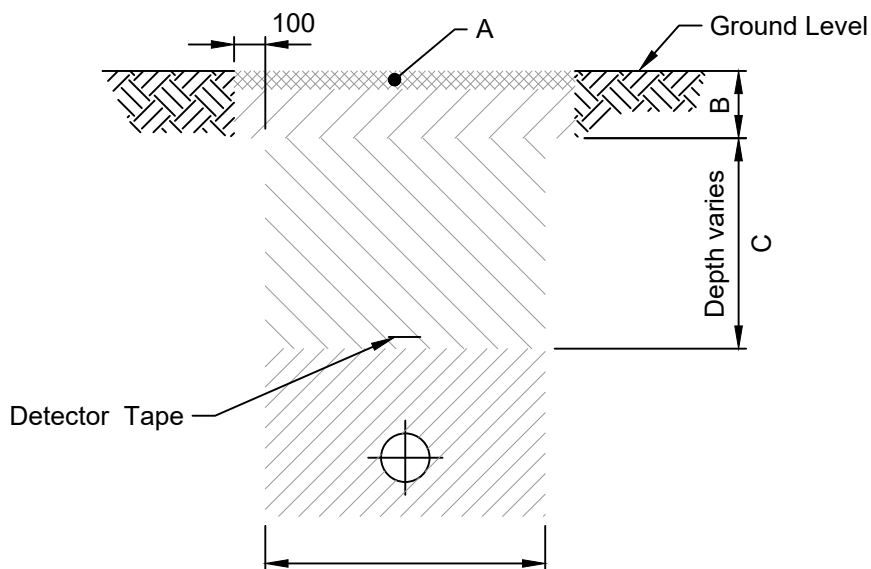


**Fig. D33A
Rev. 2
Date 03/23**



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