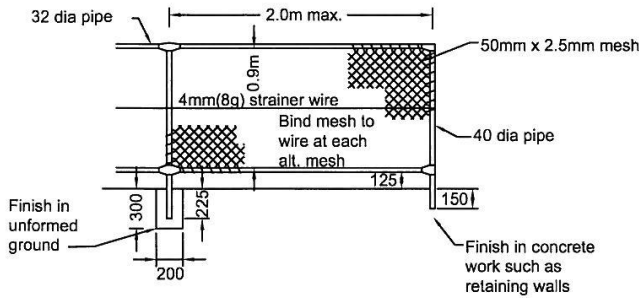


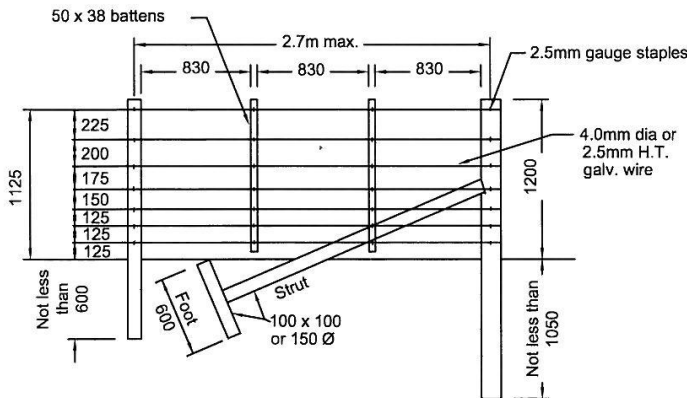
T:\\_020000\020239 KDC\04 Resource Consents\KDC Eng Standards 2009\_Final Eng Std 2009\Drawings\S22.dwg , Plotted By Anniversita P\lapi at 29/09/2009 8:57:36 a.m. Scale 1:46.82



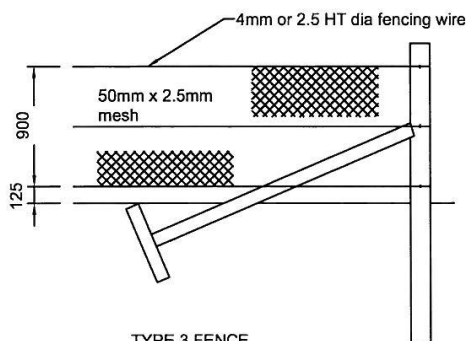
**TYPE 1 FENCE**  
WALKWAYS AND SIMILAR

**TYPE 4 FENCE**

1. To be used for fencing bush covenants and areas where stock proofing is essential.
2. Details are to conform with a Type 2 fence with the exception that:
  - a) Posts shall not be more than 5.0m apart.
  - b) Battens shall be approx. 800mm apart (i.e. 5 battens between posts)
3. Posts and hollow areas subject to lifting from wire strain are to be securely footed and/or stayed.
4. Bush covenant fencing shall only have one access gate which is to be securely wired closed in two positions each end.



**TYPE 2 FENCE**  
WALKWAYS AND SIMILAR



**TYPE 3 FENCE**  
WALKWAYS AND SIMILAR  
(Posts, struts, and footings as per Type 2 fence.)

**NOTES**

1. TYPE 2, 3 and 4 FENCES to have concrete or wooden posts and struts, securely rammed.
2. Timber posts shall be treated to H4 specification.
3. Timber posts and struts to be 100 x 100 or 150 dia min.
4. Timber strainer posts to be 150 x 150 or 250 dia min.
5. Mesh to be tied to railings and standards with galvanised binder wire as shown (Not bag ties)
6. Fittings to be "Kee Klamp" or similar pattern.
7. All pipes, wire, mesh and staples to be galvanised.
8. GENERAL:  
Safety fencing, safety railing, alternative fencing, cycle barriers, and walkway surfacing shall be subject to specific design and approval otherwise specified.

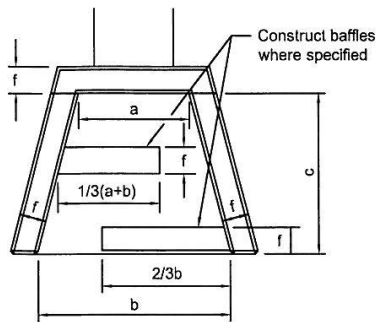
**FENCE TYPES**

No.	Revisions	Date
1	Designed	M WINCH 06/08
2	Approved	09/09
Drawing Status: IMPLEMENTATION		
Office Location: CPG, WHANGAREI		

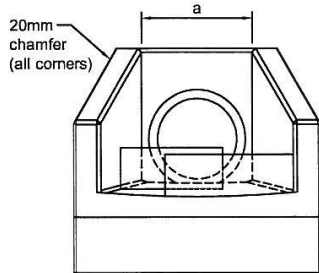


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ENGINEERING STANDARDS 2009

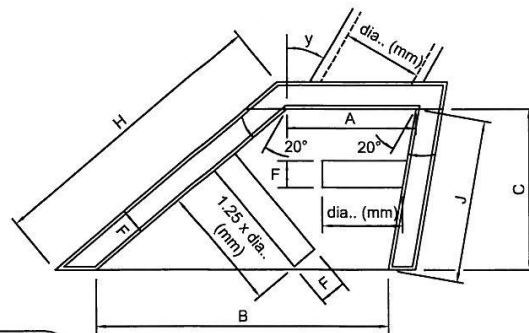
Drawing	<b>S23</b>
Revision	0
Scale	N.T.S.



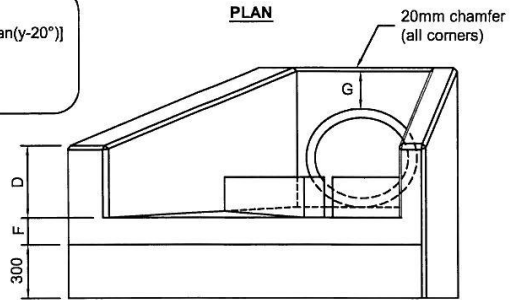
**PLAN**



**END ELEVATION**

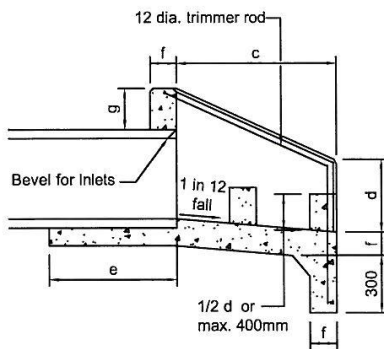


**PLAN**



**END ELEVATION**

- A Sec  $y \times (a)$
- B C Tan  $(y+20^\circ) + [A-C \text{ Tan}(y-20^\circ)]$
- H C x Sec  $(y + 20^\circ)$
- J C x Sec  $(y - 20^\circ)$



**SECTION**

PRINCIPAL DIMENSIONS (mm)							
DIA. OF PIPE	a	b	c	d	e	f	g
300	450	750	750	300	525	100	150
375	550	900	850	350	625	100	150
450	630	1100	900	400	725	150	230
525	700	1200	1000	450	825	150	230
600	800	1400	1100	550	900	150	230
750	1000	1700	1200	600	1050	150	300
900	1170	2000	1450	650	1225	150	300
1050	1380	2300	1700	750	1375	150	300
1200	1520	2600	2100	750	1550	150	450
1350	1680	2800	2400	750	1725	150	450

**NOTES**

- Reinforce floors & walls with:  
 150 - 375 665 mesh  
 450 - 600 663 mesh or D10 rods at 250 crs.  
 675 - 900 D12 rods at 250 crs.  
 1050 - 1350 D12 rods at 150 crs.
- All reinforcement shall be placed centrally in walls and floor, and shall be continuous between walls and floor.
- Laps in Structural grade bars to be 300mm min.
- There shall be at least 2 bars - whether mesh or M.S over the top of the pipe.
- Concrete is to be ordinary grade (17.5MPa) in accordance with NZS 3109.
- Baffles are to be constructed as shown when outlet velocities and soil conditions dictate, in extreme cases specific design may be required by the Council.
- Inlet structures shall have reverse apron fall and no baffles.

**INLET AND OUTLET STRUCTURES**

No.	Revision	Date
1	Designed	M WINCH 08/08
2	Approved	09/09
Drawing Status IMPLEMENTATION		
Office Location CPG, WHANGAREI		



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Drawing	<b>S24</b>
Revision	0
Scale	N.T.S.

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**CONCRETE PIPES**  
(SUITABLE FOR ALL SITUATIONS)

PIPE SIZE (mm)	CLASS	MIN. COVER (mm)	MAX. COVER (m)
225	3 (Y)	300	3.0
	2 (X)	500	2.4
300	4 (Z)	300	-
	3 (Y)	400	3.0
	2 (X)	700	2.0
375	4 (Z)	300	-
	3 (Y)	400	3.0
450	2 (X)	700	1.8
	4 (Z)	300	-
525	3 (Y)	400	3.0
	2 (X)	700	1.8
600	4 (Z)	300	-
	3 (Y)	400	3.0
750	2 (X)	500	2.0
	3 (Y)	300	3.0
900	2 (X)	300	2.0
	3 (Y)	-	3.0
1050	2 (X)	300	2.0
	3 (Y)	-	3.0
1200	2 (X)	300	2.0

Note: Information obtained from Concrete Pipe Association of Australasia

**ALUMINIUM PIPES**  
(ENTRANCE CROSSINGS - PRIVATE ROAD CULVERTS ONLY)

PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
300	300	3.0
375	300	
450	300	
600	300	
750	375	
900	450	
1050	525	
1200	600	

Note: Information obtained from C.S.P Pacific

**uPVC PIPES** (ENTRANCE CROSSINGS - PRIVATE ROAD CULVERTS ONLY)

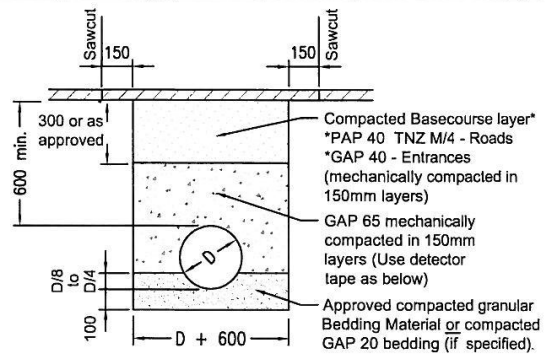
PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
225 - 475	300	3.0

Note: Information obtained from IPLEX.

**ALI-TUFF PIPES** (1.6mm Gauge)

PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
300 - 1200	600	Manufacturers Specification

Note: Information obtained from Richardson Pacific (NZ) Ltd.



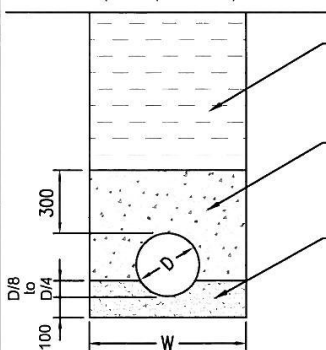
**ADDITIONAL BACKFILL REQUIREMENTS UNDER CARRIAGEWAYS**

All types of pipe except concrete (refer to concrete pipe chart)

**BEDDING MATERIAL**

Crushed aggregate with the following requirements:  
 Crushing resistance 110KN  
 Weathering resistance: AA, AB, AC, BA, BB, CA, CB  
 Clay index: B  
 Sand equivalent: 15  
 Grading: Sieve Size (mm) 19.0 2.36 0.60 0.30 0.15 0.075  
 % Mass Passing 100 100-50 90-20 60-10 25-0 10-0

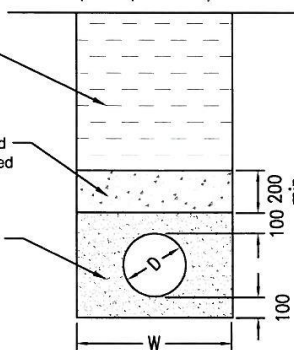
Reinstate to previous surface (where practicable)



**ALUMINIUM, CONCRETE GALVANISED STEEL OR VITRIFIED CLAY PIPE**

(Where specifically approved)

Reinstate to previous surface (where practicable)



**PVC & PE PIPE**

(PVC not approved for water supply)  
 PE pipe bedding aggregate shall not exceed 5% of the Nominal pipe dia.

W	TYPE OF PIPE
D + 600	Aluminium
D + 600	Galvanised Steel
D + 450	Concrete
D + 450	Vitrified Clay
D + 400	uPVC & PE

Variations in W require additional design compensation.

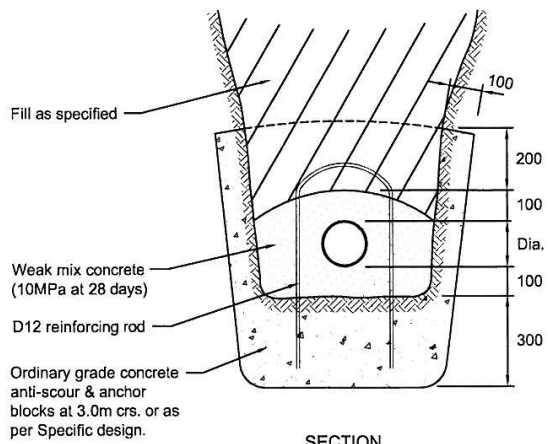
**NOTES**

- Concrete pipes to be RCRRJ "Class X" (or stronger) installed to Manufacturers requirements.
- Aluminium pipes to be "Aluflor" or "Highflo" type design (or similar).
- Ordinary backfill shall be free from stones or rocks greater than 150mm nominal diameter & compacted in 300mm layers.
- Replace topsoil to original depth as necessary.
- Existing sealed roadway excavations are to be resurfaced with 50mm of asphaltic concrete.
- Privateway basecourse metalling within pipe trenches may be in accordance with the Privateway Standards.
- Unsatisfactory trench material is to be undercut and replaced with compacted hardfill.  
 In poor soils such as swamp/peat material and in rock the minimum depth of granular bedding material below the invert is to be 200mm or Specific design as necessary.
- Trench width shall not exceed W at the pipe crown level.
- Pipelines at 1:8 gradient or steeper shall have cement stabilised bedding and/or surrounds.
- Pipelines at 1:3 gradient or steeper shall have 'weak mix' concrete bedding (10MPa). Large pipes will require Specific pipe design.
- Concrete bedding shall be allowed to cure for 48 hours prior to backfilling.
- Backfilling under carriageways may be with 'flowable fill' (low strength fly-ash concrete).
- Granular bedding is to satisfy N.Z.S 7643 - Appendix B.
- Minimum cover over pipes (unless specifically designed or protected in accordance with KDC S26), to the highest point or bell, of the outside of the pipe (or collar) in any area shall be :  
 a) 300mm - if not subjected to traffic loading  
 b) Ref. to above charts - under carriageways and trafficked areas.

**CULVERT, BEDDING AND BACKFILL DETAILS**

ORIGINAL SIZE mm A4		KAIPARA DISTRICT COUNCIL ENGINEERING STANDARDS 2009	Drawing <b>S25</b>
	No. Revisions: _____ Date: _____ Designed: M WINCH 08/08 Approved: 09/09		Revision 0
	Drawing Status: IMPLEMENTATION Office Location: CPG, WHANGAREI		Scale: N.T.S.
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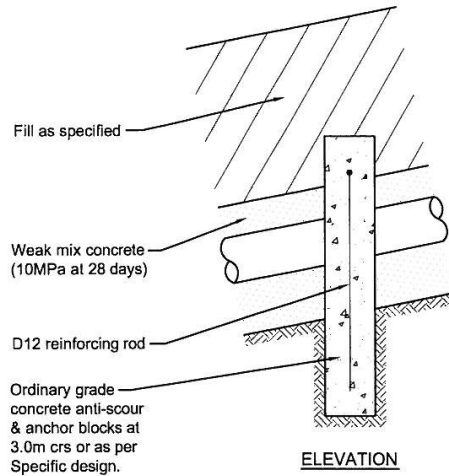
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**SECTION**

**STEEP PIPE DETAILS**

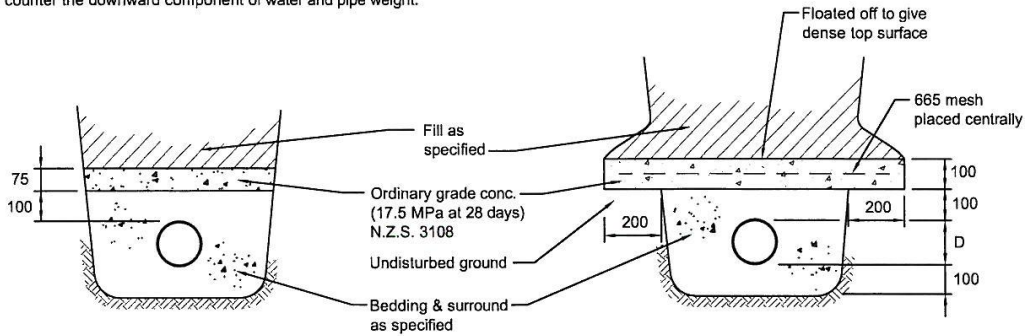
(For pipeline gradients 1:3 or steeper)



**ELEVATION**

**NOTES**

- 1) Some variation is possible using aluminium plate cut off walls bolted to larger diameter pipes.
- 2) Larger diameter pipes will require Specific pier design to counter the downward component of water and pipe weight.

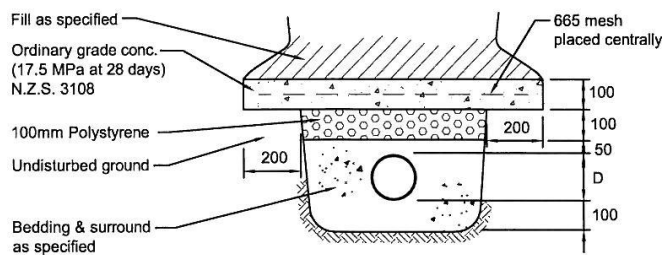


**UNREINFORCED CONCRETE  
 SLAB PROTECTION**

**REINFORCED CONCRETE  
 SLAB PROTECTION  
 (Where additional loading or  
 other requirements necessitate)**

**GENERAL NOTES**

1. Weak mix concrete:  
 - 1 part cement to 6 parts aggregate.
2. Cement stabilised bedding and back fill:  
 - 1 part cement to 20 parts aggregate.
3. Allow 48 hours curing prior to back-filling for any concrete or stabilised material.



**REINFORCED CONCRETE SLAB PROTECTION  
 FOR WATER PIPELINES**

**PIPE PROTECTION AND BULKHEAD DETAILS**

100  
75  
100  
50  
30  
10  
0  
ORIGINAL SIZE mm  
A4

No.	Revisions	Date
Designed	M WINCH	06/08
Approved		09/09
Drawing Status	IMPLEMENTATION	
Office Location	CPG, WHANGAREI	

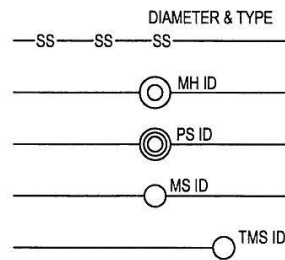


KAIPARA DISTRICT COUNCIL  
 ENGINEERING STANDARDS 2009

Drawing	S26
Revision	0
Scale	N.T.S.

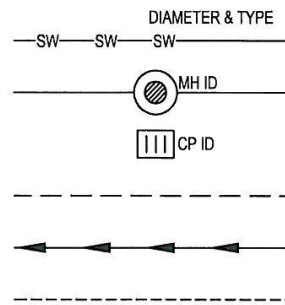
Sewer Reticulation

- Sewer Lines
- Sewer Manholes
- Pump Station
- Maintenance Shaft
- Terminal Maintenance Shaft



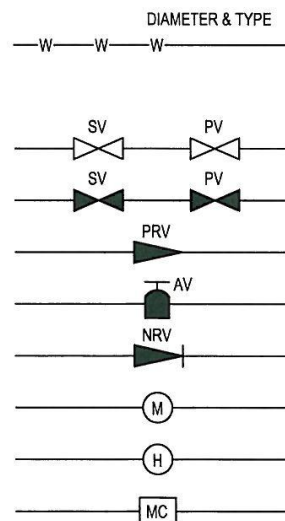
Stormwater Reticulation

- Stormwater Lines
- Stormwater Manholes
- Cesspit / Sump
- Subsoil Drain
- Watercourse
- Limit of Catchment Area



Water Reticulation

- Water Lines
- Sluice & Peet Valve
  - Normally open
  - Normally closed
- Pressure Reducing Valve
- Air Valve
- Non-Return Valve
- Bulk Meter
- Hydrant
- Multi Chamber



ORIGINAL SIZE mm  
 100  
 75  
 50  
 25  
 0

STANDARD SYMBOLS

No.	Revisions	Date
1	Designed M WHINGH	08/08
2	Approved	09/09
Drawing Status IMPLEMENTATION		
Office Location CPG, WHANGAREI		

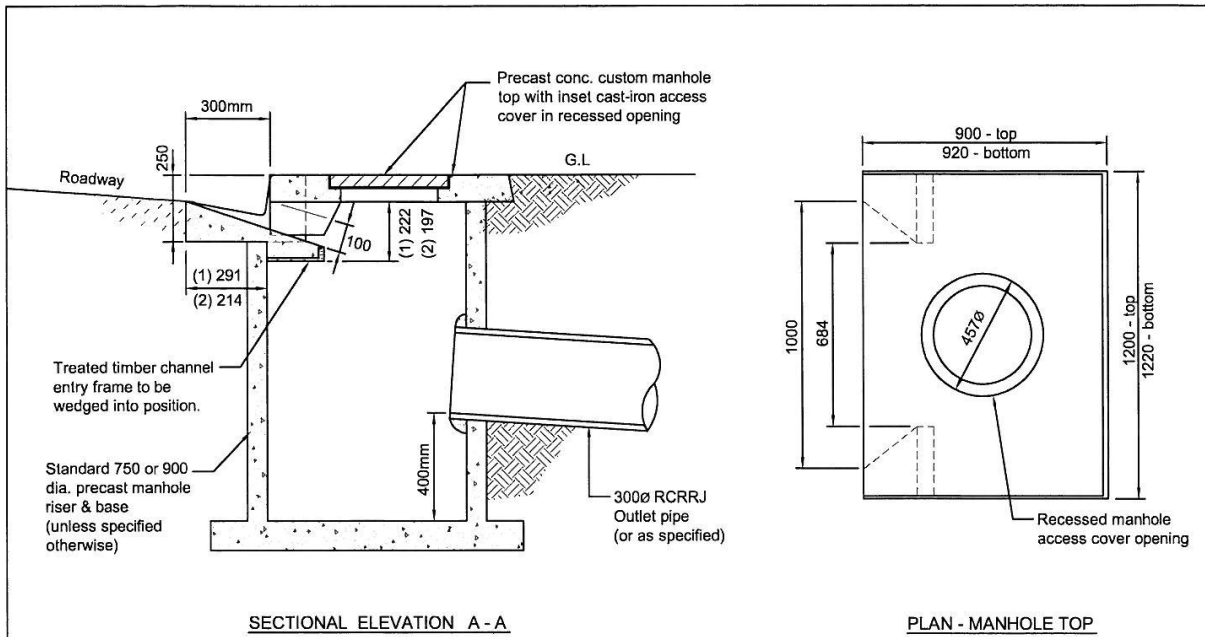


KAIPARA DISTRICT COUNCIL  
 ENGINEERING STANDARDS 2009

Drawing	<b>S27</b>
Revision	0
Scale	N.T.S.

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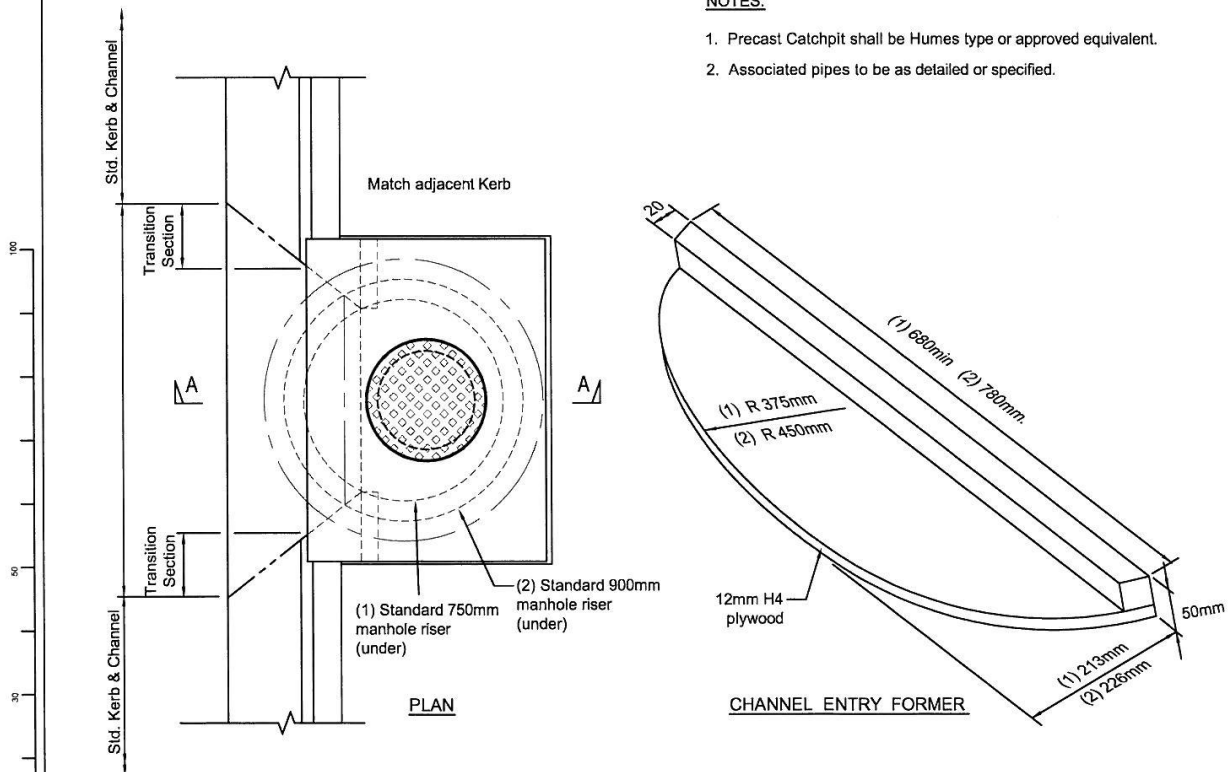


SECTIONAL ELEVATION A - A

PLAN - MANHOLE TOP

**NOTES:**

1. Precast Catchpit shall be Humes type or approved equivalent.
2. Associated pipes to be as detailed or specified.



PLAN

CHANNEL ENTRY FORMER

CATCH PITS

ORIGINAL SIZE mm  
 A4

No. Revisions	Date
Designed	M WINCH 08/08
Approved	08/09
Drawing Status	IMPLEMENTATION
Office Location	CPG, WHANGAREI

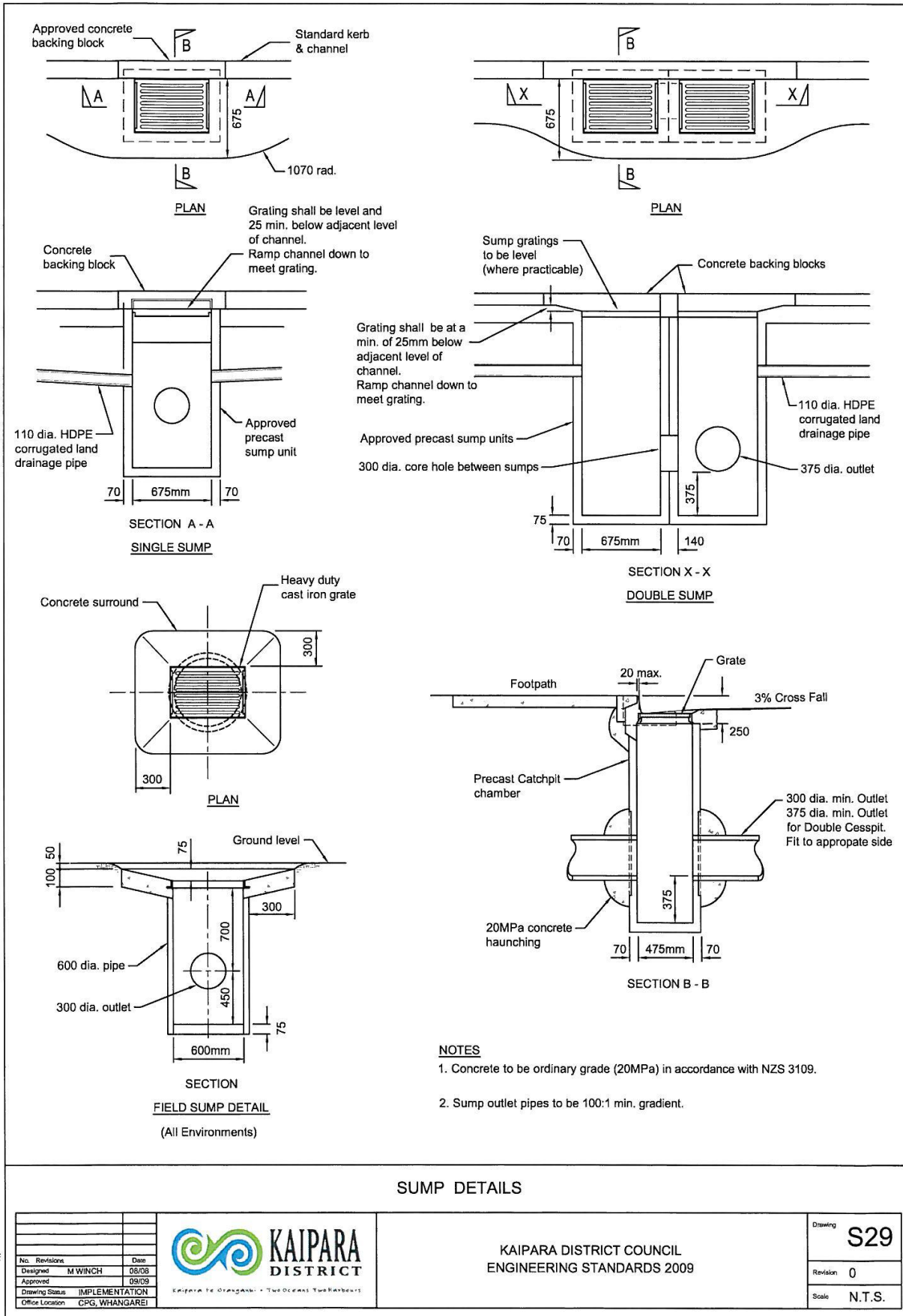


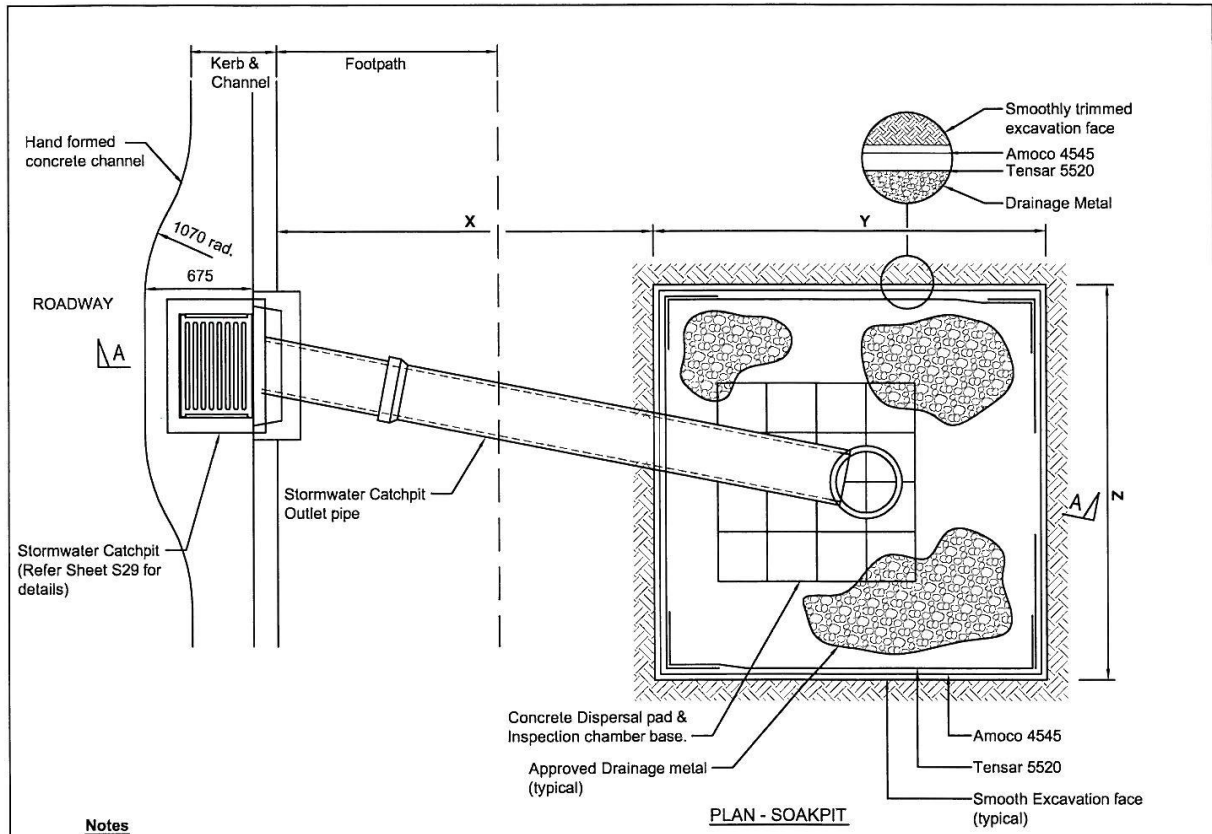
KAIPARA DISTRICT COUNCIL  
 ENGINEERING STANDARDS 2009

Drawing	S28
Revision	0
Scale	N.T.S.

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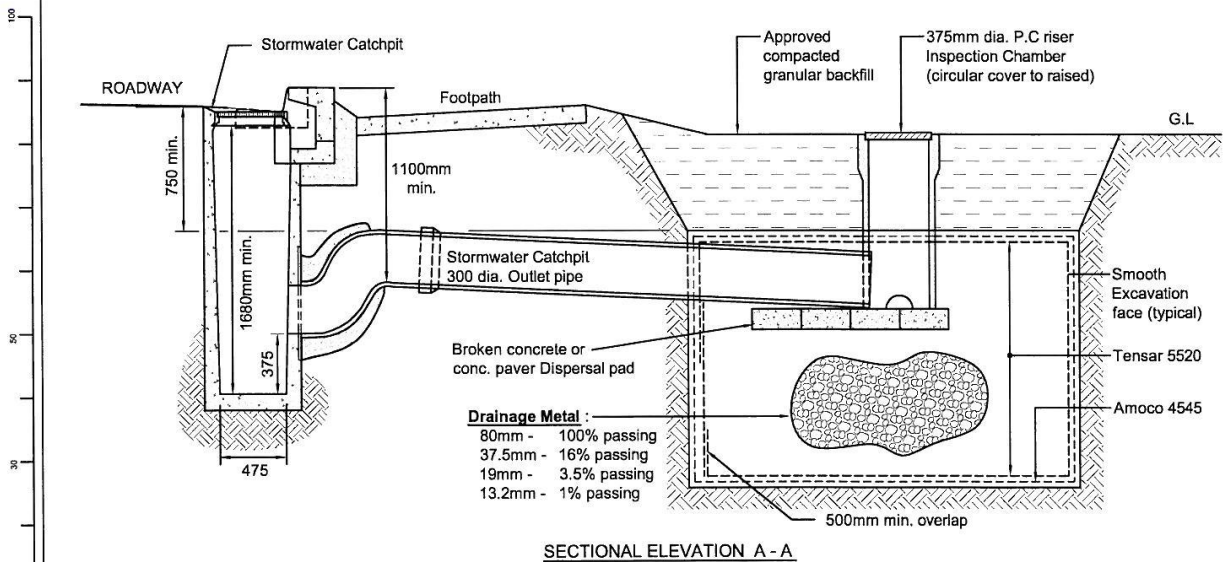






**Notes**

1. "X, Y, Z" Dimensions to be determined by Council Engineer.
2. Alternative Soakpit designs allowed but are subject to Council Engineer's approval.
3. Concrete to be ordinary grade (20MPa) in accordance with NZS 3109.
4. Half syphon sump outlet pipes to be 1:100 min. gradient.



**STORMWATER SOAKPIT**

ORIGINAL SIZE mm  
A4

No.	Revisions	Date
1	Designed	08/08
2	Approved	09/09
Drawing Status: IMPLEMENTATION		
Office Location: CPG, WHANGAREI		



KAIPARA DISTRICT COUNCIL  
ENGINEERING STANDARDS 2009

Drawing	<b>S30</b>
Revision	0
Scale	N.T.S.

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