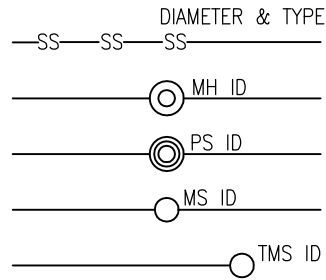


APPENDIX A – DRAWINGS

SHEET 1	STANDARD DRAWING SYMBOLS
SHEET 2	RURAL PRIVATEWAY CROSS SECTIONS
SHEET 2A	FURTHER NOTES TO RURAL PRIVATEWAY CROSS SECTIONS
SHEET 3	RURAL VEHICLE ENTRANCE CROSSING DETAILS
SHEET 3A	FURTHER NOTES TO RURAL VEHICLE ENTRANCE CROSSING DETAILS
SHEET 4	URBAN PRIVATEWAY CROSS SECTIONS
SHEET 4A	FURTHER NOTES TO URBAN PRIVATEWAY CROSS SECTIONS
SHEET 5	STANDARD STREET SIGNS
SHEET 6	STREET SIGNS – PRIVATE ROW, ACCESS LOT, COMMON AREA OR PRIVATE ROAD
SHEET 7	RESIDENTIAL AND COMMERCIAL AREA VEHICLE CROSSING DETAILS
SHEET 8	RURAL ROAD CROSS SECTIONS
SHEET 9	URBAN ROAD CROSS SECTIONS
SHEET 10	CUL DE SAC TURNING DETAILS
SHEET 11	RECOMMENDED SERVICE LOCATIONS
SHEET 11A	FURTHER NOTES TO RECOMMENDED SERVICE LOCATIONS
SHEET 12	KERB AND CHANNEL DETAILS
SHEET 13	TYPICAL KERB AND SUBSOIL DRAIN DETAILS
SHEET 14	PRAM CROSSING DETAILS
SHEET 15	TRAFFIC SIGHT LINES FOR NON-SIGNALISED INTERSECTIONS
SHEET 16	SCALA PENETROMETER CHART
SHEET 17	DESIGN CHART FOR FLEXIBLE PAVEMENTS
SHEET 18	PIPE BEDDING AND BACKFILL
SHEET 19	PIPE PROTECTION AND BULKHEADS
SHEET 20	INLET AND OUTLET STRUCTURES
SHEET 21	LAMPHOLES, STORMWATER AND SEWER CONNECTIONS
SHEET 22	SUMP DETAILS
SHEET 23	STANDARD PRECAST MANHOLES
SHEET 24	SEWER MAINTENANCE SHAFT DETAILS
SHEET 25	SATELLITE MANHOLE DETAIL
SHEET 26	SEWER PUMP STATION TYPICAL DETAILS
SHEET 27	SEWER PUMP STATION METAL WORK DETAILS
SHEET 28	RPZ WATER CONNECTION
SHEET 29	WATER PIPELINE DETAILS
SHEET 30	MULTIPLE WATER CONNECTIONS & BACKFLOW PREVENTERS
SHEET 31	SINGLE METER BOX CONNECTION
SHEET 32	ANCHOR BLOCK AND VALVE INSTALLATION DETAILS
SHEET 33	ANCHOR BLOCK DIMENSIONS
SHEET 34	AIR VALVE DETAILS
SHEET 35	VALVE AND HYDRANT MARKERS
SHEET 36	MAGFLOW AND PRESSURE REDUCING VALVE INSTALLATION
SHEET 37	WATER SUPPLY PUMP STATION DETAILS
SHEET 38	FENCE TYPES

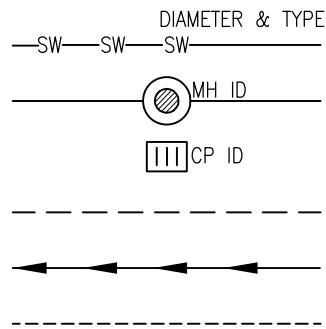
Sewer Reticulation

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



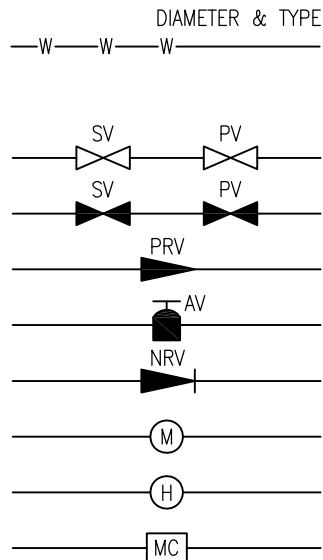
Stormwater Reticulation

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



Water Reticulation

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



STANDARD SYMBOLS



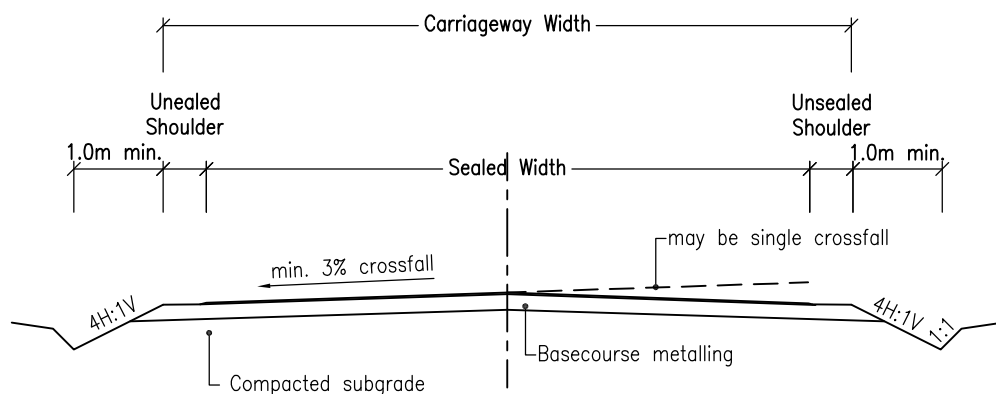
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

1



TYPICAL MINIMUM RURAL PRIVATEWAY CROSS SECTION N.T.S.

Class	Area Served / Traffic Volumes	Min. Road Reserve Width	Carriageway		
			Unsealed Shoulder	Sealed Width	Carriageway Width
PRIVATEWAY					
Rural Privateways	2 lots	4	2 x 0.25	3	3.5
	3 – 5 lots	6	2 x 0.25	4	4.5
	6 – 8 lots	10	2 x 0.25	5.5	6

Width Requirements – Rural Privateways

NOTES:

1. The standards above are the minimum permitted. Widths may need to be increased to provide for services, berms, batters, drainage, landscaping etc. Where there is potential for further development, the Road Reserve shall be increased in width to allow for this.
2. Privateways fronting a collector road or larger shall have a minimum sealed width of 5.0 m (with a corresponding increase in legal width) for a minimum of 6 m from the boundary to allow easy entry and exit to the road.
3. The maximum gradient shall be:
 - 12.5% for the first 5 m from the boundary
 - Remainder 20%.
 The minimum crossfall shall be 3%.
4. Corner splays for Privateways shall be a minimum of 3 m at intersections.
5. Where a private accessway is gated, the gates shall be located far enough from the road and provided with turning provisions, such that a 90th percentile car may enter the accessway and turn around, without passing the gates or affecting through traffic.
6. On Privateways less than 4.5 m in width, passing bays with a width of 6.0 m shall be provided at no more than 50 m spacing, subject to adequate visibility.
7. Where a private accessway contains:
 - a public water main (as approved by the Water Services Manager – See Section 6.8.1), or
 - a public sewer gravity main or rising main,
 the accessway width shall be sufficient to allow maintenance access for these service mains clear of other services, using minimum clearances required by Table 6.6.
 Adequate turning and parking areas for fire appliances and maintenance vehicles shall be provided in the vicinity of the pump station or hydrant and the access designed to take heavy vehicles.

Further notes refer to sheet 2a

RURAL PRIVATEWAY CROSS SECTION



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **2**

NOTES:

8. Pavements may be:
 - 30 MPa concrete, 125 mm thick with 665 mesh on 100mm compacted basecourse, or
 - Flexible surfacing (chip seal or asphaltic concrete). Provided tests demonstrate the subgrade CBR is a minimum of 7, the formation may consist of:
 - Sub-base – 150 mm thickness of GAP 65
 - Basecourse – 100 mm GAP 40
 - Sealed surface.
 - Where the subgrade CBR is less than 7, the pavement shall be specifically designed by a suitably qualified and experienced Engineer.Chip seal shall not be used for accessways steeper than 12.5%, or for turning areas.
9. For flexible pavements, the Clegg Impact Value on completion of pavement preparation, prior to sealing, shall be a minimum of 40.
10. Where unsealed accesses are approved, the minimum crossfall shall be 4%, and the maximum gradient shall be 12.5%. Construction shall be as for flexible surfaced roads, with the addition of a running course.
11. Road drainage shall be provided by the use of side drains, dished channels or kerb and channel (with subsoil drains). On steep gradients where scouring is likely, open water tables shall be lined with concrete (see details of Concrete Dish Channels, sheet 12). Specific provision shall be made to control velocity, particularly prior to a discharge. The drainage system shall ensure that stormwater from the access does not concentrate onto any lot.

Further notes refer to sheet 2

RURAL PRIVATEWAY CROSS SECTION



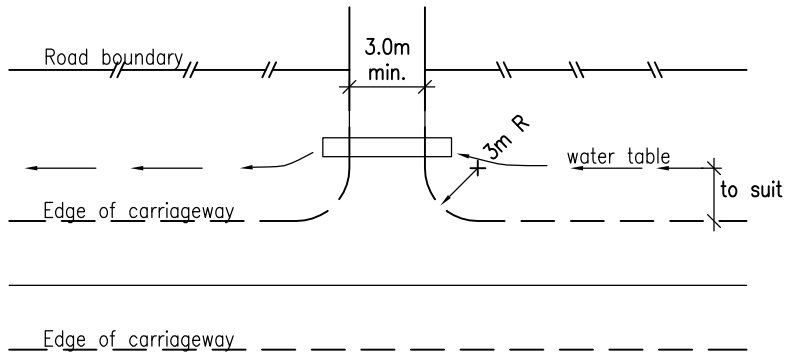
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

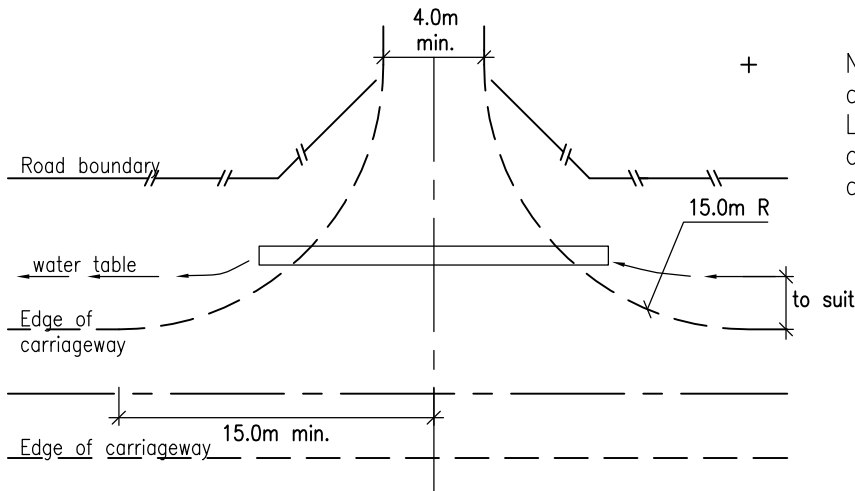
SHEET No.

2a



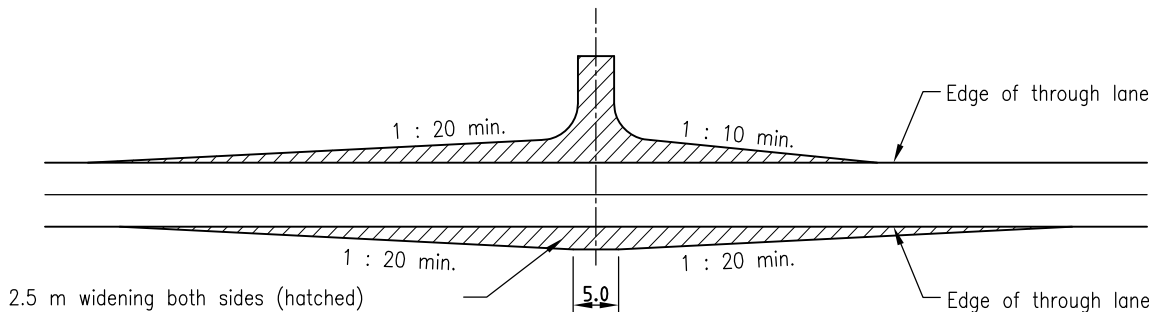
For All Environments – excluding heavy vehicle crossings.
 N.B. Living 1 and 2, and Business Environments to be sealed or concrete to boundary.

PLAN – LIGHT VEHICLES N.T.S.

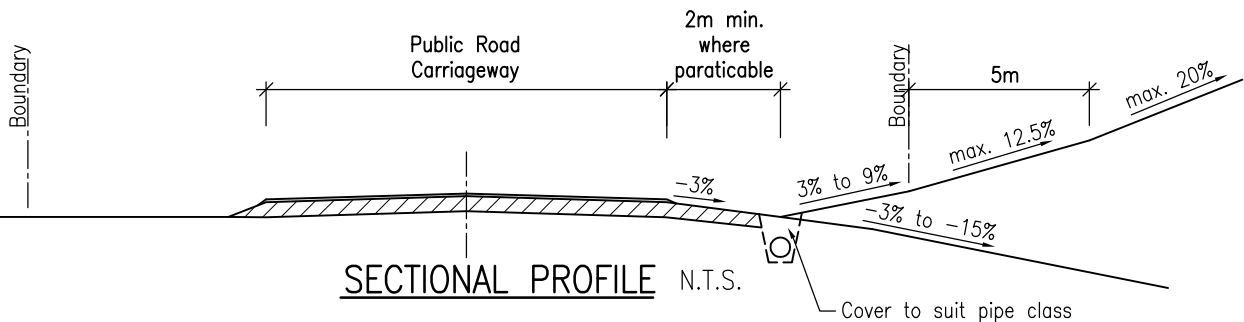


N.B. To be sealed or concrete if approved in Living and Business Environments, or specific discretionary approvals.

PLAN – HEAVY VEHICLE CROSSINGS TYPE 1 N.T.S.



PLAN – CROSSING AND DRAINAGE TYPE 2 N.T.S.



SECTIONAL PROFILE N.T.S.

Further notes refer to sheet 3a

RURAL VEHICLE ENTRANCE CROSSING



WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

3

NOTES:

1. Pipes are to comply with the relevant N.Z. Standards and the manufacturers recommendations.
2. Pipes are to be adequate for the upstream catchment, but not less than 300mm dia. Pipe cover shall be appropriate to the pipe class.
3. Provide concrete or stonework headwalls and/or concrete aprons. Pipe ends are to be bevelled
4. Gateways shall be located to allow vehicle parking clear of the road shoulder.
5. Minimum sight distance requirements for entrance crossings are to comply with sheet 15.
6. Check underground services with relevant authorities before excavation.
7. Crossings steeper than 12.5% (1 in 8) adjoining sealed public roads or any accessway where metal migrates onto the sealed carriageway are to be sealed or concrete, to the property boundary.
8. Concrete accessways shall start at least 0.5m outside of the existing edge of seal or 0.5m outside of the carriageway width required by the standard whichever is the further.
9. Concrete entrance crossings are to be 110mm of 30MPa concrete for light vehicle access. Heavy vehicle crossings shall be 150mm thick of 30MPa concrete reinforced with 665 mesh unless specifically designed.
10. Superfluous entrance crossings along the property road frontage are to be removed and the site reinstated similar to the immediate surrounding.

Further notes refer to sheet 3.

RURAL VEHICLE ENTRANCE CROSSING



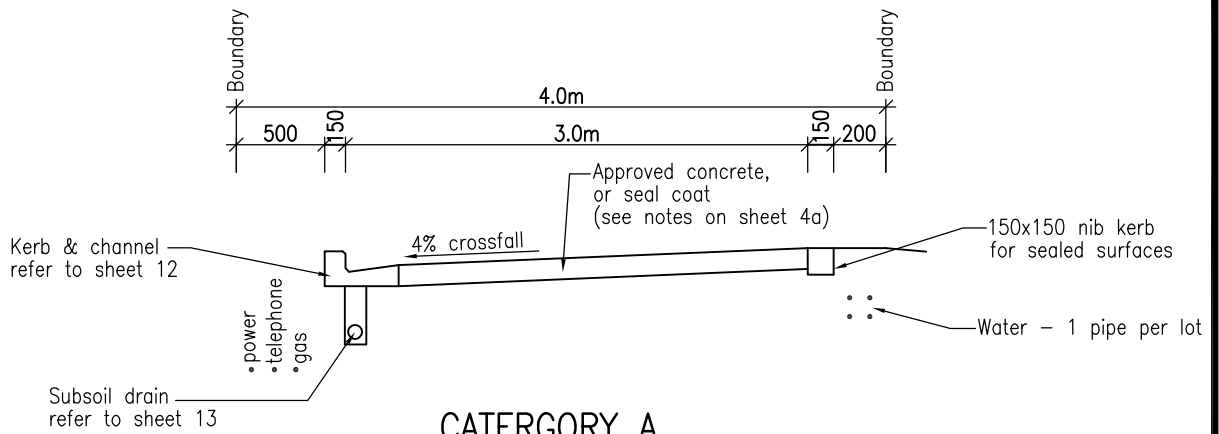
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

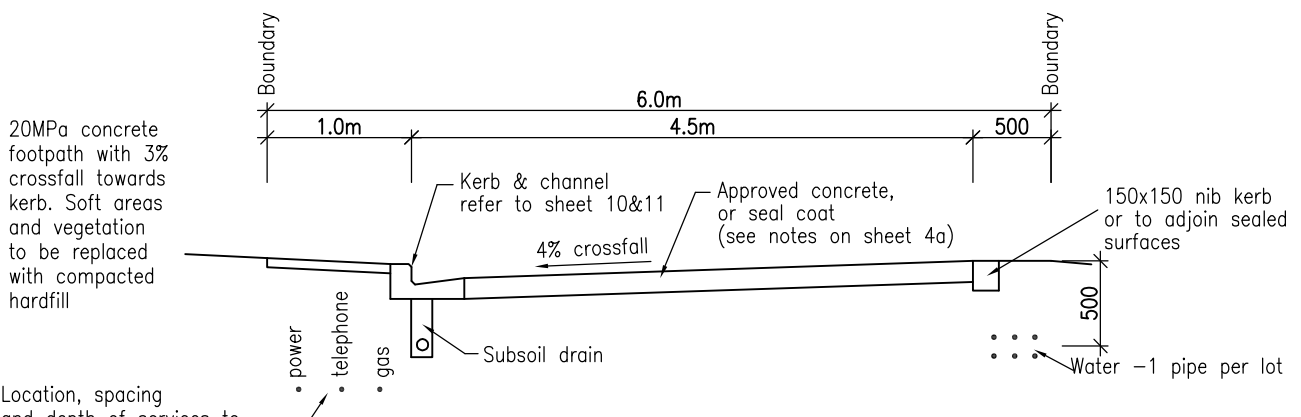
Revision:

SHEET No.

3a



CATEGORY A
ACCESS FOR UP TO 4 DWELLING UNITS N.T.S.



Location, spacing and depth of services to be to the requirements of the relevant controlling authority. Refer to sheet 11.

CATEGORY B
ACCESS FOR 5 to 8 DWELLING UNITS N.T.S.

Class	Area Served / Traffic Volumes	Min. Road Reserve Width	Carriageway		Footpath
			Traffic	Total	
PRIVATEWAY					
Urban (Living 1 & 2 Environments)	1 – 4 lots Category A	4	1 x 3.0	3	–
	5 – 8 lots Category B	6	1 x 4.5	4.5	1

Width Requirements – Urban Privateways

Refer to notes on sheet 4a.

URBAN PRIVATEWAY CROSS SECTIONS

FOR LIVING 1 AND 2, AND ALL BUSINESS ENVIRONMENTS
 Open space Environments adopt standards applying to the surrounding Environment, or if there is more than one Environment contiguous to the site, then more stringent standard applies.



WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

4

NOTES:

1. The standards above are the minimum permitted. Widths may need to be increased to provide for services, berms, batters, drainage, landscaping etc. Where there is potential for further development, the Road Reserve shall be increased in width to allow for this.
2. Privateways fronting a residential distributor road or larger shall have a minimum sealed width of 5.0 m (with a corresponding increase in legal width) for a minimum of 6 m from the boundary to allow easy entry and exit to the street.
3. The maximum gradient shall be:
 - 12.5% for the first 5 m from the boundary
 - Remainder 20%.The minimum crossfall shall be 3%.
4. Corner splays for Privateways shall be a minimum of 3 m at intersections.
5. Where a private accessway is gated, the gates shall be located far enough from the road and provided with turning provisions, such that a 90th percentile car may enter the accessway and turn around, without passing the gates or affecting through traffic.
6. On Privateways less than 4.5 m in width, passing bays with a width of 6.0 m shall be provided at no more than 50 m spacing, subject to adequate visibility.
7. Where a private accessway contains:
 - a public water main (as approved by the Water Services Manager – See Section 6.8.1), or
 - a public sewer gravity main or rising main,the accessway width shall be sufficient to allow maintenance access for these service mains clear of other services, using minimum clearances required by Table 6.6.
Adequate turning and parking areas for fire appliances and maintenance vehicles shall be provided in the vicinity of the pump station or hydrant and the access designed to take heavy vehicles.
8. Surface water from an urban accessway shall be collected in a sump and directed to a stormwater reticulation system or approved outfall location. It shall not discharge over a footpath or directly onto a road carriageway. Where accesses fall away from the road, stormwater sumps shall be provided as necessary to ensure that stormwater from the access does not concentrate onto any lot.
9. Pavements may be:
 - 30 MPa concrete, 125 mm thick with 665 mesh on 100mm compacted basecourse, or
 - Flexible surfacing (chip seal or asphaltic concrete). Provided tests demonstrate the subgrade CBR is a minimum of 7, the formation may consist of:
 - Sub-base – 150 mm thickness of GAP 65
 - Basecourse – 100 mm GAP 40
 - Sealed surface.
 - Where the subgrade CBR is less than 7, the pavement shall be specifically designed by a suitably qualified and experienced Engineer.Chip seal shall not be used for accessways steeper than 12.5%, or for turning areas.
10. For flexible pavements, the Clegg Impact Value on completion of pavement preparation, prior to sealing, shall be a minimum of 40.

Refer to notes on sheet 4

URBAN PRIVATEWAY CROSS SECTIONS

FOR LIVING 1 AND 2, AND ALL BUSINESS ENVIRONMENTS
Open space Environments adopt standards applying to the surrounding Environment, or if there is more than one Environment contiguous to the site, then more stringent standard applies.



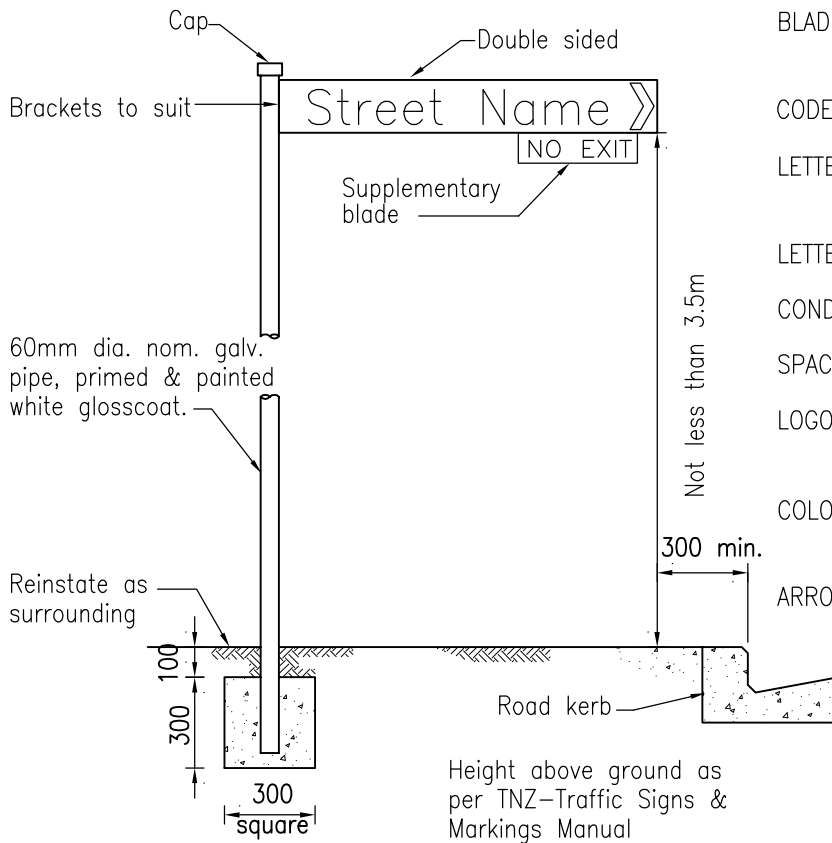
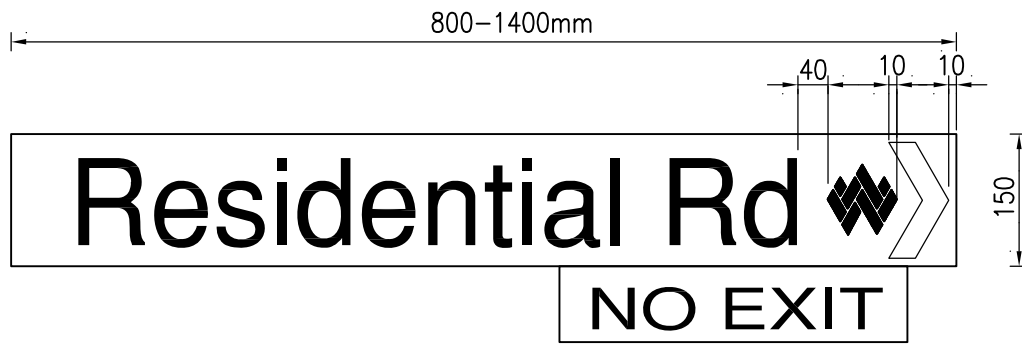
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

4a



BLADE SIZE:	150mm/200mm/250mm
BLADE TYPE:	"I" Section Aluminium Extrusion
CODE:	SNB 150mm/200mm/250mm
LETTER STYLE:	Transport-Upper & lower case
LETTER HEIGHT:	100mm/150mm/200mm
CONDENSED:	To Suit
SPACING:	To Suit
LOGO:	Whangarei District Council Logo
COLOUR:	E.C. Film Blue on High Intensity White
ARROW:	120° 150mm blade -40mm wide 200mm blade -45mm wide 250mm blade -50mm wide

NOTES:

1. Rights of way, access lots, common areas, and private roads do not require names.
Where a name is preferred for any such accessway, the applicant shall submit 3 (three) names in order of priority for Council approval.
2. When a road is to be vested in the Council the applicant shall submit 3 (three) preferred names in order of priority for Council approval.
3. The applicant is responsible for installation of necessary signage and road marking in accordance with the Transit New Zealand Manual of Traffic Signs and Markings for any access vested as road to be maintained by the Council.

**STANDARD STREET SIGNS
FOR ALL ENVIRONMENTS**



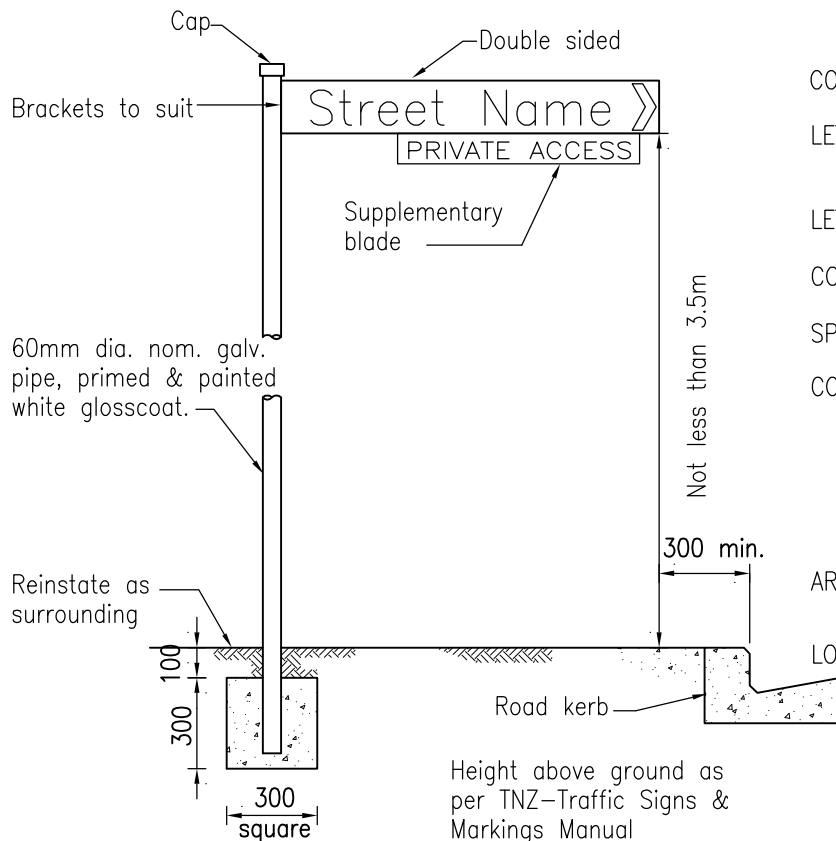
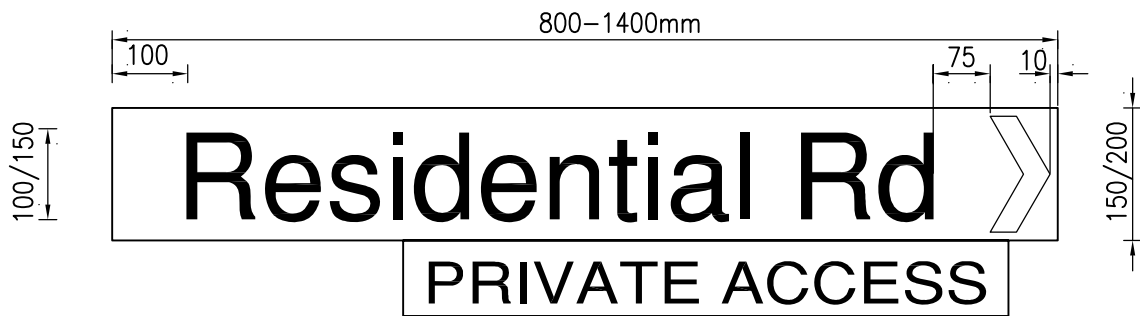
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

5



BLADE SIZE: 150mm/200mm
 BLADE TYPE: "1" Section Aluminium Extrusion
 CODE: SNB 150mm/200mm
 LETTER STYLE: Transport-Upper & lower case
 LETTER HEIGHT: 100mm/150mm
 CONDENSED: To Suit
 SPACING: To Suit
 COLOUR: Engineering Grade Reflective Material with Blue Letters on a white background (Screen printed or electronically cut letters)
 ARROW: 120°
 40mm wide
 LOGO: NO LOGO

NOTES:

1. Rights of way, access lots, common areas, and private roads do not require names.
Where a name is preferred for any such accessway, the applicant shall submit 3 (three) names in order of priority for Council approval.
2. When a road is to be vested in the Council the applicant shall submit 3 (three) preferred names in order of priority for Council approval.
3. The applicant is responsible for installation of necessary signage and road marking in accordance with the Transit New Zealand Manual of Traffic Signs and Markings for any access vested as road to be maintained by the Council.

STREET SIGNS, PRIVATE ROW, ACCESS LOT, COMMON AREA OR PRIVATE ROAD FOR ALL ENVIRONMENTS



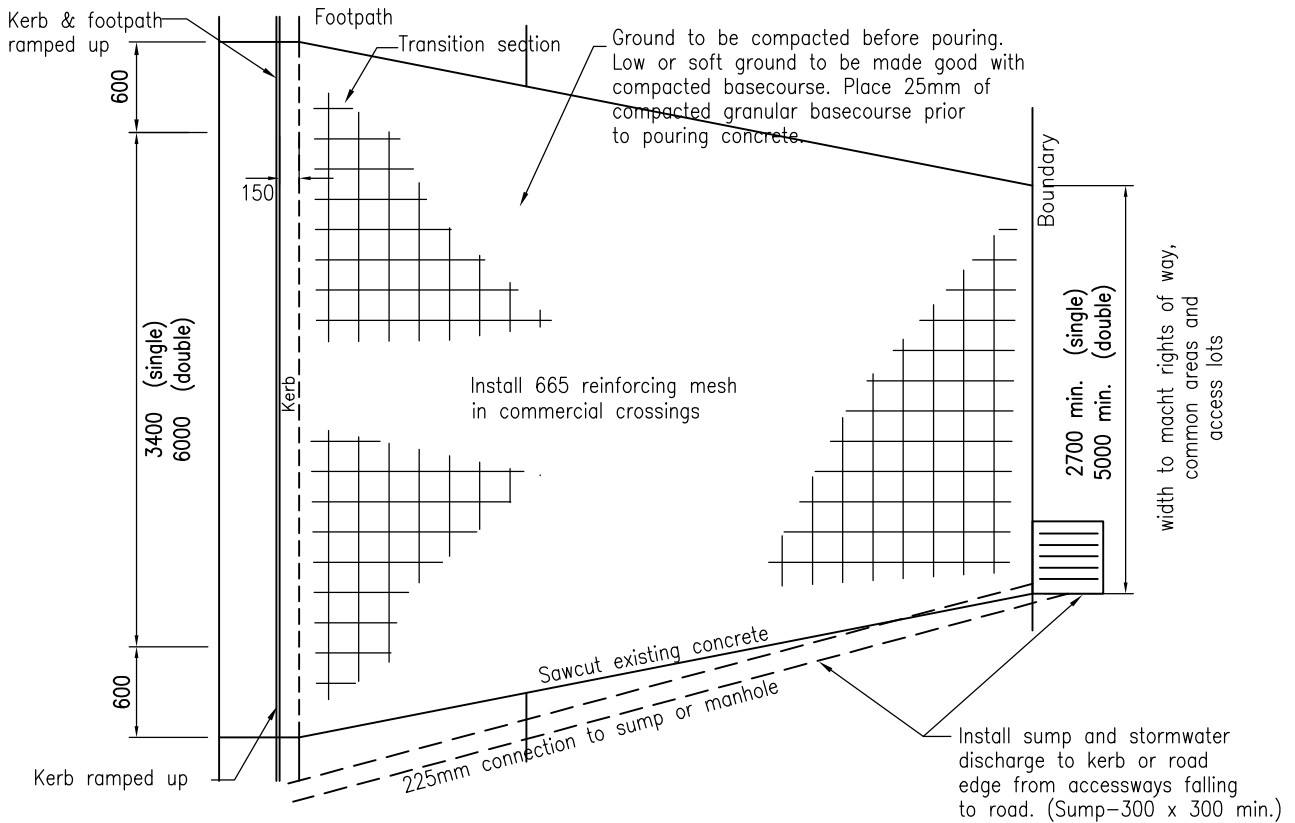
WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

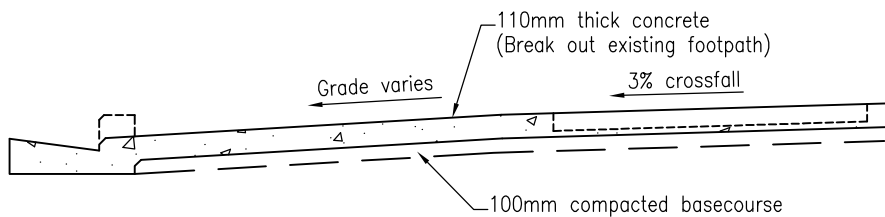
Revision:

SHEET No.

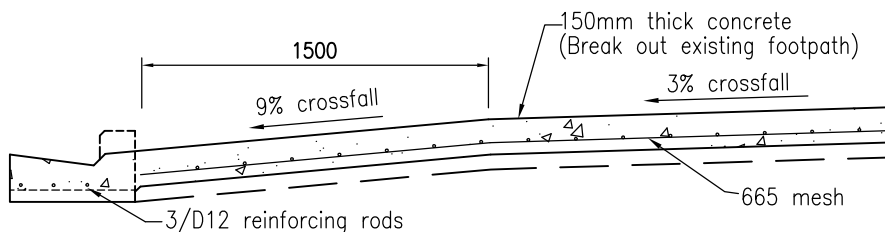
6



PLAN N.T.S.



A. RESIDENTIAL (SECTION) N.T.S.



B. COMMERCIAL AND PRIVATE ACCESSWAYS (SECTION) N.T.S.

No crossing is to be constructed to a width greater than 6.0m at the boundary and 7.0m at the kerb.

NOTES:

1. If no footpath, allowance shall be made for such with a 3% crossfall to the kerb as part of any property vehicle access.
2. Channel to be reinforced with 3-D12, and the crossing with 665 mesh. (See sheet 12)
3. Concrete to 30MPa at 28 days.
4. Sight distance requirements for entrance crossings are to comply with sheet 15.
5. All crossings require Council inspection prior to pouring concrete.
6. See sheet 12 & 13 for kerb details.

RESIDENTIAL AND COMMERCIAL VEHICLE CROSSINGS



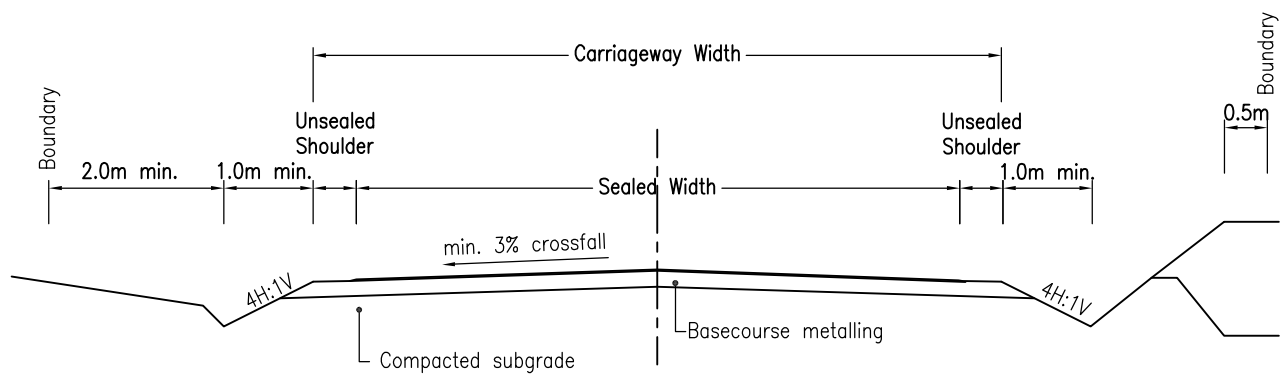
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

7



TYPICAL MINIMUM RURAL ROADING CROSS SECTION N.T.S.

Class	Area Served / Traffic Volumes	Min. Road Reserve Width	Carriageway				
			Unsealed Shoulder	Sealed Shoulder	Lane Width	Sealed Width	Carriage-way Width
LOCAL ROADS							
Local Road	0 - 300 vpd	20	2 x 0.5	2 x 0.5	2 x 2.5	6	7
Sub Collector	300 - 700 vpd	20	2 x 0.5	2 x 0.5	2 x 3.0	7	8
COLLECTOR ROADS							
Minor and Major Collector	700 - 2500 vpd	20	2 x 0.5	2 x 0.5	2 x 3.5	8	9
ARTERIAL							
Arterial	> 2500 vpd	20	2 x 0.5	2 x 1.0	2 x 3.5	9	10

Width Requirements – Rural Roads

NOTES:

- The standards above are the minimum permitted. Road reserve widths may need to be increased to provide for services, berms, batters, drainage, landscaping etc. Where there is potential for further development, the Road Reserve shall be increased in width to allow for this.
- The sealed carriageway width shall be widened on curves (see Table 3.5).
- The road reserve shall be located 0.5 metres outside the toes of earthwork cuts or fills unless the slope of the earthworks is 1V:4H (25%) or less in which case it can be located at the minimum distance from the centreline.
- Footpaths 1.4 m wide are required in Living 3 Environments, and level berms suitable for pedestrian use are required in the vicinity of cluster developments in Countryside and Coastal Countryside Environments.
- Provision for parking may be required with close development.
- Road gradients shall be in the range of 0.4% to 12.5 % for Local Roads, and 0.4% to 10% for Collector and Arterial roads.
- Pavements shall be specifically designed by a suitably qualified and experienced Engineer. For Local Roads, the design shall use either Mechanistic or Standard Chart Based Methods. The subgrade CBR may be determined using a Scala Penetrometer. For Collector Class and above, the design shall use a Mechanistic Design Method, with Laboratory CBR testing of the subgrade.
- Geometric design of roads shall be carried out by a suitably qualified and experienced Engineer, experienced in road geometric design.
- All rural roads shall be sealed except where specifically approved by the Roading Manager.
- The Clegg Impact Value on completion of pavement preparation, prior to sealing, shall be a minimum of 40. Testing shall be at 20 metre centres at the edges and centre of pavements. The Council may require Benkelman Beam testing in accordance with NZS 4404:2004.
- Surfacing will normally be Chip Seal – Grade 3 with Grade 5 wet lock.
- Road drainage shall be provided by the use of side drains, dished channels or kerb and channel (with subsoil drains). The road reserve boundary shall be at least 2.0 m outside of side drains. On steep gradients where scouring is likely, open water tables shall be lined with concrete (see details of Concrete Dish Channels, Sheet 12). Specific provision shall be made to control velocity, particularly prior to a discharge.

RURAL ROAD CROSS SECTIONS
(Countryside, Coastal Countryside and Living 3 Environments)

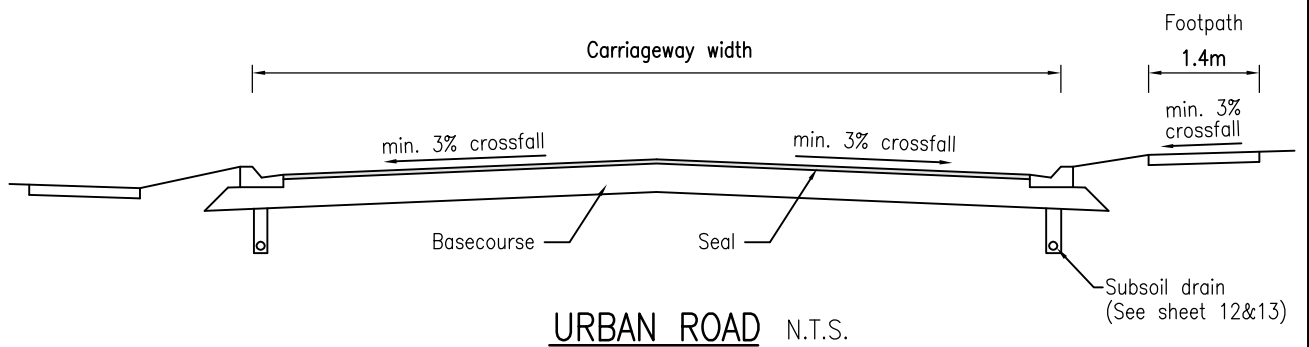
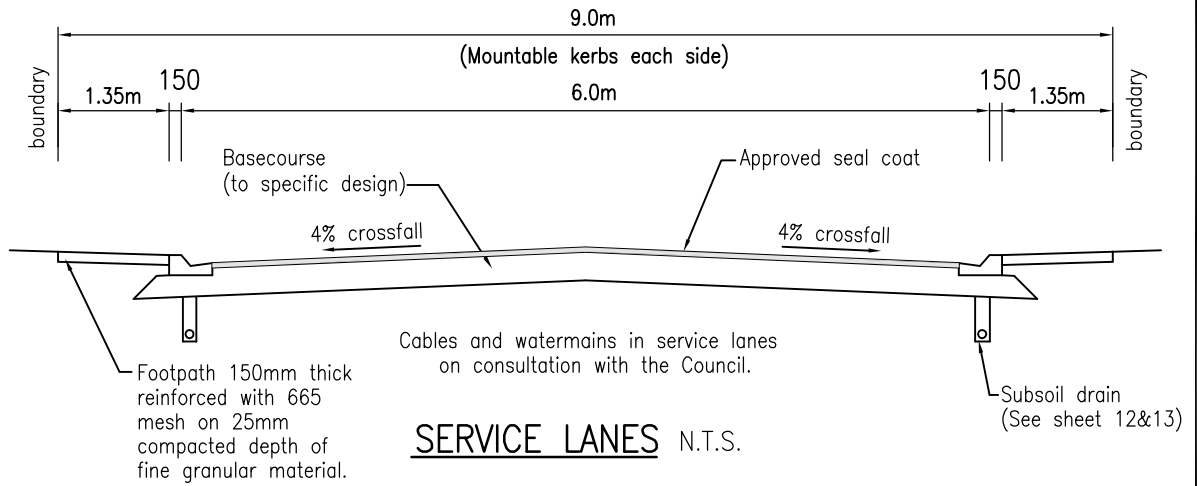


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **8**



Class	Area Served / Traffic Volumes	Min. Road Reserve Width	Carriageway Width				Foot-path	Notes	
			Parking	Traffic	Cycles	Total			
LOCAL ROADS									
URBAN (Living 1 & 2 Environments)	Cul de sac	Up to 150 m length	14				7.5	1 x 1.4	Special provision for parking may be required.
	Minor Residential Road	Up to 500 m length	18	1 x 2.5	2 x 3.0	-	8.5	2 x 1.4	
	Residential Road	Over 500 m length	21	2 x 2.5	2 x 3.0	-	11	2 x 1.4	May set parking bays into berm area.
SERVICE LANES									
INDUSTRIAL/COMMERCIAL (Business 1 to 4 (including Oil Refinery and Kauri Dairy Factory), Marsden Point Port and Airport Environments)			9		2 x 3.0	-	6	2 x 1.4	Provide mountable kerbs. Footpaths constructed to road crossing details.
COLLECTOR ROADS									
URBAN (Living 1 & 2 Environments), INDUSTRIAL/COMMERCIAL (Business 1 to 4 (including Oil Refinery and Kauri Dairy Factory), Marsden Point Port and Airport Environments)		1000 – 3000 vpd	23	2 x 2.5	2 x 3.5	2 x 1.0	14	2 x 1.4	Cycle provisions may be best marked for 2.5 m parking, and 4.5 m Wide Kerbside Lane as per Fig. 4-19 of NZ Supplement to Austroads Guide – Part 14. For main cycle routes, Arterial standards shall be applied.
ARTERIAL ROADS									
URBAN (Living 1 & 2 Environments), INDUSTRIAL/COMMERCIAL (Business 1 to 4 (including Oil Refinery and Kauri Dairy Factory), Marsden Point Port and Airport Environments)		3000 – 7000 vpd	24	2 x 2.2	2 x 3.5	2 x 1.8	15	2 x 1.4	Cycle lane layout as per Fig. 4-7, NZ Supplement to Austroads Guide – Part 14.
		> 7000 vpd	Specific Design						

Width Requirements – Urban and Commercial/Industrial Environments

NOTES:

1. Footpath widths do not include kerbs.
2. Footpaths shall be not less than 100mm thick 20MPa ordinary grade concrete at 28 days with construction joints at 3.5m crs.
3. 100mm depth of fine granular material under footpaths. Soft areas to be dug out & replaced with compacted metal fill.

**URBAN ROAD CROSS SECTIONS
FOR ENVIRONMENTS LIVING 1 AND 2, AND ALL BUSINESS**

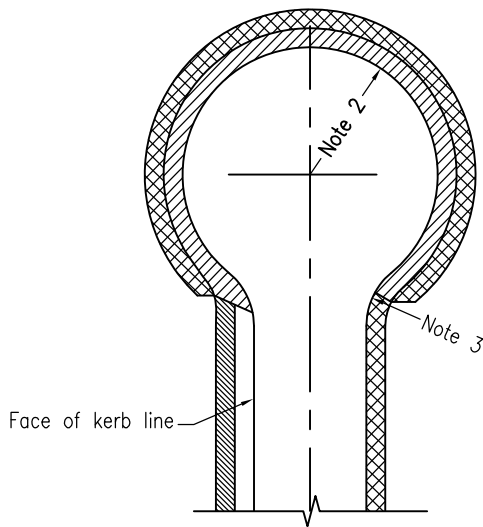


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

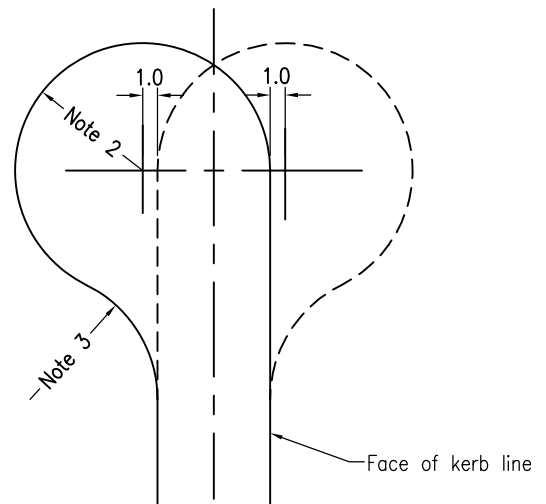
Date: MAY 2006

Revision:

SHEET No. **9**



CIRCULAR TURNING AREA
FOR CUL-DE-SAC



OFFSET CIRCULAR TURNING AREA
FOR CUL-DE-SAC
FOR RESIDENTIAL AREAS

-  Carriageway
-  Service Berm
-  Reinforced Footpath to Commercial Crossing Standard
-  Ordinary Footpath

NOTES:

1. For All Environments.
2. Turning Radius 9.5 metres for Living and Contryside Environments, 15 metres for Buisness Environment. These dimensions are absolute minima.
3. Shoulder radius 8.0 metres for non-offset heads, 9.0 metres for offset heads. The "offset" dimensions apply for offsets from the road centreline of 2 metres or more.
4. Footpaths and berm widths as required for Urban Cul de sac (refer Sheet 9).
5. Reinforced footpath to be 150mm thick concrete with 665 mesh. Concrete strength to be 30 MPa at 28 days.
6. A central area may be provided for parking or planting. Where this is proposed, the layout shall be checked for access by heavy vehicles using tracking curves.
7. The minimum kerb gradient shall be 0.5%.
8. Hammerhead or "T" cul-de-sacs may be approved where a standard circular head is unsuitable. The layout is subject to specific design. Compliance with Figure 3.5 in NZS 4404:2004 is an acceptable solution in residential areas.
9. Where a cul de sac is formed, and it is intended that the road will be extended as part of a future stage in a development, the provision for turning at the end of the cul de sac shall be specifically considered. The design shall be subject to specific approval by the Roding Manager.

CUL DE SAC TURNING

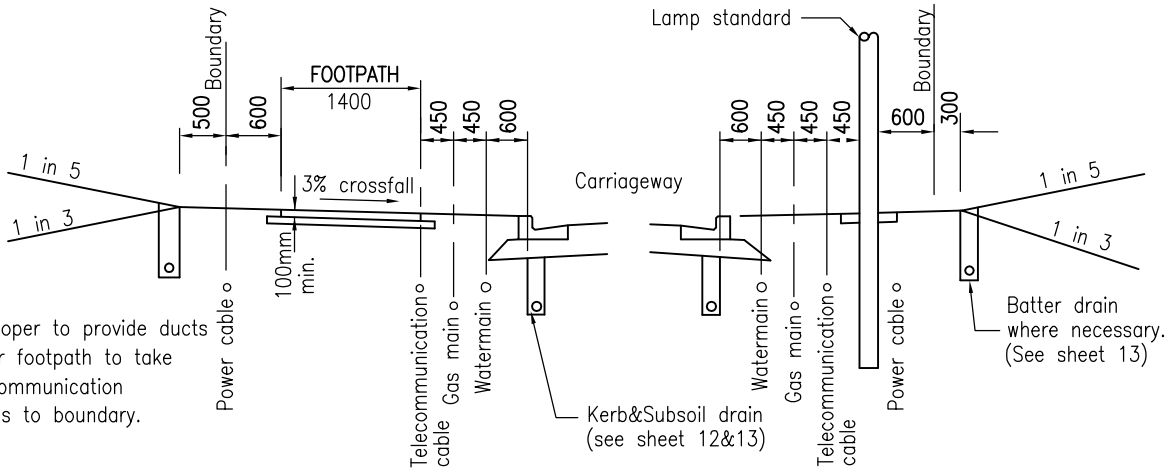


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

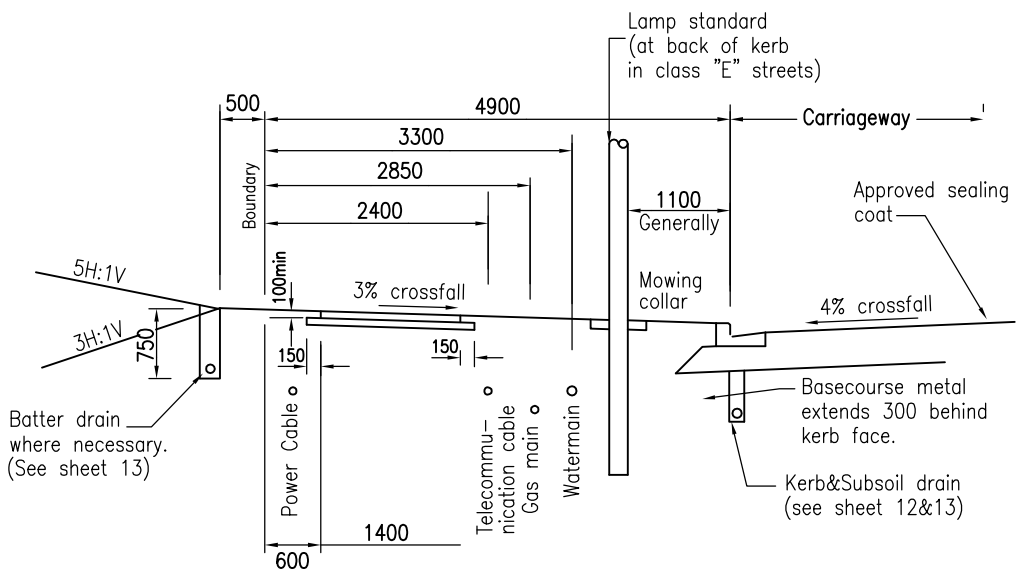
Revision:

SHEET No. **10**



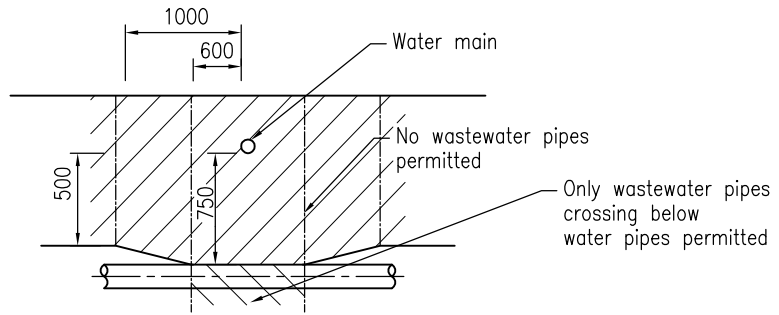
Developer to provide ducts under footpath to take telecommunication cables to boundary.

CUL DE SAC N.T.S.



URBAN ROADS N.T.S.

NOTE:
Clearance to watermain to be increased to comply with table 6.6 where the watermain diameter is greater than 200mm.



CROSSINGS BETWEEN WATER MAINS & WASTEWATER PIPES

N.T.S.

Further notes refer to sheet 11a.

RECOMMENDED SERVICE LOCATIONS
FOR ENVIRONMENTS LIVING 1 AND 2, AND ALL BUSINESS



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date:	MAY 2006
Revision:	
SHEET No.	11

MINIMUM CLEARANCE BETWEEN SERVICES

The minimum clear distance between services shall be the greater of the required clearances between the relevant services.

Stormwater: 300mm H, 150mm V

Wastewater: 300mm H, 150mm V – except watermains
1000mm H, 500mm V to 600mm H, 750mm V to watermains

Electricity: 500mm H, 225mm V – except watermains > 200mm
1000mm H, 225mm V to water mains > 200mm ID

Telcom & Gas: 300mm H, 150mm V – except watermains > 200mm
600mm H, 150mm V to watermains > 200mm ID

Watermains: Clearances to other services as above
Clearances to water pipelines as follows:
600mm H, 500mm V to a water pipeline > 375mm ID
600mm H, 150mm V where both pipelines are between 200mm ID and 375mm ID
300mm H, 150mm V where both pipelines are ≤ 375mm

NOTES:

1. Vertical clearances apply where services cross, except that water pipelines shall always maintain a clearance above parallel wastewater pipelines.
2. Refer to tables 5.6 & 6.6 for further notes.

Further notes refer to sheet 11.

MINIMUM CLEARANCES BETWEEN SERVICE FOR ENVIRONMENTS LIVING 1 AND 2, AND ALL BUSINESS

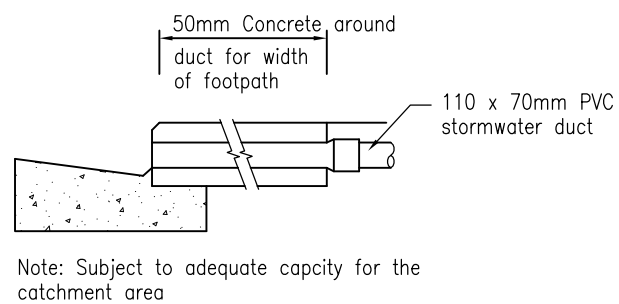
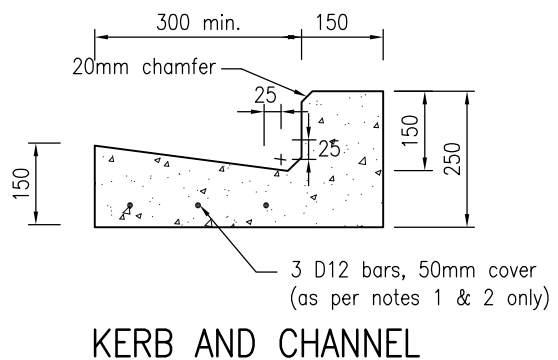
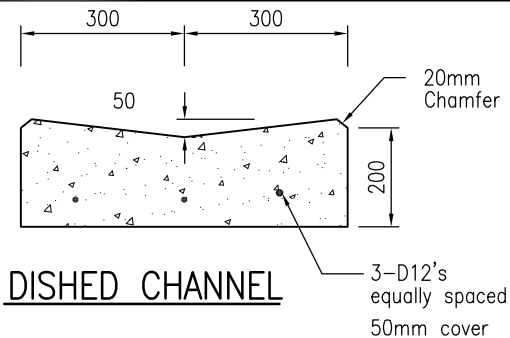


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

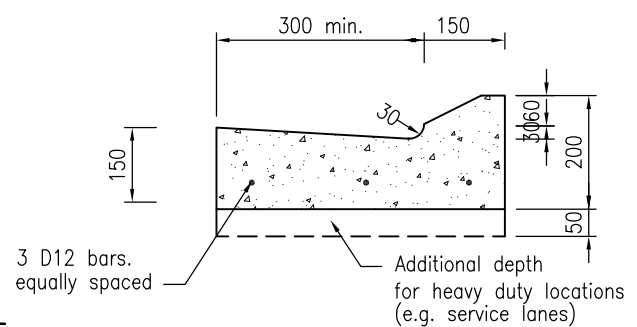
Date: MAY 2006

Revision:

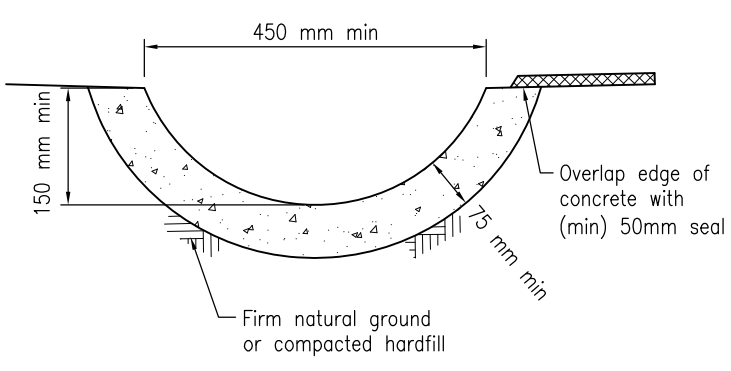
SHEET No. **11a**



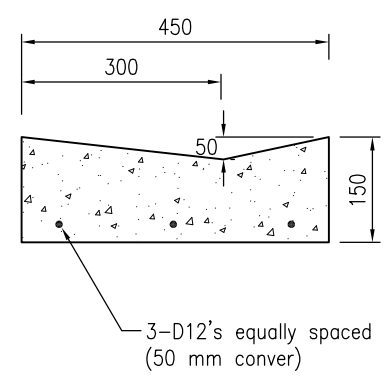
SECTION THROUGH STORMWATER DUCT AND KERB & CHANNEL



MOUNTABLE KERB AND CHANNEL



CONCRETE LINED CHANNEL - RURAL



PRAM CROSSING

NOTES:

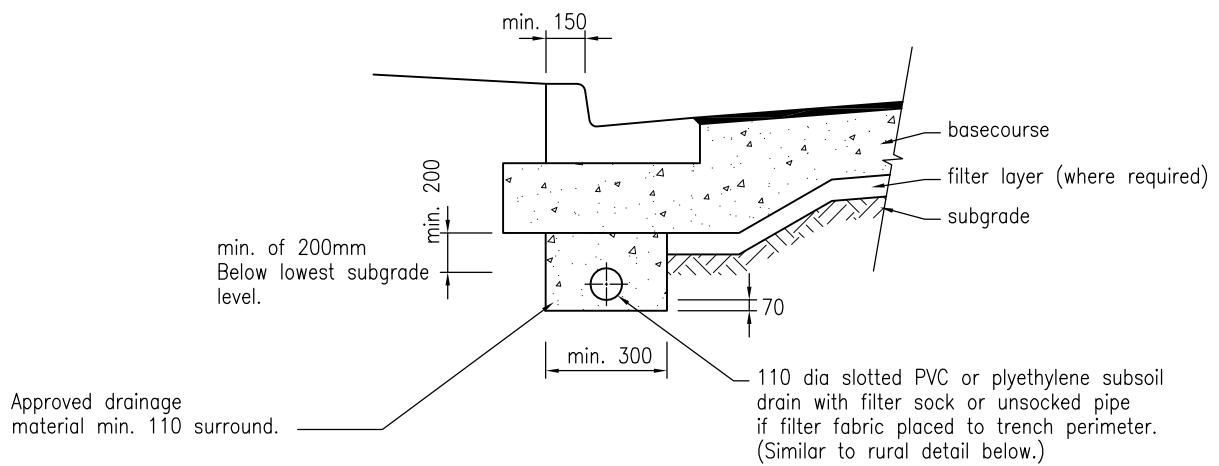
- 3/D12 reinforcing bars to be placed around all curves, and intersections between tangent points.
- Commercial crossings to be additional 50mm in depth as well as having 3-D12's equally spaced in the channel.
- Concrete for Dished Channel, Pram Crossing and Mountable Kerb and Channel shall comply with NZS3109 and be 30MPa at 28 days.
- Concrete for Concrete Lined Channel Rural and Kerb and Channel shall comply with NZS3109 and be 20MPa at 28 days.
- Crack control joints to be formed at maximum of 3.5 metre intervals.
- Profiles may be modified slightly to suit kerbing machine.
- 300mm wide channels may be used for privateways and carparks.
- Mountable kerbs are only to be used for service lanes, traffic islands and similar.

KERB & CHANNEL DETAILS FOR ALL ENVIRONMENTS

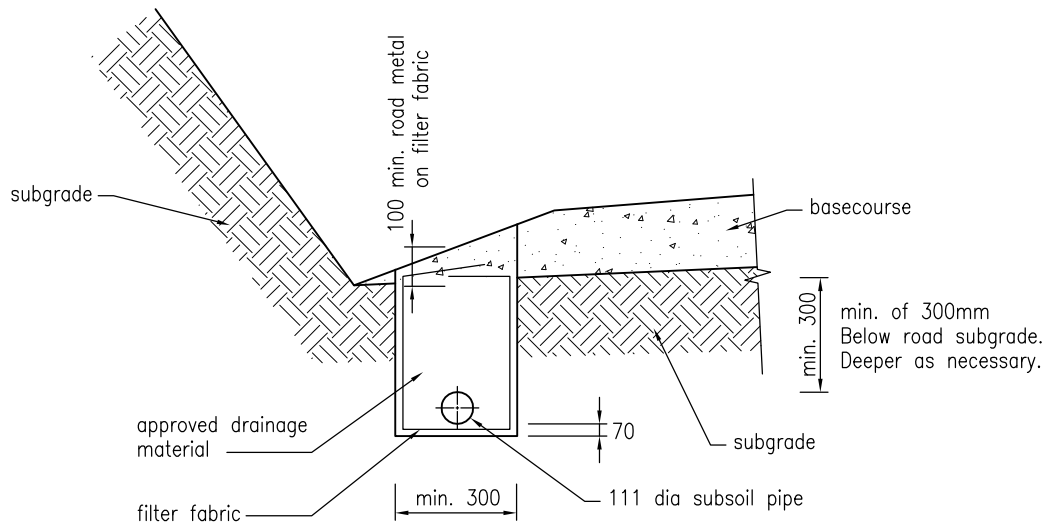


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date:	MAY 2006
Revision:	
SHEET No.	12



UNDER KERB DRAINAGE N.T.S



RURAL SUBSOIL DRAINAGE N.T.S

TYPICAL KERB & SUBSOIL DRAINAGE DETAILS



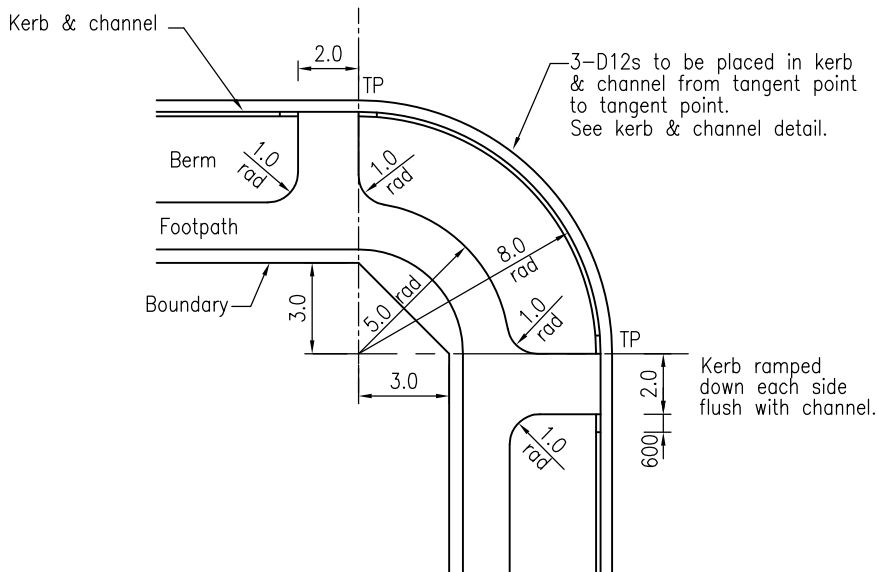
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

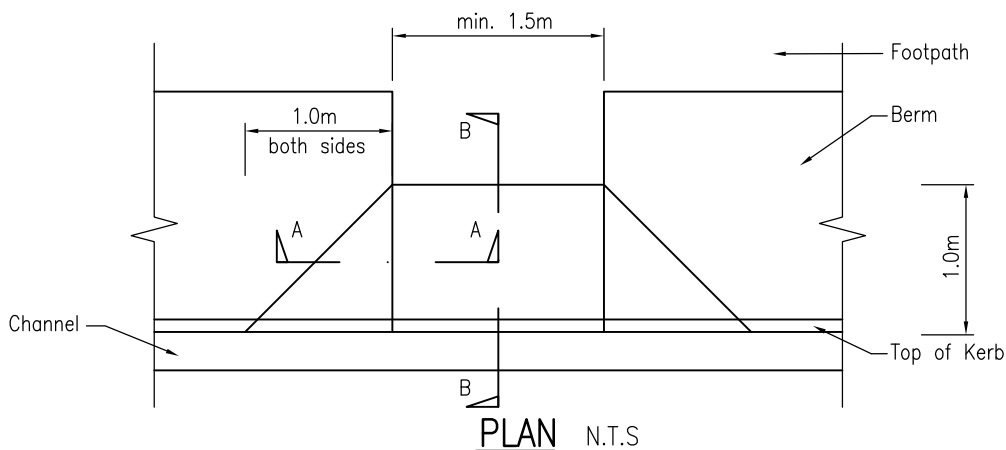
Revision:

SHEET No.

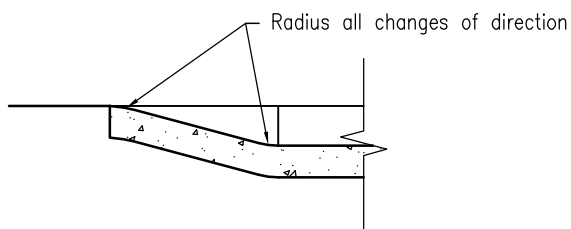
13



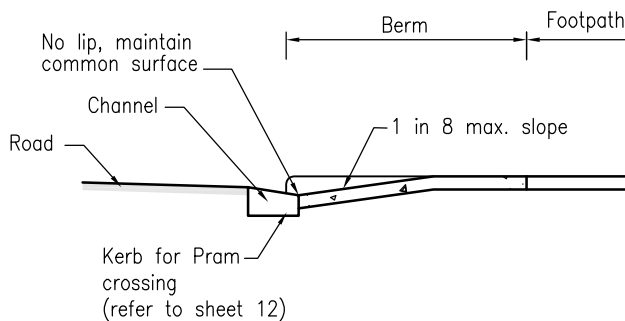
CROSS ROADS OR TEE INTERSECTION N.T.S



PLAN N.T.S



HALF SECTION A-A N.T.S



SECTION B-B N.T.S

PRAM CROSSING DETAILS
FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1-5



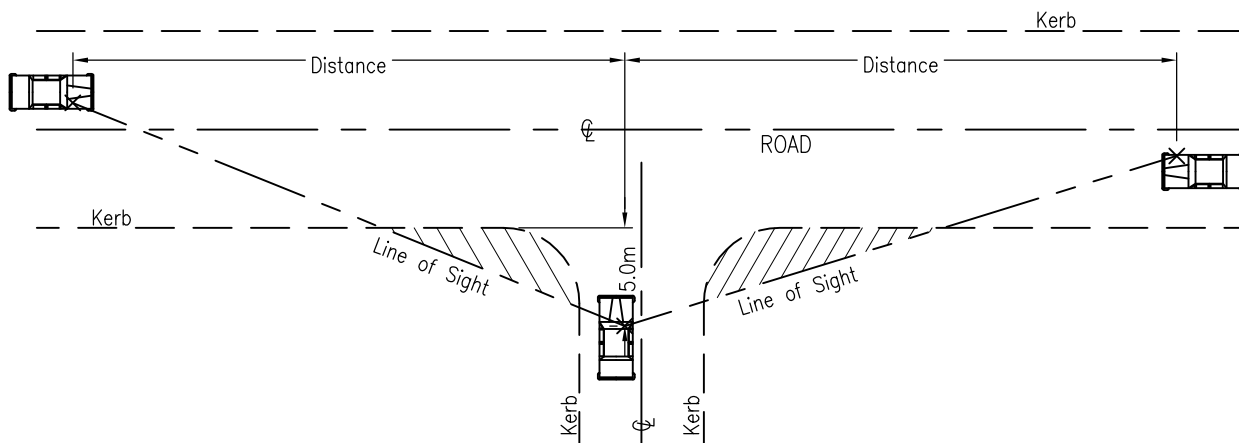
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

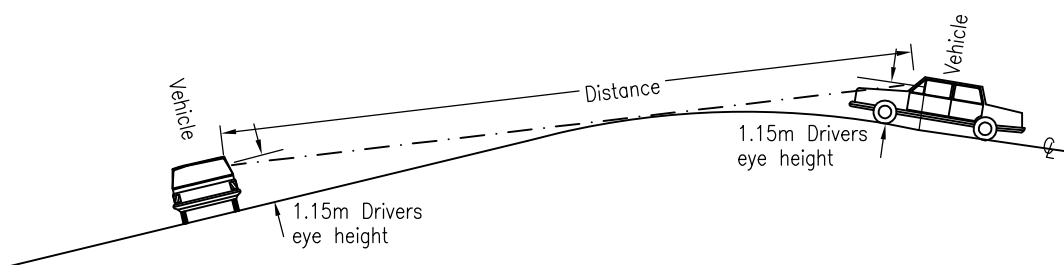
Revision:

SHEET No.

14



TYPICAL PLAN N.T.S.



TYPICAL LONGITUDINAL SECTION N.T.S.

Vehicle Crossing Classification	Operating Speed Environment (Km/hr)	Minimum Sight Distance		
		Frontage Road Classification		
		Local	Collector	Arterial
LOW VOLUME Up to 200 vehicle movements per day per access	40	30	35	70
	50	40	45	90
	60	55	65	115
	70	85	85	140
	80	105	105	175
	90	130	130	210
	100	160	160	250
	110	190	190	290
HIGH VOLUME More than 200 vehicle movements per day per access	120	230	230	330
	40	30	70	70
	50	40	90	90
	60	55	115	115
	70	85	140	140
	80	105	175	175
	90	130	210	210
	100	160	250	250
110	190	290	290	
120	230	330	330	

NOTES:

1. Full visibility is required 1.15 metres above the visibility splay areas
2. One way roads and dual carriageways only require visibility in the direction of approaching traffic.

TRAFFIC SIGHT LINES AT NON SIGNALISED INTERSECTIONS

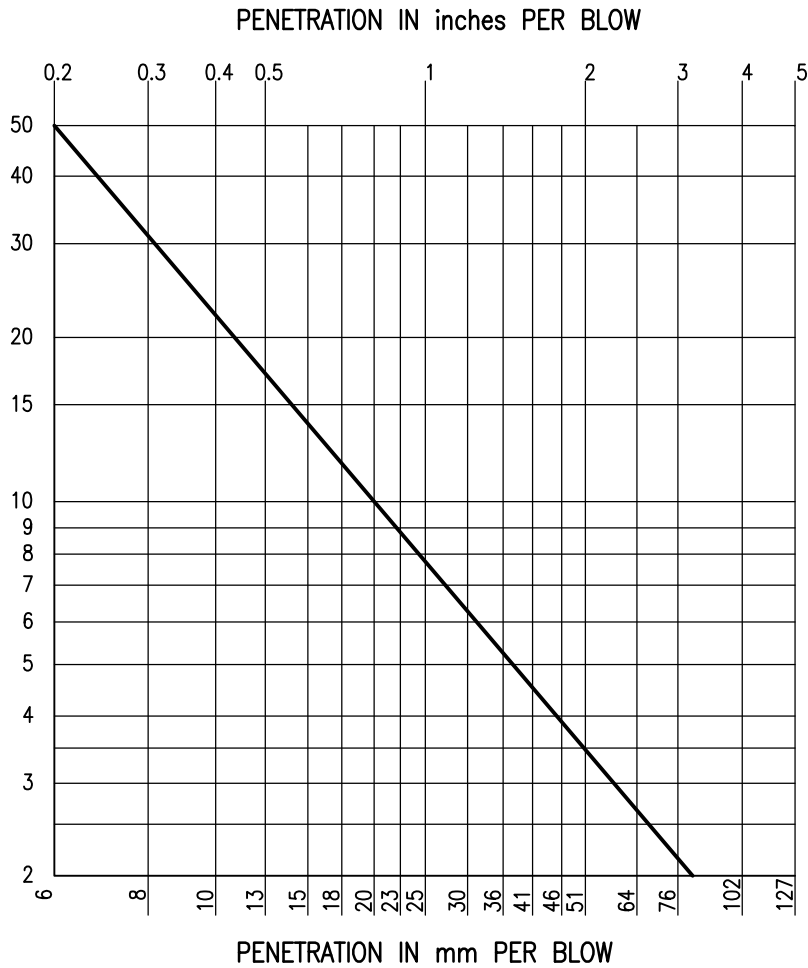


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **15**



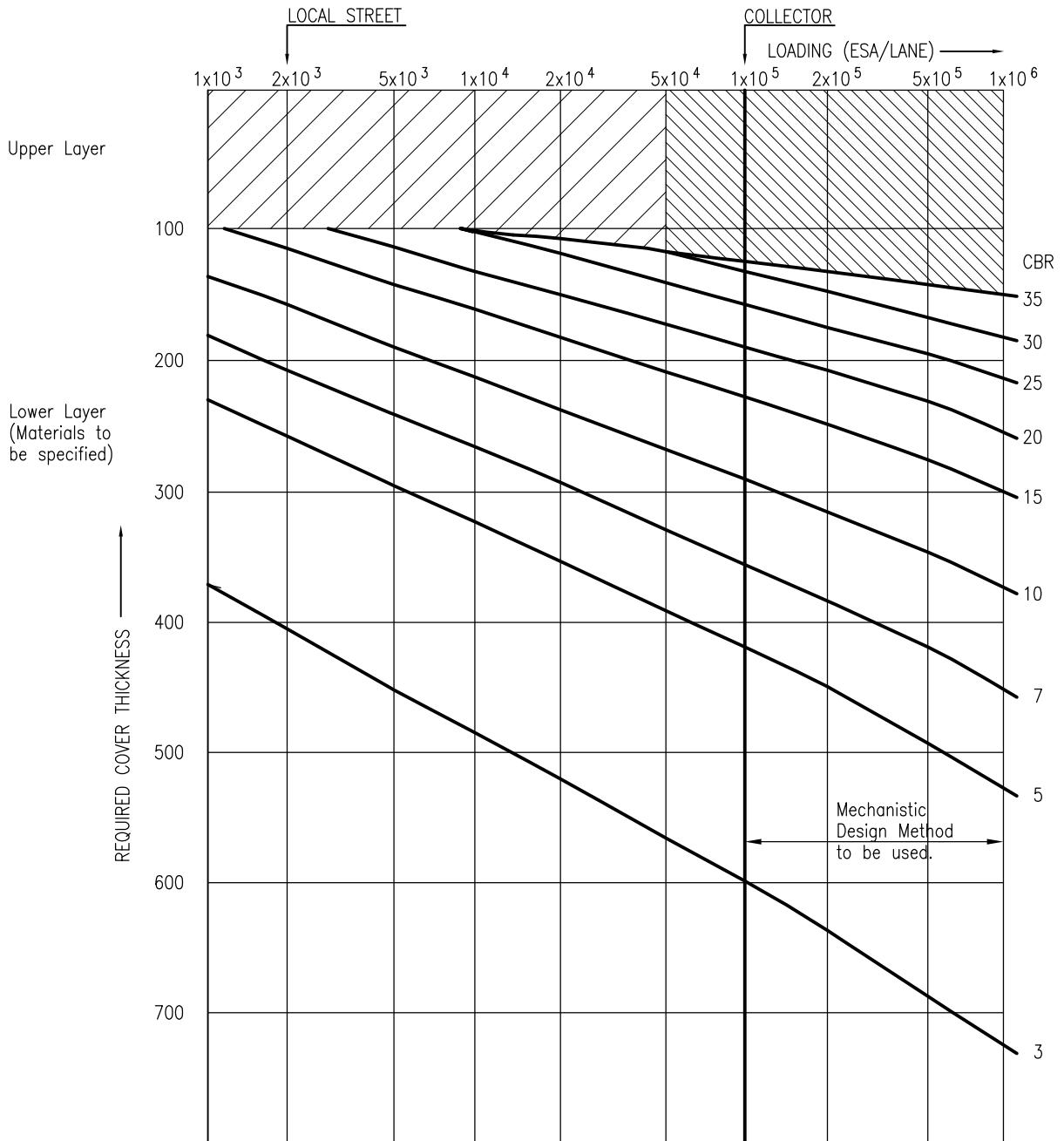
SCALA PENETROMETER CHART FOR C.B.R. VALUES (Subgrade)

SCALA PENETROMETER CHART
FOR ALL ENVIRONMENTS



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date:	MAY 2006
Revision:	
SHEET No.	16



NOTES:

1. Collector, arterial and industrial streets shall be the subject of specific design based on an estimate of their E.S.A. (Equivalent Standard Axle) loading, using a mechanistic design method.
2. The curves give minimum cover requirements above the subgrade and greater depths of higher quality materials may be necessary.
3. The minimum pavement depth for streets shall be 200mm.
4. Scala penetrometer testing is required to confirm designed aggregate depths.

**DESIGN CHART FOR FLEXIBLE PAVEMENTS
FOR ALL ENVIRONMENTS**

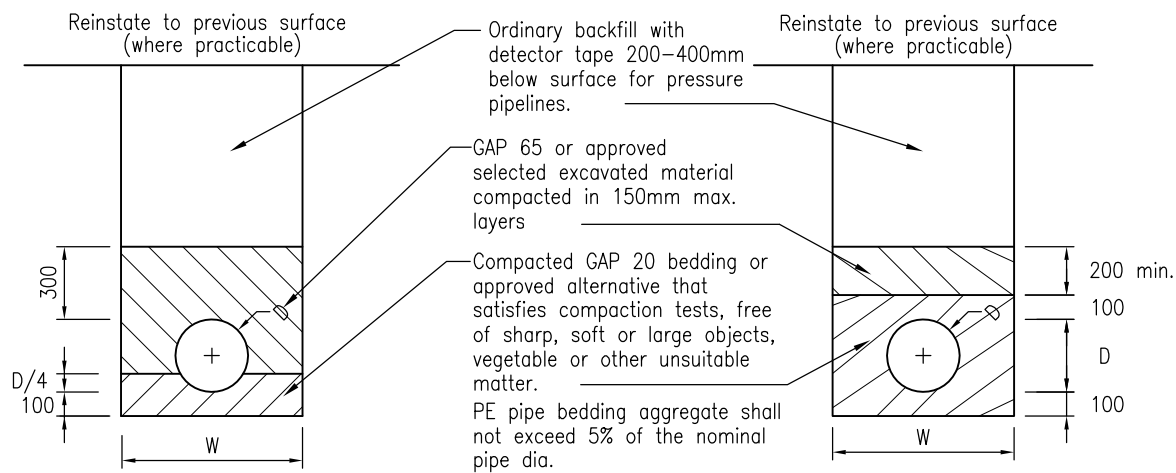


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **17**

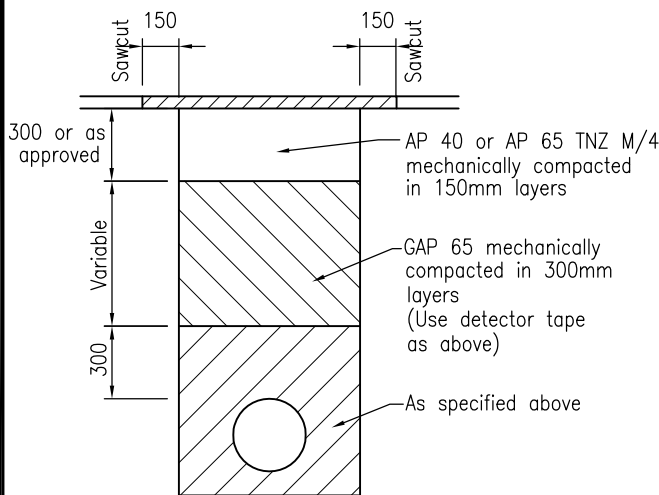


**ALUMINIUM, CONCRETE GALVANISED
STEEL OR VITRIFIED CLAY PIPE**

(Where specifically approved)

PVC & PE PIPE

(PVC not approved for water supply)



**ADDITIONAL BACKFILL REQUIREMENTS
UNDER CARRIAGEWAYS**

(All types of pipe)

W	TYPE OF PIPE
D + 600	Aluminium
D + 600	Galv. 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 "Aluflo" 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.
- Scala Penetrometer test:
The number of blows required for penetration through successive layers within carriageway trenches is as follows:
a. 0 to 150mm deep; 18 minimum
b. 150mm to 300mm deep; 12 minimum
c. 300mm to 450mm deep; 8 minimum
d. Deeper than 450mm; 6 minimum per 150mm depth
NB. Berm every 50mm; 2 minimum
- PRIVATEWAY base course metalling within pipe trenches may be in accordance with the privateway Standards.
- Trench width shall not exceed W at the pipe crown level.
- Unsatisfactory trench material is to be undercut and replaced with compacted hardfill.
In poor soils such as swamp, peat, and in rock the minimum depth of granular bedding material below the invert is to be 200mm or specific design as necessary.
- 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 pier design.
- Concrete bedding shall be allowed to cure for 48 hours prior to backfilling.
- Backfilling – 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 sheet 24).
A. 600mm if not subjected to traffic loading
B. 900mm under carriageways and trafficed areas.

**PIPE BEDDING & BACKFILL
FOR ALL ENVIRONMENTS**

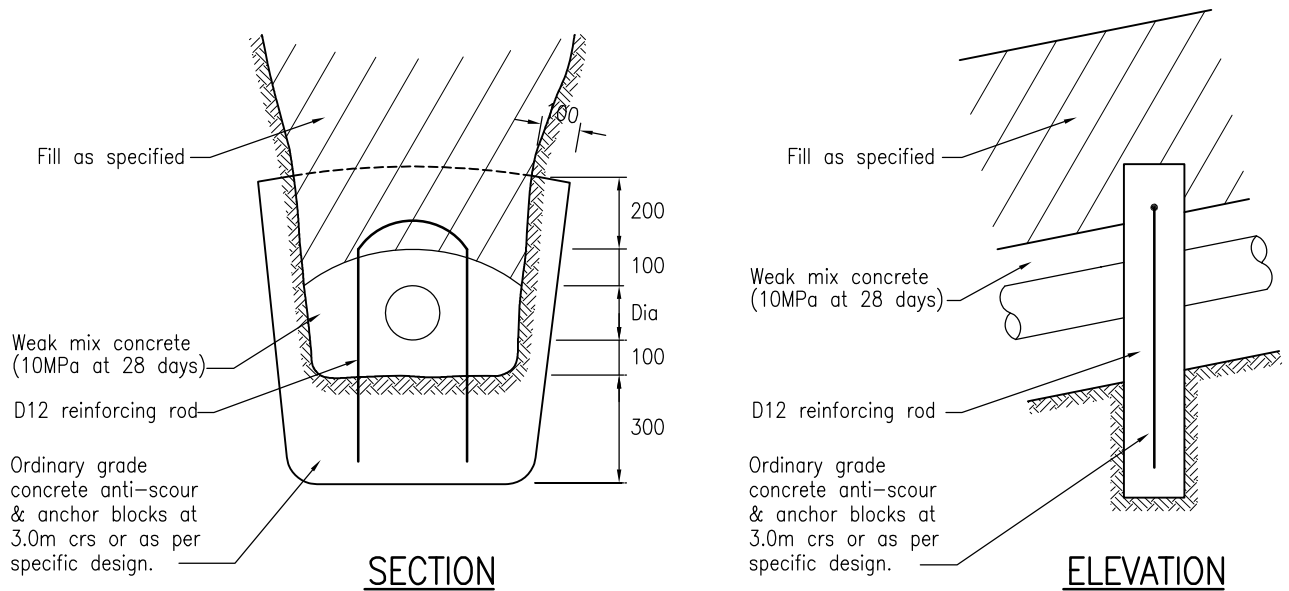


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **18**

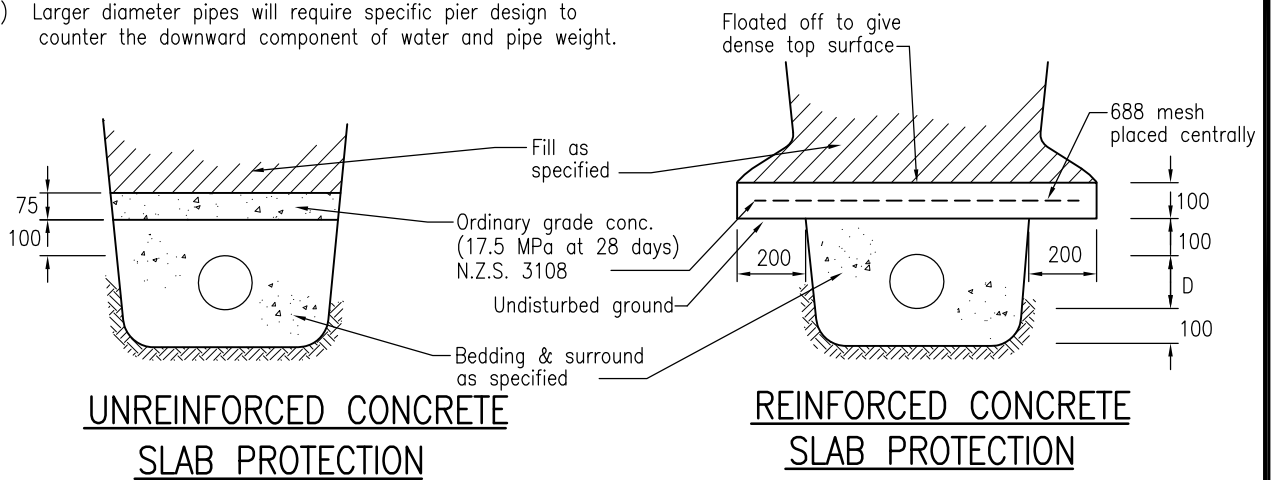


SECTION
STEEP PIPE DETAILS

(For pipeline gradients 1:3 or steeper)

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.



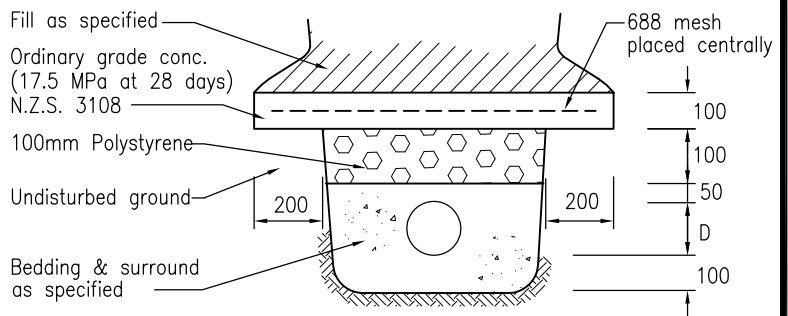
UNREINFORCED CONCRETE
SLAB PROTECTION

REINFORCED CONCRETE
SLAB PROTECTION

(Where additional loading or other requirements necessitate)

GENERAL:

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



REINFORCED CONCRETE SLAB PROTECTION
FOR WATER PIPELINES

Refer to Sheet 28

PIPE PROTECTION AND BULKHEAD DETAILS
FOR ALL ENVIRONMENTS

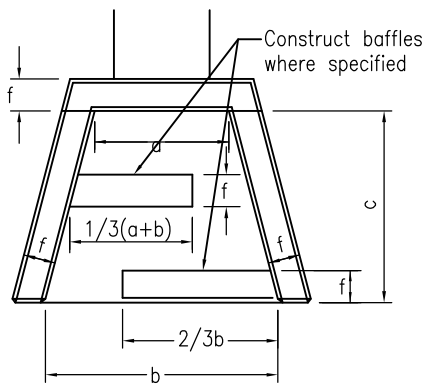


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

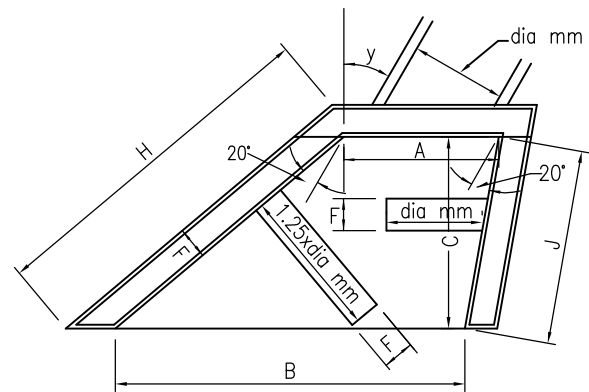
Date: MAY 2006

Revision:

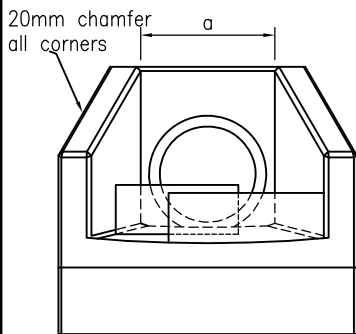
SHEET No. **19**



PLAN

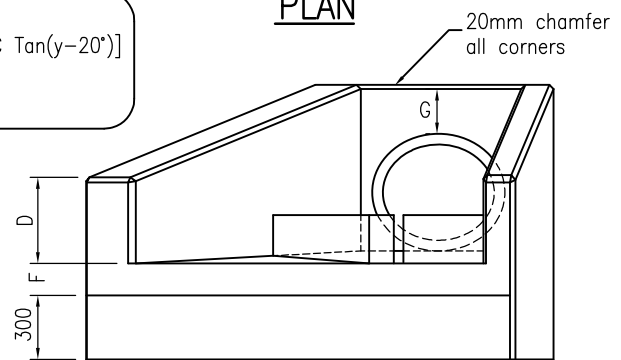


PLAN

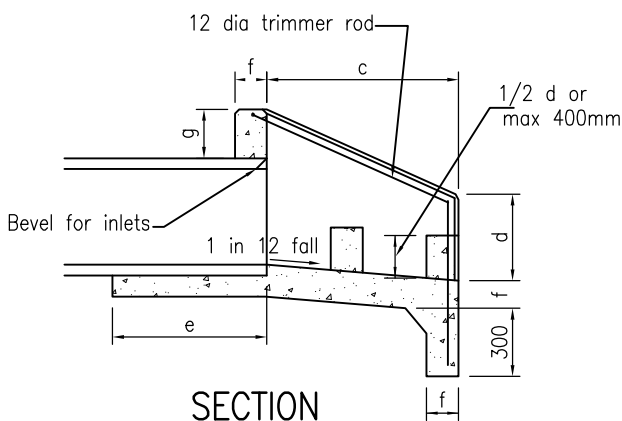


END ELEVATION

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



END ELEVATION



SECTION

PRINCIPAL DIMENSIONS (mm)							
DIA OF PIPE	a	b	c C	d D	e E	f F	g G
150	300	450	600	200	325	100	150
230	380	600	700	250	425	100	150
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	633 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 300 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 OUTFALL STRUCTURES

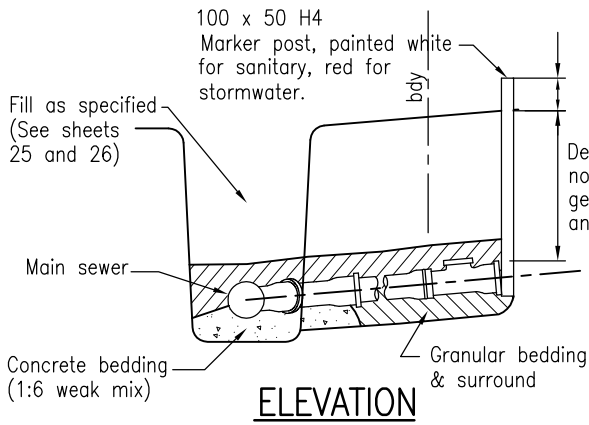


WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

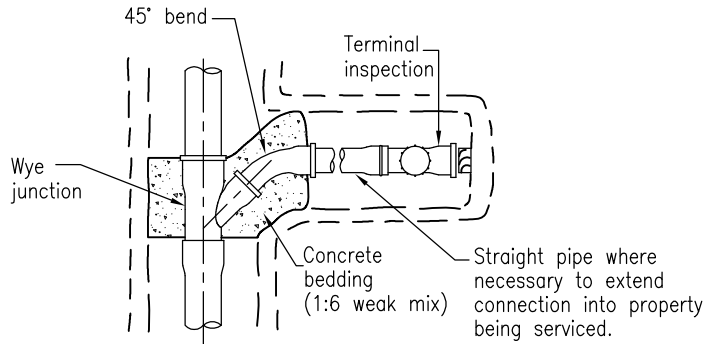
Date: MAY 2006

Revision:

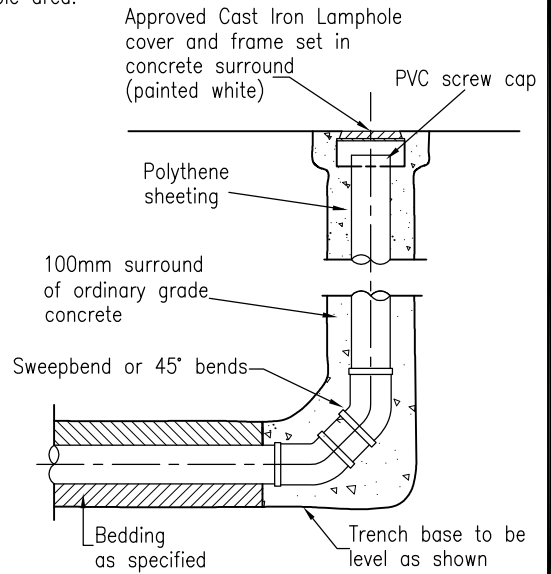
SHEET No. **20**



ELEVATION



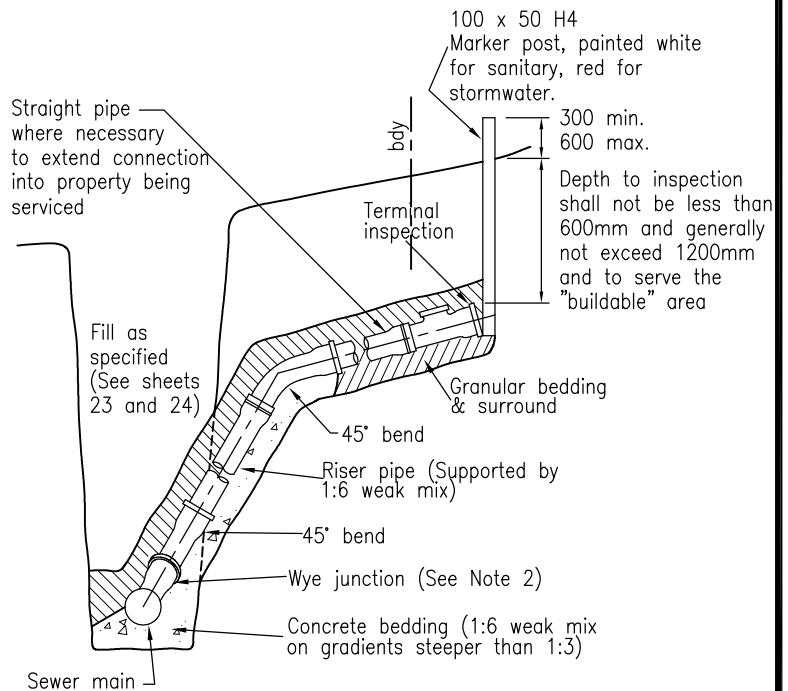
PLAN STANDARD CONNECTION



FOR BRANCH LINES LESS THAN 50m LONG LAMPHOLE

NOTES:

1. The terminal inspection shall be located not less than 300mm inside the property being serviced and be free of obstructions
2. For stormwater connections, junctions to be: (in order of preference)
 - a. Prefabricated standard wye junctions,
 - b. Prefabricated factory special connection,
 - c. Field fabricated epoxy mortared saddled flange connection with appropriate insert adapter.
3. Terminal blank end required for stormwater connections.
4. Pipes and fittings are to be sewer grade uPVC, Vitrified clay, concrete or ceramic, and to relevant NZ Standard.
5. Pipelines that are likely to carry commercial or industrial waste are to satisfy the manufacturers requirements.
6. Specific design may be required in potentially unstable areas.
7. Joint flexibility is to be maintained where pipelines are in contact with concrete. Pipes shall be separated from concrete using DPC.
8. AS-BUILT plans are required for all connections.



RAMPED RISER CONNECTION
(Requires specific approval)

LAMPHOLES, STORMWATER AND SEWER CONNECTIONS FOR ALL ENVIRONMENTS

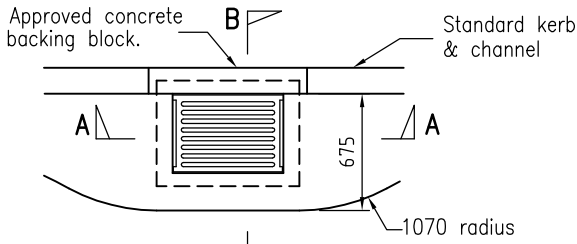


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

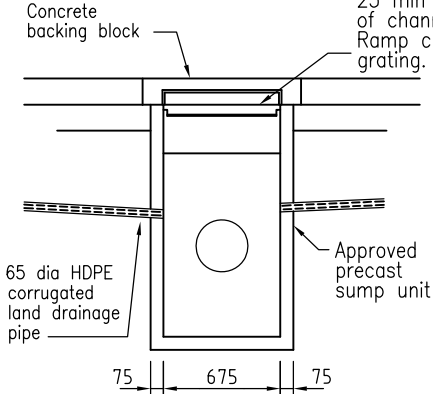
Date: MAY 2006

Revision:

SHEET No. **21**

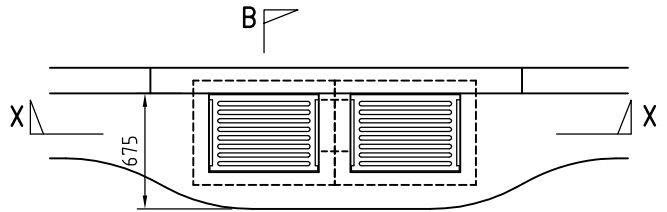


PLAN

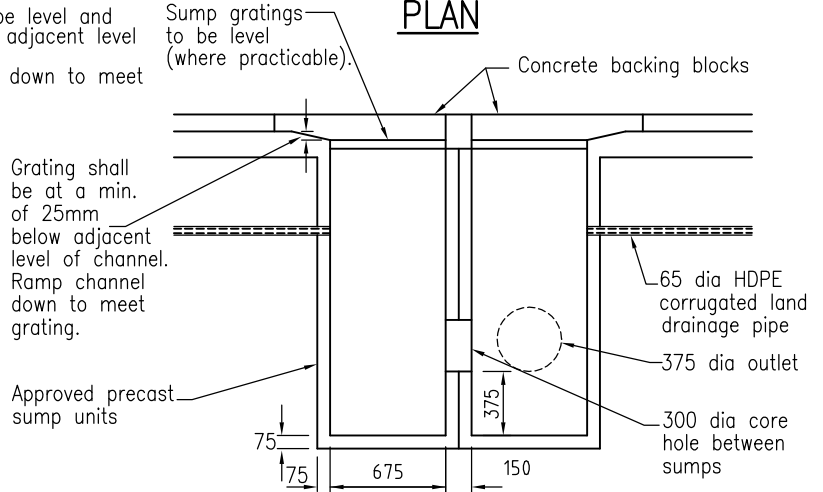


**SECTION A-A
SINGLE SUMP**

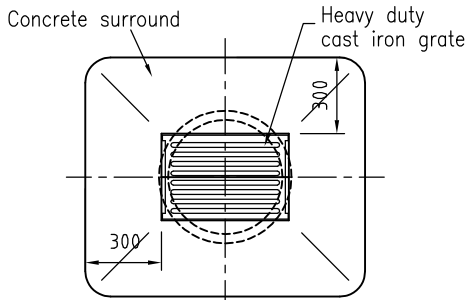
Grating shall be level and 25 min below adjacent level of channel. Ramp channel down to meet grating.



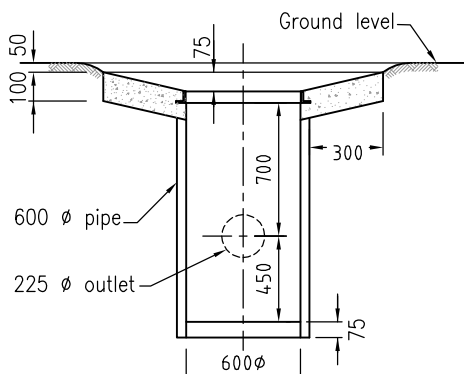
PLAN



**SECTION X-X
DOUBLE SUMP**

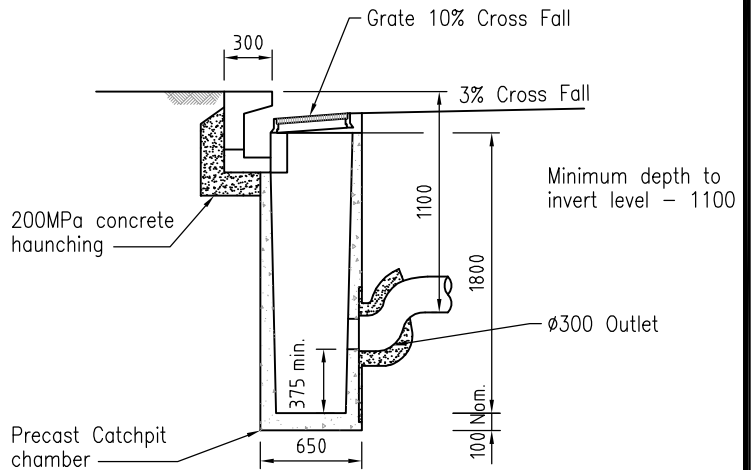


PLAN



**SECTION
FIELD SUMP DETAIL**

(All Environments)



SECTION B-B

NOTES:

1. Concrete to be ordinary grade (205MPa) in accordance with NZS 3109.
2. Sump outlet pipes to be 1:100 min gradient.

**SUMP DETAILS
FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1-5**

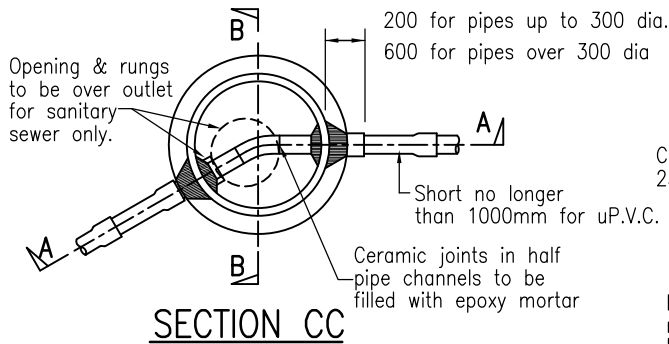


**WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS**

Date: MAY 2006

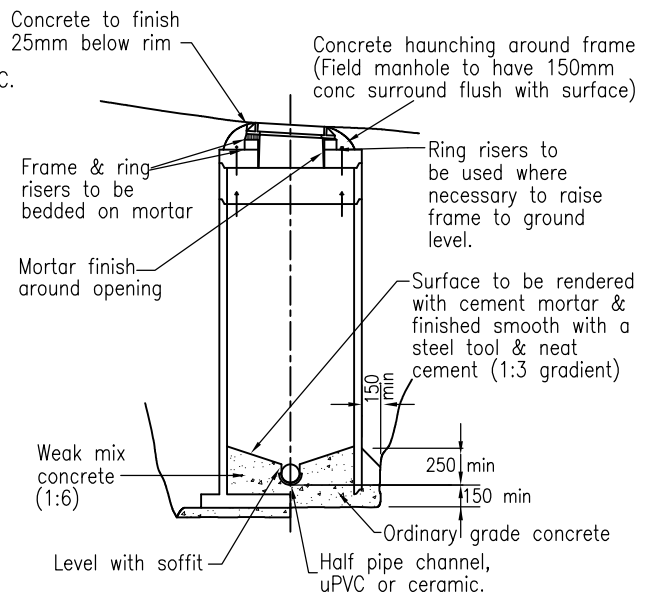
Revision:

SHEET No. **22**



NOTES:

1. This detail is applicable for pipe diameters up to 600mm & for manhole depths up to 5.0m.
2. All steel fittings to be hot dip galvanised
Zinc coatings to be not less than 700g/m
3. 150mm thick concrete lids with heavy duty cast iron frames & covers to be used in driveways, carriageways & berms. 100mm thick concrete lids with light duty cast iron frames & covers may be used elsewhere.
4. Precast manhole bases shall be used in all instances with minimum sized holes cut for pipe entry.
5. No additional thin plastering of benching or inverts is permitted.
6. All manhole covers are to be painted red for stormwater, white for sewer.
7. All concrete to be 20 MPa at 28 days unless specified as weak mix.
8. Stormwater manholes do not require half pipe channels, or short pipe sections beyond the entry or exits.

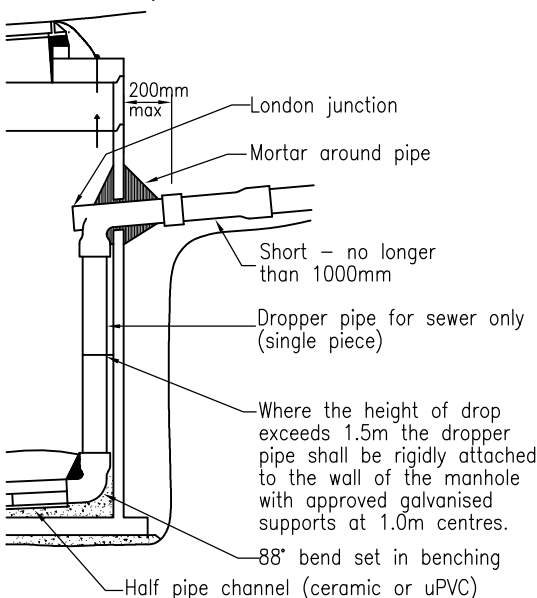


PRECAST BASE

INSITU BASE

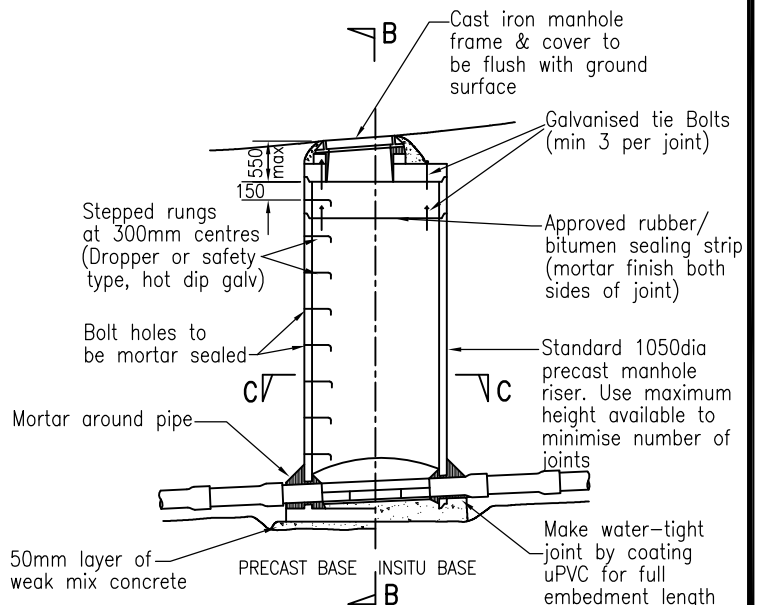
(only permitted for pipes larger than 600mm)

SECTION BB



SECTION A-A INTERNAL DROP

This detail is applicable for pipe diameters up to 250mm & for manhole depths up to 5.0m.



SECTION AA

Make water-tight joint by coating uPVC for full embedment length with solvent cement then coating wet cement with dry sand & allowed to set.

STANDARD PRECAST MANHOLE SEWER AND STORMWATER FOR ALL ENVIROMENTS



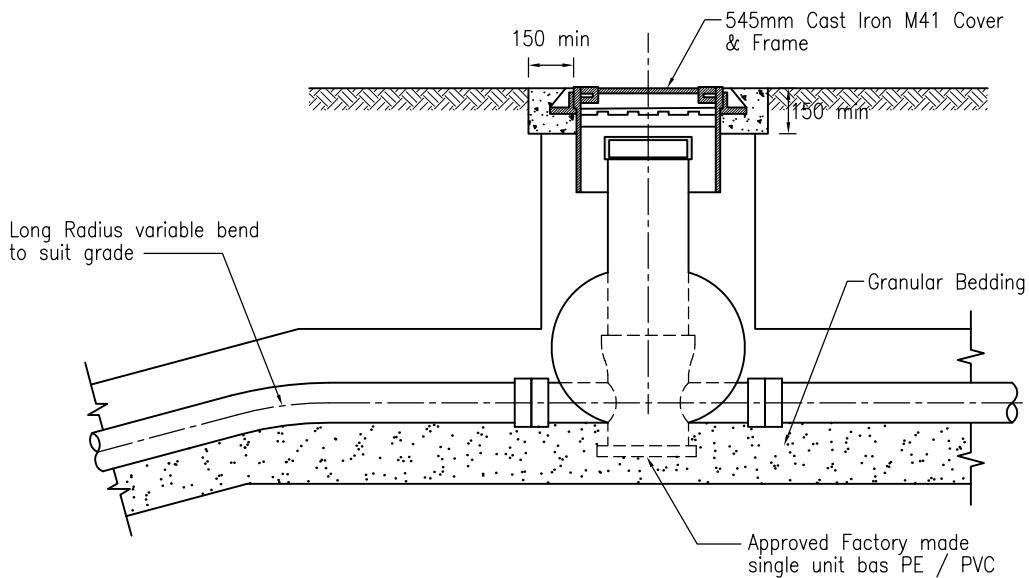
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

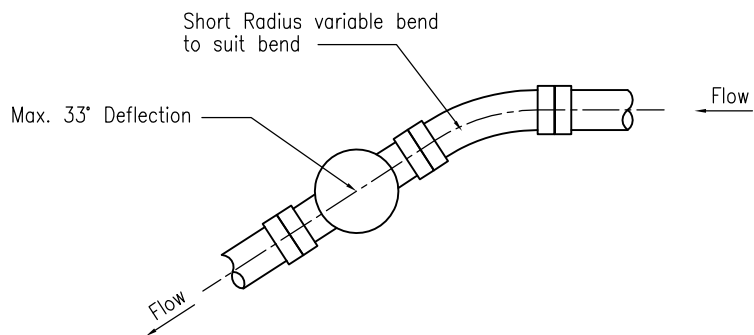
Revision:

SHEET No.

23



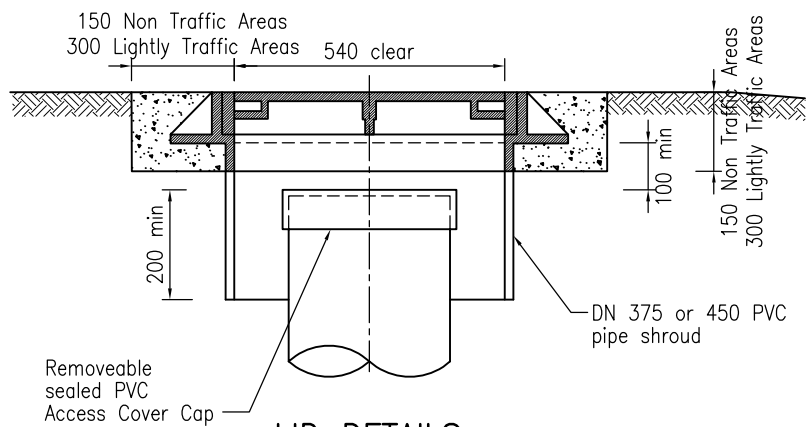
ELEVATION – MAINTENANCE SHAFT



PLAN

NOTES:

1. For use with DN150 and DN225 Pipes only.
2. Maximum Depth 3.6m.
3. Max. horizontal deviation 33° with close coupled bend, or 90° with specially designed MS units.
4. Not to be located in Carriageways or in heavily trafficked Areas.
5. See section 5.10 for Restrictions on use.



LID DETAILS

**SEWER MAINTENANCE SHAFT DETAILS
FOR ALL ENVIRONMENTS**

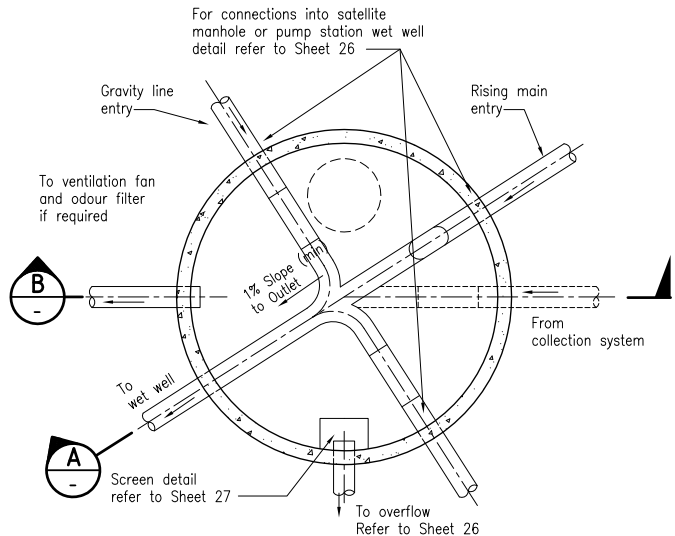


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

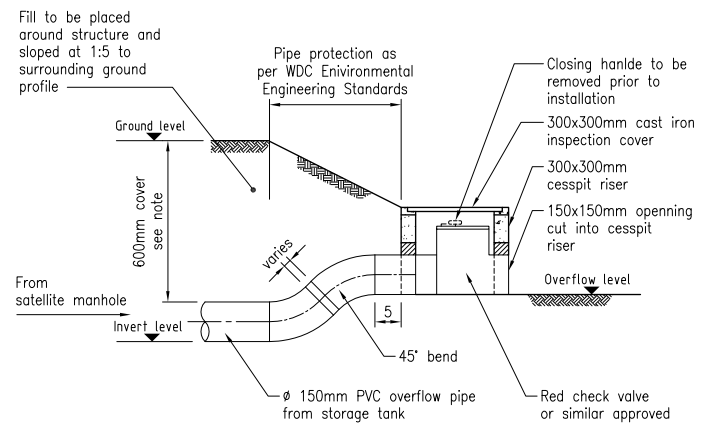
Date: MAY 2006

Revision:

SHEET No. **24**



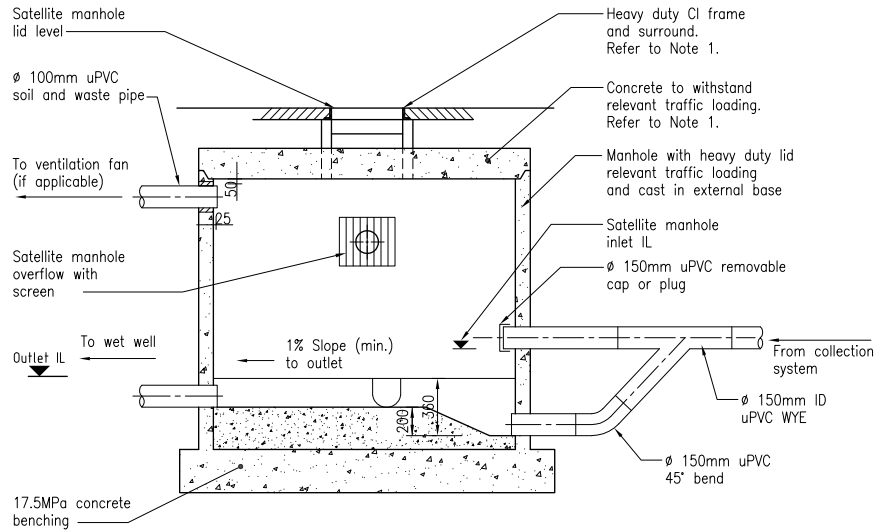
PLAN SATELLITE MANHOLE
N.T.S.



Note:
Overflow level to be set at a level at least 200mm below all service connections and manhole lids.
Refer suppliers information for valve installation details.

OVERFLOW OUTLET - LAND DISCHARGE
N.T.S.

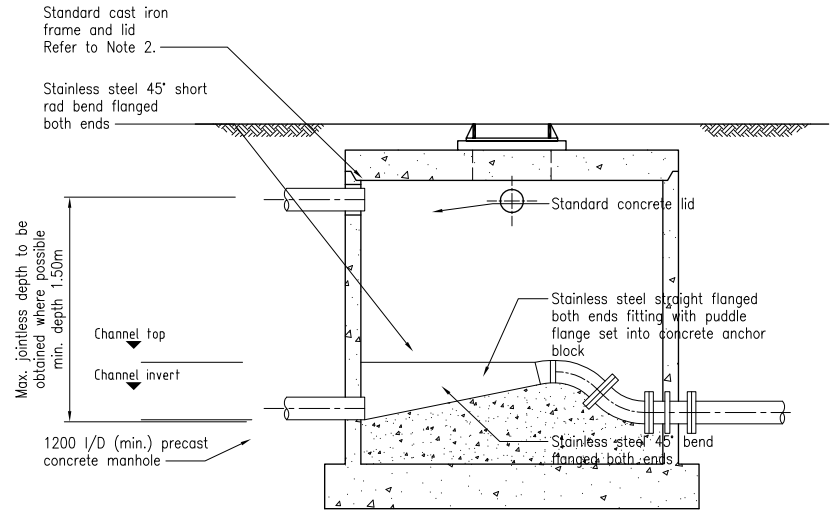
- Notes:**
1. Heavy duty CI frame and surround for use in road reserve or other area with traffic loading.
 2. Standard cast iron frame and lid in private property where no traffic loading is possible.



SECTION A-A
TYPICAL GRAVITY LINE ENTRY INTO MANHOLES

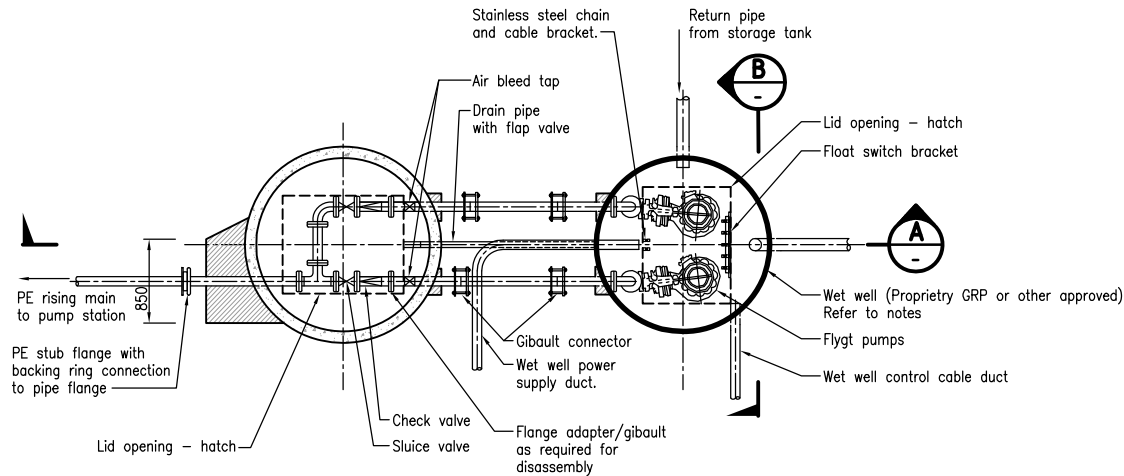
NOTE:

- Orientation of manhole inlets & outlets varies.
- Where all flow into the MH is gravity flow standard MH details may be used.



SECTION B-B
RISING MAIN DISCHARGE DETAILS TO MANHOLES
N.T.S.

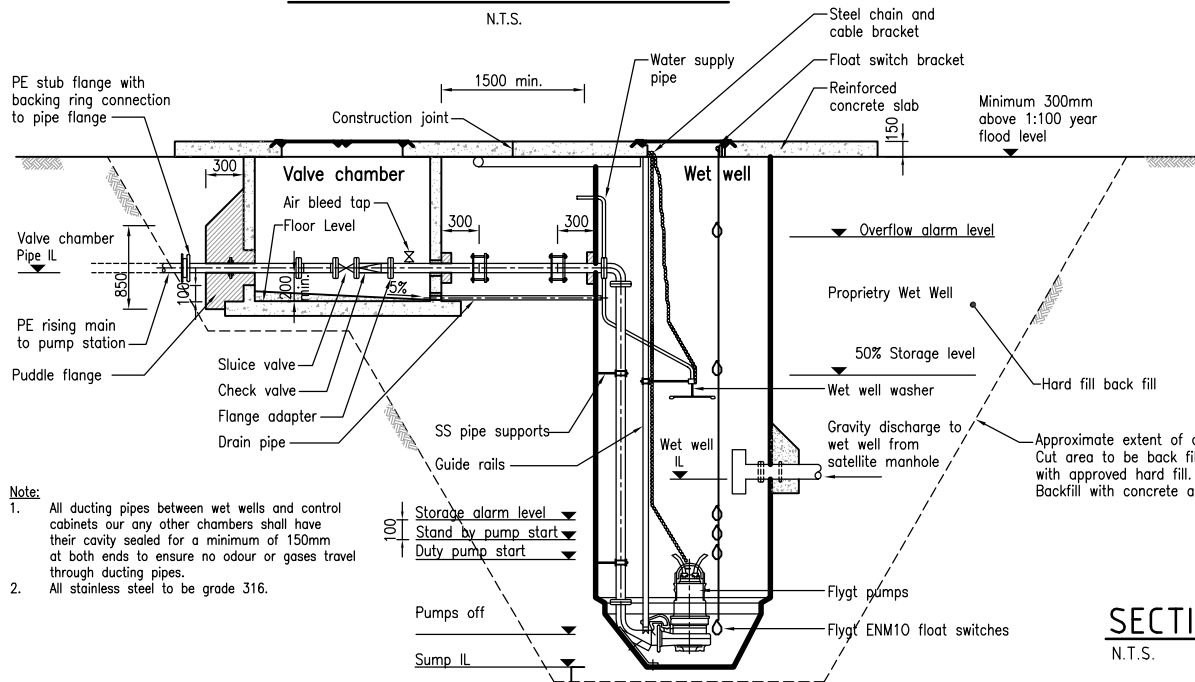
SATELLITE MANHOLE DETAILS FOR ALL ENVIRONMENTS	
WHANGAREI DISTRICT COUNCIL ENVIRONMENTAL ENGINEERING STANDARDS	Date: MAY 2006
	Revision:
	SHEET No. 25



Valve chamber Wet well
WET WELL AND VALVE CHAMBER PLAN
 N.T.S.

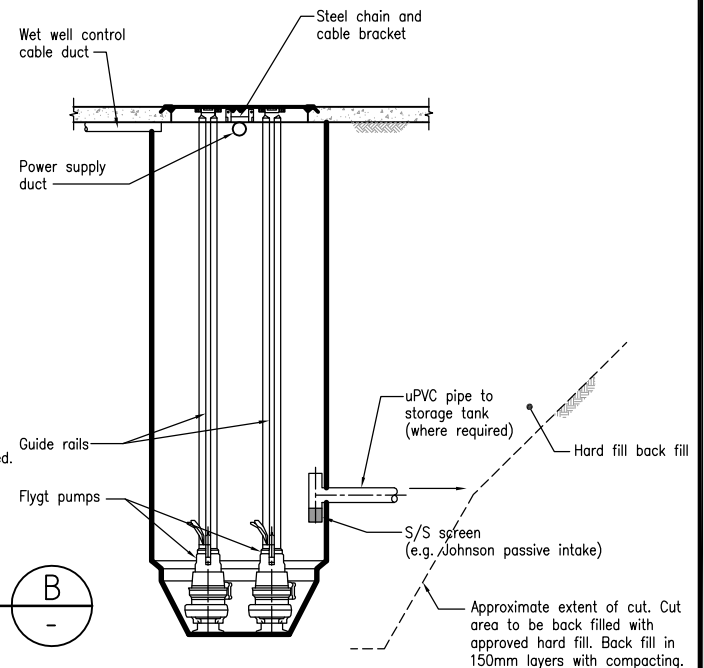
Notes:

1. Wet well – to be approved proprietary pump chamber constructed of GRP or other approved material (e.g. "Flygt Top"). The use of standard precast concrete manholes with cast in flanged base for pump wet wells will only be approved where there is no suitable proprietary chamber available, and with the approval of Council. All internal surfaces of concrete chambers are to be epoxy coated and all joints to be sealed.
2. Valve chamber – standard precast concrete manhole with cast in flanged base.
3. An approved packaged pumped station with integral valve chamber may be used.
4. Guide rails to be fabricated out of type 316 stainless steel.
5. Lifting chain to be fabricated out of type 316 stainless steel.
6. Lids shall be constructed of aluminium to details in Manukau City 'Engineering Quality Standards', complete with safety grid with grid size 100 x 100mm. For minor pump stations GRP lids may be approved.
7. Lids within 50m of residential properties shall have insulated lids.
8. Pump stations shall be provided with lighting for wet well covers and control cabinet.
9. Storage and odour control to be provided as required.
10. Electrical and control systems shall comply with WDC WDC Standard for Wastewater Pumping Station Electrical Engineering Systems.



- Note:**
1. All ducting pipes between wet wells and control cabinets or any other chambers shall have their cavity sealed for a minimum of 150mm at both ends to ensure no odour or gases travel through ducting pipes.
 2. All stainless steel to be grade 316.

SECTION A
 N.T.S.



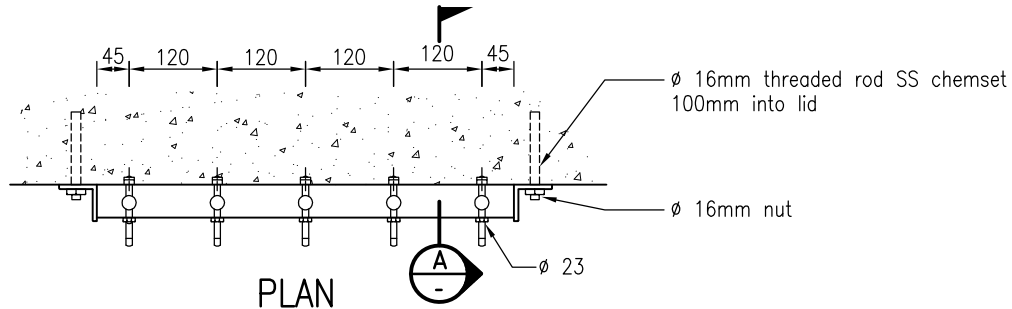
SECTION B
 N.T.S.

**SEWER PUMP STATION TYPICAL DETAILS
 FOR ALL ENVIRONMENTS**

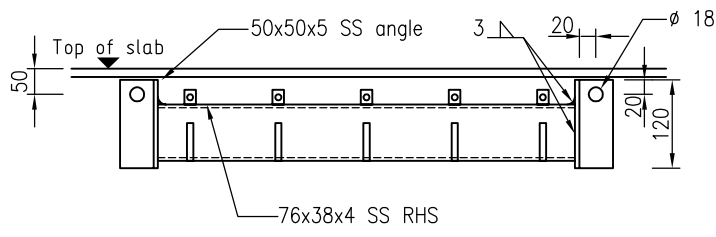


WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

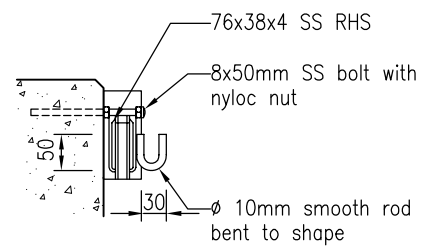
Date:	MAY 2006
Revision:	
SHEET No.	26



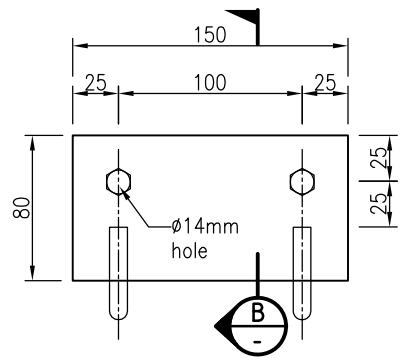
PLAN
N.T.S.



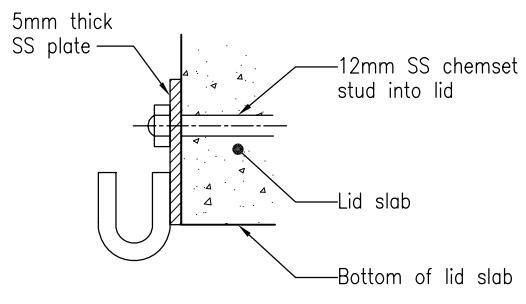
ELEVATION
N.T.S.



SECTION A
N.T.S.

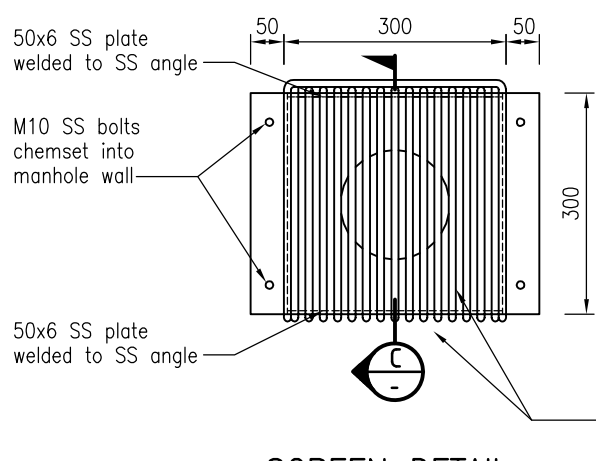


ELEVATION
CHAIN AND CABLE BRACKET
N.T.S.

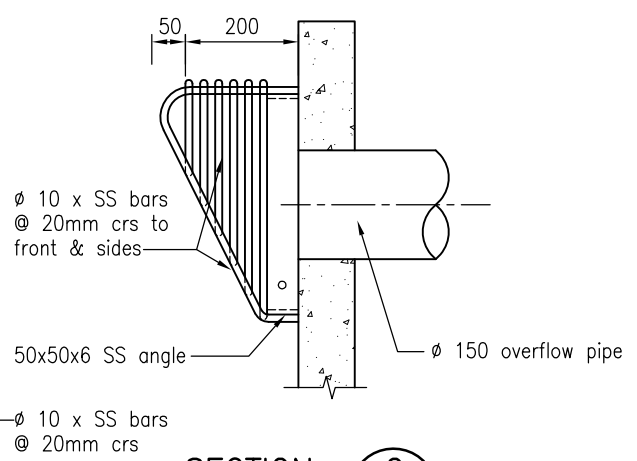


SECTION B-B

Note:
All fittings to be type 316 S/S



SCREEN DETAIL
N.T.S.



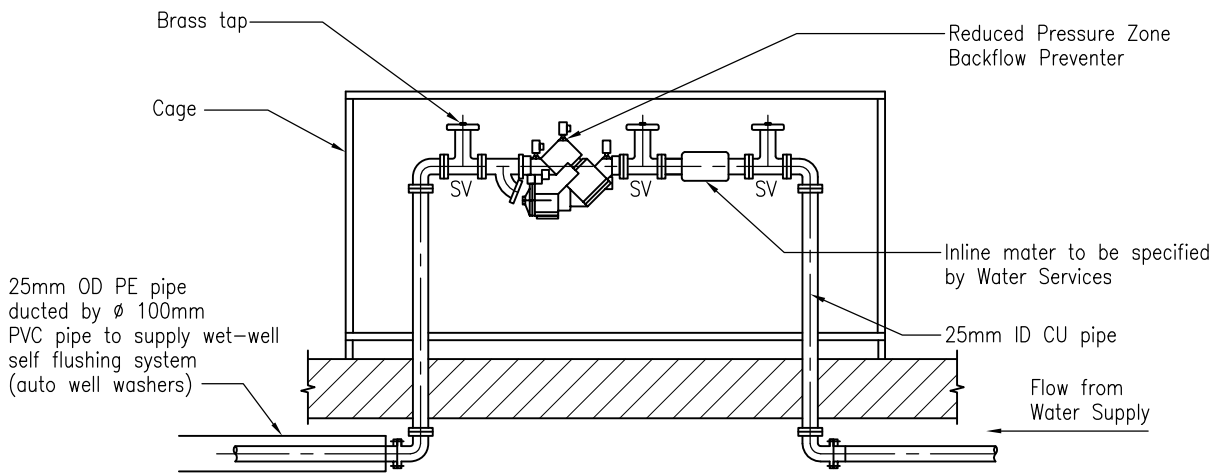
SECTION C
N.T.S.

SEWER PUMP STATION METAL WORK DETAILS

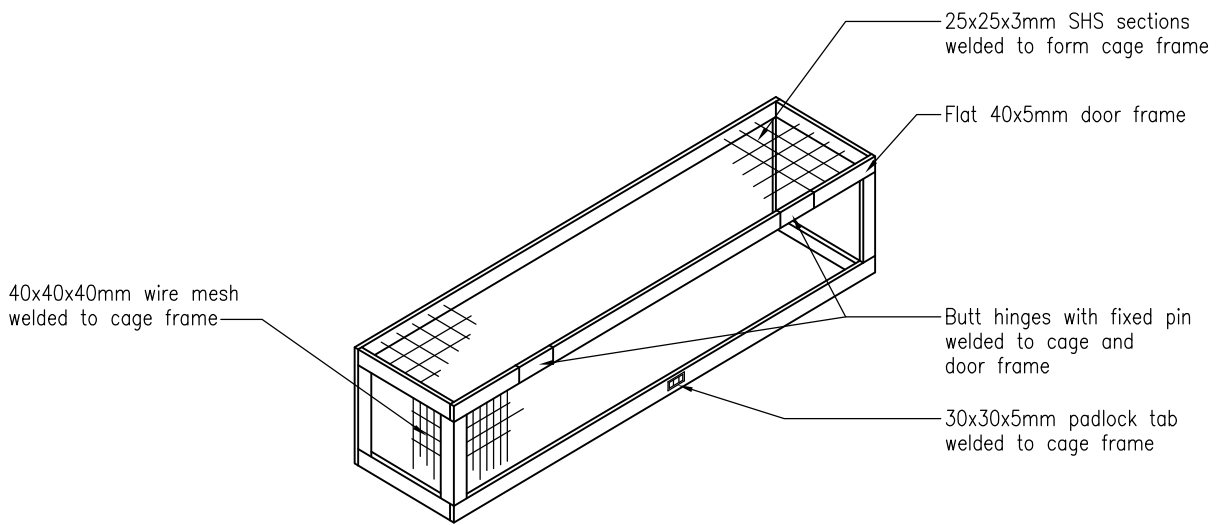


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date:	MAY 2006
Revision:	
SHEET No.	27



TYPICAL PIPE DETAIL N.T.S.
FOR 50mm + ID BFP



CAGE DETAIL
N.T.S.

Refer to sheet 26.

**RPZ WATER CONNECTION
REQUIRED FOR SEWER PUMP STATIONS**



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

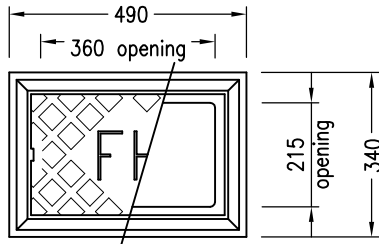
Date: MAY 2006

Revision:

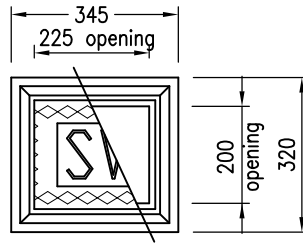
SHEET No.

28

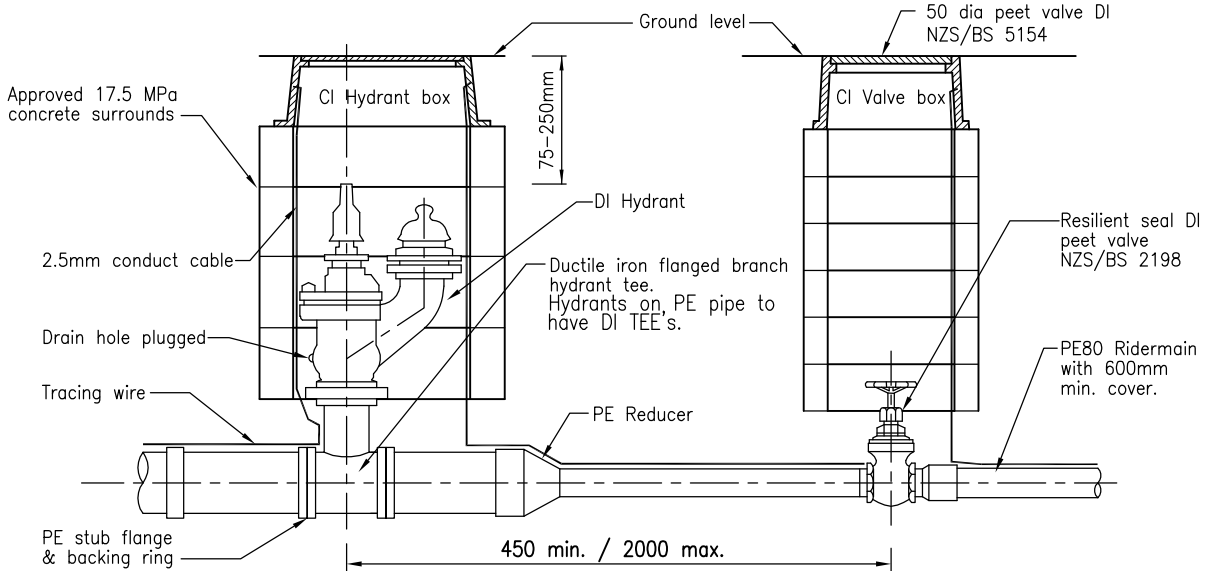
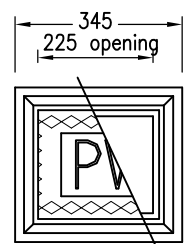
"TALL TYPE" screw down DI hydrant to NZS/BS 750. To close clockwise when viewed from above.



PLAN CAST IRON HYDRANT BOX



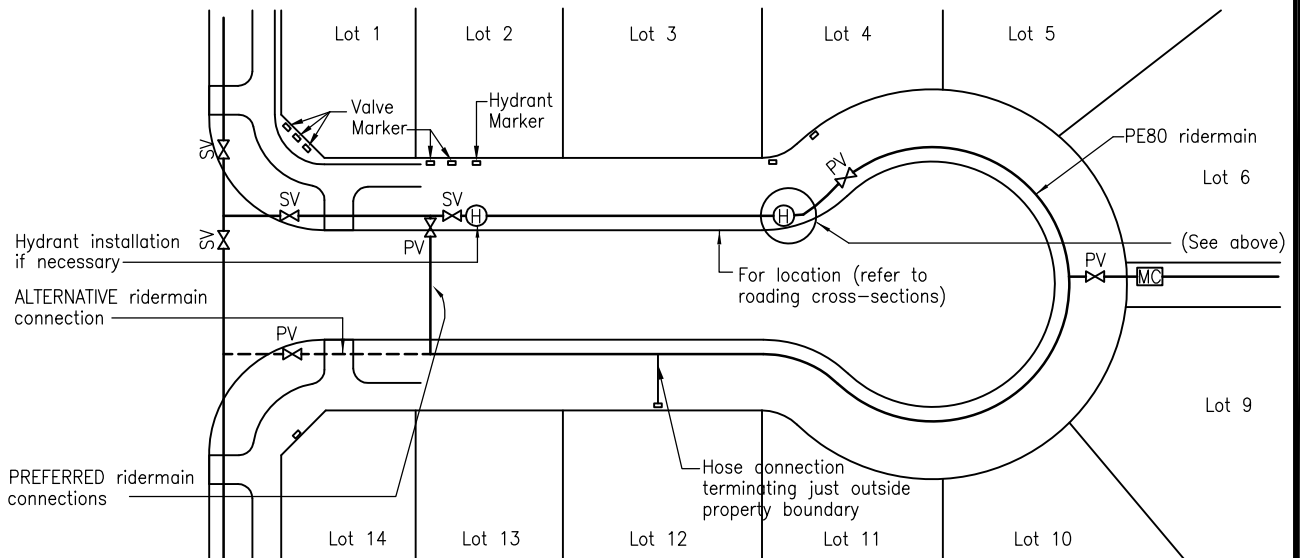
PLAN CAST IRON VALVE BOX



ELEVATION

Notes

1. Deflection of joints is not to exceed the manufacturers recommendation.
2. Where there are more than 15 connections from a rider main, an isolating peet valve should be provided in the middle of the rider main.
3. All underground bolts to be stainless steel and wrapped with denso tape, mastic and polytape.
4. Service connections to terminate just outside from boundary with an approved manifold, meter box (including base) and diaphragm valve including dual check valve.
5. Dimensions to be supplied with as-builts.



**WATER PIPELINE DETAILS
FOR ALL ENVIRONMENTS**



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No. **29**

100mm galvanised steel or reinforced concrete box to suit

Developer to leave minimum length of 250mm pipe inside box at time of construction

Room for BFP

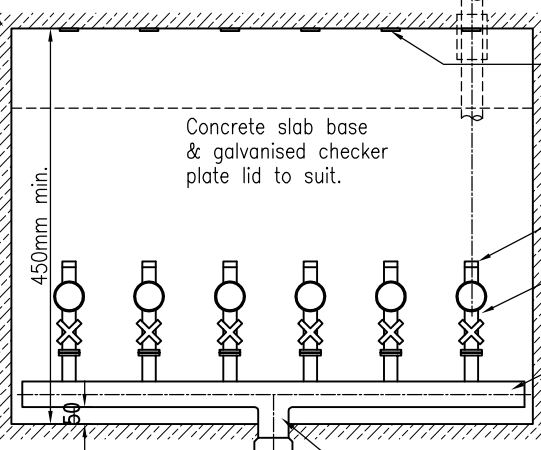
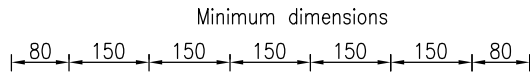


Plate or ID tag show lot number. Tag min. 50 x 50 with plastic stick or labelling as per fire hydrants.

Brass plug

Water Meter manifold with Diaphragm valve

50mm Copper manifold

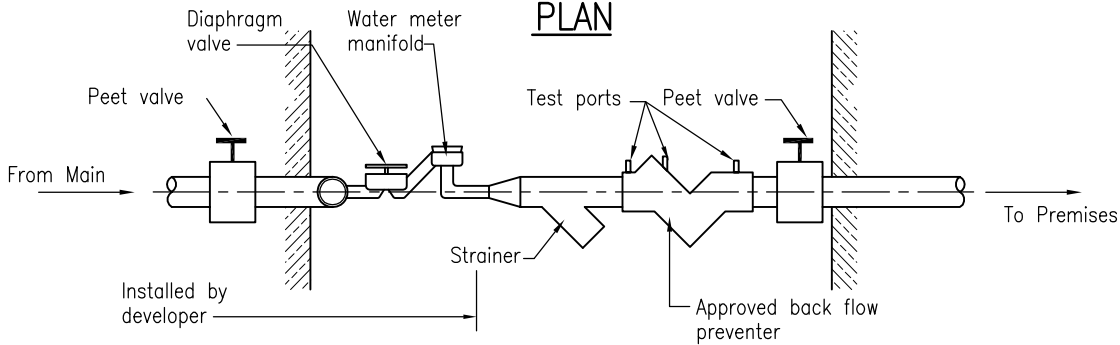
Peet Valve

63mm Ø OD PE pipe and fittings

50mm TEE

NOTE:
House No. on each tapping.

PLAN



**METERED SUPPLY WITH DOUBLE CHECK VALVE
BACK FLOW PREVENTER**

NOTE:

1. All fittings to be WDC approved. If galvanised steel box is used holes for pipes to be drilled before galvanising.
2. The width and length of box is to suit the number of meters. The minimum width shall be 450mm and the minimum length 450mm.
3. The width of box may be modified to accommodate pressure reducing valves if required.
4. The numbered tags to be provided on each connection starting with unit 1 (or the lowest unit number) from one side. The tags shall be clearly marked firmly attached.
5. Back flow preventers shall be provided if required by WDC bylaws.

Refer to sheet 28.

**MULTIPLE WATER CONNECTIONS & BACK FLOW PREVENTERS
FOR ALL ENVIRONMENTS**



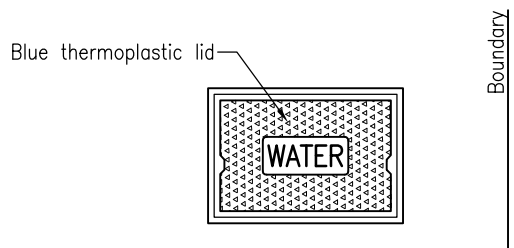
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

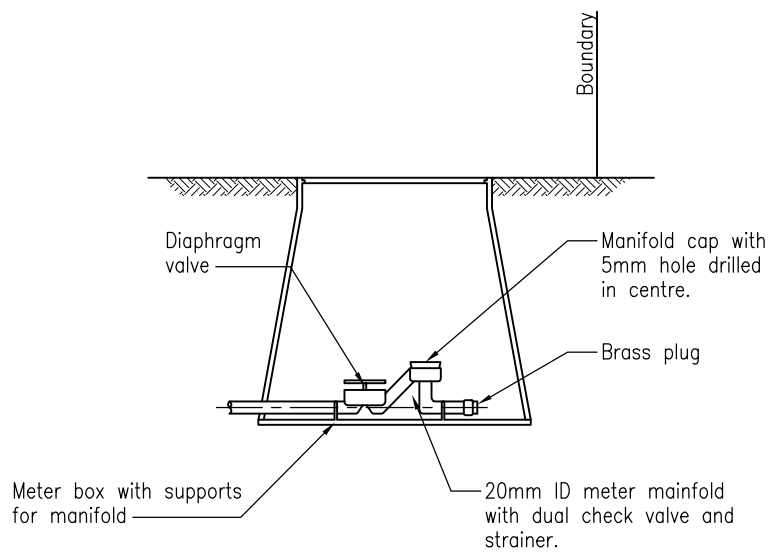
Revision:

SHEET No.

30



PLAN



SINGLE METER BOX CONNECTION

Refer to sheet 26.

SINGLE METER BOX CONNECTION
FOR ALL ENVIRONMENTS



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

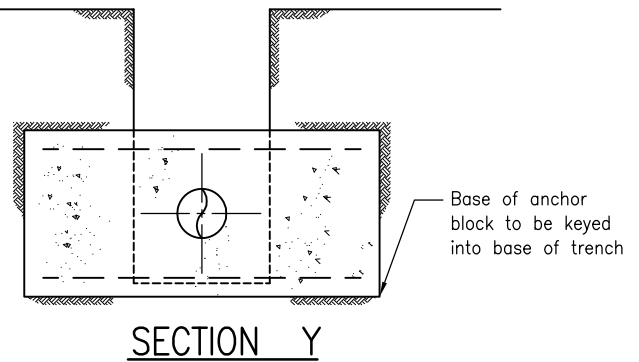
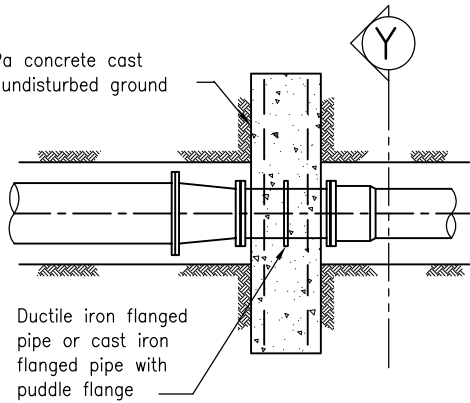
Date: MAY 2006

Revision:

SHEET No.

31

17.5 MPa concrete cast against undisturbed ground

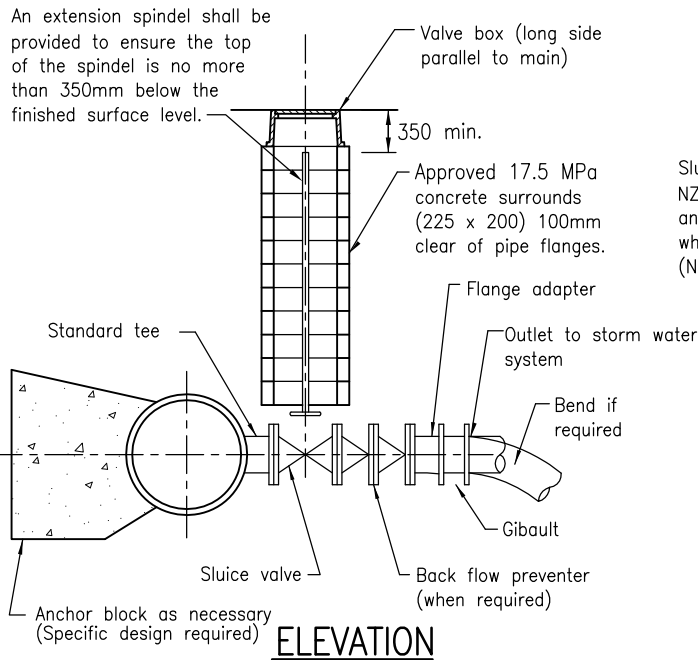


ANCHOR BLOCKS AT REDUCERS

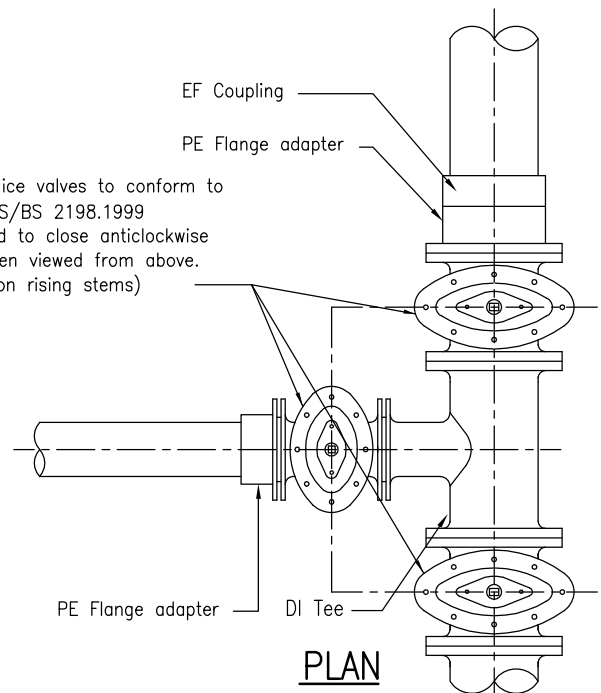
NOTES:

1. Calculations for anchor blocks at reducers and vertical curves must be shown with Engineering drawings.
2. Refer to sheet 26 for anchor block dimensions.

An extension spindle shall be provided to ensure the top of the spindle is no more than 350mm below the finished surface level.



Sluice valves to conform to NZS/BS 2198.1999 and to close anticlockwise when viewed from above. (Non rising stems)



VALVE INSTALLATION DETAILS

Refer also to Sheet 26, same note of conditions apply.

ANCHOR BLOCK AND VALVE INSTALLATION DETAILS FOR ALL ENVIRONMENTS



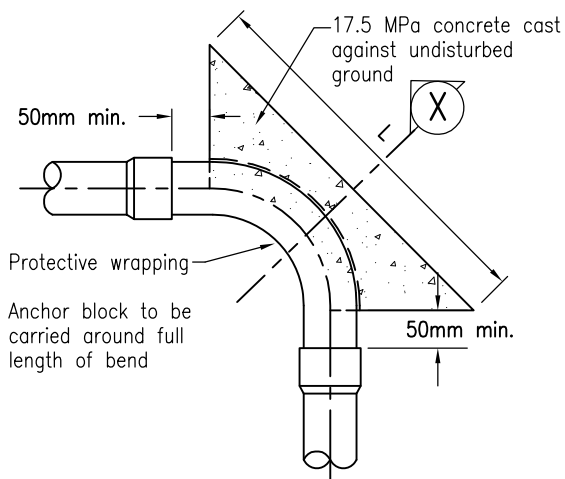
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

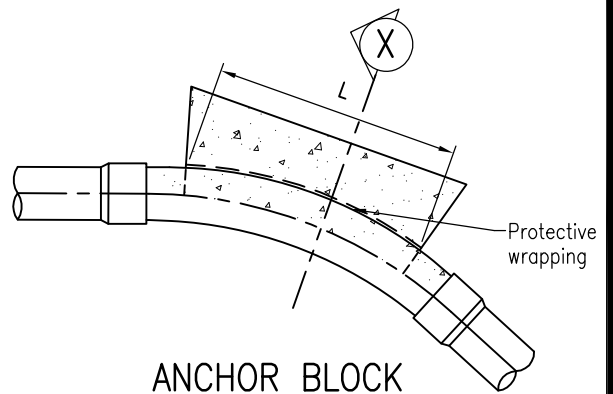
Revision:

SHEET No.

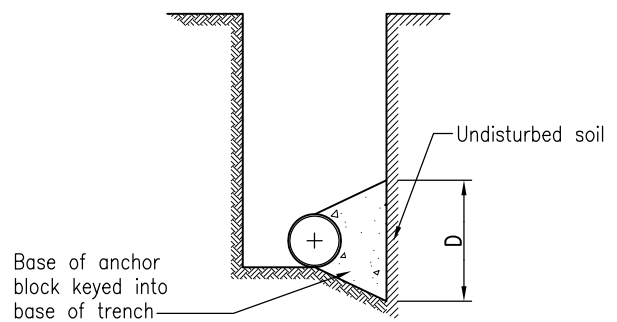
32



ANCHOR BLOCK
FOR 90° BENDS



ANCHOR BLOCK
FOR 45° BENDS



SECTION X

Nom Pipe Diameter	90° Bend		45° Bend		Tee or Closed End		22.5° Bend		11.25° Bend	
	L	D	L	D	L	D	L	D	L	D
100	740	400	500	320	520	400	300	300	300	300
150	1340	460	700	470	870	500	500	340	300	300
200	1610	660	960	600	1150	650	740	400	490	300
250	2000	800	1250	700	1420	800	890	500	640	350
300	2330	1000	1560	800	1650	1000	1080	600	810	400

NOTES:

- 1) Anchor block dimensions for firm soil conditions.
- 2) The dimensions to be increased or decreased for variation in soil conditions.
- 3) Allowable bearing stress used – 100 KPa.
- 4) Internal pipe test pressure up to 1800 KPa (18Bar).
- 5) All underground bolts to be wrapped with denso tape.
- 6) Protective membrane to be bitumised paper, thin roofing felt or polythene film applied to a thickness of 2.5mm.
- 7) If an anchor block is to be supported by engineered fill material, it shall be specifically designed, taking into account all design actions, including the weight of the concrete, with allowance for safety factors.

ANCHOR BLOCK DIMENSIONS
FOR ALL ENVIRONMENTS

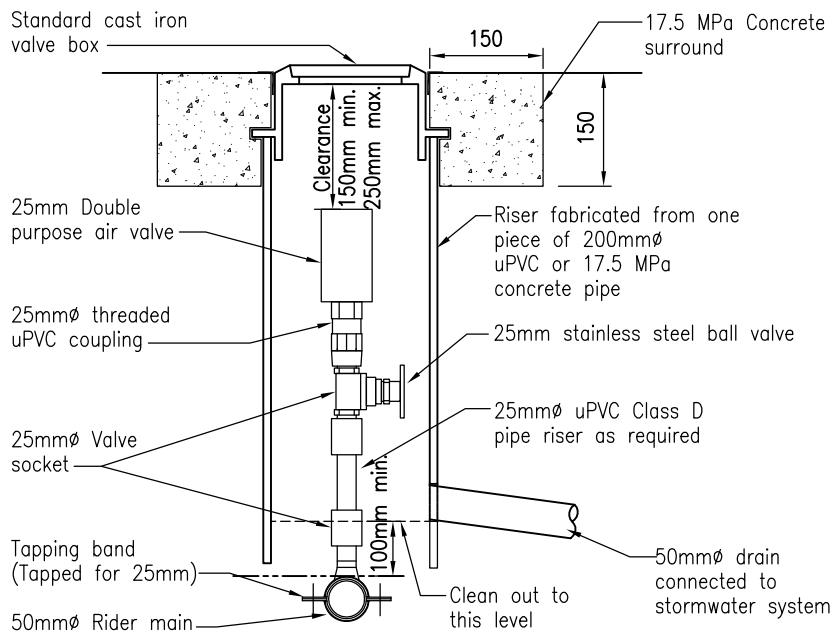


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

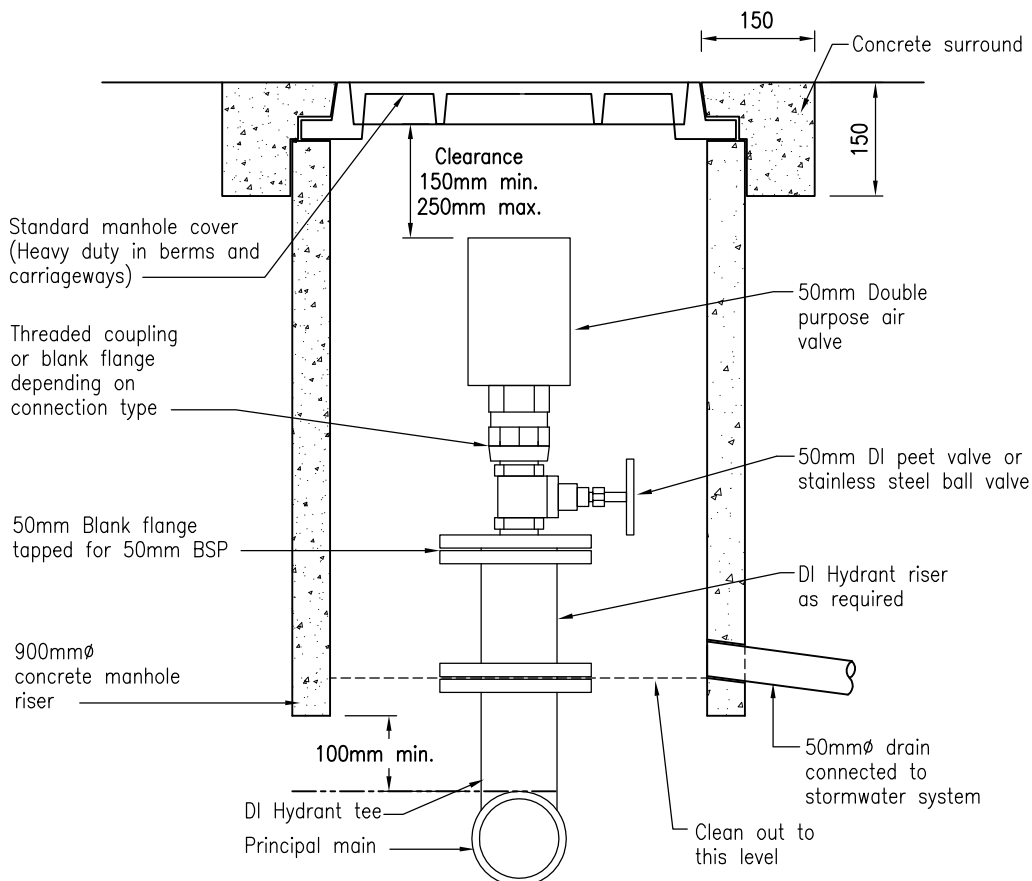
Revision:

SHEET No. **33**



STANDARD AIR VALVE DETAIL FOR 50mm ϕ RIDER MAINS

NB: Underground bolts to be wrapped with DENSO tape



STANDARD AIR VALVE DETAIL FOR PRINCIPAL MAINS

NB: Underground bolts to be wrapped with DENSO tape

AIR VALVE DETAILS
FOR ALL ENVIRONMENTS



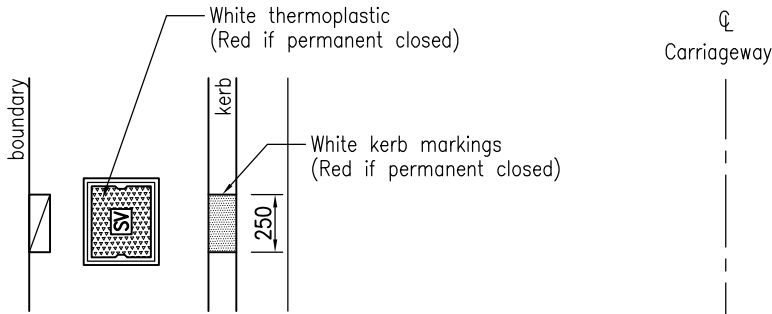
WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

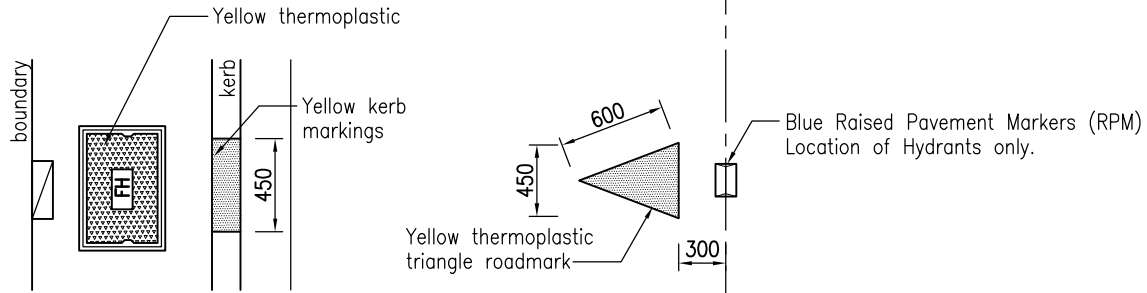
Revision:

SHEET No.

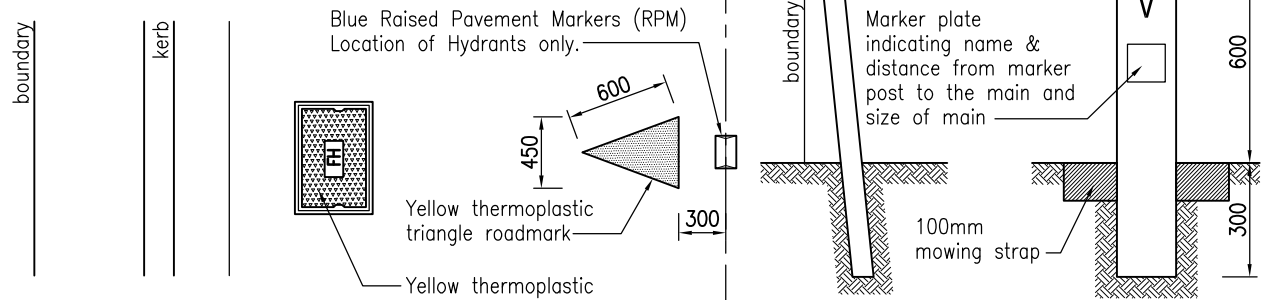
34



SLUICE VALVE MARKING



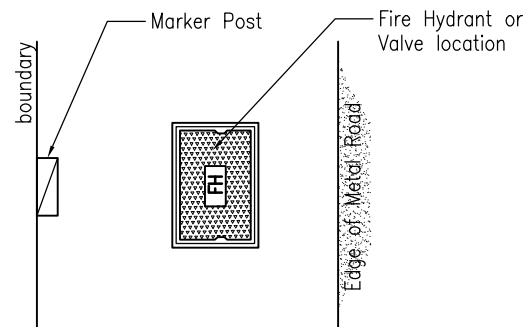
Hydrant located in Berm area



Hydrant located in Carriageway

HYDRANT MARKINGS

HYDRANT / SLUICE VALVE MARKER POSTS



HYDRANTS ON UNSEALED ROADS

Note:
 Marker post to be a white plastic for valves and yellow plastic for hydrants.
 The name of the valve shall be supplied by WDC Water Services.

VALVE AND HYDRANT MARKERS

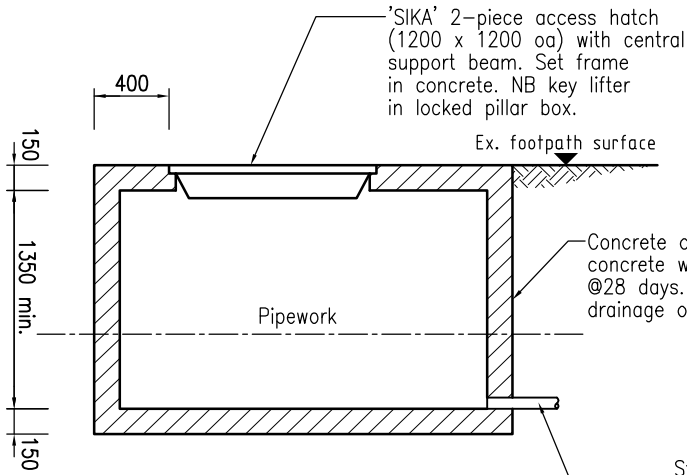


WHANGAREI DISTRICT COUNCIL
 ENVIRONMENTAL ENGINEERING STANDARDS

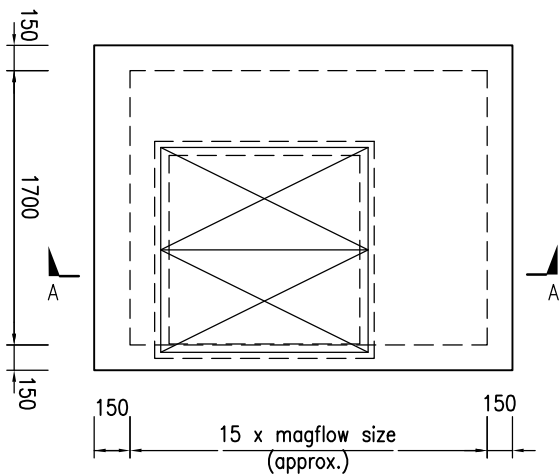
Date:	MAY 2006
Revision:	
SHEET No.	35



MAGFLOW & FLOW CONTROL VALVE INSTALLATION
FOR ALL ENVIRONMENTS

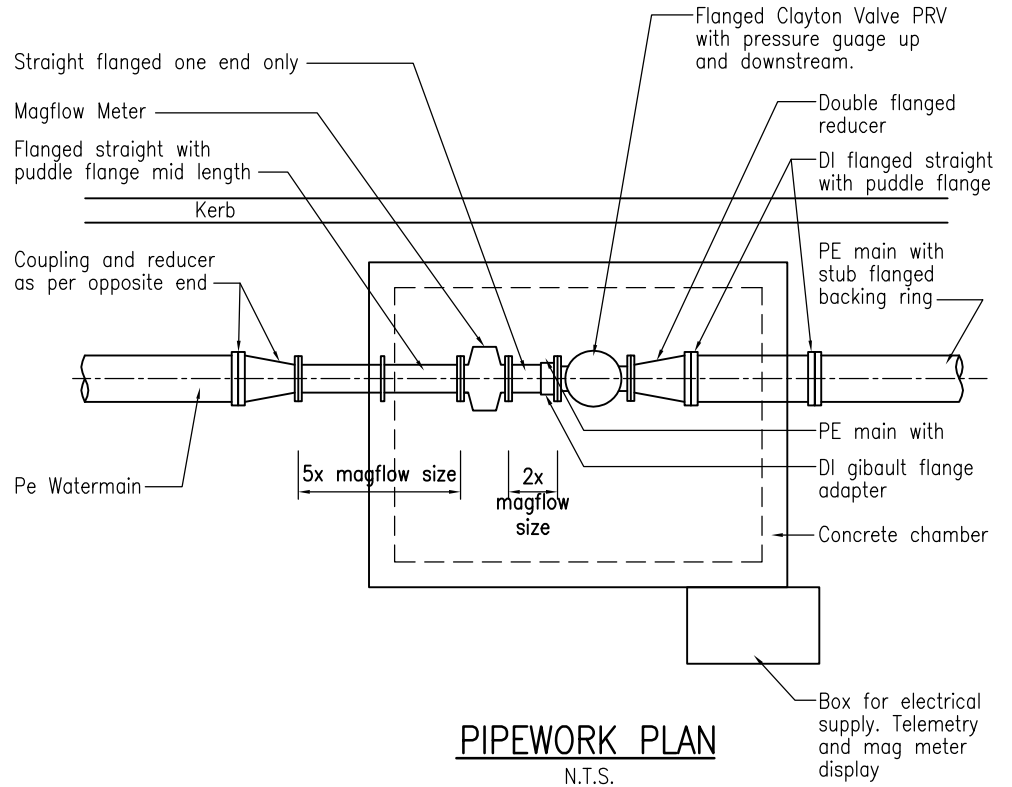


SECTION A-A
N.T.S.

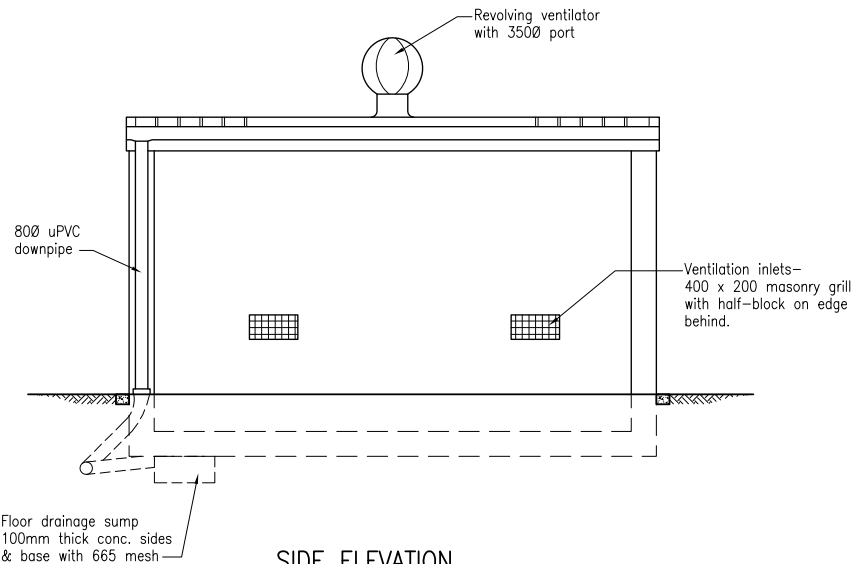


ROOF PLAN
N.T.S.

Note:
Construct concrete plinth under PRV for permanent support.
Magflow Meter & Flow Control Valve to be sized by Water Services Engineer.

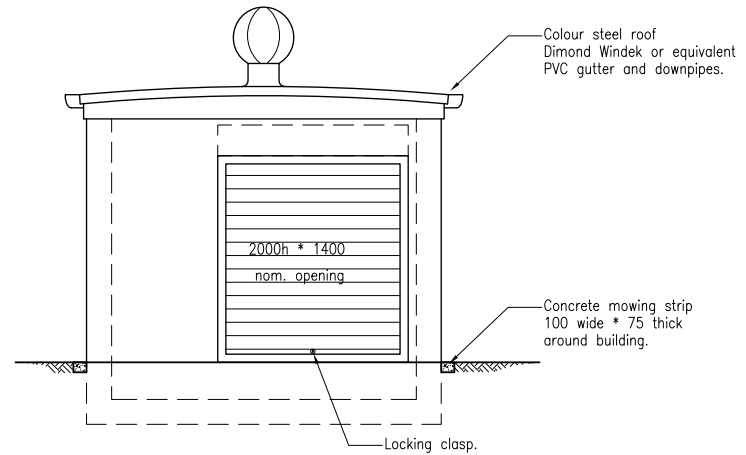


PIPEWORK PLAN
N.T.S.



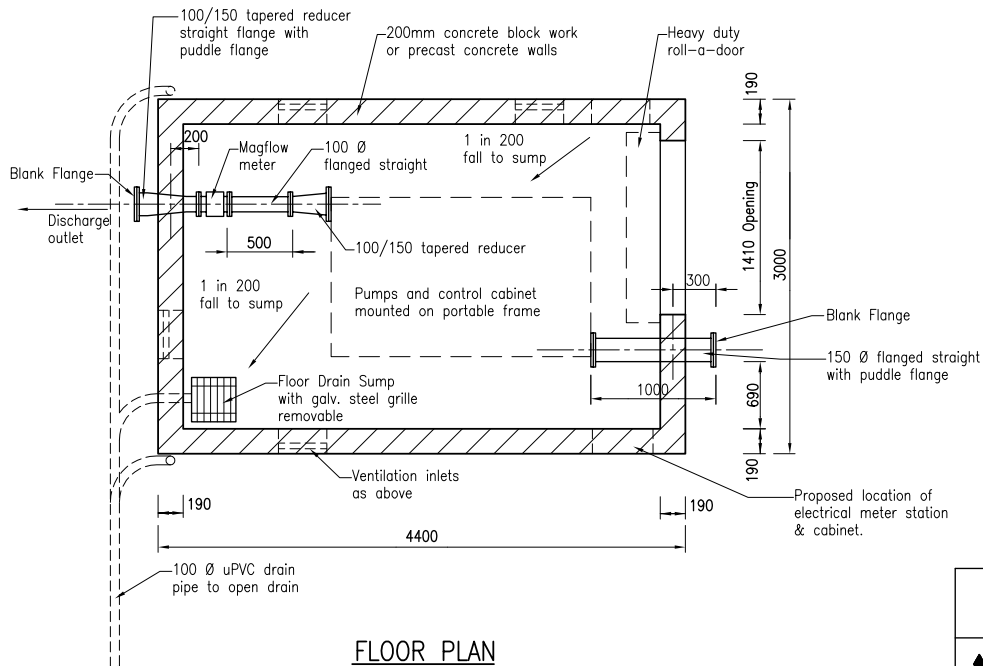
SIDE ELEVATION

N.T.S.



FRONT ELEVATION

N.T.S.



FLOOR PLAN

N.T.S.

NOTES:

- 1) The details & dimensions shown are for guidance only and may need to be changed for particular situations.
- 2) All fabricated pipework to be "Class K9 cement mortar lined ductile iron pipe in accordance with AS2280: 1988".
- 3) Jointing to be with "Tyton" rubber rings.
- 4) Pump set to be type Grundfos Hydro 2000 Booster System or similar.
- 5) The details shown are based on 150mm dia pipework and should be used for guidance only.
- 6) All details including structure, access etc. shall comply with the New Zealand Building Code and related documents.
- 7) Steps shall be provided as required between the doorway and floor level.
- 8) A minimum space of 800mm should be provided around pumps and electrical/ control cabinets for maintenance access.
- 9) The building shall be provided with internal lightning and power points.
- 10) The pump house shall be located on a separate lot, or within the road reserve where approved by the water manager.
- 11) Provision shall be made for parking and access to the doorway by maintenance vehicles.
- 12) Details of power & telemetry required to be obtained from Water Services Manager.
- 13) Refer to briefing document – EES 2, water pumping stations, electrical engineering systems, pumpsets rated above 5kW.

**WATER SUPPLY PUMP STATION DETAILS
FOR ALL ENVIRONMENTS**

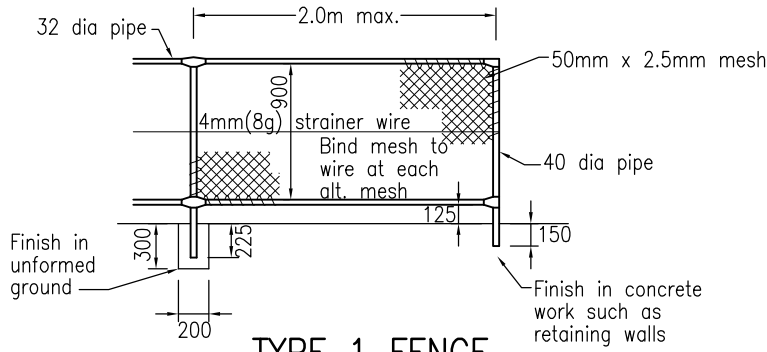


WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

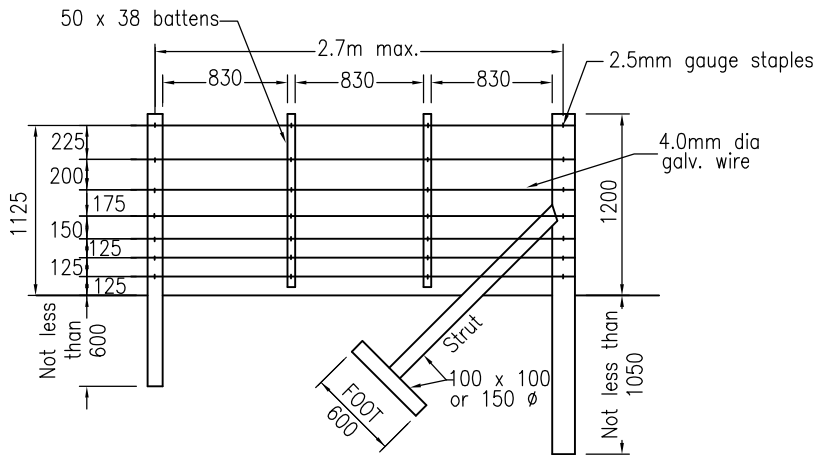
Date: MAY 2006

Revision:

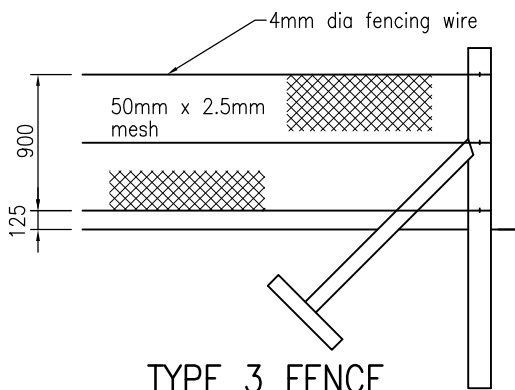
SHEET No. **37**



TYPE 1 FENCE
WALKWAYS AND SIMILAR



TYPE 2 FENCE
WALKWAYS AND SIMILAR



TYPE 3 FENCE
WALKWAYS AND SIMILAR

(Posts, struts, and footings as per Type 2 fence.)

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.

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
FOR ALL ENVIRONMENTS



WHANGAREI DISTRICT COUNCIL
ENVIRONMENTAL ENGINEERING STANDARDS

Date: MAY 2006

Revision:

SHEET No.

38