**B1 Services - General Layout**

**TRENCH DETAILS & UNDERGROUND UTILITIES IN VERGE**

**NOTE**
Seperation from watermain defined in CPB Table 6.6 (varies with pipe size)

Drawing B1-1 Typical Combined Service Trench Detail
Drawing B1-2 Standard Pipe Embedment

**NOTE**

1. ALL DIMENSIONS IN MILLIMETERS
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH CM-001
3. PIPE CLASSIFICATION
   (a) RIGID PIPES: PVC, PE, STEEL, AND CL
   (b) FLEXIBLE PIPES: PVC, GRP AND PE
4. PLACEMENT OF EMBEDMENT, TRENCH FILL AND
   COMPACTION TO MEET THE REQUIREMENTS OF DRAWINGS
   AND SPECIFICATION.
5. EXCAVATE OR COMPACT TRENCH FLOOR TO PROVIDE A
   FLAT FIRM BASE TO SUPPORT BEDDING MATERIAL AND
   MINIMIZE PIPE SETTLEMENT.
   WHEN EXCAVATED, REPLACE WITH GRANULAR MATERIAL
   AS SPECIFIED FOR BEDDING OR ADAPT TYPE 1,2,3 OR 4
   SUPPORT AS REQUIRED.
6. ENSURE BEDDING IS DEEP ENOUGH THAT PIPE JOINT
   PROJECTIONS (SOCKETS AND FLANGES) DO NOT TOUCH
   TRENCH FLOOR - SEE CM-001.
7. TYPE 4 SUPPORT TO BE USED WHERE MIGRATORY NATIVE
   SOILS (SANDS AND CLAYS) ARE ENCOUNTERED ADJACENT
   TO THE EMBEDMENT ZONE AND SINGLE SIZED AGGREGATE
   IS USED.
8. GEOTEXTILE OVERLAY IS REQUIRED FOR COARSE
   AGGREGATE EMBEDMENT >5mm
   LAY GEOTEXTILE FILTER FABRIC AGAINST TRENCH FLOOR
   AND WALLS SUCH THAT IT FULLY ENCASES THE
   EMBEDMENT
   - PRESS FILTER FABRIC INTO VOES BEFORE INSTALLING
   EMBEDMENT TO PREVENT FABRIC TEARING
   - PROVIDE A MINIMUM OF 250 OVERLAP AT ALL FILTER
   FABRIC JOINTS
9. IN SOME AREAS LOCAL PRACTICE MAY ALLOW USE OF
   SELECTED EXCAVATED MATERIAL AS PIPE EMBEDMENT.
10. IN UNSUITABLE GROUND CONDITIONS SPECIFIC DESIGN IS
    REQUIRED REFER TO WSA 03 & WSA 04 DRAWINGS FOR
    GUIDANCE.
11. CONCRETE PIPES SHOULD BE BASED ON FIGURES 11 TO 13
    IN ASNZS 3725.
Drawing B1-3 Typical Pipe Bedding & Backfill for Carriageways
Drawing B1-4 Typical Pipe Bedding & Backfill for Vehicle Crossings & non trafficable
Drawing B-1-5 Manhole Detail A –Typical Plan view

**MINIMUM MANHOLE INTERNAL DIAMETER (mm)**

<table>
<thead>
<tr>
<th>OUTLET PIPE DIA. (mm)</th>
<th>PIPELINE DEVIATION ANGLE (θ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0°-15°</td>
</tr>
<tr>
<td>Up to 300</td>
<td>1050</td>
</tr>
<tr>
<td>375-600</td>
<td>1050</td>
</tr>
<tr>
<td>675-750</td>
<td>1200</td>
</tr>
<tr>
<td>825-900</td>
<td>1500</td>
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</tbody>
</table>

* TO BE USED AS A MINIMUM GUIDE ONLY. LARGER DIAMETERS MAY BE REQUIRED WHERE MORE THAN 1 INLET PIPE IS TO BE CONSTRUCTED OR IF DEPTH EXCEEDS 4M OR WHERE REQUIRED BY THE MANUFACTURERS STANDARDS OR TO ACHIEVE HYDRAULIC EFFICIENCY IN THE BASE OF THE MANHOLE.

**NOTES**

1. ALL IN SITU CONCRETE SHALL HAVE A MINIMUM COMpressive STRENGTH OF 20MPa @ 28 DAYS.
2. ALL PRECAST MANHOLE UNITS (SHOWN SHADEd IN DRAWING D02) TO BE STANDARD MANUFACTURED UNITS. (IE. HUMES OR SIMILAR APPROVED)
3. ALL BRANCHES SHALL BE CONSTRUCTED SUCH THAT THEY CAN BE READILY ACCESSED BY CCTV CAMERA. THE HAUNCHING DETAIL (IE. CROSS SECTION) SHALL NOT BE COMPROMISED. IF REQUIRED, THE "STRAIGHT THROUGH" CHANNEL SHALL BE OFFSET FROM THE MANHOLE CENTRELINE AND THE BRANCH CHANNELLING LEFT STRAIGHT FOR A SUFFICIENT LENGTH TO ACHIEVE THE DESIRED RESULT.

---
NOTE:
1. MANHOLES WITH DEPTH TO INVERT GREATER THAN 4m SHALL HAVE A SAFETY PLATFORM INSTALLED AS PER QLD C DRAWING D05
2. MANHOLES DEEPER THAN 6.0m SHALL BE REFERRED TO THE ENGINEER FOR SPECIFIC DESIGN

SECTION ON A/CM-004a

STANDARD HEAVY DUTY CI MANHOLE LID AND FRAME WITH 600mm MIN CLEAR OPENING FLUSH WITH SURFACE.

TYPICAL JOINT DETAIL

SECTION ON B/D01

Drawing B1-6 Manhole Details B
Drawing B1-7  Manhole Detail C
NOTE:
1. ALL DIMENSIONS IN MILLIMETERS.
2. ALL STEEL FITTINGS (INCLUDING BOLTS) TO BE GRADE 316 STAINLESS STEEL.
3. ON 1200 MH TO BE USED WHERE DROP PILE > ON 150 OR MORE THAN ONE ON 150 INTERNAL DROP IS USED.
4. INTERNAL DROP NOT NORMALLY USED IN STORMWATER APPLICATIONS.
5. ALL CAST IN-SITU BENCHEING AND HAUNCHING TO BE 30MPa CONCRETE UNLESS OTHERWISE SPECIFIED BY TA.

Drawing B1-8 Mini & Drop Manhole Detail
Drawing B1-9: Manhole Detail – Typical Cross Section

NOTE:
1. MANHOLES WITH DEPTH TO INVERT GREATER THAN 4 m SHALL HAVE A SAFETY PLATFORM INSTALLED
2. MANHOLES DEEPER THAN 6.0 m SHALL BE REFERRED TO THE ENGINEER FOR SPECIFIC DESIGN
TRAFFICABLE CAST IRON LID

COMPACTED ROAD SURFACES

20MPa CONCRETE COLLAR

COMPACTED BACKFILL EVENLY IN LAYERS

PVC RISER SHAFT

GRANULAR BEDDING MATERIAL

MAINTENANCE ACCESS BASE

20MPa CONCRETE BASE

Ø150 MAX. PVC

100 MIN

100 MIN

Ø300 MIN

2600 MAX

200 MIN

150 MIN

DEPTH TO INVERT 2000 MAX.

STOPPER TO BLANK OFF INLETS NOT REQUIRED

FLOW

3/150φ INLETS

NOTE:
ONLY TO BE USED FOR THE TERMINATING MANHOLES IN COMMON EASEMENTS OR RIGHT OF WAY ACCESS FOR RESIDENTIAL SITES WITH A MAXIMUM OF THREE 100mmφ HOUSE CONNECTIONS, OR WHERE DIRECTED BY THE ENGINEER.

Drawing B1-10: PVC Inspection Chamber (Residential Only)
OPTION 1 - LATERAL OFF RODDING EYE STANDPIPE

OPTION 2 - LATERAL OFF 150mm CONNECTION TO MANHOLE

Drawing B1-11: Lateral Connections for two Properties
Drawing B1-12: Manhole Typical Heavy Duty Frame & Lid
**Drawing B1-13: Domestic Drainage (Shallow Connection) Detail**

**PLAN VIEW**

- **Property Boundary**
- **Trench Reinstatement to be as detailed in D07 and D08**
- **50mm Min Freeboard**
- **Compacted Sand Fill or Granular Bedding**

**SHALLOW CONNECTION**

- **Depth to Invert Less Than 1.2m**

**NOTES:**

1. Marker posts to be painted blue for stormwater connections or red for foul sewer connections.
2. All connections shall have no access fittings on line, no change of direction, or change of grade within 3m of main connection.
DRAWING B1-14: Domestic Drainage (Deep Connection) Detail

DEEP CONNECTION

DEPTH TO INVERT MORE THAN 1.2m

PROPERTY BOUNDARY

TRENCH REINSTALLATION TO BE AS DETAILED IN D07 AND D08

PAINTED MARKER POST

PIPE TO BE SEALED OFF WITH SCREW CAP IF NOT IMMEDIATELY CONNECTED
SCREW CAP TO BE PAINTED STORMWATER = BLUE, WASTEWATER = RED

DEPTH TO BE SUFFICIENT TO ALLOW CONNECTION TO FURTHEST POINT OF SITE

75mm GRANULAR BEDDING ≤5mm

150mm MIN. 20MPa MIX

45° BEND

USE FACTORY MADE Y JUNCTION CUT INTO MAIN AND SEALED ON WITH: 2x SEWER COUPLINGS WITH SHEAR BANDS FOR AC AND EW PIPES
2x PROPRIETARY COUPLING BANDS FOR VC AND PVC PIPES
45° Y JUNCTION ONLY - NO "LONDON JUNCTIONS"
Drawing B1-15: Anti-Scour Blocks For Steep Lines
CONCRETE TO FINISH FLUSH WHEN POSITIONED IN THE VERGE

665 MESH

GEO FABRIC

C.I. SURFACE BOX TO BS.750:1984 GRADE A, PAINTED ROADMARK YELLOW.

CONCRETE TO FINISH 30mm BELOW SURFACE TO ALLOW ASPHALT TO BE APPLIED WHEN POSITIONED IN THE ROAD

100X100 BLOCKS OR INTERLOCKING PRECAST BOXES.

STREAMLINE HYDRANT, SCREWDOWN TYPE. HYDRANT TO CONFORM TO NZS 4522:2010

BASE OF BOXES TO BE NOT HIGHER THAN BASE OF HYDRANT & TO BE FOUND ON CONCRETE PAD

RISER CONNECTIONS OFF RISER NOT PERMITTED

HYDRANT TEE.

WATER MAIN

MECHANICAL COUPLER/FLANGE OR FUSION JOINT

CONCRETE ANCHOR FOR SUPPORT AND TO PREVENT SIDE MOVEMENT.

NOTES:
1. ALL DIMS. IN mm
2. WHERE MAINS ARE CONSTRUCTED IN PVC, USE STANDARD CAST IRON HYDRANT TEE AND STEP MECHANICAL COUPLER.
3. FROST PLUG TO BE INSTALLED

Drawing B2-1 Fire Hydrant
SECTION THROUGH FRAME AND COVER

PLAN VIEW

APPROX. WEIGHT: FRAME 22kg
COVER 8kg

Drawing B2-2 Fire Hydrant Cover
CONCRETE SHALL BE 30mm BELOW THE SURFACE TO ALLOW ASPHALT TO BE APPLIED WHEN POSITIONED IN THE ROAD

CONCRETE SHALL BE FLUSH WITH SURFACE WHEN POSITIONED IN VERGE

STANDARD PRECAST CONCRETE BLOCK OR 17MPa "CAST IN situ" CONCRETE SURROUND MIN. 430mm SQUARE, 150mm THICK

ELEVATION ON

PLAN

ALL DIMENSIONS IN MILLIMETRES

COVERS TO BE PAINTED WHITE

Drawing B2-3 Typical Cast Iron Valve Box
1. Connection to main to be made by Talbot ferrule or similar (to include isolation point).
2. Differences in elevation between main and toby to be addressed via installation of elbows, not by bending the lateral. The lateral shall be brought to the connection depth as soon as practical after the main.

**Typical Service Connection**

Drawing B2-4: Typical Service Connection
Drawing B2-5: Sluice Valve Detail
Drawing B2-6: Typical Thrust Block Details
Drawing B2-7: Residential Fire System Connection with Potable Supply
Commercial Fire Fighting Water Connection

1. A STANDARD ACUFLO BOX AND MANIFOLD WILL NOT BE APPLICABLE TO THIS INSTALLATION. ACUFLO HARDWARE IS ONLY SUITABLE FOR UP TO 25MM PIPE CONNECTIONS. THIS INSTALLATION WILL NEED TO BE CONFIGURED SPECIFIC TO THE SITE. REFER TO ITEMS BELOW THAT ARE MANDATORY:

- THE SERVICE PIPE SHALL HAVE A BLUE RESILIENT SEATED SERVICE VALVE IN ITS OWN VALVE BOX.
- A REDUCED PRESSURE ZONE BFP SHALL BE INSTALLED INSIDE THE BOUNDARY OF THE PRIVATE PROPERTY. IF THE WATER SUPPLY IS PROPOSED TO BE DIVIDED INTO MULTIPLE LINES TO SERVICE DIFFERENT AREAS OF THE SITE, THE BFP SHALL BE LOCATED ON THE SINGLE INCOMING WATER SUPPLY LINE IN ADVANCE OF ANY SUCH DIVISION.
- THIS BFP IS THE POS BFP DEVICE REQUIRED BY THE HEALTH AMENDMENT ACT 2007. THE DEVICE SHALL BE LOCATED IN AN ABOVE GROUND ENCLOSURE PREFERABLY.

LOCATING BACK FLOW PREVENTERS AND WATER METERS

2. BACK FLOW PREVENTERS SHALL BE LOCATED ON THE PROPERTY SERVED IN EVERY INSTANCE EXCEPT WHERE IN A CBD ENVIRONMENT WHERE THERE MAY BE NO SPACE WITHIN THE BUILDING FRONTAGE FOR AN ABOVE GROUND CABINET.
3. THE BFP SHALL BE ABOVE GROUND AND ALLOW ANY WATER DISCHARGED TO DRAIN TO GROUND IN AN OBVIOUS MANNER.
4. THE FIRST ISOLATION VALVE IS THE SUPPLY POINT; THIS IS THE BOUNDARY BETWEEN COUNCIL RESPONSIBILITY AND PRIVATE OWNER’S RESPONSIBILITY FOR SERVICE AND WATER QUALITY.
5. THE ISOLATION VALVE SHALL BE LOCATED ON THE ROAD IN ALL Instances AND SHALL NOT BE LOCATED ON A ROW OR EASEMENT.

Drawing B2-8: Commercial Fire System Connection with Potable Supply
1. A STANDARD ACUFLO BOX AND MANIFOLD WILL NOT BE APPLICABLE TO THIS INSTALLATION. ACUFLO HARDWARE IS ONLY SUITABLE FOR UP TO 25MM PIPE CONNECTIONS. THIS INSTALLATION WILL NEED TO BE CONFIGURED SPECIFIC TO THE SITE. REFER TO ITEMS BELOW THAT ARE MANDATORY:
   - THE SERVICE PIPE SHALL HAVE A BLUE RESILIENT SEATED SERVICE VALVE IN ITS OWN VALVE BOX PRIOR TO A WATER METER BOX.
   - A WATER METER BOX SHALL BE LOCATED 300MM BEFORE THE PRIVATE PROPERTY BOUNDARY. THE BOX SHALL CONTAIN A STRAINER AND APPROVED WATER METER OF A SUITABLE SIZE. THE METER SHALL HAVE THREE REGISTERS OF THE SUB M³ VALUES. THIS IS COUNCIL’S POINT OF SUPPLY BOUNDARY AND IS LOCATED IN THE STREET PRIOR TO THE REQUIRED BFP.
   - A BFP DEVICE OF EITHER RA TESTABLE DOUBLE CHECK VALVE ASSEMBLY OR REDUCED PRESSURE ZONE BFP SHALL BE INSTALLED INSIDE THE BOUNDARY OF THE PRIVATE PROPERTY. IF THE WATER SUPPLY IS PROPOSED TO BE DIVIDED INTO MULTIPLE LINES TO SERVICE DIFFERENT AREAS OF THE SITE, THE BFP SHALL BE LOCATED ON THE SINGLE INCOMING WATER SUPPLY LINE IN ADVANCE OF ANY SUCH DIVISION.
   - THIS BFP IS THE POS BFP DEVICE REQUIRED BY THE HEALTH AMENDMENT ACT 2007. IF THIS DEVICE IS ASSSESSED TO BE A RPZ THEN IT SHOULD BE LOCATED IN AN ABOVE GROUND ENCLOSURE PREFERABLY.
   - AN ELSTER HELIX 4000 OR C4000 / 4200 OR SENSUS MEITWIN; MEISTREAM; WP WATER METER SHALL BE INSTALLED ON TO THE MANIFOLD.

LOCATING BACK FLOW PREVENTERS AND WATER METERS

2. BACK FLOW PREVENTERS SHALL BE LOCATED ON THE PROPERTY SERVED IN EVERY INSTANCE EXCEPT WHERE IN A CBD ENVIRONMENT WHERE THERE MAY BE NO SPACE WITHIN THE BUILDING FRONTAGE FOR AN ABOVE GROUND CABINET.
3. THE BFP SHALL BE ABOVE GROUND AND ALLOW ANY WATER DISCHARGED TO DRAIN TO GROUND IN AN OBVIOUS MANNER. ANY PRV INSTALLED SUB GRADE (BELOW GROUND) OR IN A PIT SHALL HAVE A DRAIN CONNECTION TO DRAIN THE TUN-DISH OR TAKE ANY FULL FLOW FROM A FAILED DEVICE TO STORMWATER.
4. THE WATER METER IS THE SUPPLY POINT; THIS IS THE BOUNDARY BETWEEN COUNCIL RESPONSIBILITY AND PRIVATE OWNER’S RESPONSIBILITY FOR SERVICE AND WATER QUALITY.
5. THE WATER METER SHALL BE LOCATED ON THE ROAD IN ALL INSTANCES AND SHALL NOT BE LOCATED ON A ROW OR EASEMENT.
6. WATER METERS OF SIZES LARGER THAN 25MM WILL REQUIRE A JUMBO METER BOX AND A SEPARATE INDIVIDUAL TOBY VALVE WITH VALVE CHAMBER PRIOR TO THE WATER METER BOX.
7. THE WATER METER BOX SHALL HAVE A WORDS “METER” AND/OR “WATER METER” VISIBLE UPON THE COVER.
NOTE
CONSIDERATION NEEDS TO BE GIVEN FOR
UPSTREAM FILTER AND PRESSURE RELIEF VALVE
WHEN DESIGNING THE INSTALLATION OF THESE
VALVES

1. HUMES CONCRETE ACCESS
    CHAMBER - 1200 x 900 x 1200 DEEP
    (CODE 04698)
2. HUMES CONCRETE ACCESS
    CHAMBER LID (CODE 04695)
3. 2 x FLEXIBLE DISMANTLING JOINTS
4. PRESSURE REDUCING VALVE
    (BERMAD MODEL 720)
5. UPSTREAM AND DOWNSTREAM
    ISOLATING VALVE

Drawing B2-10: PRV Valve Chamber
Drawing B2-11: Water Sampling Point
Drawing B3-1: Private Pressure Sewer Main Connection to Sewer Lateral
**Installation Notes:**

1. Access hatch unit with the lid and base frame securely locked together to be laid loosely on concrete apron and checked for level using min. shimming.
2. After initial leveling, all other bolt down points must be shimmed to ensure no distortion of the frame occurs during final tightening of the hold down bolts.
3. After tightening hold down bolts all voids under the frame must be filled with dry pack mortar.

Drawing B3-2: Pump Station: Split Access Hatch
Drawing B3-3 Pump Station: Split Access Hatch Sections
2 HOLES DRILL & C'SINK TO
SUIT M8 SCREW FROM
UNDERSIDE - FIT M8 x 35 LG
C'SUNK HD. SCREW, WELD
OVER HEAD & GRIND FLUSH.

HATCH FRAME
MATERIAL: 316 STAINLESS STEEL

DETAIL 'A'

NOTES:
1. HATCH FRAME MUST BE SQUARE, CHECK ACROSS CORNERS TO CONFIRM
2. ALL WELDS TO BE CONTINUOUS

Drawing B3-4: Pump Station: Split Access Hatch Frame Details
SPLIT HATCH COVER (SOUND INSULATED)
MATERIAL: 5251 ALUMINIUM (UNLESS STATED OTHERWISE)
MEDIUM STRENGTH ALUM. - MAGNESIUM ALLOY FOR MARINE AND ROAD VEHICLES

NOTE: ALL WELDS TO BE CONTINUOUS EXCEPT WHERE STATED OTHERWISE

SPLIT HATCH COVER

Drawing B3-5: Pump Station: Split Access Hatch Cover Details
### Notes
1. Reinforcing floor and walls with 150 to 375 - 665 mesh
2. 450 to 600 - 663 mesh or 10 rod @ 250 CRS
3. 675 to 900 - 12 rod @ 250 CRS
4. 1050 to 1350 - 12 rod @ 150 CRS
5. All reinforcement shall be placed central in walls & floor, and shall be continuous between wall and floor.
6. Laps in structural grade bars to be 300mm minimum.
7. There shall be at least two bars whether mesh or mild steel, over the top of the pipe.
8. Concrete compressive strength is to be 20MPa @ 28 days.
9. Baffles are to be constructed as shown when outlet velocities and soil conditions dictate. In extreme cases specific design may be required.
10. Inlets/outlets exceeding 600mm@ to have anti-vermin screens fitted.

**Drawing B4-1: Inlet & outlet Structures**
Drawing B4-2: Concrete Capping Detail
**TYPICAL RIP RAP GEOTEXTILE LINED SWALE**

**SCALE 1:20**

1. **MIN. 150mm CONCRETE**
2. **MIN. 65mm REJECT GRAVELS BACKFILLED**
3. **WHILST CONCRETE STILL GREEN**
4. **600mm DRAIN COIL**
5. **WITH FILTERSOK**
6. **1200mm**
7. **MAX. GRADE 1:6**

**TYPICAL RIP RAP CONCRETE LINED SWALE**

**SCALE 1:20**

1. **WATER TABLE**
2. **CONCRETE FILLED CHANNEL BACKFILLED WITH REJECT GRAVELS**
3. **WHILST CONCRETE STILL GREEN**
4. **REJECT GRAVELS TO BE GREATER THAN 65mm**
5. **ALD CONCRETE TO BE 20 MPa AT 28 DAYS**
6. **MAX. GRADE 1:6**

---

**NOTE:**
- RIP RAP SWALES TO BE APPLIED TO WATER DRAINAGE TABLES WITH LONGITUDINAL GRADIENT OF > 10%

Drawing B4-3: Rip Rap Lined Swale
LONGITUDINAL SECTION

CROSS SECTION

Drawing B4-4: Rip Rap Lined Swale
Drawing B4-5: Scruffy Dome Detail
Drawing B4-6: Soak Pit
DOUBLE SUMPS WHERE CUL-DE-SAC HEAD IN LOW POINT

KERB LINE FOR OFFSET CUL-DE-SAC TURNING AREA

8.0 m RADIUS

10 m RADIUS

KERB LINE FOR OFFSET CUL-DE-SAC TURNING AREA

RADIUS TABLE

<table>
<thead>
<tr>
<th>Type</th>
<th>Radius</th>
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<tbody>
<tr>
<td>Residential</td>
<td>10 m</td>
</tr>
<tr>
<td>Commercial</td>
<td>15 m</td>
</tr>
<tr>
<td>Industrial</td>
<td>15 m</td>
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WIDTHS DEPEND ON ROAD TYPE AND DWELLING UNITS

Drawing B5-1: Dimensions of No-Exit Road Turning Areas
Drawing B5-2: Turning Areas for No-Exit Roads

Y TURNING

T TURNING

L TURNING

CANNOT BE ACCESS TO ANOTHER PROPERTY

ONLY FOR USE WHERE THE STANDARD CIRCULAR HEAD IS UNSUITABLE OR WHERE APPROVED BY COUNCIL

ALL DIMENSIONS ARE IN METERS
Drawing B5-3: Parking Bay
MIN. OF 200mm BELOW LOWEST SUBGRADE LEVEL
APPROVED DRAINAGE
AGGREGATE MATERIAL
MIN 100 SURROUND,
EXTERNALLY WRAPPED IN APPROVED GEOTEXTILE FILTER FABRIC

UNDER KERB DRAINAGE

KERB AND CHANNEL

WASHED 20mm REJECT GRAVELS
BIDIM A14 OR APPROVED EQUIVALENT TRENCH SURROUND
Ø110mm SUBSOIL DRAIN

SURFACE WATER CUT-OFF DRAIN

ALL DIMENSIONS ARE IN MILLIMETRES

Drawing B5-4: Subsoil drains - Roadside
**Drawing B5-5: Typical swale detail (1)**

**DRAWING B5-6: Typical Swale Detail (2)**

**SWALE CROSS SECTION**

**NOTE**

1. Effective catchment area drained = impervious area + 0.72 x pervious area.
2. Maximum swale slope up to 5%. Steeper swales require check dams (see figures 3.6(B) and 3.6(C)).
3. Dimensions 'b' and 'd' to be sized for conveyance of 10% AEP event.
4. Existing ground is regraded, compacted, topsoiled (100 mm depth), and grassed.
5. Side slopes no steeper than 1v:3h if planted (not mown).
6. Side slopes no steeper than 1v:5h if grassed (mown).
Drawing B5-7: Typical Check Dam Detail
NOTE: KERB AND CHANNELS TO HAVE 200mm MIN. DEPTH OF COMPACTED AP40 BASECOURSE OR GAP65 SUBBASE UNDER THEM.

Drawing B5-8: Kerbs and Dished Channels
Drawing B5-9: Typical sump to driveway or right of way

NOTES:
1. USE OF SINGLE OR TWIN PIPES FROM THE PROPERTY TO THE SUMP TO BE DETERMINED BY CALCULATIONS.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
NOTE:
1. SUMP OUTLET MAY BE 150 dia. IN PRIVATE PROPERTY
2. ALL DIMENSIONS ARE IN MILLIMETERS

Drawing B5-10: Flat channel or Yard Sump – Private Only
NOTES:
1. ROAD SUMPS TO BE PLACED AT 90m (MAX.) INTERVALS
2. DOUBLE SUMPS TO BE INSTALLED IN PLACE OF SINGLE SUMPS AT ALL:
   A) UNDER VERTICAL CURVES IN ROADS
   B) ON ALL ROADS WITH VERTICAL GRADIENTS EXCEEDING 10%
      SPECIFIC DESIGN REQUIRED WHERE GRADIENT EXCEEDS 12°
3. SUMP LEADS TO INTERSECT SIDE OR BACKWALL OF SUMP BOX AT 90°
4. SITE - SPECIFIC DESIGN REQUIRED TO REDUCE SYPHON FROM 200φ
   DOWN TO 150φ
5. WHERE GRADIENTS EXCEED 10%, CHANNEL TRANSITION INTO DOUBLE
   MUD TANK TO BE 800mm AND CHANNEL TO BE FORMED DIRECTLY INTO
   BACK ENTRY.
6. TO BE USED WHERE BACK OF KERB IS NOT DIRECTLY ADJACENT TO THE
   FOOTPATH.

Drawing B5-11: Road Sump Detail
Drawing B5-12: Different Grate Layouts
SECTION THROUGH GRATE

Drawing B5-13: Standard Section Through Grate
Drawing B5-14: An Alternative Sump for Hillside Situations
Alternative connection with outlets to main from both sumps

Drawing B5-15: Double back-entry sump for road low points and alternative
Drawing B5-16: Traversable Grates for Precast Headwalls 255mm to 450mm culverts
NOTES:

1. The dimensions for the grate on this drawing are indicative only.
2. It is recommended that grates are sourced from the manufacturer of the precast culvert headwall to ensure the grate and headwall are compatible. Otherwise, guidance should be sought from the manufacturer of the precast culvert headwall on the required dimensions for any grates not supplied by them.
3. The clear width between side walls of precast culvert headwalls shall not exceed 600mm when using this grate.

Drawing B5-17: Mountable Grates for Precast Headwalls 255mm to 450mm Culverts
Drawing B5-18: Road Sump Detail: Heavy Duty Frame & Grate

Approximate Weights:
- Grate: 75kg
- Frame: 45kg
Drawing B5-19: Light Sump Frame & Grate

**FRAME**

**GRATE**

**SECTION ON A**

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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>117kg</strong></td>
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Drawing B5-20: Berm Sump Detail
1. DESIGN OF ALL RESIDENTIAL CROSSINGS TO COMPLY WITH SECTION 14.2.4.2 OF THE DISTRICT PLAN.
2. CROSSING CONCRETE TO BE 125mm THICK REINFORCED WITH 665 MESH, CENTRALLY PLACED.
3. SURFACING TO BE CONCRETE WITH A MINIMUM CRUSHING STRENGTH OF 20 MPa AT 28 DAYS OR 30mm DG7 ASPHALT (NZTA M10 Notes TABLE N3.3), OR 2 COAT SEAL.
4. BASECOURSE TO BE A MINIMUM 100mm COMPACTED DEPTH OF M4 AP40 CRUSHED GRAVEL, OR 150mm M4 AP40 FOR 2 COAT SEAL.
5. SUBGRADE TO BE TRIMMED AND COMPACTED TO ACHIEVE A MINIMUM CBR VALUE = 7.
6. MAXIMUM LONGITUDINAL GRADIENTS SHALL BE IN ACCORDANCE WITH SECTION 14.2.4.2 (iii) OF THE DISTRICT PLAN.
7. A, B, C, AND D REFER TO THE GRADIENTS EXPRESSED EITHER AS A PERCENTAGE OR IN DEGREES.
8. LOW SLUNG CARS WITH GROUND EFFECT FEATURES MAY NOT MEET THE CRITERIA ASSUMED IN THIS DESIGN GUIDE.
10. BUSSSES ARE PERMITTED LOWER CLEARENCE VALUE OF (A+B) OF 6% or 3.4 DEGREES.

Drawing B5-21: Vehicle Crossing - Residential
NOTES
1. THE CONCRETE SHALL BE 150mm THICK AND REINFORCED WITH 665 MESH, CENTRALLY PLACED.
2. THE CONCRETE SHALL HAVE A MINIMUM CRUSHING STRENGTH OF 20 MPa AT 28 DAYS AND SHALL COMPLY WITH NZS 3124.
3. CHANNEL CROSSING TO BE HEAVY DUTY, REINFORCED WITH 3 D12 BARS.
4. SUBLICITY TO BE TRIMMED AND COMPACTED TO ACHIEVE A MIN. CBR VALUE OF ≥ 7
5. DESIGN OF ALL COMMERCIAL CROSSINGS TO COMPLY WITH SECTION 14.2.4.2 OF THE DISTRICT PLAN.
6. MAXIMUM LONGITUDINAL GRADIENTS SHALL BE IN ACCORDANCE WITH SECTION 14.2.4.2 (iii) OF THE DISTRICT PLAN.
7. ONLY CONCRETE PERMITTED ( ASPHALT NOT PERMITTED )

SECTION X-X

DRAWING B5-8 KERB AND DISH CHANNELS NO.2A

Drawing B5-22: Vehicle Crossing – Commercial / Industrial
1. CROSSING TO BE MINIMUM 4.5M WIDE AT ENTRANCEWAY & INCORPORATE MIN.6M RADIUS

2. PAVEMENT CONSTRUCTION TO BE 100MM COMPACTED M4 AP40 BASECOURSE ON 150MM COMPACTED DEPTH OF AP65 SUBBASE ON COMPACTED SUB-GRADE WITH CBR > 7 (FOR ACCESSWAY INTERNAL TO SITE AS WELL AS LINKING SITE AND LEGAL ROAD)

3. WHERE THE CROSSING INTERCEPTS EXISTING SIDE DRAINAGE, A MIN. 300MMø CULVERT IS TO BE INSTALLED.

4. IF THE APPLIED SURFACE IS CHIP SEAL A SECOND COAT SEAL IS REQUIRED TO BE PROGRAMMED AND CONSTRUCTED WITHIN 12 MONTHS FROM CONSTRUCTION OF THE FIRST COAT OR IN THE NEXT SUMMER SEASON, WHICHEVER COMES FIRST.

5. CULVERT TO BE FINISHED WITH CONCRETE HEADWALLS AS PER DRAWING B5-24: NON-PRECAST HEADWALL DETAIL OR DRAWING B5-16: TRAVERSABLE GRATES FOR PRECAST HEADWALLS 250MM TO 450MM CULVERTS

Drawing B5-23: Private Rural Access
1. WHERE THE ACCESS INTERCEPTS EXISTING SIDE DRAINAGE / WATER TABLE, A 300MM MIN. DIAMETER (OR MIN. DIAMETER OF UPSTREAM CULVERT, WHICHER IS THE GREATER) CULVERT IS TO BE INSTALLED.

2. PIPE TO BE HEAVY PVC OR CONCRETE WITH APPROPRIATE BEDDING

3. COVER OVER CULVERT TO BE AS PER THE MANUFACTURERS INSTRUCTIONS, OR OTHERWISE CONCRETE CAPPED OR ENCASED.

4. CULVERT ENDS TO BE MITRED TO A GRADIENT OF 1V:6H.

5. CONSTRUCT CONCRETE HEADWALL AND APRON AROUND PIPE ENDS AND CHANNEL INVERT.

SECTION B-B: ACCESS PIPE BEDDING

Cover over culvert to be as per the manufacturers instructions, or otherwise concrete capped or encased.

SECTION A-A: CONCRETE HEADWALL

1. WHERE THE ACCESS INTERCEPTS EXISTING SIDE DRAINAGE / WATER TABLE, A 300MM MIN. DIAMETER (OR MIN. DIAMETER OF UPSTREAM CULVERT, WHICHER IS THE GREATER) CULVERT IS TO BE INSTALLED.

2. PIPE TO BE HEAVY PVC OR CONCRETE WITH APPROPRIATE BEDDING

3. COVER OVER CULVERT TO BE AS PER THE MANUFACTURERS INSTRUCTIONS, OR OTHERWISE CONCRETE CAPPED OR ENCASED.

4. CULVERT ENDS TO BE MITRED TO A GRADIENT OF 1V:6H.

5. CONSTRUCT CONCRETE HEADWALL AND APRON AROUND PIPE ENDS AND CHANNEL INVERT.

Drawing B5-24: Non-Precast Headwall Detail
HEAVY DUTY CONCRETE FOOTPATH

Drawing B5-25: Heavy Duty Footpath
Drawing B5-26: Footpath - Asphalt & Gritted Detail

ASPHALT FOOTPATH

- Width as specified
- 2% max crossfall
- 25mm asphaltic cement TNZ M/10
- 50x50x400 H4 timber pegs at 600mm CRS or longer if required to ensure it has been driven into solid unyielded ground
- 75mm compacted depth of M/4 AP40
- 75mm min. compacted AP40 granulated backfill on compacted subgrade with CBR >7
- Grade in accordance with QLDC cycle trail and track design standards & specifications

NOTE: RE. MIN CBR OF 7 REQUIRED AND SUB-BASE OF 75mm

GRITTED FOOTPATH

- Width as specified
- 25mm compacted depth AP7 on 75mm compacted depth AP20 or TNZ M/4 AP20
- 100x40mm H4 timber battens
- 50x50x400 H4 timber pegs at 600mm CRS or longer if required to ensure it has been driven into solid unyielded ground

NOTES:
1. Crossfalls to be nominally 3% (crowned or continuous crossfalls as specified).
2. Subgrade & metalcourse to be treated with approved soil sterilant.
3. Pegs to be at least 5mm below battens.
4. Pegs can be cut off at an angle, flush with boxing on side and 5-10mm down on the other.
SECTION A-A

NOTES:
1. CROSSFALL NOT GREATER THAN 1:12
2. CROSSFALL OF 1:20 IS PREFERRED
3. MAX CROSSFALL OF 1:18 WITH APPROVAL FROM COUNCIL

RAMPS 300mm 40MPa PLAIN CONCRETE
REINFORCED WITH TWO LAYERS OF 663 MESH

CROSSING: 300mm 40MPa EXPOSED AGGREGATE
CONCRETE REINFORCED WITH TWO LAYERS OF 663 MESH

RAMP CONCRETE TO BE BRUSH FINISHED
RAMPS AT 1:10 GRADE

30mm ASPHALTIC CONCRETE
150mm COMPACTED AP65

150mm COMPACTED AP65

Drawing B5-27: Pedestrian Crossing Detail
Drawing B5-28: Low Retaining Wall: Stacked Rock
Drawing B5-29: Low Retaining Wall: Post & Plank
FREE DRAINING GRANULAR BACKFILL

TERRAMESH PANEL

BIDIM A24 GEOTEXTILE OR APPROVED EQUIVALENT FLUSH AGAINST GABION

BIDIM A24 OR APPROVED EQUIVALENT

Ø110mm DRAIN COIL DRAIN TO DISCHARGE TO BACK OF SUMP/SWMH OR WATERTABLE MIN. GRADE 1:100

MINIMUM 100mm COMPACTED AP40 BLINDING LAYER. NOTIFY ENGINEER TO INSPECT SUBGRADE PRIOR TO PLACING METAL.

GABION BASKET RETAINING WALL AT 1 IN 0.25 MAX. HEIGHT 1.5m INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN SPECIFICATION

Drawing B5-30: Low Retaining Wall: Gabion
Drawing B6-1: 7 Wire Plain Fence

NOTES:
1. ALL CONCRETE TO BE 20MPa.
2. ALL POSTS, RAILS AND STAYS TO BE STEEL, GALVANISED INSIDE AND OUT.
3. REINFORCING BARS - 2/10mmØ AT 225mm CENTRES WITH 6mm STIRRUPS AT 1000mm CENTRES, ENSURE MIN. 50mm COVERAGE OF CONCRETE

REINFORCED CONCRETE MOWING STRIP (OPTIONAL - TO BE APPROVED BY ENGINEER)

20MPa CONCRETE SURROUND
NOTES:
1. OFFSET FOR ROADWAYS WITHOUT KERB, IS TAKEN FROM THE WHITE EDGE LINE.
2. BASE COMPARTMENT DOOR IS TO FACE THE ADJACENT FOOTPATH. DOOR IS TO BE SECURED WITH 6mm (OR 8mm) ALLEN KEY SCREWS. SETSCREW THREADS TO BE COATED WITH LONGLIFE ANTICORROSIVE GREASE.

Drawing B6-2: Street Lighting: Ground Planted Columns
Drawing B6-3: Street Sign: Pole Mount

STREET NAME AND POST

60mm Dia nominal
alloy fluted
 tubing powder
 coated white.

P.V.C. CAP

STREET NAME

"NO EXIT" sign
attached, where
applicable.

PRINTED WHITE
CHEVRON ARROW

'NO EXIT' to be
attached where
applicable.

REFER INFRASTRUCTURE CODE CLAUSE 3.11.8
FOR FONTS AND COLOURS

2.5mm thick extruded
aluminium panel

Provide 'socket' in
20mPa concrete base

SECTION A

300 SQUARE
B7 NZ Standards Plans

Drawing B7-1:CM – 001 Embedment & Trenchfill Arrangement
CONCRETE BULKHEAD DETAIL

TYPICAL ROAD CROSSING BULKHEAD

NOTES:
1. All dimensions in millimetres.
2. Construct concrete bulkheads and trench stops at locations specified in design drawings.
3. Construct bulkhead adjacent to kerb and gutter shoulder of sealed roads.
4. Bulkhead at a retaining wall to be under the wall.
5. Key concrete bulkheads into sides and bottom of trench against a bearing surface of undisturbed soil.
6. Concrete to be 17.5 MPa.
7. Do not deform pipes during placement of concrete or bags.
8. Seal bags to prevent leakage of contained material.
9. Compressible membrane around pipe to be 0.25 thick polyester for bulkheads adjacent to kerbs and 3 mm thick rubber for bulkheads on slopes.
10. For slopes >35% refer to territorial authority for requirements.
TYPICAL INSTALLATION OF DI AND GRP MAINS

TYPICAL INSTALLATION OF STEEL MAINS

(THRUST BLOCKS REQUIRED WHERE NON-RESTRAINING RUBBER RING JOINTS USED)

NOTE:
1. ALL DIMENSIONS IN MILLIMETRES.
2. WHERE POSSIBLE USE A SINGLE LENGTH OF PE PIPE.
3. THRUST BLOCKS TO BE IN ACCORDANCE WITH TERRITORIAL AUTHORITY REQUIREMENTS.
4. PVC PIPE MAY BE USED AS SHROUD PIPE, CUT AS REQUIRED TO CLEAR HYDRANT FLANGE.
5. FIT THE FLUSHING POINT VALVE IN SUCH A WAY AS TO PREVENT MOVEMENT OR ROTATION OF THE VALVE BODY, PROVIDE A SUITABLE PLUG OR CAP TO KEEP OUT DIRT AND GRAVEL.
6. PROVIDE CORROSION PROTECTION FOR ALL NON COATED METALLIC SURFACES IN ACCORDANCE WITH TERRITORIAL AUTHORITY REQUIREMENTS.
7. SERVICE CONNECTIONS NOT PERMITTED ON DISTRIBUTION MAINS WITHOUT TERRITORIAL AUTHORITY APPROVAL.
Drawing B7-5: WS – 003 Property Services – Connection to an existing PVC Main
Drawing B7-6: WS – 005 Thrust and anchor blocks – Gate valves and vertical bends if required
Drawing B7-7: WW - 001 Pipelaying – Typical arrangements
Drawing B7-8: WW – 002 Property connections – Buried interface method
Drawing B7-9: WW – 003 Maintenance shafts – Typical installation
Drawing B7-10: WW – 004 Maintenance shafts – MS and variable bend installations
Drawing B7-11: WW – 005 Maintenance shafts – TMS and connection installation