



# CS5 & 6 – Stormwater & Wastewater

## Contents

- CS5/6 Stormwater & Wastewater Construction..... 3
  - 5/6.1 Scope ..... 3
  - 5/6.2 Definitions..... 3
  - 5/6.3 Related Documents ..... 3
  - 5/6.4 Materials ..... 3
  - 5/6.5 General..... 4
  - 5/6.6 Excavation ..... 4
    - 5/6.6.1 Trench Outlines ..... 4
    - 5/6.6.2 Trench Protection ..... 5
    - 5/6.6.3 Ground Water ..... 5
    - 5/6.6.4 Trench Excavation ..... 5
    - 5/6.6.5 Over Excavation ..... 5
  - 5/6.7 Bedding, Pipelaying and Jointing..... 6
    - 5/6.7.1 Licensed Drainlayers ..... 6
    - 5/6.7.2 Bedding and Protection ..... 6
    - 5/6.7.3 Pipelaying ..... 6
    - 5/6.7.4 Tolerances ..... 7
    - 5/6.7.5 Jointing ..... 7
    - 5/6.7.6 Laterals & End Caps ..... 8
    - 5/6.7.7 Connections to Existing Pipelines..... 8
  - 5/6.8 Backfilling ..... 8
    - 5/6.8.1 General ..... 8
    - 5/6.8.2 Backfill Material..... 8
    - 5/6.8.3 Compaction ..... 9
  - 5/6.9 Manholes ..... 9
    - 5/6.9.1 General ..... 9
    - 5/6.9.2 Channels & Benching ..... 9
    - 5/6.9.3 Flexible Joints ..... 10
    - 5/6.9.4 Sealing of Manholes ..... 10
    - 5/6.9.5 Completion of Manholes ..... 10
    - 5/6.9.6 Drop Connections ..... 11
    - 5/6.9.6 Step Irons ..... 11
  - 5/6.10 Trenchless Construction ..... 11
    - 5/6.10.1 Methodology and Track Record..... 11
    - 5/6.10.2 Location of Existing Services..... 11
    - 5/6.10.3 Alignment..... 12
    - 5/6.10.4 Directional Drilling..... 12
    - 5/6.10.5 Pipe Thrusting (Pipe Jacking)..... 13
    - 5/6.10.6 Guided Boring/Auger boring ..... 13
    - 5/6.10.7 Pipe Bursting ..... 14
    - 5/6.10.8 Pipe Splitting..... 14
    - 5/6.10.9 Tolerances..... 15
    - 5/6.10.10 Repair of Damage..... 15
  - 5/6.11 Testing..... 15
    - 5/6.11.1 General..... 15



---

5/6.11.2 Wastewater Pipelines .....	15
5/6.11.3 Stormwater Pipelines.....	16
5/6.12 CCTV Inspections.....	16
5/6.12.1 Applications .....	16
5/6.12.2 General Specification.....	16
5/6.12.3 Particular Specification .....	16
5/6.12.4 Deliverables.....	17
5/6.12.5 Header Information Required .....	17
5/6.13 Reinstatement .....	17
5/6.13.1 General.....	17
5/6.14 Working on Utilities Notice (WUN).....	18
5/6.14.1 General.....	18



## **CS5/6 Stormwater & Wastewater Construction**

### **5/6.1 Scope**

This section sets out the requirements for the construction or upgrade and maintenance of district stormwater & wastewater drainage systems. It covers the specifications for constructing, testing and maintaining drainage systems.

All pipes shall be installed in accordance with the approved design, manufacturer’s specification and this Code.

New systems shall be maintained throughout the maintenance period. Maintenance shall include but not be limited to sound engineering practices.

Evidence of a regular maintenance contract, including contact details shall be submitted for Council approval prior to the consideration by Council of the release of either the s224 certificate or certificate of practical completion.

### **5/6.2 Definitions**

Definitions are set out in Section 1 of the Development Code: Design, unless otherwise described.

### **5/6.3 Related Documents**

The following Drawings and other documents form part of this contract Document as listed:

Design Standard DS5:	Streetscape
Design Standard DS6:	Wastewater
Drawing Number: .....	Name: .....
Construction Standard CS5 & CS6:	Stormwater & Wastewater Drainage

### **5/6.4 Materials**

Materials shall be as listed in the appropriate section of the Development Code: Construction, or as defined in this document.

Materials shall be as specified within this document, unless otherwise specifically agreed with Council.



## 5/6.5 General

All works shall be in accordance with relevant NZS/AS production and construction standards for pipeworks.

### Production Standards - Pressure Applications

- AS /NZS 4441 – PVC-O pipe for pressure applications
- AS / NZS 1477 – PVC-U pipes and fittings form pressure applications
- AS / NZS 4765 – PVC-Mpipe for pressure applications
- AS/NZS 4130 – PE pipes for pressure applications

### Production Standards - Gravity Applications

- AS / NZS 1260 PVC-U pipe and fittings for drain, waste and vent applications
- AS / NZS 1254 PVC pipes and fittings for stormwater and surface water applications
- AS / NZS 5065 - Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

### Installation Standards

- AS / NZS 2032 – Installation of PVC pipe systems
- As / NZS 2033 – Installation of Polyethylene Pipe Systems
- AS / NZS 2566 Part 1 Flexible buried Pipelines – Structural Design
- AS / NZS 2566 Part 2 Felexible buried Pipelines – Installation
- AS/NZS 3752:2007 Design for installation of buried concrete pipes
- AS/NZS3752 Supplement 1:2007 Design for installation of buried concrete pipes-Commentary
- PIPA Technical Guidelines ([www.pipa.com.au](http://www.pipa.com.au))

Where the word “Contractor” is used below, it shall mean either work undertaken by the Consent Holder’s Representative (i.e. works undertaken by the Applicant) or Council’s appointed contractor (i.e. where works are undertaken by Council). The following construction specifications apply to Stormwater and Wastewater.

Before commencing any excavation, all service utility providers shall be contacted and any approvals necessary for excavating in the vicinity of their services shall be obtained in writing. Any conditions stipulated by the utility provider in regard to working in the vicinity of their service shall be followed.

## 5/6.6 Excavation

### 5/6.6.1 Trench Outlines

Prior to the excavation of trenches under sealed pavements, trench outlines shall be cut a minimum of 300mm outside the trenchline using an abrasive type cutting wheel or other approved means.



(The purpose of trench outlines is to avoid overbreak or lifting of sealed surfaces or stabilised sub-base material where trenches are located in sealed pavements).

### **5/6.6.2 Trench Protection**

All trench excavation, backfill and reinstatement shall be carried out in accordance with the Department of Labour's Approved Code of Practice for Safety in Excavation and Shafts for Foundations (April 2000).

All work shall be undertaken in such a manner that the integrity of nearby buildings, structures, services and property is not compromised.

Access for pedestrian and vehicular traffic shall be maintained at all times unless specific arrangements to the contrary have been approved by the Engineer/Authorised Officer.

All material used in shoring of trenches shall be removed before backfilling.

### **5/6.6.3 Ground Water**

Water in the excavation shall be controlled so that the water level is kept below the level of the underside of the bedding or concrete foundation until the work has been accepted and backfilling completed.

Disposal of groundwater shall, in general, comply with the relevant Environment Bay of Plenty regulations.

### **5/6.6.4 Trench Excavation**

Trench excavation shall be carried out to the grades and levels and dimensions shown on the Drawings and in accordance with the manufacturer's specifications. The width of the trench measured at the crown of the pipe shall not be less than the minimum for H2 bedding as defined in AS/NZS 3725.

Excavation for manholes shall be sufficient to allow for adequate compaction.

Excavated materials shall not be stockpiled in such a way as to block or obstruct roads, footpaths or accessways.

### **5/6.6.5 Over Excavation**

Where the ground below the specified bedding level is rocky or not suitable for bedding, it shall be excavated and backfilled with free draining granular material and compacted in layers using mechanical compactors in accordance with this Code and the design.



## 5/6.7 Bedding, Pipelaying and Jointing

### 5/6.7.1 Licensed Drainlayers

Pipelaying and jointing shall be completed by or under the direct supervision of a licensed drainlayer.

### 5/6.7.2 Bedding and Protection

All pipelines shall be bedded, haunched and surrounded in accordance with the design standard and the manufacturer's specifications.

Pipelines that have a grade steeper than 20% shall have anti-scour blocks at not greater than 6m spacing. These blocks shall be as shown on the Drawings and shall be located at pipe joints.

### 5/6.7.3 Pipelaying

Pipes shall be accurately laid to the lines, levels and gradients shown on the Drawings.

Pipes made of plastic materials shall be laid with product labelling uppermost in the trench. For gravity and rising mains, the pipe spigot shall be the downstream end.

The following materials shall be used for reticulation mains:

- Wastewater: PVC or PE;
- Stormwater: Concrete, PVC, PE and
- Rising Mains: PE Only

unless otherwise approved in writing by Council.

For PVC-U gravity sewer pipes the minimum stiffness (SN) classes for use in public sewers shall be as follows:

- DN100 – SN 10
- DN 150 – SN 8
- DN 175 – DN 575 – SN 4

For PE gravity sewers, the minimum Standard Dimension Ratio shall be SDR 17

For pressure sewer rising mains, pipe materials shall be PVC-U (approval by Authorised Officer) or PE, unless otherwise approved by the Authorising Officer. The minimum pipe pressure class for any pressure rising main shall be PN 9, and the actual PN pressure class selected shall take account of any cyclic dynamic stresses (fatigue conditions), and pressure surge conditions likely in that pipeline. Design for dynamic stresses shall take account of the PIPA Guidelines for design of dynamic stresses, available at [www.pipa.com.au](http://www.pipa.com.au)



The pipe SN rating shall be adequate to withstand all imposed temporary onstruction and permanent loadings but under no circumstances shall be less than the following:

- DN100 – SN 10
- DN 150 – SN 8
- DN 175 – DN 575 – SN 4

#### **5/6.7.4 Tolerances**

All works shall be constructed within the tolerances set out in this clause and the manufacturers specifications.

i. General

Tolerances will be determined on the basis of permissible deviations from designated location, alignment, grade and level unless otherwise approved by Engineer/Authorised officer.

ii. Kerbside Catchpits and Kerb Inlets

The permissible deviation of the longitudinal location of a kerbside catchpit or kerb inlet shall be 0.5 m. The permissible deviation of the lateral location shall be  $\pm 25$  mm, except that any open grating shall be truly parallel to and within 5 mm of the face of the kerb.

iii. Manholes and Catchpits

The permissible deviation of the location of manholes and catchpits (other than kerbside catchpits) from the designated position shall be half a pipe length longitudinally and  $\pm 150$  mm laterally, except where locations are dimensioned from fixtures such as fences, kerbs and boundaries, in which event the permissible deviation in either direction shall be  $\pm 50$  mm.

iv. Invert Levels

The permissible deviation from the designated level of the invert at each manhole shall be  $\pm 20$  mm, provided that the fall between successive manholes is at least 90% of that specified.

v. Alignment and Gradient

The permissible deviation of the alignment and gradient of culverts and pipelines shall be the lesser of  $\pm 5\%$  of the nominal diameter of the pipe or  $\pm 20$  mm from a straight line between the inverts of successive manholes, with all such deviations being gradual. There shall be no steps at the junctions between successive pipes and no point in the pipeline or culvert shall be lower than any downstream point.

#### **5/6.7.5 Jointing**

Rubber ring joints shall be installed in accordance with the manufacturer's specification. Care shall be taken to ensure that the rubber rings are not twisted and are located evenly around the joint.



The spigot end shall be pushed firmly into the socket such that the gap between the two pipes is within the manufacturer's specified tolerance, or such that the witness mark is just visible.

Where it is necessary to form site mortared joints between drainage components, the surfaces to accept mortar shall be thoroughly scrubbed and, where contaminated with oil or grease, cleaned with "Expandite Mystic Acid" or an approved equivalent. Expocrete "UA" or an approved equivalent shall then be used in accordance with the manufacturer's specifications for making the joint. Mortared joints are not permitted on wastewater pipeline systems.

#### **5/6.7.6 Laterals & End Caps**

Laterals shall only be connected to the main pipelines with factory manufactured junctions where available or with approval from the Authorised Officer.

All laterals and pipeline ends for future extension shall terminate with a 150 to 100 level invert reducer with factory made cap.

#### **5/6.7.7 Connections to Existing Pipelines**

Any connection to, or work on Council's wastewater or stormwater pipeline system requires the consent of Council. The Contractor shall contact Council and follow the application procedure.

All connections to an existing pipeline shall be made by a contractor who is approved by Council for this work and at no cost to Council.

### **5/6.8 Backfilling**

#### **5/6.8.1 General**

Backfilling shall keep pace with the laying of pipes so that not more than 20 m of pipeline shall be left exposed in an open trench where this could represent a danger to the public. Care shall be taken during backfilling to prevent displacement of the laid pipes.

#### **5/6.8.2 Backfill Material**

Except as specified below, material excavated from the trench shall be used for backfilling trenches.

In paved areas and road reserves and where, in the opinion of the Engineer/Authorised officer, material excavated from the trench is unsatisfactory for backfilling purposes, imported granular material shall be used.





### **5/6.8.3    Compaction**

Trenches within road reserves or under paved areas shall be backfilled and compacted in layers commensurate with the compaction equipment to a density of at least 95% of the maximum dry density. Field compaction shall be tested using the New Zealand standard compaction test or nuclear densometer, shear vane, but not by dynamic cone penetrometer. Alternatively, deflection testing by Benkelman beam or similar may be used subject to the approval of the Engineer/Authorised Officer.

The Contractor shall undertake sufficient tests to demonstrate that the specified compaction standards have been achieved throughout.

Compaction testing of fill material shall be in accordance with NZS 4402 - Methods of Testing Soils for Civil Engineering Purposes.

Under roads the trench shall be compacted and tested in accordance with DS4 – Transportation.

Trenches outside road reserves and not under paved areas shall be backfilled and well compacted with mechanical compaction equipment in layers not exceeding 300 mm thick.

## **5/6.9       Manholes**

### **5/6.9.1     General**

Manholes shall be constructed in the position and to the level and details shown on the Drawings as applicable.

### **5/6.9.2     Channels & Benching**

A uniform semi-circular channel shall be formed in the concrete floor of the manhole and benched as shown on the drawings.

The flow channel shall be formed so that it presents an evenly curved flow path through the manhole.

The grade shall be even between inlet and outlet.

Benching shall be floated to a dense, smooth hard surface using 3:1 sand/cement mortar and a steel float. Side branches shall be similarly formed with a smooth bend into the main channel.

The standard of finish on the benching shall be U3 as specified in NZS 3114.



### 5/6.9.3 Flexible Joints

All pipes connected to manholes shall have a flexible joint adjacent to the manhole.

Connection through the manhole wall shall be as shown on the drawings.

### 5/6.9.4 Sealing of Manholes

Where precast manhole units are used, the joints of abutting units shall be sealed against ingress of water with Expandite BM100 'Sealastrip' or an approved equivalent. For wastewater manholes, the joint shall also be sealed with epoxy mortar.

### 5/6.9.5 Completion of Manholes

All manholes shall be completed flush to the finished ground level. All covers must be visible and accessible for maintenance. Manholes in recreation areas should be sited so that they remain visible. The covers and frames of manholes located in paved areas shall be fixed, tilted where necessary, so that the cover is flush with the adjacent paving.

Any wastewater manhole located in a stormwater secondary flow path shall be raised to 300 mm above the design flood flow level and may require local ground recontouring to suit. Where this is not possible (e.g. in a carriageway or walkway) then the manhole lid shall be properly sealed to prevent flood-water ingress.

All manholes shall have heavy-duty lids, covers and frames as shown on the Drawings. Frames shall be secured to the concrete top slab with 3 masonry bolts – M10 Chemset anchors) or pins.

Where a manhole is to be constructed in soft ground, the area under the manhole shall be undercut down to solid and backfilled with suitable fill to provide an adequate foundation for the manhole base.

Each manhole shall be fitted with an access ladder in accordance with the Drawings. In addition for manholes deeper than 5 metres no platform shall be installed.

Industry established alternative manholes or access chambers may be considered for use by the Authorised Officer.

All stormwater manhole covers shall be painted blue and all wastewater manhole covers shall be painted white with roadmarking paint complying with the relevant TNZ standard.



### **5/6.9.6 Drop Connections**

All drop connections to new sewer manholes shall be external drop connections as detailed in the drawings.

Internal drop connections will be permitted only by written approval and may require the installation of a 1200mm diameter manhole. Internal drop connections may be allowed when working in sand country and a danger to the carriageway exists.

The minimum height for drop connections shall be 600 mm.

### **5/6.9.6 Step Irons**

All manholes other than shallow manholes shall be provided with approved step irons or steps or ladders in order to give reasonable access.

These shall be of the “dropper” or “safety” type such that a foot will not slide sideways off them. Details of manhole steps and/or ladders are shown on the drawings. Step irons are to be stainless steel. The use of recessed steps is unacceptable.

## **5/6.10 Trenchless Construction**

### **5/6.10.1 Methodology and Track Record**

Trenchless construction shall only be used for applications in which the specified tolerance can be achieved.

The Contractor shall be experienced in trenchless construction or shall employ a suitably experienced subcontractor to carry out the work. The rig operator shall also be suitably experienced.

At least two weeks prior to commencing any trenchless construction, the Contractor shall submit a detailed construction methodology statement and details of its track record and rig operator's experience to the Engineer/Authorised officer for approval. No such work shall commence until the statement and details have been approved by the Engineer/Authorised Officer.

### **5/6.10.2 Location of Existing Services**

Before commencing any trenchless construction, the Contractor shall verify with the various controlling authorities that the proposed alignment is clear of any buried services.



Unless otherwise approved by the Engineer/Authorised officer, existing services that cross under or over the proposed drilling alignment shall be located, exposed and kept exposed until after the drilling or thrusting has been completed.

The minimum clearance to existing AC pipes shall be 1.0m. The minimum clearance to any other existing service shall be twice the allowable tolerance in the alignment of the pipe.

### **5/6.10.3 Alignment**

The Contractor shall mark out the proposed pipe route at 10 m intervals and shall obtain the Engineer/Authorised officer's approval for it before commencing trenchless construction.

Unless unforeseen obstructions are encountered, the pipeline shall be installed in straight runs or smooth curves as shown on the Drawings.

### **5/6.10.4 Directional Drilling**

The minimum specification for directional drilling shall be as set out below.

Directional drilling is a trenchless construction method for the installation of pipes by means of the following process:

- i. A pilot hole shall be drilled between two local pit locations. The drilling system shall incorporate a steerable head, remotely controlled to direct the hole along the correct alignment and grade.
- ii. A back reamer shall be fitted to the drill string in order to enlarge the pilot hole sufficiently to accommodate the pipe.
- iii. The pilot hole shall be supported by a bentonite slurry which also lubricates the outside of the pipe when it is drawn back through the hole.
- iv. Before the pipe is drawn back through the hole, the leading end shall be sealed to prevent the ingress of dirt and slurry. The pipe shall be attached to the back reamer and pulled through the enlarged hole.
- v. On completion of the pipe installation, if the annulus between the excavated hole and the pipe is not filled with slurry it shall be filled with grout.

The drilling machine shall be carefully aligned to provide a true line. Should the pilot hole or installed pipeline vary more than the specified tolerance from the required line and grade, the Contractor shall open excavate part or all the affected section to rectify the line to the correct line and grade or re-pilot a new line as instructed by the Engineer/Authorised Officer.

The pipe pulling equipment shall incorporate a breakaway device fitted to the leading end of the pipe to prevent the maximum pulling load being exceeded. The Contractor shall provide evidence from an IANZ approved laboratory that the device is calibrated correctly. Where the breakaway device breaks during pipe pulling, the pulling operation shall stop immediately and the Contractor



shall determine the reason for the failure and shall take the necessary precautions to prevent a recurrence of the failure. Any damaged pipes shall be replaced.

The maximum pulling load shall not exceed the load given in the table below, nor shall it exceed the load that will stress the pipe to 50% of the material yield stress, whichever is the lower.

<b>Maximum Pulling Load</b>	
<b>Pipe</b>	<b>Maximum Pulling Load (kN)</b>
63mm OD PE80 SDR11	6.9
125mm OD PE80 SDR11	26.9
180mm OD PE80 SDR11	55.7
250mm OD PE80 SDR11	107.0
315mm OD PE80 SDR11	168.7

The following additional limits shall apply:

Minimum radius	= 35m
Maximum length of drill	= 200m
Maximum pull rate	= 0.5m – 1.0m per minute

#### **5/6.10.5 Pipe Thrusting (Pipe Jacking)**

The minimum specification for pipe thrusting shall be as set out below.

Pipe thrusting is also known as microtunnelling or pipe jacking and is a trenchless construction method for the installation of pipes by means of the following process:

- i. Pipes shall be fitted behind a microtunnelling head or boring and driven through the ground by hydraulic rams.
- ii. Excavation of the face shall be carried out by the tunnelling head, with the spoil removed by slurry pumping, conveyor or auger. (There is no pilot hole).
- iii. The applied jacking force shall be distributed between the tunnelling head and the last pipe in the pipe string.
- iv. The microtunnelling head shall be equipped with individual steering jacks for directional control.
- v. Intermediate jacking stations may be introduced where necessary to reduce the jacking force.

#### **5/6.10.6 Guided Boring/Auger boring**

The minimum specification for pipe guided boring shall be as set out below.

Guided boring, is a trenchless construction method for the installation of pipes by means of the following process:



- i. Pipes shall be fitted behind a boring head and follow the pipe, driven through the ground by the boring machine, **after predrilling a pilot hole**
- ii. Excavation of the face shall be carried out by the boring head, with the spoil removed by slurry pumping, or auger
- iii. The applied jacking force shall be distributed between the tunnelling head and the last pipe in the pipe string
- iv. The boring head uses the pilot hole for grade and directional control

Where PVC-U pipes, utilising restrained rubber ring joints are used for thrusting, maximum length of thrusting shall be two hundred metres or as recommended by the pipe manufacturer. Any bending of the pipes shall not be greater than that specified by the pipe manufacturer. Thrusting or tensile loads applied to the pipe during insertion into the bored hole shall not exceed the manufacturer's recommendation.

### 5/6.10.7 Pipe Bursting

The minimum specification for pipe bursting shall be as set out below.

Pipe bursting is a trenchless construction method for the replacement of existing fractureable pipes (earthenware, vitrified clay, cast iron, asbestos cement, unreinforced concrete, PVC) by means of the following process:

- i. The manholes at each end of the pipe shall be prepared for bursting by removal of the benching at the two pipe entry points.
- ii. If there are no manholes, pits shall be excavated at each end and the pipe to be replaced shall be cut at each end, typically 5 to 100 m apart. A bursting or splitting head shall then be drawn through the pipe, fracturing the old pipe and drawing in the new pipe behind it.

On reaching the reception manhole, the bursting head shall be disconnected and the benching in the two manholes repaired.

Where PVC-U pipes, utilising restrained rubber ring joints are used for pipe bursting, the maximum length of inserted shall be as recommended by the pipe manufacturer. Thrusting or tensile loads applied to the pipe during insertion into the bored hole shall not exceed the manufacturer's recommendation.

### 5/6.10.8 Pipe Splitting

The minimum specification for pipe splitting shall be as set out below.

Pipe splitting is similar to pipe bursting, but shall be used for non-fragmental pipes such as steel, ductile iron and polyethylene. Instead of using a conical bursting head, a splitting head designed to cut through the pipe wall shall be used.



## 5/6.10.9 Tolerances

The following tolerances shall apply to trenchless construction:

Invert Levels. The permissible deviation from the designated level of the invert at each manhole or structure shall be  $\pm 50$  mm, provided that the fall between successive manholes or structures shall be at least 90% of that specified.

Horizontal Alignment. The permissible deviation of the horizontal alignment between manholes or structures shall be  $\pm 100$  mm.

Gradient. For straight gradients, the permissible deviation from the specified gradient shall be  $\pm 50$  mm from a straight line drawn between the inverts of successive manholes, provided that no point in the pipeline is lower than any downstream point. For curved gradients, the curvature shall be in the direction of the specified curvature and no point in the pipeline shall be lower than any downstream point.

Directional drilling only:

Annulus: 0 – 25mm between slurry and hole

Back ream diameter: Pipe diameter + 25% minimum, + 50% maximum

## 5/6.10.10 Repair of Damage

The Contractor shall repair all damage caused to existing services and shall reinstate the surface above the pipeline route to the same condition that existed at the commencement of the work.

## 5/6.11 Testing

### 5/6.11.1 General

All main pipe lines (only) up to 900mm dia stormwater shall be inspected by CCTV unless exempted by the authorised officer. Lots connections are excepted.

### 5/6.11.2 Wastewater Pipelines

All sanitary sewer main and branch pipelines, including manholes and extended connections, shall be pre-tested during construction. On completion of all other engineering work within the development, there shall be a final test witnessed by The Consent Holder's Representative and the Council's representative. All testing shall be carried out when backfilling is complete and prior to surface sealing and/or paving works being completed also when manholes and lines are finished and flushed.



No infiltration will be permitted.

All non-flexible pipes shall pass a high pressure air test in accordance with NZS 4452 shall be used. Pressure testing of flexible pipelines, including PVC-U, PVC-M, PVC-O and PE shall conform to the relevant parts of AS / NZS 2566 Part 2, Appendix M (Pressure pipes) or Appendix N (Non Pressure pipes)

All sewers shall be lamped between manholes to ensure the pipeline is laid straight for grade and alignment and maintained its shape (roundness). The pipeline shall be flushed prior to lamping.

As part of the s224 Application, the Consent Holder's Representative shall ensure that a Certificate of Subdivision Construction is provided in accordance with this Code, by the Engineer who supervised the works.

### **5/6.11.3 Stormwater Pipelines**

Stormwater pipes shall be pressure tested unless otherwise specified by the Engineer/Authorised Officer.

Pipes smaller than 900 mm diameter shall be inspected by CCTV to identify any leaks or Pipes of 900 mm diameter and greater shall be manually inspected for the same purpose.

## **5/6.12 CCTV Inspections**

### **5/6.12.1 Applications**

CCTV inspection shall be carried out on all new stormwater and wastewater systems.

### **5/6.12.2 General Specification**

CCTV inspections and deliverables shall be in accordance with The General Specification of The New Zealand Pipe Inspection Manual, Third Edition, Published 2006, Section 5 – Specification.

### **5/6.12.3 Particular Specification**

Slope corrections shall be carried out where the pipe alignment is out of tolerance.

The pipe shall not be in service during the CCTV inspection. The pipe shall however be flushed with water prior to CCTV.

Still images of all severity "L" and "M" defects shall be provided.





#### **5/6.12.4 Deliverables**

The Contractor shall provide the following deliverables:

- i. Computer generated logsheets.
- ii. CCTV inspection record on DVD.
- iii. Electronic data in Hansen format for TCC, or in a format suitable for viewing/use by WBOPDC.
- iv. CCTV footage needs to be referenced to ensure manhole names and DDTS ID's link footage to as-builts
- v. Still images in electronic format and hard copy.
- vi. CCTV summary sheets in electronic format and hard copy.

#### **5/6.12.5 Header Information Required**

The Contractor shall provide the following header information with each inspection record:

- i. Name of main contractor.
- ii. Name of CCTV contractor.
- iii. Name of operator.
- iv. Date and time of inspection.
- v. Location (e.g. street name)
- vi. Upstream manhole number.
- vii. Downstream manhole number.
- viii. Material type and diameter
- ix. Pipe function

### **5/6.13 Reinstatement**

#### **5/6.13.1 General**

The Contractor shall reinstate trenches within 7 days of back fill completion unless agreed, otherwise by the Engineer/Authorised Officer.

All surfaces shall be reinstated to the current infrastructure standards, even where this is superior to original and to the satisfaction of the Authorised Officer.

Permanent reinstatement materials shall be similar in type, quality, texture, skid resistance and strength to the surrounding materials.

The surface level of the reinstated trench shall match the surrounding surface level.

Reinstatement of roads and pavements shall be in accordance with DS 4 – Transportation.



Drains, fences and other structures shall be put back in their original place to their original condition or better. In the case of damage, repairs shall be effected using similar materials.

## **5/6.14 Working on Utilities Notice (WUN)**

### **5/6.14.1 General**

Any connection to, or work on Council's wastewater or stormwater pipeline system requires the consent of Council. The Contractor shall contact Council and follow the application procedure.

All connections to an existing pipeline shall be made by a contractor who is approved by Council for this work and at no cost to Council.