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3.1 INTRODUCTION

Waimakariri District Council (WDC) aims to achieve well-designed and constructed assets for its ratepayers. Building and maintaining assets, regardless of whether they are created through the subdivision and development of land or the capital works process, is a partnership of developers, designers and contractors. Where quality principles are applied to both design and construction, real benefits result.

Waimakariri District Council therefore requires the application of quality assurance for all physical works that result in assets being transferred to the Council. Any designer, contractor or supplier wishing to tender for capital works or any developer exercising a resource consent must implement this part of the CoP.

Where the assets will be vested through subdivision, constructing assets in accordance with a Project Quality System will be a condition of subdivision consent. The developer must demonstrate compliance by providing and applying the project quality system, to substantiate the release of the subdivision compliance certificate, known as the 224(c) certificate. Similarly a contractor engaging in capital works is required to provide and apply a Contract Quality Plan during the contract period, which provides the supporting structure for the quality system and allows the issue of a Practical Completion Certificate.

This Part provides a framework for a quality management system. It is based on the system developed by Christchurch City Council, which has been benchmarked against best national practice. The quality management system must ensure that all quality assurance issues relevant to a subdivisional land development or a capital works project are effectively defined, managed and communicated to ensure that all quality requirements are achieved.

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3.2 PROJECT QUALITY SYSTEM

The project quality system consists of a document trail comprising:

- The Design Report, as described in clause 3.2.1;
- Records of all materials used, testing undertaken and inspections carried out.

These documents support the certificate trail, which establishes compliance with the Project Quality System. The certificate trail includes:

- The Producer's Statement – Design (QP-C812-AC, attached as Appendix C) which completes the Design Report documentation;
- The Producer's Statement – Construction (QP-C812-AD, attached as Appendix D);
- The 224(c) Certificate or Practical Completion Certificate.

The issue of the 224(c) Certificate or Practical Completion Certificate is therefore dependent on the application of the Project Quality System and the provision of its related documentation.

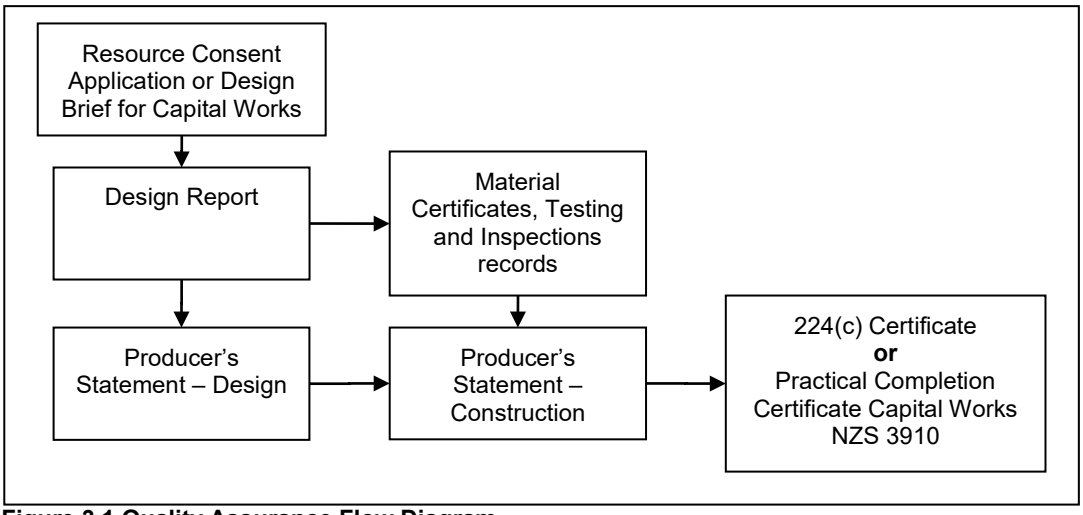

Figure 3.1 Quality Assurance Flow Diagram

Provide details of how all the identified requirements were or will be planned, controlled (managed), checked or inspected for compliance and the results recorded. Include provision for document control, including review and approval of the quality systems.

3.2.1 Design Report

A Design Report is a document summarising the design of a project in compliance with the requirements of the CoP and the resource consent or project brief.

Submit a Design Report where required as a condition of consent in respect to a subdivisional land development or where specified in the project brief. A Producer's Statement (Design) shall be submitted to the Council along with the Design Report, confirming that the design has been completed to the requirements of the CoP and appropriate WDC and NZS standards. Engineering acceptance is subject to presentation of this report.

The Design Report shall include details of the design and demonstrate that the design complies with the CoP, the conditions of subdivision and all relevant standards. It shall also provide WDC with a complete record of the design so that this can be referred to for future engineering design and subdivisions relating to this subdivision/development as assets.

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All models, calculations, specifications and plans shall be appended to the Design Report. The report shall cover assumptions made, design standards, statements on deviations from standards, and options considered. It shall also cover the planned methodologies for construction quality assurance and site auditing, including testing, inspections, and certificates for materials confirming compliance with standards.

Any subsequent amendments to the design, plans and specifications shall be submitted to Council for approval.

3.2.2 Documentation

The following documentation may be required before the approval for works may be processed:

- Stormwater catchment plan and calculations showing catchments and drainage reticulation design, secondary flow paths, minimum floor levels for lots adjacent to flowpaths.
- Wastewater catchment plan and calculations if trunk or primary reticulation is proposed or if requested by Council.
- Existing drains: Where an existing private reticulation is proposed to be included as a Council asset the condition of the reticulation may require verification. Verification can be in the form of closed circuit television video inspection and/or pressure test.
- Road pavement design calculations.
- Structural calculations.
- Geotechnical stability calculations.
- Test results to support Roading, Structural or Geotechnical calculations
- Construction management plan outlining methods of dust, noise control etc.
- Health and safety plan: required for any work in Council Land. Must identify any potential hazards and proposed measures of dealing with them.
- A copy of the Earthworks and Silt Control plan and also of any submitted to Environment Canterbury as part of any other resource consent requirement.
- Any work intended to be undertaken on third party property must be clearly identified on the plan, e.g. where material is borrowed or stockpiled.
- Where open cut excavation is proposed on existing roads this work must be identified on the plans. A Road Opening Permit shall be obtained from the WDC.
- Plans & Specifications.
- Any other resource consents required for the execution of the development.

3.2.3 Drawing and Plans

It is the developer's responsibility both directly and through its appointed representative to ensure that all physical construction work, whether carried out directly or by contractors or sub-contractors, is at all times in accordance with the approved engineering plans. Any departure from the requirements of the approved plans that may be necessary to meet particular circumstances shall be referred to the Council for approval.

Upon completion of construction work, and prior to the acceptance tests, copies of 'As-Built' plans and data recording information about the completed works shall be provided to WDC, as specified below and in CoP Part 12: *As-Builts*. Separate plans shall be required for wastewater, stormwater and water supply services. In addition to the plans, a practicing registered civil engineer or registered surveyor shall provide certification stating that the As-Built plans are a true and accurate record of all services.

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The following drawings shall be submitted to the Council where available and appropriate:

- Locality plan: showing location of work in relation to existing roads and features to enable the site to be easily located;
- Staged development plan: where development is planned in stages then each stage shall be accompanied by a plan showing how that particular stage relates to the development as a whole and also to other stages. The physical execution of the works to be staged shall align with that staging detailed in the resource consent application;
- Site plans: showing horizontal alignment, kerbs, benchmark positions, setting out data, co-ordinates etc;
- General roading works plan (including the following):
    - Detailed plans with contours of intersections, cul-de-sac heads, parking bays
    - Long-section showing, at maximum 20m chainage intervals existing ground levels, proposed final levels, cuts and fills, grades, vertical curve details, horizontal curves and services
    - Cross sections and typical cross sections
- Drainage, sewerage and water reticulation (including the following):
    - Separate plans showing the reticulation in relation to lot boundaries
    - Long sections of each drainage line with existing and final ground levels at minimum 20m intervals, pipe sizes lengths and grades, manhole cover levels, invert levels and depths
    - Any existing services shall be shown on cross sections and accurately located in the field by potholing or other buried service location techniques shall be highlighted
- Energy (electrical) reticulation
- Street lighting layout
- Communications reticulation layout
- Gas reticulation layout (if applicable)
- Earthworks and silt control plan: separate plan showing final contours, areas of cutting and filling together with depths relative to original ground level
- Topographical survey plan: showing and identifying existing features, spot levels on permanent features, invert levels, pipe and manhole materials, flow directions. The survey must be oriented by reference to legal survey pegs and not merely boundary fences or buildings
- Detail drawings: standard and other detail drawings showing details of kerbs and/or channels, pram crossings, paving and underchannel drains, stormwater inlet and outlet structure details, manholes, junctions, ramped risers, sumps, pipe bedding
- Structural drawings (if applicable)
- Ducting plan: showing ducts for communications, energy, traffic-lights, water connections etc
- Road signs and markings plan, including street names
- Pump station details (if applicable)
- Landscape planting plan
- Works to reserve areas
- As-built plans: as required in CoP Part 12: *As-Builts*

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Any departure from the requirements of the approved plans that may be necessary to meet particular circumstances shall be referred to the Council for approval.

Responsibility for providing the plans and associated data shall lie with the developer in the case of land development, or with the contractor in the case of works constructed for the Council under contract to the Council.

3.2.4 Submission of Application for Engineering Plan Approval

Upon works completion the certificate of design compliance that states that all works have been designed in accordance with the appropriate standards and sound engineering practice should accompany the application.

The Supervising Engineer/Surveyor shall submit a programme of inspection that should demonstrate an adequate level of inspection will be undertaken.

The Council will check the Engineering Plans and Specifications for compliance with this Engineering Code of Practice. The Council's approval of complying documents will be given in writing.

If alterations are required the plans and documents will be returned with the request that updated plans are amended. Minor amendments required will be endorsed on all copies of the plans.

Where the resource consent application includes a proposal plan for the proposed activity and a resource consent is granted that is conditional on works being completed in accordance with the approved plans then the Council will return a set of stamped approved plans and specifications to the developer.

At all times during construction a copy of the stamped approved plans shall be kept on site, together with a copy of the Resource Consent.

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3.3 MANAGEMENT RESPONSIBILITY

3.3.1 Developer's Representative

The Developer should appoint a single Developer's Representative who shall be responsible for submitting information required for consent application, preparing and submitting engineering plans, liaison with council, monitoring/supervising construction, certifying the 'as-built' information and the works. The Developer's Representative shall be a Chartered Professional Engineer or Registered Professional Surveyor.

The Earthworks and Land Stability investigation and completion reports shall be prepared by a Chartered Professional Engineer experienced in geotechnical engineering.

The Developer's Representative should be available for a site meeting as required. The Council will provide two (2) working days notice for any meeting it instigates except in the case of emergencies in which case an immediate response may be required.

Engineering plans and specifications must adequately specify the works and materials. Approved engineering plans are one of several requirements to be met before construction may commence.

3.3.2 Material Supply

Check materials purchased for the project that are significant in terms of achieving the contract quality requirements. Confirm compliance with the specified requirements prior to incorporation in the project. Note the verification of compliance either on the relevant checksheet or some other appropriate record.

Checking for compliance should preferably be done on receipt of the materials. The "verification" referred to can be recorded when completing the relevant checksheet. Attach any supporting documentation to the checksheet, such as delivery dockets or supplier certificates of compliance, which provide evidence of the type, grade, and class etc of material used.

Keep records of material tests that are traceable to defined sections of the work e.g. 7-day and 28-day concrete crushing strength test results, basecourse sand equivalent tests ex-supplier.

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3.4 SAFETY AND ENVIRONMENTAL MANAGEMENT

3.4.1 Health & Safety

A health and safety programme is mandatory for all contract quality plans submitted as part of a capital works project. It is not a Council requirement of subdivision consents.

Operate a formal health and safety programme, which complies with the statutory requirements of the Health and Safety in Employment Act 1992 and any subsequent revisions and associated regulations. To the extent practical and permissible by law, health and safety policies and procedures should be integrated into the engineer's and contractor's quality system.

The developer shall erect temporary fencing, in accordance with their approved Health and Safety plan. This fencing must protect the general public, particularly children, from all danger areas including dams and ponds. Danger signs approved by the Council shall be erected that warn persons of the danger.

Should a situation arise whereby the safety of the public, public or private property or the operation of any public facility is endangered, the Council may instruct the developer to stop work or to carry out such remedial measures required to remove the danger. Any work so ordered shall be at the expense of the developer.

3.4.2 Environmental Management

Environmental management is an integral part of project management and therefore will be most efficiently operated within the framework of the project's quality system.

Design the environmental management programme in full compliance with the Resource Management Act. Specific activities that may require resource management consents include:

- Management of stockpile material.
- Management of disposal areas.
- The use of chemical sprays and fertiliser.
- Noise and dust nuisance.
- Prevention of fuel and oil spills including the actions taken if an oil spill occurs.
- Control of silt, contaminants and stormwater runoff.
- The alteration of, or taking water from, waterways.
- Work around protected trees.
- Redirection of groundwater.

This is by no means an exhaustive list. Consider (if not contractually required to) developing a formal Environmental Effects Register. Also identify these matters in an assessment of environmental effects, for applications for subdivision consent.

Operate a formal environmental management programme that complies with the statutory requirements of the Resource Management Act 1991, any subsequent revisions and associated Regulations and any other specific requirements set out in any applicable resource consent. To the extent practical and permissible by law, integrate the programme into the quality system.

The Contract Quality Plan must identify all compliance issues relating to the Resource Management Act 1991, including any conditions contained within the project related resource consents.

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3.5 CONTROL AND INSPECTION OF THE WORK

The developer shall ensure that the quality requirements of the consent, CoP, design and relevant standards are complied with.

- Check, inspect and test the work and verify that it conforms to the specified requirements;
- Record the results as documentary evidence of compliance.

3.5.1 Checking, Inspection, Testing and Recording

The documentation requirements associated with checking, inspection, testing and recording need not be complex. The checksheets are useful in that they provide a breakdown of the checks that should be performed and, when completed, serve as a record. They should be developed for each work activity and should contain the quality requirements as reminders.

The construction checksheet should:

- Provide a checklist of the items to be inspected;
- Include the acceptance criteria;
- Identify the personnel responsible for doing the inspection;
- Contain space for recording that compliance of the individual items has been attained;
- Contain reference to further records generated by non-conformances;
- Provide for "signing-off" at the bottom of the sheet after a fully complying "final inspection".

An audit or inspection and test schedule should provide a full listing of all audits, inspections and tests of materials and completed works. It should clearly indicate ‘hold’ or ‘witness’ points and include signing off by the contractor, the engineer and the Council where required.

Check, inspect and test to verify compliance during design and construction and on final completion. Specify the methods, specification references, frequency, timing and responsibilities for checking, inspection and testing in the Design Report. Wherever possible, measure compliance against quantified acceptance criteria based on the CoP and/or specification requirements. Document the results and retain as part of the quality records.

3.5.2 Inspection

The developer and his/her advisors are responsible for providing Council with a Certificate of Construction.

These certifications must be provided for all engineering works associated with subdivision and land development, in accordance with this document and the District Plan. The Certification must be prepared by a chartered professional engineer or surveyor.

Commencement of stages shall not proceed until after the Engineer's inspections and approval of the previous stage. Engineer's inspections are as follows:

- After setting out and prior to commencement of work;
- Inspections of excavated material;
- Any unexpected subsoil conditions and obstructions;
- Base of trench to be inspected;
- Bedding prior to commencement of subgrade filling;
- Subgrade layer completion;
- Sub-basecourse layer completion;
- Basecourse layer completion;

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- Temporary surfacing;
- Preparation for application of final surfacing;
- Completion of final surfacing;
- Completed pipelines, drainage structures, anchor blocks prior to backfilling;
- Witnessing sterilisation of water mains in accordance with Section 6 of the Waimakariri District Council Hygiene Code of Practice for Work on Public Water Supplies;
- Inspection of finished lid levels on surface boxes, markings and reinstatement etc;
- For gravity lines, the lines are to be flooded, flushed and inspected by the Engineer with a CCTV and a copy of the CCTV provided to Council on a DVD along with an inspection record to NZ pipe inspection standard.

Council shall also be advised a minimum of 24 hours prior to the inspections required by this clause, so that they may also carry out inspections.

A summary of the Quality Assurance records obtained throughout the works will also be submitted when applying for Subdivision Compliance or Code Compliance. This will take the form of a report prepared by an appropriately qualified professional. The report will summarise the Quality Assurance Records and Standards achieved in all aspects of the project.

In addition, if Council is not satisfied with the standard of information provided, any or all Quality Assurance records must be provided to Council with 24 hours upon receiving a written request to do so by Council.

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3.6 PIPE RETICULATION – GENERAL

Refer also to CoP Part 5 *Stormwater and Land Drainage*, Part 6 *Wastewater* and Part 7 *Water Supply*. The relevant requirements of those Parts shall be met.

3.6.1 Materials

Manufacturers of any pipes and fittings intended for use in the Waimakariri distribution system must have a certified quality management system in place that complies with AS/NZS ISO 9001:2000. This system must apply to all aspects of the manufacturing processes, including product handling, administration and stock control.

The Council requires the right to verify that any and all contracted and subcontracted products conform to the specified requirements. Full product identification and traceability is required. Protection of the quality of the pipe and fittings includes transportation and off-loading at the delivery point. Full quality records, as per the manufacturer's Quality Assurance manual, must be available on request for evaluation by the Council and be kept for a minimum period of 10 years.

The Council reserves the right to require full details of the manufacturer's means for demonstrating compliance. Irrespective of the means of demonstrating compliance and the supplier's and manufacturer's quality assurance systems, responsibility remains with the developer to ensure the installation of products that conform with the requirements of the CoP and the appropriate standards. The Council may arrange for independent testing to be carried out on randomly selected samples or assembled joints.

Positive verification inspections or testing results obtained by the Council shall not limit the supplier's responsibility to provide an acceptable product, nor shall it preclude subsequent claims made under warranty due to manufacturing defects, faulty design, formulation, or processing.

3.6.2 Tolerances

Horizontal tolerances shall be as follows:

- Manholes and other drainage structures shall be within 150 mm of the position indicated on the plan.
- Pipelines shall be within 100 mm of the position indicated on the plan.
- Pipelines shall not extend into the internal wall of drainage structures more than 10 mm for pipes not entering at invert level
- For the pipeline entering and exiting the manhole at invert level the maximum tolerances are as shown in Table 3.1:

Table 3.1 Horizontal tolerances for pipeline/manhole joins

Pipe Diameter	Maximum Distance from Internal Manhole Wall
D < 675 mm	50 mm
D < 1050 mm	150 mm
D ≥ 1050 mm	250 mm

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Vertical Tolerances shall be as follows:

- Sump shall be within 5 mm of the sump frame in the correct location.
- Manhole invert levels are to be within 5 mm of the design level.
- Pipelines are to be laid to grade such that no pipe shall be more than 15 mm out of grade and adjoining pipes shall not vary in error by more than 5 mm from the adjacent pipe.
- Manhole cover levels shall be within 15 mm to adjacent surface for grass surfaces and 5 mm for concrete and seal surfaces.

3.6.3 General Testing

Before new reticulation is connected to the existing public system it shall be inspected and tested by the developer in the presence of the Council's representative. All testing shall be carried out as required in this document. All costs and arrangements shall be borne by the developer. The developer shall provide the Council a minimum of two working days notice that a test inspection is required.

The Council does not normally test materials or products. Plan and specification approval is not evidence that the Council has approved the material or product. The Council may require verification that a material or product is tested for conformance, quality or adequacy.

The developer shall supply all necessary testing apparatus. The developer shall also provide all appropriate Health and Safety equipment including gas monitors, harnesses, etc.

3.6.4 Acceptance Testing

Acceptance testing shall not be commenced before:

- The developer's representative shall have certified and supplied the Council with 'As Built' drawings of the work to be tested
- The Contractor's written testing methodology and all equipment, including backflow prevention equipment (if needed), pressure test rig, makeup volume measurement, etc) have been approved
- Suitable means for filling and flushing are in place
- The pipeline to be tested has been completed and backfilled, and is in conformity with the specification
- Any permanent or temporary concrete thrust blocks have been poured and have attained sufficient compressive strength to resist test thrusts
- End caps (that allow for filling and bleeding of air) and any temporary anchors are in place and are adequately braced to resist test thrusts
- Air has been purged from the pipeline
- Air valves are installed and their isolating valves are open
- For potable water mains, sterilisation shall have been completed in accordance with Section 6 of the Waimakariri District Council Hygiene Code of Practice for Work on Public Water Supplies;
- Arrangements have been made for the safe disposal of water flushed from the pipeline, including any consent to discharge if necessary
- Suitably qualified personnel are on site to carry out and oversee the testing
- Appropriate and approved record sheets are available for recording all aspects of the testing procedure

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3.6.5 Personnel Qualifications

The testing of all pipelines shall be carried out and supervised by acceptably qualified or accredited personnel.

Qualified or accredited personnel shall show competence and knowledge of the relevant testing methods and procedures, and:

- Hold appropriate qualifications issued by a registered training organisation; or
- Have attended a relevant training course, and received accreditation relating to the work being undertaken.

Refer to Section 7 – Water Supply, and the Waimakariri District Council Hygiene Code of Practice for Work on Public Water Supplies for Water Supply specific qualifications.

3.6.6 Filling the Pipeline

The Contractor shall be responsible for arranging for a suitable supply of clean water for testing (i.e. water containing no sediment or floating material). Waimakariri District Council will make water available for filling pipes (subject to any prevailing water restrictions) at no cost to the Contractor for testing using one of the two methods outlined below:

- From a dedicated fire hydrant to fill a water tanker. Refer to Council's 'Tanker Filling Points' on the Council's website for permit process and approved locations. The Contractor shall be responsible for all costs associated with transporting the water to the pipe section under test. Refer also Section 4.8 of the Waimakariri District Council Hygiene Code of Practice for Work on Public Water Supplies for tanker requirements, if pipe being tested is a potable water main, or;
- From an available hydrant close to the worksite, in accordance with Section 5.1 and 6 of the Waimakariri District Council Hygiene Code of Practice for Work on Public Water Supplies. Specific Council approval shall be obtained to use a hydrant for this method.

Water may be drawn from the reticulation at a maximum rate of 10 litres per second, in accordance with the following conditions:

- Preferably fill from the low end and ensure that air valves and venting points are open and operating to optimise air removal
- Making sure that the filling or flushing operations do not cause an unacceptable pressure drop in the reticulated water supply. Should the Contractor's filling operations cause a disruption to any water supply by exceeding the approved rate of flow, permission to take water will be withdrawn and an alternative water source found at the Contractor's expense.
- Repairing any leaks or making good any defects that are revealed
- Allowing the pipeline to "soak" for a period of at least 4 hours at a pressure of 20±10 metres head to allow the temperature to stabilise and any time dependent movement to take place

3.6.7 Test Lengths

Pipeline tests shall be split into three separate sections:

Lengths of shorter sections of pipe shall be tested during construction: The length of these test sections will be influenced by a number of factors:

- The availability of water,

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- The Contractor's confidence in the pipe installation and
- The level of acceptable risk related to location of possible leaks.

Test lengths should not normally exceed 1,000 metres in length; however permission to test longer lengths will be given favourable consideration. The test shall be to the system test pressure.

Pipelines shall be tested before and after connection at each end: These tests may only be possible on completion of work done under separate contracts. The Contractor shall allow for a return to the site once works have been completed to finish testing requirements. This test shall be undertaken at the connection into the pump station, and shall be to the system test pressure.

The entire length of pipeline shall be tested, once completed: The Contractor shall allow in his timetable and pricing for a return to site once the STP upgrade works have been completed to finish the testing requirements. This test shall be at the pumpstation working pressure (i.e. less than the system test pressure). Its purpose is to ensure there are no pipeline leaks.

The Contractor shall leave in position any flanges and blanking off materials required to complete testing of the pipeline.

3.6.8 Manholes – Rainfall Simulation Test

All manholes shall be subjected to the Manhole Rainfall Simulation Test and passed where required by the Engineer.

A moat 300 mm below the riser-lid joint shall be dug around each manhole. The moat and lid will then be flooded to just below the top of cast iron frame, and the water level maintained for 10 minutes.

The manhole will be deemed to have failed upon water intrusion at the time of test, or at any time prior to the end of the maintenance period.

3.6.9 Joints – Coating Of Joints (Concrete Lined Steel Pipes Only)

After initial pressure testing, the exposed exterior metal at the joint shall be thoroughly cleaned, dried and then coated with a continuous coating of "Denso" paste (or equivalent approved by the Engineer) at the rate of 500 grams to every 2.5 square metres. After the application of "Denso" paste the joint shall be wrapped with 100 mm wide "Denso" tape so that the tape laps the coal-tar coating of the pipe by 25 mm and so that laps in the "Denso" tape itself are at least 25 mm wide.

3.6.10 Failure of Test

In the event of an unsatisfactory test result, the source of failure shall be determined and repaired at the developer's expense and the system retested. Even if testing procedures produce a satisfactory result, any visible leaks that are discovered shall be rectified and re-tested.

Failure to allow adequate "soak" time or if there is a significant amount of entrapped air in the pipeline may result in an inconclusive test or a marginal failure. In such a case, the test period may be extended for a further one to two hours, as may be agreed between the Contractor and the Engineer.

If a PE pipeline test fails, the pipeline must be rested at a pressure of no more than 20m head for a period of at least 4 hours before repeating the test procedure. In the event of a dispute over test results, testing by an approved volumetric reference method will be allowed.

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3.6.11 Reporting

A complete record of all details of the test shall be made. This record shall include the following:

- Full details of the pipeline tested (including details of pipe material, diameter and pressure class, pressure rating, manufacturers identification, jointing system, pipeline profile showing changes in pipe material or pressure class as well as the location of valves and fittings, and the exact extent of test sections)
- Failure of any thrust block, pipe, fitting or other component
- Any visible leakage detected and repaired
- A detailed record of the pressure in the pipeline at appropriate time intervals. This may be from a pressure data-logger or by manually recording times and pressure readings at appropriate intervals
- Whether the pipeline passed or failed the test
- The signatures of the representatives of the Contractor and Engineer who witnessed the test.

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3.7 PIPE TESTING – GRAVITY

Before being approved all non-pressure wastewater pipelines shall have passed the air test outlined below, and any other tests required by WDC.

Gravity pipe air tests shall only be permitted when approved by the Engineer and all equipment used for air testing shall be subject to acceptance by the Engineer.

The section of pipe to be air tested should be flushed and cleaned to clear the pipe and wet the internal surface. The line shall be isolated with suitable plugs and one plug should have an inlet valve for connection to a source of air under pressure. Connect the air hose to the inlet tap and a portable air control source.

The air equipment should consist of necessary valves and pressure gauges to control the rate at which air flows into the test section and to enable monitoring of the air pressure within the test section. Also the testing apparatus should be equipped with a pressure relief device to prevent the possibility of loading the test section with the full capacity of the compressor.

3.7.1 Low-Pressure Air Test

This method should not be used for test lengths greater than 250m or where DN > 450mm. Where larger pipes are used, the designer shall be required to submit a specific testing methodology which may involve a different type of test.

The procedure for low-pressure air testing of large diameter pipelines is potentially hazardous because of the very large forces to be resisted by temporary plugs or bulkheads and the serious consequences of accidental bulkhead blowout. It is recommended that a relief valve with a 50kPa maximum setting be installed on all pressurising equipment.

For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix N2.

3.7.2 Infiltration Testing

In addition to the air test, upon completion of any section of the work, the line shall be tested for infiltration if required by the Engineer.

For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix N5.

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3.8 PIPE TESTING – PRESSURE

No test will be carried out on pressure pipelines until the whole of the layout and workmanship conforms to requirements. The test section shall then be pumped up to the pressure specified below by means of a force pump; the pump delivery being connected to any convenient and approved tapping on the main.

The pipeline may be tested as a whole or, if necessary, subdivided into test sections that satisfy the following requirements:

- The maximum allowable pressure on the lowest rated component in the test section is not exceeded
- A pressure of at least the pipeline's maximum designed operating pressure (including an allowance for pressure surges) is achieved at the highest point of each test section
- Sufficient suitable water is available for the test and there are appropriate arrangements in place for the disposal of the test water
- The elevation difference between the lowest and highest parts of the test section is minimised.

The pipeline shall be filled at an approved rate, in accordance with the following conditions:

- Preferably fill from the low end and ensure that air valves and venting points are open and operating
- A polyurethane foam swab may be run along with the filling water to assist with debris and air removal
- Where the test water is derived from a potable water supply, the filling or flushing operations shall not cause an unacceptable pressure drop in the reticulation.

Pressure testing shall not take place until thrust blocks have cured sufficiently to resist forces generated by the test pressures. Where possible and practical, fittings and bolted flanges shall be left exposed during the test.

The System Test Pressure (STP) shall be set so that the pipeline is subjected to a pressure that is in excess of the maximum pressure that will be encountered during the pipeline's operational lifetime. Unless otherwise required by the Council, the STP shall be equal to the rating pressure of the lowest rated pipe or component installed.

The pressure shall be monitored at the lowest part of the pipeline, or if that is not possible at some other convenient point, and the test pressure adjusted to achieve the system test pressure at the lowest part of the section under test. Pressurising of the pipeline above the "soak" pressure shall not begin until the Engineer is on site to witness the test.

3.8.1 Constant Pressure (Water Loss) Method – Pipes with DN ≤ 150mm

This test is acceptable for all pipelines with a nominal diameter of 150mm or less. The test pressure shall be set to the pipe rated pressure.

For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix M8.

3.8.2 Constant Pressure (Water Loss) Method – PVC, ductile iron and steel

This test is acceptable for PVC, DI and steel pipelines. It shall be used for water mains with a diameter of 200mm diameter or greater, and for all wastewater rising mains. The Contractor shall include the method and means of measuring the make-up water volume in the test methodology provided before testing commences.

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For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix M4.

3.8.3 Pressure Rebound Method – PE

Polyethylene pipelines require a different testing procedure to account for the visco-elastic behaviour of PE.

Note that the evaluation of this test requires the volume of entrapped air to be minimised. Failure to achieve adequate venting of the pipe may result in inconclusive test results and significant delays. The results of the main test can only be judged if the remaining volume of air in the test section is sufficiently low. This test may not be suitable for critical pipes or pipes with a nominal diameter greater than 315mm.

For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix M7.

3.8.4 Constant Pressure Test (Water Loss Method) – PE pipes

This test is acceptable for PE pipelines, and should be used in place of the Pressure Rebound Method (see clause 3.8.3) for critical pipes or pipes with a diameter greater then 315mm. The Contractor shall include the method and means of measuring the make-up water volume in the test methodology provided before testing commences.

For the testing process and conditions of acceptance, see NZS 2566.2:2002, Appendix M5.

3.8.5 Pressure Gauge Requirements

The pressure gauge to be used shall be accurate and readable to within 5kPa. The pressure range of the gauge shall be such that the test pressure falls within the range 50 - 90% of the full-scale range of the gauge.

The main gauge shall have been calibrated within the last 6 months and shall have a minimum dial diameter of 100mm (preferably 150mm) or be a digital gauge. A “test” pressure gauge (either digital or analogue) with an accuracy of better than ±0.5% of full scale and pressure range as above is preferred for the main gauge.

For testing on wastewater rising mains and on water mains of 200mm diameter and greater, the Contractor shall arrange for a waterworks data-logger and calibrated pressure transducer with a maximum pressure range 20 bar to be connected to the test section of pipeline throughout the duration of the test, from initial filling to the final release of the pressure. Failure to deliver a full electronic record of the test may result in a re-test being necessary. The Contractor shall be responsible for ensuring that the pressure gauge and data-logger register the pressure within 5% of each other.

The Contractor shall submit details of the proposed test rig including the gauge, data-logger etc to the Engineer for approval, prior to commencing the test.

Inadequate equipment shall not be permitted.

3.8.6 Additional or Failed Pressure Tests

The cost for the Engineer to attend pressure tests that fail shall be deducted from any payment due to the Contractor. The amount to be deducted shall be the greater of $400 plus GST or the actual costs for the Engineer’s time, transport and on-costs resulting from witnessing the failed test/s.

If the Contractor elects to use more than the scheduled (or agreed) number of pressure tests, the cost to the Contractor for each additional test shall be as described above.

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3.8.7 Completion of the Test

After testing, release the test pressure slowly and if necessary, open air valves and drain points to drain the line.

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3.9 PUMP STATIONS

Refer also to CoP Part 5 *Stormwater and Land Drainage*, Part 6 *Wastewater* and Part 7 *Water Supply*. The relevant requirements of those sections shall be met.

Testing and commissioning shall be thorough and rigorous. The pump station shall be operated beyond the range it will experience in operation and throughout its life.

3.9.1 Testing

The Contractor shall give two days notice in writing to WDC of the date after which the workers are ready to carry out any tests required.

All test instruments and other testing facilities shall be provided by the Contractor within his tender price. Should the Engineer have any doubt as to the accuracy of a measuring device, he reserves the right to instruct the Contractor to have the instrument recalibrated at no extra cost. Nevertheless, if the recalibration was in fact not necessary, the cost shall be borne by the Principal.

All testing shall be carried out in strict accordance with NZCEP 11:1993.

A thorough test schedule shall be prepared and copies of all test results, as required by NZCEP 11:1993 and AS/NZS 3017:2001, shall be appended to the Certificate of Compliance (COC) and shall be executed by an independent registered Electrical Inspector.

3.9.2 Commissioning

As a follow on from testing, the Contractor shall allow for a full re-commissioning of the switchboard, associated existing pumps, soft starters, control, alarms, and measurement/ instrumentation and telemetry systems and commissioning of the new pump, filter and extract fan. Included with this requirement is the re-commissioning of the standby generator on the new switchboard and interconnections. Full operational checks and pump running shall be carried out on the Standby Power generator supply.

A fully scheduled pre-commissioning and commissioning program shall be submitted to WDC. This shall include, but not necessarily be limited to, defining all activities to be undertaken after the testing is completed. Such pre-commissioning checks and commissioning shall allow for co-ordination with the WDC operational staff and their input. Commissioning in this regard is the confirming of operational safety and reliability only after all non-livened tests have been completed.

Full written records of all operational set points, readings of all dials, instrument digital displays for the whole range of operational equipment, alarm indications etc, shall be taken at the time, on site, and presented in a tabulated and written/typed form to WDC.

The relevant Asset Manager or a representative shall be present for the pump station commissioning. Following commissioning two copies of the pump station manual and keys shall be submitted to the relevant Asset Manager.

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Commissioning shall include the following items, which shall be fully documented and submitted to WDC for insertion on the pump station file:

- Ensuring all electrical circuits are operating as expected
- Calibration by operating hydrants during a low flow period
- Simulate cavitation cut-out for each pump separately
- Check manual override operates
- Check a minimum of three flow and pressures readings to ensure compliance with pump operating curve
- Check pumps supply adequate flow/pressure to meet level of service in highest point of zone
- Check minimum run time
- Simulate flows to ensure that the pumps station control schematic is met.
- Confirm that water hammer does not occur and that the check valves operate quietly
- Forced water hammer test

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3.10 WATER QUALITY TESTING

Refer also to CoP Part 7: *Water Supply*. The relevant requirements of that Part shall be met.

All proposed water supplies shall be sampled and tested to ensure the health and well-being of consumers. Sampling and testing of the proposed water supply for both bacteriological and chemical quality shall be carried out in accordance with "*Drinking Water Standards for New Zealand 2005*" by a laboratory that is IANZ registered or independently accredited by a recognised authority approved by the Council.

Samples from the water source shall be taken either by:

- The laboratory carrying out the analysis, or
- Other agencies approved by the Waimakariri District Council.

Refer also to QP-C816-AC Chemical Quality of Potable Water.

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3.11 ROAD TESTING

The relevant requirements of CoP Part 8: *Roading* shall be met. Refer also to CCC *CSS Part 6 – Roads*.

Subgrade and pavement testing shall accord with the appropriate tests and sample rates from NZS 4402: 1986/1988 and the methods given below:

- Benkelman Beam test;
- Clegg Hammer Impact Value test;
- Density & Voids (Nuclear Densometer) test;
- CBR (Scalar Penetrometer) test Victoria County Roads method;
- Undrained Shear Strength test;
- Any other approved method, as agreed with the Council.

The Council may approve other standards and alternative test methods.

The developer shall provide the Council with 48hrs minimum notification of any proposed test, and 24hrs minimum notification that a pre-seal inspection is required. A sealed surface that has not been approved by inspection will not be approved. The developer shall submit for approval the binder composition and application rate prior to chipsealing.

The developer shall supply sufficient information to confirm all other performance criteria have been achieved. Laboratory results shall be forwarded to the Council as soon as they become available.

The developer shall be responsible for remedial works required to any failed section.

The finished surface shall not hold water at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate. Channels with a design gradient of 1 in 500 or steeper shall not pond water.

3.11.1 Level Tolerances

Level tolerances shall be as follows:

- Sealed surfaces shall be reasonably smooth and even, having no ridges or depressions, shall finish flush with but in no case more than 3mm above the adjacent surface and no area shall hold water.
- Unsealed surfaces shall be within ±15mm of the surrounding ground
- Grassed surface shall be within ±15mm of surrounding ground.
- Kerb & channel shall be within ±5mm of design level and location

The gap under a 3m straight-edge placed longitudinally shall not exceed 5mm with a cumulative total of all visible gaps of not more than 20mm and the gap under a 1m straight-edge placed transversely shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm, except where design or material considerations dictate otherwise.

The finished carriageway shape shall be consistently convex across the constructed width, unless otherwise specified. All tie-ins to existing carriageways or concrete kerbs shall be flush.

The line of the kerb shall be straight between tangent points and shall sweep around curves without kinks, flats, or angles in a smooth arc.

The difference in level between adjacent paving blocks shall not exceed 2mm. The joint widths shall be between 2mm and 5mm with an average over the entire pavement of 3mm.

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3.11.2 NAASRA Testing

The finished surface shall give a smooth ride with average and maximum NAASRA roughness counts as specified in Table 3.2

Table 3.2 NAASRA Roughness Counts

Surfacing	Average (mm/km)	Maximum (mm/km)
All new asphaltic concrete and open graded porous asphalt surfaces	55	75
Asphaltic concrete and open graded porous asphalt overlays and shape corrections	65	90
Chipseal through streets with 10,000-20,000+ vehicles per day (RAMM Pavement Use T6 and T7)	60	80
Chipseal through streets with 2,000-9,999 vehicles per day (RAMM Pavement Use T4 and T5)	65	85
Chipseal through streets, culs-de-sac and rights of way with 0-1,999 vehicles per day (RAMM Pavement Use T1-T3)	70	90

The developer shall undertake NAASRA testing on the carriageway where specified. The average and maximum readings shall exclude values affected by intersecting streets, platforms and road humps. The Defects Liability Certificate will not be issued until a complying NAASRA test is received.

3.11.3 Benkelman Beam Testing

Benkelman Beam testing is specified in the TNZ T/1 document, which sets out equipment and test method requirements. Acceptable results shall be as specified in Table 3.3.

Table 3.3 Benkelman Beam – Acceptable Values

Traffic Loadings (heavy vehicles/day)	95% of readings (mm)	Maximum (mm)
>500	<1.2	1.5
100-499	<1.6	2.0
<99	<2.0	2.5

Beam testing shall commence with a test 5m **beyond** the extent of work, then at 15m intervals for projects greater than 100m in length, or 10m intervals for projects less than 100m. In each case the final reading shall also be beyond the end of the work. The readings beyond the work should not form part of the calculation, as they are required for asset research purposes only.

No more than 5% of the tests may exceed the maximum design deflection for that category. No single result shall exceed the maximum by more than 50% for that category.

3.11.4 Clegg Hammer Testing

Compaction may be measured by Clegg hammer or other approved impact device. These devices shall be calibrated at 12-month intervals. At no point on the finished surface shall the Clegg Impact Value (CIV) be less that that specified in Table 3.4, and the testing shall be carried out at a minimum rate of 1 test per 1000m^2 for subbase, and 1 test per 200m^3 for metalcourse.

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Table 3.4 Clegg Hammer – Acceptable Values

Material	Minimum CIV
Subgrade	10
Metalcourse – Footpath & Residential Vehicle Crossings	25
Metalcourse – Commercial Vehicle Crossing & Carriageway	35

3.11.5 Nuclear Densometer Testing

The density of metalcourse under kerb & channel shall be measured by Nuclear Densometer. NZS4402 sets out equipment and test method requirements. .

Individual readings with the nuclear densometer in the backscatter mode shall be at completely random locations and at not greater than 10m longitudinal intervals for shoulder work, or not greater than 5m intervals for trenching work. Testing shall be carried out at a minimum rate of 1 test per 2000m^2 for subgrade, and 1 test per 100m^3 for metalcourse

Table 3.5 Nuclear Densometer – Acceptable Values

Material	Minimum Voids	Average Voids	Maximum Voids
Subgrade	12%	-	18%
Metalcourse	-	≤ 8%	10%

Moisture content test shall be as per NZS 4402 within 2% of Optimum Moisture Content

No more than 5% of the tests may exceed the maximum or minimum voids percentage for that category. No single result shall exceed the maximum or minimum by more than 50% for that category.

3.11.6 Scale Penetrometer

CBR results shall be equal to or greater than 7. Testing shall be carried out at a minimum frequency of 1 test per 2000m^2.

To convert penetrometer readings to CBR values, when confirming pavement designs, use Figure 5.2 “Correlation of Dynamic Cone Penetration and CBR” from Austroads Pavement Design 2004.

For irregular unsuitable foundation areas up to 50m^2 the developer shall remove the unsuitable material to meet the design requirements. The Council shall be advised as soon as practicable and provided with the following information: area and depth excavated and marked on the plan; CBR and description of the unsuitable material; CBR and description of material at base of unsuitable material excavation.

3.11.7 Undrained Shear Strength

Undrained shear strength shall be measured by hand-held vane. Testing shall be in accordance with BS 1377:1990, as adopted by TELARC, or with NZS 4402.

The average result shall be at least 150kPa, and the minimum for any single test shall be 80kPa.

The testing shall be done at a minimum frequency of 1 test be 2000m^2.

3.11.8 Core Testing

Where asphaltic concrete is laid on carriageways, core samples shall be a fair representation of the paved area. All core results shall be returned to the Council. Core samples shall be 100mm in diameter.

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Where required, the developer shall take core samples from the kerb. The cores shall be greater than 90mm in diameter and shall be tested for compressive strength by an approved laboratory. The cores shall be clearly marked to identify the contract site and core location. The coring and testing shall be in accordance with NZS 3109 “Concrete construction”.

For machine laid kerb and channel each core shall be assumed to represent the truckload of concrete for that pour.

3.11.9 Chipseal Texture (Sand Circle) Test

Finished first-coat surfaces shall be of uniform texture and appearance and shall meet the sand circle test limits specified below at the end of the defects liability period. Tests to TNZ T/3 shall be carried out at the frequency of not less than one per 30m lane length with a minimum of three sand circles to be carried out on any treated area.

Table 3.6 Sand Circle Testing – Acceptable Values

Surface Type (chip grade)	Sand Circle Maximum Diameter
3 (8.5-10)	150
4	160
5	170
6	185
4/6	165
3/5	165

3.11.10 Slurry Sealing

Prior to commencing the works, a test section at least 20m long and 2m wide shall be placed at the developer’s cost away from the site and using the proposed materials.

The slurry seal shall be placed and rolled in accordance with CCC *CSS Part 6*, and shall be checked for laid depth, consistency and break time. An approved laboratory shall carry out tests to determine the asphalt content and aggregate gradation. If the observations and tests indicate that the slurry seal test section does not conform to the specification, the necessary adjustments shall be made and additional test sections shall be constructed for conformance to the specification.

The Contractor shall supply recently achieved wet track abrasion and loaded wheel abrasion loss tests carried out in accordance with ASTM D3910 ‘*Standard practices for design, testing and construction of slurry seal*’ for the proposed slurry mixes at least one week prior to commencing the contract works.

The Contractor shall test a minimum of one sample of slurry seal each day that slurry is laid. The sample shall be taken from the discharge chute and tested to determine asphalt cement content, moisture content and aggregate grading. Testing shall be by an approved laboratory and the results shall be submitted to the Engineer the next working day.

The cured slurry shall have a homogeneous appearance, with no efflorescence, scars, streaks or uneven joints and shall adhere firmly to the surface. The final compacted depth of Type I slurry shall be 3.5mm +1mm, -0mm. The final compacted depth of Type II slurry shall be 5.5mm ±1mm.

Abrasion or loss of the slurry surface due to the effects of normal use and environmental conditions shall not reveal more than 0.5m^2 of the underlying surface of the area being slurried within the defects liability period.

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3.12 UTILITIES TESTING

Inspection and testing shall be carried out on all new reticulation and switchgear in the presence of a representative of the utility service provider prior to its connection to existing utility, in accordance with the requirements of that provider.

The developer shall provide evidence to the Council that the supply and reticulation meets the requirements of the utility service provider and of the Electricity Act 1992.

The developer shall ensure that all tests are documented, identifying the tested equipment and the personnel involved. Test sheets shall be transmitted to the utility service provider for approval and copied to the Council.

The developer shall arrange for the utility service provider to forward certification to the Council. Certification shall verify that:

- The reticulation meets the requirements of this Code.
- Reticulation is physically available to the main body of each lot within the completed development.
- The utility service provider/s have received and approved satisfactory As-Built drawings from the developer.

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3.13 NON-CONFORMANCE & QUALITY IMPROVEMENT

3.13.1 Conditions Auditing

The Council will audit compliance with the conditions of consent. Auditing will involve both site inspections and checking of associated documentation to the extent necessary to ensure the work is completed in accordance with the approved plans and specifications, and to the Council's standards. The Council will undertake auditing inspections and checking of resource consent conditions as part of the Council's fixed fees for subdivision resource consents or otherwise a fee based on the officer's concerned current hourly charge out rates together with current vehicle running costs/kilometre.

The developer shall notify the Council that audit inspections are required giving at least one working day notice. The minimum level of inspection will be as given in Table 3.7.

Table 3.7 Inspection Requirements

Type of Works	Level of Inspection
Roading	Following shaping of roading and footpath subgrade prior to placement of sub-base material
	Following metalling up, prior to pouring of kerb and channel
	Following compaction of base course prior to final surfacing. This surface is to be tested with a Benkelman Beam, or other approved method, and the results submitted to Council for approval
Trenching/Road Opening	Prior to backfilling of service trenches
Services	Testing of water, sewer and stormwater mains and laterals
	Disinfection of water mains
Water	Following completion of required works
Sewer	Following completion of required works
Stormwater/Land Drainage	Following completion of required works
Footpaths	Prior to pouring concrete
Vehicle crossings / Entrances / Rights of Way	On completion of excavation to subgrade
	Following compaction of base course prior to final surfacing

Where additional inspections are required because of faulty workmanship or work not being ready contrary to the receipt of a notification, such inspections will be carried out for an additional fee, for the additional hours required and distance travelled.

3.13.2 Control of Non-conforming Work

It is inevitable that, even with excellent practices and controls, some degree of defective workmanship or material will occur. When it does, it is important that it is properly handled to ensure that the defects are rectified in the appropriate way.

A non-conformance should be considered an opportunity for improvement, rather than to apportion blame. By adopting this philosophy, identifying a non-conformance provides an opportunity to learn from the mistake and (more importantly) prevent it happening again.

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Note that there is a clear differentiation between what should be considered a "routine construction issue" or a "routine design step" and a non-conformance. Ensure this is understood by and communicated to all staff. A construction issue, such as soft sub-soils, is often identified (and reasonably expected) during a project and does not therefore necessitate the raising of a Non-Conformance Report, unless procedures have not been followed. The inability to achieve the minimum grade on a sewer design is a non-conformance and must be reported, as is the inability to achieve a passing Benkelman Beam test or infiltration test.

A non-conformance exists, and therefore a report should be raised, in all instances where a defect in the work or design occurs that indicates that the required standard or key achievement criteria prescribed in the Design Report, Contract Quality Plan or Engineer's Report has not been met, e.g. failure to achieve compaction results, pre-seal inspection etc. For this process to be successful it must be handled in a positive and constructive manner, without unnecessary recrimination.

Any non-conforming work that is subject to follow-on work by other parties must be clearly denoted as such to alert the other parties to its non-conforming status.

The designer must have a procedure to ensure that design work that does not conform to the specified requirements is either:

- Redesigned to meet the specified requirements; or
- Accepted by concession from the Council.

Record all non-conforming work on the relevant design record and/or the relevant design checksheet.

The contractor/engineer must have a procedure to ensure that construction work that does not conform to the specified requirements is either:

- Reworked to meet the specified requirements;
- Accepted with or without repair by concession from the Council;
- Regraded for alternative use;
- Rejected and replaced.

Record all non-conforming work on the relevant construction checksheet.

If the construction non-conformance is significant in that it either:

- Results in the need for written concession;
- Results in delay or interference to the work or to other parties;
- Indicates that the fault has occurred due to the use of incorrect work practices and/or failure of materials and could have been prevented;
- Occurs sufficiently frequently as to indicate a problem in training or procedures,
- Produce a Non-Conformance Report (NCR) and send to the Council.

The report and supporting documentation must clearly indicate the action to be taken to rectify the fault, the timeframe and responsibilities. It must be authorised by the engineer.

In cases involving concessions, the engineer and the Council must approve the proposed rectification (the corrective action) of the non-conforming work in writing and prior to implementation.

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3.13.3 Defects

Council's receipt and acceptance of 'As Built' plans does not absolve the Developer of any responsibility for accuracy. In the event of any service connection not being located where shown on the 'as built' plan the Council will verify the 'as built' information with the consultant and give the consultant 48 hours to rectify the situation. If no action has been taken within 48 hours the Council will arrange for another connection to be installed and charge the consultant accordingly.

After prior agreement, the Council will accept new reticulation that connects to Council's infrastructure. The Council will then operate and maintain that reticulation. However, the developer remains financially responsible for any hidden defects and defects bonded for and covered by the Construction Completion Certificate.

3.13.4 Maintenance

The developer shall be responsible for maintenance of any services or infrastructure to be adopted by the Council a period of six months following the date of issue of the Engineering Release Certificate. A bond equal to 5% of the construction works shall be lodged with Council for the same period.

Maintenance shall include appropriate and regular mowing of grass and watering of all plants and trees together with the replacement of any perished specimens.

The Council, upon request from the developer, will issue formal notification that the maintenance period has expired, the works are satisfactory and that the bond will be released. This notification will be followed by the release of the maintenance bond. This notification will not be released until maintenance matters and defects have been remedied.

3.13.5 Completion

Prior to the issue of the 224(c) Certificate or Engineering Release Certificate as appropriate, the developer shall:

- Provide As-Built information to the Council's for approval and certification.
- Provide their consultant's completion certificate to the Council.
- Have made arrangements for fee payments to the Council's satisfaction.

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3.14 ASSOCIATED DOCUMENTS

Appendix A Design Report Template (QP-C812-AA)

Appendix B Contract Quality Plan Template (QP-C812-AB)

Appendix C Producer's Statement – Design (QP-C812-AC)

Appendix D Producer's Statement – Construction (QP-C812-AD)

Appendix E Non-Conformance Report Template (QP-C812-AE)

Appendix F Engineer's Checklist (QP-C812-AF)

Appendix G Construction Checklist – Pipe Construction (QP-C812-AG)

Appendix H Construction Checklist – Basecourse Stringing (QP-C812-AH)