
PART5: SECTION 2.2 PWC RETICULATION**530 GENERAL**

- 530.1** The PWC reticulation shall be designed to serve the whole of the natural upstream catchment area as per the requirements under PART 5 with overall master planning for the Catchment carried out first.
- 530.2** Where further development upstream of the area under consideration is provided for in the District Plan, wastewater planning will need to address the maximum upstream development permitted by the planning schemes as part of this master planning.
- 530.3** In cases where substantial costs are likely to be incurred in providing extended wastewater lines that will not serve the development under consideration, the Council may contribute towards these costs.
- 530.4** Where the adoption of pressure wastewater technology may make it possible to extend the upstream wastewater serviced catchment, such extensions will only occur with the permission of Council according to the General Bylaw 1998 and in accordance with any District and Regional Planning.
- 530.5** Overall the PWC reticulation should be designed to minimise the number of pipe size changes whilst still delivering an economically viable scheme that meets minimum technical requirements. It should be based upon readily available pipe sizes.
- 530.6** Council will determine the discharge point the Developer is to connect to and the developer is to provide to Council the estimated flows likely to occur from the proposed PWC systems and PWC reticulation to allow this determination where it is not covered under the master planning.
- Developers should also provide an estimated wastewater useage during the development's build out, so that Council will understand if any odour suppression may be required.
- 530.7** Only pipe sizes that are readily available within the commercial market place and comply with Council's Engineering Standards are to be used in the construction of the PWC reticulation.

531 CALCULATION OF FLOWS**531.1 Domestic Flows**

Domestic wastewater flows shall be calculated on the basis of an Average Dry Weather Flow (ADWF) of 250 litres per person per day, with the population (growth) figure based on the district planning scheme forecast. If population figure is not stated for specific design, it will be taken as 2.6 persons per household.

Design Criteria: Design flows from individual residences:

250 litres/ person / day: 2.6 people per residence
650 litres / residence / day
Wet Weather Flow Factor: 1

The system base performance parameters should be modelled using a wet weather flow factor of 1. Nil infiltration occurs in the PWC reticulation, but the overall performance relies on the integrity and compliance of the individual residences house gravity wastewater system. To confirm satisfactory performance within the system with respect to pressure head, a sensitivity check should be modelled, using a flow factor of 1.2 for Greenfield sites and a factor of 1.5 for retrofit schemes. To confirm satisfactory performance within the system with respect to velocity, a sensitivity check should be modelled, using a flow factor of 0.6.

531.2 "On the Property" Design

On the property design will be on the basis of a standard domestic pumping unit (or range there of) which has been approved by Council as accredited PWC System that is allowed for such use in the District and one that is consistent with the Pressure Wastewater Master Planning.

531.3 Wet Weather Flows

Industry standard for the design of pressure wastewater is to exclude wet weather flow infiltration in the design. A PWC reticulation will exclude wet weather flows from the street reticulation system. Infiltration may occur in defects within the on property works. The on property infiltrations can come from defects such as illegally connected downpipes, relief gullies in depressions, or in defective cracked pipes or joints.

Sensitivity modelling should be undertaken to confirm satisfactory performance flexibility for loadings above and below the council adopted loading criteria, ensuring acceptable performance across all flow ranges observed within PWC reticulation. The intent of the sensitivity modelling is to identify the acceptable operating conditions of the PWC reticulation.

In existing area retrofits where the existing drainage systems are suspect, a higher wet weather factor can be experienced where there is insufficient quality control and management of illegal connections. Higher wet weather flows are experienced where existing services are aged and in poor condition and allowed to remain.

532 INDUSTRIAL FLOW

532.1 Where the industrial, domestic waste and trade waste flows from a particular industry are known, these shall be used as the basis for the specific wastewater design. When the above information is not available, but the long term future occupancy of the land is known with certainty as light dry commercial, a minimum design flow of 0.1 litres/sec/ha shall be adopted.

532.2 Trade Waste

All industries are required to comply with the requirements of the Rodney District Council Trade Waste Bylaw. This must be included in the design of the PWC reticulation.

532.3 On Property Contributions

Where on property contributions are unknown in a specific PWC reticulation these will be on the basis of generalised flows set out in Section 503 Table 5.1.

Where these are known, the on the property design for these scenarios will be done by an experienced designer on the basis of a specifically designed PWC system being provided to match the specific needs identified to that site. An experienced designer will use these known loads to assess these properties and how they will impact on the collection system.

533 THE HYDRAULIC DESIGN OF PIPELINES

533.1 The design of all PWC reticulation shall be carried out in accordance with the Pressure Sewerage Code of Australia WSA 07 - 2007: (latest edition), of the Wastewater Services Association of Australia Inc.

The code is based on the "**Colebrook White Formula**":

All pipe coefficients, velocities etc adopted in the design should be as per the master planning for the area. Where no such master plan exists these will be as advised by Council or the designer in adopting any coefficient needs to support the choice of this coefficient based on appropriate proof of the suitability of this coefficient.

533.2 All PWC reticulation design work needs to achieve an optimum balance between the:

- minimum velocity to achieve main's clearing (WSA 07 - 2007)
- maximum head on the pump
- the suggested time in the mains is generally limited to 6-8 hours

As such the PWC reticulation designer must justify their design in terms of these parameters and demonstrate it has achieved this balance. The designer needs to identify their relative experience in designing this technology.

- 533.3** The PWC reticulation design must clearly identify the technology/ies (pumping unit, discharge head and flow rate) the design was based on. As such it must identify any of Council's approved technologies that may not be compatible with this design.
- 533.4** The PWC reticulation designer needs to identify sufficient expected pump heads at the properties that Council is able to develop basic pump head contours as a checking mechanism for the final design performance.
- If Council discovers more than 10% of properties when constructed are departed from these figures by more than 5m then it will require a formal explanation of the designer as to the reasons for this departure and may refuse to accept the handover of the system.
- 533.5** A PWC reticulation will consist of pipelines of a minimal diameter of 50 mm and shall be laid generally straight horizontally but use of the pipes flexibility can be made to avoid obstacles along the pipe route. A minimum corridor of one metre should be allowed to permit ongoing clear physical access to the buried lines.
- 533.6** All pipes are to be laid at minimum depth not grade excepting where specifically identified by the designer for particular design reasons such as placement of air valves.
- 533.7** All pipes are to be laid not deeper than 1,8m except where specifically identified by the designer for particular design reasons such as crossing of other services, placement of specials, etc.
- 533.8** There is to be no deviation from this design without formal approval by the designer and must be marked on the plans as such a change and duly signed and dated.
- 533.9** Where the design is for large ongoing developments / subdivisions, the design may be broken down into a number of designated reticulation zones if the overall subdivision or existing village is to proceed in a short time frame. These zones will permit the installation of pumping units in one zone (i.e. commence the installation process) once the pipe laying in that zone is complete, and before (and during) any other pipe laying is being carried out in the other attached zones. Zones should radiate out from the discharge point.
- 533.10** The zones will be defined by the public system discharge point(s) and a series of isolation valves, or dead end lines that allow a discrete area to be isolated from the other pipe work.
- 533.11** Flushing points are to be placed in locations where a tanker can be readily connected to the flushing point for flushing or evacuation purposes without causing a significant traffic hazard.
- 533.12** All road crossings of the PWC reticulation where there is an existing sealed road will be done using trenchless technology. For unsealed roads these can be laid by open excavation or by use of trenchless technology. These mains will be as near to right angles as possible to the centreline of the road but will be at the minimum depths for pressure wastewater pipe work.
- 533.13** All design issues are to be addressed by the developer to the satisfaction of Council.
- 533.14** The maximum static head on any pumping unit will not exceed 40m.

534 LOCATION OF OTHER SERVICES, PRECONSTRUCTION ACTIVITIES

- 534.1** The PWC reticulation and PWC system designers must walk the pipelines and identify any existing services in the ground that may interfere with the construction activities.
- 534.2** Those laying the pipes should survey and peg out the PWC reticulation and determine any possible conflicts with existing services.
- 534.3** These pipelayers should determine what areas may need to be directionally drilled.
- 534.4** Where other services are parallel to the PWC reticulation and these intrude into the pressure wastewater allocation, the pipelayer will need to work with the **Engineer** and other service providers to stay inside the allocated area for the PWC reticulation.
- 534.5** Where the PWC reticulation is to cross other services the depth and nature of these services is to be determined prior to construction and the pressure wastewater main may be either raised above or laid below those services. This decision will be made with **the Engineer** and the designer.

534.6 It is the pipelayer's responsibility to prove the location of all underground services shown on the drawings as well as locate any additional services not shown on the drawings.

535 PIPE MATERIALS

535.1 The words 'pipe' or 'piping' used in this document shall mean all pipes, fittings, valves and accessories connected thereto. All pipe dimensions are external diameters unless otherwise specified.

535.2 Polyethylene pipes and fittings shall be used for the PWC reticulation and shall be used in accordance with the Polyethylene Systems technical manual as produced by Vinidex, GF Technical Handbook and shall be manufactured in accordance with AS/NZ 4130- Polyethylene Pipes for pressure applications. This includes all directional drilling applications.

535.3 All fittings for Polyethylene pipes shall be in accordance with AS/NZS 4129 (Int) Fittings for Polyethylene Pipes for pressure applications.

535.4 Installation will be in accordance with AS2033, Installation of Polyethylene Pipes.

535.5 All pipes and fittings shall be to a minimum specification of PE100 PN 16 in relation to the pipe grading, with electro-fusion jointing.

535.6 Where the pipes are used for trenchless or boring applications they should also be of sufficient strength to be used in that process without any short term or long term effect on the material and maintaining the manufacturer's full product warranty. The Engineer will advise if a change of pipe grade is required.

535.7 Only black polyethylene pipes with an off white stripe (as defined in the WSA 07 2007 Code) are to be used for pressure wastewater systems in Rodney District Council applications. An alternative may be to use just black polyethylene pipe if there are difficulties in getting the white striped pipe. Council approval will be required for the use of the alternative all black pipe colours.

536 POLYETHYLENE (PE) PIPES

536.1 All pipes in pressure wastewater applications are to be joined by electro fusion techniques using polyethylene fittings and in accordance with the manufacture's recommended jointing procedures in compliance with NZS/AS 4131. These joining procedures will be for pipe sizes up to and including 125 mm with the option to adopt butt welding for the 140 mm and above pipe sizes.

Jointing shall be carried out in accordance with the manufacturer's recommendations.

Butt Welding: shall be permitted only when the pipes and spigot fitting either side of the same dimensional SDR (wall thickness) and are not misaligned. All welding is to be carried out by welding operators certified in accordance with the UNItec/Australian National Plastics and Rubber Industry Training Council, or similar approved certification. All welds are to be stamped with the identification of the certified welder. The name and number the certified welder shall be in writing for Council approval prior to any welding being done. All welding shall be carried out under controlled conditions, i.e. use of a tent is required. Upon request a welded joint (selected at random) will be provided at no cost to Council for testing. If the test is unsatisfactory, additional joints will be tested and all costs associated with the testing and reinstatement will be met by the developer. Only butt welding equipment capable of providing a printout of individual weld parameters shall be used.

536.2 Those carrying out the pipe joining are to be appropriately qualified with appropriate certification capable of demonstrating their experience with this technique, have the right equipment to affect the welds and conduct all such welds in accordance with the pipe manufacturers recommended joining procedures and the PE welding specifications included in the appendices (Appendix M) of the Standards for Engineering Design and Construction.

Electrofusion: couplers and fittings shall comply with the internal 39.5 volt.

536.3 Prior to the installation of thermal fusion joints in the ground, the joints have to cool to ambient temperature.

- 536.4 No joints are to be installed in a bore application unless prior written approval is gained from **the Engineer**.
- 536.5 All equipment such as electro fusion jointing machines must be correctly calibrated with appropriate current certification. These calibration certificates will be provided to Rodney District Council as directed by the **Engineer** on the project
- 536.6 Where butt welding of pipes is used the bead must be removed. Refer to Section 508 for the Rodney District Council requirements in respect to the butt welding of polyethylene pipe
- 536.7 Sections of polyethylene pipe should be joined in continuous lengths on the job site above the ground.

537 **BEDDING OF PIPELINES**

- 537.1 Pipe bedding will be designed to meet the requirements of the class of pipe used under the design loading condition including construction loads. **The Engineer** may require copies of pipeline bedding design to be provided with the engineering drawings.
- 537.2 PWC pipes shall be bedded on suitable fine compacted granular material not less than 100mm and in accordance with the Code of Practice for Working on the Road. Scoria AP7 shall be used as bedding and cushion material for all PWC pipes laid by open trenching including drill pits, service connections and connection points. All PWC pipes under the carriageway shall have sand or fine granular bedding and surround. Fine sand and freely flowing sand is not permitted.
- 537.3 The same bedding and surround shall also be used in rock country or where the trenching has brought out hard lumpy clay. There shall be no sharp stones or large clay lumps in the bedding or surround. Each pipe shall be laid so that the barrel of the pipe is supported for 60° to 90° of its circumference along its entire length. The bottom of the trench shall be cut out to sufficient size to permit jointing of the pipes, and all pipes shall be supported upon their barrels only.
- 537.4 All PWC mains installed by trenching shall be thoroughly bedded, haunched and surrounded as detailed on Council Drawing 18000 Sheet 6.6. In all cases the manufacturer's recommendations for pipe storage, handling, protection and laying techniques shall be followed.
- 537.6 When a PWC pipe is to go under an existing road trenchless installation methods shall be used unless a Road opening Notice is issued.
- 537.6 The entry of clay, bedding, runoff and other foreign material into the pipeline shall be avoided by the use of end caps and diligence during the construction phase.
- 537.7 Pipes subjected to heavy loadings shall be subject to specific design and must be approved by the **Engineer**

538 **SOFT GROUND CONDITIONS**

- 538.1 Where a pipeline is to be laid in soft ground the **Engineer** may require a geotechnical analysis of the site to determine the most appropriate bedding design and backfill material and process. Any such requirements shall be strictly adhered to and the **Developer's Representative** shall be required to confirm this in writing to the **Engineer**.

539 **TRENCHLESS INSTALLATION OF PIPES**

- 539.1 These include guided boring, directional drilling, impact moulding and ramming, pipe-jacking and micro tunneling.
- 539.2 Diameters of thrusts and horizontal bores shall be as close as possible to the outside diameter of the pipe. If the thrust or horizontal bore diameter excessively exceeds the diameter of the pipe, the cavity around the pipe shall be filled with a sand and cement slurry.
- 539.3 Where trenchless installations will pass under the drip line of specified trees an arborist's report on the installation may be required to ensure that the designed cover over the pipe within the drip line will not injure the tree. Any conditions from the report or consequential resource consent must be strictly adhered to.

540 PIPELINE CONSTRUCTION

540.1 Construction with Polyethylene pipelines shall be carried out in accordance with AS 2033 and AS/NZS 2566.

540.2 Trenched pipelines under carriageways, private ways, or other trafficked areas shall be backfilled with approved compacted hard fill to the subgrade level.

540.3 The maximum lateral displacement from the design pipeline designation shall be 100mm for pipelines laid in trench.

540.4 During the construction of the project, all open ends of the pressure wastewater pipes are to be strictly capped off to prevent the entry of foreign matter into the pipelines.

540.5 All materials for the pipelines including fittings need to be ordered in a timely manner so as not to compromise the suggested works program.

540.6 In PWC reticulation segments of pipes having cuts or gouges in excess of 10% of the wall thickness of the pipe should be cut out and removed. The undamaged portions of the pipe shall be rejoined using electro fusion joining method.

541 MINIMUM COVER OVER PIPES

541.1 Private Property

On private property the depth of cover will be governed by the location and the potential likelihood of vehicle traffic over the pipelines

Traffic Zone	Cover in mm
Nil	450
Light traffic	450
Unknown /other	600

541.2 Public Domain

In the public domain depth of cover is again governed by the location and the potential for traffic over the mains

Traffic Zone	Cover in mm
Footpath or Road Verge	600
Under Sealed Roads	900
Under Unsealed Roads	900

541.3 Cover over the pipe in an open drain application where erosion is occurring may need to be backfilled with concrete. This need will be determined in review with **the Engineer** for the particular pressure wastewater project.

542 FLUSHING POINTS

- 542.1 All PWC reticulation will contain a number of flushing points where water can be added or wastewater extracted from the pipe PWC reticulation in sufficient volumes to allow for the cleaning of these mains.
- 542.2 The flushing points are to be installed as per the designer's drawings but these must be in a location where it is safe to park a tanker and connect it to the flushing point without constituting a significant traffic risk.
- 542.3 Only approved flushing point products, as per Council's list of approved pressure wastewater fittings, can be used for this purpose in the Council's PWC reticulation.
- 542.4 The flushing point must have a valve and safety arrangement such that if there was to be accident the PWC reticulation would remain intact at all times.
- 542.5 The fittings are to have camlock connections and should be sufficiently rugged in nature to avoid easily breaking through normal operational use.
- 542.6 The flushing point is to be contained within a "valve box", which should be capable of taking the normal traffic that might be anticipated for the location of the flushing point.
- 542.7 In a new development and or during construction activities the PWC reticulation is to be flushed via a flushing programme. That programme should detail the frequency of flushing based on a percentage development of the subdivision. An example of the correct format for a flushing program is set out in the table below:

Subdivision Development	Flushing Frequency
Up to 35% in filled	Every 4 months
Between 36% and 66% in filled	Every 6 months
Between 67% and 85% in filled	Every 12 months
Greater than 86%	As required by the Engineer

The designer is to provide the actual flushing programme for the particular development and the above Table is provided as a guide only.

- 542.8 Developers may be required to make a contribution towards these flushing programmes as part of their Development Fees and Council will calculate these costs and include them in that fee at the time of application. The nature of the costs will depend upon the number of flushing points and the speed of the anticipated development.
- 542.9 The flushing point valve box is to have a bright red lid with the colour homogeneous in the lid material.

543 PWC CONNECTIONS

- 543.1 The PWC systems will be connected to the PWC reticulation via a connection (spur line) from a boundary kit 1.0m from the side boundary and 300mm outside the property to the PWC reticulation. A single connection is to be provided to each property. These connections do not need to be to the lowest point on the property.

- 543.2** PWC reticulation is generally laid down only on one side of a street and may necessitate connection lines that cross the road as well as lines that bring the PWC reticulation from the footpath to the property.
- 543.3** These connection lines will be the same size as the private pressure main (property service line) used on property layout. Where a non residential property is serviced the Developer's designer is to provide a guide as to the size of these connection lines.
- 543.4** Where the connection is to an existing property (no boundary kit installed) with a dwelling on it or a proposed building if a building application has been lodged, the connection point will be to the proposed boundary kit in the design of the property layout. That point will be fixed by the nature of the existing dwelling on that property and any driveways gardens or other features on the property.
- 543.5** Where the connection is to an existing non residential unit the size of the connection will need to be appropriate to the nature of that non residential usage at the time.
- 543.6** Where the connection is to a vacant Lot the connection point will be fixed in the PWC reticulation designs.
- 543.7** Where there is a road crossing involved these will be constructed by trenchless technology if the road has already been sealed by a single road drilling accommodating a connection to adjoining properties.
- 543.8** All connection lines should be constructed perpendicular to the collection mains into which they connect.
- 543.9** These connections lines are deemed to be part of the PWC reticulation and are to be carried out as part of the Developer's work.
- 543.10** The valves inside the boundary kit are to be closed off until connected to the PWC system and the box itself covered to prevent vandalism if it will be a significant period of time before the on PWC system is to be connected.
- 544 THE BOUNDARY KIT**
- 544.1** The boundary kit is to include the following components:
- An isolation valve of the same size as the overall connection for the property being served.
 - A one way or check valve of the same size as the overall connection for the property being served.
 - A stainless steel inspection tee piece with a PE plug that can be checked and used for flushing if required.
- 544.2** The boundary kit is to be housed in a valve box that provides protection for all of the above components.
- 544.3** The boundary kit will be part of the Council maintained PWC reticulation. Accordingly recognizing that these kits are also proprietary items that can be purchased as Approved Products, Council will only permit those fittings listed in the attachments as being approved for use for this purpose in the District.
- 544.4** The Boundary kit is to be located 300mm outside the boundary line. It is not to be installed in a trafficable area.
- 544.5** The boundary kit is to be laid flush with ground levels and should not be installed in a natural surface hollow where water may collect.
- 544.6** The boundary kit is to have a bright red coloured lid with the colour homogeneous in the lid material.

545 VALVES AND VALVE MARKERS

- 545.1** All valves of any particular type will be obtained from the same manufacturer and should have **clockwise closing** and be resilient seated.
- 545.2** Valves are suitable for the system pressure of 1600 kPa. Valves located in the ground are to be installed with a cast iron path box with a pipe riser to the surface level.
- 545.3** All isolating valves (other than for the individual properties) shall be resilient seating sluice or equivalent valves with a safe working pressure of 1600 kPa and suitable for wastewater environment.
- 545.4** Isolating valves are to be installed to a maximum depth of 800 mm measured from the finished surface level to the pressure wastewater valve pit centre line.
- 545.5** All valve boxes are to have bright red lids with the colour homogeneous in the lid material.
- 545.6** All valve markers are to be bright red with the colour homogeneous in the material. (No painted plastic markers)

546 AIR VALVES AND FLANGES

- 546.1** Air valves are to be installed as shown in the locations provided for on the design drawings and are not to be moved without the consent of the designer.
- 546.2** Air valves may be installed above ground according to the detail drawing.
- NOTE: PWC reticulation is to provide continual rise to the air valve location in areas noted on the drawings.*
- All air valve installations must make provision for odour control facility equivalent to McBerns ground mounted odour filter.
- 546.3** Any valve box lids are to be bright red in colour with the colour homogeneous in the lid material.
- 546.4** Flanges are to be utilised to connect pipework (50 mm in diameter and larger) to items of plant and equipment so all plant and valves can be easily removed and maintained.
- 546.5** All bolts utilised to fasten flanged joints are to be manufactured from minimum 316 grade stainless steel with non binding (or seizing) lubricant applied to all threads and be suitable for a 1600 kPa system.

547 FLOW METERS AND PRESSURE MONITORING

- 547.1** Flow meters shall be battery powered electromagnetic type with on site digital data logging, to be specified. The flow meters shall be housed in a polyethylene pit with a lockable lid.
- 547.2** The minimum requirement is for a flowmeter located before discharge into the discharge point at the pumping station or collection manhole. However, the designer shall consider the requirement for flow meters on each of the main discharge lines from main catchments.
- 547.3** Pressure monitoring points shall be provided in each catchment to enable trouble shooting both during commissioning and future operation. The designer shall determine the appropriate positioning of the pressure monitoring points during detail design.
- 547.4** Each pressure monitoring point shall comprise a connection into the PWC main with a ball cock and 15mm BSP thread on the tee. This will enable pressure gauges / pressure monitors to be connected to the monitoring point. Each pressure monitoring point shall be enclosed in a polyethylene pit with a lockable lid. There will be sufficient room in the pit to leave a pressure logger in position for monitoring over a period.

548 TESTING AND ACCEPTANCE

- 548.1** All pipes shall be subjected to an acceptance pressure test after laying and jointing. No connection of a permanent nature between new PWC main and the existing PWC reticulation shall be made before pressure testing. The acceptance test shall be observed by the **Engineer/ Engineer's Representative**. The Contractor shall successfully pre-test the line before requesting an acceptance test.
- 548.2** All necessary apparatus for testing shall be supplied by the Contractor. The section to be tested shall be capped or flanged off at either end, and at any branches which it is desired to test separated. The blanked off ends and all bends, tees, crosses, etc shall be securely strutted or otherwise prevented from movement, before applying any pressure. Each individual pipe shall be anchored against movement by backfilling between joints if laid by open trenching.
- 548.3** The pressure during the test shall be monitored by an approved pressure gauge with marked intervals of not more than 10kPa, and an accuracy of +/- 5% at the test pressure(s). The Contractor shall provide a calibration certificate from an IANZ approved testing laboratory for the pressure gauge to the **Engineer's Representative** (ER) satisfaction.
- 548.4** Testing for PWC reticulation pipelines will be carried out in accordance with NZS/AS 2566.2 for Polyethylene Pipes
- 548.5** All PWC reticulation is to be flushed with water to remove all foreign matter from the bore of the pipe prior to it being put into operation. This flushing should occur after the system has been tested and prior to the system being put into operation. It should be done with clean water at a minimum velocity of 1/m/s and for a period of time sufficient to change the water in the pipe three times.
- 548.6** The volumes of water used and locations flushed are to be signed off by the **Engineer**. The removal of any material removed from the pipe will be to a place designated by the **Engineer**.
- 548.7** Each section of the completed PWC reticulation shall be visually inspected and tested by the Developer in the presence of the Engineer or his Representative. The visual inspection should ensure that all construction materials and debris are removed from contact with the pipes and fittings.
- 548.8** Where thermal welding has been used, no testing should take place until the joints have completely cooled to ambient conditions.
- 548.9** The hydrostatic test shall be carried out in the presence of the Developer and the Engineer or his Representative with all necessary apparatus supplied by the Developer/ Sub Contractor who will organise the testing procedures.
- 548.10** The specified test pressure is to be applied to the lowest point of elevation in the section. If the pressure recording gauge is not located at the lowest point, a correction may be required if there is a significant difference in elevations.
- 548.11** The hydrostatic testing is to occur prior to the backfilling of each section of pipework.
- 548.12** The hydrostatic test will involve testing the collection system to a pressure of 1600 kPa (measured at the lowest point in the section being tested). The pressure shall be maintained for a period of not less than 2 hours.
- 548.13** The pressure testing will be considered satisfactory if:
- There is no failure of any pipe, fitting, valve, joint or any other pipeline component.
 - There is no visual leakage during the test
 - **The Engineer** witnesses and approves the tested section of the pipe.

548.14 The PWC reticulation design may be checked by placing pressure gauges on the discharge side of the PWC pumps and the pressures recorded should not exceed 45m. It should also reflect the design estimates of pressure in the PWC reticulation. Where a variation of +10% to -15% has been measured a full and sufficient explanation must be provided to Council in respect to these deviations in the design pressures.

549 BACKFILLING AND ACCEPTANCE

549.1 Carriageways and Driveways

549.1.1 In general, open cutting of paved carriageways and existing paved driveways will not be permitted where the pipes can be horizontally bored or thrust under them. Paved surfaces include chip-seal, asphalt, concrete and paving stones.

549.1.2 If open cutting cannot be avoided saw cuts shall be made along both edges of the trench in continuous lines parallel to the pipeline. Area surfaced with paving stones will require careful dismantling and reinstatement. Trenches shall be reinstated using GAP 65 from immediately above the pipe surround and compacted in layers not exceeding 150 mm in depth. The depth of base course and type of seal shall conform to the standard of the existing road construction and the **Engineer's** requirements.

549.2 Berms

549.2.1 Pipe trenches under grass berms and footpaths shall be backfilled in accordance with the requirements of Rodney District Council drawing 18000 Sheet 6.7, 6.8, 6.9 and 6.10.

549.3 PWC Reticulation Narrow Trenches

549.3.1 The PWC reticulation pipes can in most instances be backfilled with the excavated material from the trench where the trench has been dug by a trenching machine. This assumes that the trench is excavated in what are soil conditions (no rock) and the soil is relatively clean and free of potential abrasives. The **Engineer** will advise on the suitability of this backfill material.

549.3.2 Where rock, gravel or similar is encountered in the trench or in some circumstances where any pieces of foreign material is present that might puncture the polyethylene pipe for pressure wastewater collection, then the pipe is to have 100 mm of sand backfilling on all sides. Where sand fill is required the trench is to be excavated an additional 100 mm in depth with the pipe to be laid on a sand bed. The trench may need to be widened to accommodate these requirements.

549.3.3 Where it is difficult to gain the minimum depth for PWC reticulation due to excavation difficulties then the pipeline may be encased in a minimum of 150 mm of concrete subject to a case by case specific approval of the **Engineer**. The trench is to be widened to accommodate this encasement.

549.3.4 Where there are loads that may lead to shear failure of the PWC reticulation pipes such as when they may traverse under a retaining wall a minimum 100 mm thick concrete slab will be laid over the pipe to protect it from such shearing actions. The specific requirements here may alter from case to case to be determined by the **Engineer**.

550 RESIDENTIAL ACCESS TO THEIR PROPERTY

550.1 In the servicing of an existing area the resident's access to the property must be maintained to the maximum extent possible. For small diameter trenches such as for pressure wastewater collection, covers may be used where required but in general no resident should be denied overnight access to their properties.

550.2 The pipeline contractor is recommended to provide a minimum of five working days notice to any existing residents, prior to constructing the works in that street and inform how their access may be impacted.

550.3 As a rule no trench for PWC reticulation should be left open overnight. The only exception to this will be where approval from **the Engineer** has been gained for a specific purpose.

- 550.4** The minimum possible length of trench should be left open at any time with the trench backfilled once the pipeline is laid and any lateral connections cut in.
- 550.5** Where it is desirable to leave open a key point for subsequent installation of other material or structures these should be provided with covers that reasonably prevent entry from members of the public or their animals.
- 550.6** Barricading (and night lights if required) is to be used, where any trench needs to be left exposed.

551 LOCATING PWC RETICULATION PIPELINES

- 551.1** The location of the PWC reticulation pipelines are to be marked in the following ways:
- A formal surface marker is to be installed as shown on the drawings.
 - A tracer wire that is capable of being energised is to be laid with the pipeline trench at a similar level to the pipe.
 - A marker tape indicating that a pressure wastewater pipe is laid 300 mm below the tape is to be included in the pipe trench. The tape is to be brightly coloured and have the words "PWC pipe" printed on it.
 - All pipes and their location are to be marked on the as built drawings.

552 PRIVATE PUMPING STATIONS

- 552.1** Typically private pump stations are only permitted in exceptional conditions where it is not possible to obtain a gravity connection to the Council wastewater system within the prescribed distance under the Local Government Act. If part of the household unit can achieve a gravity connection, then that part may have been so connected.
- 552.2** The private pumping arrangement can be changed over to an approved Council PWC system. The property owner may contact an Approved PWC Installer to make this changeover. Council's consent through the PWC application [Building Consent] process is required.
- The resident must enter into a management contract with an Approved PWC Installer where the PWC system is connected to the wastewater network.

553 HANDOVER OF THE PWC RETICULATION

- 553.1** Council will accept handover for the PWC reticulation for a particular reticulation zone, subject to the following:
- verification that the pipelines have been cleaned of debris.
 - completion of independently verified pressure tests on the PWC reticulation that indicates the compliance with both the relevant standards and the designs for the system.
 - verification that the PWC reticulation as installed is of the design and classes indicated in the design drawings.
 - the pump pressures meet the design specifications and the PWC reticulation is not recording any significant deviations in pump pressures.
 - in new subdivisions where these pressures cannot be confirmed at the time of the PWC reticulation construction handover will be conditional/ provisional on this pump pressure test being achieved at a later date.
 - acceptance of the Contractors maintenance manual and as built information.
 - visual inspection of the pipeline to ensure that they appear to be:
 - Laid in the correct easement

- Appropriately marked
- Appropriately compacted.

553.2 A formal inspection of the pipelines will be part of the handover and this is to confirm:

- all fittings (valves, air valves, flushing points, etc) are in working order.
- a flushing program has been attached to the handover application and all flushing points are working as per the specification.
- all connections to the residential boundary kit are made.
- all "Asbuilt" information has been provided.
- all information as required by Council has been provided.

553.3 A handover application needs to be made in writing to Council, indicating exactly what works the Developer wants Council to take over and the date they want handover to occur. A minimum of 5 working days notice must be provided to Council, in relation to the handover and Council will endeavour to accommodate the desired handover dates, but will not be constrained by it.

553.4 As part of the handover process Council may require the pipelayer to uncover a section or sections of the pipe to confirm:

- it has been laid at the correct depth.
- it has been laid in the correct easements.
- the property connections have been provided
- the correct pipe has been used.

554 REPAIRS TO PWC RETICULATION

554.1 Being a sealed pipe, tree root ingress is not expected and thus there should be fewer repairs to the pipes than for conventional wastewater technologies. Where such repairs are required these will be achieved through either crimping of the pipe or the isolating of a section of the pipe using the various isolating valves (property and PWC reticulation).

554.2 All repairs will be in accordance with the methods of repair for PE pipes as defined by the pipe manufacturer and the appropriate New Zealand Standard for that pipe.

555 BOUNDARY CONDITION

555.1 A boundary condition may be applicable for specific developments within a specific existing catchment.