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METROPOLITAN WATER SUPPLY, SEWERAGE,
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METROPOLITAN WATER
SUPPLY, SEWERAGE
AND
DRAINAGE BY-LAWS
1981

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WESTERN AUSTRALIA

METROPOLITAN WATER SUPPLY, SEWERAGE, AND DRAINAGE ACT 1909

**METROPOLITAN WATER SUPPLY, SEWERAGE
AND DRAINAGE BY-LAWS 1981**

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Act 1984* as at 7 November 1986.

WESTERN AUSTRALIA

METROPOLITAN WATER SUPPLY, SEWERAGE, AND DRAINAGE ACT 1909

**METROPOLITAN WATER SUPPLY, SEWERAGE
AND DRAINAGE BY-LAWS 1981**

PRELIMINARY AND DEFINITIONS

1.0 These by-laws may be cited as the *Metropolitan Water Supply, Sewerage and Drainage By-laws 1981*¹ and shall come into operation on 1 March 1981.

1.1 In these by-laws, unless the context otherwise requires—

“Air Gap”—the unobstructed vertical distance through the free atmosphere between the lowest outlet of a pipe or fitting discharging fluid to a tank, fixture or other device; and

(a) the spill level of the receptacle for those with piped overflows, or

(b) the overflow level of the receptacle for those without piped overflows.

“Anti-Syphonage vent” (or “back vent”) means any vent pipe from an individual trap to the open air or to a main or branch vent pipe having for its purpose the prevention of loss of water seal in the trap.

“Approved” means approved by the Board or by a duly designated officer of the Board.

“Backflow”—in relation to water supply installation means the flow of water or other fluids into the water supply pipe of a property, or a watermain, from any source or sources or in a manner other than approved.

“Bore”, “Diameter”, or “Size”, in reference to—

- (a) any pipe of copper or brass, means the external diameter of the pipe; and
- (b) any pipe of any other material, means the internal diameter of the pipe.

“Boundary Trap” (or “Interceptor Trap”) means a composite fitting incorporating a trap for preventing the passage of gases from the sewer to the property sewer.

“Branch property sewer” means any branch off a property sewer.

“Branch Pipe” means a common discharge pipe to which 2 or more fixture traps at any one floor level are connected.

“Branch Vent” means a graded vent at any one floor level interconnecting 2 or more individual trap-vents or group-vents.

“Capacity”—The capacity of a water heater or container shall be one of the following:—

- (a) for electric storage water heaters—the rated hot water delivery in litre;
- (b) for other storage water heaters or containers—the nominal storage capacity in litre;
- (c) for heat exchange water heaters—the storage volume in litre.

“Check Valve”—(Non-return valve or reflux valve), is a valve which prevents reversal of flow in the pipes of a water supply system by means of the check mechanism, the valve being opened by the flow of fluid and closed by the action of the check mechanism when the flow ceases, or by back pressure.

“Chief Engineer” means—

- (a) the person who is for the time being the Chief Engineer or Acting Chief Engineer for the Board; and
- (b) any other officer or person appointed by the Board for the purpose of discharging the duties and exercising the powers of the Chief Engineer.

“Cistern-Fed Water Heater” means a water heater which is supplied with cold water from a feed tank in which the level of the water is automatically maintained. The cold water feed tank may form an integral part of the water heater or it may be detached and mounted separately in such a manner that the maximum working head is not exceeded.

“Combined Waste Pipe” means any pipe which receives the discharge from both soil and waste fixtures and conveys those discharges to the property sewer; combined waste pipes are connected directly to the property sewer and are used only in connection with the combined pipe system.

“Commercial Type” means other than domestic type.

“Combination Relief Valve” means a valve which incorporates the features of temperature and pressure relief valves.

“Container” means the vessel in which the heated water is stored; sometimes referred to as the storage container, cylinder or tank.

“Cross Connection” means any connection or arrangement, physical or otherwise, between any potable water supply system directly connected to a water main, and any fixture, storage tank, receptacle, equipment or device, through which it may be possible for any non-potable, used, unclean, polluted or contaminated water, or any other substance, to enter any part of such potable water supply system under any conditions.

“Cross-Vent” means a vent interconnecting a stack and its relief-vent.

- “Disconnecter Trap” means a trap used in the separate pipe system for isolating or disconnecting waste pipes from the property sewer and soil pipes and for providing inlet ventilation to the waste pipe or pipes discharging into it.
- “Discharge Pipe” means any pipe for the conveyance of sewage or trade waste.
- “Displacement Water Heater” means a water heater in which cold water is fed into the container at or near the bottom, and displacing but not mixing with the hot water as it is drawn off at, or near, the top.
- “Domestic Purposes”, in relation to the supply of water, means the supply of water to rated land classified as residential under section 90 of the Act or non-rated land used for residential purposes; the term also includes the use of water for watering lawns and gardens appurtenant to the land and for watering lawns and gardens growing in a street or road adjoining the land and for the purpose of these by-laws shall include water used for toilet, ablution or kitchen purposes in land rated as industrial or commercial.
- “Domestic Sewage” means all faecal matter, urine, household slops and household liquid refuse.
- “Domestic Type” means a fixture or appliance which is designed for use in residential situations. A fixture or appliance of this type may be installed in a non-residential building, but the sewage which it discharges shall be similar to that which would be discharged if installed in a residential situation.
- “Educt Vent” means an opening or pipe for the exit of air from a soil pipe, waste pipe, combined waste pipe or property sewer.
- “Expansion Joint” means a joint which permits relative axial movement of the jointed parts.
- “Falling Level Water Heater” means a water heater with a free water surface, from which hot water is drawn off at or near the bottom, the level of the water falling as the hot water is drawn off.
- “Feeder” means any water course, creek, stream or other channel with either perennial or intermittent flow whereby water can be conveyed to any reservoir.
- “Fixture Discharge Pipe” means the discharge pipe to which the single fixture trap is connected.
- “Fixture Unit” means a unit of measure based on the rate of discharge, time of operation and frequency of use of a fixture that expresses the hydraulic load imposed by that fixture on the sanitary plumbing installation.
- “Fixture Unit Rating” means the system loading value in fixture units assigned to a fixture.
- “Flash” means to cover the joint between 2 surfaces with a strip or sleeve of impervious material.
- “Flat” means a suite of rooms used or intended or adapted for use as a separate habitation and comprised in a building containing one or more similar suites.
- “Float Valve” means a valve operated by a float and designed to maintain a constant level of water in a feed tank; sometimes called a ball valve or ball cock.
- “Flood Level Rim” is the lowest part of the top edge of any fixture from which water will overflow.
- “Floor Waste” means the grated inlet within a graded floor intended to drain the floor.
- “Free-Outlet Water Heater” means a water heater with a permanently open outlet from which hot water is discharged by displacement, the flow of water being controlled by means of a valve or tap in the inlet water feed pipe.

"Fully Vented System" means a system of plumbing with provision for the separate ventilation of every fixture trap connected other than to a floor waste-gully and of the trap of every floor waste-gully.

"Fully Vented System—Modified" means a system of plumbing differing from a fully vented system in that the traps of any group of 2 or more fixtures, or floor-waste gullies, discharging to the same branch pipe are vented in common by one or more group vents connected to such pipe.

"Gate Valve"—a valve which provides a straight through passage for the flow of fluid. The body ends are in line, and a shaped gate is moved between the body seats by a stem whose axis is at right angles to the line between the body ends.

"Grade" means the angle of inclination expressed as the ratio of unit rise to horizontal distance (Figure 1.1.)

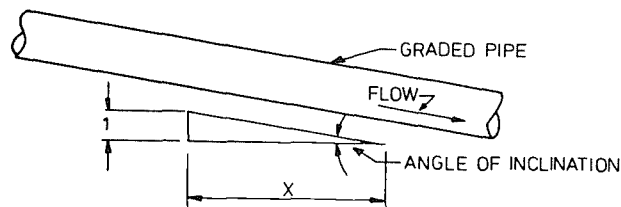


FIGURE 1.1 GRADE EQUALS 1:X.

"Graded Pipe" means a pipe installed on a flatter grade than 1:1

"Ground" means the surface of the earth, soil, or rock which conform to the established finished grade at a specific location after all excavations have been thoroughly backfilled or otherwise closed and after all surface treatment at said location has been completed.

"Group-Vent" means a vent connected to a branch to which unvented fixture discharge pipes are connected.

"Heat Exchange Water Heater" means a water heater in which cold water is fed into a heat exchanger (e.g. a coiled tube or similar device) which is immersed in a container of static heated water or other suitable medium.

"High-Water Mark" means the level of full supply of any reservoir or feeder thereto.

"Horizontal Branch" means that part of a soil and/or waste pipe extending laterally from a soil and/or waste stack with or without vertical section or branches which receives the discharge from one or more waste and/or soil pipes and conducts it to the soil and/or waste stack.

"Hot Discharge" is a discharge with a temperature of 50 degrees C or more.

"Hot Water Service" means all parts of the installation and all equipment and materials necessary to provide an efficient supply of hot water at the specified outlets.

"Indirectly Connected" means interrupted by a water seal or air gap as applicable to the situation.

"Induct vent" means an opening or pipe for the admission of air to a soil pipe, waste pipe, combined waster pipe or property sewer.

- “Industrial Waste” means the liquid, solid or gaseous refuse from any business, industry, warehouse or manufacturing premises other than domestic sewage, stormwater, or unpolluted water.
- “Inspection Opening” means an access opening in a pipe or fitting sealed with a removable plug or cover, used as access for purposes of inspection and maintenance, and testing where provided in property sewers.
- “Inspector” means any person appointed by the Board for purposes connected with the administration of these by-laws, and also any person acting in the capacity of ranger of any proclaimed catchment area.
- “Instantaneous Water Heater” means a water heater in which the heat energy is applied only while water flows to the outlet(s).
- “Invert” means the lowest point of the internal surface of a pipe or channel at any cross-section.
- “Isolating Valve” means any valve installed for the purpose of shutting off part of a water supply system from the remainder.
- “Long Bend” means a pipe bend greater than 45 degrees having a centre line radius of curvature equal to or greater than 1.5 times its internal diameter. For the purposes of these by-laws a 45 degree or less bend with a lesser radius of curvature is considered equivalent to a long bend.
- “Main Vent” means the principal artery of the venting system, to which vent branches may be connected prior to joining the stack vent.
- “Mains Pressure Water Heater” means a water heater, hydrostatically tested to a minimum of 2000 kPa, which is connected directly to the cold water mains in such a manner that hot water is delivered at the cold water mains pressure.
- “Maximum Head” means the maximum water pressure to which a water heater is to be subjected, expressed in metre of water head (or kPa for unvented water heaters), as measured at the lowest point of the water heater.
- “Nominal Size” means the size of pipe and fittings in accordance with the relevant Australian Standard.
- “Non-Return Valve”—see check valve.
- “Observation Well” means a well constructed for the purposes of observing the depth to the ground water from the top of the well, and for obtaining samples of the ground water.
- “Offset” means the pipe and fittings used to provide continuity between pipes whose axes are parallel but not in line.
- “Overflow Level” means the level of the rim of a fixture or the invert level of an overflow pipe.
- “Pesticides” means a substance or compound used or intended for use for agricultural, pastoral, horticultural, domestic, or industrial purposes for controlling, destroying or preventing the growth and development of any fungus, virus, insect, mite, mollusc, nematode, plant or animal and includes all admixtures containing any proportion of any one or more of them.
- “Pipework” is the assembly of pipes and fittings.
- “Plug Tap” means a device used to regulate or stop the flow of a fluid by the rotation, in its seating, of a drilled or slotted plug.
- “Pressure-Limiting Valve” means a valve which limits its outlet pressure to within specified limits of the set pressure, when the inlet pressure rises above the set pressure.

- “Pressure-Ratio Valve” means a valve which automatically reduces outlet water pressure to a specified ratio of its inlet pressure.
- “Pressure-Reducing Valve” means a valve which automatically reduces inlet water pressure to a specified value at its outlet.
- “Pressure-Relief Valve” means a pressure-actuated valve which automatically discharges fluid at a specified set pressure.
- “Pressure Water Heater” means a water heater having a maximum working pressure greater than 21 kPa (maximum working head greater than 2 m) but less than that of mains pressure. This includes both vented and unvented water heaters.
- “Primary Circuit Flow and Return Pipes” means pipes which respectively convey water from the source of heat to the container, and from the container back to the source of heat.
- “Private Service” includes all the pipes and fittings, and all connections and apparatus of any nature or kind, whether used temporarily or otherwise, on any part of any land or building, supplied with water, whether by meter or otherwise and includes any pipes or fittings the property of the consumer, which are used for conveying water from the mains of the Board whether situated on the premises of the consumer or otherwise.
- “Production Well” means a well owned and operated by the Board and from which groundwater is extracted and conveyed by pipeline to a water treatment plant.
- “Reflux Valve”—see check valve.
- “Relief-Vent” means a vent branching from a stack below the point of connection thereto of the lowest fixture.
- “Residential Building” means a building in which sleeping accommodation is provided for persons other than caretakers and their families and includes dwellings, tenements, flats, hotels, lodging houses, dormitories, hospitals and motels.
- “Sanitary Plumbing Installation” means an assembly of pipes, fittings, fixtures, and appliances connected thereto, which is used for or intended to be used to convey sewage to the sewer system.
- “Secondary Circuit Flow and Return Pipes” means pipes which respectively convey hot water from and return it to the container, and from which hot water may be drawn off.
- “Side-Fed Water Heater” means a displacement type of water heater with a free water surface in which the cold water is supplied from an integral feed tank attached to the side of the heater. The hot water is drawn off at an outlet located below the free water surface.
- “Single-Stack System” means a system of plumbing in which the stack and discharge pipes serve also as vent pipes.
- “Single-Stack System—Modified” means a system of plumbing differing from a single stack system in that a relief vent is provided appurtenant to the discharge stack, and is interconnected therewith at alternative floors, or at every floor by a cross vent.
- “Spill Level” of any fixture, storage tank or receptacle is the maximum height to which water will rise while overflowing freely either over its rim or through any channels or overflows that are provided and have a free discharge to the atmosphere under all conditions, when water is flowing into such fixture, storage tank or receptacle at the maximum rate under a pressure equal to a head of 70 m applied either at the outlet end of the pipe or at the inlet to the fitting or valve actually discharging such water, with all the service outlets of such fixture, storage tank or receptacle closed.

- “Soffit” means the highest point of the internal surface of a pipe at any cross-section.
- “Soil Fixture” means a water-closet pan, urinal, slop hopper, autopsy table, bed pan washer or sanitary napkin disposal unit.
- “Soil Pipe” means a pipe which conveys the discharge from a soil fixture.
- “Stack” means any vertical pipe extending more than one storey in height.
- “Stack Vent” means the extension of a discharge stack above the highest connected discharge pipe.
- “Stop Tap” means a screw down pattern tap with or without a loose jumper valve arrangement, with the inlet and outlet both having suitable means for connection into a pipeline.
- “Storage Water Heater” means a water heater incorporating a thermally insulated container in which the water is heated and stored for subsequent use.
- “Temperature-Relief Valve” means a temperature actuated valve which automatically discharges fluid at a specified temperature.
- “Testing Opening” means an opening with a removable cover in a pipe or fitting, of sufficient size to permit the installation of a plug for use in the hydro-static testing of a pipeline.
- “The Act” means the *Metropolitan Water Supply, Sewerage, and Drainage Act 1909*, as amended from time to time.
- “Trade Waste” means liquid waste other than domestic sewage and as defined by the Board. See “Industrial Waste”.
- “Trap” means any fitting designed to retain a water-seal. (Figure 1.2)
- “Trap Vent” means a vent pipe venting an individual trap to the open air or to a main or branch vent pipe for the prevention of loss of water-seal in the trap.
- “Unvented” refers to a discharge pipe without a vent at its upstream end.
- “Unvented Water Heater” means a water heater without provision for a vent permanently open to the atmosphere.
- “Vacuum-Relief Valve” means a valve which automatically opens to relieve vacuum conditions.
- “Vent or Exhaust Pipe” means an open-ended pipe connected at any high point in a hot water system, or from any vessel containing hot water and so arranged that the open end discharges into the air space of the cold water storage tank or to the outer atmosphere.
- “Vent” means a pipe provided to limit the pressure fluctuations within the discharge pipe system.
- “Vented” refers to a discharge pipe with a vent connected at its upstream end.
- “Vent Pipe” means any pipe used or intended to be used for ventilating soil pipes, waste pipes, property sewers, traps, connections or sewers.
- “Vent Stack” means a vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of a property sewer on the sewerage system.

“Vertical” means any pipe which is equal to or more than 45 degrees to the horizontal. A pipe with a grade of not less than 1:1.

“Water Heater” means an appliance, usually self-contained, for heating water which is either stored in it or passing through it.

“Water Seal” or “Trap Seal” means the vertical distance between the dip and the crown weir of a trap as shown in sketch.

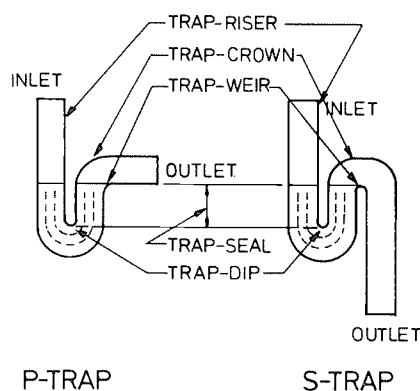


FIGURE 1:2 TRAPS

“Water Service” means the pipes and fittings used or intended to be used for the supply of water from a watermain up to and including the meter assembly, if any, of each property.

“Water Supply System” means the pipes and fittings used or intended to be used for the supply of water from a meter assembly to the points of usage within any property, and includes any water storage tank or pipes therefrom.

“Waste Fixture” means any fixture, other than a soil fixture.

“Waste Pipe” means a pipe which conveys the discharge from waste fixtures only.

“Yard Gully” means a disconnector trap which is used externally and fitted with a basin top and grating.

[By-law 1.1 amended in Gazette 24 December 1982 pp. 4924-25.]

1.2 In these by-laws a reference, however expressed, to “the Metropolitan Water Supply, Sewerage, and Drainage Board” or “the Board” shall, unless the context requires otherwise, be read and construed as a reference to the Metropolitan Water Authority preserved and continued pursuant to section 8 of the *Metropolitan Water Authority Act 1982*.

[By-law 1.2 inserted in Gazette 24 December 1982 p. 4925.]

1.3 Terms defined in the Act or the *Metropolitan Water Authority Act 1982* shall have the same meaning as those terms have in and for the purposes of those Acts.

[By-law 1.3 inserted in Gazette 24 December 1982 p. 4925.]

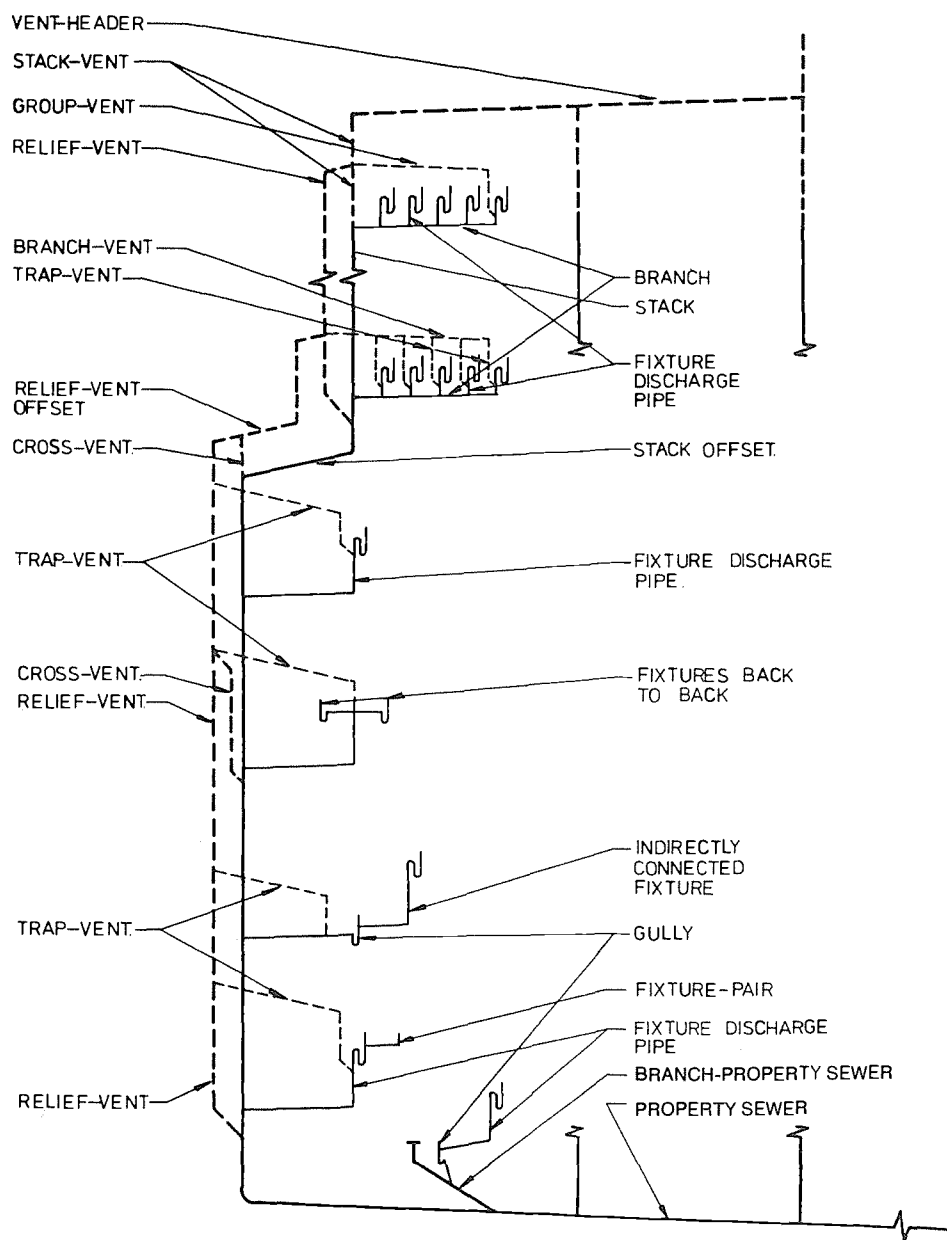


FIGURE 1.3 DEFINITIONS

[Figure 1.3 amended in Gazette 24 December 1982 p. 4925.]

2.0 PROTECTION OF THE BOARD'S WORKS AND PROPERTY

2.1 GENERAL

2.1.1 By-laws in this Part are intended to—

- (a) Protect the Board's works and property from interference or damage that would hinder or prevent normal operation of the system.
- (b) Regulate the entry of persons onto Board property and behaviour of those persons while entered thereon.

2.1.2 Attention is drawn to By-law 31.4 regarding penalties that may be imposed for breaches of these by-laws.

2.2 PROTECTION OF WORKS

2.2.1 No unauthorized person shall use waterworks and fittings which are the property of the Board.

2.2.2 No person shall wilfully or carelessly damage or cause damage to waterworks and fittings which are the property of the Board.

2.2.3 No person shall carry on, or cause to be carried on, any mining or quarrying operation, or make any excavation of any sort, or cause any explosion or other action in the vicinity of the Board's works which may cause damage, or future damage by subsidence of the ground, without the written permission of the Board and under such conditions as the Board may deem necessary.

[By-law 2.2.4 repealed in Gazette 24 December 1982 p. 4925.]

2.2.5 No person shall drive, take, ride or permit any vehicle, conveyance or animal to cross any exposed pipe, valve, fitting or apparatus except at approved crossing points indicated by sign-boards.

2.2.6 No person shall drive, take or ride any vehicle, conveyance or animal across underground pipelines or works, where warning signs have been erected by the Board except at approved crossing points indicated by sign-boards.

2.3 PROTECTION OF GROUNDS

2.3.1 No person shall wilfully or carelessly injure, damage, disfigure, displace, or remove any fence, stake, post, pillar, pipe, survey mark, peg, tablet or notice board belonging to, or installed by the Board.

2.3.2 No person shall wilfully or carelessly injure, deface or disfigure any notice or copy of a by-law, rule or regulation displayed upon any tablet or notice board erected by the Board.

2.3.3 No unauthorized person shall open any gate, slip rail, manhole, door, or other entrance into, or trespass upon any enclosure of the Board's property without the written permission of the Board.

2.3.4 No unauthorized person shall stand, park or leave unattended any vehicle, trailer or item of mobile equipment on property, (including depots) or reserves vested in the Board except in a place set aside and designated as a Visitors Car Park.

2.3.5 Any person driving or taking vehicles onto property (including depots) or reserves vested in the Board shall comply with all signs erected thereon for the regulation of traffic speed and movement.

2.3.6 No person shall remove, pluck or damage any wildflower, shrub, bush, tree or other plant growing on any land or reserve vested in the Board.

2.3.7 No loose paper or any refuse is to be left on any portion of the grounds of any reservoir or water, sewerage or stormwater drainage works except in the receptacles provided. Where no receptacle is provided, the loose paper or other refuse is to be removed from the site.

2.3.8 No person shall post or distribute bills, advertisements, or other notices on any portion of any reservoir or water, sewerage or stormwater drainage works, or on any portion of the ground in the vicinity thereof without permission in writing from the Board.

2.3.9 No person is to camp on Board property, or reserves vested in the Board without the written permission of the Board and subject to any conditions that it may impose.

2.3.10 All persons using picnic or recreation areas set aside for that purpose on Board property or reserves vested in the Board shall obey any instructions displayed on notice boards or issued verbally by the Board's Rangers or other authorized employees regarding behaviour in, or use of those picnic or recreation areas.

3. PROTECTION OF WATER AGAINST POLLUTION

3.1 GENERAL

3.1.1 By-laws contained in Part 3 are intended to prevent the contamination of water stored for distribution by the Board.

3.1.2 Attention is drawn to By-law 31.4 regarding penalties for breaches of these by-laws.

3.2 PROTECTION OF WATER PURITY

3.2.1 No person shall throw or deposit any refuse, contaminating chemical or noxious substance into—

- (a) Any reservoir, pond or tank that holds or is intended to hold water for distribution to the Board's consumers.
- (b) Any pipe, conduit, valve, meter, or fitting through which potable water is to be passed.
- (c) Any pit, manhole or other structure containing valves, meters, fittings or connections to potable water mains.

3.2.2 No person shall commit a nuisance in, upon, or in the vicinity of any water-works.

3.2.3 No person shall swim, bathe, or wash in any reservoir, pond, or tank containing water stored for distribution to consumers. Nor shall any person knowingly suffer any child under their control to swim, bathe, or wash in any such reservoir, pond or tank.

3.2.4 No boating, canoeing, fishing, or shooting is permitted in, on or over any reservoir, pond, watercourse, or channel vested in, or under the control of the Board without the written authority of the Board.

3.2.5 No person shall permit any dog, or other animal or bird under his ownership or control to swim in or trespass on any portion of the ground within the vicinity of any reservoir, pond, tank or watercourse or sewerage or stormwater drainage works without the written permission of the Board.

4. PROTECTION OF CATCHMENT AREAS AND WATER RESERVES

4.1 GENERAL

4.1.1 The by-laws contained in Part 4 of the Board's by-laws are intended to—

- (a) Prevent any deterioration of the quality of water collected from the Board's catchment areas and water reserves by way of increased bacteriological or chemical contamination, increased turbidity, or increased level of nutrients necessary to the growth of undesirable aquatic flora.
- (b) Control and manage existing and future development within the catchments and water reserves that could adversely affect water quality.
- (c) Regulate the behaviour of persons entering the catchment areas.

4.1.2 Attention is drawn to By-law 31.4 regarding penalties that may be imposed for breaches of these by-laws.

4.2 APPLICATION

4.2.1 The by-laws in this Part apply to Water Reserves and Catchment Areas constituted under or for the purpose of the Act and located within or in the vicinity of the Darling Range and within which surface or sub-surface water may be collected into an open storage reservoir before distribution to consumers.

4.2.2 In this Part—

4.2.2.1 All by-laws applicable to a catchment area shall apply equally to any part of a water reserve from which water can flow into an existing storage reservoir.

4.2.2.2 Prohibited Zone means that part of a catchment area which lies—

- (a) Upstream of a dam, and
- (b) Within 2 kilometres of the top water level of any reservoir in which water is or can be stored.

4.2.2.3 Public road means a road or street as defined in the Local Government Act.

4.3 PROTECTION OF WATER QUALITY

4.3.1 No person shall throw, deposit, discharge or leave or cause, permit or suffer to be thrown, deposited, discharged or left into or upon a catchment area or water reserve any chemical, radioactive material, litter, rubbish, offal, dung, dead animal or any noisome, noxious or polluting liquid substance, matter, or thing which is likely to pollute the catchment area or water reserve or any reservoir or watercourse in the catchment area, or which is likely to affect purity of the water.

4.3.2 No person shall swim, bathe, or have any bodily contact with the water or wash any clothes or other articles in any stream, reservoir, aqueduct or other water works within a catchment area.

4.3.3 No person shall in or upon any watercourse, lake, reservoir, aqueduct or other water works in a catchment area set afloat, sail, propel or cause to be propelled any craft or vessel, without express permission in writing from the Board and subject to any conditions that it may deem necessary.

4.3.4 No person shall camp, or shoot, trap or hunt any game or catch, or attempt to catch, any fish or marron within a catchment area, without specific permission in writing from the Board to which it may attach any conditions that it deems necessary.

4.3.5 No person shall light a fire in a prohibited S4.3.6 zone on a catchment area except in the fire places provided at authorized picnic sites unless with the written approval of the Board, and any person lighting fires at other places on a catchment area shall comply fully with all requirements of the Bush Fires Act or restrictions promulgated under that Act.

4.3.6 No unauthorized person shall enter a prohibited zone on any catchment area except for the purposes of—

- (a) Travelling through the prohibited area on public roads, or
- (b) Travelling along private roads constructed for the Board or Forests Department² and which are open for public use, or
- (c) Picnicking within designated picnic sites provided and serviced by the Board.

4.3.7 No picnic area or amenity to encourage picnicking or public recreation is to be established in any catchment area or water reserve without the written approval of the Board.

4.4 DISPOSAL OF SEWAGE AND WASTE

4.4.1 No person shall permit the water of any property sewer or any filthy or polluted water discharging from premises occupied by him or under his control, to run, flow, or be brought into any reservoir or watercourse in any catchment area or water reserve.

[By-law 4.4.1 amended in Gazette 24 December 1982 p. 4926.]

4.4.2 Disposal of domestic sewage on catchment areas and water reserves.

4.4.2.1 All domestic sewage and liquid waste shall be treated and disposed of in accordance with the *Bacteriolytic Treatment of Sewage and Disposal of Effluent and Liquid Waste Regulations* of the Public Health Department³.

4.4.2.2 Prior approval in writing must be obtained from the Board before a bacteriolytic treatment plant is installed within a prohibited zone or within 100 metres of the centre line of any watercourse.

4.4.2.3 Any liquid waste not processed through a bacteriolytic treatment plant, or not capable of treatment in such a plant shall be stored in watertight tanks or receptacles (which shall be maintained in good condition) and periodically removed from the catchment area by a liquid waste removal contractor approved by the appropriate Local Health Authority, and by the Board.

4.4.3 The occupier of every house or premises shall provide and maintain in good condition a sufficient number of receptacles or boxes to contain all solid refuse, and the contents of these receptacles or boxes shall be removed from the catchment area at least once every week.

4.5 CONTROL OF ANIMALS, LIVESTOCK, ETC.

4.5.1 The owner or person in charge of any animals or birds shall not cause or permit any dog, horse, goat, cattle, sheep, pig, duck, geese or fowls or other species of livestock to enter or remain on any portion of a catchment area.

4.5.2 The occupier or owner of any land within a catchment area shall not raise or graze livestock without approval of the Board.

4.5.3 No person shall ride a horse or any other animal on any of the Board's catchment areas (except along public roads) without the written permission of the Board.

4.5.4 Any animal or bird found straying within a catchment area may be—

- (a) Driven away or otherwise removed from such lands;
- (b) Sold;
- (c) Destroyed; or
- (d) Otherwise disposed of,

by any officer or person authorized by the Board without incurring any liability on the part of the Board to recompense the owner for the loss.

4.5.5 No person shall slaughter any animal or bird in a catchment area without the permission of the Board.

4.5.6 The owner of any animal or bird which dies upon any part of a catchment area or the person under whose charge the animal was at or immediately before the time of its death, shall forthwith upon knowing or being informed of the death of the animal or bird remove its body or carcass from the catchment area or bury the same so that all parts of the carcass are not less than 300 mm below the normal surface and restore the ground at least to its original level except that no animal or bird shall be buried within a prohibited zone or within 100 metres of the centre line of any watercourse.

4.6 CHEMICALS AND FLAMMABLE LIQUIDS

4.6.1 The occupier or owner of any house, land or premises situated within a catchment area shall not store or use any animal manure or fertilizer unless written permission therefor has been given by the Board and subject to any conditions that it may consider necessary.

4.6.2 No person shall lay, place or use upon any part of the catchment area any poison, pesticide, insecticide, herbicide or other dangerous substances without written permission of the Board and then they shall be applied in the manner required by the *Pesticides Regulations* of the Public Health Department³.

4.6.3 All persons storing, laying, placing or using any explosive or dangerous goods on a catchment area shall comply with the requirements of the Explosives and Dangerous Goods Act administered by the Mines Department⁴.

4.6.4 No toxic, dangerous chemicals or radioactive materials are to be stored on the catchment areas without the prior approval of the Board in writing, and may be subject to such conditions as the Board considers necessary.

4.6.5 Storage of Petroleum Products on Catchment Areas and Water Reserves.

4.6.5.1 Approval in writing from the Board must be obtained before any licensed installation for the storage of petroleum or petroleum products is constructed.

4.6.5.2 Petroleum products are to be stored and handled in accordance with the Flammable Liquids Regulations issued by the Mines Department⁴ and in addition shall comply with the following—

- (a) No underground tanks are to be situated within a prohibited zone or within 100 metres of the centre line of any watercourse.
- (b) All underground tanks shall be provided with an additional impervious outer coating or otherwise adequately protected against corrosion to the approval of the Board.
- (c) Any bunds or compounds on any premises licensed under the Flammable Liquids Regulations shall be constructed with walls and floor impervious to the flow of petroleum to the approval of the Board.
- (d) Any additional conditions that the Board may deem necessary.

4.6.5.3 Any person storing petroleum products on unlicensed premises are to take all precautions necessary to prevent spillage of petroleum products onto the ground.

4.7 PROTECTION OF WATER FROM TURBIDITY

4.7.1 No person or corporation shall clear any portion of the catchment area or commence any excavation or any construction, alteration or diversion of roads without first obtaining the approval of the Board in writing. This approval may be given subject to any conditions that the Board deems necessary.

4.7.2 No person shall drive a vehicle on any part of a catchment area other than a road or track which has a graded, gravelled, sealed, primed or other prepared surface without written approval of the Board.

4.7.3 No person or organization shall conduct a vehicle rally or race on a catchment area without first obtaining the Board's written approval and then only under such conditions as the Board may impose.

4.8 CONTROL OF DEVELOPMENT

4.8.1 No person shall commence, carry out, change or expand any agricultural, industrial, commercial, quarrying or mining development in a catchment area without the approval in writing of the Board which may impose any conditions thereon that it considers necessary.

4.8.2 No person is to establish or carry on an offensive trade as defined in the Health Act on a catchment area or water reserve without written approval from the Board which may impose conditions regarding the establishment and operation of that trade.

4.8.3 No person shall commence or proceed with the erection of a building or structure of any kind or any alterations or additions to a building or structure on a catchment area or water reserve without the approval in writing of the Board and subject to any conditions that it may deem necessary.

4.8.4 The occupier or owner of premises in a catchment area shall maintain those premises at all times to the standards required by the Public Health Act or the relevant Regulations made under that Act.

4.9 RESTORATION AFTER COMMISSION OF AN OFFENCE

If any person or corporation commits an offence under Part 4, the Board, upon discovery of that offence, may serve notice on the offending person or corporation to restore any damage, remove any cause of pollution, or dismantle any building carried out in contravention of these by-laws by a nominated date. Failure to comply with the notice by the nominated date shall constitute a continuing offence from that date under section 147 of the Act, or in accordance with Section 17 of the Metropolitan Water Supply, Sewerage, and Drainage Act.

4.10 CONTROL OF PERSONS AND VEHICLES

4.10.1 The Board may erect signs at any position in the catchment areas or water reserves that it considers necessary to control the activities of persons or movement of vehicles entering onto or moving across the catchment areas or water reserves.

4.10.2 Any person driving or taking a vehicle, trailer, or item of mobile equipment onto or across a catchment area shall comply with all signs erected to control the speed, movement or parking of vehicles, trailers or mobile equipment.

4.10.3 Powers of a Ranger.

4.10.3.1 Rangers and other authorized officers of the Board are empowered to demand the name and address of any person committing or reasonably suspected of committing an offence against the Act or Board's by-laws relating to catchment areas and water reserves.

4.10.3.2 Any person who refuses to give, or gives a false name or address when such is requested by a Ranger or other authorized officer is deemed to commit an offence under these by-laws.

5.0 PROTECTION OF PUBLIC WATER SUPPLY AREAS AND UNDERGROUND WATER POLLUTION CONTROL AREAS

5.1 GENERAL

5.1.1 The objectives of the by-laws in Part 5 are—

- (a) To define provisions governing the licensing, construction and operation of private wells.
- (b) To protect the Board's production and observation wells from damage or pollution.
- (c) To prevent contamination of underground water in the pollution control areas.
- (d) To control development over the areas so as to prevent or inhibit contamination.

5.1.2 Penalties for breaches of any by-laws in Part 5 shall be as set out in sub-section 57B(4) of the Act.

5.1.3 The Board may erect signs and notice boards in any pollution area or Public Water Supply Area for the exhibition of any by-law, rule, regulation or notice.

5.2 CONTROL OF PRIVATE WELLS

5.2.1 Licences—

5.2.1.1 Every application for a licence under section 57G shall be made in the form No. 1 in Schedule B to these by-laws.

[By-law 5.2.1.1 amended in Gazette 31 July 1981 p. 3169.]

5.2.1.2 A person shall not give false or misleading information in his application for a licence.

5.2.1.3 A licence shall, subject to the terms, limitations and conditions endorsed thereon be in the form No. 2 in Schedule B to these by-laws.

[By-law 5.2.1.3 amended in Gazette 31 July 1981 p. 3169.]

5.2.2.1 Progress Statements—

5.2.2.1 A licensee shall within 30 days of completing a well, or completing alterations to a well, for which a licence has been issued, forward to the Board a statement in the form No. 3 in Schedule B to these by-laws.

[By-law 5.2.2.1 amended in Gazette 31 July 1981 p. 3169.]

5.2.2.2 The provisions of sub-section 5.2.2.1 of this by-law apply notwithstanding that the works relating to the well have been unsuccessful.

5.2.3 Measurement of Water Drawn from Well—

5.2.3.1 The Board or any officer authorized by the Board may fit a measuring device to any well to measure the quantity of water drawn from the well and to ensure the adequate performance of the measuring device, the Board may—

- (a) Alter the piping or other means of conveying the water from the well, and
- (b) Fit screens and traps to the pump to protect the measuring device.

5.2.3.2 A person who damages or interferes with a measuring device or with any piping or channelling installed by or at the direction of the Board in connection with the measuring device, or who fails to comply with a direction given pursuant to this by-law commits an offence.

5.2.3.3 The provisions of this by-law are in addition to and not in derogation of the provisions contained in By-law 6.7.

5.2.4 A person shall not construct or cause to be constructed or altered a well in any pollution area except in accordance with the *Health Act (Underground Water Supply) Regulations 1959* as amended from time to time.

5.2.5 A person shall not place any chemical or other substance that is capable of polluting underground water, down a well during the course of its construction, redevelopment, maintenance or operation without prior approval of the Board.

5.3 PROTECTION OF BOARD WORKS

5.3.1 A person shall not construct, alter or obstruct any watercourse, or drainage works in a manner that causes the flooding of any well or observation well.

5.4 PROTECTION OF UNDERGROUND WATER QUALITY

5.4.1 In a pollution area the use, storage and transport of pesticides, the disposal of pesticide containers and the disposal of spilled pesticides shall be in compliance with the provisions of the *Pesticides Regulations* as amended from time to time.

5.4.2 In a pollution area a person shall not store animal manures or sewage sludges within 100 metres of a production well except under approved conditions.

5.4.3 In a pollution area a person shall not carry out the burial or disposal of animal or poultry carcasses, blood offal, or other refuse products in excess of 2 tonnes, unless prior approval has been obtained from the Board.

5.4.4 In a pollution area a person shall not yard or house an animal within 30 m of a production well.

5.4.5 In a pollution area installation or operation of septic tanks, leach drains, soakwells and other apparatus for the disposal of domestic waste waters shall be carried out in conformity with the *Bacteriolytic Treatment of Sewage and Disposal of Effluent and Liquid Waste Regulations* as amended from time to time and where the site is within 100 m of a production well a person shall obtain prior consent for the installation or operation from the Board which may impose further conditions and restrictions as to the siting, construction or operation of the apparatus, in which event the Board shall meet any consequential extra cost incurred in the initial construction of the apparatus.

5.4.6 In a pollution area or a part of a pollution area a person shall not dispose of or discharge onto or into the ground, or into any lake, swamp or drain industrial wastes, chemicals, radioactive material, petroleum or petroleum products, polluted water, or refuse unless that person has been granted permission in writing by the Board to do so.

5.4.7 A person shall not discharge into any well or observation well any chemical, industrial waste, treated or untreated sewage, effluent or other matter which in the opinion of the Board may pollute the underground water.

5.4.8 The holder of a permit referred to in By-law 5.5.2. shall notify the Board immediately any spillage occurs that might pollute the groundwater, either directly or indirectly, and where that spillage occurs.

[By-law 5.4.8 amended in Gazette 24 December 1982 p. 4926.]

5.4.9 Any person spilling, or being aware of any leakage of, any petroleum product in a pollution area shall notify the Board immediately of that occurrence.

5.5 CONTROL OF DEVELOPMENT

5.5.1 A person shall not establish an offensive trade in accordance with the provisions of the *Health Act 1911*, in a pollution area, unless they have obtained the consent of the Board to do so, and unless they comply with any conditions which the Board may impose in relation to the establishment of that offensive trade.

5.5.2 The establishment or operation of any premises for the storage, packaging, formulating, processing, manufacturing, sale, testing or use of chemicals or other substances liable to pollute underground water in a pollution area shall be subject to the following terms, provisions and conditions—

- (a) application shall be made to the Board in writing for a permit to operate existing or proposed premises and the application shall set out—
 - (i) The process or processes of manufacture, packaging, storage, formulating, testing, or use of all raw materials and fuels, intermediate products and final products including waste material and effluents whether gaseous, liquid or solid.
 - (ii) The quantities of raw materials, and fuels used and the intermediate and final products, waste materials, effluents, being or proposed to be produced.
 - (iii) The methods proposed to treat and dispose of any wastes, by-products and effluents, including stormwater and wash down water where this may be or could become polluted.
 - (iv) Plans and procedures proposed to prevent pollution of underground water, including emergency plans and procedures for contingencies such as accidental spillage or malfunction of any manufacturing, storage, transport or treatment process or system, both on and off the premises where this is applicable.
 - (v) Such other information required by the Board to assess the pollution risk to underground water and to assist with measures to prevent pollution.
- (b) Upon receipt of the permit for the operation of the premises the applicant shall enter into a written agreement with the Board to comply with the conditions of the permit which may where so required include conditions that where at any time in the opinion of the Board—
 - (i) The occupier is not fully and faithfully performing and observing the terms, provisions and conditions of the permit or any by-law;
 - (ii) The raw materials, intermediate products and final products, wastes, effluents, fuels or any other substances are not in compliance with the terms, provisions or conditions of the permit;
 - (iii) The apparatus, the subject of the permit is not in efficient working order;
 - (iv) Pollution of the groundwater may be occurring or about to occur; or
 - (v) Any other breach of the agreement has been made,

the Board may serve a notice in writing upon the occupier of the property, by delivering it or posting it addressed to him at the property, specifying the matter or matters in respect of which a breach has taken place, or as to which the occupier is in default, or concerning which there is any complaint by the Board, and the notice shall require the occupier to make good the same in all things to the satisfaction of the Board, within a period to be stated therein, from the date of service thereof, in a manner so specified, and the notice shall also state that the Board is at liberty to terminate and put an end to the permit.
- (c) The occupier shall notify the Board in writing of his desire to make any alteration which shall in any way affect the nature and quantity of the raw materials, fuels, intermediate and final products, wastes and effluents, or the apparatus plans and procedures the subject of the permit, and which may affect the risk of pollution to underground water, and shall not make such an alteration without prior approval in writing from the Board.

- (d) The person to whom the permit is granted shall notify the Board in writing of any change of ownership or occupancy of the property, at least 14 days prior to the change.
- (e) The permit shall not be assigned or transferred, unless the consent of the Board in writing has been first obtained.
- (f) The Board may require the owner or occupier of any premises the subject of a permit from the Board to install sample collection apparatus, measuring equipment and observation wells in the ground for the purpose of measuring the depth to the ground water and for obtaining samples of ground water, or for any other purpose.
- (g) The Board or any authorized officer, servant, agent, or workman of the Board shall be at liberty at any time and from time to time to enter upon the property and every part thereof and to take samples or measurements and otherwise to inspect the apparatus stored or situated on the property.

5.5.3 Where the requirements of a notice referred to in By-law 5.5.2 (b) have not been complied with on the expiration of the period mentioned therein, the permit shall automatically terminate, and the Board, by its officers may enter upon the property, and at the expense of the occupier disconnect or stop the apparatus used and take such other action as may be deemed necessary to prevent or stop pollution of groundwater that may be occurring or which might occur, and the occupier shall not be entitled to compensation in connection therewith.

[By-law 5.5.3 amended in Gazette 24 December 1982 p. 4926.]

5.5.4 Any person handling petroleum and other flammable liquids in a pollution area shall store and handle those liquids in accordance with the *Flammable Liquids Regulations 1967*, as amended from time to time and in addition shall comply with the following requirements—

- (a) Underground tanks for the storage of petroleum products shall not be installed within 100 m of a production well.
- (b) All underground tanks for the storage of petroleum products shall be installed in approved impervious containment structures or membranes capable of preventing any leakage from the storage tank to the ground or ground water.
- (c) Any bunds or compounds on any premises licensed under the *Flammable Liquids Regulations 1967*, as amended from time to time, shall be constructed so that the walls and floor of the bund or compound are of impervious material to the approval of the Board.
- (d) Where a person intends to store flammable liquids in a pollution area, they shall apply to the Board for its prior approval, setting out the location of proposed structures, buildings and tanks and shall abide by any conditions which the Board may impose.

5.5.5 A person storing or using petroleum products in a pollution area at unlicensed premises in accordance with Part III of the *Flammable Liquids Regulations 1967*, as amended from time to time, shall take all reasonable care to prevent spillage or leakage of petroleum products onto or into the ground and may be required by the Board to install suitable impervious catchpits, or similar approved containment structures.

6.0 SUPPLY OF WATER AND THE INSTALLATION OF SERVICES AND METERS

6.1 GENERAL

6.1.1 By-laws contained in Part 6 are intended to define—

- (a) The purposes for which water can be used.
- (b) The conditions under which water services will be provided, altered and disconnected, and
- (c) The powers of the Board to install water meters on services and the consequent responsibilities of occupiers and owners.

6.1.2 Attention is drawn to By-law 31.4 of the by-laws regarding penalties for offences against these by-laws.

6.2 SUPPLY AND USE OF WATER

6.2.1 After receipt of an application, the Board may supply water for the following purposes subject to any conditions relating to the method of taking, using, and controlling the water that it may deem necessary—

- (a) Domestic purposes.
- (b) Industrial purposes.
- (c) Drinking water for stock.
- (d) Fire fighting and protection.
- (e) Cleansing, maintenance or construction of public or private roads.
- (f) Watering of public or private parks, gardens and playing fields.
- (g) Filling and operating ornamental fountains, swimming pools, wading pools, fish ponds, ornamental lakes, or any receptacle of a similar nature.
- (h) Construction of buildings or other works on private or public property.
- (i) The operation of any form of hydraulic ejector or machine.
- (j) The operation of any apparatus in which water is used for cooling including refrigerating equipment, air conditioning or any form of temperature control.

6.2.2 Any person provided with a supply of water for a specified purpose shall not use such water for any other purpose without the written permission of the Board.

6.2.3 No occupier, owner or any other person shall allow water supplied by the Board to run to waste or permit undue consumption. If in the opinion of the Board any person is wasting or unduly consuming water, it may serve notice on the occupier, owner or other person to cease the waste or undue use within a period nominated by the Board. Failure to prevent the waste or undue use within the nominated period shall be deemed an offence against these by-laws and the Board may without prejudice to any other penalty contained in these by-laws, forthwith disconnect the supply and debit the cost of the disconnection to the occupier or owner.

6.2.4 The occupier or owner of land or premises supplied with water from the Board's mains shall ensure that such water is not used by persons not connected with said land or premises.

6.2.5 No person shall, without the written permission of the Board, allow water supplied by the Board to be sold to another person, carried away, or transferred in any manner from the property or other location to which it was supplied.

6.2.6 The Board may from time to time, and without giving prior notice to the occupiers or owners affected, cut off the supply of water to any part or parts of the area for the purpose of carrying out work on its mains.

6.2.7 Board May Impose Restrictions—

6.2.7.1 The Board may, from time to time as it considers necessary, by notices published at least once in a daily newspaper circulating in the Metropolitan Water, Sewerage and Drainage Area—

- (a) Prohibit, regulate, or impose restrictions on, the use or consumption of water by any person or class of person, within the whole or any portion of the area, for any purpose generally or for such purpose or purposes as are specified in the order, for any period or periods;
- (b) Exempt either wholly or partially any portion of the area, any person or class of person, or any place or institution or class of place or class of institution from the operation of the whole or part of the order.

6.2.7.2 An order so made and published may be cancelled or varied by a subsequent order made by the Board and published in a daily newspaper circulating in the area.

6.2.7.3 A person using or consuming water in contravention of an order made and published under this by-law is deemed to commit a breach of this by-law.

6.2.7.4 For the purposes of this by-law a person who allows water to flow or leak from any pipe or other fittings used for or in connection with the supply of water to or in any premises shall be regarded as a person using water.

6.3 SERVICES TO RATED PROPERTIES

6.3.1 The Board will provide one service to each rated property provided that the water is required for one of the purposes listed in By-law 6.2.1 except as set out in By-law 6.3.3.

[By-law 6.3.1 amended in Gazette 24 December 1982 p. 4926.]

6.3.2 A service will not be laid onto any rated property until the internal water supply system has been completed except as provided in By-law 6.5.2.2.

[By-law 6.3.2 amended in Gazette 24 December 1982 p. 4926.]

6.3.3 Where applications are received for water services to a group of properties incorporated or to be incorporated under the Strata Titles Act⁵ or to a group of properties under the one common ownership or use the Board shall provide a single water service except where the Board at its discretion decides that additional rated services are justified.

6.3.4 Where an applicant requires the Board to provide a new water service to a rated property which has an existing disconnected service, the Board reserves the right to recover from such applicant the whole or part of the current cost of the disconnected service or services.

6.3.5 The service pipe provided by the Board to supply water to any rated property shall not exceed 20 mm nominal internal diameter unless the Board at its absolute discretion decides that a pipe of greater diameter is necessary in order to maintain a reasonable supply of water to the said property.

6.3.6 No branch or fitting shall be connected to a private service pipe within a distance of one metre on the consumer's side of the Board's stop-cock or water meter.

6.3.7 No part of a private water supply system that can be fed from private water tanks or from supplies other than that provided by the Board shall be connected to any part of a private water supply system that is connected directly to the Board's service pipe. (See By-law 19.1 regarding methods of operation.)

6.3.8 No occupier or owner shall connect or allow to be connected any pump to any part of a private water supply system that is supplied directly from the Board's service pipe without the written permission of the Board and without accepting in writing any conditions that the Board may deem necessary.

6.3.9 No person shall connect or interfere, or allow any connection or interference with the Board's mains, service pipes or meters.

6.3.10 Applications for water services to rated properties shall be made on the printed form procurable at the Head or Branch Offices of the Board, and shall be lodged not less than 7 days before the service is required.

6.3.11 Applications for alteration of position or size, and disconnection of the Board's services shall be made on the printed form procurable at the Head or Branch Offices of the Board, and the necessary fees paid, if required, before work is commenced.

6.3.12 The occupier or owner of any property provided with a water service from the Board shall ensure that the portion of the Board's service on his property is adequately protected from damage and shall be held liable for the cost of any repairs thereto.

6.4 NON-RATED SERVICES

6.4.1 Services covered by this by-law include—

- (a) Services to non-rated properties defined in section 39 of the *Metropolitan Water Authority Act 1982*.
- (b) Services to properties not rateable under section 90 of the Act.
- (c) Fire services.
- (d) Additional services.
- (e) Temporary services including hydrant services.

[By-law 6.4.1 amended in Gazette 24 December 1982 p. 4926.]

6.4.2 Non-rateable services may be provided at the discretion of the Board subject to any conditions which it may see fit to impose.

6.4.3 Applications for non-rateable water services shall be made on the printed form procurable at Head or Branch Offices of the Board, and shall be lodged, the fees paid and conditions accepted not less than 7 days before the service is required.

6.4.4 Applicants shall be advised in writing of any conditions to be imposed in a Letter of Conditions. In each case these conditions shall be accepted in writing, and will include provisions for the applicant to pay—

- (a) The cost of installation, maintenance where applicable, and disconnection of the service.
- (b) The cost of any main extension necessary for provision of the non-rated service.
- (c) An annual service fee and meter rental charge if applicable.
- (d) The cost of excess water where applicable.

6.4.5 By-laws 6.3.2, 6.3.3, 6.3.5 to 6.3.9 and 6.3.12 applying to rated services shall also apply to non-rated services.

[By-law 6.4.5 amended in Gazette 24 December 1982 p. 4926.]

6.4.6 Private Fire Services—

6.4.6.1 Fire services may be provided by the Board for the purpose of supplying water for fire fighting and the necessary testing of firefighting equipment.

6.4.6.2 Subject to By-law 6.4.4 the Board will lay to each property or group of properties under the one common ownership or use—

- (a) A single or dual fire service for the operation of sprinklers, or
- (b) A single fire service for the operation of hydrants or hose-reels.

[By-law 6.4.6.2 amended in Gazette 24 December 1982 p. 4926.]

6.4.6.3 Seals may be affixed to hydrant valves at the discretion of the Board at the expense of the occupier or owner. In the event of the seals having been broken in the case of fire or by accident or otherwise, the occupier or owner shall give notice forthwith to the Board and pay the cost of re-sealing.

6.4.6.4 No water shall be taken from any fire service except for the purpose of extinguishing fires or for the necessary testing of the service. When required by the Board, the occupier or owner shall notify and make any necessary arrangements with the Board in advance of any proposed test.

6.4.6.5 Where any fire service has been given the Board shall not be liable to provide or maintain a continuous supply or pressure of water.

6.4.7 Where any property is provided with 2 or more water services whether rated or otherwise, interconnection of such services through the internal private water supply system is prohibited except in the cases of—

- (a) A dual fire service provided under By-law 6.4.6.2 (a) where approved non-return valves shall be provided and maintained by the occupier or owner on each service so as to prevent a back-flow of any water into the Board's mains.
- (b) An additional service where the Board may install and maintain at the expense of the occupier or owner, a non-return valve or other approved backflow prevention device on each or any service capable of being interconnected.

[By-law 6.4.7 amended in Gazette 24 December 1982 p. 4926.]

6.4.8 Where a water supply of a non-permanent nature is required for any purpose specified in By-law 6.2.1 a temporary non-rated service may be provided.

[By-law 6.4.8 amended in Gazette 24 December 1982 p. 4926.]

6.5 BUILDING SERVICES

6.5.1 This by-law contains by-laws applicable to the use of water for construction purposes on rated or non-rated properties or other land for the construction of new buildings, extensions or alterations to existing buildings, or for other construction works.

[By-law 6.5.1 amended in Gazette 24 December 1982 p. 4926.]

6.5.2 To Unserved Properties—

6.5.2.1 Applications for services shall be made on the printed form available from Head or Branch Offices of the Board. Before any application is accepted the applicant must—

- (a) Provide 2 copies of the building plans.
- (b) Pay the building fee as assessed—see Part 29.
- (c) In the case of a rated service application pay any charges arising from By-laws 6.3.4 or 6.3.11.
- (d) In the case of a non-rated service application accept the Letter of Conditions and pay the cost of the service.

[By-law 6.5.2.1 amended in Gazette 24 December 1982 p. 4926.]

6.5.2.2 The builder shall engage a licensed plumber to provide and install an adequately supported stand-pipe complete with hose-tap situated not less than 2 metres horizontally from the proposed stop-cock position together with the connecting pipe before the Board will install its service pipe.

6.5.2.3 The builder or principal contractor shall be responsible for the protection and cost of maintenance of the Board's service and meter (if fitted) until he notifies the Board of the date of practical completion of the works under construction.

6.5.3 To properties already serviced—

No water is to be used for building or construction purposes from an existing water service until the conditions contained in subsection 6.5.2.1 have been complied with.

6.5.4 All hoses in use on building or construction sites shall be fitted with a self-closing hand-operated valve at the outlet end except when the hose is connected to any apparatus for the controlled distribution of water for a specific purpose.

6.5.5 The supply to any property may be disconnected at the expense of the builder if water is used in connection with any work in addition to that shown on the plans submitted and on which the building fee was assessed.

6.6 WATER FOR COOLING AND HYDRAULICALLY OPERATED MACHINES

6.6.1 See By-law 15.4 for details regarding the method of applying for and the conditions applicable to a service or sub-service provided for cooling purposes or for the operation of hydraulic machines.

6.7 METERS

6.7.1 The Board may install a water meter on any service at its discretion, and shall determine the size and class of meter in each case.

6.7.2 Meters will be supplied by the Board and set above the normal ground surface except that in special circumstances they can be set below ground level at the discretion of the Board.

6.7.3 The occupier or owner of premises where a meter has been installed shall maintain a clear space not less than 300 mm horizontally and 1200 mm vertically from the meter and ensure easy access for the Board's employees at all times.

6.7.4 No person shall break or in any way interfere with the seal fixed on the meter through which water is supplied by the Board, or turn or attempt to turn any screw, bolt, or nut on or attached to such meter, or use any tool or appliance on any such meter, or introduce or attempt to introduce any body or substance into such meter, or in any way interfere with any portion of such meter, or any pipes or fittings attached thereto.

6.7.5 Any persons supplied by the Board through a meter shall, on finding the meter damaged, or not registering, immediately give notice of the damage or non-registration to the Head or any Branch Office of the Board.

6.7.6 Protection of Water Meters.

6.7.6.1 The occupier or owner of any property supplied through a meter affixed to the Board's service shall take every necessary precaution to protect the Board's meter from damage.

6.7.6.2 All repairs required to damaged meters shall be carried out by the officers of the Board.

6.7.6.3 The occupier or owner shall pay to the Board the cost of making good any damage to such meter on demand, and if not paid on demand shall be recoverable in the same manner as water rates.

7.0 WATER SUPPLY PLUMBING—SCOPE

7.1 SCOPE AND APPLICATION

These by-laws set out the requirements for:

- (a) the installation and connection of water supply pipework to plumbing fixtures and appliances within properties,
- (b) the installation and connection of hot water services,
- (c) the installation and connection of fire fighting services, and
- (d) the installation and connection of garden watering and irrigation systems.

Subject to any limitations stated, these requirements shall apply to the installation and connection of water supply systems as defined herein.

7.2 STANDARDS

In all works carried out pursuant to these by-laws, materials conforming to the following Australian Standards Specifications shall be used:—

AS 1074-1971 Steel tubes and tubulars suitable for screwing to AS B53 pipe threads.

AS 1159-1973 Polyethylene (polythene) pipe for pressure applications.

AS 1167-1971 Alloy filler rods for brazing.

- AS 1357-1972 Water fittings for protection and control of unvented storage water heaters.
- AS 1379-1973 Ready mixed concrete.
- AS 1397-1973 Hot-dipped zinc-coated steel coil and cut lengths.
- AS 1432-1973 Copper tubes for water, gas and sanitation.
- AS 1460-1973 Mechanical jointing fittings for use with polyethylene pressure pipes.
- AS 1465-1974 Dense natural aggregates for concrete.
- AS 1477-1975 Unplasticized PVC (UPVC) pipes and fittings for pressure applications.
- AS 1488-1974 Cast grey cast iron fittings for pressure pipes (excluding bolted gland joints).
- AS 1529-1974 Code for practice for installation of household type hot water supply systems.
- AS 1567-1974 Wrought copper and copper alloy rods, bars and section for general engineering purposes.
- AS 1585-1976 Capillary and brazing fittings of copper and copper alloy.
- AS 1588-1974 Filler rods for welding.
- AS 1590-1974 Copper alloy screwed pipe fittings for use in water supply and hot water services.
- AS 1628-1974 Copper alloy gate valves and non-return valves for use in water supply and hot water services.
- AS 1645-1974 Copper and copper alloy compression fittings for use in water supply and hot water services.
- AS 1646-1974 Rubber joint rings for water supply, sewerage and drainage purposes.
- AS 1711-1975 Asbestos cement pressure pipes.
- AS 1718-1975 Copper alloy draw-off taps, stop taps, and ferrule or main taps for use in water supply and hot water services.
- AS 1722-1975 Pipe threads of Whitworth form.
- AS 1723-1975 Centrifugally cast iron pressure pipes (excluding pipes with bolted gland joints).
- AS 1724-1975 Cast grey iron pressure pipes for bolted gland joints.
- AS 1769-1975 Welded stainless steel tubes for plumbing applications.
- AS A2-1963 Portland Cement.
- AS A126-1965 Coal-tar primer for steel pipes.
- AS A127-1965 Coal-tar enamel for steel pipes.
- AS A185-1971 Solvent-welding cements for use with rigid PVC pipe and fittings.
- AS CA36-1965 Code of recommended practice for the coating and lining of steel pipes with coal-tar enamel.
- AS CA67-1972 Rules for the installation of PVC pipe systems.
- AS B52-1971 Flanges and bolting for pipes, valves and fittings.

AS G31-1971 Stainless and heat-resisting steel plate, sheet and strip of A1S1-SAE Standard steels type (coils and cut lengths).

AS H1-1931 Soft Solders (Grades A, B, C, D, E, F, G, H, and I).

BS 143 & 1256-1968 Malleable cast iron and cast copper screwed pipe fittings for steam, air, water, gas, and oil.

BS 3464-1965 Cast iron wedge and double disc gate valves for general purposes.

AS C142-1964 Electric water heaters.

8.0 WATER SUPPLY PLUMBING MATERIALS

8.1 ASBESTOS CEMENT (AC)

8.1.1 Material Specification

Asbestos cement pipes and fittings shall comply with AS 1711, and Class F or in accordance with Table 8.1

TABLES 8.1 WORKING PRESSURE FOR ASBESTOS CEMENT PIPES

Class of Pipes	Maximum Working Pressure	
	MPa	Metre Head
A	0.30	30
B	0.60	61
C	0.90	92
D	1.20	123
E	1.50	153
F	1.80	184

8.1.2 Restrictions on Use

Asbestos cement pipes shall only be used in locations where ready access for maintenance is available.

8.1.3 Methods of Jointing

8.1.3.1 Asbestos Cement to Asbestos Cement

Joints between asbestos cement pipes shall be:

- spigot and socket type with a rubber sealing ring (By-law 9.10.4),
- bolted gland (By-law 9.10.2), or
- as approved.

[By-law 8.1.3.2 amended in Gazette 24 December 1982 p. 4926.]

8.1.3.2 Asbestos Cement to Metal Pipes

Joints between asbestos cement pipes and metal pipes shall be:

- (a) bolted gland (By-law 9.10.2)
- (b) lead caulked (By-law 9.10.3), may only be used when joining asbestos cement spigots to metal sockets, or
- (c) as approved.

[By-law 8.1.3.2 amended in Gazette 24 December 1982 p. 4926.]

8.1.3.3 Connections to Asbestos Cement Water Service Pipes

Small bore connections to a private water service laid in asbestos cement shall be made by:

- (a) tee's (branches) or crosses,
- (b) tapping bands, or
- (c) ferrule main taps.

8.1.4 Special Installation Requirements

8.1.4.1 Bedding

Asbestos cement pipes shall be bedded with the barrel fully supported. When the trench bottom is rock or clay the pipes shall be bedded on a layer of fine granular material, free of stones and clay lumps retained on a 26.5 mm aperture sieve and the layer of bedding material shall be at least 100 mm thick. Alternatively, the asbestos cement pipes may be bedded on cement mortar. (By-law 8.9.5).

[By-law 8.1.4.1 amended in Gazette 24 December 1982 p. 4926.]

8.1.4.2 Anchoring

Asbestos cement pipes shall be anchored in accordance with By-law 9.4.

8.1.4.3 Support and Protection

- (a) When used within or attached to buildings asbestos cement pipes shall be provided with additional support in the locations nominated in By-law 9.4.1 to prevent movement.
- (b) Asbestos cement pipework shall be protected where it is liable to physical damage.

[By-law 8.1.4.3 amended in Gazette 24 December 1982 p. 4926.]

8.1.4.4 Testing

- (a) All unmetered fire services of asbestos cement shall be tested to 200 m pressure head without leakage.
- (b) Metered fire services of asbestos cement shall be tested to 200 m pressure head without leakage when required by the Board.

8.2 CAST IRON (CI)

8.2.1 Material Specification

8.2.1.1 Pipes

Cast iron pipes shall be in accordance with AS 1723 or AS 1724, and shall comply with the minimum Classes shown in Table 8.2.

TABLE 8.2 MINIMUM CLASSES OF CAST IRON PIPES

Pipe Size mm	Class of Pipe Specified in Table 2 of AS 1723	Class of Pipe Specified in Table 3 of AS 1724
80 100 150 to 600	Class C Class C Class B	— Class 2 Class 1

8.2.1.2 Fittings

- Cast iron fittings shall be in accordance with AS 1488 or AS 1724.
- The Class for the minimum dimension of wall thickness for a fitting shall correspond to the Class of pipe to which it is to be fitted. The actual dimensions shall be those as stated for such Class and for the types of fitting concerned in the relevant Tables of AS 1488 or AS 1724 respectively.

8.2.1.3 Linings or Coatings

Where used, linings or coatings on cast iron pipes and fittings shall be in accordance with the relevant requirements in AS 1723, and for steel pipes AS A126, AS A127 and AS CA36 as applicable.

8.2.2 Unsuitable Locations

In soils where the acidity may cause rapid corrosion, cast iron pipes and fittings may be used only if suitable protective coatings or wrappings are applied.

8.2.3 Methods of Jointing

Joints between cast iron pipes and fittings shall be:

- spigot and socket types which are lead caulked (By-law 9.10.3),
- spigot and socket types with rubber sealing rings (By-law 9.10.4),
- flanges cast integrally with the pipes and fittings coupled with galvanized steel or copper alloy bolts and nuts, and fitted with gaskets,
- bolted gland, (By-law 9.10.2) or
- as approved.

[By-law 8.2.3 amended in Gazette 24 December 1982 p. 4926.]

8.2.4 Special Installation Requirements

8.2.4.1 Anchoring

Cast iron pipes and fittings which utilize spigot and socket or bolted gland type joints shall be anchored in accordance with By-laws 9.4 and 9.5 as applicable.

8.3 COPPER AND COPPER ALLOY

8.3.1 Material Specification

8.3.1.1 Pipes

- (a) Copper pipes shall be in accordance with AS 1432.
- (b) Copper alloy pipes shall be Type 259D, 70/30 arsenical brass in accordance with AS 1567 and shall comply dimensionally with copper tube to AS 1432.

8.3.1.2 Fittings

- (a) Copper and copper alloy fittings shall be in accordance with AS 1585, AS 1590 or AS 1645 where applicable.
- (b) Copper fabricated fittings shall comply with the following:
 - (i) Sockets fabricated in copper tube shall be made using approved tools designed for such purposes;
 - (ii) Fabricated junctions and fittings shall be made from Types A, B or C tube, using approved tools designed for such purposes;
 - (iii) Fabricated socket junctions and other fitting joints shall be made using silver brazing or bronze welding; and
 - (iv) If required by the Board, fabricated sections of installations shall be hydrostatically tested to 200 m pressure head.

8.3.2 Restrictions on Use

8.3.2.1 Type D Tubes

- (a) Except that local annealing is permissible where necessary for making joints, type D tubes shall only be used in the "as drawn" condition.
- (b) Type D tubes shall not be bent.
- (c) Type D tube shall not be used in the meter assembly.

8.3.2.2 Unsuitable Locations

Unless suitably protected against external corrosion, copper and copper alloy pipes and fittings shall not be used where they may be in contact with the following materials:

- (a) ash;
- (b) sodium chloride (salt);
- (c) compounds consisting of magnesium oxychloride (magnesite); or
- (d) another material of similar corrosive properties.

8.3.3 Methods of Jointing

8.3.3.1 Heavy Gauge Screwing Quality Copper or Copper Alloy

Joints between heavy gauge screwing quality copper tube shall be—

- (a) screwed joints (By-law 9.10.5);
- (b) silver brazed (By-law 9.10.6);
- (c) bronze welded (By-law 9.10.1); or
- (d) as approved.

[By-law 8.3.3.1 amended in Gazette 24 December 1982 p. 4926.]

8.3.3.2 Types A, B, C and Copper Tubes

Joints between Types A, B, C and D copper tubes shall be:

- (a) silver brazed (By-law 9.10.6);
- (b) bronze welded (By-law 9.10.1) (not permitted for type D tubes);
- (c) compression fittings to AS 1645 (not permitted for Type D tubes);
- (d) capillary fittings to AS 1585, Table 1A and soft soldered (By-law 9.10.7);
- (e) capillary fittings to AS 1585, Table 1B and silver brazed; or
- (f) as approved.

[By-law 8.3.3.2 amended in Gazette 24 December 1982 p. 4926.]

8.3.3.3 Copper Pipes to Flanged Valves

Joints between copper water service pipes larger than 65 mm and flanged valves shall be made using cast brass or gunmetal flanges into which the copper pipes shall be:

- (a) silver brazed only for tube Type D; or
- (b) bronzed welded or silver brazed for tube Types A, B, C and screwing class.

The flanges shall be secured to the flanges of valves by gunmetal or extruded brass bolts and nuts and the joint made watertight with a gasket.

8.4 GALVANIZED STEEL

8.4.1 Material Specification

- (a) Galvanized steel tube and tubulars shall be in accordance with AS 1074.
- (b) For pipe sizes less than 100 mm "Heavy Gauge" tubing shall be used, and for pipe sizes 100 mm or larger "Medium or Heavy Gauge" tubing shall be used.
- (c) Screwed fittings shall comply with AS 1590, BS 143 and BS 1256, as applicable.
- (d) Welded fabricated fittings shall be hot dipped galvanized after fabrication, and tested hydrostatically to 200 m pressure head or by other approved means.

8.4.2 Restrictions on Use

- (a) Galvanized steel tubing and fittings shall not be concealed within walls (including ducts), floors or ceiling spaces of buildings.
- (b) Galvanized steel tubing shall not be bent.

8.4.3 Unsuitable Locations

Suitable protective coatings to prevent rapid corrosion shall be applied to galvanized steel pipes and fittings in acidic soils.

8.4.4 Methods of Jointing

Joints between galvanized steel tubes and fittings shall be:

- (a) screwed joints (By-law 9.10.5);
- (b) flanged joints; or
- (c) as approved.

[By-law 8.4.4 amended in Gazette 24 December 1982 p. 4926.]

8.5 POLYETHYLENE

8.5.1 Material Specification

8.5.1.1 Pipes

Polyethylene pipes shall be in accordance with AS 1159, Type 50, Class 15 or as in Table 8.3.

TABLE 8.3 WORKING PRESSURES FOR POLYETHYLENE PIPES

Class of Pipe	Maximum Material Temperature				
	20 deg C	30 deg C	40 deg C	50 deg C	60 deg C
	Maximum Working Pressure—mPa				
Class 3	0.3	0.22	0.16	0.10	0.06
Class 4.5	0.45	0.34	0.25	0.15	0.09
Class 6	0.6	0.45	0.33	0.20	0.12
Class 9	0.9	0.67	0.50	0.31	0.18
Class 12	1.2	0.90	0.60	0.41	0.24
Class 15	1.5	1.12	0.83	0.51	0.30

8.5.1.2 Fittings

Mechanical jointing fittings for use with polyethylene pipes shall be in accordance with AS 1460, and shall be suitable for the class of pipes being used.

8.5.2 Restrictions on Use

Polyethylene pipes shall not be concealed within walls (including ducts) floor or ceiling spaces of buildings, or used above ground where exposed to direct sunlight.

8.5.3 Method of Jointing

Only mechanical jointing fittings or other approved methods shall be used for jointing polyethylene pipes.

8.5.4 Special Installation Requirements

8.5.4.1 Earthing Electrical Installations

- Being a non-conductive material, Polyethylene cannot be used as a means of earthing electrical installations or of dissipating static charges.
- Metallic water pipes shall not be replaced with polyethylene pipes until the earthing system of the electrical installation has been checked, and modified if necessary by a Licensed Electrical Contractor.
- Prior to polyethylene pipes being used in a new water service the Statutory Electrical Authority shall be notified.

8.5.4.2 Hot Water Cylinder Supply

Where polyethylene pipe is used for cold water supply to a directly connected hot water cylinder, it shall not be used for the last 1 metre of such connection and shall not extend beyond the check valve.

8.5.4.3 Standpipes

All standpipes, except where fixed to a building wall, shall be of approved metallic material and shall be firmly clipped to a suitable support to prevent stress being imparted to the underground polyethylene pipe in the event of strain being imposed on the riser pipe.

8.5.4.4 Installation Below Ground

Care should be taken to ensure that pipes installed in trenches are clear of sharp objects such as rocks, brickbats etc.

8.6 STAINLESS STEEL

8.6.1 Material Specification

8.6.1.1 Pipes

Stainless steel tubes shall be in accordance with AS 1769 and AS G31 material Grade 304.

8.6.1.2 Fittings

Fittings for use with stainless steel shall be copper or copper alloy in accordance with AS 1585 or AS 1645, or other approved fittings.

8.6.2 Restrictions on Use

Stainless steel may only be used below ground where approved.

8.6.3 Unsuitable Locations

Unless suitably protected against external corrosion, stainless steel shall not be used where it may be in contact with the following materials:

- (a) ash;
- (b) sodium chloride (salt);
- (c) any compound consisting of magnesium oxychloride (magnesite); or
- (d) another material of similar corrosive properties.

8.6.4 Jointing Methods

8.6.4.1 Pipework Up to 25 mm

Joints in stainless steel pipework up to 25 mm size shall be:

- (a) compression type joints using copper or copper alloy fittings in accordance with AS 1645,
- (b) capillary type joints using copper or copper alloy fittings in accordance with AS 1585,
- (c) capillary type joints using expanded sockets made in the stainless steel tube, or
- (d) croxed type joints using approved fittings.

8.6.4.2 Pipework Larger than 25 mm

Joints in stainless steel pipework larger than 25 mm size shall be:

- (a) butt welded using a tungsten inert gas (T.I.G.) argon arc method, or
- (b) flanged joints equivalent at least to Table "F" rating of AS B52.

8.6.5 Jointing Practice

8.6.5.1 Soft Soldering—Soft soldered joints shall be made using a phosphoric acid based paste flux. Chloride fluxes shall not be used.

8.6.5.2 Silver Brazing

- (a) Silver brazing alloy shall be in accordance with AS 1167, Table 1, Alloy A8.
- (b) A fluoborate paste shall be used for flux, and shall be washed from the installation on completion of the joints.

8.6.5.3 Croxed Joints—Croxed joints shall be made with an approved "croxing" tool and using compression nuts in accordance with AS 1645.

8.6.5.4 Argon Arc (T.I.G.) Welding—See Figure 8.1

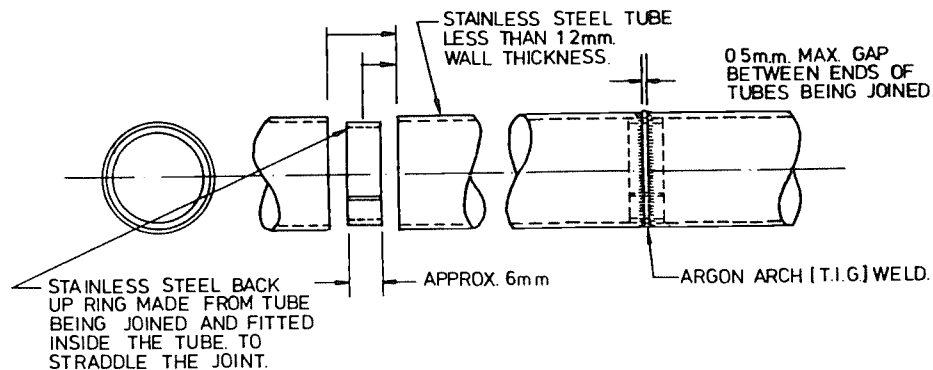
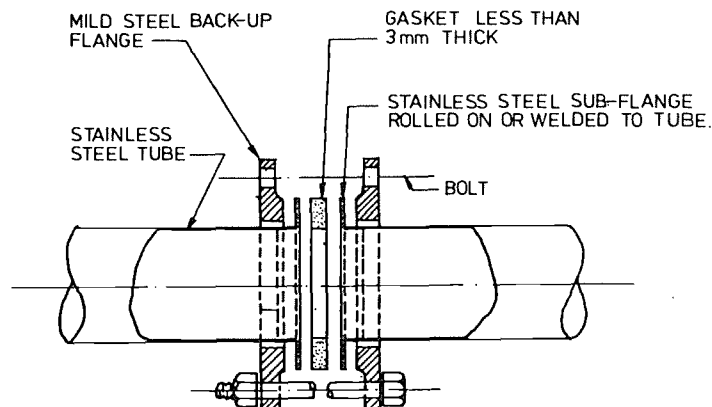


FIGURE 8.1 ARGON ARC [T.I.G.] WELDING OF STAINLESS STEEL TUBING OF LESS THAN 1.2mm. WALL THICKNESS

- (a) The gap between abutting tube ends to be joined should not be greater than 0.5 mm.
- (b) For tubes of wall thickness less than 1.2 mm a stainless steel back-up ring approximately 6 mm long made from the tube being joined shall be fitted inside the tube to straddle the joint.
- (c) The filler rod used shall be stainless steel of low carbon type and should not be greater than 2 mm in diameter to ensure minimal heat input.
- (d) The ends to be joined should be butted and held firmly together and tack welded in at least 4 spots around the circumference prior to welding the entire joint.

8.6.5.5 Flanged Joints (See Figure 8.2)—Flanged joints shall be made up by forming a stub flange of the same gauge and wall thickness as the tube, having a diameter conforming to dimension "F" on Figures 3, 4 etc. of AS B52. This stub flange may be either rolled on, or welded to the tube. A mild steel back-up flange shall be used, the thickness of which shall conform to dimension "T" on Figure 3, 4 etc.



**FIGURE 8.2 FLANGED JOINTS IN
STAINLESS STEEL TUBING**

8.7 UNPLASTICIZED POLYVINYL CHLORIDE (UPVC)

8.7.1 Material Specification—UPVC pipes and fittings shall be in accordance with AS 1477, Class 18 or as in Table 8.4.

TABLE 8.4 WORKING PRESSURES FOR UPVC PIPES

Pipe Material Temperature Degrees C	Maximum allowable working pressure, mPa					
	Class 4.5 pipe	Class 6 pipe	Class 9 pipe	Class 12 pipe	Class 15 pipe	Class 18 pipe
20	0.45	0.60	0.90	1.20	1.50	1.80
30	0.36	0.48	0.72	0.96	1.20	1.44
40	0.27	0.36	0.54	0.72	0.90	1.08
50	0.18	0.24	0.36	0.48	0.60	0.72
60	0.09	0.12	0.18	0.24	0.30	0.36

8.7.2 Restrictions on Use

UPVC pipes and fittings shall not be concealed within walls (including ducts) floor or ceiling spaces of buildings, or used above ground where exposed to direct sunlight.

8.7.3 Method of Jointing

Jointing of UPVC pipes and fittings shall be:

- (a) solvent joints (By-law 9.10.8),
- (b) rubber ring joints (By-law 9.10.4), or
- (c) as approved.

[By-law 8.7.3 amended in Gazette 24 December 1982 p. 4926.]

8.7.4 Special Installation Requirements

8.7.4.1 Earthing Electrical Installations

- (a) Being a non-conductive material UPVC cannot be used as a means of earthing electrical installations or of dissipating static charges.
- (b) Metallic water pipes shall not be replaced with UPVC pipes until the earthing systems of the electrical installation has been checked, and modified if necessary by a Licensed Electrical Contractor.
- (c) Prior to UPVC pipes being used in a new water service the Statutory Electrical Authority shall be notified.

8.7.4.2 Hot Water Cylinder Supply

Where UPVC pipe is used for cold water supply to a directly connected hot water cylinder, it shall not be used for the last 1 m of such connection and shall not be taken beyond the check valve.

8.7.4.3 Standpipes

All standpipes, except where fixed to a building wall, shall be of metallic material and shall be firmly clipped to a suitable support to prevent stress being imparted to the underground pipe in the event of strain being imposed on the riser pipe.

8.7.4.4 Installation Below Ground

Pipes installed in trenches shall be clear of sharp objects such as rocks, brickbats etc.

8.7.4.5 Repairs to service

Approved thimble type fittings shall be used if the service is to be put into immediate use. Repairs using solvent joints are not suitable unless the service can be left for 24 hours before water pressure is reapplied.

8.7.4.6 Connection to Pipes of Other Materials

- (a) Provided both threads are of the fastening type, fittings with screwed end connections for accommodation of pipes of other materials may be used.
- (b) Screw threads shall not be cut on UPVC pipe.

8.7.4.7 General Precautions

Precautions for the use, handling and transportation of UPVC pipes, fittings, and solvent cements, shall be in accordance with AS CA67.

8.8 TAPS AND VALVES

- (a) All taps and valves used in water supply services shall be of the high pressure type, and in accordance with AS 1628 or AS 1718 as applicable.
- (b) Cast iron valves shall be in accordance with BS 3464 or other approved Standard.
- (c) Where required by the Board all ferrule taps, stop taps or isolating valves used below ground or in inaccessible places shall have the bonnet secured to the body by means of a locking screw to prevent inadvertent unscrewing of the bonnet.
- (d) Silver brazing or bronze welding shall not be used as a means of jointing taps or valves to water service pipes greater than 50 mm size.
- (e) The bonnet, with spindle and valve shall be removed from the body of taps and valves during silver brazing and bronze welding operations to prevent damage.

8.9 MISCELLANEOUS MATERIALS

8.9.1 Cement

Cement shall be Portland cement in accordance with AS A2.

8.9.2 Fine Aggregate (Sand)

Fine aggregate shall be an approved material complying with AS 1465.

8.9.3 Coarse Aggregate (Metal)

Coarse aggregate shall be an approved material complying with AS 1465 and shall not exceed 20 mm nominal size.

8.9.4 Concrete Mix

- (a) Site mixed concrete shall consist of 1 part cement, 2 parts fine aggregate, 4 parts coarse aggregate all measured by volume, and sufficient water added to make the mix workable.
- (b) Ready-mixed concrete shall be in accordance with AS 1379.

8.9.5 Cement Mortar

- (a) Cement mortar shall consist of 1 part cement and 2 parts of fine aggregate measured by volume, properly mixed with the minimum amount of water necessary to render the mix workable, except that a 1 to 4 mix may be used for bedding pipes.
- (b) Cement mortar shall not be used which has been mixed more than one hour.

9.0 INSTALLATION OF PIPEWORK, MISCELLANEOUS MATERIALS AND JOINTING

9.1 NOMINAL SIZE OF PIPEWORK

Where a nominal size of pipework is stated in these by-laws, an equivalent size in accordance with Table 9.1 shall be acceptable.

TABLE 9.1 ACCEPTABLE EQUIVALENT NOMINAL SIZES

Specified size mm	Acceptable Equivalent Nominal Size—mm						
	Taps	Gate Valves	Copper Pipe- work	S. Steel Pipe- work	GS Pipe- work	PE Pipe- work	UPVC Pipe- work
15	15	15	15	15	15	10	8
20	20	20	20	20	20	20	15
25	25	25	25	25	25	25	20
32	32	32	32	32	32	32	25
40	40	40	40	40	40	40	32
50	50	50	50	50	50	50	50

9.2 MINIMUM COVER OVER PIPEWORK BELOW GROUND

Water supply pipework laid below ground shall have a minimum cover of 300 mm. Where pipelines are laid in areas subject to vehicular traffic special protection, such as a greater depth of cover may be necessary.

9.3 LAYING OF WATER SUPPLY PIPEWORK IN SAME TRENCH AS PROPERTY SEWER

[By-law 9.3 amended in Gazette 24 December 1982 p. 4926.]

9.3.1 Where practicable, underground water supply pipework shall not be installed in the same trench as property sewers.

[By-law 9.3.1 amended in Gazette 24 December 1982 p. 4926.]

9.3.2 Where underground water supply pipework is to be installed in the same trench excavations as property sewers, such installation shall comply with the following:

- (a) The water supply pipes shall be located on a shelf or ledge excavated at one side of the trench, and be not less than 50 mm from the vertical continuation of the trench, and
- (b) The height of the shelf or ledge shall be not less than 100 mm above the line of sockets of the property sewers located in the trench.

[By-law 9.3.2 amended in Gazette 24 December 1982 p. 4926.]

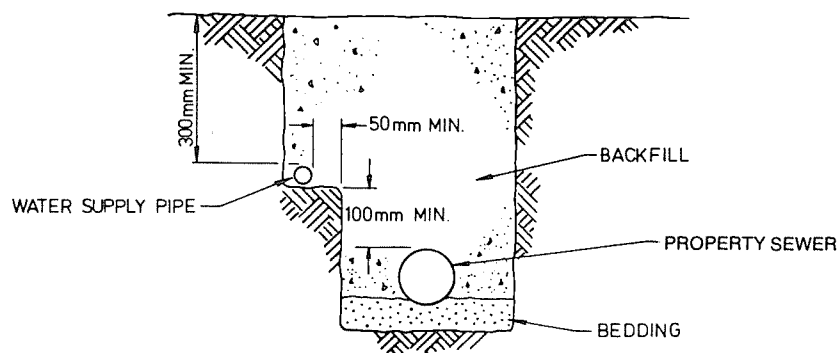
9.4 ANCHORING OF WATER SUPPLY PIPEWORK BELOW GROUND

For water supply pipework with flexible or lead caulked joints laid below ground adequate measures shall be taken to prevent movement of the pipework due to water pressure effects.

9.4.1 Location of Thrust Blocks

Thrust blocks shall be installed in the following locations:

- (a) At all bends or junctions.
- (b) At the termination of pipework.
- (c) At valves installed in the pipework, and
- (d) At other locations where movement will occur without thrust blocks.



**FIGURE 9.1 LAYING OF WATER SUPPLY PIPEWORK
IN SAME TRENCH AS PROPERTY SEWER**

[Figure amended in Gazette 24 December 1982 p. 4926.]

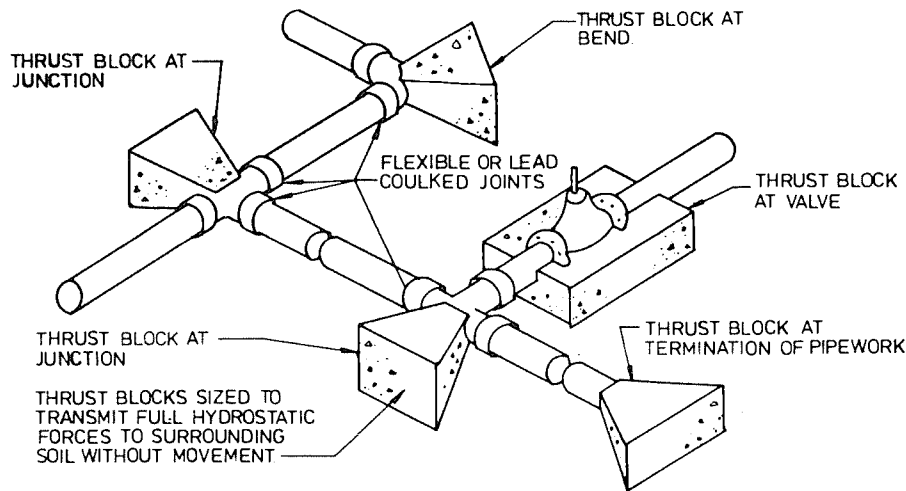


FIGURE 9.2 LOCATION OF THRUST BLOCKS

9.4.2 Construction of Thrust Blocks

- (a) Thrust blocks shall be constructed of concrete with one side bearing against a firm vertical face of the excavation.
- (b) In no case shall any thrust block be installed in such a way that thrust or pressure is transmitted to any other service pipework.
- (c) Thrust blocks shall be of such a size that the full hydrostatic forces in the pipework are transmitted to the surrounding soil without the maximum bearing pressures of the soil and pipework material being exceeded.

9.5 FIXING OF WATER SUPPLY PIPEWORK ABOVE GROUND

9.5.1 Brackets and Clips

- (a) Brackets and clips shall be formed of mild steel or other approved material, and shall be provided with a shank or other suitable means of attachment to the structure.
- (b) Brackets and clips shall be designed to withstand the applied loads.
- (c) Brackets and clips which are exposed to corrosive conditions shall be rendered corrosion resistant by an approved treatment process.
- (d) Brackets and clips used to support pipework of copper, copper alloy, polyethylene, stainless steel or UPVC shall be of like material or shall be lined or coated with PVC or other approved non-abrasive and inert material for the section in contact with the pipework.
- (e) Except where thermal movement is anticipated, all fasteners when tightened shall clamp the pipe securely to prevent movement.
- (f) Brackets and clips shall be securely fixed to timber by screwed fasteners and to brickwork or concrete:
 - (i) by drilling and bolting through;
 - (ii) by drilling and caulking with lead (wooden plugs are not permitted);
 - (iii) by securing with a screwed or bolted masonry anchor;

(iv) by percussive fasteners used in accordance with the relevant regulations;
or

(v) by other approved means.

9.5.2 Spacing of Brackets and Clips

- (a) Water supply pipes shall be securely supported and fixed at intervals not exceeding those shown in Table 9.2.

TABLE 9.2 SPACING OF BRACKETS AND CLIPS

Maximum Spacing of Brackets and Clips—m						
Nominal Pipe Size—mm	Copper and Stainless Steel Tube	Galvanized Steel and Cast Iron Pipes	UPVC Pipes (See Note 1)		Polyethylene Pipes (See Note 2)	
			Horizontal or Graded Pipes	Vertical Pipes	Horizontal or Graded Pipes	Vertical Pipes
8	1.0	—	0.50	1.00	—	—
10	1.5	—	0.50	1.00	0.25	0.50
15	1.5	2.0	0.60	1.20	0.30	0.60
18	1.5	—	—	—	—	—
20	1.5	2.0	0.70	1.40	0.35	0.70
25	2.0	2.0	0.75	1.50	0.38	0.75
32	2.5	2.5	0.85	1.70	0.43	0.85
40	2.5	2.5	0.90	1.80	0.45	0.90
50	3.0	3.0	1.05	2.10	0.50	1.00
65	3.0	3.0	1.20	2.40	0.60	1.20
80	4.0	4.0	1.35	2.70	0.67	1.35
100	4.0	4.0	1.50	3.00	0.75	1.50
125	4.0	4.0	1.70	3.40	0.85	1.70
150	4.0	4.0	2.00	4.00	1.00	2.00
175	—	—	2.20	4.40	1.10	2.20
200	—	—	2.30	4.60	1.15	2.30
225	—	—	2.50	5.00	1.25	2.50
250	—	—	2.60	5.20	1.30	2.60
300	—	—	3.00	6.00	1.50	3.00

NOTES:

1. Extracted from Australian Standard CA67-1972
2. For polyethylene pipes where the ambient temperatures or the temperature of piped fluids are such that the temperature of the pipework becomes greater than 20 degrees C the support distances should be reduced.

(b) Valves 80 mm and above shall be independently supported.

(c) For water supply pipework with flexible or lead caulked joints additional brackets and clips located in accordance with By-law 9.4.1 may be required to prevent movement of the pipework due to water pressure effects.

[By-law 9.5.2 amended in Gazette 24 December 1982 p. 4926.]

9.6 STANDPIPES

- (a) All standpipes connected to water supply systems shall be securely supported by fixing to walls of buildings or other suitable means. Standpipes shall not be fixed to timber fences.
- (b) Standpipe draw off taps shall be at a height of not less than 450 mm measured above ground level or the gully top as applicable.
- (c) Standpipes shall not be connected between the water main connection and the lower outlet bend of the water meter assembly, nor within one metre of the meter.

9.7 ELECTRICAL CABLES OR CONDUITS

Water supply pipework shall not be installed in contact with any electrical cable or conduits.

9.8 ENCASING WATER SUPPLY SERVICES IN CONCRETE STRUCTURES

Where water supply pipes are to be encased in structural concrete they shall be Type A or B copper pipe or an approved grade of stainless steel tube, and shall be in accordance with the following:

- (a) Approval for the installation shall be obtained from the appropriate Building Authority.
- (b) The pipework shall not pass through concrete expansion or contraction joints.
- (c) There shall be not less than 40 mm of concrete cover around the pipework; and
- (d) The pipework shall be laid in continuous lengths without joints or fittings except where such joints or fittings are located within access ports of sufficient size to permit maintenance.

9.9 PIPE PROTECTION DURING INSTALLATION

At points where fittings such as screwed bib or stop-taps are to be installed, provision shall be made to secure the water supply pipework so as to avoid deformation or other damage when the fittings are installed.

9.10 JOINTING OF PIPEWORK

9.10.1 Bronze Welded Joints

- (a) Bronze welding filler rods shall be in accordance with AS 1588, and shall contain not less than 57 per cent copper.
- (b) Joints for bronze welding shall be formed by belling, or other means used for fusion welded joints, so as to permit the satisfactory deposition of weld material.

9.10.2 Bolted Gland Joints

The use of bolted gland joints below ground is prohibited except in those areas where approved by the Board.

9.10.3 Lead Caulked Joints

Lead used for jointing shall be commercially pure lead.

9.10.4 Rubber Ring Joints

Rubber rings used for jointing shall comply with AS 1646 and the relevant pipe and fittings Standard, and be of the dimensions, composition and hardness approved for the particular application.

9.10.5 Screwed Joints

- (a) All tube threads shall be in accordance with AS 1722.
- (b) All fitting threads shall be in accordance with the appropriate Australian Standard for the fitting.
- (c) Where a sealing thread and a fastening thread are joined a seal shall be formed by using polytetrafluoroethylene (PTFE) tape, hemp or pipe jointing compound on metal threads, and only PTFE tape on UPVC threads.
- (d) Where 2 fastening threads are joined a seal shall be formed as in By-law 9.10.5(c) above or where applicable by an appropriate gasket or grummet.
- (e) After jointing, exposed areas of galvanized steel tubes from which the galvanizing has been removed shall be coated with a rust inhibiting paint.

[By-law 9.10.5 amended in Gazette 24 December 1982 p. 4926.]

9.10.6 Silver Brazed Joints

- (a) Silver brazing alloys shall contain not less than 1.8 per cent silver and shall comply with AS 1167, Tables 1 or 2, for jointing only copper or copper alloy.
- (b) Silver brazing alloys for stainless steel applications shall be in accordance with By-law 8.6.5.2(a).

[By-law 9.10.6 amended in Gazette 24 December 1982 p. 4926.]

9.10.7 Soft Soldered Joints

Soft solder shall be nominally one part of lead to one part of tin, and shall comply with AS H1.

9.10.8 Solvent Joints

- (a) Solvent cement shall comply with AS A185, types P1 or P2.
- (b) Solvent jointing practice shall be in accordance with AS CA67 and joints shall be left for 24 hours before the water pressure is applied.

9.10.9 Other Joints

Joints other than those specified herein shall not be used except when approved and under such conditions as may be specified by the Board.

9.11 CONNECTING PILLAR TAPS OR COMBINATION TAP ASSEMBLIES

Every pillar tap or combination tap assembly installed in any fixture shall be connected to the water supply pipework by a union that is easily disconnected.

9.12 MIXER VALVES

Mixer valves shall be of a type suitable for the hot and cold water pressures of the installation.

10.0 CROSS CONNECTIONS AND BACKFLOW PREVENTION

(Implementation of Part 10 requires special Board approval)

10.1 DEFINITIONS

10.1.1 Backflow

is the unwanted reversal of flow of liquids in piping.

10.1.2 Back-Pressure

occurs when the pressure within a container, receptacle or pipework system is higher than the pressure within the water service pipework. Back-pressure may be caused by either a pressure increase within a container or receptacle, generated by an external energy source, or a drop of supply pressure within the service pipework.

10.1.3 Back-Siphonage

occurs when the pressure within the water service pipework falls below atmospheric pressure.

10.1.4 Contaminants

are any substances which are not to be present within a potable water supply. For the purposes of this Code contaminants are classified into 3 degrees of hazard:

- (a) Bacteriological—when any substance is present that contains bacteria which might be detrimental to health if consumed.
- (b) Toxic—when any substance of a chemical nature is present which might be detrimental to health if consumed.
- (c) Non-toxic—when any substance is present which would not normally have any detrimental physical effects if consumed.

10.1.5 Cross Connection

is any actual or potential connection between a potable water service and a source of contamination or pollution. Cross connections are generally one of 2 types:

- (a) Inlet type in which the potable water supply pipework extends above the spill level of the receptacle, or in the case of garden sprinkler systems and the like above the water supply outlets which might constitute the cross connection. With these types of cross connections backflow can only occur due to back-siphonage.
- (b) Direct or pressure type in which the potable water supply pipework is at or below the spill level of the receptacle or water supply outlets which might constitute the cross connection, or where the water service may become pressurized by a malfunction in a boiler or pump installation and such like. With these types of cross connections backflow may occur due to back-siphonage or back-pressure.

TABLE 10.1 TYPICAL CONTAMINANT HAZARDS

NOTE: The contaminant hazards shown in the Table are for guide purposes only, the final decision with respect to the actual hazard will rest with the Authority.

Installation	Contaminant Hazard
Pumps, tanks, pipework and fixtures connected to a sewerage system, including flush valves	Bacteriological
Fire services;	
(a) with fire brigade pump connections	Non-toxic
(b) storage tanks	Non-toxic
(c) treated for scale, or algae formation or containing anti-freeze	Toxic
(d) with black iron pipes	Non-toxic
Garden and agricultural watering systems;	
(a) with water outlets less than 150 mm above ground level	Non-toxic
(b) with fertilizer or insecticide, etc. injection	Toxic
Steam Boiler;	
(a) with rust and scale inhibitors	Toxic
(b) without rust and scale inhibitors	Non-toxic
Drink dispensing equipment, beverage vending machines, soda fountains, etc.	Non-toxic
Potable water treatment equipment, filters, water softeners, chlorinators, etc.	Non-toxic
Central heating systems with pipework not complying with Part 14	Non-toxic
Commercial and manufacturing installations;	
(a) car wash installation	Toxic
(b) coils and jackets in heat exchangers	Toxic
(c) tanks, vats and vessels used for plating, degreasing, descaling, stripping, pickling, clipping, etc.	Toxic
(d) tanks, vats and vessels used for the preparation or storage of food	Non-toxic.

10.2 QUALITY OF WATER SUPPLY

Only potable water shall be accessible to plumbing fixtures supplying water for drinking, bathing, culinary use or the processing of food, medical or pharmaceutical products. The water service downstream of a backflow prevention device shall be considered to be non-potable water.

10.3 GENERAL

Potable water supply systems shall be designed, installed and maintained in such manner as to prevent non-potable liquids, solids or gases from being introduced into the potable water supply through cross connections or any other piping connections to the systems. Backflow prevention devices shall be selected in accordance with Table 10.2 on the basis of hazard generated by the potential contaminant and the installation requirements.

TABLE 10.2 PERMISSIBLE METHODS OF BACKFLOW PREVENTION

Type of Back-flow Prevention Device	Contaminant Hazard permissible method of backflow prevention—"p"					
	Bacteriological		Toxic		Non-Toxic	
	System Subject to Back Pressure	System Subject to Back Siphonage	System Subject to Back Pressure	System Subject to Back Siphonage	System Subject to Back Pressure	System Subject to Back Siphonage
Air gap (By-law 10.4)	p	p	p	p	p	p
Reduced pressure zone device (By-law 10.5)	—	—	p	p	p	p
Double check valve (By-law 10.6)	—	—	—	—	p	p
PressureType vacuum breaker (By-law 10.7)	—	—	—	p	—	p
Atmospheric vacuum breaker (By-law 10.8)	—	—	—	p*	—	p
Barometric loop (By-law 10.9)	—	—	—	p	—	p

*Not to be used for permanent connections in continuous use.

10.4 AIR GAP

The minimum air gap shall be as set out in Table 10.3.

TABLE 10.3 MINIMUM AIR GAP

Effective size of Water Supply Inlet	Minimum Air Gap
Not more than 10 mm	20 mm
Not more than 15 mm	40 mm
Not more than 20 mm	60 mm
Above 20 mm	3 times the effective size of the water supply inlet up to 150 mm

10.5 REDUCED PRESSURE ZONE DEVICE

- (a) Reduced pressure zone device backflow prevention assemblies shall be of approved fittings for the particular application, and shall incorporate the following:
 - (i) 2 independently acting spring loaded check valves;
 - (ii) a vented and drained spring loaded pressure differential relief valve located between the check valves;
 - (iii) provision for testing the installation against malfunction; and
 - (iv) isolating valves, installed upstream of the first check valve and downstream of the second check valve;
 - (v) a line strainer installed upstream of the upstream isolating valve required in By-law 10.5(a)(iv).
- (b) After installation and before being put into service, reduced pressure zone device backflow prevention assemblies shall be inspected and tested in accordance with the requirements of the Authority, and thereafter at no more than yearly intervals.
- (c) Reduced pressure zone device backflow prevention assemblies shall be installed such that:
 - (i) ready access is provided for inspection and servicing;
 - (ii) the assembly is protected from freezing;
 - (iii) the relief valve vent is given free ventilation to the atmosphere at all times; and
 - (iv) the relief valve drain discharges through an air gap, and does not cause damage or nuisance.

[By-law 10.5 amended in Gazette 24 December 1982 p. 4926.]

10.6 DOUBLE CHECK VALVES

- (a) Double check valve backflow prevention assemblies shall be of approved fitting for the particular application, and shall incorporate the following:
 - (i) 2 independently acting spring loaded check valves;
 - (ii) provision for testing the installation against malfunction; and
 - (iii) isolating valves, installed upstream of the first check valve and downstream of the second check valve;
 - (iv) a line strainer installed upstream of the upstream isolating valve required in By-law 10.6(a)(iii).
- (b) After installation and before being put into service, double check valve backflow prevention assemblies shall be inspected and tested in accordance with the requirements of the Authority, and thereafter at no more than yearly intervals.
- (c) Double check valve backflow prevention assemblies shall be installed such that:
 - (i) ready access is provided for inspection and servicing; and
 - (ii) the assembly is protected from freezing.

[By-law 10.6 amended in Gazette 24 December 1982 p.4926.]

10.7 PRESSURE TYPE VACUUM BREAKER

- (a) Pressure type vacuum breaker backflow prevention assemblies shall be of approved fittings for the particular application and shall incorporate the following:
 - (i) a positive acting spring loaded ventilating valve;
 - (ii) at least one positive acting spring loaded check valve;
 - (iii) provision for testing the installation against malfunction; and
 - (iv) isolating valves installed immediately upstream and downstream of the vacuum breaker fitting.
- (b) After installation and before being put into service, pressure type vacuum breaker backflow prevention assemblies shall be inspected and tested in accordance with the requirements of the Authority, and thereafter at no more than yearly intervals.
- (c) Pressure type vacuum breaker backflow prevention assemblies are only effective against back siphonage and shall be installed such that:
 - (i) ready access is provided for inspection and servicing;
 - (ii) the level of the vacuum breaker shall be not less than 300 mm above the spill levels of all receptacles, storage tanks, fixtures, etc. served or above all water supply outlets served; and
 - (iii) the vacuum breaker vent is given free ventilation to the atmosphere at all times.

10.8 ATMOSPHERIC VACUUM BREAKER

Atmospheric vacuum breaker backflow prevention devices shall be approved fittings for prevention of back siphonage and shall be installed such that:

- (a) ready access is provided for inspection and servicing;
- (b) the level of the vacuum breaker shall be not less than 300 mm above the spill levels of all receptacles, storage tanks, fixtures, etc. served or above all water supply outlets served;
- (c) no valves are installed in the water service pipework downstream of the vacuum breaker;
- (d) the vacuum breaker does not under normal operation remain continuously pressurized with water for more than 12 hours, and
- (e) the vacuum breaker vent is given free ventilation to the atmosphere at all times.

10.9 BAROMETRIC LOOP

- (a) Barometric loops may be used only where approved.
- (b) A barometric loop shall be formed by looping the water supply pipework a minimum of 11 m above the spill levels of all receptacles, storage tanks and fixtures served or above all water supply outlets served.
- (c) A suitably designed air-water separator shall be installed at the base of the downstream leg of the loop. The air-water separator shall be vented through a minimum 15 mm pipe to the top of the downstream leg.

10.10 IDENTIFICATION OF POTABLE AND NON-POTABLE WATER

Where dual water distribution systems are installed, one with potable water and the other with non-potable water, each system shall be identified by colour marking, metal tags or other approved method.

10.11 PROTECTION OF PUBLIC WATER SUPPLY

In commercial and industrial situations the Authority may require the installation of a backflow prevention device on the property water supply system, located adjacent to the meter.

11.0 STORAGE TANKS FOR COLD WATER

11.1 DEFINITION

A storage tank is any vessel used or intended to be used for the storage of water whether under pressure or not, and not being a hot water system, or flushing cistern in accordance with AS 1218.

11.2 STORAGE TANKS REQUIRED

Where specified in this by-law, elsewhere in these By-laws or by the Board water shall be supplied from storage tanks.

11.2.1 Multi-Storey Buildings

Except where the Board has approved the use of a booster pump to maintain a direct supply of water to the upper storeys of a building, every water outlet installed at a height of 15 m or more above ground level, or such other height as the Board may specify, shall be supplied from a storage tank.

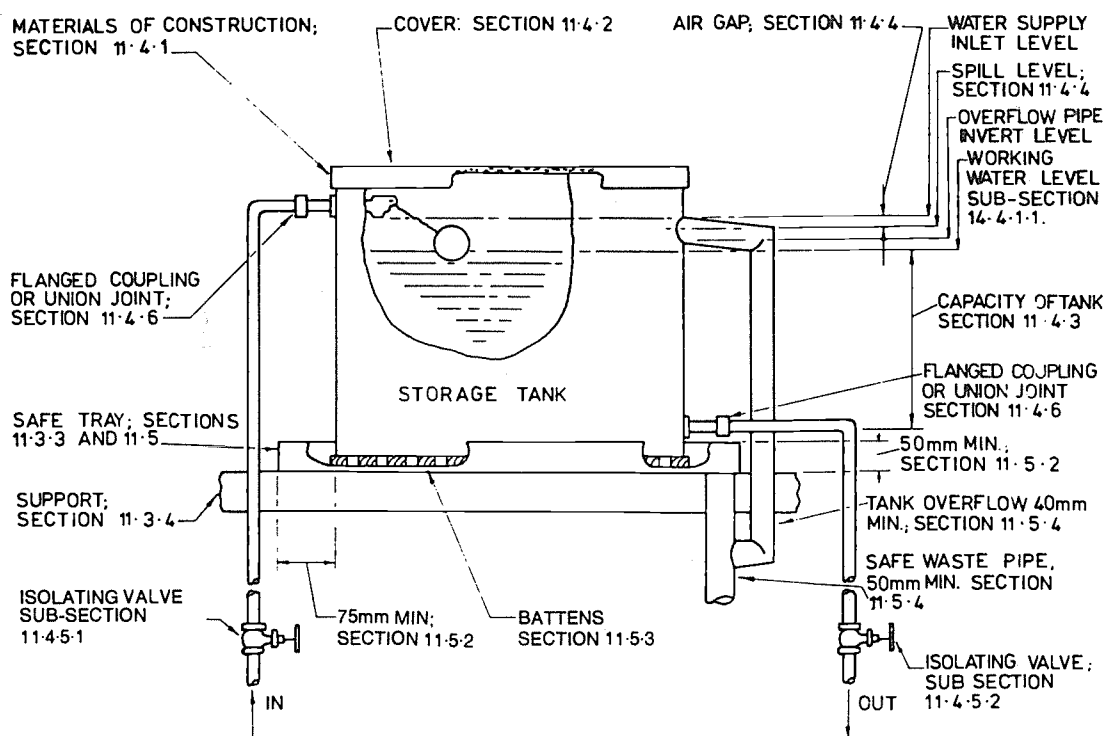


FIGURE 11.1 COLD WATER STORAGE TANK

11.2.2 Flush Valves

All flush valves shall be supplied with water from a storage tank, serving the flush valves only.

11.2.3 Hot Water Systems

Hot Water systems shall be supplied with water from a storage tank except that a storage tank is not required when:

- (a) The hot water system is a mains pressure type;
- (b) The hot water system has a feed tank as an integral part of the heater;
- (c) The hot water system is supplied with water through a pressure reducing or pressure ratio valve; or
- (d) The hot water system is a free-outlet water heater.

11.3 INSTALLATION OF STORAGE TANK

11.3.1 Flush Valves

The head of water supplying any flush-valve shall not be less than 3 m measured vertically from the outlet of the storage tank, nor more than 30 m measured vertically from the highest working water level of the storage tank.

11.3.2 Hot Water Systems

The head of water supplying hot water systems shall not be less than 1 m measured vertically from the outlet of the storage tank to the highest hot water delivery point, nor more than the height equivalent of the maximum pressure rating for the heater measured vertically from the spill level of the storage tank to the base of the water heater.

11.3.3 Safe Tray

Storage tanks installed between the roof and ceiling of any building shall be provided with safe trays fitted with a suitably constructed safe-waste pipe.

11.3.4 Support

All storage tanks and safe trays shall be adequately supported.

11.4 FORM OF STORAGE TANKS

11.4.1 Materials

Storage tanks shall be constructed of copper, copper alloy, cast iron, galvanized steel, stainless steel or other approved material.

11.4.1.1 Galvanized Steel Sheet Storage Tanks

Galvanized steel sheet storage tanks within any building shall not exceed 2 500 litres.

11.4.2 Cover

Each storage tank shall be provided with an approved cover.

11.4.3 Capacity

11.4.3.1 Flush Valves

The capacity of storage tanks for flushing purposes shall be in accordance with the "Australian Model Plumbing Code—Sanitary Drainage".

11.4.4 Overflow

- (a) Each storage tank shall be provided with an overflow so constructed that with the water supply inlet discharging at its maximum flow with water pressure of 70 m head and with all service outlets closed, an air gap of not less than those shown in Table 11.1 shall be maintained between the spill level and the inlet of the water supply.
- (b) The minimum size of the overflow shall be 40 mm.
- (c) The overflow shall discharge;
 - (i) into the safe tray of the storage tank such that there will be no splashing of water outside the tray,
 - (ii) into the waste from the safe-tray,
 - (iii) to atmosphere, clear of doors, windows or other openings, where it is readily visible and shall not cause any damage or nuisance, or
 - (iv) to an approved internal drainage point where it is readily visible.

TABLE 11.1 AIR GAP REQUIRED BETWEEN SPILL LEVEL
AND WATER SUPPLY INLET

Effective Opening of Water Supply Inlet	Minimum Air Gap Between Spill Level and Water Supply Inlet
Not more than 10 mm	20 mm
Not more than 15 mm	40 mm
Not more than 20 mm	60 mm
Above 20 mm	3 times the diameter of the effective opening up to 150 mm.

11.4.5 Control Valves

11.4.5.1 Water Supply Inlet

Water supply to the storage tank shall be controlled by an isolating valve located in a position accessible from ground or floor level and by a float control valve, or be controlled by other approved means.

11.4.5.2 Service Outlets

All storage tanks in excess of 50 litres capacity shall be fitted with a full way type isolating valve on each service outlet.

11.4.6 Pipework

- (a) The material size and configuration of pipework supplying water to fixtures and fittings shall be in accordance with the requirements specified elsewhere in these by-laws.
- (b) Inlet and outlet pipework shall be connected to storage tanks using compression, union or flanged joints.

11.5 SAFE TRAY

11.5.1 Material

Safe trays shall be constructed of copper, copper alloy, galvanized steel sheet or other approved materials.

11.5.2 Construction

Safe trays shall be not less than 50 mm in depth and shall extend at least 75 mm beyond the base of the storage tank. All joints shall be made watertight by welding, brazing, soft soldering or other approved means. Soft soldered joints shall not depend on the solder for mechanical strength.

11.5.3 Placement of Storage Tank on Safe Tray

Storage tanks shall be supported in safe trays on evenly spread battens. The battens shall:

- (a) Be of sufficient thickness to allow the outlet pipe to clear the sides of the safe tray but not less than 12 mm nominal thickness;
- (b) Support not less than one-half of the base of the storage tank, with a spacing of not less than 12 mm between battens; and,
- (c) Have a clearance of not less than 20 mm between battens and sides of the safe tray.

11.5.4 Safe-Waste Pipe

Each safe tray shall be provided with a safe-waste pipe of not less than 50 mm to discharge to the outside atmosphere, clear of doors, windows or other openings or to an approved internal drainage point. The discharge shall be readily visible, and not cause any damage or nuisance.

12.0 JOINT WATER SUPPLY SYSTEM

12.1 DEFINITION "JOINT WATER SUPPLY SYSTEM"

12.1.1 A "joint water service" is any privately owned water supply pipe which services 2 or more dwelling units.

12.1.2 Each dwelling or common facility shall be serviced by a separate branch from a joint water service.

12.2 JOINT WATER SUPPLY SYSTEM ISOLATING VALVE

An isolating valve shall be installed in all joint water supply systems in an accessible position close to the property alignment, and such that all branch connections to the joint system can be isolated from the watermain.

12.3 DWELLING UNIT ISOLATING VALVE

An isolating valve shall be installed in each separate dwelling unit service branch from the joint system in an accessible position and such that the dwelling unit supply can be isolated without affecting the water supply to other dwellings units or to common facilities.

12.4 COMMON FACILITIES ISOLATING VALVE

An isolating valve shall be installed in each water supply branch from the joint service which services common garden areas or common laundry facilities etc., such that the common facilities supply can be isolated without affecting the water supply to the separate dwelling units.

12.5 PROVISION FOR METERING

Where required by the Board provision shall be made for the installation of meters on the branch supply lines to individual dwelling units and common facilities.

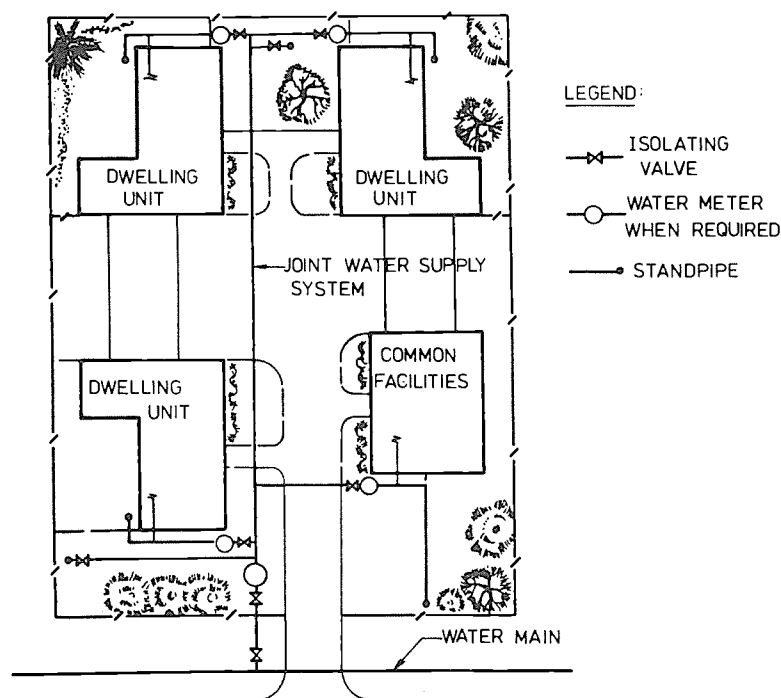


FIGURE 12-1 JOINT WATER SUPPLY SYSTEM

13.0 FIRE SERVICES

13.1 FIRE HYDRANT AND FIRE HOSE REEL INSTALLATIONS

13.1.1 General

Fire hydrant installations within properties shall comply with the requirements set out in this By-law and shall also comply with the relevant material and installation practices for domestic water services.

13.1.2 Materials

Materials shall be as for domestic water supply installations except:

- (a) Subject to compliance with Part 10, black iron pipe may be used above ground and within buildings; and
- (b) Provided they service fire services only, galvanized iron may be concealed in buildings.

13.1.3 Identification of Pipework

Where required by a relevant Statutory Authority pipework shall be painted and maintained at all times with a distinguishing coating of bright red paint or other distinguishing marking.

13.1.4 Fire Hose Connection Points

- (a) A controlling valve shall be installed adjacent to each fire hose reel connection.
- (b) All fire hose reel and hydrant connection points shall be fixed above ground surface level.
- (c) All fire hose reels shall be connected to a metered supply unless otherwise approved.

13.1.5 Fire Brigade Pump Connection

- (a) Pump connection fittings for the use of the Fire Brigade may be installed on the fire hydrant service in a location approved by that Authority.
- (b) Before connecting to the fire hydrant service the pump connection assembly shall include a check valve followed by a gate valve.

13.1.6 Installation Requirements

- (a) All make-up water supply requirements to storage tanks serving fire hydrant installations shall be from a metered service.
- (b) Means for the prevention of backflow for installations with fire brigade pump connections and storage tanks shall be in accordance with Part 10.

13.2 FIRE SPRINKLER INSTALLATIONS

13.2.1 General

Fire sprinkler systems within properties shall comply with the requirements set out in this Part and, with the exception of that part of the installation beyond the main sprinkler control valve shall also comply with the relevant material and installation practices for domestic water services.

13.2.2 Identification of Pipework

Where required by a relevant Statutory Authority pipework and fittings shall be painted and maintained at all times with distinguishing coating of bright red paint or other distinguishing marking.

13.2.3 Installation Requirements

- (a) All make-up water supply requirements to storage tanks serving fire sprinkler installations shall be from a metered service.
- (b) Means for the prevention of backflow for installations with storage tanks shall be in accordance with Part 10.

14.0 DOMESTIC HOT WATER SYSTEMS

14.1 GENERAL

14.1.1 Scope

This Part sets out the rules for the installation of hot water supply systems in household premises and in commercial and industrial installations comparable with household installations regardless of the source of energy.

14.1.2 Charging of Hot Water Systems

Hot water systems shall be charged with water before the heating medium is connected to the heater.

14.2 INSTALLATION OF HEATER

14.2.1 General

Water heaters or hot water containers shall be installed in such a manner that the maximum rated working pressure is not exceeded.

14.2.2 Accessibility of Markings

The water heater shall be so placed that markings and instructions are readily visible.

14.2.3 Access for Maintenance

- (a) The water heater shall be placed in such a position as to give unobstructed access to all water service and pressure temperature relief fittings and controls.
- (b) Where the cylinder for a solar water heater of the mains pressure or reduced pressure type is located in an elevated position, the easing gear of the temperature pressure relief valve or temperature relief valve shall be fitted with an approved resistant mechanism which enables the easing gear to be operated from ground level.

14.2.4 Safe Tray

14.2.4.1 Safe Tray to be Provided

- (a) Storage water heaters installed in a roof space or concealed by other than hinged or sliding doors shall be on a safe tray complying with By-law 14.2.4.2.
- (b) A water heater installed in any other position need not be placed on a safe tray unless required by the Board.

[By-law 14.2.4.1 amended in Gazette 24 December 1982 p. 4926.]

14.2.4.2 Construction

- (a) The safe tray shall be constructed of material not inferior, under the condition of use, to 0.60 mm commercial grade galvanized steel sheet to AS 1397.
- (b) The safe tray shall be turned up for a distance of not less than 50 mm, and all joints shall be made watertight and welded, brazed or soft soldered. Soft soldered joints shall not depend on the solder for mechanical strength.
- (c) The safe tray shall be of such dimensions that it will, with any attached auxiliary or component parts of the water heater, meet the requirements of By-law 14.2.4.3.

- (d) The safe tray shall be fitted with a safe-waste which shall effectively drain the safe tray and be not inferior, under the conditions of use, to pipe constructed from 0.50 mm commercial grade galvanized steel sheet to AS 1397. The safe-waste shall:
- (i) have an internal diameter of not less than 50 mm;
 - (ii) have a continuous fall to its discharge point;
 - (iii) have all seams uppermost;
 - (iv) have all circumferential joints in sheet metal pipe lapped in the direction of the flow;
 - (v) have all circumferential joints securely sweated with solder or made watertight in a manner appropriate to the material used;
 - (vi) have support in the vicinity of the heater and at intervals not exceeding 2 mm;
 - (vii) discharge to the outside atmosphere, clear of doors, windows or other opening, and the discharge shall be readily visible, and not cause any damage or nuisance;
 - (viii) discharge on the owner's property unless the Statutory Authority permits otherwise; and
 - (ix) not discharge on to a roof surface or gutter or into a downpipe except where the safe-waste outlet is readily visible.

[By-law 14.2.4.2 amended in Gazette 24 December 1982 p. 4926.]

14.2.4.3 Placement of Heater on Safe tray

The water heater shall be placed on the safe tray in accordance with the following requirements:

- (a) No portion of an attached cold water feed tank shall be closer than 75 mm to a vertical line from the edge of the safe tray and no portion of the heater or other attached auxiliary part shall be closer than 25 mm to such vertical.
- (b) Where required by the Board the water heater and the safe tray shall be supported as in By-law 11.5.3.

[By-law 14.2.4.3 amended in Gazette 24 December 1982 p. 4926.]

14.3 PRESSURE RELIEF AND VENTING OF WATER HEATER

14.3.1 Vent or Relief Valve to be Provided

Every water heater shall:

- (a) have a free and unobstructed vent, complying with Section 14.3.2, open to atmosphere at all times; or
- (b) be fitted with a pressure-relief valve complying with Section 14.3.3, except that temperature instantaneous water heater in which the water is heated as it passes through a tube, and which incorporates a suitable thermally operated pressure-relief device, such as a fusible plug, need not be provided with any other form of pressure relief unless required by the Board.
- (c) in the case of unvented pressure water heaters of the storage type, be fitted with a vacuum relief valve.
- (d) be fitted with any additional pressure protective device(s) required by the Board or specified by the manufacturer for the particular type of hot water system.

14.3.2 Vent or Exhaust Pipe

- (a) All vent or exhaust pipes connected to storage water heater shall be of copper, copper alloy, stainless steel or other approved material. The installation of the pipe shall be in accordance with the following requirements:
 - (i) The pipe shall extend on a rising grade from the highest point of the container without restriction or sharp change in direction other than permitted in (iv) below. No tap or valve shall be fitted in the vent line between the heater and the vent outlet.
 - (ii) The pipe shall be as short as practicable.
 - (iii) The pipe shall extend on a rising grade to a height not less than 80 mm above the water level in the cold water feed tank for every 1 m between the overflow water level in the cold water feed tank and the base of the heater, or
 - (iv) The pipe shall be turned downward, pass through the lid and terminate above the level of the ball-float, or it shall be taken outside the building to the outer air. It shall be suitably bent and supported or stayed where it projects more than 1 m above the roof.
 - (v) Where the Board permits the use of a pressure-reducing valve with vent pipe relief, the pipe shall extend to a height above the valve equal to the pressure rating of the valve in metres of water plus a minimum of 1 m and a maximum of 2 m. The pipe shall extend on a rising grade, rise to a height above the bottom of the water heater not exceeding the maximum head of the water heater.
 - (vi) The pipe shall be of sufficient size to relieve the energy input but in no case less than the size recommended by the water heater manufacturer, subject to a minimum size of 15 mm nominal size.
- (b) On secondary circuits the vent pipe required at the highest point of the hot water piping shall also be accepted as providing the pressure relief for the container, provided it meets the conditions set out above.

14.3.3 Pressure and Temperature Relief Valves

- (a) Each storage type unvented water heater shall be provided with a temperature and pressure or combination temperature-pressure relief valve in accordance with AS 1357.
- (b) The temperature and pressure or combination temperature-pressure relief valve shall:
 - (i) be installed at or near the top of the heater in accordance with AS C142;
 - (ii) have no valve or other restriction placed between the heater and the relief valve;
 - (iii) be fitted as to permit ready replacement; and
 - (iv) be protected from freezing.

14.3.4 Pressure and Temperature Relief Valve Drain Pipes

14.3.4.1 Size and Material

- (a) The relief valve drain pipe shall be of copper, copper alloy, stainless steel or other approved material and of the size recommended by the manufacturer, but not less than that specified in Table 14.1.
- (b) The relief valve drain pipe with 3 or fewer bends shall not exceed 9 m in length. For each additional bend the maximum drain pipe length shall be reduced by 600 mm. All bends shall be formed with a centre line radius of not less than 5 times the diameter of the drain.

14.3.4.2 Installation

The installation of the relief drain pipe shall be in accordance with the following requirements:

- (a) No tap, valve, or other restriction shall be placed in the relief drain pipe;
- (b) The relief drain pipe shall be installed in such a manner as will ensure drainage of both valve and piping and shall fall continuously to its outlet;
- (c) The relief drain pipe shall be installed in such a manner that will prevent blockage due to freezing, and it shall discharge inside or outside the building such that when flow occurs, it may be readily observed but will minimize risk of injury or damage from steam or hot water. The relief drain pipe shall not discharge in any way to cause a nuisance;
- (d) If discharging outside the building the relief drain pipe shall have the point of final discharge not lower than 300 mm and not more than 600 mm above the ground, except that when it discharges into a rainwater downpipe, drain grating or similar conduit, it shall have a free fall of at least 75 mm between the overflow of the downpipe or grating. The relief drain pipe shall not discharge into a common conduit except through an air break which shall be visible and have a tundish fitted to the conduit;
- (e) Unless the manufacturer specifies otherwise, in the case of unvented pressure water heaters of the storage type, the relief drain pipe shall discharge at a point or air break, not more than 600 mm below the base of the water heater; and
- (f) Drain pipes from individual pressure, temperature or combined pressure-temperature relief valves shall not be combined.

TABLE 14.1 SIZE OF PRESSURE OR TEMPERATURE
RELIEF DRAIN

NOMINAL (thread) size of valve outlet connection	Nominal size of pressure-relief or temperature-relief drain pipe
	mm
1/2	15
3/4	20
1	25
1 1/4	32
1 1/2	40

14.4 COLD WATER SUPPLY

14.4.1 Feed Tank

Any cold water feed tank which does not form an integral part of the water heater shall be constructed and installed in accordance with Part 11.

14.4.1.1 Level of Overflow

The overflow from the cold water feed tank shall be so placed that with the water in the feed tank at the marked level:

- (a) a further quantity of water not less than 1/30 of the hot water capacity of the heater can be added before overflow occurs; or
- (b) there shall be no discharge from the overflow during the initial heating of the water through 70 degrees C.

14.4.2 Cold Water Pipework

14.4.2.1 Materials and Installation

All pipework materials and installation shall be in accordance with Parts 8 and 9.

14.4.2.2 Mains Pressure Water Heaters

- (a) Every mains pressure water heater shall be connected to the cold water supply in accordance with the relevant requirements of By-law 14.4.2.4.
- (b) Where the cold water mains pressure may exceed the maximum limit stated by the manufacturer, such heaters shall be connected to the cold water mains through a pressure ratio, pressure-limiting or pressure-reducing valve, in accordance with the requirements of the Board.

[By-law 14.4.2.2 amended in Gazette 24 December 1982 p. 4926.]

14.4.2.3 All water heaters other than mains pressure water heaters shall be supplied:

- (a) from an integral cold water feed tank,
- (b) through a pressure-reducing, pressure-ratio or pressure-limiting valve,
- (c) directly from the cold water mains in the case of a free outlet water heater, or
- (d) from a cold water storage tank.

14.4.2.4 Cold Water Control—Mains Supplied

- (a) Except where otherwise approved the cold water supply to a water heater supplied directly from the mains, shall be controlled by the following devices:
 - (i) Isolating valve (located furthest from the heater);
 - (ii) Line strainer, if specified;
 - (iii) Pressure-reducing, pressure-limiting or pressure-ratio valves (where required by By-law 14.4.2.3) complying with AS 1357;
 - (iv) Non-return device complying with AS 1357;
 - (v) Expansion valve (if required by the Board in hard water areas) complying with AS 1357; and
 - (vi) Provision for draining where specified (See By-law 14.4.2.8).
- (b) Any device approved for use in a particular position (e.g. horizontal only) shall be installed in the correct position.
- (c) Water heaters with integral feed tanks shall be controlled by an isolating valve located in a position accessible from ground or floor level.
- (d) On a free-outlet water heater the inlet control valve shall be marked as a hot tap.

[By-law 14.4.2.4 amended in Gazette 24 December 1982 p. 4926.]

14.4.2.5 Cold Water Control—Tank Supplied

Every water heater supplied from a gravity cold water storage tank shall be controlled by a full way isolating valve at the inlet to the water heater.

14.4.2.6 Cold Water Feed Tank Piping

Any cold water feed piping between a feed tank which is not an integral part of the water heater and the container shall:

- (a) be of copper tube, stainless steel or other approved material;
- (b) for a displacement water heater, have a nominal diameter larger than the nominal size of the heater outlet; and
- (c) be connected to the heater inlet, by couplings or unions appropriate to the piping used, so as to facilitate disconnection.

14.4.2.7 Pressure-reducing, Pressure-limiting and Pressure-ratio Valves

- (a) Pressure-reducing, pressure-limiting or pressure-ratio valves supplying the water heater shall be fitted to the water heater in accordance with the requirements of the Board. Brass couplings or unions shall be provided to facilitate replacement of the valve.
- (b) The pipe between the valve and the container shall be of copper, copper alloy, stainless steel or other approved material and shall have a nominal size not less than that of the heater inlet.

14.4.2.8 Facilities for Drainage of Water Heater or Container

Where required by the Board provision shall be made for draining of the heater.

14.5 HOT WATER PIPEWORK

14.5.1 Hot Water Pipes

14.5.1.1 All Piping

All pipework used for the conveyance of hot water shall be of copper, copper alloy, stainless steel or other approved material in accordance with Part 8.

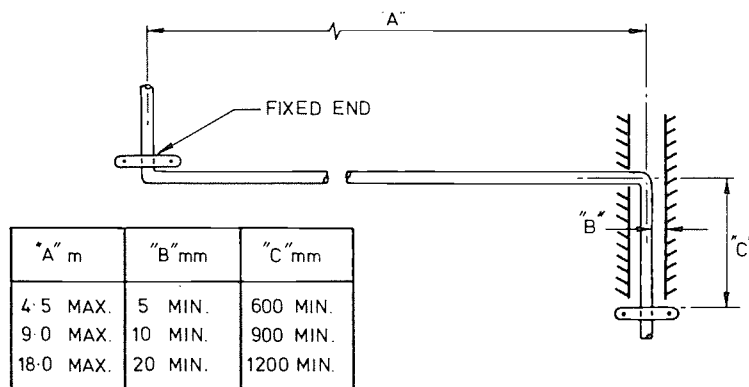
14.5.1.2 Provision for Expansion

- (a) Allowance for expansion shall be made in pipe runs by allowing freedom of movement at bends or branches.
- (b) Such freedom of movement shall provide:
 - (i) a clear space to permit movement; and
 - (ii) sufficient free length of tubing around the bend or along the branch to prevent overstressing the tube.
- (c) For lengths of tubing in excess of 18 m, expansion loops, offsets or bellows shall be used, and shall be located as close as possible to the midpoint of the tubing.

14.5.2 Venting of Secondary Circuit

Except for mains pressure installations, the secondary circuit shall be vented at the highest point of the rise in the main flow piping by a vertical pipe complying with the general requirements of By-law 14.3.2.

[By-law 14.5.2 amended in Gazette 24 December 1982 p. 4926.]



**FIGURE 14.1 PROVISION FOR EXPANSION
IN HOT WATER PIPEWORK**

14.5.3 Free Outlet Water Heater

- The outlets from a water heater designed for use with a permanently open end, or any pipes or fittings attached to or extended from the heater outlet, shall not restrict the free flow of water or cause an increase of pressure in excess of the hydrostatic pressure specified by the manufacturer's limits.
- The hot water outlet shall be open to the atmosphere under all conditions of operation.

14.5.4 Control Tap

On falling level heaters, and for other heaters where required by the Board the hot water flow from the heater shall be controlled by a full way isolating valve.

14.5.5 Hot Water Taps

All hot water taps shall:

- in new installations, be the left hand or upper tap; and
- be clearly and permanently marked with an "H" or "HOT" or by a red marker which shall be easily visible when the tap is installed.

14.5.6 Lagging of Piping

14.5.6.1 General

Where lagging is provided for purposes of heat insulation or for protection of the pipework it shall be of hair felt or other approved material.

14.5.6.2 Lagged Pipework Exposed to the Weather or Buried in Ground

- Where lagged pipework is exposed to the weather, it shall be surrounded by a weatherproof enclosure which shall be not less durable than 0.50 mm galvanized steel sheet to AS 1397 and installed so that water will not enter any joint, or shall itself be weatherproof to the same degree.
- Where lagged pipework is buried in the ground it shall be protected by means of a waterproof conduit not less durable than galvanized steel pipe.

14.5.6.3 Buried Piping

All hot water piping including relief drain pipes encased in concrete, cement, plaster or similar material which may restrict movement caused by expansion or contraction shall be lagged throughout the whole buried length with hair felt or other approved flexible lagging material of not less than 6 mm thickness.

14.5.6.4 Vents

All vents, exposed to freezing conditions shall be lagged.

14.6 TESTING

Where required by the Board the following tests shall be performed on hot water systems:

- (a) Watertightness tests on safe trays and safe-wastes; and
- (b) Free flow tests on valves, vent pipes and pressure or temperature relief drains.

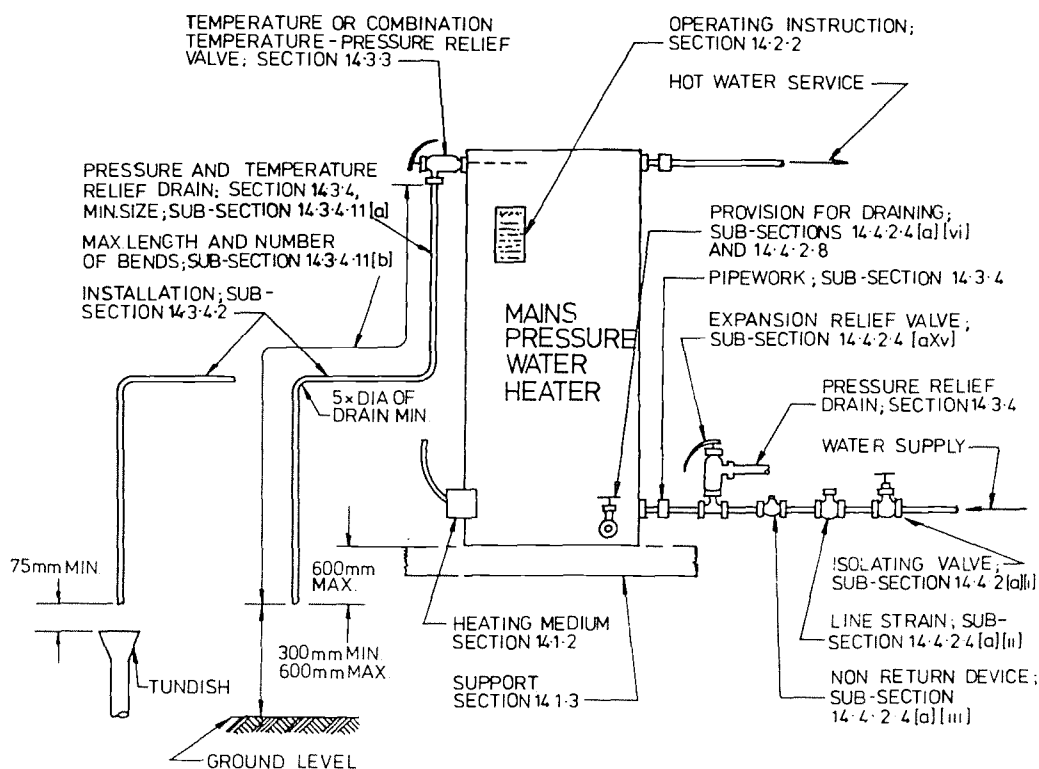


FIGURE 14.2 MAINS PRESSURE WATER HEATER

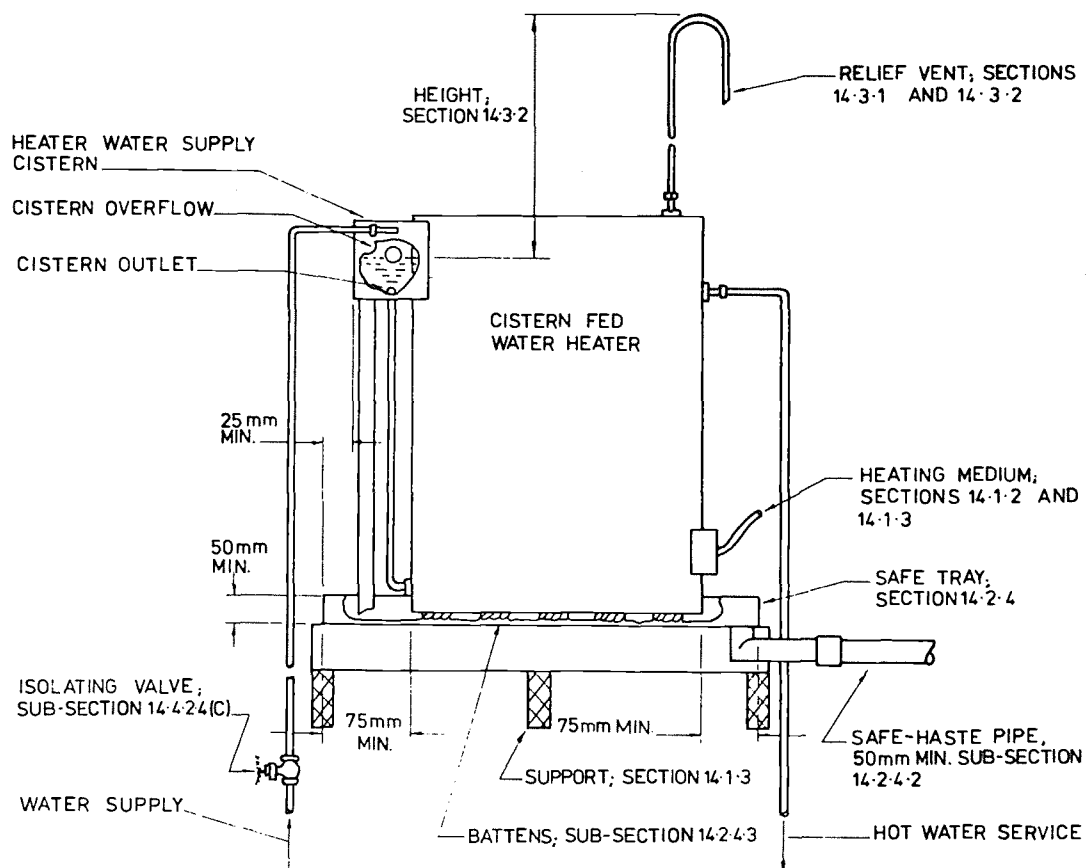


FIGURE 14.3 CISTERN FED WATER HEATER

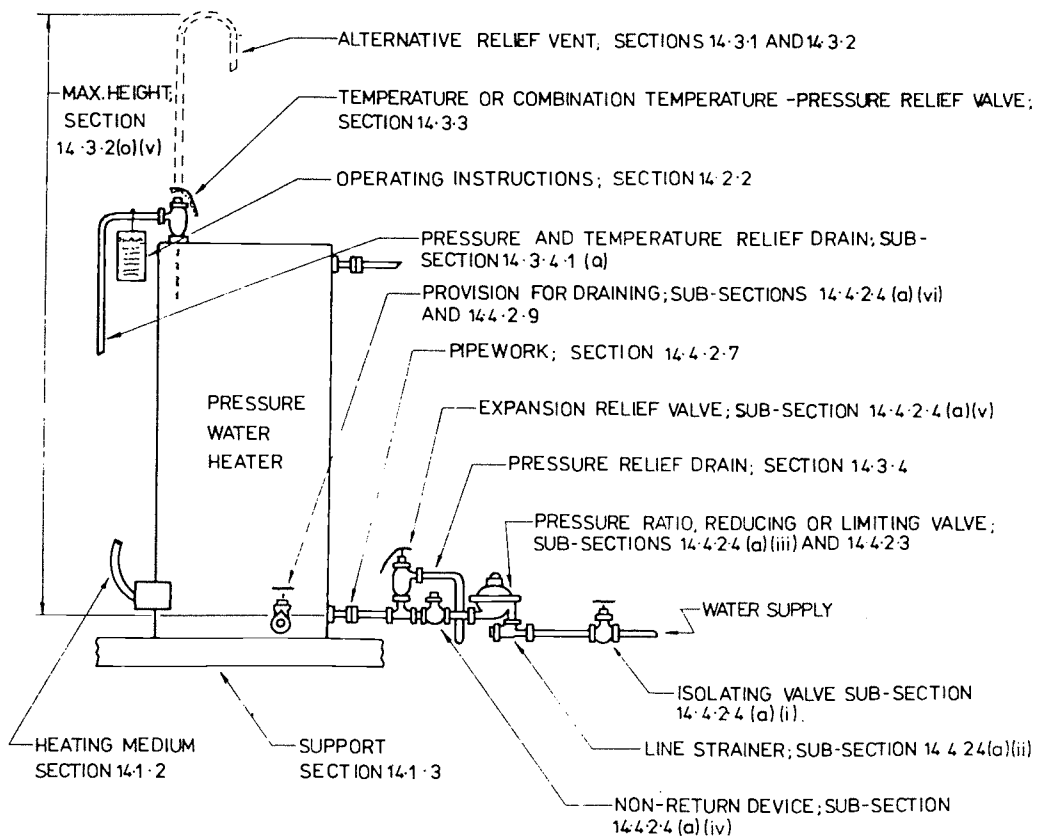


FIGURE 14.4 PRESSURE WATER HEATER

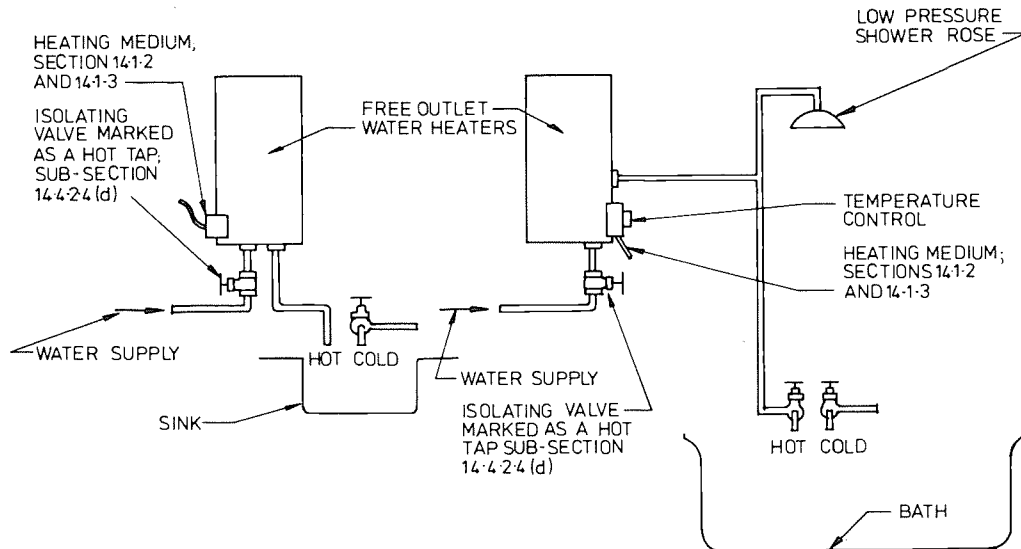


FIGURE 14.5 FREE OUTLET WATER HEATERS

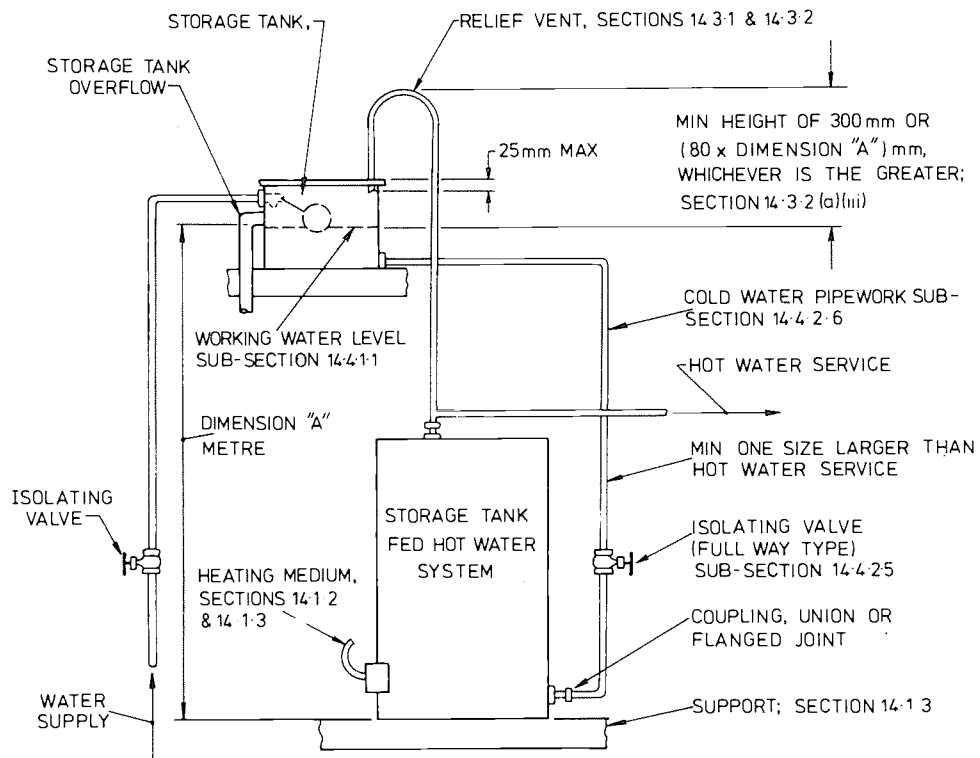


FIGURE 14.6 STORAGE TANK FED HOT WATER SYSTEM

15.0 PRIVATE WATER SUPPLY SYSTEMS

15.1 PIPES, FITTINGS, AND APPARATUS FOR PRIVATE SERVICES

In connection with the laying down, maintenance, alteration, or repair of every private service, the following conditions shall be observed by the owner or occupier of the premises:—

- (a) Except with the written consent of the Board only piping, fittings, fixtures and apparatus of approved quality or conforming to the Australian Standard Specification or such other specification as the Board determines, and tested and stamped by the Board, shall be used for services whether outside or inside the building line;
- (b) All pipes and fittings shall be of steel, or malleable iron, copper, brass, cast iron, cement asbestos, stainless steel, or other approved material;
- (c) A charge shall be made by the Board for testing and branding all pipes, fittings, fixtures and apparatus to be used in connection with water supply and sanitary plumbing work;
- (d) Reinforced concrete pressure pipe shall conform to the Board's standard specification;
- (e) Tees, thimbles, bends, reducing couplings, plugs, etc., shall be of the best material and manufacture, true in section, regular and of equal thickness, properly and truly cut with the British Standard thread perfectly sound and new, free from all defects; the tees, bends, tubes etc., shall be capable of withstanding a hydrostatic pressure of 2000 kPa, shall be tested to this pressure by the duly authorized officer and shall conform otherwise to the British Standard Specification existing at the time;
- (f) No pipe or other apparatus shall be laid through any sewer, property sewer, ash pit, cistern or manure bin, or through, in, or into, any place where in the event of the pipe becoming unsound the water conveyed through the pipe or apparatus would be liable to be polluted or to escape without observation, unless the pipe or apparatus is laid through a sleeve which may consist of an approved iron pipe or box of sufficient length and strength to afford due protection to the pipe or apparatus, and to bring any leakage or waste to notice and easy detection;
- (g) All taps, stop-cocks, ball-cocks, valves, fittings or other apparatus used in connection with the supply of water shall be of approved types and capable of withstanding a pressure of 2000 kPa and shall be tested and stamped by the duly authorized officer of the Board before being fixed;
- (h) A valve, or cock or apparatus of any description shall not be used if a rise in pressure of more than 70 kPa occurs when the valve, cock or apparatus is closing;
- (i) Every cistern and tank shall be provided with an equilibrium ball valve and stop-cock and the overflow pipe shall be laid and fixed in a suitable manner, so as to discharge in some conspicuous place open to inspection;
- (j) No part of any service shall communicate directly with any vessel, other than approved apparatus for heating water for domestic purposes, except with the written permission of the Board;
- (k) No part of any service shall communicate directly with any steam boiler or other vessel used for generating steam, or with any other vessel, in such manner that noxious liquids or gases can return into the main or service pipes;
- (l) Every water closet, urinal, slop hopper, or other fixtures as directed by the Board shall be supplied from the service pertaining to the building through an approved waste-preventing apparatus, and no service pipe shall communicate directly with the fixture, or otherwise than with the cistern;

- (m) Unless otherwise approved by the Board, the outlet of every fixture, such as baths, lavatory basins, kitchen sinks, etc., shall be distinct from and unconnected with the inlet, and the inlet shall be placed at least 25 mm above the highest water level of the fixtures; the outlet of every fixture shall be provided with a perfectly watertight plug, and shall be constructed so as to prevent a waste of water;
- (n) Projection pieces between a bib tap and fitting on the end of a horizontal water service pipe shall not be permitted unless so supported as to prevent the pipe and tap swinging downwards;
- (o) All taps over fixtures shall be so arranged that any drips from the taps will fall within the fixture;
- (p) Pipes shall be laid in a straight line, and where change of direction occurs underground bends shall be used;
- (q) In all cases where a water service pipe is attached to a cistern, lavatory basin, or any other plumbing fixture, the connection shall be made by means of an annealed copper connection or other approved method; and
- (r) No person shall fix any water ejector, automatic siphon, booster pump, or other water power pumping appliance to the Board's supply without the permission in writing of the Board being first obtained and in that event only in compliance with such conditions as the Board specifies in writing.

[By-law 15.1 amended in Gazette 24 December 1982 p. 4926.]

15.2 SEPARATE SERVICES REQUIRED

Not more than one house or tenement shall be supplied from one service except as set out in By-law 6.3.3 or with the written permission of the Board in special cases. When more than one house or tenement is supplied from a single service, the sub-services shall be so arranged that the supply to each house shall be independent of the supply to the remaining houses and controlled by a stop-cock on such sub-services. Refer Figure 12.1.

15.3 NOTICE OF INTENTION TO BUILD

The owner or occupier of any land supplied with water who shall erect, or make, or cause to be erected or made any building or addition to an existing building on such land, shall, before the commencement of same, give notice in writing thereof to the Board.

15.4 WATER FOR COOLING PURPOSES

15.4.1 Any apparatus in which water is used for cooling purposes, including refrigerating equipment or machinery, or any apparatus or system used for the cooling of roofs, or for any form of air conditioning or temperature control or in connection with any form of hydraulic ejector or hydraulic apparatus for power purposes, shall be deemed to be an apparatus within the meaning of this by-law.

15.4.2 The use of water for any such apparatus shall be subject to the conditions set out in this by-law.

15.4.3 From and after the commencement of this by-law, no apparatus shall be installed or used, and no apparatus previously installed shall be used in, on, or in connection with any property, land, or tenement unless the Board shall have first consented thereto in writing.

15.4.4 Applications for consent to install or use such apparatus shall be made on the printed form available at Head and Branch offices of the Board and shall state the make and type, the minimum and maximum requirements, and any other information the Board may require.

15.4.5 If water used for or in the operation of any apparatus under full output exceeds 2.27 litres per minute, it shall be re-used, unless consent to run it to waste shall have been obtained in writing from the Board. If installation is such that the unit cuts in and out, the supply of water for cooling purposes must be automatically shut off when the unit cuts out.

15.4.6 The quantity of water run to waste shall be limited to the quantity specified in the Board's consent. The water which shall so run to waste shall be recorded by a meter specially affixed for the purpose and shall not exceed 16.2 litres per min. per 1000 kilowatts of refrigeration capacity.

15.4.7 Should water in excess of the quantity specified in the Board's consent be run to waste, every owner or occupier of the property, land, or tenement or other persons supplied by the Board who so permit or allow such excess water to be run to waste, shall be guilty of an offence.

15.4.8 A person supplied by the Board with water shall, at his own expense:

- (a) make any alteration to the existing water service necessary in order that the subservice can be separately metered;
- (b) pay the cost of removing the meter and disconnecting the subservice, if not further required; and
- (c) during the continuance of the service, keep or cause to be kept, such apparatus, and all pipes in connection therewith, in a proper state of repair.

15.4.9.1 Where a person supplied by the Board with water desires to draw the supply direct from the Board's main through an additional service, such additional service shall, at the discretion of the Board, be installed upon such occupier or owner depositing in advance:

- (a) the amount of the estimated cost of installation; and
- (b) the amount of the estimated cost of affixing a meter.

15.4.9.2 The owner or occupier shall, on completion of the work pay the actual costs thereof, whether they amount to more or less than the estimates. He shall also pay meter rent and bear the expense of maintaining the additional service and of having it disconnected when no longer required.

15.4.10 An owner, occupier, or other person who is supplied with water by the Board aforesaid, who shall fail to comply with this by-law, shall be deemed to be guilty of an offence hereunder, and shall be liable for each offence to a penalty not exceeding \$80 and to a further penalty not exceeding \$8 for each day the offence continues after notice thereof from the Board.

15.5 SUPPLY OF WATER TO FIXTURES

- (a) Unless otherwise directed by the responsible officer, water closets and other plumbing fixtures shall be provided by the owner with a sufficient supply of water from the Board's service, for flushing purposes to keep them in a proper and clean condition at all times.
- (b) An owner of property who desires, or who has been ordered, to provide sanitary appliances for his property and to connect his property with the Board's sewers, shall provide the necessary connections for the conveyance of water, in accordance with these by-laws.

- (c) The piping to plumbing fixtures shall be of capacity sufficient to supply all sanitary fixtures on the property freely and continuously, and convey to the flushing cistern, flushing tank or other flushing apparatus of each water closet upon the property enough water to fill the same at an average rate of not less than 4.5 litres per minute, with one other tap turned on.
- (d) The owner shall keep the piping to plumbing fixtures of sufficient capacity to fill the flushing cistern, storage tank or other flushing apparatus, at an average rate of not less than 4.5 litres per minute, with one other tap turned on.

[15.6, 15.7. *By-laws 15.6 and 15.7 repealed in Gazette 28 June 1985 p. 2349.*]

15.8 MAINTENANCE OF PRIVATE SERVICES AND INTERFERENCE WITH METERS ETC.

- (a) The owner of a property supplied with water shall at his own risk and expense lay down his private service and keep it in good order and repair, in accordance with the provisions of these by-laws.
- (b)
 - (i) Upon receiving notice from the Board that service pipes or apparatus, which service, and are within the boundary of, land, require repair, the owner of the land shall forthwith employ a licensed plumber to effect the necessary repairs.
 - (ii) An owner of land who fails to comply with subparagraph (i) shall have committed an offence and be liable to a penalty not exceeding \$200 and a further penalty of \$20 for each day on which the offence continues.
 - (iii) Until the necessary repairs have been effected, the Board may stop the supply of water to the land.
 - (iv) The owner of the land shall be deemed to be responsible for loss of water or damage caused by the service pipes or apparatus being out of repair.
- (c) In addition to any penalty provided by this by-law, the Board may cut off the supply of water to land whereon the private service is not at all times laid, fixed, used and maintained in accordance with the provisions of the said by-law, and may keep the same cut off until such provisions have been fully observed.
- (d) A branch shall not be taken off the service pipe within a distance of one metre on the consumer's side of the Board's stop-cock or meter.

[*By-law 15.8 amended in Gazette 24 December 1982 p. 4926.*]

15.9 ORNAMENTAL FOUNTAINS AND SWIMMING POOLS

- (a) Persons shall not connect a supply pipe to an ornamental fountain or swimming or bathing pool, wading pool, fish pond, or ornamental lake or receptacle of a similar nature, without first obtaining the written permission of the Board.
- (b) Where the Board grants permission under sub-bylaw (a) of this by-law, it may specify—
 - (i) The size and location of the supply pipe or pipes required;
 - (ii) whether the supply pipe shall be separate from the ordinary supply pipe;
 - (iii) the rate at which the water will be supplied;
 - (iv) the hours during which the supply of water will be permitted; and
 - (v) whether anemometer controls are to be fitted to the fountain,
 and may require such supplies to be metered and recirculated.

16.0 SANITARY AND PROPERTY SEWERAGE BY-LAWS—SCOPE

[By-law 16.0 amended in Gazette 24 December 1982 p. 4926.]

16.1 SCOPE AND APPLICATION

Parts 16-26 inclusive set out the requirements for;

- (a) the installation and connection of plumbing fixtures and appliances in buildings,
- (b) the design and installation of discharge pipes and vents, and
- (c) the design and installation of property sewers.

Subject to any limitations stated, these requirements shall apply to the installation and connection of plumbing systems as defined herein.

No provision is included for the pretreatment of industrial waste.

[By-law 16.1 amended in Gazette 24 December 1982 p. 4926.]

16.2 STANDARDS

In all works carried out pursuant to these by-laws materials conforming to the following Australian Standard Specifications shall be used.

- AS 1074-1976 Steel tubes and tubulars suitable for screwing to AS 1722 pipe threads.
- AS 1167-1971 Alloy filler rods for brazing.
- AS 1218-1972 Flushing cisterns.
- AS 1229-1972 Laundry Troughs.
- AS 1260-1974 Unplasticized PVC (UPVC) pipes and fittings for sewerage application.
- AS 1272-1974 Unsintered PTFE tape for thread sealing applications.
- AS 1279-1974 Refined Copper.
- AS 1315-1973 Specification and methods of test for portland cement (metric units).
- AS 1379-1973 Ready-mixed Concrete.
- AS 1415-1974 Unplasticized PVC (UPVC) pipes and fittings for soil, waste and vent application.
- AS 1432-1973 Copper tubes for water, gas and sanitation.
- AS 1465-1974 Dense natural aggregate for concrete.
- AS 1566-1974 Copper and copper alloy plate, rolled bar, sheet, strip and foil for general engineering purposes.
- AS 1567-1974 Wrought copper and copper alloy rods, bars and sections for general engineering purposes.
- AS 1588-1974 Filler rods for welding.
- AS 1589-1973 Copper and copper based alloy fittings for use in sanitary plumbing installations.
- AS 1631-1974 Cast iron non-pressure pipe and pipe fittings.
- AS 1646-1974 Rubber joint rings for water supply, sewerage and drainage purposes.
- AS 1693-1975 Rubber ring joints for vitrified clay pipes.
- AS 1712-1975 Asbestos cement pipes and fittings for sewerage and drainage.

- AS 1722-1975 Pipe threads of Whitworth Form.
- AS 1730-1975 Wash Basins.
- AS 1741-1975 Vitrified clay pipes.
- AS 1756-1975 Stainless steel sinks.
- AS 1866-1976 Wrought aluminium and aluminium alloy extruded rod, bar, solid and hollow shapes for general engineering purposes.
- AS 2023-1977 Baths for domestic purposes.
- AS A185-1971 Solvent-welding cements for use with rigid PVC pipes and fittings.
- AS CA52-1968 Design for access by handicapped persons.
- AS CA56-1968 Code of recommended practice for the construction of vitrified clay pipeline (up to and including 12 in. diameter with flexible or rigid joint systems).
- AS CA67-1972 Rules for the installation of PVC pipe systems.
- AS CA68-1972 Rules for plastics pipelaying design.
- AS 1867-1976 Wrought aluminium and aluminium alloy drawn tubes for general engineering purposes.
- BS 2598-1966 (British Standard) Glass Pipelines and Fittings.
- BS CP304-1968 (British Standard) Sanitary Pipework above Ground.
- AS C142-1964 Electric water heaters.

17.0 SANITARY AND PROPERTY SEWERS—MATERIALS

[By-law 17.0 amended in Gazette 24 December 1982 p. 4926.]

17.1 GENERAL

Unless otherwise specified by the Board, materials used in plumbing installation and all materials used to fabricate pipes, fittings, fixtures and appliances shall be in accordance with the requirements of this Part.

17.2 PIPES AND FITTINGS

17.2.1 Aluminium

- (a) Aluminium pipes may only be used as vents in accessible locations and shall be either Alloy 6061 or Alloy 6063 in accordance with AS 1866 or AS H72.
- (b) Wall thickness of aluminium tubing shall be not less than 1.2 mm.

17.2.2 Asbestos Cement (AC)

Asbestos cement pipes and fittings may only be used as property sewers or vents, and shall be in accordance with AS 1712 Class 50 for property sewers and Class 35 or heavier for vents.

[By-law 17.2.2 amended in Gazette 24 December 1982 p. 4926.]

17.2.3 Cast Iron (CI)

Cast iron pipes and fittings shall be in accordance with AS 1631.

17.2.4 Copper

- (a) Copper tubing shall be in accordance with AS 1432, Type B or D tubes, and shall comply with the following:
 - (i) Type D tubing shall be used only in straight lengths with approved fittings, and shall never be offset by bending;
 - (ii) Type D tubing shall not be embedded in concrete or used below ground;
 - (iii) Where, in respect of any stack formed of copper tubing, the overall height above the junction or bend at the base, or at any offset, is less than 6 m, such fitting shall be formed of Type B tubing or heavier.
Where such overall height is more than 6 m, such fitting shall be formed of cast or hot pressed copper alloy;
 - (iv) Straight junction fittings, for use with Type D tubing, may also be made from Type D tubing but bends and sweep junction fittings for use with Type D tubing shall be made from Type B tubing or heavier;
 - (v) Type B tubing may be bent in the field up to an offset angle of 10 degrees;
 - (vi) Field fabricated bends of from 10 degrees to 45 degrees shall be made from Type A tubing; and
 - (vii) Manufactured bends shall be of uniform bore and of minimum wall thickness at every point as specified for Type B tubes.
- (b) Copper fittings shall be in accordance with AS 1589. Fittings for Type D tubes shall not be used with Type B tubes.
- (c) Pipes fabricated from copper sheet may only be used as vents in external locations above ground. Copper sheet for vents shall be in accordance with AS 1279 and shall be not less than 0.65 mm thick.
- (d) Copper pipes and fittings shall not be used to conduct urinal discharges.

17.2.5 Copper Alloy (Brass)

- (a) The material of copper alloy tubes shall be Type 259D, 70/30 arsenical brass in accordance with AS 1567.
- (b) Copper alloy fittings shall be in accordance with AS 1589.
- (c) The dimensions of copper alloy tubing shall be in accordance with AS 1432 Type D tubes.
- (d) Copper alloy tubing shall not be bent in the field. Manufactured bends shall be of uniform bore and of minimum wall thickness at every point as specified for Type B tubes in AS 1432.

17.2.6 Galvanized Steel (GS)

- (a) Galvanized steel tubing may be used in waste and vent application only where provision is made for the removal and replacement of all galvanized steel pipes without damaging the structure.
- (b) Galvanized steel tubing shall be in accordance with AS 1074 and tubing of 32 to 80 mm size shall be "heavy steel tube" and 100 to 150 mm size shall be at least "medium steel tube" or heavier.

- (c) Pipes fabricated from galvanized steel sheet may be used as vents only in external locations above ground.
- (d) Galvanized steel sheet for vents shall be in accordance with AS 1397, and shall not be less than 0.80 mm thick. The hot dipped zinc coating class shall be 550 g/m².

17.2.7 Glass

Glass pipes shall be of high grade, low thermal expansion, borosilicate glass to BS 2598.

17.2.8 Polypropylene

Polypropylene pipes and fittings shall be used inside buildings only in locations not exposed to direct sunlight.

17.2.9 Unplasticized Polyvinyl Chloride (UPVC)

- (a) UPVC pipes and fittings shall be in accordance with AS 1415 for soil, waste and vent applications, and AS 1260 Class SH for property sewers.
- (b) For property sewers less than 90 mm UPVC pipes and fittings shall be in accordance with AS 1415.
- (c) The use of plastic piping and fittings in buildings may be subject to restrictions by the Building Authority.

[By-law 17.2.9 amended in Gazette 24 December 1982 p. 4926.]

17.2.10 Vitrified Clay (VC)

- (a) Vitrified clay pipes and fittings may be used only for property sewers and shall be in accordance with AS 1741 and as approved by the Board.
- (b) Unless otherwise approved, joints shall be by means of rubber rings in accordance with By-law 26.4.7
- (c) Vitrified clay pipes and fittings may be used for the following applications:
 - (i) in reclaimed or filled-in ground, or within 2 m of basements, or ground which has been excavated below the invert of the property sewer provided there is approved compaction, or the pipes are laid in timber or reinforced concrete decking supported on piles;
 - (ii) as risers above ground surface to water-closet outlets situated within a building provided the risers above ground are constructed using one pipe only, with the pipe joint below ground level and extending not more than 1.0 m above ground surface; and
 - (iii) through walls or footings of a building provided there is an annular clearance of at least 25 mm around the pipe. The annular space shall be kept free of coarse particles by filling with sand, fine grained soil or a suitable flexible material. The pipe traversing the wall shall be as short as possible and generally shall not exceed 600 mm in length between flexible rubber ring joints.
- (d) Two flexible joints shall be provided within 600 mm of an inspection chamber or similar structure.

[By-law 17.2.10 amended in Gazette 24 December 1982 p. 4926.]

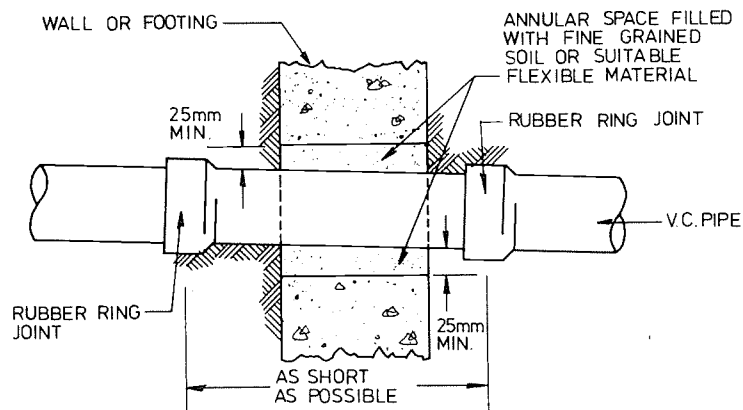


FIGURE 17.1 VITRIFIED CLAY PIPES TRAVERSING WALLS OR FOOTINGS

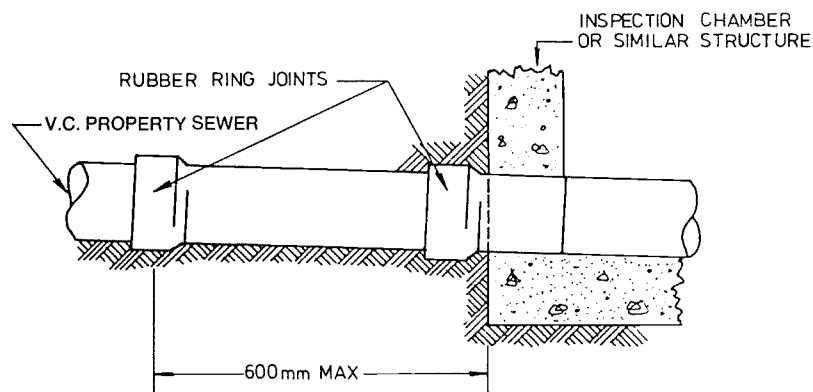


FIGURE 17.2 VITRIFIED CLAY PIPES ENTERING INSPECTION CHAMBERS OR SIMILAR STRUCTURES

[Figure 17.2 amended in Gazette 24 December 1982 p. 4926.]

17.3 FIXTURES

Unless otherwise specified by the Board all fixtures and appliances shall conform to the relevant Australian Standard.

17.4 MISCELLANEOUS MATERIALS

17.4.1 Cement

Cement shall be Portland cement in accordance with AS 1315.

17.4.2 Fine Aggregate (Sand)

Fine aggregate shall be an approved material complying with AS 1465.

17.4.3 Coarse Aggregate (Metal)

Coarse aggregate shall be an approved material complying with AS 1465 and shall not exceed 20 mm nominal size.

17.4.4 Concrete Mix

Concrete shall consist of 1 part cement, 2 parts fine aggregate, 4 parts coarse aggregate all measured by volume, and sufficient water added to make the mix workable.

17.4.5 Cement Mortar

Cement mortar shall consist of 1 part cement and 2 parts of fine aggregate measured by volume, properly mixed with the minimum amount of water necessary to render the mix workable, except that a 1 to 4 mix may be used for rendering work, sealing inspection openings, and bedding pipes.

18.0 CONNECTION OF FIXTURES AND FITTINGS

18.1 GENERAL

This Part covers the installation and connection of all sanitary fixtures, fittings and appliances commonly used in Australia. For sanitary fixtures, fittings and appliances not specifically mentioned in this by-law, installation and connection shall be to the requirement of the Board.

[By-law 18.1 amended in Gazette 24 December 1982 p. 4926.]

18.1.1 Installation of Fixtures

Fixtures shall be secured in position independent of support from their traps, discharge-pipes or water supply connections.

18.1.2 Position for Fixture Traps

The distance from the fixture-trap seal-level to the nearest connect fixture shall be as short as possible and in no case shall it exceed 300 mm for urinals and 600 mm for other fixtures.

18.1.3 Connection of Fixture Pairs (Figure 18.1)

Fixture—pairs—connection of

Waste fixtures may be connected in pairs to a single fixture-trap provided:

- (a) fixtures shall be located within the same room, and
- (b) the length of waste pipe from the outlet of the untrapped fixture to the riser of the fixture trap shall not exceed 1.2 m.

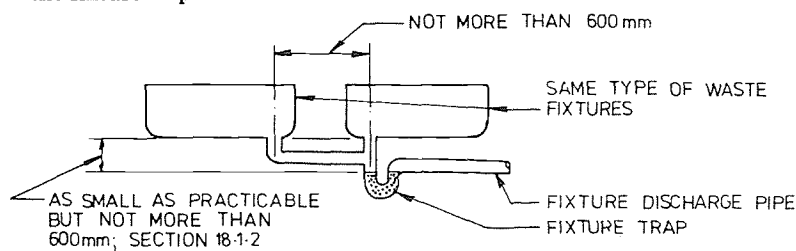


FIGURE 18.1 FIXTURE PAIR

18.1.4 Fixture Gratings

- (a) The outlets of all fixtures except closet pans, slop hoppers, bedpan washers and bedpan washer sterilizers shall be fitted with gratings.
- (b) The area and shape of waterway and fixing of any fixture grating shall comply with the requirements of AS 1589.

[18.1.5 By-law 18.1.5 repealed in Gazette 28 June 1985 p. 2349.]

18.2 AIR-CONDITIONERS AND PLANT-ROOMS

- (a) Where air-conditioning plant waste is to discharge to the sewer it shall be connected in a similar manner to sterilizers and autoclaves, By-law 18.19.
- (b) Where air-conditioning plant room waste is to be discharged to the sewer the room shall be connected either:
 - (i) through an outlet-pipe of not less than 50 mm terminating with a flap-valve over a suitably located floor-waste gully outside the room, or,
 - (ii) through an approved deep-water-seal floor-waste gully located within the room. The depth of the deep-water-seal shall be at least 75 mm plus the water gauge equivalent of the maximum pressure differential of the air-conditioning room.

18.3 ARRESTORS

Arrestors shall be designed, constructed and installed in accordance with the requirements of the Board.

18.4 AUTOPSY TABLES

- (a) Each autopsy table shall drain to a 50 mm waste outlet fitted with a grating, and connected to a soilpipe through a flushing floor-waste gully with a 65 mm or larger outlet.
- (b) The water supply to the flushing floor-waste shall be from a flush valve or cistern.

18.5 BAIN MARIES, HYDROTHERMS AND WATER BOILERS

- (a) Overflows and waste outlets from bain maries, hydrotherms and water boilers shall be connected in a similar way to sterilizers and auto-claves, By-law 18.19.
- (b) Hydrotherms and water boilers shall be installed on drained impervious surfaces, or on safe trays fitted with outlets of not less than 32 mm.

18.6 BASINS

18.6.1 Installation

18.6.1.1 Inset basins (Vanity Bowls) and Basins against Walls

Basins shall be securely fixed in position.

[By-law 18.6.1.1: By-laws 18.6.1.1 and 18.6.1.2 repealed and By-law 18.6.1.1 substituted in Gazette 28 June 1985 p. 2349.]

[By-law 18.6.1.2: By-laws 18.6.1.1 and 18.6.1.2 repealed and By-law 18.6.1.1 substituted in Gazette 28 June 1985 p. 2349.]

18.6.2 Connection

18.6.2.1 Connection of Single Basins

The traps of basins, whether 32 mm or 40 mm, may be connected to floor-waste gullies, disconnector gullies, or directly to discharge-stacks or property sewers. Refer to By-law 18.13.8 for connection of basins to floor-waste gullies.

[By-law 18.6.2.1 amended in Gazette 24 December 1982 p. 4926.]

18.6.2.2 Connection of Basins in Pairs

Basins may be connected in pairs to a single 40 mm fixture-trap. Refer to By-law 18.1.3

[By-law 18.6.2.2 amended in Gazette 24 December 1982 p. 4926.]

18.6.3 Unpluggable Basins

“Unpluggable basins” shall have domed outlet gratings or use other approved means to prevent a plug being used in conjunction with the basin.

18.7 BATHS

18.7.1 Installation

Baths shall be adequately supported and securely fixed in position.

[By-law 18.7.1: By-laws 18.7.1 and 18.7.2 repealed and By-law 18.7.1 substituted in Gazette 28 June 1985 p. 2349.]

[By-law 18.7.2: By-laws 18.7.1 and 18.7.2 repealed and By-law 18.7.1 substituted in Gazette 28 June 1985 p. 2349.]

18.7.3 Connection

Baths may be connected either:

- (a) through 40 mm traps and wastes to floor-waste gullies, disconnector gullies, or directly to discharge-stacks or property sewers; or
- (b) through 40 mm untrapped wastes to floor-waste gullies.

[By-law 18.7.3 amended in Gazette 24 December 1982 p. 4926.]

18.8 BED PAN WASHERS AND SANITIZERS (Figure 18.2)

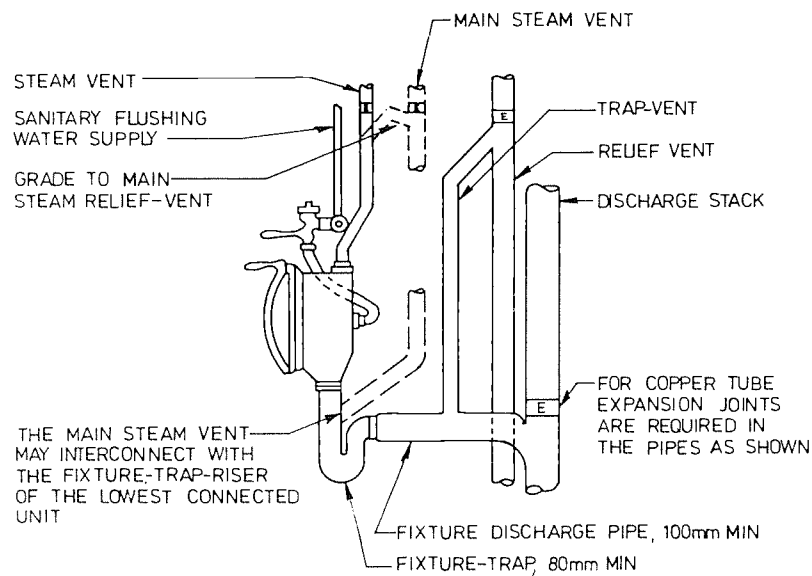
18.8.1 Connection—Bed pan washers and sanitizers shall be connected as soil fixtures directly to soil discharge-stacks or property sewers, through traps of not less than 80 mm, and soil pipes of not less than 100 mm.

[By-law 18.8.1 amended in Gazette 24 December 1982 p. 4926.]

18.8.2 Flushing Installation—Bed pan washers and sanitizers shall be provided with an approved flushing apparatus.

18.8.3 Steam Connections for Sterilizing

- (a) Where pressurized steam is connected to the chamber of bed pan washers and sanitizers the units must be provided with separate and independent steam relief-vents or other devices to prevent blowing of traps.
- (b) The pressure within the units shall not be more than 0.35 kPa.



DISCHARGE PIPES AND VENTS OF UPVC ARE NOT PERMITTED

FIGURE 18.2 BED PAN WASHER AND SANITIZER

18.8.3.1 Steam Relief-Vents

- (a) Steam relief-vents shall be not less than 40 mm, terminating above the roof of the building.
- (b) The relief-vents from 2 or more units may be interconnected provided that the points of connection to the main steam relief-vent are at least 300 mm above the top of the units

18.8.3.2 Main Steam Relief-Vent

- (a) Branch steam relief-vents shall be graded downwards at the points of the connection into the main steam relief-vents to give an invert fall equal to half the diameter of the branch-vents.
- (b) The main steam relief-vent shall discharge condensate to the sewer by interconnecting the base of the main steam relief-vent to the fixture-trap riser of the lowest connected bed pan washer and sanitizer.

18.8.4 Pipework and Expansion Joints

Where pressurized steam is connected to chambers of bed pan washers and sanitizers:

- (a) UPVC pipe shall not be used for soil stacks, soil-vents, or steam relief-vents connected to the unit.
- (b) Where copper tubing is used expansion joints must be provided in soil-stacks, soil-vents and steam relief-vents in accordance with the requirements of the Board.

18.9 BIDETS

18.9.1 Installation

Pedestal type bidets shall be set such that the base is not more than 20 mm above finished floor. They shall be fixed by bedding with cement mortar on concrete or tiled floors, and by approved corrosion resistant fasteners on wooden floors

18.9.2 Connection

Bidets shall discharge directly to disconnector gullies, discharge-stacks or drains through trapped outlets of not less than 32 mm.

18.9.3 Water Supply to Bidets

Bidets fitted with water connections below the level of the rims shall be provided with hot and cold water services without any direct connection with other pipes or apparatus supplying water for domestic purposes.

18.10 DENTAL UNITS

- (a) Single dental units shall discharge through traps of not less than 32 mm, and shall be connected directly to discharge-stacks or property sewers or through disconnector gullies.
- (b) Multiple dental unit drained to a common point shall discharge through a trap of not less than 50 mm and shall be connected directly to a discharge-stack or property sewer or through a disconnector gully.

[By-law 18.10 amended in Gazette 24 December 1982 p. 4927.]

18.11 DRINKING FOUNTAINS

Where connected to sewer drinking fountains shall discharge through traps and waste pipes not less than 32 mm, and shall be connected directly to discharge-stacks or property sewers or through disconnector or floor-waste gullies.

[By-law 18.11 amended in Gazette 24 December 1982 p. 4927.]

18.12 FOOD WASTE DISPOSAL UNITS (Domestic Type) (Figure 18.3)

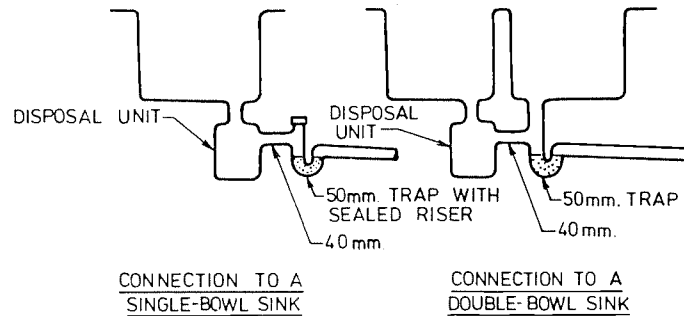


FIGURE 18.3 FOOD WASTE DISPOSAL UNIT

18.12.1 General

Where the installation is permitted by the Board food waste disposal units shall comply with the following:

- (a) the food waste disposal unit shall be approved as a domestic type;
- (b) the outlet size shall be 40 mm; and
- (c) food waste disposal units shall not discharge to a grease arrestor.

18.12.2 Connection

The outlet of food waste disposal units shall be connected:

- (a) directly to traps not less than 50 mm, discharging directly to discharge-stacks or property sewers; or
- (b) where fitted to one bowl of a double-bowl sink, the outlet may discharge untrapped above the water seal of the fixture trap connected to the second bowl. Unless otherwise approved the fixture trap shall discharge directly to discharge-stacks or property sewers.

[By-law 18.12.2 amended in Gazette 24 December 1982 p. 4927.]

18.13 GULLIES

18.13.1 Form

Gullies shall be self-cleansing, p-trap form with plain-riser or inlet-riser sections added to the vertical legs as necessary to finish at the required level.

18.13.2 General

- (a) Gullies shall be used for one or more of the following purposes:
 - (i) as reliefs in the event of sewage overflow;
 - (ii) as waste fittings, with integral water-seal, collecting and transmitting waste discharges; or
 - (iii) to provide disconnection between waste discharges and the remainder of the sewerage installation.
- (b) Where no fixtures discharge to a gully, an approved means shall be provided to maintain the water seal.
- (c) Unless otherwise stated, the rules applying to the connection of fixtures to the sanitary plumbing system shall also apply to the connection of gullies.

18.13.3 Gully Types

18.13.3.1 Overflow-Relief Gullies

- (a) One overflow-relief gully shall be provided on each property sewer system for each property or unit system connected to the sewer.
- (b) Overflow-relief gullies shall be fitted with loose, pop-out type, lightweight domed gratings.
- (c) The overflow-relief gully shall be located at the point of the building closest to the downstream end of the property sewer or such other approved location as the Authority considers to be more effective.

[By-law 18.13.3.1 amended in Gazettes 24 December 1982 p. 4927; 28 June 1985 p. 2349.]

18.13.3.2 External Disconnecter Gullies

External disconnecter gullies may serve as overflow-relief gullies.

18.13.3.3 Sealed Disconnecter Gullies

Gullies other than floor-waste gullies, installed internally, shall be sealed with removable airtight tops and shall be ventilated.

18.13.3.4 Floor-Waste Gullies

Floor-waste gullies shall be installed internally with provision, where required, for the connection of waste-pipes from fixtures, and for the entry of water spillage from floors.

18.13.4 Bedding of Buried Gully Traps

Gully traps of size 100 mm or more installed in the ground shall be bedded on concrete at least 100 mm thick.

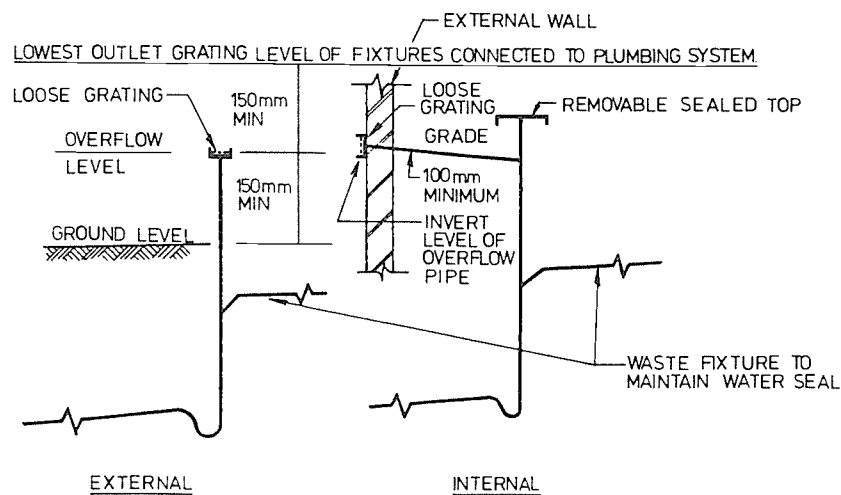


FIGURE 18.4 OVERFLOW RELIEF GULLIES

18.13.5 Size of Gullies

- (a) Overflow-relief, disconnector and sealed gullies shall have inlet and outlet sizes of not less than 100 mm.
- (b) Floor-waste gullies shall be in accordance with By-law 18.13.8.2

[By-law 18.13.5 amended in Gazette 24 December 1982 p. 4927.]

18.13.6 Overflow-Relief Gullies (Figure 18.4)

18.13.6.1 Installation in External Locations

The tops of vertical risers on overflow-relief gullies in external locations shall be fitted with loose, pop-out type, lightweight domed grates and finishing collars fixed not less than 150 mm below the outlet grating or overflow level of the lowest inlet fitting or fixture connected to the building property sewerage installation, and at least 150 mm above ground surface, or such other minimum distances as approved.

[By-law 18.13.6.1 amended in Gazettes 24 December 1982 p. 4927; 28 June 1985 p. 2349.]

18.13.6.2 Installation in Internal Locations

- (a) Subject to By-law 18.13.6.3 where overflow-relief gullies cannot be located externally they shall be installed within the building, fitted with removable-sealed tops and drained and vented from the gully risers to the atmosphere by an overflow vent from the gully riser to the atmosphere of not less than 100 mm.
- (b) The overflow vent pipe shall drain to the gully riser and shall terminate with a pop-out grating at the external wall of the building to discharge at a level of not less than 150 mm below the outlet grating or overflow level of the lowest inlet fitting or fixture connected to the building property sewerage installation, and at least 150 mm above ground level, or such other minimum distances as approved.
- (c) Access for cleaning of the overflow-relief gully shall be provided by means of a screwed brass inspection shaft top or such other similar fitting as is approved.

[By-law 18.13.6.2 substituted in Gazette 28 June 1985 p. 2350.]

18.13.6.3 Overflow-Relief Gullies in Paved Areas

Where the gully overflow is located in a paved area, a lesser distance above the paving may be permitted provided that the paving shall be graded in all directions away from the gully overflow.

18.13.7 Disconnector Gullies

18.13.7.1 External Disconnector Gullies

- (a) The tops of the vertical risers on disconnector gullies shall be fitted with approved loose, "pop-out" type, lightweight domed grates and the finishing collars installed not less than 150 mm below the outlet grating or overflow level of the lowest connected inlet fitting or fixture, and at least 150 mm above ground level, or such other minimum distances as approved in order to ensure that internal backflooding does not occur in the event of the gully overflowing.
- (b) Where the gullies are located in paved areas, a lesser distance above the paving may be permitted provided that the paving shall be graded in all directions away from the gully traps.

- (c) A disconnector gully (other than an overflow relief gully) may be located under a verandah or patio where—
- (i) the verandah or patio has 3 open sides;
 - (ii) the floor grades away from the main building to an external location;
 - (iii) the gully trap is located not more than 2.5 metres from any one of the 3 open sides.

[By-law 18.13.7.1 amended in Gazette 28 June 1985 p. 2350.]

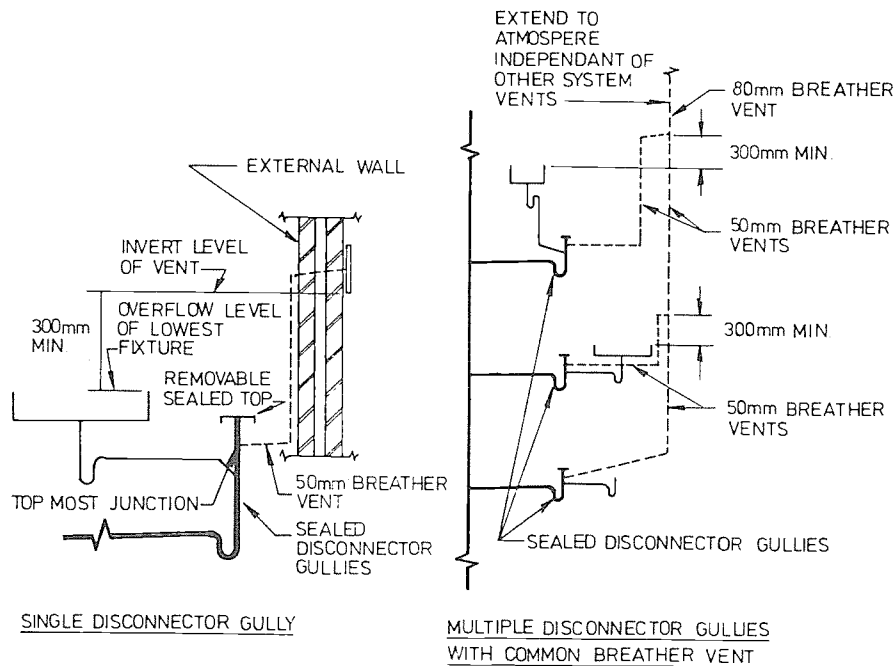


FIGURE 18.5 SEALED DISCONNECTOR GULLIES

18.13.7.2 Sealed Disconnector Gullies (Figure 18.5)

- (a) The vertical risers of sealed gully traps shall be vented by means of:
- (i) vent pipes extended above roof level; or
 - (ii) breather pipes extended to an external wall and fitted with flush fitting wall grates.
- (b) Vent pipes shall be at least 50 mm, taken off as the highest connection from the vertical riser, and terminating at least 300 mm above the over-flow level of the lowest fixture connected to the sealed gully. Two such gully trap vent pipes may be combined at a point above the minimum vent height of each gully trap. Three or more gully trap vent pipes may be similarly combined provided that the combined vent is increased to at least 80 mm prior to the connection of the third vent.
- (c) The top of the sealed disconnector trap riser shall be fitted with a screwed brass inspection shaft top or such other similar fitting as is approved.

[By-law 18.13.7.2 amended in Gazette 28 June 1985 p. 2350.]

18.13.7.3 Connections to Disconnecter Gullies

- (a) Waste-pipes shall discharge into a disconnecter gully as near as practicable above the water-seal of the trap, and may enter on grade or at an angle of 45 degrees.
- (b) Waste-pipes shall not discharge through the grating of the gully.
- (c) All pumped discharges shall rise to a height of not less than 150 mm above the overflow level of the gully and discharge into the riser at an angle of 45 degrees, or discharge through a level-inlet fitting.

18.13.8 Floor-Waste Gullies

18.13.8.1 Location

- (a) Floor-waste gullies shall be located at the lowest point of graded floors, and gratings shall be fitted at floor level.
- (b) Provided it complies with the requirements of By-law 18.13.8 a shower outlet may be installed as a floor-waste gully.

[By-law 18.13.8.1 amended in Gazette 28 June 1985 p. 4927.]

18.13.8.2 Size

- (a) Vertical risers of floor-waste gullies shall be at least:
 - (i) 80 mm where fixtures are connected to the riser; or
 - (ii) 50 mm where no fixtures are connected to the riser.
- (b) The height of the riser shall be sufficient to prevent the surcharge of wastewater through the floor-waste grating, as per Table 18.1.
- (c) Pumped discharge shall enter floor-waste gullies at 45 degrees.
- (d) The height of vertical risers from water-seal to floor level shall not exceed 600 mm.
- (e) The size of floor-waste gully traps shall be in accordance with Table 18.2.
- (f) The size of floor-waste gully traps installed below ground shall not be less than 65 mm.

TABLE 18.1 MINIMUM HEIGHT OF FLOOR-WASTE GULLY RISERS

Waste Fixture Connected to Floor-waste Gully	Minimum Height of Floor-waste Gully Riser (water-seal to floor level)	
	88½ deg entry	45 deg entry
Shower only	150 mm	100 mm
Baths only	250 mm	200 mm
Other fixtures	250 mm	150 mm

NOTE:

Baths connected at 45 degrees to floor-waste gully risers may discharge with less noise than if connected at grade.

TABLE 18.2 SIZE OF FLOOR WASTE GULLY TRAPS

Total Fixture Unit Rating of Waste Fixture Connected to Floor Waste Gully	Size of Floor Waste Gully Trap
Less than 3 3-10	50 mm 65 mm

18.13.8.3 Connecting to Floor Waste Gullies (Figure 18.6)

- (a) Pipes for the conveyance of waste discharges to floor-waste gullies shall be connected to the vertical riser above, and as near as possible to, the water-seal.
- (b) The following fixtures may be connected to floor waste gullies with or without a fixture-trap fitted:
- | | |
|--------------------------|------------------------|
| Ablution troughs | Sterilizers |
| Autoclaves | Glass washing machines |
| Bar sinks | Overflow pipes from |
| Baths | Hot water services |
| Bain Maries | Refrigerated cabinets |
| Cleaners sinks | Shower |
| Clothes washing machines | Shower baths |
- (c) Basins and drinking fountains shall have fixture-traps fitted when connected to floor waste gullies.
- (d) The length of waste-pipe connecting a fixture to a floor waste gully shall be as short as possible and shall not exceed 1.2 m if no fixture-trap is provided, nor 2.5 m if a fixture-trap is provided.
- (e) Fixtures and fixture pairs connected to a floor waste gully riser shall be located in the same room as the floor waste gully and connected separately.

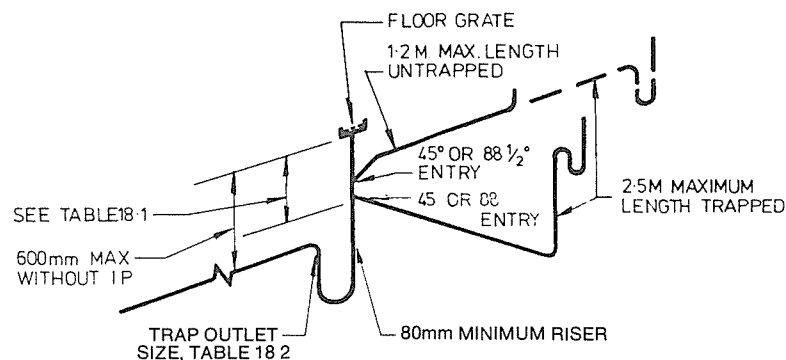


FIGURE 18.6 CONNECTION TO FLOOR-WASTE GULLIES

18.14 REFRIGERATED AND DEEP FREEZE CABINETS

Outlet pipes from refrigerated and deep freeze cabinets shall be connected in a similar way as sterilizers and autoclaves, By-law 18.19.

18.15 SANITARY NAPKIN DISPOSAL UNITS

Sanitary napkin disposal units, macerating type, shall discharge directly to soil-discharge-stacks or property sewers through trapped outlets of not less than 40 mm.

[By-law 18.15 amended in Gazette 24 December 1982 p. 4927.]

18.16 SHOWERS

18.16.1 General

For the purpose of these by-laws "shower" shall mean:

- (a) fixed or hand-held heads;
- (b) pipes, fittings and control valves for the supply of water to shower heads;
- (c) fabricated shower-bases; and
- [(d) deleted.]*
- (e) shower outlets.

[By-law 18.16.1 amended in Gazette 28 June 1985 p. 2350.]

18.16.2 Form

Shower installations may comprise any of the following:

- (a) showers over baths, whether fixed or hand-held; or
- (b) individual showers, whether prefabricated or built *in situ*; or
- (c) group showers.

[18.16.3, 18.16.4. By-laws 18.16.3 and 18.16.4 repealed in Gazette 28 June 1985 p. 2350.]

18.16.5 Prefabricated Shower Bases

Prefabricated shower bases shall be rigidly supported.

[By-law 18.16.5 amended in Gazette 28 June 1985 p.2350.]

18.16.6 Connection

18.16.6.1 Single Showers or Shower Pairs

Single showers or shower pairs shall discharge through 80 mm removable gratings and have not less than 40 mm wastes for single showers, or 50 mm wastes for shower pairs. They shall be connected either:

- (a) trapped or untrapped to floor-waste gullies; or
- (b) trapped directly to discharge-stacks or property sewers or through disconnector gullies.

[By-law 18.16.6.1 amended in Gazette 24 December 1982 p. 4927.]

18.16.6.2 Shower Groups

Drainage channel outlets of shower groups shall discharge through removable gratings, and waste traps and pipes in accordance with Table 18.3.

TABLE 18.3 SIZE OF SHOWER DRAINAGE CHANNEL OUTLETS

No. of Showers	Size of Outlet Grating	Size of Waste Trap and Pipe
1 to 3 4 to 6	80 mm 100 mm	50 mm 65 mm

18.17 SINKS

18.17.1 Bar Sinks

[(a) and (b) deleted.]

(c) Bar sinks shall drain to 40 or 50 mm outlets connected either:

- (i) trapped or untrapped to floor waste gullies; or
- (ii) trapped directly to stacks, property sewers or through disconnector gullies.

[By-law 18.17.1 amended in Gazettes 24 December 1982 p. 4927; 28 June 1985 p. 2350.]

18.17.2 Cleaners' Sinks

(a) Cleaners' sinks shall drain to 50 mm outlets.

(b) Cleaners' sinks may discharge either:

- (i) trapped or untrapped to floor-waste gullies; or
- (ii) trapped directly to discharge-stacks or property sewers, or through disconnector gullies.

(c) The taps supplying water to any cleaner's sink shall be installed at a height of at least 450 mm above its rim.

[By-law 18.17.2 amended in Gazette 24 December 1982 p. 4927.]

18.17.3 Kitchen Sinks

18.17.3.1 Form

(a) Kitchen sinks shall be in accordance with AS 1756, and unless otherwise approved shall be provided with an integral, fluted drainer not less than 300 mm in length extending on at least one side of the sink and graded to permit the surface water to drain into the sink.

(b) A sink without a drainer may be fixed adjacent to a sink with a drainer provided the distance between the 2 sinks is not more than 50 mm, and both sinks are inset in a bench top in accordance with By-law 18.17.3.2.

[By-law 18.17.3.1 amended in Gazette 24 December 1982 p. 4927.]

18.17.3.2 Installation of Inset Type Sinks

An inset type sink shall be securely fixed in position.

[By-law 18.17.3.2 substituted in Gazette 28 June 1985 p. 2350.]

18.17.3.3 Connection

- (a) Kitchen sinks shall be connected directly to discharge stacks or property sewers, or through disconnector gullies, using fixture-traps and waste-pipes of not less than 50 mm.
- (b) Double-bowl kitchen sinks may be connected as a fixture pair, refer to By-law 18.1.3.
- (c) Triple-bowl kitchen sinks may be connected:
 - (i) as 3 single-bowl sinks;
 - (ii) as a fixture pair and one single-bowl sink; or
 - (iii) through a single fixture-trap provided that the total length of waste-pipe between the sink outlets and the fixture-trap-seal is not more than 1.2 m.

[By-law 18.17.3.3 amended in Gazette 24 December 1982 p. 4927.]

18.17.4 Pan Room Sinks and Flushing Bowls (Figure 18.7)

18.17.4.1 Connection

- (a) The flushing bowls shall be fabricated with integral traps of not less than 100 mm and shall be connected directly to soil-stacks or property sewers.
- (b) Pan room sinks shall connect through traps and waste-pipes of not less than 50 mm directly to soil-discharge-stacks or property sewers.
- (c) Trapped wastes from sinks may discharge into vertical soil pipes from flushing bowl traps provided the branches are vented by a vent of not less than 50 mm connected either:
 - (i) where only one sink is fitted between the sink and flushing bowl; or
 - (ii) where 2 sinks and a flushing bowl are fitted between the sink outlets.

[By-law 18.17.4.1 amended in Gazette 24 December 1982 p. 4927.]

18.17.4.2 Flushing Installation

Flushing bowls shall be provided with approved flushing apparatus.

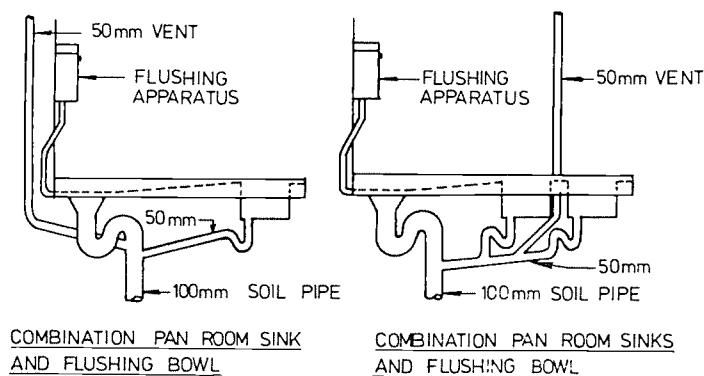


FIGURE 18.7 PAN ROOM SINK AND FLUSHING BOWL

18.18 SLOP HOPPERS

18.18.1 Installation

Slop hoppers shall be set such that the base is not more than 20 mm above finished floor, and shall be fixed by bedding with cement mortar on concrete or tiled floors or by approved corrosion resistant fasteners on wooden floors.

18.18.2 Connection

Slop hoppers shall be connected directly to soil-discharge-stacks or property sewers through 80 or 100 mm soil-pipes and traps. The trap and soil pipe size shall not be less than the slop hopper outlet.

[By-law 18.18.2 amended in Gazette 24 December 1982 p. 4927.]

18.18.3 Water Supply to Slop Hoppers

Slop hoppers shall be provided with approved flushing apparatus. In addition, a bib tap shall be fixed directly over and at a height of not less than 450 mm above the top of each slop hopper.

18.19 STERILIZERS AND AUTOCLAVES (Figure 18.8)

- (a) Overflow and waste outlet pipes from sterilizers or autoclaves, including any blow-down pipes, shall discharge over tundishes, or suitably located floor-waste gullies along side units such that there are air gaps between the outlet pipes and the top of tundishes or floor-wastes of not less than twice the nominal size of the outlet pipe.
- (b) Tundishes shall be of copper alloy or stainless steel, and shall be connected through waste-pipes of not less than 32 mm either:
 - (i) trapped or untrapped to floor-waste gullies; or
 - (ii) trapped directly to discharge-stacks or property sewers, or through disconnector gullies.

[By-law 18.19 amended in Gazette 24 December 1982 p. 4927.]

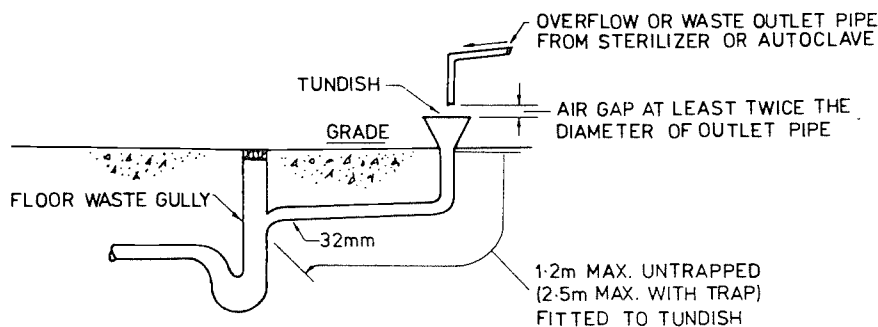


FIGURE 18.8 STERILIZER DISCHARGING TO FLOOR-WASTE GULLY THROUGH A TUNDISH

18.20 SWIMMING POOLS

[18.20.1. *By-law 18.20.1 repealed in Gazette 28 June 1985 p. 2350.*]

18.20.2 Commercial Type Swimming Pools

The backwash and pool drainage from commercial swimming pools constitute an industrial waste discharge and shall be connected in accordance with the industrial waste requirements of the Board.

18.21 TROUGHS

18.21.1 Ablution Troughs

18.21.1.1 Installation

Ablution troughs may be installed in units of maximum length of 4 m, and shall drain to 50 mm outlets. Outlet traps, where fitted shall be 50 mm.

18.21.1.2 Connection

Ablution troughs shall discharge either:

- (a) trapped or untrapped through 50 mm waste-pipes into floor waste gullies, or
- (b) trapped, directly to discharge-stacks, property sewers or disconnector gullies.

[*By-law 18.21.1.2 amended in Gazette 24 December 1982 p. 4927.*]

18.21.1.3 Fixture Pairs

Two adjacent ablution troughs may be connected as a fixture pair in accordance with By-law 18.1.3.

[*By-law 18.21.1.3 amended in Gazette 24 December 1982 p. 4927.*]

18.21.2 Laundry Troughs

- (a) Single compartment laundry troughs shall be connected directly to stacks or property sewers or through disconnector gullies using fixture-traps and waste-pipes of not less than 40 mm.
- (b) Double compartment laundry troughs shall be connected directly to stacks or property sewers or through disconnector gullies using fixture-traps and waste pipes of not less than 50 mm.

[*By-law 18.21.2 amended in Gazette 24 December 1982 p. 4927.*]

[18.21.3. *By-law 18.21.3 repealed in Gazette 28 June 1985 p. 2350.*]

18.22 URINALS

18.22.1 Floor types Adjacent Floor and Step (Figure 18.9)

[(a) *deleted.*]

- (b) Where the floor adjacent to a urinal is exposed to rain water, sand, mud or other materials which may enter the urinal channel, a step-up shall be provided in front of the urinal channel.

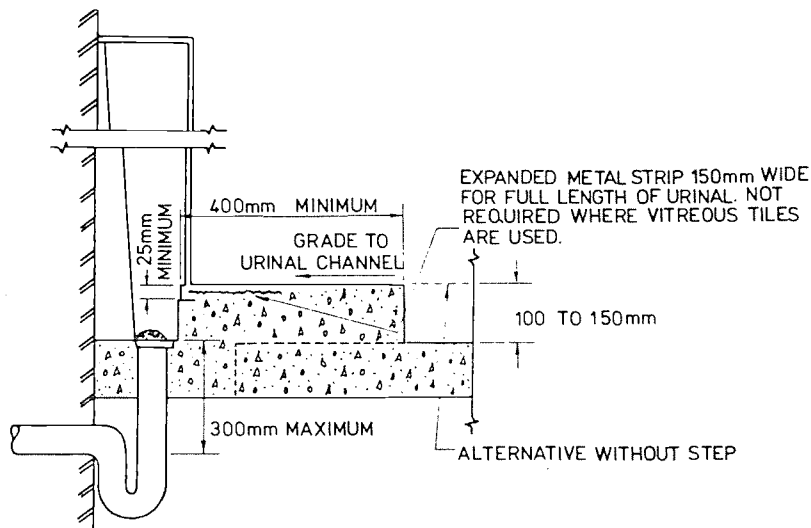


FIGURE 18.9 DETAILS OF URINAL CHANNEL

[By-law 18.22.1 amended in Gazette 28 June 1985 p. 2350.]

[18.22.2 By-law 18.22.2 repealed in Gazette 28 June 1985 p. 2350.]

18.22.3 Connection

- (a) Floor-type urinals shall be provided with continuous channels graded at not less than 1 in 100 to minimum outlet sizes as set out below:
 - (i) 50 mm—up to 3 stalls or less than 2 m total length.
 - (ii) 65 mm—4 to 8 stalls or 2 to 5 m total length.
- (b) Channels serving in excess of 8 stalls or 5 m total length shall be provided with additional outlets on the basis of an extra 65 mm outlet for each additional length in excess of 5 m multiples.
- (c) Urinals shall be separately trapped below each outlet and be connected directly to soil-stacks or property sewers.
- (d) The connecting soil-pipes and traps shall be of copper alloy, cast iron, UPVC or other approved materials.

[By-law 18.22.3 amended in Gazette 24 December 1982 p. 4927.]

18.22.4 Flushing Installation

Urinals shall be provided with approved flushing systems in accordance with By-law 19.3

[By-law 18.22.4 amended in Gazette 24 December 1982 p. 4927.]

18.22.5 Wall hung Urinals

- (a) Wall hung urinals shall be fabricated with 50 mm integral traps, or 50 mm traps directly coupled to the urinal outlet, and shall be connected directly to soil discharge-stacks or property sewers.

[(b) *deleted.*]

[By-law 18.22.5 amended in Gazettes 24 December 1982 p. 4927; 28 June 1985 p. 2350.]

18.23 WASHING MACHINES

18.23.1 Clothes Washing Machines (Domestic)

18.23.1.1 Pumped Discharges

The pumped wastes from washing machines may be discharged over the rims of fixtures or into trapped standing waste pipes, or floor waste gullies.

18.23.1.2 Gravity Discharges

Washing machines with gravity discharges shall discharge through:

- (a) 40 mm fixture discharge pipes connected to floor waste gullies in accordance with By-law 18.13.8; or
- (b) 40 mm trapped standing waste pipes.

In either case the waste pipe shall terminate not less than 25 mm above floor level and not more than 25 mm from the side of the washtrough or cabinet.

[By-law 18.23.1.2 amended in Gazette 28 June 1985 p. 2350.]

18.23.2 Commercial Type Laundries

Commercial type laundry installations shall not be made until plans and specifications of the proposed work have been approved by the Board.

18.23.3 Dishwashing Machines

[18.23.3.1. By-law 18.23.3.1 repealed in Gazette 28 June 1985 p. 2351.]

18.23.3.2 Connection (Figure 18.10)

- (a) Domestic dishwashing machines whether of the fixed or portable type shall discharge:
 - (i) Over a sink with the outlet at least 25 mm above the rim;
 - (ii) Through a trapped waste-pipe of not less than 40 mm connected to a disconnector gully;
 - (iii) Through a trapped waste-pipe of not less than 40 mm, connected downstream of another fixture, the overflow level of the fixture being at least 50 mm below the level of the base of the dishwashing compartment;

- (iv) Provided the outlet hose extends not less than 25 mm above the overflow level of the sink, above the water-seal of a 50 mm sink-trap, the length of untrapped waste-pipe not exceeding 1.2 m; or
 - (v) Provided an air disconnection coupling is inserted at the junction of the outlet hose and the waste-pipe through a trapped waste-pipe of not less than 40 mm connected directly to a discharge stack or property sewer.
- (b) Air disconnection couplings shall be fixed in the upright position, in accessible locations. The connecting hose shall be clipped in the vertical position for at least 50 mm above the coupling.
- (c) Dishwashing machines other than domestic type shall be connected to traps not less than 50 mm discharging to grease arrestors.

[By-law 18.23.3.2 amended in Gazette 24 December 1982 p. 4927.]

18.23.4 Glass Washing Machines

The outlet hose and waste-pipe may be connected in a similar manner to domestic dishwashing machines, By-law 18.23.3, or connected to discharge to a floor-waste gully.

[By-law 18.23.4 amended in Gazette 24 December 1982 p. 4927.]

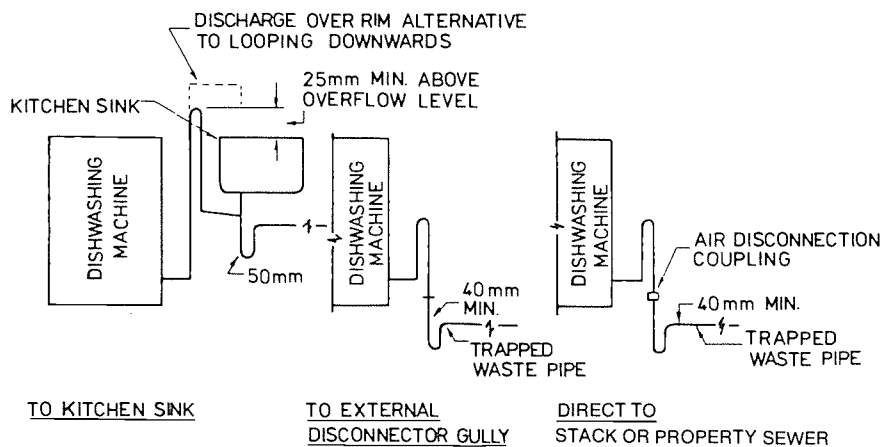


FIGURE 18.10 CONNECTION OF DOMESTIC DISHWASHING MACHINES

[Figure 18.10 amended in Gazette 24 December 1982 p. 4927.]

18.24 WASTE DISPOSAL FROM CARAVANS

Dump and connection points for the disposal of soil and sullage wastes from caravans shall be in accordance with the requirements of Figures 18.11 and 18.12 respectively.

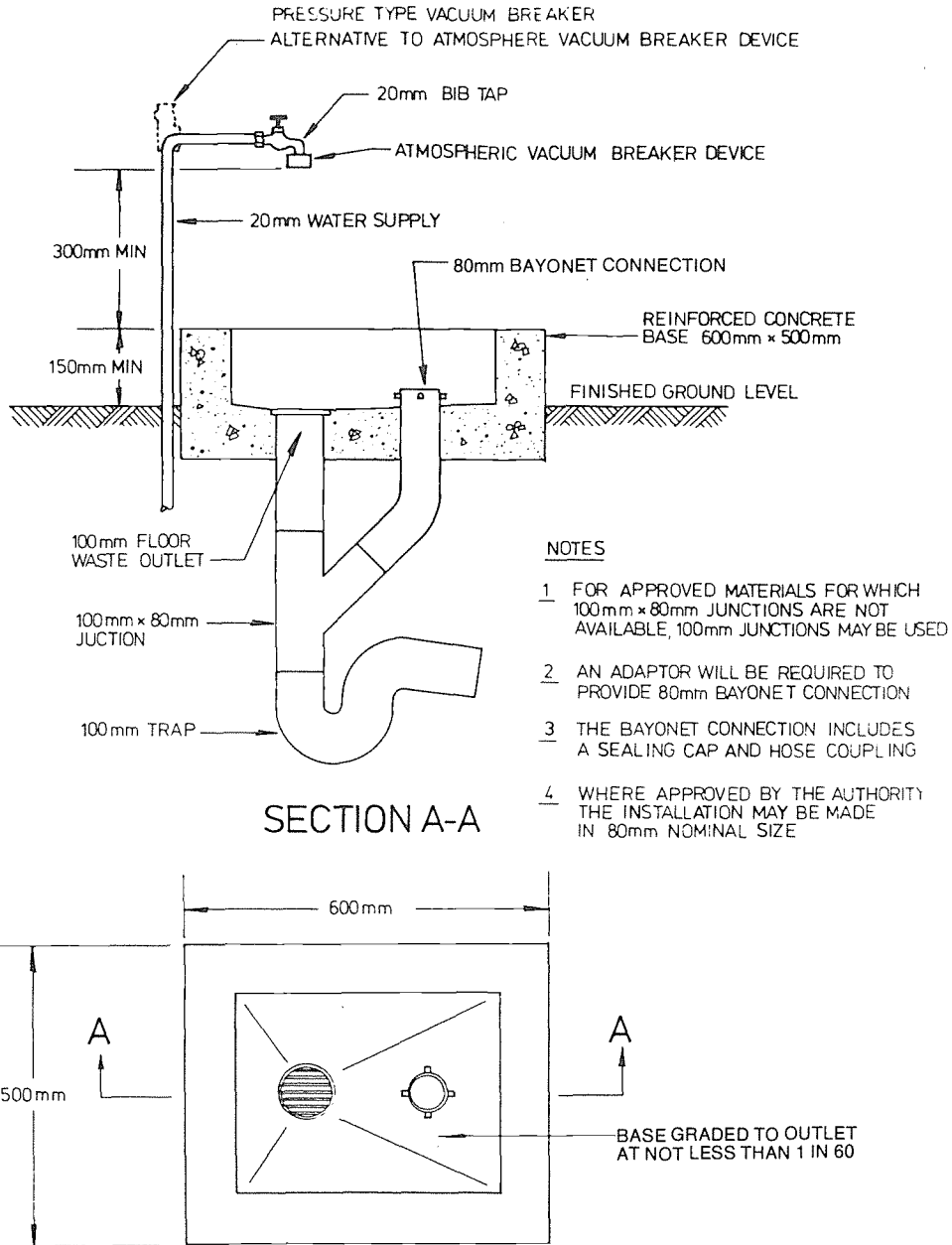
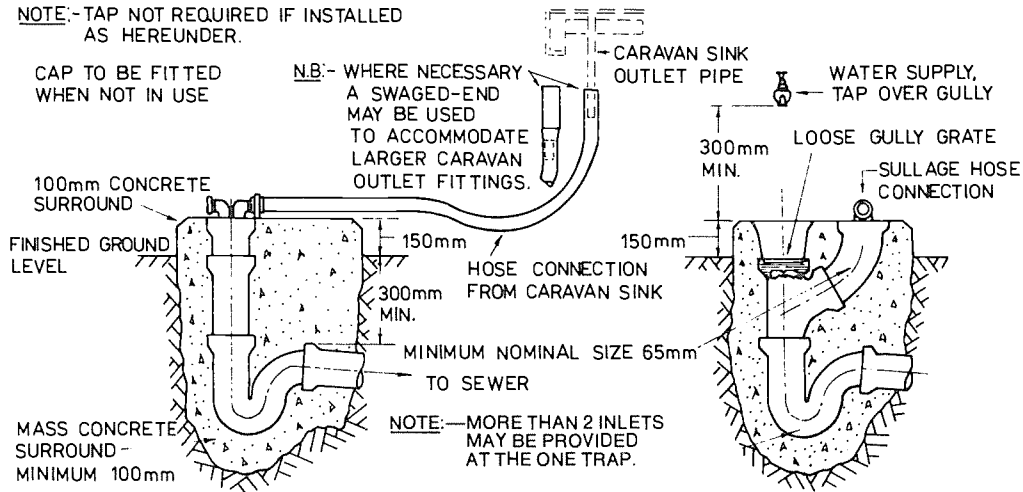


FIGURE 18.11 SOIL WASTES DUMP POINT FOR CARAVAN PARKS

NOTE:- TAP NOT REQUIRED IF INSTALLED AS HEREUNDER.



(1) ALTHOUGH SHOWN USING V.C. AND SCREWED GAL. FITTINGS, ANY OTHER APPROVED FITTINGS MAY BE USED.

(2) OUTLETS TO BE CAPPED WHEN NOT IN USE.

(3) WHERE APPROVED BY THE AUTHORITY 100mm, 80mm OR 65mm NOMINAL SIZE OUTLET TRAPS MAY BE INSTALLED.

100mm TRAP (80mm WHERE APPROVED)

(1) ALTERNATIVE ARRANGEMENT WHERE GULLY IS REQUIRED IN CONJUNCTION WITH CARAVAN SULLAGE DISPOSAL POINT. (SINK STONE MAY BE USED)

(2) SQUARE WITH BEND MAY BE USED IN LIEU OF SLOPE JUNCTION AND BEND

DUAL SULLAGE HOSE CONNECTIONS

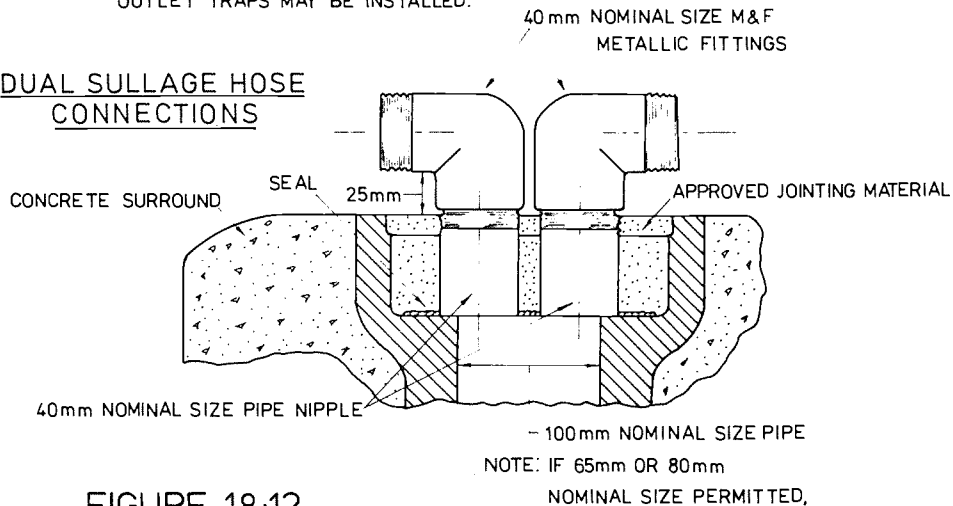


FIGURE 18.12
SULLAGE DUMP POINT
FOR CARAVAN PARKS

18.25 WATER-CLOSET PANS

18.25.1 Connection

Water-closet pans shall be connected directly to soil-discharge stacks or property sewers through soil-pipes of not less than 100 mm.

[By-law 18.25.1 amended in Gazette 24 December 1982 p. 4927.]

18.25.2 Installation

- (a) Pedestal water-closet pans shall be set such that the base is not more than 20 mm above finished floor. The pans may be fixed by bedding with cement mortar on concrete or tiled floors, and by approved corrosion resistant fasteners on wooden floors.
- (b) Wall hung pans shall be supported on approved brackets and fixed securely.

18.25.3 Flushing Installation

Water-closet pans shall be provided with approved flushing apparatus.

19.0 WATER SUPPLY TO SANITARY FIXTURES

19.1 PREVENTION OF CROSS CONNECTION

- (a) Pipework, for the supply of water to any fixture, whether directly, or indirectly through storage-tanks or flushing-cisterns, shall be so connected that the contents of any such fixtures, storage-tank or flushing-cistern cannot flow back into the supply pipes.
- (b) All water supply pipework and fittings shall be disconnected from water contained in fixtures, storage-tanks, and flushing-cisterns by an air gap of at least 200 mm, or such other minimum distances as specified in Table 19.1.

19.2 WATER SUPPLY TO FIXTURES

Pipework for the supply of water to any fixture, flushing-cistern, flushing tank or other flushing device shall be of a size in accordance with the "Water Supply" requirements of the Board.

19.3 FLUSHING SYSTEMS

19.3.1 General

- (a) Water-closet pans, slop hoppers, urinals and such other fixtures as specified by the Board shall be supplied with an approved flushing system.
- (b) Flushing systems shall be so controlled, fitted and placed so as to supply water for flushing purposes without any direct connection between the flushed fixture and the water supply pipework.
- (c) Automatic flushing systems shall be approved for their application by the Board.
- (d) Flush pipes shall be of copper, copper alloy, stainless steel or other approved material, and of sizes as specified herein.

19.3.2 Flushing-Cisterns

- (a) Flushing-cisterns shall comply with AS 1218, and be of an approved design, fitted with separate float control valves and overflows.

- (b) Where specified by the Board water supply to flushing-cisterns shall be from an approved storage tank.
- (c) Cisterns shall be firmly fixed to their supports by an approved means.
- (d) The water supply to a cistern shall be controlled by a separate stop-tap fixed as near as practicable to the cistern and within the same room or enclosure.
- (e) The cistern shall be connected to the water supply pipe by means of 15 mm copper tube, or other approved connection.
- (f) If a cistern is concealed from view a removable panel sized to facilitate maintenance of the cistern shall be provided.

19.3.3 Flush-Valves

- (a) Flush-valves shall be of a type approved by the Board and tested and stamped as required.
- (b) Valves shall be provided with an easily accessible control tap.
- (c) Flush-valves shall be supplied with water from an approved storage tank, serving flush-valves only.

19.4 STORAGE TANKS (Figure 19.1)

19.4.1 General

- (a) Where specified in these by-laws or by the Board, water shall be supplied from storage tanks, installed in accordance with these by-laws and with the Australian Model Plumbing Code—Water Supply.
- (b) Except where the Board has approved the use of a booster pump to maintain a direct supply of water to the upper storeys of a building, water outlets installed at a height of 15 m or more above ground level, or such other height as the Board may specify, shall be supplied from a storage tank.
- (c) Where water is supplied from a storage tank a separate storage tank shall be provided to supply flush-valves, in accordance with By-law 19.3.3 (c), and shall be installed in accordance with the requirements of this Part.

[By-law 19.4.1 amended in Gazette 24 December 1982 p. 4927.]

19.4.2 Form

- (a) Storage tanks shall be constructed of copper, copper alloy, cast iron, galvanized steel or other approved materials. Galvanized steel sheet storage tanks within buildings shall not exceed 2500 litres in size.
- (b) Storage tanks shall be provided with an approved cover.
- (c) Unless another drainage provision exists storage tanks shall be provided with a safe tray not less than 50 mm in depth and at least 150 mm larger than the base of the storage tank.

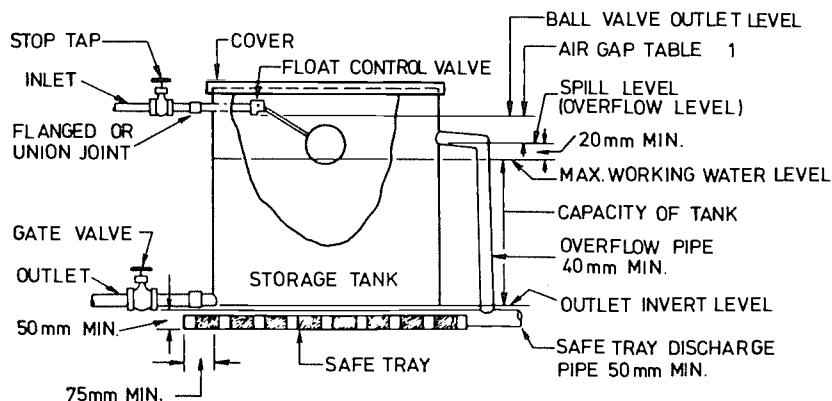


FIGURE 19.1 STORAGE TANKS

- (d) Storage tanks shall be provided with an overflow so constructed that with the water supply outlet discharging at its maximum flow with water pressure of 70 m head and with all service outlets closed, an air gap of not less than those shown in Table 19.1 shall be maintained between the spill level and the outlet of the water supply system. The minimum size of the overflow shall be 40 mm.
- (e) The overflow from a storage tank safe tray shall discharge through a suitably constructed safe waste pipe of not less than 50 mm, such that the overflow discharges to the atmosphere, clear of doors, windows and other openings. It shall be plainly visible and shall not cause any damage or nuisance.
- (f) Storage tanks in excess of 50 litre capacity shall be fitted with a control valve as close as practicable to the storage tank on the outlet of the storage tank, and the outlet pipe connected to the valve shall be by means of a union or flanged joint.

TABLE 19.1 AIR GAP REQUIRED BETWEEN SPILL LEVEL AND WATER SUPPLY OUTLET

Effective Opening of Water Supply Outlet	Minimum Air Gap Between Spill level and Water Supply Outlet
Not more than 10 mm	20 mm
Not more than 15 mm	40 mm
Not more than 20 mm	60 mm
Above 20	3 times the diameter of the effective opening up to 150 mm

19.4.3 Size

The capacity of the storage tank for flushing purposes shall be a minimum of 50 litre for each flush-valve served, measured from the invert of the outlet pipe to 20 mm below the invert of the overflow pipe.

19.4.4 Water Supply

Water shall be supplied to the storage tank through a stop-tap and float control valve or controlled by other approved means.

19.4.5 Installation

- (a) The safe tray and storage tank shall be supported on a suitably constructed platform complying with the relevant Building Regulations.
- (b) The minimum height of storage tanks above flush-valves or cisterns shall be 3 m measured vertically from the outlet of the storage tank to the inlet of the flush-valve or cistern.

19.5 WATER PIPES FROM STORAGE TANKS TO FLUSH-VALVES (Figure 19.3)

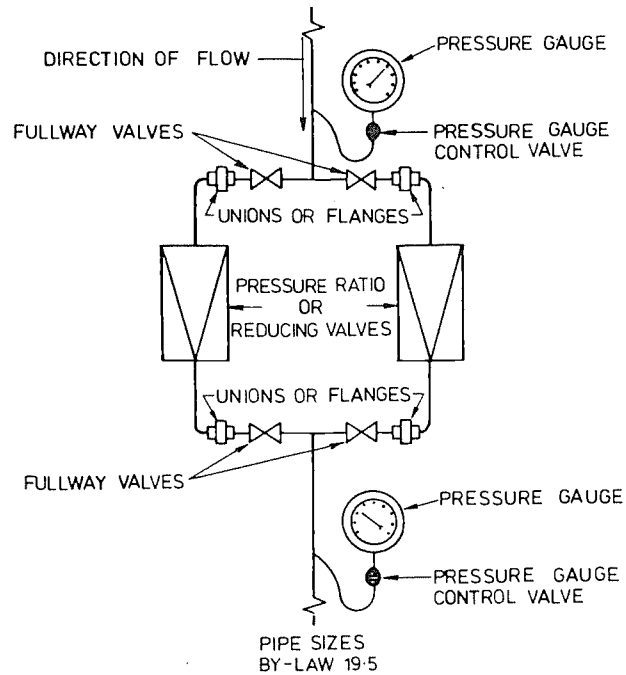
- (a) Subject to By-laws 19.5 (b) to 19.5 (d) the size of water supply pipes from storage-tanks to flush-valves shall be selected in accordance with Table 19.2. Galvanized steel pipes shall not be used.
- (b) Where a pressure ratio valve is used to reduce the head to comply with By-law 19.6, the head available to determine pipe sizes will be reduced in the same proportion as the ratio reduction of the valve.
- (c) In no case shall any section of the supply pipe from a storage tank be of less diameter than that of any lower section of the same pipe or branch which it serves.
- (d) Where the flush-valves to be supplied exceed the maximum number per table 19.2, special approval shall be obtained for the installation.

TABLE 19.2 SIZE OF WATER SUPPLY PIPEWORK TO FLUSH-VALVES

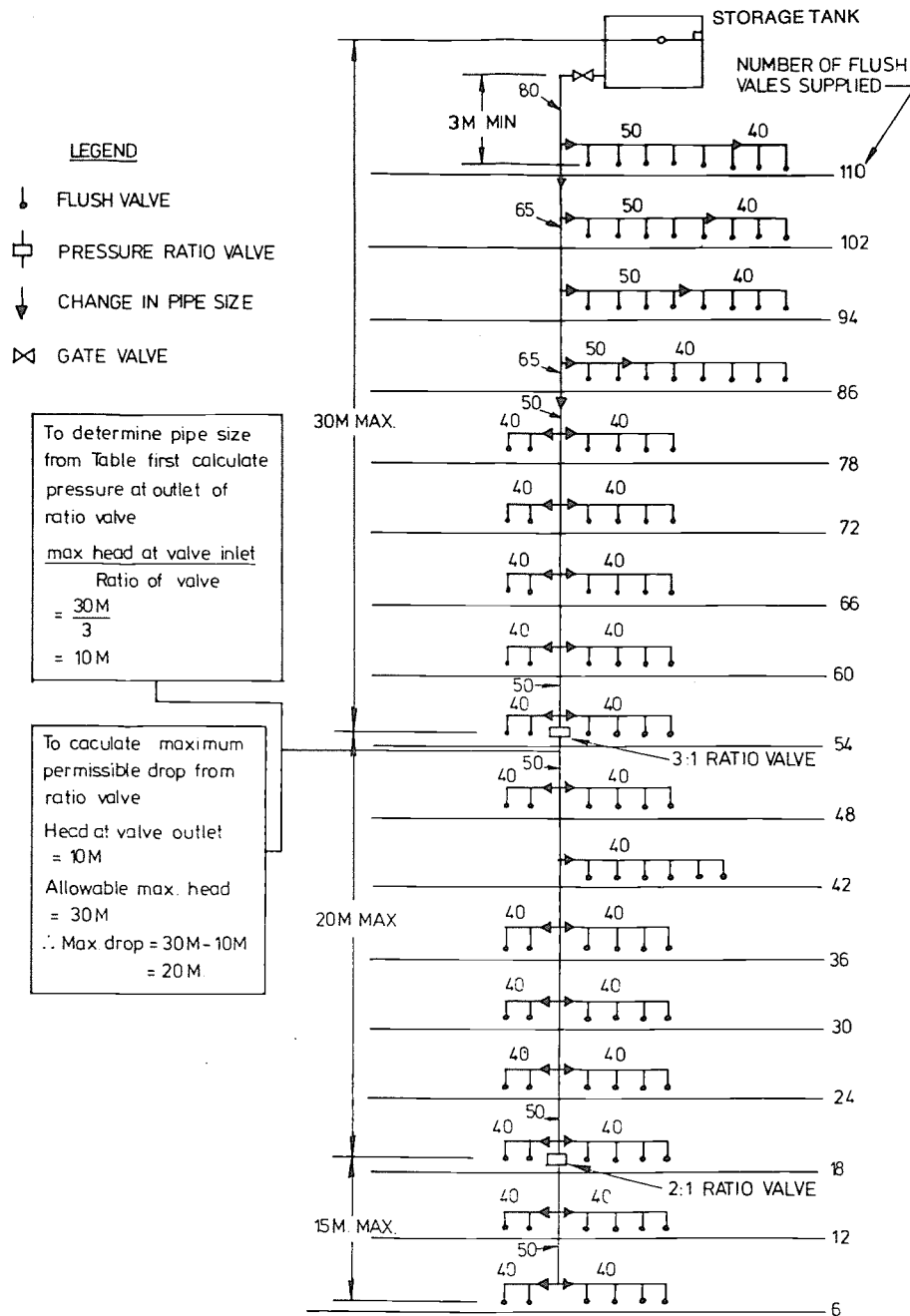
Available Head	Required Size of Serviced Pipe	Total Number of Flush-valves Served Downstream, on the Same Floor and at lower levels
Not less than 3 m	40 mm	2
	50 mm	15
	65 mm	50
	80 mm	150
Not less than 6 m	40 mm	3
	50 mm	30
	65 mm	150
	80 mm	200
Not less than 9 m	40 mm	4
	50 mm	50
	65 mm	200
Not less than 12 m	40 mm	6
	50 mm	100
	65 mm	250

19.6 OPERATING HEADS TO FLUSH-VALVES

- (a) The head of water supplying any flush-valve shall be at least 3 m and shall not exceed 30 m.
- (b) Supply level heads greater than 30 metres may be reduced by using intermediate storage tanks or by using pressure ratio or reducing valves subject to the following conditions:
 - (i) Ratio or reducing valves shall be of at least the same pipe size as specified in Table 19.2 in the position where it is to be installed and shall be of an approved type.



**FIGURE 19.2 VALVE CONTROL OF PRESSURE
FOR FLUSH VALVES**



**FIGURE 19-3 TYPICAL FLUSH VALVE INSTALLATION
USING PRESSURE RATIO VALVES**

- (ii) Ratio or reducing valves shall be installed in duplicate and in parallel.
- (iii) Ratio or reducing valves shall be isolated by means of a full-way valve fitted on the inlet and outlet sides.
- (iv) A pressure gauge calibrated to a maximum of 50 metres and greater than the working head is to be installed on the inlet and outlet sides of each dual installation.
- (v) Ratio or reducing valves shall be readily removable for maintenance purposes, by means of flanged or approved union type joints.
- (vi) The ratio or reducing valve installation shall be fully operative when one of the valves is isolated for maintenance purposes. Under normal operation, full way control valves shall be open.

19.7 WATER SUPPLY PIPELINES

The material, thicknesses, jointing and fixing of water supply pipes shall comply with the "Water Supply" requirements of the Board.

19.8 FLUSHING APPARATUS FOR SANITARY FIXTURES

19.8.1 Water-Closet Pans

- (a) Cisterns in accordance with By-law 19.3.2 shall be fixed to water-closet pans within the heights specified by AS 1218.
- (b) The overflow from the cistern shall discharge to the W.C. pan or to a graded floor with floor waste gully and in the latter case the discharge shall be visible and not constitute a nuisance.

[By-law 19.8.1 amended in Gazette 24 December 1982 p. 4927.]

19.8.2 Urinals

- (a) The flushing system shall adequately wash the surface of a urinal.
- (b) Manually operated cisterns for urinals shall be fixed so that the bottom of the cistern shall be at least 450 mm above the sparge pipe or spreader of the urinal and the operating control shall be no more than 2 metres above floor level.
- (c) Where practicable the urinal flush pipe should connect midway along the sparge pipe.
- (d) The wall surface of stainless steel urinals shall not be drilled for the fixing of brackets or clips.
- (e) The urinal flushing system shall comply with Table 19.3.

TABLE 19.3 FLUSHING SYSTEMS FOR URINALS

No. of Urinals per Cistern or Flush Valve	Length of Wall per Cistern or Flush Valve	Minimum No. of Spreaders for Wall Urinals	Minimum Capacity of Flush (litres)	Diameter of Flush Pipes for Cisterns (mm)	Diameter of Sparge Pipes to Spreaders (mm)
1	0.45	1	2.5	25	—
2	0.6	2	2.5	25	20
3	1.2	3	5.0	32	20
4	1.8	4	7.5	40	25
	2.4	5	10.0	40	25

20.0 DESIGN REQUIREMENTS

20.1 Trapping of Fixtures

The discharge from sanitary fixtures and appliances shall pass through fixture-traps or floor waste gullies before entering property sewers or soil pipes.

[By-law 20.1 amended in Gazette 24 December 1982 p. 4927.]

20.2 TRAP DESIGN AND PERFORMANCE

20.2.1 Trap Design

- Excepting W.C. pans and slop hoppers, fixture traps (including floor waste gully traps) shall have trap seals of 75 ± 5 mm.
- W.C. pans and slop hoppers shall have trap seals of 50 ± 5 mm.
- Boundary traps, disconnector and overflow relief gullies shall have trap seals of not less than 50 ± 5 mm nor more than 75 ± 5 mm.
- Except when specifically approved, no trap which depends upon internal partitions, moving parts, unequal sectional areas or any other device for the protection of its seal, shall be used in any sanitary plumbing installation.

20.2.2 Trap Performance

- Plumbing systems in accordance with the requirements of this code are designed so that under normal operating conditions the residual water-seal in fixture-traps should not be less than 25 mm.
- When under normal operating conditions the water seal in any fixture-trap is reduced to less than 25 mm, provision shall be made for venting such trap in accordance with By-law 20.10, or retention of the water seal by other approved means.

20.3 GULLIES

20.3.1 Usage of Gullies

- Gullies shall be used for one or more of the following purposes:
 - as reliefs in the event of sewage overflow;
 - as waste fittings, with integral water-seal collecting and transmitting waste discharges; or
 - to provide disconnection between waste discharges and the remainder of the sewerage installation.

- (b) Refer to By-law 18.13 for types, form and installation of gullies.

20.3.2 Fixtures Connected to Disconnecter Gullies

- (a) Where permitted in this Code fixtures with discharge pipe lengths not exceeding those shown in Table 20.1 may be connected to disconnector gullies without trap-vents.
- (b) Ground floor waste fixtures may be connected without vents to disconnector gullies in accordance with By-law 25.5.2

[By-law 20.3.2 amended in Gazette 24 December 1982 p. 4927.]

TABLE 20.1 FIXTURES WITHOUT TRAP-VENTS CONNECTED TO DISCONNECTOR GULLIES

Fixture	Requirements and Maximum Lengths of Fixture Discharge Pipe
Basin with 32 mm trap	Not permitted
Basin with 40 mm P-trap and 40 mm waste pipe	0.6 m on grade followed by 2.1 m vertical, both lengths must be straight.
Basin with 40 mm S-trap and 40 mm waste pipe.	2.5 m total length comprising 1 vertical length and 1 graded length, both lengths must be straight.
Bidet with 32 mm trap	Not permitted.
Bidet with 40 mm P-trap and 40 mm waste pipe.	0.6 m on grade followed by 2.1 m vertical, both lengths must be straight.
All other waste fixtures which are permitted to discharge to disconnector gullies.	6 m. All bends shall be long radius bends or equivalent.

20.3.3 Fixtures Connected to Floor-waste Gullies

- (a) Fixture-traps connected to floor-waste gully risers shall not have trap-vents.
- (b) Fixtures connected to floor-waste gullies shall conform with requirements in By-law 18.13.8.

[By-law 20.3.2 amended in Gazette 24 December 1982 p. 4927.]

20.4 PIPE LENGTHS—HOW MEASURED (Figure 20.1)

The length of discharge pipes shall be measured along the centre line from the trap-weir to the point of connection to gullies, discharge-stacks or graded pipes.

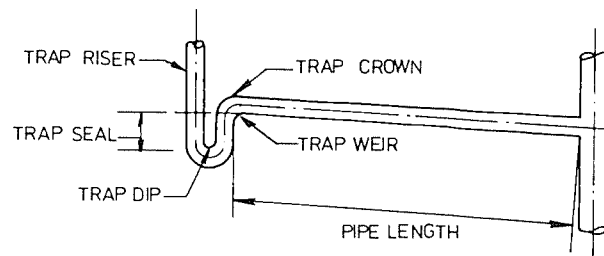


FIGURE 201 PIPE LENGTH [HOW MEASURED]

20.5 CONNECTION OF BRANCHES NEAR THE BASE OF STACKS (Figure 20.2)

- (a) Without approval, branches shall not be connected to the graded pipe within 2.5 m downstream nor 1 m upstream from a discharge stack entry point.
- (b) Branches shall not be connected to a discharge stack within the following distances from the base of the stack:
 - (i) For stacks not more than 5 storeys in height at least 600 mm between the base of the stack and the invert of the lowest branch.
 - (ii) For stacks more than 5 storeys in height at least 1 m between the base of the stack and the invert of the lowest branch.

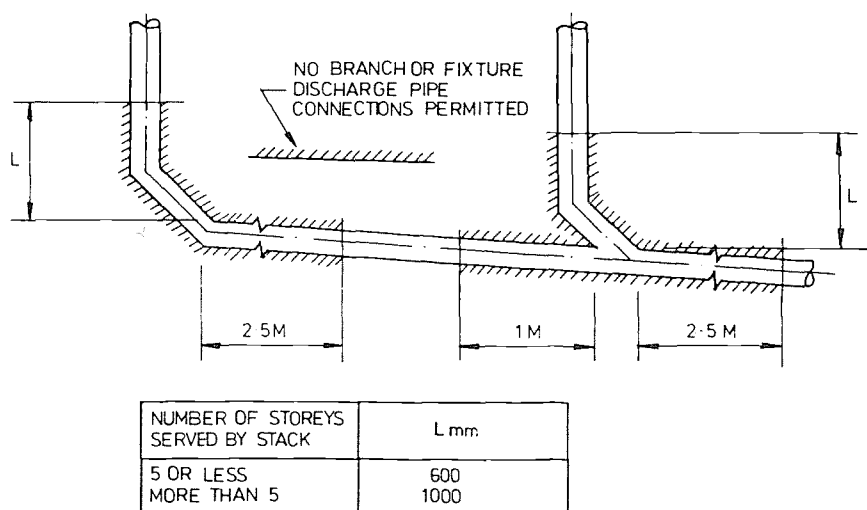


FIGURE 20.2 ENTRY BRANCHES OR FIXTURE DISCHARGE PIPES NEAR THE BASE OF STACKS

20.6 SIZING OF PIPES

20.6.1 Discharge Pipes

Except where floor-waste gully risers are larger than the floor waste-gully trap outlets and for water-closet pans where 80 mm soil pipes are approved, the size of a pipe shall not be reduced in the direction of flow.

20.6.2 Vent Pipes

Except in accordance with By-law 23.6.1 the size of a vent pipe shall not be reduced in the direction of its opening to atmosphere.

[By-law 20.6.2 amended in Gazette 24 December 1982 p. 4927.]

20.7 FIXTURE UNITS

- (a) For the purpose of determining the size of discharge pipes, the relative load producing effect of connected sanitary fixtures and continuous flows shall be expressed in fixture units in accordance with Tables 20.2 and 20.3.
- (b) The fixture unit rating of fixtures not listed in Table 20.2 shall be determined by the Board.
- (c) In certain structures such as hospitals, laboratory buildings, and other special use or occupancy buildings where the ratio of plumbing fixtures to occupants is proportionally more than required by building occupancy, and in excess of 1 000 fixture units, the Board may permit the rise of a diversity factor for sizing discharge pipes.

TABLE 20.2 FIXTURE UNIT RATINGS OF FIXTURES

Fixture	Rating (Fixture Units)
Ablution Trough	3
Autopsy table	3
Bain marie	1
Bar sink (domestic)	1
Bar sink (commercial)	3
Basin	1
Bath	4
Bed Pan sterilizer and washer (cistern)	4
Bed Pan sterilizer and washer (flush valve)	6
Bidet	1
Cleaner's sink	1
Clothes washing machine (domestic)	5
Combination pan room sink and flushing bowl	6
Dental unit	1
Dishwasher (domestic)	3
Drinking fountain	1
Glass washing machine	3
Kitchen sink (single or double) (with or without food waste disposal unit)	3
Kitchen sink (commercial)	5
Laboratory sink	1
Laundry trough (single or double)	5
Potato peeler	3
Refrigerated cabinet	1
Sanitary napkin disposal unit	3
Shower	2
Shower bath	3
Slop hopper (cistern)	4
Slop hopper (flush valve)	6
Sterilizer	1
Urinals (2.4 m of wall length or 4 stalls)	3
Water-closet pan (cistern)	4
Water-closet pan (flush valve)	6
Group of fixtures in one room (bath, basin, shower, water closet pan)	6

TABLE 20.3 FIXTURE UNIT
RATINGS OF CONTINUOUS FLOWS

Flow (litre/second)	Rating (Fixture Units)
0.5	6
1.0	8
1.5	15
2.0	25
2.5	40
3.0	60
3.5	85
4.0	115

20.8 PLUMBING STACK SYSTEMS

Plumbing systems in multi-storey buildings can conveniently be classified into 4 types:

- (a) Fully Vented Systems;
- (b) Fully Vented System—Modified;
- (c) Single Stack System; and
- (d) Single Stack System—Modified.

20.9 DESIGN OF VENTS

20.9.1 Vertical Vent Pipes

Whenever possible every vent pipe shall be vertical. Any offset constructed at 45 degrees or more to the horizontal shall be deemed to be vertical.

20.9.2 Prohibited use of Chimneys or Ventilating Shafts

Chimneys or ventilating shafts shall not be used for venting any discharge pipe.

20.9.3 Drainage of Vents

Vents shall be installed so that any condensation or other liquids which form in or enter the vents will drain to the sewer.

20.9.4 Vents to be Separate

The following vent pipes shall be vented to the atmosphere independently of any other system vent:

- (a) Vent pipes from waste-fixtures discharging into disconnector gullies;
- (b) Breather vents from sealed disconnector gullies;
- (c) Chamber or steam relief-vents from bed pan sanitizers and washers;
- (d) Vent pipes from ejectors except with the approval of the Authority; and
- (e) Vent pipes from arrestor chambers.

20.9.5 Height of Vent (Figure 20.3)

Except where specified in these by-laws the opening to atmosphere of a vent shall be located:

- at least 600 mm above any window or other opening into any building, within a horizontal distance of 3 m from the vent;
- at least 150 mm above its point of penetration through any roof covering;
- at least 3 m above any roof decking used for other purposes besides weather-proofing and within a horizontal distance of 3 m from the vent;
- at least 600 mm above any eaves, coping or parapet within a horizontal distance of 600 mm from the vent;
- at least 2 m above or 600 mm below any chimney or similar opening, within a horizontal distance of 3 m from the vent; and
- at least 5 m from any air-duct intake.

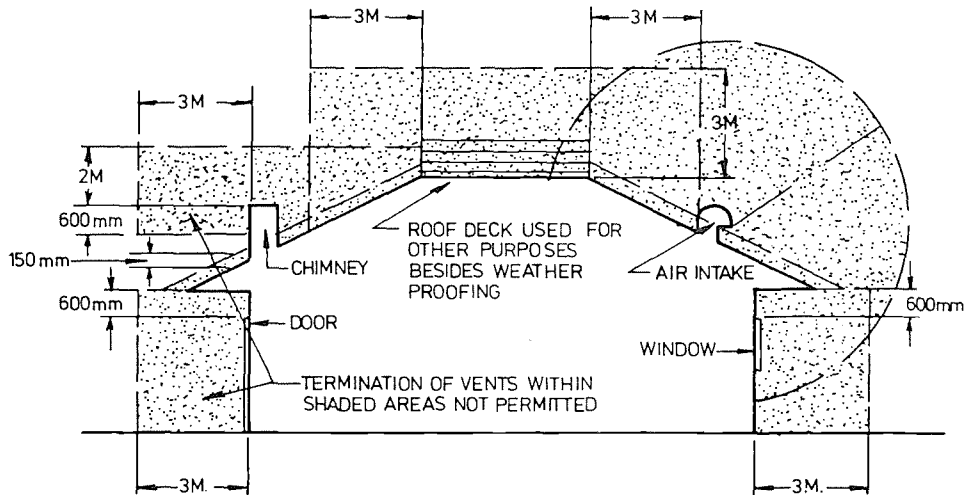


FIGURE 203 TERMINATION OF VENTS

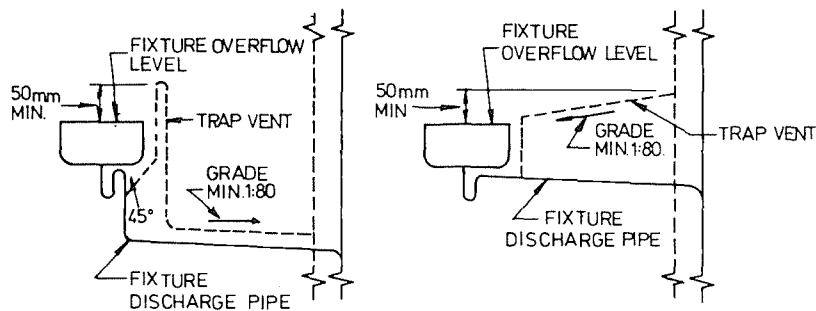


FIGURE 204 DRAINAGE OF TRAP-VENTS

20.9.6 Ground-Vents from Boundary-Traps

Ground-vents shall be located so that:

- (a) the vent tops are at least 3 m from any door, window or other opening into a building;
- (b) the vent tops are at least 150 mm above ground level; and
- (c) they are clear of pedestrian walkways and protected from damage by vehicles.

20.10 TRAP-VENTS (Figures 20.4 to 20.7)

- (a) Unless otherwise specified in these by-laws fixture-traps shall be individually vented with a trap-vent sized in accordance with Table 20.4.
- (b) Trap-vents shall, where practicable, be connected at a distance of 75 mm from the trap, or shall be connected as closely as possible within the following specifications:—
 - (i) Subject to (ii) in the case of basins and bidets, trap-vents shall be connected between 75 mm and 300 mm from the crown of the trap;
 - (ii) If no change of direction occurs in the section of waste pipe between the trap and the trap-vent connection where a basin or bidet is fitted with a P-trap and discharges to a disconnector gully, the trap-vent may be connected to the first graded section of waste pipe between 75 mm and 600 mm from the crown of the trap;
 - (iii) Subject to (iv), (v) and (vi), in the case of fixtures other than basins and bidets the trap-vent shall be connected between 75 mm and 1.5 m from the crown of the trap, or, if there is a vent horn, at the crown of the trap;
 - (iv) Where a fixture other than a basin or bidet is fitted with a P-trap, the trap-vent shall be connected either in the first graded section of waste pipe or in the first vertical section of discharge pipe and in the latter case at least 300 mm above the bottom of the vertical section;
 - (v) Subject to (vi) where a fixture other than a basin or bidet is fitted with an S-trap, the trap-vent shall be connected in the first vertical section of discharge pipe; or
 - (vi) Where a water closet pan or a slop hopper is fitted with an S-trap the trap-vent may be connected to the first graded section not more than 1.2 m from the crown of the trap.
- (c) Trap-vents may connect into branch-vents, relief-vents, or extend separately to atmosphere.
- (d) Each trap-vent shall extend at an angle of not more than 45 degrees to the vertical to a height of at least 50 mm above the overflow rim of the trapped fixture before entering into a graded or vertical system vent pipe.
- (e) All trap-vents shall drain at a minimum grade of 1:80 to the discharge pipe system.
- (f) No other fixture shall be connected to any discharge pipe between any fixture-trap and its associated vent.
- (g) A single trap-vent may be used to vent the traps of any 2 fixtures connected back to back to a vertical discharge pipe provided:
 - (i) P-traps are used;
 - (ii) Both fixture discharge pipes are connected at the same level to a “Y” junction fitting with an included angle of 90 degrees;
 - (iii) The vent pipe is extended vertical from such junction;

- (iv) The vent pipe is of the size appropriate to the larger fixture-discharge pipe; and
- (v) The distance measured along the pipework from the crown of either trap to the vent connection complies with the requirements of By-law 20.10(b) above.

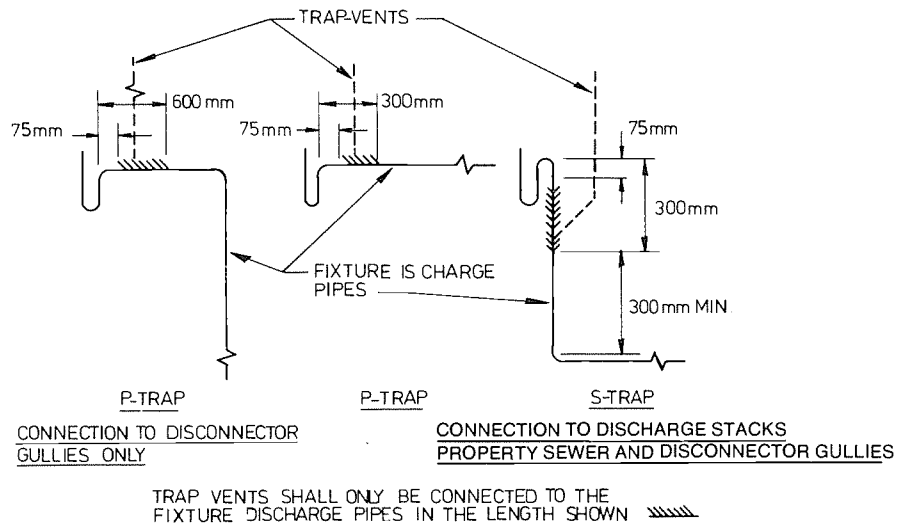


FIGURE 20.5 TRAP-VENTS SERVING BASINS AND BIDETS

[Figure 20.5 amended in Gazette 24 December 1982 p. 4927.]

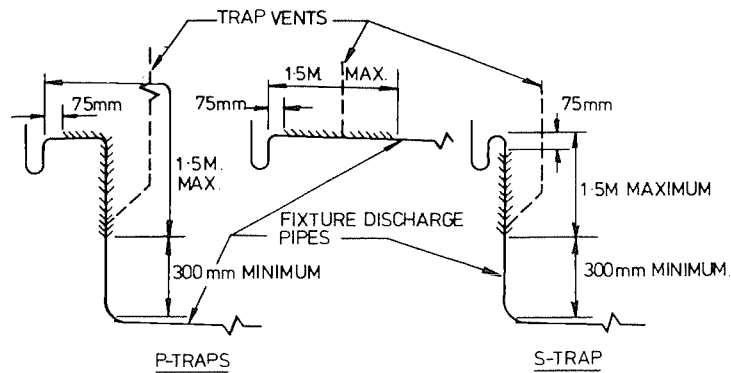


FIGURE 20.6 TRAP VENTS SERVING ANY FIXTURES EXCEPT BASINS AND BIDETS

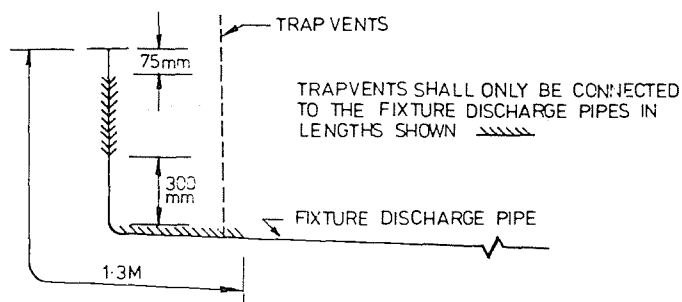


FIGURE 20.7 TRAP VENTS SERVING WATER CLOSET PANS AND SLOP HOPPERS

TABLE 20.4 SIZE OF TRAP-VENTS

Fixture Trap Size —mm	Trap Vent Size —mm
32	32
40	32
50	40
65	40
80	40
100	40

20.11 PUMPED DISCHARGES

20.11.1 General

Except with the approval of the Board no device shall be used to eject to sewage from any property.

20.11.2 Ejection by Compressed Air

20.11.2.1 Inlet Pipe

The pipe conveying discharges to any ejector pot shall be sized, vented and installed as a property sewer in accordance with Part 25.

[By-law 20.11.2.1 amended in Gazette 24 December 1982 p. 4927.]

20.11.2.2 Outlet Pipe

The outlet pipe from any ejector pot shall be connected either:

- (a) to a boundary trap shaft; or
- (b) provided that the connection is at least 2.5 m distance from any other connection thereto, and the outlet pipe is connected on a falling gradient from a height of at least 300 mm above such property sewer or graded discharge pipe, to a property sewer or graded discharge pipe.

[By-law 20.11.2.2 amended in Gazette 24 December 1982 p. 4927.]

20.11.2.3 Vent from Ejector Pot

Except with the approval of the Board the vent pipe from the ejector pot shall extend to its opening to atmosphere independently of any other system vent.

20.11.3 Ejection by Pumping

20.11.3.1 General

- (a) Pumping installations for the ejection of sewage shall be in accordance with the relevant provision of this Part.
- (b) Every such installation shall comprise a wet well to which sewage is gravitated, and from which the contents are pumped.
- (c) Except with the specific approval of the Board, pumps, whether of the submersible or non-submersible kind, shall be installed in duplicate.

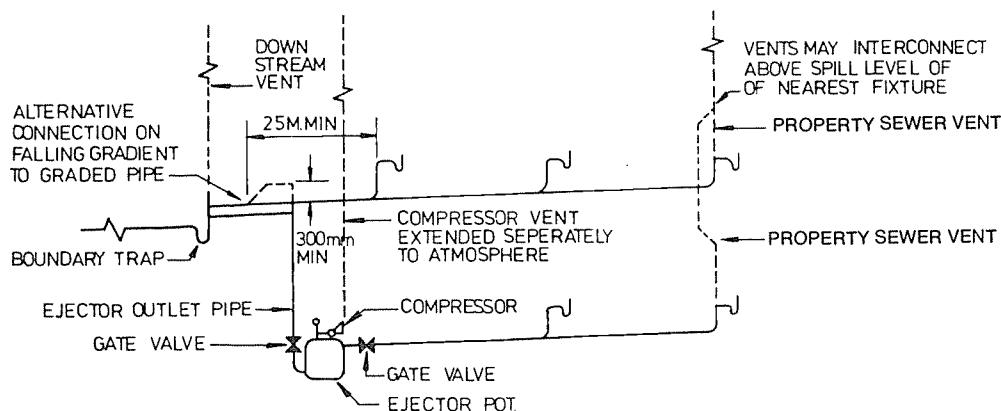


FIGURE 20.8 EJECTION BY COMPRESSED AIR

[Figure 20.8 amended in Gazette 24 December 1982 p. 4927.]

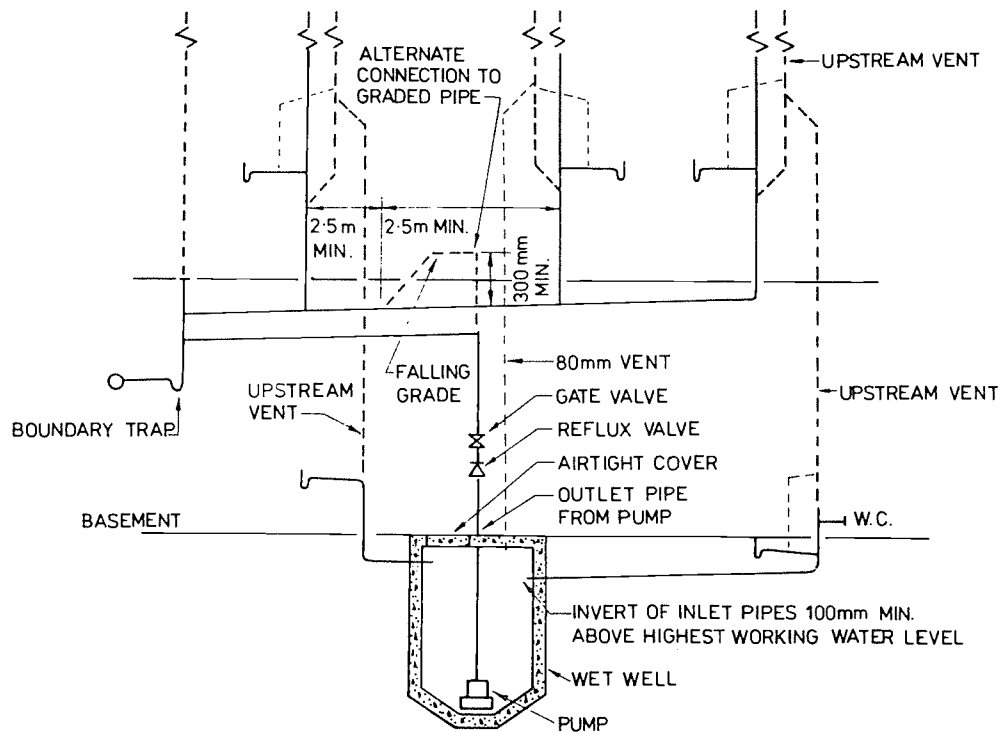


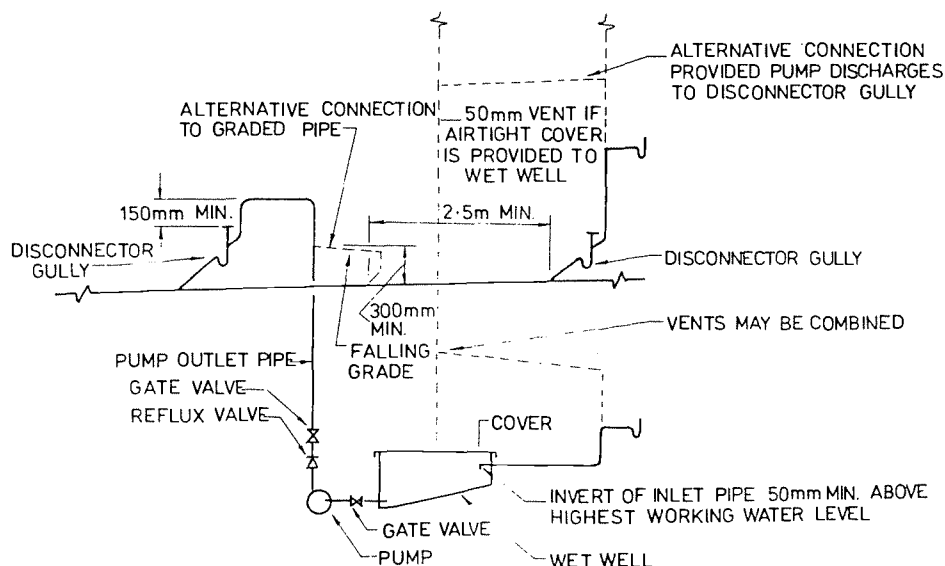
FIGURE 20.9 EJECTION BY PUMPING, SOIL DISCHARGES

20.11.3.2 Wet Well

(a) Wet wells shall be constructed of:

- (i) reinforced concrete, with a smooth hard finish;
- (ii) steel, coated internally and externally with an approved corrosion resistant material;
- (iii) provided the wet well receives waste discharges only copper or copper alloy; or
- (iv) other approved construction.

(b) The bottom of the wet well shall be graded from all sides towards the entry of the pump inlets.



**FIGURE 20.10 EJECTION BY PUMPING WASTE
DISCHARGES ONLY**

- (c) A ladder, or step irons, in accordance with By-law 25.10.4.3 or 25.10.4.4 shall be provided in every wet well exceeding 1.2 m in depth.
- (d) A removable cover of sufficient size to provide access for maintenance, including complete removal of the pumping unit shall be provided on each wet well. Except where approved in external locations, the cover on wet wells receiving soil discharges shall be airtight.

[By-law 20.11.3.2 amended in Gazette 24 December 1982 p. 4927.]

20.11.3.3 Inlet to Wet Well

The inlet to wet wells shall be at least the following distances above the highest working water level:

- (a) 100 mm for wet wells receiving soil discharges; or
- (b) 50 mm for wet wells receiving waste discharges only.

20.11.3.4 Control Valves

- (a) For non-submersible pump installations a full-way valve shall be provided on the inlet pipe to the pump, so the pump can be removed.
- (b) A reflux valve and gate valve shall be provided on every pump outlet pipe and in such a position that the pump can be readily removed for maintenance purposes.

20.11.3.5 Outlet from Wet Well

Except that for wet wells receiving waste discharges only, the outlet may be connected to a disconnector gully. The outlet from wet wells shall be connected as provided in By-law 20.11.2.2.

[By-law 20.11.3.5 amended in Gazette 24 December 1982 p. 4927.]

20.11.3.6 Venting to Wet Well

- (a) Where an airtight cover is provided on a wet well, such well shall be vented by a vent of not less than the following sizes:
 - (i) 80 mm for wet wells receiving soil discharges; or
 - (ii) 50 mm for wet wells receiving waste discharges only.
- (b) The vent, installed in accordance with By-law 20.9, may extend to atmosphere separately or where approved interconnect with another system vent at a height of not less than 50 mm above the overflow rim of the lowest fixture discharging to the wet well.

21.0 GRADED PIPES

21.1 MINIMUM GRADES OF DISCHARGE AND VENT PIPES

21.1.1. Discharge Pipes

Except as specified in By-law 25.4 the minimum grades of discharge pipes shall in accordance with Table 21.1.

TABLE 21.1 MINIMUM GRADES OF DISCHARGE PIPES

Discharge Pipes Nominal Size—mm	Minimum Grade
32	1:40
40	1:40
50	1:40
65	1:40
80	1:60
100	1:60
125	1:80
150	1:80
175	1:100
200	1:100
225	1:100
250	1:100
300	1:100

21.1.2 Vent Pipes

Vent pipes shall be constructed on grade of at least 1 in 80.

21.2 SIZE OF GRADED DISCHARGE PIPES

- (a) Except as specified in By-law 23.3 the size of graded discharge pipes shall be determined from 21.2.
- (b) Unless it is established to the Board's satisfaction that a steeper grade can be achieved, graded branches shall be sized on the basis of minimum grade in accordance with Table 21.1.

TABLE 21.2 SIZE OF GRADED DISCHARGE PIPES

Nominal Pipe Size mm	Maximum Loading (Fixture Units)						
	1 in 100	1 in 80	1 in 60	1 in 50	1 in 40	1 in 30	1 in 20
32	np	np	np	np	1	1	1
40	np	np	np	np	4	5	6
50	np	np	np	np	8	10	15
65	np	np	np	np	20	25	35
80	np	np	15*	27*	40*	55*	65*
100	np	np	100	150	200	250	325
125	np	250	400	450	550	600	700
150	np	625	775	875	975	1 075	1 250
175	900	1 050	1 250	1 350	1 500	1 650	1 900
200	1 350	1 600	2 000	2 200	2 500	2 750	3 150
225	1 800	2 300	2 900	3 300	3 700	4 100	4 500

np = not permitted

* = no more than 2 closet pans to be connected to any 80 mm graded pipe.

21.3 BENDS IN GRADED PIPES

All bends greater than 45 degrees in graded discharge pipes shall be long bends.

21.4 CONNECTIONS TO GRADED DISCHARGE PIPES

21.4.1 Graded Pipes to Graded Pipes

- (a) Unless specified elsewhere in these by-laws, the junction used for connecting a graded discharge pipe to a graded discharge pipe shall be either:
 - (i) a 45 degree junction, or
 - (ii) a sweep junction.
- (b) Junctions shall be swept in the direction of flow.
- (c) Double "Y" junctions shall not be used to make connections on grade, without approval.
- (d) Graded discharge pipes of different sizes shall be connected soffit to soffit.

21.4.2 Fixture Discharge Pipes to Graded Pipes

- (a) Except where maximum and minimum grades are specified in group-vented and single stack systems and the below cannot be achieved the invert level of the gully or fixture-trap weir shall be at a higher level than the soffit of the graded discharge pipe to which it connects. (Figure 21.1)
- (b) Individual fixture discharge pipes shall connect into graded pipes using:
 - (i) 45 degrees junction, or
 - (ii) Sweep junction, and shall be swept in the direction of flow.

21.4.3 Discharge-Stacks to Graded Pipes (Figure 21.2)

- (a) Bends at the base of discharge-stacks shall be the same size as the graded discharge pipe or offset. Tapered enlarging fittings shall be used in the vertical discharge-stack where necessary.
- (b) Bends at the base of discharge-stacks shall have:
 - (i) a 225 mm centre line radius for pipes up to 100 mm, and 300 mm centre line radius for pipes of 125 mm and 150 mm, or
 - (ii) two 45 degree bends separated by a straight pipe not less in length than twice the size of the pipe.
- (c) Junctions at the base of discharge-stacks shall not be more than 45 degrees to the horizontal and the length of junction branch shall be such that the vertical projection of the discharge-stack will be wholly outside the area of the junction with the graded discharge pipe.
- (d) Branch and fixture discharge pipe connections near the base of discharge-stacks shall be in accordance with By-law 20.5.

21.5 GROUP-VENTED BRANCHES (Figure 21.5)

The provision of individual fixture trap-vents in a multiple fixture installation normally intended to be fully vented may be omitted provided:

- (a) the fixtures discharge to the same graded branch in accordance with By-law 21.5.1;
- (b) the individual fixture discharge pipes are in accordance with By-law 21.5.2; and
- (c) the branch is group-vented in accordance with By-law 21.5.3.

[By-law 21.5 amended in Gazette 24 December 1982 p. 4927.]

21.5.1 Size and Configuration of Group-Vented Branches

- (a) Group-vented branches shall be sized in accordance with By-law 21.2 except when:
 - (i) the group-vent is larger than the discharge pipe to which it connects, the discharge pipe shall be increased in size to not less than the size of the group-vent; or
 - (ii) for unvented fixture-discharge pipes less than 65 mm, the group-vented branch to which they connect shall be at least one size larger than the fixture discharge pipes.
- (b) Except in accordance with By-law 21.5.1(c), group-vented branches shall be installed on grade throughout. Changes in direction not exceeding 45 degrees are permitted in the horizontal plane.
- (c) A vertical dropper not exceeding 1.5 m in height may be installed in a group-vented branch provided:
 - (i) a group-vent is installed downstream of the lower bend forming the dropper, and upstream of the first fixture discharge pipe junction with the branch below the dropper; or
 - (ii) all fixtures connected downstream of the dropper are trap-vented.
- (d) Changes in group-vented branch size shall be made using eccentric enlargers with the pipes installed soffit to soffit.

[By-law 21.5.1 amended in Gazette 24 December 1982 p. 4927.]

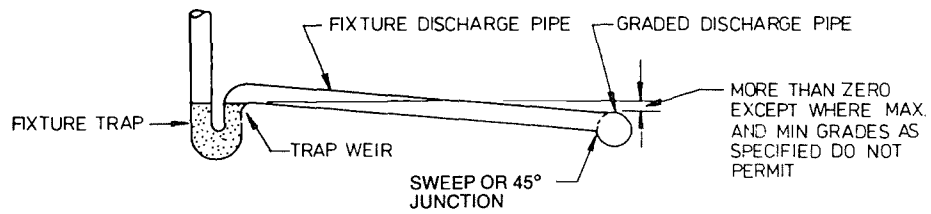


FIGURE 21:1 FIXTURE DISCHARGE PIPES TO GRADED DISCHARGE PIPES

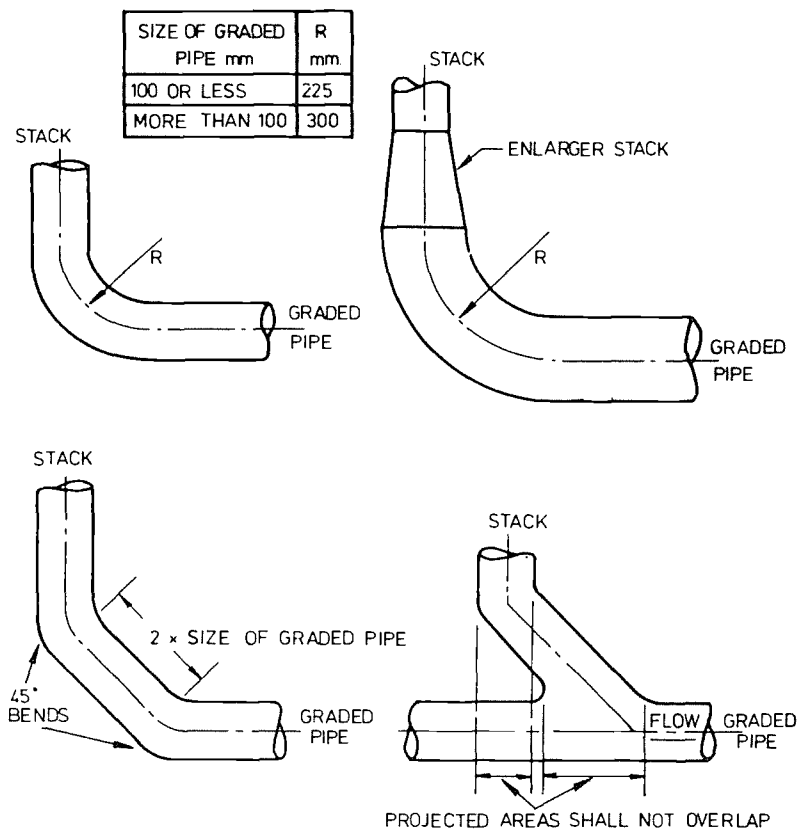


FIGURE 21:2 CONNECTION OF DISCHARGE STACKS TO GRADED DISCHARGE PIPES

21.5.2 Connection of Unvented Fixture Discharge Pipes to Group-Vented Branches—

- (a) Provided the lengths and grades of the fixture discharge pipes are in accordance with Table 21.3 fixtures may be connected to group-vented branches without individual trap-vents.
- (b) Provided the fixture discharge pipe is increased to 40 mm at a distance of 50 + or - 10 mm from the trap weir, using an eccentric enlarger with the pipes installed soffit to soffit basins with plugs or bidets with 32 mm P-trays may be installed without trap-vents (Figure 21.3).

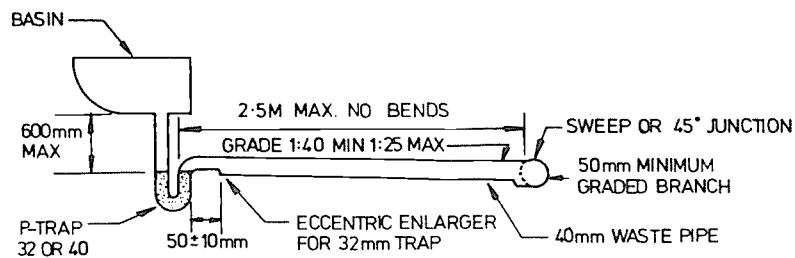


FIGURE 21.3 CONNECTION OF BASINS WITHOUT TRAP VENTS TO GRADED BRANCHES

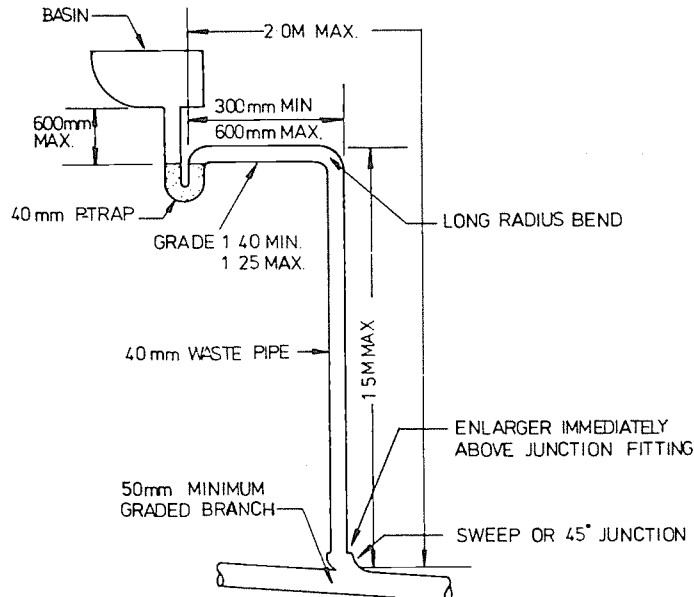


FIGURE 21.4 CONNECTION OF BASINS WITHOUT TRAP-VENTS AND WITH A VERTICAL DROPPER TO GRADED BRANCHES

- (c) Basins or bidets with 40 mm P-traps may be installed without trap-vents, and with one long-bend in the vertical plane of the fixture discharge pipe provided (Figure 21.4):
- (i) the length of 40 mm discharge pipe from the trap-crown to the enlarger does not exceed 2 m;
 - (ii) the enlarger is installed immediately above the junction into the group vented branch; and
 - (iii) the graded section of the fixture pipe is graded between 1:40 and 1:20 and has a length between 300 and 600 mm.
- (d) Fixture discharge pipes, not serving basins with plugs or bidets, may have a maximum of 2 long bends in the horizontal plane, 2 long bends in the vertical plane for fixtures with P-traps, and one long bend in the vertical plane for fixtures with S-traps. The length of a vertical dropper shall not exceed 1.5 m.

TABLE 21.3 CONNECTION OF FIXTURE BRANCHES WITHOUT TRAP-VENTS TO GROUP-VENTED BRANCHES

Fixture	Fixture Trap —mm	Maximum Length of Fixture Discharge Pipe —m	Range of Grades of Fixture Discharge Pipe	
			Min.	Max.
Basins and Bidets	32 mm "p"-trap see By-law 21.5.2 (b)	2.5	1:40	1:25
	40 mm P-traps			
	(i) no bends	2.5	1:40	1:25
	(ii) Vertical dropper see By-law 21.5.1 (c)	2.0	1:40	1:25
Unpluggable Basins	32 and 40	2.5	1:40	1:25
Baths	40	2.5	1:40	1:20
Floor-Waste Gullies	50 and 65	2.5	1:40	1:20
Kitchen Sinks	50	2.5	1:40	1:20
—with food disposal unit	50	2.5	1:20	1:10
Laundry Troughs	40 and 50	2.5	1:40	1:20
Showers	40 and 50	2.5	1:40	1:20
Urinals	50 and 65	2.5	1:40	1:20
Washing Machines	40 and 50	2.5	1:40	1:20
Water-closet Pans	100 m soil pipe	6	1:60	1:20
	80 mm soil pipe and only where approved	1.5	1:60	1:20

[Table 21.3 amended in Gazette 24 December 1982 p. 4927.]

21.5.3 Group-Vents

- (a) Group-vents shall be sized in accordance with Table 21.4.
- (b) At least one group-vent shall be provided for every group of 10 fixtures or part thereof.
- (c) One group-vent shall be connected to the most upstream fixture discharge pipe in accordance with By-law 20.10. Subsequent group-vents shall be installed as required approximately equidistant along the group-vented branch.
- (d) If the graded pipe varies in size along its length, the group-vent shall be sized on the largest size of branch pipe which it serves. The branch pipe served by a group-vent is that length of discharge pipe from the group-vent to the next downstream group-vent, or the junction of the branch with a stack, vented graded discharge pipe, disconnector gully or property sewer as applicable.
- (e) Group-vents may connect into branch-vents, relief-vents, stack-vents or extend separately to atmosphere.
- (f) Group-vents shall extend to a height of not less than 50 mm above the overflow rim of the nearest fixture connected to the group-vented branch before interconnecting with any other system vent.
- (g) Group-vents connected directly to the branch pipe shall extend from the top of the branch.

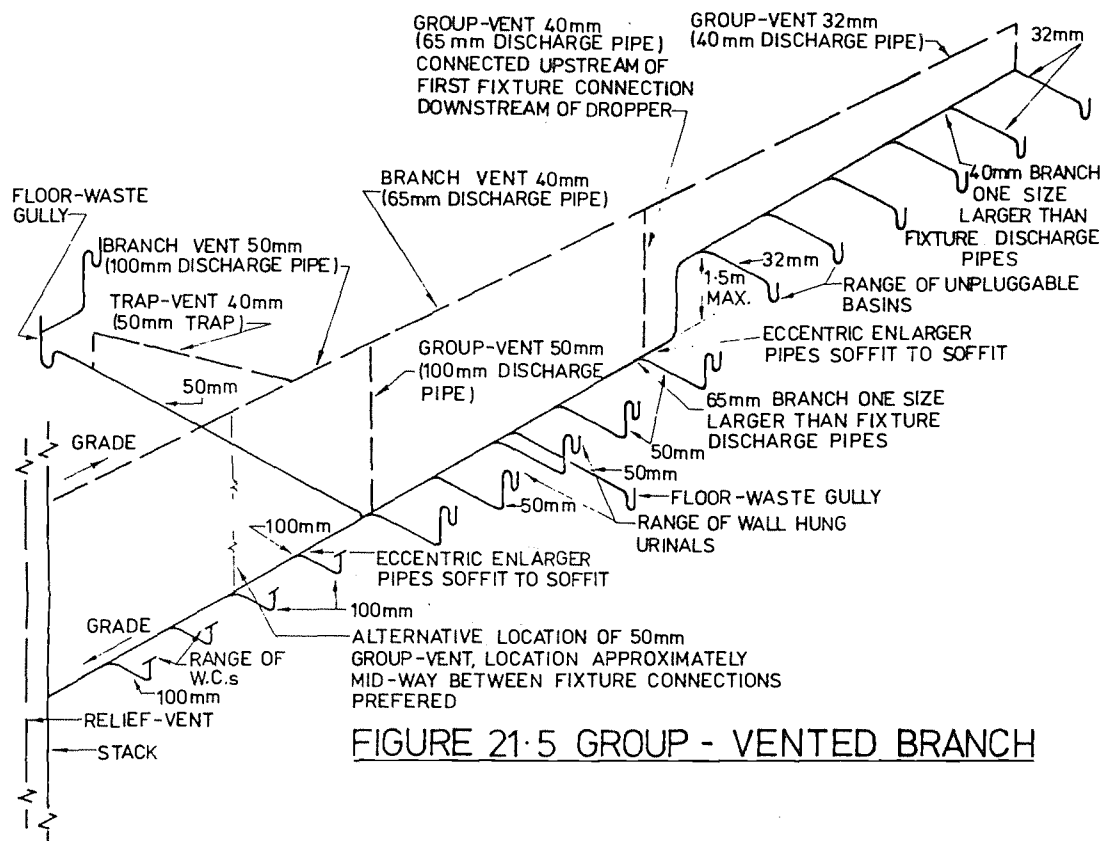
[By-law 21.5.3 amended in Gazette 24 December 1982 p. 4927.]

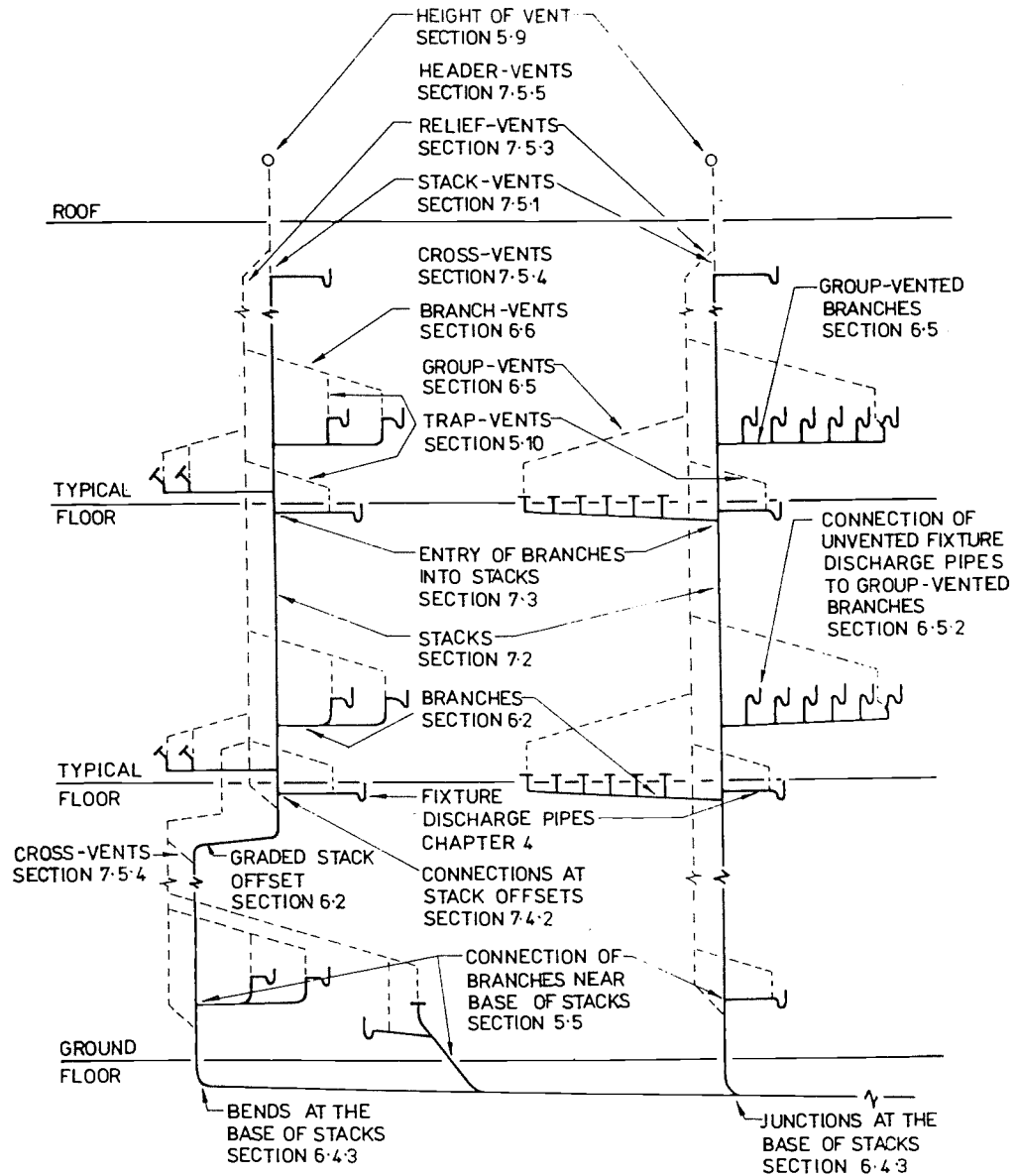
TABLE 21.4 SIZE OF BRANCH-VENTS AND GROUP-VENTS

Size of Branch Discharge Pipe —mm	Size of Vent—mm	
	Group-Vents	Branch-Vents
40	32	32
50	40	40
65	40	40
80	50	50
100	50	50
150	50	80

21.6 BRANCH VENTS

- (a) Unless otherwise specified in these by-laws every branch with more than one group-vent or trap-vent or a combination of both connected shall be vented with a branch vent sized in accordance with Table 21.4.
- (b) If the branch discharge pipe varies in size along its length, the corresponding sections of branch vent shall be sized on the largest size of branch discharge pipe which it serves.
- (c) Any enlargement in size in the branch vent shall occur prior to the junction connecting the trap-vent or group-vent which requires the branch vent size to be increased.
- (d) Branch vent may connect into relief-vents, stack-vents or extend separately to atmosphere.





FULLY VENTED SYSTEM

FULLY VENTED-MODIFIED SYSTEM

FIGURE 22-1 FULLY VENTED SYSTEMS

22.0 FULLY VENTED SYSTEMS

22.1 Maximum Permissible Stack Loading

- (a) The maximum permissible loading on a fully vented stack shall not exceed that shown in Table 22.1.
- (b) For stacks more than 3 storeys not more than one quarter of the maximum loading shall enter the stack at any floor-interval.

TABLE 22.1 MAXIMUM FIXTURE UNIT LOADING ON STACKS

Nominal Pipe Size —mm	Maximum Load —Fixture Units	
	Stacks up to 3 Storeys	Stacks more than 3 Storeys
32	2	4
40	8	16
50	18	36
65	25	56
80	50	80
100	250	500
125	600	1 100
150	1 000	2 400
175	1 600	3 700
200	2 500	5 100
225	3 800	7 000

22.2 SIZE OF STACKS

The size of stacks for the fully vented systems shall be determined from Table 22.1 and Table 22.3.

22.2.1 Size of Stacks without Offsets

The size of stacks without offsets shall be determined by the total number of fixture units discharging into the stack. If the offsets are not more than 45 degrees to the vertical a stack shall be considered to be without offsets.

22.2.2 Size of Stacks with Offsets

- (a) The size of the stack above the offset shall be sized as in Table 22.1 and Table 22.3.
- (b) The size of the graded sections of offsets shall be calculated by the total number of fixture units discharging through the offsets as determined from Table 21.2.
- (c) Save that in no case shall the stack be less than the size of the graded section forming the offset, the portion of stacks below offsets shall be sized by the total number of fixture units discharging into the stack as determined from Table 22.1 and Table 22.3.

TABLE 22.2 ZONES OF PROHIBITED CONNECTIONS

Higher Branch Size—mm	Stack Size —mm	“A” —mm
32-65	32-80	90
	100	110
	125	210
	150	250
80 or more	80 or more	200

22.3 ENTRY OF BRANCHES INTO STACKS

22.3.1 Junctions

- (a) Subject to By-law 22.3, the following types of junctions shall be used to make connections between any fixture or branch discharge-pipes and discharge-stacks:
- (i) 45 degree Junctions;
 - (ii) Sweep Junction;
 - (iii) Entry at grade with throat radius; and
 - (iv) Straight entry at grade.
- (b) “Entry at grade” junctions between a stack and any fixture or branch discharge pipe less than 500 mm in length may be used only if:
- (i) S-traps are fitted;
 - (ii) a vertical dropper occurs in the discharge pipe between the fixture and stack junction; or
 - (iii) the discharge pipe is graded at not less than 1:15.

[By-law 22.3.1 amended in Gazette 24 December 1982 p. 4927.]

22.3.1.1 45 degree or sweep junctions shall be used to connect 65 mm or smaller branches to stacks of the same size.

22.3.1.2 Unless in accordance with By-law 22.3.1(b) if the entry of 65 mm or smaller branches to larger stacks is at grade, no fixture shall be connected to such branch within 500 mm of the stack.

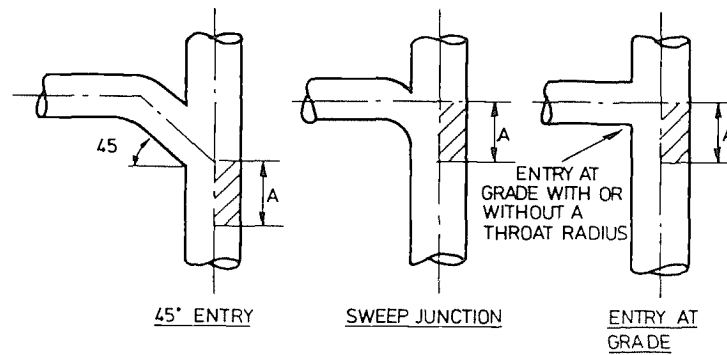
[By-law 22.3.1.1 amended in Gazette 24 December 1982 p. 4927.]

22.3.1.3 Straight entry of 80 mm or larger branches to any stack at grade is not permitted. Entry may be at grade with a throat radius of 50 mm.

22.4 RESTRICTIONS ON BRANCH CONNECTIONS TO STACKS

22.4.1 Near Adjacent Branches (Figure 22.2)

Unless the entry is at an angle of 45 degrees branches shall not be connected to stacks with the branch centre line located in the area bounded by half of the stack wall immediately opposite the next highest branch and a Distance “A” in accordance with Table 22.2 below the intersection of the next highest branch centre line and the stack centre line.



NO OTHER BRANCH SHALL CONNECT INTO THE STACK
WITH ITS CENTRE LINE LOCATED WITH THE SHADED
AREA UNLESS ENTRY IS AT AN ANGLE OF 45°

**FIGURE 22.2 CONNECTION OF BRANCHES
NOT PERMITTED**

TABLE 22.3 RELIEF AND STACK-VENTS

SIZE OF DISCHARGE STACK (mm)	MAXIMUM FIXTURE UNITS CONNECTED	REQUIRED SIZE OF VENT (mm)									
		32	40	50	65	80	100	125	150	175	200
		DEVELOPED LENGTH OF VENT (M)									
32	2	9									
40	16	6	15								
50	20	8	15	46							
	36	6	10	30							
65	20		12	40	110						
	56		7	24	80						
80	20		8	27	70	170					
	80			12	20	110					
100	150			9	25	70	280				
	300			8	22	60	216				
	500			6	19	50	197				
125	300				9	22	95	280			
	750				7	19	72	230			
	1100				6	14	62	190			
150	700				4	9	37	155	300		
	1300					7	30	130	250		
	2400					6	24	100	200		
175	1000						23	70	190		
	2000						19	40	160		
	3700						14	35	130		
200	1500						12	30	110	220	350
	3500						8	23	60	134	220
	5100						6	19	50	115	190
225	1700							16	62	150	245
	4000							14	43	81	120
	7000							6	31	53	75

22.4.2 Near Offsets in Stacks

22.4.2.1 Offsets 45 degrees or Less from the Vertical

Branches shall not be connected to stacks with offsets 45 degrees or less from the vertical, within 600 mm of the bends forming the offset.

22.4.2.2 Offsets More than 45 degrees from the Vertical

- (a) Subject to subparagraph (b), branches shall not be connected to stacks with offsets more than 45 degrees from the vertical in the following locations:
 - (i) for buildings not more than 5 floors in height above the offset within 600 mm between the invert level of the lowest branch and the offset;
 - (ii) for buildings more than 5 floors in height above the offset within 1 m between the invert level of the lowest branch and the offset;
 - (iii) within 600 mm above and below the bend into the lower vertical stack; or
 - (iv) within 2.5 m of the upper vertical stack along the offset.
- (b) Where in softwater areas there is a risk of foaming, the distances specified in (i) and (ii) shall be increased as necessary.

22.5 VENTING

22.5.1 Stack-Vent

- (a) Except that the stack-vent need not be larger than the stack every stack shall continue to atmosphere at its uppermost end, and shall be sized in accordance with Table 22.3.
- (b) The developed length of the stack-vent shall be:
 - (i) for stacks with relief-vents the length of the relief-vent; or
 - (ii) for stacks without relief-vents the length of stack-vent and stack to the point of connection of the lowest branch.
- (c) If interconnected with the relief-vent above the overflow level of the top-most fixture connected to the stack the stack-vent may extend separately to atmosphere.

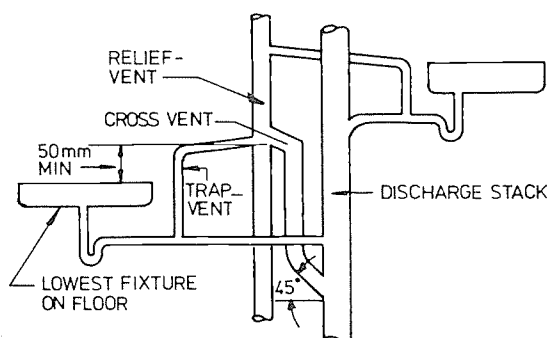


FIGURE 22.3 CROSS VENTS

22.5.2 Venting of Fixture-Traps

- (a) Subject to (b) all fixture traps shall be vented in accordance with By-law 20.10.
- (b) Fixture trap vents may be omitted if:
 - (i) the fixture is the topmost connected to the stack and is in accordance with By-law 23.2, or
 - (ii) the fixture is connected to a group-vented branch in accordance with By-law 21.5. Connection of the fixture to the group-vented branch shall be in accordance with By-law 21.5.2.

[By-law 22.5.2 amended in Gazette 24 December 1982 p. 4927.]

22.5.3 Relief-Vents

- (a) Stacks 3 or more floors in height shall be provided with relief-vents which connect to such stacks at an angle of 45 degrees below the lowest branches discharging into the stacks.
- (b) Relief-vents shall be sized in accordance with Table 22.3. The developed length of a relief-vent is the full length of vent pipe from its opening to atmosphere to its lowest point of connection to the stack.
- (c) Connections between relief-vents and stack-vents shall be at least 50 mm above the overflow levels of the topmost fixtures connected to the stacks.
- (d) Where the lowest fixture connected to a stack is several floors above the base of the stack the relief-vent is to be extended to the base of the stack.

22.5.4 Cross-Vents

- (a) Stacks 20 floors or more in height shall be cross-vented to the relief-vent at no more than 10 floor intervals.
- (b) The size of the cross-vent shall be the size of the main relief-vent or the size of the stack whichever is the smaller.
- (c) Cross-vents shall connect into the stack at an angle of 45 degrees.
- (d) Cross-vents shall commence below the lowest branch connection to the stack at the floor concerned and join into the main relief-vent not less than 50 mm above the overflow point of the lowest fixture, discharging into the stack at that floor.
- (e) Where foaming is anticipated in the bends forming an offset in a stack and only a few fixtures are connected to the stack below the offset, a cross-vent connected to the stack at or below the downstream offset bend and above the highest fixture connected to the stack below the offset, is to be installed.

22.5.5 Vent-Header

- (a) Except as provided in By-law 20.9.4 the vents from the soil and waste stacks may be connected at their uppermost end into a common vent-header which shall extend to the open air at one point.

- (b) The size of the vent-header shall be determined by the equivalent number of 50 mm relief-vents connected in accordance with Table 22.4.
- (c) Relief-vents serving discharge-stacks shall be sized on the total fixture units connected to the stack and the total developed length of the relief-vent to its opening to atmosphere in accordance with Table 22.3.
- (d) The size of the vent-header and vertical vent to atmosphere shall not be smaller than any vent it serves.
- (e) The size of vent-header shall be increased just before the junction requiring the vent-header size to be increased.

[By-law 22.5.5 amended in Gazette 24 December 1982 p. 4927.]

TABLE 22.4 VENT-HEADERS

Size of Vent-Header or Relief-Vent—mm	Equivalent Number of 50 mm Relief-Vents
50	1
65	2
80	3
100	6
125	11
150	18
175	28
200	40
250	72
300	117

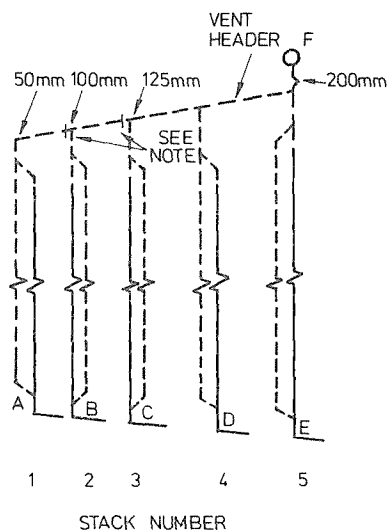
22.5.6 Venting Arrangements at Offsets in Stacks

22.5.6.1 Offsets 45 degrees or less from the Vertical—An offset in a vertical stack with a change of direction of 45 degrees or less from the vertical may be sized as a vertical stack and does not require additional relief venting.

22.5.6.2 Offsets more than 45 degrees from the Vertical (Figure 22.5)

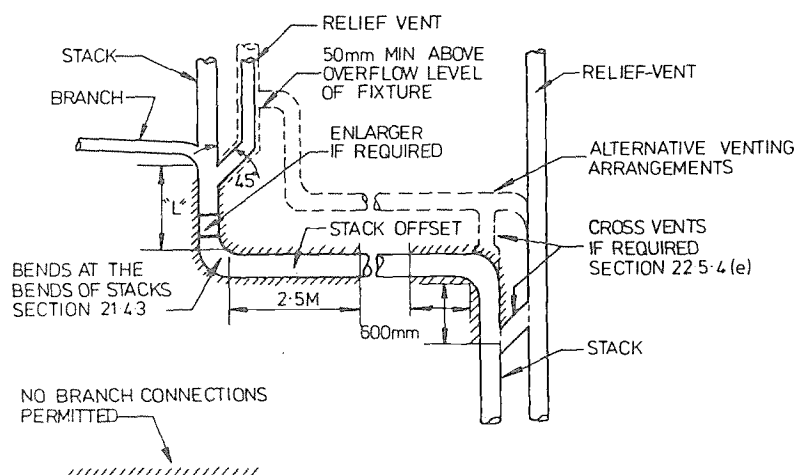
- (a) For offsets than 45 degrees from the vertical the relief-vent shall interconnect with the stack below the lowest branch above the offset.
- (b) The relief-vent for the upper portion of the stack and for the lower portion may be separate in which case each shall be sized in respect to the total number of fixture units discharging into the portion of stack served. Alternatively the relief-vent shall be carried through as the one vent in which case the vent shall be sized on the basis of the total fixture unit loading on the lower portion of the stack.
- (c) Connections between sections of relief-vents shall be at least 50 mm above the overflow level of the lowest fixture connected to the stack above the offset.
- (d) Any offset in a stack above the topmost fixture connected to the stack shall not require relief-venting.

STACK NUMBER	1	2	3	4	5
LOAD FIXTURE UNITS	36	140	140	36	3400
RELIEF-VENT LENGTH - M	AF 30	BF 70	CF 65	DF 18	EF 120
STACK SIZE TABLE 22.1 & 22.3	50	100	100	50	200
RELIEF VENT SIZE TABLE 22.3	50	80	80	50	175
RELIEF-VENT 50mm EQUIVALENTS TABLE 22.4	1	3	3	1	28
VENT-HEADER 50mm EQUIVALENTS	1	4	7	8	36
VENT-HEADER SIZE TABLE 22.4	50	100	125	125	200



NOTE THE SIZE OF THE VENT-HEADER SHALL BE INCREASED JUST BEFORE JUNCTION
REQUIRING THE VENT-HEADER SIZE TO BE INCREASED.

FIGURE 22.4 VENT-HEADER



NUMBER OF STOREYS ABOVE OFFSET	"L" mm
5 OR LESS	600
MORE THAN 5	1000

FIGURE 22.5 VENTING AT OFFSETS IN STACKS

23.0 SINGLE STACK SYSTEMS

23.1 GENERAL CONDITIONS

23.1.1 Residential Buildings

Not more than 2 W.C.s., 2 kitchen sinks (with or without food waste disposal units), 2 dishwashers, 2 baths, 2 basins, 2 showers, 2 clothes washing machines and 2 laundry-troughs shall discharge at each floor level into the one stack. Additional or alternative fixtures may be permitted by the Board.

23.1.2 Commercial Buildings

Not more than 5 W.C.s., 5 basins, 5 urinals, 1 cleaner's sink and 1 kitchen sink shall discharge at each floor level into the one stack. Additional or alternative fixtures may be permitted by the Board.

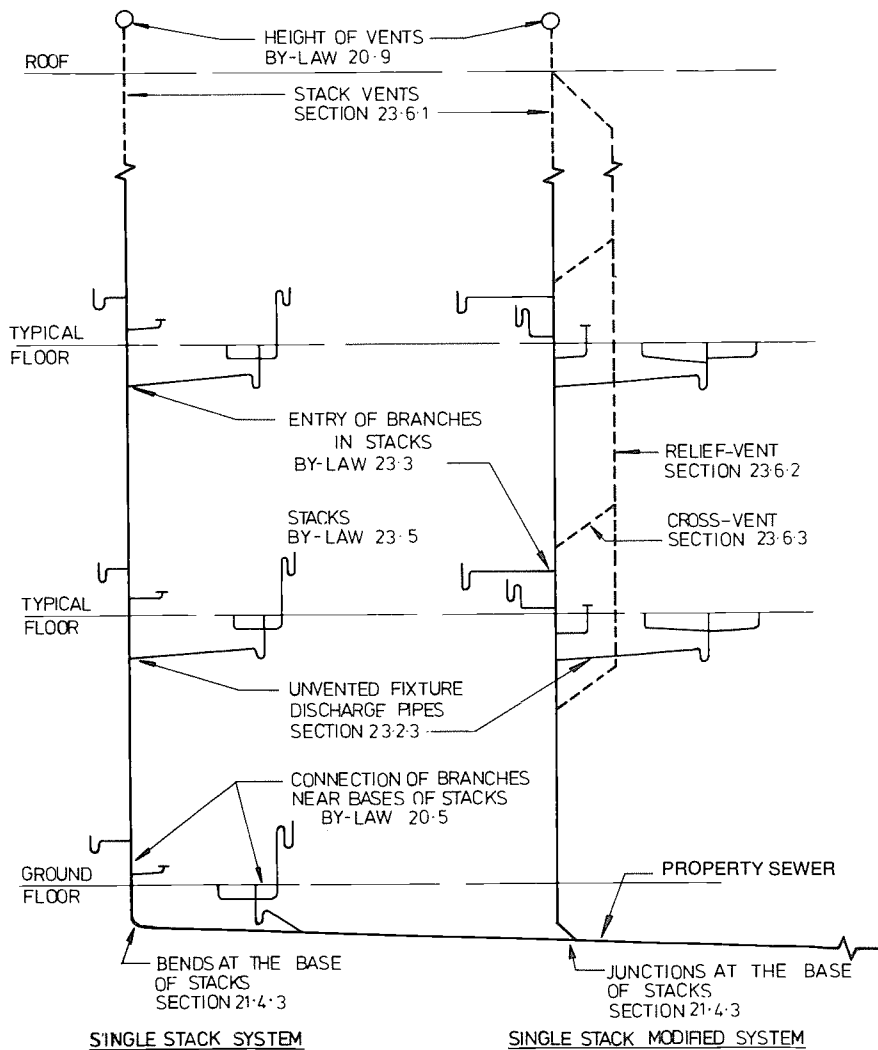


FIGURE 23.1 SINGLE STACK SYSTEMS

[Figure 23.1 amended in Gazette 24 December 1982 p. 4927.]

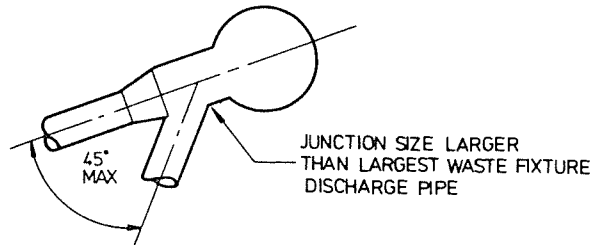
23.1.3 Connection of Basins with S-traps

Only unpluggable basins fitted with S-traps may discharge directly to stacks without trap-vents.

23.2 CONNECTION OF FIXTURE BRANCHES

23.2.1 Residential Buildings

- (a) Each W.C., bath, basin, trough or sink (not discharging into a floor-waste gully) and each floor-waste gully receiving the discharge from fixtures shall be on an individual fixture discharge-pipe.
- (b) A waste fixture discharge pipe will be considered individually connected if 2 fixture discharge pipes discharge into an oblique (45 degree) junction one size larger than the largest fixture discharge pipe provided such junction is positioned adjacent to a stack junction. (Figure 23.2).



**FIGURE 23.2 JUNCTION OF WASTE FIXTURE
DISCHARGE PIPES**

23.2.2 Commercial Buildings

Each W.C., urinal or basin (not discharging into a floor-waste gully) and each floor-waste gully receiving the discharge from fixtures shall be on an individual branch, except where ranges of fixtures in accordance with By-law 23.2.4 are installed.

[By-law 23.2.2 amended in Gazette 24 December 1982, p. 4927.]

23.2.3 Fixture Discharge-Pipes

- (a) Fixtures with discharge pipes conforming with Table 23.1 may be connected to stacks without trap-vents. Except when in accordance with By-law 23.2.3(e), all fixture discharge pipes with lengths and grades exceeding those shown in Table 23.1 shall be fitted with trap-vents.
- (b) Provided the fixture discharge pipe is increased to 40 mm at a distance of 50 + or - 10 mm from the trap weir, using an eccentric enlarger with the pipes installed soffit to soffit (Figure 23.3) basins fitted with 32 mm P-traps may be installed without trap-vents.
- (c) Except those serving basins with plugs and bidets, each fixture discharge pipe may have a maximum of 2 long-bends in the horizontal plane, 2 long-bends in the vertical plane for fixtures with P-traps, and one long-bend in a vertical plane for fixtures with S-traps. The length of a vertical dropper shall not exceed 1.5 m.
- (d) Waste fixtures, except basins with plugs, may be connected through a vertical dropper at least one size larger than the fixture discharge pipe if required to avoid cross-flow from other fixture discharge pipes connected to the stack. (Figure 23.4).

[By-law 23.2.3 amended in Gazette 24 December 1982, p. 4927.]

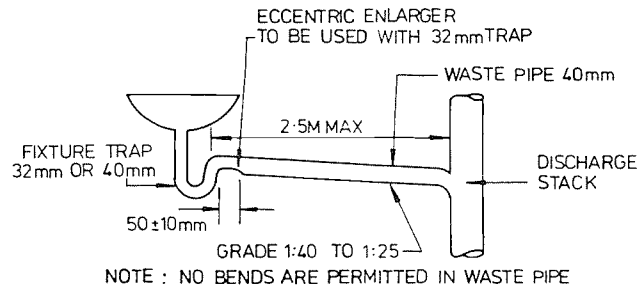


FIGURE 23.3 CONNECTION OF BASIN TO STACKS WITHOUT TRAP VENTS

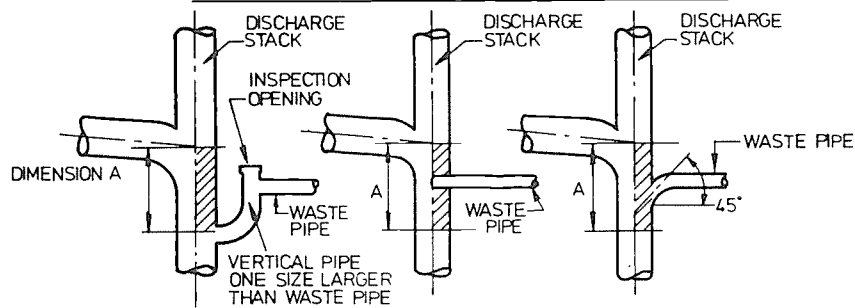


FIGURE 23.4 CONNECTION OF WASTE FIXTURES EXCEPT BASINS WITHOUT VENTS IN RESTRICTED ZONE

TABLE 23.1 CONNECTION OF FIXTURE DISCHARGE-PIPES WITHOUT TRAP-VENTS TO STACKS

Fixture	Fixture Trap —mm	Maximum Length of Fixture Discharge-Pipe —m	Range Grades of Fixture Discharge-Pipe Min. Max.
Basins (refer to Item 23.2.3(b))	32 mm P-traps with 40 mm waste pipe.	2.5	1:40 to 1:25
Unpluggable Basins	40 mm P-trap	2.5	1:40 to 1:25
Baths	32 and 40	2.5	1: to 1:25
Floor-Waste Gullies	40	2.5	1:40 to 1:20
Kitchen Sinks —with food disposal units	50 and 65	2.5	1:40 to 1:20
Laundry Troughs	50	2.5	1:20 to 1:10
Showers	40 and 50	2.5	1:40 to 1:20
Urinals	40 and 50	2.5	1:40 to 1:20
Washing Machines	50 and 65	2.5	1:40 to 1:20
Water-Closet Pans	40 and 50	2.5	1:40 to 1:20
	100 mm soil pipe	6	1:50 to 1:20
	80 mm soil pipe and only where approved	1.5	1:60 to 1:20

- (e) The fixture discharge pipe shall be graded within the range of 1:15 to 1:10 if:
 - (i) a P-trap is used;
 - (ii) the length of fixture discharge pipe is less than 500 mm;
 - (iii) no vertical dropper occurs in the fixture discharge pipe; and
 - (iv) the stack connection is an entry at grade junction.

23.2.4 Fixture Ranges

- (a) Ranges of fixtures may be connected without trap-vents, group-vents or branch-vents provided they are in accordance with By-laws 23.2.4.1 to 23.2.4.4 inclusive.
- (b) Ranges of fixtures which do not comply with By-laws 23.2.4.1 to 23.2.4.4 shall be provided with trap-vents or group-vents.

[By-law 23.2.4 amended in Gazette 24 December 1982, p. 4927.]

23.2.4.1 Range of Basins (Figure 23.5)

Up to 4 basins may be connected in a range provided that:

- (a) the basins have P-traps;
- (b) for basins with 32 mm traps the fixture discharge pipes shall be increased to 40 mm at a distance of 50 + or – 10 mm from the trap crowns using eccentric enlargers with the pipes soffit to soffit;
- (c) the fixture discharge pipes shall extend without bends not more than 750 mm before connecting with a 50 mm common branch discharge pipe, and be graded at not more than 1:25;
- (d) the junction between the fixture discharge pipe and the common branch discharge pipe shall be made using a sweep or 45 degree junction; and
- (e) the 50 mm common branch discharge pipe shall not exceed 4 m in length, and shall be straight and graded at not more than 1:25.

23.2.4.2 Range of Unpluggable Basins (Figure 23.6)

Up to 5 unpluggable basins may be connected in a range provided that:

- (a) the basins are connected to a common branch discharge pipe which is one size larger than the fixture discharge pipes, and the length of fixture discharge pipes are kept as short as practicable;
- (b) the common branch discharge pipe shall not exceed 4.5 m in length, be graded at not more than 1:25, and have not more than two 45 degree bends in the horizontal plane only.

23.2.4.3 Range of Water Closet Pans (Figure 23.7)

Up to 5 water closet pans may be connected in a range provided that:

- (a) where S-trap pans are used the vertical drop from the trap shall not exceed 1.5 m in height;
- (b) the fixture discharge pipes are straight and kept as short as practicable to their point of connection with the common branch discharge pipe;
- (c) the common branch discharge pipe shall not exceed 10 m in length, be graded at not more than 1:20, and have not more than two 45 degree bends in the horizontal plane only; and
- (d) the distance between adjacent pan connections and the distance between the stack junction and its nearest pan connection on the common branch discharge pipe shall not exceed 6 m.

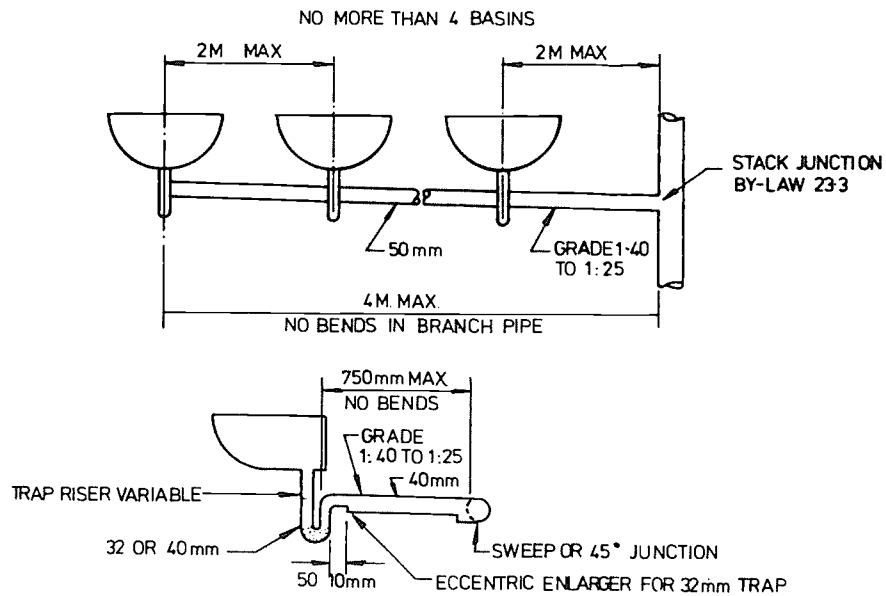


FIGURE 23.5 RANGE OF BASINS WITHOUT VENTS

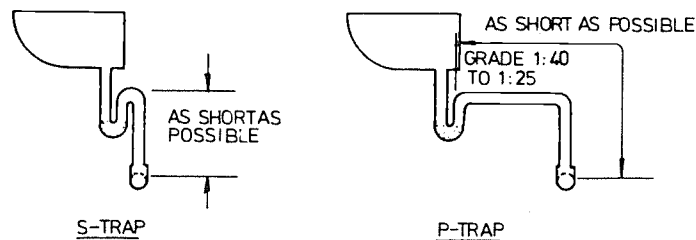
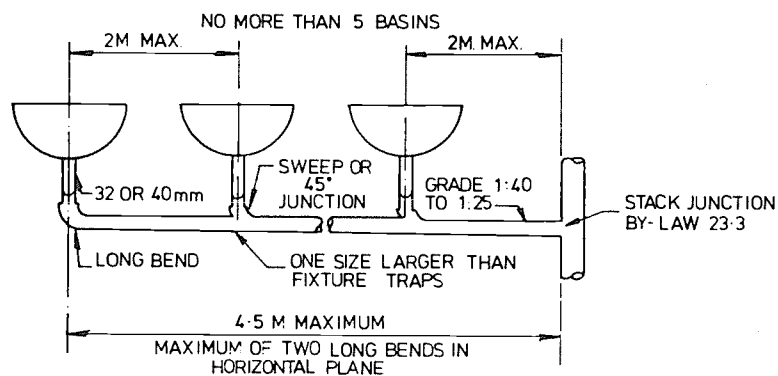
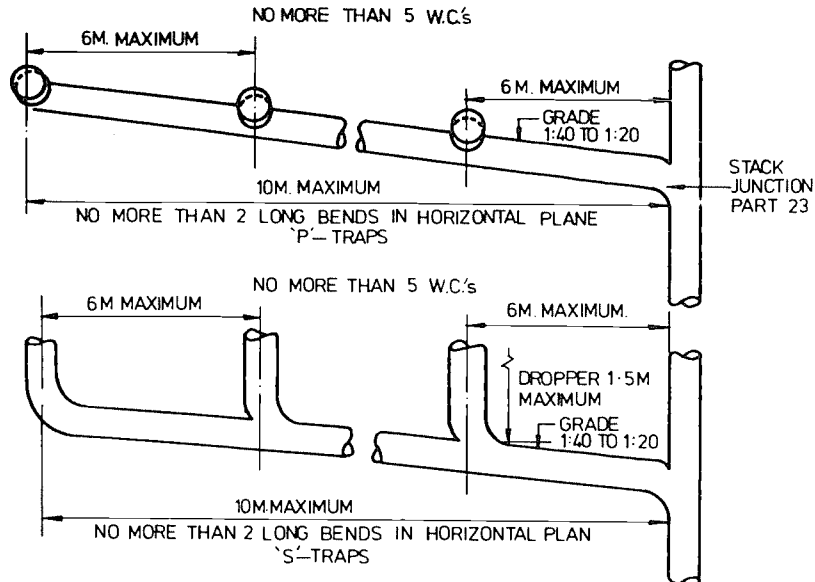
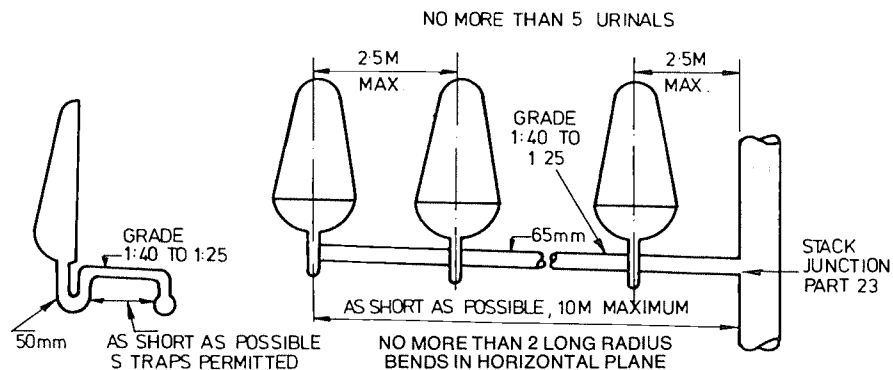


FIGURE 23-6 RANGE OF UNPLUGGABLE BASINS
WITHOUT VENTS



**FIGURE 23.7 RANGE OF WATER-CLOSET PANS
WITHOUT VENTING**



**FIGURE 23.8 RANGE OF WALL HUNG URINALS
WITHOUT VENTING**

23.2.4.4 Range of Wall Hung Urinals

Up to 5 wall hung urinals may be connected in a range provided that:

- the urinals are connected to a common branch discharge pipe of 65 mm, through 50 mm fixture discharge pipes which are kept as short as practicable; and
- the common branch discharge pipe shall not exceed 10 m in length, be graded at not more than 1:25, and have not more than two 45 degree bends in the horizontal plane only.

23.3 ENTRY OF BRANCHES INTO STACKS

23.3.1 Junctions

- (a) Subject to By-law 23.3 the following types of junctions shall be used to make connections between any fixture or branch discharge pipes and discharge stacks:
- (i) 45 degree Junctions;
 - (ii) Sweep junctions;
 - (iii) Entry at grade with throat radius; or
 - (iv) Straight entry at grade.
- (b) "Entry at grade" junctions between a stack and any fixture or branch discharge pipe less than 500 mm in length may only be used only if:
- (i) S-traps are fitted;
 - (ii) a vertical dropper occurs in the discharge-pipe between the fixture and stack junction; or
 - (iii) the discharge pipe is graded at not less than 1:15.

[By-law 23.3.1 amended in Gazette 24 December 1982, p. 4927.]

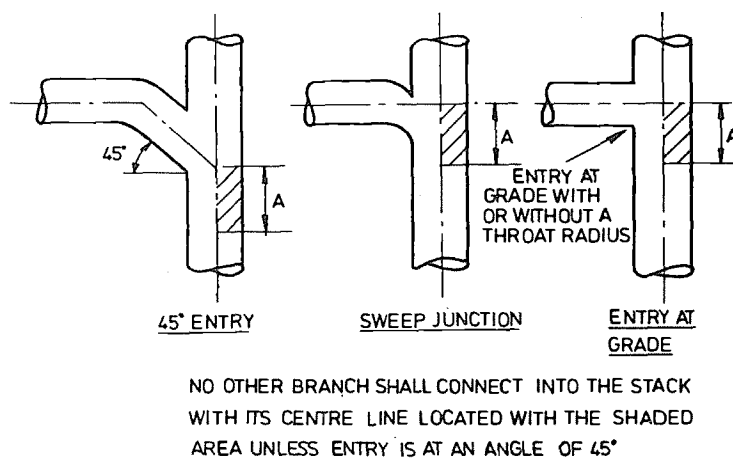
23.3.1.1 Fixture Discharge Pipes Serving Basins

- (a) Fixture discharge pipes without trap-vents serving basins, except unpluggable basins shall enter stacks at grade without a throat radius or with a throat radius of not more than 25 mm.
- (b) Fixture discharge pipes serving basins with trap-vents shall enter stacks in accordance with By-law 23.3.1.2 or 23.3.1.3

[By-law 23.3.1.1 amended in Gazette 24 December 1982, p. 4927.]

23.3.1.2 65 mm or Smaller Branches to Stacks of the Same Size

45 degrees or sweep junctions shall be used for 65 mm or smaller branches to stacks of the same size.



**FIGURE 23.9 CONNECTION OF BRANCHES
NOT PERMITTED**

23.3.1.3 65 mm or Smaller Branches to Larger Stacks

If the entry is at grade, no fixture shall be connected to such branch within 500 mm of the stack, unless in accordance with By-law 23.3.1(b), for 65 mm or smaller branches to larger stacks.

[By-law 23.3.1.3 amended in Gazette 24 December 1982 p. 4928.]

23.3.1.4 80 mm or Larger Branches to Any Stack

Straight entry at grade is not permitted. Entry at grade with a throat radius of not less than 50 mm is permissible, for 80 mm or larger branches to any stack.

23.4 RESTRICTIONS ON BRANCH CONNECTIONS TO STACKS (Figure 23.4 and 23.9)

Unless the entry is at an angle of 45 degrees branches shall not be connected to stacks with the branch centre line located in the area bounded by half of the stack wall immediately opposite the next highest branch and a Distance "A" in accordance with Table 23.2 below the intersection of the next highest branch centre line and the stack centre line.

TABLE 23.2 ZONES OF PROHIBITED CONNECTIONS

Higher Branch Size—mm	Stack Size —mm	"A" —mm
32-65	32-80	90
	100	110
	125	210
	150	250
80 or more	80 or more	200

23.5 DISCHARGE-STACK DESIGN

- (a) Discharge-stacks shall be straight for their entire length between the highest and lowest branch connections to the stacks.
- (b) One offset only shall be permitted below the lowest branch connection to the stack provided:
 - (i) The discharge pipe forming the offset is not less than 45 degrees to the horizontal; and
 - (ii) No branch connections are made to the stack within 600 mm of the bend forming the offset.
- (c) Bends at the base of stacks shall be in accordance with By-law 21.4.3.
- (d) Single stack systems shall be sized in accordance with Tables 23.3 or Table 23.4 for Residential buildings and in accordance with Tables 23.4 and 23.5 for Commercial Buildings.

[By-law 23.5 amended in Gazette 24 December 1982 p. 4928.]

TABLE 23.3 SINGLE STACK DESIGN—RESIDENTIAL BUILDINGS

Stack Size —mm	Relief and Cross-Vent Size Arrangement RV—Relief-Vent CV—Cross-Vent	Maximum Number of Floors	Fixture Unit Loading
100	None	10	260
	50 mm RV, 50 mm CV at alternate floors	15	290
	50 mm RV, 50 mm CV at each floor	15	390
	65 mm RV, 65 mm CV at alternate floors	20	320
	65 mm RV, 65 mm CV at each floor	20	500
125	None	15	390
150	None	30	780

NOTE: When a laundry trough is installed the fixture unit loading of a clothes washing machine shall be included.

TABLE 23.4 SINGLE WASTE-STACK
DESIGN—RESIDENTIAL BUILDINGS
OR COMMERCIAL BUILDINGS

Stack Size —mm	Fixture Unit Loading
50	6
65	15
80	30

NOTE: For stacks less than 80 mm the property sewer shall be at least one size larger than the stack.

[Table 23.4 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

TABLE 23.5 SINGLE-STACK DESIGN—COMMERCIAL BUILDINGS

Stack Size —mm	Relief and Cross Vents Size and Arrangement RV—Relief-Vent CV—Cross-Vent	Maximum Number of Floors	Fixture Unit Loading
100	None	4	60
	50 mm RV, 50 mm CV at each floor	12	120
125	None	6	100
	65 mm RV, 65 mm CV at each floor	18	250
150	None	8	200
	80 mm RV, 80 mm CV at each floor	24	600

NOTE: Stack loadings are based on the "Congested" loading table of BS CP304.

23.6 VENTING

23.6.1 Stack-Vents

Except that, for stacks which are not more than 3 floor levels in height and receive a discharge of not more than 30 fixture units the stack may be reduced to 50 mm above the topmost fixture branch, every stack shall continue to atmosphere at its uppermost end undiminished in size.

23.6.2 Relief-Vents

- (a) The size of relief-vents shall comply with Table 23.3 or Table 23.5.
- (b) The relief-vents shall interconnect with the soil stack below the entry of the lowest fixture to the stack at an angle of 45 degrees.
- (c) The relief-vent may interconnect with the main stack-vent at a point not less than 50 mm above the overflow level of the highest fixture, or extend separately to the full required height.

23.6.3 Cross-Vents

- (a) Cross-vents shall be the same size as the relief-vent.
- (b) Where cross vents are required they shall interconnect with the stack:
 - (i) At a point not less than 50 mm or more than 600 mm above the top of the highest fixture on the floor concerned and at an angle of 45 degrees; or
 - (ii) To the W.C. branch Connection to the stack on the floor concerned, and as close as possible to the stack.
- (c) Where required on alternate floors, the cross-vents shall commence on the lowest floor having a fixture discharging into the stack and then on each alternate floor above.
- (d) Cross-vents are not required above the topmost fixtures connected to the stack.

24.0 INSTALLATION OF PIPEWORK ABOVE GROUND

24.1 FIXING OF PIPES

24.1.1 Brackets and Clips

24.1.1.1 Form

- (a) Brackets and clips shall be formed of mild steel or other approved material, and shall be provided with a shank or other suitable means of attachment to the structure.
- (b) Brackets and clips shall be designed to withstand the applied loads.
- (c) Brackets and clips which are exposed to corrosive conditions shall be rendered corrosion resistant by an approved treatment process.
- (d) Brackets and clips used to support pipework of copper, copper alloy or plastics shall be lined or coated with PVC or other approved non-abrasive and inert material for that section which is in contact with the pipework.
- (e) All fasteners for use with cast iron or steel pipes shall when tightened evenly, clamp the pipe securely to prevent movement.
- (f) All fasteners for use with copper, and copper alloy and plastic tubing other than at expansion joints shall, when fully tightened, permit longitudinal movement of the tubing. Fasteners for use at expansion joints shall, when tightened evenly, clamp the expansion joint-fitting securely to prevent movement.

24.1.1.2 Fixing

Brackets and clips shall be securely fixed to timber by screwed fasteners and to brickwork or concrete:

- (a) by drilling and bolting through;
- (b) by drilling and caulking with lead (wooden plugs are not permitted);
- (c) by securing with a screwed or bolted masonry anchor;
- (d) by percussive fasteners used in accordance with the relevant regulation; or
- (e) by other approved means.

24.1.2 Spacing of Brackets and Clips

- (a) Every discharge and vent pipe shall be securely supported and fixed at least at 2 points and at intervals not exceeding those shown in Table 24.1, or at other maximum distances as specified in these by-laws.
- (b) Fixing of copper, copper alloy and UPVC pipes shall be in accordance with the requirements in By-laws 24.9 and 24.10.

TABLE 24.1 SPACING OF BRACKETS AND CLIPS

Situation	Maximum Spacing —m
Pipes on grade	2
Vertical pipes in internal location	3
Vertical pipes in external location	2

NOTE: This table does not apply to plastic pipes.

24.2 TESTING AND INSPECTION OPENINGS

24.2.1 General

All openings for testing and inspection shall be in accordance with the Australian Standard appropriate to the material used in the plumbing installation.

24.2.2 Location

24.2.2.1 Testing Openings

Openings for the hydrostatic testing of all stacks shall, unless otherwise approved, be provided in accessible positions:

- (a) Near the base of each stack; and
- (b) Elsewhere in the stack as necessary to conduct hydrostatic tests in sections of one or more floors.

24.2.2.2 Inspection Openings

Openings for inspection and maintenance, unless otherwise approved, shall be located to provide access to every part of the plumbing installation:

- (a) At the stack junction of vertical and graded discharge pipes; and
- (b) At the first change of direction downstream of any fixture trap and in no case more than 10 m from such trap, and thereafter at every second change in direction or at not more than 10 m intervals whichever is less.

24.3 MARKING OF PIPES

In all multi-storey buildings every soil, waste and vent pipe installed within a duct shall be clearly and permanently marked "soil", "waste", or "vent", in a clear and visible position by a sticker or stencil, at least at each floor.

24.4 PIPES LIABLE TO DAMAGE

Pipes installed in positions exposed to mechanical damage shall be of cast iron, galvanized steel tube or other approved material.

24.5 INSTALLATION OF VENTS

24.5.1 Vent Cowls

Approved vent cowls shall be affixed to the upper extremities of vents.

24.5.2 Staying of Vents

- (a) The top of vent pipes which are more than the maximum distances specified in Table 24.2 above the highest fastening to a structure or which have offsets above such fastenings, shall be stayed by at least 2 struts set at right angles to each other, or 3 stays set at 120 degrees to each other.
- (b) Vent pipes struts or stays shall have approved lugs secured by fasteners to bands which tightly fit the pipe, and their feet shall be securely fastened to the building or supports.

TABLE 24.2 STRUTTING OR STAYING OF VENTS

Vent Pipe Material	Maximum Height above Fastening to Structure
Galvanized steel tube	3.0 m
Copper or copper alloy tube	1.8 m
Cast iron	1.8 m
Other approved vent pipe material	1.0 m

24.5.3 Vents Through Roofs

The roof shall be flashed around the vent with approved materials and shall be made watertight or the vent pipe may be offset from a wall for a minimum distance necessary to avoid a gutter or other obstruction.

24.6 BUILDING PIPES INTO WALLS OR FLOORS

24.6.1 Basement Walls

Cast iron pipes shall be used through all external basement walls of a building and shall extend for a distance of not less than 300 mm beyond the outer wall face.

24.7 CONCEALMENT OF PIPES AND FITTINGS

24.7.1 General

- (a) Pipework installed in walk-in pipe ducts, limited-access ducts, cavity walls, timber-framed walls or chases shall be in accordance with this by-law.
- (b) Pipework shall not be embedded in concrete.

[By-law 24.7.1 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.7.2 Walk-in Pipe Ducts

All pipework other than of galvanized sheet steel or sheet copper material may be concealed in walk-in pipe ducts which shall be constructed at least 1.5 m high and 0.6 m wide to accommodate pipework at the specified spacing (By-law 24.8) and provide ready access for maintenance personnel.

24.7.3 Limited-Access Pipe Ducts

All pipework other than of galvanized sheet steel or sheet copper material may be concealed in limited-access pipe ducts. Pipe ducts too small for entry by maintenance personnel shall, in addition to accommodating pipework at the specified spacing (By-law 24.8), have at least one side so constructed and fixed as to be capable of independent removal without damage to the main structure, and shall be provided with access parts in accordance with By-law 24.7.7.

[By-law 24.7.3 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.7.4 Pipework in Cavity Walls

All pipework other than of galvanized steel tube, galvanized sheet steel or sheet copper material may be concealed in cavity walls provided that:

- (a) pipes, are at the specified spacing (By-law 24.8);
- (b) access ports are provided in accordance with By-law 24.7.7; and
- (c) pipework does not touch or bear on any wall surface.

[By-law 24.7.4 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.7.5 Pipework in Timber-Framed Walls

All pipework other than of galvanized steel tube, galvanized sheet steel or sheet copper material may be concealed in timber-framed walls provided that:

- (a) except with the approval of the appropriate Building Authority, no timber frame shall be cut or damaged;
- (b) pipes are at the specified spacing (By-law 24.8); and
- (c) access ports are provided in accordance with By-law 24.7.7.

[By-law 24.7.5 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.7.6 Pipework in Chases

Pipework in cast iron, copper, copper alloy or UPVC material may be concealed in chases cut in brick, concrete or masonry walls and floors provided that:

- (a) every such chase shall be to the requirements of the appropriate Building Authority;
- (b) copper, copper alloy and UPVC tubes and fittings are lagged with an approved material not less than 6 mm thick; and
- (c) access ports are provided in accordance with By-law 24.7.7.

[By-law 24.7.6 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.7.7 Access Ports

Excepting where pipework is in walk-in ducts, access ports with removable covers and of a size and shape suitable for conducting cleaning operations shall be provided to all concealed pipework as follows:

- (a) At each inspection opening in the case of fixtures with 32 mm outlets, fixtures with integral traps and water-closet pans. (The outlet of every other fixture may be used to gain access to the first 10 m of discharge pipe downstream for purposes of clearing stoppages by mechanical means);
- (b) At each inspection opening on graded discharge pipes which is more than 10 m downstream of a fixture outlet;
- (c) At each inspection opening on a stack; and
- (d) At each expansion joint.

24.8 SPACING OF PIPES

24.8.1 General

Where practicable, at least 50 mm of space shall separate plumbing pipes from each other and from any other pipe or service.

24.8.2 UPVC Pipework

- (a) (i) Subject to (ii) pipes of UPVC, or of other plastic material, shall, in general, be spaced as far as possible from any hot pipe.
- (ii) A clear space of at least 75 mm shall separate pipes of plastic material from any lagged hot pipe, and at least 150 mm from any unlagged hot pipe.
- (b) Horizontal pipes of plastic material, installed close to hot pipes, shall be at a lower level than such hot pipes.

24.9 INSTALLATION OF COPPER AND COPPER ALLOY PIPES

24.9.1 Fixing of Copper and Copper Alloy Pipes

- (a) All fasteners for use with copper and copper alloy tubing other than at expansion joints shall, when fully tightened, permit longitudinal movement of the tubing.
- (b) All fasteners for use at expansion joints shall, when tightened evenly, clamp the expansion joint fitting securely and prevent movement.
- (c) All fasteners for use with copper or copper alloy pipes shall be lined with PVC, or other approved non-abrasive and inert material, for that part of the fastener where in contact with the pipe.

24.9.2 Expansion Joints for Copper and Copper Alloy Pipes

Where specified expansion joints of approved design shall be provided in all copper and copper alloy pipes used for plumbing systems.

24.9.2.1 Stacks

- (a) Where any stack extends through more than 2 floors either above its base or above any offset bend, expansion joints shall be fixed in the following locations:
 - (i) at its base or in the vertical pipe above an offset bend;
 - (ii) at each alternate floor level when the stack is unrestrained in accordance with By-law 24.9.3, or at each floor level when the stack is restrained or is subject to hot discharges such as from dishwashing machines; and
 - (iii) at other locations where directed by the Board.
- (b) The expansion joint at an intermediate floor shall be placed immediately above the junction of the highest discharge pipe connected at the floor concerned.

[By-law 24.9.2.1 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

24.9.2.2 Graded Discharge Pipes

Where graded discharge pipes are restrained and are more than 6 m in length an expansion joint shall be installed in the graded pipe.

24.9.2.3 Vent Pipes.

Except where excessive or continuous hot discharges such as from bed pan washers and sanitizers and dishwashing machines are discharged into the stack expansion joints will not be required for vents.

24.9.2.4 Bed Pan Sanitizer and Washer

Where a bed pan sanitizer and washer is connected with steam, and is connected to a copper tube soil stack, soil-vent, or steam relief-vent an expansion joint shall be required at each floor for the soil stack, soil-vent and steam relief-vent pipe and shall be located in positions defined in By-law 18.8.

24.9.3 Freedom from Restraint (Figure 24.1)

A copper pipe will be considered unrestrained provided:

- (a) Where it passes through walls or floors no restraint on longitudinal movement occurs. An annular space of at least 6 mm shall be provided, and such space may be filled with an approved flexible material; and
- (b) No restraint on movement occurs on any branch discharge pipe for a distance of 450 mm from its junction with a stack. Where it traverses any floor or wall within such distance, an annular space of at least 6 mm shall be provided, which may also be fitted with flexible material.

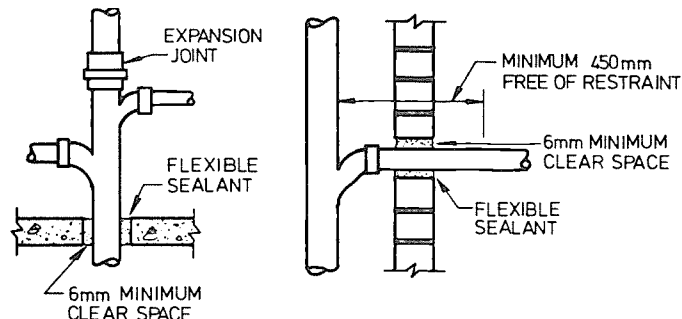


FIGURE 24.1 FREEDOM FROM RESTRAINT

24.10 INSTALLATION OF UPVC PIPES

UPVC pipes and fittings shall be installed in accordance with the provision of AS CA67.

TABLE 24.3 SUPPORTS FOR UPVC PIPES

Pipe Size mm	Maximum Spacing of Brackets and Clips	
	Vertical Pipe	Graded Pipe
32	1.8 m	0.9 m
40 and 50	2.0 m	1.0 m
65 to 150	2.5 m	1.2 m

NOTE: For discharge pipes subject to hot discharge the maximum spacings for brackets and clips given in Table 24.3 above should be halved.

25.0 PROPERTY SEWERAGE DESIGN AND INSTALLATION

[By-law 25.0 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

25.1 USAGE OF CONCRETE

- (a) Subject to these by-laws concrete shall not be less than 100 mm thick or as directed by the Board.
- (b) Subject to these by-laws, concrete shall be used in the following applications and elsewhere as directed by the Board:
 - (i) Under 100 mm or larger gully traps and boundary traps in the ground;
 - (ii) Under all inspection opening junctions where the riser is brought to the surface, the concrete shall finish at least 20 mm clear of any flexible joint; and
 - (iii) Under all junctions and bends forming risers from the main drain.
- (c) Exposed concrete shall have a smooth finish.

25.2 PROPERTY SEWERS UNDER BUILDINGS

- (a) If practicable, property sewers shall be designed not to pass under buildings.
- (b) Where a property sewer passes under a building, it shall be constructed as follows:
 - (i) If practicable it shall be straight for the whole distance under the building;
 - (ii) Inspection openings shall be positioned in the property sewer outside and adjacent to the building, and at any change of direction under the building. If required by the Board the inspection opening shall be brought to the surface, or inspection chambers provided. Additional inspection openings in accordance with By-law 25.9 may be required; and

- (iii) Pipes under footings shall have a minimum clearance of 75 mm from the top of the pipe to the underside of any footing.

[By-law 25.2 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

25.3 SIZE OF PROPERTY SEWERS

- (a) Unless otherwise approved, every property sewer shall be at least 100 mm size from its connection with the sewer to its up-stream vent or vents. 65 mm and 80 mm branch property sewers shall be in accordance with By-law 25.5.2.
- (b) The size of property sewers shall be determined by the total number of fixture units drained or likely to be drained in Table 25.1 and Table 25.2.
- (c) Where a property sewer requires a size larger than 150 mm all details shall be submitted to the Board.

[By-law 25.3 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

TABLE 25.1 SIZE OF PROPERTY SEWERS

Nominal Pipe Size mm	Maximum Loading (Fixture Units)									
	1 in 150	1 in 100	1 in 90	1 in 80	1 in 70	1 in 60	1 in 50	1 in 40	1 in 30	1 in 20
100	np	np	np	120	140	165	205	260	380	450
125	np	np	320	375	425	500	630	820	1 000	1 000
150	np	840	900	995	1 050	1 190	1 420	1 700	1 900	1 900
175	np	1 700	1 850	1 975	2 150	2 350	2 600	2 600	—	—
200	2 100	2 850	3 000	3 250	3 550	3 600	3 600	—	—	—
225	3 050	4 050	4 300	4 650	5 000	5 000	—	—	—	—

[Table 25.1 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

TABLE 25.2 SIZE OF LARGE PROPERTY SEWERS

Nominal Pipe Size mm	Maximum Loading (Fixture Units)				
	1 in 300	1 in 250	1 in 200	1 in 150	1 in 100
300	np	5 750	6 700	7 800	9 700
375	10 000	11 500	13 200	15 200	19 000

np—not permitted.

[Table 25.2 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

25.4 GRADES OF PROPERTY SEWERS

[By-law 25.4 amended in Gazette 24 December 1982 p. 4928, see Corrigendum in Gazette 4 February 1983 p. 425.]

25.4.1 General

- (a) Property sewers installed at grades of less than 1 in 80 shall be laid under the control of a supervisor who is competent in establishing precise levels.
- (b) Property sewers of diameters larger than necessary shall not be used to take advantage of the flatter grades permitted for larger diameter pipes.

[By-law 25.4.1 amended in Gazette 24 December 1982 p. 4928.]

25.4.2 Minimum Grades

- (a) Branch property sewers of 65 mm and 80 mm shall be laid on grades of not less than 1 in 40 and 1 in 60 respectively.
- (b) Where sufficient fall exists property sewers of 100 mm and 150 mm shall be laid on grades of not less than 1 in 60 and 1 in 80 respectively.

[By-law 25.4.2 amended in Gazette 24 December 1982 p. 4928.]

25.4.2.1 100 mm Property Sewers

Where a grade of 1 in 60 is unobtainable in any 100 mm property sewer, the property sewer shall be installed in the steepest obtainable grade, but not less than 1 in 80.

[By-law 25.4.2.1 amended in Gazette 24 December 1982 p. 4928.]

25.4.2.2 150 mm Property Sewers

Where a grade of 1 in 80 is unobtainable in any 150 mm property sewer, the property sewer shall be installed on the steepest obtainable grade, but not less than 1 in 120.

[By-law 25.4.2.2 amended in Gazette 24 December 1982 p. 4928.]

25.5 VENTING OF PROPERTY SEWERS

[By-law 25.5 amended in Gazette 24 December 1982 p. 4928.]

25.5.1 Location and Size of Vents

- (a) All property sewers shall be vented at their upstream end, except where an unvented branch property sewer in accordance with By-law 25.5.2 is permitted, and at their downstream end whenever a boundary-trap is installed.
- (b) Termination of vents at their opening to atmosphere shall be in accordance with By-law 20.9.
- (c) Any portion of a vent installed below ground shall not be less than the size of the property sewer or 100 mm whichever is the smaller.

[By-law 25.5.1 amended in Gazette 24 December 1982 p. 4928.]

25.5.1.1 Upstream Vents

- (a) The upstream vent on any property sewer shall be connected either:
- (i) to the property sewer downstream of a fixture connection or gully so that the property sewer upstream from the vent connection is in accordance with By-law 25.5.2, or,
 - (ii) to the property sewer as the vent extension of a discharge stack so as any property sewer upstream from the stack connection is in accordance with By-law 25.5.2
- (b) The vent size above ground shall be in accordance with Table 25.3.

[By-law 25.5.1.1 amended in Gazette 24 December 1982 p. 4928.]

TABLE 25.3 SIZE OF VENTS FOR PROPERTY SEWER

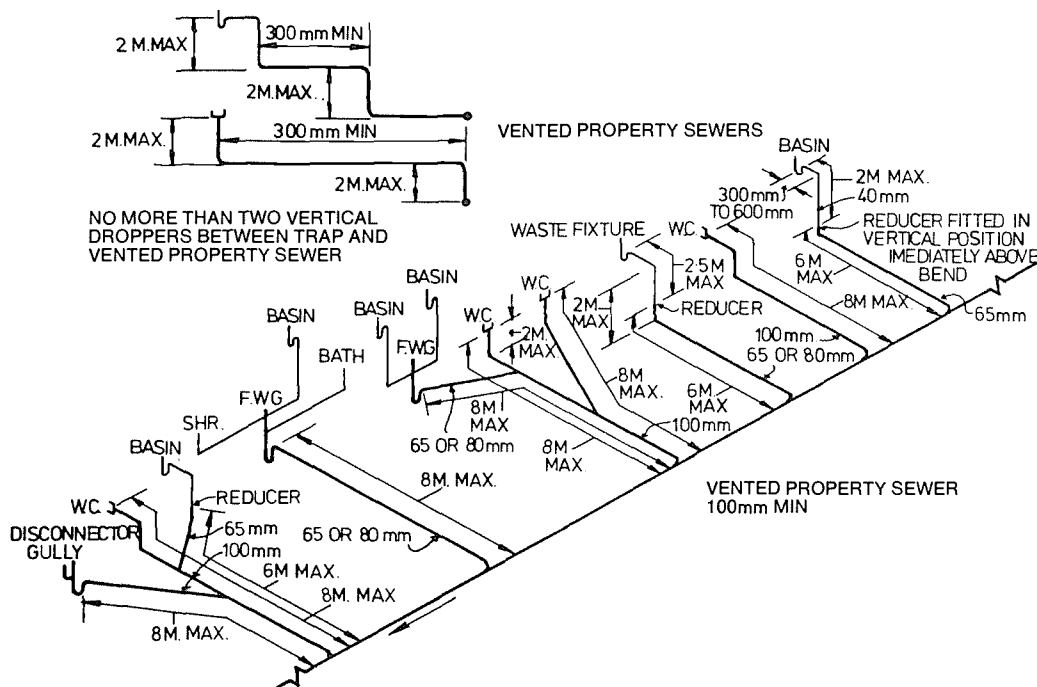
Fixture Unit Loading on Property Sewer	Minimum Size of Vent Above Ground —mm
Up to 30	50
Up to 400	80
More than 400	100

[Table 25.3 amended in Gazette 24 December 1982 p. 4928.]

25.5.1.2 Downstream Vents

- (a) The downstream vent on any boundary trapped property sewer shall be connected:
- (i) to the inspection shaft directly above the boundary trap; or
 - (ii) Provided no branch connections are made to the property sewer between the vent and the boundary trap to the property sewer within 6 m upstream of the boundary trap.
- (b) The vent size above ground shall be in accordance with Table 25.3.

[By-law 25.5.1.2 amended in Gazette 24 December 1982 p. 4928.]



**FIGURE 25.1 TYPICAL CONNECTIONS OF
GROUND FLOOR FIXTURES
TO UNVENTED BRANCH PROPERTY SEWERS**

[Figure 25.1 amended in Gazette 24 December 1982 p. 4928.]

25.5.1.3 Closet Pans in Toilet Blocks

- Where 10 or more closet pans, in any ground floor toilet block, are each separately connected to unvented branch property sewer in accordance with this Part, and the spacings of respective branch property sewer connections to the vented property sewer are such that, on the average, they are 2 m apart or less, one 50 mm vent shall be provided for the first 10 pans and an additional 50 mm vent shall be provided for each additional 10 pans or part thereof.
- The vents shall be positioned to divide the pans into approximately equal groups.
- Where practicable each vent shall branch from the vented property sewer, or otherwise from a closet pan branch.

[By-law 25.5.1.3 amended in Gazette 24 December 1982 p. 4928.]

25.5.2 Unvented Branch Property Sewers (Figure 25.1)

Ground floor fixtures may be connected to an unvented branch drain provided that:

- except in the case of overflow relief or disconnector gullies where the length shall not exceed 10 m, the length of pipework from the vented property sewer to the crown of the trap shall not exceed 8.5 m;

- (b) provided that the connection of basins and bidets without trap-vents shall be in accordance with By-law 25.3.3, where the trap discharge pipe is smaller than the unvented branch property sewer the length of pipework from the reducer to the crown of the trap shall not exceed 2.5 m;
- (c) reducers located in graded pipes shall be of the eccentric type and the 2 connecting pipes shall be soffit to soffit;
- (d) the pipework from the trap to the vented property sewer may have a maximum of 2 vertical droppers not exceeding 2 m each in height and separated by not less than 300 mm of graded pipe; and
- (e) all bends, junctions and graded pipe installed in the ground shall not be less than 65 mm in size.

[By-law 25.5.2 amended in Gazette 24 December 1982 p. 4928.]

25.5.2.1 100 mm Branch Property Sewers

An unvented 100 mm branch property sewer may be connected to a vented property sewer or disconnector gully in the case of waste fixtures only, provided:

- (a) the unvented property sewer does not receive the discharge from more than 2 water-closet pans, and
- (b) the unvented property sewer does not receive the discharge from fixtures having a total rating of more than 30 fixture units.

[By-law 25.5.2.1 amended in Gazette 24 December 1982 p. 4928.]

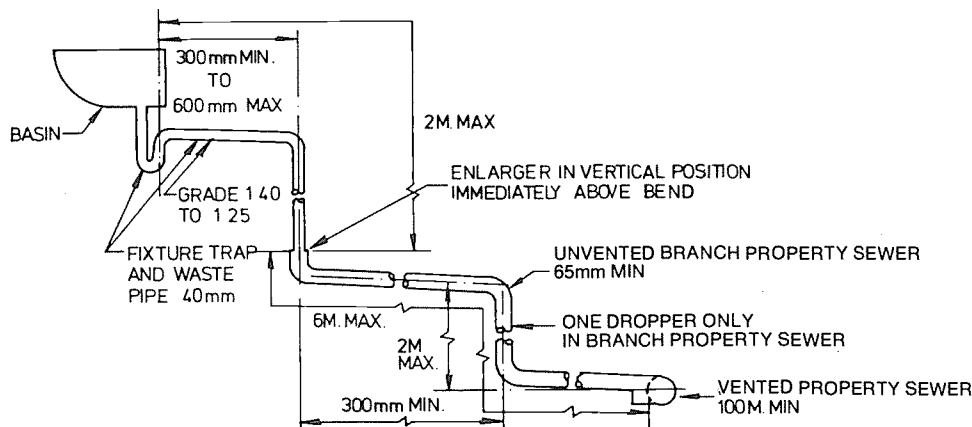


FIGURE 25-2 CONNECTION OF BASINS TO PROPERTY SEWERS WITHOUT VENTING

[Figure 25.2 amended in Gazette 24 December 1982 p. 4928.]

25.5.2.2 80 mm Branch Property Sewers

An 80 mm branch property sewer may be connected to a property sewer of not less than 100 mm or disconnector gully in the case of waste fixtures only, provided;

- (a) the 80 mm property sewer receives the discharge from a single fixture or floor-waste gully only; and
- (b) except where approved by the Authority the 80 mm property sewer does not receive the discharge from a water-closet pan.

[By-law 25.5.2.2 amended in Gazette 24 December 1982 p. 4928.]

25.5.2.3 65 mm Branch Property Sewers.

Provided it receives the discharge from a single fixture or floor-waste gully only, a 65 mm branch property sewer may be connected to a property sewer of not less than 100 mm or a disconnector gully in the case of waste fixtures.

[By-law 25.5.2.3 amended in Gazette 24 December 1982 p. 4928.]

25.5.3 Connections of Basins and Bidets without Trap-Vents to Branch Property Sewers (Figure 25.2)

- (a) Basins and Bidets with 32 mm unvented waste pipes, or basins and bidets with unvented S-traps shall not be connected directly to property sewers.
- (b) Basins and bidets with 40 mm P-traps and waste pipes may be connected without trap vents to property sewers provided:
 - (i) The graded section of waste pipe from the fixture trap crown to the vertical dropper is between 300 and 600 mm in length and graded between 1:40 and 1:25;
 - (ii) No bends are installed within the graded and vertical sections of waste pipe;
 - (iii) The length of waste pipe from the fixture trap crown to the enlarger at the branch property sewer shall not exceed 2 m; and
 - (iv) The enlarger in the branch property sewer is located in the vertical riser, and fitted directly to the bend in the property sewer.

[By-law 25.5.3 amended in Gazette 24 December 1982 p. 4928.]

25.6 MINIMUM COVER OVER PIPES

25.6.1 With No Concrete Protection

Where no protective cover is used the minimum depth of cover from the top of the socket to the ground surface shall be in accordance with Table 25.4.

TABLE 25.4 COVER OVER PIPES

Condition	Minimum Cover
In public thoroughfares, right of way, and other places subject to heavy vehicular traffic.	750 mm
Light vehicular traffic	450 mm
Elsewhere	300 mm

25.6.2 With Concrete Protection

- (a) In public thoroughfares right of way, and other places subject to heavy vehicular traffic where less than 750 mm of cover to ground surface is provided a protective cover of at least 100 mm of concrete shall be provided.
- (b) In places not subject to heavy traffic a concrete path shall be considered as sufficient protective cover.

25.7 EXCAVATION, BEDDING AND PROPERTY SEWER INSTALLATION

[By-law 25.7 amended in Gazette 24 December 1982 p. 4928.]

25.7.1 Protection of Trenches

An excavation exceeding 1.5 m in depth, or less in depth but where the sides are not self supporting, shall comply with the requirement of the relevant Construction Safety Acts and Regulations that such trenches be adequately supported against collapse. The Board may refuse to inspect or test any installation where the excavation is not so supported.

25.7.2 Width of Trenches

Trenches shall be made with a clearance of not less than 100 mm on each side of the pipe measured to the inside timbers or trench. The trench width to the level of the top of the pipe shall be kept as narrow as possible.

25.7.3 Explosives

Explosives shall be used for the excavation of trenches only when approved by all relevant Authorities, and in accordance with conditions they may specify.

25.7.4 Dewatering

Dewatering of trenches shall be carried out by pumping so as to lower the water level below the barrel of the pipes to be laid and to ensure a firm base. Ground water shall not be discharged into the connection or sewer. The water level shall be maintained below the level of the barrel of the pipes until such time as the trench or excavation has been backfilled completely.

25.7.5 Laying of Property Sewers

Pipes shall be laid to the standards required by AS CA56, AS CA67 and AS CA68 using a practice approved by the Board.

[By-law 25.7.5 amended in Gazette 24 December 1982 p. 4928.]

25.7.6 Connecting to Board's Connection

- (a) Where a trench is excavated by machine, the section of the trench within 600 mm of the Board's connection shall be excavated by hand to prevent damage to the connection fittings.
- (b) When the stopper is removed from the connection fitting, care shall be taken to prevent the fitting being damaged.
- (c) If the connection is damaged the Board shall be informed as soon as possible and the fault rectified before the property sewer is laid.

[By-law 25.7.6 amended in Gazette 24 December 1982 p. 4928.]

25.8 INSTALLATION OF PROPERTY SEWERS ON STEEP GRADES

Property sewers laid on grades of more than 1 in 5 shall be anchored by approved means at:

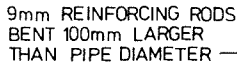
- (a) the bend or junction at the top or bottom of the inclined property sewer; and
- (b) at intervals not exceeding 10 m or as required by the Board.

[By-law 25.8 amended in Gazette 24 December 1982 p. 4928.]

25.8.1 Anchor Blocks (Figure 25.3)

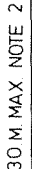
- (a) Anchor blocks shall be formed of concrete:
 - (i) not less than 150 mm thick;
 - (ii) keyed at least 150 mm into the trench floor; and
 - (iii) extend the full width of the trench where practicable, and be at least 150 mm on each side of the property sewer.
- (b) Anchor blocks shall be reinforced with two 9 mm reinforcing rods bent to 100 mm larger than the diameter of the pipe.
- (c) Anchor blocks shall not cover flexible joints.

[By-law 25.8.1 amended in Gazette 24 December 1982 p. 4928.]



- NOTES: 1 FLEXIBLE JOINTS SHALL BE WITHIN 300mm
OF CONCRETE BLOCK
2 BLOCK TO BE CLEAR OF FLEXIBLE JOINTS
3. BLOCK TO EXTEND FULL WIDTH OF TRENCH

FIGURE 25.3 ANCHOR BLOCKS



- NOTES:
1. ON EACH W.C. OR SLOP HOPPER BRANCH
 2. AT EACH INTERVALS OF NOT MORE THAN 30M AND WHERE PRACTICABLE LOCATED ON OR IMMEDIATELY DOWNSTREAM OF A BEND
 3. WITHIN 10M OF A WASTE FIXTURE IF THE BRANCH IS MORE THAN 10M LONG
 4. AT THE CONNECTION TO THE AUTHORITY'S SEWER IF NOT PROVIDED BY THE AUTHORITY
 5. WHERE REQUIRED FOR LOCATING PROPERTY SEWERS ON THE FIRST BEND EXCEEDING 45° IN THE PROPERTY SEWER UPSTREAM OF THE SEWER CONNECTION POINT
 6. AT NOT MORE THAN 10M FROM THE UPSTREAM END OF ANY PROPERTY SEWER

FIGURE 25.4 PROVISION OF INSPECTION OPENINGS
FOR MAINTENANCE PURPOSES

[Figure 25.4 amended in Gazette 24 December 1982 p. 4928.]

25.9 INSPECTION OPENINGS

25.9.1 Provision of Inspection Openings for Maintenance Purposes (Figure 25.4).

Except where inspection chambers are provided, inspection openings for maintenance purposes shall be provided:

- (a) on a WC or slop hopper branch (The Board may approve alternative access provision for maintenance of groups of WC's discharging to property sewers under buildings);
- (b) at intervals of not more than 30 m, and, where practicable, located on or immediately downstream of a bend;
- (c) within 10 m of a waste fixture if the branch is more than 10 m long;
- (d) at the connection to the Board's sewer, if an inspection opening is not provided by the Board;
- (e) where required by the Board for locating property sewers on the first bend exceeding 45 degrees in the property sewer upstream of the sewer connection point;
- (f) at not more than 10 m from the upstream end of a property sewer; and
- (g) where required by By-law 25.2.

[By-law 25.9.1 amended in Gazette 24 December 1982 p. 4928.]

25.9.2 Provision of Inspection Openings for Visual Inspection Purposes (Figure 25.5)

Where specified by the Board inspection openings for visual inspection purposes shall be provided:

- (a) if an inspection opening is not provided by the Board at the connection to the Board's sewer;
- (b) at each end of a straight section of property sewer;
- (c) at even spacings of not more than 30 m along the property sewer
- (d) on inclined jump-ups, the length of which exceed 3 m provided that, if its length does not exceed 6 m, only one inspection opening is required, located centrally on the jump-up;
- (e) except when a 100 mm opening is provided in an accessible position on the water-closet discharge pipe on a water-closet branch property sewer;
- (f) on a 100 mm or larger branch property sewer, the length of which exceeds 3 m provided that, if its length does not exceed 6 m, only one inspection opening is required, located centrally on the branch property sewer; and
- (g) at the offtake of a branch property sewer if such branch property sewer is not installed and tested concurrently with the main property sewer.

[By-law 25.9.2 amended in Gazette 24 December 1982 p. 4928.]

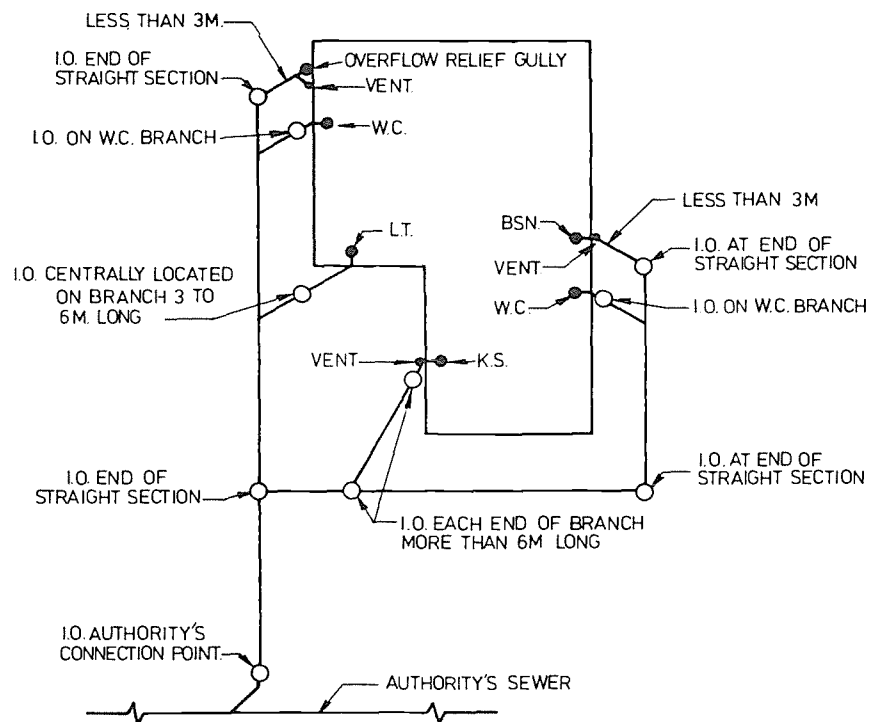


FIGURE 25.5 PROVISION OF INSPECTION OPENINGS
FOR VISUAL INSPECTION PURPOSES.

25.9.3 Use of Vents

If an approved access cover is fixed to the vent near ground level, and if the vent is of the same diameter as the property sewer a vent may be used in lieu of an inspection opening for maintenance purposes.

[By-law 25.9.3 amended in Gazette 24 December 1982 p. 4929.]

25.9.4 Size of Inspection Openings

- (a) Subject to (b) inspection openings shall be of the same diameter as the property sewer.
- (b) Where the property sewer is more than 150 mm, an inspection opening of at least 150 mm may be used.

[By-law 25.9.4 amended in Gazette 24 December 1982 p. 4929.]

25.9.5 Access to Inspection Openings

Where required by the Board inspection openings shall extend to ground level.

25.9.6 Sealing of Inspection Openings and Sockets

- (a) Stoppers or caps shall be used to seal all inspection openings and unused sockets.

- (b) Stoppers or caps shall be of an approved type and sealed by means of a gasket, sealing ring, or other approved method, and securely held in position by an approved clip or strap, or other approved means.
- (c) When a stopper or cap with a rubber ring or gasket is removed, a new rubber ring or gasket shall be fitted if the rubber ring or gasket has been damaged or deformed in any way.
- (d) Where the inspection opening is brought to the surface, a removable airtight cover shall be fitted. Where the cover may be subjected to external loading the Board may direct special types of covers to be used.

25.10 INSPECTION CHAMBERS

25.10.1 Provision

Inspection chambers shall be used where directed by the Board and may be used in lieu of inspection openings.

25.10.2 Size of Inspection Chambers

Inspection chambers shall be sized in accordance with Table 25.5

TABLE 25.5 SIZE OF INSPECTION CHAMBERS MINIMUM INTERNAL MEASUREMENTS (mm)

Depth to Floor of Chamber	Rectangular		Circular Diameter
	Width	Length	
Less than 600	450	600	600
600 to 900	600	900	900
900 to 1200	750	900	1050
Over 1200	750	1200	1050

25.10.3 Form and Materials

25.10.3.1 Form—Inspection chambers shall be either:

- (a) rectangular in shape and constructed *in situ* of brickwork at least 190 mm thick or concrete at least 150 mm thick; or
- (b) circular in shape and prefabricated in accordance with By-law 25.10.3.3 or constructed *in situ* of concrete at least 150 mm thick.

[By-law 25.10.3.1 amended in Gazette 24 December 1982 p. 4929.]

25.10.3.2 Rectangular Inspection Chambers

- (a) Each inspection chamber shall be constructed on a concrete bed of at least the same external dimensions as the chamber and at least 150 mm thick.
- (b) Chamber walls of brickwork shall not exceed 1.5 m in depth measured from surface level of invert of channel. Deeper walls shall be of concrete.
- (c) Bricks used for this purpose shall be first quality, clay bricks, or solid concrete blocks.

25.10.3.3 Circular Inspection Chambers

Prefabricated chambers shall be formed of spun reinforced concrete pipes with a wall thickness of at least 60 mm.

25.10.4 CONSTRUCTION

25.10.4.1 Conduit

- (a) The conduit in an inspection chamber located inside a building shall be fully enclosed and incorporate an inspection opening.
- (b) The conduit in an external inspection chamber may either be enclosed as above or be an open channel of width and depth equal to the diameter of the property sewer.
- (c) The floor in an inspection chamber shall slope towards the channel, or towards the inspection opening, on a grade of approximately 1 in 12.
- (d) Formed junctions and bends in channels shall have a centre line radius of not less than 300 mm.
- (e) A fall of at least 15 mm shall be provided in the invert of every straight channel.
- (f) A fall of at least 30 mm shall be provided in the invert of a channel which curves through 45 degrees or more.

[By-law 25.10.4.1 amended in Gazette 24 December 1982 p. 4929.]

25.10.4.2 Jump-Ups

- (a) Each jump-up in an inspection chamber shall be of cast iron or UPVC pipe or of other approved material securely clipped to the wall and terminating at either end with a 90 degree bend, the higher one of which shall incorporate an inspection opening.
- (b) Where more than one jump-up is installed in any circular inspection chamber, the chamber shall be at least 1.2 m in diameter.
- (c) External jump-ups shall be in accordance with the requirements of the Board.

25.10.4.3 Ladders

- (a) Subject to By-law 25.10.4.4(a), ladders shall be provided in chambers 1.2 m or more in depth.
- (b) (i) Ladders in inspection chambers shall be hot-dipped galvanized steel with not less than 20 mm diameter rungs at least 300 mm long and spaced at not more than 300 mm. Stringers shall be not less than 50 x 10 mm located 200 mm from the wall and fixed using stainless steel or hot dipped galvanized bolts to the wall at spacings not exceeding 3.5 m;
- (ii) If approved, ladders may be of materials and length other than that specified in (i).

[By-law 25.10.4.3 amended in Gazette 24 December 1982 p. 4929.]

25.10.4.4 Step-Irons

- (a) Step-irons may be used in lieu of ladders provided:
 - (i) the chamber is a dry chamber;
 - (ii) the chamber does not exceed 3 m in depth; and
 - (iii) the step-irons are built-in during construction of the chamber.
- (b) (i) Subject to (ii), step-irons shall be hot-dipped galvanized steel not less than 24 mm diameter with 350 mm long rungs constructed 200 mm from the chamber wall. Spacing between step-irons shall be not more than 300 mm.
- (ii) Step-irons may be of other approved materials and designs.

25.10.4.5 Cement Rendering

The walls of brick inspection chambers and the floor and channels of all inspection chambers shall be rendered with a coat of cement mortar at least 10 mm thick and have a smooth finish.

25.10.4.6 Top of Inspection Chamber

Inspection chambers may be constructed:

- (a) either full size to surface level; or
- (b) at height of not less than 1.5 m above the floor, may be tapered to an access opening, provided the access shaft is at least 600 mm diameter and does not exceed 300 mm in length.

25.10.4.7 Access Opening

- (a) A circular or rectangular access opening at least 530 mm in size fitted with a removable watertight cover, shall be provided at surface level.
- (b) Where subject to vehicular traffic or other heavy loading, the cover shall be of a heavy-duty type.

25.10.4.8 Construction Joints

- (a) No more than 24 hours shall elapse between successive pours of concrete.
- (b) The keying surface of every construction joint shall be scabbled and cleaned.
- (c) A cement slurry shall be applied to every construction joint immediately prior to pouring concrete.

25.10.4.9 Inserts

Holes broken or formed in walls of inspection chambers for insertion of pipes or fittings shall be made watertight by keying and preparing as construction joints and caulking with a stiff 2:1 mix of sand : cement mortar into the annular space between the concrete and pipe or fitting, or sealing with an epoxy based, or other approved sealant.

25.10.5 Testing

The Board may order the application of a water test to an inspection chamber.

25.11 BOUNDARY TRAPS (Interceptor Traps)

25.11.1 General requirements

Where a boundary trap is required by the Board it shall comply with the following:

- (a) The trap shall be the same size as the down stream property sewer to which it connects;
- (b) The trap shall be bedded on concrete;
- (c) The inlet riser shall be extended to near ground level and a cap or cover fitted to the top of the riser;
- (d) In areas subject to heavy vehicular traffic a cast iron cover and frame shall be set at ground level on a concrete base such that no traffic load can be directly transmitted to the boundary trap or property sewer; and
- (e) The boundary trap shall be vented in accordance with By-law 25.5.1.2 and By-law 20.9.

[By-law 25.11.1 amended in Gazette 24 December 1982 p. 4929.]

25.11.2 Boundary Trap Inside or Under a Building

Where a boundary trap is installed inside or under a building it shall comply with the following:

- (a) The riser shall be sealed with an air and watertight removable screwed or bolted cover in an accessible position.
- (b) Where specified by the Board the boundary trap riser shall be installed in a chamber.

25.12 REFLUX VALVES

25.12.1 General

A reflux valve shall be installed where an overflow gully cannot be provided in accordance with By-law 18.13, and where specified by the Board.

25.12.2 Location

- (a) When required on the main property sewer a reflux valve shall be placed as close as possible to the sewer connection point.
- (b) When required on a branch property sewer to protect fixtures not protected by the overflow gully a reflux valve shall be located as close as possible to the branch offtake.

[By-law 25.12.2 amended in Gazette 24 December 1982 p. 4929.]

25.12.3 Reflux Valve Chamber

Except where a reflux valve is installed in an accessible position in a building or elsewhere when approved by the Board, it shall be installed in a chamber complying with By-law 25.10 and shall be centrally located in the chamber. The floor of any reflux valve chamber shall be cement rendered and graded to the reflux valve top.

25.12.4 Reflux Valve with Boundary Trap

Where a reflux valve and a boundary trap are both required by these by-laws, the reflux valve shall be fitted downstream of the boundary trap.

25.13 GULLIES

Gullies shall be in accordance with By-law 18.13.

25.14 TESTING OF PROPERTY SEWERS

Property sewers shall be tested in accordance with the appropriate Australian Standard or as required by the Board.

[By-law 25.14 amended in Gazette 24 December 1982 p. 4929.]

25.15 JUNCTIONS IN PROPERTY SEWERS

- (a) Junctions used for connecting property sewers shall be either:
 - (i) equal 45 or 60 degree junctions fixed on grade, or
 - (ii) unequal 45 degree junctions fixed so that the smaller property sewer entries are at an angle of approximately 45 degrees to the horizontal.
- (b) Reducers shall be of the "level invert taper" type with the pipework connected soffit to soffit.
- (c) Sweep junctions are not permitted.

[By-law 25.15 amended in Gazette 24 December 1982 p. 4929.]

26.0 JOINTING OF PIPES

26.1 GENERAL

The joints between discharge pipes, vent pipes, fittings, fixtures and appliances shall be made in the following ways, or in other approved ways, as appropriate to the material used, and each such joint shall be rendered airtight and watertight.

26.2 CONNECTION OF FIXTURE OUTLETS

26.2.1 To Traps or Waste Pipes

A standard screwed connection shall be used to make the joint between any fixture outlet and a fixture trap or waste pipe. The approval of the Board shall be obtained before any other type of connection is made.

26.2.2 To Soil Pipes

The joint between any water-closet pan, slop hopper, bedpan washer or bedpan washer-sterilizer and the soil pipe to which it is connected shall be made:

- (a) by compacting a sealing compound into the socket and neatly splaying off;
- (b) using a diaphragm connector; or
- (c) using other materials or connectors approved by the Board.

26.3 CONNECTION OF VENTS TO WATER-CLOSET PAN AND SLOP HOPPER OUTLETS

Where vents are connected to vent horns on water-closet pans and slop hoppers they shall be connected using either:

- (a) an approved connector of rubber or other materials; or
- (b) a cap-piece of sheet lead at least 1.8 mm thick, and packed with a sealing compound.

26.4 MATERIALS AND METHODS OF JOINTING PIPES AND FITTINGS

- (a) Jointing of pipes and fittings of dissimilar materials shall be made using approved adaptors of the appropriate material and design for the pipes and fittings being joined.
- (b) The type of joint selected is dependent on the materials of the pipes, fittings and adaptors, and shall be in accordance with Table 26.1, unless otherwise approved or directed.

26.4.1 Bronze Welded Joints (Figure 26.1)

- (a) Bronze welding filler rods shall be in accordance with AS 1588, and shall contain not less than 57% copper.
- (b) Joints for bronze welding shall be formed by bellng, or other means used for fusion welded joints, so as to permit the satisfactory deposition of weld material.

26.4.2 Bolted Gland Joints

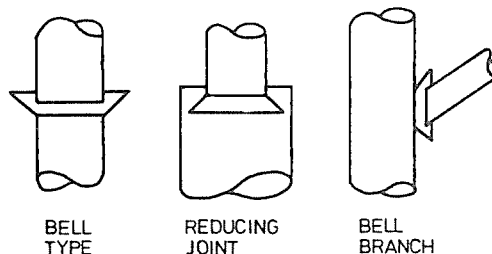
- (a) Bolted gland joints shall comply with AS 1631 for cast iron, and for other materials with any relevant requirements in AS 1631.
- (b) The sealing rings used in bolted gland joints shall be appropriate for the material and dimensions of the pipes or fittings being jointed.
- (c) The use of bolted gland joints below ground is prohibited except in those areas where approved by the Board.

26.4.3 Cement Joints

- (a) Cement mortar joints shall be used only where approved by the Board.
- (b) Cement mortar shall consist of one part of Portland cement and 2 parts of clean sharp sand, properly mixed with a minimum of water necessary to enable the joint to be caulked.
- (c) Cement mortar joints shall only be used for jointing to vitrified clay sockets.
- (d) UPVC spigots shall be coated with solvent cement for the full engagement length of the joint and quickly coated with sharp dry sand prior to making the joint.

TABLE 26.1 PERMISSIBLE JOINTS FOR PIPES AND FITTINGS OF SIMILAR AND DISSIMILAR MATERIALS

[illegible]



**FIGURE 26.1 TYPICAL BRONZE WELDED
JOINT DETAILS**

26.4.4 Epoxy Resin Joints

Epoxy resin shall be compatible with the materials being jointed.

26.4.5 Fusion Welded Joints

Fusion welded joints shall be used only on vent pipes, and external protective coatings shall be reinstated after welding.

26.4.6 Lead Caulked Joints

Lead used for jointing shall be commercially pure lead.

26.4.7 Rubber Ring Joints—

- (a) Rubber rings used for jointing shall comply with AS 1646 and the relevant pipe and fitting Standard, viz AS 1693 and be of the dimensions, composition and hardness approved for the particular application.
- (b) Adaptors used for forming joints between pipes of other materials and vitrified clay shall have the dimensions of vitrified clay spigots or sockets as applicable.
- (c) Rubber ring joints for use in property sewers shall have a root inhibitor to the requirements of the Board.

[By-law 26.4.7 amended in Gazette 24 December 1982 p. 4929.]

26.4.8 Screwed Joints

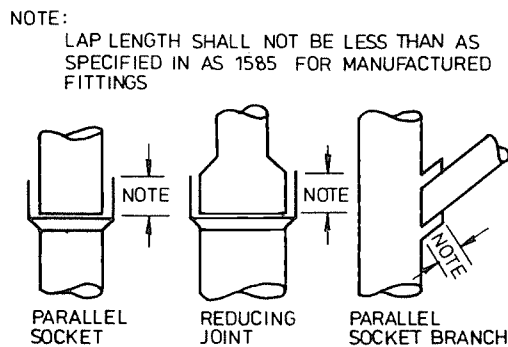
- (a) All tube threads shall be in accordance with AS 1722.
- (b) All fitting threads shall be in accordance with the appropriate Australian Standard for the fitting.
- (c) Where a sealing thread and a fastening thread are joined a seal shall be formed on metal threads by using polytetrafluoroethylene (PTFE) tape, hemp or pipe jointing compound and on plastic threads by using PTFE tape only.

- (d) Where 2 fastening threads are joined a seal shall be formed as in By-law 26.4.8(c) above or where applicable by an appropriate gasket or grummet.
- (e) After jointing, exposed areas of galvanized steel tubes from which the galvanizing has been removed shall be coated with a rust inhibiting paint.

[By-law 26.4.8 amended in Gazette 24 December 1982 p. 4929.]

26.4.9 Silver Brazed Joints (Figure 26.2)

- (a) Silver brazing alloys shall contain not less than 1.8% silver and shall comply with AS 1167.
- (b) Silver brazed joints shall be lapped joints in accordance with AS 1589.
- (c) All manufactured fittings shall comply with AS 1589.



**FIGURE 26.2 TYPICAL SILVER BRAZED
JOINT DETAILS**

26.4.10 Soft Soldered Joints

- (a) Soft solder shall be nominally one part of lead to one part of tin.
- (b) Soft soldered joints shall only be used for jointing to sheet copper or galvanized steel vents in external locations above ground.
- (c) Soft soldered joints shall be lapped joints. Formed Joints between a main-vent and a branch-vent, and the mitre forming an elbow shall lap at least 3 mm. Circumferential joints shall lap at least 25 mm.

26.4.11 Solvent Welded Joints

Solvent welding cement shall comply with AS A185.

26.4.12 Other Joints

Joints other than those specified herein shall not be used except when approved and under conditions as may be specified by the Board.

27.0 SEWERAGE SERVICES—GENERAL

27.1 PROCEDURE FOR CONNECTIONS TO SEWER

When a sewer is completed and ready for use, action may be taken under sections 59 and 60 of the Act.

27.2 PROOF OF CONNECTIONS HAVING BEEN MADE. Certificate of Board's officer

The certificate of such officer as the Board may appoint, in writing, shall be *prima facie* evidence that a water-closet or water-closets, or drains, appliances, apparatus and connections have been provided or that the works, matters and things have been performed, as the case may be, and *prima facie* evidence as to the amount of costs, expenses, and interest recoverable in respect thereof.

27.3 PLANS REQUIRED FOR PROPERTY SEWERAGE INSTALLATION AND FEES FOR EXAMINATION OF PLANS

[By-law 27.3 substituted in Gazette 29 June 1984 p. 1812.]

27.3.1 Interpretation

In By-laws 27.3.2 and 27.3.3 "exempt building" means—

- (a) a single occupancy dwelling;
- (b) a residential or industrial development containing not more than 8 units; or
- (c) a commercial development of not more than 160 fixture units.

[By-law 27.3.1 substituted in Gazette 29 June 1984 p. 1812.]

27.3.2 Notice of proposed new works

A person who proposes to erect a new building or to make alterations or additions to such a building shall—

- (a) give to the Authority notice of that erection, alteration or addition in the form of a form approved by the Authority;
- (b) furnish to the Authority 2 copies of a plan of the building in a form acceptable to the Authority, of which one shall bear the stamped approval of the relevant local authority; and
- (c) where the building is not an exempt building, furnish to the Authority a plumbing design plan in a form acceptable to the Authority.

[By-law 27.3.2 substituted in Gazette 29 June 1984 p. 1812.]

27.3.3 Existing buildings

A person who proposes to connect fittings in an existing dwelling to the sewers of the Authority shall—

- (a) give to the Authority notice of the connection in the form of a form approved by the Authority;
- (b) furnish to the Authority 2 copies of a plan showing the location of the building in relation to the boundaries of the land and showing the location and level of the proposed fixtures; and
- (c) where the building is not an exempt building, furnish to the Authority a plumbing design plan in a form acceptable to the Authority.

[By-law 27.3.3 substituted in Gazette 29 June 1984 p. 1812; amended in Gazette 28 June 1985 p. 2348.]

27.3.4 Fees

(a) In this by-law "major fixtures" includes water closets, urinal outlets, slop hoppers, pan washers and industrial waste outlets.

(b) The fees to be paid in respect of proposals to carry out plumbing works are—

(i) Examination of plan of proposed new works and inspection of works—

	\$
(I) Single residential building—	
One major fixture.....	43.00
Each additional major mixture.....	10.50
Re-inspection	21.50
(II) Other than single residential building—single storey—	
One major fixture.....	65.50
Each additional major fixture.....	21.50
Re-inspection	32.50
(III) Other than single residential building—more than one storey—fee per floor—	
One major fixture on floor	109.00
Each additional major fixture on floor	32.50
Re-inspection	54.50

(ii) Plumbing work only (septic tanks)—

 One major fixture \$25.00

 Each additional fixture \$12.00

(c) Fees will be assessed and are payable at the time of lodgement of a notice under By-law 27.3.2(a) or By-law 27.3.3(a).

[By-law 27.3.4 substituted in Gazette 29 June 1984 p. 1812; amended in Gazettes 28 June 1985 p. 2348; 27 June 1986 p. 2131.]

27.3.5 Scale of Plans: All plans submitted shall be drawn to a scale of not less than 1:200.

27.4 DIAGRAM OF EXISTING PROPERTY SEWERS

A person may make application to the Board for a diagram of existing property sewers in any area the plans or records of which are in the custody of the Board, and on payment of such sum as the Board requires, be supplied by the Board with a diagram of the existing property sewers in that area in accordance with those plans and records.

[By-law 27.4 amended in Gazette 24 December 1982 p. 4929.]

27.5 PLAN TO BE AVAILABLE TO OFFICER OF THE AUTHORITY

An approved plan of proposed plumbing work shall be produced whenever required during the progress of work, to an officer of the Authority.

[By-law 27.5 substituted in Gazette 29 June 1984 p. 1812.]

27.6 NOTICE AND PLAN OF INTENDED NEW BUILDING OR ADDITIONS ETC. TO EXISTING BUILDING

A person intending to erect a building, or rebuild, or to make any addition or alteration to any building, adjacent to the Board's sewers shall give to the Board at least 14 days' notice of such intention, and with such notice shall submit for approval 2 copies of the building plan, of which one shall bear the stamped approval of the local authority, and shall also submit sections of such intended building, additions or alterations, drawn to a scale of not less than 1:200 showing the position of proposed fixtures and approaches thereto. When required by the Board, enlarged details to such scale as instructed shall be supplied.

[By-law 27.7 repealed in Gazette 28 June 1985 p. 2351.]

27.8 USE OF PROPERTY SEWERS

The owner and the occupier of a sewered property shall discharge into the sewerage system all faecal matter, urine, household slops, and household liquid refuse from such property and such other polluted water from stables, washing areas, manure bins, basements, cellars and roofed yards and, subject to these by-laws such industrial wastes as the Board has consented in writing to being so discharged.

[By-law 27.8 amended in Gazette 24 December 1982 p. 4929.]

27.8.1 Tests

The responsible Officer of the Board shall require the application of the water or smoke test or such other tests as he may order or approve.

27.8.2 Water Test—

- (a) The water test shall be applied to the property sewerage and plumbing systems and their fittings in their entirety or in sections, and shall be applied by hermetically sealing all openings below the top of the section to be tested. The system shall then be filled with water to the highest point of the section, or, if considered necessary, to such additional height as the responsible officer may order, and every joint, fitting and pipe carefully examined for leaks.
- (b) In testing stoneware or concrete property sewers a loss allowance at the rate of $2\frac{1}{2}$ per centum per hour of the capacity of the property sewer under test and at 1.5 m head shall be permitted.

[By-law 27.8.2 amended in Gazette 24 December 1982 p. 4929.]

27.8.3 Smoke Test

The smoke test shall be applied by forcing into the system thick smoke to a pressure of 25 mm of water by means of a smoke test apparatus, closing all openings at which smoke appears and maintaining the pressure for 5 minutes after the last opening is closed. Every joint or pipe shall then be carefully examined for leaks.

27.8.4 Equipment

The equipment, material, power and labour necessary for the inspection and tests shall be furnished by the licensed plumber.

27.8.5 Defective Work

Materials, pipes, bends, junctions, fittings, fixtures, and apparatus found to be defective shall be removed and replaced by sound ones, and defective joints made tight and every part of the work shall be made to comply to these by-laws and shall be subject to the approval of the Board or its responsible officer.

27.8.6 Maintenance by Licensed Plumber

A person who holds a licence from the Board, and executes work in connection with sewerage, property sewerage or sanitary plumbing shall, when so directed by the Board, make good at his own expense, a defect that is found within 12 months of date of completion of the work and is in the opinion of the Board, due to faulty workmanship.

[By-law 27.8.6 amended in Gazette 24 December 1982 p. 4929.]

27.8.7 Maintenance by Occupier

A silt trap, grease trap, oil trap or neutralizer, and such other appliance as the Board may direct, shall be maintained by the owner or occupier at his own expense and shall be cleaned at such intervals as may be necessary to ensure that such trap or appliance operates in an efficient and hygienic manner.

27.8.8 Separate or Common Property Sewers—

- (a) A house shall be separately served unless a common property sewer is ordered or approved by the Board.
- (b) Where a common property sewer is ordered or approved by the Board, the provisions of section 70 of the Act, as other conditions required by the Board, shall apply.

[By-law 27.8.8 amended in Gazette 24 December 1982 p. 4929.]

27.8.9 Provision of Water Closets—

- (a) At least one water closet approved by the Board shall be provided for each house, flat, building or land required by notice from the Board to be connected with the Board's sewer.
- (b) After the date fixed by notice from the Board to the owner of any house, building or land, requiring him to connect the same with the Board's sewer, or after such further time as shall be allowed by the Board, for the purpose of such connection, no privy closet other than a water closet approved by the Board, shall be used in such house or building or upon such land.

27.9 SEWERAGE SERVICES TO NON-RATEABLE PROPERTIES

Applications for sewerage services to non-rateable properties shall be made on the prescribed form procurable at the Head or Branch Offices and the Board may provide a service on payment of the prescribed annual fee, of the cost of extending the sewer to the land if the sewer is not extended thereto and of installing a property sewer to the boundary of the land. The applicant shall also bear the cost of maintaining the property sewer and of having it sealed when the service is no longer required.

The annual fee shall take the place of a sewerage rate and the general provisions of these by-laws shall apply to such services.

[By-law 27.9 amended in Gazette 24 December 1982 p. 4929.]

INDUSTRIAL WASTES AND PLUMBING BY-LAWS NOT INCLUDED IN PARTS 14 TO 24 INCLUSIVE

28.0 INDUSTRIAL WASTES

28.1 Conditions of Discharge

The discharge of industrial wastes into a sewer shall be subject to the following terms, provisions and conditions:—

- (a) An application for permission to discharge industrial wastes from a property into a sewer shall be made in writing to the Board and shall set out—
 - (i) the processes of manufacture from which industrial wastes are discharged into the Board's sewer;
 - (ii) the nature of the industrial waste from every such process;
 - (iii) the estimated maximum rate of discharge of industrial waste from every such process;
 - (iv) the hours of the day during which discharge of industrial wastes from every such process will normally take place; and
 - (v) the estimated maximum daily discharge of such industrial wastes into the Board's sewer,

and the application shall be accompanied by detailed plans of the apparatus to be used for the treatment of the industrial waste and by such other information regarding the nature, quantity, rates, and times of discharge as may be required by the Board;

- (b) No industrial waste shall be discharged into the Board's sewer unless a written permit has been first granted by the Board, and an agreement executed by the applicant containing a covenant to comply with the conditions of the permit, which shall include the following conditions, namely:—

That if at any time in the opinion of the Board—

- (i) the quantity, quality, or rate of the discharge of the said industrial waste is not in compliance with the terms, provisions, or conditions of the permit;
- (ii) the occupier is not fully and faithfully performing and observing the terms, provisions, and conditions of the said permit and of this or any other by-law;
- (iii) the treatment apparatus is not in efficient working order; or
- (iv) any other breach of the agreement has been made,

the Board may serve a notice in writing upon the occupier of the property, by leaving it thereon or posting it addressed to him at the property, specifying the matter or matters in respect of which a breach has taken place, or as to which the occupier is in default, or concerning which there is any complaint by the Board, and the notice shall require the occupier to make good the same in all things to the satisfaction of the Board, within a period to be stated therein, from the date of service thereof, in the manner so specified, and the notice shall also state that the Board is at liberty to terminate and put an end to the permit; and, further, that if the requirements of the notice have not been complied with on the expiration of the period mentioned therein, the permit shall automatically terminate and be deemed to be at an end, save and except as to the power of entry by the Board's officers as mentioned in the permit without any further or other notice from the Board, and the Board by its officers may enter upon the property, and at the cost and expense in all things of the occupier disconnect the apparatus used to discharge the industrial waste into the Board's sewers, and prevent and put an end to the further entry of industrial waste to the sewers, and the occupier shall be entitled to no compensation whatever in connection therewith;

- (c) The Board shall be the sole judge as to the quality, quantity and rate of discharge of such industrial waste and as to whether the same complies with the conditions of the said permit and of Parts 6 to 25 of these by-laws and its decision in regard thereto shall be final and conclusive;
- (d) Except by special permission of the Board, in writing, the volume of industrial waste discharged from any property into a sewer of the Board shall not in any case exceed—
- (i) if the industrial waste is discharged into a 100 mm sewer of the Board, a discharge rate of 3 kilolitres per hour;
 - (ii) if the industrial waste is discharged into a 150 mm sewer of the Board, a discharge rate of 7 kilolitres per hour; or
 - (iii) if the industrial waste is discharged into a 230 mm sewer of the Board, a discharge rate of 11.5 kilolitres per hour;
- (e) The maximum aggregate daily quantity of industrial waste which may pass from any property into a sewer, the size and capacity of the property sewer for conveying such industrial waste from the property to the sewer, and the hours during which such flow will be permitted, shall be determined by the Board. The volume of industrial waste discharged shall, if ordered by the Board, be determined by meter or by some approved means of measurement provided by the occupier;
- (f) The Authority may levy industrial waste charges in accordance with the following scale—
- | | |
|------------------------|--|
| Volume | 49c kl |
| B.O.D..... | 60c kl |
| Suspended solids | 67c kg |
| Minor permits..... | \$72.00 (including first fixture) plus \$10.00 for each additional fixture |
| Medium permits | \$80.00 plus \$40.00 for each washing unit |
| Major permits | \$230.00; |
- (g) All industrial wastes shall be passed through such settling, screening or neutralizing chambers or such other apparatus as ordered or approved by the Board or any one or more of those chambers or apparatus to ensure that the resulting effluent shall comply with the requirements of the said permit and of this by-law. All such apparatus or machinery shall be approved in type and general arrangement by the Board, but the applicant shall determine the size, capacity and details of the treatment apparatus necessary to provide an effluent in compliance with the requirements of the said permit and this by-law;
- (h) The occupier shall notify the Board in writing of his desire to make any alteration which shall in any way affect:—
- (i) the nature of the waste from any process of manufacture;
 - (ii) the estimated maximum rate of discharge from any such process of manufacture; or
 - (iii) the hours of discharge of industrial waste from any such process; and all alterations or additions to the treatment apparatus shall in all things comply with the requirements of the said permit and of this by-law, but in no case shall any such alteration be made without the approval in writing of the Board;
- (i) The person to whom the permit is granted shall notify the Board in writing of any change of ownership or occupancy of any industrial property connected with the Board's sewers, at least 14 days prior to such change;

- (j) The permit shall not be assigned or transferred, unless the consent thereto in writing of the Board has been first obtained;
- (k) The owner or occupier of any property connected with the Board's sewers shall, if and where directed, install to the Board's design an approved chamber for inspection, sampling, and measurement, and every such chamber shall at all times be readily accessible to the Board's officers;
- (l) The Board or any authorized officer, servant, agent, or workman, of the Board shall be at liberty at any time and from time to time to enter upon the property and every part thereof and take samples of industrial waste for analysis and otherwise and also to inspect the treatment apparatus;
- (m) Every settling, screening, or neutralizing chamber, or other apparatus for the treatment of industrial wastes in accordance with this by-law shall be cleansed and maintained by the occupier at his own expense and, at such intervals as may be considered necessary by the Board to ensure the efficient operation of such chamber or apparatus;
- (n) Notwithstanding the permission or approval of the Board, the occupier of a property shall be solely liable for and in respect of—
 - (i) accident or damage, loss, or injury directly or indirectly arising out of or resulting from the discharge of industrial waste from the property into the Board's sewer, and the occupier shall agree to hold harmless and keep indemnified the Board against all claims and demands for such damage, loss, or injury of any description made and/or suffered by the workmen of the Board or any other persons whomsoever; and
 - (ii) damage, loss, or injury occasioned by or done to the Board's sewer or to property belonging to the Board or to a Company, person, or persons, by reason of such discharge failing to comply with the terms, conditions, and provisions of the said permit or of the by-laws of the Board, and the occupier shall pay the cost of making good any such damage, loss or injury;
- (o) The Board may from time to time without payment of any compensation exclude from its sewers all industrial waste from any property during the repairing, examination, or maintenance of the sewers or the carrying out by the Board of any works in connection therewith; and
- (p) Such other conditons as may be required by the Board having regard to the special circumstances of the case.

[By-law 28.1 amended in Gazettes 18 June 1982 p. 2023; 24 December 1982 p. 4929; 24 June 1983 p. 2008; 29 June 1984 p. 1813; 28 June 1985 p. 2349; 27 June 1986 p. 2131.]

28.2 CONNECTIONS PRIOR TO BY-LAW

28.2.1 Subject to By-law 28.1, where the Board has, before the date of the coming into operation of this by-law, granted to a person permission to discharge industrial waste into a property sewer or into a sewer of the Board, or where a person has, before the date of the coming into operation of this by-law, been discharging industrial waste into a property sewer or into a sewer of the Board without the express permission of the Board, if after the said date, such person continues so to discharge such industrial waste, the Board may, if it thinks fit and notwithstanding anything contained in these by-laws, by notice in writing, direct such person wholly to cease from discharging such industrial waste.

[By-law 28.2.1 amended in Gazette 24 December 1982 p. 4929.]

28.2.2 A notice under Section 28.2.1 of this by-law shall specify a day, not less than 8 weeks from the date of the notice as the day on and after which such person is directed to cease discharging such industrial waste.

28.2.3 A person who fails to comply with a direction contained in the notice commits an offence.

28.3 POLLUTED AREAS

28.3.1 Connection—The Board may by notice in writing require any owner or occupier of any land to which Section 58 of the Act applies to connect with the sewer of the Board dairies, market-places, abattoirs, areas for washing vehicles, or other polluted areas upon such land.

28.3.2 Conditions Governing Connection—A connection of the kind referred to in By-law 28.3.1 shall not be made unless the following conditions have been complied with:—

- (a) The place, or places, to be connected, if of a total area greater than 17 square metres, shall be so roofed as to prevent the entry of rainwater from it to the sewers, and in no case shall rainwater be permitted to discharge on to such place from adjoining surfaces;
- (b) The property to be connected shall be paved with concrete or other approved materials, with a 75 mm raised kerb and graded to the satisfaction of the Inspector; and
- (c) The property sewer from any such place shall be provided with an approved silt trap with a removable grating.

[By-law 28.3.2 amended in Gazette 24 December 1982 p. 4929.]

28.3.3 Prevention of Storm Water entering Yard Gullies—

- (a) Stoneware yard gully basins and the top of silt traps provided with stoneware basins shall be so surrounded with an approved impervious kerbing of concrete or other approved material as to prevent the access of surface water to the property sewers, and if the Board so directs, the wall at the rear of a gully or silt trap, if of brick or stone, shall be cement rendered to the height of the top over same, and if of wood, the wall shall be provided with an approved galvanized sheet iron apron.
- (b) Rainwater pipes shall not be connected to or discharge into a gully or fixture connected to the Board's sewers.
- (c) Gullies or pits for the disposal of road drainage, or for the disposal of storm water from a roof, yard or vacant land shall not be connected to a sewer or property sewer under the control of the Board.

[By-law 28.3.3 amended in Gazette 24 December 1982 p. 4929.]

28.3.4 Sealed Disconnecter Traps:

- (a) Sealed disconnecter traps may be affixed inside or outside a building, or outbuilding, and in such cases breather pipes or fresh air inlet equal in area to the waste pipe or pipes discharging into the trap shall be taken to such height as directed.
- (b) Where the trap is inside the building or outbuilding such pipes shall be led to the outside of the building or outbuilding.
- (c) The material for the breather pipes shall be the same as for vent pipes.
- (d) Inspection openings to the traps shall be sealed with screwed plugs, or as otherwise approved.

28.3.5 Provision of Grease, Petrol, and Oil Traps

Wastes from the following fixtures and areas shall first discharge into an approved apparatus for retaining objectionable matter, that is to say:—

- (a) A fixture or area from which petrol, benzine or other inflammable or explosive substance, or grease, oil or greasy or oily matter, is likely to be discharged, or conveyed into waste, combined waste, or soil pipes or into property sewers;
- (b) A sink in food-packing houses, food preparation premises, butchers' shops, lard rendering establishments, hotels, motels, restaurants, boarding houses, and such other places as the Board may direct; and
- (c) Such other fixtures, areas or apparatus as the Board may direct.

[By-law 28.3.5 amended in Gazette 24 December 1982 p. 4929.]

28.3.6 Construction of Grease Traps:

- (a) Grease traps shall be fixed outside buildings or outbuildings wherever practicable.
- (b) External grease traps shall be constructed of approved materials.
- (c) Internal grease traps shall be constructed of copper, stainless steel, or other approved material, and, if directed fixed upon a tray.
- (d) The outlet from a grease trap shall be connected to a disconnecter trap.

28.3.7 Grease Trap Ventilation

Internal and external grease traps shall have approved independent provision made for inlet and outlet ventilation as provided for waste pipes in By-law 28.9.12.

[By-law 28.3.7 amended in Gazette 24 December 1982 p. 4929.]

28.3.8 Size of Grease Trap:

- (a) The dimensions of a grease trap to be provided shall be such as to ensure the retention of all grease entering such trap.
- (b) The height from the top of the outlet of a grease trap to the vent take off shall not be less than 100 mm.
- (c) The difference in level between invert of inlet and invert of outlet shall be not less than 25 mm.
- (d) The capacity of a sink shall be measured to the overflow level, or, in the event of there being no overflow, to the top of the sink.
- (e) Where hot water is being fed to a dishwasher the capacity of the dishwasher shall be taken as the amount of maximum hourly discharge.

28.3.9 Outlet Pipes from Grease Traps

The outlet pipe from a grease trap shall be at least equal to the size of the pipe which has a cross sectional area equivalent to the total area of incoming waste pipes and unless the Board so permits shall not be less than 65 mm in diameter.

28.3.10 Construction of Petrol and Oil Traps

- (a) Petrol and oil traps shall be constructed in accordance with the Board's type drawings.
- (b) Such traps shall be connected to a disconnecter trap and shall be provided with independent ventilation.

28.3.11 Construction of Silt Traps, Bucket Traps and Potato Peeling Machine Traps

Construction of silt traps, bucket traps, and potato peeling machine traps shall be in accordance with the Board's Standard Drawings and be sized to the requirements of the Board.

28.3.12 Venting of fixtures and fittings discharging into grease traps

- (a) Irrespective of the length of the wastepipe, kitchen or scullery sinks and dishwashers discharging into grease traps shall be vented.
- (b) Unless the length of the wastepipe exceeds 6 metres, bucket traps discharging into grease traps need not be vented.

28.3.13 Potato Peeling Machines

Potato peeling machines shall be fixed to a floor of impervious material of approved grade or slope and shall drain to and discharge into a silt trap through a screen or mesh of non-corrodible material of not less than 4 meshes to 25 mm.

28.4 PROHIBITED DISCHARGES

The depositing or discharge of the following substances into a property sewer or sewer without prior approval of the Board, shall be an offence against these by-laws, namely:—

- (a) Animal matter, other than as mentioned in By-law 28.3.1, fleshing, wool, hair, dead animal, grease, dust, ashes, rubbish, garbage, offal, vegetable and fruit or their parings, rags, oil, fat, mud, sand, gravel, or like substance, or any other substance which is, in the opinion of the Board, liable to be injurious to any part of the sewerage system or to employees of the Board engaged in the operation of maintenance of the sewerage system;
- (b) Petrol or other inflammable or explosive substance, whether solid, liquid or gaseous;
- (c) Rain, roof, surface, river or flood waters, except by special permission in writing under the hand of the Board;
- (d) The contents of a nightsoil cart, cesspool, or privy;
- (e) Industrial waste or any substance which has a pH outside the range of 6.2 to 9.0;
- (f) Industrial waste which is above the temperature of 38 degrees Celsius or such lower temperature as may be prescribed by the Board, having regard to the special circumstances of a particular case;
- (g) Liquid which contains such percentage of common salt, or of other mineral, salt, acid, solvent or gas, as in the opinion of the Board, is injurious to, or liable to form compounds injurious to any part of the sewerage system or to employees of the Board engaged in the operation or maintenance of the sewerage system;
- (h) Water from a steam exhaust, blow off drip pipe or condenser;
- (i) Radio-active substances beyond the safe limits prescribed by the Radiological Council of Western Australia; and
- (j) Unless the discharge has been thoroughly disinfected, solid or liquid discharge from patients suffering from any infectious or contagious disease.

[By-law 28.4 amended in Gazette 24 December 1982 p. 4929.]

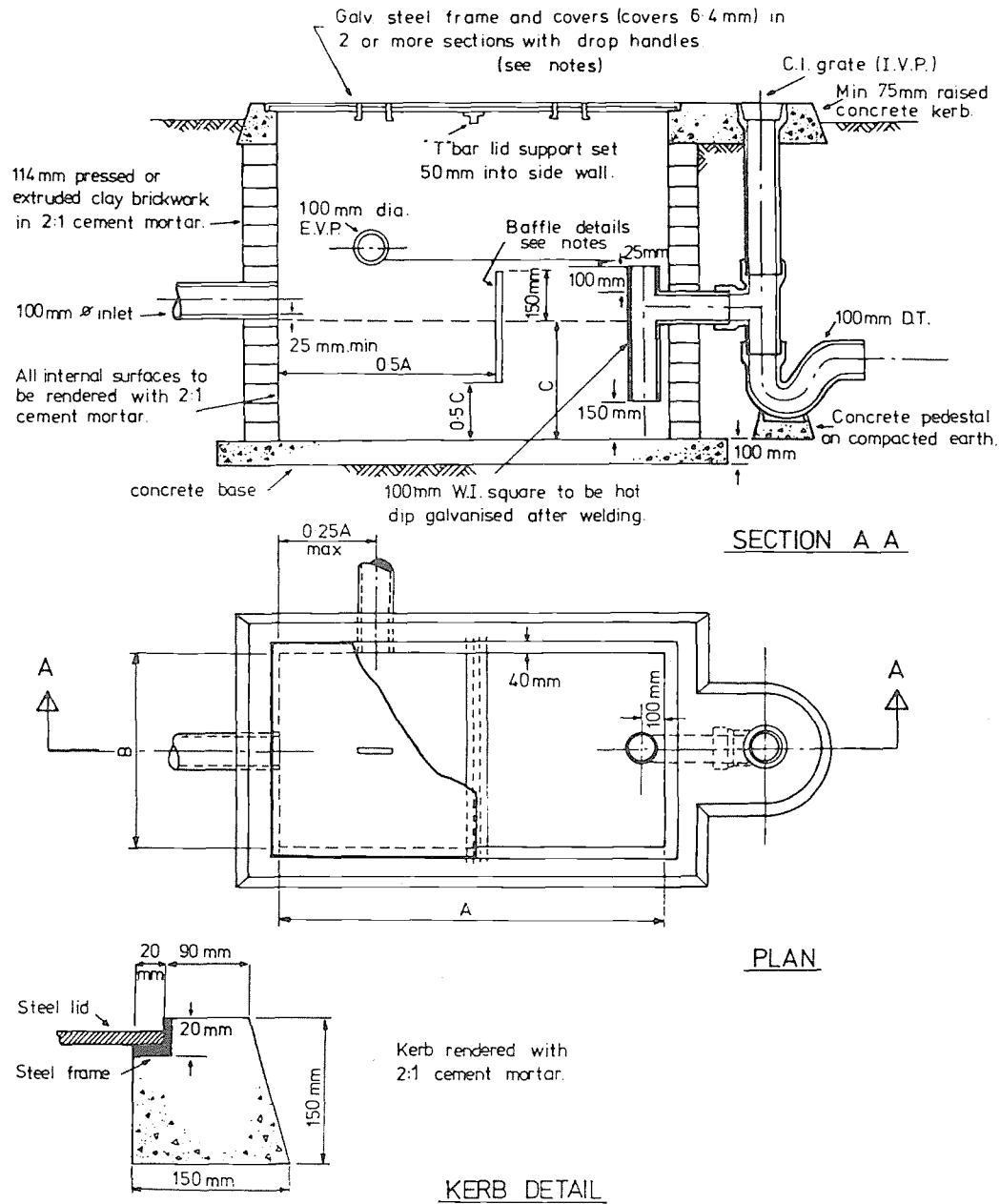


FIG. 28.1 GREASE TRAP
CONSTRUCTION

DESIGN NOTES

- 1 Sizes and application – See note 3 for dimension.
 - (a) Size 1 – Fried fish shops with maximum of 2 fixtures and 1 bucket trap.
 - (b) Size 2 – Small restaurants, works canteens, small hospital kitchens, licensed premises serving meals but with limited accommodation facilities and small butcher shops.
 - (c) Size 3 – Large supermarket butcher shops, major hospital kitchens, large accommodation hotel kitchens small food manufacturing premises.
- 2 Other applications not covered in 1(a), 1(b) and 1(c) must be discussed with the Industrial Waste Section.
- 3 Trap dimensions and construction notes.
 - (a)

Dimensions mm	Size 1	Size 2	Size 3
A	900	1200	1800
B	450	600	750
C	300	450	450
 - (b) Sizes 1 and 2 to have 2 covers of equal size, size 3 to have 3 covers of equal size, and set in steel frame
 - (c) Baffle to be 22mm. thick slate, 6.3mm M.S plate (nylon, epoxy resin, or pvc. dipped), or 12.6mm pvc.

FIG. 28.2 GREASE TRAP CONSTRUCTION NOTES

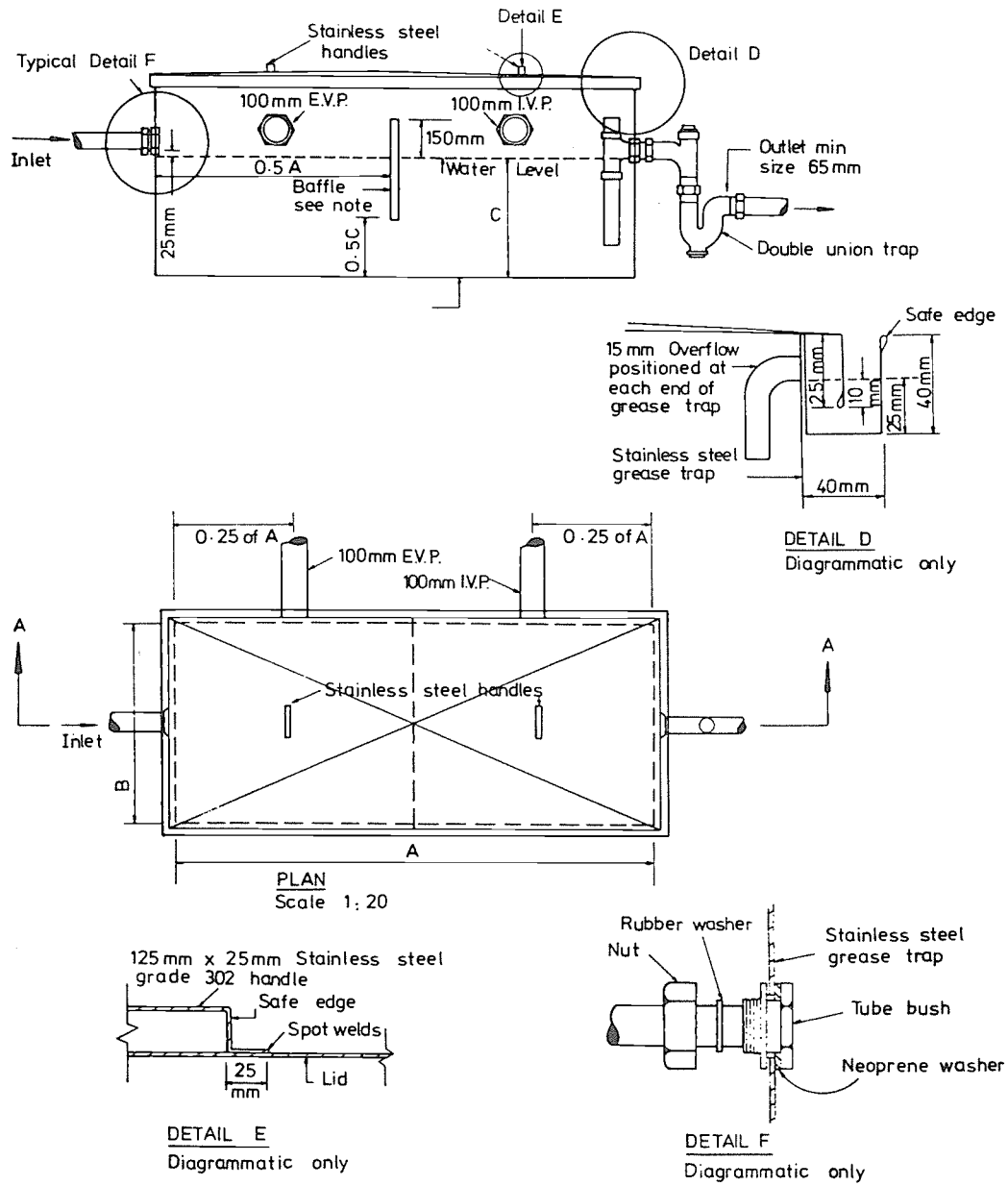


FIG. 28.3 PREFABRICATED GREASE TRAP CONSTRUCTION.

DESIGN NOTES

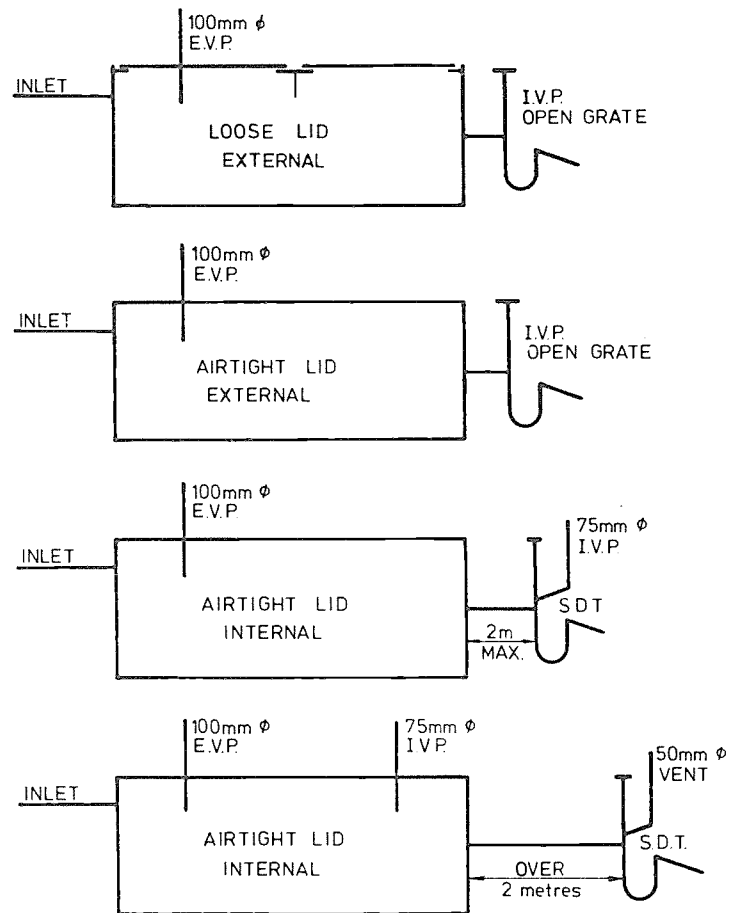
- 1 Sizes and application — See note 3 for dimension.
 - [a] Size 1 - fried fish shops with maximum of 2 fixtures and 1 bucket trap.
 - [b] Size 2 - small restaurants, works canteens, small hospital kitchens, licenced premises serving meals but with limited accommodation facilities and small butcher shops.
 - [c] Size 3 - large supermarket butcher shops, major hospital kitchens, large accommodation hotel kitchens, small food manufacturing premises.
- 2 Other applications not covered in 1[a], 1[b] and 1[c] must be discussed with the Industrial Waste Section.
- 3 Trap dimensions and construction notes.

[a]

Dimensionsmm	Size 1	Size 2	Size 3
A	900	1200	1800
B	450	600	750
C	300	450	450

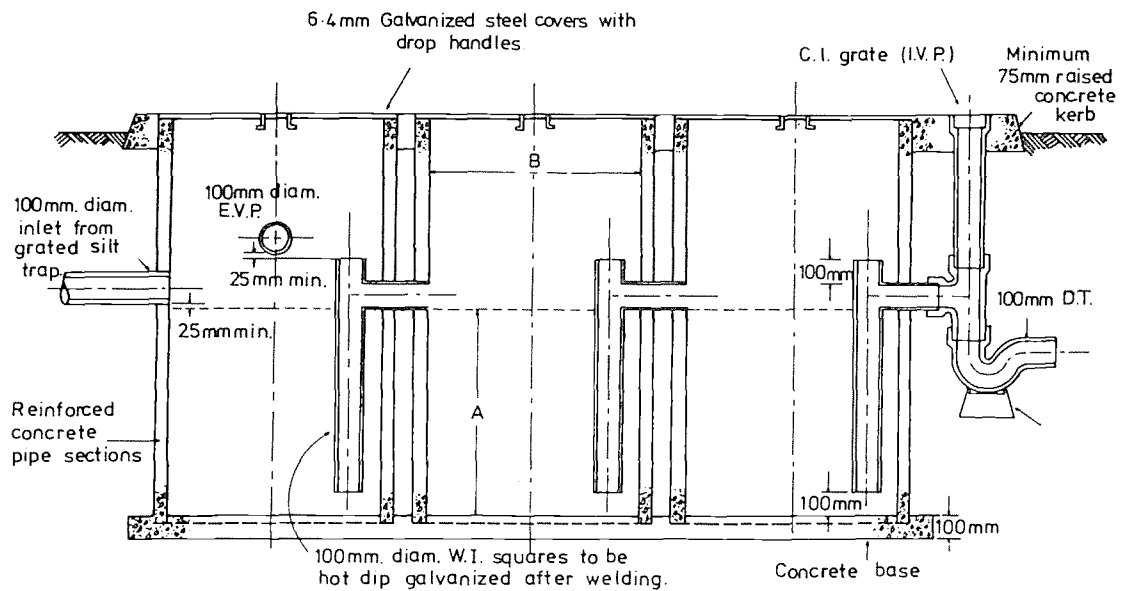
- [b] Where internal grease traps occur on impervious floors graded to a floor waste an overflow tray is not required.
- [c] Where trays are required the tray size shall be fabricated from grade 302 0.55mm sheet stainless steel and have 80mm of clearance surrounding the trap with 80mm upstand and a safe edge. A 50mm overflow pipe shall discharge from the overflow tray (if required) to a conspicuous position outside the building or where otherwise directed by M.W.S.S. & D.B. Plumbing Inspector.
- [d] All welds to be polished to a satin finish & left in as new condition.
- [e] Grease trap to be fabricated from grade 302 0.7mm stainless steel on 1 & 2 but 0.9mm on size 3.
- [f] Lid to be crimped for strength (see plan) on size 1 & 2 but size 3 to have strengthening rib incorporated in lid.
- [g] Baffle to be formed from grade 302 0.7mm stainless steel in each type.
- [h] Inlet and outlet sizes to be in accordance with M.W.S.S. & D.B. by-law 133.
- [i] 8mm charge pipe to discharge into water seal from nearest low pressure point.

FIG. 28.4 PREFABRICATED GREASE TRAP
CONSTRUCTION NOTES.

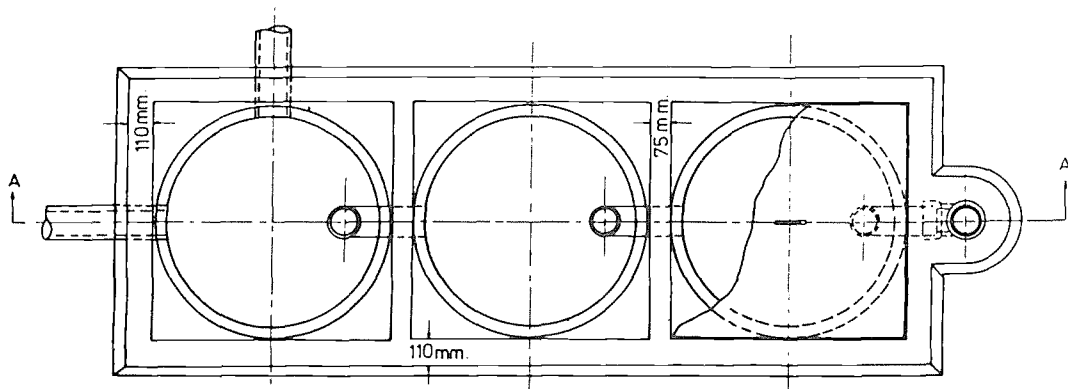


INDUSTRIAL WASTE ARRESTOR I.V.P. AND E.V.P.
NOT TO BE COMBINED

FIG.28.5 VENTING OF INDUSTRIAL WASTE ARRESTORS



SECTION A.A



PLAN.

FIG. 28.6 PETROL AND OIL TRAP
CONSTRUCTION

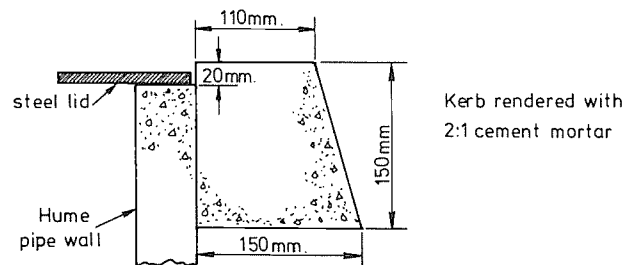
DESIGN NOTES

1. Sizes and applications – See note 3 for dimensions.
 - (a) Size 1– Small mechanical workshops, carrying out small engine servicing with 1 silt sump.
 - (b) Size 2– Average sized service stations with 1 silt sump and lube bay area.
 - (c) Size 3– Large service stations with 2 to 4 silt sumps, lube bay areas and manual vehicle wash area.
2. Other applications not covered in 1(a), 1(b) and 1(c) must be discussed with the Industrial Waste Section.
3. Trap dimensions and construction notes.

(a)

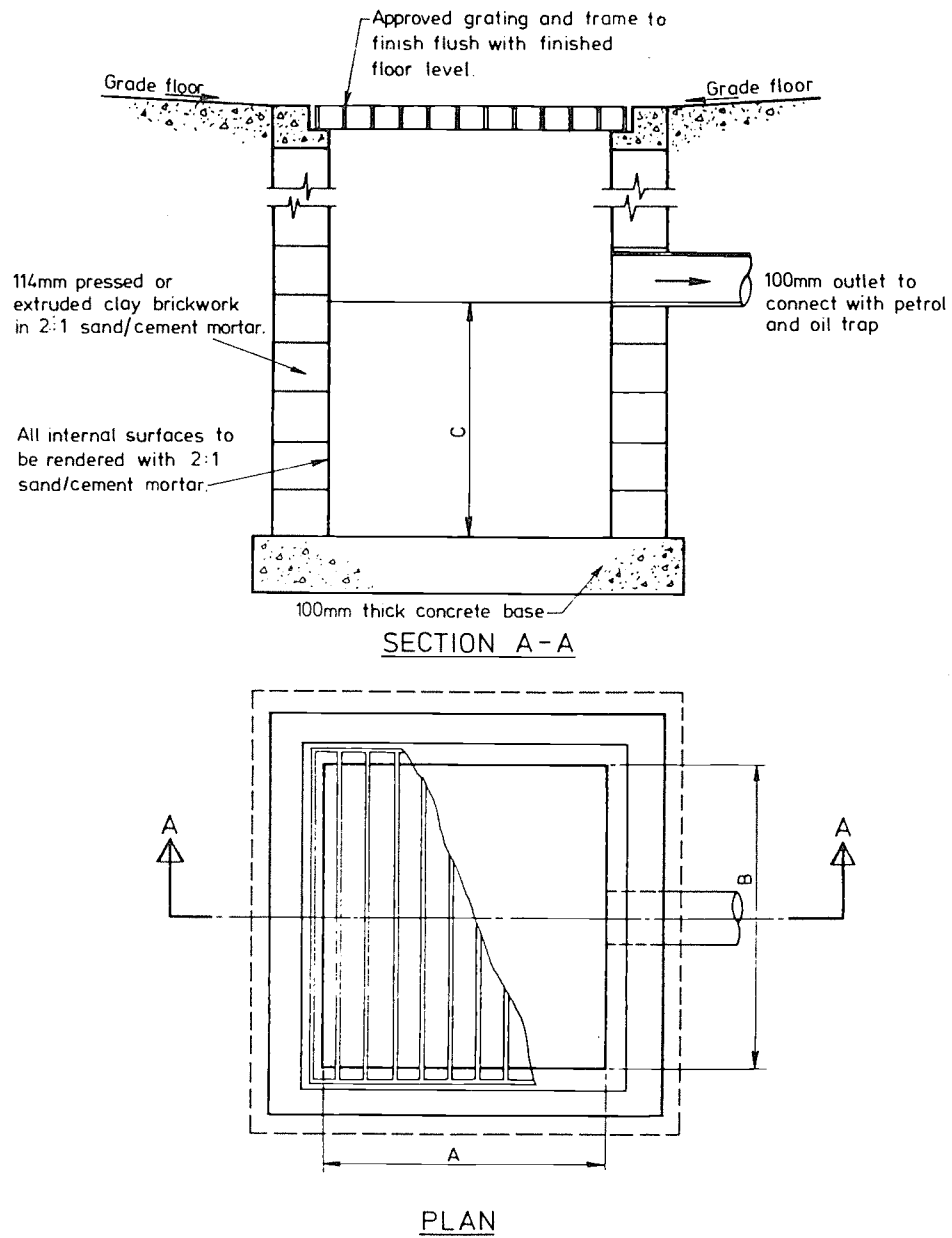
Dimension. mm	Size 1	Size 2	Size 3
A	600	900	900
B (Dia.)	600	600	900

- (b) 3 Pipe sections to be used in each case.
- (c) Pipe sections to be set 25mm. into concrete base.
- (d) Each pipe section to have square or round lid with one drop handle.



KERB DETAIL

FIG. 28.7 PETROL AND OIL TRAP
CONSTRUCTION NOTES



**FIG. 28·8 SILT TRAP
CONSTRUCTION**

DESIGN NOTES

1. Sizes and application— See note 3 for dimensions.
 - (a) Size 1— garage floor silt.
 - (b) Size 2— manual car wash areas, garage engine parts wash areas.
2. Other applications not covered in 1(a) or 1(b) must be discussed with the Industrial Wastes Section.
3. Trap dimensions and construction.

Dimensions mm	Size 1	Size 2
A	450	600
B	450	600
C	450	600

FIG. 28·9 SILT TRAP
CONSTRUCTION NOTES

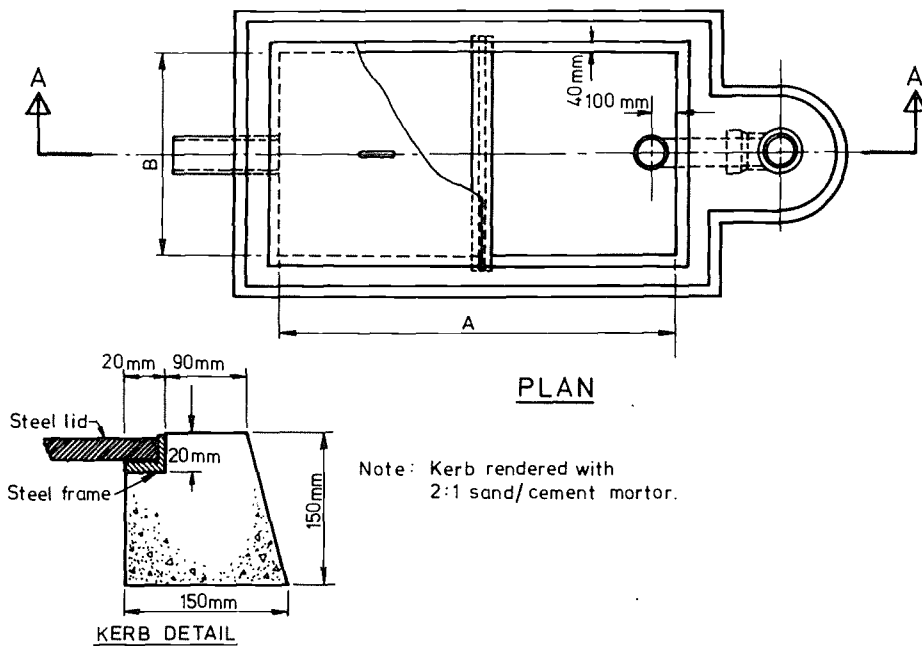
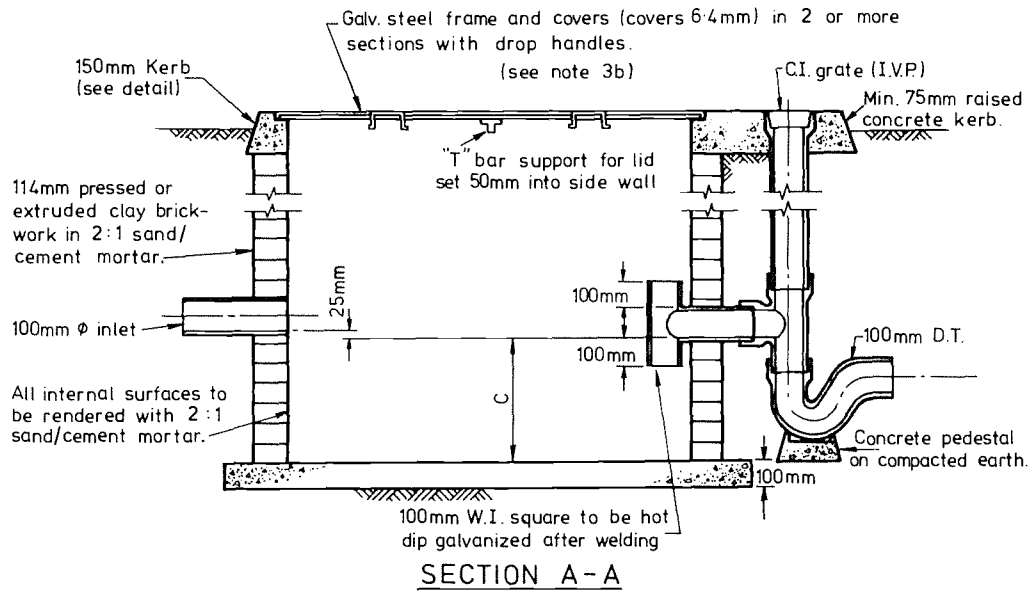


FIG. 28-10 SAND/PLASTER TRAP CONSTRUCTION

DESIGN NOTES

1. Sizes and applications— See note 3 for dimensions.
 - (a) Size 1 – Beach shower room installations with up to 4 shower units.
School plaster and clay rooms with up to 3 sinks.
 - (b) Size 2 – Beach shower room installations with up to 8 shower units.
School plaster and clay rooms with up to 8 sinks.
2. Other applications not covered in 1(a) or 1(b) must be discussed with the Industrial Wastes Section.
3. Trap dimensions and construction notes

(a)

Dimensions mm	Size 1	Size 2
A	1200	1800
B	450	600
C	600	600

- (b) Size 1 to have 2 covers of equal size,
size 2 to have 3 covers of equal size, and set
in steel frame.

FIG. 28-11 SAND/PLASTER TRAP
CONSTRUCTION NOTES

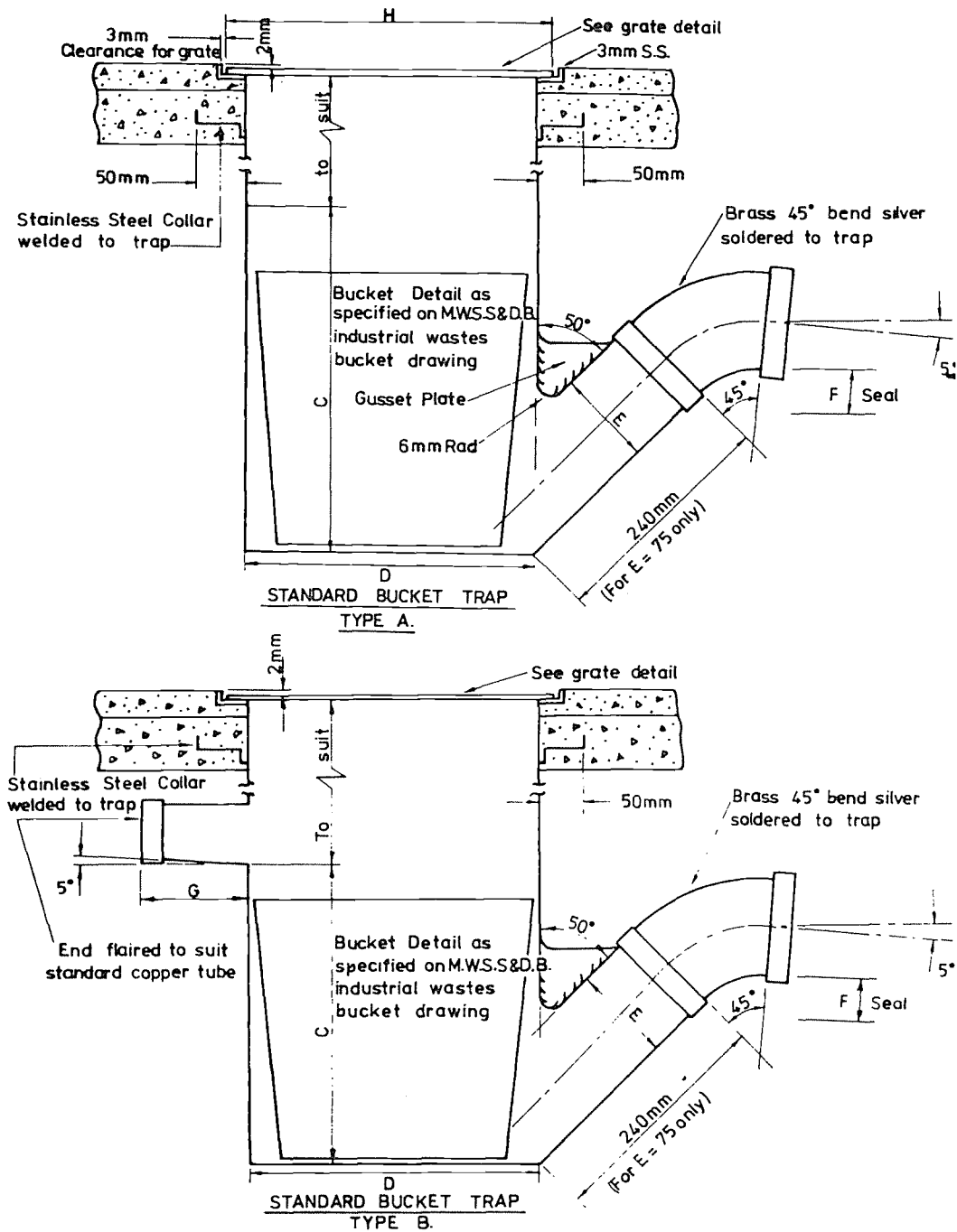


FIG. 28.12 STAINLESS STEEL BUCKET TRAP CONSTRUCTION

DESIGN NOTES

1) Trap & Grate dimensions

Bucket Trap Type	S.S. Thick- ness (mm)	Int Dia Dmm	Height to Inlet C mm	Outlet Dia E mm (Min)	Seal F mm	Length of Inlet Gmm	GRATE	
							Dia Hmm	Thick- ness Jmm
A	1.6	225	-	75	65	-	265	5
B	1.6	225	350	75	65	75	265	5
A	1.6	300	-	75	65	-	350	5
B	1.6	300	350	75	65	75	350	5

2) Traps to be constructed of 1.6mm stainless steel
to conform to 18/8/MO standard

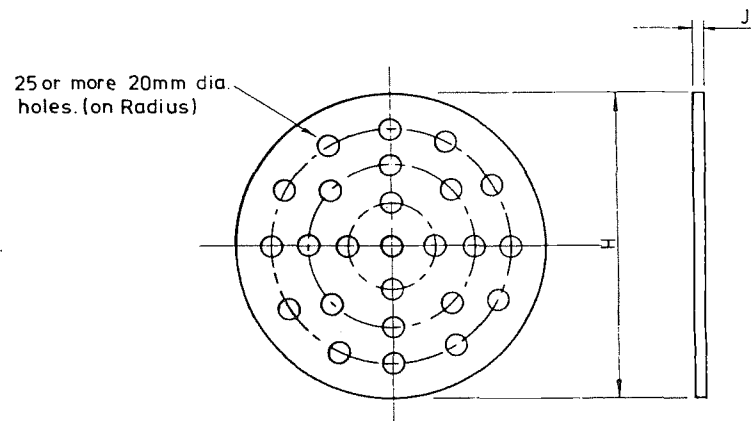
DETAIL OF STAINLESS STEEL GRATE

FIG. 28.13 STAINLESS STEEL BUCKET
TRAP. CONSTRUCTION NOTES

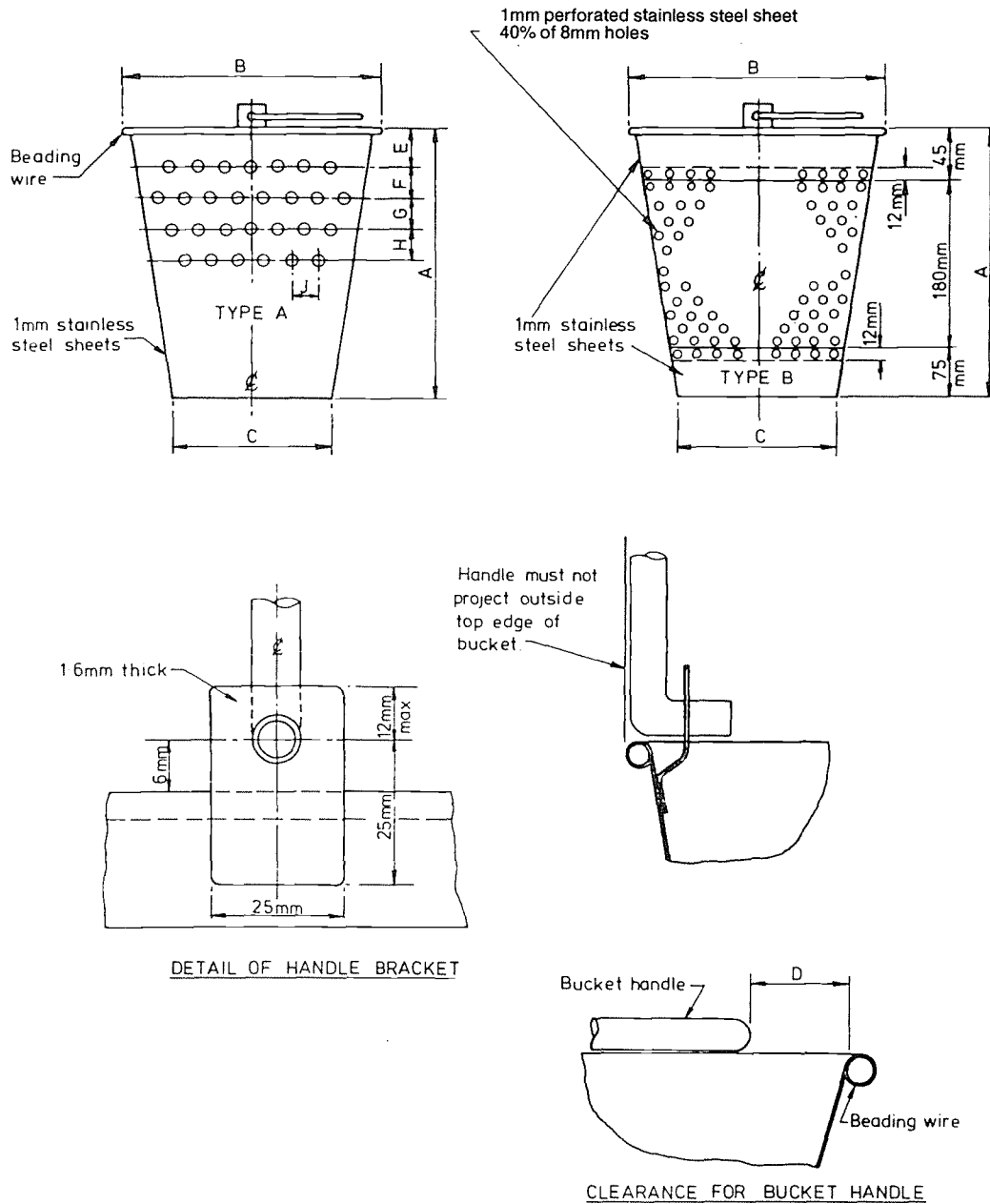


FIG 28.14 STAINLESS STEEL BUCKETS
CONSTRUCTION

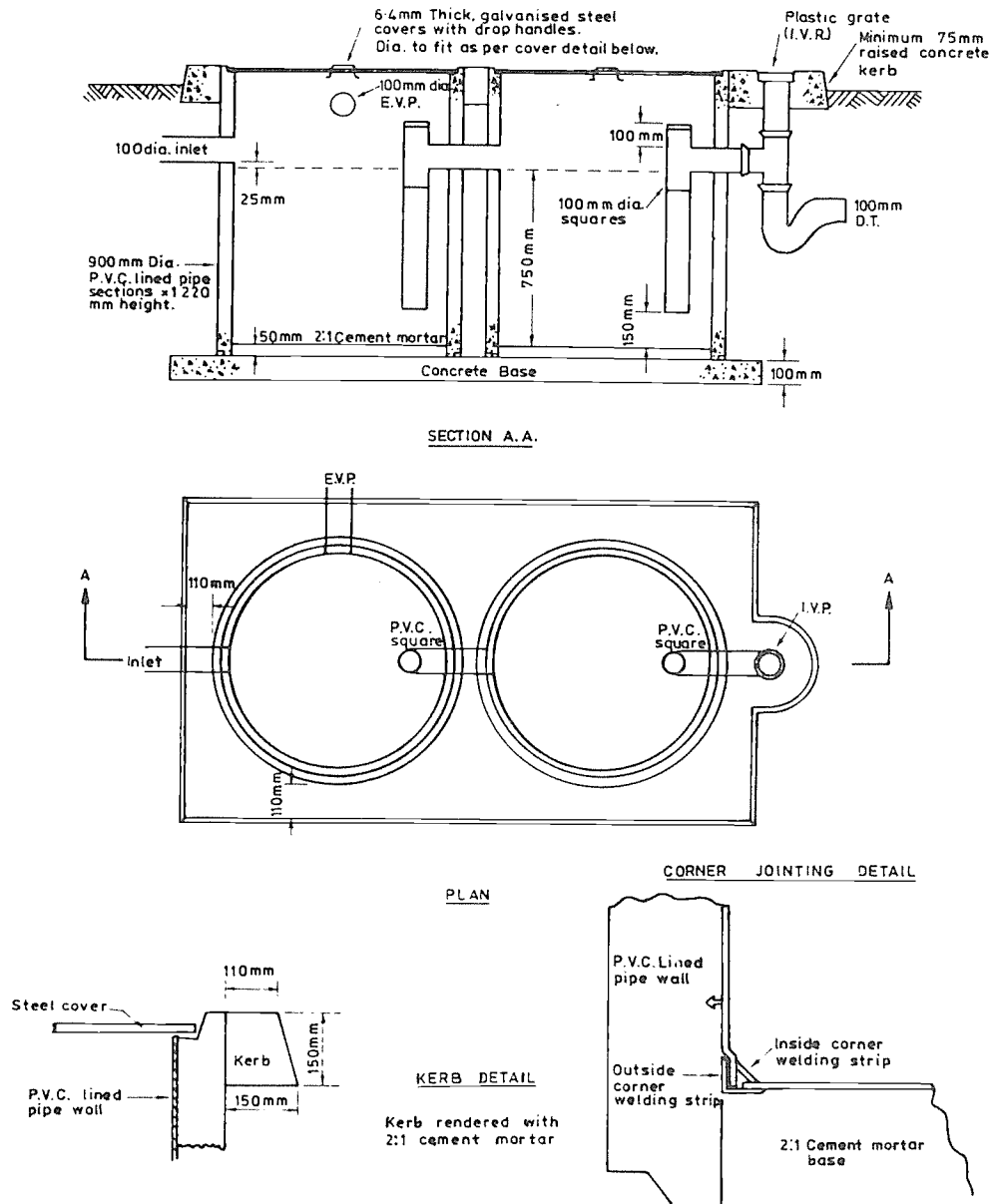
DESIGN NOTES

1. Sizes and applications:
 - (a) A1 – Plaster Traps, Bin Wash Areas, General Floor Wastes and Bottle Washing Machines.
A2 – For High Flow Applications which must be discussed with Industrial Wastes Section before specification.
 - (b) B – Fish shops, butchers shops, smallgoods and potato washing/peeling wastes.
2. Other applications not covered in 1(a) or 1(b) must be discussed with Industrial Wastes Section.
3. Bucket Dimensions and Construction Notes:

Bucket No.	Material Thickness (mm)	A (mm)	B Dia (mm)	C Dia (mm)	D (mm)	Beading Wire Dia (mm)	Handle Rod Dia (mm)	Hole Details (mm)						
								No of Rows	Dia (mm)	E	F	G	H	J
A1	1	300	218	180	10	5	6	4	6	25	30	30	30	30
A2	1	300	292	180	10	6	10	3	10	25	30	30	-	30
B	1	300	218	180	10	5	6	-	-	-	-	-	-	-

(b) Stainless Steel to be 18/8/MO grade.

FIG. 28.15 STAINLESS STEEL BUCKETS
CONSTRUCTION NOTES



**FIG. 28.16 DILUTION / NEUTRALIZER TRAP
CONSTRUCTION**

DESIGN NOTES

1. Trap dimensions shown are minimum dimensions and cover laboratory installations with up to 20 sinks.
2. Other applications must be discussed with the Boards Industrial Waste Officer.
3. Two 900mm. nominal internal diameter P.V.C. lined spun concrete pipe sections to be used.
4. A P.V.C. base sheet to be welded to the P.V.C. lining of each pipe; using corner joint as shown in the standard drawing.
5. The welded joints to be spark tested in the presence of the Boards Industrial Waste Officer.
6. Other joints to be sealed with an epoxy resin.

FIG. 28.17 DILUTION NEUTRALIZER TRAP CONSTRUCTION NOTES

28.5 SUB-SOIL WATER

Upon written application the Board may grant permission in writing to a person to discharge sub-soil water into any property sewer or into any sewer of the Board subject to such terms and conditions as may be imposed.

[By-law 28.5 amended in Gazette 24 December 1982 p. 4929.]

28.6 MATERIALS AND FITTINGS USED IN CONNECTION WITH THE AUTHORITY'S WORKS

[By-law 28.6 amended in Gazette 29 June 1984 p. 1813.]

28.6.1 Fittings to be above Flood Level

- (a) Inlets and openings shall not be in such positions that extraneous water, due to rise of subsoil water level, or from a river, bay, gully or creek, or any other source, whether in flood or otherwise, may gain access to the Board's sewers.
- (b) Without in any way limiting the generality of sub-bylaw (a) in areas liable to be flooded or affected by rise of subsoil water level, persons shall not place in position for use any fitting, fixture, or apparatus having an inlet or opening into a property sewer or into a sewer of the Board unless the inlet or opening is above a level fixed by the Board for the particular district or locality as being a level providing a safe margin above the highest known subsoil water level or flood level.

[By-law 28.6.1 amended in Gazette 24 December 1982 p. 4929; 29 June 1984 p. 1813.]

28.6.2 Approval of materials and fittings

- (a) No material, fitting, fixture or apparatus shall be connected to the works of the Authority unless it is the same as a material, fitting, fixture or apparatus that is currently approved for such connection by the Authority.
- (b) A material, fitting, fixture or apparatus that meets the requirements of By-law 28.6.2(a) shall be marked with a notice to the effect that that type of material, fitting, fixture or apparatus is so approved.
- (c) Every application for approval of any material, fitting, fixture or apparatus for connection to the works of the Authority shall be made in writing and shall be accompanied by—
 - (i) 3 copies of drawings in a form acceptable to the Authority; and
 - (ii) unless exempted by the Authority, a sample of the material, fitting, fixture or apparatus.
- (d) The Authority may, in writing, grant or refuse to grant approval to connect any material, fitting, fixture or apparatus to the works of the Authority or may grant such approval subject to such conditions as the Authority sees fit to impose.
- (e) Where the Authority tests or inspects a material, fitting, fixture or apparatus for the purpose of this by-law a charge shall be imposed for that test or inspection.

[By-law 28.6.2 substituted in Gazette 29 June 1984 p. 1813; amended in Gazette 8 March 1985 p. 907.]

28.6.3 Workmanship

Work shall be executed in a thorough and tradesman like manner to the satisfaction of the Board.

28.6.4 Protection of Workmen, etc.

Adequate precautions shall be adopted, by persons carrying out work, to prevent injury to workmen, property, or the public, and the Board shall not be responsible for injury arising from the inadequacy of those precautions.

28.7 BASEMENT AND CELLAR DRAINAGE

28.7.1 Risk of Back Flow

- (a) Where a cellar, basement, or floor below ground level is at such a level as may, in the opinion of the Board, involve risk of back flow in the event of the sewer becoming overcharged, the sewage from fixtures therein or on shall be raised by ejector, pump, or other approved mechanical appliance to such height as ordered, and discharged into the sewer as and where directed, by the Board.
- (b) Reflux Valves shall not be used as an alternative to pumping.

28.7.2 Fixtures

- (a) If approval is given for the connection of a cellar, basement or floor below ground level, no sink, trap, water-closet, urinal, or other fixture or apparatus shall be laid or fitted in the cellar or basement or on a floor below ground level unless the following conditions are complied with:—
 - (i) The consent, in writing, of the Board shall be first obtained, and may be revoked at any time;
 - (ii) The owner shall submit such information as may be required by the Board and shall undertake, in writing, on an approved form, to accept all liability for damage that may occur, and shall also give to the Board any indemnity that the Board may require; and
 - (iii) Such other conditions as may be required by the Board.
- (b) If on an inspection subsequent to connection:
 - (i) The fixtures and their surroundings are not in the opinion of the Board, being kept in a sanitary condition; or
 - (ii) The purpose for which the cellar, basement or floor below ground level is used, has been changed,

then the Board may revoke its consent, and upon the expiration of 14 days from the date of revocation, if the defect has not been remedied, the closet, urinal, or other fixture shall be disconnected from the Board's sewers.

28.7.3 Seepage Drains

A seepage drain from a cellar, basement, or a floor below ground level shall not be discharged into a sewer without the consent of the Board. Where such discharge is permitted, the seepage shall be raised by ejector, pump or other approved mechanical appliance to such height as ordered and discharged into the sewer as and where directed.

28.8 SAFES AND OVERFLOWS

28.8.1 Safes—where required

Where in the opinion of the Board there is a likelihood of damage being caused by the fixtures overflowing, unless the floor is constructed of concrete of not less than 100 mm thickness or of other approved impervious material, graded as directed, safes of approved impervious material shall be fitted under slop hoppers and water closets, and under baths, wash troughs and other plumbing fixtures.

28.8.2 Safes under Fixtures

- (a) The safe under a fixture shall discharge in some conspicuous place.
- (b) Where a water closet is on the ground floor of a house or building, where in the opinion of the Inspector, there is no likelihood of damage being caused by leakage or blockage, this by-law shall not apply.

28.8.3 Safe Overflow

Unless otherwise permitted, a safe shall be drained by a separate 50 mm diameter pipe provided at the inlet with a brass grating and at the outlet into the open air with a flap valve of brass or other approved metal and shall not connect with any waste pipe, soil pipe, property sewer or sewer.

[By-law 28.8.3 amended in Gazette 24 December 1982 p. 4929.]

28.8.4 Cistern Overflows

- (a) A cistern supplied with water shall have an overflow pipe of adequate size discharging in such a position that it will not cause damage and will act as a warning pipe.
- (b) On ground floors where cisterns are fixed over impervious floors graded to drain outside the room, the overflow may discharge on to such floors provided no damage is likely to arise therefrom.

28.8.5 Discharges from Safe Overflows

- (a) Overflows may discharge into the open air above ground level only when the discharge, in the opinion of the Inspector, will not cause any inconvenience or nuisance.
- (b) In all other cases the pipes shall be brought nearly to the ground surface, or be arranged to discharge where they will not prove a source of annoyance or inconvenience.

28.8.6 Existing Floors Under Fixtures

Where necessary in the opinion of the Board, the existing floor under a fixture shall, at the owners cost, be regraded, and a proper discharge pipe with flap valve fixed.

28.8.7 Existing Fixtures and Fittings, etc.

Existing fixtures, fittings and apparatus not in accordance with these by-laws and which in the opinion of the Board are unsatisfactory shall be removed or replaced by approved fittings at the cost of the owner.

28.9 PLUMBING GENERAL

28.9.1 Waste Pipes

Separate waste pipes shall be provided for each of the following classes of polluted water, namely:—

- (a) Dirty water from baths, sinks, lavatory basins, and wash troughs and other waters containing a small proportion of soap or dirt; and
- (b) Greasy water from kitchens and scullery sinks or other fixtures, in such cases where grease traps are ordered or required.

28.9.2 Soil Pipes

Except as provided in By-law 28.9.3, soil pipes shall be provided for soil water from closets and other waters containing faecal matter and for urinal waters from slop hoppers and urinals, and where directed, for discharges from operating theatres and mortuaries.

[By-law 28.9.2 amended in Gazette 24 December 1982 p. 4929.]

28.9.3 Combined Pipe System

The combined pipe system for plumbing installations may be used subject to the following conditions:

- (a) An interceptor or boundary trap shall be provided in the property sewer in accordance with By-law 25.11 of these by-laws;
- (b) Fixture traps shall be vented as required by these by-laws;
- (c) In order to prevent fouling of traps as much as possible by the discharge from water closets, slop hoppers and urinals, in the event of a blockage in the combined waste pipe—the waste pipe from baths and shower compartments or other fixtures, as determined, shall be branched into the combined waste stack; and
- (d) Such other conditions as may be imposed by the Board.

[By-law 28.9.3 amended in Gazette 24 December 1982 p. 4929.]

28.9.4 Connections to Property Sewer

- (a) Waste pipes shall discharge under the grating and above the water seal of a yard gully or disconnector trap.
- (b) Soil pipes, including those for urinals and slop hoppers shall be connected directly to a property sewer.

[By-law 28.9.4 amended in Gazette 24 December 1982 p. 4929.]

[28.9.5 By-law 28.9.5 repealed in Gazette 28 June 1985 p. 2351.]

28.9.6 Sheet Metal Bends and Offsets

All sheet metal bends and offsets for flush and vent pipes, shall be bent or pressed. Mitred elbows shall not be used.

28.9.7 Painting

Except by permission of the Inspector, painting shall not be done on any part of the plumbing installation until after the work has been inspected and approved by the Inspector.

28.9.8 Inserting Junctions

- (a) Where it becomes necessary to insert a junction in an existing line of property sewer, a suitable length of property sewer shall be removed, and the junction, with an inspection opening on either side, dropped back into position, and the line tested in the usual manner.
- (b) Junctions in existing metal pipes shall not be made unless an approved closure pipe is used.

[By-law 28.9.8 amended in Gazette 24 December 1982 p. 4929.]

28.9.9 Outlet Fittings to Fixtures

- (a) Subject to (c), where baths, sinks, basins, troughs and similar fixtures are constructed of cast iron, plate iron, ceramic ware or concrete, the connection between such fixtures and outlet fittings shall be made with locknuts.
- (b) The outlet fitting shall be connected to the waste pipe by means of a union.
- (c) When approved fixtures are made of sheet metal lighter than 20 gauge soldered connections may be used in lieu of locknuts.

28.9.10 Waste Pipes to Troughs

Connections of waste pipes to washtroughs shall be made as provided hereunder:—

- (a) Sheet metal troughs shall be connected to the waste pipe in compliance with By-law 28.9.9.
- (b) Where wrought iron or other screwed pipes are used the plug shall be connected to the trough by means of a locknut in lieu of flange.

28.9.11 Foot Baths

Approved foot baths shall have not less than 50 mm waste pipe trapped and vented similarly to wash troughs and baths and the dimensions of such foot baths shall be approved by the Board.

28.9.12 Vents Adjoining High Buildings

- (a) Where a building is erected next to an existing building of less elevation, and any door, window or other opening of the new building is located within 9 metres of a vent stack on the existing building, the owner of such new building shall defray the cost of such alterations to the vents of the existing building as necessary to conform with By-law 28.3.7.
- (b) Upon the receipt of money, or security therefor sufficient for the purpose, from the owner of the new building, the owner of the existing building shall make the necessary alterations, or shall permit at the request of the owner of the new building the making of such alterations, by the owner of such new building.

28.9.13 Down Venting

In special cases which must be approved by the Senior Inspector, vent pipes may be installed on the "down venting" principle. That is, the vent pipe from the fixture trap may be taken below level of the fixture and graded under the floor to an external wall or into the pipe duct and then carried up in accordance with the requirement of By-law 22.2. An approved accessible fitting shall be provided at the lowest point of such vent for the purpose of draining off any water or condensation collected therein.

28.9.14 Lead Pipes

Joints in lead pipe shall be plumber's wiped joints.

28.9.15 Galvanized Steel Tubing to Lead Pipe

Joints between galvanized steel tubing and lead pipes shall be made by means of brass unions screwed to iron and wiped to lead.

28.9.16 Lead Pipe to Cast Iron Pipe

The connection of lead pipes or traps to cast iron pipes shall be made by means of brass sleeve; brass sleeve shall be lined with and connected to the lead pipe or trap by means of a wiped joint and connected to the cast iron by inserting the sleeve in socket thereof and making the joint in the same way as in cast iron pipe.

28.9.17 Sheet Iron Pipe to Wrought Iron Pipe

Galvanized sheet iron pipes shall be connected to wrought iron pipes by means of brass unions or thimbles soldered to the sheet iron and screwed to the wrought iron.

28.9.18 Use of Concrete

Concrete shall be used:—

- (a) For gully basins as specified in By-laws 18.13.3 and 28.3.3;
- (b) Around the top of educt vent and induct vent pipe sockets;
- (c) Around interceptor trap covers and tops of disconnector or other shafts;
- (d) Under and around bends rising vertically off oblique branches and under bases of all drainage traps;
- (e) Around property sewers which are liable to be affected by tree roots;
- (f) For property sewers under buildings as provided in By-law 25.1;
- (g) Around property sewers having insufficient cover as provided for in By-law 25.6; and
- (h) For floors under plumbing fixtures, where specified by the Inspector.

[By-law 28.9.18 amended in Gazette 24 December 1982 p. 4929.]

28.9.19 Maintenance and Defective Work

28.9.19.1 (a) Where work is done other than in accordance with these by-laws or, in the opinion of the Board is defective, then, upon receiving notice in writing from the Board, the owner or occupier, or, in the case of common property sewerage, the owners or occupiers, of the property in which the work was done shall make good the defects as required, and within the time fixed, by the Board and to the satisfaction of the Inspector.

- (b) An owner or occupier who fails to comply with the terms of the notice of the Board, shall have committed an offence.
- (c) If an owner or occupier fails to comply with the notice of the Board, the board may make good the defects, and recover the cost incurred by it as a debt due to it by the owner or occupier.

[By-law 28.9.19.1 amended in Gazette 24 December 1982 p. 4929.]

[28.9.19.2 By-law 28.9.19.2 repealed in Gazette 24 December 1982 p. 4925.]

[29 By-law 29 repealed in Gazette 18 June 1982 p. 2023.]

30.0 LICENCES AND PERMITS

30.1 WATER SUPPLY PLUMBING WORKS SHALL BE DONE ONLY BY LICENSED PLUMBERS

A person shall not carry out work in connection with the water supply or apparatus connected therewith, unless he is duly licensed by the Board as a "Licensed Water Supply and Sanitary Plumber" or as a "Licensed Water Supply Plumber", or as a registered plumber or registered apprentice working under the direction and supervision of a Licensed Plumber.

30.2 SEWERAGE OR PROPERTY SEWERAGE WORK SHALL BE DONE ONLY BY LICENSED WATER SUPPLY AND SANITARY PLUMBERS

A person shall not carry out work in connection with sewerage or property sewerage on any premises or in connection with any fittings or apparatus connected therewith unless he is duly licensed by the Board as a "Licensed Water Supply and Sanitary Plumber", or as a registered plumber or registered apprentice working under the direction and supervision of a Licensed Plumber.

[By-law 30.2 amended in Gazette 24 December 1982 p. 4929.]

30.3 PENALTIES FOR DOING WORK WITHOUT A WATER SUPPLY OR SANITARY PLUMBER'S LICENCE

Any person who contravenes either of the 2 preceding by-laws, shall be guilty of an offence and liable to a penalty not exceeding \$50.00.

30.4 DESCRIPTION AND SCOPE OF LICENCES

The conditions upon which licences will be issued by the Board are:—

30.4.1 The Board may grant licences to Water Supply and Sanitary Plumbers and to Water Supply Plumbers on condition that the certificate of a Board of Examiners appointed by the Board has been obtained, the prescribed payment made and provided that it is satisfied that the applicant is a fit and proper person to hold a licence and is more than 21 years of age.

30.4.2 Such licences shall be issued subject to the by-laws and any special conditions that the Board considers desirable.

30.4.3 The holder of a Water Supply and Sanitary Plumber's Licence may carry out any water supply or sewerage plumbing or property sewerage work within the Metropolitan Water, Sewerage, and Drainage Area, and only plumbers holding such licences shall do or cause to be done plumbing or property sewerage work within areas open for sewerage house connections.

[By-law 30.4.3 amended in Gazette 24 December 1982 p. 4929.]

30.4.4 The holder of a Water Supply Plumber's Licence may carry out water supply work only outside areas open for sewerage house connections.

30.5 CONDITIONS OF LICENCE

30.5.1 The holder of a licence from the Board:—

- (a) shall execute such works in accordance with the provisions of the Act and of these by-laws, and of any special directions or orders given or issued by the Board;
- (b) shall execute such works in a thorough and tradesman-like manner to the satisfaction of the Board and as expeditiously as practicable;
- (c) shall on actual sewerage plumbing work, but not including property sewers, employ only such certificated operatives as provided in By-law 30.13;
- (d) shall obtain permission from the person or authorities concerned when necessary for the execution of such works on, over, or through any private property, or any streets, roads, parks, reserves, or other public places or properties;
- (e) shall pay fees demanded by any Municipality or other local authority for opening any street, road, or thoroughfare, or otherwise in connection with such work;

- (f) shall restore any part of any street, road, or thoroughfare interfered with by such work to the satisfaction of the local authority having control thereof, upon the completion of such work;
- (g) shall restore any other property interfered with by such work to the satisfaction of the Board's Inspector; and
- (h) shall, in the execution of such work, take such proper and necessary precautions that no accident or damages or unnecessary inconvenience may be directly or indirectly occasioned thereby.

[By-law 30.5.1 amended in Gazette 24 December 1982 p. 4929.]

30.5.2 Without prejudice to other rights of the Board when, in the opinion of the Board, the holder of a licence granted by the Board has failed to comply with the conditions of the licence, the Board may suspend or cancel the licence.

30.6 ANNUAL FEE FOR LICENCE

The fee for a Water Supply and Sanitary Plumber's Licence, Water Supply Plumber's Licence, and for renewal of such licence shall be \$50.

[By-law 30.6 amended in Gazettes 26 March 1982 p. 1088; 6 April 1984 p. 978; 8 March 1985 p. 907; 27 June 1986 p. 2132.]

30.7 RENEWAL OF LICENCES

A licence issued by the Board shall be current only to the 30th June next following the date of issue and may be renewed each year for a period of 12 months expiring on the 30th June in the next succeeding year. The holder of a Water Supply and Sanitary Plumber's Licence or a Water Supply Plumber's Licence shall apply for a renewal thereof and pay the necessary fee prior to the expiration of the period for which his existing licence is current.

30.8 LIST OF LICENSED PLUMBERS SHALL BE PUBLISHED

A list of licensed water supply and sanitary plumbers and water supply plumbers shall from time to time be published at the office of the Board.

30.9 NOTICES, APPLICATIONS, PERMITS, AND INSPECTION OF WORKS

30.9.1 Applications for permission to undertake work in connection with water supply, or property sewerage or the extension or alteration or replacement thereof shall be made in writing on the prescribed form by the owner or occupier of any property, and if approved a permit will be issued to the owner or occupier, and in the case of minor alterations and additions which in the opinion of the Engineer do not require a sewerage plan, to a licensed plumber nominated by the owner or occupier.

[By-law 30.9.1 amended in Gazette 24 December 1982 p. 4929.]

30.9.2 A person licensed as a water supply and sanitary plumber may perform any specified work in connection with water supply, or property sewerage work, for which a permit has been issued by the Board, in any area whether sewered or unsewered.

[By-law 30.9.2 amended in Gazette 24 December 1982 p. 4929.]

30.9.3 A person licensed as a water supply plumber may perform any plumbing work in connection with water supply work for which a permit has been issued in an unsewered area.

30.9.4 A person shall not perform any work unless a permit has been issued by the Board covering such work. Where the permit has been issued to the owner or occupier it must be sighted by the licensed plumber who shall give not less than 48 hours' notice to the Board of his intention to commence the work.

30.9.5 Water pipes, property sewers, or apparatus in connection with water supply or property sewers, shall not be used until the work has been inspected, and tested by an officer of the Board, and that officer has authorized, in writing, the use thereof.

[By-law 30.9.5 amended in Gazette 24 December 1982 pp. 4929-30; 29 June 1984 p. 1813.]

30.9.6 Underground or enclosed work shall not be covered up or concealed from view until the same has been duly inspected and passed by the Inspector. For this purpose the licensed plumber shall immediately report, in writing signed by him, any work which is ready for inspection or test, and every facility shall be accorded to the Inspector for making such inspection or test.

[By-law 30.9.6 amended in Gazette 29 June 1984 p. 1813.]

30.9.7 A permit shall be issued by the Board, subject to the following conditions:—

- (a) A duly licensed water supply and sanitary plumber or water supply plumber, as the case may be, shall be employed to carry out the work for which the permit is issued;
- (b) The application shall have been made at least 7 days prior to the date such work is to commence;
- (c) The information as required on the Board's application form shall have been supplied;
- (d) The application shall have been signed by the owner or occupier and in the case of minor alterations or additions by the licensed plumber who is actually engaged to carry out the work referred to in the notice;
- (e) A licensed plumber signing an application for work which is not done either by himself or by a person employed under his direct supervision shall be guilty of an offence and shall be liable to have his licence suspended or cancelled;
- (f) The fees as prescribed in these by-laws shall have been paid to the Board;
- (g) Only work described on the permit shall be executed;
- (h) If any further work shall be required in addition to that covered by the original permit an additional permit shall be obtained; and
- (i) In extreme cases where water is wasting, pipes are choked, or property is being damaged the work may be put in hand at once, but a permit shall be applied for by the licensed Plumber who carried out the work as soon thereafter as possible.

30.9.8 If any person shall execute work without the proper notice having been given to and the permit obtained from the Board, the Board may in addition to exercising any other remedy, charge to and recover from such person an inspection fee in connection with such work.

30.9.9 Attention is drawn to section 102 of the *Metropolitan Water Authority Act 1982* relating to connection to main drains.

[By-law 30.9.9 inserted in Gazette 24 December 1982 p. 4925.]

30.9.10 An application for approval to connect to a main drain shall be in writing in a form approved by the Authority and shall be accompanied by one copy of all relevant plans.

[By-law 30.9.10 inserted in Gazette 24 December 1982 p. 4925.]

30.9.11 By-law 30.9.8 applies in relation to work to connect to a main drain.

[By-law 30.9.11 inserted in Gazette 24 December 1982 p. 4925.]

30.10 WATER SUPPLY PLUMBERS

30.10.1 An applicant for a Water Supply Plumber's Licence shall satisfy the Board of Examiners appointed by the Board that he has knowledge and competence in the following areas:—

- (a) That branch of the plumber's trade relating to water supply;
- (b) Water supply work, including the proper disposal of pipes, fittings, etc., for hot water installations;
- (c) These by-laws as applied to water supply plumbing; and
- (d) The general principles of water supply plumbing work.

30.10.2 The candidate shall satisfy the Board of Examiners as to his practical ability as a water supply plumber and may be required to submit samples of work done by himself, and also to do any water supply plumbing work which may be required by the Examiners.

30.11 WATER SUPPLY AND SANITARY PLUMBERS

30.11.1 An applicant for a Licence as a Water Supply and Sanitary Plumber shall satisfy the Board of Examiners appointed by the Board that he has knowledge and competence in the following areas:—

- (a) All branches of the plumber's trade, including that of all materials used by the plumber or drainer;
- (b) Water supply, sewerage and drainage work, including the proper disposal of pipes, fittings, etc., for hot water installations;
- (c) These by-laws, and the construction of all water supply and sewerage apparatus and appliances required thereby;
- (d) The by-laws of Local Authorities in the Metropolitan Water Supply, Sewerage, and Drainage Area; and
- (e) The general principles of sanitary and water supply plumbing work.

30.11.2 The candidate shall satisfy the Board of Examiners as to his practical ability as a sanitary plumber and drainer and that he has served not less than 5 years at the trade and may be required to submit samples of work done by himself, and also to do any plumbing or drainage work which may be required by the Examiners.

30.12 CANDIDATES HOLDING LICENCES FROM OTHER AUTHORITIES

Candidates holding licences issued by other authorities may be exempted from such portions of the examination as the Board may think fit.

30.13 PERSONS AUTHORIZED TO CARRY OUT PLUMBING WORK UNDER THE DIRECTION OF A DULY LICENSED SANITARY PLUMBER

No person shall be employed upon plumbing work in connection with sewerage installations unless he complies with the following conditions:—

- (a) That he has passed the practical examination for Water Supply and Sanitary Plumbers (as defined in By-law 30.11) and possesses a certificate from the Board that he is authorized to execute plumbing work;
- (b) That he has prior to 1 October 1938, been employed under a licensed plumber and has satisfied the Board of Examiners as to his tradesmanship and knowledge of practical plumbing, and possesses a certificate to that effect;
- (c) That he is a plumbing apprentice duly registered with the Western Australian Industrial Commission or a trainee apprenticed under the Commonwealth Reconstruction Training Scheme, and is employed under the direction and supervision of a licensed sanitary plumber on work of a plumbing nature only;
- (d) That he is in possession of a provisional certificate from the Board allowing him to work at the trade of sanitary plumbing and draining under the immediate supervision of a licensed sanitary plumber, but such provisional certificate shall not continue in force for longer than a period of 12 months; or
- (e) That he has satisfactorily completed an apprenticeship in the plumbing trade.

30.14 REGISTRATION OF CERTIFICATES OF PERSONS PROVIDED FOR IN BY-LAW 30.13

A register shall be kept at the Board's Head Office of all persons entitled to work under By-law 30.13.

30.15 DELAY IN WORK

Licensed plumbers shall execute any work they undertake with reasonable despatch; and any inconvenience to the public or the Board caused by licensed water supply and sanitary plumbers or water supply plumbers by unnecessary delay in carrying out work shall be rigorously dealt with by the Board.

30.16 DAMAGE TO PIPES SHALL BE REPORTED

Damage caused by licensed water supply and sanitary plumbers or water supply plumbers or their employees to water, sewer, gas, or other pipes shall be reported forthwith by the plumber to the authority concerned, and immediate steps shall be taken to have repairs effected, and the cost of same shall be defrayed by such plumber.

30.17 STATEMENT TO BE SIGNED

Before any licence is issued, the person to whom the same is to be issued shall sign a statement that he accepts the licence subject to the conditions thereof and with these by-laws, and that he will comply therewith.

30.18 CHANGE OF ADDRESS SHALL BE NOTIFIED

A licensed water supply and sanitary plumber and a licensed water supply plumber shall, within 48 hours of any change in his address, give notice in writing thereof to the Board.

30.19 PENALTIES FOR BREACHES OF BY-LAWS BY PLUMBERS

30.19.1 A licensed water supply and sanitary plumber or water supply plumber who refuses either by himself or by those employed by him to give information properly required by an officer of the Board shall be guilty of an offence and liable to a fine not exceeding \$200.00.

[By-law 30.19.1 amended in Gazette 24 December 1982 p. 4930.]

30.19.2 A licensed water supply and sanitary plumber or water supply plumber who commits a breach of these by-laws may be required by the Board to show cause why his licence should not be suspended or cancelled.

30.19.3 A water supply and sanitary plumber or water supply plumber whose licence has been suspended shall not be relicensed as a licensed water supply and sanitary plumber or water supply plumber until the term of his suspension has expired, or the Board has directed the reinstatement of his licence.

31.0 OFFENCES AND PENALTIES

31.1 GRATUITIES PROHIBITED

Officers, workmen, or agents of the Board shall not solicit or receive any fee or gratuity whatever.

31.2 JUNCTION OR INTERFERENCE WITH PIPES, SEWERS, OR FITTINGS

No person shall make any connection or interfere with any pipe, sewer, or fitting of the Board or with any water pipes, sewer, or drain communicating therewith, at any other place than shall be approved by the Board, and the main shall be tapped only by the workmen of the Board.

31.3 OBSTRUCTION OF SEWERS AND MAIN DRAINS

[By-law 31.3: By-laws 31.3, 31.3.1, 31.3.2, 31.3.3 and 31.3.4 repealed and by-laws 31.3, 31.3.1 and 31.3.2 substituted in Gazette 24 December 1982 p. 4925.]

31.3.1 Attention is drawn to section 66 of the Act relating to construction, in, upon, over, under or in proximity to a sewer.

[By-law 31.3.1: By-laws 31.3, 31.3.1, 31.3.2, 31.3.3 and 31.3.4 repealed and by-laws 31.3, 31.3.1 and 31.3.2 substituted in Gazette 24 December 1982 p. 4925.]

31.3.2 Attention is drawn to section 101 of the *Metropolitan Water Authority Act 1982* relating to construction upon, over, under or in proximity to a main drain.

[By-law 31.3.2: By-laws 31.3, 31.3.1, 31.3.2, 31.3.3 and 31.3.4 repealed and by-laws 31.3, 31.3.1 and 31.3.2 substituted in Gazette 24 December 1982 p. 4925.]

[By-law 31.3.3: By-laws 31.3, 31.3.1, 31.3.2, 31.3.3 and 31.3.4 repealed and by-laws 31.3, 31.3.1 and 31.3.2 substituted in Gazette 24 December 1982 p. 4925]

[By-law 31.3.4: By-laws 31.3, 31.3.1, 31.3.2, 31.3.3 and 31.3.4 repealed and by-laws 31.3, 31.3.1 and 31.3.2 substituted in Gazette 24 December 1982 p. 4925.]

31.4 PENALTIES

31.4.1 A person committing a breach of any of the provisions of these by-laws, to which no specific penalty is attached shall be liable on summary conviction to a penalty not exceeding \$200.00 and in addition may be ordered to pay any expense incurred by the Board in consequence of such breach.

[By-law 31.4.1 amended in Gazette 24 December 1982 p. 4930.]

31.4.2 In the case of a continuing breach the offender shall be liable in addition to the fine and payment of expenses to a daily penalty not exceeding \$20.00 for each day the breach continues after notice thereof has been given by or on behalf of the Board to the offender.

[By-law 31.4.2 amended in Gazette 24 December 1982 p. 4930.]

31.5 AUTHORITY TO ENTER PREMISES

31.5.1 An officer acting under the Board's authority may at all reasonable times enter any property connected, or in process of being connected with the water mains or sewers, in order to examine whether the water pipes, drains, property sewers and other fittings in such property are in proper order, and any person refusing such admission or in any way hindering such officer in the execution of his duty shall be guilty of an offence.

[By-law 31.5.1 amended in Gazette 24 December 1982 p. 4930.]

31.5.2 An Inspector, or any assistant acting under the directions of an Inspector, or other authorized officer may, at his discretion, at any reasonable hour, with or without notice, enter any land, house, or premises for the purpose of ascertaining whether any act or thing is being done or permitted within such property in breach of these by-laws, and to remove, or cause to be removed, anything therein or thereon in breach of these by-laws, or to take such steps as he may deem necessary for carrying out these provisions.

31.5.3 The cost of such removal or such other necessary act shall be borne by the owner or occupier of the property upon which such breach shall occur.

31.6 PERIOD FOR COMPLIANCE WITH NOTICES

Unless otherwise provided, the time which may elapse between the giving of a notice and the doing of a thing required to be done by any Inspector or other authorized officer shall be determined by the Board according to the nature of each case.

32.0 MISCELLANEOUS

32.1 STANDARD DRAWINGS FOR FIXTURES AND FITTINGS

32.1.1 Approved standard drawings of fixtures and fittings will be exhibited at the Board's office.

32.1.2 Due consideration shall be given by the Board to the claims of any other fittings which may be presented for approval, and, if considered satisfactory, the same may be placed among and become one of the approved standard fittings.

32.1.3 The Board may, from time to time, amend, alter, or cancel any or all of the standard fittings or type drawings, and replace them by such other approved fittings or drawings.

32.2 SECRECY

[By-law 32.2 inserted in Gazette 18 June 1982 p. 2023.]

32.2.1 The Acts set forth in the Schedule to this by-law are prescribed for the purposes of section 30 (2) (a) of the *Metropolitan Water Authority Act 1982*.

Schedule

Local Government Act 1960
Public Works Act 1902
Rights in Water and Irrigation Act 1914
Workers' Compensation and Assistance Act 1981.

[By-law 32.2.1 inserted in Gazette 18 June 1982 p. 2023.]

33.0 REPEAL

33.1 The Metropolitan Water Supply, Sewerage and Drainage Board By-laws published in the *Government Gazette* on 28 January 1970, as amended, are repealed.

[*SCHEDULE A. Schedule A deleted in Gazette 18 June 1982 p. 2023.*]

SCHEDULE B

Form 1

(5.2.1.1)

METROPOLITAN WATER SUPPLY, SEWERAGE, AND DRAINAGE BOARD

APPLICATION FOR A WELL LICENCE

(Under Section 57G of the *Metropolitan Water Supply, Sewerage, and Drainage Act 1909* as amended).

OWNER OF LAND	Name	
	Address	
	Telephone	Postcode
<hr/>		
OCCUPIER (if same as Owner write "As above")	Name	
	Address	
	Telephone	Postcode
<hr/>		
PROPERTY	Hse No. Lot No. Street	
	Postal District	
	Town/City/Shire of	
<hr/>		
CLASSIFICA- TION	Existing Well (or bore) <input type="checkbox"/>	(Place \checkmark in relevant box) Month/year
	Sink a new Well (or bore) <input type="checkbox"/>	constructed/.....
	Alter or deepen a Well (or bore) <input type="checkbox"/>	Licence No.
	Change of licence conditions <input type="checkbox"/>	Licence No.
<hr/>		
CONSTRUC- TION	Proposed depth (if known) .....m	
	Method of construction (if known)	
	Self <input type="checkbox"/>	
	Contractor <input type="checkbox"/>	Name
	
	Other <input type="checkbox"/>
	Proposed pump rate litres/second	

PURPOSE OF WELL OR BORE Indicate by a ✓ in the relevant boxes	DOMESTIC GARDEN WATERING	<input type="checkbox"/>	OFFICE USE
	HOUSEHOLD USE	<input type="checkbox"/>	
	STOCK WATERING—number of	<input type="checkbox"/>	
	horses		
	cattle		
	sheep		
	pigs—open run		
	penned		
	other		
	COMMERCIAL POULTRY	<input type="checkbox"/>	
Number of birds			
Roof sprinklers <input type="checkbox"/>			
Foggers <input type="checkbox"/>			
COMMERCIAL IRRIGATION	Area ha	<input type="checkbox"/>	
Vegetables			
Lucerne			
Other pasture			
Nursery			
Orchard			
Other			
Information given should include that for adjacent lots where it is proposed water from the well will be shared with these lot owners.	PARK & RECREATION	<input type="checkbox"/>	
	Area irrigated .....ha		
		
		
		
	INDUSTRIAL	<input type="checkbox"/>	
	Specify intended purposes for water use giving annual quantities.		
		
		
		
OTHER	<input type="checkbox"/>		
.....			
.....			
.....			
.....			
.....			
ADJACENT PROPERTIES	If water from a well is to be shared with adjacent properties give details below.		
	Street Name	Hse. Number	Lot Number
1.	.....	.....	.....
2.	.....	.....	.....
3.	.....	.....	.....
4.	.....	.....	.....
5.	.....	.....	.....
	Nature of agreements		
		
		
APPLICANT'S SIGNATURE.....			
ADDRESS (IF NOT OWNER.....			
OR OCCUPIER).....			
TELEPHONE.....			
DATE.....			

SITE PLAN.

- Distances of existing and proposed wells from side boundaries of the property are to be shown in metres.
- Show the location of any existing or abandoned septic tanks, leach drains or soak wells and their distance from the proposed well.
- *The Health Act (Underground Water Supply) Regulations 1959* require wells to be not less than 30 m from septic tanks, soak wells or leach drains.
- The Board may require alterations to the location, plans and specification of any work proposed in this application before it issues a licence.

Form 2

(5.2.1.3)

METROPOLITAN WATER SUPPLY, SEWERAGE, AND DRAINAGE BOARD.

LICENCE RELATING TO A WELL

(Under section 57G of the *Metropolitan
Water Supply, Sewerage, and Drainage
Act 1909*, as amended)

LICENCE No.

OWNER OF LAND (LICENSEE)	Name Address Telephone Postcode
PROPERTY	Hse No. Lot No. Street Postal District City/Town/Shire
LOCATION OF WELL	..... .....
LICENCE CLASSIFICA- TION	Draw water from existing well Construct and draw water from a new well Alter or deepen existing well Carry out exploratory drilling Change of conditions
WATER MAY BE USED FOR	1. 2. 3. 4. 5.
LICENCE CONDITIONS	..... ..... ..... .....

This Licence is issued subject to and in accordance with the By-laws relating to wells in Public Water Supply Areas made under the Act.

Given under my hand at Perth this day of 19.....

.....
COMMISSIONER

METROPOLITAN WATER SUPPLY, SEWERAGE, AND DRAINAGE BOARD

WELL COMPLETION STATEMENT

LICENCE No.

--

LICENSEE: Name
 Address
 Telephone Postcode
 PROPERTY: Hse No. Lot No. Street
 Postal District
 Town/City/Shire of
 CONTRACTOR: Name
 (if applicable) Address
 Postcode

COMPLETION: Date Commenced Date Completed
 How was the completed well left:
 Capped ☐ Equipment for use ☐
 Casing pulled ☐ Abandoned ☐
 Left for water level observation ☐ Other.....
 Motor power kW/HP Depth m
 Approx.

LOCATION PLAN: Draw a location plan of the well on the back of this Statement where indicated.
 REMARKS:

Signature of Licensee Date.....

Note: The Contractor may complete this form but the accuracy of the information should be verified as far as possible by the licensee or his representative and forwarded to:

Commissioner
 Metropolitan Water Board
 Newcastle Street
 LEEDERVILLE 6007 W. AUST.

LOCATION PLAN OF WELL.

Distances from side boundaries should be measured in metres.

Location of septic tanks, leach drains and soak wells should be shown in relation to the well.

SUPPLEMENTARY INFORMATION.

To be completed only when requested.

PLANT USED: Rotary Drill Rig Sand or Sludge Pump
 Cable Tool Drill Rig Other
 Air Drill Rig

STRATA DETAILS:

Depth from surface		Description of Strata
From	To	
0 m		

e.g. Fine sand, coarse sand, shelly sand, limestone, peat, clay, coffee rock, or other such description.

WATER FOUND

Strata	Description of Quality & Supply
..... m to m	
..... m to m	
..... m to .....m	

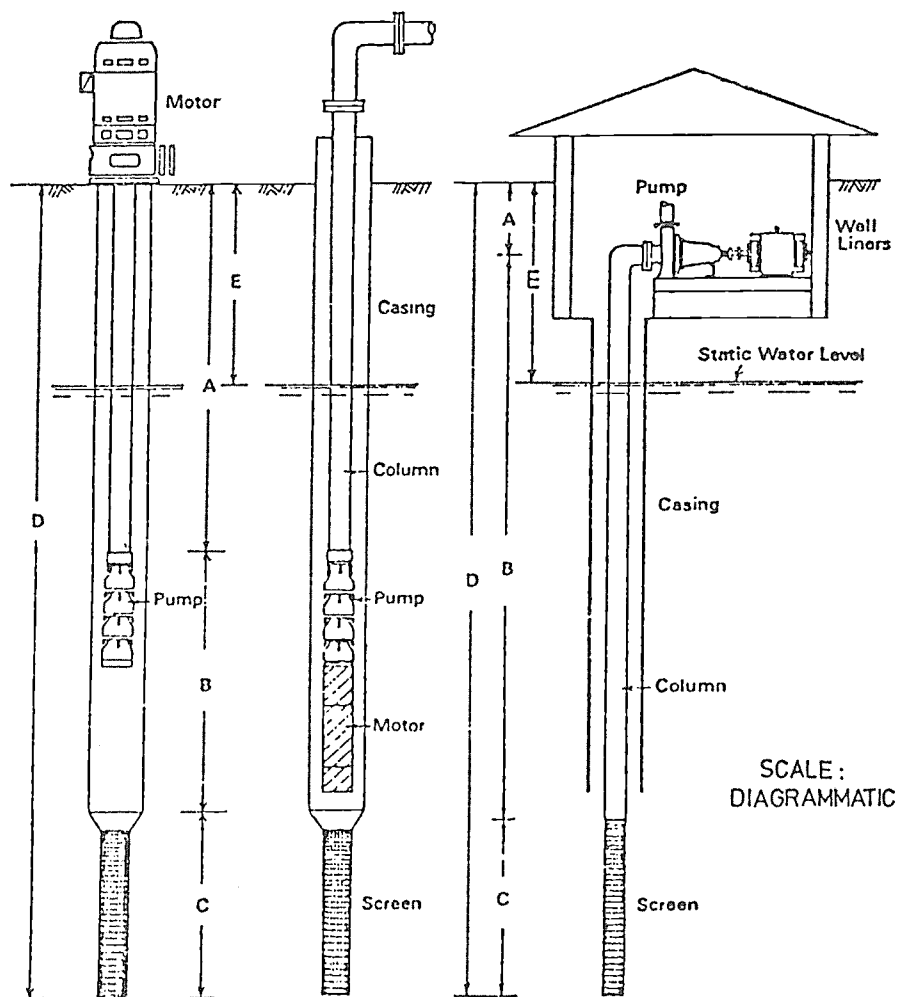
REMARKS:

SIGNATURE OF LICENSEE..... DATE

AS CONSTRUCTED DATA

SEE DIAGRAMS BELOW

1. DEPTH: A metres
 B metres
 C metres
 D metres
 E metres to water
2. CASING: Diam. mm from m to m
 mm from m to m
- Material: Steel/GWI/PVC
- Other.....
- is casing slotted? YES/NO If so give details in remarks.
- Well liners Number mm Total well liner length m
3. SCREENS: Length m diam mm Aperture mm
- Material of construction
- make

SUBMERSIBLE PUMP TYPECENTRIFUGAL OR JET PUMP TYPELINE SHAFT DRIVENSUBMERSIBLE MOTOR

[Schedule B added in Gazette 31 July 1981 pp. 3169-73.]

NOTES

¹ This reprint is a compilation as at 7 November 1986 of the *Metropolitan Water Supply, Sewerage and Drainage By-laws 1981* and includes all amendments effected by the by-laws referred to in the following Table.

Table of By-laws

By-law	Gazettal	Commencement	Miscellaneous
<i>Metropolitan Water Supply, Sewerage and Drainage By-laws 1981.</i>	22 January 1981 pp. 165-219.	1 March 1981.	Corrigendum see <i>Gazette</i> 30 January 1981 p. 488
<i>Metropolitan Water Supply, Sewerage and Drainage Board By-laws (No. 1) of 1981.</i>	20 February 1981 p. 773.	1 March 1981.	
<i>Metropolitan Water Supply, Sewerage, and Drainage Amendment By-laws (No. 3) 1981.</i>	26 June 1981 pp. 2326-27.	1 July 1981.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 2) of 1981</i>	31 July 1981 pp. 3169-73.	31 July 1981.	
<i>Metropolitan Water Supply, Sewerage and Drainage Board Amendment By-laws 1982.</i>	26 March 1982 p. 1088.	1 July 1982.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 2) 1982.</i>	18 June 1982 pp. 2022-23.	1 July 1982.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 3) 1982.</i>	24 December 1982 pp. 4924-30.	31 December 1982.	Corrigendum see <i>Gazette</i> 4 February 1983 p. 425.
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws 1983.</i>	24 June 1983 pp. 2007-08.	1 July 1983.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws 1984.</i>	6 April 1984 p. 978.	1 July 1984.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 2) 1984.</i>	29 June 1984 pp. 1812-13.	1 July 1984.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 2) 1985.</i>	8 March 1985 p. 907.	By-laws 1, 2, 3 and 4: On day of Gazettal. By-law 5: 1 July 1985.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws (No. 3) 1985.</i>	28 June 1985 pp. 2348-49.	1 July 1985.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws 1985.</i>	28 June 1985 pp. 2349-51.	28 June 1985.	
<i>Metropolitan Water Supply, Sewerage and Drainage Amendment By-laws 1986.</i>	28 June 1986 pp. 2131-32	1 July 1986.	

² Now Department of Conservation and Land Management.

³ Now Health Department of Western Australia.

⁴ Now Department of Mines.

⁵ See the *Strata Titles Act 1985*.

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