7.4.2.1. Connections to Sanitary Drainage Systems

(1) Every *fixture* shall be directly connected to a *sanitary drainage system*, except that,

(a) drinking fountains may be,

(i) *indirectly connected* to a *sanitary drainage system*, or

(ii) connected to a *storm drainage system* provided that where the system is subject to *backflow*, a *check valve* is installed in the fountain *waste pipe*,

(b) laundry *plumbing appliances* may be *indirectly connected* to a *sanitary drainage system*,

(c) *fixtures* or *plumbing appliances*, other than floor drains, except as provided in Sentence 7.1.4.2.(2), that discharge only *clear water waste* may be connected to a *storm drainage system*,

(d) the following devices shall be *indirectly connected* to a *drainage system*:

(i) a device for the display, storage, preparation or processing of food or drink,

(ii) a sterilizer,

(iii) a device that uses water as a cooling or heating medium,

(iv) a water operated device,

(v) a water treatment device,

(vi) a drain or overflow from a *water system* or a heating system, or

(vii) a drain line from an HVAC system or equipment, and

(e) floor drains within walk-in coolers shall be connected to a *sanitary drainage system*,

(i) indirectly with an *air break*, or

(ii) directly with a *backwater valve* installed on the *drainage system* before connection to the *sanitary building drain*.

(2) The connection of a *soil* or *waste pipe* to a *nominally horizontal soil* or *waste pipe* or to a *nominally horizontal offset* in a *soil* or *waste stack* shall be respectively at least 1 500 mm measured horizontally from the bottom of a *soil* or *waste stack* or from the bottom of the upper vertical section of the *soil* or *waste stack* that,

(a) receives a discharge of 30 or more *fixture units*, or

(b) receives a discharge from *fixtures* located on 2 or more *storeys*.

(3) No other *fixture* shall be connected to a lead bend or stub that serves a water closet.

(4) Where a change in direction of more than 45° occurs in a *soil* or *waste pipe* that serves more than one clothes washer, and in which pressure zones are created by detergent suds, no other *soil* or *waste pipe* shall be connected to it within a length less than,

(a) 40 times the *size* of the *soil* or *waste pipe* or 2.44 m maximum vertical, whichever is less, before the change in direction, and

(b) 10 times the *size* of the *nominally horizontal soil* or *waste pipe* after the change in direction.

(5) Where a *vent pipe* is connected into a suds pressure zone referred to in Sentence (4), no other *vent pipe* shall be connected to that *vent pipe* within the height of the suds pressure zone.

7.4.2.2. Connection of Overflows from Rainwater Tanks

(1) Where an overflow from a *rainwater* tank is connected to a *storm drainage system*, it shall be connected by,

(a) an *air break*, or

(b) a *backwater valve* installed on the *storm drainage pipe* before the connection to the *storm building drain*.

7.4.2.3. Direct Connections

(1) Two or more *fixture outlet pipes* that serve outlets from a single *fixture* that is listed in Clause 7.4.2.1.(1)(d) may be *directly connected* to a *branch* that,

(a) has a *size* of at least 1 ¼ in., and

(b) is terminated above the *flood level rim* of a *directly connected fixture* with a minimum diameter waste of 1 ½ in. to form an *air break*.

(2) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(i) and (ii) may be *directly connected* to a pipe that,

(a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected to* a *sanitary drainage system*, and

(b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.

(3) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(iii) to (vi) may be *directly connected* to a pipe that,

(a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *storm drainage system*, and

(b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.

(4) Every *waste pipe* carrying waste from a device for the display, storage, preparation or processing of food or drink shall be trapped and have a minimum diameter equal to the diameter of the drain outlet from the device.

7.4.3. Location of Fixtures

7.4.3.1. Plumbing Fixtures

(1) *Sanitary units*, bathtubs and shower baths shall not be installed adjacent to wall and floor surfaces that are pervious to water.

7.4.3.2. Restricted Locations of Indirect Connections and Traps

(1) Indirect connections or any *trap* that may overflow shall not be located in a crawl space or any other unfrequented area.

7.4.3.3. Equipment Restrictions Upstream of Interceptors

(1) Except as provided in Sentence (2), equipment discharging waste with organic solids shall not be located upstream of an *interceptor*.

(2) If a food scrap *interceptor* has been installed upstream of the grease *interceptor*, equipment discharging waste with organic solids may discharge through a grease *interceptor*.

7.4.3.4. Fixtures Located in Chemical Storage Locations

(1) A floor drain or other *fixture* located in an oil transformer vault, a high voltage room or any room where flammable, dangerous or toxic chemicals are stored or handled shall not be connected to a *drainage system*.

7.4.3.5. Macerating Toilet System

(1) A maceration toilet system shall only be installed,

(a) where no connection to a gravity *sanitary drainage system* is available, and

(b) in accordance with the manufacturer's instructions.

7.4.3.6. Drains Serving Elevator Pits

(1) If a floor drain is provided in an elevator pit, it shall be installed in accordance with Section 2.2. of ASME A17.1 / CSA B44, "Safety Code for Elevators and Escalators".

7.4.4. Treatment of Sewage and Wastes

7.4.4.1. Sewage Treatment

(1) Where a *fixture* or equipment discharges *sewage* or waste that may damage or impair the *sanitary drainage system* or the functioning of a *sanitary sewage* works or *sanitary sewage* system, provision shall be made for treatment of the *sewage* or waste before it is discharged to the *sanitary drainage system*.

7.4.4.2. Protection for Drainage System

(1) Where a *fixture* discharges *sewage* or *clear water waste* that has been heated, the *drainage system* shall be suitable for the temperature of the *sewage* or *clear water waste* being discharged.

7.4.4.3. Interceptors

(1) Except for *suites* of *residential occupancy*, where a *fixture* discharges *sewage* that includes fats, oils or grease and is located in an area where food is cooked, processed or prepared, it shall discharge through a grease *interceptor*.

(2) Except as provided in Sentence (3), oil *interceptors* shall be provided as follows:

(a) service stations, repair shops and garages or any establishment where motor vehicles are repaired, lubricated or maintained shall be provided with an oil *interceptor*, and

(b) establishments which use oily or *flammable liquids* or have such wastes as a result of an industrial process shall be provided with an engineered oil *interceptor*.

(3) Oil *interceptors* are not required for a drain in a hydraulic elevator pit, parking lot, car wash or a garage used exclusively as a motor vehicle parking area.

(4) Where a *fixture* discharges sand, grit or similar materials, an *interceptor* designed for the purpose of intercepting such discharges shall be installed.

(5) Every *interceptor* shall have sufficient capacity to perform the service for which it is provided.

(6) An on site constructed *interceptor* shall be constructed to the requirements of a manufactured *interceptor*.

(7) A grease *interceptor* shall be located as close as possible to the *fixture* or *fixtures* it serves.

(8) The flow rate through a grease *interceptor* shall not exceed its rated capacity and the flow rate shall be determined using the following:

$$Q = (\sum_{1}^{N}(0.75\frac{V}{DDT})) + PD$$

where:

Q is the flow rate to a grease interceptor in L/s.

V is the volume of the *fixture* in L.

DDT is the drain down time, 60 or 120 seconds.

PD is any pump discharge in L/s.

N is the number of *fixtures* to go through the interceptor.

(9) All grease and oil *interceptors* shall have an internal flow control and, where the head will exceed five feet, a secondary flow control shall be required.

(10) Floor drains that conform to Sentence 7.4.5.1.(3) are not required to be separately trapped and vented, and may be gang trapped when discharging through an oil *interceptor*.

7.4.4.4. Neutralizing and Dilution Tanks

(1) Where a *fixture* or equipment discharges corrosive or acid waste, it shall discharge into a neutralizing or diluting tank that is connected to the *sanitary drainage system* through,

(a) a *trap*, or

(b) *indirect connection*.

(2) Each neutralizing or diluting tank shall have a method for neutralizing the liquid.

7.4.5. Traps

7.4.5.1. Traps for Sanitary Drainage Systems

(1) Except as provided in Sentences (2) and (3) and Article 7.4.5.2., every *fixture* shall be protected by a separate *trap*.

(2) One *trap* may protect,

(a) all the trays or compartments of a two or three compartment sink,

(b) a two or three compartment laundry tray, or

(c) two similar type single compartment *fixtures* located in the same room.

(3) One *trap* may serve a group of floor drains and *hub drains*, a group of shower drains, a group of washing machines or a group of laboratory sinks if the *fixtures*,

(a) are in the same room, and

(b) are not located where they can receive food or other organic matter.

(4) Reserved

(5) A grease *interceptor* shall not serve as a *fixture trap* and each *fixture* discharging through the *interceptor* shall be trapped and vented.

(6) Where a domestic dishwashing machine equipped with a drainage pump discharges through a direct connection into the *fixture outlet pipe* of an adjacent kitchen sink or disposal unit, the pump discharge line shall,

(a) rise as high as possible to just under the counter, and

(b) connect,

(i) on the inlet side of the sink *trap* by means of a Y fitting, or

(ii) to the disposal unit.

7.4.5.2. Traps for Storm Drainage Systems

(1) Where a *storm drainage system* is connected to a public combined sewer, a *trap* shall be installed between any opening in the system and the drain or sewer, except that no *trap* is required if the opening is the upper end of a *leader* that terminates,

(a) at a roof that is used only for weather protection,

(b) not less than 1 000 mm above or not less than 3.5 m in any other direction from any air inlet, openable window or door, and

(c) not less than 1 800 mm from a property line.

7.4.5.3. Connection of Subsoil Drainage Pipe to a Sanitary Drainage System

(1) Except as permitted in Sentence (2), no foundation drain or *subsoil drainage pipe* shall connect to a *sanitary drainage system*.

(2) Where a *storm drainage system* is not available or *soil* conditions prevent drainage to a culvert or dry well, a foundation drain or *subsoil drainage pipe* may connect to a *sanitary drainage system*.

(3) Where a *subsoil drainage pipe* may be connected to a *sanitary drainage system*, the connection shall be made on the upstream side of a *trap* with a *cleanout* or a trapped sump.

7.4.5.4. Location and Cleanout for Building Traps

(1) Where a *building trap* is installed, it shall,

(a) be provided with a *cleanout* fitting on the upstream side of and directly over the *trap*,

(b) be located upstream of the *building cleanout*, and

(c) be located,

(i) inside the *building* as close as practical to the place where the *building drain* leaves the *building*, or

(ii) outside the *building* in a manhole.

7.4.5.5. Trap Seals

(1) Provision shall be made for maintaining the *trap* seal of a floor drain or a *hub drain* by the use of a *trap* seal primer, by using the drain as a receptacle for an *indirectly connected* drinking fountain, or by equally effective means.

(2) Where a mechanical device is installed to furnish water to a *trap*, the pipe or tube conveying water from the device to the *trap* shall be at least ⅜ in. inside diameter.

7.4.6. Arrangement of Drainage Piping

7.4.6.1. Separate Systems

(1) No vertical *soil* or *waste pipe* shall conduct both *sanitary sewage* and *storm sewage*.

(2) There shall be no unused open ends in a *drainage system* and *dead ends* shall be so graded that water will not collect in them.

7.4.6.2. Location of Soil or Waste Pipes

(1) A *soil* or *waste pipe* shall not be located directly above,

(a) non-pressure *potable* water storage tanks,

(b) manholes in pressure *potable* water storage tanks, or

(c) food-handling or processing equipment.

7.4.6.3. Sumps or Tanks

(1) Only piping that is too low to drain into a *building sewer* by gravity shall be drained to a sump or receiving tank.

(2) Where the sump or tank receives *sanitary sewage* it shall be water and air-tight and shall be vented.

(3) Equipment such as a pump or ejector that can lift the contents of the sump or tank and discharge it into the *sanitary building drain* or *sanitary building sewer* shall be installed.

(4) Where the equipment does not operate automatically, the *capacity* of the sump shall be sufficient to hold at least a 24 hours accumulation of liquid.

(5) Where there is a *building trap*, the discharge pipe from the equipment shall be connected to the *sanitary building drain* downstream of the *trap*.

(6) The discharge pipe from every pumped *sanitary sewage* sump shall be equipped with a union, a *check valve* and a shut-off valve installed in that sequence in the direction of discharge.

(7) The discharge piping from a pump or ejector shall be sized for optimum flow velocities at pump design conditions.

(8) The discharge pipe from every pumped *storm sewage* sump shall be equipped with,

(a) a union and a *check valve* installed in that sequence in the direction of discharge and pumped to above grade level, or

(b) a union, a *check valve* and a shut-off valve installed in that sequence in the direction of discharge.

7.4.6.4. Protection from Backflow

(1) Except as permitted in Sentence (2), a *backwater valve* that would prevent free circulation of air shall not be installed in a *building drain* or in a *building sewer*.

(2) A *backwater valve* may be installed in a *building drain* provided that,

(a) it is a "normally open" design conforming to,

(i) CAN/CSA-B70, "Cast Iron Soil Pipe, Fittings, and Means of Joining",

(ii) CAN/CSA-B181.1, "Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings",

(iii) CAN/CSA-B181.2, "Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings", or

(iv) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings", and

(b) it does not serve more than one *dwelling unit*.

(3) Except as provided in Sentences (4) and (5), where a *building drain* or a *branch* may be subject to *backflow*,

(a) a *backwater valve* shall be installed on every *fixture drain* connected to it when the *fixture* is located below the level of the adjoining street, or

(b) a *backwater valve* shall be installed to protect *fixtures* which are below the upstream sanitary manhole cover when a *residential building* is served by a public *sanitary sewer*.

(4) Where more than one *fixture* is located on a *storey* and all are connected to the same *branch*, the *backwater valve* may be installed on the *branch*.

(5) A *subsoil drainage pipe* that drains into a *sanitary drainage system* that is subject to surcharge shall be connected in such a manner that *sewage* cannot back up into the *subsoil drainage pipe*.

7.4.6.5. Mobile Home Sewer Service

(1) A *building sewer* intended to serve a mobile home shall,

(a) be not less than 4 in. in *size*,

(b) be terminated above ground,

(c) be provided with,

(i) a tamperproof terminal connection that is capable of being repeatedly connected, disconnected and sealed,

(ii) a protective concrete pad, and

(iii) a means to protect it from frost heave, and

(d) be designed and constructed in accordance with good engineering practice.

7.4.6.6. Building Drain Ends

(1) Where a *building drain* enters a *building* above the elevation of the bottom of the wall of a *building*, the *building drain* may be deemed to terminate at the first point that the drainage pipe changes direction from the horizontal to the vertical.

7.4.7. Cleanouts

7.4.7.1. Cleanouts for Drainage Systems

(1) Every *sanitary drainage system* and *storm drainage system* shall be provided with *cleanouts* that will permit cleaning of the entire system.

(2) A *cleanout* fitting shall be provided on the upstream side and directly over every running *trap*.

(3) Every interior *leader* shall be provided with a *cleanout* fitting at the bottom of the *leader* or not more than 1 000 mm upstream from the bottom of the *leader*.

(4) Where a *cleanout* is required on a *building sewer* 8 in. or larger in *size*, it shall be a manhole.

(5) Where there is a change of direction greater than 45° in a *sanitary building drain* or a *sanitary building sewer*, a *cleanout* shall be installed at each change in direction.

(6) Every *sanitary building drain* or *storm building drain* shall be provided with a *cleanout* fitting that is located as close as practical to the place where the drain leaves the *building*.

(7) Every *soil* or *waste stack* shall be provided with a *cleanout* fitting,

(a) at the bottom of the stack,

(b) not more than 1 000 mm upstream of the bottom of the stack, or

(c) on a Y fitting connecting the stack to the *building drain* or *branch*.

(8) A *cleanout* shall be provided to permit the cleaning of the piping immediately downstream of an *interceptor*.

(9) Every indirect drainage pipe carrying waste from a food receptacle shall have a *cleanout* access at every change of direction of more than 45°.

(10) A *cleanout* shall be installed on a *trap arm* serving a kitchen sink as close as practical to the *trap* outlet and shall be readily *accessible*.

7.4.7.2. Size and Spacing of Cleanouts

(1) Except as provided in Sentences (2) and (3), on drainage piping of 4 in. *size* and smaller, the minimum *size cleanout* opening shall be the same *size* as the drainage pipe and on drainage piping larger than the 4 in. *size*, the *cleanout* opening shall be 4 in. or larger and the maximum spacing between *cleanouts* on horizontal pipe shall be,

(a) in the case of a sink *waste pipe*, 6 m,

(b) in the case of a horizontal *sanitary drainage pipe*, or *storm drainage pipe*, other than a *waste pipe* from a sink, 15 m, and

(c) in the case of a horizontal *sanitary drainage pipe* or *storm drainage pipe* larger than 4 in. *size*, 30 m.

(2) The spacing between manholes serving a *building sewer*,

(a) 24 in. or less in *size* shall not exceed 90 m, and

(b) over 24 in. in *size* shall not exceed 150 m.

(3) The *developed length* of a *building sewer* between the *building* and the first manhole to which the *building sewer* connects shall not exceed 30 m.

(4) *Cleanouts* that allow rodding in one direction only shall be installed to permit rodding in the direction of flow.

(5) Manholes shall be located at all junctions and all changes in grade, *size* or alignment (except for curvilinear alignment) on a *sanitary building sewer* that is 8 in. or larger in *size*.

(6) Manholes shall be located at changes of grade, *size* or alignment (except for curvilinear alignment) on a *storm building sewer* or exterior *storm drainage pipe* that is 8 in. or larger in *size.*

7.4.7.3. Manholes

(1) A manhole including the cover shall be designed to support all loads imposed upon it.

(2) A manhole shall be provided with,

(a) a cover which shall provide an airtight seal if located within a *building*,

(b) a rigid ladder of a corrosion-resistant material where the depth exceeds 1 000 mm, and

(c) a vent to the exterior if the manhole is located within a *building*.

(3) A manhole shall have a minimum horizontal dimension of 1 200 mm, except that the top 1 500 mm may be tapered from 1 200 mm down to a minimum of 600 mm at the top.

(4) A manhole in a *sanitary drainage system* shall be channelled to direct the flow of effluent.

7.4.7.4. Location of Cleanouts

(1) *Cleanouts* and access covers shall be located so that the openings are readily *accessible* for drain cleaning purposes.

(2) A *cleanout* shall not be located in a floor assembly in a manner that may constitute a hazard and shall not be used as a floor drain.

(3) Reserved

(4) Each change of direction of the piping between a *cleanout* fitting and the drainage piping or *vent piping* that it serves shall be accomplished by using 45° bends.

(5) A *cleanout* shall be provided to serve vertical drainage piping from a wall hung urinal and shall extend above the *flood level rim* of the *fixture*.

(6) A *cleanout* serving a *fixture* in health care facilities, mortuaries, laboratories and similar *occupancies*, where contamination by body fluids is likely, shall be located a minimum of 150 mm above the *flood level rim* of the *fixture*.

7.4.8. Minimum Slope and Length of Drainage Pipes

7.4.8.1. Minimum Slope

(1) Except as provided in Sentences (2) and (3), every drainage pipe that has a *size* of 3 in. or less shall have a downward slope in the direction of flow of at least 1 in 50.

(2) Sentence (1) does not apply to a *force main*.

(3) Where it is not possible to comply with Sentence (1), a lesser slope may be used if it will produce a gravity flow of not less than 0.6 m per second.

7.4.8.2. Length of Fixture Outlet Pipes

(1) Except for *fixture outlet pipes* installed in conformance with Sentence 7.4.5.1.(3), the *developed length* of every *fixture outlet pipe* shall not exceed 1 200 mm.

7.4.9. Size of Drainage Pipes

7.4.9.1. No Reduction in Size

(1) Except as permitted in Sentence (3), no drainage pipe that is of minimum *size* required by this Part for the purpose for which it is installed shall be so connected as to drain to other drainage pipe of lesser *size*.

(2) Where a *building drain* connects to a stack through a wall or floor, the drain shall retain its full *size* through the wall or floor.

(3) A *sanitary drainage pipe* may be connected to a pre-engineered waste water heat recovery system that incorporates piping of a lesser *size* than required by Sentence (1) provided that it does not convey *sewage*,

(a) from a *sanitary unit*, or

(b) that contains solids.

7.4.9.2. Serving Water Closets

(1) The *size* of every drainage pipe that serves a water closet shall be at least 3 in.

(2) The *size* of every horizontal drainage pipe downstream of the third water closet *fixture drain* connection shall be at least 4 in.

(3) The *size* of every *soil stack* that serves more than six water closets shall be at least 4 in.

(4) The *size* of the discharge pipe serving a macerating toilet system shall be at least ¾ in.

(5) No *vertical leg* of the drainage pipe from a water closet or other *fixture* that has an integral siphonic flushing action shall exceed 1 000 mm.

7.4.9.3. Size of Fixture Outlet Pipes

(1) Except as provided in Sentence (2), the *size* of every *fixture outlet pipe* shall conform to Table 7.4.9.3.

Table 7.4.9.3.
Minimum Permitted Size of Fixture Outlet Pipe and Hydraulic Loads for Fixtures

Forming Part of Sentences 7.4.9.3.(1) and 7.4.10.2.(1)

Item	Column 1 *Fixture*	Column 2 Minimum *Size* of *Fixture Outlet Pipe*, in.	Column 3 Hydraulic Load, *fixture units*
1.	Autopsy table	1 ½	2
2.	Bathroom group		
	(a) with flush tank		6
	(b) with direct flush valve		8
3.	Bathtub (with or without shower)	1 ½	1 ½
4.	Bath: foot, sitz or slab	1 ½	1 ½

5.	Bed pan washer	3	6
6.	Beer cabinet	1 ½	1 ½
7.	Bidet	1 ¼	1
8.	Chinese range	1 ½	3
9.	Clothes washer		
	(a) domestic	N/A	1 ½ with 2 in. *trap*
	(b) commercial	N/A	2 with 2 in. *trap*
10.	Cup Sinks	1 ¼	½
11.	Dental unit or cuspidor	1 ¼	1
12.	Dishwasher		
	(a) domestic	1 ½	1 (no load if connected to garbage grinder or domestic sink)
	(b) commercial type	2	3
13.	Drinking fountain	1 ¼	½
14.	Fish tank or tray	1 ½	1 ½
15.	Floor drain	2	2 with 2 in. *trap*
			3 with 3 in. *trap*
16.	Garbage grinder, commercial type	2	3
17.	Icebox	1 ¼	1
18.	Laundry tray		
	(a) single or double units or 2 single units with common *trap*	1 ½	1 ½
	(b) 3 compartments	1 ½	2
19.	Lavatory		
	(a) barber or beauty parlor	1 ½	1 ½
	(b) dental	1 ¼	1
	(c) domestic type single, or 2 single with common *trap*	1 ¼	1 with 1 ¼ in. *trap*
			1 ½ with 1 ½ in. *trap*
	(d) multiple or industrial type	1 ½	3
20.	Macerating Toilet System	3/4	4
21.	Potato Peeler	2	3
22.	Shower drain		
	(a) from 1 head	1 ½	1 ½
	(b) from 2 or 3 heads	2	3
	(c) from 4 to 6 heads	3	6
23.	Sink		
	(a) domestic and other small type with or without garbage grinders, single, double or 2 single with a common trap	1 ½	1 ½
	(b) other sinks	1 ½	1 ½ with 1 ½ in. trap
			2 with 2 in. trap
			3 with 3 in. trap
24.	Urinal		
	(a) pedestal, siphon jet or blowout type	2	4
	(b) stall, washout type	2	2
	(c) wall		
	(i) washout type	1 ½	1 ½
	(ii) other types	2	3
25.	Water closet		
	(a) with flush tank	3	4
	(b) with direct flush	3	6

(2) The part of the *fixture outlet pipe* that is common to three compartments of a sink shall be one *size* larger than the largest *fixture outlet pipe* of the compartments that it serves.

(3) Where clothes washers do not drain to a laundry tray, the *trap* inlet shall be fitted with a vertical standpipe that is not less than 600 mm long measured from the *trap weir* and the top of the standpipe shall terminate above the *flood level rim* of the clothes washer it serves.

7.4.9.4. Minimum Size of Building Drains and Sewers

(1) Every *sanitary building drain* and every *sanitary building sewer* shall be at least 4 in. in *size*.

(2) Every *storm building drain* and every *storm building sewer* shall be at least 4 in. in *size*.

7.4.10. Hydraulic Loads

7.4.10.1. Total Load on a Pipe

(1) The hydraulic load on a pipe is the total load from,

(a) every *fixture* that is connected to the system upstream of the pipe,

(b) every *fixture* for which provision is made for future connection upstream of the pipe, and

(c) all roofs and paved surfaces that drain into the system upstream of the pipe.

7.4.10.2. Hydraulic Loads for Fixtures

(1) The hydraulic load from a *fixture* that is listed in Table 7.4.9.3. is the number of *fixture units* set forth in the Table.

(2) Except as provided in Sentence (1), the hydraulic load from a *fixture* that is not listed in Table 7.4.9.3. is the number of *fixture units* set forth in Table 7.4.10.2. for the *trap* of the *size* that serves the *fixture*.

Table 7.4.10.2.
Permitted Hydraulic Load from a Fixture Based on Size of Trap

Forming Part of Sentence 7.4.10.2.(2)

Item	Column 1 *Size* of *Trap*, in.	Column 2 Hydraulic Load, *fixture units*
1.	1 ¼	1
2.	1 ½	2
3.	2	3
4.	2 ½	4
5.	3	5
6.	4	6

7.4.10.3. Hydraulic Loads from Fixtures with Continuous or Semi-continuous Flow

(1) Except as provided in Sentence (2), the hydraulic load from a *fixture* that produces a continuous flow, such as a pump or an air-conditioning *fixture*, is 31.7 *fixture units* for each litre per second of flow.

(2) Where a *fixture* or equipment that produces a continuous or semi-continuous flow drains to a *storm drainage system*, the hydraulic load from the *fixture* is 900 litres for each litre per second of flow.

(3) The hydraulic load from a *fixture* or equipment that produces a semi-continuous flow shall conform to Table 7.4.10.3.

Table 7.4.10.3.
Maximum Permitted Hydraulic Load from Fixtures with Semi-continuous Flows

Forming Part of Sentence 7.4.10.3.(3)

Item	Column 1	Column 2	Column 3
	Maximum Permitted Flows by *Trap Size*		
	Trap Size, in.	Flow, L/s	Hydraulic Load, *fixture units*
1.	1 ½	0.00 - 0.090	3
2.	2	0.091 - 0.190	6
3.	3	0.191 - 0.850	27
4.	4	0.851 - 5.700	180

7.4.10.4. Hydraulic Loads from Roofs or Paved Surfaces

(1) Except as provided in Sentence (2), the hydraulic load in litres from a roof or paved surface is the maximum 15 min rainfall determined in conformance with MMAH Supplementary Standard SB-1, “Climatic and Seismic Data”, multiplied by the sum of,

(a) the area in square metres of the horizontal projection of the surface drained, and

(b) one-half the area in square metres of the largest adjoining vertical surface.

(2) *Flow control roof drains* may be installed provided,

(a) the maximum drain down time does not exceed 24 h,

(b) the roof structure is designed to carry the load of the stored water,

(c) one or more scuppers are installed not more than 30 m apart along the perimeter of the *building* so that,

(i) the scuppers are designed to handle at least 200% of the 15-minute rainfall intensity, and

(ii) the maximum depth of controlled water is limited to 150 mm,

(d) they are located not more than 15 m from the edge of the roof and not more than 30 m from adjacent drains, and

(e) there is at least one drain for each 900 m^2.

(3) Where the height of the parapet is more than 150 mm or exceeds the height of the adjacent wall flashing,

(a) emergency roof overflows or scuppers described in Clause (2) (c) shall be provided, and

(b) there shall be a minimum of two roof drains.

7.4.10.5. Conversion of Fixture Units to Litres and Gal/min

(1) Except as provided in Sentence 7.4.10.3.(2), where the hydraulic load is to be expressed in litres, *fixture units* shall be converted as follows:

(a) when the number of *fixture units* is 260 or fewer, the load is 2 360 L, and

(b) when the number of *fixture units* exceeds 260, the load is 9.1 L for each *fixture unit*.

(2) Where the hydraulic load is to be expressed in gal/min, *fixture units* shall be converted in accordance with Table 7.4.10.5.

Table 7.4.10.5.
Maximum Probable Drainage Rate, gal/min

Forming Part of Sentence 7.4.10.5.(2)

Item	Column 1	Column 2	Column 3	Column 4
	Fixture Units in Service	*Fixture Units*	*Fixture Units*	*Fixture Units*
		Col. 1	Col. 1 × 10	Col. 1 × 100
1.	100	53	174	900
2.	90	51	164	835
3.	80	49	153	750
4.	70	47	140	680
5.	60	44	128	600
6.	50	41	115	520
7.	40	38	102	435
8.	30	33	88	350
9.	20	27	72	262
10.	10	21	53	174

7.4.10.6. Hydraulic Loads to Soil or Waste Pipes

(1) Except as provided in Sentence (2), the hydraulic load that is drained to every *soil* or *waste stack* shall conform to Table 7.4.10.6.

Table 7.4.10.6.
Maximum Permitted Hydraulic Load Drained to Soil or Waste Stack

Forming Part of Sentence 7.4.10.6.(1)

Item	Column 1 Pipe *Size*, in.	Column 2 Maximum Hydraulic Load, *fixture units*	Column 3 Maximum *Fixture Units* Drained from any one *Storey*
1.	1 ¼	2	2
2.	1 ½	8	5
3.	2	24	10
4.	3	102	18
5.	4	540	100
6.	5	1 400	250
7.	6	2 900	500
8.	8	7 600	830
9.	10	15 000	2 700
10.	12	26 000	4 680
11.	15	50 000	9 000

(2) Where the *nominally horizontal offset* in a *soil* or *waste stack* is 1 500 mm or more, the hydraulic load that is served by it shall conform to Table 7.4.10.8.

(3) Vertical *sanitary drainage pipe* shall be designed to carry no more than 29% of its full capacity.

7.4.10.7. Hydraulic Loads on Branches

(1) No horizontal *sanitary drainage pipe* of less than 3 in. *size* shall have a *fixture* loading in excess of that permitted by Table 7.4.10.7.

Table 7.4.10.7.
Maximum Permitted Hydraulic Load Drained to a Branch

Forming Part of Sentence 7.4.10.7.(1)

Item	Column 1 *Size* of *Branch*, in.	Column 2 Maximum Load, *fixture units*
1.	1 ¼	2
2.	1 ½	4
3.	2	6

7.4.10.8. Hydraulic Loads on Sanitary Horizontal Drain

(1) Except as permitted by Article 7.4.10.7., the hydraulic load that is drained to a horizontal *sanitary drainage pipe* shall conform to Table 7.4.10.8., based on the *size* and slope.

(2) Horizontal *sanitary drainage pipe* shall be designed to carry no more than 65% of its full capacity.

Table 7.4.10.8.
Maximum Permitted Hydraulic Load Drained to a Horizontal Sanitary Drainage Pipe

Forming Part of Sentences 7.4.10.6.(2) and 7.4.10.8.(1)

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Drain *Size*, Nominal in.	Maximum Hydraulic Load, *fixture units*					
		Slope[(1)]					
		1 in 400	1 in 200	1 in 133	1 in 100	1 in 50	1 in 25
1.	3	---	---	---	---	27	36
2.	4	---	---	---	180	240	300
3.	5	---	---	380	390	480	670
4.	6	---	---	600	700	840	1300
5.	8	---	1400	1500	1600	2250	3370
6.	10	---	2500	2700	3000	4500	6500
7.	12	2240	3900	4500	5400	8300	13000
8.	15	4800	7000	9300	10400	16300	22500

Notes to Table 7.4.10.8.:

(1) Slope is the ratio of rise to run, in whatever measurement units are chosen.

7.4.10.9. Hydraulic Loads on Horizontal Storm Drains

(1) The hydraulic load that is drained to a horizontal *storm drainage pipe* shall conform to Table 7.4.10.9., based on the *size* and slope.

Table 7.4.10.9.
Maximum Permitted Hydraulic Load Drained to a Horizontal Storm Drainage Pipe

Forming Part of Sentences 7.4.10.9.(1) and 7.4.10.10.(2)

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
	Size of Drain or Sewer, in.	Maximum Hydraulic Load, L						
		Slope[(1)]						
		1 in 400	1 in 200	1 in 133	1 in 100	1 in 68	1 in 50	1 in 25
1.	3	------	------	------	------	------	2 770	3 910
2.	4	------	------	------	4 220	5 160	5 970	8 430
3.	5	------	------	6 760	7 650	9 350	10 800	15 300
4.	6	------	------	10 700	12 400	15 200	17 600	24 900
5.	8	------	18 900	23 200	26 700	32 800	37 800	53 600
6.	10	------	34 300	41 900	48 500	59 400	68 600	97 000
7.	12	37 400	55 900	68 300	78 700	96 500	112 000	158 000
8.	15	71 400	101 000	124 000	143 000	175 000	202 000	287 000

Notes to Table 7.4.10.9.:

(1) Slope is the ratio of rise to run, in whatever measurement units are chosen.

7.4.10.10. Rain Leaders

(1) No change in the *size* of a rain *leader* with a *nominally horizontal offset* is required if the *offset*,

(a) is located immediately under the roof,

(b) is not more than 6 m long, and

(c) has a slope not less than 1 in 50.

(2) If the horizontal *offset* is more than 6 m long, the rain *leader* shall conform to Table 7.4.10.9.

(3) The hydraulic load that is drained to a rain *leader* shall conform to Table 7.4.10.10.

Table 7.4.10.10.
Maximum Permitted Hydraulic Load Drained to a Circular Rain Leader

Forming Part of Sentence 7.4.10.10.(3)

Item	Column 1 *Size*, in.	Column 2 Maximum Hydraulic Load, L
1.	2	1 700
2.	2 ½	3 070
3.	3	5 000
4.	4	10 800
5.	5	19 500
6.	6	31 800
7.	8	68 300

Section 7.5. Venting Systems

7.5.1. Vent Pipes for Traps

7.5.1.1. Venting for Traps

(1) Except as provided in Sentences (3) and (4), every *trap* shall be protected by a *vent pipe*.

(2) *Drainage systems* shall be protected by the installation of a system as provided in Subsections 7.5.4. and 7.5.5. by the installation of,

(a) *additional circuit vents*,

(b) *branch vents*,

(c) *circuit vents*,

(d) *continuous vents*,

(e) *dual vents*,

(f) *fresh air inlets*,

(g) *headers*,

(h) *individual vents*,

(i) *offset relief vents*,

(j) *relief vents*,

(k) *stack vents*,

(l) *vent stacks*,

(m) *wet vents*, or

(n) *yoke vents*.

(3) A *trap* that serves a floor drain or *hub drain* need not be protected by a *vent pipe* separately where,

(a) the *size* of the *trap* is not less than 3 in.,

(b) the length of the *fixture drain* is not less than 450 mm,

(c) the fall on the *fixture drain* does not exceed its *size*, and

(d) the *trap* is connected to a horizontal drainage pipe that terminates at its upstream end in a 3 in. *stack*.

(4) A *trap* need not be protected by a *vent pipe*,

(a) where it serves,

(i) a *subsoil drainage pipe*, or