

P157-24 Part II

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2024 International Residential Code

SECTION R202 DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating wastewater and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Delete without substitution:

SECTION P2910 NONPOTABLE WATER SYSTEMS

P2910.1 Scope. The provisions of this section shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.

P2910.2 Water quality. Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the *jurisdiction*. Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent requirements of this code applicable to such sources.

P2910.2.1 Residual disinfectants. Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.

Exception: Reclaimed water sources shall not be required to comply with the requirements of this section.

P2910.2.2 Filtration required. Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron or finer filter.

Exception: Reclaimed water sources shall not be required to comply with the requirements of this section.

P2910.3 Signage required. Nonpotable water outlets such as hose connections, open-ended pipes and faucets shall be identified at the point of use for each outlet with signage that reads, "Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER. DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant, waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and in colors contrasting the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2910.3 shall appear on the signage required by this section.



FIGURE P2910.3 PICTOGRAPH—DO NOT DRINK

P2910.4 Permits. *Permits* shall be required for the construction, installation, *alteration* and *repair* of nonpotable water systems. *Construction documents*, engineering calculations, diagrams and other such data pertaining to the nonpotable water system shall be

submitted with each *permit* application.

P2910.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P2910.6 Approved components and materials. Piping, plumbing components and materials used in collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.

P2910.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P2910.8 Freeze protection. Where sustained freezing temperatures occur, provisions shall be made to keep storage tanks and the related piping from freezing.

P2910.9 Nonpotable water storage tanks. Nonpotable water storage tanks shall comply with Sections P2910.9.1 through P2910.9.11.

P2910.9.1 Sizing. The holding capacity of the storage tank shall be sized in accordance with the anticipated demand.

P2910.9.2 Location. Storage tanks shall be installed above or below grade. Above grade storage tanks shall be protected from direct sunlight and shall be constructed using opaque, UV resistant materials such as, but not limited to, heavily tinted plastic, lined metal, concrete and wood; or painted to prevent algae growth; or shall have specially constructed sun barriers including, but not limited to, installation in garages, *crawl spaces* or sheds. Storage tanks and their manholes shall not be located directly under any soil piping, waste piping or any source of contamination.

P2910.9.3 Materials. Where collected on site, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion resistant materials. The storage tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.

P2910.9.4 Foundation and supports. Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with this code.

P2910.9.4.1 Ballast. Where the soil can become saturated, an underground storage tank shall be ballasted or otherwise secured to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the storage tank weight when full, consistent with the bearing capability of adjacent soil.

P2910.9.4.2 Structural support. Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P2910.9.5 Makeup water. Where an uninterrupted nonpotable water supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by means of an *air gap* not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with Section P2902. A *full open valve* located on the makeup water supply line to the storage tank shall be provided. Inlets to the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall be prohibited from dropping below the source water inlet or the intake of any attached pump.

P2910.9.5.1 Inlet control valve alarm. Makeup water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the storage tank begins to discharge into the

overflow system.

P2910.9.6 Overflow. The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table P2910.9.6. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or floor drain; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by $\frac{1}{4}$ -inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed to prevent freezing on roof walks. The overflow drain shall not be equipped with a shutoff valve. Not less than one cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P2910.9.6 SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	$1\frac{1}{2}$
1,501 to 3,000	2
3,001 to 5,000	$2\frac{1}{2}$
5,001 to 7,500	3
Over 7,500	4

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P2910.9.7 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade storage tanks, located outside of the *building*, shall be provided with a manhole either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access.

Exception: Storage tanks under 800 gallons (3028 L) in volume installed below-grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.

P2910.9.8 Venting. Storage tanks shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or a U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade, or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P2910.7.

SECTION P2911 ON-SITE NONPOTABLE WATER REUSE SYSTEMS

P2910.9.9 Drain. A drain shall be located at the lowest point of the storage tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P2910.9.6. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P2910.10 Marking and signage. Each nonpotable water storage tank shall be *labeled* with its rated capacity. The contents of storage tanks shall be identified with the words, "CAUTION: NONPOTABLE WATER. DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER—CONFINED SPACE." Markings shall be indelibly printed on the tank, or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and shall be of a color in contrast with the background on which they are

applied-

P2910.11 Storage tank tests. Storage tanks shall be tested in accordance with the following:

1. Storage tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.
2. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and leaks do not exist.
3. Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is 2 inches (51 mm) below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.

P2910.12 System abandonment. If the *owner* of an on-site nonpotable water reuse system or rainwater collection and conveyance system elects to cease use of or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. System piping connecting to a utility provided water system shall be removed or disabled.
2. The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable water pipe system is already in place, the fixtures shall be connected to the existing system.
3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filled with sand or equivalent.

P2910.13 Separation requirements for nonpotable water piping. Nonpotable water collection and distribution piping and reclaimed water piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5.
3. The required separation distance shall not apply where a nonpotable water pipe is located in the same trench with a *building sewer* that is constructed of materials that comply with the requirements of Table P3002.2.
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe provided that the nonpotable water pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.2.
6. The required separation distance shall not apply to irrigation piping located outside of a building and downstream of the backflow preventer where nonpotable water is used for outdoor applications.

P2910.14 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key.

P2911.1 General. The provisions of this section shall govern the construction, installation, *alteration* and *repair of on-site nonpotable water reuse systems* for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the *jurisdiction*.

P2911.2 Sources. *On-site nonpotable water reuse systems* shall collect waste discharge only from the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. Water from other *approved* nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, foundation drain water, fluid cooler discharge water and fire pump test water shall be permitted to be collected for reuse by *on-site nonpotable water reuse systems*, as *approved by the building official* and as appropriate for the intended application.

P2911.2.1 Prohibited sources. Reverse osmosis system reject water, water softener backwash water, *kitchen sink wastewater*, dishwasher wastewater and wastewater containing urine or fecal matter shall not be collected for reuse within an on-site nonpotable water reuse system.

P2911.3 Traps. Traps serving fixtures and devices discharging wastewater to *on-site nonpotable water reuse systems* shall comply with the Section P3201.2.

P2911.4 Collection pipe. *On-site nonpotable water reuse systems* shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the *graywater* system. Collection and vent piping materials shall comply with Section P3002.

P2911.4.1 Installation. Collection piping conveying untreated water for reuse shall be installed in accordance with Section P3005.

P2911.4.2 Joints. Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3002.

P2911.4.3 Size. Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.

P2911.4.4 Marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P2911.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P2911.6 Disinfection. Nonpotable water collected on-site for reuse shall be disinfected, treated or both to provide the quality of water needed for the intended end use application. Where the intended end use application does not have requirements for the quality of water, disinfection and treatment of water collected on-site for reuse shall not be required. Nonpotable water collected on-site containing untreated *graywater* shall be retained in collection reservoirs for not more than 24 hours.

P2911.6.1 Graywater used for fixture flushing. *Graywater* used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF-350.

P2911.7 Storage tanks. Storage tanks utilized in *on-site nonpotable water reuse systems* shall comply with Section P2910.9 and Sections P2911.7.1 through P2911.7.3.

P2911.7.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2911.7.1.

TABLE P2911.7.1 LOCATION OF NONPOTABLE WATER REUSE STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	40
Septage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

For SI: 1 foot = 304.8 mm.

P2911.7.2 Inlets. Storage tank inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2911.7.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank, and shall not skim water from the surface.

P2911.8 Valves. Valves shall be supplied on *on-site nonpotable water reuse systems* in accordance with Sections P2911.8.1 and P2911.8.2.

P2911.8.1 Bypass valve. One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated *on-site reuse sources* to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.

P2911.8.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2911.9 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2911.10 Water pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure reducing valve shall be installed to reduce the pressure in the nonpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P2911.11 Distribution pipe. Distribution piping utilized in *on-site nonpotable water reuse systems* shall comply with Sections P2911.11.1 through P2911.11.3.

Exception: Irrigation piping located outside of the *building* and downstream of a backflow preventer.

P2911.11.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.

P2911.11.2 Design. On-site nonpotable water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

Delete without substitution:

~~**P2911.11.3 Marking.** On-site nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.~~

~~**P2911.12 Tests and inspections.** Tests and inspections shall be performed in accordance with Sections P2911.12.1 through P2911.12.6.~~

~~**P2911.12.1 Collection pipe and vent test.** Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.~~

~~**P2911.12.2 Storage tank test.** Storage tanks shall be tested in accordance with Section P2910.11.~~

~~**P2911.12.3 Water supply system test.** The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~**P2911.12.4 Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~**P2911.12.5 Inspection of vermin and insect protection.** Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~**P2911.12.6 Water quality test.** The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~**P2911.13 Operation and maintenance manuals.** Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections P2911.13.1 through P2911.13.4.~~

~~**P2911.13.1 Manual.** A detailed operations and maintenance manual shall be supplied in hard copy form for each system.~~

~~**P2911.13.2 Schematics.** The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~**P2911.13.3 Maintenance procedures.** The manual shall provide a schedule and procedures for system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.~~

~~**P2911.13.4 Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.~~

SECTION P2912

NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS

~~**P2912.1 General.** The provisions of this section shall govern the construction, installation, *alteration* and *repair* of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2912.2 Collection surface.** Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from~~

~~approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.~~

~~**P2912.3 Debris excluders.** Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.~~

~~**P2912.4 Roof washer.** An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.~~

~~**P2912.5 Roof gutters and downspouts.** Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.~~

~~**P2912.5.1 Slope.** Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $\frac{1}{8}$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.~~

~~**P2912.5.2 Cleanouts.** Cleanouts shall be provided in the water conveyance system to allow access to filters, flushes, pipes and downspouts.~~

~~**P2912.6 Drainage.** Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.~~

~~**P2912.7 Collection pipe.** Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.~~

~~**P2912.7.4 Marking.** Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.~~

~~**P2912.7.2 Joints.** Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.~~

~~**P2912.7.3 Size.** Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~**P2912.7.1 Installation.** Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.~~

~~**P2912.8 Filtration.** Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.~~

~~**P2912.9 Disinfection.** Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.~~

~~**P2912.10 Storage tanks.** Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section~~

P2910.9 and Sections P2912.10.1 through P2912.10.3.

P2912.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2912.10.1.

TABLE P2912.10.1 LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P2912.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2912.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P2912.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P2912.11.1 and P2912.11.2.

P2912.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P2912.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2912.12 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2912.13 Water pressure reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P2912.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P2912.14.1 through P2912.14.3.

Exception: Irrigation piping located outside of the *building* and downstream of a backflow preventer.

P2912.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.

P2912.14.2 Design. Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P2912.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

~~**P2912.15 Tests and inspections.** Tests and inspections shall be performed in accordance with Sections P2912.15.1 through P2912.15.8.~~

~~**P2912.15.1 Roof gutter inspection and test.** Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P2912.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.~~

~~**P2912.15.2 Roofwasher test.** Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P2912.4 shall be verified.~~

~~**P2912.15.3 Collection pipe and vent test.** Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.~~

~~**P2912.15.4 Storage tank test.** Storage tanks shall be tested in accordance with Section P2910.11.~~

~~**P2912.15.5 Water supply system test.** The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~**P2912.15.6 Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~**P2912.15.7 Inspection of vermin and insect protection.** Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~**P2912.15.8 Water quality test.** The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~**P2912.16 Operation and maintenance manuals.** Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P2912.16.1 through P2912.16.4.~~

~~**P2912.16.1 Manual.** A detailed operations and maintenance manual shall be supplied in hard copy form for each system.~~

~~**P2912.16.2 Schematics.** The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~**P2912.16.3 Maintenance procedures.** The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.~~

~~**P2912.16.4 Operations procedures.** The manual shall include system startup and shutdown procedures, and detailed operating procedures.~~

SECTION P2913 RECLAIMED WATER SYSTEMS

~~**P2913.1 General.** The provisions of this section shall govern the construction, installation, *alteration* and *repair* of systems supplying nonpotable reclaimed water.~~

~~**P2913.2 Water pressure reducing valve or regulator.** Where the reclaimed water pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure reducing valves shall be specified and installed in accordance with Section P2903.3.2.~~

~~P2913.3 Reclaimed water systems.~~ The design of the reclaimed water systems shall conform to accepted engineering practice.

~~P2913.3.1 Distribution pipe.~~ Distribution piping shall comply with Sections P2913.3.1.1 through P2913.3.1.3.

~~Exception:~~ Irrigation piping located outside of the *building* and downstream of a backflow preventer.

~~P2913.3.1.1 Materials, joints and connections.~~ Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.

~~P2913.3.1.2 Design.~~ Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

~~P2913.3.1.3 Labeling and marking.~~ Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

~~P2913.4 Tests and inspections.~~ Tests and inspections shall be performed in accordance with Sections P2913.4.1 and P2913.4.2.

~~P2913.4.1 Water supply system test.~~ The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.

~~P2913.4.2 Inspection and testing of backflow prevention assemblies.~~ The testing of backflow preventers shall be conducted in accordance with Section P2503.8.

Add new text as follows:

CHAPTER 34

WATER REUSE SYSTEMS

SECTION 3401

GENERAL

P3401.1 General. The provisions of this chapter shall govern the materials, design, construction, and installation of systems for the treatment, storage, and distribution of *reuse water*. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment, and distribution. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction.

P3401.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables P3401.2(1), P3401.2(2), P3401.2(3), and as established for the intended application by all applicable laws, rules, and ordinances of the jurisdiction. Where water from multiple sources is combined, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

TABLE P3401.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure ^a	Quality Tier ^b
Direct Potable Reuse	Direct Potable Reuse	DC	4
	Aquifer Recharge - Direct Injection	IC	2
	Aquifer Recharge - Surface Application	IC	2
	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
Indirect Potable Reuse (Treatment Follows Reuse Application)	Infiltration/Percolation Lagoons	IC	2

	<u>Raw Water Augmentation</u>	IC	2
	<u>Saltwater Intrusion Barrier</u>	IC	2
	<u>Surface Water Augmentation to a Supply Source</u>	IC	2
	<u>Food crop w/ processing that destroys pathogens (Restricted Access)</u>	LC	1
	<u>Orchards and Vineyards</u>	AC/LC	4/1
	<u>Water contacts edible portion of food crop (Includes Root Crops)</u>	AC	4
<u>Irrigation of Food Crops for Human Consumption (Spray/Drip)</u>	<u>Water doesn't contact edible portion of food crop (Restricted Access)</u>	IC	2
	<u>Christmas Tree Farms</u>	AC/LC	3/1
	<u>Hemp Crops</u>	AC/LC	3/1
	<u>Fiber crops</u>	AC/LC	3/1
<u>Irrigation of Crops Not for Human Consumption (Spray/Drip)</u>	<u>Fodder /Feed Crop/ Forage Crops</u>	AC/LC	3/1
	<u>Ornamental nursery stock</u>	AC/LC	3/1
	<u>Silviculture / Tree Farms</u>	AC/LC	3/1
	<u>Sod/Turf Crops</u>	AC/LC	3/1
	<u>Tobacco</u>	AC/LC	3/1
	<u>Athletic Fields</u>	AC/LC	3/1
	<u>Cemeteries</u>	AC/LC	3/1
	<u>College and University Campuses</u>	AC/LC	3/1
	<u>Commercial Campuses</u>	AC/LC	3/1
	<u>Golf Courses (Restricted Access)</u>	LC	1
	<u>Golf Courses (Unrestricted Access)</u>	AC/LC	3/1
	<u>Highway/Freeway Medians/ Roadside Vegetation</u>	AC/LC	3/1
<u>Landscape Irrigation (Spray/Drip)</u>	<u>Open Access Land Irrigation</u>	AC/LC	3/1
	<u>Pasture for Milk Producing Animals (Restricted Access)</u>	LC	1
	<u>Pasture for Non-Milk Producing Animals (Restricted Access)</u>	LC	1
	<u>Parks</u>	AC/LC	3/1
	<u>Playgrounds</u>	AC/LC	3/1
	<u>Residential Irrigation</u>	AC/LC	3/1
	<u>Landscape Irrigation (Restricted Access)</u>	LC	1
	<u>Urban Landscaping</u>	AC/LC	3/1
	<u>Schoolyards</u>	AC/LC	3/1
	<u>Decorative Fountains</u>	AC	3
	<u>Landscape Impoundments (With Fountain(s))</u>	AC	3
	<u>Landscape Impoundments (Without Fountain(s))</u>	LC	1
<u>Water Features</u>	<u>Ponds and Lagoons</u>	LC	1
	<u>Recreational Impoundments (Restricted Access)</u>	LC	1
	<u>Recreational Impoundments (Unrestricted Access)</u>	AC	3
	<u>Reservoir Augmentation (Recreational)</u>	AC	3
	<u>Wetland Creation</u>	LC	1
	<u>Wetland Discharge / Application</u>	LC	1
	<u>Fire Fighting Via Plane</u>	AC	3
<u>Life Safety</u>	<u>Fire Hydrant Water Supply</u>	AC	3
	<u>Fire Protection systems</u>	AC	3
	<u>Non Structural Fire Fighting</u>	AC	3
	<u>Structural Fire Fighting</u>	AC	3
	<u>Concrete and Cement mixing</u>	LC	1
<u>Construction</u>	<u>Dust Control</u>	LC	1
	<u>Equipment Operation (Ex. Cooling Power Equipment)</u>	LC	1
	<u>Material Washing and Sieving</u>	LC	1
	<u>Soil Compaction and Consolidation</u>	LC	1
	<u>Agricultural Cleaning (Animal Washing & Animal Pens)</u>	AC	3
	<u>Aquaculture</u>	LC	1
	<u>Boiler Feed</u>	LC	1
	<u>Building Washing</u>	AC	3
	<u>Chemical Mixing (Herbicides, Pesticides, Fertilizers)</u>	LC	1
	<u>Commercial Car Washes</u>	AC	3
	<u>Commercial Laundries</u>	AC	3
	<u>Cooling Power Equipment</u>	LC	1
	<u>Cooling systems with aerosolization</u>	AC	3
	<u>Cooling systems with no aerosolization</u>	LC	1
<u>Process Water</u>	<u>Dust Control (Roads and Streets)</u>	LC	1
	<u>Flushing Sanitary Sewers</u>	LC	1
	<u>Flushing Toilets and Urinals</u>	AC	3
	<u>Bidets and personal hygiene devices</u>	DC	4
	<u>Frost Protection</u>	LC	1
	<u>Gas Pipeline Testing</u>	LC	1

	<u>Hydro Seeding</u>	<u>AC</u>	<u>3</u>
	<u>Impoundments at Fish Hatcheries</u>	<u>LC</u>	<u>1</u>
	<u>Industrial Oil and Gas Operations</u>	<u>LC</u>	<u>1</u>
	<u>Industrial Process Water (No Possibility of Human Contact)</u>	<u>LC</u>	<u>1</u>
<u>Process Water</u>	<u>Industrial Process Water (Possibility of Human Contact or Evaporative)</u>	<u>AC</u>	<u>3</u>
	<u>Industrial Washwater applications</u>	<u>AC</u>	<u>3</u>
	<u>Livestock Drinking Water (Milk Producing)</u>	<u>AC</u>	<u>3</u>
	<u>Livestock Drinking Water (Non-Milk Producing)</u>	<u>AC</u>	<u>3</u>
	<u>Parts Cleaning</u>	<u>LC</u>	<u>1</u>
	<u>Pool Water Makeup</u>	<u>DC</u>	<u>4</u>
	<u>Pressure Washing</u>	<u>AC</u>	<u>3</u>
	<u>Priming Drainage Traps</u>	<u>LC</u>	<u>1</u>
	<u>Road Milling</u>	<u>LC</u>	<u>1</u>
	<u>Ship Ballasting</u>	<u>LC</u>	<u>1</u>
	<u>Snow Making (Commercial / Recreational Use)</u>	<u>AC</u>	<u>3</u>
	<u>Snow Making (Storage)</u>	<u>AC</u>	<u>3</u>
	<u>Stack Scrubbing</u>	<u>AC</u>	<u>3</u>
	<u>Stream Flow Augmentation</u>	<u>LC</u>	<u>1</u>
	<u>Street, Sidewalk, Parking Lot Cleaning (Restricted Access)</u>	<u>LC</u>	<u>1</u>
	<u>Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)</u>	<u>AC</u>	<u>3</u>
	<u>Vehicle and equipment Washing</u>	<u>AC</u>	<u>3</u>
	<u>Wastewater Treatment (Process Uses)</u>	<u>LC</u>	<u>1</u>
	<u>Window Washing</u>	<u>AC</u>	<u>3</u>

- a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).
- b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE P3401.2(3) LOG REDUCTION (LRV) CREDITS APPLICABLE TO DPR BASED ON SOURCE WATER

<u>Source Water</u>	<u>Maximum LRV Credits for DPR</u>
<u>Blackwater</u>	<u>0/0/0</u>
<u>Blackwater blended with ground water^a</u>	<u>LRV credit^b = negative log of BWC</u>
<u>Blackwater blended with surface water^a</u>	<u>LRV credit^b = negative log of BWC</u>
<u>Blackwater blended with groundwater and surface water^a</u>	<u>LRV credit^b = negative log of BWC</u>
<u>Graywater</u>	<u>Case by case basis</u>
<u>Stormwater</u>	<u>Case by case basis</u>
<u>Rainwater</u>	<u>Case by case basis</u>
<u>Industrial Water</u>	<u>Case by case basis</u>
<u>Process water</u>	<u>Case by case basis</u>

- a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.
- b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

TABLE P3401.2.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimum Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances, and NSF/ANSI 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

P3401.3 Signage required. Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets each outlet shall be identified at the point of use with signage that reads as follows: “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required text, the pictograph shown in Figure P3401.3 shall appear on the signage required by this section.



FIGURE P3401.3 PICTOGRAPH—DO NOT DRINK

P3401.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of water reuse systems. Construction documents, engineering calculations, diagrams, operation and maintenance manuals, and other such data pertaining to the water reuse system shall be submitted with each permit application.

P3401.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P3401.6 Components and materials. Piping, plumbing components, and materials used in conveyance and distribution systems shall be of material *approved* for the intended application.

P3401.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P3401.8 Freeze protection. Where freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment, and the related piping from freezing.

P3401.9 Water tanks. Water storage and process tanks shall comply with Sections P3401.9.1 through P3401.9.10.

P3401.9.1 Location. Any storage tank, process tank and equipment, or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

P3401.9.2 Materials. Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The tank shall be constructed of materials compatible with all disinfection systems used to treat water upstream of the tank and with all systems used to maintain water quality in the tank.

P3401.9.3 Foundation and supports. All tanks shall be supported on a firm base capable of withstanding the weight of the tank when filled to capacity. Tanks shall be supported in accordance with the *International Building Code*.

P3401.9.3.1 Ballast. Where the soil can become saturated, an underground tank shall be ballasted, or otherwise secured, to resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall exceed the buoyancy force applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the tank when full, consistent with the bearing capability of adjacent soil.

P3401.9.3.2 Structural support. Where installed below grade, tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P3401.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, an additional source of makeup water shall be provided for the storage tank. All makeup water supplies shall be protected against backflow in accordance with Section P2902. A *full-open valve* located on the makeup water supply lines to the storage tank shall be provided. Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. The water level shall not be permitted to drop below the intake of any pump supplying makeup water.

P3401.9.5 Overflow. Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table P3401.9.5. The overflow pipe shall be protected from insects and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P3401.9.5 SIZE OF DRAIN PIPES FOR WATER TANKS

<u>TANK CAPACITY (gallons)</u>	<u>DRAIN PIPE (inches)</u>
<u>Up to 750</u>	<u>1</u>
<u>751 to 1,500</u>	<u>1½</u>
<u>1,501 to 3,000</u>	<u>2</u>
<u>3,001 to 3,000</u>	<u>2½</u>
<u>5,001 to 7,500</u>	<u>3</u>
<u>Over 7,500</u>	<u>4</u>

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P3401.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade tanks, located outside of

the building, shall be provided with an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). An access opening shall extend not less than 4 inches (102 mm) above ground and shall be designed to prevent water infiltration. The finished grade shall be sloped away from the maintenance hole to divert surface water. Access opening covers shall be secured to prevent unauthorized access. Service ports in an access opening shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled "CONFINED SPACE."

Exception: Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with an access opening provided that the tank has a service port of not less than 8 inches (203mm) in diameter.

P3401.9.7 Venting. Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P3401.7.

P3401.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P3401.9.5. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P3401.9.9 Marking and signage. Each nonpotable water tank shall be labeled with its rated volumetric capacity. The contents of tanks shall be identified with the words "CAUTION: NONPOTABLE WATER – DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER – CONFINED SPACE." Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied

P3401.9.10 Tank tests. Pressurized tanks shall be certified in accordance with Section P2609.4. Tanks that receive flow by gravity shall be tested in accordance with the following: Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified.

P3401.10 System abandonment. If the owner of an on-site *water reuse system* or components thereof elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with Sections P3401.10.1 through P3401.10.3.

P3401.10.1 Utility-connected piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

P3401.10.2 Distribution piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

P3401.10.3 Tanks. Tank(s) shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

P3401.11 Trenching requirements for nonpotable water piping. Nonpotable water distribution piping shall be separated from the

building sewer and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conform to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5
3. Nonpotable water pipe is permitted to be located in the same trench as a building sewer, provided that such sewer is constructed of materials that comply with the requirements of Table P3002.1(2).
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

P3401.12 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section P3401.3.

P3401.13 Operation and Monitoring. The design, installation and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

SECTION P3402 **GRAYWATER AND BLACKWATER REUSE**

P3402.1 General. The provisions of ASTM E2635 and Section P3402 shall govern the construction, installation, alteration and repair of water reuse systems.

3402.2 Graywater sources. Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, laundry trays, condensate and other domestic wastewaters that are not expected to contain urine, fecal matter, grease or food wastes.

P3402.3 Blackwater sources. Blackwater shall be discharged to the sanitary drainage system in accordance with Chapter 30 or to an approved on-site blackwater reuse system.

P3402.4 Other sources. Other sources including, but not limited to, condensate, reverse osmosis system reject water and water softener discharge water shall also be considered for use in a water reuse system.

P3402.5 Traps. Traps serving fixtures and devices discharging water to water reuse systems shall comply with Section P3201.2.

P3402.6 Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P3402.7 Treatment. Water collected for reuse shall be treated to meet the quality standards required in Tables P3401.2(1) and P3401.2(2).

P3402.8 Treatment systems. Treatment systems shall be installed to allow access for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P3402.9 Tanks. Nonpotable tanks utilized in water reuse systems shall comply with Sections P3401.9, P3402.9.1 and P3402.9.2.

P3402.9.1 Location. Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3402.9.1.

TABLE P3402.9.1 LOCATION OF NONPOTABLE WATER REUSE TANKS

<u>ELEMENT</u>	<u>MINIMUM HORIZONTAL DISTANCE FROM TANK (feet)</u>
<u>Critical root zone (CRZ) of protected trees</u>	<u>2</u>
<u>Lot line adjoining private lots</u>	<u>5</u>
<u>Public water main</u>	<u>10</u>
<u>Seepage pits</u>	<u>5</u>
<u>Septic tanks</u>	<u>5</u>
<u>Streams and lakes</u>	<u>50</u>
<u>Water service</u>	<u>5</u>
<u>Water wells</u>	<u>50</u>

1 foot = 304.8 mm.

P3402.9.2 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the tank and shall not skim water from the surface.

P3402.10 Valves. Valves shall be installed on the collection piping of the *water reuse systems* in accordance with Sections P3402.10.1 and P3402.10.2.

P3402.10.1 Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, as applicable, to divert untreated on-site reuse sources to the sanitary sewer or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow. Bypass valves shall be provided with access that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

P3402.10.2 Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section P3008.

P3402.11 Pumping and control system. Mechanical equipment including pumps, valves, and treatment units shall have access in order to replace, repair, maintain and clean. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3402.12 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3402.13 Distribution piping. Distribution piping utilized in water reuse systems shall comply with Sections P3402.13.1 through P3402.13.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3402.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906.

P3402.13.2 Design. Water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3402.13.3 Labeling and marking. Nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.

P3402.14 Tests and Inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections P3402.14.1 through P3402.14.7.

P3402.14.1 Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.5.

P3402.14.2 Tank test. Tanks shall be tested in accordance with Section P3401.9.10.

P3402.14.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3402.14.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3402.14.5 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the tank and piping systems in accordance with Section P3401.7.

P3402.14.6 Initial water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with all applicable laws, rules and ordinances of the jurisdiction.

P3402.14.7 Operational water quality testing. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

P3402.15 Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections P3402.15.1 through P3402.15.4 and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

P3402.15.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P3402.15.2 Schematics. The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

P3402.15.3 Maintenance procedures. The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3402.15.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 3403

NONPOTABLE RAINWATER COLLECTION SYSTEMS

P3403.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

P3403.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.

P3403.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

P3403.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically. Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the stormwater runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.

P3403.5 Roof gutters and downspouts. Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.

P3403.5.1 Slope. Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $\frac{1}{8}$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.

P3403.5.2 Cleanouts. Cleanouts shall be provided in the water conveyance system to allow access to filters, flushes, pipes and downspout

P3403.6 Drainage. Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.

P3403.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.

P3403.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.

P3403.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.

P3403.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage-sizing requirements specified in Section P3005.4

P3403.7.4 Marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that

required for sanitary drainage, waste, and vent piping by Chapter 30.

P3403.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P3403.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.

P3403.10 Storage tanks. Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P3401.9 and Sections P3403.10.1 through P3403.10.3.

P3403.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3403.10.1.

TABLE P3403.10.1 LOCATION OF RAINWATER STORAGE TANKS

<u>ELEMENT</u>	<u>MINIMUM HORIZONTAL DISTANCE (feet)</u>
<u>Critical root zone</u>	<u>2</u>
<u>Lot line adjoining private lots</u>	<u>5</u>
<u>Seepage pits</u>	<u>5</u>
<u>Septic tanks</u>	<u>5</u>

For SI: 1 foot = 304.8 mm

P3403.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P3403.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P3403.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P3403.11.1 and P3403.11.2.

P3403.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P3403.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P3403.12 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P3403.13 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3403.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P3403.14.1 through P3403.14.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer; irrigation piping located outside of the building and downstream of a backflow preventer.

P3403.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.

P3403.14.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P3403.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

P3403.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P3403.15.1 through P3403.15.8.

P3403.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P3403.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

P3403.15.2 Roofwasher test. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P3403.4 shall be verified.

P3403.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.5.

P3403.15.4 Storage tank test. Storage tanks shall be tested in accordance with the Section P3401.9.10.

P3403.15.5 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3403.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3403.15.7 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P3401.7.

P3403.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

>P3403.16 Operation and maintenance manuals. Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P3403.16.1 through P3403.16.4.

P3403.16.1 Manual. A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.

P3403.16.2 Schematics. The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P3403.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for system components

requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3403.16.4 Operations procedures. The manual shall include system startup and shutdown procedures, and detailed operating procedures.

SECTION P3404 **RECLAIMED WATER SYSTEMS**

P3404.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of systems supplying nonpotable reclaimed water.

P3404.2 Water pressure-reducing valve or regulator. Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3404.3 Reclaimed water systems. The design of the reclaimed water systems shall conform to accepted engineering practice.

P3404.3.1 Distribution pipe. Distribution piping shall comply with Sections P3404.3.1.1 through P3404.3.1.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3404.3.1.1 Materials, joints and connections. Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.

P3404.3.1.2 Design. Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3404.3.1.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P3401.3.

P3404.4 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P3404.4.1 and P3404.4.2.

P3404.4.1 Water supply system test. The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.

P3404.4.2 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers shall be conducted in accordance with Section P2503.8.

DOE

US Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Add new standard(s) as follows:

N/A. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official

has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

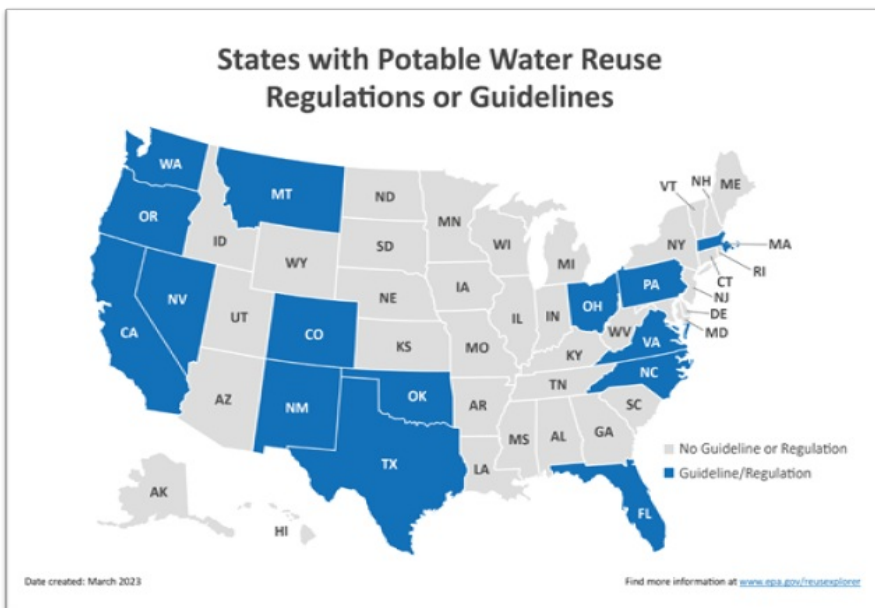
More detail is needed on blackwater reuse and related quality.

This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the practice is currently labeled "Advanced Water Purification" (AWP) instead of DPR.



What Is Advanced Water Purification?

Advanced Water Purification (AWP) is an innovative set of water treatment processes that purifies recycled water into safe drinking without the need for an environmental buffer, such as a river or lake. The purified water is then blended with other sources of water, such as groundwater or surface water, and distributed as drinking water to consumers. AWP can help increase the availability of water in areas with water scarcity and reduce the dependence on limited sources of water.



Key Facts About AWP

- AWP involves using proven technologies such as UltraViolet (UV) light, Reverse Osmosis (RO), ozone and biofiltration to purify water to meet or exceed state and federal drinking water standards.
- The treatment process effectively targets pathogens and harmful chemical contaminants.
- AWP is safe and effective in providing high-quality drinking water. Studies have shown that the purified water is of comparable or better quality than conventional drinking water sources.

What Is ADEQ Doing And Why?

Just like water conservation, water recycling and other sustainable water management practices, AWP is a part of Arizona's long-term strategy to ensure a safe and adequate drinking water supply sufficient to support Arizona's existing and future population.

ADEQ is working on a rule to establish a permitting process for collecting and treating wastewater to meet protective standards so that it may be used as a drinking water source.

What Are The Benefits Of AWP?

AWP is a valuable strategy for managing water resources, offering numerous benefits:

- Increased Water Quality
- Drought Resilience & Water Security
- Improved Public Health
- Reduced Environmental Impact
- Energy Efficiency
- Sustainability

Learn more about what ADEQ is doing to help utilities provide AWP as a viable drinking water source for Arizona communities and how you can get involved:



azdeq.gov/AWP

For translations or other communications aids, please email the Title VI Coordinator, Leonard Drago, at Drago.Leonard@azdeq.gov or call 602-771-2288.

Para traducciones u otras ayudas de comunicación, envíe un correo electrónico al Coordinador del Título VI, Leonard Drago, a Drago.Leonard@azdeq.gov o llame al 602-771-2288.

Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

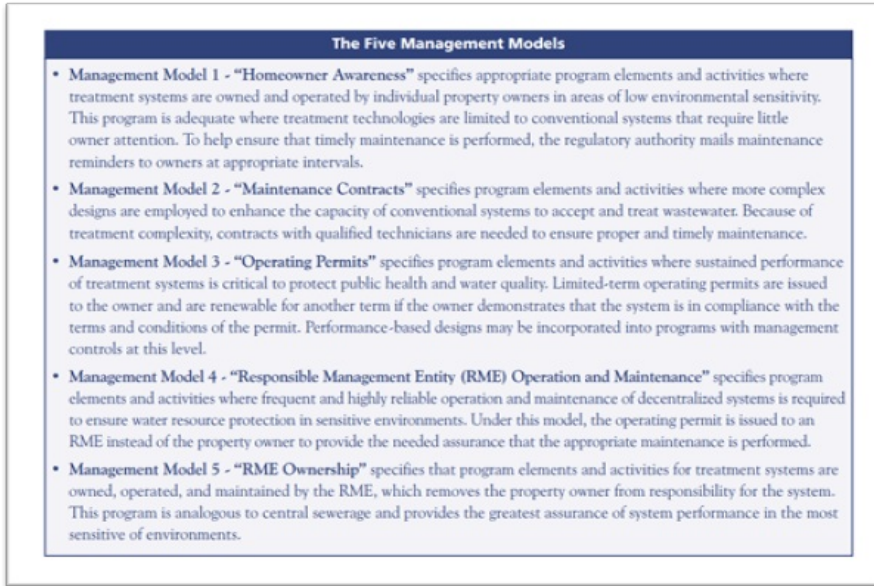
These log reductions, mean that enteric viruses are reduced by 99.999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.99999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a

credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality, and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)



SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

$$BWC = 10,000 / (10,000 + 70,000 + 20,000)$$

$$BWC = 0.10$$

$$LRV \text{ Credit} = -\log(BWC)$$

$$LRV \text{ Credit} = -\log(0.10)$$

$$LRV \text{ Credit} = 1.0$$

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at [PMGCAC](#).

Bibliography: Alsup, Kayla and Alsup, Kayla E., "[Sustainable Water Treatment Systems: A Direct Potable Proposal](#)" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), <https://sfpub.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects>, accessed July 27, 2023.

[Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR](#)

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation
<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141>.

Ghernaout, D. , Elboughdiri, N. and Alghamdi, A. (2019) [Direct Potable Reuse: The Singapore NEWater Project as a Role Model](#). Open Access Library Journal, 6, 1-10. doi: [10.4236/oalib.1105980](https://doi.org/10.4236/oalib.1105980).

Kehoe P. & Nokhoudian T. 2022 [“Onsite Water Recycling: an Innovative Approach to Solving an Old Problem”](#). San Francisco, CA.

Leslie, Jacques., [“Where Water is Scarce, Communities Turn to Reusing Wastewater,”](#) Yale Environment 360, May 1, 2018.

National Water Research Institute. [“DPR Criteria Expert Panel: Preliminary Findings and Recommendations”](#), Fountain Valley, California, June 23, 2023.

[“Onsite Water Reuse Program Guidebook \(2022\)”](#), San Francisco Public Utilities Commission (SFPUC), accessed July 27, 2023.

[“Potable reuse: Guidance for producing safe drinking-water.”](#) Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO.

Rich, D., Andiroglu, E., Gallo, K., & Ramanathan, S. (2023). A Review of Water Reuse Applications and Effluent Standards in Response to Water Scarcity. *Water Security*. Accepted through Peer Review July 2023.

Sharvelle, S.; Ashbolt, N.; Clerico, E.; Hultquist, R.; Leverenz, H.; and A. Olivieri. (2017). [“Risk-Based Framework for the Development of Public Health Guidance for Decentralized Nonpotable Water Systems.”](#) Prepared by the National Water Research Institute for the Water Environment & Reuse Foundation. Alexandria, VA. WE&RF Project No. SIWM10C15.

Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., [Wastewater engineering : treatment and reuse](#). (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility’s rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about \$50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.