

## **DHCD, DBFR 2009 Code Change Process**

**June 15, 2009 at 9:30 a.m. at DHCD, 2<sup>nd</sup> Floor Conference Room  
Gray Water, Reclaimed Water and Rainwater Harvesting  
Sub-group Meeting Agenda Package**

**DCR, DEQ, VDH, DHCD and VBCOA/VPMIA**

### **CURRENT AND PROPOSED STATE REGULATIONS AND GUIDELINES:**

1. DEQ reclaimed water
2. DCR storm water and rainwater harvesting collection
3. VDH Clean Water Act and guidelines for gray water
4. DHCD - USBC - proposed moving gray water appendix into the USBC International Plumbing Code and International Residential Code.

**INTERFACING THESE STATE AND FEDERAL REGULATIONS TO  
AVOID CONFLICT; OVERLAP AND ENSURE THE END USERS CLEARLY  
UNDERSTAND THE PROCESS AND STEPS FOR APPROVALS**

### **VIRGINIA HOUSING COMMISSION MEETING – JUNE 2, 2009:**

1. Issues raised regarding incentives and ensuring the regulations work in a coordinated and collaborative process.
2. New DCR storm water regulations deemed by builders as too stringent, as not recognizing current practices and as possible impediment to new urban planning requirements for local governments to concentrate density in planned districts.

**IRRIGATION SYSTEMS WITH SENSORS AND CROSS CONNECTION  
ISSUES**

**INDOOR PLUMBING SYSTEMS USING NON-POTABLE WATER AND  
POTABLE-PLUMBING SYSTEMS**

**IMPACTS ON LOCAL OR REGIONAL WATER-SEWER AUTHORITIES**

**OTHER ISSUES**

**USBC PROCESS AND SCHEDULE**

**Board of Housing and Community Development (BHCD), Fire Services Board  
(FSB) and BHCD's Codes and Standards Committee  
2009 Regulatory Action and Meeting Dates**

**These dates are subject to change.**

**January 26, 2009:** BHCD presented with 2009 regulatory schedule.

**March 23, 2009:** BHCD approves Notice of Intended Regulatory Action (NOIRA).

**May 18, 2009:** BHCD's Codes and Standards Committee will meet from approximately 11:00 a.m. to 4:00 p.m. at DHCD, 1<sup>st</sup> floor board room (right after the BHCD board meeting that will be from 10:00 a.m. to 11:00 p.m.). Four Work Groups, advisory committees, Fire Services Code Committee and associations should have identified their 2009 code changes and gained consensus where possible.

**June 22, 2009:** BHCD's Codes and Standards Committee will meet to review non-consensus items at DHCD, 1<sup>st</sup> floor board room from 9:30 a.m. to 4:00 p.m.

**July 27, 2009:** BHCD will meet at VDHA, 4224 Cox Road (Innsbrook), 1<sup>st</sup> floor. BHCD and FSB Public Hearing at 9:30 a.m., Codes and Standards Committee following the hearing from approximately 11:00 a.m. to 12:15 p.m. and BHCD Board meeting at 1:00 p.m. to approve the 2009 proposed regulations.

**August, September, and October, 2009:** No meetings during this time as regulations are approved for publication and 60 days comment period.

**November 16<sup>th</sup> or December 21<sup>st</sup>, 2009:** BHCD's Codes and Standards Committee will meet to review public comments on the proposed regulations, carry-over code changes and new code changes.

**January 18<sup>th</sup> or 25<sup>th</sup>, 2010:** BHCD and FSB will hold a public hearing on the proposed regulations.

**March 1, 2010:** Deadline for new code changes.

**May 17, 2010:** BHCD's Codes and Standards Committee will meet to consider all code changes not approved, public comments or any new code changes and a final review of the regulations and approval to submit for the BHCD to approve.

**June 21, 2010:** BHCD approve final regulations with input from the FSB on the SFPC. Codes and Standards Committee will have a short meeting prior to the BHCD meeting.

**September 30, 2010:** Effective date of final regulations if approved by the OAG and Governor's Office.

(Updated March 27, 2009)

**2009 BHCD Regulatory Cycle Schedule and Meetings for the USBC, SFPC, VADR, VCS, MHSR and the IBSR:**

March 19, 2009: Work Group 2 Administrative, technical amendments from the 2006 regulations and the SFPC meets

March 23, 2009: BHCD approves the publication of the NOIRA's for each regulation.

March 26, 2009: Work Group 1 Energy meets:

April 2, 2009: Work Group 3 model codes technical amendments meets:

April 9, 2009: Work Group 4 International Residential Code meets:

April 23, 2009: Work Group 1 Energy meets:

April 30, 2009: Work Group 2 Administrative, technical amendments and the SFPC meets:

May 6, 2009: Work Group 3 model codes technical amendments meets:

May 13, 2009: Work Group 4 International Residential Code meets:

May 18, 2009: BHCD's Codes and Standards Committee meets 1<sup>st</sup> floor board room at DHCD approximately 11:00 to 4:00 following the regular scheduled BHCD meeting.

June 22, 2009: BHCD's Codes and Standards Committee meets 1<sup>st</sup> floor board room at DHCD at 9:30 to 4:00.:

July 27, 2009: BHCD and Fire Services Board hold public hearing at 9:30, Codes and Standards Committee at approximately 11:00 to 12:15 and at 1:00 the BHCD meets to approve the draft regulations. Meeting at VDHA in Innsbrook at 4224 Cox Road, 1<sup>st</sup> floor.

August to October, 2009: 60 day public comment period for the proposed USBC, SFPC and related regulations

November 16<sup>th</sup> to December 21<sup>st</sup>, 2009: BHCD's Codes and Standards Committee meets to consider public comments, carry-over code changes from the Work Groups 1-4 meetings and any new code changes. Work Groups to meet same time frames.

January 18<sup>th</sup> or 25<sup>th</sup>, 2010: BHCD and Fire Service Board hold 2<sup>nd</sup> public hearing.

February to April, 2010: Work Groups to meet.

March 1, 2010: Deadline for 2009 code changes.

May 17, 2010: BHCD's Codes and Standards Committee meets to consider all remaining code changes and approve the final regulations for submission to the full BHCD.

June 21, 2010: BHCD approve final regulations with input from the FSB.

Effective Date: September 30, 2010

**Rodgers, Emory**

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**From:** Rodgers, Emory  
**Sent:** Friday, April 03, 2009 9:06 AM  
**To:** Rourke, Valerie  
**Subject:** RE: Water Reclamation and Reuse Regulation

Valerie: Thanks and will send this onto the VPMIA and building official folks.

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**From:** Rourke, Valerie [mailto:varourke@deq.virginia.gov]  
**Sent:** Fri 4/3/2009 8:49 AM  
**To:** Rodgers, Emory  
**Subject:** Water Reclamation and Reuse Regulation

Hello Emory.

I appreciated the opportunity to attend the DHCD Work Group 3 meeting on 2009 USBC/SFPC Technical Amendments and to meet you in person. It was very informative and interesting to hear and observe your process to make code changes.

Following the meeting yesterday, you had indicated that you would likely refer the Water Reclamation and Reuse Regulation (9 VAC 25-740) to the Virginia Plumbing and Mechanical Inspector Association (VPMIA) for their review. The full text of the regulation can be accessed via the Virginia Legislative Information System (<http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC25-740>). However, I thought it might be helpful to bring attention to certain items and sections of the regulation that may be of greater interest to VPMIA as follows (highlighted text are links):

1. The Water Reclamation and Reuse Regulation applies only to the reclamation and reuse of domestic, municipal and industrial wastewater. It does not apply to the reclamation and/or reuse of gray water or stormwater, including harvested rain water.
2. Direct potable reuse of reclaimed water and the reuse of reclaimed water inside residential or domestic dwellings or a building containing a residential or domestic unit is prohibited per 9 VAC 25-740-50.B.
3. Reclaimed water that is treated to meet Level 1 standards (9 VAC 25-740-70.A) may be used inside commercial or non-residential buildings for toilet flushing, fire fighting or protection and fire suppression per 9 VAC 25-740-90.A.
4. When applying for a permit to distribute reclaimed water to end users, the provider of reclaimed water must submit a cross-connection and backflow prevention program, and a description of how reclaimed water quality will be maintained in the distribution system to meet standards required for specific reuses of reclaimed water per 9 VAC 25-740-100.C.1.g and h.
5. Design requirements for systems that reclaim wastewater, reclaimed water distribution systems, and storage facilities for reclaimed and reject water are contained in 9 VAC 25-740-110. Subsection B focuses more specifically on reclaimed water distribution systems.
6. There are also access control and advisory sign requirements for water reclamation systems, reclaimed water storage facilities and areas of reclaimed water reuse in 9 VAC 25-740-160.

5/7/2009

Please let me know if you have any questions regarding this information and thank you for the opportunity to provide input on USBC technical amendments.

Valerie

*Valerie A. Rourke*

Coordinator for Water Reuse and Land Treatment

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*Water is the future of Virginia! Protect, conserve and reuse it.*

## WATER RECLAMATION AND REUSE REGULATION (9 VAC 25-740-10)

Adopted: December 4, 2007 – Effective: October 1, 2008

### **9VAC25-740-50 Exclusions and prohibitions**

#### **B. Prohibitions**

The following are prohibited under this chapter:

1. Direct potable reuse;
2. The reuse of reclaimed water for any purpose inside a residential or domestic dwelling or a building containing a residential or domestic unit;
3. The reuse of reclaimed water to fill residential swimming pools, hot tubs or wading pools;
4. The reuse of reclaimed water for food preparation or incorporation as an ingredient into food or beverage for human consumption;
5. Bypass of untreated or partially treated wastewater from the reclamation system or any intermediate unit process to the point of reuse unless the bypass complies with standards and requirements specified in 9VAC25-740-70 and is for essential maintenance to assure efficient operation; and
6. The return of reclaimed water to the reclaimed water distribution system after the reclaimed water has been delivered to an end user.

### **9VAC25-740-110 Design criteria**

A. Reclamation system. The design of systems for the reclamation of municipal wastewater or the effluent derived from a municipal wastewater treatment works shall adhere to the standards of design and construction specified in the Sewage Collection and Treatment Regulations (9VAC25-790) and other applicable engineering standards and regulations. Design standards for reclamation systems of industrial wastewater or the effluent derived from an industrial wastewater treatment works shall be determined and evaluated on a case-by-case basis.

#### **B. Reclaimed water distribution system**

1. All reclaimed water distribution systems shall be designed and constructed in accordance with this chapter and applicable sections of the Sewage Collection and Treatment Regulations (9VAC25-790) pertaining to force mains, so that:
  - a. Reclaimed water does not come into contact with or otherwise contaminate a potable water system;
  - b. The structural integrity of the system is provided and maintained; and
  - c. The capability for inspection, maintenance, and testing is maintained.
2. For a reclaimed water distribution system, the following shall be implemented as part of the cross-connection and backflow prevention program submitted with the RWM plan:

- a. There shall be no direct cross-connections between the reclaimed water distribution system and a potable water supply system.
  - b. The reclaimed water distribution system shall be in compliance with the cross connection control and backflow prevention requirements of the Article 3 (12VAC5-590-580 et seq.) of Part II of the Commonwealth of Virginia Waterworks Regulations, the Uniform Statewide Building Code, and local building and plumbing codes.
  - c. Potable water may be used to supplement reclaimed water for a reuse, provided there is an air gap separation of at least eight inches between the potable water and the reclaimed water or a reduced pressure principle backflow prevention device installed at the potable water service connection to the reuse. The installation of the reduced pressure principal backflow prevention device shall allow for proper inspection and testing of the device.
  - d. Reclaimed water shall not be returned to the reclaimed water distribution system after the reclaimed water has been delivered to an end user.
3. In-ground reclaimed water distribution pipelines shall be installed and maintained to achieve minimum separation distance and configurations as follows:
- a. No reclaimed water distribution pipeline shall pass within 50 feet of a potable water supply well, potable water supply spring or water supply intake that are part of a regulated waterworks. The same separation distance shall be required between a reclaimed water distribution pipeline and a non-public or private potable water supply well or spring, but may be reduced to not less than 35 feet provided special construction and pipe materials are used to obtain adequate protection of the potable water supply.
  - b. Reclaimed water distribution pipeline shall be separated horizontally by at least 10 feet from a water main. The distance shall be measured edge-to-edge. When local conditions prohibit this horizontal separation, the reclaimed water distribution pipeline may be laid closer provided that the water main is in a separate trench or an undisturbed earth shelf located on one side of the reclaimed water distribution pipeline and the bottom of the water main is at least 18 inches above the top of the reclaimed water distribution pipeline. Where this vertical separation cannot be obtained, the reclaimed water distribution pipeline shall be constructed of water pipe material in accordance with AWWA specifications and pressure tested in place without leakage prior to backfilling. The hydrostatic test shall be conducted in accordance with the AWWA standard (ANSI/AWWA C600-05, effective December 1, 2005) for the pipe material, with a minimum test pressure of 30 psi.
  - c. Distribution pipeline that conveys Level 1 reclaimed water shall be separated horizontally by at least 2 feet from a sewer line. The distance shall be measured edge-to-edge. When local conditions prohibit this horizontal separation, the reclaimed water distribution pipeline may be laid closer provided that the sewer line is in a separate trench or an undisturbed earth shelf located on one side of the reclaimed water distribution pipeline and the bottom of the reclaimed water distribution pipeline is at least 18 inches above the top of the sewer line. Where this vertical separation cannot be obtained, either the reclaimed water distribution pipeline or the sewer line shall be constructed of water pipe material in accordance with AWWA specifications and pressure tested in place

without leakage prior to backfilling. The hydrostatic test shall be conducted in accordance with the AWWA standard (ANSI/AWWA C600-05, effective December 1, 2005) for the pipe material, with a minimum test pressure of 30 psi.

d. Reclaimed water distribution pipeline shall cross under water main such that the top of the reclaimed water distribution pipeline is at least 18 inches below the bottom of the water main. When local conditions prohibit this vertical separation, the reclaimed water distribution pipeline shall be constructed of AWWA specified water pipe and pressure tested in place without leakage prior to backfilling, in accordance with the provisions of the Sewage Collection and Treatment Regulations (9VAC25-790). Where reclaimed water distribution pipeline crosses over water main, the reclaimed water distribution pipeline shall:

- (1) Be laid to provide a separation of at least 18 inches between the bottom of the reclaimed water distribution pipeline and the top of the water main.
- (2) Be constructed of AWWA approved water pipe and pressure tested in place without leakage prior to backfilling, in accordance with the provisions of the Sewage Collection and Treatment Regulations (9VAC25-790).
- (3) Have adequate structural support to prevent damage to the water main.
- (4) Have joints placed equidistant and as far as possible from the water main joints.

e. Sewer line shall cross under distribution pipeline that conveys Level 1 reclaimed water such that the top of the sewer line is at least 18 inches below the bottom of the reclaimed water distribution pipeline. When local conditions prohibit this vertical separation, the sewer line shall be constructed of AWWA specified water pipe and pressure tested in place without leakage prior to backfilling, in accordance with the provisions of the Sewage Collection and Treatment Regulations (9VAC25-790). Where sewer line crosses over distribution pipeline that conveys Level 1 reclaimed water, the sewer line shall:

- (1) Be laid to provide a separation of at least 18 inches between the bottom of the sewer line and the top of the reclaimed water distribution pipeline.
- (2) Be constructed of AWWA approved water pipe and pressure tested in place without leakage prior to backfilling, in accordance with the provisions of the Sewage Collection and Treatment Regulations (9VAC25-790).
- (3) Have adequate structural support to prevent damage to the reclaimed water distribution pipeline.
- (4) Have joints placed equidistant and as far as possible from the reclaimed water distribution pipeline joints.

f. No reclaimed water distribution pipeline shall pass through or come into contact with any part of a sewer manhole. Distribution pipeline that conveys Level 1 reclaimed water shall be separated horizontally by at least 2 feet from a sewer manhole whenever possible. The distance shall be measured from the edge of the pipe to the edge of the manhole structure. When local conditions prohibit this horizontal separation, the manhole shall be of watertight construction and tested in place.

4. No setback distance is required to any non-potable water supply well and no vertical or horizontal separation distances are required between above-ground reclaimed water pipelines and potable water, sewer or wastewater pipelines.
5. All reclaimed water outlets shall be of a type, or secured in a manner, that permits operation by authorized personnel. Public access to reclaimed water outlets shall be controlled in areas where reclaimed water outlets are accessible to the public as follows:
  - a. If quick connection couplers are used on above-ground portions of the reclaimed water distribution system, they shall differ materially from those used on the potable water supply.
  - b. Use of above-ground hose bibs, spigots or other hand-operated connections that are standard on local potable water distribution systems shall be prohibited for use on the local reclaimed water distribution system. If above-ground hose bibs, spigots or other hand-operated connections are used on the reclaimed water distribution system, they must differ materially from those used on the local potable water distribution system and must be clearly distinguishable as reclaimed water connections (i.e., painted purple, valve operation with a special tool) so as not to be mistaken for potable water connections. Where below-grade vaults are used to house reclaimed water connections, the connections in the vault may have standard potable water distribution system thread and bib size services provided the bib valves can be operated only by a special tool. The below-grade vaults shall also be labeled as being part of the reclaimed water distribution system (i.e., painted purple, labeled).
6. Existing potable water, sewer and wastewater pipelines may be converted for use as reclaimed water distribution pipelines. The following information shall be submitted to the board for approval of the conversion:
  - a. The location and identification of the facilities to be converted;
  - b. The location of all connections to the facilities to be converted;
  - c. A description of measures to be taken to ensure that existing connections will be eliminated;
  - d. Description of procedures to be used to ensure that all connections and cross-connections shall be eliminated. This may include physical inspections, dye testing, or other testing procedures;
  - e. Description of marking, signing, labeling, or color coding to be used to identify the converted facility as a reclaimed water transmission facility;
  - f. Description of cleaning and disinfection procedures to be followed before the converted facilities will be placed into operation for reclaimed water distribution;
  - g. Assessment of the physical condition and integrity of facilities to be converted; and
  - h. Reasonable assurance that cross-connections will not result, public health will be protected, and the integrity of potable water, wastewater, and reclaimed water systems will be maintained when the conversion is made.
7. Tank trucks may be used to transport and distribute reclaimed water only if the following requirements are met:

- a. The truck is not used to transport potable water that is used for drinking water or food preparation;
  - b. The truck is not used to transport waters or other fluids that do not meet the requirements of this chapter, unless the tank has been evacuated and properly cleaned prior to the addition of the reclaimed water;
  - c. The truck is not filled through on-board piping or removable hoses that may subsequently be used to fill tanks with water from a potable water supply; and
  - d. The reclaimed water contents of the truck are clearly identified as non-potable water on the truck.
8. Reclaimed water distribution systems shall have the following identification, notification and signage:
- a. All reclaimed water piping shall have the words "CAUTION: RECLAIMED WATER - DO NOT DRINK" embossed, integrally stamped, or otherwise affixed to the piping, and shall be identified by one or more of the following methods:
    - (1) Painting the piping purple (Pantone 522) and stamping the piping with the required caution statement on opposite sides of the pipe, repeated at intervals of three feet or less.
    - (2) Using stenciled pipe with two- to three-inch letters on opposite sides of the pipe, placed at intervals of three to four feet. For pipes less than two inches in diameter, lettering shall be at least five eighths inch, placed on opposite sides of the pipe, and repeated at intervals of one foot.
    - (3) Wrapping the piping with purple (Pantone 522) polyethylene vinyl wrap or adhesive tape, placed longitudinally at three-foot intervals. The width of the wrap or tape shall be at least three inches, and shall display the required caution statement in either white or black lettering.
    - (4) Permanently affixing purple (Pantone 522) vinyl adhesive tape on top of the piping, parallel to the axis of the pipe, fastened at least every ten feet to each pipe section, and continuously for the entire length of the piping. The tape shall display the required caution statement in either white or black lettering.
  - b. All visible, above-ground portions of the reclaimed water distribution system including reclaimed water piping, valves, outlets (including fire hydrants) and other appurtenances shall be colored coded, taped, labeled, tagged or otherwise marked to notify the public and employees that the source of the water is reclaimed water, not intended for drinking or food preparation. For reclaimed water treated to Level 2, such notification shall also inform employees to practice good personal hygiene for incidental contact with reclaimed water and the public to avoid contact with the reclaimed water.
  - c. Each mechanical appurtenance of a reclaimed water distribution system shall be colored purple and legibly marked "RECLAIMED WATER" to identify it as a part of the reclaimed water distribution system and to distinguish it from mechanical appurtenances of a potable water distribution system or a wastewater collection system.

d. Existing underground distribution or collection pipelines and appurtenances retrofitted for the purpose of distributing reclaimed water shall be colored coded, taped, labeled, tagged or otherwise identified as described in subdivisions 8 a, b and c of this subsection. This identification need not extend the entire length of the retrofitted reclaimed water distribution system but is required within 10 feet of locations where the distribution system crosses a potable water supply line or sanitary sewer line.

e. Valve boxes for reclaimed water distribution systems shall be painted purple. Valve covers for reclaimed water distribution lines shall not be interchangeable with potable water supply valve covers.

9. All reclaimed water distribution systems shall be maintained to minimize losses and to ensure safe and reliable conveyance of reclaimed water such that the reclaimed water will not be degraded below the standards required for the intended reuse or reuses in accordance with 9VAC25-740-90.

### C. Storage requirements

1. To ensure reliable reclamation system operation in accordance with the requirements of this chapter, all reclamation systems shall have the ability to implement one or more of the following options:

- a. Store reclaimed water,
- b. Discharge reclaimed water to another permitted reuse system, if applicable;
- c. Discharge reclaimed water to surface waters of the state under a VPDES permit;
- d. Suspend all or a portion of water reclamation for planned periods; or
- e. In the case of a satellite reclamation system, discharge reclaimed water into the sewage collection system from which it received water for reclamation.

2. Storage for reclaimed water shall be required only when subdivision 1 b, c, or d of this subsection or, as applicable, subdivision 1 e of this subsection are not available or approved by the board.

3. Separate, off-line storage shall be provided for reject water of the reclamation system unless the reject water can be diverted to another permitted reuse system, discharged to surface waters of the state under a VPDES permit, returned directly to an appropriate point of treatment in the reclamation system, or in the case of a satellite reclamation system, sent to the sewage collection system from which the reclamation system received water for reclamation. Where reject water is stored, provisions shall be incorporated into the design of the reclamation system to distribute the reject water from storage to other parts of the reclamation system for additional or repeated treatment.

4. Storage for reject water may also be used for emergency storage to ensure Class I reliability of the reclamation system in accordance with 9VAC25-740-130.

5. Reject water and reclaimed water may be stored in water-tight tanks placed above-ground or in-ground. Labeling of tanks used for reject water storage, system storage or non-system storage shall be in accordance with 9VAC25-740-160 B, and shall, at a minimum, identify the contents of each tank as either reject water or reclaimed water.

6. For all impoundments or ponds that are used for reject water storage or system storage, with the exception of impoundments and ponds specified in C 7 of this section, the following are required:

- a. A minimum two-foot free board shall be maintained at all times. Any emergency discharge or overflow device and the disposition of the overflow discharge shall be identified in the engineering report.
- b. There shall be a minimum two-foot separation distance between the bottom of the impoundment or pond and the seasonal high water table.
- c. The impoundment or pond shall have a properly designed and installed synthetic liner of at least 20 mils thickness or a compacted soil liner of at least one foot thickness. Synthetic liners shall be installed in accordance with the manufacturer's specifications and recommendations. The soil liner shall be composed of separate lifts not to exceed six inches. The maximum coefficient of permeability for the synthetic and soil liners shall not exceed  $1 \times 10^{-6}$  cm/sec and  $1 \times 10^{-7}$  cm/sec, respectively. A plan of quality assurance and quality control which substantiates the adequacy of the liner and its installation shall be included in or shall accompany the preliminary engineering report or supporting documentation for the CTC. Documentation of quality assurance and quality control activities on liner installation along with permeability test results, shall be submitted with the statement of construction completion to the board.
- d. If the requirements of subdivision 6 b or c of this subsection cannot be met, the board may allow use of the impoundment or pond for storage provided that a groundwater monitoring plan for the facility is submitted to the board for review and approval. The plan shall identify the direction of groundwater flow and the proposed location and depth of groundwater monitoring wells at the location of the impoundment or pond, parameters to be monitored, a monitoring schedule, and procedures for proper sample collection and handling.
- e. The design of the impoundment or pond shall prevent the entry of surface water or storm water runoff from outside the facility embankment or berm.
- f. Where the embankment of the impoundment or pond is composed of soil, the embankment shall have:
  - (1) A top width of at least five feet.
  - (2) Interior and exterior slopes no steeper than one foot vertical to three feet horizontal unless alternate methods of slope stabilization are used,
  - (3) Shallow-rooted vegetative cover or other soil stabilization to prevent erosion, and
  - (4) Erosion stops and water seals installed on all piping that penetrates the embankment.
- g. There shall be routine maintenance of the impoundment or pond liner, embankments and access areas.
- h. Impoundments and ponds shall be sited to avoid areas of uneven subsidence, sinkholes, or unstable soils unless provisions are made for their correction. Results from

field and laboratory tests from an adequate number of test borings and soil samples shall be the basis for computations pertaining to permeability and stability analyses.

i. Impoundments or ponds shall not be located on a floodplain unless protected from inundation or damage by a 100-year frequency flood event.

j. There shall be a minimum setback distance measured horizontally from the perimeter of the storage impoundment or pond to potable water supply wells and springs, and public water supply intakes, of 100 feet for storage of Level 1 reclaimed water and 200 feet for storage of Level 2 reclaimed water or reject water.

7. Reject water storage and system storage impoundments or ponds that exist upon October 1, 2008 shall be exempt from the design, construction, and operation requirements specified in subdivision 6 of this subsection until such time these facilities are modified or expanded, or unless they have failed to comply with other existing regulatory or permitting requirements.

8. The capacity of reject water storage and system storage facilities, including impoundments, ponds or tanks, shall be as follows:

a. For reject water, the capacity of the storage facility shall, at a minimum, be the volume equal to the average daily permitted flow of the reclamation system unless other options exist for immediate disposal or retreatment of the reject water in addition to storage.

b. For reclaimed water, the capacity of the storage facility shall be determined by the seasonal variability in demand, intended reuses with intermittent, variable demand, such as fire protection or fighting; and the availability of other options to generate or manage reclaimed water as specified in subdivision 1 of this subsection.

(1) Where there is no or minimal seasonal variability in demand and no other options are available for alternative generation or management of all or a portion of the reclaimed water, the capacity of the storage facility shall, at a minimum, be the volume equal to three times that portion of reclaimed water average daily flow for which no other options to generate or manage the reclaimed water are permitted.

(2) Where there is seasonal variability in demand and no other options are available for alternative generation or management of all or a portion of the reclaimed water during periods of low seasonal demand, storage facilities shall have sufficient storage capacity to assure the retention of the reclaimed water under conditions and circumstances that preclude reuse. The methods, assumptions and calculations used to determine the system storage requirements shall be provided and justified in the preliminary engineering report or supporting documentation for the CTC. Analytical means of determining system storage requirements, such as water balance calculations or computer hydrological programs, shall be used and shall account for all water inputs into the system. Analysis shall be based on site-specific data. Irrigation efficiencies or rainfall efficiencies shall not be used in storage volume determinations.

9. Requirements specified in subdivision 6 of this subsection shall not apply to lakes, impoundments or ponds used for non-system storage with the exception of those specified in subdivision 11 of this subsection.

10. Landscape impoundments may also be used for non-system storage of reclaimed water prior to another subsequent reuse, such as irrigation.
11. Impoundments or ponds used for non-system storage of reclaimed water, including landscape impoundments, for subsequent irrigation reuse on sites under common ownership or management with the reclamation system or satellite reclamation system that provides reclaimed water to the sites, shall comply with the design, construction and operation requirements specified in subdivision 6 of this subsection.
12. For lakes, impoundments or ponds used for non-system storage of reclaimed water, the following setback distances shall apply:
  - a. There shall be a 50-foot minimum setback distance measured horizontally from the perimeter of the lake, impoundment or pond to property lines.
  - b. For an impoundment or pond with a liner meeting the requirements specified in subdivision 6 c of this subsection, there shall be a minimum setback distance measured horizontally from the perimeter of the storage impoundment or pond to potable water supply wells and springs, and public water supply intakes, of 100 feet for storage of Level 1 reclaimed water and 200 feet for storage of Level 2 reclaimed water.
  - c. For an unlined impoundment or pond, there shall be a minimum setback distance measured horizontally from the perimeter of the storage impoundment or pond to potable water supply wells and springs, and public water supply intakes, of 200 feet for storage of Level 1 reclaimed water and 400 feet for storage of Level 2 reclaimed water.
13. Where more than one setback distance applies to storage for reclaimed water or reject water, the greater setback distance shall govern.
14. All storage facilities, including landscape impoundments used for non-system storage, shall be designed and operated to prevent a discharge to surface waters of the state except in the event of a storm greater than the 25-year 24-hour storm.
15. Permittees shall maintain current inventories of reject water storage, system storage and non-system storage facilities located within the service area of the RWM plan. An inventory or a revised inventory shall be submitted as part of the RWM plan in the permit application. For the addition of new storage facilities to an inventory after permit issuance, the permittee shall submit to the board an amended inventory at least 30 days before reclaimed water will be introduced into the new storage facilities. An inventory of reject water storage, system storage and non-system storage facilities shall include the following:
  - a. Name or identifier for each storage facility,
  - b. Location of each storage facility (including latitude and longitude),
  - c. Function of each storage facility (i.e., reject water storage, system storage or non-system storage),
  - d. Type of each storage facility (i.e., covered tank, uncovered tank, lined pond, unlined pond, etc.), and
  - e. Location (latitude and longitude) and distance of the nearest potable water supply well and spring, and public water supply intake, to each storage facility within 450 feet of that facility.

16. Storage requirements as specified in 9VAC25-740-110 C shall not apply to reclaimed water storage facilities provided at the site of an industrial end user where such facilities are regulated by an existing water permit issued by the board to the industrial end user, or the industrial end user is also the generator of reclaimed water stored in the these facilities and is excluded under 9VAC25-740-50 A.

**9VAC25-740-160 Access control and advisory signs**

- A. There shall be no uncontrolled public access to reclamation systems, satellite reclamation systems and system storage facilities. Access to any wastewater treatment works directly associated with a reclamation system or satellite reclamation system shall be controlled in accordance with the Sewage, Collection and Treatment Regulations (9VAC25-790). System storage ponds shall be enclosed with a fence or otherwise designed with appropriate features to discourage the entry of animals and unauthorized persons.
- B. Where advisory signs or placards are required as described in subsections C and D of this section, each sign shall state, at a minimum, "CAUTION: RECLAIMED WATER – DO NOT DRINK" and have the equivalent standard international symbol for non potable water. The size of the sign and lettering used shall be such that it can be easily read by a person with normal vision at a distance of 50 feet. Alternate signage and wording that assures an equivalent degree of public notification and protection may be accepted by the board.
- C. For all reuses of reclaimed water treated to Level 2, public access shall be restricted and advisory signs shall be posted around reuse areas or reuse site boundaries. The advisory signs shall additionally state the nature of the reuse and no trespassing. Fencing around the site boundary is not required.
- D. Advisory signs or placards for all reuses of reclaimed water treated to Level 1 shall be posted within and at the boundaries of reuse areas. The advisory signs or placards shall additionally state the nature of the reuse. Examples of some notification methods that may be used by permittees include posting advisory signs at entrances to residential neighborhoods where reclaimed water is used for landscape irrigation and posting advisory signs at the entrance to a golf course and at the first and tenth tees.
- E. Advisory signs shall be posted adjacent to impoundments or ponds, including landscape impoundments, used for non-system storage of reclaimed water.
- F. For industrial reuses, advisory signs shall be posted around those areas of the industrial site where reclaimed water is used and at the main entrances to the industrial site to notify employees and the visiting public of the reclaimed water reuse. Access control beyond what is normally provided by the industry is not required.

# COMMONWEALTH OF VIRGINIA

SENATOR MAMIE LOCKE, Chair  
DELEGATE JOHN COSGROVE, Vice Chair  
ELIZABETH A. PALEN, Executive Director



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## VIRGINIA HOUSING COMMISSION

### AGENDA

#### **Housing and Environmental Standards Work Group House Room C, General Assembly Building June 2, 2009, 1:00 P.M.**

**I. Welcome and Call to Order – Senator John Watkins, Chair**

**II. Water Issues**

Jack Frye – *Division Director, Soil and Water Conservation, Virginia Department of Conservation and Recreation, Runoff Reduction for Storm Water Management*

Scott Kudlas – *Director, Office of Surface and Groundwater Supply Planning, Virginia Department of Environmental Quality, Water Conservation and Re-use in Virginia*

Wes Kleene – *Director, Office of Drinking Water, Virginia Department of Health, Rainwater overview- Status and Update of Interagency Guidance Development*

**III. Update on Sprinkler System and Carbon Monoxide Detector Requirements**

Emory Rodgers – *Deputy Director, Division of Building and Fire Regulation, Department of Housing and Community Development*

**IV. Adjourn**

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DELEGATE JOHN A. COSGROVE  
DELEGATE ROSALYN R. DANCE  
DELEGATE ROBERT D. HULL  
DELEGATE DANIEL W. MARSHALL, III  
DELEGATE G. GLENN ODER

SENATOR MAMIE E. LOCKE  
SENATOR JOHN C. WATKINS  
SENATOR MARY MARGARET WHIPPLE

F. GARY GARCZYNSKI  
T. K. SOMANATH  
MELANIE S. THOMPSON

## APPENDIX C

# GRAY WATER RECYCLING SYSTEMS

*Note:* Section 301.3 of this code requires all plumbing fixtures that receive water or waste to discharge to the sanitary drainage system of the structure. In order to allow for the utilization of a gray water system, Section 301.3 should be revised to read as follows:

**301.3 Connections to drainage system.** All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code. This section shall not be construed to prevent indirect waste systems required by Chapter 8.

**Exception:** Bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to discharge to the sanitary drainage system where such fixtures discharge to an approved gray water system for flushing of water closets and urinals or for subsurface landscape irrigation.

### SECTION C101 GENERAL

**C101.1 Scope.** The provisions of this appendix shall govern the materials, design, construction and installation of gray water systems for flushing of water closets and urinals and for subsurface landscape irrigation (see Figures 1 and 2).

**C101.2 Definition.** The following term shall have the meaning shown herein.

**GRAY WATER.** Waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

**C101.3 Permits.** Permits shall be required in accordance with Section 106.

**C101.4 Installation.** In addition to the provisions of Section C101, systems for flushing of water closets and urinals shall comply with Section C102 and systems for subsurface landscape irrigation shall comply with Section C103. Except as provided for in Appendix C, all systems shall comply with the provisions of the *International Plumbing Code*.

**C101.5 Materials.** Above-ground drain, waste and vent piping for gray water systems shall conform to one of the standards listed in Table 702.1. Gray water underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

**C101.6 Tests.** Drain, waste and vent piping for gray water systems shall be tested in accordance with Section 312.

**C101.7 Inspections.** Gray water systems shall be inspected in accordance with Section 107.

**C101.8 Potable water connections.** Only connections in accordance with Section C102.3 shall be made between a gray water recycling system and a potable water system.

**C101.9 Waste water connections.** Gray water recycling systems shall receive only the waste discharge of bathtubs, showers, lavatories, clothes washers or laundry trays.

**C101.10 Collection reservoir.** Gray water shall be collected in an approved reservoir constructed of durable, nonabsorbent and corrosion-resistant materials. The reservoir shall be a closed and gas-tight vessel. Access openings shall be provided to allow inspection and cleaning of the reservoir interior.

**C101.11 Filtration.** Gray water entering the reservoir shall pass through an approved filter such as a media, sand or diatomaceous earth filter.

**C101.11.1 Required valve.** A full-open valve shall be installed downstream of the last fixture connection to the gray water discharge pipe before entering the required filter.

**C101.12 Overflow.** The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the gray water. The overflow pipe shall be indirectly connected to the sanitary drainage system.

**C101.13 Drain.** A drain shall be located at the lowest point of the collection reservoir and shall be indirectly connected to the sanitary drainage system. The drain shall be the same diameter as the overflow pipe required in Section C101.12.

**C101.14 Vent required.** The reservoir shall be provided with a vent sized in accordance with Chapter 9 and based on the diameter of the reservoir influent pipe.

### SECTION C102 SYSTEMS FOR FLUSHING WATER CLOSETS AND URINALS

**C102.1 Collection reservoir.** The holding capacity of the reservoir shall be a minimum of twice the volume of water required to meet the daily flushing requirements of the fixtures supplied with gray water, but not less than 50 gallons (189 L). The reservoir shall be sized to limit the retention time of gray water to a maximum of 72 hours.

**C102.2 Disinfection.** Gray water shall be disinfected by an approved method that employs one or more disinfectants such as chlorine, iodine or ozone.

**C102.3 Makeup water.** Potable water shall be supplied as a source of makeup water for the gray water system. The potable water supply shall be protected against backflow in accordance with Section 608. There shall be a full-open valve located on the makeup water supply line to the collection reservoir.

**C102.4 Coloring.** The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.

**C102.5 Materials.** Distribution piping shall conform to one of the standards listed in Table 605.4.

**C102.6 Identification.** Distribution piping and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section 608.8.

### SECTION C103

#### SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS

**C103.1 Collection reservoir.** Reservoirs shall be sized to limit the retention time of gray water to a maximum of 24 hours.

**C103.1.1 Identification.** The reservoir shall be identified as containing nonpotable water.

**C103.2 Valves required.** A check valve and a full-open valve located on the discharge side of the check valve shall be installed on the effluent pipe of the collection reservoir.

**C103.3 Makeup water.** Makeup water shall not be required for subsurface landscape irrigation systems. Where makeup water is provided, the installation shall be in accordance with Section C102.3.

**C103.4 Disinfection.** Disinfection shall not be required for gray water used for subsurface landscape irrigation systems.

**C103.5 Coloring.** Gray water used for subsurface landscape irrigation systems shall not be required to be dyed.

**C103.6 Estimating gray water discharge.** The system shall be sized in accordance with the gallons-per-day-per-occupant number based on the type of fixtures connected to the gray water system. The discharge shall be calculated by the following equation:

$$C = A \times B$$

$A$  = Number of occupants:

Residential—Number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.

Commercial—Number of occupants shall be determined by the *International Building Code*<sup>®</sup>.

$B$  = Estimated flow demands for each occupant:

Residential—25 gallons per day (94.6 lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 lpd) per occupant for clothes washers or laundry trays.

Commercial—Based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.

$C$  = Estimated gray water discharge based on the total number of occupants.

**C103.7 Percolation tests.** The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

**C103.7.1 Percolation tests and procedures.** At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

**C103.7.1.1 Percolation test hole.** The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

**C103.7.1.2 Test procedure, sandy soils.** The hole shall be filled with clear water to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows: Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/in) shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested in accordance with Section C103.7.1.3.

**C103.7.1.3 Test procedure, other soils.** The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows: Any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than 0.62 inch (1.59 mm). At least three water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

*H. H. Hall*  
*Contractor*  
*2 minutes*  
*rain forest*

**C103.7.1.4 Mechanical test equipment.** Mechanical percolation test equipment shall be of an approved type.

**C103.7.2 Permeability evaluation.** Soil shall be evaluated for estimated percolation based on structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section C103.7.1 for evaluating the soil.

**C103.8 Subsurface landscape irrigation site location.** The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining property. Where this is not possible, the site shall be located so surface water drainage from the site is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table C103.8. Private sewage disposal systems in compacted areas, such as parking lots and driveways, are prohibited. Surface water shall be diverted away from any soil absorption site on the same or neighboring lots.

**TABLE C103.8  
 LOCATION OF GRAY WATER SYSTEM**

ELEMENT	MINIMUM HORIZONTAL DISTANCE	
	HOLDING TANK (feet)	IRRIGATION DISPOSAL FIELD (feet)
Buildings	5	2
Property line adjoining private property	5	5
Water wells	50	100
Streams and lakes	50	50
Seepage pits	5	5
Septic tanks	0	5
Water service	5	5
Public water main	10	10

For SI: 1 foot = 304.8 mm.

**C103.9 Installation.** Absorption systems shall be installed in accordance with Sections C103.9.1 through C103.9.5 to provide landscape irrigation without surfacing of gray water.

**C103.9.1 Absorption area.** The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table C103.9.1.

**TABLE C 103.9.1  
 DESIGN LOADING RATE**

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
0 to less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 to 60	0.4

For SI: 1 minute per inch = min/25.4 mm.  
 1 gallon per square foot = 40.7 L/m<sup>2</sup>.

**C103.9.2 Seepage trench excavations.** Seepage trench excavations shall be a minimum of 1 foot (304 mm) to a maximum of 5 feet (1524 mm) wide. Trench excavations shall be spaced a minimum of 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be a maximum of 100 feet (30 480 mm) in developed length.

**C103.9.3 Seepage bed excavations.** Seepage bed excavations shall be a minimum of 5 feet (1524 mm) wide and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. Distribution piping in a seepage bed shall be uniformly spaced a maximum of 5 feet (1524 mm) and a minimum of 3 feet (914 mm) apart, and a maximum of 3 feet (914 mm) and a minimum of 1 foot (305 mm) from the sidewall or headwall.

**C103.9.4 Excavation and construction.** The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

**C103.9.5 Aggregate and backfill.** A minimum of 6 inches of aggregate ranging in size from 1/2 to 2 1/2 inches (12.7 mm to 64 mm) shall be laid into the trench below the distribution piping elevation. The aggregate shall be evenly distributed a minimum of 2 inches (51 mm) over the top of the distribution pipe. The aggregate shall be covered with approved synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. A minimum of 9 inches (229 mm) of soil backfill shall be provided above the covering.

**C103.10 Distribution piping.** Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table C103.10. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be a minimum of 2 inches (51 mm) and a maximum of 4 inches (102 mm) per 100 feet (30 480 mm).

**TABLE C103.10  
 DISTRIBUTION PIPE**

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F 405
Polyvinyl chloride (PVC) plastic pipe	ASTM D 2729
Polyvinyl chloride (PVC) plastic pipe with pipe stiffness of PS 35 and PS 50	ASTM F 1488

**C103.11 Joints.** Joints in distribution pipe shall be made in accordance with Section 705 of this code.

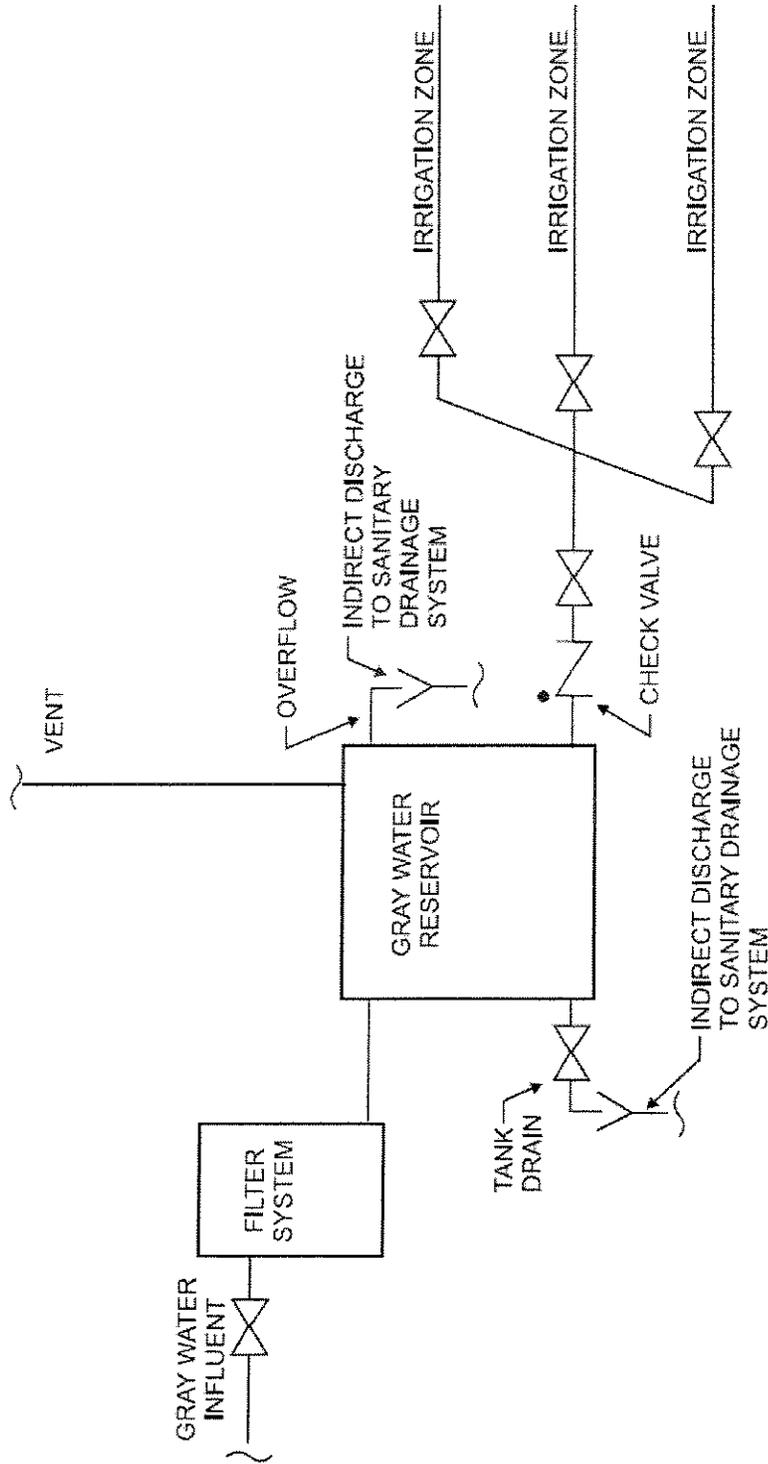


FIGURE 1  
GRAY WATER RECYCLING SYSTEM FOR SUBSURFACE LANDSCAPE IRRIGATION

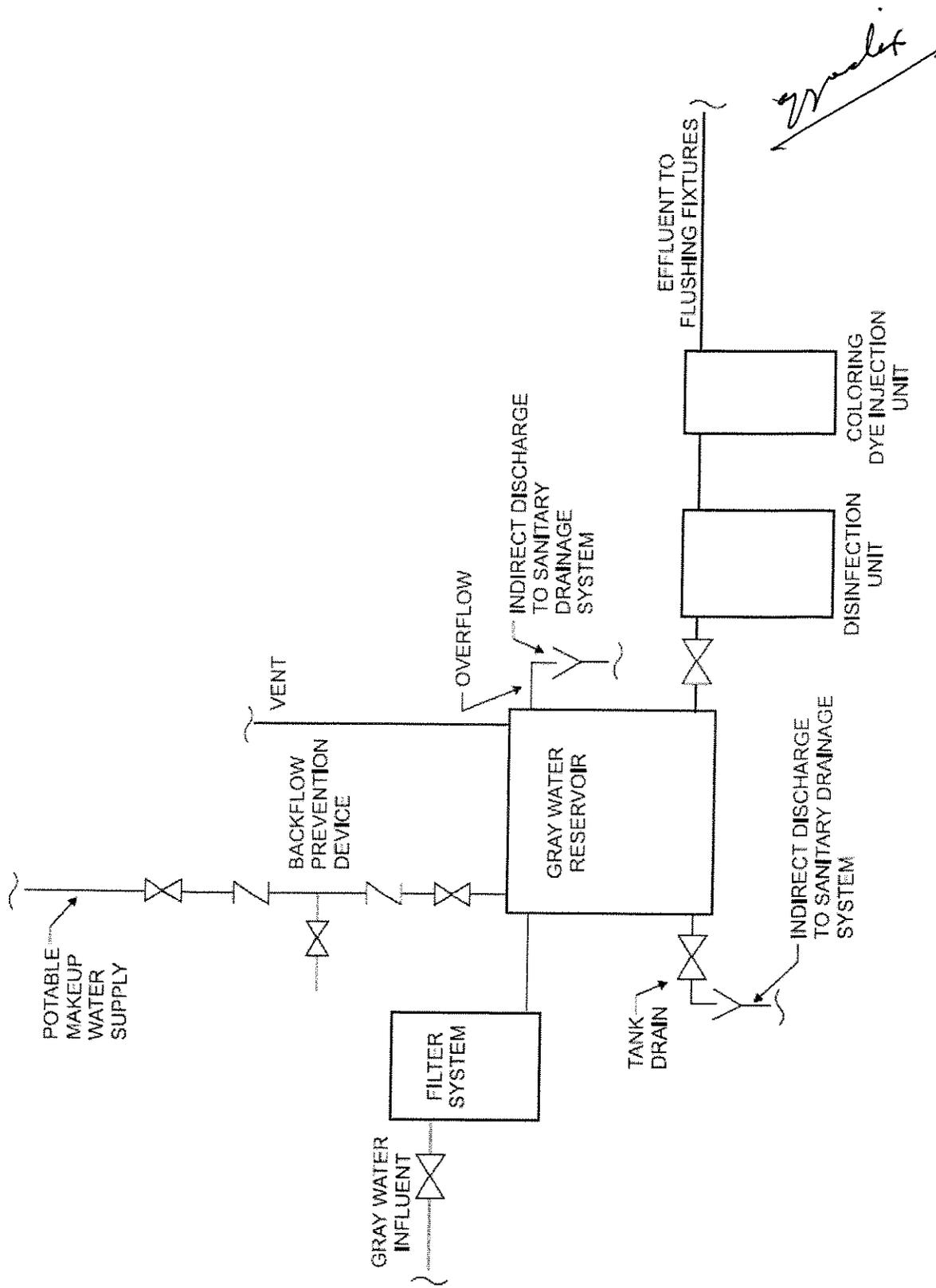


FIGURE 2  
GRAY WATER RECYCLING SYSTEM FOR FLUSHING WATER CLOSETS AND URINALS