

**Expanding Water Reclamation and Reuse
in Virginia**

Prepared by the

Department of Environmental Quality

and

Virginia Department of Health

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I. Executive Summary

This report has been prepared by the Department of Environmental Quality (DEQ) and the Virginia Department of Health (VDH) in response to a line item of the 2011 Appropriations Act (Department of Health, Item 290), a letter request from Delegate Harvey Morgan, and 2011 amendments to § 10.1-2129 of the Virginia Water Quality Improvement Act. The agencies were asked to examine opportunities to expand the reuse of wastewater (also referred to as water reclamation and reuse) with the goal of conservation and reducing nutrient pollution in the Commonwealth's surface waters. As part of this effort, new Water Quality Improvement Fund criteria to financially incentivize water reclamation and reuse were reviewed.

In Virginia, water reclamation and reuse essentially involves the treatment of wastewater to produce water of a quality that can be reused safely for a variety of purposes. Although it is voluntary in Virginia, once implemented, water reclamation and reuse may be subject to state regulatory requirements or guidelines. More than one state agency can regulate water reclamation and reuse in Virginia: DEQ regulates the reclamation and reuse of domestic, municipal and industrial wastewater; VDH regulates the reuse of treated sewage onsite for toilet flushing and has guidelines for the reuse of gray water and harvested rainwater; and the Department of Conservation and Recreation (DCR) has the authority to develop regulations for the reclamation and reuse of storm water. DEQ has various statutes, regulations and guidance that specifically affect water reclamation and reuse, the most significant of which is the Water Reclamation and Reuse Regulation (9 VAC 25-740-10 et. seq.; http://www.deq.virginia.gov/export/sites/default/vpa/pdf/Water_Reclamation_and_Reuse_Reg.pdf). This regulation specifies minimum reclaimed water standards and requirements for permit applications, monitoring, design, construction, operation and maintenance of water reclamation and reuse projects.

There are several advantages and disadvantages of water reclamation and reuse. The most notable advantages for the purposes of this report are that water reclamation and reuse can reduce nutrient loads to surface waters and supplement a community's overall water supply for other uses. While supporting these goals, however, treated wastewater diverted from a surface water discharge to water reclamation and reuse may reduce minimum instream flow of the surface water, thereby potentially impacting beneficial uses downstream that rely on the water provided by the discharge, including water withdrawals for public water supply. This is a concern where, based on 2009 water withdrawal data, surface water supplies greater than 90 % of Virginia's public water supply.

DEQ promotes and encourages water reclamation and reuse through, among other things, financial incentives that include Virginia Clean Water Revolving Loan Fund low interest loans and Water Quality Improvement Fund grants.

The water reuse policies and programs in Florida and Georgia were compared to Virginia. Florida has a variety of laws and regulation that drive water reuse with the intended or unintended effect of reducing surface water discharges and/or conserving water. Georgia has fewer regulations than Florida and a limited number of policies and programs in place to drive water reuse.

Florida and Georgia require a feasibility study for water reuse or non-discharging alternatives in lieu of surface water discharges for most domestic wastewater treatment facilities. Virginia largely relies on a market-based approach whereby localities independently determine, based on their needs and available resources, the best alternative for the reduction of nutrient loads to surface waters.

Florida and Georgia have laws and regulations limiting water withdrawals to maintain minimum flows or levels of surface waters and groundwater for the protection of other beneficial uses. Virginia lacks this mechanism to incentivize both water conservation and water reuse, and could consider Florida's approach to address stream impacts and consumptive use issues. DEQ is currently attempting to address potential adverse impacts to downstream beneficial uses and users that may result from the consumptive use of water reclamation and reuse through proposed amendments to the Water Reclamation and Reuse Regulation and associated guidance.

In order to encourage public input regarding water reuse, DEQ and VDH organized a committee consisting of 20 stakeholders and various technical support staff from VDH, DEQ and DCR to identify potential opportunities to expand water reclamation and reuse with the goals of water conservation and reducing nutrient pollution of the surface water of the Commonwealth. Many of the committee stakeholders also served on the regulatory advisory panel to amend the Water Reclamation and Reuse Regulation and were, as a result, already informed of the purpose of the committee and report, and well prepared to discuss and identify opportunities and concerns related to expanding water reclamation and reuse in Virginia. The agencies met with the committee on August 9, 2011 to receive their input and suggestions. The stakeholders and state agencies identified and prioritized a number of potential opportunities to expand the use or improve implementation of water reclamation and reuse projects. These opportunities fell into six (6) primary categories:

- i. Regulatory issues (22 priority points);
- ii. Role of education (15 priority points);
- iii. Financial issues (12 priority points);
- iv. Addressing the link to water resources issues (10 priority points);
- v. Addressing public health risks (7 priority points); and
- vi. Technical issues related to irrigation sites (7 priority points).

While issues related to regulatory oversight received the most priority points overall from the stakeholder committee, education was one specific area that the committee agreed is critical. The committee agreed that because water reuse is not always the best option, education regarding the pros and cons of specific water reuse applications is a necessary part of any educational effort. For example, reduction in discharges due to treated effluent diverted to water reclamation and reuse must be weighed against the resulting reduction in instream flow and the possible impact on water supply and assimilative capacity. A large part of the educational effort should be aimed at generating demand, as the committee agreed that a key factor to expansion of reuse is establishment of a large customer base for the product. Human health issues arise in this arena, particularly the importance of assuring the public that the product is safe based on appropriate regulation.

Regulations must be balanced between protecting public health and the environment, and providing options to implement cost effective alternatives. The current regulatory process to amend the Water Reclamation and Reuse regulation is aimed at achieving this goal, and the public involvement process to review the proposed regulation will provide additional insight in achieving this balance. The regulatory issue that garnered the most priority points from the committee was related to the use of reclaimed water for groundwater recharge. DEQ will be starting a regulatory process in 2012 to examine the rules related to groundwater recharge, as the related issues encompass multiple regulations and policies.

The mechanisms necessary to implement further action include potential changes in statute, regulation, or agency operations or processes, and local government or private sector action. While actions requiring statutory changes did not rank highest in priority in the list of opportunities, those issues related to legislative action include:

- Providing tax incentives and tax credits for end users in order to create demand;
- Providing subsidies for agricultural irrigation reuse of reclaimed water;
- Establishing priority areas to encourage water reuse pending completion of the State Water Resources Plan;
- Subsidizing operation and maintenance costs of water reclamation and reuse projects; and
- Ensuring continued availability of grant funds for the Water Quality Improvement Fund.

During the 2011 General Assembly, the Water Quality Improvement Act (WQIA) was amended to require that the Water Quality Improvement Fund (WQIF) grant guidelines of the Secretary of Natural Resources (SNR) “*define criteria and financial incentives for reuse*”. Draft proposed revisions to the WQIF grant guidelines proposed by DEQ are discussed in Section VI of this report. DEQ will also provide in guidance further explanation and details on the elements of water reclamation and reuse projects that qualify for WQIF cost-share.

There are discharging and non-discharging alternatives in addition to water reclamation and reuse that are available to reduce nutrient pollution of surface waters from point source discharges in Virginia. Wastewater treatment facilities can maintain a discharge of treated water to surface waters while reducing their discharge of nutrients with nutrient reduction technology. Non-discharging alternatives may include, but are not limited to, land treatment, conventional or alternative onsite sewage systems, or storm water reclamation and reuse. Advantages and disadvantages of these alternatives are discussed in Section VII.

A variety of factors, including environmental, economic and societal, should be considered when determining the most appropriate alternative(s) to implement for water conservation and the reduction of nutrient pollution in surface waters of the Commonwealth. Based on these factors, water reclamation and reuse may or may not be the best alternative.

II. Background and Scope of Report

The basis and scope of this report are provided in a line item of the 2011 Appropriations Act (Department of Health, Item 290) (hereafter referred to as Item 290), a letter request dated February 24, 2011 to VDH and DEQ from Delegate Harvey Morgan, and 2011 amendments to §10.1-2129 of the Virginia Water Quality Improvement Act. Copies of these items are provided in Attachment A of the report.

The language in Item 290 and Delegate Morgan's Letter is similar in most aspects and involves a joint effort by VDH and DEQ to:

- Explore opportunities to expand the reuse of wastewater with the goal of reducing nutrient pollution of the surface waters of the Commonwealth;
- Establish an appropriate committee of stake holders to assist in identifying potential opportunities [to expand water reclamation and reuse];
- Examine practices in other states that have developed policies and programs to reduce surface water discharges through beneficial reuse of wastewater;
- Report recommendations;
- Include conservation with reduced nutrient pollution of surface waters as a goal or basis to expand the reuse of wastewater; and
- Identify statutory and regulatory changes, including potential incentives, to reduce wastewater discharges to surface waters.

Regarding other states' policies and programs, those of Florida and Georgia are examined in this report. Due to the focus of Item 290 and Delegate Morgan's letter, the report addresses water reclamation and reuse more extensively than other alternatives to reduce wastewater discharges to surface waters. Consistent with the goal of reducing nutrient pollution of surface waters in the Commonwealth, an alternative to discharge wastewater with reduced nutrient content to surface waters is also discussed in this report.

Section 10.1-2129 of the Virginia Water Quality Improvement Act addresses agency coordination and conditions for grants related to WQIF. As a result of 2011 amendments to §10.1-2129, the Secretary of Natural Resources must develop additional written guidelines that "define criteria and financial incentives for water reuse". The Secretary's Grant Guidelines already recognize water reclamation and reuse, by definition, as a form of nutrient reduction technology eligible for cost-share as part of a WQIF grant project. To date, two WQIF grants for discharging facilities have included reuse in the eligible project scope. While cost-effective use of WQIF grants is the primary focus of the cost-share program, it is likely that water reclamation and reuse will play a more important role in the future as treatment plant owners seek options to maintain their nutrient loading caps in the face of increasing flows and technology limitations. Because of the legislative mandate and the need to further define the eligibility of reuse under WQIF, a discussion of recommended WQIF criteria and financial incentives for water reuse is included in this report.

III. Water Reclamation and Reuse in Virginia Today

In Virginia, water reclamation and reuse essentially involves the treatment of wastewater to produce water of a quality that can be reused safely for a variety of purposes. Non-potable reuses of reclaimed water include, but are not limited to, crop and landscape irrigation, toilet flushing, fire fighting and protection, commercial and non-commercial car washing, landscape impoundments, stack scrubbing, boiler feed, cooling and various construction activities. Reclaimed water may also be reused for indirect potable purposes, but will generally require more advanced treatment before discharge to reservoirs or streams used for public water supply. Virginia currently has seven facilities permitted for water reclamation and reuse by DEQ, and an additional four that were either grandfathered or excluded from the requirements of the Water Reclamation and Reuse Regulation (see Subsection III.A). This includes one of the oldest indirect potable reuse projects in the nation, which has augmented a water supply reservoir in Fairfax County since 1978 (See Attachment D).

A. Regulatory Framework and Guidelines

1. General

Water reclamation and reuse in Virginia is voluntary. Once implemented, however, it may be subject to state regulatory requirements or guidelines. More than one state agency can regulate water reclamation and reuse in Virginia, including DEQ, VDH and DCR. The jurisdiction of each agency is determined most often by the type of water to be reclaimed. For example, if the water to be reclaimed is domestic, municipal or industrial wastewater, the reclamation and reuse of that water will be regulated by DEQ in accordance with the Water Reclamation and Reuse Regulation (9 VAC 25-740). VDH regulations narrowly govern the treatment and reuse of sewage (to reduce wastewater flows) for toilet flushing in conjunction with a permitted onsite sewage system. VDH has also developed guidelines as required by § 32.1-248.2 for the reuse of gray water and for the use of harvested rainwater. DCR, which regulates discharges of storm water to surface waters excluding discharges of storm water associated with industrial activities, has the authority specified in § 10.1-603.4 of the Code of Virginia to develop regulations for the reclamation and non-potable reuse of storm water. Currently, DCR evaluates and regulates such proposals on a case-by-case basis.

2. DEQ

DEQ has various regulations and guidance that specifically affect the reclamation and reuse of domestic, municipal and industrial wastewater in Virginia. These are briefly described below.

a. Water Reclamation and Reuse Regulation (9 VAC 25-740)

The Water Reclamation and Reuse Regulation (9 VAC 25-740) went into effect on October 1, 2008. As required by State Water Control Law and stated in 9 VAC 25-740-20, it is the purpose of the regulation to promote and encourage water reclamation and reuse in a manner that is

protective of the environment and public health, and as an alternative to discharging treated effluent to state waters. To that end, the regulation specifies minimum reclaimed water standards and requirements for permit applications, monitoring, design, construction, operation and maintenance of water reclamation and reuse projects. This eliminates uncertainty for designers and permittees, and inconsistent project permitting and regulation by DEQ. During the development of reclaimed water standards contained in the regulation, existing treatment available at most wastewater treatment facilities (WWTFs) within Virginia was also considered. As a result, more WWTFs are capable of producing reclaimed water that meets the standards of the regulation without extensive changes to their existing treatment processes.

- b. Water Guidance Memo No. 10-2001: Implementation Guidance for the Water Reclamation and Reuse Regulation, 9 VAC 25-740-10 *et seq.*

Associated with the Water Reclamation and Reuse Regulation, DEQ developed Water Guidance Memo No. 10-2001 to ensure proper and consistent implementation of the regulation by DEQ Water Division managers and permits writers. The guidance is available to the public on the DEQ website at <http://www.deq.state.va.us/waterguidance/pdf/102001.pdf>. DEQ also has a program page for water reclamation and reuse at <http://www.deq.state.va.us/vpa/waterreuse.html> that provides links to the regulation, permit application forms, guidance, a possible source of project funding, and useful information and resources related to water reclamation and reuse.

- c. Local and Regional Water Supply Planning (9VAC25-780)

The regulation for Local and Regional Water Supply Planning requires every county, city, and town to develop a water plan in accordance with established planning criteria. Where appropriate, the plan may consider nontraditional means of increasing supplies such as interconnection, desalination, recycling and reuse. Water reclamation and reuse is anticipated to play a greater role in water supply planning by conserving potable water and augmenting the overall water resources of localities and regions. However, the State plan must evaluate the impact of water reclamation and reuse as an alternative water source both on the users within the jurisdiction and those downstream.

- d. Sections 62.1-44.19:12 through 62.1-44.19:19 of the Code of Virginia

Sections 62.1-44.19:12 through 62.1-44.19:19 of the Code of Virginia allow for recycle or reuse of wastewater in lieu of the installation of required nutrient removal technologies for new and expanding WWTFs in the Chesapeake Bay watershed. The recycle or reuse project must remove a nutrient load equivalent to that removed by nutrient removal technology.

- e. Sewage Collection and Treatment Regulations (9VAC25-790)

Most reclaimed water is derived from municipal wastewater. Therefore, many of the treatment processes used to reclaim municipal wastewater are those used by municipal WWTFs. The Sewage Collection and Treatment (SCAT) Regulations contain design, construction and operation requirements for sewage or municipal WWTFs. Consequently, the Water Reclamation and Reuse Regulation contains several references to the SCAT Regulations related to the design,

construction, operation and monitoring of reclamation systems for municipal wastewater.

The SCAT regulations also address land-treatment systems, including slow-rate irrigation, over land flow, and rapid infiltration basins. Most land treatment of wastewater differs from irrigation reuse of reclaimed water in that land treatment is considered a method to further treat and dispose of wastewater, while irrigation reuse is not intended to provide any additional treatment or disposal of reclaimed water. There is one exception where the SCAT Regulations indicate that rapid infiltration basins are to be designed, in part, to recover “renovated water using wells or under drains with subsequent reuse”.

3. VDH

a. Sewage Handling and Disposal Regulations (12VAC5-610)

The Sewage Handling and Disposal Regulations govern the collection, conveyance, treatment and disposal of sewage from conventional and alternative onsite sewage systems. These regulations establish basic site and soil requirements and construction and location requirements necessary to protect public health and ground and surface waters. Onsite sewage systems treat wastewater and disperse partially treated effluent into the soil for additional treatment and disposal. There are maximum loading rates intended to assure year-round disposal of effluent; the regulations are generally aimed at individual, single family dwellings, however there is no upper limit for the size of onsite sewage systems. There are no operation and maintenance requirements for conventional onsite sewage systems. The regulations address sewage recycling for toilet flushing and state that any other uses would be considered “experimental.”

b. Regulations for Alternative Onsite Sewage Systems (12VAC5-613).

The Board of Health adopted emergency regulations for Alternative Onsite Sewage Systems (AOSS) in April 2010. Those regulations expire in October 2011. The emergency AOSS regulations establish performance requirements and operation and maintenance requirements for AOSS. The Board adopted permanent regulations to replace established performance requirements for alternative systems (mass drainfields) in June 2011. These permanent AOSS regulations were published November 7, 2011, in the *Virginia Register of Regulations* and will become effective December 7, 2011. The AOSS regulations (emergency and permanent) establish effluent performance requirements intended to protect public health and ground water; the permanent AOSS regulations specifically establish performance requirements for direct dispersal of effluent in groundwater. The AOSS regulations do not specifically address water reclamation or reuse. However, onsite sewage systems can be designed for ‘secondary benefits’ such as lawn irrigation. Amendments to the Water Reclamation and Reuse Regulation that are currently in the proposed stage may address offsite reuse of reclaimed water from AOSS.

c. Virginia Waterworks Regulations (12VAC5-590).

The *Virginia Waterworks Regulations* govern the quality of water provided to consumers by public water systems (waterworks) as required under the federal Safe Drinking Water Act (SDWA). VDH is the primary enforcement agency for these regulations through the

Environmental Protection Agency (EPA). A waterworks is defined as a system that serves piped water for drinking or domestic use to (i) the public, (ii) at least 15 connections, or (iii) an average of 25 individuals for at least 60 days out of the year. Waterworks may be owned by individuals, corporations or governmental entities. The federal SDWA serves as the basis for design requirements, monitoring, reporting, and water quality standards contained in the *Virginia Waterworks Regulations*.

The *Virginia Waterworks Regulations* and the SDWA are key elements of public health protection as they are developed to ensure the provision of safe drinking water to consumers. An effective water quality program requires protective measures that EPA has termed a multi-barrier approach. To meet the SDWA water quality standards, a waterworks owner relies on a stable source of water along with operational and engineered methods to effectively treat the water in order to achieve these standards for finished water. In addition to current standards, waterworks owners are required to comply with new EPA-mandated drinking water quality rules. Many of the contaminants that are being considered (by EPA) for new regulatory limits have been identified in reclaimed water for reuse (See Attachment D).

The Safe Drinking Water Act and Virginia's Waterworks Regulations do not directly establish requirements for wastewater management alternatives that may include, among others, water reclamation and reuse. Because source water quality is an important factor in the protection of public health, regulated public water supplies may be impacted by wastewater management strategies. EPA has a source water protection program, implemented through the Waterworks Regulations that promotes the removal of contaminants prior to discharge as compared to the significant expense required to remove the contaminants prior to drinking.

d. Va. Code § 32.1-163.6.

Legislation approved in 2008 required VDH to accept designs for onsite sewage systems ("treatment works") that are compliant with performance requirements established by the Board, standard engineering practice, certain horizontal setbacks necessary to protect public health, and certain discharge, effluent, and surface and ground water quality standards. The statute sets aside the prescriptive requirements of the Sewage Handling and Disposal Regulations, thereby making it (theoretically) possible to design onsite sewage systems for sites with soil conditions previously considered unsuitable. The statute does not address water reclamation or reuse directly, however, engineers are not constrained from designing onsite sewage systems that provide benefits such as lawn irrigation.

e. Gray water guidelines.

VDH adopted the Gray Water Guidelines in 1999. The guidelines are available at: http://www.vdh.virginia.gov/EnvironmentalHealth/ONSITE/regulations/FormsDocs/documents/2010/pdfs/Graywater%20Use%20guidelines%20by%20VDH_feb99.pdf. Properly treated and disinfected, gray water may be used in accordance with these guidelines for above-ground irrigation or toilet flushing.

f. Private Well Regulations (12VAC5-630).

The Private Well Regulations establish location and construction requirements for private wells, including irrigation wells, intended to protect public health and ground water. An owner is required to establish suitability of a drinking water well at the time of construction by providing a negative bacteriological sample. Beyond that initial requirement, there are no other water quality requirements and no ongoing monitoring (sampling) requirements. Of all potentially affected stakeholders, private well owners stand to be impacted the most and earliest by water quality problems resulting from non-discharging wastewater management alternatives, including, but not limited to, water reclamation and reuse, where such alternatives are inadequately designed, constructed, operated and maintained. Without aggressive notification and education strategies, many private well owners may be unaware of onsite or offsite non-discharging wastewater management alternatives that could impact their wells. Most private well water is not treated prior to delivery into a home. Since there are no monitoring requirements, water quality problems would not be easily detected before health effects emerge. To further compound matters, there is no regulatory authority to require an owner to address a water quality problem, and since there is typically no central system to turn to, remediating problems would be difficult and expensive.

B. Advantages and Disadvantages

Water reclamation and reuse has both advantages and disadvantages as an alternative to reduce surface water discharges. Advantages of water reclamation and reuse include the following:

- In addition to reducing nutrient loads to surface waters, water reclamation and reuse can be used as a water supply planning tool to conserve potable water for human consumption and other purposes requiring a higher quality of water, and to supplement a community's overall water supply for other uses;
- Water reclamation and reuse can delay the need for and cost of new or expanded drinking water resources and infrastructure;
- Water reclamation and reuse provides an opportunity for WWTFs/reclamation systems to generate revenues from wastewater that was previously disposed with little or no recovery of cost;
- Water reclamation typically produces reclaimed water that has a more consistent quality and is a more reliable supply than untreated water withdrawn from surface waters;
- Compared to other non-discharging alternatives, many reuses of reclaimed water are not land- dependent (e.g., requiring land, such as irrigation);
- Irrigation with reclaimed water that contains nitrogen and phosphorus can reduce the amount and cost of commercial fertilizer applied to sites irrigated with reclaimed water;
- Irrigation with reclaimed water does not require a nutrient management plan in all cases; and
- Supplemental irrigation rates required for irrigation with reclaimed water have a lower potential to release nutrients to groundwater and do not require groundwater monitoring.

Disadvantages of water reclamation and reuse are as follows.

- Treated wastewater diverted from a surface water discharge to water reclamation and reuse may reduce minimum instream flow of the downstream surface water, thereby potentially impacting beneficial uses downstream that rely on the water provided by the discharge, including, but not limited to, water withdrawals for public water supply. This is of concern to DEQ and VDH because, based upon 2009 data of total water withdrawn by source in Virginia, 57% was from streams and 29 % was from surface water reservoirs. Surface water also provided 90.5 % of the water for public water supply compared to groundwater which provided approximately 9.4 % (Ref. 1). Consequently, proposals for water reclamation and reuse as an alternative to reduce surface water discharges will need to be evaluated for impacts to downstream beneficial uses due to the consumptive use of water reclamation and reuse. Where impacts to beneficial uses are anticipated under specific flow conditions of the receiving surface water, it may be necessary to reduce the amount of water diverted to water reclamation and reuse and increase the discharge in order to prevent or minimize the impacts.
- In addition to impacting water availability to downstream beneficial uses, water reclamation and reuse can affect the amount and flow available for use in assimilative capacity determinations. Assimilative capacity refers to the ability of a stream (or other surface water) to reduce the concentration of contaminants discharged to that stream through natural physical, biological, and chemical processes that occur typically as a result of water in the stream.
- The distribution of reclaimed water to end users will, in most cases, require a system separate from a potable water distribution system. The cost of reclaimed water distribution systems will be influenced by a variety of factors, and may be a significant portion of the overall project costs.
- Where the same entity is not both the water purveyor and reclaimed water agent or provider for a community, the water purveyor has less incentive to support water reclamation and reuse if it may reduce the amount of potable water used, particularly where the cost of reclaimed water is much lower than the cost of potable water. This, in turn, would reduce the revenues generated by the sale of potable water. An exception would be indirect potable reuse of reclaimed water where the reclaimed water is discharged to a water supply reservoir and then withdrawn by the water purveyor for potable use following additional treatment.
- Irrigation reuse with reclaimed water is hydraulically limited to supplemental irrigation rates and will, in most cases, require more land area than other land-dependent, non discharging alternatives, such as land treatment of wastewater, to eliminate the same volume of water. Supplemental irrigation is defined in the Water Reclamation and Reuse Regulation as irrigation, which in combination with rainfall, meets but does not exceed the water necessary to maximize production or optimize growth of the irrigated vegetation.
- Total reliance on irrigation reuse to reduce or eliminate a discharge may require a significant amount of land to manage and reuse all reclaimed water produced by the reclamation system.
- Where irrigation reuse is proposed to completely eliminate a discharge, storage or other non-discharging options to manage unused reclaimed water during “non-growing season” months will be necessary to ensure that reclaimed water is properly reused and not

disposed at irrigation sites. (Options for land-based disposal of treated wastewater are discussed in Subsection VII.B)

- In Virginia, many private well owners obtain drinking water from surficial aquifers or shallow groundwater. There is concern that water reclamation and reuse and other land-based, non-discharging wastewater management alternatives may result in the release of potentially harmful contaminants to shallow groundwater, thereby impacting these private well owners.
- Additional monitoring of reclaimed water within a reclaimed water distribution system that is performed to ensure the protection of public health and the environment, and/or to demonstrate consistent quality as a means to gain and maintain public confidence, represents operating costs that must be considered.

C. Funding

DEQ promotes and encourages water reclamation and reuse through, among other things, financial incentives that include the following.

- Virginia Clean Water Revolving Loan (VCWRL) Fund

Low interest loans are available through the VCWRL Fund for water reclamation and reuse projects that are publicly-owned and involve the treatment and reuse of municipal wastewater or sewage. Current federal requirements mandate that a certain percentage of projects receiving state revolving loans must qualify under the Green Project Reserve (GPR). Water reclamation and reuse projects are considered GPR projects and help Virginia meet its quota for GPR. The VCWRL Fund offers 25 additional ranking points on the loans for projects that employ water reclamation and reuse technologies. Privately-owned or industrial facilities are not eligible to receive loans from the VCWRL Fund.

- Water Quality Improvement Fund (WQIF) Grants

In the current Guidelines of the Secretary of Natural Resources for WQIF Grants (<http://www.deq.virginia.gov/export/sites/default/bay/WQIFGuidelinesNov2006.pdf>), water reclamation and reuse is already, by definition, recognized as a form of nutrient reduction technology (NRT) and eligible for cost-share as part of a WQIF Grant project. Like the VCWRL Fund, WQIF Grants are available to only publicly-owned WWTFs, with an additional limitation that funds can only be used for design and installation of NRT. Additional WQIF Grant Guidelines that “define criteria and financial incentives for water reuse” are under development as discussed in Section VI of the report.

IV. Practices in Other States to Reduce Surface Water Discharges

The following describes policies and programs that reduce surface water discharges through beneficial reuse of wastewater (or water reuse) in two states, Florida and Georgia, and provides a comparison of these policies and programs with those of Virginia. Although there are numerous other states with policies and programs for this purpose, the following analysis was limited to

Florida and George per the recommendation in Delegate Morgan’s letter (see Attachment A).

A. Florida

Florida has a variety of laws and regulation that drive water reuse with the intended or unintended effect of reducing surface water discharges. They are described as follows.

Chapters 403.064 and 373.250 of the Florida Statutes (F.S.)

Sections 403.064(1) and 373.250(1), F.S. establish the encouragement and promotion of water conservation and reuse of reclaimed water as state objects and state that water conservation and reuse are in the public interest. Section 403.064(1) further states that the “Legislature finds that the reuse of reclaimed water to be a critical component of meeting the state’s existing and future water supply needs while sustaining natural systems” and “encourages the development of incentive-based programs for reuse implementation.”

Rule Chapter 62-610 and 62-40 of the Florida Administrative Code (F.A.C.)

To achieve the objectives of Sections 403.064(1) and 373.250(1), F.S., Rule Chapter 62-610, F.A.C. establishes design, operation and maintenance requirements for the reclamation of domestic wastewater for reuse. In addition, Rule Nos. 62-610.820 and 62-40.416, F.A.C. describe requirements for a detailed study on the feasibility of water reuse for the following facilities that apply for either a domestic wastewater treatment facility permit through the Florida Department of Environmental Protection (FDEP) or a consumptive use permit^a through any one of five Water Management Districts (WMDs) within the state:

1. Domestic wastewater facilities located within, serving a population within or discharging within a designated water resource caution area (an area of the state designated by the WMD as having critical water supplies) require a feasibility study unless:
 - a. The domestic wastewater facility has an existing or proposed permitted or design capacity less than 0.1 million gallons per day, or
 - b. The permitted reuse capacity equals or exceeds the total permitted capacity of the domestic wastewater facility;
2. Domestic wastewater facilities proposing a new, relocated, or expanded discharge of advanced waste treated level effluent or higher into the Indian River Lagoon System, require a feasibility study unless:
 - a. The proposed discharge is conclusively demonstrated not to result in violation of state water quality standards, either by itself or in combination with other discharges, and will not hinder efforts to restore the water quality of the Indian River Lagoon System; or
 - b. The discharge is an intermittent surface water discharge occurring during wet weather conditions subject to the requirements of FDEP rules;
3. Domestic wastewater facilities proposing a new, relocated, or expanded surface water

^a Per Florida regulations, a consumptive use permit or water use permit is issued by a water management district to authorize water use. These types of permits allow water to be withdrawn from surface and groundwater supplies for reasonable and beneficial uses such as public supply (drinking water), agricultural and landscape irrigation, and industry and power generation.

discharge;

4. Facilities holding an FDEP permit authorizing a domestic wastewater discharge to an Ocean Outfall (specific to South Florida) as of July 1, 2008; or
5. Certain new consumptive or water use permit and permit renewal applicants (including water supply utilities, permitted water users, and utilities that are responsible for both water supply and wastewater management), as required by rules of the applicable water management district.

Once a reuse feasibility study has been conducted and submitted to the FDEP or WMD, Sections 403.064(14) and (15), F.S. place limitations on methods of effluent disposal, specifically surface water discharges, deep well injection and types of land application not defined as reuse, for domestic wastewater facilities located in a water resource caution area. Where the study concludes that reuse is feasible for these facilities using (or proposing to use) any of the above effluent disposal methods, the facilities must implement water reuse to the degree that it is determined to be feasible based on the feasibility study, and the disposal method may be used as a back up to a reclaimed water reuse system.

Rule Chapter 62-4 of the Florida Administrative Code (F.A.C.)

Florida's Antidegradation Policy contained in Rule Chapter 62-4, F.A.C. requires any applicant (regardless of location and size) for a new or expanded surface water discharge or relocation of an existing outfall to demonstrate that the resulting degradation to the surface water is necessary or desirable under federal standards and is in the public interest. As part of the demonstration, the applicant must complete a feasibility study showing the practicability of implementing water reuse in lieu of the proposed new or expanded surface water discharge. In accordance with Section 403.064(4), F.S., reuse must be given significant consideration if it is determined to be feasible.

Chapter 373.042 of the Florida Statutes (F.S.)

Chapter 373.042, F.S. requires that state WMDs or FDEP establish minimum flows and levels for aquifers, surface watercourses, and other surface water bodies to identify the limit at which further consumptive withdrawals would be significantly harmful to the water resources or ecology of the area. Florida's water withdrawal regulatory program distinguishes between consumptive and non-consumptive uses. Only consumptive uses require a permit, and the applicant must evaluate the impact of withdrawal on water resources. Minimum flows and levels are adopted into Florida Administrative Code and are used in the WMDs consumptive use or water use permitting program to ensure that withdrawals do not cause significant harm to water resources or the environment. Minimum flows and levels are sufficiently strict to cause most localities to seek options other than surface or ground water withdrawals for water supply, such as desalination, or to conserve or augment their existing water supply through water reuse. In Florida, more than 90% of water supplies are groundwater based sources. The southern half of the state is subject to no net increases in pumping from groundwater including the South Florida Availability Rule and the Southwest Florida Most Impacted Area and Water Use Caution Area.

Rule Chapter 62-503 of the Florida Administrative Code (F.A.C.) and WMD Alternative Water Supply Funding

Florida further promotes reuse of reclaimed water through funding mechanisms such as the State

Revolving Loan Program described in Chapter 62-503, F.A.C. Specifically, Rule No. 62-503(6)(a) assigns a higher base priority score for water reuse when determining the priority list of projects to receive funds from the program.

Also, Florida's WMDs have alternative water supply funding available from the Florida Water Protection and Sustainability Trust Fund that can be used to partially or completely fund water reuse project costs.

B. Georgia

Georgia has fewer regulations than Florida and a limited number of policies and programs in place to drive water reuse with the intended or unintended effect of reducing surface water discharges. They are described as follows.

Water Reclamation and Reuse Guidelines

Georgia has no laws or regulations that specifically promote or encourage water reclamation and reuse. Instead, the Watershed Protection Branch of the Georgia Environmental Protection Division (EPD) has developed various technical guidelines addressing water reclamation and urban water reuse, reclaimed water systems for buildings, and reclaimed water distribution by tanker truck.

Georgia Department of Natural Resources (DNR) Rule 391-3-6-.03

Georgia DNR Rule 391-3-6-.03 (Water Use Classifications and Water Quality Standards) contains a statewide antidegradation policy intended to protect and enhance the water quality of the state's rivers and streams by minimizing point source pollution and promoting "no discharge" alternatives for wastewater treatment and disposal that may include water reuse. In limited cases, however, economic grounds can be used to allow additional point source loadings to certain state waters if water quality standards can be met. To determine which projects qualify for this exception to the policy, the Watershed Protection Branch of the EPD provides technical guidance requiring permit applicants proposing an additional point source pollutant load to surface waters to perform an antidegradation review. This review includes an economic analysis to determine if the additional point source load is necessary to accommodate important economic or social development in the community and that it would be an economic hardship on the community to develop a "no discharge" alternative, such as land treatment or urban water reuse. Where the economic analysis determines that the costs incurred by implementing a "no discharge" alternative would not significantly interfere with the community's development, then a permit for an increased point source discharge would not be considered.

Georgia DNR Rule 391-3-6.07 and Interim Minimum Stream Flow Protection Policy

Georgia DNR Rule 391-3-6.07 (Surface Water Withdrawals) essentially embodies Georgia's Interim Minimum Stream Flow Protection (IMSFP) policy that was adopted in April 2001. Specifically, Rule 391-3-6.07(4)(b) 9 (iii) requires persons withdrawing surface water to allow specified minimum flows to remain or pass "at or immediately downstream of the point of withdrawal, diversion or impoundment so long as it is available from upstream". This policy applies only to requests for surface water withdrawals made after March 30, 2001 by non-farm applicants on rivers that are not highly influenced by federal reservoirs. The policy does not

apply to individual small water withdrawals that are less than 100,000 gallons per day, reasonable use for agricultural water users, any agricultural water use for capacity in place by 1988, and any water withdrawal used to pay off revenue certificates or general obligation bonds as of and prior to 1977. As with Florida's requirements for minimum water flows and levels, Georgia's IMSFP policy is sufficiently strict to cause many localities to seek options other than surface water withdrawals for water supply, or to conserve or augment their existing water supply through water reuse.

State Water Plan

Georgia also encourages wastewater reclamation and reuse through its State Water Plan (SWP). The SWP is not a statute or regulation, but is a policy adopted by the Georgia General Assembly by joint resolution and signed by the Governor in 2008. One of the primary goals of the SWP is to minimize withdrawals and maximize returns to surface waters of the state. While this would appear to provide little or no incentive for wastewater reclamation and reuse, Section 14 (Regional Water Planning) of the SWP describes a process by which Regional Water Plans (RWPs) may identify management practices to conserve and protect water resources. Such management practices may include water reclamation and reuse, and are listed in the RWPs.

Section 50-23-5 of the Official Code of Georgia Annotated (O.C.G.A)

In Georgia, the Clean Water State Revolving Loan Fund (CWSRF) is administered by the Georgia Environmental Finance Authority (GEFA), a government entity established pursuant to § 50-23-5, O.C.G.A to finance various environmental projects. Specific types of water conservation projects can be funded by the CWSRF, including recycle and water reuse projects that replace potable sources with non-potable sources. The GEFA board of directors also approved a one percent interest rate reduction on all water conservation loans from the CWSRF that applies to all stand-alone water conservation projects.

C. Virginia Comparison

Virginia has policies, programs and circumstances that differ from those of Florida and Georgia for the purpose of reducing surface water discharges through the beneficial reuse of wastewater. Some of the more significant differences between Virginia and the other states are discussed below.

Florida and Georgia require a feasibility study for water reuse or non-discharging alternatives in lieu of a surface water discharge for most domestic WWTFs. Currently in Virginia, water reclamation and reuse is voluntary and existing laws, regulations and policy to conserve water and to reduce nutrient loads to surface waters do not prescribe specific methods and alternatives by which localities are to achieve these goals. Instead, Virginia relies on a market-based approach, whereby localities determine independently the best alternative to achieve these goals based on their needs and available resources. This approach still allows surface water discharges with nutrient removal technology to be considered an acceptable alternative in addition to non-discharging alternatives to reduce nutrient loads to surface waters in Virginia. There is one exception in 9VAC25-260-275 of the Virginia's Water Quality Standards. The regulation requires a permit application for a new or expanded discharge to include an analysis of wastewater management alternatives where the discharge affects Eastern Shore tidal waters,

resulting in shellfish water condemnation.

Like Florida and Georgia, Virginia also has an antidegradation policy established pursuant to the Clean Water Act that serves to protect and maintain the quality of all state waters. Unlike the policies of Florida and Georgia, however, Virginia's antidegradation policy has not been used to require non-discharging alternatives for wastewater treatment and disposal. Although this policy requires an alternatives analysis for a permit application to discharge to surface waters where DEQ determines that the discharge will degrade a Tier II water, such analyses have never been used because DEQ determines the *de minimus* amount of a pollutant that can be discharged to avoid degradation of a Tier II water and sets discharge limits for the pollutants in the permit accordingly.

Florida and Georgia have laws and regulations limiting water withdrawals to maintain minimum flows or levels of surface waters and groundwater for the protection of other beneficial uses. This has had the effect of limiting new water withdrawals and increasing water conservation and water reuse. Wastewater diverted to reclamation and reuse has the subsequent effect of reducing discharges to surface waters. Although Virginia relies heavily on surface water for public water supply, Virginia does not have similar laws and regulations that pre-establish a defined instream flow number for every basin in order to limit surface water withdrawals. Instead, Virginia makes an instream flow determination for water withdrawals on a case-by-case basis through the Virginia Water Protection Permit program. Consequently, Virginia lacks this mechanism to incentivize both water conservation and water reuse. The Florida consumptive use and minimum flows and levels law may provide an example of how the stream impact and consumptive use issue could be addressed in Virginia.

Also in Virginia, water withdrawal owners that are located downstream of and are reliant upon the water from the surface water discharge of WWTFs, have begun to express concern that water diverted to reclamation and reuse by upstream WWTFs will reduce the volume of water available to the downstream withdrawals, particularly during periods of drought. In this case, water reclamation and reuse may be considered a consumptive use that impacts downstream communities. DEQ is attempting to address potential adverse impacts to downstream beneficial uses and users that may result from the consumptive use of water reclamation and reuse through proposed amendments to the Water Reclamation and Reuse Regulation or possibly through guidance. It is not clear that Florida and Georgia are addressing the consumptive use of water reclamation and reuse to ensure minimum flows and levels of surface waters and groundwater.

Like Florida and Georgia, Virginia can provide funding for water reuse projects that involve the reclamation of municipal wastewater or sewage through Clean Water Revolving (CWR) Loan Funds. However, Virginia awards far fewer priority points than Florida and does not reduce the interest rates on CWR loans like Georgia for water reuse proposals. Through changes to procedural guidelines of the CWR Loan Fund, DEQ could increase priority points for water reclamation and reuse projects. However, reducing interest rates on CWR loans for any type of project would reduce the fiscal soundness of Virginia's CWR Loan Fund.

V. Opportunities to Expand Water Reclamation and Reuse to Achieve Goals

VDH and DEQ organized a committee consisting of 20 stakeholders and various technical support staff from VDH, DEQ and DCR to identify potential opportunities to expand water reclamation and reuse with the goals of water conservation and reducing nutrient pollution of the surface waters of the Commonwealth. The committee was requested to identify or suggest potential opportunities to expand water reclamation and reuse in Virginia. All opportunities identified by the committee were noted. Each committee member was then asked to assign four points to one or more opportunities that they believed to be the greatest priorities among the opportunities listed. All opportunities sorted by group and in order of highest to lowest number of priority points received, including opportunities that received no points, are contained in Attachment B of this report. Following this exercise, the committee discussed opportunities by group, identifying relevant concerns and potential solutions. This discussion provided further information on what the committee considered to be higher priorities and where opportunities for action were most supported.

Table 1 contains opportunities to expand or improve water reclamation and reuse that were: (i) identified and assigned at least one priority point by the committee, and (ii) identified by the agencies independent of the committee. Also contained in the table is a description of existing or currently proposed initiatives to implement these opportunities, and any further action that may be needed for implementation. Summaries of opportunities and recommendations regarding further action, and mode of implementation based on the information provided in Table 1 and discussions of the committee are provided following the table.

Table 1. Potential Opportunities to Expand or Improve Implementation of Water Reclamation and Reuse

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
<p>1. EDUCATION: Develop public educational information to promote water reclamation and reuse for both benefits to utilities, growth opportunities for localities and safety to the public. This may generate demand and ensure there is an informed public.</p>	<p>13</p>	<p>DEQ currently has a water reclamation and reuse program page on the agency’s website that provides information on the regulation, permit application forms, possible sources of funding and other resources; develop educational programs through the Virginia Cooperative Extension Service and public university faculty and staff.; Investigate other opportunities.</p>	<p>Agency operational or process change (VDH, DEQ and DCR); local government action; private sector action</p>
<p>2. REGULATIONS: Resolve issues that inhibit groundwater recharge with reclaimed water.</p>	<p>6</p>	<p>DEQ has committed to publishing a Notice of Intended Regulatory Action in early 2012 to amend the Water Reclamation and Reuse Regulation and other regulations to address groundwater recharge with reclaimed water for reuse. This activity carries risks to those who use groundwater (untreated and un-monitored) for drinking or domestic purposes that will need to be considered by future regulatory actions.</p>	<p>Regulatory change; agency operational or process change (DEQ)</p>

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
3. FINANCIAL: Provide tax incentives and tax credits for end users in order to create demand	6	§58.1-3660 of the Code of Virginia gives the State Water Control Board authority to certify that specific equipment and facilities will abate or prevent pollution of state waters in order to qualify for certain tax exemptions. Addendum No.6 to DEQ Water Division Guidance Memo No. 92-006 describes agency procedures to certify water reclamation and reuse equipment and facilities for this tax exemption. Any state tax incentives and state tax credits for water reclamation and reuse would need to be approved by the General Assembly and localities.	Statutory change; local government action
4. WATER RESOURCES: Utilize a watershed approach when considering water reclamation and reuse and consider water supply. The analysis approach should include a mass balance.	6	Proposed amendments to the Water Reclamation and Reuse Regulation will require cumulative impact analysis for new or expanding water reclamation and reuse proposals to determine impacts to beneficial uses. The unit of analysis will be a watershed. Water reuse is identified in the Local and Regional Water Supply Planning Regulation (9VAC25-780) as a nontraditional means of increasing water supplies.	Regulatory change (in progress); agency operational or process change (DEQ)

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
<p>5. REGULATIONS: Consider whether the regulatory actions taken in other states are appropriate to promote and encourage water reclamation and reuse in Virginia</p>	<p>5</p>	<p>Although much of Virginia’s Water Reclamation and Reuse Regulation was modeled after Florida’s water reuse regulations, future amendments to the Virginia regulation may incorporate further requirements that are similar to those in the Florida regulation, particularly those related to groundwater recharge with reclaimed water.</p>	<p>Regulatory change</p>
<p>6. PUBLIC HEALTH: Ensure public health risks related to water reclamation and reuse are adequately addressed for all types and uses of reclaimed water</p>	<p>4</p>	<p>Standards for reclamation of municipal wastewater are contained in Virginia’s Water Reclamation and Reuse Regulation, and were derived largely from EPA Guidelines for Water Reuse (2004), which address public health risks. Requirements of the Water Reclamation and Reuse Regulation do not apply to reclamation and reuse of gray water and storm water.</p> <p>VDH will implement the AOSS Regulations to assure adequate standards are in place to protect groundwater and that AOSS are properly operated and maintained. (See also item #27 information on regulatory action.)</p>	<p>Agency operational or process change (DEQ and VDH)</p>

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
7. PUBLIC HEALTH: Establish a risk based decision process when evaluating impacts to public health	3	<p>As required by the Water Reclamation and Reuse Regulation, public health risks for the reclamation and reuse of industrial wastewater and for reuses not listed in the regulation are evaluated on a case-by-case basis with input from VDH. Requirements of the Water Reclamation and Reuse Regulation do not apply to reclamation and reuse of gray water and storm water.</p> <p>VDH, DEQ and DCR could work collaboratively to develop and implement risk-based strategies for evaluating the reclamation and reuse of various wastewater sources (e.g., municipal and industrial wastewater, sewage, gray water, and stormwater). These agencies may also consider cost benefit analysis.</p>	Agency operational or process change (VDH, DEQ and DCR)
8. REGULATIONS: Examine other sections of Virginia Administrative Code [e.g., Uniform Statewide Building Code] and eliminate conflicts that are obstacles to water reuse	3	VDH and DEQ have been and will continue to be involved in the advisory committee assisting the Virginia DHCD with amendments to the USBCs. This process occurs every three years.	Regulatory change

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
9. FINANCIAL: Link financial incentives to water supply and nutrient caps creating demand for reuse	3	Currently, DEQ is considering increasing priority points given to all water reclamation and reuse projects applying for VCWRL funds, including, but not limited to, those projects for which the primary purpose is to reduce nutrient pollution to surface water or conserve water. WQIF grant guidelines are also to be amended to define criteria and financial incentives for water reuse.	Agency operational or process change (DEQ)
10. REGULATIONS: Reduce permitted limitations on irrigation rates and consider use of reclaimed water with higher nutrient levels	3	Existing agency guidance on irrigation reuse of reclaimed water may be amended to address this.	Agency operational or process change (DEQ)
11. TECHNICAL: Encourage use of in-field monitoring to regulate application rates (e.g. soil moisture gauges)	2	Existing agency guidance on irrigation reuse of reclaimed water may be amended to address this.	Agency operational or process change (DEQ)
12. FINANCIAL: Encourage or subsidize irrigation reuse for agriculture. Irrigation reuse can result in more efficient nutrient uptake, particularly during/after drought.	2	Investigate feasibility of subsidy	Statutory change
13. REGULATIONS: Identify opportunities to reuse storm water	2	DCR has statutory authority to develop regulations for the reclamation and reuse of storm water; examine procedures with respect to promoting practices	Regulatory change; agency operational or process change (DCR)
14. REGULATIONS: Address storage limitations for reclaimed water experienced by some end users	2	Proposed amendments to the Water Reclamation and Reuse Regulation will significantly reduce the size of reclaimed water storage facilities required by end users.	Regulatory change (in progress); agency operational or process change (DEQ)

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
15. WATER RESOURCES: Examine projects as a whole to meet goals and consider in-stream impacts	2	Proposed amendments to the Water Reclamation and Reuse Regulation will require cumulative impact analysis for new or expanding water reclamation and reuse proposals to determine impacts to beneficial uses.	Change to regulation (in progress); agency operational or process change (DEQ)
16. WATER RESOURCES: Create a state fresh water management plan	2	It is anticipated that the State Water Resources Plan resulting from the Local and Regional Water Supply Planning process will provide a much clearer hydrologic basis for identifying where greater encouragement of reuse would contribute to or detract from long term water availability.	Statutory change and/or regulatory change (pending completion of the State Water Resources Plan)
17. REGULATIONS: Allow storm water volume and pollutant reduction credits for LID (Low Impact Development) practices that harvest storm water	1	These credits will be provided in DCR's final storm water regulations expected to become effective on 10/24/11	Regulatory change (in progress); agency operational or process change (DCR)
18. REGULATIONS: Establish a link between water reclamation and reuse and nutrient reduction goals in the Chesapeake Bay TMDL Watershed Implementation Plan (WIP)	1	Water reclamation and reuse is identified as an option to meet waste load allocations for nitrogen and phosphorus in Phase I of the WIP	None

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
19. WATER RESOURCES: Acknowledge limited water supply creates demand for reclaimed water and focus on water reclamation and reuse to address shortages	1	Within Groundwater Management Areas, localities are experiencing water shortages and, as a result, these are areas where reuse projects are more likely to occur. DEQ has proposed amendments to 9VAC25-600 that, if adopted, will expand the Eastern Virginia Groundwater Management Area to include the remaining portions of Virginia's coastal plain.	Regulatory change (in progress); agency operational or process change (DEQ); local government action; private sector action
20. REGULATIONS: Eliminate barrier in some residential subdivisions where Home Owners Associations do not allow rain barrels	1	DCR is responsible for state design manuals and most regulations pertaining to storm water runoff management and discharges. This could be addressed in the implementation guidance for the final storm water regulations that are anticipated to go into effect on 10/24/11 and implemented in July 2014.	Agency operational or process change (DCR); local government action; private sector action
21. EDUCATION: Partner with engineering groups to promote water reclamation and reuse	1	DEQ and VDH are involved with the VA AWWA and VA WEA joint water reuse committee that represents largely utilities and their engineering consultants. DEQ also provides presentations on water reclamation and reuse at various training events and seminars sponsored by wastewater engineering groups and organizations. Utilize resources (e.g., publications, websites, training and demonstrations) that can be provided by the Virginia Cooperative Extension Service and public university faculty and staff.	Agency operational or process change (VDH, DEQ and DCR); private sector action

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
22. EDUCATION: Promote LEED (Leadership in Energy and Environmental Design) certification	1	LEED is an internationally recognized green building certification system developed by the U.S. Green Building Council.	Private sector action
23. FINANCIAL: Subsidize operation and maintenance costs for projects	1	The state currently provides financial support for initial construction costs only. Investigate feasibility of subsidy.	Statutory change
24. TECHNICAL: Increase nutrient content in reclaimed wastewater used for irrigation reuse (i.e. do not highly treat for nutrient reduction as required for discharges)	1	Existing agency guidance on irrigation reuse of reclaimed water may be amended to address this.	Agency operational or process change (DEQ)
25. TECHNICAL: Coordinate permitting for biosolids sites with sites permitted for irrigation reuse. Synchronize irrigation needs with nutrient needs.	1	Existing agency guidance on irrigation reuse of reclaimed water may be amended to address this.	Agency operational or process change (DEQ)
26. FINANCIAL: Provide financial incentives to the most cost effective option to achieve the goals	**	Currently, the sole purpose of the Water Quality Improvement Act is to provide WQIF funds for cost effective nutrient removal technology to reduce point source nutrient loads within the Chesapeake Bay Watershed. Payment of grants through WQIF is subject to the availability of funds appropriated by the General Assembly.	Statutory change (maintenance of funding levels)

Opportunities	Priority Points*	Existing or Potential Initiatives to Implement	Further Action Needed
27. REGULATIONS: Implement final AOSS Regulations effective December 7, 2011; develop regulations for gray water reclamation and reuse	**	<p>VDH will complete the regulatory action on the final AOSS regulations. These regulations will assure that adequate standards are in place to protect groundwater and AOSS are properly operated and maintained.</p> <p>VDH may consider adopting regulations for gray water reclamation and reuse.</p>	Regulatory change (VDH); agency operation or process change (VDH)
28. REGULATIONS: Develop a general permit for certain reclaimed water agents or distributor (i.e., tank trucks that deliver reclaimed water to end users other than themselves that are independent owners/operators)	**	<p>§ 62.1-44.15 (15) of the Code of Virginia gives the State Water Control Board the authority to establish general permits for various potential categories of water reuse. This is currently not a high priority as reclaimed water bulk filling stations for tank trucks are planned but not yet constructed. As these facilities become more prevalent in the future, there will be a greater need for the general permit.</p>	Regulatory change (DEQ)
29. FINANCIAL: Assign more priority points to water reclamation and reuse proposals that apply for Virginia Clean Water Revolving Loans	**	Would require change to VCWRL Fund procedural guidelines and approval by the State Water Control Board	Agency operational or process change (DEQ)

* Priority Points were assigned by the stakeholder committee.

**Additional opportunity identified by DEQ and VDH, no priority was assigned by the committee.

Summary of Opportunities and Recommendations Regarding Further Action

The opportunities identified by the stakeholder committee to expand the use or improve implementation of water reclamation and reuse projects fall into six (6) primary categories:

- i. Regulatory issues (22 priority points);
- ii. Role of education (15 priority points);
- iii. Financial issues (12 priority points);
- iv. Addressing the link to water resources issues (10 priority points);
- v. Addressing public health risks (7 priority points); and
- vi. Technical issues related to irrigation sites (7 priority points).

These categories are prioritized according to the number of priority points assigned by committee stakeholders. Categories with the greatest number of priority points are identified as areas of highest concern.

Regulation and Education

While issues related to regulatory oversight received the most priority points overall from the stakeholder committee, education is one specific area that the committee agreed is critical. The target audience includes municipal utilities, municipal governments, engineering consulting firms, potential end users, and the public at large. The committee also agreed that because water reuse is not always the best option, education regarding the pros and cons of specific water reuse applications is a necessary part of any educational effort. For example, reduction in discharges due to treated effluent diverted to water reclamation and reuse must be weighed against the resulting reduction in instream flow and the possible impact on water supply and assimilative capacity. Because water reuse is not likely to be the least costly option, other benefits of water reuse such as the ability for a locality capped on nutrient discharges to continue to grow if water is reused, must be communicated. A large part of the educational effort should be aimed at generating demand, as the committee agreed that a key factor to expansion of water reuse is establishment of a large customer base for the product. Human health issues arise in this arena, particularly the importance of assuring the public that appropriate regulatory standards, operation and maintenance, and monitoring requirements are in place.

Regulations must be balanced between protecting public health and the environment, and providing options to implement cost effective alternatives. The current regulatory process to amend the Water Reclamation and Reuse regulation is aimed at achieving this goal, and the public involvement process to review the proposed regulation will provide additional insight in achieving this balance. Specific issues being addressed in this regulatory action that received attention from the stakeholder committee include relaxing the storage capacity requirements for end users, as well as additional monitoring requirements for some reclaimed water distribution systems in order to provide assurance that public health is protected.

The regulatory issue that garnered the most priority points from the committee was related to the use of reclaimed water for groundwater recharge. DEQ will be starting a regulatory process in 2012 to examine the rules related to groundwater recharge, as the related issues encompass multiple regulations and policies. The practice of groundwater recharge involves significant

technical issues related to aquifer geology, hydrology, travel time, and chemistry; and the quality and quantity of water to be used for recharge, which, in turn, affect the maintenance of a safe potable groundwater supply.

Financial

Financial issues were identified by the committee most frequently related to ways to incentivize water reclamation and reuse. As stated previously, reclamation of wastewater is generally not the most cost effective source of water for most uses. Therefore, there should be mechanisms in place to offset the associated costs. Subsidies identified included potential benefits not only for capital costs associated with providing the water (currently provided), but also to end users to incentivize the demand. Some of these financial issues could be addressed through changes in agency regulation or policy, specifically those related to priority points assigned to VCWRL Fund projects. Most financial issues would require resolution through legislative action, specifically the following:

- i. Availability of grant funds for WQIF projects;
- ii. Tax incentives/tax credits;
- iii. Subsidies for agricultural irrigation use; and
- iv. Subsidies for operation and maintenance of water reclamation and reuse projects

Water Resources

The stakeholder committee spent a considerable amount of time discussing the relationship between demand for reclaimed water and water supply. It is recognized that where supplies are limited due to environmental or consumptive uses, or where the cost of potable groundwater is higher, demand for reclaimed water increases. As Virginia is not an arid state, challenges in the Commonwealth are more closely related to increasing demand for water. This demand applies to both surface water and groundwater sources. Whether it be the importance of maintaining flow for downstream users, or maintenance of instream flow for assimilative capacity related to existing discharges, expansion of water reclamation and reuse projects must be weighed against these other factors on a consistent basis.

The establishment of a state freshwater management plan to address water resources issues in a more comprehensive, holistic fashion was seen as a priority by the stakeholder committee. Components of such a plan (essentially what will be the State Water Resources Plan) could require statutory change.

Public Health

The committee agreed that protection of public health must remain paramount in any effort to promote water reclamation and reuse and as a determining factor in evaluating policy changes, as well as, individual strategies or projects. As discussed, a balance between public health protection, ease of implementation and consideration of all costs to potentially affected stakeholders must be considered. While standards and procedures for risk-based assessment have been established for reuse of wastewater, there are opportunities to further refine those standards and consider similar standards for storm water reuse projects. These standards might be applied through regulation or policy by DCR and VDH where authority exists or is provided through future changes to governing statutes. Once policies and regulations are established to protect

public health, education remains a critical component of any water reclamation and reuse project. The increased interest in groundwater recharge, as well as increased permitting activity for AOSS that employ direct dispersal to groundwater, serve as a poignant reminder of the need for appropriate risk-based strategies. These strategies include public education regarding the risks associated with non-discharging wastewater management alternatives, including, but not limited to, water reclamation and reuse, and public involvement opportunities (See Attachment D).

Technical

Technology to produce reclaimed water is not seen as an obstacle to expanding reclamation and reuse. In fact, since most wastewater is so highly treated, most plants already meet the requirements necessary for many uses. Technical issues identified by the stakeholder committee related primarily to irrigation reuse practices, as the nutrient reduction necessary for discharge limits does not work in concert with nutrient demands of crops. While limits related to nutrient management must be considered in order to address non-point pollution concerns, areas where changes in agency guidance could result in more efficient utilization of reclaimed water were identified. Differences between land treatment, where more nutrients are available to meet crop nutrient demands, and irrigation reuse, where the primary benefit is supplying crop water demands, are practices that can be employed based on site specific conditions.

Summary of Mode of Implementation

The mechanisms necessary to implement further action identified in Table 1 include:

- i. Statutory change;
- ii. Regulatory change;
- iii. Agency operational or process change;
- iv. Local government action; and
- v. Private sector action.

The mode of implementation for the opportunities identified by the stakeholder committee is summarized below:

- **Statutory:**
 - Provide tax incentives and tax credits for end users in order to create demand (item #3)
 - Provide subsidies for agricultural irrigation reuse of reclaimed water (item #12)
 - Establish priority areas to encourage water reuse pending completion of the State Water Resources Plan (item #16)
 - Subsidize operation and maintenance costs of water reclamation and reuse projects (item #23)
 - Ensure availability of grant funds for WQIF (item #26)
- **Regulatory:**
 - DEQ
 - Resolve issues that inhibit groundwater recharge with reclaimed water (item #2)

- Utilize a watershed approach when considering water reclamation and reuse, and consider water supply (item #4)
- Consider whether the regulatory actions taken in other states are appropriate to promote and encourage water reclamation and reuse in Virginia (item #5)
- Examine other sections of Virginia Administrative Code [e.g., Uniform Statewide Building Code] and eliminate conflicts that are obstacles to water reuse (item #8)
- Address storage limitations for reclaimed water experienced by some end users (item #14)
- Perform cumulative impact analysis for new or expanding water reclamation and reuse proposals (item #15)
- Identify and establish priority areas to encourage water reuse pending State Water Resources Plan completion (item #16)
- Limit groundwater withdrawals within Groundwater Management Areas (item #19)
- Develop a general permit for reclaimed water agents that use tank trucks to distribute reclaimed water (item #27)
- VDH
 - Implement final (permanent) AOSS Regulations effective December 7, 2011 (Item #27)
 - May consider adopting regulations for the reclamation and reuse of gray water (Item #27)
- DCR
 - Develop regulations to promote storm water reclamation and reuse (item #13);
 - Allow storm water volume and pollutant reduction credits for LID (Low Impact Development) practices that harvest storm water (item #17)
- **Agency operational or process change:**
 - DEQ
 - Development of training and educational programs and materials (item # 1, 21);
 - Resolve issues that inhibit groundwater recharge with reclaimed water (item #2);
 - Utilize a watershed approach when considering water reclamation and reuse and consider water supply (item #4);
 - Revision of WQIF grant guidelines (item #9)
 - Revision of the VCWRL procedural guidelines (item #28);
 - Revision of regulation implementation guidance (item #10, 11, 15, 19, 24, 25); and
 - Address storage limitations for reclaimed water experienced by some end users (item #14)
 - Work collaboratively with other state agencies (e.g., VDH and DCR) to develop and

implement risk-based strategies for evaluating the reclamation and reuse of various wastewater sources. May also consider cost benefit analysis. (Item #7)

- VDH

- Implement final AOSS Regulations effective December 7, 2011 (Item #6)
- Development of training and educational programs and materials (item #1, 21); and
- Revision or development of guidance and procedures to address public health risks associated with gray water reclamation and reuse (item #6, 7)
- Work collaboratively with other state agencies (e.g., DEQ and DCR) to develop and implement risk-based strategies for evaluating the reclamation and reuse of various wastewater sources. May also consider cost benefit analysis. (Item #7)

- DCR

- Development of training and educational programs and materials (item # 1, 21);
- Revision or development of guidance and procedures to address public health risks associated with storm water reclamation and reuse (item #6, 7)
- Revision or development of procedures to promote storm water reclamation and reuse (item #13),
- Revision or development of regulation implementation guidance (item #17, 20)
- Work collaboratively with other state agencies (e.g., VDH and DEQ) to develop and implement risk-based strategies for evaluating the reclamation and reuse of various wastewater sources. May also consider cost benefit analysis. (Item #7)

- **Local government action:**

- Development of training and educational programs and materials (item #1, 21);
- Provide tax incentives and tax credits for end users (item #3);
- Local ordinances that limit specific groundwater withdrawals (item #19);
- Promote storm water reclamation (item #20)

- **Private sector action:**

- Development of training and educational programs and materials (item # 1, 21, 22);
- Promotion of reclamation projects in areas with limited groundwater withdrawals (item #19);
- Promote storm water reclamation (item #20)

VI. Define WQIF Criteria and Financial Incentives for Water Reclamation and Reuse

During the 2011 General Assembly, the WQIA was amended to require that WQIF grant guidelines of the SNR “*define criteria and financial incentives for reuse*”. As mentioned in the Executive Summary, reclamation and reuse is already defined as nutrient reduction technology

(NRT) in the WQIF point source grant program and two projects have received cost-share for some components making up the reuse process. One project involved reclaimed water used for agricultural spray irrigation and the other will provide water to a power generating facility for use as cooling water.

DEQ staff has recognized the need for further explanation and details on the elements of a reclamation and reuse project that would qualify for WQIF cost-share. In addition to revisions needed in the SNR's WQIF Grant Guidelines, further details will be added to a current DEQ Guidance Memorandum (#06-2012) that lays out the eligibility of individual unit processes in a WWTF that are eligible components of an NRT system.

The WQIA specifies that amendments to the SNR's Guidelines must go through a public participation process that includes:

- Use of an advisory Committee composed of interested parties (the group assembled to assist with this Report),
- A 60-day public comment period on draft guidelines, and
- Notice of availability of draft guidelines and final guidelines to all who request such notice.

In addition, the SNR must consult with various other Cabinet Secretaries and citizen boards when developing the WQIF Guidelines. This advice and consultation will be sought on the following draft proposed revisions to the Guidelines:

1. Define criteria for water reclamation and reuse:
 - a. Must be authorized under a VPDES permit.
 - b. The proposal must meet all other WQIF criteria for cost-effectiveness and reliability to meet performance limits.
 - c. Any necessary contracts or agreements for long-term use of reclaimed water by end-users must be secured.
 - d. The reuse must be consumptive (i.e., eligibility will be dependent on, and possibly reduced in proportion to, the amount of reclaimed water returned to the WWTF).
2. Financial incentives:
 - a. NRT components necessary to treat the wastewater to a quality required for its intended use (i.e., Standards for Reclaimed Water; Level 1 and Level 2) will be eligible for cost-share.
 - b. In addition to in-plant NRT units, eligibility will be given to on-site storage, pumping and main-trunk transmission piping to deliver the reclaimed water to end users. Off-site storage, satellite pump stations and spur-line piping for expanded distribution systems are the responsibility of the grantee or end user.
 - c. Minimum line-item eligibility will be 75% of the total cost for eligible components comprising the reclamation and reuse system. This eligible cost is

- then subject to the overall grant percentage for the project.
- d. Eligibility may be higher if it can be demonstrated that there are other benefits provided by reuse (e.g., assists in meeting an approved local or regional water supply plan).

To-date, with the exception of the two projects previously mentioned, water reclamation and reuse has not been included as a part of WQIF grant-funded NRT projects. The availability and relatively lower cost of potable water (compared to the cost per gallon to treat and deliver reclaimed water) appear, in part, to suppress the demand for reclaimed water as an alternative. However, water reclamation and reuse has been included in several projects outside the WQIF program, and serious consideration is being given to water reclamation and reuse as a way to maintain nutrient waste load allocations at WWTFs “capped” in the Chesapeake Bay watershed. As population increases in the future and WWTFs become limited by the available nutrient treatment technology, water reclamation and reuse (either seasonal or year-round) may offer a viable alternative to surface water discharge and allow for design flow expansion. Therefore, it is likely that discharge “cap” maintenance will become a greater driver than financial incentives for water reclamation and reuse in the future.

VII. Other Alternatives to Reduce Discharges of Nutrients to Surface Waters in Virginia

There are alternatives in addition to water reclamation and reuse that are available to reduce nutrient pollution of surface waters from point source discharges in Virginia. A variety of factors, including environmental, economic and societal, should be considered when determining the most appropriate alternative to implement. The following briefly discusses some of the more common alternatives and their advantages and disadvantages.

A. Discharging Alternatives

Section 101 (a) (1) of the federal Clean Water Act states that it is the objective of the Act “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters”. In order to achieve this objective, the Act further states that “it is the national goal that the discharge of pollutants into navigable water be eliminated by 1985”. As reflected in various state laws and regulations governing point source discharges to surface waters, Virginia has interpreted this goal of the Clean Water Act to mean the elimination of pollutant discharges and not the elimination of water that may carry these pollutants in the discharge. Greater than 90 percent of Virginia’s public water supply is obtained from surface water (Ref. 1), which consists in part of flows from upstream discharges to these waters, particularly during periods of drought. Consequently, eliminating or substantially reducing surface water discharges could adversely impact downstream beneficial uses, including water withdrawals for public water supply.

Wastewater treatment facilities can maintain a discharge of treated water to surface waters and reduce the discharge of nutrients by reducing the concentration of nutrients in the treated water. This can be achieved through specific wastewater treatment processes referred to as nutrient reduction technology.

1. Nutrient reduction technology

Most publicly owned WWTFs use biological processes to treat wastewater. As a result, they achieve some degree of nitrogen and phosphorus removal just to meet secondary treatment levels. However, more stringent discharge limitations are being placed on WWTFs that require additional treatment processes in order to aid in restoring and maintaining water quality in the Chesapeake Bay watershed and other receiving waters impacted by excessive nutrient loads. NRT uses biological and physical or chemical processes to reduce nitrogen and phosphorus in the discharge of WWTFs, thereby allowing them to meet more stringent limitations.

Advantages and disadvantage of NRT are as follows:

a. Advantages

- Technology is well-known, effective and , properly designed and maintained, is capable of reliably achieving annual average discharge limits and load allowances;
- Improves the settling and dewatering properties of activated sludge;
- Typically has a smaller physical footprint compared to most non-discharging, land-based alternatives; and
- Can partially offset electrical and chemical costs in addition to removing nutrients. Most plants are required to reduce ammonia-nitrogen discharge due to instream dissolved oxygen depletion or toxicity concerns. This is typically achieved through nitrification (conversion of ammonia to nitrate) using extensive aeration systems. After nitrifying, adding a denitrification process (conversion of nitrate to elemental nitrogen gas) has the advantages of not only reducing the discharged total nitrogen, but also reclaiming a portion of the oxygen used in aeration (lowering electrical costs for blowers) as well as recovering alkalinity (potentially reducing chemical costs) that was consumed during nitrification; and
- Maintains flow levels for downstream beneficial uses.

b. Disadvantages

- More expensive to construct, operate and maintain than conventional secondary treatment processes;
- Requires more careful design and complex operation due to added recycles and chemical addition. However, improvements are being made in automated system control and remote monitoring to reduce this impact;
- Depending on supplemental carbon source used for denitrification (if needed), may be hazardous (e.g., methanol) or require post-aeration to maintain dissolved oxygen levels in the discharge; and
- Phosphorus reduction is typically achieved by chemical precipitation. This increases the amount of biosolids requiring treatment, dewatering and disposal, and the amount of phosphorus in the biosolids, which may further limit the rate at which the biosolids can

be land applied on soils already high in phosphorus for beneficial use (e.g., turf production, hay, pasture, etc.).

B. Non-discharging Alternatives

There are a variety of non-discharging alternatives in addition to water reclamation and reuse that can be used to reduce nutrient pollution of surface waters from point source discharges. Some of the more common or increasingly popular alternatives among these are land treatment, conventional or alternative onsite sewage systems, and storm water reclamation and reuse. While each of these alternatives has unique advantages, they share some common disadvantages.

Some non-discharging alternatives can support surface water flows and levels where the alternatives are designed to recharge groundwater that then provides base flow to surface waters. However, most non-discharging alternatives are likely to reduce surface water flows and levels, and could impact beneficial uses of these waters, particularly where the uses were previously supported by the flow of a discharge. This is a significant concern related to public water supply, which relies heavily on surface water withdrawals in Virginia (Ref. 1). Consequently, it may be necessary to maintain a surface water discharge in addition to a non-discharging alternative determined by the type and extent of impacts to downstream beneficial uses that are anticipated under specific low flow conditions.

Non-discharging alternatives may not significantly reduce nutrient pollution of surface waters where they are not designed to remove nutrients or are not properly constructed, operated or maintained. This may result in nutrient pollution of groundwater and subsequently surface waters where the groundwater is hydrologically connected (e.g., provides base flow) to surface waters. Also, inspection and monitoring requirements to verify the performance of non-discharging alternatives vary widely. Therefore, it is difficult to quantify the relative nutrient pollution reduction to surface waters achieved by various non-discharging alternatives.

In Virginia, many private well owners obtain drinking water from surficial aquifers or shallow groundwater. There is concern that land-based, non-discharging wastewater management alternatives may result in the release of potentially harmful contaminants to shallow groundwater, thereby impacting these private well owners.

Lastly, the total maximum daily load for nutrients (nitrogen and phosphorus) developed by the U.S. EPA for the Chesapeake Bay will increasingly affect non-point sources of nutrients to the Bay, including non-discharging alternatives to manage and/or dispose of wastewater. This is likely to increase wastewater treatment requirements and the use of best management practices for non-discharging alternatives.

1. Land treatment

As described by the SCAT Regulations (9VAC25-790), land treatment involves the pretreatment of municipal wastewater by secondary treatment processes followed by the application of this partially treated wastewater to an approved site for further treatment and disposal. Treatment at the application site occurs through natural processes in the soil and nutrient uptake by vegetation

(e.g., row crops, hay, turf, etc.) if planted at the site. Methods to apply wastewater to a land treatment site include slow rate irrigation, overland flow, and infiltration-percolation (e.g., rapid infiltration).

Land treatment is not the same as irrigation reuse. Land treatment is considered a method to further treat and dispose of wastewater, while irrigation reuse is not intended to provide any additional treatment of reclaimed water or disposal. There is one exception where the SCAT Regulations indicate that a rapid infiltration basin (a method of land treatment) is to be designed, in part, to recover “renovated water using wells or under drains with subsequent reuse”. Also, land treatment typically has higher hydraulic loading rates than irrigation reuse, increasing the potential for groundwater contamination and, therefore, the need for groundwater monitoring. Irrigation reuse does not require groundwater monitoring. Lastly, land treatment of wastewater will require a permit from DEQ or VDH depending on the type and size of the land treatment system, while irrigation reuse of reclaimed water will not require most end users to obtain a permit.

Advantages and disadvantages of land treatment are as follows:

a. Advantages

- Can remove both nitrogen and phosphorus depending on the method of land treatment used;
- Typically allows higher hydraulic loading rates than irrigation reuse determined by onsite conditions and the type of vegetation if used as part of treatment;
- Allows harvestable crops to be grown on treatment sites with some setbacks and restrictions for access and harvesting; and
- Can reduce the amount and cost of commercial fertilizer for crops grown on land treatment sites.

b. Disadvantages

- Nutrient loading rates at treatment sites will be limited by the concentration of nutrients in the effluent and in accordance with a nutrient management plan;
- Typically requires groundwater monitoring;
- Has greater potential for hydraulic overloading where the treatment sites are under common ownership or management with wastewater treatment works providing wastewater to the sites;
- May require a significant area of land for treatment and an extensive distribution system to deliver wastewater to the treatment sites;
- May require storage or other non-discharging alternative to manage or dispose of the partially treated wastewater during non-growing season months; and

- Is not considered a water supply planning tool to conserve potable water and to supplement a community's overall water supply for other uses.

2. Conventional or alternative onsite sewage systems

Onsite sewage systems, often called “decentralized” sewage systems, are usually privately owned and serve a single household. There is no regulatory upper limit for the size of an onsite sewage system. Therefore, they can be designed to serve multiple households. In such situations, decentralized sewage systems are owned by homeowners associations, private utility companies or government entities. Onsite sewage systems employ some form of wastewater treatment, often a septic tank, before releasing partially treated wastewater into the soil environment for additional treatment and dispersal similar to land treatment systems. Some onsite sewage systems utilize advanced treatment, producing wastewater of secondary or better quality. Most onsite sewage systems require unsaturated soil conditions below the soil treatment area (“drainfield”) because initial treatment is not adequate to fully renovate the wastewater and render it safe for incorporation directly into groundwater. The unsaturated soil in the drainfield provides additional treatment, or ‘polishing.’ Onsite sewage systems completely dispose of all wastewater in the soil and do not create a point source discharge.

As an alternative to reduce nutrient pollution to surface waters, onsite sewage systems are not optimal. Because these systems are located in the upper part of the unconsolidated soil column, wastewater from onsite sewage systems that is not evaporated or taken up by plants percolates downward and combines with or rides atop the unconfined aquifer to eventually become part of surface water base flow. According to the U.S. EPA, 40 percent of nitrogen from a conventional onsite sewage system reaches a stream. Design choices can reduce the amount of nitrogen leaving an onsite sewage system. These include the use of treatment devices to reduce total nitrogen, and locating the system drainfield in a biologically active zone where plant uptake and denitrification may occur. Achieving near-zero nitrogen loss (to groundwater) from an onsite sewage system is possible, but expensive.

Onsite sewage systems can be configured, through careful application of treatment technologies and proper operation and maintenance, for water reuse. Virginia Department of Health regulations do not prohibit water reuse for toilet flushing, and drainfields can be designed to function partially as irrigation systems for lawns, trees, shrubs, etc. With the exception of irrigation with treated and disinfected gray water, above ground irrigation and other uses such as car washing, laundry, etc. are currently not allowed. In the future, owners may be able to obtain permits issued jointly by VDH and DEQ that will allow other uses of reclaimed water from onsite sewage systems.

Onsite systems are distinguished from land treatment systems by several characteristics. First, land treatment systems may apply effluent above ground, while onsite sewage systems must keep all effluent under the ground surface at all times. Land treatment systems require storage for periods when effluent cannot be land applied due to seasonal conditions or other factors, whereas onsite sewage systems do not require storage. Land treatment systems that rely, in part, on vegetation at the site for nutrient removal prescribe effluent application rates in accordance with a nutrient management plan; onsite sewage application rates are based on soil long-term

acceptance rates. Lastly, onsite systems are permitted by VDH pursuant to authorities established in Title 32.1 of the Code of Virginia, whereas land treatment systems are permitted by DEQ pursuant to authorities in Title 62.1 of the Code.

Conventional and alternative onsite sewage systems can be distinguished by certain design characteristics. Conventional systems use septic tanks for treatment and gravity distribution in the drainfield. Alternative systems employ treatment other than septic tanks and/or pressurized distribution in the drainfield.

Advantages and disadvantages of onsite sewage systems (conventional and alternative) are as follows:

a. Advantages

- Modular concept allows the owner to build only what is needed;
- Do not require a large investment in a collection system;
- Can be configured to function as irrigation in the growing season and disposal in the non-growing seasons with no storage required;
- Can employ nitrogen-reducing strategies in the design; and
- Can be designed and operated for limited reuse.

b. Disadvantages

- Nitrogen discharges are not regulated except for alternative onsite sewage systems where the concentration of nitrate for systems over 1,000 gpd is limited to 5mg/l, which may be achieved by dilution. (Note: the final AOSS Regulations will establish nitrogen removal requirements for large AOSS, and for AOSS located within the Chesapeake Bay watershed);
- Increased operation and maintenance (O&M) costs due to travel and decentralized nature;
- Require relatively deep well-drained soils (applicable to conventional onsite sewage systems);
- Have regulated O&M requirements (applicable to alternative onsite sewage systems);
- Contribute nitrogen to surface waters unless significant design modifications are made; and
- Lack groundwater quality standards and operational standards that are appropriate and adequate for the protection of public health and the environment for systems discharging directly to groundwater (Note: the final AOSS Regulation will address groundwater quality standards and operational standards for AOSS, but not for conventional onsite sewage systems). Some permittees have abandoned surface discharges in favor of onsite sewage systems because of the perceived ease in obtaining such permits and the lack of O&M requirements.

3. Storm water reclamation and reuse

Section § 10.1-603.4. charges the Virginia Soil and Water Conservation Board (Board) and the Department of Conservation and Recreation (DCR) to promote the reclamation and reuse of storm water for uses other than potable water in order to protect state waters and the public health and to minimize the direct discharge of pollutants into state waters. As such, new Board approved storm water regulations encourage the harvesting of storm water for the purposes of landscape irrigation systems, fire protection systems, flushing water closets and urinals, and other water handling systems to the extent such systems are consistent with federal, state, and local regulations. In doing so, DCR developed design specifications that allow the use of rainwater harvesting to meet storm water quality design criteria for new and redevelopment projects. These design specifications can be found at:

http://vwrrc.vt.edu/swc/NonPBMPSpecsMarch11/DCR%20BMP%20Spec%20No%206_RAIN_WATER%20HARVESTING_Final%20Draft_v1-9-5_03012011.pdf. The new regulations will be effective in October 2011 and implemented in July 2014.

VIII. Public Comments on Second Draft Report

To provide the public an opportunity to review and submit comments on the report, a public notice with a link to the second draft of the report was posted on the Virginia Regulatory Town Hall from September 7 through September 21, 2011. Comments were received from three persons and are included in Attachment C.

IX. References

1. Virginia Department of Environmental Quality. 2010. Status of Virginia's Water Resources: A Report on Virginia's Water Resources Management Activities, available at http://www.deq.virginia.gov/export/sites/default/regulations/documents/2010_State_Water_Resource_Report.pdf.

Attachment A

2011 Appropriations Act, Department of Health (601), Item 290

Department of Health (601)

290.	Environmental Health Hazards Control (56500)	8,025,897 8,140,522	7,811,497 8,842,294
	State Office of Environmental Health Services (56501)	4,330,585 4,445,210	4,330,585 4,503,993
	Shellfish Sanitation (56502)	2,060,237	1,845,837 1,995,987
	Bedding and Upholstery Inspection (56503)	260,872	260,872 400,872
	Radiological Health and Safety Regulation (56504)	1,374,203	1,374,203 1,941,442
Fund Sources:	General	4,897,583	4,683,183 4,897,583
	Special	772,830	772,830 1,182,255
	Dedicated Special Revenue	416,341	416,341 714,155
	Federal Trust	1,939,143 2,053,768	1,939,143 2,048,301

Authority: §§ 2.2-4002 B 16; 28.2-800 through 28.2-825; and 32.1-212 through 32.1-245, Code of Virginia.

A. Out of this appropriation, \$12,500 the first year and \$12,500 the second year from the general fund shall be provided for the activities of the Sewage Appeals Review Board.

B. The Commissioner shall work with the Director of the Department of Environmental Quality to review opportunities to expand the reuse of wastewater with the goal of reducing nutrient pollution of the surface waters of the Commonwealth. The review shall include the establishment of an appropriate committee of stakeholders to assist in identifying potential opportunities. The review shall include an examination of the practices in other states that have developed policies and programs to reduce surface water discharges by way of beneficial reuse of wastewater. The Commissioner shall report the recommendations to the Governor and General Assembly by October 1, 2011.



HARVEY B. MORGAN
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GLOUCESTER, VIRGINIA 23061
NINETY-EIGHTH DISTRICT

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

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COMMITTEE ASSIGNMENTS:
AGRICULTURE, CHESAPEAKE AND
NATURAL RESOURCES (CHAIRMAN)
APPROPRIATIONS
COMMERCE AND LABOR

February 24, 2011

Dr. Karen Remley, Commissioner
Virginia Department of Health
P.O. Box 2448
Richmond, VA 23218

David K. Paylor, Director
Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Dear Commissioner Remley and Director Paylor:

At the recommendation of the Committee on Agriculture, Chesapeake, and Natural Resources (ACNR), I write to request that jointly you explore opportunities to expand the reuse of wastewater with the goal of both conservation and reducing nutrient pollution of the surface waters of the Commonwealth. In doing so, I encourage you to establish an appropriate committee of stakeholders to identify potential opportunities. The review should examine practices in other states such as Florida and Georgia that have developed policies and programs to reduce surface water discharges through beneficial reuse of wastewater. Hopefully, the successful application of your findings can also assist in meeting Virginia Chesapeake Bay obligations.

Following deliberations, please prepare a report identifying statutory and regulatory changes, including potential incentives to reduce wastewater discharge to surface waters. I ask that you submit this report to me by October 1, 2011, as well as a copy to Senator Stuart, the patron of SB 1056.

The study can further the opportunity to employ reuse as a means of reducing pressure on other sectors to meet Virginia's Chesapeake Bay obligations.

I appreciate your attention to this request.

Sincerely,

Harvey B. Morgan

Cc: Mr. Marty Farber
The Honorable Richard H. Stuart

CHAPTER 189

An Act to amend and reenact § [10.1-2129](#) of the Code of Virginia, relating to incentives for water reuse.

[S 1427]

Approved March 15, 2011

Be it enacted by the General Assembly of Virginia:

1. That § [10.1-2129](#) of the Code of Virginia is amended and reenacted as follows:

§ [10.1-2129](#). Agency coordination; conditions of grants.

A. If, in any fiscal year beginning on or after July 1, 2005, there are appropriations to the Fund in addition to those made pursuant to subsection A of § [10.1-2128](#), the Secretary of Natural Resources shall distribute those moneys in the Fund provided from the 10 percent of the annual general fund revenue collections that are in excess of the official estimates in the general appropriation act, and the 10 percent of any unrestricted and uncommitted general fund balance at the close of each fiscal year whose reappropriation is not required in the general appropriation act, as follows:

1. Seventy percent of the moneys shall be distributed to the Department of Conservation and Recreation and shall be administered by it for the sole purpose of implementing projects or best management practices that reduce nitrogen and phosphorus nonpoint source pollution, with a priority given to agricultural best management practices. In no single year shall more than 60 percent of the moneys be used for projects or practices exclusively within the Chesapeake Bay watershed; and

2. Thirty percent of the moneys shall be distributed to the Department of Environmental Quality, which shall use such moneys for making grants for the sole purpose of designing and installing nutrient removal technologies for publicly owned treatment works designated as significant dischargers or eligible nonsignificant dischargers. The moneys shall also be available for grants when the design and installation of nutrient removal technology utilizes the Public-Private Education Facilities and Infrastructure Act (§ [56-575.1](#) et seq.).

3. Except as otherwise provided in the Appropriation Act, in any fiscal year when moneys are not appropriated to the Fund in addition to those specified in subsection A of § [10.1-2128](#), or when moneys appropriated to the Fund in addition to those specified in subsection A of § [10.1-2128](#) are less than 40 percent of those specified in subsection A of § [10.1-2128](#), the Secretary of Natural Resources, in consultation with the Secretary of Agriculture and Forestry, the State Forester, the Commissioner of Agriculture and Consumer Services, and the Directors of the Departments of Environmental Quality and Conservation and Recreation, and with the advice and guidance of the Board of Conservation and Recreation, the Virginia Soil and Water Conservation Board, the State Water Control Board, and the Chesapeake Bay Local Assistance Board, and following a public comment period of at least 30 days and a public hearing, shall

allocate those moneys deposited in the Fund, but excluding any moneys deposited into the Virginia Natural Resources Commitment Fund established pursuant to § [10.1-2128.1](#), between point and nonpoint sources, both of which shall receive moneys in each such year.

B. 1. Except as may otherwise be specified in the general appropriation act, the Secretary of Natural Resources, in consultation with the Secretary of Agriculture and Forestry, the State Forester, the Commissioner of Agriculture and Consumer Services, *the State Health Commissioner*, and the Directors of the Departments of Environmental Quality and Conservation and Recreation, and with the advice and guidance of the Board of Conservation and Recreation, the Virginia Soil and Water Conservation Board, the State Water Control Board, and the Chesapeake Bay Local Assistance Board, shall develop written guidelines that (i) specify eligibility requirements; (ii) govern the application for and the distribution and conditions of Water Quality Improvement Grants; (iii) list criteria for prioritizing funding requests; and (iv) define criteria and financial incentives for water reuse.

2. In developing the guidelines the Secretary shall evaluate and consider, in addition to such other factors as may be appropriate to most effectively restore, protect and improve the quality of state waters: (i) specific practices and programs proposed in any tributary strategy plan, and the associated effectiveness and cost per pound of nutrients removed; (ii) water quality impairment or degradation caused by different types of nutrients released in different locations from different sources; and (iii) environmental benchmarks and indicators for achieving improved water quality. The process for development of guidelines pursuant to this subsection shall, at a minimum, include (a) use of an advisory committee composed of interested parties; (b) a 60-day public comment period on draft guidelines; (c) written responses to all comments received; and (d) notice of the availability of draft guidelines and final guidelines to all who request such notice.

3. In addition to those the Secretary deems advisable to most effectively restore, protect and improve the quality of state waters, the criteria for prioritizing funding requests shall include: (i) the pounds of total nitrogen and the pounds of total phosphorus reduced by the project; (ii) whether the location of the water quality restoration, protection or improvement project or program is within a watershed or subwatershed with documented water nutrient loading problems or adopted nutrient reduction goals; (iii) documented water quality impairment; and (iv) the availability of other funding mechanisms. Notwithstanding the provisions of subsection E of § [10.1-2131](#), the Director of the Department of Environmental Quality may approve a local government point source grant application request for any single project that exceeds the authorized grant amount outlined in subsection E of § [10.1-2131](#). Whenever a local government applies for a grant that exceeds the authorized grant amount outlined in this chapter or when there is no stated limitation on the amount of the grant for which an application is made, the Directors and the Secretary shall consider the comparative revenue capacity, revenue efforts and fiscal stress as reported by the Commission on Local Government. The development or implementation of cooperative programs developed pursuant to subsection B of § [10.1-2127](#) shall be given a high priority in the distribution of Virginia Water Quality Improvement Grants from the moneys allocated to nonpoint source pollution.

Attachment B

Potential Opportunities to Expand Water Reclamation and Reuse Identified by the Stakeholder Committee

August 9, 2011

1. Laws and Regulations (17 priority points)*

- Consider other states' regulations (i.e. Florida) (5)
- Look at other sections Virginia Code (3)
- Look at reclamation and reuse for storm water (2)
- Storage is an issue (2)
- HOAs don't allow rain barrels; resolve this barrier (1)
- How will TMDL be met? (1)
- Use same sites for reclaimed water and biosolids application (1)
- Decrease permit fees, monitoring and reporting; streamline permitting time
- Let policymakers decide how to incentivize reclamation and reuse
- Limits in USBC for reuse of storm water in homes and commercial buildings
- LEED vs. Code
- Initiative for water R/R (rain barrels)
- Think about need for water reclamation as part of planning & development
- Regional incentives related to water supply
- Eliminate storage requirements (seasonal storage) - document why it is needed

Discussion of laws and regulations

- Equity issues in distribution
- Demonstration of adequate long-term water supply
- Revisit water supply planning; re-emphasize greater role of R/R
- Change Code to require localities to look at water R/R in their CIP process
- Storage for grey water issue in USBC – work w/ DHCD on changes to USBC
- Bits and pieces of conflicts & impediments throughout Code that may need to be fixed- a lot of research
- Acceptable offsets for discharges

2. Groundwater (6 priority points)

- Resolve groundwater recharge issues (6)
- Need more coordination between VDH and DEQ on groundwater withdrawals
- Groundwater recharge provides base flow for some surface waters
- Groundwater recharge to be revisited by DEQ
- Reclaimed water needed for groundwater recharge to stop salt water intrusion

No further discussion of groundwater

3. Water Balance (9 priority points)

- Need to do watershed approach when considering water reclamation and reuse. This should include a mass balance. (5)
- Look at projects as a whole to meet goals and look at in-stream impacts (2)
- Need a state fresh water management plan (2)

Discussion of water balance

- Water withdrawal regulations in Virginia are not the same as those of Georgia and Florida
- Encourage end user that reduce both a discharge and a water supply withdrawal
- There may be greater incentive to reclaim and reuse storm water over municipal wastewater or sewage
- Look at consumptive use of new reclaimed water generators and their storage to offset consumptive use

4. Public Health (7 priority points)

- Identify public health risks of water reclamation and reuse (all types of reclaimed water) (4)
- Need risk based decision process when evaluating impacts to public health (3)
- Grey water reuse – public health risks
- Permit by rule for grey water – determined by quality of grey water
- Recycling can be simple for onsite use (low tech, but manage health risks)
- Look at existing/proposed regulations – public health risks with increased reuse

Discussion of public health

- Risk assessment –what would/should it involve
- Is there a need for risk analysis?
- Risk assessment – needed for GW recharge
- As we incentivize – need to consider public health risk
- If you make regulations less stringent – need more risk analysis

5. Financial (11 priority points)*

- End user must buy into this – provide tax incentives and tax credits (6)
- Water supply and nutrient caps driving reuse – link funding to this (3)
- State does not have money for operation and maintenance costs (1)
- Give credit to environmental benefits for WWTFs that reduce discharge due to water reclamation and reuse

- (Sticky note attached: Money is always an issue. PSAs and utilities required to operate in the black. County must operate in red. They do not charge enough to cover water costs. Do not charge enough for distribution to cover maintenance costs.)
- Localities need to be creative about costs/pricing
- Raise price of drinking water
- Not always most cost effective
- Cost effective component to generate nutrient credits
- Funding needed and monetary incentives
- How will costs /prices be set?
- What is actual benefit of tax credits?

Discussion of financial

- Make it free
- Money – biggest incentive
- Don't increase cost of other resources and services to pay for water reclamation and reuse, needs to support itself
- State tax credits for end users
- State buyback water rights to increase water reuse
- Tax incentive needs to be measured against cost avoidance (related to TMDL)
- Eliminate competition between purveyors and water generators
- Provide phase-out tax incentives (e.g., declining tax benefit with time)
- Charge true cost for potable water – appears to be a secondary issue relative to decreasing nutrient loads
- Look at reclaimed water as commodity
- When determining rates – different rates for rural vs. urban end-users

6. Education (8 priority points)*

- Do more to educate public (by state) (5)
- Work with engineering groups to promote water reclamation and reuse (1)
- Develop public education information (brochures, etc.) to promote water reclamation and reuse (1)
- Include Coop Extension in public education.
- Need to eliminate “fear factor” of water reclamation and reuse – need to educate
- Need public support
- Need Governor's endorsement

Discussion of education

- Bay TMDL – drives need for education
- Educate potential end users
- Educate decision makers

7. **End Users** (11 priority points)*

- Must have end users – need market and this needs education (6)
- Necessity versus incentivize – water reclamation and reuse allows growth to occur (1)
- Need to consider for water supply (1)
- Create demand for reuse (1)
- Need end users –eliminate sales tax for infrastructure, provide tax credit, reduce rate, need to demonstrate long-term water supply ; water reclamation and reuse should be a component “water use wisely”, a public educational tool
- Look at industries that have year round use – incentivize this
- Flexibility in implementation

Discussion of end users

- Local leaders having difficulty supporting water reclamation and reuse – not cheapest option
- Strong relationship between education and end users
- Nutrients from irrigation reuse can conflict with other agricultural practices
- CAFOs – other potential end users
- Get large industrial end users
- What are factors to consider related to end users:
 - Disruption to existing infrastructure
 - Size and number of end users
 - Distance to deliver reclaimed water
 - Changing monitoring
 - Availability of water sources
 - Relative cost of reclaimed water
- Competition between water purveyor and reclaimed water generator for the same revenue where they’re not under same ownership
- Groundwater withdrawal restrictions would increase demand for reclaimed water
- Other restrictions affect industrial end user of reclaimed water (e.g., food processing industry may require water of a quality better than reclaimed water)
- Need to identify drivers to get end users to use reclaimed water
- Must convince locality that water reclamation and reuse is cost effective option

8. **Irrigation** (8 priority points)

- Reduce permitted limitations on irrigation rates and consider use of reclaimed water with higher nutrient levels (3)
- Use soil moisture gauges for irrigation reuse (2)
- Encourage or subsidize irrigation use for agriculture - more efficient nutrient uptake, particularly during or after drought (2)
- Don’t over treat wastewater – make more nutrients available for irrigation reuse (1)
- Nutrient management programs need to address irrigation reuse

Discussion of irrigation

- Change application rates allowed for irrigation reuse
- Consider use of water with higher nutrient levels

9. General (0 priority points)

- Promote drug collection programs to reduce CECs at source
- Require certain operations to do water reuse
- Should use reclaimed water rather than groundwater when available
- Need regulatory change for water supply that puts water reclamation and reuse as a higher priority

No further discussion of general

10. Other Factors and Incentives (2 priority points)

- LID (Low Impact Development) practices give credit for storm water harvesting (DCR) (credit for volume reduction and pollutants) (1)
- Credits are available through LEEDS (1)
- Sustainability needed
- Avoid Jargon such as “sustainability” - don’t use “sustainability” in report

No further discussion of other factors and incentives

* The category received priority points in addition to individual items within the category

Attachment C

Public Comments on Second Draft Report

Fairfax Water

FAIRFAX COUNTY WATER AUTHORITY

8570 Executive Park Avenue

Fairfax, Virginia 22031-2218

www.fairfaxwater.org

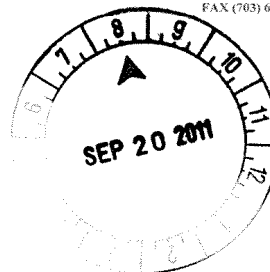
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JOHN R. BYERS

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DEPUTY GENERAL MANAGER
TELEPHONE (703) 289-6012

FAX (703) 698-1759

September 16, 2011



Ms. Valerie Rourke
Water Reclamation and Reuse Coordinator
Virginia Department of Environmental Quality
629 East Main Street
Richmond, VA 23218

Re: **Public Comment Opportunity –
Draft Report on Water
Reclamation and Reuse in Virginia**

Dear Ms. Rourke:

The Fairfax County Water Authority (“Fairfax Water”) appreciates the opportunity to comment on the Draft Report on Water Reclamation and Reuse in Virginia (“Report”).

Fairfax Water is a public, non-profit authority that provides drinking water to nearly **1.7 million** people in Virginia, or about one in five Virginia residents. As with any drinking-water provider, we are in fact involved with recycling and the reuse of water and this Report is of great interest to us. We have significant concerns with the Report as it appears to go beyond the originally legislated intent to study water reclamation and reuse. The Report centers on efforts to promote and expand some reuse practices that may not benefit the community when viewed in a larger context. The impact on downstream users must be carefully considered before promoting or subsidizing reuse projects. In addition, one of the major legislative objectives was to reduce nutrient discharges to streams and rivers. While the reuse of wastewater discharges for irrigation can be an effective nutrient- management practice in some cases, such strategies may not be feasible or cost-effective in urban areas and may be practical only seasonally. The Report should recommend that a fair assessment of the overall societal costs and benefits be the focus of a future study.

As an example, discharges from the Upper Occoquan Service Authority (UOSA), an advanced wastewater treatment facility, are and will continue to be a substantial component of the Occoquan Reservoir raw-water supply, as intended by the Occoquan

Policy adopted by the State Water Control Board in 1971. Water discharged from UOSA can comprise nearly half the safe yield of the Occoquan Reservoir, which provides the source water for a 120 million-gallon-per-day water treatment plant for Northern Virginia. This facility was constructed at a cost of almost \$200 million and represents a tremendous investment by the community in indirect potable reuse. The current operation of this facility, and its future expansion to meet continued growth in Northern Virginia, are dependent on the water quality and safe yield of the Occoquan Reservoir. Any diversion of the source water provided by UOSA for competing reuse projects would reduce the ability to meet community water demands and require a new duplicative community investment to develop replacement water supplies and treatment facilities. It is imperative that Virginia develop a regulatory framework that evaluates the impact of water reuse on downstream water supplies.

Fairfax Water has several specific comments on the Report:

Disadvantages of Water Reclamation and Reuse (pp.7-8): It should be noted in this section that the distribution of reclaimed water to end users will **always** require a separate distribution system. The construction, operation, and maintenance may not always be in the long-term interest of the community. It is important to note that reuse projects are not always financially sustainable on their own, but require a subsidy to make them appear economically viable (see last comment on Financial Incentives and add a reference to Table 1, p.15, in this section).

Practices in Other States to Reduce Surface Water Discharges (pp 9-13): Adopting policies based on examples from Florida and Georgia is problematic without considering the context of how they are developed and applied, and the differences in geography and hydrologic patterns as compared with Virginia.

Florida Reuse Regulations (p. 9): The reference to Rule Chapter 62-610 and 62-40 of the Florida Administrative Code needs to note that Florida's water-withdrawal regulatory program distinguishes between consumptive and non-consumptive uses. Only consumptive uses require a permit and the applicant must evaluate the impact of the withdrawal on downstream water resources. Although these provisions are not directly related to the reuse program, they do provide an example of how the consumptive use issue could be addressed in Virginia's reuse program.

Anti-Degradation Policies (p. 13): We are concerned with the reference noting that anti-degradation policies in Florida and Georgia have been used to require non-discharging alternatives. While protecting water quality is critical, evaluation of the impacts of reuse must be considered on a case-by-case basis. The policies need to recognize the benefits that discharges have to downstream beneficial users, and promote the most appropriate and effective pollution-reduction

strategies rather than automatically imposed no-discharge mandates, which might have considerable unintended consequences throughout the Commonwealth.

Financial Incentives (Table 1, p.15): Financial incentives (if any) must be geared toward the most cost-effective option to achieve water-quality goals, rather than subsidize the creation of new systems that may not be economically sustainable. It is important to consider that the cumulative cost burden of reuse (to both the ratepayers of the local water/wastewater systems and the downstream system ratepayers) is dependent on many factors. These factors include whether the reuse is for a “new” customer or replacing an existing customer, the cumulative impact of water-supply loss in the basin, the cost of developing new supply sources, and the hydrologic characteristics where the reuse occurs (i.e., surface water vs. groundwater, and location in the basin relating to other downstream users). The text should be modified to recognize that financial incentives or subsidies increase the long-term economic burden on the water/wastewater ratepayers and on the State to operate and maintain new infrastructure.

In short, consumptive water reuse should be considered as comparable to a direct surface-water withdrawal and comprehensively evaluated as such.

We appreciate the opportunity to participate in the deliberations on this important issue and to comment on the draft report. We hope that our comments will be seriously considered and the proposed draft will be modified to address our concerns.

Thank you for your attention to this matter.

Sincerely,



Charles M. Murray
General Manager

cc : Delegate David B. Albo
Delegate David L. Bulova
Delegate Barbara J. Comstock
Delegate David L. Englin
Delegate Eileen Filler-Corn
Delegate Charniele L. Herring
Delegate Timothy D. Hugo
Delegate Mark L. Keam

DEQ Draft Report Comments
September 16, 2011
Page 4

Delegate Kaye Kory
Delegate James M. LeMunyon
Delegate Kenneth R. Plum
Delegate Thomas Davis Rust
Delegate James M. Scot
Delegate Mark D. Sickles
Delegate Scott A. Surovell
Delegate Vivian E. Watts
Philip W. Allin, Chairman, Fairfax Water
Deputy General Manager
Director, Planning and Engineering
Manager, Planning
Chief, Source Water Planning and Protection



September 20, 2011

BY E-MAIL

Ms. Valerie Rourke
Virginia Department of Environmental Quality
629 E. Main Street
Richmond, VA 23219

Re: Comments on Draft Report
Water Reclamation and Reuse

Dear Valerie:

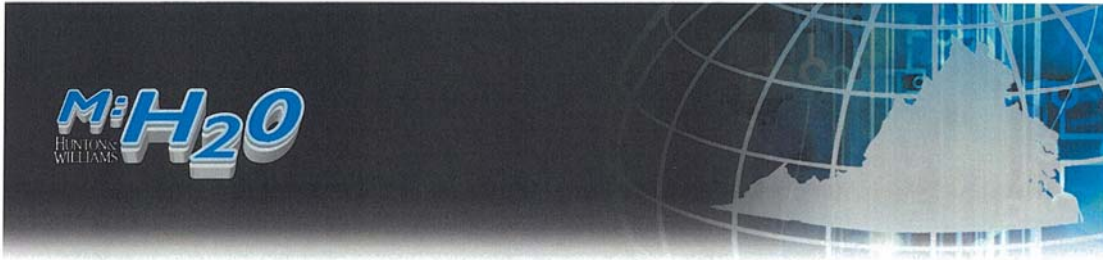
Mission H₂O appreciates the opportunity to provide comments on DEQ's draft report entitled "Expanding Water Reclamation and Reuse in Virginia." Mission H₂O participated in the stakeholder group DEQ convened to provide input into this study report. Although the study report characterizes the stakeholder discussion as one that was focused on identifying "opportunities" for reuse, in fact the question asked of the stakeholder group was what impediments prevent reuse projects. The group identified those impediments and then discussed how to remove them. Although there were several themes that emerged from that stakeholder discussion, through the course of the day the stakeholder group identified three opportunities that appeared to offer the greatest opportunity for increasing reuse:

- groundwater recharge;
- stormwater reuse;
- reconsideration of impediments to use of reclaimed water for irrigation purposes.

Given the short time frame given for preparing this report, none of the opportunities listed above was fully explored.

Additionally, the analysis of what other states are doing to promote reuse, how those programs have been implemented and whether those programs have achieved their intended goals is not comprehensive, again because there has not been sufficient time to fully perform this research. Focusing only on the programs in Florida and Georgia is problematic without considering the context of how they are developed and applied, and the differences in temporal and hydrologic patterns as compared with Virginia. This is particularly true for the discussions about the antidegradation policies and minimum instream flow components of those states.

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Conclusory statements about whether the goals of the Clean Water Act are being achieved, the scope of the antidegradation policy and the development of a minimum instream flow should not be included in the report. It should also be noted that while the report suggests on pages 2 and 13 that Virginia does not have a minimum instream flow “mechanism to incentivize both water conservation and water reuse,” this is somewhat misleading. Virginia does have a water withdrawal permitting program that assesses instream flow needs as part of the evaluation of withdrawal permit applications. It is unclear how formalizing an instream flow number for every basin will provide any additional or greater incentive for reuse.

Moreover, the report does not fully flesh out the current incentives and the success of those incentives in Virginia. For example, the reclamation and reuse regulation provides an exemption for industrial facilities reusing water within their process. As a result of this exemption, many industries in Virginia reuse water multiple times before discharging it. While this type of reuse is not regulated, it is a valid example of how reuse is being successfully undertaken in Virginia already. Likewise, the water supply planning process (discussed on page 6) requires localities to evaluate alternative water sources, including reuse, to accommodate water needs in the future.

There are also some suggestions Mission H₂O provided for regulatory or statutory changes to encourage reuse that were not included in the report. Those ideas included creating a standalone reclamation/reuse permitting program separate from the VPDES and VPA programs that is focused on consumptive use projects; amending the water supply planning regulation to increase emphasis on consideration of reclamation and reuse as an alternative water supply source, along with criteria for when it is most appropriate and the type of analysis that should take place to determine whether it’s appropriate; and enacting an adequate public facility statute providing that new development cannot take place unless a determination is made that sufficient water is available to support it.

For all of these reasons, Mission H₂O believes the study report should highlight for General Assembly members additional areas for study and research rather than proffering suggestions based on one stakeholder meeting and preliminary research into the reuse programs of two states.

Mission H₂O members also believe that there are several important aspects that must be considered when evaluating the feasibility of reuse. Those aspects, summarized below, should be included in the report.



1. Water reclamation and reuse cannot be considered in a vacuum. The impact of such projects must be evaluated both from a water quality and a water quantity perspective.
2. The distinction between consumptive and nonconsumptive reuse projects should be addressed more fully. The report should also explain that there is a difference in the impact of a reuse project that serves an existing water need, thereby eliminating both a discharge and a withdrawal at the same time, and a reuse project that serves a new water user, thereby impacting the system by eliminating a water discharge without a corresponding decline in water withdrawal.
3. Directing incentives toward water reclamation and reuse projects means that scarce resources would be diverted from maintenance of existing distribution and other infrastructure. Moreover, encouraging reuse as a solution to the water quality issues in the Bay is a significant departure from the Commonwealth's policy decision to invest in wastewater treatment plant upgrades. Changing course now could detrimentally impact those investments. A discussion of the significance of this change – and the potential impacts on investments made to date – should be included in the report.

Thank you for your work on this study. Mission H₂O recognizes that DEQ is attempting to assimilate a large volume of information within a short timetable. As noted above, Mission H₂O believes that the stakeholder group identified several opportunities for reuse in the state. Those opportunities need to be more fully evaluated before any recommendations could be made. Moreover, additional research into other state programs would provide a more comprehensive overview of how other states have dealt with those issues, and whether those programs have been successful or would be workable in Virginia given differences in need, use, and hydrology. The study report should recommend these additional areas for study.

If you have any questions about these comments, please call Andrea Wortzel at 804-788-8425.

Sincerely,

A handwritten signature in black ink that reads 'Andrea Wortzel'.

Andrea W. Wortzel

cc: Mission H₂O Members

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VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AGENCIES, INC.

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City of Lynchburg
City of Martinsville
Pepper's Ferry Regional Wastewater Auth.
Prince William County Service Authority
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Rivanna Water and Sewer Authority
South Central Wastewater Authority
County of Spotsylvania
County of Stafford
Upper Occoquan Service Authority
Western Virginia Water Authority
City of Winchester

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County of Powhatan
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Rapidan Service Authority
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Sussex Service Authority
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O'Brien & Gere

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Reid Engineering
Timmons Group
Whitman, Requardt & Associates
Wiley & Wilson
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President, Aqualaw PLC

21 September 2011

By Electronic Mail: valerie.rourke@deq.virginia.gov

Ms. Valerie A. Rourke
Coordinator for Water Reuse and Land Treatment
Office of Land Application Programs
Department of Environmental Quality
629 East Main Street
P.O. Box 1105
Richmond, Virginia 23218

Re: Draft Report on Expanding Water Reclamation and Reuse in Virginia

Dear Ms. Rourke:

Please accept this comment letter submitted on behalf of the Virginia Association of Municipal Wastewater Agencies, Inc. ("VAMWA"), with respect to the second draft report prepared by the Department of Environmental Quality ("DEQ") and the Virginia Department of Health (collectively with DEQ, the "Agencies") entitled "Expanding Water Reclamation and Reuse in Virginia" (the "Report"). VAMWA, a statewide association of local governments and authorities that own and operate municipal wastewater treatment plants, supports the development of water quality programs based on sound science and good public policy, including policies that encourage cost-effective, economical, market-driven water reclamation and reuse projects.

VAMWA was an active participant in the original rulemaking that resulted in promulgation of the Water Reclamation and Reuse Regulation, 9VAC25-740-10 *et seq.* (the "Regulation"), as well as a member of the regulatory advisory panel (the "RAP") that recently reviewed amendments proposed by DEQ to the Regulation. VAMWA also attended the stakeholder committee meeting on August 9, 2011, convened at the suggestion of Delegate Harvey B. Morgan in his letter requesting that the Agencies prepare the Report after a joint exploration of opportunities to expand wastewater reuse for conservation and nutrient pollution reduction purposes. VAMWA submitted a comment letter on the first draft of the Report, a copy of which is attached to this letter.

VAMWA appreciates the opportunity to provide the following comments on the Report prepared by the Agencies and on the future of water reclamation and reuse in the Commonwealth.

1. VAMWA Supports a Market-Based Approach

VAMWA believes that Virginia's existing market-based approach to investment decisions in effluent reuse infrastructure, in accordance with applicable state regulations, is the best approach. Under this approach, Virginia localities and authorities determine whether reuse is an appropriate means to meet local needs. Of course, whenever a local utility proceeds with a project, that project must be designed and constructed in accordance with applicable regulations. This approach allows those closest to consumers to gauge consumer demand, design infrastructure and safeguard costs (treatment and distribution) passed on to those consumers.

2. VAMWA Opposes Mandatory Feasibility Studies

As a corollary to VAMWA's strong support for maintaining Virginia's current market-based approach to reuse, VAMWA opposes regulatory measures that impose mandatory feasibility studies on wastewater treatment plants. VAMWA views mandatory engineering studies of only one particular management option as contrary to the preferred market-based approach. VAMWA is also concerned that mandatory studies could lead to state agencies picking preferred winning and losing technologies in the field of wastewater treatment. These matters are properly left to the owners of the infrastructure with responsibility for delivering this public service to the customers who pay for it.

3. VAMWA Supports a Groundwater Recharge Regulatory Process

As discussed during the RAP's proceedings, VAMWA believes that an important component to a robust reuse program in Virginia is appropriate regulatory authorization of the use of reclaimed water for direct groundwater recharge. VAMWA supports investigating groundwater recharge as a potential method of reducing nutrient discharges while maximizing the beneficial use of available water resources. VAMWA looks forward to working with the Agencies on the issue of groundwater recharge, and appreciates DEQ's commitment to undertaking regulatory activity on this topic in the near future.

4. VAMWA Supports Water Reuse Education

Educational efforts on the topic of beneficial reuse have been ongoing for some time, such as those within Virginia Water Environment Association and the Virginia Chapter of the American Water Works Association. VAMWA supports these efforts and would support other complementary efforts in the future.

Once again, VAMWA appreciates the opportunity to comment on the Report and looks forward to working with the Agencies on this important issue.

Sincerely,



Robert C. Steidel

Encl.

cc: Christopher D. Pomeroy, Esq.
VAMWA Reuse Subcommittee



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LimnoTech
Parsons
Reid Engineering
Stearns & Wheeler
Timmons Group
URS Corporation
Whitman, Reganard & Associates
Wiley & Wilson
WW Associates

LEGAL COUNSEL

Christopher D. Pomeroy, Esq.
President, Aqualaw PLC

30 August 2011

By Electronic Mail

Ms. Valerie A. Rourke
Coordinator for Water Reuse and Land Treatment
Office of Land Application Programs
Department of Environmental Quality
629 East Main Street
P.O. Box 1105
Richmond, Virginia 23218

Re: Draft Report on Expanding Water Reclamation and Reuse in Virginia

Dear Ms. Rourke:

Please accept this letter submitted on behalf of the Virginia Association of Municipal Wastewater Agencies, Inc. ("VAMWA"), in response to your August 23, 2011 e-mail request for comments on the draft report prepared by the Department of Environmental Quality ("DEQ") and the Virginia Department of Health (collectively with DEQ, the "Agencies") entitled "Expanding Water Reclamation and Reuse in Virginia" (the "Report"). VAMWA, a statewide association of local governments and authorities that own and operate municipal wastewater treatment plants, supports the development of water quality programs based on sound science and good public policy, including policies that encourage cost-effective, economical, market-driven water reclamation and reuse projects.

VAMWA was an active participant in the original rulemaking that resulted in promulgation of the Water Reclamation and Reuse Regulation, 9VAC25-740 et seq. (the "Regulation"), as well as a member of the regulatory advisory panel (the "RAP") recently reviewing amendments to the Regulations proposed by DEQ. VAMWA also attended the stakeholder committee meeting convened at the request of Delegate Harvey B. Morgan in his letter requesting that the Agencies prepare the Report after a joint exploration of opportunities to expand wastewater reuse for conservation and nutrient pollution reduction purposes. VAMWA appreciates the opportunity to provide the following comments on the first draft of the Report prepared by the Agencies.

Ms. Valerie A. Rourke
30 August 2011
Page 2

Preliminarily, VAMWA notes that the issue of multiple points of compliance for reuse water discharges to a distribution system and across the distribution systems (9VAC25-740-70), which arose during the RAP process, is not specifically mentioned in the Report. VAMWA remains concerned that this proposed amendment to the Regulation creates an obstacle to encouraging reuse by creating unnecessary duplication of monitoring efforts and should be identified as such in the Report.

For purposes of complying with Delegate Morgan's request, and in order that the Report both better reflect the input of interested stakeholders and advance the dialogue surrounding reuse in the Commonwealth, VAMWA suggests that the Agencies revise the Report to make several clarifying changes.

First, VAMWA recommends that the Agencies reorder the list of opportunities in Table 1 to reflect the priority ranking assigned to each opportunity during the stakeholder committee meeting, without giving Agency-identified opportunities preferential placement. VAMWA believes that each of these opportunities should be incorporated into the stakeholder committee-identified opportunities and presented in their appropriate order.

Second, VAMWA recommends that the Agencies expressly state how each item listed in Section III. C. incentivizes water reclamation and reuse by producers, purveyors and customers. Although VAMWA agrees that additional funding and regulatory clarity are generally positive in terms of incentivizing reuse, VAMWA believes that further justifications are required in this section to enhance overall understanding of the current status of reuse incentives in the Commonwealth. Additionally, VAMWA recommends that the Agencies also consider adding a column to Table 1 explaining how each identified opportunity incentivizes water reclamation and reuse.

Finally, VAMWA recommends that the Agencies expand the discussion in Section IV of other states' practices to include discussions and examples from states with more developed and robust wastewater reuse programs, such as those in the South and West.

Sincerely,



Robert C. Steidel
VAMWA President

cc: Christopher D. Pomeroy, Esq.
VAMWA Reuse Subcommittee

Attachment D

VDH Approach to Chemicals of Emerging Concern and Drinking Water

The federal Safe Drinking Water Act (SDWA) requires that Environmental Protection Agency (EPA) establish criteria for a program to monitor unregulated contaminants and identify no more than 30 contaminants to be monitored every five years. Under the SDWA Unregulated Contaminant Monitoring Rule (UCMR) program, EPA develops a listing of contaminants that may warrant regulation in the future. The UCMR program seeks to identify previously unregulated contaminants that are known or anticipated to occur in public drinking water systems.

These contaminants are further evaluated to assess their risks to public health. UCMR benefits the environment and public health by providing EPA with scientifically valid data on the occurrence of these contaminants in drinking water. EPA uses this information to identify potential sources of contaminants as well as risks to the exposed population. EPA is currently in the third round of UCMR (UCMR 3). During the data collection phase, public waterworks will monitor for 30 contaminants that are currently unregulated in the SDWA. These include 28 chemicals (6 Hormones, 9 Volatile Organic Compounds, 1 Synthetic Organic Compound, 4 Metals, Chlorate, 6 Perfluorinated Compounds), and 2 viruses.

EPA notes in the 2004 Guidelines for Water Reuse, *“One of the most critical objectives in any reuse program is to ensure that public health protection is not compromised through the use of reclaimed water.”* EPA further states that *“Protection of public health is achieved by: (1) reducing or eliminating concentrations of pathogenic bacteria, parasites, and enteric viruses in the reclaimed water, (2) controlling chemical constituents in reclaimed water, and/or (3) limiting public exposure (contact, inhalation, ingestion) to reclaimed water.”* Therefore, it is important that reclamation and reuse projects incorporate stakeholders ranging from the wastewater generator to the local residential community to ensure an effective program for all involved.

There are specific examples cited which demonstrate considerable control and monitoring of both the “advanced wastewater treatment” and the use of reclaimed water. One such example is the Upper Occoquan Sewage Authority (UOSA), which is noted for operating a “consolidated advanced wastewater treatment plant to provide the highest treatment technologically achievable.” In this example, there is an independent laboratory that monitors the operation (including water quality in the treatment plant, the treatment technology, and the environmental health of the reservoir), and a direct inter-relationship with the public drinking water system that relies on the reservoir.

Other studies have identified unintended consequences to “stakeholders” that may have limited ability to react or respond to changes in their source water. A recently published groundwater study by the Santa Clara Valley Water District (City of San Jose South Bay Water Recycling Groundwater Data Evaluation, Santa Clara Valley Water District, May 2008) provides an example of how this can impact users. This study monitored groundwater both prior to (1997), and following the application of recycled water for irrigation (1998 and 1999). The report noted

increasing trends in shallow wells for sodium, calcium, magnesium, sulfate, chloride, and boron. Deeper wells were not as impacted. This information is important to Virginia, as many of the private wells would be similar to the “shallow wells” identified in the study.

Public drinking water systems regulated under the Virginia Waterworks Regulations (12 VAC5-590) are potentially impacted by water reclamation and reuse. Protection of public health and the environment are critical to the longevity of an effective reclamation and reuse program in Virginia. Additional studies provide practices and recommendations that must be considered carefully when evaluating or governing a reuse project. These encompass actions such as the use of best available treatment technology; utilization of multiple, independent barriers for the removal of contaminants; monitoring of current and emerging contaminants; effective source controls, and; formal channels of communication between stakeholders and regulatory agencies.