

MCM	PROPOSED BMP	TASK	MEASURABLE GOAL\ANTICIPATED ACHIEVEMENT	QTR	ACTION TAKEN	REVISED OR ALTERED	REF
#1: Public Education and Outreach on Stormwater Impacts	1.1.1. Lawn and Garden Activities	Information will be Included in <i>The City Focus</i> addressing appropriate landscape design, efficient irrigation, use of mulches, fertilizers, and pesticides. The City Focus is a City wide newsletter published in January, May, July and October.	Information on landscape design and fertilizer to be provided in May of each year. Information on mulch and efficient irrigation to be provided in May. Information on pesticides to be provided in July. <i>Use of harmful pesticides and fertilizers will be minimized by educating how water conservation techniques will be provided to homeowners.</i>	Q4	<i>Developing a Stormwater-friendly Lawn</i> is part of the seasonal stormwater literature offered as a permanent feature of the City's stormwater website.		1
#1: Public Education and Outreach on Stormwater Impacts	1.1.2. Water Conservation Practices for Homeowners	Provide information on city website and in <i>The City Focus</i> to advise public about water conservation practices. Provide links on City website to organizations that promote conservation practices.	Information to be provided in the Spring of each year and as necessary in drought conditions. <i>Water conservation techniques will be identified to homeowners.</i>	Q4	<i>10 Easy Ways to Conserve Water</i> is part of the seasonal stormwater literature offered as a permanent feature of the City's stormwater website.		2
#1: Public Education and Outreach on Stormwater Impacts	1.1.3. Proper Disposal of Hazardous Wastes	Provide information on city website and in <i>The City Focus</i> about the household hazardous waste pick up points and reasons to dispose of hazardous waste properly.	Information to be provided in the Fall of each year. <i>Homeowners will be educated on how to dispose of hazardous wastes properly.</i>	Q2	<i>Our Hazardous Households</i> is part of the seasonal stormwater literature offered as a permanent feature of the City's stormwater website.		3
#1: Public Education and Outreach on Stormwater Impacts	1.1.4. Trash Management	Provide information on city website and in <i>The City Focus</i> to inform public about benefits of proper trash management and effects of littering.	Information to be provided in Fall of each year. <i>Homeowners will be aware of problems associated with improper trash disposal (flooding, health hazards, etc.)</i>	Q2	Incorporated under 1.1.3; see associated Reference.		
#1: Public Education and Outreach on Stormwater Impacts	1.1.5. Pet Waste Management	Provide information on city website and in <i>The City Focus</i> to inform public about impacts of pet wastes to the environment. Post signs at City parks to address pet waste disposal. Provide waste disposal bags at city parks.	Information to be provided in the Spring of each year. Signs currently posted. Currently provided and will continue. <i>Owner will be aware of legal responsibility to remove pet wastes from City property and will use waste disposal bags to contain pet wastes.</i>	Q4	Signs and disposal containers are posted and present at all City parks.		4
#1: Public Education and Outreach on Stormwater Impacts	1.2.2. Develop a Relationship with Local Media	Identify local media staff and send them information generated.	Identify and review annually. <i>Get media involved.</i>	Q4	Costs for PSAs through TV and Radio were prohibitive. SWMP administration is investigating industry methods for PSAs that are less costly.		
#1: Public Education and Outreach on Stormwater Impacts	1.2.3. Classroom Education on Stormwater	Review curriculum for sixth grade students addressing natural resource management and its relation to public policy and cost/benefit tradeoffs as defined by SOL guidelines consistent with grade level. Target a select school in first year and evaluate for expansion.	Curriculum to be developed and used annually. <i>Children will learn about water conservation and environmental impacts caused by Improper waste disposal and misuse of household products.</i>	Q2	As the <i>Greener Ways, Cleaner Bays</i> initiative has yet to receive funding, SWMP administration is developing opportunities with school staff that meets SOL guidelines. The materials associated to Task 2.1.3 are being tailored to meet SOL guidelines.		
#1: Public Education and Outreach on Stormwater Impacts	1.2.4. Organized Education on Stormwater	Identify two (2) target audiences who would benefit from organized education programs. Potential groups include the Boy and Girl Scouts.	Make contact with two (2) youth group leaders and explore target education programs. <i>Children will learn about environmental impacts of improper waste disposal and will learn to take responsibility for their environment.</i>	Q1	In addition to the <i>Greener Ways, Cleaner Bays</i> initiative that continues to seek funding, the City has initiated a partnership with the local Boy Scout troop for Stormwater Education programs\presentations. The first presentation\cooperative learning program is being developed and targeted for early spring.		11

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#1: Public Education and Outreach on Stormwater Impacts	1.3.1. Low Impact Development	Encourage developers and planners to apply low impact development practices (LID) Establish guidelines in plan review process for voluntary consideration applicable BMP measures for new development	Establish guidelines, record contact with developer and estimate number of acres developed with LID annually. <i>Low-impact development practices will be considered and used by builder to minimize development impacts</i>	O N G O I N G	In addition to LID Guidance documents, the City is developing a Stormwater Utility Fee Credit Policy to accompany its recently established Stormwater Utility Fee. The Credit Policy is scheduled for implementation by the end of June 2013 and contains financial incentives for LID.		5 & 5(A)
#1: Public Education and Outreach on Stormwater Impacts	1.4.1. Pollution Prevention Program for Homeowners	Formalize pollution prevention hotline to report problems and/or illicit discharge and notify the public of the hotline number and conditions they should be aware of.	Develop hotline to appear permanently on and in <i>The City Focus</i> . <i>Citizens will be able to notify appropriate City personnel of violations and unfavorable conditions</i>	O N G O Q I 1 N G -	The City has had a fully functional Pollution Prevention Hotline and an electronic reporting method for reporting polluting activities for two reporting years.	Though the City receives numerous calls reporting polluting activities, the Hotline is not widely used. SWMP administration is currently investigating industry methods for making it more accessible.	6
#1: Public Education and Outreach on Stormwater Impacts	1.4.2. Pollution Prevention for Businesses	Establish guidelines for a pollution prevention and recognition program tailored for the business community and annually provide information to business owners through a brochure or the City's newsletter.	Establish a formal pollution prevention program that provides guidelines for the business community to follow and obtain public recognition. <i>Recognition of pollution prevention efforts and environmental responsibility will provide an incentive for the business community to cooperate with proper storm water management.</i>	Q1	<i>Our Waters Award</i> program, as mentioned in last year's report, is scheduled to be adopted as an incentive component of the Stormwater Utility Fee.		7 & 5(A)
#1: Public Education and Outreach on TMDLs	1.5.2 TMDL Awareness for Appomattox River	As a component of the SMWM Program's Adopt-A-Waterway Program, information on TMDL WLAs on the Appomattox will be circulated to participants on annual clean-up day.	Participants will be educated on particular toxins in the Appomattox and the danger they pose to its health.	Q4	TMDL Information was distributed at the City's annual Clean-up Day.		8
#1: Public Education and Outreach on TMDLs	1.5.3 TMDL Awareness for Appomattox River	Display pamphlets and literature on TMDLs in the Appomattox River as a permanent part of the city's Appomattox River Trail project.	Trail visitors will learn about the harmful effects of stormwater on the Appomattox, and how they can help reduce harmful chemicals therein.	O N G O I N G	Developers whose property abuts this trail are required to post TMDL information in informational Kiosks. The City also plans to post TMDL information at the mouth of the trail as soon as it is completed. The fourth and final segment of trail is in its final phase of PE.		8
#2: Public Involvement/Participation	2.1.1. Stream Cleanup	Involve Boy and Girl Scout troops or other non-municipal organizations in cleanup efforts along streams and rivers. Encourage Scout masters to involve troop participation to meet goals consistent with the Boy Scout Forestry, and Soil and Water Conservation	Meet annually in Fall with Boy and Girl Scoutmasters / troop leaders or other non-municipal organizations to schedule annual clean up day along streams and rivers. <i>Children/Citizens will learn about environmental impacts of improper waste disposal.</i>	Q2	See 1.2.4 above and 2.1.2 below.		
#2: Public Involvement/Participation	2.1.2. Adopt-A-Street/Adopt-A-Stream	Encourage residents and groups to adopt streets and areas along streams and rivers for clean up and volunteer monitoring and identify which stream is the recipient of runoff from the adopted street. Develop a program to distribute to interested groups.	Inform public biannually through website and <i>The City Focus</i> of streets available for adoption. <i>Public will help keep streets and streams free of debris and identify with the program.</i>	Q 2 & Q 4		SWMP administration proposed an Adopt-A-Waterway program during the previous reporting year. City Council has since debated and continues to debate the utility of Adopt-A programs and has delayed action on implementation of the Adopt-A-Waterway program.	9
#2: Public Involvement/Participation	2.1.3. Public Programs in Schools	Encourage school children to create educational displays for public libraries and schools addressing stormwater pollution and control measures. Set up meetings and offer assistance to school science coordinator. Public Works to provide oversight and coordination.	Meet with Science coordinator annually. Consider creation of displays for August (National Water Quality Month). <i>Children will learn about stormwater impacts and ways that they can improve their environment.</i>	Q2	The City's <i>Greener Ways, Cleaner Bays</i> initiative as previously developed is still seeking funding. A coloring and activity book were developed for the K through 3 levels, and a trivia\activity poster were developed for the 4 through 6 levels. These materials are also available on the City's Stormwater 4 Kids webpage.		10 & 11

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#2: Public Involvement/Participation	2.2.1. Stakeholder Meeting with City staff	Conduct City stakeholders meetings to include City personnel in monitoring effectiveness and in promoting involvement in stormwater program.	Conduct annual meeting prior to general stakeholders meeting. <i>City will assess stormwater management program and evaluate effectiveness in preparation for general stakeholders meeting.</i>	Q3	Quarterly meetings as revised and reported during last year's reporting cycle continue to be held.		
#2: Public Involvement/Participation	2.2.2. Stakeholder Meetings with Public	Conduct general stakeholders meetings to include teachers, business owners, and homeowners. City officials and interested parties in monitoring effectiveness and in promoting involvement in stormwater program.	Conduct annual meeting. <i>Stakeholders will be able to participate in the City's stormwater program.</i>	Q4		This Task has been revised per stakeholder efficiency. During initial meetings the consensus was toward an interest in what was being constructed or rehabilitated rather than providing input on the process. Thus the City is developing a Quarterly reporting method that would act like a Stormwater Report Card disseminated to residents.	
#2: Public Involvement/Participation	2.3.1. Develop list of Speakers using City Staff and Stakeholders. Speaker would be available upon request to give a presentation on stormwater management as it relates to Colonial Heights	Coordinate interested Staff and Stakeholders and presentation material will be developed for use in such presentations. Place list on Web site and include in <i>The City Focus</i> .	Develop list and set goal for 2 presentations annually. Increase public awareness and attitudes.	Q2 & Q4	No meetings have taken place this reporting cycle.	Despite being widely advertised, this Task has not been heavily utilized. SWMP administration is currently investigating popular industry methods for marketing community outreach events such as these. Potential coupling with the Quarterly Report as mentioned in the previous task may prove more efficient and more marketable.	13
#3: Illicit Discharge Detection and Elimination	3.1.1. Review of Legal Authority	Assess City ordinance to ensure illicit discharges are adequately defined and prohibited. Ensure enforcement actions are implemented.	Revise ordinance as needed and review annually. (High Priority)	O N G O I N G	Slight changes were made to the City's Stormwater Ordinance per a Code rewrite. See the associated Reference for the updated version of the Ordinance.	<i>The city continues to evaluate the Stormwater Ordinance and is investigating methods to encourage continued compliance.</i>	14
#3: Illicit Discharge Detection and Elimination	3.2.1. Inventory Regulated Stormwater Outfall Locations	Using existing map and fieldwork, establish program and schedule for inventory and data base development.	Existing regulated outfalls will be identified for annual inspection and illicit discharge tracking. <i>Create map of regulated outfalls.</i> The City's 2003 inventory included approximately 40 outfalls to waterways and 600 inlets.	O N G O Q I N G -	Incorporated under 3.2.2		15
#3: Illicit Discharge Detection and Elimination	3.2.2. Map Regulated Outfalls and their Drainage Areas	Using existing mapping and continuing to do field work, refine and increase accuracy and detail of stormwater drainage system maps.	Create mapping delineating drainage areas associate with regulated outfalls. <i>Areas contributing to runoff will be identified.</i>	O N G O Q I N G -	Approximately (20) previously unknown outfalls were discovered per completion of the City's mapping initiative. These outfalls are being added to the dataset. Now that inventory has been completed, all outfalls will be inspected once per year and repairs shall be made per those findings. Drainage basins were completed per the City's Stormwater Utility Fee Feasibility Study and have been functionally in use since then.		12
#3: Illicit Discharge Detection and Elimination	3.2.3. Locate Priority Area or Businesses Likely to have an Illicit Discharge	Using staff knowledge and available information develop a list of areas and businesses that would have a significant impact if a spill occurred or would have a high probability of having an accidental spill (ie auto repair shop restaurant and other industrial activities).	Create mapping of priority areas with unique pollution prevention schemes. <i>Areas that are possible sources of detrimental pollutants will be identified and monitored of possible problems.</i>	Q1	Database is in use and is utilized in PE&O, IDDE and for the City's watershed planning initiative.		16

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#3: Illicit Discharge Detection and Elimination	3.2.4. Inspect Regulated Outfalls for Dry Weather Discharge	Develop a program to use in the inspection to include visual observation, odors and conditions that would indicate illicit discharges. Schedule and forms to document the program will be included.	Inspect all regulated outfalls annually. <i>Dry weather discharges will be identified and appropriate action taken.</i>	Q3	As the City's inventory & mapping initiative were ongoing during this reporting cycle and thus less than one calendar year has elapsed since last screened, approximately 25% of the City's regulated outfalls were Dry-weather Screened. Now that mapping is complete all regulated outfalls will be screened. See Appendix C.		
#3: Illicit Discharge Detection and Elimination	3.3.2. Program Evaluation and Assessment	Develop a formal record-keeping procedure to document identification of illicit discharge and the steps taken to address the situation. Record keeping will be consistent with DCR reporting requirements in VA040009.	Annual review by City Staff. <i>Historic records addressing illicit discharge detection and elimination will be maintained and can be used for program evaluation.</i>	O N G G - O Q I 1 N	See Appendix E.		
#3: Illicit Discharge Detection and Elimination	3.3.3. Stormwater Stenciling Program	Implement program with stakeholders to perform stenciling of catch basins and inlets.	Stakeholders will establish a program that involves stenciling of stormwater structures. <i>Educate citizens and visitors on drainage system and reduce potential illicit discharges.</i>	O N G O Q I 1 N G	As part of the City's comprehensive inventory, approximately 10% of the City's inlets have been stenciled (decal). The City also allows residents to sponsor an inlet with a decal. The City also intends to incorporate inlet stenciling into some of its cooperative learning partnerships.		17
#3: Illicit Discharge Detection and Elimination	3.4.1. Illicit Discharge Education for Residences	Develop public education pollution prevention handouts to address illicit discharges from residences. Suggested topics include Household Hazardous Waste, Grass Clippings and Pesticides. Prepare 1 per year or as need is shown. Coordinate with 1.1 and 1.4	Provide on city forms to residents addressing household hazardous waste and impact to stormwater. <i>Homeowners will dispose of household hazardous wastes properly.</i>	Q3	As mentioned, the publications listed under this task are a regular fixture in the City's SWMP literature. SWMP administration has developed a promotional refrigerator magnet that is slated for purchase and dissemination this reporting cycle.		23
#3: Illicit Discharge Detection and Elimination	3.4.2. Illicit Discharge Education for Businesses	Develop public education pollution prevention handouts to address illicit discharges from specific businesses. Suggested businesses include Auto Repair, Dry Cleaners and Restaurants. Prepare 1 per year or as need is shown. Coordinate with 1.4.2	Provide handouts to businesses addressing illicit discharges from their specific business and impact to stormwater. <i>Business will dispose of hazardous wastes and minimize use of hazardous or toxic materials.</i>	Q4	Disseminated once per year and an ongoing feature of the Stormwater website.		18
#3: Illicit Discharge Detection and Elimination	3.5.1 Outfall Reconnaissance for TMDL WLA waters Å	Perform reconnaissance on at least 25% of all outfalls to TMDL WLA waters.	Reconnaissance will identify and quantify levels of TMDL toxins emitted from outfalls. Levels for 100% of outfalls discharging to WLA waters will be identified by permit reissuance period.	Q1	Accomplished via 3.2.4. Sight reconnaissance during this reporting year was investigatory for determination of frequent or likely dischargers. All outfalls slated to be monitored and tested with water quality equipment requested for purchase in the Department's FY12 budget.		
#3: Illicit Discharge Detection and Elimination	3.5.2 Outfall/Facility Reconnaissance of City-owned stormwater facilities Å	Perform reconnaissance / field survey on city-owned facilities as directed in General Permit VAR04, Section I B, Part 6.	Survey/data collection will identify possible sources of pollutants contributing to TMDL pollutants.	Q 2 Q 4 &	City facilities have been comprehensively mapped and inventoried and are EQC'd regularly. Structural control facilities (ponds) are being mapped and will be incorporated into this process.		25
#3: Illicit Discharge Detection and Elimination	3.5.3 Wasteload Analysis & Characterization for WLA waters ±	Conduct an annual characterization that estimates the volume of stormwater discharged, in cubic feet, & the quantity of pollutant identified in the WLA, in a unit consistent with the WLA, discharged by the system.	More complete understanding of amount of discharge & wasteload for Appomattox sections 2 & 3. Data will be utilized to monitor long-term changes in pollutant loads.	Q3	Evaluated using the TR55 Model and SRC Simple Method; see associated reference.		19 & 19(A)

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#4: Construction Site Stormwater Runoff Control	4.1.1. Evaluate Current Ordinance and Method of Site Plan Review Using DCR Guidelines	Review current City of Colonial Heights ordinances, policies and procedures for reviewing E&S Control plans submitted in conjunction with the Site Plan review. Compare the City practices with those of other Virginia municipalities and the industry standards. Attention will be given to Ordinance 92-6, requiring VSMPs and other applicable regulations.	Compile, create, and publish a standard operating procedure for the review of E&S Control Plans. Refine E&S Control Plan review and publish definitive SOP	Q4	Currently used; see associated reference.		20
#4: Construction Site Stormwater Runoff Control	4.1.2. Revise Ordinance Pertaining to Site Plan Review Including Construction Waste	Revise and introduce legislation to City Council as needed and identified in 4.1.1	Development and adaptation of ordinance <i>Uniform application of regulation.</i>	Q1	The City Ordinance and the Department's Plan Review Checklist address the Task in various ways. See the associated Reference and Reference 20 for detail.		20 & 20(A)
#4: Construction Site Stormwater Runoff Control	4.3.1. Training of City Staff for E&S Management and Site Plan Review	Select city site review staff members for training and certification in Virginia Department of Conservation (DCR) and Recreation E&S Control in Virginia for Plan Reviewers.	Provide opportunity for training and certification to new employees within 1 year of employment. Improves understanding of inspections on BMPs and E&S Procedure.	O N N G G - O Q I 1	One (1) Senior Construction Inspector underwent DCR E&S Training.		31
#4: Construction Site Stormwater Runoff Control	4.3.2. Training and Certification of E&S Construction Site Inspectors	Select city site review staff members of training and certification in (DCR) E&S Control in Virginia for Plan Inspectors.	Provide opportunity for training and certification to new employees within 1 year of employment. Improves understanding of inspections on BMPs and E&S procedure.	O N G G - O Q I 1 N	No new staff was hired and all present staff have current Plan Reviewer Certifications.		31
#4: Construction Site Stormwater Runoff Control	4.3.3. Coordination with Other Staff	Develop scheduled periodic meetings with Site Reviewers, Inspectors, GIS staff, and Public Works staff to discuss modifications to benefit programs.	Schedule meeting annually. <i>Continuously improve program for effectiveness.</i>	Q3	Revised previous to last reporting cycle. Documentation sheet is used regularly.		22
#5: Post-Construction Stormwater Management in New Development and Redevelopment	5.1.1. Develop Strategies for Watershed	Subdivide City into approximately 6 sub-watersheds for long term planning. Develop City wide strategy for watershed planning which will be used in all sub-watersheds. This includes looking at long term needs for preventing or reducing flood damage and dev	Prepare a strategy for development of a Stormwater Master Plan for future preparation either in-house or through a consultant. Establish City wide strategies to provide consistent planning for stormwater facilities, long term capital improvement planning and O&M cost development		Underway; mapping is complete and SWMP administration is developing Ordinances for incorporation into City Code.		
#5: Post-Construction Stormwater Management in New Development and Redevelopment	5.1.4. Enforcement of Structural BMP maintenance ±	Pursuant to 5.1.2. above, enforce maintenance agreements as required through various zoning ordinances, including the Chesapeake Bay ordinance.	All BMPs under maintenance agreement will be inspected and verified by a professional engineer on a continuing schedule. Necessary improvements will be required within 45 days of inspection.	O N G O I N G	Ongoing; all owners have been compliant to date. See associated Reference for O&M reporting tool and Local Guidance.		29
5.3. Structural BMP's	5.3.4. Develop and Maintain Inventory of Structural BMP's	Coordinate with mapping to establish an inventory of structural BMP's to include type, owner required O & M, inspection frequency, and location.	Develop and maintain data base. BMPs and map updates annual after initial completion.		Complete; see associated Reference.		21

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#5: Post-Construction Stormwater Management in New Development and Redevelopment	5.4.1. Training of City Staff for Site Plan Review and Field Inspections	Select staff members for training and certification of city staff using DCR course "Basic E & S Control in Virginia"	Provide opportunity for certification for new employees within 1 year of employment. <i>Improves understanding of inspections on BMPs and E&amp;S procedure.</i>	O N G O Q I 1 N G -	See 4.3.2		
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.1.4. Personnel Training	Train operations personnel in pollution prevention measures.	Record annual training schedules and number and department of personnel. <i>City will ensure that all personnel are adequately informed of pollution prevention measures.</i>	Q3	Training has been implemented; see associated reference.		28 & 28(A)
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.2.1. Parking Lot and Street Cleaning	One full time sweeper to clean all curb and gutter streets once a year.	Develop mapping to indicate streets cleaned and tonnage picked up. <i>City will track and evaluate current street cleaning routine and identify problem areas.</i>	O N G G - O Q I 1 N	656 Cubic yards of debris were removed this reporting year.	The City's truck experienced several mechanical failures this year. The City is evaluating options for more efficient machinery. The mapping to date has been by sketch. The City is developing a GIS layer for this Task for this reporting year.	27
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.2.2. Personnel Training	Evaluate inlet protection, erosion, and sediment control measures in road, utility, and bridge maintenance and train staff on methods.	Meet with 25% of required personnel on annual basis for training on current erosion and sediment control measures. <i>City personnel will employ current water quality measures for road, utility, and bridge maintenance.</i>	Q4	See 6.1.4		
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.3.1. Storm Drain Intake System Cleaning	Using City field crews and equipment, clean curb inlets, catch basins and manholes in the stormwater drainage system.	Clean 25% of storm structures per year. Record for historic data on database. <i>Reduces volume of solids in stormwater.</i>	O N G G - O Q I 1 N	As a component of the City's inventory and mapping initiative, all inlets and structures that were mapped were also cleaned. An estimated 200 of the City's 450(+) inlets were cleaned this reporting cycle.		
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.3.3. Stormwater Complaint File and History	Develop system to track and maintain historical data.	Review data annually. <i>Detection of failing or undersized systems.</i>	O N G G - O Q I 1 N	See associated Reference. Utilized to determine one undersized system this year. System is now placed on Capital Improvement list for upgrade.		30
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.4.1. Hazardous Materials Storage and Management	Evaluate storage locations and method of storing hazardous materials by EPA guidelines.	Record locations and methods of hazardous materials storage on map layer and database and inspect storage facilities annually. <i>Ensure hazardous materials storage containment is adequate.</i>	Q4	Completed last reporting year; see associated Reference.		25
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.4.2. Salt Storage	Evaluate application and method of storing road salt.	Record application locations and methods of storage in layer and database. Inspect storage facilities annually. <i>Ensure salt storage is adequate.</i>	Q3	See Reference 25. During one (1) storm event this reporting year, salt and sand admixture was spread on all City streets.		
#6: Pollution Prevention/Good House-keeping for Municipal Operations	6.4.3. Oil and Antifreeze Recycling	Evaluate used oil and antifreeze recycling methods.	Record used oil and used antifreeze recycling programs and amount collected to assess efficiency of current programs annually. <i>Ensure current programs are adequate.</i>	O N G G - O Q I 1 N	Incorporated under Superintendant Report initiative. Comprehensive reporting going forward will ensure task control and delivery.		26

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#6: Pollution Prevention/ Good House-keeping for Municipal Operations	6.5.1. MS4 Program Evaluation	Evaluate the City's MS4 Program in accordance with EPA's Municipal Stormwater Program Evaluation Guidance (EPA-833-R-07-003).	Identify program weaknesses, update and clarify milestones and BMPs, provide recommendation and record results for subsequent adoption and implementation	Q3	Program was evaluated internally using EPA guidelines and implementation plan for 2013-2018 permit cycle was revised accordingly.		32

SWM ID	Facility Name	Facility Address	Owner\Designee	Owner\Designee Mailing	Owner\Designee City	Owner\Designee State
BMP-0001	City of Colonial Heights	201 James Avenue	City	201 James Avenue	Colonial Heights	VA
BMP-0002	City of Colonial Heights	1209 Covington Road (behind)	City	201 James Avenue	Colonial Heights	VA
BMP-0003	City of Colonial Heights	Lee Place & Danville Ave	City	201 James Avenue	Colonial Heights	VA
BMP-0004	City of Colonial Heights	Archer Avenue at MLK Bridge	City	201 James Avenue	Colonial Heights	VA
BMP-0005	City of Colonial Heights	Chesterfield Avenue at Marvin Avenue	City	201 James Avenue	Colonial Heights	VA
BMP-0006	City of Colonial Heights	100 Highland Avenue	City	201 James Avenue	Colonial Heights	VA
BMP-0007	Boulevard Flowers	111 Pickett Avenue	Charles H. Aters, IV	206 Woodbridge Road	Colonial Heights	VA
BMP-0008	Carlton's Auto Service	116 Taswell Avenue	McGlone, Clifford	6217 Matoaca Rd	Petersburg	VA
BMP-0009	CHMS (additions; staff parking lot)	500 Conduit Road	School Board	512 Boulevard	Colonial Heights	VA
BMP-0010	Clements Retail Center (formerly)	3522 Boulevard	Jones Jr., Norris	16925 Jefferson Davis Hwy	Colonial Heights	VA
BMP-0011	Colonial Car Wash	3224 Boulevard	FD & B Enterprises, LLC	1377 Anderson Hwy	Powhatan	VA
BMP-0012	Lakeview Maintenance Bldg.	401 Taswell Avenue	School Board	512 Boulevard	Colonial Heights	VA
BMP-0013	Colonial Shell (Country Store)	3220 Boulevard	BDSB, LLC	P.O. Box 29317	Richmond	VA
BMP-0014	Creek View Center	3660 Boulevard	Creek View Centre, LLC	PO Box 23061	Richmond	VA
BMP-0015	Dominion Chevrolet	325 Charles H. Dimmock Parkway	J. Theodore Linhart, Dominion Auto Group	12050 West Broad St.	Richmond	VA
BMP-0016	Dominion Nissan	445 Charles H. Dimmock Parkway	J. Theodore Linhart, Dominion Auto Group	12050 West Broad St.	Richmond	VA
BMP-0017	Dr. Richard Bates, DDS	3610 Boulevard	Dr. Richard Bates	3610 Boulevard	Colonial Heights	VA
BMP-0018	Dunlop Farms Senior Apartments	1000 Dunlop Place	Mr. Lanny Redden, APTCO East, LLC	21400 Ridgetop Circle, Ste 250	Sterling	VA
BMP-0019	Gilcreff Place Subdivision	Dunlop Farms Boulevard	Gilbert Martin	117 Roanoke Avenue	Colonial Heights	VA
BMP-0020	Gills Point Section 9	Conduit Road	Bernard A. Hrouda c/o Gills Point Development Corp.	1001 Taylor Lane	Colonial Heights	VA
BMP-0021	Hardee's	1850 Boulevard	BNE Restaurant Group IV LLC c/o RASH #56-46-28160	PO Box 260888	Plano	TX
BMP-0022	Home Depot #4633	2600 Conduit Road	Sammy Boehms, Home Depot USA, Inc	2455 Paces Ferry Rd.	Atlanta	GA
BMP-0023	J.W. Humphries, Lot 2	107 Jackson Avenue	J.W. Humphries	127 Boulevard	Colonial Heights	VA
BMP-0024	Jones Office Building	2306 Boulevard	Mr. Norris E. Jones	16925 Jefferson Davis Hwy	Colonial Heights	VA
BMP-0025	Laurel Park Office Building	2421 Boulevard	Jones Realty & Construction Corporation	9800 JEB Stuart Parkway, Ste 200	Glen Allen	VA
BMP-0026	Laurel Park Parking Facility	2421 Boulevard	Jones Realty & Construction Corporation	9800 JEB Stuart Parkway, Ste 200	Glen Allen	VA
BMP-0027	McDonald's	411 Southpark Circle	Faison Associates	121 W Trade St., Ste 2700	Charlotte	NC
BMP-0028	Mekhoubat Office Building	107 W Ellerslie	Mekhoubat Properties, Inc	P.O. Box 276	Colonial Heights	VA
BMP-0029	Merchants Tire & Auto	773 Southpark Boulevard	Kosmakos Properties, LLC	11101 Hampton Rd	Fairfax Station	VA
BMP-0030	MIDAS	1400 Boulevard	TMT, LLC	11463 West Broad St.	Richmond	VA
BMP-0031	Movie Time	2900 Cedar Lane	88, LLC	P.O. Box 71150	Richmond	VA
BMP-0032	Mt. Pleasant Baptist Church	3110 Greenwood Avenue	Rob McIntosh c/o MPBC	3110 Greenwood Avenue	Colonial Heights	VA
BMP-0033	Mt. Pleasant Baptist playground	3110 Greenwood Avenue	Rob McIntosh c/o MPBC	3110 Greenwood Avenue	Colonial Heights	VA
BMP-0034	Mt. Pleasant Baptist parking lot extension	3110 Greenwood Avenue	Rob McIntosh c/o MPBC	3110 Greenwood Avenue	Colonial Heights	VA
BMP-0035	Old Towne Center	2801 Boulevard	Multiple tenants	N/A		
BMP-0036	Olive Garden	801 South Avenue	Mr. Nick Patel, Kaylan Plaza II	931 South Avenue		
BMP-0037	Outback Steakhouse	165 Southpark Circle	(Robert Basham, COO) / Mr. Jamie Butler c/o Outback Steakhouse	Outback Steakhouse, 2202 North Westshore Boulevard, 5th Floor	Tampa	FL
BMP-0038	Over The Edge	3635 Boulevard	William K. Thibault	3635 Boulevard	Colonial Heights	VA
BMP-0039	Park South Business Park	798 Southpark Boulevard	Faison Associates	121 West Trade Street, Ste 2550	Charlotte	NC
BMP-0040	Peoples Advantage Credit Union	2801 Conduit Road	Audrey L. Bollinger, President	2801 Conduit Road	Colonial Heights	VA
BMP-0041	Pizza Hut Delivery	714 Ellerslie Avenue	GE Capital Franchise Finance	8377 E Hartford Dr., Ste 200	Scottsdale	AZ
BMP-0042	Prospect Heights Subdivision	214 Clover Hill Avenue				
BMP-0043	Rite Aid #4820	3210 Boulevard	Mr. Jeff Hansen	291 N Main St.	Amherst	VA
BMP-0044	Riverview Apartments	205 Archer Avenue	RV Limited Partnership c/o VA Housing Development Authority	13195 Warwick Boulevard, Ste 1F	Newport News	VA
BMP-0045	Sam's Club	735 Southpark Boulevard	Store Manager	735 Southpark Boulevard	Colonial Heights	VA
BMP-0046	Sheetz	2711 Conduit Road	Randall A. Sheetz, Sheetz, Inc.	5700 6th Avenue	Altoona	PA
BMP-0047	Southside Regional Medical Center	436 Claremont Court	The Cameron Foundation	P.O. Box 3090	Petersburg	VA
BMP-0048	Starbucks	790 Southpark Boulevard	MKIS Enterprise, LLC c/o Sang Park Moon Park & Associates	7617 Little River Turnpike #930	Annandale	VA
BMP-0049	Target Store (#T-1016)	721 Southpark Boulevard	Cindy Swanson - Dayton Hudson Corporation	P.O. Box 9456	Minneapolis	MN
BMP-0050	Temple Lake Offices, Lots 11 & 12	131 Temple Lake Drive	Roslyn Farm Corp.	P.O. Box 727	Colonial Heights	VA
BMP-0051	Terrace View Apartments	200 Lakeview Park Road	H.W. Owens, S.A. Housing, LLP	2717 Willard Rd.	Richmond	VA
BMP-0052	Tussing Elementary	5501 Conduit Road	School Board	512 Boulevard	Colonial Heights	VA
BMP-0053	Virginia Pediatrics (Atreos)	301 Jennick Drive	Dr. Oscar & Amabel Sibal	11904 Hogans Alley	Chester	VA

BMP-0054	Waffle House	2002 Boulevard	Raypark, LLC, Jayfair Corp, North Lake Foods Inc-WH #136	PO Box 6450	Norcross	GA
<b>BMP-0055</b>	<a href="#">Walgreens</a>	<a href="#">626 Boulevard</a>	<a href="#">Walgreen Company</a>	<a href="#">104 Wilmot Rd.</a>	<a href="#">Deerfield</a>	<a href="#">IL</a>
BMP-0056	WaWa	604 Boulevard	Property Management	260 Baltimore Pike	Media	PA
BMP-0057	Wesley Methodist Church	3701 Conduit Road	Wesley Methodist Church	3701 Conduit Rd	Colonial Heights	VA
BMP-0058	White Bank Landing, Section II	155 Watercress Court (adjacent)				
<b>BMP-0059</b>	<a href="#">Wilton Property Grading</a>	<a href="#">Ridge at Temple</a>				
BMP-0060	A. Wright Pond Office Building	250 Ellerslie Avenue	A.Wright Pond, DDS	1025 Avon Court	Colonial Heights	VA
BMP-0061	American Family Fitness	930 South Avenue	Roslyn Farm Corporation	320C Charles Dimmock Parkway	Colonial Heights	VA
BMP-0062	Anderson Office Building	200 Lakeview	Don Anderson	PO Box 517	Colonial Heights	VA
BMP-0063	Ariya	3507 Boulevard	Ariya Real Estate	3660 Boulevard, Ste G	Colonial Heights	VA
BMP-0064	Bank of Southside VA	764 Ellerslie Avenue	Property Manager	PO Box 40	Carson	VA
BMP-0065	Behavior & Stress Management Center	3236 Boulevard	Broad Investments, LLC	3236-B Boulevard	Colonial Heights	VA
BMP-0066	Jones Office Building	201 Temple Avenue	Mr. Norris E. Jones	16925 Jefferson Davis Hwy	Colonial Heights	VA
BMP-0067	Colonial Heights Healthcare Center	831 E Ellerslie Avenue	Mario Thompson	831 E Ellerslie Avenue	Colonial Heights	VA

Owner\Designee Zip	END 1-YMP	TYPE	CONSTRUCT CERTIFIED	EASEMENT	ACRES BMP'd	Sub-Watershed	H.U.C.	FILE #
23834	Jan-02	BR		N\A	0.6	Oldtown	JA40	100162
23834		CB		N\A	8	Appomattox	JA44	
23834	Jan-99	UD		N\A		Appomattox	JA44	100520
23834	Jan-03	DB		N\A	0.4	Appomattox	JA40	101101
23834	Aug-93	DB \ FL		N\A	0.11	Fleets Branch	JA40	100530
23834	Jan-03	BR		N\A	0.6	Oldtown	JA40	100162
23834	Jan-90	US		YES	0.82	Oldtown	JA44	100001
23803-1589	Jan-96	SW		NO	0.75	Oldtown	JA40	100026
23834	Jan-03	SW		NO	1.2	Appomattox	JA40	100973
23834-5330	Jan-91	US		NO	0.44	Swift Creek	JA44	100040
23139	Jan-00	US \ ST		YES	0.7	Swift Creek	JA44	100006
23834	Sep-11	DB	YES	YES	1.5	Oldtown	JA40	100208
23242	Jan-98	CB \ US		YES	0.79	Swift Creek	JA44	100119
23223-0361	Jan-94	CB		NO	5.86	Swift Creek	JA44	100039
23233	Jan-95	DB		YES	0.56	Appomattox	JA40	100035
23233	Jul-09	DB \ ST		YES	11.03	Appomattox	JA40	100017
23834	Oct-02	DB		YES	0.39	Swift Creek	JA44	100005
20166	Jan-01	CB		YES	5.79	Swift Creek	JA44	100024
23834	Dec-09	DB		YES	6.35	Swift Creek	JA44	100159
23834		DB	YES	YES	1.73	Swift Creek	JA44	100209
75026-0888	Jan-86	SW \ DB		NO	1.62	Oldtown	JA40	100053
30339	Jan-01	DB		YES	13.11	Oldtown	JA40	100054
23834	Jan-96	CB		NO	0.032	Appomattox	JA40	100070
23834-5330	Dec-05	DB		YES	0.12	Oldtown	JA40	100047
23059	Jan-05	DB		YES	0.2	Oldtown	JA40	100138
23059	Jan-08	DB		YES	0.34	Oldtown	JA40	100218
28202-1195	Jan-91	DB		NO	1.15	Oldtown	JA40	100080
23834	Jan-07	DB		YES	0.2	Swift Creek	JA44	100129
22039-2301	Jan-95	DB		NO	1.14	Oldtown	JA40	100068
23233	Jan-02	DB		YES	0.42	Oldtown	JA40	100007
23255	Jan-88	DB		YES	0.08	Oldtown	JA40	file drawer
23834	Jan-98	RCC		NO	2.45	Oldtown	JA40	100067
23834	Jan-09	US \ UI		YES	0.2	Oldtown	JA40	100137
23834	Jun-11	UI		YES	0.83	Oldtown	JA40	100188
	Jan-89	FL		NO	1.26	Oldtown	JA40	101011
	Jun-09	US		YES	0.32	Appomattox	JA40	100183
33607	Jan-00	DB		YES	1.92	Oldtown	JA40	100055
23834	Apr-02	US		YES	1.41	Swift Creek	JA44	100050
28202	Jan-90	DB \ US		YES	14.61	Oldtown	JA40	100073
23834	Jun-05	US		YES	1.3	Oldtown	JA40	100152
85255-5687	Jan-91	DB		NO	0.84	Swift Creek	JA40	100046
	Jan-11	RB	YES	YES	0.5	Oldtown	JA40	100189
24521	Jan-98	DB		YES	1.7	Swift Creek	JA44	100101
23606	Jan-02	DB		YES	6.27	Appomattox	JA40	100083
23834	Jan-94	DB		YES	6.61	Oldtown	JA40	100121
16602	Jan-03	RP		YES	2.09	Oldtown	JA40	100084
23805	Sep-09	DB		YES	5.64	Swift Creek	JA44	100058
22003	Jan-09	US		YES	0.8	Oldtown	JA40	100142
55440	Jan-98	DB		YES	2.7	Appomattox	JA40	100112
23834	Jan-06	CB		NO	1.7	Oldtown	JA40	100127
23294	Jan-98	DB		YES	2.26	Oldtown	JA44	100111
23834	Aug-10	DB	YES	YES	3.66	Appomattox	JA44	100202
23836	Feb-09	DB		YES	1.37	Appomattox	JA40	100128

## Stormwater Management Facility Data

30091	Jan-01	US		NO	0.48	Oldtown	JA40	100109
<b>60015-5121</b>	<b>Dec-11</b>	<b>DB</b>	<b>YES</b>	<b>YES</b>	<b>0.32</b>	<b>Appomattox</b>	<b>JA40</b>	<b>100198</b>
19063	Jan-01	DB \ FL		YES	0.32	Fleets Branch	JA40	100107
23834-2631	Jan-93	UD		NO	0.46	Appomattox	JA40	100115
	Jan-96	DB		NO	3.79	Swift Creek	JA44	100430
				NO				100201
23834	Jan-03	RO		YES	0.41	Swift Creek	JA40	100051
23834	Jan-04	DB		YES	32.44	Appomattox	JA40	100002
23834	Jan-96	DB		NO	0.32	Oldtown	JA44	file drawer
23834	Mar-11	US		YES	0.3	Swift Creek	JA44	100191
23830-0040	Jan-93	DB		NO	0.88	Swift Creek	JA40	100012
23834	Jan-88	RO		NO	0.9	Swift Creek	JA44	file drawer
23834-5330	Jan-03	DB		YES	0.44	Oldtown	JA40	100052
23834	Jul-11	DB	YES	YES	6.2	Oldtown	JA40	100886

APROX TOTAL ACRES BMP'd = 173.732

**NOTES**

- \* In 1-year maintenance period
- \* Approved & discontinued or unconstructed
- \* JA40 - Old Town Creek, Appomattox River
- \* JA44 - Swift Creek

**LEGEND**

- RB = Retention Basin
- DB = Detention Basin
- CB = Catch Basin (includes Drop Inlet)
- UD = Underground Detention
- RCC = Restrictive Curb Cuts
- ST = Sediment Trap
- FL = Flume
- SW = Swale
- RO = Restrictive Outlet
- UI = Underground Infiltration
- BR = Bioretention

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 9:58  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-003</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input checked="" type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input type="checkbox"/> 1 - No flow\interior conditions are dry
	<input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp
	<input type="checkbox"/> 3 - Visible flow
	Flow Estimates:
	Width of flow surface: __ inches __ feet
Approximate depth of flow: __ inches __ feet	
Approximate flow rate: __ feet per second	
- REPORT SUMMARY CHARACTERIZATION -	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	
<u>Ponding water</u> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:10  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-011</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input checked="" type="checkbox"/> 3 - Visible flow	
	<b>Flow Estimates:</b>	
	Width of flow surface: <u>8</u> inches <u>  </u> feet	
Approximate depth of flow: <u>&lt;1</u> inches <u>  </u> feet		
Approximate flow rate: <u>2-3</u> feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b>	<input type="checkbox"/> <b>Suspected Illicit Discharge</b>	<input type="checkbox"/> <b>Obvious Illicit Discharge</b>
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <u>Ponding water</u> <hr/> <hr/>		

REPORTER SIGNATURE: \_\_\_\_\_




DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:21  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-013</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: __ inches __ feet Approximate depth of flow: __ inches ____ feet Approximate flow rate: __ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
	
<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	



REPORTER SIGNATURE: \_\_\_\_\_



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:26  AM  PM

FILED BY: A. J. Covington

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-015</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

PIPE SITUATION ▼

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	Flow Estimates: Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second	
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report	
ADDITIONAL NOTES: <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: a.j. coringa

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:30  AM  PM

FILED BY: A. J. Covington

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-017</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	<b>Flow Estimates:</b>	
	Width of flow surface: ____ inches ____ feet	
Approximate depth of flow: ____ inches ____ feet		
Approximate flow rate: ____ feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: a.j. coringa

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 2:31  AM  PM

FILED BY: A. J. Covington

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-026</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	Flow Estimates:	
	Width of flow surface: ____ inches ____ feet	
Approximate depth of flow: ____ inches ____ feet		
Approximate flow rate: ____ feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: a.j. coringa

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 9:17  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-032</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input checked="" type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

FLOW CONDITIONS	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second		
	<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
	<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
			<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>
	<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE:

*Jeremy D Moore*

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 9:32  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-033</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input checked="" type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	



REPORTER SIGNATURE: \_\_\_\_\_



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:34  AM  PM

FILED BY: Jeremy Moore

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-038</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

PIPE SITUATION ▼

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
 <div style="position: absolute; bottom: 10%; right: 10%; font-size: 0.8em; color: orange;">05.15.2013</div> <div style="position: absolute; bottom: 0; right: 0; font-size: 0.8em; color: orange;">05.15.2013</div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 9:48  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-039</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input checked="" type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input checked="" type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: <u>3</u> inches <u>  </u> feet Approximate depth of flow: <u>&lt;1</u> inches <u>  </u> feet Approximate flow rate: <u>&lt;1</u> feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
 <div style="text-align: right; margin-top: 10px;"> <b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b> </div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 2:15  AM  PM

FILED BY: Jeremy Moore

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-041</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

PIPE SITUATION ▼

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input checked="" type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: <u>8</u> inches <u>  </u> feet Approximate depth of flow: <u>1.5</u> inches <u>  </u> feet Approximate flow rate: <u>&lt;1</u> feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	


**REPORTER SIGNATURE:** \_\_\_\_\_


DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 9:12  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-042</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input checked="" type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input type="checkbox"/> Corridor (In or adjacent to watercourse) <input checked="" type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
	
<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 10:39  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-044</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____	<input type="checkbox"/> None <input checked="" type="checkbox"/> Algae <input type="checkbox"/> Dead fish <input type="checkbox"/> Suspended solids <input type="checkbox"/> Sewage	

FLOW CONDITIONS	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: __ inches __ feet Approximate depth of flow: __ inches ____ feet Approximate flow rate: __ feet per second		
	- REPORT SUMMARY CHARACTERIZATION -		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge			
		<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> Ponding water <hr/> <hr/> <hr/>			

REPORTER SIGNATURE: \_\_\_\_\_

*Jeremy D Moore*

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 10:52  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-046</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input checked="" type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input type="checkbox"/> Corridor (In or adjacent to watercourse) <input checked="" type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	<b>Flow Estimates:</b>	
	Width of flow surface: _____ inches _____ feet	
Approximate depth of flow: _____ inches _____ feet		
Approximate flow rate: _____ feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: Jeremy D Moore

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 10:10  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-051</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
 <div style="text-align: right; margin-top: 10px;"> <b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b> </div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	


**REPORTER SIGNATURE:** \_\_\_\_\_


DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 2:41  AM  PM

FILED BY: A. J. Covington

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-052</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

PIPE SITUATION ▼

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	Flow Estimates: Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second	
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: a.j. coringa

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 2:55  AM  PM

FILED BY: A. J. Covington

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-053</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second		
	- REPORT SUMMARY CHARACTERIZATION -		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge			
		<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>			

REPORTER SIGNATURE: a.j. coringa

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 2:52  AM  PM

FILED BY: Jeremy Moore

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-054</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

PIPE SITUATION ▼

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second		
	- REPORT SUMMARY CHARACTERIZATION -		
	<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
			
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>		
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>			

REPORTER SIGNATURE: Jeremy D Moore

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 9:37  AM  PM

FILED BY: Jeremy Moore

- ENVIRONMENTAL INFORMATION -

OUTFALL ID: <u>OF-055</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input checked="" type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input type="checkbox"/> Corridor (In or adjacent to watercourse) <input checked="" type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

SURROUNDING LAND USE(S) ▼

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

- OUTFALL OBSERVATIONS -

PIPE OBSTRUCTIONS ▼

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

PIPE SITUATION ▼

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

- ILLICIT DISCHARGE INDICATORS -

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input checked="" type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: <u>3</u> inches <u>1</u> feet Approximate depth of flow: <u>&lt;1</u> inches <u>  </u> feet Approximate flow rate: <u>&lt;1</u> feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1; text-align: right;"> <b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b> </div> </div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 8:30  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-058</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
	
<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 8:07  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-070</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input type="checkbox"/> Other: _____				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: ____ inches ____ feet Approximate depth of flow: ____ inches ____ feet Approximate flow rate: ____ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> Unlikely Illicit Discharge <input type="checkbox"/> Suspected Illicit Discharge <input type="checkbox"/> Obvious Illicit Discharge	
 <div style="text-align: right; margin-top: 10px;"> <b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b> </div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 9:24  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-080</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input checked="" type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

FLOW CONDITIONS	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry <input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: _____ inches _____ feet Approximate depth of flow: _____ inches _____ feet Approximate flow rate: _____ feet per second		
	<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
	<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b>	<input type="checkbox"/> <b>Suspected Illicit Discharge</b>	<input type="checkbox"/> <b>Obvious Illicit Discharge</b>
			<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>
	<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		



REPORTER SIGNATURE: \_\_\_\_\_



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 9:25  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-081</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input checked="" type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	<b>Deposits\Stains:</b> <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	Flow Estimates:	
	Width of flow surface: _____ inches _____ feet	
Approximate depth of flow: _____ inches _____ feet		
Approximate flow rate: _____ feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> Unlikely Illicit Discharge	<input type="checkbox"/> Suspected Illicit Discharge	<input type="checkbox"/> Obvious Illicit Discharge
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE: Jeremy D Moore

DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/15/2013

TIME: 1:57  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-086</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input type="checkbox"/> JA40 (Appomattox River I and II) <input checked="" type="checkbox"/> JA44 (Swift Creek, Old Town Creek) <input type="checkbox"/> JA-J (Fleets Branch)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input checked="" type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial       Commercial       Residential       Institutional       Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe       Roots\brush       Earth\sediment       Rock\rubble       No obstruction

**PIPE SITUATION ▼**

Stabilized embankment       Eroded embankment       On\In concrete structure  
 In\Near watercourse       Upland area\away from watercourse       Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent) <input type="checkbox"/> Sulfide (rotten eggs) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Sewage <input type="checkbox"/> Natural gas	<input type="checkbox"/> Rancid\Sour\Pungent <input type="checkbox"/> Petroleum (gas)
APPEARANCE	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Oily sheen\film <input type="checkbox"/> Cloudy <input type="checkbox"/> Suds <input type="checkbox"/> Colored (describe): _____ <input type="checkbox"/> Other: _____		
FLOATABLES	Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____		

<b>FLOW CONDITIONS</b>	<input type="checkbox"/> 1 - No flow\interior conditions are dry <input checked="" type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp <input type="checkbox"/> 3 - Visible flow <b>Flow Estimates:</b> Width of flow surface: __ inches __ feet Approximate depth of flow: __ inches ____ feet Approximate flow rate: __ feet per second
<b>- REPORT SUMMARY CHARACTERIZATION -</b>	
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b> <input type="checkbox"/> <b>Suspected Illicit Discharge</b> <input type="checkbox"/> <b>Obvious Illicit Discharge</b>	
 <div style="text-align: right; margin-top: 10px;"> <b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b> </div>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>	

REPORTER SIGNATURE: Jeremy D Moore



DRY-WEATHER FIELD REPORT  
STORMWATER MANAGEMENT PROGRAM  
CITY OF COLONIAL HEIGHTS, VIRGINIA

DATE: 5/16/2013

TIME: 9:43  AM  PM

FILED BY: Jeremy Moore

**- ENVIRONMENTAL INFORMATION -**

OUTFALL ID: <u>OF-091</u>	HYDROLOGIC UNIT CODE (HUC) ▼ <input checked="" type="checkbox"/> JA40 (Appomattox River I and II) <input type="checkbox"/> JA44 (Swift Creek, Old Town Creek)	PROXIMITY TO WATERCOURSE ▼ <input checked="" type="checkbox"/> Corridor (In or adjacent to watercourse) <input type="checkbox"/> Upland (Not adjacent to watercourse) <input type="checkbox"/> Tributary (In or near basin, wetland, etc.)
<b>MOST RECENT RAIN EVENT ▼</b> Time Lapse: <input type="checkbox"/> < 2 days <input checked="" type="checkbox"/> > 2 days Estimated Amount: <input checked="" type="checkbox"/> < 0.5 inches <input type="checkbox"/> > 0.5 inches		

**SURROUNDING LAND USE(S) ▼**

Industrial     Commercial     Residential     Institutional     Open space (check all that apply)

**- OUTFALL OBSERVATIONS -**

**PIPE OBSTRUCTIONS ▼**

Collapsed pipe     Roots\brush     Earth\sediment     Rock\rubble     No obstruction

**PIPE SITUATION ▼**

Stabilized embankment     Eroded embankment     On\In concrete structure  
 In\Near watercourse     Upland area\away from watercourse     Maintained earth

**- ILLICIT DISCHARGE INDICATORS -**

ODOR	<input checked="" type="checkbox"/> None (no detectable scent)	<input type="checkbox"/> Sewage	<input type="checkbox"/> Rancid\Sour\Pungent		
	<input type="checkbox"/> Sulfide (rotten eggs)	<input type="checkbox"/> Natural gas	<input type="checkbox"/> Petroleum (gas)		
<input type="checkbox"/> Other: _____					
APPEARANCE	<input type="checkbox"/> Normal	<input type="checkbox"/> Oily sheen\film	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Suds	<input type="checkbox"/> Colored (describe): _____
	<input checked="" type="checkbox"/> Other: <u>Stagnant Water</u>				
Deposits\Stains: <input type="checkbox"/> Oily <input type="checkbox"/> Paint <input type="checkbox"/> Flow line <input type="checkbox"/> Other (describe): _____					
FLOATABLES	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Algae	<input type="checkbox"/> Dead fish	<input type="checkbox"/> Suspended solids	<input type="checkbox"/> Sewage
	<input type="checkbox"/> Other: _____				

<b>FLOW CONDITIONS</b>	<input checked="" type="checkbox"/> 1 - No flow\interior conditions are dry	
	<input type="checkbox"/> 2 - No visible flow\interior conditions are moist or damp	
	<input type="checkbox"/> 3 - Visible flow	
	<b>Flow Estimates:</b>	
	Width of flow surface: _____ inches _____ feet	
Approximate depth of flow: _____ inches _____ feet		
Approximate flow rate: _____ feet per second		
<b>- REPORT SUMMARY CHARACTERIZATION -</b>		
<input checked="" type="checkbox"/> <b>Unlikely Illicit Discharge</b>	<input type="checkbox"/> <b>Suspected Illicit Discharge</b>	<input type="checkbox"/> <b>Obvious Illicit Discharge</b>
	<b>Photographic Documentation of Outfall <u>Must</u> be Attached to Complete Report</b>	
<b>ADDITIONAL NOTES:</b> <hr/> <hr/> <hr/> <hr/>		

REPORTER SIGNATURE:

*Jeremy D Moore*

Illicit Discharge Incident Reference Guide			
Reference Number	Location / Descriptive Name	Incident Date	Date Closed
00001	Southpark Mall carnival discharge	12-Mar-09	13-Mar-09
00001A	<i>second incident reported on July 30</i>	30-Jul-09	30-Jul-09
00001B	<i>third incident discovered on June 22</i>	22-Jun-11	27-Jun-11
00001C	<i>4th incident discovered on June 15</i>	13-Jun-13	14-Jun-13
00002	Highland Avenue garden drainage ditch	6-Apr-09	6-Apr-09
00003	Lafayette Avenue automobile leakage	14-May-09	currently open
00004	Billy's Lawn Service, Pertshire and School Streets	6-Nov-09	currently open
00005	214 Biltmore Drive	16-Apr-10	16-Apr-10
00006	Ridge and Snead	28-Mar-11	currently open
00007	111 Lakeside		currently open
00008	Hemlock Avenue, north end	17-Jun-11	currently open
00009	94 Swift Creek Lane	13-Jun-11	8-Jul-13
00010	209 Windmere Avenue	15-Jul-11	18-Jul-11
00011	210 Windmere Avenue	15-Jul-11	19-Sep-13
00012	1801 Duke of Gloucester inlet discharge	30-Aug-11	7-Sep-11

**2010 POTENTIAL ILLICIT DISCHARGERS by INDUSTRY**

TRADE NAME	FULL NAME	ADDRESS #	STREET NAME	CITY	STATE	ZIP	LICENSE NO	ALTERNATIVE CONTACT	FACILITIES	TYPE OF DISCHARGE	PAST VIOLATIONS
A Rainbow Taxi Co	Harry E Winkler	105	Pickwick Circle	Colonial Heights	VA	23834	20091854				
A-1 Steam It Inc	David Krueh	303	Temple Ave	Colonial Heights	VA	23834	20090231				
Ackerman Auto Repair	James Ackerman	111	Boulevard	Colonial Heights	VA	23834	20090461				
Affordable Carpet Cleaning	Gilbert Nugent	243	Lee Ave	Colonial Heights	VA	23834	20090358				
All Seasons Termite & Pest											
All Seasons Termite & Pest Control	Control	435	Ellerslie Ave	Colonial Heights	VA	23834	20091441				
Ann's Cleaners	David J Lee	654	Boulevard	Colonial Heights	VA	23834	20091474				
Aqua Cleaners	Glory Family Corp	40	Pickwick Shop Cntr	Colonial Heights	VA	23834	20090329				
Atlantic Power Washing	Edwin Endoza	3110	Holly Ave	Colonial Heights	VA	23834	20091443				
Attention to Detail	Roscoe Davis	433	Ellerslie Ave	Colonial Heights	VA	23834	20090593				
Auto Tech Road Service Repair	Mutaz Y Alkhadra	303	Nottingham Dr	Colonial Heights	VA	23834	20091572				
Avery Lawn Care & Landscaping	Joseph Avery	2505-A	Pineoak Ct	Colonial Heights	VA	23834	20090155				
B & Q Lawn Care	Kenny Drumright	101	Indian Rock Ct	Colonial Heights	VA	23834	20090167				
Brian Bagwell's Lawn Service	Brian Bagwell	110	Hargrave Ave	Colonial Heights	VA	23834	20090816				
Balch Alignment & Frame Inc	Christopher Balch	192	Lyons Ave	Colonial Heights	VA	23834	20091245				
Battlefield Park Body Shop	Wilson W Abernathy	118	Bruce Ave	Colonial Heights	VA	23834	20090159				
Battle's Landscaping	Michael B Battle	118	Pinecliffe Dr	Colonial Heights	VA	23834	20091511				
Billy's Lawn Service	William E Toth Jr	3606	Perthshire Lane	Colonial Heights	VA	23834	20090511				
Excavating	Donald Blake	3644	Ashby Ave	Colonial Heights	VA	23834	20090813				
Boulevard Coin Laundry	Tri-City Properties of VA	P O Box 39		Colonial Heights	VA	23834	20091214				
Briggs Auto Service	Mark Briggs	1700	Snead Ave	Colonial Heights	VA	23834	20090344				
Brother Johns	Digital Photography Rooney Jr	1120	Jett Ave	Colonial Heights	VA	23834	20090589				
Buddy's Towing	Buddy Whiting	225	Boulevard	Colonial Heights	VA	23834	20091415				
C & C Lawn Service Inc	C & C Lawn Service Inc	917	Lakeview Ave	Colonial Heights	VA	23834	20090412				
C & L Excavation LLC	C & L Excavation LLC	3242	Longhorn Dr	Colonial Heights	VA	23834	20090990				
Cal's Inc	Calvin Meadows	101	Boulevard	Colonial Heights	VA	23834	20090143				
Carlton's Auto Service	Clifford B McGlone	116	Taswell Ave	Colonial Heights	VA	23834	20090646				
Carwile's Auto Detailing	Joseph Carwile	517-A	James Ave	Colonial Heights	VA	23834	20091708				
Chip's Auto Repair	Randell Pulver	P O Box 549		Colonial Heights	VA	23834	20091590				
CJW Dry Cleaners & Alteration	Jeom S Park	22	Dunlop Village Shop Cntr	Colonial Heights	VA	23834	20090683				
Colonial Car Wash	FD & B Associates	1377	Anderson Hwy	Powhatan	VA	23139	20090420				
Colonial Curb Appeal	Joshua Cummings	601	Ivey Ave	Colonial Heights	VA	23834	20091952				
Colonial Heights Health Care Center	Colonial Heights Operations LLC	831	Ellerslie Ave	Colonial Heights	VA	23834	20090536				
Colonial Heights Muffler & Auto	Autoworks Service Center	1718	Snead Ave	Colonial Heights	VA	23834	20091154				
Colonial Heights Taxi	Paul Maillet	100	Taswell Ave	Colonial Heights	VA	23834	20091619				
Colonial Lawn Care	Nathan Gregg	113	Deerwood Dr	Colonial Heights	VA	23834	20091170				
Colonial Lawnmower Shop	M Sidney Watkins Jr	303	Norwood Dr	Colonial Heights	VA	23834	20090901				
Colonial Power Wash	Stephen Selfe	1306	Canterbury Lane	Colonial Heights	VA	23834	20090569				
Colonial Tire & Auto LLC	Colonial Tire & Auto LLC	100	Roanoke Ave	Colonial Heights	VA	23834	20090633				
Conner Small Engine	Robert H Conner	1000	Temple Ave	Colonial Heights	VA	23834	20090497				
Cox Landscaping	Ike J Cox	3631	Boulevard #14	Colonial Heights	VA	23834	20091933				
Crowder, Robert	Robert Crowder	502	Braxton Ave	Colonial Heights	VA	23834	20091514				
Cutting Edge Lawn Service & Landscape	Stallard Mark	124	Lauren's Lane	Colonial Heights	VA	23834	20091167				
Dominion Southpark Inc	Dominion Southpark Inc	P O Box 3406		Colonial Heights	VA	23834	20090919				
The Dry Cleaners	Dolan/Naworal Inc	184	Southgate Square	Colonial Heights	VA	23834	20090605				

	Coordinated Services						
The Dunlop House	Management Inc	3333	Peters Creek Rd	Roanoke	VA	24019	20090540
Executive Automotive Detail LLC	Tremayne Stith	2100	Boulevard	Colonial Heights	VA	23834	20091312
Ezell's Lawn & Maintenance	Ezell's Lawn & Maintenance						
Ezell's Lawn & Maintenance Service	Service	402	Crescent Ave	Colonial Heights	VA	23834	20090528
Flagstop Car Wash & Quick Lube	Flagstop Corporation	610	Boulevard	Colonial Heights	VA	23834	20091212
Flores, Maria Cleaning Service/Property							
Maintenance & Repair	Maria Flores	149	Watercress Ct	Colonial Heights	VA	23834	20091691
G & S Services	Galy Robinson	123	Lee Ave	Colonial Heights	VA	23834	20091781
Giovanna's Commercial Cleaning	Giovanna Stith	1211	Clifton Dr	Colonial Heights	VA	23834	20091341
Harris Auto Repair	Delmer J Shumate	115	Boulevard	Colonial Heights	VA	23834	20090735
Health Care Plus	Petersburg Clinic Company LLC	P O Box 3088		Petersburg	VA	23805	20090992
Home Pride Power Washing	Phillip Butler Sr	115	Clearfield Circle Apt G	Colonial Heights	VA	23834	20090811
Johnson's Laundry & Dry Cleaning	Johnson's Laundry & Dry Clean	1919	Boulevard	Colonial Heights	VA	23834	20090130
Master Transmissions	RWRW Inc	636	Boulevard	Colonial Heights	VA	23834	20090382
Mayes Home Improvement	James D Mayes Sr	1309	Canterbury Lane	Colonial Heights	VA	23834	20091719
Meineke Discount Muffler	Charles Cheeseman Inc	712	Boulevard	Colonial Heights	VA	23834	20091196
Tom Mentzer, Home & Ground Maintenance	J Tom Mentzer	427	Ellerslie Ave	Colonial Heights	VA	23834	20090890
Midas Auto Service Center	TMT LLC	1400	Boulevard	Colonial Heights	VA	23834	20090849
Moonlighting Lawn Care	Amy G Armstrong	410	Highland Ave	Colonial Heights	VA	23834	20090902
Motorcycle Authority Inc	Motorcycle Authority Inc	3008	Boulevard	Colonial Heights	VA	23834	20091757
Orion Pest Services LLC	Terry Shaver	811	Keswick Rd	Colonial Heights	VA	23834	20091826
Palmers Towing & Recovery LLC	Palmers Towing & Recovery LLC	P O Box 1019		Colonial Heights	VA	23834	20091188
Palmore Automotive Service	Palmore Motorsports Inc	305	Boulevard	Colonial Heights	VA	23834	20091537
Parlow Automotive/Towing	Rodney Parlow	405	Ellerslie Ave	Colonial Heights	VA	23834	20091670
Precision Sealing and Powerwashing	Jeremy Hare	P O Box 566		Colonial Heights	VA	23834	20091292
Randall Brush Services	Randall Brush	104	Moore Ave	Colonial Heights	VA	23834	20090874
Rayfield's Lawn Care & Home Repair	William Rayfield	1318	Appomattox Dr	Colonial Heights	VA	23834	20091538
Reighard's Lawn Care	Chris Reighard	309	Maple Lane	Colonial Heights	VA	23834	20090703
John Ricks, Grass Cutting	John Ricks	114	Richmond Ave	Colonial Heights	VA	23834	20091833
Sarek Autowork	Ralf Sarek	119	Boulevard	Colonial Heights	VA	23834	20091697
Jeff Shelton, Lawn Care	Jeff Shelton	1917	Franklin Ave	Colonial Heights	VA	23834	20091343
Sherwood Hills Automotive Inc	Sherwood Hills Automotive Inc	3300	Boulevard	Colonial Heights	VA	23834	20090868
Shores Landscaping	Jesse Shores	3112	Woodlawn Ave	Colonial Heights	VA	23834	20091810
Shumate Automotive	Delmer J Shumate Jr	225	Boulevard	Colonial Heights	VA	23834	20090056
Signature Automotive Service	Signature Automotive Service	1010	Kensington Ave	Colonial Heights	VA	23834	20091350
Stone Motor Express Inc	Stone Motor Express Inc	1312	River Oaks Dr	Colonial Heights	VA	23834	20091359
Swarmers Pest Control	Michael & Lindsay Bessant	106	Laurel Parkway	Colonial Heights	VA	23834	20091142
T & S Lawn Care	Terry Schane	3800	Orkney Rd	Colonial Heights	VA	23834	20090172
Tri City Lawn & Land	William Myers	P O Box 2449		Petersburg	VA	23804	20091404
Tri-City Laundromat	Nam Hi Lee	101	Bruce Ave	Colonial Heights	VA	23834	20090506
Tuffy Muffler	Lizco Inc	1115	Boulevard	Colonial Heights	VA	23234	20090325
Turner & Son Lawn Service	H R Turner	P O Box 600		Colonial Heights	VA	23834	20090034
Van's Lawn Care	George Temple	613	Hamilton Ave	Colonial Heights	VA	23834	20090118
Victory Lane Auto Sales & Accessories	Shawn & Phyllis Mongeur	3245	Boulevard	Colonial Heights	VA	23834	20090881
Wamsley Service Center	C Neil Wamsley Jr	3504	Boulevard	Colonial Heights	VA	23834	20090869

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
JULY							

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
AUGUST							

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights							
Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
SEPTEMBER	FAMILY DOLLAR	1604 Boulevard	FD06 - Colonial Heights, LLC	610 E. Morehead Street, Ste. 100 Charlotte, NC 28202	Bryan E. Smith/(704) 366-7337	9/10/2012	0.99
SEPTEMBER	MARTIN'S FUEL STATION	2906 Boulevard	Giant Food Stores, LLC	1149 Harrisburg Pike Carlisle, PA 17013	Nicholas Kerilla/(717) 245-7434	9/27/2012	1.23

Total Acreage = 2.22

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
OCTOBER	BB&T Bank	2609 Boulevard	Branch Banking & Trust	2400 Reynolds Road Winston-Salem, NC 27106	M. Carey/(727) 366-2577	10/11/2012	1.22

Total Acreage = 1.22

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights							
Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
NOVEMBER	<b>Yew Avenue Medical Office Building</b>	3611 Boulevard	Dirach, LLC	3403 Boulevard Colonial Heights, VA 23834	Raphael Agada/(804) 526-2816	11/20/2012	0.38

Total Acreage =	0.38
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2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
DECEMBER							0

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
JANUARY							0

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights							
Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
FEBRUARY	I-95 Exit Ramp 53D Drainage Outfall	E. Roslyn/Southpark Boulevard	Roslyn Farm Corp.	320 C Charles H. Dimmock Pkwy. Colonial Heights, VA 23834	Nick Walker/(804) 526-0820	2/11/2013	1.22

Total Acreage =	1.22
-----------------	------

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
MARCH							

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
APRIL							

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
MAY							

Total Acreage = 0

2012-13 Monthly Report of Land Disturbance Activities for the City of Colonial Heights

Month	Project Title	Project Address	Owner/Applicant	Owner/Applicant Address	Owner/Applicant Contact No	Date Issued	Total Disturbed
JUNE							

Total Acreage = 0

## TR 55 Worksheet 2: Runoff Curve Number and Runoff

Project: Overall Discharge - Colonial Heights   Designed By: \_\_\_\_\_ Date: \_\_\_\_\_

Location: City of Colonial Heights      Checked:      Date:

Check one:  Present  Developed

## 1. Runoff curve number (CN)

<sup>1/</sup> Use only one CN source per line.

Totals = 4,800.0 350,400.0

$$CN \text{ (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{350,400.0}{4,800.0} = 73 \quad \text{Use CN} = \boxed{73}$$

## 2. Runoff

Frequency ..... years

Rainfall, P (24 hour) ..... in.

Runoff, Q ..... in.

(Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3
2	10	100
3.5	5.5	8.0
1.2	2.7	4.8

### TR 55 Worksheet 3: Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ )

Project: Overall Discharge - Colonial Heights      Designed By: \_\_\_\_\_ Date: \_\_\_\_\_

Location: City of Colonial Heights      Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

Check one:  Present      Developed

Check one:  $T_c$        $T_t$       through subarea \_\_\_\_\_

NOTES: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

#### Sheet Flow (Applicable to $T_c$ only)

Segment ID

--	--

1. Surface description (Table 3-1) .....
2. Manning's roughness coeff., n (Table 3-1) .....
3. Flow length, L (total  $L \leq 100$  ft) ..... ft
4. Two-year 24-hour rainfall,  $P_2$ ..... in
5. Land slope, s .....
6.  $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$       Compute  $T_t$ ..... hr

33% Impervious	
0.01	
27,444	
3.5	
0.010	
2.27	+

= 2.27

#### Shallow Concentrated Flow

Segment ID

--	--

7. Surface description (paved or unpaved) .....
8. Flow length, L ..... ft
9. Watercourse slope, s ..... ft/ft
10. Average velocity, V (Figure 3-1) ..... ft/s
11.  $T_t = \frac{L}{3600 V}$       Compute  $T_t$  ..... hr

	+

=   

#### Channel Flow

Segment ID

--	--

12. Cross sectional flow area, a .....  $ft^2$
13. Wetted perimeter,  $P_w$  ..... ft
14. Hydraulic radius,  $r = \frac{a}{P_w}$       Compute  $r$  ..... ft
15. Channel Slope, s ..... ft/ft
16. Manning's Roughness Coeff., n .....
17.  $V = 1.49 r^{2/3} s^{1/2}$       Compute  $V$  ..... ft/s


18. Flow length, L ..... ft
19.  $T_t = \frac{L}{3600 V}$       Compute  $T_t$  ..... hr
20. Watershed or subarea  $T_c$  or  $T_t$  (add  $T_t$  in steps 6, 11, and 19 ..... hr


=   

2.27

### Tr 55 Worksheet 4: Graphical Peak Discharge Method

Project: Overall Discharge - Colonial Heights      Designed By: \_\_\_\_\_ Date: \_\_\_\_\_

Location: Colonial Heights      Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

Check one: Present Developed

1. Data:

Drainage area .....  $A_m$  = 7.40 mi<sup>2</sup> (acres/640)

Runoff curve number .... CN = 73 (From Worksheet 2)

Time of concentration ....  $T_c$  = 2.20 hr (From Worksheet 3)

Rainfall distribution type ..... = II (II, III, DMVIII)

Pond and swamp areas spread  
throughout watershed ..... = \_\_\_\_\_ percent of  $A_m$  ( \_\_\_\_\_ acres or mi<sup>2</sup> covered)

	Storm #1	Storm #2	Storm #3
2. Frequency..... yr	2	10	100
3. Rainfall, P (24-hour)..... in	3.5	5.5	8.0
4. Initial abstraction, $I_a$ ..... in (Use CN with Table 4-1.)	0.740	0.740	0.740
5. Compute $I_a/P$ .....	0.21	0.13	0.09
6. Unit peak discharge, $q_u$ ..... csm/in (Use $T_c$ and $I_a/P$ with exhibit 4- <u>II</u> )	200	220	240
7. Runoff, Q ..... in (From Worksheet 2)	1.10	2.60	4.60
8. Pond and swamp adjustment factor, $F_p$ ..... in (Use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero percent pond and swamp area.)	1.0	1.0	1.0
9. Peak discharge, $q_p$ ..... cfs (Where $q_p = q_u A_m Q F_p$ )	1,628	4,233	8,170

# The Simple Method to Calculate Urban Stormwater Loads

## Introduction

The Simple Method estimates stormwater runoff pollutant loads for urban areas. The technique requires a modest amount of information, including the sub-watershed drainage area and impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, the investigator can either break up land use into specific areas, such as residential, commercial, industrial, and roadway and calculate annual pollutant loads for each type of land, or utilize more generalized pollutant values for land uses such as new suburban areas, older urban areas, central business districts, and highways.

Stormwater pollutant concentrations can be estimated from local or regional data, or from national data sources. Tables 1 through 3 summarize pollutant concentration data for Total Suspended Solids (Table 1), Total Phosphorous (Table 2), and Total Nitrogen (Table 3) for residential, commercial, industrial, and roadway land uses, and identify default values. Table 4 identifies pollutant concentration values for Phosphorus, Nitrogen, COD, BOD, and some metals for more generalized land use categories. In general, the selected data sources are nationwide in scope, or are summaries of several regional studies. Some studies included in these data did not characterize stormwater concentrations for specific land uses, and instead reported a concentration for "urban runoff." In these instances, the data are reported as the same concentration for each land use in Tables 1 through 3.

Fecal coliform is more difficult to characterize than other pollutants. Data are extremely variable, even during repeated sampling at a single location. Because of this variability, it is difficult to establish different concentrations for each land use. Although some source monitoring data exists (Steuer *et al.*, 1997; Bannerman *et al.*, 1993), the simple method assumes a median urban runoff default value, derived from NURP data (Pitt, 1998), of 20,000 MPN/100ml. For more information on sources and pathways of bacteria in urban runoff, consult Schueler (1999).

The Simple Method estimates pollutant loads for chemical constituents as a product of annual runoff volume and pollutant concentration, as:

$$L = 0.226 * R * C * A$$

Where: L = Annual load (lbs)

R = Annual runoff (inches)

C = Pollutant concentration (mg/l)

A = Area (acres)

0.226 = Unit conversion factor

For bacteria, the equation is slightly different, to account for the differences in units. The modified equation for bacteria is:

$$L = 1.03 * 10^{-3} * R * C * A$$

Where: L = Annual load (Billion Colonies)

R = Annual runoff (inches)

C = Bacteria concentration (#/100 ml)

A = Area (acres)

1.03 \* 10<sup>-3</sup> = Unit conversion factor

## Annual Runoff

The Simple Method calculates annual runoff as a product of annual runoff volume, and a runoff coefficient (Rv). Runoff volume is calculated as:

$$R = P * P_j * R_v$$

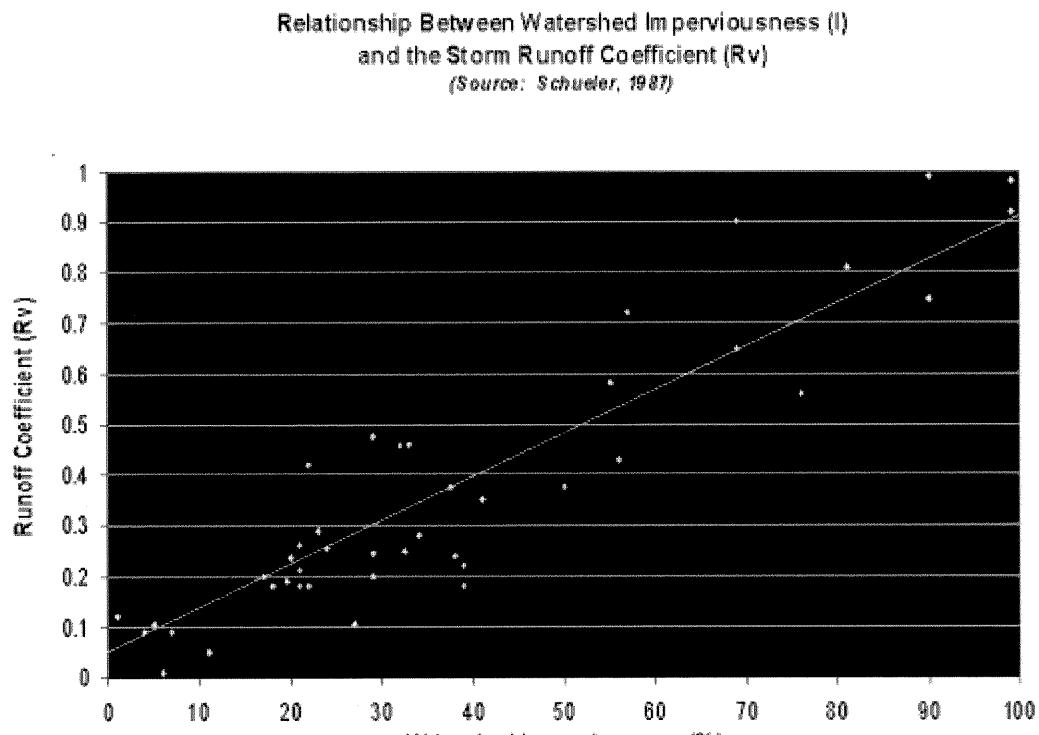
Where: R = Annual runoff (inches)

P = Annual rainfall (inches)

$P_j$  = Fraction of annual rainfall events that produce runoff (usually 0.9)

R<sub>v</sub> = Runoff coefficient

In the Simple Method, the runoff coefficient is calculated based on impervious cover in the sub-watershed. This relationship is shown in Figure 1. Although there is some scatter in the data, watershed imperviousness does appear to be a reasonable predictor of R<sub>v</sub>.



The following equation represents the best fit line for the dataset (N=47, R<sup>2</sup>=0.71).

$$R_v = 0.05 + 0.9I_a$$

Where: I<sub>a</sub> = Impervious fraction

#### Impervious Cover Data

The model uses different impervious cover values for separate land uses within a sub-watershed.

Representative impervious cover data, along with Model default values, are presented in [Table 5](#). A study is currently being conducted by the Center for Watershed Protection under a grant from the U.S. Environmental Protection Agency to update impervious cover estimates for these and other land uses. The results of this study will be available by 2001. In addition, some jurisdictions may have detailed impervious cover information if they maintain a detailed land use/land cover GIS database.

#### Limitations of the Simple Method

The Simple Method should provide reasonable estimates of changes in pollutant export resulting from urban development activities. However, several caveats should be kept in mind when applying this method.

The Simple Method is most appropriate for assessing and comparing the relative stormflow pollutant load changes of different land use and stormwater management scenarios. The Simple Method provides estimates of storm pollutant export that are probably close to the "true" but unknown value for a development site, catchment, or sub-watershed. However, it is very important not to over emphasize the precision of the results obtained. For example, it would be inappropriate to use the Simple Method to evaluate relatively similar development scenarios (e.g., 34.3% versus 36.9% Impervious cover). The simple method provides a general planning estimate of likely storm pollutant export from areas at the scale of a development site, catchment or sub-watershed. More sophisticated modeling may be needed to analyze larger and more complex watersheds.

In addition, the Simple Method only estimates pollutant loads generated during storm events. It does not consider pollutants associated with baseflow volume. Typically, baseflow is negligible or non-existent at the scale of a single development site, and can be safely neglected. However, catchments and sub-watersheds do generate baseflow volume. Pollutant loads in baseflow are generally low and can seldom be distinguished from natural background levels (NVPDC, 1979). Consequently, baseflow pollutant loads normally constitute only a small fraction of the total pollutant load delivered from an urban area. Nevertheless, it is important to remember that the load estimates refer only to storm event derived loads and should not be confused with the total pollutant load from an area. This is particularly important when the development density of an area is low. For example, in a large low density residential sub-watershed (Imp. Cover < 5%), as much as 75% of the annual runoff volume may occur as baseflow. In such a case, the annual baseflow nutrient load may be equivalent to the annual stormflow nutrient load.

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Annual Runoff:

**R = Annual Runoff (inches)**

**P = Annual Rainfall (inches)**

**P<sub>j</sub> = Fraction of annual rainfall events that produce runoff (usually 0.9)**

**R<sub>v</sub> = Runoff Coefficient**

<i>P</i>	<i>P<sub>j</sub></i>	<i>R<sub>v</sub></i>
45.26	0.90	0.32

$$R = 13.03$$

**Bacteria Concentration:** 20,000 MPN / 100 ml.

**L = Annual Load (Billion Colonies)**

**R = Annual Runoff (inches)**

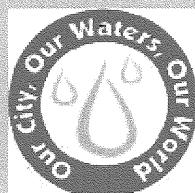
**C = Bacteria Concentration (#/100ml)**

**A = Area (acres)**

<i>R</i>	<i>C</i>	<i>A</i>
13.03	200.00	4,800.00

$$L = 12,888.89$$

<a href="#">Stormwater Mgmt Home</a>
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<a href="#">7 Easy Steps</a>
<a href="#">Get Involved</a>
<a href="#">News</a>
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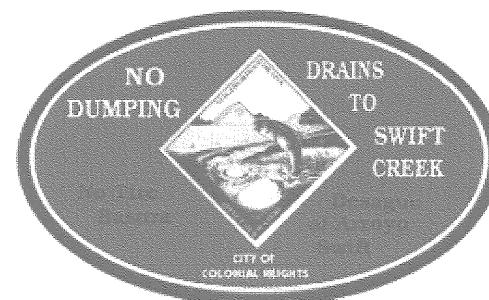


## COLONIAL HEIGHTS STORMWATER MANAGEMENT

### Get Involved

Getting involved in protecting the City's waterways and water bodies is easier than you think. If you've already begun practicing the [7 Easy Steps](#) to preventing stormwater pollution, there are also opportunities to learn more and do more . . .

- *If you'd like to learn more about stormwater and the City's SWMP and belong to a civic group or organization, request a [Stormwater Forum](#) and Department of Public Works personnel will be happy to come out and speak to your group or organization. When requesting a Forum, please remember to leave your organization contact's name, contact information and a time when that person may be reached.*
- *If you're interested in helping clean the City's waterways, volunteer your civic group or organization to [Adopt-A-Waterway](#) and begin seeing a difference today.*
- *Help educate the rest of the City's residents about the dangers of stormwater runoff by dedicating a storm drain decal. The Department of Public Works will provide a pollution awareness decal that you'll affix to one of the City's storm drains, permanently reminding passers-by that anything that enters the City's storm sewer system affects local waters. [Contact the City's MS4 Coordinator for more details.](#)*



From Colonial Heights Stormwater Management Program website, available at  
[www.colonial-heights.com/StormwaterManagement](http://www.colonial-heights.com/StormwaterManagement)

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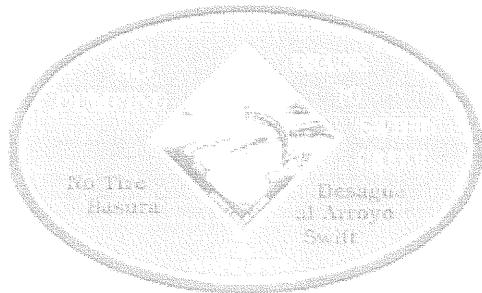


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NO  
DUMPING

No Tire  
Basura

DRAINS  
TO  
APPOMATTOX

RIVER  
Los desagües  
al Río  
Appomattox

CITY OF  
COLONIAL HEIGHTS





# Colonial Heights Department of Public Works



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Colonial Heights, VA 23834  
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[www.colonial-heights.com/PublicWorks](http://www.colonial-heights.com/PublicWorks)

# Stormwater BMPs in Colonial Heights

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**Guidance for Stormwater Planning and Design**

Produced by the Engineering Division,  
Department of Public Works

Spring 2010

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### **Executive Summary**

#### **Introduction**

- Layout
- Primary sources

#### **Purpose**

- Scope and limitations of this whitepaper

#### **Best Management Practices (BMPs)**

- Overview of common methods
- Current methods in Virginia
- New methods

#### **Selecting BMPs for Colonial Heights**

- Selection criteria

#### **Evaluating BMP Effectiveness**

- Considerations
- Effectiveness by volume and pollutant removal

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- Assigning grades

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- Construction concerns

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## Executive Summary

Structural stormwater Best Management Practices (BMPs) are used in the field of stormwater management to mitigate the damage caused to waterways and water bodies by stormwater runoff. These BMPs range in type from the traditional and commonly-used retention pond to the emerging method of green roofing. Though many conditions affect the sampling data for efficiency rates and the data for many emergent BMPs is still limited, many of these BMPs have shown moderate to significant levels of runoff volume reduction and pollutant removal.

Given their wide range and variety of designs, selection of suitable BMPs often hinges on community conditions, site suitability and the reliability and cost of the BMP over the course of its life. This being the case, general selection criteria should be identified and considered when selecting project-appropriate BMPs. If appropriately identified and duly considered during the planning and development stages of a project, the selection criteria will help ensure that the selected BMP(s) are the "best choice" for the project and remain efficient over the life of the site.

The selection phase, however, is not the only phase of development that determines how well a structural BMP functions. Problems often arise during and after the construction phase that hinder BMP function. Actions can be taken that eliminate these construction and post-construction issues and further guarantee that BMPs retain the ability to mitigate the damages of runoff.

Thus if throughout the planning, development and implementation phases of a site's BMP(s) the data and selection criteria is accurately considered and the construction is closely coordinated and well-monitored, planners and stormwater personnel can reasonably ensure that BMPs function to design over the course of their lives.



## Introduction

Protecting the health and ensuring the vitality of Colonial Heights' surrounding waters begins with eliminating the sources of degradation and pollution. As sediments and pollutants in stormwater runoff are the leading cause of aquatic pollution, implementing effective practices to mitigate these causes is certainly a key to success.

This whitepaper discusses the use of stormwater Best Management Practices (BMPs) within the City of Colonial Heights. It briefly addresses the general use and function of BMPs in the practice of stormwater management. It examines, in greater detail, current methods and types of structural BMPs and their prevalence in the James River basin of central Virginia, as well as new and developing types of structural BMPs from around the stormwater management community. It then evaluates the use of structural BMPs specific to the suitability of their use in Colonial Heights and the effectiveness of their design. In so doing, it discusses the circumstances of avouchment or impediments to the use of the various types of BMPs, particularly through the planning and design stages.

Upon suggesting the types of BMPs most suitable for use in Colonial Heights, the whitepaper discusses some of the common design and construction problems affecting BMP implementation and function. Recommendations for preventing or correcting these common problems are then presented.

## Primary sources

Primary sources for this report include the June 2009 *Technical Report* of the Center for Watershed Protection (CWP), part of CWP's three-year *Extreme BMP Makeover* project. Authors of that report field surveyed and analyzed nearly 200 structural BMPs in the middle and lower James River basin. Sites of study included the cities of Charlottesville, Norfolk, Hampton, and Portsmouth as well as the counties of Albemarle, Henrico, Chesterfield and James City. The Environmental Protection Agency's (EPA) *National Menu of Stormwater Best Management Practices*, originally published in 2000, was also heavily utilized. The *National Menu of Stormwater BMPs* is an excellent resource for BMP comparison, as it collects volumes of available research in one easily accessible database. Material from Maryland's Department of the Environment (MDOE) *Stormwater BMP Manual* was also sited numerous times, as that state has led many initiatives in the field of stormwater management and shares Virginia's common interest of protecting the Chesapeake Bay. Additional sources are noted under *References*.



## Purpose of this whitepaper

As noted in the introduction, this whitepaper evaluates common and developing types of structural stormwater BMPs. More specifically, it investigates types of structural BMPs commonly used in the central Virginia area and makes recommendations for the types that are most suitable to the conditions and characteristics in Colonial Heights. By identifying a selection criterion it suggests which BMPs might be more suitable for use in Colonial Heights. It also identifies some of the common problems related to the highlighted BMPs and suggests how these might be mitigated.

As such, the whitepaper is intended to be used as guidance for all personnel that play a role in the administration of stormwater practices in the City. It has been formatted with the intention of being utilized during the planning, initial development, construction and post-construction phases of all development and watershed protection initiatives within the City.

The scope of this whitepaper is limited, however, to a discussion of generally and commonly accepted stormwater practices related to structural BMPs. It does not address non-structural practices, which are often critical tools for positively impacting the health of a jurisdiction's receiving waters. The gradation of BMPs is intended only as a general reference, designed only to allow the reader to consider those noted in a manner relative to the others. To be sure, all of the BMPs listed in this whitepaper have received at least some merit in protecting stormwater resources. Moreover, the whitepaper is not intended to represent a comprehensive approach to stormwater management in the City. As will be noted in the following, addressing the types of site-specific questions that arise during the planning and initial development phases of a given project, particularly in a format such as this, is an impossibility. Careful planning and communication should always be facilitated between City personnel, engineering consultants and contractors in order to ensure that each BMP is adequate for the subject site and is constructed to design standards.

## Why Stormwater Matters

Development has a profound influence on the health and quality of Colonial Heights' waters. Site changes that occur during the initial clearing and grading alter the hydrologic cycle. Trees, grasses, and other covers that had previously intercepted and absorbed rainfall are removed and natural depressions that had temporarily ponded water are graded to a uniform slope. Cleared and graded sites erode, are often severely compacted, and can no longer prevent rainfall from being rapidly converted into stormwater runoff. After construction, roof tops, roads, parking lots, driveways and other impervious surfaces no longer allow rainfall to soak into the ground. Consequently, the volume of stormwater runoff increases sharply with impervious cover. Stormwater runoff is one of the leading causes of water pollution in this country, as Table 1.1 helps to demonstrate. As such, methods whereby this runoff can be managed become an exceedingly important tool in protecting our waters.

**Table 1.1<sup>1</sup>**

Typical Pollutants Found in Stormwater Runoff	Units	Average Concentration *
Total Suspended Solids (a)	mg/l	80
Total Phosphorus (b)	mg/l	0.30
Total Nitrogen (a)	mg/l	2.0
Total Organic Carbon (d)	mg/l	12.7
Fecal Coliform Bacteria (c)	MPN/100 ml	3600
E. coli Bacteria (c)	MPN/100 ml	1450
Petroleum Hydrocarbons (d)	mg/l	3.5
Cadmium (e)	ug/l	2
Copper (a)	ug/l	10
Lead (a)	ug/l	18
Zinc (e)	ug/l	140
Chlorides (f) (winter only)	mg/l	230
Insecticides (g)	ug/l	0.1 to 2.0
Herbicides (g)	ug/l	1 to 5.0

\* These concentrations represent mean or median storm concentrations measured at typical sites and may be greater during individual storms. Also note that mean or median runoff concentrations from stormwater hotspots are 2 to 10 times higher than those shown here. Units = mg/l = milligrams/liter, ug/l = micrograms/liter, MPN = Most Probable Number.

Data Sources: (a) Schueler (1987) (b) Schueler (1995), (c) Schueler (1997), (d) Rabanal and Grizzard (1996) (e) USEPA (1983) (f) Oberts (1995) (g) Schueler, (1996)



## Best Management Practices

Stormwater Best Management Practices, commonly known as BMPs, are defined as any practice or technique whose goal is reduction of pollutant loads in stormwater runoff. They cover a wide range of activities – schedules of activities, prohibitions

of practices, maintenance procedures and other management practices to prevent or reduce pollutant discharges, and public education campaigns are all commonly known as BMPs. This encompassing term is generally subdivided into *structural* versus *non-structural* BMPs, structural being those that involve some physical mechanism(s), barrier(s) or constructed impediment(s) to divert, slow, hold or filter stormwater runoff in some fashion and non-structural being things such as policies or education campaigns.

Per the requirements of the Clean Water Act (CWA) and subsequent environmental regulations, the Environmental Protection Agency (EPA) administers, through the corresponding state authorities, the National Pollutant Discharge and Elimination System (NPDES). One of the responsibilities of the NPDES is regulation of municipal discharges through the use of Municipal Separate Storm Sewer System (MS4) permits. Under the MS4 permitting requirement of the NPDES, municipalities are required to apply for a permit to discharge their storm sewer systems into receiving waters. These MS4 permits require municipalities to institute a comprehensive set of stormwater BMPs to mitigate or prevent pollution levels of their respective stormwater discharge.

In conjunction with the heightened awareness of polluted runoff borne out of the CWA but predating the NPDES MS4 permit requirements, the Chesapeake Bay Preservation Act (CBPA) requires municipalities to employ strategies to ensure that the use and development of land be accomplished in a manner that protects the quality of state waters. One method by which planners and developers have attempted to protect water quality is through the use of structural BMPs, generally designed to keep a site's post-development runoff pollutant load as near as possible to the levels of its pre-development pollutant load. Considering CBPA regulations and MS4 permitting requirements, then, localities have been using structural stormwater BMPs for nearly two decades.

### **- Common Methods**

While many types of structural BMPs are used to mitigate the pollutant contribution of a given

#### **Structural BMP**



*Detention pond*



*Retention pond*



*Catch basin with filter*



*Rain garden*



*Infiltration trench under construction*

development site, a number of these are more commonly used than others. Of these, structural BMPs designed to contain stormwater runoff on-site have perhaps been the most common. These include:

- grassed swales
- infiltration trenches
- catch basin filters
- sand filters
- vegetative strips
- detention ponds
- retention ponds
- rain gardens

These methods generally share a common design principle – they are intended to treat stormwater runoff at its source. Stated differently, they are designed to prevent or mitigate runoff pollution by treating the rainfall received by the site, at its source, before it leaves the site. By treating runoff at its source, these BMPs are designed to mimic the characteristics of undeveloped land, whereupon rainfall would naturally infiltrate into the ground or contain few pollutants when it leaves the site.

### Containment

One of the most common and most widely used structural BMPs are facilities designed to contain - *retention or detention* - stormwater runoff for a sufficient enough period of time to allow sediments and associated pollutants to settle out of the runoff prior to its leaving the site. Detention ponds, for example, are designed to detain a site's runoff for a period of time (often 24hrs) and release it slowly to an outfall or other conveyance system.

### Infiltration

Facilities designed to allow soil infiltration are another popular method for controlling stormwater. BMPs like rain gardens and infiltration trenches are designed to capture stormwater runoff but, unlike containment facilities like detention ponds, are constructed with highly permeable soils at their base. The permeable soil allows stormwater runoff to infiltrate into the ground, thereby filtering pollutants through the soil.

### Filtration

While filtration practices like sand filters, vegetative strips and catch basin filters aren't capable of containing much runoff on site, they are designed to filter pollutants out of runoff before the runoff leaves the limits of the site. Acting essentially as a buffer, these methods are designed to filter out sediment and pollutants as runoff flows through them.

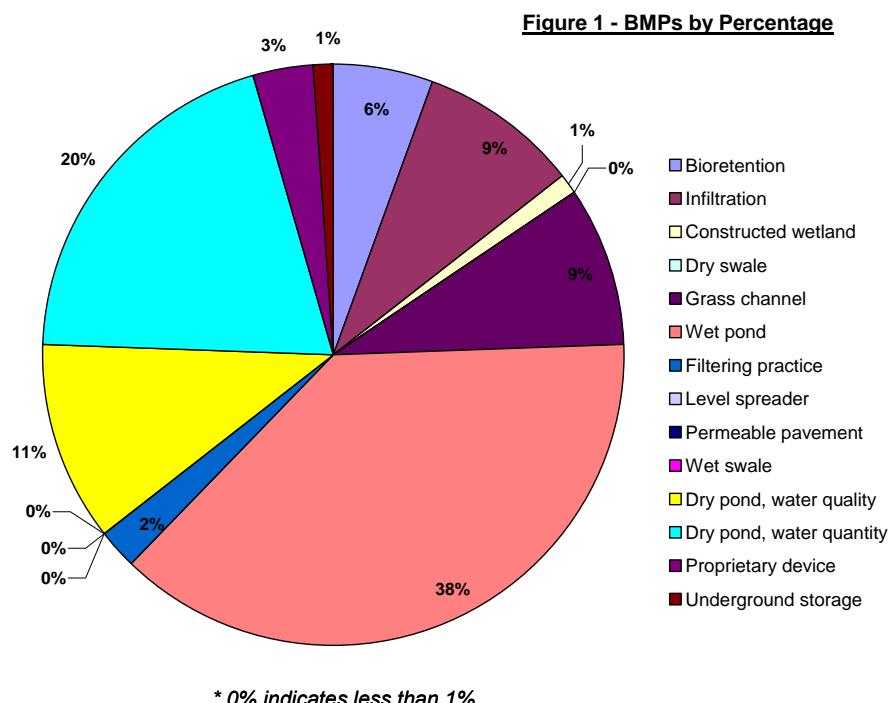
#### **- Methods commonly found in Virginia**

Table 1.2 illustrates a broad sampling of the types of BMPs found in the James River Basin. The BMPs shown are the most frequently used in eleven communities within the basin and may reasonably be said to represent the structural stormwater BMPs within the basin at large.<sup>2</sup>

BMPs in the James River Basin	
Bioretention	Level spreader
Infiltration	Permeable pavement
Constructed wetland	Wet swale
Dry swale	Dry pond, water quality treatment
Grass channel	Dry pond, w/o water quality treatment
Wet pond	Proprietary device
Filtering practice	Underground storage

**Table 1.2**

As indicated in Figure 1, below, conventional BMPs like dry and wet ponds are still the most frequently used structures for stormwater management. Permeable pavements, a less conventionally used method, are one of the least frequently used BMPs.



Not surprisingly, the majority of BMPs in the basin receive drainage from commercial and institutional development. Residential runoff, both suburban and urban, and industrial runoff account for a significant amount of the remainder. A negligible percentage of BMPs collected runoff from parks, forests and pastures.<sup>3</sup>

Table 1.2 demonstrates that, even across the James River Basin, a fairly broad range of structural BMPs are employed in the use of stormwater management. While structures like ponds are more commonly used than some of those listed, the use of so broad a range of structures bears truth to the fact that planners and MS4 administrators face many decisions when determining the appropriate type of BMPs for a given site or their jurisdictions at-large. Given the decisions that the numerous structural BMP options present, consideration of the design principles of each BMP is necessary. A summation of these follows.

<b><u>Structural BMP Type</u></b>	<b><u>Design Principle*</u></b>	<b><u>Characteristics</u></b>
<b>Dry pond</b>	Containment	Designed to detain stormwater runoff for some minimum time to allow particles and associated pollutants to settle. Unlike wet ponds, they are not designed to have a large permanent pool of water. Because they are designed to contain large areas of a site's drainage, they can also be used to provide flood control by including additional flood detention storage. Many soil types are suitable for dry pond construction.
<b>Wet ponds</b>	Containment\Infiltration	Designed to have a permanent pool of water throughout the year, they treat incoming stormwater runoff by allowing particles to settle and algae to take up nutrients. Primary removal mechanism used is settling, though pollutant uptake, particularly of nutrients, also occurs through biological activity in the pond. Many soil types are suitable for dry pond construction. May be designed to treat water quantity or water quality (i.e., filter particular nutrients). Proximity to water table should be considered.
<b>Grassed channel</b> (aka, grassed swale)	Containment\Infiltration	Open-channel management practice designed to treat and attenuate stormwater runoff for a specified water quality volume. Designed to slow stormwater as it flows along these channels to allow sedimentation, filtering through subsoil, and/or infiltration into the underlying soils. Secondary or dual design purpose includes directing flow to dry or wet ponds. Generally constructed as a linear feature.
<b>Infiltration basins</b>	Infiltration\Containment	Shallow, pond-like impoundments designed to infiltrate stormwater into the soil through permeable subsoil mixtures. Via their design, infiltration basins generally have both a water quantity and water quality control feature. Proximity to water table should be considered.

<b>Infiltration trenches</b>	Infiltration\Containment	Designed with the same characteristics as infiltration basins. Trenches, however, are usually ditch-like, linear features often constructed on slopes or at slope bases. Proximity to water table should be considered.
<b>Bioretention</b> (rain gardens, &c)	Filtration\Containment	Landscaping features adapted to provide on-site treatment of runoff. Commonly located in parking lot islands and within pockets of residential land areas. Shallow, landscaped depressions are designed to incorporate many of the pollutant removal mechanisms that operate in forested ecosystems. During storms, runoff ponds above the mulch and soil where it filters through the mulch and prepared soil mix. The filtered runoff is sometimes collected in a perforated underdrain and returned to the storm sewer system. Proximity to water table should be considered.
<b>Proprietary devices</b>	Filtration\Containment	Broad range of manufactured BMPs designed for treatment of stormwater. Proprietary devices generally serve two major purposes: separation and filtration. They feature internal mechanisms through which settling of sediment particles and flotation of hydrocarbons takes place. Proprietary BMPs often pass runoff through filter cartridges or filter media, thereby removing some fraction of the solid pollutants from the stormwater.
<b>Vegetated strip</b> (aka, vegetated buffer)	Filtration	Variable-width landscaped or vegetated buffers that divide land uses or provide landscape relief between a site's limits and adjacent areas\properties. Designed to treat stormwater before it exits the site via filtering of sediments and pollutants.
<b>Underground storage</b>	Containment\Infiltration	A range of practices that often utilize manufactured devices or systems to contain the flow from rainfall events underground, later releasing it to a storm sewer system or, in some cases, allowing infiltration into subsoils. Also known as in-line storage, referring to the use of restrictive devices within the lines of the storm sewer pipes to temporarily store water.
<b>Level spreader</b>	Filtration\Containment	System of mechanisms designed to work in conjunction to diffuse collected runoff, allowing closer contact of the runoff to the vegetated buffer. Level spreaders usually consist of an impoundment mechanism, a diffusion (level spreader) mechanism and a vegetated strip or buffer. Closer contact of the runoff to the buffer is intended to guarantee filtration.

**Constructed wetland** Containment

Practices similar to wet ponds designed to incorporate wetland biodiversity into the treatment of runoff. As runoff flows through the wetland, pollutant removal is achieved through settling and biological uptake within the wetland. Also constructed to offer aesthetic and habitat value. Designed specifically for the purpose of treating stormwater runoff and typically have less biodiversity than natural wetlands in terms of both plant and animal life.

**Permeable pavement** (porous pavers) Infiltration

Designed to temporarily store surface runoff before it infiltrates into the subsoil. Used to replace traditional pavement, allowing parking lot stormwater to infiltrate directly into underlying soils. Designed to consist of an open-graded coarse aggregate with sufficient interconnected voids to make it highly permeable to water. Some permeable pavements are designed with fibrous grids with open areas that allow grass or sand within the voids to allow infiltration. Proximity to water table should be considered.

\* *primary design principle \ secondary design principle*

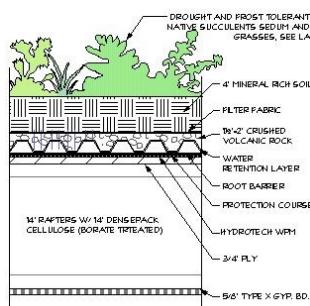
**- New and emergent methods of structural BMPs**

As the practice of stormwater management develops and increasingly incorporates and utilizes the principles of hydrology, new and developing BMPs continue to evolve. While not all of the new and innovative BMPs on the horizon have shown promise in pollutant and sediment reduction, several structural methods have demonstrated some impressive capabilities. Though more data is needed to determine the exact levels of effectiveness of some of these new practices, initial data indicates that the following BMPs are having a positive impact on the health of aquatic resources.

**Green Roofs**

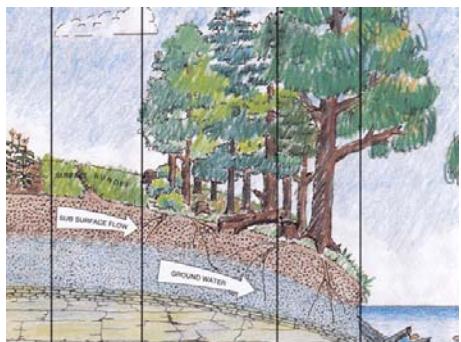
Green roofs harness the principles of natural plant cover by replacing impervious surfaces like roofs, a significant contributor to stormwater runoff, with natural cover. By constructing roofs that are capable of sustaining a minimum level of growing medium and extensive landscaping, as opposed to traditional asphalt or metal, two critical objectives in reducing the damages of stormwater runoff are achieved: quantity reduction and synthetic sediment reduction. Runoff quantity is reduced by eliminating what would otherwise be impervious surface.

Synthetic sediments, like shingle grits and industrial crushed



aggregate coatings that are otherwise washed into waterways via gutters and storm sewers are subsequently eliminated by using landscaping features in their place.

### Forested Buffers



Forested buffers work very much like vegetated strips on a magnified scale. Rather than clearing a lot in its entirety, a forested boundary zone is allowed to remain on the property's limits, particularly if the property abuts any water resources. The buffer allows stormwater to be filtered through a natural area before it exits the site, thereby decreasing the sediments and pollutants. While planners play an important role in facilitating the use of forested buffers, as a structural BMP these buffers may have significant impact on the amount of sediment and pollutants that reach our aquatic resources.

### Green Parking

Green parking takes the principles that underlie permeable pavements and expands them. Whereas permeable parking lots are designed to make all or parts of a traditionally-paved lot more receptive to infiltration, green parking lots are designed to mimic natural infiltration rates by taking an undeveloped area and making it stable for parking without the use of impervious surfaces.



One example is the use of alternative 'pavers', which many times aren't at all pavements in the traditional sense. Open paving blocks (**porous pavers**), gravel, cobblestone, wood chips or mulch, and various types of amended turf are all used as alternative pavers. By utilizing materials like these, underlying soils are still accessible to runoff while the surface is made strong enough to support vehicle traffic.

### On-Lot Treatment



While this term refers to a rather broad range of practices designed to manage runoff on-site and, in fact, many of the BMPs previously discussed are designed to do just that, one type of BMP uniquely associated with the on-lot treatment principle is the cistern. Designed to capture runoff for use on other applications at a later date, cisterns can be large, underground systems or individual rain barrels. Mechanisms such as the cistern have long been used in arid regions of the country for agricultural purposes, where long periods without rainfall make harvesting crops nearly impossible without some ability to use rainfall more systematically. This

method is now gaining popularity in stormwater management, where its use is doubly advantageous for decreasing runoff and negating the effects of impervious surfaces.

As both the common and new structural BMP examples demonstrate, planners and stormwater managers have many choices when deciding the best methods for controlling stormwater in their communities. The ability to do this effectively, however, is dependant not only upon knowing the range of BMPs available. Rather, it relies upon an understanding of the effectiveness of each BMP and an understanding of the conditions of the community.



## **Choosing the Right BMPs for Colonial Heights: Selection Criteria**

Choosing the right BMPs for Colonial Heights involves defining the selection criteria and weighing it against both the site conditions and the BMP effectiveness. An appropriate selection criterion can be identified as follows:

- General Feasibility
- Pretreatment\Treatment
- Environmental Design\Landscaping Aesthetic
- Maintenance

Identifying selection criteria in this manner helps to ensure that each BMP will be effective and appropriate for each site, will be both environmentally and aesthetically attractive, and will allow planners and developers to better understand the degree of maintenance that will be required over the life of the BMP, thus allowing the "best choice" to be made.

### **- General Feasibility**

The geographic conditions of Colonial Heights and of the project site are perhaps the most important considerations when selecting an appropriate, or feasible, BMP. Topography, aquatic conditions, soil structure and community conditions are all factors that determine a BMP's general feasibility.

#### **Topography**

#### ***Aquatic Conditions***

Roughly 75 percent of Colonial Heights is bordered by water resources. Swift Creek defines its northern boundary and the Appomattox River defines its eastern and southern boundaries. Fleets Branch traverses a small portion of its southwestern boundary and Old Town Creek nearly evenly divides the City. Approximately 35% of the runoff from Colonial Heights drains to Old Town Creek, 25% to the Appomattox River, 35% to Swift Creek and 5% to Fleets Branch (see Figure 2). The Appomattox River receives runoff that is approximately 15% industrial, 25% commercial and 60% residential. Swift Creek receives runoff that is

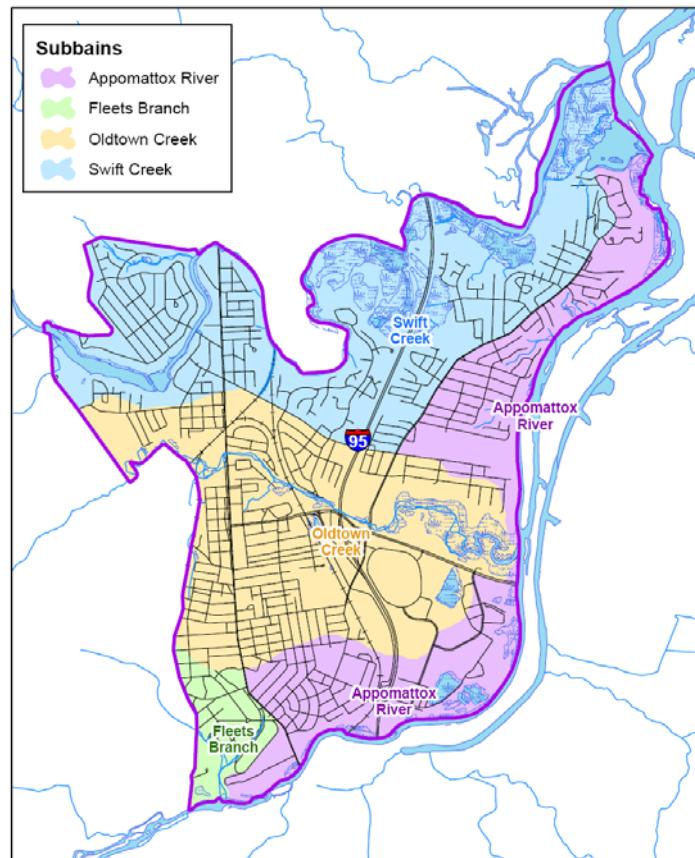
approximately 70% residential, 10% commercial and 20% undeveloped. Old Town Creek receives runoff that is approximately 60% residential and 40% commercial. Fleets Branch receives runoff that is predominantly residential. Thus the topography of Colonial Heights is such that the majority of parcels drain either directly to a waterway or directly to a storm sewer system that does.

### **Soil Structure**

Generally, soil in Colonial Heights is predominantly loamy with some alluvial wet land. Loamy soils are those that are composed of sand, silt, clay, and organic matter in somewhat evenly mixed particles of various sizes. More fertile than sandy soils, loam is not stiff and tenacious like clay soils and its porosity allows high moisture retention and air circulation. While some loams have higher concentrations of clay than others and there are, in fact, some eighty different variations of soil in the area, within the scope of this report it is appropriate to address only the broadest characteristics of these soils.<sup>4</sup>

The loamy soils in Colonial Heights are, in general, relatively well-drained. Unlike heavy clays they are non-consolidated, or friable, and allow a certain percentage of moisture to permeate through to their subsoils. One characteristic that may affect the permeability of loamy soils is the layer of soil known as the fragipan, a diagnostic horizon in USDA soil taxonomy. This fragipan layer may exist at varying depths in certain types of loam and may not exist at all in other types. In soils where it does exist, it acts, in laymen's terms, as a much more concentrated and generally less permeable layer. Thus if a certain type of loam - Beltsville sandy loam, for example - has a fragipan layer at 36" deep, water might drain well through the upper layer but then be retained at a much slower rate at that 36" deep fragipan layer.

Alluvial wet land soil, on the other hand, occupies flood plains along creeks and secondary streams and occurs along drainways. This type of soil is associated with areas of the Piedmont and Coastal Plain. Alluvial wet land is subject to frequent



**Figure 2 - Drainage Basins in Colonial Heights**

flooding and has a seasonal perched water table within 18" of surface during wet seasons. Because it is so water bearing it is not stable in deep cuts or excavations.

### **Community Conditions**

Occupying only 7 and a ½ square miles of area and supporting a population of roughly 18,000, Colonial Heights is generally 'built-out', meaning essentially that there remain very few areas of undeveloped land within the City. Housing units, alone, in the City number 980 per square mile. Thus little undeveloped land still exists in the City, and the majority of the development in Colonial Heights is in-fill development. In-fill development consists of improving land adjacent to and between existing development, or redeveloping an older but formerly developed lot.

Considering this, size requirements may be a concern for many sites in the City. Thus a BMP that requires a significant amount of space, such as a constructed wetland, may be less suitable than an underground storage or underground infiltration BMP. Particularly with retro-fits, lot size and space restraints may often make large BMPs impractical.

### **Pretreatment\Treatment**

As one of the primary functions of a BMP is mitigation of the harmful affects of stormwater, treatment of both volume and pollutants must be considered when selecting a BMP. One of the guidelines that must be considered when selecting BMPs according to their treatment capabilities is existing regulations.

Each state submits an annual list of its impaired waters to the EPA for approval. The EPA then publishes a biannual list of impaired waters, known as the 303(d) list, which identifies all waters and segments of waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards. An impairment labeling means that a water body does not meet state and\or federal regulations that designate certain uses for that body. Drinking, swimming or consumption of fish, for example, is discouraged from impaired waters. Water quality standards protect the public health and welfare, enhance the quality of water and serve the purposes of the Clean Water Act.

All of Colonial Heights' waters are listed on the EPA's 303(d) list, and Swift Creek and the Appomattox River have had Total Maximum Daily Loads (TMDLs) applied to them by governing regulatory agencies. TMDLs limit the amount of certain types of pollutants that can be drained to that water body and, while they utilize a 'daily' unit of measurement, essentially formulate a yearly waste load allocation that is not to be exceeded without penalty. A TMDL for Old Town Creek is forthcoming. As Colonial Heights is located within the Chesapeake Bay watershed, it will additionally be affected by the Bay TMDL scheduled for implementation in 2011. As all of Colonial Heights' waters ultimately drain to the Bay, the Bay TMDL

will further restrict Colonial Heights' drainage based on pollutant levels found in the Bay.

Considering these, a BMP that drains to the Appomattox and has no capability of treating for pollutants would be an inappropriate choice. Additionally, as regulations become more stringent it will soon be the case that BMPs that do not treat for specified pollutants will not be approved in drainage basins with TMDL waters.

### **Environmental Design\Landscape Aesthetic**

While certain BMPs are designed to be virtually completely underground, the majority of BMPs are above-ground and at least partially visible. Many BMPs, in fact, occupy a significant portion of the landscape. This being the case, it is important at many sites that the BMP have the capability of being incorporated into the existing landscape design and have a certain level of aesthetic appeal. As various landscape requirements apply in all jurisdictions, selecting a BMP that properly supports its surrounding landscape requirements is of key importance.

### **Maintenance**

Maintenance is perhaps as important a consideration as any for ensuring the effectiveness of a BMP. Due to the nature of their function, some BMPs require more frequent maintenance than others to remain effective. In addition, all NPDES permitted municipalities require periodic maintenance. Thus, over the life of the BMP, maintenance costs for certain BMPs could be significant. Additionally, most jurisdiction have screening ordinances that require certain landscape buffers around BMPs, so knowing what landscaping works with which BMP is sometimes critical.

Potential cost is not the only concern posed by maintenance. Much of the research on structural BMPs has indicated that a lack of maintenance is one of the leading causes of a BMP's diminished effectiveness and subsequent failure. One study in Virginia found that nearly half of the BMPs studied needed maintenance and that nearly 15% even failed to have maintenance accesses.<sup>5</sup>



### **Evaluating BMP Effectiveness**

As eliminating the sources of degradation and pollution is the first step in mitigating the effects of stormwater, understanding how effective each BMP discussed above is at volume reduction and\or pollutant removal is an essential component of BMP selection. It is not, however, the only determining factor in that decision.

As discussed, the majority of the development that occurs in Colonial Heights is infill development. An office building, for example, may be planned for development on a ½ acre lot between two existing businesses, perhaps a restaurant and a

medical office. A constructed wetland, then, may well be an inappropriate choice for several reasons: size requirements, higher foot traffic and the lot's topography, which, in this case, is unlikely to be favorable to those required for a wetland. Thus the *applications* of each BMP also play a decisive role in their selection.

Application, itself, sometimes depends upon things like site location. TMDLs, as discussed earlier, limit the amounts of certain types of pollutants that can be received by a given water body. Thus a BMP that treats phosphorous may be suitable in the Old Town Creek drainage basin, as that water body is impaired partly due to dissolved oxygen, where it may not be necessary in the Swift Creek drainage basin, where dissolved oxygen is not one of its impairments.<sup>6</sup> Complicating this is the fact that by 2012 a TMDL will be applied to the Chesapeake Bay and, by default, Colonial Heights.

In sum, then, volume\pollutant reduction *and* BMP application are both factors that must be evaluated against the topographic characteristics and structural impediments particular to Colonial Heights in order to effectively choose the most appropriate BMP.

### **- Considerations**

Several factors, however, serve as impediments to accurately gauging BMP effectiveness, and these factors must be addressed before examining the rates for specific BMPs. It is only with these caveats in mind that the removal rates of BMPs may rightly be considered and selected.

**Limited Data** - BMP research is still a relatively young field and the number of studies is limited, especially for certain categories of BMPs. Readers should understand that any performance results represent an analysis of currently available research. Further research will likely lead to revised removal rates.

**Range of Data** - Across the various categories of BMPs, the range of data for a particular pollutant can be very high. To be sure, there is often a large difference between the lowest and highest removal efficiency reported. It is important to remember that the greater the range, the less confidence there is in the average removal efficiency. In addition, further work is necessary to identify the factors that lead to either poor or good performance.

**Factors that Affect Performance** - Related to the foregoing point about data ranges, the following factors affect BMP performance:

- Number of storms sampled
- Manner in which pollutant removal efficiency is computed
- Monitoring technique employed
- Geometry and storage volume utilized by the designer
- Sediment/water column interactions
- Regional differences in soil type
- Rainfall, flow rate, and particle sizes of the influent (runoff entering the BMP)
- Latitude

- Size and land use of the contributing drainage area

**Incoming Pollutant Concentrations** - Variability of the pollutants in incoming stormwater can strongly influence performance results. In other words, if relatively clean water is entering a BMP, then there is limited performance potential that can be achieved by the BMP. BMPs that treat the dirtiest water (runoff with relatively high pollutant concentrations) will, almost by default, achieve higher percent removals.

**BMP Age** - generally, data that is used to determine general removal capabilities are based on "best condition" values. While many of the studies focus on BMPs that are less than three years old, some variance of the age of some sample BMPs may exist.

**Volume Reduction** - Several categories of BMPs can be quite effective at reducing the overall volume of runoff. Volume reduction BMPs have a filtering, infiltration, biological uptake, or storage and reuse component that permanently removes some volume of runoff from the outflow. BMPs that reduce volume are also reducing pollutant loads, although a concentration-in vs. concentration-out study would not account for such. For this reason, the removal efficiency of these types of BMPs may be under-reported, especially when a concentration-in vs. concentration-out study approach was used.<sup>7</sup>

#### **- BMP effectiveness by volume reduction\pollutant removal**

The above limitations being understood, Table 1.3 summarizes the volume reduction and\or pollutant removal rates of the BMPs discussed earlier. As the reader will note, pollutant removal is generally more researched and reported, due primary to the fact that volume reduction is so heavily dependant upon original design, and many BMPs have the capability of being designed to accommodate various ranges of volume reduction.

**Table 1.3 - Effectiveness by volume reduction\pollutant removal**

	Average Volume Reduction	Average Pollutant Removal <sup>8</sup>
Dry pond	Detention ponds can be designed to achieve various levels of volume reduction. While regulatory drivers generally determine for what volume a pond will be designed, even smaller ponds can be fitted with large storage tanks to facilitate high levels of volume reduction and subsequent flood control. While a basin's performance is really dependant...	Dry detention basins provide moderate pollutant removal when site and design has been considered. They can be effective at removing some pollutants through settling. Typical rates include 19% phosphorous removal, 31% nitrogen removal, 9% nitrate nitrogen removal and 26%-54% metals removal. Total suspended solids removal averaged around 61%.

<b>Wet Pond</b>	...upon its actual site and design considerations, volume reduction rates of 50-80% are not uncommon.	Wet ponds are among the most effective BMPs at removing stormwater pollutants. Typical removal rates include 48% for phosphorous, 31% for nitrogen, 24% for nitrate nitrogen, 24.73% for metals and 65% for bacteria. Total suspended solids removal averages 67%.
<b>Grassed channel</b>	Grass channels are not designed as primary volume reducers. Rather, they are often used to direct stormwater flow to BMPs designed specifically for volume reduction.	Preliminary data suggest the following removal rates: 29% for phosphorous, 38% for nitrate nitrogen and anywhere from 14% to 55% for metals. Grass channels have, however, shown a 50% <i>increase</i> in bacteria. Total suspended solids removal has been recorded at upwards of 70%.
<b>Level spreader</b>	Level spreaders are not designed for volume reduction. Rather, they are used to distribute peak flow and prevent channelized flow, or to facilitate flow to other facilities.	Considering their design, some average pollutant removal rates for level spreaders have been documented at less than 25%.
<b>Infiltration basin</b>	When sand is used as a medium, infiltration practices have reduced volume by as much as 80%. Dependant upon soil types and whether or not a BMP was designed with an underdrain, removal levels have averaged around 60%.	Typical rates for infiltration basins are 60-70% for phosphorous, 55-60% for nitrogen, 85-90% for metals and 90% for bacteria. Total suspended solids removal averages 75%.
<b>Infiltration trench</b>		Available data shows pollutant removal rates of 60-70% for phosphorous, 55-60% for nitrogen, 85-90% for metals and 90% for bacteria. Total suspended solids removal averages 75%.
<b>Bioretention</b>	Data presented by the Chesapeake Bay Program has demonstrated volume reduction levels around 50%.	Typical numbers for bioretention facilities are 43-97% for copper, 70-95% for lead, 64-95% for zinc, 65-87% for phosphorus, 52-67% for Total Kjeldahl Nitrogen (TKN), 92% ammonium, 15-16% for nitrate, 49% for total nitrogen and 27% for calcium.

<b>Proprietary devices</b>	As many proprietary devices are designed with limited land considerations in mind and to occupy less land surface, as a general rule they are not capable of significant volume reduction.	As proprietary devices represent an entire field of systems and manufacturers, defining an average removal rate would not be appropriate. Manufacturers' specifications and specific comparison studies are better gauges of pollutant removal rates for this category of BMP.
<b>Vegetated strip</b>	Vegetated strips are not generally designed for significant volume reduction.	Using a 150-ft vegetated strip as a model, average pollutant removal rates have been shown at 20% for nitrate+nitrite, 40% for phosphorus, 50% for extractable lead, 55% for extractable zinc and 84% for total suspended solids.
<b>Underground storage</b>	Underground storage facilities - particularly those with restrictive devices like in-line storage - are generally designed to reduce peak flow, subsequently reducing total solids and downstream\system erosion. This being the case, underground storage facilities generally <i>restrict</i> volume rather than <i>reduce</i> it.	Though underground storage BMPs can be designed to simultaneously convey flow to underground infiltration or bioretention facilities, underground or in-line storage units are not designed to remove pollutants. Some suspended solids, dependant upon storage design time, may be removed but these units are primarily designed to reduce peak flow.
<b>Constructed wetland</b>	A University of Virginia study showed a volume reduction of nearly 40% for constructed wetlands.	Pollutant removal rates for the "average" pond\wetland system have been shown as follows: 19-29% for nitrogen, 40-68% for NOx and 0-57% for metals. Total suspended solids removal ranges from 35-71% and total pollutants from 35-56%.
<b>Permeable pavement</b>	Volume reduction for permeable pavements, when installed with an underdrain, ranges from 60 to 100% for parking lots and residential streets.	Though difficult to determine due to the range of products, surface use and maintenance schedules, some preliminary removal numbers for permeable pavement used in parking lots show a 71% total solids removal rate, an 80% copper and zinc removal, and a 50% removal rate for phosphorous and nitrogen.

Green roofs	Though popular in Europe for more than two decades, green roofs are only recently beginning to emerge as a practical BMP in the US. Preliminary studies have shown an average of 35 to 50% volume reduction.	As green roofs, by default, intercept rainfall before it collects all the traditional ground-level toxins, high pollutant removal rates have not been recorded with this BMP. There is some evidence to suggest, however, that green roofs can reduce airborne pollutants like CO <sub>2</sub> .
Forested buffers	An insignificant number of studies exist to accurately determine an average or typical volume reduction for forested buffers.	Removal rates of 50-75% for nitrogen and phosphorous have been documented for forested buffers. Total suspended solids removal ranges from 63 to 90%.
Green parking	One study focusing on an extensive and comprehensively designed green parking area in Arkansas found that total volume was reduced at a rate of 325,851 gallons per year. <sup>9</sup>	As the term green parking refers to a wide range of methods and products, a strict data range for green parking would not accurately reflect this category of BMP.



## Grading BMPs

In order to choose site-appropriate BMPs, a methodology must be applied that allows each BMP to be identified within an appropriate level of the selection criteria. Due to the caveats discussed in the foregoing, the methodology utilized herein represents only a general categorization of BMPs as deemed appropriate or feasible for Colonial Heights. Many BMPs can be designed to meet specific site requirements even if the 'traditional' design has not fully supported a certain function. The most efficient way to choose an appropriate BMP is to work closely with an environmental engineer experienced in BMP design.

The methodology here employed grades BMPs only on a *pass/fail* basis and indicates this with a checkmark. The reader should remember that the gradations are only relative to each other, based upon selection criteria that utilize "general" or "common" levels of acceptance. Thus the criteria category for each BMP was left blank in three conditions: a) either that BMP has no ability to meet a certain criteria, like pollutant removal, for example, or b) if that criteria does not apply to that BMP (e.g. landscaping with underground storage units), and c) if using an "acceptable" level, and maintenance of a specific BMP will be a significant and regular concern over the life of the BMP in order to keep it functioning efficiently. Conversely, a checkmark with an accompanying addition symbol is meant to indicate the highest level of criteria acceptance. Thus a BMP with a "checkmark-plus" under the landscaping criteria, for example, means that the BMP is capable of being visually incorporated into its surrounding environment with minimal landscaping effort and that the landscaping will not require a significant level of

maintenance over the BMP's life. Further, it means only that it requires less effort than a BMP with only a check for the same criteria.

Concerning pretreatment\treatment efficiency gradations in Table 1.4, BMPs that meet that particular selection criterion are given a '*pass*' irrespective of level or range. Thus a BMP that has been shown to reduce phosphorus by 40% is credited in the same manner as one that reduces it by 100%, awarding a grade only at a minimum level of criteria acceptance (e.g. does or does not have treatment capability). As noted under *Considerations* in the foregoing, many things affect the documented removal rates and further research will likely lead to revision of these rates. Efficiency rates may decrease, but they may also increase, thus making grading of comparable criteria across BMP type inappropriate at this time. As such, the grades are intended as a general starting point, and the reader is encouraged to both examine the data presented in Table 1.3 for further comparison of removal rates and work closely with an environmental engineer.

Table 1.4: GRADING BMPs BY SELECTION CRITERIA

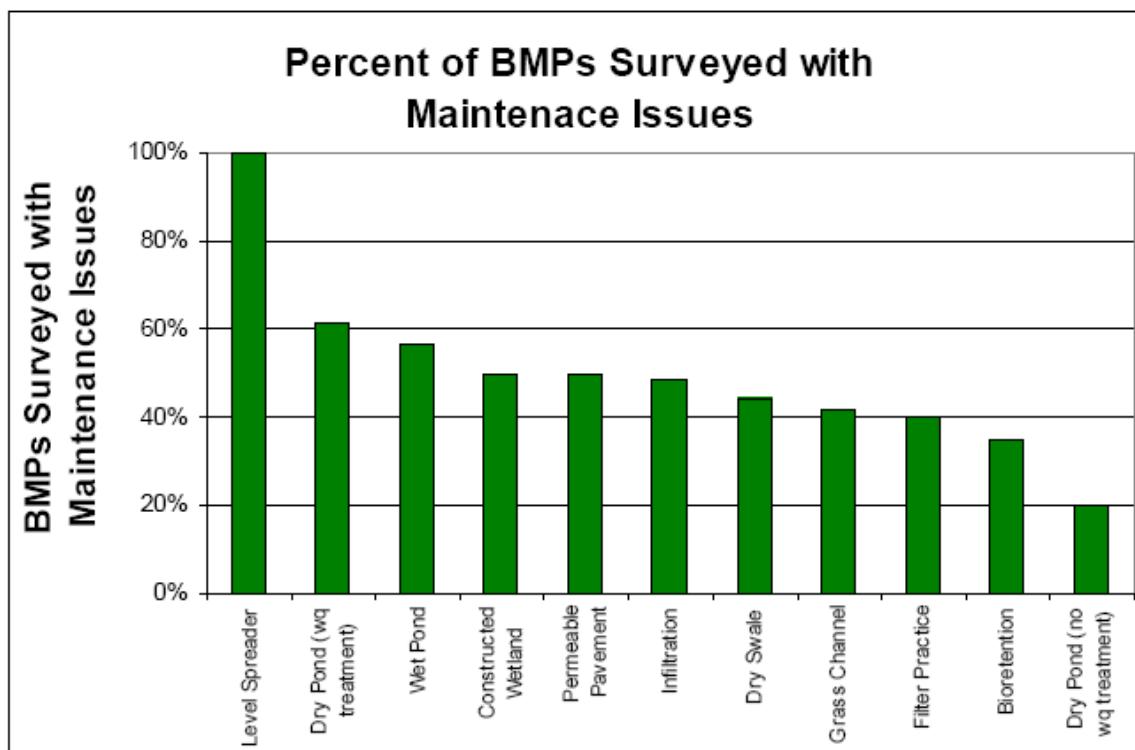
BMP Category	General Feasibility	Pretreatment \ Treatment	Landscaping	Maintenance
Dry pond	✓ +	✓	✓ +	✓
Wet Pond	✓ +	✓ +	✓ +	✓
Grassed channel	✓ +	✓	✓ +	✓ +
Level spreader	✓		✓ +	
Infiltration basin	✓ +	✓ +	✓	✓
Infiltration trench	✓ +	✓	✓ +	✓
Bioretention	✓ +	✓ +	✓	✓
Proprietary devices	✓ +			✓
Vegetated strip	✓ +		✓ +	✓ +
Underground storage	✓ +			✓
Constructed wetland		✓		
Permeable pavement	✓ +	✓	✓	
Green roofs	✓			
Forested buffers	✓ +	✓		✓ +
Green parking	✓	✓	✓	



## Maintenance Issues & BMP Performance

Lack of proper maintenance is often a significant concern with many BMPs. As mentioned earlier, nearly half of the BMPs studied in the James River basin needed maintenance. In fact, the highest ranked performance concern in the Center for Watershed (CWP) study was maintenance. Table 1.5 demonstrates the prevalence of maintenance needs per BMP studied. To be sure, numerous studies confirm that maintenance issues, specifically sedimentation, are problems that can critically affect BMP performance.

As almost all BMPs are designed to restrict or permanently trap pollutants and solids, it is understandable that clogging of inlets and outlets is the maintenance problem most common to structural BMPs. In fact, sedimentation - particularly due to lack of regular sediment removal - not only decreases storage capacity and inhibits flow, it significantly diminishes the pretreatment capabilities of BMPs.<sup>10</sup>



**Table 1.5**

Vegetation in BMPs is also a frequent maintenance concern. Stressed or dead plants and ground cover were of particular concern. Stressed plants, in bioretention for example, have stressed root systems that cannot uptake pollutants at the rate at which the BMP was designed. Dead and missing ground covers lead to increased erosion and subsequent sediment accumulation. This is a particular problem for BMPs like dry ponds, swales and bioretention facilities. Conversely, overgrowth of vegetation can also impair BMP performance. Roots from shrubs or

nearby planting features, if not properly selected or maintained, can endanger inlets and outlets. Certain invasive species also, if not properly controlled, have the potential to dominate and eventually choke out any native species and diminish uptake or infiltration.

The accumulation of trash and other floatables (brush, etc.) is also a common maintenance problem in structural BMPs. Debris of this type impedes the function of trash racks, inlets and outlets, affects storage capacity and infiltration rates. This is of particular concern for BMPs along roadways and in and around parking facilities. Other issues, such as damaged concrete structures, failing pipe joints and seepage, can also be of concern. While less common than sediment accumulation and vegetation issues, structural impairments can result in either complete BMP malfunction or act as a bypass, of sorts, allowing untreated or sediment-laden runoff to flow directly to waterways.

The important thing to understand about all these maintenance issues is that all can be addressed through a well-built and properly administered Stormwater Management Program (SWMP). Ensuring that access easements are in place at the time of approval, certifying that BMPs are constructed in accordance with design, and requiring regular maintenance are all components of a good SWMP and are critical tools for maintaining the proper function of BMPs.



## **A Note on Common Construction Issues**

It is no more than an exercise in futility for a BMP to have been comprehensively planned, meticulously selected and methodically designed if it has not been constructed according to that design. While guaranteeing that constructed BMPs do not deviate from plan BMPs falls largely to the administration of the construction inspection program, a note on some of the more common construction issues affecting BMP performance is appropriate.

The three most common issues related to BMP construction are deviations from design, grading elevations and discrepancies between planned and constructed volume calculations. In the CWP study, alone, 57% of BMPs studied were constructed using some incorrect materials or built to the wrong dimensions. Fortunately, many of these problems can be addressed by a few proactive measures, as demonstrated in Table 1.6.

**Table 1.6 - Common Construction Problems**

<b>Construction Discrepancy \ Flaw</b>	<b>Recommendation</b>
<b>Deviations from design</b>	<ul style="list-style-type: none"> <li><b>Good Plans</b> Design drawings, details and specifications should be clear, concise, unambiguous and, of course, correct. Engineers should take extra caution to produce plans that are error-free. Details should be easy to interpret and free of vague information. Interpretation problems often lead to contract change orders and usually increase construction costs.</li> <li><b>Coordination</b> Involve the design engineer in the construction process, if possible. This means that the engineer supervises construction inspections, reviews drawings, participates in construction progress meetings, and coordinates directly with the contractor on critical construction issues.</li> </ul>
<b>Inexperienced contractors</b>	The contractor should have prior experience building the specific type of BMP(s) proposed. Bidding documents should specifically require contractors to submit documentation of prior work experience, and that documentation used as part of a "qualified bidder" assessment process. Many construction problems can be attributed to the fact that a contractor may never have seen anything like the specific BMP before. Conversely, a qualified contractor with experience in BMP construction can solve many unforeseen problems, often before they become problems.
<b>Deviations related to Land Workability</b> (Grading issues, lack of compaction, etc.)	While Virginia's climate is much milder than other areas of the country, it should be noted that construction in the winter months (November through February) has the potential to significantly impact site conditions. Many stormwater practices involve earth moving operations, dewatering, and\or stream diversions. Winter construction often complicates these. Excessive soil moisture prevents contractors from meeting compaction specifications, construction equipment may be limited to certain areas and may have a more difficult time moving saturated soils, concrete has a more difficult time curing, and stabilization of disturbed areas is sometimes next to impossible.
	Work in dry conditions when possible. Most BMPs are constructed at the bottoms of drainage systems of one kind or another, and projects are not usually completed before at least a few precipitation events. Designers and...

	...contractors need to work together to divert storm flows around construction sites in order to prevent deviations from planned grades and volume requirements.
<b>Discrepant finished grade</b>	Make sure a professional land surveyor stakes out the project and certifies its accuracy. Many BMPs require the maintenance of extremely tight tolerances to foster the volumes, slopes, depth and characteristics required for the planned removal rates or to maintain complex plant communities. Filter strips, for example, function properly only when sheet flow is maintained. The slightest imperfection in a level spreader, for another example, will result in concentrated flow. Sand filters, which also rely on the distribution of flow across a level filter bed, need to be built to within very tight tolerances.
<b>General construction discrepancies</b>	Provide close monitoring with construction inspections to ensure that facilities are built in accordance with approved design plans. This involves a commitment from the approving regulatory agency to develop inspection standards, train personnel on how to perform inspections, and, in particular, provide enforcement mechanisms for those facilities that are not constructed in accordance with approved plans.

*As compiled by Richard A. Clayton, Jr., P.E., Director of Watershed Services. Critical Components for Successful Planning, Design, Construction & Maintenance of Stormwater Best Management Practices. Horsley & Witten, Inc. Sandwich, Massachusetts.*

### **- Cover and Filter Media**

Filter media problems, though less common than grading and volume deviations, also cause BMPs to operate less efficiently. Bioretention facilities are often missing a required layer of gravel or are too highly concentrated with clay and soil types that are inappropriate for the retention volumes indicated on the plans. Over-compaction by equipment at the time of construction has also been cited in cases of insufficient retention capability. Implementing the recommendations listed in Table 1.7, in addition to working closely with a geotechnical consultant, will help correct many of these concerns.

Aesthetic BMP cover, usually in bioretention and similar facilities with landscaping features, also causes BMP inefficiency if imprudently placed or improperly designed. Landscape materials like mulch and stone often clog grates, sediment traps and outlets if not properly screened or graded. Finished grades should be such that they allow some cover accumulation around the outlets without allowing that material to clog or accumulate in the actual outlet. This should account for the customary amount of periodic destabilization while facilitating the designed flow.

## NOTES

<sup>1</sup> *Maryland Stormwater Design Manual, Volume II*, Chapter 1 (2009). Published by the Maryland Department of the Environment (MDOE) and available electronically at [www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/stormwater\\_design/index.asp](http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/stormwater_design/index.asp).

<sup>2</sup> Based upon a sampling of 5,251 structural BMPs surveyed as part of CWA's *Extreme BMP Makeover*.

<sup>3</sup> Less than 5% of those sampled in the CWA project received drainage from parks, forests and pastures.

<sup>4</sup> The soil information presented herein was reproduced from *Soils of Chesterfield County, Virginia* by Harold L. Mathews, 1970, a cooperative report of Virginia Tech's Agronomy Department and Chesterfield County. As it discussed soil types that extended to the Appomattox and to Swift Creek, and in the apparent absence of any significant soil studies having been done specific to Colonial Heights, that report was deemed suitable for the purposes herein. Please note that the information here is intended for use as a general guide, and it is recommended that an engineer and/or geotechnical specialist be consulted for evaluation of specific sites. An electronic version of the report is available on Chesterfield County's website at [www.chesterfield.gov/content.aspx?id=2840&ekmensex=c580fa7b\\_66\\_118\\_2840\\_5](http://www.chesterfield.gov/content.aspx?id=2840&ekmensex=c580fa7b_66_118_2840_5).

<sup>5</sup> *Technical Report, Stormwater BMPs in Virginia's James River Basin: An Assessment of Field Conditions & Programs*. Center for Watershed Protection (CWP), June, 2009. Available electronically at [www.cwp.org/Resource\\_Library/Center\\_Docs/SW/ExtremeBMP/extrmbmp\\_tech\\_rprt09.pdf](http://www.cwp.org/Resource_Library/Center_Docs/SW/ExtremeBMP/extrmbmp_tech_rprt09.pdf).

<sup>6</sup> One of the leading causes of dissolved oxygen in a water body is phosphorous, as increased levels of phosphorous cause increased algae growth that in turn depletes oxygen. Nitrogen is also a cause of dissolved oxygen. These pollutants have not yet impaired Swift Creek, impaired at this point for E.coli and fecal coliform.

<sup>7</sup> Winer, R. 2000. *National Pollutant Removal Database for Stormwater Treatment Practices*. Second edition. Center for Watershed Protection (CWP), Ellicott City, MD. Compiled in the report *National Pollutant Removal Performance Database, Version 3* (CWP, September 2007). Available electronically at [www.stormwaterok.net/CWP%20Documents/CWP-07%20Natl%20Pollutant%20Removal%20Perform%20Database.pdf](http://www.stormwaterok.net/CWP%20Documents/CWP-07%20Natl%20Pollutant%20Removal%20Perform%20Database.pdf).

<sup>8</sup> Calculations were made based upon 1 or 2 year storms.

<sup>9</sup> Green Parking Lot Case Study: Heifer International, Inc. May 2007. Industrial Economics, Incorporated. Accessed electronically from the Environmental Protection Agency (EPA) and available at [www.epa.gov/earth1r6/6sf/pdffiles/heiferparkingstudy.pdf](http://www.epa.gov/earth1r6/6sf/pdffiles/heiferparkingstudy.pdf).

<sup>10</sup> *Technical Report*, CWP. June, 2009.

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*National Pollutant Removal Performance Database, Version 3* (CWP, September 2007). Available electronically at [www.stormwaterok.net/CWP%20Documents/CWP-07%20Nat%20Pollutant%20Removal%20Perform%20Database.pdf](http://www.stormwaterok.net/CWP%20Documents/CWP-07%20Nat%20Pollutant%20Removal%20Perform%20Database.pdf).

Richard A. Claytor, Jr., P.E., Director of Watershed Services. *Critical Components for Successful Planning, Design, Construction & Maintenance of Stormwater Best Management Practices*. Horsley & Witten, Inc. Sandwich, Massachusetts. Available electronically at [www.epa.gov/nps/natlstormwater03/27Claytor.pdf](http://www.epa.gov/nps/natlstormwater03/27Claytor.pdf).

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*Level Spreader Effectiveness Evaluation, Final Report* (CTSW-RT-02-020), California Department of Transportation (Sacramento, May 2002). Available electronically at [www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-020.pdf](http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-020.pdf).

*Chesapeake Bay Program Nutrient Subcommittee, UMD/MAWP Year 2 BMP Approval Status* (January 21, 2009). Available electronically at [www.archive.chesapeakebay.net/.../NSC\\_01-21- Handout\\_10\\_9968.pdf](http://www.archive.chesapeakebay.net/.../NSC_01-21- Handout_10_9968.pdf).

*Urban Stormwater BMP Performance Monitoring: A Guidance Manual for Meeting the National Stormwater BMP Database Requirements* (April, 2002). Prepared by GeoSyntec Consultants and Urban Water Resources Research Council (UWRRC) of ASCE in cooperation with the Office of Water, USEPA, Washington, DC. Available electronically at [www.epa.gov/guide/stormwater/files/monntoc.pdf](http://www.epa.gov/guide/stormwater/files/monntoc.pdf).

Yu, Ph.D., Fitch and Earles, *et al. Constructed Wetlands for Stormwater Management: Final Report* (University of Virginia). Available electronically at [www.northinlet.sc.edu/training/resources.html](http://www.northinlet.sc.edu/training/resources.html).

ID	USE	USE_TYPE
1	Stockpile	Stone\Aggregate
2	Stockpile	Sand
3	Storage	Vehicles
4	Storage	Roadway Salt
5	Storage	Vehicles\Equipment
6	Administration	Employees
7	Equipment Maintenance	Municipal
8	Fleet Maintenance	Passenger\Utility
9	Storage	Vehicles\Equipment
10	Storage	Vehicles\Materials
11	Administration	Office
12	Storage	Vehicles
13	Storage	Materials
14	Storage	Vehicles\Materials
15	Parking	Employee Parking
16	Fueling Station	Unleaded\Diesel
17	Parking	Visitor\Employee
18	Storage	Materials
19	Storage	Fill Debris
20	Stockpile	Sand\Fill
21	Stockpile	Stone\Aggregate
22	Stockpile	Stone\Aggregate
23	Stockpile	Stone\Aggregate
24	Storage	Vehicles

<b>ID</b>	<b>PRACTICE</b>
1	Sediment retention
2	Sediment retention
3	Sediment retention
4	Covered storage
5	Absorbent
6	Covered exposure
7	Covered storage

<b>ID</b>	<b>TYPE</b>	<b>USE</b>
1	Non-stormwater	General\equipment washing
2	Non-stormwater	General\equipment washing
3	Non-stormwater	Equipment washing
4	Non-stormwater	Equipment washing

<b>ID</b>	<b>CAUSE</b>
1	Small basin collects facility's runoff - no outlet
2	Retention basin collects facility's runoff
3	Fueling station for all City vehicles
4	Washing area for City vehicles
5	Equipment maintenance area\liquid storage
6	Diesel fuel storage area
7	Open dumpster
8	Roadway mixture escaping from storage building

<b>ID</b>	<b>DESCRIP_</b>	<b>MAINTAIN_</b>
1	Inlet detention pond	0
2	Conveyance piping\retention channel	0
3	Outlet detention pond	0



# The Cost of Compliance: **BMP Planning, Cost, and Maintenance**

March 19, 2013  
8:00 AM to 4:30 PM  
Westin Hotel in Richmond, VA

## VWEA Stormwater Committee 2013 Spring Seminar

### Who should attend?

Stormwater program engineers and administrators, MS4 program compliance managers, and environmental consultants

**\$115 VWEA Members/\$145 Non-members  
After March 5<sup>th</sup>: \$145 Members / \$175  
Non-members**

**5.0 CEUs will be awarded**

Register Online:



<https://www.regonline.com/2013stormwater>



# The Cost of Compliance: BMP Planning, Cost, and Maintenance

March 19, 2013  
8:00 AM to 4:30 PM  
The Westin in Richmond, VA

## Seminar Program

8:00 to 8:30	Breakfast	
8:30 to 9:00	Keynote Address	Preston Bryant, <i>McGuireWoods</i>
9:00 to 10:00	Programmatic Planning of BMPs	
9:00 to 9:30	Montgomery County Countywide Coordinated Implementation Strategy: Achieving the MS4 Permit and Bay Restoration Goals	Meosotis Curtis, <i>MS4 Program Manager, Montgomery County, MD</i>
9:30 to 10:00	MS4 Permit and TMDL Challenges	Jason Papacosma, <i>Watershed Programs Manager, Arlington, VA</i>
10:00 to 10:30	Break	
10:30 to 12:00	Performance and Maintenance	
10:30 to 11:00	A Comparison of Maintenance Cost: Labor Demands and System Performance for LID and Conventional Stormwater Management	James Houle, <i>Storm Center, University of New Hampshire</i>
11:00 to 11:30	Operations and Maintenance Issues with Green Infrastructure	Theodore Scott, <i>Executive VP and Founder, Stormwater Maintenance LLC</i>
11:30 to 12:00	The M in BMP: Managing Maintenance and Inspections of your BMPs	Dan Frisbee, <i>Environmental and Stormwater Coordinator, City of Charlottesville, VA</i>
12:00 to 1:30	Lunch	
1:30 to 2:30	Cost of Implementation	
1:30 to 2:00	Stormwater Program Funding – Cost of BMP Construction and Maintenance	Randy Bartlett, <i>Deputy Director of Public Works and Environmental Services, Fairfax County, VA</i>
2:00 to 2:30	Cost-Effective BMPs in Virginia and Local Implementation Planning	Adrienne Kotula, <i>James River Association</i> ; Grace LeRose, <i>City of Richmond, VA</i>
2:30 to 3:00	Break – Door Prizes	
3:00 to 4:30	VA Experience Roundtable Discussion featuring experienced utility providers	<i>Charlottesville; Fairfax; Lynchburg; Montgomery County, MD; Richmond</i>

Questions?  
Contact Lisa Jeffrey, SW Committee Chair  
757.518.2423

For directions to The Westin Hotel, 6631 West Broad St, Richmond, VA, click on the link below or use your favorite online mapping guide:  
[www.starwoodhotels.com/westin/property/area/directions.html?propertyID=1993](http://www.starwoodhotels.com/westin/property/area/directions.html?propertyID=1993)

# Developing a Cost-Effective Municipal Stormwater Retrofit Program to Satisfy the Chesapeake Bay TMDL

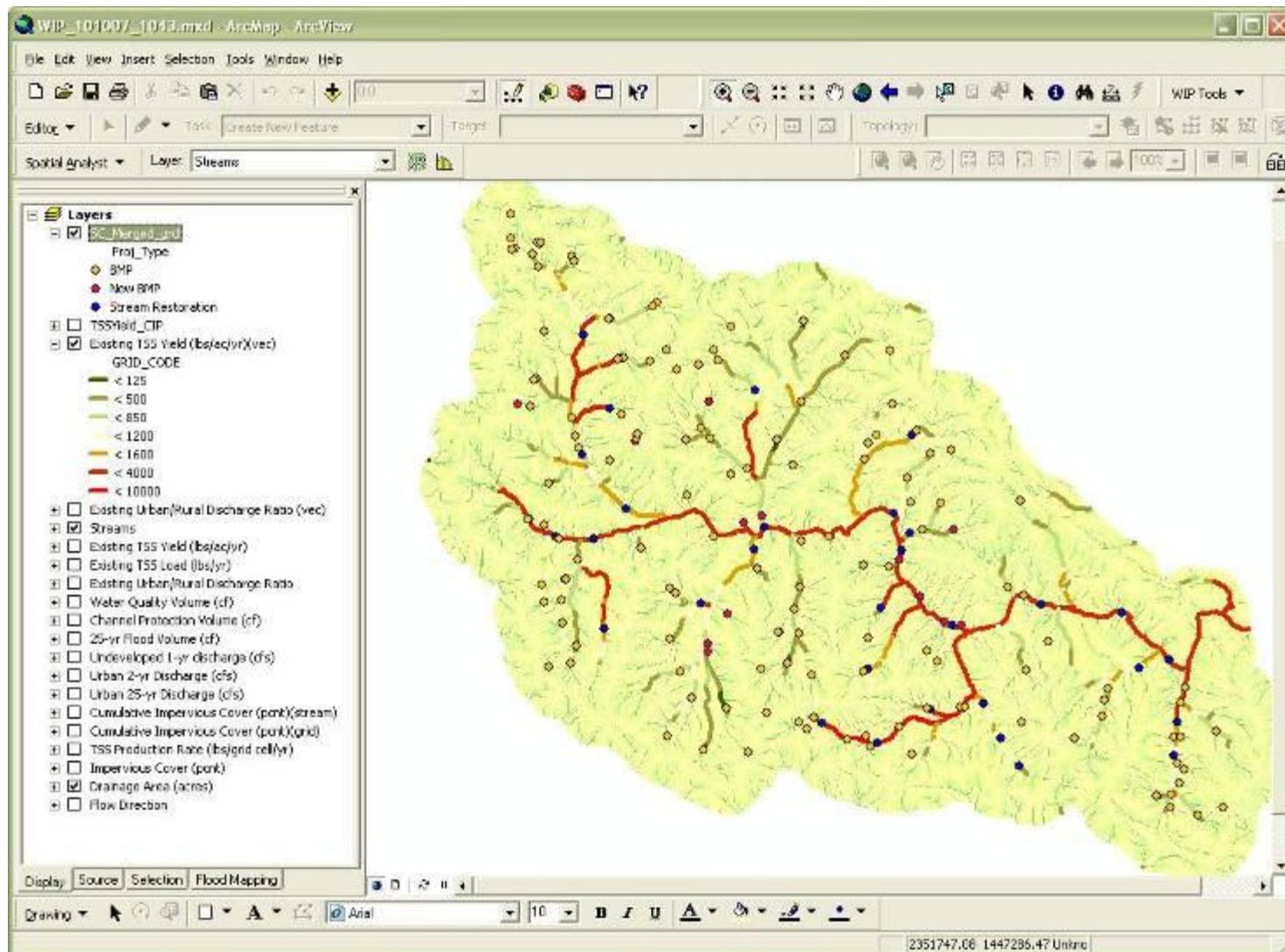
2012 Mid-Atlantic APWA Chapter's Annual  
Conference

May 10, 2012

Jeff Herr, P.E., D.WRE  
National Stormwater Leader

BMP-PT03

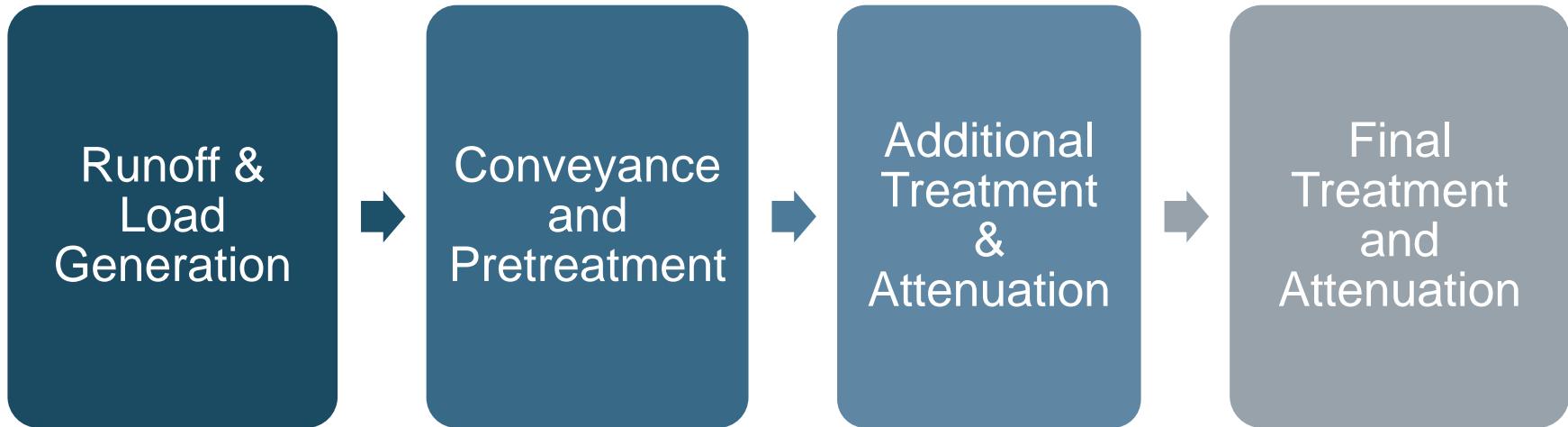
# Understand Your Watershed Sources and Magnitudes of Pollutants – Prioritize Projects



# Identify Potential Projects

- Identify stormwater improvement options
- Establish standard prioritization criteria
- Prioritize Potential Improvements
  - nutrient reduction benefit
  - feasibility
  - site constraints
  - cost/benefit ratio
- Conceptual designs & cost estimates
- Evaluate Long Range Funding Needs

# Promote a Treatment Train Approach



Regulations  
Public education  
Erosion control  
Roof runoff  
Disconnect IA  
Landscaping  
Pervious paving  
Pavement cleaning

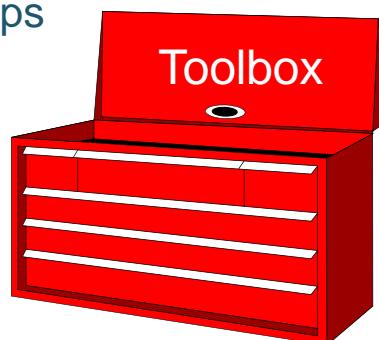
**LID**

Swales  
Catch Basins  
Inlets filters  
Oil/water separators  
Trash/sediment traps

Detention  
Wetland  
Storage  
Sediment sump

Final Treatment and Attenuation

Retention  
Detention  
Wetland  
Chemical  
Ozone  
UV  
Reuse  
End of pipe



# Consider Non-Structural Alternatives

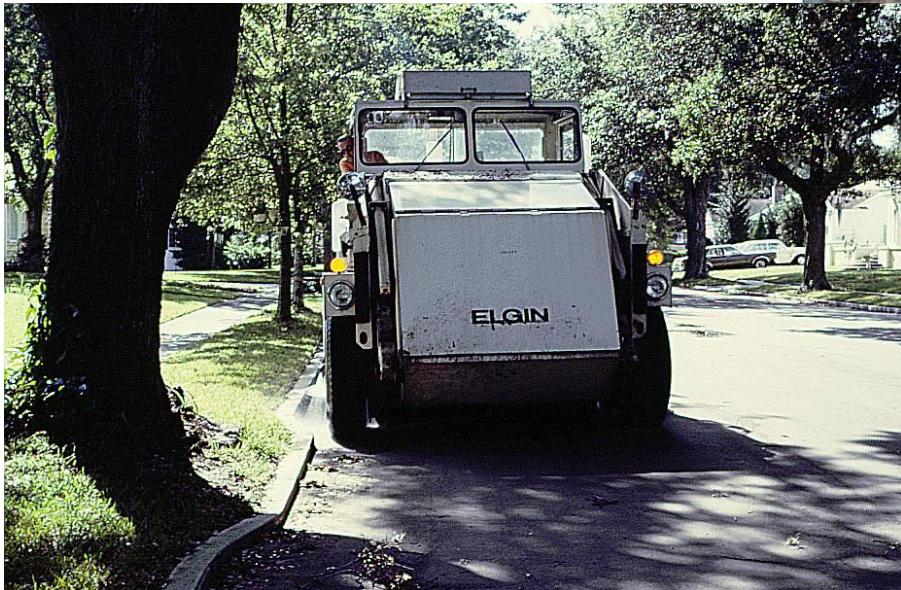
Material Storage

Nutrient Management

Forest Management

Street Sweeping

Catch Basin Cleanout



# BMP Selection Criteria Factors

- Ability to meet regulatory criteria
- Ability to meet environmental goals
- BMP pollutant removal effectiveness
- Site characteristics
- Hydrology and Water Quantity
- Public acceptance
- Maintenance entity sophistication
- Life cycle cost per mass pollutant removed

# Evaluation and Selection of BMPs

- Identify primary and secondary pollutants
- Determine min and max influent pollutant concentrations and stormwater flow rates
- Determine desired removal efficiencies
- Identify available land area
- Identify effective treatment train components
- Evaluate potential treatment trains based on BMP Selection Criteria Factors
- Implement best solution – keep pushing forward, you will have obstacles!

# Chesapeake Environmental Benefit BMP Efficiencies

Urban BMP	Load Reduction (%)			
	Total Nitrogen	Total Phosphorus	TSS	
Wet Ponds, Constructed Wetlands	20	45	60	
Dry Detention/Hydrodynamic	5	10	10	
Dry Extended Detention Pond	20	20	60	
Infiltration, A/B soils	80	85	95	
Filters (sand/organic/peat)	40	60	80	
Bioretention	C&D w/ UD	25	45	55
	A&B w/ UD	70	75	80
	A&B w/o UD	80	85	90
Permeable Pavement	C&D w/ UD	10	20	55
	A&B w/ UD	45	50	70
	A&B w/o UD	75	80	85
Grass Channels	C&D w/o UD	10	10	50
	A&B w/o UD	45	45	70
Bioswale		70	75	80

# Comparison of BMP Treatment Efficiencies for Primary Pollutants

TYPE OF BMP	ESTIMATED REMOVAL EFFICIENCIES (% LOAD REDUCTION)			
	TN	TP	TSS	BOD
	INFILTRATION/REUSE			
1.00" VOLUME	80	80	80	80
1.50" VOLUME	90	90	90	90
WET DET (14-21 day WSRT)	25-35	60-70	90	50-70
WET DET/FILTER	0-10	50	85	70
DRY DETENTION	10-20	20-40	20-60	20-50
DRY DET/FILTER	(-)-20	(-)-20	40-60	0-50
CHEMICAL TREATMENT	20-40	80-90	>90	30-60
WETLAND TREATMENT	(-)-90	(-)-90	50-90	(-)-50

# First Priority is Volume Reduction!

**No volume = no load**

**Also reduces conveyance requirements and cost.**

**Disconnect Impervious Areas**

**Rainwater Harvesting and Reuse**

**Stormwater Storage and Reuse**

**Low Impact Development  
and Infiltration Practices**



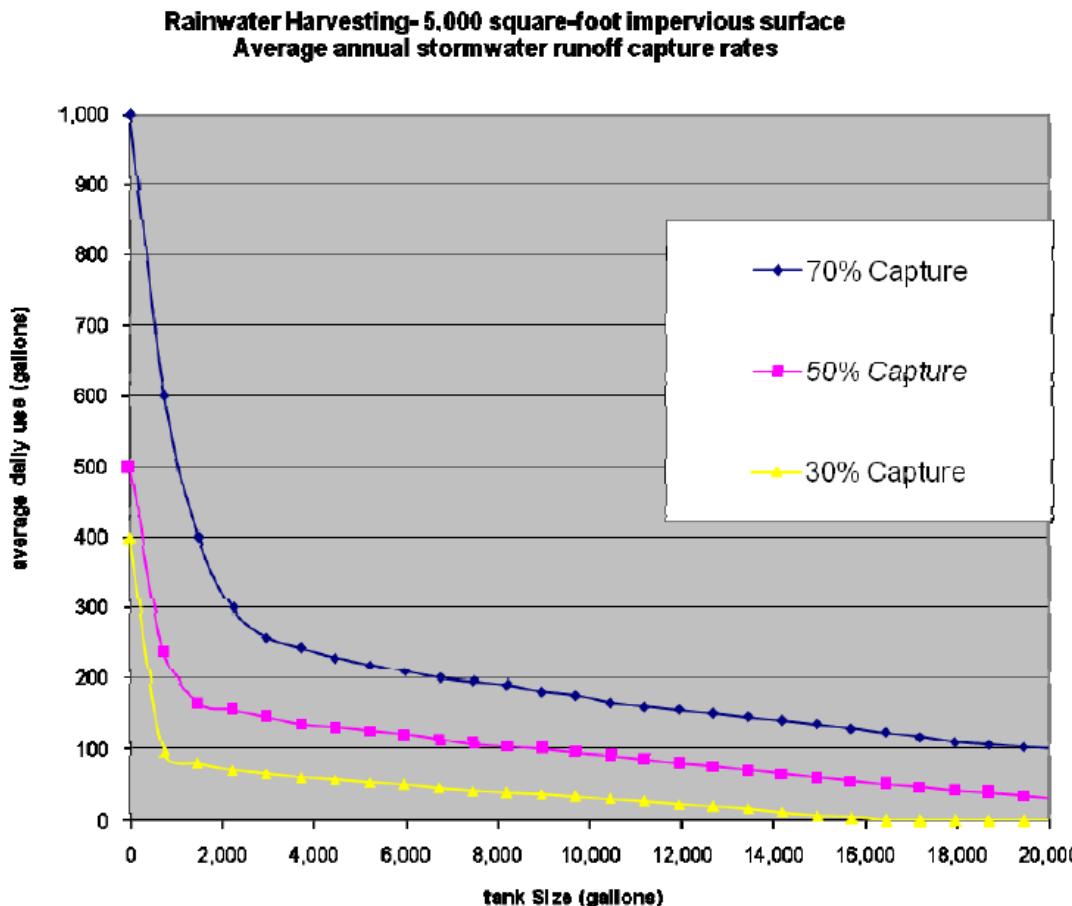
**Directly Connected Impervious Area  
is the major source of stormwater runoff.  
No opportunity for infiltration.  
1-inch rainfall = 0.9 inch runoff**



**Disconnect Impervious Areas**  
**1-inch rainfall = 0.4-inch runoff**  
**and lower costs!!**

# Rainwater Harvesting

(inexpensive, relatively clean water source,  
capture rainwater before contact with pavement)



# Simple 55 Gallon Rain Barrel (only holds 0.09 inches of rainfall over 1000 SF)



6/16/36

# Above Ground Storage



# Stormwater Reuse

**Reduces runoff volume and pollutant load and reduces potable water demand.**

**Higher concentrations of pollutants than rainwater but can be used for irrigation and gray water.**

**Must have sediment removal element prior to any underground storage with ability to remove sediment.**

# **Wet Detention Pond Storage Horizontal Well Withdraw Run Dual Lines to Homes**



# Underground HDPE Storage



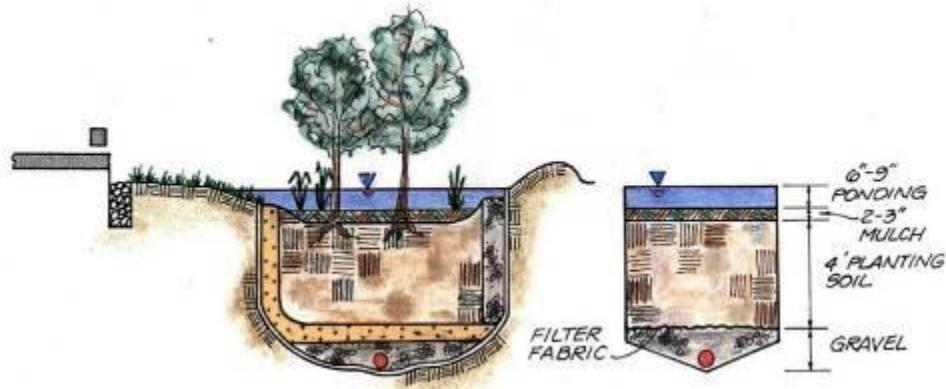
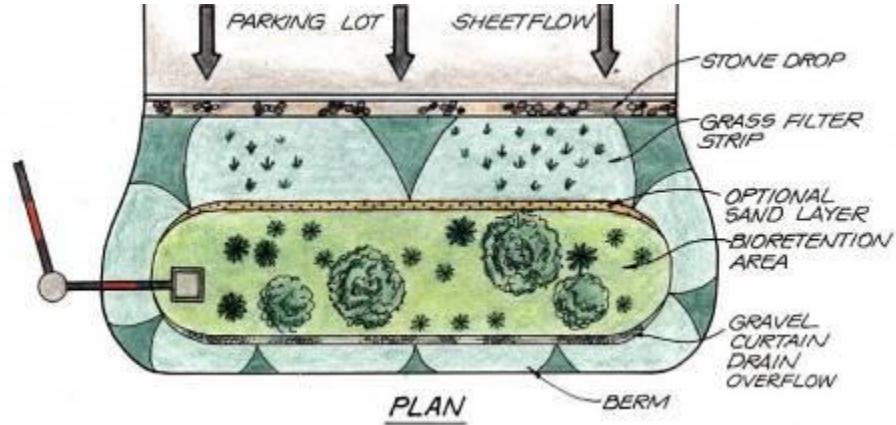
# Underground Concrete Vault Storage



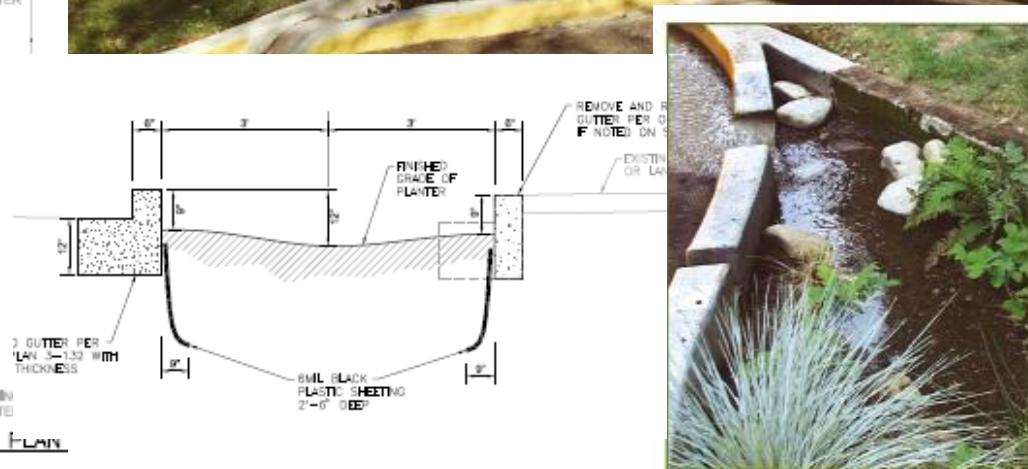
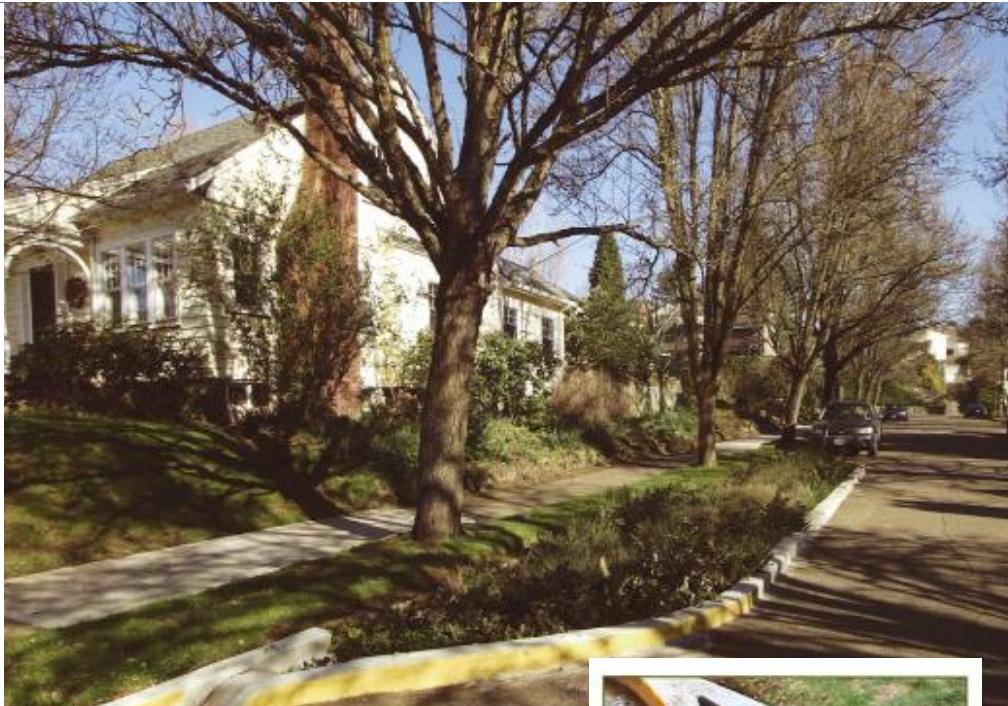
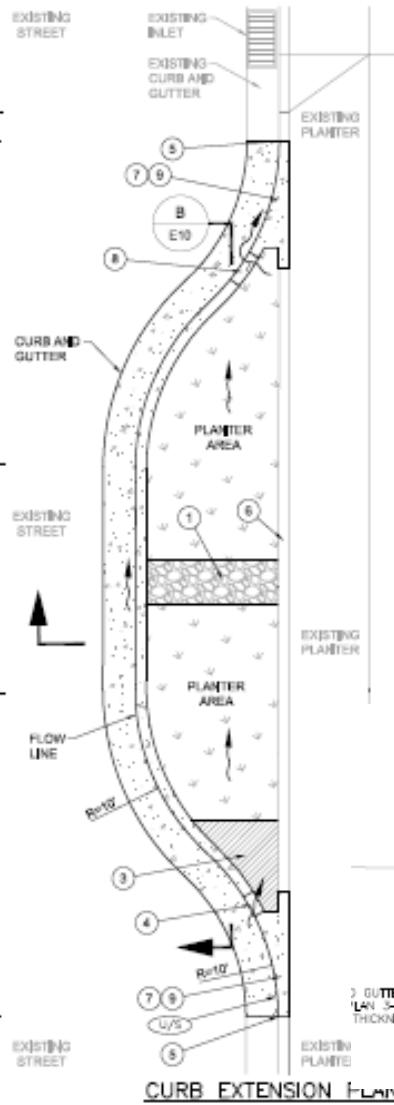
# Low Impact Development Practices Permeable Pavers and Porous Pavement



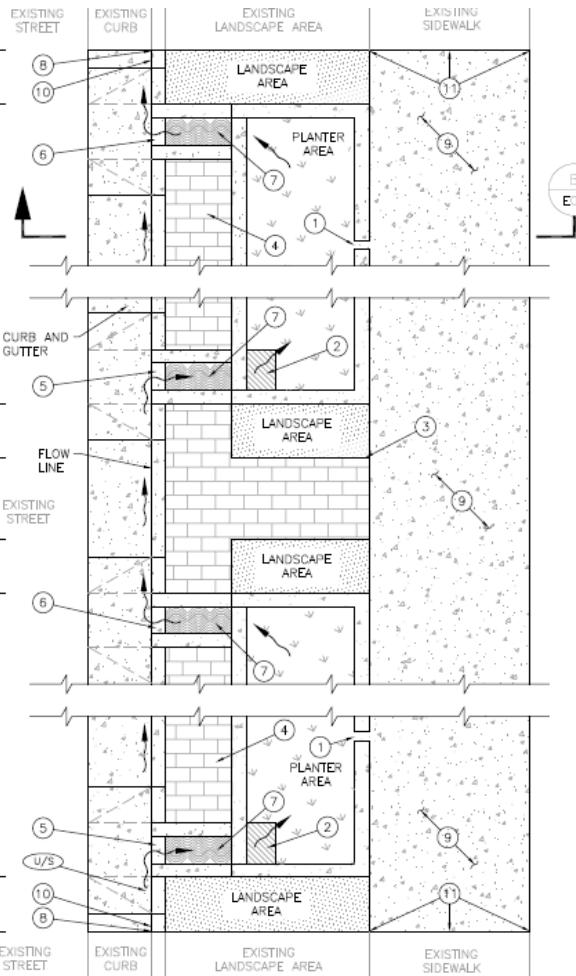
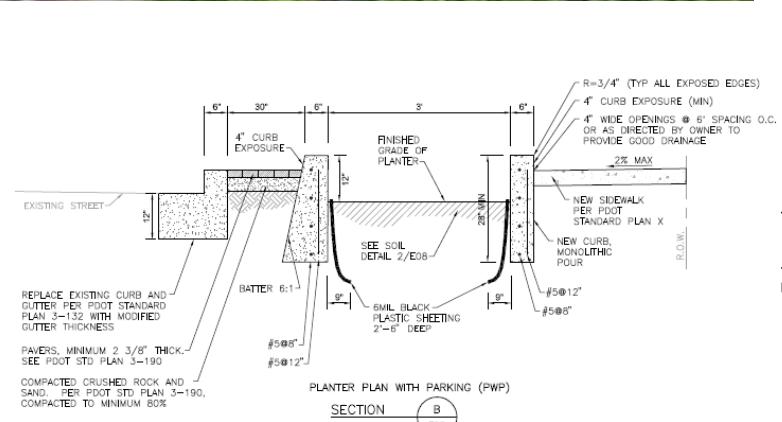
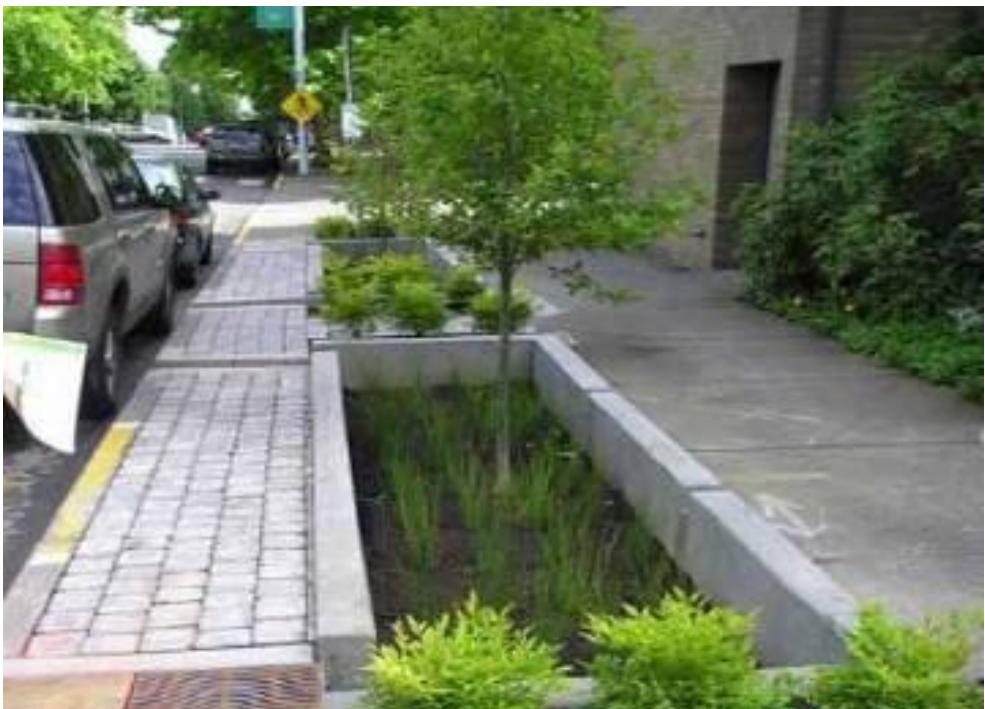
# Bioretention Areas



# Curb Extension



# Sidewalk Planter



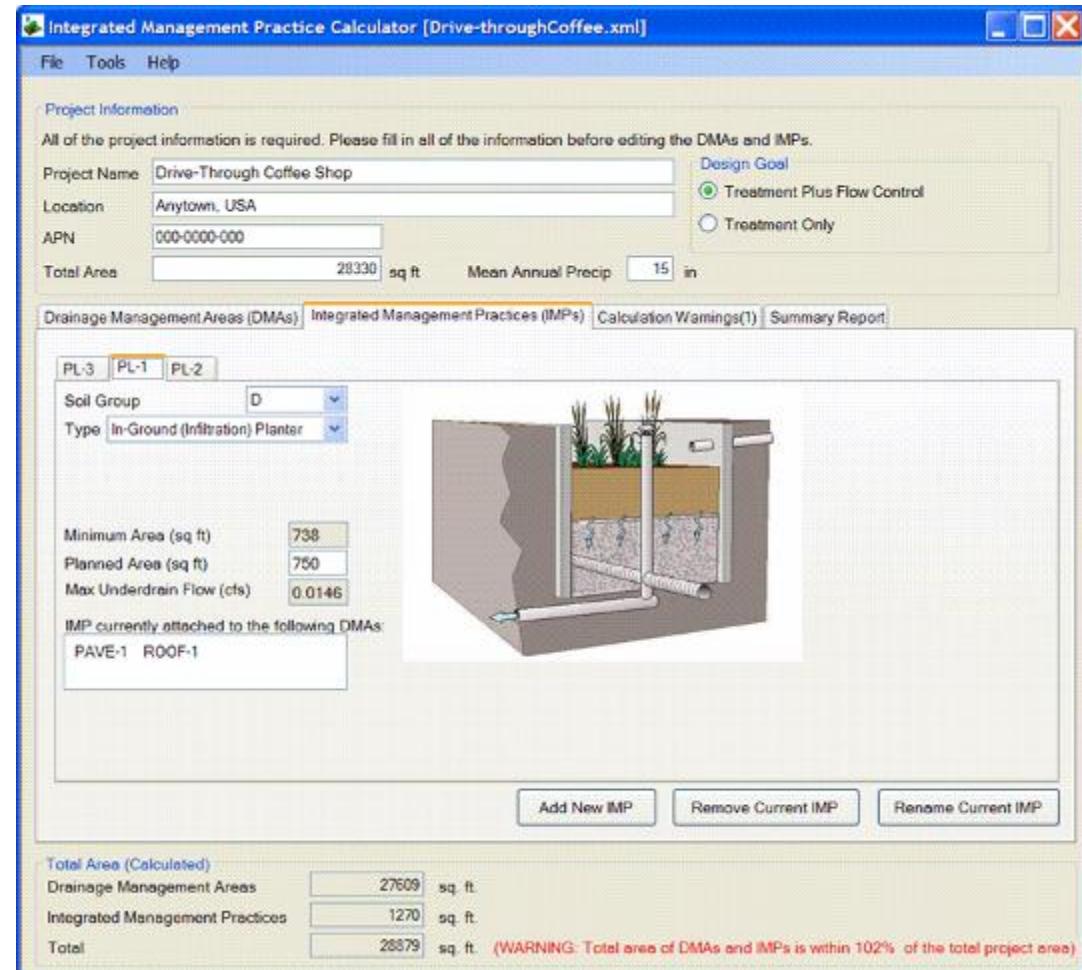
# Green Roof



# Develop a Local LID Stormwater Program

## BC LID Feature Sizing Tool

- Continuous simulation model to determine sizing factors for LID facilities
- Create tool for engineers to use to size LID facilities
- Determines % capture or % treatment
- Easy to use with output verification report





# Infiltration Practices

Volume  
reduction  
= load  
reduction

THE  
BEST!





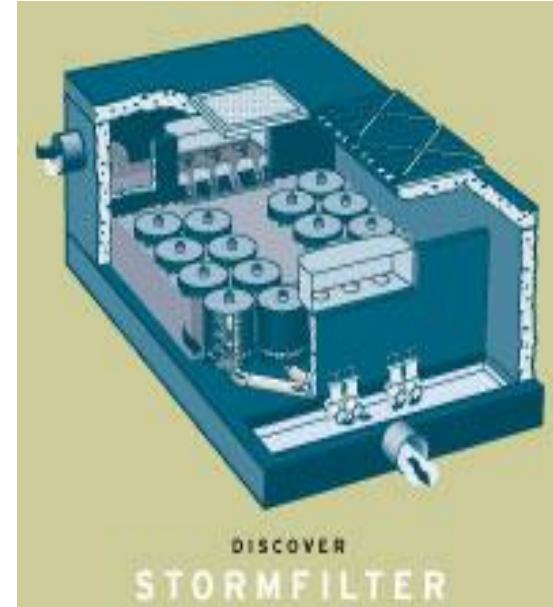
## Detention Practices

**(much lower pollutant  
removal efficiencies  
than reuse or  
infiltration practices)**



# End-of-Pipe Treatment Technologies

- Typically only for gross solids and sediment removal but new medias effective for removing other pollutants
- Used extensively for removal primary pollutants
- Minimal land required
- Relatively inexpensive



Can achieve up to 50% nutrient load reduction.

# Retrofit BMP Life Cycle Cost Comparison

Retrofit BMP	Life Cycle Cost per kg TP removed (\$)	Life Cycle Cost per kg TN removed (\$)
Pet Waste Education	150 - 300	20 - 40
Second Generation Baffle Box	800 – 1,600	250 - 500
Wet Detention Pond	1,200 - 2,400	500 - 1,000
Dry Detention Basin	3,500 - 7,000	1,250 - 2,500
LID - Bioretention	10,000- 40,000	500 - 5,000
Stream Restoration	2,000 - 4,000	300 - 600
Chemical Treatment	90 - 180	50 - 100
Enhanced Wetland Treatment	100 - 200	100 - 200

**Education is very cost effective.**

**Larger - regional systems tend to have significantly lower life cycle costs per mass of TP and TN removed than many smaller systems.**



## Second Generation Baffle Box Suntree Technologies

Installed Cost  
\$30,000 - \$75,000/unit

# Chemical Treatment

- Achieves significantly higher removal efficiencies than traditional treatment methods for many pollutants; **80-90% TP, 99.9% pathogen removal**
- Requires significantly less land than traditional methods
- Typically has the lowest life cycle cost per mass TP and pathogen removed
- Improves receiving surface water quality for aesthetics, recreational use or public health
- Provides source water protection and controls growth of algae and bacteria (including blue-green algae)



**Before Stormwater Chemical Treatment**

ALUM FEED AND  
METERING LOCATION

PUMP STATION  
SITE

**System to Treat Runoff from  
300 acre Urban Watershed  
Construction cost \$400,000  
Annual O&M cost \$35,000**

ALUM FEED AND  
METERING LOCATION

LAKE LUCERNE

ALUM FEED  
LOCATION

CROSS DRAIN

METERING LOCATION

ALUM FEED  
LOCATION

ALUM FEED AND  
METERING LOCATION

LAKE LUCERNE

DRAINAGE  
WELL

CIRCLE

CIRCLE

METERING LOCATION

ALUM FEED  
LOCATION

AVENUE

DELANEY

N

# Entire Treatment System Underground



# Stormwater Flow Metering and Chemical Feed Equipment





**After Stormwater Chemical Treatment**

# Largo Central Park



**1200 acre watershed treated using 3 acre pond, floc pumped to SS**  
**Construction cost = \$1,000,000**  
**Annual O&M cost = \$50,000**

# LCWA Nutrient Reduction Facility



Treats flows up to 300 cfs and 50,000 ac-ft of water per year from a 60,000 ac watershed. Meets P TMDL requirements for entire watershed.  
Construction Cost \$7.5M  
Annual O&M Cost \$1M

12-20-2008

# Floc Removal and Dewatering



# Wetland Treatment

Significant land area required, efficiencies highly dependent on influent concentrations and hydraulic loading rate, plan for future maintenance.

- emergent marsh w/ open water pools
- submerged aquatic vegetation (SAV)
- hardwood elements
- design to minimize short circuiting
- management including application of alum residuals for P binding in wetland soils
- treatment train with sediment sump, wet detention or chemical treatment





**15 Acre SAV/Wet Detention System treats 600 acres  
Construction cost \$1M  
Annual O&M cost \$20,000**

# McIntosh Park Enhanced Stormwater Treatment Wetland (ETW)

Provides Treatment for  
6000 acre Watershed:  
2 acre wet sediment sump;  
45 acre emergent marsh;  
5 acre chemical treatment.  
Construction Cost \$2M  
Annual O&M Cost \$75,000



# Design of Natural Stream Restoration and Stormwater BMPs



# Design of Natural Stream Restoration and Erosion Control BMPs



Stream Restoration and Erosion Control Options

# Include Recreational and Educational Elements

- pedestrian path, boardwalk, floating pier
- educational kiosk and signage
- parking
- picnic pavilions
- restrooms
- observation tower
- fishing



**Allows a stormwater treatment system to be useful to the public and increases awareness!**

# Public Outreach and Education



## How will the City benefit from a watershed assessment?

An assessment is a health check-up for a watershed and its streams. By learning about a watershed's current condition and projecting for the future, we can better understand how everyday activities, weather conditions, population shifts, and development activities impact our water resources. For instance, as more land surface is paved, greater amounts of rainfall run off the land and into streams. Greater amounts of runoff can erode stream banks and beds, increasing the amount of dirt in a body of water. Runoff also affects water quality since it picks up the grease, oil, litter, and other debris from parking lots as well as nitrogen and phosphorous from fertilized lawns. All of these factors contribute to decreases in plant and animal life as well as water quality in streams.

Assessments use data collection from "streamwalks." During streamwalks, field crews walk along streams observing the condition of the stream to identify which areas need improvement; for example, crumbling banks or areas affected by litter and other debris. The City of Durham has an ongoing ambient water quality monitoring program that takes water samples to test the water quality and determine what nutrients, bacteria, metals, and other pollutants are in the water as well as the physical and biological indicators. These are good indicators of the overall health of streams.

During the Ellerbe Creek project the stream assessment and analysis of the City's water quality data will be combined to give a more complete picture of the watershed. These data are also used to validate the mathematical models being developed to study current and future watershed conditions.

For more info about the Ellerbe Creek Watershed Improvement Project visit the web site: [www.durhamnc.gov/stormwater](http://www.durhamnc.gov/stormwater)  
Or contact City Project Manager: Sandra Wilbur – (919) 560-4326



## Ellerbe Creek Watershed Improvement Project Overview



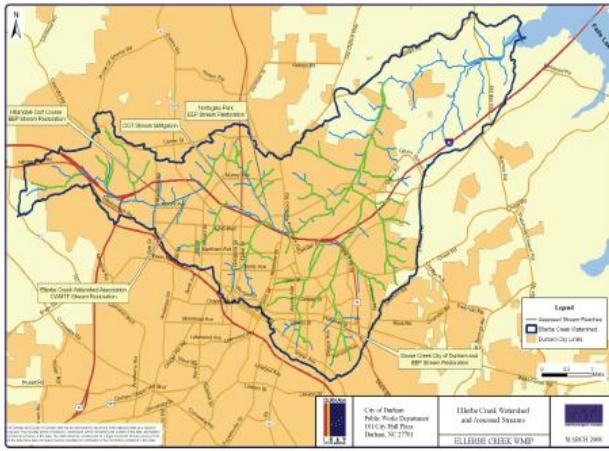
### From your City Project Manager, Sandi Wilbur: Why a watershed improvement project?

The City of Durham launched the Ellerbe Creek Watershed Improvement Project at the end of November as a way to proactively address changes the City is making to comply with water quality regulations, to improve the health of the Ellerbe Creek and other watersheds in Durham, as well as to create value for neighborhoods in the watersheds. Field crews comprised of City staff and Brown and Caldwell staff walked approximately 37 miles of Ellerbe Creek. The data collected will help the City better understand the creek's current health and prioritize the areas and types of projects to be designed and implemented.



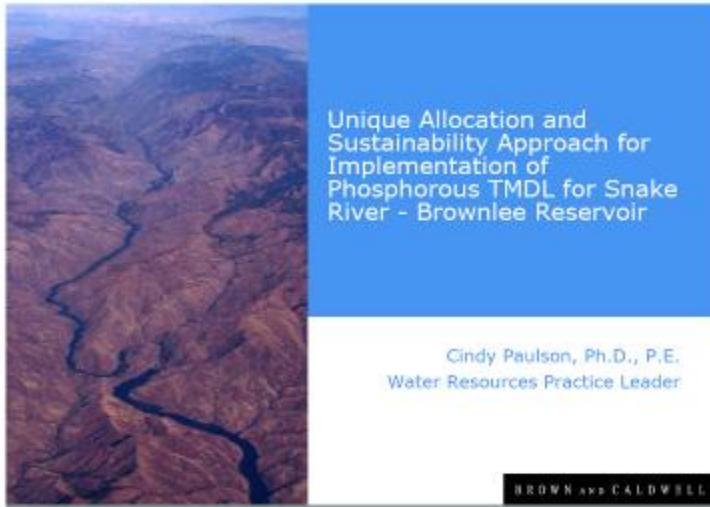
Field crews take baseline measurements of stream banks.

Field crews surveyed portions of Ellerbe Creek and its tributaries in January and February (shown in green on the map, right). Their primary objectives were to evaluate the physical condition of the streams, identify sources of pollution contributing to water quality problems and to identify stream reaches and riparian buffer areas that need to be restored or preserved.

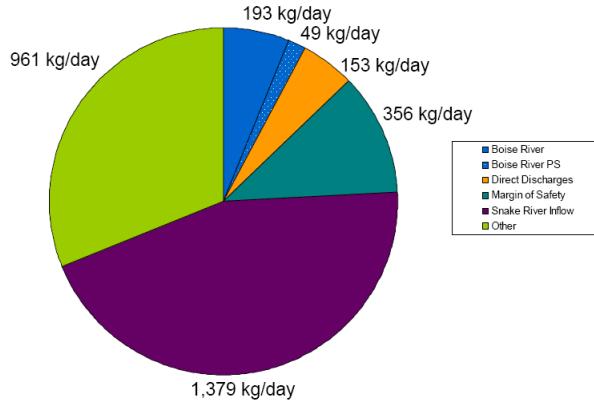


Map of the Ellerbe Creek watershed - areas assessed by field crews are shown in green.

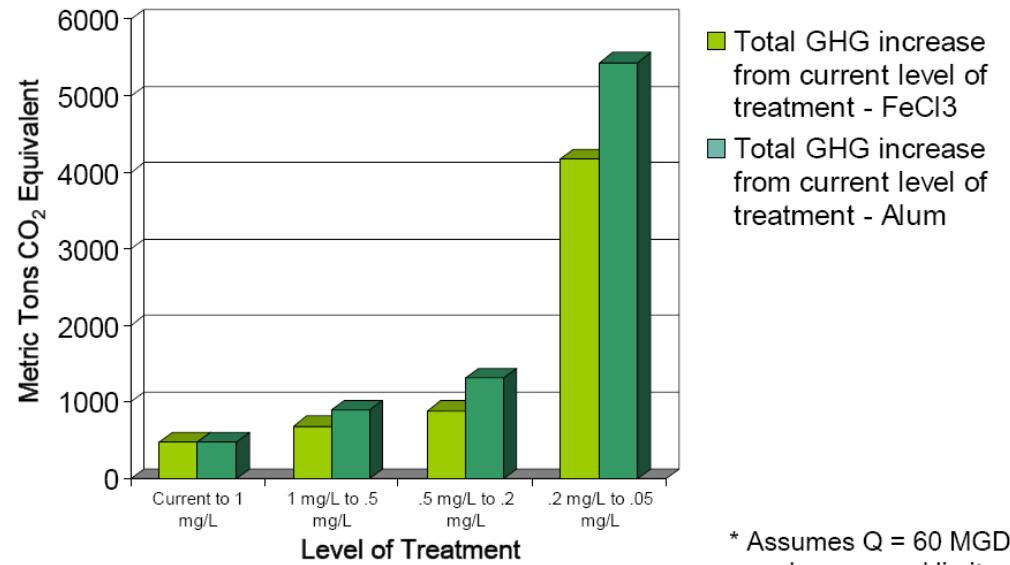
# Develop Sustainable Solutions



## Allocation Summary to Reach 3,091 kg/day

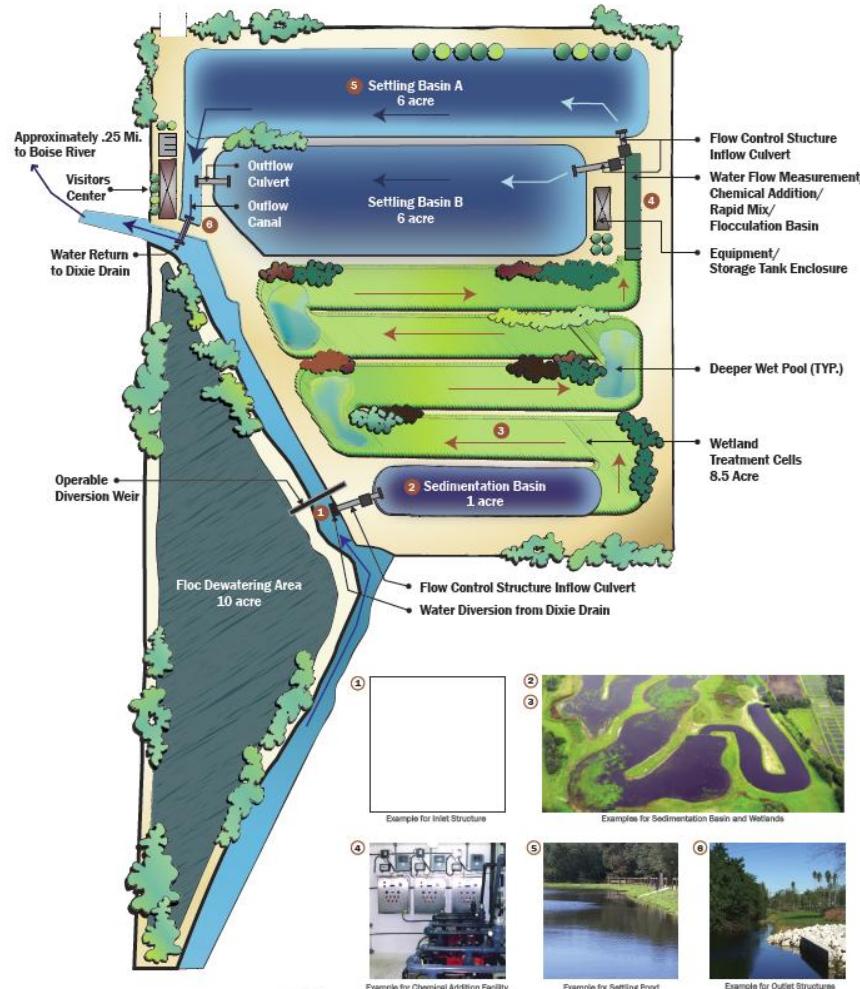


## Sustainability – Environmental Cost



\* Assumes Q = 60 MGD and year round limit

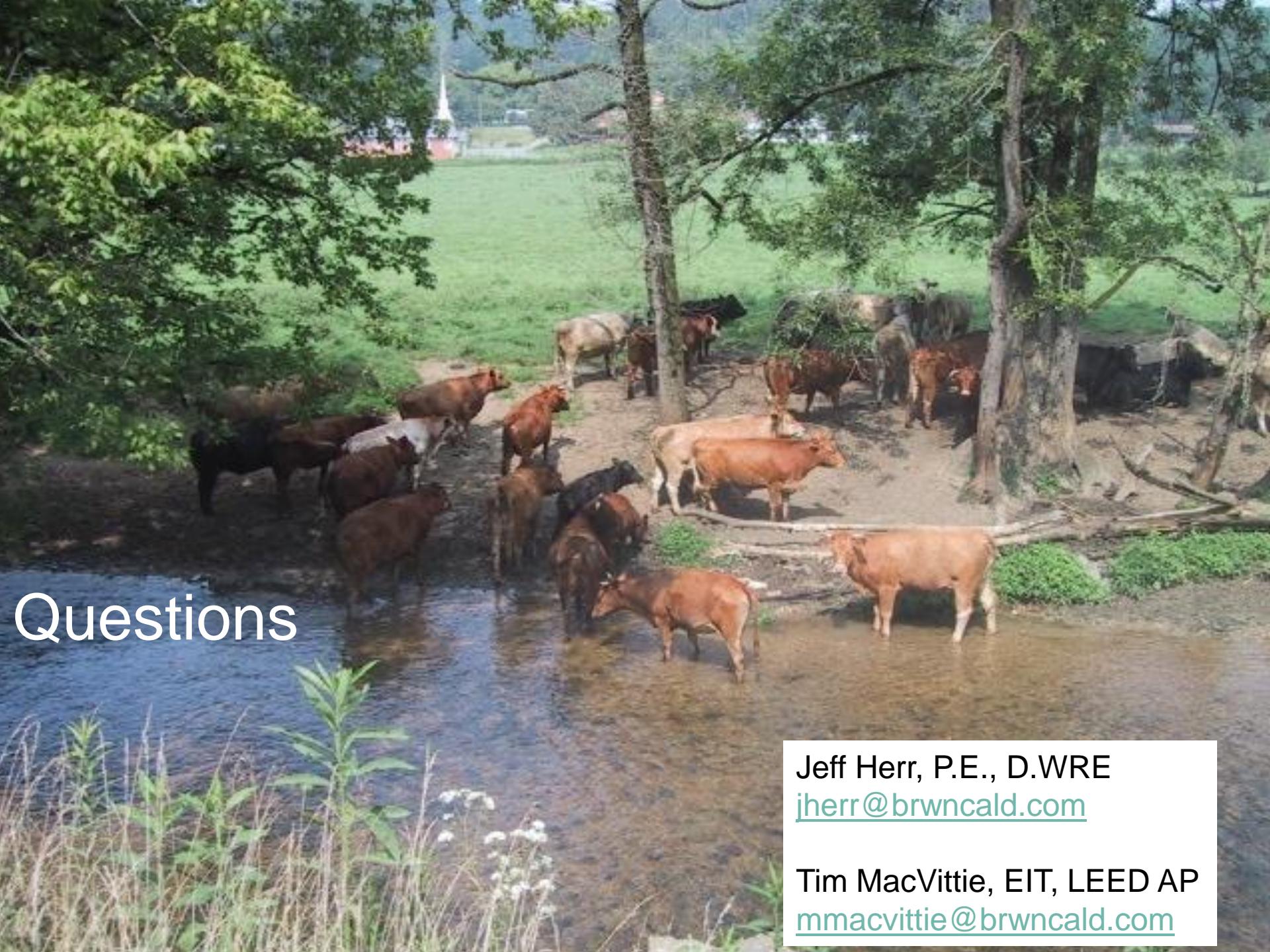
# Dixie Drain Non-Point to Point Trade Boise, Idaho to Meet Phosphorus TMDL



Brown AND  
Caldwell

**J-U-B**  
ENGINEERS, INC.  
PLANNERS • DESIGNERS • CONTRACTORS

City of Boise | Dixie Drain Phosphorus Removal Project  
Conceptual Design



# Questions

Jeff Herr, P.E., D.WRE  
[jherr@brwncald.com](mailto:jherr@brwncald.com)

Tim MacVittie, EIT, LEED AP  
[mmacvittie@brwncald.com](mailto:mmacvittie@brwncald.com)

# FY13 Annual Activity Report

Run Date: 9/27/2013 12:34:25 PM

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/26/2012	Storm Drain Clogged	Phone	W015965-102612	Patsy Dixon	200 Beechwood Ave.	Cleaned and removed leaves	Completed		
1/16/2013	Storm Drain Clogged	Walk-In	W016671-011613	Patsy Dixon	320 Lynchburg Ave.	Took tops off small grates in front of garage, used small shovel to clean dirt out of boxes, pipe goes toward house, spoke to Amy Armstrong, she says she does not have a sump pump under her house water just has to seep into ground french drain.	Completed		
7/9/2012	Storm Drain Clogged	Phone	W014733-070912	Patsy Dixon	121 Lakeside Dr.	Raked 1 black 55 gallon trash bag of pine needles and pine cones from top of grate top basin	Completed		
6/3/2013	Storm Drain Clogged	Phone	W017905-060313	Patsy Dixon	Wellington Rd.	Used shovels, pitchfork and cleaned basin removed 1 cubic yards of pineneedles and sticks	Completed		
5/6/2013	Storm Drain Clogged	Walk-In	W017644-050613	Patsy Dixon	Covington Rd.	Used backhoe to lift off concrete lid of basin, used shovels to get rocks, silt and leaves out of basin. removed 1 cubic yards of debris.	Completed		
6/26/2013	Storm Drain Clogged	Phone	W018144-062613	Patsy Dixon	1300 Canterbury Ln	Cleaned curb inlet used shovels to remove 1/2 cubic yard of sticks and pineneedles	Completed		
1/14/2013	Storm Drain Clogged	Email	W016656-011413	Patsy Dixon	Mallard Dr.	On 1/14/13 used shovels, hoe, pitch fork and pry bar and could not break through, inlet is 8' to the bottom leaves packed tight up to the manhole lid. On 1/15/13 used pump from Utilities Division to help lower water level to break up and vacuum out leaves with sweeper, water went down removed 2 cubic yards of leaves. Water overflow inlet did not cause any property damage. Resident at 348 and 356 mallard Dr already have channel at edge of driveways for when it rains hard and water picks up speed coming down steep hill before getting to inlet water shoots down driveways never an issue called in at these addresses.	Completed		
10/26/2012	Storm Drain Clogged	Phone	W015964-102612	Patsy Dixon	713 Conduit Rd.	Used pitch fork and leaf rake to clean and removed	Completed		
10/4/2012	Storm Drain Clogged	Internal-Employee	W015765-100412	Patsy Dixon	318 Jefferson Ave.	Used flusher, flushed and vacuumed out box removed 1/4 cubic yards of leaves and trash. Used 100 gallons of water.	Completed		
9/4/2012	Storm Drain Clogged	Internal-Employee	W015399-090412	Patsy Dixon	Conduit Rd.	Removed leaves, sticks and grass from a grate top basin in front of Home Depot	Completed		
8/2/2012	Storm Drain Clogged	Internal - Mayor	W015096-080212	Patsy Dixon	121 Lakeside Dr.	Cleaned Grate Top Basin and around area removed 1 cubic yards of pineneedles and silt with shovels and rakes	Completed		
8/1/2012	Storm Drain Clogged	Internal-Employee	W015076-080112	Patsy Dixon	Boulevard @ Valley Rd.	Cleaned trash out of a grate top catch basin removed 1-55 gallon trash bag.	Completed		
10/28/2012	Storm Drain Clogged	Internal-Employee	W015996-102812	Patsy Dixon	Yacht Basin @ Greenwood Drs.	Flushed box and pipe removed 1/2 cubic yards of leaves used 500 gallons of water.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/29/2012	Storm Drain Clogged	Internal-Employee	W016025-102912	Patsy Dixon	City Wide	Brookhill at Forest View Drs, 1023 Forest View Dr, Behind 7-11 on Sherwood Dr, 118 Lakeside Dr, 1907 Wakefield Ave, 316 N Temple Ave, 507 Battery Pl, 151 and 167 Chesterfield Ave, 131 Carroll Ave, 110 Royal Oak Ave, 209 E. Westover Ave, 418 E. Westover Ave, 210 and 214 Duyupy Ave.	Completed		
10/29/2012	Storm Drain Clogged	Internal-Employee	W016026-102912	Patsy Dixon	City Wide	Cleaned Maple at Meridian Aves, Meridan at Fairfax Aves, Chesterfield at Marvin Aves, 114 Chesterfield Ave, 121 Lakeside Dr.	Completed		
5/2/2013	Storm Drain Clogged	Internal-Employee	W017570-050213	Patsy Dixon	1207 Meridian Ave.	Removed car parts from catch basin	Completed		
2/1/2013	Storm Drain Clogged	Internal-Employee	W016763-020113	Patsy Dixon	111 Lakeside Dr.	Removed 2 cubic yards of pine needles and leaves with flusher that was placed there by lawn care take	Completed		
2/1/2013	Storm Drain Clogged	Internal-Employee	W016764-020113	Patsy Dixon	1907 Wakefield Ave.	Removed 1 cubic yards of leaves with flusher	Completed		
6/5/2013	Drainage Ditch need cleaning	Internal-Employee	W017966-060513	Patsy Dixon	202 Davis Ave.	Cleaned drainage ditch with bush hog	Completed		
11/28/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016234-112812	Patsy Dixon	Pickwick Ave.	In Alley cleaned gravel and leaves from a grate top basin	Completed		
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015764-100312	Patsy Dixon	228 Washington Ave.	Used flusher to flush line of gravel from a grate top basin used 500 gallons of water.	Completed		
11/6/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016085-110612	Patsy Dixon	City Wide	318 Jefferson Ave - Curb Inlet removed leaves, 713 Conduit Rd - Curb Inlet removed wood, pineneedles, 1314 Canterbury Ln. - Curb Inlet Grate Inlet removed Leaves, pineneedles, sticks, Alley behind Colonial Apartment - Grate top basin removed leaves, sticks, 7-11 Sherwood Dr - Grate top basin removed pineneedles, 111 Lakeside Dr - Curb Inlet grate otp basin, removed pineneedles used flush truck, 121 Lakeside Dr - Grate top basin removed leaves, Lakeview Ave at Lakeview Pkwy - grate top basins removed leaves.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
1/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016582-010413	Patsy Dixon	Lakeview Ave @ Lakeview Park Rd.	Cleaned box removed 1 bag of trash, sticks and leaves	Completed		
12/21/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016473-122112	Patsy Dixon	Boulevard	Cleaned the following catch basins: Fairfax Ave - Curb Inlet removed leaves and trash, Charlotte Ave - Curb Inlet removed leaves, Hamilton Ave - Curb Inlet removed Leaves, Lafayette Ave - Curb Inlet removed leaves and sticks, Lyons Ave - Curb Inlet removed leaves and trash.	Completed		
1/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016575-010413	Patsy Dixon	City Wide	Chesterfield Ave - Retention Basin removed leaves and trash, 228 Washington Ave removed leaves, E. Westover Ave at Conduit Rd - removed sticks and leaves, Alley between Bermuda and Dale Aves removed leaves, Sherwood Dr at 7-Eleven removed pine needles.	Completed		
8/13/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015216-081312	Patsy Dixon	City Wide	Cleaned storm drains at Sherwood Dr behind 7-11 both sides, Behind Big Lots, Shuford at Westover Aves, Hamilton at Westover Aves, Forest View Dr at Lakewood Dr, Marvin at Chesterfield Aves.	Completed		
8/16/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015263-081612	Patsy Dixon	318 Jefferson Ave.	Flushed and vacuumed curb Inlet removed 1 cubic yards of leaves, sticks, trash and dirt. Used 250 gallons of water	Completed		
8/16/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal - Mayor	W015264-081612	Patsy Dixon	Boulevard	At 7-11 South Flushed and vacuumed 2 grate top basins removed 1/2 cubic yards of silt. Used 250 gallons of water	Completed		
8/16/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015265-081612	Patsy Dixon	Conduit Rd @ E. Westover Ave.	Flushed and vacuumed curb Inlet removed 1/2 cubic yards of sticks, trash and dirt. Used 250 gallons of water	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
8/16/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015266-081612	Patsy Dixon	Dale Ave.	Flushed and vacuumed Grate Top Manhole Alley between Dal and the dead end of Bermuda Ave removed 1 cubic yards of leaves and dirt. Used 250 gallons of water	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015173-080912	Patsy Dixon	Conduit Rd.	At Charles Ave cleaned a curb Inlet removing car parts, grass and silt. At Center Ave cleaned a curb Inlet removing grass clipping. Removed 1/2 cubic yard of debris	Completed		
9/5/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015432-090512	Patsy Dixon	City Wide	Brookhill @ Forest View Drs, 1023 Forest View Dr, 313 Brookedge Dr, 1016 Lafayette Ave, 151 Chesterfield Ae, 214 Dupuy Ave, 110 Royal Oak Ave, Behind Big Lots	Completed		
8/2/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015085-080212	Patsy Dixon	City Wide	Cleaned the following basins: Removed 1 cubic yards of debris, 7-11 at Sherwood Dr - Grate top basin removed Pineneedles, Chesterfield at Marvin Aves - Grate Top Basin removed Trash, E. Westover Ave at Conduit Rd - Curb Inlet removed stickies.	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015175-080912	Patsy Dixon	Temple Ave.	At I-95 Intersection cleaned a grage top basin removing 1/2 cubic yard of mulch	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015176-080912	Patsy Dixon	Boulevard	At 7-11 cleaned 2-grate top basin removing 2-5 gallon buckets of silt.	Completed		
10/28/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015993-102812	Patsy Dixon	Biltmore Dr.	Behind house downed tree blocking 3 grate top catch basins. Removed 2 flat bed loads of debris from site.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015752-100312	Patsy Dixon	City Wide	Cleaned the following catch basins: Conduit Rd at E. Westover Ave removed sticks and trash, Southpark Blvd. in front of Wal-mart removed trash and car parts, Charles Dimmock Pkwy at Temple Lake Dr removed trash, Dunlop Farms Blvd. at Longhorn Dr removed silt and trash, Boulevard at Sherwood Dr removed car parts.	Completed		
10/29/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016033-102912	Patsy Dixon	City Wide	Cleaned the following storm drains: 1000 Forest View Dr, 1023 Sherwood Dr, Sherwood Dr behind 7-11	Completed		
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015725-100312	Patsy Dixon	City Wide	Cleaned storm drains at the following locations: Forest View at Brookhill Drs, Sherwood Dr behind 7-11, 316 N. Temple Ave, 131 Carroll Ave.	Completed		
8/2/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015093-080212	Patsy Dixon	Biltmore Dr.	Behind Biltmore on Railroad bed cleaned 4-grate top ctch basins removed leaves, dirt, and silt with shovels and rakes placed debris in woods.	Completed		
8/1/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015077-080112	Patsy Dixon	Boulevard @ Lafayette Ave.	Cleaned Curb Inlet of grass, dirt and silt removed 2 cubic of debris.	Completed		
7/2/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W014685-070212	Patsy Dixon	City Wide	checked and cleaned the following basins: 318 Jefferson Ave - Sticks and toys curb inlet, E. Westover Ave at Conduit Rd - Sticks and trash Curb Inlet, Lakeview Ave At Lakeview Park Rd - Trash Catch basin, Boulevard at Valley Rd - Trash Grate Top Basin, Boulevard at Dupuy Ave - Trash Curb Inlet.	Completed		
10/28/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015984-102812	Patsy Dixon	City Wide	318 Jefferson Ave removed leaves and sticks, 228 Washington Ave removed leaves, Pickwick Ave Alley removed trash and leaves, Conduit Rd at E. Westover Ave removed trash. collected 1/2 cubic yards of debris.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/2/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015692-100212	Patsy Dixon	City Wide	1023 Forest View Dr, Colonial Apartments, Behind Big Lots, Marvin at Chesterfield Aves, Lafayette at E. Westover Aves, Colonial at E. Westover Aves, Hamilton at E Westover Aves, 12 Lakeside Dr.	Completed		
3/22/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017187-032213	Patsy Dixon	City Wide	115 Dupuy Ave, 120 Lake Dr, Brookhill at Forest View Dr, 313 Brookedge Dr, behind Colonial Apartments, Wakefield Ave, Westover Ave, and checked drainage in Alley behind Pickwick Ave.	Completed		
9/12/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015514-091212	Patsy Dixon	City Wide	Cleaned clogged boxes at the following locations: 1316 Canerbury Ln removed sticks, pine needles, and grass clipping, Marvin at Chesterfield Aves intersections 4 grate top basins removed grass clipping and leaves, 121 Lakeside Dr removed pine needles and dirt, 114 Chesterfield Ave removed pine needles and dirt.	Completed		
3/22/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017170-032213	Patsy Dixon	City Wide	Pickwick Alley, Piedmont Ave, Wakefield Ave, Franklin Ave, Westover Ve, Lakeside Dr.	Completed		
3/22/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017179-032213	Patsy Dixon	City Wide	Cleaned the following storm drains: Pickwick Alley, Brookhill Ave and Ct, 1905 Wakefield Ave, Marvin Ave and 316 N. Temple Ave, Chesterfield and Marvin Aves both sides, Hamilton and Westover Aves both sides, 114 Chesterfield Ave, Behind Big Lots, Sherwood Dr behind 7-11.	Completed		
3/21/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017148-032113	Patsy Dixon	City Wide	Woodlawn, Sprindale, West, Ellerslie, Pickett, Cedar Ln, Cloverhill, Maple, Poplar St, Gould, Orchard.	Completed		
3/21/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017151-032113	Patsy Dixon	City Wide	Chesterfield Ave, Washington Ave, Virginia Ave, Jefferson Ave, Royal Oak Ave.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017015-030413	Patsy Dixon	City Wide	Lakeview Ave at lakeview Parkway - Grate Top removed leaves, Boulevard at Lakeview Ave - Grate Top removed car parts, 1314 Canterbury Ln - Grate Top removed sticks and pineneedles, 500 Huntington Rd - Curb Inlet removed Large piece of Card Board, 1001 Forest View Dr - Curb Inlet removed leaves and Sticks. Removing 1 cubic yards of debris	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016767-020113	Patsy Dixon	Pickwick Alley	Cleaned leaves and trash from a grate top basin	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016768-020113	Patsy Dixon	318 Jefferson Ave.	Removed leaves from a curb inlet	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016770-020113	Patsy Dixon	E. Westover @ Hamilton Aves	Removed leaves from a Grate top Basin	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal - Mayor	W016771-020113	Patsy Dixon	Boulevard @ Shuford Ave.	Removed trash from a Grate Top Basin	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016772-020113	Patsy Dixon	E Westover Ave @ Conduit Rd.	Removed Sticks from a Curb Inlet	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal - Mayor	W016773-020113	Patsy Dixon	114 Chesterfield Ave.	Removed pineneedles from a Grate top basin	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/2/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017564-050213	Patsy Dixon	City Wide	Collected 1/2 cubic yards of debris from the following: 1314 Canterbury Ln - Curb Inlet removed Pineneedles and sticks, E. Westover at Hamilton Aves - Grate Top removed Trash and Leaves, 5113 Salem Ct - Curb Inlet removed Pineneedles, 106 Salisbury Rd - Curb Inlet removed Sticks.	Completed		
5/2/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017566-050213	Patsy Dixon	City Wide	Collected 1 cubic yards of debris from the following: behind 625 Conduit Rd - Grate Top Basin removed Leaves, 607 Pinehurst Ave - Curb Inlet removed Trash, 203 Ingram Ave - Curb Inlet removed Pineneedle and Trash, 131 W. Westover Ae - Curb Inlet removed Trash, 162 Wright Ave - Curb Inlet removed 2x4 wood 6' long.	Completed		
5/2/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017589-050213	Patsy Dixon	City Wide	Cleaned the following Storm Drains: 1203 Forest View Dr, 114 Chesterfield, Lafayette at E. Westover Aves, 316 N. Temple Ave, 313 Brookedge Dr,	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017024-030413	Patsy Dixon	903 Conduit Rd.	Pulled trash and sticks out of a Curb Inlet removed 1/2 curb yards of debris	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017025-030413	Patsy Dixon	424 Roslyn Ave.	Removed Sticks and trash from a Curb Inlet	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017026-030413	Patsy Dixon	South Ave.	Near Lake removed trash and car parts from a curb inlet needs repairs done to floor and walls of basin will repair when weather warms up.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017027-030413	Patsy Dixon	City Wide	114 Chesterfield Ave - Grate top removed sand and pineneedles, Dupuy at Gould Aves - Grate Top removed cardboard, 503 Braxton Ave - Curb Inlet removed trash and sticks, Boulevard at 7-11 South - Grate top removed Trash and Card board. Removing 1 cubic yard of debris.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017028-030413	Patsy Dixon	City Wide	Conduit Rd at E. Westover Ave - Curb Inlet removed sticks and trash, 233 Huntington Rd - Curb Inlet removed Leaves, 100 Red Fox Rd - Curb Inlet removed Pineneedles, Southpark Blvd in front of Walmart - Curb Inlet removed Car Parts.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017031-030413	Patsy Dixon	City Wide	3218 Jersey Ct - Curb Inlet removed Trash, 219 Pecan Tree Ter - Curb Inlet removed recyclies and Trash, 208 Crestwood Dr - Curb Inlet removed Pineneedles, 327 Ridge Rd - Grate Top Removed Pineneedles and Trash, 2102 Snead Ave - Catch Basins removed cardboard box, 306 Walnut Ave - Curb Inlet Romoved kids toys placed back in yard. Removed 1/2 cubic yard of debris.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017037-030413	Patsy Dixon	City Wide	Marvin Ave, Chesterfield Ave, Washington Ave, Ivey Ave, Behind Colonial Apartments,.	Completed		
1/17/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016680-011713	Patsy Dixon	City Wide	Cleaned the following storm drains: Forest View at Brookedge Drs, 1023 Forest View Dr, 1905 Wakefield Ave, 121 Lakeside Dr, Behind Big Lots, Hamilton at Westover Aves, Westover at Colonial Aves.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017011-030413	Patsy Dixon	City Wide	Cleaned the following basins: 228 Washington Ave - Grate Top Removed leaves, Hamilton at E. Westover Aves - Grate Top Removed Trash, Shuford at Boulevard - Grate Top removed Car Parts.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017008-030413	Patsy Dixon	526 Roslyn Ave.	Cleaned trash and car parts out of basin, investigated condition of 12" concrete pipe will need to be replaced in near future pipe is crumbling and drains slowly.	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/21/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017797-052113	Patsy Dixon	City Wide	101 Indian Rock Ct - 2 Curb Inlet, Across from 101 Indian Rock Ct. - Curb Inlet, 604 Waterfront Dr - Curb Inlet, 603 Waterfront Dr - Curb Inlet, Lakewater Ct at Waterfront Dr - Curb Inlet, 518 Waterfront Dr - Curb Inlet, 159 Waterfront Dr - Curb Inlet, 101 Kennon Ct - Curb Inlet, 324 Waterfront Dr - Curb Inlet, Brook Ct at Waterfront Dr - 2 Curb Inlet, 400 Waterfront Dr - Curb Inlet, 407 Waterfront Dr - Curb Inlet, Behind 500 Waterfront Dr - Catch Basin Grate top. 16 Basin total.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017241-040113	Patsy Dixon	111 Yew Ave.	Removed 1 bag of trash from a Curb Inlet	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017242-040113	Patsy Dixon	206 Hargrave Ave.	Removed 1/2 cubic yard of sticks and trash from a Curb Inlet	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017243-040113	Patsy Dixon	Charles @ Fredrick Aves.	Removed 1/2 cubic yards of Leaves from a Curb Inlet	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017244-040113	Patsy Dixon	City Wide	Removed 2 cubic yards of debris from the following: 1201 Clifton Dr - Curb Inlet-Asphalt Chunks, 5213 Cedar Ridge Ct - Curb Inlet-Gum Ball from tree, 103 Creek Point Ct - Curb Inlet-Trash, 101 Kennon Ct - Curb Inlet-Trash, 109 Salisbury Rd - Curb Inlet-Asphalt Chunks, 233 Huntington Rd - Curb Inlet-Leaves.	Completed		
6/5/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017962-060513	Patsy Dixon	418 Lyons Ave.	Removed 3 logs from Curb Inlet	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
6/5/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017971-060513	Patsy Dixon	318 Jefferson Ave.	Cleaned curb inlet - Trash and toys	Completed		
6/5/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017972-060513	Patsy Dixon	3107 Greenwood Ave.	Cleaned curb inlet - Sticks	Completed		
6/5/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017975-060513	Patsy Dixon	City Wide	Cleaned the following basins: 121 Salisbury Rd - Curb Inlet removed Trash and Sticks, 500 Huntington Rd - Curb Inlet removed pine needles, 1016 Avon Ct - Curb Inlet removed Grass, 307 Windmere Dr - Curb Inlet removed Sticks, Bruce Ave - Drainage Ditch removed rocks from road used backhoe.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017246-040113	Patsy Dixon	City Wide	Removed 1 cubic yards from the following: 130 Sadler Ave - Curb Inlet-Trash and Sticks, 506 Compton Rd - Curb Inlet-Sticks, 1214 Oakwood Dr-Curb Inlet-Leaves and Trash.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017247-040113	Patsy Dixon	City Wide	Removed 1 Cubic yards from the following: 1113 Oakwood Dr - Catch Basin Top - Leaves, 700 Greenleaf Ln - Curb Inlet-Trash, 1314 Caterbury Ln - Curb Inlet - Pineneedles, 1208 River Oaks Dr - Curb Inlet - Asphalt Chunks, 212 Breezy Hill Dr - Curb Inlet - Trash and a Cardboard box.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017248-040113	Patsy Dixon	City Wide	Removed 1 cubic yards from the following Grate Top Basins: Behind 206, 208 and 212 Biltmore Dr - Leaves and Sticks, 2900 Cedar Ln - A cardboard box, Sherwood Dr at 7-11 - Pineneedles and Pine cones, 927 Lakeview Ave - Car Parts and Trash.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017250-040113	Patsy Dixon	103 Royal Oak Ave.	Removed leaves and trash from Curb Inlet	Completed		

## 1500 - Clean Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman	
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017251-040113	Patsy Dixon	319 Jefferson Ave.	Removed 1/4 cubic yards of Leaves and trash from a Curb Inlet	Completed			
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017252-040113	Patsy Dixon	319 Jefferson Ave.	Removed 1/4 cubic yard of Leaves from a Curb Inlet	Completed			
4/30/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017517-043013	Patsy Dixon	Boulevard	Cleaned grate and drainage ditch behind Big Lots	Completed			
5/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal - Mayor	W017558-050113	Patsy Dixon	City Wide	Cleaned the following basins: 313 Dick Ewell Ave - Grate Top removed trash and car parts, 206 Lee Ave - Curb Inlet removed Trash, 1013 Kensington Ave - Curb Inlet removed Sticks, 1012 Floral Ave - Grate Top removed Leaves and trash. Collected 1 cubic yards of debris.	Completed			
5/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017561-050113	Patsy Dixon	City Wide	319 Bristol Ave- Catch Basin removed trash and stricks, 129 Washington Ave - Curb Inlet removed broken Cinderblocks, 607 Pinehurst Ave - Curb Inlet removed Pineneedles, 315 Maple Ave - Curb Inlet removed Trash, 220 Piedmont Ave - Curb Inlet removed Asphalt chunks, 208 Crescent Ave - Curb Inlet removed Leaves and Sticks. Collected 2 cubic yards of debris	Completed			
4/30/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017509-043013	Patsy Dixon	South Ave.	Cleaned 2-curb inlets at Duck pond flushed and vacuumed silt and roucks out of a 15" concrete pipe removed 2 cubic yards of debris	Completed			

## 1501 - Repair Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
8/1/2012	Storm Drain Clogged	Internal-Employee	W015075-080112	Patsy Dixon	Boulevard @ Shuford Ave	Repaired holes in walls with 1/2 bag cement. Catch Basin Grate Top	Completed		
3/5/2013	Sinkhole	Phone	W017054-030513	Patsy Dixon	312 Greenmeadow Ct.	On 3/5/13 Reset a 4" pvc pipe taht came apart from drain tile pipe causing sinkhole around catch basin grate top On 3/27/13 used 1/2 bucket hydraulic cement to patch a large hole in basin wall caused dirt to wash away. Yard is still too wet to fill in hole, Cone and tape area around basin will have to wheel barre material across yard at a later date. On 4/3/13 Placed 1.5 tons 57 tons of stone to fill hole and low area, packed stone, topsoil area, had to wheel barrel materias to back of property.	Completed		
5/7/2013	Sinkhole	Phone	W017653-050713	Patsy Dixon	3261 Longhorn Drive	On 5/23/13 Dug out in front of basin mouth where old concrete had settled and broke causing large hole, 1/2 ton dirt removed by shovel and wheel barrel. hauled to shop in loader bucket. Started ot form up for new concrete when it started to rain. On 5/29/13 Set forms for concrete and placed 1/4 tons crush and run around basin and formed. On 5/30/13 mixed 10 bags of 80lbs of ready mixed concrete, cut wire to put in concrete and poured concrete and smoothed out. On 5/31/13 stripped forms and backfilled.	Completed		
10/3/2012	Drainage (Misc.)	Internal-Employee	W015760-100312	Patsy Dixon	114 Chesterfield Ave.	Repaired a grate top basin poured new concrete floor used a 1/2 bag of concrete.	Completed		
10/3/2012	Drainage (Misc.)	Internal-Employee	W015761-100312	Patsy Dixon	218 Piedmont Ave.	On 9/24/12 Curb Inlet and gutter repaired, used jackhammer, broke up gutter and curb that was sinking in front of inlet, placed 1.4 ton #57 stone back in hole where it has washed out and coned off area. On 9/25/12 Poured 8' of C&G at Inlet, used 2 bags of 94lb cement on 9/26/12 backfilled with topsoil behind curb.	Completed		
8/9/2012	Drainage (Misc.)	Internal-Employee	W015174-080912	Patsy Dixon	Conduit Rd	At Center Ave repaired walls of a Curb Inlet with a 1/2 bag of cement filled holes and cracks.	Completed		
8/2/2012	Drainage (Misc.)	Internal-Employee	W015083-080212	Patsy Dixon	A Ave @ Boulevard	On 7/10/12 Investigated area found that this area asphalt in front of basin needs replacing so water can flow into basin. Will call MU to locate utilites. On 7/17/12 Removed old asphalt and removed 12 tons of debris, grass, silt, dirt and asphalt, packed area down with roller and cone area off for the night. On 7/18/12 Placed 16 tons of asphalt, used roller and plate tamper to pack asphalt, cone area off for the night. On 7/19/12 Placed 5 more tons of asphalt, used roller and plate tamper to pack asphalt and cone area off. On 7/20/12 removed all cones.	Completed		AJ
4/3/2013	Drainage (Misc.)	Internal-Employee	W017298-040313	Patsy Dixon	601 Pinehurst Ave.	Repaired Curb Inlet, Holes in wall, Mixed 1 bag of cement in bucket filled holes and cracks in wall.	Completed		
4/3/2013	Drainage (Misc.)	Internal-Employee	W017299-040313	Patsy Dixon	406 Roslyn Ave.	Repaired Curb Inlet - washed out floor mixed 2 bags of cement in wheel barrel and replaced floor.	Completed		
4/30/2013	Drainage (Misc.)	Internal-Employee	W017512-043013	Patsy Dixon	228 Washington Ave.	Jack hammered concrete out of way to get to hole in basin wall, mixed 2-bags of cement, filled hole to sturdy basin top, placed 1/4 ton 57 stone in hole, packed, placed dirt on top of stone and sowed grass seed.	Completed		
9/19/2012	Drainage (Misc.)	Phone	W015567-091912	Mike West	194 Charlotte Avenue	Placed new bricks and cement in box to keep lid from falling into box. 8-bricks and 1/2 94lb bag of cement	Completed		AJ

## 1501 - Repair Catch Basin

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/1/2013	Concrete Miscellaneous	Internal-Employee	W017253-040113	Patsy Dixon	South Ave.	Near Lake repaired a Curb Inlet, used 1-94lb bag of Concrete, mixed in barrel, patched walls and floor, filled hole outside of box with stone, dirt and backfilled back of box with grass	Completed		

## 1502 - Clean Storm Sewer

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
8/2/2012	Storm Drain Clogged	Walk-In	W015081-080212	Patsy Dixon	Covington Rd.	Used backhoe to remove concrete lid, used shovels to remove grass clippings, rocks, silt and dirt. removed 1/4 cubic yards of debris.	Completed		
9/19/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015568-091912	Mike West	804 W. Roslyn Road	Flushed 250' of 15" concrete pipe into wood line, collected 2 cubic yards of silt, trash and removed a basketball, used 2000 gallons of water.	Completed		AJ

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/3/2012	Street Flooding	Phone	W015711-100312	Patsy Dixon	704 Brookedge Dr.	Used shovels and backhoe to open drainage ditch so water will flow - After hours Overtime	Completed		
4/22/2013	Storm Drain Clogged	Phone	W017413-042213	Patsy Dixon	555 Fairfax Ave.	On 4/10/13 See REF# W015353 for additional information On 5/2/13 Used chainsaw, pitch fork and shovels to clean ditch spillway, loaded branches and trash onto dumptruck and haul to recycling center.	Completed		
6/26/2013	Storm Drain Clogged	Phone	W018143-062613	Patsy Dixon	512 Waterfront Dr.	On 7/18/13 started weedeating half of the ditch On 7/19/13 finished weedeating and trimming the rest of the ditch.	Completed		
1/18/2013	Storm Drain Clogged	Phone	W016691-011813	Patsy Dixon	Wright Ave.	Used rakes to pull leaves out of ditch water went down	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/22/2013	Storm Drain Clogged	Phone	W017412-042213	Patsy Dixon	1214 Boulevard	On 4/19/13 Used weedeater and rakes to clear spillway, cut grass and raked up 1/2 cubic yards of debris On 4/22/13 Looked inside 12" plastic pipe, inlets and pipes in area are clean too much rain fell in a short period of time. On 4/25/13 Spoke to RL Dunn explained to him pipes are clear in are when it rains hard water just drains slow because of al the water draining in Charlotte Ave, Blvd and his property all drains to 1 basin a 12" pipe, informed him to call the Engineering Division "Scott Thornton". On 4/30/13 meet with Mr. Dunn and Scott discuss drainage what can be done.	Completed		
7/10/2012	Storm Drain Clogged	Phone	W014743-071012	Patsy Dixon	1214 Boulevard	Chopped grass and dirt out of spillway so water cold flow usd street sweeper to pick up grass and dirt. Removed 2 cubic yards of debris	Completed		
6/4/2013	Storm Drain Clogged	Phone	W017922-060413	Patsy Dixon	3216 Glenview Ave.	On 6/5/13 Used rakes, pitchforks to cleaned ditch line from 3210 to 3216 removed 3 cubic yards of pine needles. On 7/3/13 Mike, Scott and AJ spoke to resident they decided to put stone in holes ditch and pack with stone tamper, dig only high spots out of ditch, placed asphalt at in and out flow of pipe 2-3' out from pipe to keep water from washing under pipe. On 8/7/13 Utilities assistance used mini excavator to clean upper and lower end of ditch in front of house.	Completed		
6/26/2013	Vegetation Control (Public Property)	Internal-Employee	W018167-062613	Patsy Dixon	Biltmore Dr.	Removed dead dogwood trees from drainage ditch	Completed		
1/23/2013	Drainage Ditch need cleaning	Phone	W016707-012313	Alan Thornton	405 Gould Ave		Initiated		
3/13/2013	Drainage Ditch need cleaning	Phone	W017083-031313	Patsy Dixon	1113 W. Roslyn Rd.	On 3/14/13 Raked leaves, trash and gum balls from trees out of ditch, weedeated ditch, shoveled high spots in ditch, shoveled out the ends of the 15" concrete pipe and used street sweeper to vacuum up debris from ditch removed 3 cubic yards of debris. On 8/7 and 8/8/13 cleaned ditch on right side of house used mini excavator Utilities division assistance. Trees are ok. Also, filled in ruts with 1/2 yd topsoil and seeded area.	Completed		
10/5/2012	Drainage Ditch need cleaning	Phone	W015809-100512	Patsy Dixon	406 MacArthur Ave.	On 10/11/12 Investigated area with Scot, he Suggested to clean trash and leave bricks. He will talk to Chuck about this. There are wires and pipes exposed in the ditch. Will have to wheel barrel rip rap where the bank is washing away. On 10/12/12 removed 6-trash bags of trash, 2 tires, roll of carpet and pipes. On 11/6/12 started placing 4 tons of rip rap stone on washed out bank, placed stone in backhoe bucket then wheel barrel rip rap from street to ditch.	Completed		
5/24/2013	Drainage Ditch need cleaning	Phone	W017852-052413	Alan Thornton	116 Seaton Dr	On 5/28/13 took pictures of area for Mike. Dead tree removed by Britt's Tree Service 6/12/13. On 6/12/13 Used pitchforks, strap and chainsaw to clear fallen tree branches in drainage ditch removed 1 load and hauled away.	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
6/14/2013	Drainage Ditch	Walk-In	W018050-061413	Alan Thornton	115 Seaton Dr.	Used backhoe to pull 2 samall tree stumps blocking channel causing water to flow in residents back yard when it rains heavy, water now flows. Resident at the above address and at 116 would like brush cut back along channel when we can.	Completed		
7/1/2012	Drainage Ditch	Web	W014680-070112		309 wright ave	Used backhoe to clean out spillway leading to main ditch on both sides of dead end of street. removed grass, leaves and dirt 10 cubic yards of debris.	Completed		
2/1/2013	Drainage Ditch	Internal-need cleaning	Employee W016769-020113	Mike West	Lakeview & Vance	raked, weedeated, vacuumed ditch from Vance to Woodlawn Aves, removed 4 cubic yards of debris, leaves, trash and dead grass clipping. used leaf machine to vacuum out ditch and pick up debris, no more standing water at intersection and ditch is open to allow water to flow.	Completed		
2/1/2013	Drainage Ditch	Phone	W016774-020113	Mike West	403, 409, & 411 Lakeview Ave	Raked, weedeated and vacuumed ditch from Vance to Woodlawn Aves. Removed 4 cubic yards of leas, trash and dead grass clipping, ditch does not need to be lowered, water flows now.	Completed		AJ
8/30/2012	Drainage Ditch	Internal-need cleaning	Employee W015353-083012	Patsy Dixon	555 Fairfax Ave.	On 9/4/12 looked at ditch very grown up, ditch has never been cleaned by the City, spoke to Mike, will go to engineering and look at map to find out if this is City or not. On 9/19/12 Scott Thorton looked at map it is City's ditch 16' wide. Will be cleaned out all trees will be cut and brush down this fall. On 2/15/13 Cut small trees out of bottom on bank of ditch chipped trees with chipper, removed 4 cubic yards of debris. still need to cut all brush and small trees down first to be able to clean debris that is thrown into ditch. On 4/8/13 Finished cutting brush and small trees out of ditch, used backhoe to pull brush, trees, 10 pallets, thrown brush in ditch, trash, leaves, piled on bank to let water drain out of debris to be hauled away. On 4/9/13 Used backhoe to bite up brush and trash remed 4-loads 16 cubic yards of debris. On 4/10/13 placed 2 tons of topsoil down in area where backhoe messed up grass and ground used shovels and rakes to spread dirt, sowed seed and straw.	Completed		
7/26/2012	Drainage Ditch	Phone	W014955-072612	Patsy Dixon	400 Marvin Ave.	Slopemower cut grass in drainage ditch	Completed		
6/5/2013	Drainage Ditch	Internal-need cleaning	Employee W017983-060513	Patsy Dixon	Lakeview Ave.	Between Woodlawn and Vance Aves used weedeaters to cut grass down to dirt and picked up 1/2 bage of trash out of ditch.	Completed		
6/5/2013	Drainage Ditch	Internal-need cleaning	Employee W017969-060513	Patsy Dixon	Lakeview Ave.	Cleaned drainage ditch with bush hog	Completed		
10/26/2012	Drainage Ditch	Phone	W015966-102612	Patsy Dixon	555 Roslyn Ave.	On 10/26/12 She was informed that the crew may not have time to do this today. On 11/1/12 removed 2 cubic yards of debris, grass and dirt from ditch. Used loader, dump truck, shovels to scaped debris from ditch.	Completed		
3/4/2013	Drainage Ditch	Internal-need cleaning	Employee W017017-030413	Patsy Dixon	1400 Covington Rd.	Behind the above address downed tree blocking outfall, used cahsaw to cut up and removed.	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
3/4/2013	Drainage Ditch need cleaning	Internal- Employee	W017014-030413	Patsy Dixon	Lakeview Ave @ Lakeside Dr.	Cleaned Ditch used rakes and leaf machine to vacuum up pine needles removed 2 cubic yards of debris	Completed		
3/21/2013	Drainage Ditch need cleaning	Internal- Employee	W017142-032113	Patsy Dixon	Chesterfield Ave.	On 3/1/13 Started cutting back retainer pond loaded small trees on loader removed a flatbed load and cleaned sidewalks off. On 3/5/13 Finished cutting brush around pond and drainage ditch removed from site.	Completed		
3/21/2013	Drainage Ditch need cleaning	Internal- Employee	W017158-032113	Patsy Dixon	Boulevard	Cleaned drainage ditch behind Big Lots where someone placed a large pile of brush in the drainage ditch.	Completed		
5/2/2013	Drainage Ditch need cleaning	Internal- Employee	W017567-050213	Patsy Dixon	Charlotte Ave.	At the dead end Used backhoe to pull sticks, trash and leaves blocking water flow removed 4 cubic yards of debris	Completed		
2/28/2013	Drainage Ditch need cleaning	Internal- Employee	W016939-022813	Patsy Dixon	Boulevard	Cleaned drainage ditch from Oak Ave that runs behind Big lots on Boulevard	Completed		
2/28/2013	Drainage Ditch need cleaning	Internal- Employee	W016957-022813	Patsy Dixon	119 W. Highland Ct.	Removed 12' section of wall concrete blocks that had fallen into the drainage ditch blocking water flow. There is a 8' section of wall still standing but leaning toward drainage ditch.	Completed		
2/28/2013	Drainage Ditch need cleaning	Internal- Employee	W016966-022813	Patsy Dixon	Fairfax Ave.	Assisted Stormwater crew cleaning drainage ditch behind apartments cutting down trees and brush.	Completed		
3/4/2013	Drainage Ditch need cleaning	Internal- Employee	W017021-030413	Patsy Dixon	1201 Choptank Ct.	Removed brush and tree branches from outfall	Completed		
3/4/2013	Drainage Ditch need cleaning	Internal- Employee	W017022-030413	Patsy Dixon	1372 Whitehall Dr.	Behind the above address Removed brush and tree branches from outfall	Completed		
8/2/2012	Drainage Ditch need cleaning	Internal- Employee	W015086-080212	Patsy Dixon	City Wide	Dead End of Old Town Dr - Concrete ditch removed sticks, trash and bags, 309 Ridge Rd - removed silt and pallet, 518 Waterfront Dr - Sticks, grass clippings that has been piled up by homeowners.	Completed		
10/28/2012	Drainage Ditch need cleaning	Internal- Employee	W015989-102812	Patsy Dixon	1210 Hermitage Rd.	Cut grass low with weed eaters from 1210 Hermitage to Conduit Rd. placed mosquito bait in bottom of ditch. picked up trash, tree limbs and piles of grass clippings/	Completed		
8/2/2012	Drainage Ditch need cleaning	Internal- Employee	W015091-080212	Patsy Dixon	219 Kennon Pt.	large tree limb in ditch, cut with chainsaw and removed.	Completed		
10/3/2012	Drainage Ditch need cleaning	Internal- Employee	W015751-100312	Patsy Dixon	Chesterfield Ave.	Retention Pond removed mud and gravel from Spillway *New Courthouse.	Completed		
10/3/2012	Drainage Ditch need cleaning	Internal- Employee	W015754-100312	Patsy Dixon	Ivey Ave @ Riverview Rd.	Removed 2 cubic yards of silt, dirt, grass and gravel.	Completed		
10/3/2012	Drainage Ditch need cleaning	Internal- Employee	W015755-100312	Patsy Dixon	Charlotte Ave.	Weedeated ditch at Fairfax Ave.	Completed		
10/3/2012	Drainage Ditch need cleaning	Internal- Employee	W015756-100312	Patsy Dixon	1204 Boulevard	Weedeated ditch behind apartments	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/3/2012	Drainage Ditch need cleaning	Internal-Employee	W015732-100312	Patsy Dixon	Walnut Ave.	Cleaned and graded drainage ditch at the dead end.	Completed		
8/2/2012	Drainage Ditch need cleaning	Internal-Employee	W015084-080212	Patsy Dixon	Charlotte Ave.	Used backhoe to remove 12 cubic yards of debris, grass, trash, dirt and silt from the bottom ditch to allow water to flow	Completed		
9/12/2012	Drainage Ditch need cleaning	Internal-Employee	W015519-091212	Patsy Dixon	Newcastle Dr.	At the dead end cut up a fallen tree in spill way to creek blocking water flow. remove 3 loads limbs and brush	Completed		
8/13/2012	Drainage Ditch need cleaning	Internal-Employee	W015198-081312	Patsy Dixon	Charlotte Ave.	Used backhoe to scraped out silt, grass, trash and mud. Grass and weeds were about 4-5' tall in ditch. Removed 12 cubic yards of debris. Need to rent a small tractor with a bucket that is no more then 5' across in order to finish cleaning ditch.	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal-Employee	W015391-090412	Patsy Dixon	Wakefield Ave.	Cut 3 loads of brush from ditch and removed	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal-Employee	W015392-090412	Patsy Dixon	Roanoke Ave.	On 8/21/12 Removed 4 cubic yards of silt, grass and rocks. Weedeated ditch spillway at the dead end. On 8/22/12 removed 12 cubic yards of silt, dirt and rocks with backhoe at the dead end.	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal-Employee	W015394-090412	Patsy Dixon	Bruce Ave.	Removed 20 cubic yards of grass, trash, dirt and rocks from ditch with backhoe.	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal-Employee	W015396-090412	Patsy Dixon	City Wide	Cut and sprayed drainage ditches at the following locations dead end: W. Westover Ave, Roanoke Ave, Wright Ave, Plumtree Ave, Maple Ln, Bruce Ave, Charlotte Ave used 25 gallons of round-up.	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal - Mayor	W015397-090412	Patsy Dixon	Dupuy Ave.	Sprayed ditch from Dupuy to Charlotte Aves.	Completed		
8/23/2012	Drainage Ditch need cleaning	Internal-Employee	W015323-082312	Patsy Dixon	1204 Hermitage Rd	Cleaned cut limbs from ditch that someone had threw into ditch	Completed		
1/29/2013	Drainage Ditch need cleaning	Phone	W016729-012913	Patsy Dixon	424 Fairfax Ave	Utilities investigated found to be a Stormwater issue will contact Stormwater Foreman. On 2/6/13 Used loader to clean ditch, dragged dirt and tree roots out ditch, scooped up dirt in bucket and dumped in holes on old railroad bed.	Completed		
12/3/2012	Drainage Ditch need cleaning	Internal-Employee	W016305-120312	Patsy Dixon	Piedmont Ave.	Cleaned drainage ditch of brush and small tree to county line	Completed		
4/17/2013	Drainage Ditch need cleaning	Phone	W017386-041713	Patsy Dixon	322 Ivey Ave	Used loader to drag out grass and silt from ditch, bit up debris and hauled away on dump truck, removed 3 cubic yards of debris.	Completed		
1/10/2013	Drainage Ditch need cleaning	Internal-Employee	W016632-011013	Patsy Dixon	Boulevard	Cleaned drainage ditch from Oak Ave to Behind Big Lots Store.	Completed		
11/6/2012	Drainage Ditch need cleaning	Internal-Employee	W016091-110612	Patsy Dixon	319 Ridge Rd.	Cleaned ditch of branches, leaves and sand removed 4 cubic yards of debris.	Completed		
11/28/2012	Drainage Ditch need cleaning	Internal-Employee	W016231-112812	Patsy Dixon	501 Lake Ave.	Cleaned trash, branches and cut grass out of ditch.	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
11/28/2012	Drainage Ditch need cleaning	Internal-Employee	W016233-112812	Patsy Dixon	Piedmont Ave.	Cut and removed 1-flatbed load of brush from ditch at City limits	Completed		
1/4/2013	Drainage Ditch need cleaning	Internal-Employee	W016576-010413	Patsy Dixon	Charlotte Ave.	Dead End A small tree had fallen into ditch, cut and removed tree.	Completed		
1/4/2013	Drainage Ditch need cleaning	Internal-Employee	W016577-010413	Patsy Dixon	518 Waterfront Dr.	Picked up 1 bag of trash, cut back brush and small trees growing in ditch.	Completed		
1/4/2013	Drainage Ditch need cleaning	Internal-Employee	W016578-010413	Patsy Dixon	705 - 714 Compton Rd.	Behind the above addresses cut back brush and vines overhanging inot concrete fitch removed to loads of debris	Completed		
1/4/2013	Drainage Ditch need cleaning	Internal-Employee	W016579-010413	Patsy Dixon	200 Lenoir Ave.	On 12/18/12 started cutting brush with bush hog, cleaned out and around head wall to storm sewer pipe. On 12/19/12 finished cleaning ditch removed 2 bags of trash, opened ditch with backhoe, finished cutting brush and vines.	Completed		
1/4/2013	Drainage Ditch need cleaning	Internal-Employee	W016580-010413	Patsy Dixon	421 Crescent Ave.	Fleets Branch Creek, cut brush, grass and trees. Scraped up leaves, dirt and gravel into loader, removed 6 cubic yards of debris.	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Phone	W016652-011113	Patsy Dixon	E. Westover Floral Aves.	@ Downed tree in front of a 36" pipe at the edge of the woods, used backhoe to remove tree.	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016648-011113	Patsy Dixon	Temple Ave @ Conduit Rd.	Used backhoe to clean in front of pipe removed 2 cubic yards of Leaves and Silt.	Completed		
9/12/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015516-091212	Patsy Dixon	114 Chesterfield Ave.	On 9/5/12 Cut and removed vines and root from spillway On 9/6/12 used backhoe and cleaned out trash and silt so water can drain out of pipe, remaoved 6 cubic yards of debris.	Completed		
9/12/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015517-091212	Patsy Dixon	Chesterfield Ave.	On 9/5/12 Started cleaning retention pond basin, removed 4 cubic yards of silt, grass, dirt and rocks. On 9/6/12 finished cleaning with backhoe, shoves and rakes removed 10 cubic yards of silt, dirt, grass and rocks.	Completed		

## 1503 - Clean Drainage Ditch

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
9/12/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015518-091212	Patsy Dixon	170 Carroll Ave.	Across from the above address removed a small tree that had fallen on the edge of the street.removed 1 flat bed load.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017238-040113	Patsy Dixon	Temple Ave @ Conduit Rd.	Cleaned 2-96" culverts removed trash, brush and 4 tires.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017256-040113	Patsy Dixon	Charlotte Ave.	At the dead end removed a small tree out of tree blocking water flow.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017249-040113	Patsy Dixon	148 Briarcliffe Ct.	Outfall 15" concrete pipe blocked by a dead tree. Used chainsaw to cut and removed tree water flows freely.	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
1/14/2013	Storm Drain Clogged	Phone	W016655-011413	Patsy Dixon	302 Hamilton Ave.	Used hoe and pitch fork to pull leaves and trash from in front of pipe in box water went down	Completed		
1/17/2013	Storm Drain Clogged	Phone	W016685-011713	Patsy Dixon	529 Roslyn Ave.	Used flusher to flush 12" pipe stopped up with leaves removed 1 cubic yards	Completed		
10/28/2012	Storm Drain Clogged	Internal-Employee	W015995-102812	Patsy Dixon	Newcastle @ Keith Drs.	Flushed box and pipe removed trash and a basketball used 500 gallons of water.	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/1/2013	Storm Drain Clogged	Internal-Employee	W017556-050113	Patsy Dixon	501 Lake Ave.	On 4/16/13 In back of Complex Outfall Used backhoe and dumptruck to digh out 16 tonss of dirt, leaves, trash and grave, cut back fabric and flaced along edge of outfall, placed 6 tons of #3 stone back around edge, cut grass and brush down around area. On 4/17/13 Use Utilities flusher vacuumed 1500 gallons of water out of outfall, pulled more trash and leaves out of 30" corrugated pipe, cleaned up around back of yard, pulled branches and trash out of inflow of pipe and ditch, pushed trash dirt pipe up to keep contained from washing into ditch	Completed		
6/25/2013	Sinkhole	Phone	W018113-062513	Alan Thornton	927 Lakeview Ave	Utilities checked area it is a storm drain request printed for Stormwater foreman. Used flashing, cement, #5 stone and crushe and run to repair seperated 12" concrete pipe and 1-bage cold patch asphalt.	Completed		
2/7/2013	Drainage (Misc.)	Phone	W016822-020713	Patsy Dixon	424 Fairfax Ave	Used flusher to flush 3 driveway pipes, 12" plastic ribbed on inside, vacuumed up mud, roucks and roots removed 2 cubic yards of debris used 500 gallons	Completed		
9/12/2012	Drainage (Misc.)	Internal-Employee	W015535-091212	Patsy Dixon	Bruce Ave.	Graded stone area on Bruce Ave with motorgrader, located and uncloged drainage pipe that crosses the street.	Completed		
9/12/2012	Drainage (Misc.)	Internal-Employee	W015536-091212	Patsy Dixon	Lakeview Ave.	Located and cleaned the end of pipe and ditch with back hoe near railroad off Lakeview Ave.	Completed		
6/5/2013	Drainage Ditch need cleaning	Internal-Employee	W017978-060513	Patsy Dixon	Bruce Ave.	Unstopped an 8" metal pipe removed gravel from road #3 and #5 stone	Completed		
3/4/2013	Drainage Ditch need cleaning	Internal-Employee	W017013-030413	Patsy Dixon	319 Ridge Rd.	Cleaned concrete ditch and pipes removed silt, leaves, sticks, trash and a blue plastic barrel, removed 2 cubic yards of debris.	Completed		
3/4/2013	Drainage Ditch need cleaning	Internal-Employee	W017020-030413	Patsy Dixon	A Ave @ Boulevard	Cleaned a 12" concrete pipe removed trash and leaves from pipe and ditch, cut tree roots growing inside pipe removed 1/2 cubic yards of debris	Completed		
3/4/2013	Drainage Ditch need cleaning	Internal-Employee	W017010-030413	Patsy Dixon	Pondola Ln.	At City Limits Removed 1 cubic yards of Leaves, Dirt and gravel from a 12" concrete pipe used 1000 gallons of water.	Completed		
10/28/2012	Drainage Ditch need cleaning	Internal-Employee	W015994-102812	Patsy Dixon	Branders Bridge Rd.	Removed 4 pallets, 2 large tree limbs and 2 sheets of plywood from the front of the Culvert pipes. Using a large gang hook and ropes.	Completed		
10/3/2012	Drainage Ditch need cleaning	Internal-Employee	W015758-100312	Patsy Dixon	319 Ridge Rd.	Across from above address a tree fell blocking water cut up tree and cleared spillway.	Completed		
8/2/2012	Drainage Ditch need cleaning	Internal-Employee	W015082-080212	Patsy Dixon	D Ave @ Boulevard	Across from the address above cleaned drainage ditch, removed grass and dirt from a 15" concrete pipe so water could drain better off the Boulevard. Removed 3 cubic yards of debris	Completed		
8/9/2012	Drainage Ditch need cleaning	Internal-Employee	W015181-080912	Patsy Dixon	101 Seaton Dr.	Cleaned draiange ditch and culvert pipe, 2-36" concrete pipe, removed 8 cubic yards of debris, dirt, grass, silt and a large logs from front of pipe that was causing water to back up and flow slowing	Completed		
9/4/2012	Drainage Ditch need cleaning	Internal-Employee	W015398-090412	Patsy Dixon	Conduit Rd @ Temple Ave.	Cut up a down tree blocking water flow and removed	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016643-011113	Patsy Dixon	1201 Choptank Ct.	Cut brush and vines from around pipe and ditch. Removed 1 flat bed of debris	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016644-011113	Patsy Dixon	412 Whippoorwill Ct.	Cut up a large tree fallen down, cut back brush and vines in front of outfall pipe.	Completed		
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015762-100312	Patsy Dixon	Pickwick Ave.	Flushed and vacuumed a 6" pipe from a grate top basin in ALLEY collected 1/2 cubic yards silt and gravel used 1500 gallons of wter	Completed		
11/6/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016086-110612	Patsy Dixon	Conduit Rd @ Temple Ave.	Cleaned culverts removed sticks used hook and rope	Completed		
1/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016583-010413	Patsy Dixon	1402 Covington Rd.	On 12/28/12 started cleaning outfall, cut up a fallen tree branches blocking outfall.	Completed		
12/21/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016478-122112	Patsy Dixon	122 Pinecliffe Dr.	Cut brush and limbs leading to outfall, outfall is clear no obstructions 24" concrete pipe	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016650-011113	Patsy Dixon	Conduit Rd @ Clifton Dr.	Manhole clean out. Used backhoe fork and shovels to pick trash and a kick ball from a 15" pipe	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016651-011113	Patsy Dixon	143 Briarcliff Ct.	Behind the above address, Hourda Pump Station, cut small tree, brush, dug out silt and dirt to make outfall more accessible	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016646-011113	Patsy Dixon	5019 Conduit Rd.	Cut brush and vines from around headwall and outfall pipe	Completed		
1/11/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016647-011113	Patsy Dixon	1107 Peace Cliff Ct.	Cut branches from around headwall and outfall pipe, Headwall and pipe have seperated and is sliding down the ditch.	Completed		
9/4/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015389-090412	Patsy Dixon	501 Lake Ave.	Removed 16 cubic yards of debris from spillway, sand, dirt and grass with backhoe	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015171-080912	Patsy Dixon	Charlotte Ave.	Dead end cleaned a 24" concrete pipe removed sticks, leaves, trash and car parts 1-cubic yard of debris.	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015172-080912	Patsy Dixon	W. Westover Ave.	Dead End cleaned a 24" Concrete Pipe, removing sticks, leaves, dirt and trash removed 3 cubic yards of debrs.	Completed		
8/9/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015177-080912	Patsy Dixon	City Wide	Cleaned ends of pipe at the following locations: Dead end Windmere Dr - removed trash, stick and grass, Dead end Taylor Ln - removed leaves and sticks, Behind 269 Kennon Pt - removed grass and leaves, Across from 228 Washington Ave - removed tree limbs.	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015757-100312	Patsy Dixon	120 Charlotte Ave.	Flushed 12" pipe that was struck by asphalt crew this pipe needs to be replaced.	Completed		
10/3/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015753-100312	Patsy Dixon	1111 W. Roslyn Rd	Used shovels and removed rocks, dirt and grass collected 3 cubic yards of debris.	Completed		
8/2/2012	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W015092-080212	Patsy Dixon	Bradsher Ave.	Tree fell in outfall, cut up tree, chip up branches and loga with chipper. Removed 4 cubic yards of wood chips.	Completed		
2/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W016766-020113	Patsy Dixon	Lakeview Ave	Used flusher to break thru leaves and trash, a small cooler was jammed inside pipe, broke thru with nozzle head water went down	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017012-030413	Patsy Dixon	City Wide	Cleaned the following: End of pipes at the Old Railroad Bed, Maple Ln Removed Sticks and Leaves, Plumtree Ave removed sticks, Pineneedles and trash, Wright Ave removed sticks and Leaves, Roanoke Ave reomoved Sticks, Asphalt chucks, leaves and trash, W. Westover Ave removed trash, Charlotte Ave removed Sticks and Trash. Remove 3 cubic yards of debris	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017237-040113	Patsy Dixon	Temple Ave @ I-95	Cleaned Northbound ramp 24" concrete pipe removed trash and sticks.	Completed		
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017239-040113	Patsy Dixon	281 Kennon Pt.	Cleaned a 36" concrete pipe removed brush and trash.	Completed		

## 1504 - Clean Drainage Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017240-040113	Patsy Dixon	Royal Oak Ave @ Appomattox River	Cleaned 2-36 Concrete Pipes removed 1/2 cubic yards of brush	Completed		
5/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017557-050113	Patsy Dixon	City Wide	Cleaned the following concrete outfalls: Behind 115 Seaton Dr - 18" pipe removed brush and leaves, Behind 114 Tudor Rd - 15" pipe removed leaves, Behind 102 Camelot Ct - 18" pipe removed Brush and leaves.	Completed		

## 1505 - Repair Storm Sewer

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/3/2013	Sinkhole	Internal-Employee	W017642-050313	Patsy Dixon	321 Lafayette Ave.	On 5/3/13 Placed 1-sand bag in hole, 3-traffic cones and caution tape around basin will fix problem on Monday. On 5/6/13 used 2-94lbs bags of cement to patch wall on outside of basin, used 1/4 ton crush and run stone, tamped stone, used 3-5 gallon bucket of topsoil and sowed grass seed.	Completed		

## 1506 - Repair Drop Inlet

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
8/2/2012	Sinkhole	Internal-Employee	W015087-080212	Patsy Dixon	100 Red Fox Rd.	On 7/20/12 Sinkhole in road investigated area found floor of Curb Inlet has crumbled and washed away causing sinkhole, placed 3 barrels, 2 cones and caution tape in area and put 1 ton of #5 stone in hole temporary On 7/23/12 Used pipe saw to cut a small area around sinkhole in street, removed asphalt and placed 3 tons of crush and run stone in hole. On 7/26/12 picked up supplies from Lowes, 10-50lbs bags faast setting concrete for new floor in box. On 7/27/12 mixed concrete and poured new floor used 10 50lb bags of concrete, Used 4-5 gal buckets of hydraulic cement on top of concrete becasuse of eater running threw pipes while pouring floor concrete set up within a minute.	Completed		

## 1506 - Repair Drop Inlet

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
1/11/2013	Drainage (Misc.)	Internal-Employee	W016649-011113	Patsy Dixon	D Ave @ Boulevard	On 1/7/13 Curb Inlet and C&G repair beside box, saw cut asphalt and jagged concrete broken by cars running on top of curb and box. Formed Concrete, coned and taped area for the night. On 1/8/13 mixed 1 cubic yards of concrete, poured 4' of C&G to Curb inlet, poured 3'x3' pad beside of inlet to protect inlet from cars and trucks, put screen wire in pad. used 1.5 bags of concrete. On 1/9/13 removed forms, backfilled with dirt and 1-bag of cold patch asphalt and removed 1 cubic yards of asphalt, silt, trash and dirt.	Completed		
3/4/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017009-030413	Patsy Dixon	302 Hamilton Ave.	Flushed and vacuumed curb inlet removed 1/2 cubic yards of leaves, trash and gravel used 500 gallons of water.	Completed		

## 1507 - Clean Curb and Gutters

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/12/2013	Street Flooding	Internal-Employee	W017364-041213	Patsy Dixon	313 Roanoke Ave.	Used street sweeper and swept up clay and gravel out of gutters, which came from 309, 311 and 313 Roanoke Ave. Driveways removed 2 cubic yards of debris	Completed		
7/12/2012	Vegetation Control (Public Property)	Phone	W014777-071212	Patsy Dixon	320 Jackson Ave.	Cut grass and limbs on tree, cleaned gutters and sprayed from street to fence line.	Completed		
12/10/2012	Vegetation Control (Public Property)	Web	W016391-121012		212 richmond ave	Used weedeater, shovels, blower and street sweeper removed 2 cubic yards of debris the gutter is not dirt concrete removed.	Completed		
8/9/2012	Street Sweeping	Phone	W015180-080912	Patsy Dixon	900 East Ellerslie Ave.	Used sweeper to vacuum up sand, rocks, dirt from gutters removed 4 cubic yards.	Completed		
8/30/2012	Street Sweeping	Web	W015357-083012		146 Charlotte Ave.	Used sweeper to clean gutters of dirt and trash.	Completed		
10/9/2012	Drainage (Misc.)	Phone	W015815-100912	Patsy Dixon	323 Yorktown Dr.	On 10/10/12 Used loader and dump truck unit 244, scraped grass, silt and dirt out of gutters and spillway leading to main ditch. Removed 3 tons of debris, trees are on private property owned by Swearinger. On 10/18/12 cut large limb out tree on City Property removed 1 load.	Completed		

## 1507 - Clean Curb and Gutters

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/9/2012	Drainage (Misc.)	Phone	W015816-100912	Patsy Dixon	802 Conduit Rd.	Used shovels to remove 57 stone that was washed out out resident yard, placed stone back in front yard. Mike took pictures, Scott investigated site and said that the property ownder did not have permit for type work begin done. He will contact owner.	Completed		
5/24/2013	Curb and Gutter Cleaning	Internal-Employee	W017834-052413	Patsy Dixon	Conduit Rd.	Shoved grass and dirt out of gutters and sweeper swept it up	Completed		
6/6/2013	Curb and Gutter Cleaning	Phone	W018003-060613	Patsy Dixon	900 East Ellerslie Ave.	Swept gutters	Completed		Linwood
5/21/2013	Curb and Gutter Cleaning	Internal-Employee	W017806-052113	Patsy Dixon	Conduit Rd.	Chopped grass in gutters on both sides of street and sweeper removed 4 cubic yards of debris from E. Ellerslie Ave to School Ave.	Completed		
5/21/2013	Curb and Gutter Cleaning	Internal-Employee	W017807-052113	Patsy Dixon	1101 Covington Rd.	Shoveled out dirt, Silt and grass out driveway wedge to allow water to flow to inlet removed 1 cubic yards of debris.	Completed		
3/4/2013	Curb and Gutter Cleaning	Internal-Employee	W017023-030413	Patsy Dixon	Whitesand Ct.	At the deadend cleaned c&g used weedeater to cut grass overhangin curb, shoveled up dirt, silt, grass, trash and leaves removed 3 cubic yards of debris	Completed		
5/2/2013	Curb and Gutter Cleaning	Internal-Employee	W017569-050213	Patsy Dixon	1117 Yacht Basin Dr.	Cleaned gutters of leaves from 1109 to 1117 removed 4 cubic yards of debris	Completed		
3/22/2013	Curb and Gutter Cleaning	Internal-Employee	W017184-032213	Patsy Dixon	125 Stratford Dr.	Cleaned C&G to help with problem with car door hitting C&G until asphalt crew can place asphalt there.	Completed		
9/12/2012	Curb and Gutter Cleaning	Internal-Employee	W015515-091212	Patsy Dixon	114 Moore Ave.	Removed a large limb from gutter	Completed		
12/3/2012	Curb and Gutter Cleaning	Internal-Employee	W016304-120312	Patsy Dixon	Danville Ave @ Lee Pl.	Cleaned gutters full of leaves.	Completed		
7/9/2012	Curb and Gutter Cleaning	Web	W014732-070912		re: 704 Hamilton	Cut grass, soil, removed from gutters and sprayed.	Completed		
8/31/2012	Curb and Gutter Cleaning	Internal-Employee	W015376-083112	Patsy Dixon	1111 W. Roslyn Rd.	Used shovels and removed rocks, dirt and grass from C&G collected 3 cubic yards.	Completed		

## 1507 - Clean Curb and Gutters

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/14/2013	Curb and Gutter Cleaning	Phone	W017692-051413	Patsy Dixon	120 Stratford Dr.	Took plastic screen out of pipe at end of driveway at 122 Stratford Dr. that was causing water not to flow. Chopped grass out of gutters from 122-124 with shovels, Brandon used sweeper to clean from 120 Stratford to windmere Dr. collected 2 cubic yard of debris of grass, dirt and pine needles.	Completed		
8/11/2012	Curb and Gutter Cleaning	Web	W015192-081112		221 piedmont ave	Homeowner blew grass into gutters, used sweeper to clean gutters.	Completed		
9/24/2012	Curb and Gutter Cleaning	Internal - City Manager	W015581-092412	Alan Thornton	3100 Holly Ave	Used loader, dump truck unit 243, sweeper, shovels and rakes to remove 4 cubic yards of debris, grass, silt, dirt and trash from gutters and ditch	Completed		
5/9/2013	Curb and Gutter Cleaning	Phone	W017663-050913	Patsy Dixon	1009 Forestview Ave	Grounded down 6' gutter pan to improve drainage with Concrete saw	Completed		
6/6/2013	Curb and Gutter Cleaning	Phone	W018005-060613	Patsy Dixon	922 Yorkshire Rd.	Sweep street and cleaned gutters	Completed		Linwood
11/28/2012	Curb and Gutter Cleaning	Phone	W016241-112812	Alan Thornton	802 Conduit Rd.	Used weedeater, shovels, blower, leaf truck and machine to clean C&G removed grass, leaves and dirt.	Completed		
10/11/2012	Curb and Gutter Cleaning	Phone	W015837-101112	Patsy Dixon	1014 Flora Ave.	Removed debris and dirt from gutter to allow water to drain to box	Completed		

## 1508 - Clean Drop Inlets

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
7/26/2012	Street Flooding	Phone	W014957-072612	Patsy Dixon	121 Lakeside Dr.	Removed leaves and other debris from a inlet grate water went down - After hours Overtime	Completed		
7/23/2012	Storm Drain Clogged	Phone	W014852-072312	Patsy Dixon	1316 Canterbury Ln.	Used rakes, shovels and pitch forks to clean curb inlet grate top. Removed 1 cubic yards of debris of sticks, pine needles and a 2"x6"x4' wood board.	Completed		
5/21/2013	Curb and Gutter Cleaning	Internal-Employee	W017808-052113	Patsy Dixon	1102 Covington Rd.	Removed asphalt wedge that was holding water and debris from flowing into inlet. Shoveled out grass and silt.	Completed		

## 1509 - Drainage Miscellaneous

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
6/7/2013	Street Flooding	Phone	W018008-060713	Patsy Dixon	Pickwick Ave @ Boulevard	Investigated area street draining no standing water	Completed		
6/7/2013	Street Flooding	Phone	W018012-060713	Patsy Dixon	106 Stratford Dr.	Removed Recycling Can from gutter water went down	Completed		
6/3/2013	Storm Drain Clogged	Phone	W017910-060313	Patsy Dixon	110 Dupuy Ave	This is on private property resident was notified	Completed		
6/12/2013	Storm Drain Clogged	Phone	W018038-061213	Patsy Dixon	405 MacArthur Avenue	SEE REF# W019123 for additional information this has been completed duplicate request.	Completed		
6/7/2013	Storm Drain Clogged	Phone	W018013-060713	Patsy Dixon	104 Verbov Ave.	On 6/7/13 I contacted Scott in Engineering and he is showing that there is a swell and a storm drain in back between 107 and 109 Laurens Ln that may be stopped up. But no burms are shown on the site plans On 6/10/13 checked map with Scott City does not have an easement behide properties 100-104, talked to resident showed map, resident was not pleased she stated that she would go to City Hall to talk to Chuck Henley.	Completed		
8/16/2012	Storm Drain Clogged	Phone	W015278-081612	Patsy Dixon	Charlotte Ave.	Checked all basins on Charlotte all clear. Too much rain fell in a short time basins could not handle.	Completed		
7/23/2012	Storm Drain Clogged	Web	W014856-072312		1312 Canterbury Lane	See REF # W014852 for additional information	Completed		
4/1/2013	Standing Water	Internal-Employee	W017255-040113	Patsy Dixon	E. Westover @ Fischer Aves.	Vacuumed up water at intersection per Mike	Completed		
3/26/2013	Standing Water	Walk-In	W017215-032613	Patsy Dixon	2105 WAKEFIELD AVE.	Private Property spoke to resident Not a City issue	Completed		
3/20/2013	Standing Water	Phone	W017134-032013	Patsy Dixon	116 E. Westover Ave.	Checked at City Hall this is Private Property No drainage Right-of-Way or City Drains called Wesll Realty and explained	Completed		
3/6/2013	Standing Water	Phone	W017056-030613	Patsy Dixon	905 Jamestown Rd	Road and drainage needs to be reconstructed water drains but slowly. resident fell in street trying to step over broken and tilted C&G. Spoke to Scott Thornton he will come out with us to see what can be done. Asphalt and C&G needs to be replaced.	Completed		
4/1/2013	Sinkhole	Internal-Employee	W017245-040113	Patsy Dixon	W. Roslyn Rd @ I-95	At Sound Barrier Wall, placed cones in area of hole, hole is mostly under wall, metal drain pipe. Went to City Hall to talked to Scott about problem to see if the could talk to someone from VDOT.	Completed		
4/30/2013	Sinkhole	Internal-Employee	W017510-043013	Patsy Dixon	228 Washington Ave.	Across the above address sinkhole beside of basin checked out basin inside found hole in wall will have to dig out around outside of basin with shovels and jack hammer and pull concrete out to get to hole in basin wall at a later date	Completed		
10/1/2012	Sinkhole	Phone	W015607-100112	Patsy Dixon	200 Stratford Dr.	T'ved a 36" concrete pipe found nothing wrong with pipe. Concrete crew will pour new driveway entrance.	Completed		

## 1509 - Drainage Miscellaneous

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
3/20/2013	Sinkhole	Phone	W017129-032013	Patsy Dixon	220 Piedmont Ave.	Used 1/4 bucket of hydraulic cement in hole no other problems in area Curbing just old	Completed		
1/11/2013	Drainage (Misc.)	Internal-Employee	W016645-011113	Patsy Dixon	Branders Bridge Rd.	Checked out beaver dam blocking water flow, water is 6-8' deep, 3-16" dia or bigger trees have been cut down by beaver, dam has increased in height and width across ditch, lots of down small trees and multiple large beavers are doing this.	Completed		
10/4/2012	Drainage (Misc.)	Internal-Employee	W015766-100412	Patsy Dixon	231 Chesterfield Ave.	New Courthouse location placed 7 manhole riser on storm sewer manhole requested by Steve Perkins	Completed		
10/3/2012	Drainage (Misc.)	Internal-Employee	W015759-100312	Patsy Dixon	120 Charlotte Ave.	Called in a MU for strom sewer pipe replacement 12"	Completed		
11/28/2012	Drainage (Misc.)	Internal-Employee	W016237-112812	Patsy Dixon	Conduit Rd.	Measured sediment build up around 6 culverts in Old Town Creek to clean out per Mike	Completed		
10/18/2012	Drainage (Misc.)	Internal-Employee	W015885-101812	Patsy Dixon	Piedmont Ave.	Assisted Stormwater crew repairing a drainage pipe	Completed		
8/30/2012	Drainage (Misc.)	Phone	W015355-083012	Patsy Dixon	147 Chesterfield Ave.	Placed bait in 2 inlets on corner of Chesterfield Ave and Sancho Alley	Completed		
9/4/2012	Drainage (Misc.)	Internal-Employee	W015390-090412	Patsy Dixon	Atlantic Ave.	On 8/14/12 Used mini generator and small electric pump to lower water level so contractor can comple street renovation. On 8/15/12 continued pumping water from street. On 8/16/12 continued pumping water from street On 8/17/12 Had a specialist come in with sonar equipment to listen for leaks found nothing, will pump water down again. On 8/21/12 continued pumping water from street requested by Scott Thornton	Completed		
10/28/2012	Drainage (Misc.)	Internal-Employee	W015983-102812	Patsy Dixon	151 Chesterfield Ave.	Placed rate bait in 4 sanitary manholes and 2-curb inlets storm sewer.	Completed		
5/2/2013	Drainage (Misc.)	Internal-Employee	W017606-050213	Patsy Dixon	Elko @ Walnut Aves	Try to unstop pipe in inlet.	Completed		
5/2/2013	Drainage (Misc.)	Internal-Employee	W017607-050213	Patsy Dixon	1147 Cumberland Dr.	Met with Columbia Gas to discuss gas lines to close to C&G	Completed		
3/4/2013	Drainage (Misc.)	Internal-Employee	W017018-030413	Patsy Dixon	Branders Bridge Rd.	Met with Jerry Duffy from Chesterfield County, showed him the Beaver dam he will try to get in contact with land owner for permission to come across property with equipment will get back in touch with us.	Completed		
5/2/2013	Drainage (Misc.)	Internal-Employee	W017571-050213	Patsy Dixon	Old Town Creek	Investigated Old Town Creek at Conduit Rd Culverts took pictures for Mike areas to be cleaned by contractors of silt, brush and trash.	Completed		
5/2/2013	Drainage (Misc.)	Phone	W017563-050213	Patsy Dixon	White Bank Rd.	Looked at ditch on White Bank Rd trucks keep running threw ditch causing water to stand	Completed		

## 1509 - Drainage Miscellaneous

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/2/2012	Drainage (Misc.)	Internal-Employee	W015690-100212	Patsy Dixon	Brookedge Ave.	On 9/12/12 At the dead end rearranged rip rap with backhoe to prepared for concrete grouting of stone in flow line of ditch at both ends of new pipe. On 9/13/12 washed dirt off rip rap. On 9/14/12 placed concrete around rip rap on both ends of new pipe.	Completed		
2/1/2013	Drainage (Misc.)	Internal-Employee	W016754-020113	Patsy Dixon	406 MacArthur Ave.	Placed black fabric with pins and broken concrete to line ditch. Grouted to soft will wait until it stiffens up to start project.	Completed		
4/30/2013	Drainage (Misc.)	Internal-Employee	W017540-043013	Patsy Dixon	City Wide	Rain all day checked problem drainage areas	Completed		
5/21/2013	Drainage (Misc.)	Internal-Employee	W017795-052113	Patsy Dixon	City Wide	Cleaned the following pathways to outfalls in woods at: 201 Kennon Pt, Across from 202 Orchard Ave, Behind 105 Lexington Dr, Heroda Pump Station.	Completed		
5/21/2013	Drainage (Misc.)	Internal-Employee	W017796-052113	Patsy Dixon	City Wide	3712 Perthsire Dr, 3001 Wildwood Dr, Behind 102 Camelot Ct, 429 Nottingham Dr, Sherwood Dr Bridge - 4 outfalls.	Completed		
5/21/2013	Drainage (Misc.)	Internal-Employee	W017802-052113	Patsy Dixon	405 MacArthur Ave.	Looked at catch basin in back of above address resident is concerned about concrete at both openings at each end of basin, concrete is sinking water does not drain well will fix problem in future.	Completed		
4/30/2013	Drainage (Misc.)	Internal-Employee	W017511-043013	Patsy Dixon	Boulevard @ Bruce Ave.	Gas company struck old pipe in ground, pipe no longer in use, used 1/4 bucket of Hydraulic cement and patched pipe. Called in by Travis in Utilities	Completed		
12/16/2012	Drainage (Misc.)	Web	W016437-121612		218 Heron Run Drive	After checking with the Engineering Division found that there is only a Utility Easement behind property 8' easement Not a City Issue	Completed		
1/17/2013	Drainage (Misc.)	Phone	W016681-011713	Patsy Dixon	3201 Dale Ave.	Looked into 4 basins in the area saw no oily film in water, gutter had a swift moving water flow coming down the hill from Bermuda and Dale Aves that could have washed oily film and smell away.	Completed		
6/4/2013	Drainage Ditch need cleaning	Walk-In	W017923-060413	Alan Thornton	1210 Covington Rd	Drainage ditch is fine resident is just concerned when it rains 2-3" an hours time Mon June 3 9-11pm very hard. resident said she hoped that "she could get City Council to make up grade in her neighborhood".	Completed		
6/5/2013	Drainage Ditch need cleaning	Internal-Employee	W017982-060513	Patsy Dixon	501 Lake Ave.	Placed 2 spaghetti booms in 2 separate places in ditch to catch oil, 1-10' boom near milling pile, 1-20' boom near fence at Lakeview Park.	Completed		
7/30/2012	Public Works Miscellaneous	Phone	W015011-073012	Patsy Dixon	Lynchburg Ave.	Site Visit 7/30/12 by Scott, AJ, Jeremy. Noted grass clippings on sidewalk and in gutter. Stormwater crew will remove clippings. Scott has obtained property owner information and issued a warning notice stating that future violations could result in fines/fees as outlined in city stormwater ordinance. Warning Letter on file in Engineering dept. Mailed 7/30/12. AJ and Jeremy used blower to blow grass off sidewalk, used street sweeper to remove grass.	Completed		
6/21/2013	Curb and Gutter Cleaning	Internal-Employee	W018086-062113	Patsy Dixon	401 Jefferson Ave.	Searched area could not find address also checked Jackson Ave no address could be found will wait until resident calls back in.	Completed		Linwood

## 1509 - Drainage Miscellaneous

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
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## 1511 - Drainage Structure Inv Misc.

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/1/2013	Drainage (Misc.)	Internal-Employee	W017236-040113	Patsy Dixon	Fleets Branch Creek	Placed stickers on all basins	Completed		

## 1514 - Repair Storm Sewer Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/15/2013	Sinkhole	Phone	W017373-041513	Patsy Dixon	401 James Ave.	On 4/23/13 Used backhoe to dig down to pipe found seperated joint of 24" Completed concrete pipe , hauled away 12 tons of dirt, concreted and rapped pipe used 1-94 lb bag of cement, put 6 tons of #5 stone back in hole on top of pipe, placed remaining dirt back on hole on top of stone, used 6 tons of topsoil from Utilities to fill in ruts on top of clay dirt comed off area for the night. On 4/24/13 Sowed grass seed and placed straw on top.			
4/30/2013	Sinkhole	Internal-Employee	W017513-043013	Patsy Dixon	113 Moore Ave.	Mixed 1/2 bag of cement, patched hole around pipe in box causing ground to settle.	Completed		
8/9/2012	Sinkhole	Email	W015169-080912	Patsy Dixon	157 Roanoke Ave.	Used shovels and dug along outside wall, found hole where a 15" concrete pipe comes threw pre-fabricaded box. Used 1-94lb bag of concrete on inside box around pipe and outside of box arond pipe and backfilled with 2 -5 gallon buckets of fill dirt	Completed		
5/9/2013	Sinkhole	Phone	W017661-050913	Patsy Dixon	401-405 MacArthur Ave.	Used 1-gal ready mixed concrete patch, to patch walls with plastic 48" pipe comes into manhole vault. Used 2-5 gal buckets of topsoil and sowed grass seed.	Completed		
5/15/2013	Sinkhole	Phone	W017704-051513	Patsy Dixon	101 Kennon Ct.	Used mini Excavator to dig down to pipe found seperated joint of pipe, used half a bag of cement on joint to seal, placed 3 tons # 5 sone in hole on top and around pipe, placed dirt back one top of stone and paced with mini excavator, used 2 tons of topsoil from Utilties to put on top of clay, raked dirt and used 5 gallons of grass seed.	Completed		
11/28/2012	Drainage (Misc.)	Internal-Employee	W016235-112812	Patsy Dixon	114 Chesterfield Ave.	On 11/15/12 removed broken and seperated pipe with backhoe. Loaded up a flared out 12" concrete pipe and materials needed to repair from shop. On 11/6/12 set flared out pipe and cemented pipe together, placed 6 tons of fill dirt to cover pipe and packed with backhoe.	Completed		

## 1514 - Repair Storm Sewer Pipe

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman	
7/2/2012	Drainage (Misc.)	Internal-Employee	W014690-070212	Patsy Dixon	931 Edinborough Dr.	Verizon phone company cut out a section of concrete to lay cable in ground, mixed 2-94lbs of portland cement, sand and chip stone, poured 12" x 8' x 4" section to repair pipe.	Completed			
10/2/2012	Drainage (Misc.)	Internal-Employee	W015699-100212	Patsy Dixon	205 Norfolk Ave.	Replaced plastic drain grate	Completed			
5/21/2013	Drainage (Misc.)	Internal-Employee	W017805-052113	Patsy Dixon	Roanoke Ave @ Boulevard	9-11:30am Saw cut met pipe, cut 6' of pipe out, let gas company finsh digging a 7' hole to set new gas line, from 12:30-6pm cut 15" ads black pipe already on yard, used 8 1/2' of pipe and shoved up into metal pipe, used pump to try to keep water level down to steady water flow threw pipe, metal pipe in very bad condition. used 6 tons of 57 stone, contractor backfilled hole and tamped. used flusher to wash right lane of Boulevard and Roanoke Ave used 1000 gallons of water. Eq used 257, 202, flusher, dump truck, pipe saw, 2-shovels, broom, sledge hammer, strap and pump. 8 man hours.	Completed			
10/28/2012	Repair Storm Sewer Pipe	Internal-Employee	W015985-102812	Patsy Dixon	120 Charlotte Ave.	Removed 8 tons of old broken pipe and asphalt. Installed new 12" x 28' of plastic pipe from inlet to inlet, placed 6 tons of 57 stone on top, around pipe and tamped area.	Completed			
10/28/2012	Repair Storm Sewer Pipe	Internal-Employee	W015992-102812	Patsy Dixon	24 Pickwick Ave.	On 10/12/12 placed plywood over hole with sand bags, coned, taped area for the weekend. Called MU to mark utilities. Scott wants it fixed and keep up with time and materials. On 10/17/12 Replaced 4' of 12" concrete pipe with plastic pipe, used 2-94lbs bags of cement, removed 8' of sidewalk which needs to be repaired, placed 6 tons of 57 stone in hole removed 6 tons of debris from site.	Completed			
5/14/2013	Storm Drain Repairs	Internal-Employee	W017689-051413	Patsy Dixon	Wright Ave @ Boulevard	Replaced a 7' of pipe with 15" ADS plastic pipe shoved pipe inside metal pipe, used 3 bags cement, 12-4x8" concrete bricks for filler, 1-5 gallon bucket hydraulic cement to mend pipes together, placed 6 tons of 57 stone, contractor filled hole when they were done with the gas line.	Completed			

## 1600 - Sweeper Clean Street

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
11/1/2012	Street Sweeping	Web	W016059-110112		2565 Pin Oak Court	See Message below	Completed		
4/3/2013	Street Sweeping	Internal-Employee	W017300-040313	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Dick Ewell, Jett, Jo Johnson, Lyons, Moorman, Oaks, Fischer, Highland, E. Highland Ct, W. Highland Ct, Shuford, Tussing Ln, W. Roslyn Rd.	Completed		Linwood

## 1600 - Sweeper Clean Street

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
4/3/2013	Street Sweeping	Internal-Employee	W017301-040313	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Center, Danville, Kensington, Lafayette, Lee, Lee Pl, Lynchburg, Norfolk, Park, Pickwick, Richmond, Elko, Hardy, Hill Pl, Suffolk.	Completed		Linwood
4/5/2013	Street Sweeping	Internal-Employee	W017315-040513	Patsy Dixon	City wide	Collected 16 cubic yards of debris: Brookedge Dr, Crestwood Dr, Laurel Pkwy, Jamestown Rd, James, MacArthur, Pride, Prince Albert, Ridge Rd, Elko, Ellis Ln, Helen, Snead, Spring Dr, N. Temple, Valley Rd N and S, Walnut.	Completed		Linwood
4/11/2013	Street Sweeping	Internal-Employee	W017351-041113	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Charles, Compton Rd, Dover Ln, Keswick Rd, Old Town Dr, Pin Oak Ct, Fairlie Rd, Greenleaf Ln, White Oak Ct.	Completed		
4/30/2013	Street Sweeping	Internal-Employee	W017504-043013	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Appomattox Ct, Appomattox Dr, Covinton Rd, Duke of Gloucester St.	Completed		Linwood
4/30/2013	Street Sweeping	Internal-Employee	W017505-043013	Patsy Dixon	City Wide	Collected 8 cubic yards of debris: Cedarwood, Even side Oakwood Dr, Driftwood, Greenwood, Wildwood, Woodside, Yacht Basin Dr.	Completed		Linwood
4/30/2013	Street Sweeping	Internal-Employee	W017506-043013	Patsy Dixon	Dunlop Farms Blvd.	Collected 8 cubic yards of debris Dunlop Farms Blvd and Islands	Completed		Linwood
4/30/2013	Street Sweeping	Internal-Employee	W017507-043013	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Atlantic, Charles, Jamestown Rd, Mount Pleasant Dr, elmwood Dr, Frederick, Holly, Williamsbug Rd, Yorkshire Rd, Odd side of Oakwood Dr.	Completed		Linwood
4/30/2013	Street Sweeping	Internal-Employee	W017508-043013	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Angus Ln, Bear Chase Ct, Birch, Bluffs Ct, Bluffs Ter, Bluffs Dr, Jersey Ct, Longhorn Dr, Pecan Tree Ter, Greemeadow Ct, Greenmeadow Dr, Honeycreek Ct, Shade Tree Ct, Shade Tree Dr.	Completed		Linwood
4/1/2013	Street Sweeping	Internal-Employee	W017257-040113	Patsy Dixon	City Wide	Removed 24 cubic yards of debris from the following streets: Cameron, Colonial, Danville, Lafayette, Floral, Hamilton.	Completed		Linwood
5/21/2013	Street Sweeping	Internal-Employee	W017813-052113	Patsy Dixon	City Wide	Collected 24 Cubic Yards of Debris: South Bound side of Boulevard from Piedmont to Dupuy Aves, Conduit Rd from Ellerslie Ave South both sides, Bridges on Boulevard, Temple, Conduit, Ellerslie, Roslyn Rd, Sherwood, 120 Stratford Dr.	Completed		Linwood
9/10/2012	Street Sweeping	Phone	W015504-091012	Patsy Dixon	900 E. Ellerslie Ave.	Swept street collected 1 cubic yard of debris	Completed		
5/14/2013	Street Sweeping	Internal-Employee	W017675-051413	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Brooke Ct, Camden rd, Clements Ct, Comstock Dr, Conjurers Dr, Creek Point Ct, Kennon Ct, Kennon Point Dr, Kingfisher Wy, Lakewater Ct, Mosse, Moose Ln, Nantucket Ct, Old Brickhouse Ln, Red Fox Rd, Dunston Point Pkwy, Germar Ct, Heron Run Dr, Indian Rock Ct, Salem Ct, Watercress Ct, Waterfront Dr, White Sand Ct, Woodbridge Rd. Odd side of Huntington Rd.	Completed		Linwood

## 1600 - Sweeper Clean Street

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
5/14/2013	Street Sweeping	Internal-Employee	W017676-051413	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Brockwell Ln, Cedar Ridge Ct, Choptank Ct, Clifton, Conjurers Dr, Dana Ln, mallard Dr, Old Brickhouse Ln, Peace Cliff Ct, Whipporwill Ct.	Completed		Linwood
5/15/2013	Street Sweeping	Internal-Employee	W017723-051513	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: avon ct, Berkshire Ln, brandywine Ct, Briarcliffe ct, Briarcliffe Dr, Courtland Dr, Cumberland Dr, Nantucket Ct, pinecliffe Dr, Princeton Rd, Eastwind Ct, Hope Ridge Ct, Huntington Rd, Salem Ct, Salisbury Rd, Stratford Dr, Taylor Ln, Welesley Ln, Whitestone Ct, Whitestone Pl, Wicker Dr, Windmere Dr, Woodcliffe Dr.	Completed		Linwood
5/21/2013	Street Sweeping	Internal-Employee	W017794-052113	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Ayshire Rd, Asalea Ln, Dogwood Dr, Orkney Rd, Perthsire Ln, Dunoon Ct, Dunoon Rd, edinborough Dr, Hawick Dr, Holly, Wilkshire, School, 900 Ellerslie Ave, North end of Conduit Rd from Ellerslie Ave North.	Completed		Linwood
2/1/2013	Street Sweeping	Internal-Employee	W016765-020113	Patsy Dixon	Lakeside Dr.	Swept street removed 8 cubic yards of pine needles and leaves	Completed		
3/20/2013	Street Sweeping	Internal-Employee	W017125-032013	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Archer, Bradsher, Cambridge Pl, Carroll, Chesterfield, Crescent, Marvin, Orchard, Gould, Hanover, Hillside Ln.	Completed		Linwood
3/20/2013	Street Sweeping	Internal-Employee	W017126-032013	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Battery Pl, Braxton, Bruce, Cottage Grove, Drake, Maple Ln, Meridian, Plumtree, Wilson.	Completed		Linwood
3/22/2013	Street Sweeping	Internal-Employee	W017163-032213	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Arlington, Jefferson, Jackson, Roslyn, Royal Oak, Stuart, Virginia, Washington, Wilson.	Completed		Linwood
3/26/2013	Street Sweeping	Internal-Employee	W017210-032613	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Beech, Bristol, Chestnut, Lilliston, Meadow View Rd, Pinehurst, Riverview Rd, Ryan, Ingram, Ivey	Completed		Linwood
9/12/2012	Street Sweeping	Internal-Employee	W015513-091212	Patsy Dixon	Boulevard	Collected 8 cubic yards of debris from 3/4 of the street	Completed		Linwood
7/26/2012	Street Sweeping	Internal-Employee	W014964-072612	Patsy Dixon	City Wide	Swept part of Wildwood, Oakwood and Mt Pleasant Dr.	Completed		
10/1/2012	Street Sweeping	Internal-Employee	W015614-100112	Patsy Dixon	City Wide	Collected 16 cubic yards of debris from the following streets: charlotte Ave, Colonial Ave, Cottage Grove Ave, Piedmont Ave, East and West Westover Ave, Dupuy Ave.	Completed		Linwood
5/2/2013	Street Sweeping	Internal-Employee	W017573-050213	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Breezy Hill Dr, Burlington Dr, Canterbury Ln, Cedarwood, Deerwood Dr, Lexington Dr, Pleasant Dale, Ridgecrest Ln, Riveroaks Dr, Gill Dr, Hermitage Rd, Wellington Rd, Whitehall Dr.	Completed		Linwood
2/8/2013	Street Sweeping	Internal-Employee	W016827-020813	Patsy Dixon	City Wide	Collected 16 Cubic Yards: Ashby, Boykins, Brookhill, Brookhill Ct, Lakewood Dr, Forest View Dr, Sherwood Dr.	Completed		Linwood
2/8/2013	Street Sweeping	Internal-Employee	W016828-020813	Patsy Dixon	City Wide	Collected 16 Cubic Yards: Charles Dimmock Pkwy, Jennick Dr, E. Roslyn Rd, South Ave, Southpark Blvd, Southpark Cir, temple Lake Dr.	Completed		Linwood

## 1600 - Sweeper Clean Street

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
2/13/2013	Street Sweeping	Internal-Employee	W016862-021313	Patsy Dixon	City Wide	Collected 24 cubic yards of debris: Biltmore Dr, Camelot Ct, Norwood Dr, Nottingham Dr, Friar Ln, Seaton Dr, Tudor R, Homestead Dr, Robinwood Ct	Completed		Linwood
2/15/2013	Street Sweeping	Internal-Employee	W016871-021513	Patsy Dixon	City Wide	Collected 16 Cubic Yards of Debris: Brian Ln, Brookhill, Buckingham Dr, Lake, Lakewood Dr, Pickett, Fairmount Dr, Forest View Dr, Springdale, Swift Creek Ln, Winston.	Completed		Linwood
2/28/2013	Street Sweeping	Internal-Employee	W016936-022813	Patsy Dixon	City Wide	Collected 8 Cubic Yards of debris: Brijadan Ln, Cedar Creek Ln, Cedar Ln, Cloverhill Ave, Laurens Ln, Lenoir, Lundy, Ewing, Sadler, Taswell, Vance, Verbov, Woodlawn	Completed		Linwood
2/28/2013	Street Sweeping	Internal-Employee	W016937-022813	Patsy Dixon	City Wide	Collected 24 Cubic yards of debris: A, Adams, Ash, B, Virch, Brame, C, Cedar Ln, D, Lakeview, Moore, E, F, Franklin, George, Hemlock, Spruce, Wakefield, West, Yew	Completed		Linwood
2/28/2013	Street Sweeping	Internal-Employee	W016938-022813	Patsy Dixon	City Wide	Collected 28 cubic yards of debris: Beechwood, Bermuda, Dale, Keith, Maple Grove, Newcastle, Orange, Ross, East, Eastman, Essex Rd, Farris, Hampton Dr, Hargrave, Hillcrest	Completed		Linwood
3/1/2013	Street Sweeping	Internal-Employee	W016997-030113	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Branders Bridge Rd, Concord Rd, Kent Ave, Maple Ave, Piedmont Ave, Roanoke Ave, Fairfax AVe, Franklin Ave, W. Westover Ave, Wright Ave, Yorktown Dr.	Completed		Linwood
3/4/2013	Street Sweeping	Internal-Employee	W017005-030413	Patsy Dixon	City Wide	Collected 16 cubic yards of debris: Cabell Dr, Caswell, Davis, Lakeside Dr, Lakeview Park Rd, Lenoir, Ellerslie, Glenview, Woodlawn.	Completed		Linwood
8/2/2012	Street Sweeping	Internal-Employee	W015090-080212	Patsy Dixon	Boulevard	Swept from Ellis Ave to Essex Rd center turning lane collected 2 cubic yards of debris, glass, shredded paper, sand and dirt.	Completed		
7/11/2012	Street Sweeping	Internal - Mayor	W014751-071112	Patsy Dixon	Dupuy Ave.	Swept Street from Boulevard to Bradsher - removed 4 cubic yards of debris	Completed		AJ
7/11/2012	Street Sweeping	Internal-Employee	W014752-071112	Patsy Dixon	E. Westover Ave.	Swept street from Conduit Rd to Boulevard removed 4 cubic yards of debris.	Completed		AJ
10/28/2012	Street Sweeping	Internal-Employee	W015980-102812	Patsy Dixon	City Wide	Sweep Conduit Rd from Yacht Basin Dr to Brockwell Ln and back up to Huntington Rd. W. Ellerslie Ave, Sprindale Ave, Lake Ave. Collected 16 cubic yards of debris.	Completed		Linwood
10/28/2012	Street Sweeping	Internal-Employee	W015981-102812	Patsy Dixon	City Wide	Swept Conduit Rd from Ellerslie Ave to Mall entrance, all islands, C&G and 3812 Conduit Rd, Dupuy Ave, Temple Ave, E. Westover Ave. Collected 1.5 cubic yards of debris.	Completed		Linwood
8/2/2012	Street Sweeping	Internal-Employee	W015094-080212	Patsy Dixon	Dunlop Fams Blvd.	Swept around islands removed 4 cubic yards of debris, sand, grass and trash	Completed		AJ
10/3/2012	Street Sweeping	Phone	W015747-100312	Patsy Dixon	Temple Ave.	Swept bridges I-95 and Appomattox River, on Ramp North I-95 chopped grass collected 8 cubic yards of debris.	Completed		
10/3/2012	Street Sweeping	Internal-Employee	W015748-100312	Patsy Dixon	E. Westover Ave.	Swept form Boulevard to Conduit Rd. Collected 8 cubic yards of debris.	Completed		

## 1600 - Sweeper Clean Street

Create Date	Request Type	Source	Reference No	Created By	Request Address One	Action Taken	Request Status	Cubic Yards	Foreman
10/3/2012	Street Sweeping	Internal-Employee	W015749-100312	Patsy Dixon	Boulevard	Swept from Pickwick Ave South to Hamilton Ave. From Hamilton North to Temple Ave. Collected 8 cubic yards of debris.	Completed		
10/3/2012	Street Sweeping	Internal-Employee	W015750-100312	Patsy Dixon	Dupuy Ave.	Swept street collected 8 cubic yards of debris	Completed		
9/4/2012	Street Sweeping	Internal-Employee	W015409-090412	Patsy Dixon	Dupuy Ave.	Swept street	Completed		
9/4/2012	Street Sweeping	Internal-Employee	W015420-090412	Patsy Dixon	Boulevard	From Arlington to Petersburg Line and from Chesterfield Line to Ashby Ave.	Completed		
9/4/2012	Street Sweeping	Internal-Employee	W015393-090412	Patsy Dixon	East Ellerslie Ave.	Swept from holly to Dunlop Farms Blvd collected 4 cubic yards of grass and silt.	Completed		AJ
9/13/2012	Street Sweeping	Phone	W015550-091312	Patsy Dixon	1006 Colonial Ave.	Swept both sides of street.	Completed		
8/9/2012	Street Sweeping	Phone	W015183-080912	Patsy Dixon	424 Fairfax Ave	Swept from Meridian Ave to dead end, and resident driveway entrance. Removed 3 cubic yards of debris rocks, silt and dirt.	Completed		
12/21/2012	Street Sweeping	Internal-Employee	W016468-122112	Patsy Dixon	Temple Ave.	Swept traffic islands removing leaves, debris and loose gravel on the shoulders removed 2 cubic yards.	Completed		
12/21/2012	Street Sweeping	Internal-Employee	W016472-122112	Patsy Dixon	Boulevard	Cleaned street collected 16 cubic yards of debris	Completed		AJ
5/1/2013	Clean Catch Basin, BMPs, Inlets, Outfalls, Drainage Ditches etc.	Internal-Employee	W017559-050113	Patsy Dixon	Lakeside Dr.	Swept street removing 3 cubic yards of silt and pine needles so the debris will not stopped up storm sewer during rain storm	Completed		

# BMP Inspections & Cleaning - 2013

Run Date: 9/27/2013 12:48:42 PM

Request Address One	Action Taken	Code Number	Work Completion Date	Reference No
Archer Ave.	Inspected BMP-0004 and removed 2-black trash bags of trash	1516 - Inspect/Clean BMP	04/30/2013	W017565-050213
201 James Ave	Inspected BMP-0001.	1516 - Inspect/Clean BMP	05/01/2013	W017608-050213
1209 Covington Rd	Inspected BMP-0002.	1516 - Inspect/Clean BMP	05/01/2013	W017609-050213
Lee Place & Danville Ave	Inspected BMP-0003.	1516 - Inspect/Clean BMP	05/01/2013	W017610-050213
Chesterfield & Marvin Avenues	Inspected BMP-0005.	1516 - Inspect/Clean BMP	05/01/2013	W017611-050213
100 Highland Ave	Inspected BMP-0006.	1516 - Inspect/Clean BMP	05/01/2013	W017612-050213
500 Conduit Rd	Inspected BMP-0009.	1516 - Inspect/Clean BMP	05/01/2013	W017613-050213
401 Taswell Ave	Inspected BMP-0012.	1516 - Inspect/Clean BMP	05/01/2013	W017614-050213
5501 Conduit Rd	Inspected BMP-0052.	1516 - Inspect/Clean BMP	05/01/2013	W017615-050213
2463 Boulevard	Used small shovel to clean trash in front of trash rack inside basin. the trash rack is only a 4" opening. removed a 5 gallon bucket of trash	1516 - Inspect/Clean BMP	06/04/2013	W017924-060413
Chesterfield Ave.	BMP - Removed trash, sticks and grass	1516 - Inspect/Clean BMP	06/05/2013	W018456-070813

# Drop Inlet Cleaning 2013

Run Date: 9/27/2013 12:46:56 PM

Request Address One	Action Taken	Code Number	Work Completion Date
121 Lakeside Dr.	Removed leaves and other debris from a inlet grate water went down - After hours Overtime	1508 - Clean Drop Inlets	07/09/2012
1316 Canterbury Ln.	Used rakes, shovels and pitch forks to clean curb inlet grate top. Removed 1 cubic yards of debris of sticks, pine needles and a 2"x6"x4' wood board.	1508 - Clean Drop Inlets	07/23/2012
1102 Covington Rd.	Removed asphalt wedge that was holding water and debris from flowing into inlet. Shoveled out grass and silt.	1508 - Clean Drop Inlets	05/20/2013

# Storm Sewer Cleaning 2013

Run Date: 9/27/2013 12:47:36 PM

Request Address One	Action Taken	Code Number	Work Completion Date
Covington Rd.	Used backhoe to remove concrete lid, used shovels to remove grass clippings, rocks, silt and dirt. removed 1/4 cubic yards of debris.	1502 - Clean Storm Sewer	08/03/2012
804 W. Roslyn Road	Flushed 250' of 15" concrete pipe into wood line, collected 2 cubic yards of silt, trash and removed a basketball, used 2000 gallons of water.	1502 - Clean Storm Sewer	09/21/2012



# The City of Colonial Heights, Virginia

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## COLONIAL HEIGHTS STORMWATER MANAGEMENT

### Stormwater 4 Kids

When rain runs across the ground, parking lots and streets it picks up trash, oil, sand and all kinds of other chemicals that it washes into the storm drains. These storm drains empty into rivers that hundreds of types of animals, not to mention people, need to survive. It's important for all of us to do what we can to protect our waters.

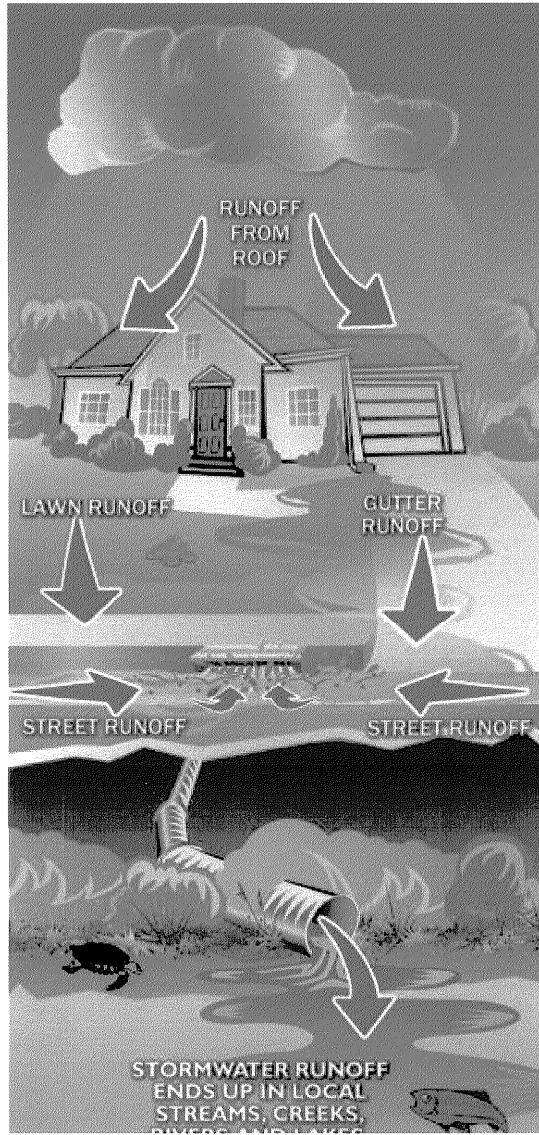
#### Where the Rain Goes...



Rain falls from the sky on hard surfaces like rooftops, driveways, sidewalks and the ground. Gravity then makes this rainfall - called **stormwater runoff** - flow towards low areas like ditches, storm drains, streams and rivers. Storm drains and storm sewer systems are designed only to carry runoff away from roads and buildings, so the water they collect simply dumps into local rivers and streams rather than going somewhere to be treated.

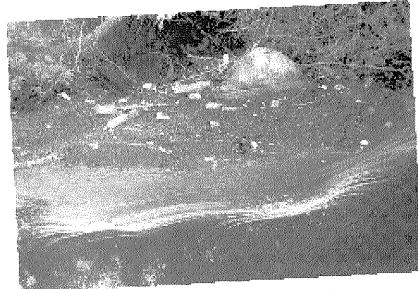
So when it rains, all the runoff that has flowed across the rooftops, parking lots, driveways and streets has collected all the fluids and litter that has spilled, fallen or been thrown on the ground. It carries all of this into the storm sewer system where it then flows into nearby streams, rivers and lakes.

All these chemicals and trash make the water very unhealthy. Important grasses and plants can't grow as they should and the animals get sick and often die. These polluted waters are dangerous for people, too. Drinking or swimming in these polluted waters can

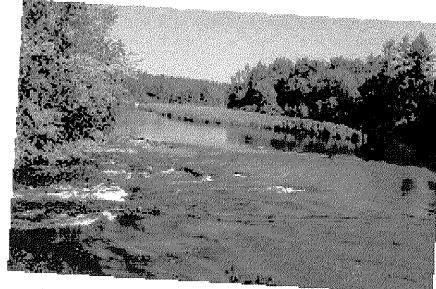


make us sick, and eating the fish we catch from these waters can also make us very sick. So keeping these waters clean is very important for people and for animals!

### A Tale of Two Rivers...



River A



River B

One of these rivers is in nature, away from roads, streets, parking lots and buildings. The other is in an urban area, surrounded by roads, streets, parking lots and buildings. The animals and plants in one of them are healthy and thriving. The animals and plants in the other are sick and finding their river a very difficult place to live. See if you can guess which river is located in which area.



### FUN FACTS ABOUT WATER

- ⊕ Water is the most common substance found on earth.
- ⊕ The only water we will ever have is what we already have now.
- ⊕ Each day the sun evaporates 1,000,000,000,000 (a trillion) tons of water.
- ⊕ Water is the only substance on earth naturally found in the three rule element forms: solid, liquid and gas.
- ⊕ 80% of the earth's surface is water.
- ⊕ 97% of the earth's water is in the oceans and seas.
- ⊕ 66% of your body is water.
- ⊕ Bones are 25% water.
- ⊕ Human blood is 83% water.
- ⊕ A person can survive without food for more than 30 days, but less than a week without water.
- ⊕ The average household uses 107,000 gallons of water per year.
- ⊕ It takes 120 gallons of water to produce one egg.
- ⊕ Over 42,000 gallons of water (enough to fill a 30x50 foot swimming pool) are needed to grow and prepare food for a typical Thanksgiving dinner for eight.

### ACTIVITIES



[Watch the water cycle in action!](#) (Link requires Adobe Flash Player - [download here](#))

**Games...**

The Dirty Dozen word search

Water's Alive crossword puzzle

Stormwater word scramble

**Coloring Pages...**

Color Your Water Clean coloring and activity book

**Other Fun Stuff...**

Stream Protector activity poster (prints to 11 x 17 paper)

What Happens When It Rains brochure

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# Mulch with Less This Fall & Save More

You can create beautiful, healthy landscapes that control weeds, conserve water and reduce costs by using plant trimmings as mulch. Tree prunings, brush, grass clippings, and leaves that are chipped or shredded are an excellent source of mulch. In nature, these things fall to the ground, creating an organic layer that protects and builds the soil. This "local" mulch can offer the same advantage to the landscapes you maintain while saving you time and money, and using it recycles plant material into a valuable nutrient for your landscape. Using materials already present in your landscape areas also saves removal costs and the costs of bringing in "foreign" mulches. Consider the following types this fall and winter:

## Mixed mulch...

Mixed mulch provides a broad range of nutrients and elements essential to building healthy soil. It can be any combination of the materials listed above, and can include chipped brush and other plant trimmings. You can produce it on-site with a chipper/shredder. It settles more quickly than pure bark or wood because the leafy material breaks down rapidly. This decomposition allows nutrients to easily be recycled back into the soil.

## Compost...

Compost is plant and other organic matter that has gone through a controlled decomposition process. It provides many valuable nutrients thus improving soil structure. Used as a mulch, it may not control weeds very well because seeds can germinate and grow in the compost. It can however, as a mulch, be very effective for controlling erosion.

## Leaves...

Leaves are plentiful, even in yards where trees are simply nearby rather than in the yard. They readily break down, creating natural mulch that contains valuable nutrients. Falling leaves is nature's system for returning nutrients and organic matter to the soil. However, leaves can be carried away by heavy rain or wind and dry leaves can be flammable under certain conditions. Their most efficient use may be as an aesthetic amendment in smaller planting areas.

## Grass Clippings...

Grass Clippings are a good source of nutrients - particularly nitrogen - because they decompose rapidly. Leaving the clippings on the lawn is the best way to use them. They can also be used as mulch when they are too long to leave on the lawn, but are not considered to be attractive as other mulches and, if applied too thick, they can form a mat. They are an excellent amendment, though, when used in mixed mulches or compost.

## Using mulch for more than its looks...

Mulch is a highly recommended and often used method of stabilizing soil to control runoff and erosion. It is very effective at reducing runoff velocity and, when combined with seeding or planting, mulch also:

- Provides essential nutrients and microbes
- Aids plant growth
- Holds seeds and fertilizers in place
- Prevents birds from eating seed
- Insulates plant roots

Creating mulch from plant debris and using mulch is also an important stormwater-friendly landscaping practice, helping control runoff and reducing the use of harmful fertilizers and, often, pesticides. Using mulch nurtures healthy soil by protecting soil structure, preventing erosion, and supporting the microbes that cycle nutrients and filter pollutants. Nurturing these essential and natural nutrients equates to needing fewer synthetic fertilizers, which means that fewer and fewer of these synthetics will end up in our streams and rivers. Covering the surface of all soil that is not protected by plant growth is critical for creating drought resistant soils and conserving water. Water quality is protected when soil erosion is prevented. Water quality is also protected when weeds are controlled through the use of mulch rather than herbicides. It is important, however to place mulch in areas that will protect it from being picked up and pulled into the storm drain with stormwater runoff.

...Remember that protecting our waters begins at home!



# Department Guidance

On March 11, 2009 City Council approved the addition of Chapter 245, *Stormwater Management*, to the City's Code. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with the requirements of the City's National Pollutant Discharge Elimination System (NPDES) permit.

## What Does It Prohibit?

Chapter 245 prohibits two things: *illegal discharges* and *illicit connections*. An *illicit connection* is any surface or subsurface drain or conveyance that allows an illegal discharge to enter the storm drain system. This includes sewage, processed wastewater, and washwater either from indoor drains or sinks, regardless of whether such connection had been previously allowed or approved by the City. Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented and approved by the City is also prohibited. An *illegal discharge* is any direct or indirect non-stormwater discharge to the storm drain system. The only exceptions are water line flushing, landscape irrigation, diverted stream flows, ground water infiltration to storm drains, foundation or footing drains, crawl space pumps, air conditioning condensation, non-commercial washing of vehicles, swimming pools (if dechlorinated - less than one PPM chlorine), and fire fighting activities.

## Who Is Excluded?

Other than fire fighting activities, which are exempt due to their emergency nature, and non-commercial vehicle washing, no one is excluded from the regulations of

Chapter 245. Individuals, residences, businesses and City departments are all affected.

## How Does It Affect City Departments?

In aggregate, the City is responsible for maintaining the storm sewer system and storm sewer facilities, maintaining streets and public lands over which stormwater flows directly to water courses, and conducts numerous other activities that directly impact stormwater. In addition, the City is responsible for enforcing the *Stormwater Management* Ordinance. Thus City departments are uniquely affected by Chapter 245.

## How Will It Impact My Department Specifically?

Your department's responsibilities determine the degree to which you are impacted by Chapter 245. The Department of Public Works, for example, is heavily impacted by its regulations, as it regularly conducts activities that bring hazardous and non-stormwater substances into potential contact with storm drains, curb inlets and the City's water courses. It operates and stores vehicles, chemicals and contaminants that could easily leak or spill into the storm sewer system, as well as conducts land-disturbing activities that could introduce damaging sediments into the City's water courses. The Department of Recreation and Parks, as another example, maintains the City's public lands and buildings and, in so doing, generates large amounts of landscaping debris that could become seriously damaging to the storm sewer system and adjacent water courses. Departments with strictly administrative functions, on the other hand, will be impacted to a lesser degree. Even these departments, however, should take certain steps to ensure their compliance with Chapter 245.

## Stormwater runoff is...

- The leading source of water pollution
- Generated from impervious surfaces at a rate 9 times greater than the rate for pervious surfaces
- Primarily responsible for the impairment of Colonial Heights' waters, all of which are listed by the EPA as unsafe for virtually all forms of human contact
- The conveyance by which e.coli, PCBs and fecal coliform end up in our waters

## What Steps Should My Department Be Taking?

The key to compliance with Chapter 245 is awareness. By thinking about where any waste you or your department's personnel may generate in the execution of work may end up, or where and how any chemicals or substances your department may handle could come in contact with storm sewers or water courses, you'll be able to eliminate many situations that might currently be in violation of Chapter 245. Here are a few examples:

### *No liquids, solids or other materials down the storm drains:*

Chemicals, washwater of any type, grass clippings, leaves, brush, sands, mud and other sediments are all considered illegal discharges. Make sure none of your department's personnel are responsible for any such substances getting down the storm drains.

### *Inspect storage facilities thoroughly:*

Chemicals, oils, paints and other solvents are often stored for lengthy periods. Cover any and all stockpiles and storage facilities and store these items above-ground, in rust-proof containers, if at all possible.

### *Be aware of floor drains:*

Verify that any floor drains your department's facilities have are not connected to the storm sewer and do not drain to untreated areas or water courses. Permanently cover these drains if they are not absolutely necessary and take steps to avoid sending runoff to them if not. Try sweeping, for example, in place of hosing shop floors down. The Engineering Division can help with maps of your facilities.

### *Protect land disturbances:*

Be sure that erosion and sediment control measures like silt fencing and gravel curb inlet filter protection are in place before any land disturbances take place.

### *Report illicit connections and illegal discharges:*

Whether video-imaging utility lines, inspecting a building facility or collecting meter information, inform the Engineering Division of anything you think may be an illicit connection. Illegal discharges are often much easier to recognize than illicit connections, and should be reported to the Engineering Division whenever suspicions of them arise.

## **Colonial Heights Stormwater Management Program FAQ's**

**Q:** *Why does the City have a stormwater program?*

**A:** *The City's Stormwater Management Program (SWMP) is mandated by the terms of its NPDES permit, which allows it to discharge its MS4 into receiving waters.*

**Q:** *Who enforces it?*

**A:** *EPA, through the Department of Conservation and Recreation (DCR), enforces the terms of the City's permit. The Department of Public Works is responsible for administering the permit's program.*

**Q:** *My office's duties do not involve any of those components mentioned in the body of this guide. Are we still affected?*

**A:** *Even departments whose duties have nothing to do with anything related to stormwater play a role. Public Works may periodically need your assistance in some component of the program's administration or enforcement.*

**Q:** *What authority do I have in enforcement of Chapter 245 if I play a supporting role in the program?*

**A:** *All SWMP personnel have the authority to enforce Chapter 245 and several offices play a supporting role. Even if you are not in one of these roles, as a City employee you have a responsibility to report circumstances that you believe may be a violation of Chapter 245.*

**Q:** *To whom do I report possible violations to?*

**A:** *The Engineering Division of the Department of Public Works should be contacted with any potential violations.*

**Q:** *Where can I go to find out more?*

**A:** *Engineering Division personnel will be glad to answer any questions you have about the program and field any concerns or reports you might have regarding stormwater in the City. In addition, a good deal of SWMP information, as well as general stormwater pollution information, is available on the Public Works website under the stormwater management link.*

**Protecting the City's natural resources  
is everyone's responsibility.**



*Find out more at  
[www.colonial-heights.com/StormWaterManagement](http://www.colonial-heights.com/StormWaterManagement)*