

ANNE ARUNDEL COUNTY GOVERNEMENT

Chesapeake Bay TMDL

2 Year Implementation Milestones

FINAL Progress Report

Progress Achieved from July 1, 2015 – June 30, 2017

**Submitted by:
Anne Arundel County
Department of Public Works
Annapolis, MD**

MILESTONES

WASTEWATER SOURCE SECTOR

2016 – 2017 IMPLEMENTATION MILESTONES

WASTEWATER SOURCE SECTOR

Major Municipal WWTPs (ENR Upgrades)

2016 – 2017 Implementation Milestones

ENR Project Implementation

Complete ongoing construction projects in accordance with the schedules below:

FACILITY	COMPLETION DATE
Annapolis WRF	Complete
Broadneck WRF	1st Quarter 2018
Broadwater WRF	Complete
Cox Creek WRF – Phase I	Complete
Cox Creek WRF – Phase II	1st Quarter 2018
Maryland City WRF	Complete
Mayo WRF	Complete
Patuxent WRF	Complete

SEPTIC SOURCE SECTOR

Implementation of Anne Arundel County's Onsite Sewage Disposal System (SDS) Strategic Plan

DPW periodically holds internal coordination meetings to review progress on the overall program. Agenda topics vary depending on ongoing activities. New tasks or activities that are identified as being required to support an aspect of the program are assigned a tracking number based on calendar year and entered into a log. Due dates are loosely assigned and tasks are generally completed based on the dependence of other tasks.

A copy of the Task List as of January 2018 is provided in Appendix A as supplemental information to this report. More detailed descriptions can be provided if necessary. The list reflects when tasks are identified and added to the list rather than the completion date. As such, all dates provided are to be construed as approximations.

2016 – 2017 Implementation Milestones (Large CIP Program)

- **Determine core features of program such as funding and participation through interdepartmental discussions and with direction and action by the Council and Administration as needed.**

STATUS: During 2015, the Department of Public Works (DPW) initiated a “Septic Task Force” that included community, environmental, and business representatives. Information on the Task Force can be found at <http://www.aacounty.org/departments/public-works/septic-task-force/index.html> the Task Force held six (6) public meetings in 2017 to review the different issues associated with a large scale septic connection program. Copies of the meeting minutes and presentations are available on the DPW website. Separate meetings were held with small working groups that were established to examine specific subject areas. DPW is developing a Task Force Report to summarize the feedback that was received and determine future areas requiring investigation.

- **Consistent with program features, evaluate the potential for increased staffing in project management, public relations, and other areas either through direct hiring or staff augmentation contracts.**

STATUS: Formal recommendations will be developed after the program approach and financial plan have been determined.

- **Consistent with program funding, initiate designs for capital projects within the Priority Management Areas.**

STATUS: Formal recommendations will be developed after the program approach and financial plan have been determined.

- **Refine sewer extension and cluster treatment system preliminary plans and cost estimates based upon site specific engineering studies. Update costing information as appropriate with recent bid prices.**

STATUS: DPW has developed conceptual layouts and cost estimates for approximately 140 separate projects that could be included in the Large CIP Program. Individual tasks have been completed in-house and through the use of consultants under Open End contracts. New site specific studies have not been initiated but are anticipated in 2018.

- **Hire OSDS Strategic Planner to develop key program features including: engineering, design and construction management, financial planning, public and environmental policy, public relations, and program management. Upon completion, submit to MDE a strategic plan defining the program elements.**

STATUS: The County initiated a new contract, X734249 – “OSDS Strategic Plan” to retain the services of a program management team with expertise in multiple areas including: engineering and construction, financial planning, public and environment policy, public relations, and program management. Statement of Qualifications (SOQ) packages were received for this contract in November 2016 and proposals were received in May 2017. It is anticipated that the contract award and notice-to-proceed will be issued in 2018.

- **Upon approval of program funding, submit budget requests to support design and construction contracts within the Priority Management Areas.**

STATUS: Budgeting for design and construction contracts will be dependent upon the final program approach and identification of funding needs. Funding has been requested in FY19 to support the work of the OSDS Strategic Planner.

- **For the Broadneck Sewer Service Area, prepare an overall schedule for the design and construction of the sewer system expansion to facilitate a systematic and logical progression for retirement of septic systems.**

STATUS: The sequence and schedule of projects will be further developed once program funding is established.

2016 – 2017 Implementation Milestones (Small CIP Program)

- **Connect existing OSDS to public sewer through existing sewer connection contract depending on current contract funding.**

STATUS: The County has a blanket order contract for water and sewer house connections. This contract provides a method for providing connection where existing sewer abuts property but connections were not made as part of a previous capital project.

- **Create a new Project in budget to fund small extension and connection work.**

STATUS: Creation of a new project series in the Capital Budget will be done once program funding is established. The County completed Contract X764239 – “Small CIP Program Plan” to develop layouts for areas not included in the Large CIP layouts. The County is also working on a second contract, X764246 – “Small CIP Program Plan – Phase 2” which will be completed in 2018. Information from these contracts will be used to establish the basis for the annual funding level.

- **Consistent with the Strategic Plan, determine core features of program such as funding and participation through interdepartmental discussions and with direction and action by the County Council and Administration as needed.**

STATUS In 2017 the County initiated a “Septic Task Force” including community, environmental and business representatives. DPW has developed a Task Force to summarize the feedback that was received and determine future areas requiring further investigation. Input from the Septic Task Force will be used to develop specific contract tasks for the OSDS Strategic Planner.

- **Create a prioritization list for identifying projects and potential construction contracts.**

STATUS: Creation of a comprehensive prioritization list will be done once program features are finalized. In early 2017 the County completed work on contract, X764250 – HDPA Prioritization. This contract developed a prioritization ranking of the approximately three dozen Health Department Onsite Wastewater Management Problem Areas. It is expected that future efforts at prioritizing area will build on this study.

2016 – 2017 Implementation Milestones (Private Sector Facilitated Upgrades)

- **Explore potential of public-private partnerships for facilitating connection projects.**

STATUS: DPW has had some preliminary discussion with private interests related to the facilitation of sewer connections, but no project has been advanced to date. In addition, the scope for the Strategic Planner will include tasking to examine public-private partnerships and their potential role in the program.

2016– 2017 Milestones (OSDS Nitrogen Reducing Units)

- **Implement the requirements of C.O.M.A.R. 26.04.02**

Code of Maryland Regulations C.O.M.A.R. 26.04.02 established new requirements for on-site sewage disposal systems within the Chesapeake Bay Watershed. Effective September 1, 2016, a Best Available Technology (BAT) nitrogen-reducing unit (NRU) is required in place of a septic tank where a building addition, upgrade or new on-site sewage disposal system installation is made. The requirements apply to permit applications for septic tanks, drain fields, drywells, sand mound systems, pressure dosed beds and any other type of on-site sewage disposal system on a property located within the Chesapeake Bay Critical Area. Conventional septic systems outside the Critical Area are not required to comply with the new regulation.

Status: On-going Program. The Department of Health continued to implement the requirements of COMAR 26.04.02 for Best Available Technology (BAT) where a building addition, upgrade or new OSS is made in the County. Five hundred and ninety-nine (599) BATS were installed in FY16 and FY17. Four hundred and fifty-five (455) of the 599 BATS installed were funded with Bay Restoration Funds (BRF).

- **Implement the Bay Restoration (Septic) Fund Program**

Anne Arundel County will continue to administer a Bay Restoration (Septic) Fund program. The program is supported by a State grant from the Maryland Water Quality Financing Administration of the Maryland Department of the Environment (MDE) and is subject to the Maryland Board of Public Works approval. Anne Arundel County is required to implement the Bay Restoration (Septic) Fund program consistent with the program implementation guidance issued by MDE. The Bay Restoration (Septic) Fund provides up to 100% funding to property owners to cover part or all of the cost for the nitrogen-reducing unit. Applications

are prioritized based on the guidance given from MDE, with repair of failing systems in the Critical Area given the highest priority for funding. A geographic information system (GIS) is used to determine the location of the property in proximity to the Chesapeake Bay Critical Area. The County utilizes only third party verified BAT approved units for grant eligibility. BAT units are approved based on their capability of reducing total nitrogen from an on-site sewage disposal system by 50%. MDE evaluates and establishes a list of nitrogen-reducing units approved as Best Available Technology (BAT) for nitrogen removal. Grant awards include the purchase and installation cost of a BAT unit and a 2 year service contract. Qualified expenses are made by Anne Arundel County as a reimbursable cost from MDE based on the grant award letter. Currently the use of Bay Restoration Funds has been expanded and is available to support sewer connection projects where public sewer abuts a property or is in a utility easement immediately abutting a property. Grants are limited to \$20,000 per household with priority given to properties in Critical and Priority Funding Areas within Existing Sewer Service Areas of the County.

Status: In progress. The Department of Health continues to administer the Bay Restoration Septic grant program (BRF) that provides funding to projects that reduce the amount of nitrogen discharged from on-site sewage disposal systems (OSDS) to the Chesapeake Bay. In FY16 and FY17, four hundred and fifty-five (455) BRF grants were awarded for the installation of BATs. Additionally, twelve (12) public sewer connections were funded with BRF.

- **Implement the Requirements of the Groundwater Protection Plan**

The County Dept. of Health will continue to implement the requirements of the Groundwater Protection Plan as found in Appendix D of the County's Master Water and Sewer Plan. This Plan documents and summarizes policies and programs regarding on-site sewage disposal systems and the protection of groundwater where public sewer is not available. Nitrogen-reducing technology is utilized on properties for the repair of failing on-site sewage disposal systems, limited home additions, and new construction outside the Critical Area where variances to lot size, number of replacement systems, or change in the size of the on-site disposal system is necessary.

Status: On-going program. The Department of Health continued to implement the requirements of the Groundwater Protection Plan in assuring nitrogen-reducing technology is utilized for existing development using OSDS and where recommended for building permit approval.

URBAN STORMWATER SOURCE SECTOR

Core Urban Stormwater Strategy – Tier I

2016 – 2017 Implementation Milestones (Stream Restoration)

- **FY 16 Twenty-five thousand four hundred and thirty-four (25,434) linear feet of stream restoration programmed**
- **FY 17 Six thousand nine hundred and eighty-six (6,986) linear feet of stream restoration programmed**

***STATUS:** Feasibility assessments and design contracts were initiated for stream restoration projects programmed in FY16. Stream restoration projects programmed in FY17 have been assigned to project managers for the initiation of feasibility assessments and contract initiation. During FY16 One hundred and twelve thousand five hundred and seventy nine (112,579) linear feet of stream restoration were in notice to proceed design stage. In FY17 twenty thousand five hundred and fifty (20,550) linear feet of stream restoration were in notice to proceed to design stage. Construction of these projects is estimated to be complete in FY23. Proposed construction schedules may be delayed if State and Federal permit requirements are extensive.*

The following projects totaling eleven thousand two hundred and sixty five (11,265) linear feet of restoration were completed in FY16:

- *Annapolis Corporate Park SPSC #1 – 522 linear feet*
- *Annapolis Corporate Park SPSC #2 – 1000 linear feet*
- *Camp Woodlands Pre-Treatment - 276 linear feet*
- *Annapolis Harbour Center SPSC- 290 linear feet*
- *Church Creek Wetland- 1100 linear feet*
- *North Branch Muddy Creek- 1400 linear feet*
- *Annapolis Harbour Center Stream Restoration -1200 linear feet*
- *Poplar Point Wetland (Church Creek Gully) – 637 linear feet*
- *Duvall Creek Outfall Retrofit- 300 linear feet*
- *Cell 9 stream restoration- 827 linear feet*
- *Dividing Creek Stream Restoration- 1000 linear feet*
- *Warehouse Creek Outfall Retrofit- 1108 linear feet*

- *Hospital Drive Extension- 258 linear feet*
- *Cinnamon Lane Outfall- 455 linear feet*
- *Picture Springs Branch Outfall- 642 linear feet*
- *Buttonwood Trail Outfall -250 linear feet*

In addition, the following shoreline restoration projects totaling one thousand six hundred and sixty three (1,663) linear feet were completed in FY16:

- *Lake Ogleton (Annapolis Cove) Living Shoreline – 639 linear feet*
- *Cloverlea Boat Club Living Shoreline – 490 linear feet*
- *Tomkies Living Shoreline – 167 linear feet*
- *Twin Harbors Living Shoreline -180 linear feet*
- *Quiet Waters Shoreline Protection -187 linear feet*

The following projects totaling five hundred (500) linear feet of restoration were constructed in FY16:

- *Cape St Claire Fire Station SPSC – 378 linear feet*
- *Pinewood Rd SD – 122 linear feet*

The following projects totaling eleven hundred and sixty-one (1,161) linear feet of restoration were completed in FY17:

- *Navy Dairy Farm Stream Restoration -1,011 linear feet*
- *Four Seasons Restoration Repair – 150 linear feet*

The following shoreline restoration projects totaling one thousand five hundred and seventy-eight (1,578) linear feet were completed in FY17:

- *Londontowne Property Owners Association – Section 5 Living Shoreline – 300 linear feet*
- *Brewers Pond Shoreline Protection – 487 linear feet*
- *Living Shoreline at The Preserve at Broad Creek and Broadview Estates – 124 linear feet*
- *Turkey Point Island Living Shoreline Project – Phase 1- 667 linear feet*

In addition, forty-one (41) shoreline projects totaling six thousand three hundred and seventy-five (6,375) linear feet on private property were completed in FY17.

2016 – 2017 Implementation Milestones (Stormwater Pipe Outfall Retrofits)

- **FY 16 Two hundred sixteen (216) outfalls programmed for water quality enhancement**
- **FY 17 Thirty-two (32) outfalls programmed for water quality enhancement**

STATUS: Feasibility assessments and design contracts were initiated for the outfall retrofit projects programmed in FY16. Outfall retrofit projects programmed in FY17 have been assigned to project managers. Those project managers are in the process of initiating contracts for feasibility assessments. Thirty-four (34) outfalls were under notice to proceed to design in FY16 and eighteen (18) outfalls were under notice to proceed to design in FY17. Construction of these projects is estimated to be complete in FY19. Proposed construction schedules may be delayed if State and Federal permit requirements are extensive.

The following projects were constructed in FY16 (Note: acres are equivalent impervious acre credits)

- *Maryland Therapeutic Riding Center – 3.33 acres*

The following outfall stabilization projects totaling three hundred and forty five (345) linear feet were completed in FY16

- *Locust Dr. - 30 linear feet*
- *Puffin Ct – 50 linear feet*
- *Tam Glade- 200 linear feet*
- *Arundel Ave. - 40 linear feet*
- *Seaborne Dr. - 25 linear feet*

The following outfall stabilization projects totaling two hundred and fifty (250) linear feet were completed in FY17:

- *Old Mill Rd – 70 linear feet*
- *209th St – 40 linear feet*
- *Monaghan Rd – 50 linear feet*
- *Woodland Manor Dr. – 90 linear feet*

2016 – 2017 Implementation Milestones (Pre 2002 Stormwater Management Pond Retrofits)

- **FY 16 Sixty-five (65) pond retrofits programmed**
- **FY 17 Twenty-six (26) pond retrofits programmed**

STATUS: Feasibility assessments and design contracts were initiated for the pond retrofit projects programmed in FY16. Pond retrofit projects programmed in FY17 have been assigned to project managers. Those project managers are in the process of initiating contracts for feasibility assessments. Thirty-one (31) pond retrofits were under notice to proceed to design in FY16 and Twenty-seven pond retrofits were under notice to proceed to design in FY17. Construction of these projects is estimated to be complete in FY19. Proposed construction schedules may be delayed if State and Federal permit requirements are extensive.

The following projects were constructed in FY16, providing one hundred and seventeen (117) acres of equivalent impervious acre credits.

- *Crofton South*
- *Gapgallion*
- *Garland Park*
- *Saint Josephs Church*
- *Sun Valley Apartments*
- *Saint Andrews United Methodist Church*
- *Inverness Woods*
- *Kellwood Estates*
- *Hospital Dr. Pond 3 Retrofit*
- *Anne Arundel Community College*
- *Chesterfield 4-1/ Phase 4*
- *Deerfield*
- *Glen Eden*
- *Laurel Highlands*
- *Merriweather #2*
- *Sturbridge #3*
- *Sturbridge #4*
- *Shiple-Fairmount/ 253-42*
- *Severn Hills*
- *Wicklows Woods*
- *Shiple-Fairmount/ 253-42*
- *Chelsea Beach Lots 405a-405d*
- *Wise Metals*
- *Loch Haven Manor Lots 1-17*
- *Grosvenor Lane Bioretention*
- *Arundel On The Bay Bioswale #1*
- *Arundel On The Bay Bioswale #2*
- *Arundel On The Bay Bioswale #3*

- *Arundel On The Bay Pocket Wetland*
- *Hillsmere - Beach Drive Kayak Area CPO / Bioretention*
- *Hillsmere Community Pool Bioretention*
- *Historic London Town Step Pools and Rain Garden*

The following projects were under construction in FY16:

- *Annapolis Landing*
- *Hardesty Estates/ Section 6*
- *Patapsco Tidal Outfall K040026*
- *Linthicum Oaks #2*
- *Oakleaf Villa I*
- *Lp-Pc Public Ponds*
- *Northrup Grumman Bioswale -1*
- *Northrup Grumman Grass Swale -1*
- *Northrup Bioretention Area -1*
- *Northrup Grumman Pervious Pavement - 1*
- *Northrup Grumman Pervious Pavement - 2*
- *Northrup Grumman Pervious Pavement - 3a*
- *Northrup Grumman Pervious Pavement - 3b*

The following projects were constructed in FY17, providing one hundred and forty one (141) acres of equivalent impervious acre credits.

- *Annapolis Landing*
- *Tulip Oak Court Pond/Outfall Retrofit*
- *Linthicum Oaks #2*
- *Hardesty Estates Section 6*
- *Valentine Creek SWM Retrofit*
- *Chalmers Ave Pond Retrofit*
- *Baby Baer Court Pond Retrofit*
- *New Cut Farms*
- *Whites Cove Rd Retrofit*
- *Courts at Four Seasons (Waugh Chapel RD) Pond Retrofit*
- *Oakleaf Villa I*
- *Northrup Grumman Bioswale 1*
- *Northrup Grumman Pervious Pavement 1*
- *Northrup Grumman Pervious Pavement 3A-2*
- *Northrup Grumman Pervious Pavement 3B*
- *Northrup Grumman Pervious Pavement 2*
- *Empowering Believers Church Rain Garden 6*

- *Empowering Believers Church Rain Garden 2*
- *Empowering Believers Church Rain Garden 1*
- *Coventry Court Dry Channel RSC- Category 2*
- *Herald Harbor Bonaparte RD #2 CPO*
- *St. Anne School of Annapolis Rain Garden*
- *Avalon Shores Fire Dept Stormwater Wetland*
- *Sappington Hill BMP 1281*
- *Fairfield Drive Pond Retrofit*
- *Dellwood Court Outfall Sand Filter*
- *Dellwood Court Outfall Bioretention*
- *Dellwood Court Infiltration Trench*
- *Northrop Grumman ESD Pervious Pavement 3A-1*
- *Northrop Grumman ESD Raingarden*
- *Pinewood Road Storm Drain SPSC*

The following project was under construction in FY17:

- *Fox Cub Court Pond Retrofit*

Core Urban Stormwater Strategy – Tier II

2016 – 2017 Implementation Milestones (Street Sweeping)

- **Implement twice monthly street sweeping along up to three hundred (300) curb miles of the County road network.**

STATUS: The County is focusing street cleaning efforts on high traffic volume arterial and collector roads, industrial/business parks, and NPDES priority area streets, including several that discharge to a tidal or non-tidal water body within the Patapsco River watershed given the Baltimore Harbor Trask TMDL. Street sweeping occurs on targeted streets twice per month for the full 12 months per year weather permitting. Between July 1, 2015 and June 30, 2016 a total of 4,871 curb miles were swept. Between July 1, 2016 and June 30, 2017 a total of 7,128 curb miles were swept. In total, the County swept eleven thousand nine hundred and ninety-nine (11,999) curb miles during the reporting period. Select County parking lots comprising approximately 9.7 acres were also included in twice monthly sweeping in support of facility specific stormwater pollution prevention plans.

- **Implement expansion of curbed streets included in the County's street sweeping program to include WIP, TMDL and NPDES related priority areas. The County anticipates adding up to 50 curb miles to the street sweeping program.**

STATUS: Between July 1, 2015 and June 30, 2017 no new WIP, TMDL and NPDES related priority areas were added to the street sweeping program. However, the FY17 Street Sweeping program expansion incorporated the street cleaning of one hundred (100) additional curb miles of collector roadways spanning most of the County's 12 primary watersheds, to provide enhanced material collection and increased NPDES credits.

2016 – 2017 Implementation Milestones (Inlet Cleaning)

- **Hand clean up to sixteen thousand (16,000) inlets yearly.**

STATUS: Between July 1, 2015 and June 30, 2016 the County manually cleaned and removed debris from twelve thousand three hundred and twenty nine (12,329) catch basins, inlets and outlet structures. Between July 1, 2016 and June 30, 2017 the County manually cleaned and removed debris from six thousand eight hundred and seventy nine (6,879) catch basins, inlets and outlet structures.

- **Machine clean up to three thousand (3,000) inlets yearly.**

STATUS: Between July 1, 2015 and June 30 2016, the County machine cleaned a total of nine hundred eighty seven (987) structures with a sewer vacuum truck. Prior to and during the reporting period, the County initiated the process of purchasing two (2) additional vacuum trucks and two (2) replacement vacuum truck for the inlet cleaning program, with productivity on track to exceed three thousand (3,000) inlets (and adjacent pipe) yearly.

2016 – 2017 Implementation Milestones (Tree Planting)

- **Implement tree planting on up to seventy (70) acres.
Rockhold Creek Farm Park (50 acres)
Simmons Farm (15-20 acres)**

STATUS: Through a partnership with the Chesapeake Bay Trust, Anne Arundel County funded the reforestation of 3.4 acres of protected park land, 2 acres of forest

enhancement, and an additional 27.3 acres of invasive plant species removal that will be reforested in the coming years. The program widened its focus in 2016 to allow opportunities for land preservation through conservation easements. Five (5) applications are currently under review and successful projects will receive grant awards in March of 2017. These figures do not reflect the Anne Arundel County Community Forestry Mini Grant, which offers funding on a rolling basis for reforestation and invasive species removal. In FY17 the County preserved through a permanent easement 123 acres of forest including much of the area protecting the Cranberry Woods bog on the Severn River.

2016 – 2017 Implementation Milestones (Stormwater to the Maximum Extent Practicable)

- **Provide stormwater treatment to the maximum extent practical on seventy-six (76) acres of publically owned land and facilities.**

STATUS: The following four (4) projects were completed on publicly owned property during FY16

- *Quiet Waters Park – Shoreline Protection – 7.48 equivalent impervious acres treated*
- *Dividing Creek Pond Retrofit – Pond Retrofit – 10.99 equivalent impervious acres treated*
- *Cell 9 stream restoration– Stream Restoration–12 acres of equivalent impervious area credit*
- *Dividing Creek – Stream Restoration – 10 acres of equivalent impervious area credit*

The following four (4) projects were under design on publicly owned property during FY17:

- *Jack Creek Park – Shoreline Protection – 64 equivalent impervious acres treated*
- *Fort Smallwood Shoreline Protection: Reach 1, Stone breakwater living shoreline – 55 equivalent impervious acres treated*
- *Fort Smallwood Shoreline Protection: Reach 2, Stone breakwater living shoreline – 65 equivalent impervious acres treated*
- *Fort Smallwood Shoreline Protection: Reach 3, Stone breakwater living shoreline – 66 equivalent impervious acres treated.*

2016 – 2017 Implementation Milestones (Watershed Stewards Academy (WSA) and Watershed Organization Implementation)

- **The Anne Arundel Watershed Stewards Academy will install two hundred (200) rain barrels.**

STATUS: During FY16 – FY17 Watershed Stewards installed two hundred and nine (209) rain barrels and six (6) cisterns capturing 15,970 gallons of rain water.

- **The Anne Arundel Watershed Stewards Academy will plant twelve thousand (12,000) native plants and trees.**

STATUS: During FY16 – FY17 Watershed Stewards planted 26,307 native plants and shrubs and 4,151 native trees totaling 30,458 native plants and trees.

- **The Anne Arundel Watershed Stewards Academy will install four hundred thousand (400,000) square feet of new residential and community restoration.**

STATUS: During FY16 – FY17 Watershed Stewards installed 195,893 square feet of restoration (4.5 acres) (note: the discrepancy between the projected and actual square footage of restoration relates to a change in the way backyard buffers are calculated).

- **The watershed organizations operating in Anne Arundel County will:**
 - **Restore approximately two thousand six hundred and fifty (2,650) linear feet of stream**
 - **Construct two hundred and ninety (290) linear feet of living shoreline**
 - **Create five thousand eight hundred (5,800) square feet of tidal marsh/living shoreline**
 - **Treat thirteen (13) acres with bio-retention systems**
 - **Five thousand (5,000) square feet bio-retention in Critical Area**
 - **One (1) acre wetland restoration**
 - **Reforest five (5) acres**

STATUS:

During FY16 the following restoration activities were funded through the WPRP Grant Program and implemented by watershed organizations in the County:

- *1,410 linear feet of stream restoration*
- *460 linear feet of Step Pool Stormwater Conveyance (SPSC)*
- *15,764 square feet of bio-retention*
- *5.1 acres of non-tidal wetlands*

During FY17 the following restoration activities were completed and funded through the WPRP Grant Program:

- *2,000 square feet of impervious pavement removed (Avalon Shores Fire Station)*
- *4,252 square feet of non-tidal wetlands*
- *1,057 square feet of bio-retention*
- *120 linear feet of dry channel Regenerative Stormwater Conveyance*

2016 – 2017 Implementation Milestones (Other)

- **Removal of 5.98 acres of concrete lined perennial stream channel in the headwaters of Furnace Creek (1.88 acres) and Marley Creek (4.1 acres).**

STATUS: Furnace Creek (B553902) is at 90% Design. 1.88 acres of impervious area is proposed to be removed. Marley Creek Group 3 (B554801) is in the Schematic Design Phase. 3.88 acres of impervious area is proposed to be removed (a concrete lined stream segment has been removed from the scope of the project). In addition, during FY17 2,000 square feet of impervious pavement was removed from the Avalon Shores Fire Station site through a WPRP grant funded project.