

February 12, 2019

Lisa Plevin
Executive Director
Highlands Water Protection and Planning Council
100 North Road (Route 513)
Chester, NJ 07930-2322

Re: Regional Stormwater Management Planning Proposal

Dear Lisa:

The Rutgers Cooperative Extension (RCE) Water Resources Program is pleased to provide you with this proposed scope of work. We are excited to develop regional stormwater management planning for the New Jersey Highlands by completing impervious cover assessments (ICAs), impervious cover reduction action plans (RAPs), and green infrastructure (GI) feasibility studies for municipalities in one of the watersheds of the New Jersey Highlands. The RCE Water Resources Program has been actively involved in working with municipalities across the state to identify opportunities to reduce the impacts of stormwater runoff using green infrastructure practices. The ICA, RAP, and GI feasibility study provide municipalities with a blueprint for retrofitting existing development with stormwater management that will help improve the water quality of the local waterways as well as reduce localized flooding in the community. These three documents will be suitable for submittal to Sustainable Jersey so municipalities can obtain the Sustainable Jersey points for green infrastructure planning.

The RCE Water Resources Program is funded in-part by the New Jersey Agricultural Experiment Station (NJAES), which receives state and federal financial support. Our projects, staff, and programs are made possible through this support, supplemental grants, and agreements with our project partners and communities throughout New Jersey. Financial support from our project partners allows the RCE Water Resources Program to leverage the resources available through Rutgers University by applying them to the real-world issues threatening the quality of our state's waters and our citizens' quality of life.

We appreciate your interest in working with the RCE Water Resources Program, and our technical staff is well qualified and prepared to develop these very important plans for the communities of the New Jersey Highlands.

The New Jersey Highlands Region covers less than 15% of the state but provides drinking water for 70% of its residents. New Jersey recognized the significance of this region and passed the Highlands Act in 2004 to protect the valuable resources in this region. The Highlands Act

advocated for a regional planning approach to protect and restore the waterways of the New Jersey Highlands. This proposal seeks to embrace the regional planning concept and focus on identifying opportunities in the watersheds of the Highlands for green infrastructure to manage uncontrolled sources of stormwater runoff.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on the scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams. Schueler (1994, 2004) developed an impervious cover model that classified “sensitive streams” as typically having a watershed impervious surface cover from 0-10%. “Impacted streams” have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. “Non-supporting streams” have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community. Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This new analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

For this proposal, we will complete green infrastructure plans on a municipal basis for one of the Highlands watersheds and provide summaries of proposed green infrastructure projects by subwatershed to help prioritize project implementation. We would like to focus on the Highlands portion of Watershed Management Area 8 – North and South Branch Raritan (see attached list of municipalities). We already have completed green infrastructure plans for three of the 27 municipalities. For the remaining municipalities, we would complete impervious cover assessments (ICAs), impervious cover reduction action plans (RAPs), and green infrastructure (GI) feasibility studies. These green infrastructure plans are described below. Since the information in each of these municipal green infrastructure plans is prepared on a subwatershed basis, information for subwatersheds can be combined from the municipal plans to summarize recommendations for subwatersheds (e.g., HUC 14 basis). We would also like to prepare some engineering designs for green infrastructure demonstration projects. Many of these municipalities are in the Sustainable Jersey program and can earn points to their accreditation for both green infrastructure planning and implementation. The designs will help these municipalities move forward with implementation. The individual tasks are outlined below for this project.

Task 1 – Prepare impervious cover assessments (ICAs)

The RCE Water Resources Program will prepare an impervious cover assessment for each of the 24 municipalities in the Highlands portion of WMA 8 – North and South Branch Raritan River

Watershed. Using NJDEP's land use/land cover GIS data layer, the RCE Water Resources Program will determine the acres of impervious cover in each municipality. In the NJDEP land use/land cover GIS data layer, each land cover polygon has an associated impervious cover percentage based on the type of land use there. The RCE Water Resources Program will calculate stormwater runoff volumes for the impervious surfaces for the New Jersey water quality design storm of 1.25 inches of rain, an annual rainfall of 44 inches, the 2-year design storm, the 10-year design storm, and the 100-year design storm. These calculations will graphically illustrate the impact of impervious surfaces with increasing the amount of stormwater runoff leaving a site. All calculations will be completed for the entire municipality and on a subwatershed basis. By combining results from individual municipal ICAs, the impervious cover on a HUC 14 watershed basis can be determined, which may include portions of several municipalities.

Task 2 – Prepare impervious cover reduction action plans (RAPs)

Using the data gained from the ICA, the RCE Water Resources Program will develop a RAP for each of the 24 municipalities in the watershed. Digital imagery will be used to identify opportunities for implementing impervious cover management strategies. Several factors will be considered, including property ownership, availability of useable land on site, and proximity to waterways. For each opportunity, appropriate green infrastructure practices will be identified. Large scale systems such as constructed wetlands or bioretention systems will be considered to treat residential or commercial developments. Small scale systems such as rain gardens will also be considered for individual lots (e.g., churches, schools, businesses, homes). The environmental benefits for each recommended practice will be provided in the plan including stormwater volume managed, expected pollutant load reductions, and wildlife habitat enhancements. Ten to 20 sites will be incorporated into the RAP for each municipality. Projects will be grouped by subwatershed (e.g., HUC 14 watershed) to help prioritize installation. The municipalities will have an opportunity to recommend sites for consideration. The sites from the RAP will be incorporated into a web-based interface so the general public can easily access the recommendations.

Task 3 – Create green infrastructure feasibility studies

The RCE Water Resources Program will prepare a green infrastructure feasibility study for each of the 24 municipalities. The feasibility study incorporates the information from the ICA and RAP into an easy-to-read document that includes information from the Green Infrastructure Guidance Manual for New Jersey, such as descriptions and images of various green infrastructure practices as well as information on community engagement and educational programs. Artistic renderings for several of the proposed green infrastructure projects will be included in the feasibility study.

Task 4 – Summarizing findings and recommendations on a HUC 14 watershed basis

Since each plan provides analyses on a subwatershed basis, results and recommendations from several adjacent municipalities can be used to summarize information on a HUC 14 watershed basis. This will allow for a regional approach to prioritize projects and better understand the effects projects in one municipality may have on another municipality.

Task 5 – Design of demonstration green infrastructure projects

The overall goal for any plan should be implementation. For this task, the RCE Water Resources Program will design 12 green infrastructure demonstration projects throughout the North and South Branch Raritan River Watershed. Designs will be provided for municipalities that are willing to fund the implementation of demonstration projects. For each design, a set of signed and sealed engineering drawings will be provided with a materials list and a cost estimate.

All work will be closely coordinated with the Highlands Council. The RCE Water Resources Program will work to complete tasks in a timely manner. Tasks 1 – 4 will be completed within one year of authorization. It may take up to an additional six months to complete the designs for Task 5. A budget is attached.

We are excited about this opportunity to partner with the Highlands Council. We look forward to examining stormwater on a regional basis through this planning process. Please do not hesitate to call or email me with any comments or questions.

Best Regards,



Christopher C. Obropta, Ph.D., P.E.
Extension Specialist in Water Resources

Attachment 1
Municipalities in WMA 8 Portion of the New Jersey Highlands

WMA 8 - North and South Branch Raritan	
Municipality	County
ALEXANDRIA TWP	HUNTERDON
BETHLEHEM TWP	HUNTERDON
CALIFON BORO	HUNTERDON
CLINTON TOWN	HUNTERDON
CLINTON TWP	HUNTERDON
GLEN GARDNER BORO	HUNTERDON
HAMPTON BORO	HUNTERDON
HIGH BRIDGE BORO	HUNTERDON
LEBANON BORO	HUNTERDON
LEBANON TWP	HUNTERDON
TEWKSBURY TWP	HUNTERDON
UNION TWP	HUNTERDON
CHESTER BORO	MORRIS
CHESTER TWP	MORRIS
MENDHAM BORO	MORRIS
MENDHAM TWP	MORRIS
MINE HILL TWP	MORRIS
MOUNT ARLINGTON BORO	MORRIS
MOUNT OLIVE TWP	MORRIS
RANDOLPH TWP	MORRIS
ROXBURY TWP	MORRIS
WASHINGTON TWP	MORRIS
BEDMINSTER TWP	SOMERSET
BERNARDS TWP	SOMERSET
BERNARDSVILLE BORO	SOMERSET
FAR HILLS BORO	SOMERSET
PEAPACK-GLADSTONE BORO	SOMERSET

Completed Green Infrastructure Plans

Attachment 2 Budget

Task 1 – Prepare impervious cover assessments (ICAs)

Task 2 – Prepare impervious cover reduction action plans (RAPs)

Task 3 – Create green infrastructure feasibility studies

Task 4 – Summarizing findings and recommendations on a HUC 14 watershed basis

Cost for Tasks 1 – 4 is \$240,000 plus 10% for Rutgers overhead = \$264,000

Task 5 – Design of demonstration green infrastructure projects

Cost for Task 5 (12 project designs) is \$42,000 plus 10% for Rutgers overhead = \$46,200