

# Section 1

## Introduction

### 1.1 Overview

A well-crafted and implemented watershed management plan is arguably the best and most comprehensive tool to protect urban streams and riparian corridors from the cumulative impacts of new land development and existing urbanization. Storm water runoff is part of a natural hydrologic process. However, urbanization and other human activities can alter natural drainage patterns and add pollutants to runoff and streams, causing declines in habitat quality and limiting the public's ability to enjoy many of the benefits that water provides. The practice of watershed protection is about making choices about what tools and measures to apply and in what combination. This draft report is the culmination of the watershed planning process for the Nine Mile Run (NMR) watershed and documents the resulting findings, conclusions, and recommendations. Watershed stakeholders will need to carefully review these recommendations, make any needed revisions, and adopt the finalized plan as a comprehensive guidebook for improving the NMR watershed.

Section 1 of this draft Watershed Management Plan summarizes the history of the NMR project and the previously completed tasks and analyses that were conducted in support of this plan, the relative roles of the various institutional entities in the watershed, and outlines the process for review and finalization of this draft document. Section 2 of the draft plan documents the problems that were identified and goals that were established for the NMR watershed. The watershed planning process was supported by existing and new data and analyses. Section 3 summarizes the pertinent input from completed hydrologic/hydraulic and water quality investigations and analyses. The watershed planning process identifies and assesses non-structural best management practices and structural remediation measures and technologies to mitigate or remediate point and non-point sources within the watershed. Section 4 of the draft plan documents the alternative non-structural measures and Section 5 documents the structural alternatives that were pertinent to the NMR watershed. Section 6 documents the assessment and screening process that was conducted on each of the alternative control measures that were considered. Section 7 documents the Watershed Management Plan elements that are recommended for review, revision, adoption, and implementation by the watershed stakeholders.

Successful watershed planning in Nine Mile Run will require a combination of existing and new institutional organizations to focus the resources of a diverse group of stakeholders to implement the plan. A long-term management structure is not only critical to prepare and implement the plan, but to revisit and update the plan as goals are achieved or circumstances change over time. The following institutional entities either have or will have significant roles in reviewing, revising, adopting, and implementing the watershed management plan.

**Nine Mile Run Watershed Association:** The watershed association currently is being established to oversee and implement the NMR Watershed Management Plan. The association will be comprised of citizen volunteers with diverse backgrounds, interests, and areas of expertise. Association members will represent the interests of the NMR watershed, home and business owners in the watershed, other stakeholders in the watershed. The association also will evaluate and oversee the improvements provided by the Habitat Restoration Program after construction has been completed. The management association will have no regulatory authority, but will make recommendations to local municipalities, sewer authorities, and environmental regulators to implement recommended management strategies, restoration measures, and structural rehabilitation. The management association will have the primary responsibility for reviewing this draft management plan, making any needed revisions, adopting the plan, and coordinating with the other institutional entities so that the plan is implemented, evaluated, and updated on a regular basis.

**Municipal Government:** There are four municipalities that have jurisdiction over their respective portions of the NMR watershed. They are the City of Pittsburgh, and the Boroughs of Edgewood, Swissvale, and Wilkinsburg. These four municipalities will need to work together as a unified watershed entity and transcend existing municipal borders. The municipalities will have the authority to revise and enforce ordinances that would shape new development and restorative redevelopment, control the disposal of pet wastes and household hazardous wastes, and oversee the rehabilitation of aging sewer, storm drain and pavement systems in the watershed. Municipalities in the NMR watershed also will need to carefully review this draft management plan and make any needed revisions.

**Regulatory Agencies:** The Allegheny County Health Department (ACHD), PA Department of Protection (PA-DEP), and the PA Department of Conservation and Natural Resources (PA-DCNR) are existing regulatory agencies that have authority and jurisdiction over environmental quality within the NMR watershed. They have been active in the watershed in the past and will have active roles in the future implementation of the NMR Watershed Management Plan. The ACHD has conducted field investigations and laboratory analyses and determined that bacterial concentrations along the NMR stream channel exceed established water quality standards. The PA-DEP has issued Consent Order Agreements (COAs) to the Pittsburgh Water and Sewer Authority (PWSA) and the Boroughs of Edgewood, Swissvale, and Wilkinsburg. These orders require comprehensive inspections of aging sewer systems, removal of illicit sewage connections to municipal storm drain systems, assessment of sewer system conveyance capacities, the elimination of SSOs, and meeting the standards of the National CSO Control Policy. PA-DEP will issue the regulatory permits associated with the construction of many of the structural control measures recommended in the plan and insure that the requirements of the COAs are met.

**Sewer Authorities:** The Pittsburgh Water and Sewer Authority (PWSA) has the responsibility to operate and maintain the combined and separate sewer systems located within the City of Pittsburgh portions of the NMR watershed. The Allegheny County Sanitary Authority (ALCOSAN) has the responsibility to operate and maintain the M-47 regulator structure that controls the flow of wastewater into the regional interceptor and treatment systems. The separate sanitary sewer and municipal storm drain systems within the rest of the watershed currently are owned and operated by the respective Boroughs of Edgewood, Swissvale, and Wilkinsburg.

**NMR Habitat Restoration Project:** The Nine Mile Run Habitat Restoration Project (NMR-HRP) would be the institutional vehicle to implement recommended restoration measures along the existing NMR and Fern Hollow riparian corridors. Under the project, the natural morphology of the stream and the connection to the flood plain will be restored, the stream channel and over-banks will be stabilized to control erosion and bed-loads, new wetland areas will be created, vegetation will be enhanced and managed, and aquatic and terrestrial habitat will be restored. The City of Pittsburgh is the local sponsor for the program that is administered via a Water Resources Development Act (WRDA) Section 206 grant administered by the Army Corps of Engineers (ACOE).

## 1.2 Project History

A series of successive tasks has been conducted to develop and implement the watershed planning process for Nine Mile Run. The watershed planning process identifies and prioritizes problems and sets goals and objectives for future work. The completed Watershed Master Plan identifies and assesses non-structural best management practices and structural remediation measures and technologies to mitigate or remediate point and non-point sources within the watershed. The following tasks have been completed and documented in the watershed planning process.

**Task 1, Coordination with Stakeholders and Agencies:** Public meetings were conducted with watershed residents and stakeholders to identify and prioritize problems and goals for the NMR watershed. Watershed management planning activities were coordinated with various municipalities and agencies working in the watershed to insure that proposed activities are consistent with watershed goals.

**Task 2, Gather Pertinent Historic and Background Information:** The foundation of the watershed master plan was prepared by obtaining pertinent historic and background information on the NMR watershed. Research papers were obtained from various academic authors who had written on the history of the watershed to provide an historic backdrop to the watershed management plan. Historic water quality data was obtained to characterize existing conditions and problems and identify opportunities to mitigate these problems. Geographic information for the NMR watershed was obtained from a countywide geographic information system

(GIS) database that includes topography, building footprints, streets and driveways, land uses, surface streams, and tree cover. Watershed communities are under order from the Pennsylvania Department of Environmental Protection (PA-DEP) to identify and eliminate illegal discharges into NMR. Enforcement and rehabilitation actions from these orders should significantly reduce pollutant loads to watershed streams, and copies were obtained for this watershed study.

**Task 3, Conduct Field Investigations and Gather New Data:** Additional field investigations were conducted along Nine Mile Run and Fern Hollow to obtain new field data in support of watershed planning. Cross sections of the stream channel and overbank areas were obtained and a centerline profile of the channel was prepared. Sewer system structures such as regulator chambers, manholes, and combined sewer overflow (CSO) outfalls were inspected and accurately located using global positioning satellite (GPS) technology. To refine the assessment and characterization of water quality, samples were obtained along watershed streams and sent to a laboratory for analysis. Extensive bioassessment surveys were conducted to quantify the impacts of urban pollution on aquatic and wetland habitat quality. An inventory of riparian vegetation was conducted to quantify the impacts of moving, filling in of wetland areas, lateral scouring during storm flow, altered drainage systems, and intrusion by aggressive exotic non-native plant species.

**Task 4, Conduct Fluvial Geomorphology Assessment and Collect Supporting Data:** An extensive assessment of channel morphology and stability was conducted along NMR and Fern Hollow. General conditions were documented, and eroded areas were identified, located and mapped. Field measurements were obtained and channel areas were classified using the Rosgen stream classification method. The causes of observed problems and alternative ways to mitigate accelerated bed and bank adjustments were determined.

**Task 5, Perform Hydrologic and Hydraulic Analyses:** Modeling activities were conducted to characterize and simulate hydrologic and hydraulic processes in the NMR watershed. To insure the success of new wetland areas that are planned for the watershed, an accurate and reliable understanding of surface hydrology and stream hydraulics is needed. Continuous simulation models were developed and used to support environmentally sensitive and sustainable engineering design procedures based upon sound geomorphic principals. The models represent base-flow, overland rainfall-runoff, storm drain discharges, CSO discharges, and resultant receiving stream hydraulics within the entire NMR watershed.

**Task 6, Develop a Watershed Management Plan for Nine Mile Run:** This task is the culmination of the watershed planning process. The associated report documents the resulting findings, conclusions, and recommendations from the completed watershed planning activities. The watershed planning process identified and prioritized problems and set goals and objectives for future work. The watershed planning

process was supported by existing and new data and analyses. The watershed planning process identified and assessed non-structural best management practices and structural remediation measures and technologies to mitigate or remediate point and non-point sources within the watershed. The planning process included the assessment and screening process that was conducted on each of the alternative control measures that were considered. Finally, the Watershed Management Plan documents control and remediation elements that are recommended for implementation.