

ENVIRONMENTAL APPENDIX

WATER QUALITY, IMPERVIOUS COVER, FORST AND TREE CANOPY COVER

Information about water quality in the Great Seneca Plan area is derived from Montgomery County's stream monitoring program, which is jointly administered by the Montgomery County Department of Environmental Protection and the Montgomery County Department of Parks. Water quality is determined by sampling biological indicators that respond to changing water quality conditions, including benthic macroinvertebrates (insects and insect larvae that live in the water) and fish communities. Benthic macroinvertebrates and fish that are less tolerant of pollutants drop out of in-stream biological communities as water quality is impaired, leaving behind only the more pollution-tolerant species and less species richness and diversity in the aquatic systems. Montgomery County's stream monitoring program has been operating for about 25 years, generating enough records over time to be able to identify trends in water quality condition.

Because Montgomery County has biological monitoring stations in streams downstream of the planning areas and enclaves in the Great Seneca Plan, specific differences in water quality conditions downstream of the Plan's areas can be identified. This information is available in sufficient detail to allow us to determine past and existing water quality conditions for several specific areas within the Plan.

Water quality conditions are strongly correlated with the amount of impervious cover and the amount of forest and tree canopy within the area draining to each monitoring station location on the stream. Greater amounts of impervious cover and lower forest and tree canopy cover result in lower water quality conditions. Stormwater management controls can mitigate somewhat for increases in imperviousness and decreases in forest and tree canopy coverage. The poorest water quality in the County occurs in streams within watersheds that have high impervious cover, low forest and tree canopy cover, and inadequate or absent stormwater treatment controls.

LIFE SCIENCES CENTER WATER QUALITY

The LSC South and portions of the LSC Central district drain south to the Watts Branch watershed. The Piney Branch, which is a tributary of the Watts Branch, has its headwaters in the Life Sciences center. The Piney Branch watershed was declared a Special Protection Area in XXXX based on initial assessments that identified indicators of high water quality ahead of pending development in the area. The LSC North, LSC West, and the remainder of the LSC Central drain north and west into the

Muddy Branch watershed. Protection of these watersheds is especially important because both streams discharge into the Potomac River upstream of the water intake for WSSC's Potomac Water Filtration Plant, which provides most of the potable water for Montgomery County.

LSC Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 42.05%

Tree canopy cover: 27.89% (includes forest cover)

Forest cover: 12.42%

Muddy Branch Water Quality

When biological monitoring stations downstream of the Life Sciences Center were first sampled in 1996, the water quality was classified as “good” based on biological indicators. The water quality condition dropped to “fair” based on assessments done in 1997 and 2002, then recovered to “good” condition when monitored in 2007, 2014, and 2019, with a slight upward trend in water quality.

Watts Branch Water Quality

Due to the presence of the Piney Branch Special Protection Area, biological monitoring of the Piney Branch has been conducted frequently, with monitoring stations sampled 20 to 24 times since 1997. Following the initial assessment of “good” water quality at the start of monitoring, water quality in the Piney Branch declined precipitously to “poor” conditions in 2003 as development occurred in the headwaters of the stream. Water quality conditions recovered to “fair” by 2008, and have remained in the “fair” range through the last 14 monitoring assessments, with the most recent monitoring conducted in 2021. Development particularly affected the benthic macroinvertebrate populations in the stream, with a decline in benthic macroinvertebrate biological indicators dropping from “good” in 1997 to “fair” and “poor” conditions through most of the monitoring. For the last four years of monitoring from 2018 to 2021, benthic macroinvertebrate scores have remained in the “poor” range. Water quality monitoring at a station farther down the Watts Branch shows better water quality conditions as more water reaches the stream from areas with lower imperviousness, more forest and tree cover, and developed neighborhoods that have not been significantly disturbed for many years. In addition, the main stem of the Watts Branch stream is protected within the boundaries of Watts Branch Stream Valley Park, with the size of the park expanding as the stream reaches less densely developed areas.

OAKMONT/ROSEMONT/WALNUT HILL, WASHINGTONIAN LIGHT INDUSTRIAL, AND WASHINGTONIAN APARTMENTS ENCLAVES WATER QUALITY

These areas drain to the Muddy Branch watershed, and water quality results for these areas come from the same biological monitoring station as the northern portions of the Life Sciences Center.

Monitoring results indicate a decline from “good” to “fair” water quality, then back to “good” with a slight upward trend in recent years. Water quality farther downstream tends to get better thanks to protection accorded the stream by Muddy Branch Stream Valley Park and less dense development.

Washingtonian Light Industrial Park Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 80.42%

Tree canopy cover: 10.26% (includes forest cover)

Forest cover: 0.01%

Washingtonian Apartments Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 36.98%

Tree canopy cover: 35.34% (includes forest cover)

Forest cover: 0.00%

Oakmont/Rosemont/Walnut Hill Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 29.31%

Tree canopy cover: 29.31% (includes forest cover)

Forest cover: 8.42%

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) WATER QUALITY

Water from NIST drains to two watersheds, with the northern portion of the property flowing west into the Seneca Creek watershed and the southern portion draining south into the Muddy Branch watershed. Monitoring stations that inform water quality conditions flowing from NIST are the same as the stations for other Great Seneca Plan areas that drain to Muddy Branch and Great Seneca Creek. Biological indicators show fair to poor water quality in the upper reaches of Great Seneca Creek and Muddy Branch, with slightly improving conditions farther downstream.

NIST Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 24.58%

Tree canopy cover: 28.72% (includes forest cover)

Forest cover: 14.41%

QUINCE ORCHARD WATER QUALITY

The Quince Orchard area of the Great Seneca Plan drains west to Great Seneca Creek. This area is quite large, and there is information from six different biological monitoring stations to inform water quality assessment trends from 1998 to the most recent monitoring in 2018. In general, water quality monitoring higher up in the watershed and closer to developed areas show fair to poor water quality over the 20-year monitoring period, likely reflecting the larger impervious areas contributing runoff to the streams. Two monitoring stations lower in the watershed record fair to good conditions with a slow downward trend in water quality. The better water quality readings downstream likely reflect more water being contributed to the stream from areas with lower impervious levels and higher percentages of forest and tree cover. The stream benefits from the protection provided by Seneca Creek State Park. High figures for forest and tree canopy cover and low imperviousness result from a large portion of this study area being within Seneca Creek State Park.

Quince Orchard Imperviousness, Tree Canopy Cover and Forest Cover

Impervious cover: 10.62%

Tree canopy cover: 66.10% (includes forest cover)

Forest cover: 53.70%

AIR QUALITY

Air pollutants that pose the greatest health risks in Montgomery County are ground-level ozone and fine particulate pollution (PM 2.5, or airborne particulates 2.5 microns or smaller). Ground level ozone, which is formed by certain airborne pollutants in the presence of heat and sunlight, is more prevalent in the summertime. Monitoring for these pollutants is done at a regional level, combining monitoring results for the Washington D.C. Metropolitan Area. Regionally, monitoring in the D.C. Metro area, including Montgomery County, shows the area's PM 2.5 pollution to be below the limits set by the Environmental Protection Agency for clean air, and is not considered a health threat. Regional monitoring for ground-level ozone has shown dramatic decreases in ground-level ozone. Prior to the Covid-19 outbreak, the region was still slightly exceeding the newest (2015) ground-level ozone pollution standard. Decreased driving during Covid helped drop the region below the 2015 limits. Ongoing monitoring will tell us whether the area remains below the ground-level ozone limits as driving increases.

While monitoring for ground-level ozone and PM 2.5 pollution are done at a regional scale, studies have shown that locally higher concentrations of these pollutants can occur around major road corridors.

Forests and tree canopy cover have been shown to be effective at filtering PM 2.5 from the air and reducing summer surface temperatures that promote the formation of ground-level ozone. See forest and tree cover figures for different portions of the Great Seneca Plan area in the Water Quality section of the Existing Conditions report.

BIOLOGICAL DIVERSITY

There is growing concern worldwide about the loss of plant and animal species due to habitat loss, habitat degradation, overharvesting, and more recently from climate change impacts. Unique and rare habitats and species are especially at risk. One such rare habitat exists within and near the Great Seneca Plan area, where an outcrop of serpentinite bedrock creates conditions that are hostile to many plant species typical of the Mid-Atlantic Piedmont region. Plants that are better adapted to the chemical makeup of the soil that occurs on the serpentinite become predominant, resulting in the occurrence of some rare plants in the LSC South district, and the presence of the Serpentine Barrens Conservation Park not far to the south of the Life Sciences Center. The serpentine barrens are considered a globally rare biological community. Rare plants occurring within the LSC are protected in conservation easements.

Other species of concern, including native pollinators necessary to maintenance of our food supplies can be helped by planting native plant species in our developing and developed areas.

HUMAN HEALTH

Human health is influenced by a variety of factors, including access to nutritious foods and good health care services. But environmental factors and land use design also play a role in human health outcomes. The air quality issues already covered are related to increased incidences of pulmonary diseases including asthma, as well as heart disease and metabolic diseases such as diabetes. Extreme heat events kill more people every year than any other weather-related phenomenon, and heat-related deaths and illnesses are expected to increase as the climate heats up. Land use designs that do not include places and facilities to get beneficial exercise contribute to problems associated with excessive weight gain and a sedentary lifestyle. Both exercise and green spaces are also correlated with improved mental health. Portions of the Great Seneca Plan area lack parks, green spaces, bicycle and pedestrian facilities and other opportunities for exercise and quiet contemplation, especially in the Life Sciences Center.