Long Branch Sector Plan

Appendix 14
Environmental Conditions

Existing Conditions

As a result of the Purple Line, reinvestment is likely to occur in the commercial areas adjacent to and near the Purple Line. In the commercial areas, asphalt parking lots dominate the urban landscape, stormwater management is insufficient, and few trees are planted, providing little shade, habitat, or landscape beautification. Modest attention has been paid to safe pedestrian crossing, or bicycle friendly streets. Elaboration on the site conditions in Long Branch is described below.

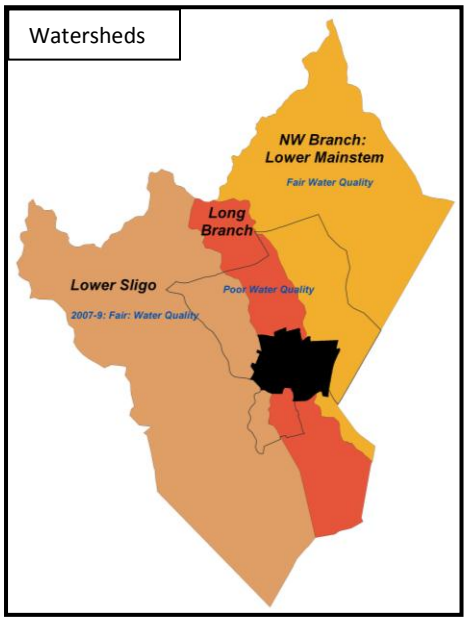
The environmental recommendations are one component of the Plan's focus on long-term regional sustainability. The recommendations also seek to address water pollution, excessive greenhouse gas, and habitat loss caused by existing development. To achieve the maximum benefit for the community and region, sustainable design principals should be applied using the best available technology, methods, and standards.

Sustainability

Sustainability is defined as providing for the needs of the current generation without compromising the ability of future generations to meet their own needs. Our human well-being is integrally connected with the well-being of the natural world. Supporting and encouraging sustainability within Long Branch is a key canon of the Plan. All environmental recommendations aim to improve sustainability, natural resources and water quality, and reduce fossil fuel consumption.

Watersheds and Water Quality

A water use designation is a surface water quality ranking for each watershed, as determined by the Maryland Department of the Environment. Water use is given a numerical ranking from I-IV and a higher ranking most often indicates better water quality, which in turn requires more stringent protective measures. These may include a wider stream buffer with increased tree planting. In addition, the Montgomery County Department of the Environment and the Department of Parks monitor county streams for fish, aquatic macro-invertebrates, and habitat to determine the biological integrity and water quality.



The majority of sector plan is within the subwatershed of Long Branch, a designated Use I stream with poor water quality throughout. The eastern portion of the Plan area drains to the lower mainstem of Northwest Branch, a Use IV stream with fair water quality. To the west, the Plan area drains to Lower Sligo Creek, also a Use I stream with poor water quality.

Long Branch Stream

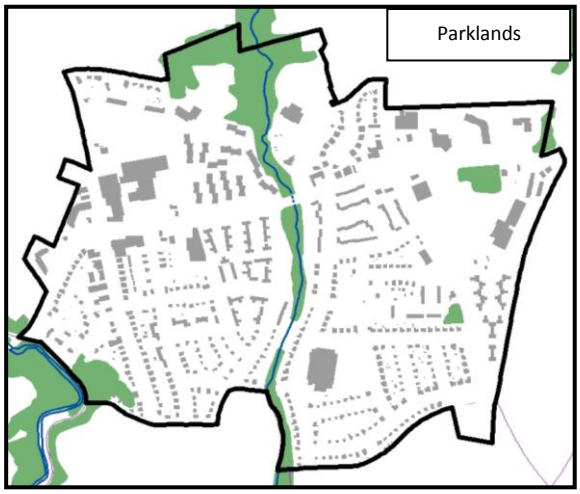
Long Branch flows north to south through the center of the plan area. Stream conditions are poor, supporting only a few pollution tolerant species. Current regulations would require a minimum stream valley buffer of at least 150 feet; however, development that occurred prior to present day requirements has resulted in many homes, apartment complexes, and even park facilities within the stream valley buffer. A stream valley or riparian buffer performs a range of functions with ecological as well as economic and social value.

These include:

- trapping and removing sediment in stormwater runoff
- reducing stream bank erosion
- trapping and removing phosphorus, nitrogen, pesticides, and other nutrients that reduce the health of the aquatic ecosystem
- storing stormwater runoff reducing stream flooding and property damage
- maintaining habitat for fish, aquatic, and terrestrial species
- lowering water temperatures by shading to improve water quality and oxygen levels
- improving the aesthetic appearance of stream corridor (which increases property value, sense of place, health, and livability)
- providing recreational and educational opportunities.

Parkland of varying widths borders the stream valley throughout. The widest is in the north and the narrowest in the south. An asphalt trail parallels the stream from Piney Branch Road southward. There is no trail north of Piney Branch Road.

North of Piney Branch Road the forest buffer is wide with a stable stream bank and nominal erosion. South of Piney Branch Road the forest buffer varies with some areas only 18 inches wide. Consequently, the stream is more deeply incised and the stream banks are eroded.

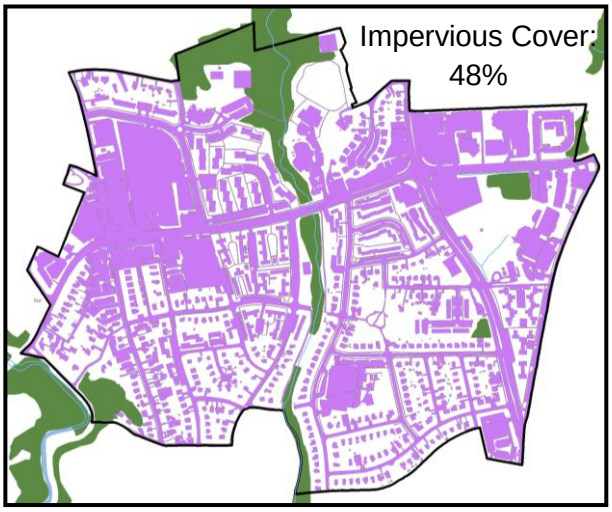


Stream channel erosion is the wearing away of the soil from the streambed, banks, and surrounding areas. Erosion occurs from friction caused by water flow. As the rate of flow increases, so does the rate of erosion. Increases in runoff caused by impervious surfaces and forest clearing sweep large quantities of soil into the stream. The additional sediment scours the stream bank and bed, suffocates fish, smothers spawning areas, kills aquatic insects, and degrades water quality. To control the erosion, large scale stabilization measures such as gabion walls have been installed along the stream.

Impervious Cover

Impervious cover refers to anything that prevents water from soaking into the ground. Examples include driveways, roads, buildings, streets, and parking lots. Impervious surfaces reduce groundwater recharge, soil saturation, pollution reduction, and the slow release of water from saturated soils to streams, wetlands, or other water bodies. Stormwater sweeps across impervious surfaces, taking with it pollutants such as oils, de-icing salts, sand, fertilizers, pet waste, and other pollutants. These pollutants enter storm inlets, which discharge at outfalls along stream banks causing increased stream surges, erosion, algae blooms, reduced aquatic life, and reduced water quality.

Research has shown that "when impervious cover reaches 10 to 25 percent, major alterations in stream morphology occur, significantly reducing habitat quality. At greater than 25 percent impervious cover, streams suffer from loss of habitat, floodplain connectivity, and bank stability, as well as decreased water quality."[1] Within the Long Branch Sector Plan total impervious cover is nearly 48 percent. In the commercial zones, impervious cover is close to 94 percent while the residential zones have over 42 percent. On average, impervious cover for the three watersheds within the Plan area is in the range of 30 to 35 percent.



Another consequence of impervious cover is urban heat island effect. Surfaces like roofs, parking lots, and roads absorb and radiate heat during the day and night causing the average temperature of those surfaces to be "50-90°F hotter than the surrounding air"[2]. Heat island effect can make summer days six to eight degrees hotter in urban areas than in surrounding greener areas.

Stormwater Management

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not percolate into the ground. In the Plan area, stormwater runoff is left untreated, with the majority conveyed into swales and stormdrains where it is discharged directly into Long Branch stream. Untreated stormwater transports pollutants collected along the way, contributing to poor water quality.

There are many techniques to minimize the effects of stormwater. In the past, stormwater management required large areas of land where the runoff was collected in pond-like depressions and released slowly over a period of time. However, in May, 2009, the State amended its 2007 stormwater manual requiring the application of Environmental Site Design (ESD) methods. ESD is used to minimize onsite and offsite hydrologic and water quality impacts due to runoff by attempting to incorporate and reestablish natural hydrologic processes into the built environment. These measures can be designed and implemented in new developments as well as retrofit into existing development in cost efficient ways. ESD stormwater management practices have the capability to significantly improve the quality of stormwater runoff, as well as quality of life. The practices include: reducing impervious surfaces, bio-retention and infiltration systems such as bioswales, filter strips and level spreaders, green roofs, permeable pavement, rainwater harvesting, rainwater gardens, and vegetative swales.

For further descriptions and requirements, refer to Montgomery County Stormwater regulations and guidelines, and the Maryland Stormwater Design Manual supplemental Chapter 5 for specific stormwater design requirements.
http://www.mde.state.md.us/assets/document/chapter5.pdf

[1] Center for Watershed Protection, "Impacts of Impervious Cover on Aquatic Systems", Ellicott City, MD, 2003

[2] http://www.epa.gov/hiri/resources/pdf/BasicsCompendium.pdf

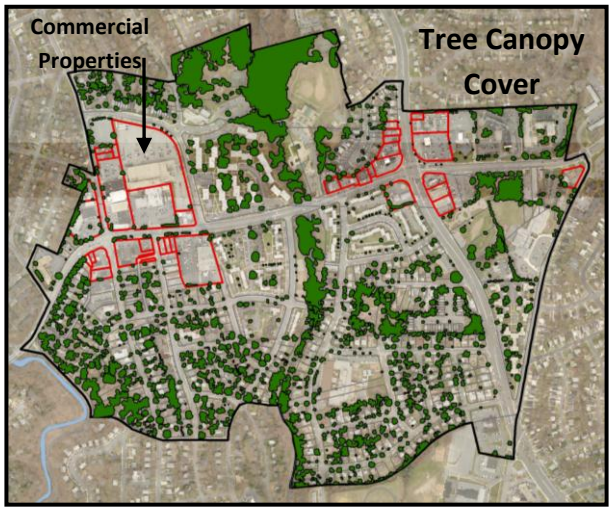
Urban Forest

An urban forest includes street trees, park trees, existing forest cover, landscaping, and neighborhood trees. Trees provide multiple benefits including carbon sequestration, erosion reduction, wildlife nesting and foraging areas, and are critical in reducing urban heat island effect (cooling surfaces and reducing ozone formation). Trees can also decrease stress, improve quality of life, buffer pedestrians from vehicle traffic, as well as shade homes and businesses, thereby reducing energy demand.

The highest quality and largest forest area is north of Piney Branch Road. The stratified forest structure contains mixed hardwoods with a mature canopy cover consisting of tulip poplar, red oak, white oak, slippery elm, and mulberry. The understory is thin with young spicebush and occasional viburnums. Invasive species are encroaching inward from the park's edge with scattered clusters in the interior.

The highest quality forest patch is found west of Long Branch Local Park tennis courts on the steep slopes. This forest consists of mature beech and tulip trees with a native understory. Invasive species are moving in from its edge. The stream is stable with rip-rap reinforcement along the shallow banks.

South of Piney Branch Road the park narrows significantly. East of Long Branch Garland Neighborhood Park the buffer has a single row of trees with a few scattered 100+ year-old tulip trees. In between the trees is an understory of non-native invasive species, including multiflora rose, bush honeysuckle, and Japanese knotweed. These aggressive, invasive species are covering the entire forest floor, and climbing into the tree canopies strangling the native species. Trash is scattered throughout the lower stream valley south.



Tree Canopy Cover

Based on GIS analysis, tree canopy (leaves, branches, and tree stems that cover the ground when viewed from above) covers approximately 20 percent of the Plan area. However, in the commercial areas, less than 3.6 percent is in canopy cover. This, as well as the high amount of impervious cover, makes the commercial areas an unattractive and hot environment. Ideally, tree cover should be at least 25 to 30 percent of the Plan area to provide adequate shade and canopy connectivity with the surrounding corridors, reduced temperatures, and a better quality of life.

OPEN GREEN SPACE

Open green space should accommodate the social, civic, cultural, and recreational needs of a community, while simultaneously providing a variety of environmental benefits. Often, open space is the cornerstone of a community, where people can congregate and opportunities for positive, social interaction are fostered. Open spaces promote safer neighborhoods, community vitality, reduce stress, increase wellness, and raise property values. Environmental benefits vary from park to park, but can provide benefits such as habitat, food and nesting for birds, mammals, and insects. Open space can also provide a connected green network, reduce heat island effect, abate noise, and provide stormwater management, water and air quality mitigation, and groundwater recharge.

Network of Resource Connectivity

Resource connectivity refers to natural resource features that are linked together to form linear networks that function biologically and ecologically. They are connected corridors that serve both people and wildlife, forming a nexus of streams, forests, meadows, wetlands, or other open green space. Resource networks become a vital part of a diverse ecosystem as they provide the opportunity of genetic exchange and animal movement that would otherwise be inhibited by landscape fragmentation.

Within the Plan area, the Long Branch stream valley provides a resource connection through its water and associated forest buffer. Although the buffer is narrow in parts, it accommodates the needs of many species. Presently there are no connections to other stream valleys or other east-west corridors within or beyond the Plan area. Improving tree canopy and increasing parkland throughout the Plan area will increase habitat, ecological linkages, and corridor connections.

Energy Efficiency

Energy efficiency that significantly reduces local energy demand is most effective when woven into the fabric of a community. Federal, state, and local incentives, planning, zoning and regulatory requirements promoting energy efficient design will encourage development and citizen effort in reducing energy consumption. Providing walkable access to mass transit, housing, employment, shopping centers, entertainment, eateries, medical facilities, etc., can substantially reduce energy demand by reducing vehicle miles traveled. Simultaneously improving community infrastructure enhances quality of life, improves individual health, and creates lively sidewalk mobility and improved economics.
The majority of the buildings within the sector plan were constructed with conventional, low efficiency building and utility components. In general, buildings are poorly insulated and draw energy from the local energy grid.

Greenhouse Gas Modeling

Montgomery County law (Bill No. 34-07, Greenhouse Gas Emissions) is intended to help implement the County's established goals to stop increasing greenhouse gas emissions by 2010, and to reduce emissions to 20 percent of 2005 levels by the year 2050. The bill requires that the Planning Board assess each master and sector plan's potential impact on greenhouse gas emissions in the County and make recommendations to minimize those emissions.

The Department's greenhouse gas modeling uses a version of the spreadsheet model developed by King County, Washington, which considers embodied energy emissions, building energy emissions, and transportation emissions in projecting total emissions for an area. The model defines embodied emissions as "emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass)."

Carbon Emissions Analysis

Building energy emissions are created in the normal operation of a building, including lighting, heating cooling and ventilation, operation of computers and appliances. Transportation emissions are released by cars, trucks, buses, motorcycles. The model's results for the total life of the development from construction to demolition are given in Metric Tons of Carbon Dioxide Equivalents (MTCO2e). Results of the modeling in Long Branch are described below. Please note that these results assume a "business as usual" approach to development.

Methodology

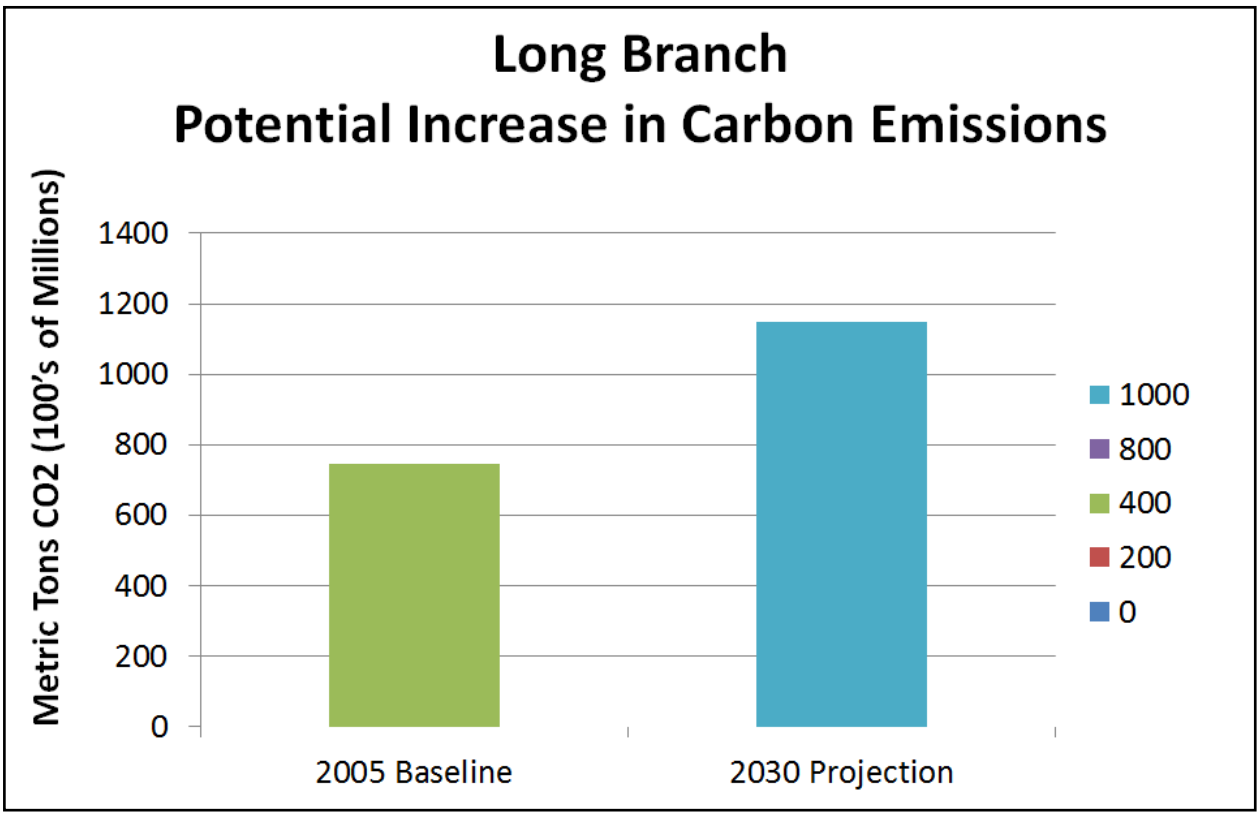
The numeric inputs for each plan area include the numbers and types of housing units and the square footage of different categories of retail, commercial, and public buildings. The model is run once using 2005 data to establish baseline results. To estimate future greenhouse gas emissions, the model is run again using housing units, and commercial and retail space projected to develop under plan recommendations. The model estimates emissions over the life of the development, and results are given in metric tons of CO2 equivalents. This is different from the County Emissions Inventory included in the County's *Climate Protection Plan* (CPP) prepared by the Department of Environmental Protection (http://www6.montgomerycountymd.gov/content/dep/downloads/air/2009mococlimprotplan.pdf), which estimates annual emissions.

The model factors in emissions; it does not calculate or estimate potential carbon offsets from tree planting or best management practices. As more carbon statistics become available for County master plans, the data will be refined to provide more accurate estimates. As carbon emissions models evolve, they may include data on building energy consumption, vehicle fuel efficiency, and other input parameters that will show how improvements in technology and design affect projected outcomes.

Model Results and Recommendations

The modeling results shown below are restricted to the boundaries within the Plan area. The results of the carbon modeling show an increase in carbon emissions by nearly 53 percent. However, the increase is due to a population increase and not energy consumption escalation. In fact, on a per-capita basis, energy consumption will decrease by approximately 56 percent. The model factors in reduced per capita transportation demand and a decrease in the size of residential units. As mentioned above, this model does not consider improvements in construction and building efficiency.

As these model results are evaluated, we must bear in mind that Montgomery County's greenhouse gas reduction targets are considered at a Countywide scale. If more of our growing population can be accommodated in Smart Growth development, our potential carbon footprint can be substantially reduced. Further improvements in building energy efficiency, use of green building technology, and greater use of mass transit and low-emission vehicles can result in even greater reductions in greenhouse gas emissions.



Efforts to moderate carbon emissions have been applied to the Long Branch Plan's recommendations and align with the County's 2009 CPP. Both the CPP and this Plan make recommendations such as increasing renewable energy use, building energy efficient homes and developments, reducing automobile travel, reducing heat island effect, and providing community education and long-term planning.

The Long Branch Plan specifically addresses carbon reduction by encouraging and supporting Smart Growth and energy efficiency. It also encourages the following strategies and mechanisms to achieve further energy savings by:

- concentrating growth around the Purple Line and bus stations to reduce the need and rate of vehicles miles traveled
- increasing the number of multifamily residential units with higher performance energy efficient buildings
- increasing growth rates without increasing the amount of surface pavement. This will reduce heat island effect lowering radiant temperatures and the need for increased cooling of buildings during summer months
- encouraging new buildings to meet or exceed the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) advanced energy design guide
- encouraging renovated buildings to meet the appropriate ASHRAE advanced energy design guide.
- Orient buildings to maximize passive and active solar use to reduce the need for conventional non-renewable energy consumption
- encourage the use of photovoltaic cells on surfaces (horizontal and vertical)
- encourage alternative energy consumption and the use of district energy systems and design

- encourage tree planting throughout the Sector Plan vicinity to sequester carbon, reduce heat island effect, and provide thermal comfort during summer months.

Water and Sewer

The Washington Suburban Sanitary Commission provides public water and sewer service to Plan area. WSSC sewer modeling, under its Consent Decree (2005) requirements, has determined that some sections of the Sligo Creek basin have capacity constraints under significant wet weather conditions, particularly in the downstream sections in Prince George's County. Therefore, significant growth in areas that drain to the Sligo Creek trunk sewer may require sewer system improvements.

Development proposals in the Long Branch area that generate 100,000 gallons of wastewater per day (base sanitary flow approximately of 700 housing units or 3,500 employees), or more, would be required to undergo testing (using the WSSC's sanitary sewer model). They would be required to work with WSSC to plan improvements to the conveyance system if the modeling yields results as detailed under its newly adopted policy, ENG-09-02. Also, any local capacity (non-CIP) issues identified in development proposals under review in the WSSC Development Services Program may require cooperation from developers under the WSSC's Letter of Findings to plan and construct local sewer system capacity improvements.

Some structural repair and sewer rehabilitation work will be done as part of WSSC's Sewer Basin Repair Replacement and Rehabilitation (SRRR) plans for Sligo Creek. These plans are subject to MDE approval and the work may include future capacity expansion as required by WSSC.

Projects in the Anacostia basins (County basins that drain to the Anacostia No. 2 Wastewater Pumping Station and are conveyed to Washington, D.C.'s Water and Sewer Authority Blue Plains Wastewater Treatment Plant) will depend on completion of the Anacostia Storage Facility (Project number S-89.22) currently in the WSSC CIP and under design. At this time, construction has a projected completion date of December 2013.