



Environmental Appendix

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Introduction

The Grosvenor-Strathmore Metro Area Minor Master Plan includes a transit center, residential development, a cultural arts and music performance venue, and a large natural area preserved within Rock Creek Stream Valley Park. This combination of man-made and natural features close to a heavy rail transit system is unique in Montgomery County.

The Metro site within the Master Plan area is bounded by Rockville Pike (MD 355) and Tuckerman Lane. The area is currently developed with surface parking and a large parking garage adjacent to the Metro station and high density residential buildings on the southern end of the property. The Plan area also includes the Music Center at Strathmore and a townhouse community to the north of the Metro station, and condominium apartments and a forest conservation area protecting a stream valley buffer to the east. The entire area drains eastward to Rock Creek, which is a State Use Class I-P watershed. The “P” designation in this category denotes that Rock Creek is part of a potable water supply that feeds the Potomac River. The Potomac is the source of most of the drinking water for lower Montgomery County. Protecting and enhancing the water quality of Rock Creek should be an important environmental goal of this Master Plan.

Forest and Tree Cover, and Impervious Surfaces

Water quality is especially correlated with the amount of forest cover and the percentage of the watershed that is impervious. Within the Grosvenor Master Plan boundary, approximately 40 percent of the area is covered by impervious surfaces, while roughly 14 percent of the area is covered by forest.

Tree canopy coverage does not match forest cover in terms of environmental benefits, but there are still significant water quality, air quality, carbon storage and health benefits that accrue from a healthy tree canopy. Approximately 43 percent of the Plan area is currently covered by tree canopy. Development envisioned by the Master Plan could reduce the forest cover to about 12.5 percent, and tree cover to around 41.5 percent.

The non-profit conservation group *American Forests* recommends a goal of 40 percent tree cover for developed and developing communities to promote sustainability and a healthy human environment. By taking advantage of opportunities to increase tree canopy through redevelopment, including planting trees in public and private open space areas and as a part of streetscaping, the Plan area should continue to exceed the 40 percent tree canopy goal.

While overall forest area within the Plan area is not high, the amount of quality forest land in the immediate vicinity is quite significant. Approximately 2,400 feet of the Plan boundary abuts Rock Creek Stream Valley Park (Unit 3). This unit covers around 315 acres from Connecticut Avenue north to the CSX railroad tracks. The vast majority of this park is forested. The stream valley park itself is much larger, stretching from the D.C. line to north of Muncaster Road.

Just to the south of the Plan area, the County champion white oak resides in Rock Creek Stream Valley Park at the intersection of Rockville Pike and Beach Drive. Special care should be taken to avoid disturbing the critical root zone of this tree when considering improving connections to the park.

Environmental Goal

The goal for environmental planning stated in the 1993 *General Plan Refinement* is to:

“Conserve and protect natural resources to provide a healthy and beautiful environment for present and future generations. Manage the impacts of human activity on our natural resources in a balanced manner to sustain human, plant, and animal life.”

Implementation of this goal guides the environmental recommendations in Montgomery County’s master plans.

Provision of Environmental Services

Undeveloped land provides many positive benefits necessary to sustain life. Through a combination of biological communities and biochemical processes, an undeveloped landscape produces clean air, filters water, produces food, moderates temperature extremes (heat island effect), attenuates water flows, and moderates the climate through the storage of carbon.

Modern buildings provide a more comfortable environment for human life, and transportation systems facilitate people’s movements between residences, employment centers, shopping areas, etc. As areas develop, the biological communities are removed, along with the associated environmental benefits they provide. These environmental services must be replaced if life is to be sustained. We pay to create water filtration and delivery systems, and to build stormwater management facilities to protect water quality, reduce flooding, protect infrastructure, and maintain aquatic life. We build HVAC systems to heat, cool, and filter air, and pay for the energy needed to run them. We plant trees and create landscaped areas to provide shade, generate oxygen, filter air and water, and provide the green environment that has demonstrated benefits for physical and mental health. But artificial systems cannot fully replace the environmental functions lost when development occurs. Ultimately, a balance must be achieved between development and the preservation of natural resources if we are to create sustainable communities.

In this Plan, the balance between the built and natural environments is achieved both locally and regionally. Locally, the Plan identifies existing natural areas that can be preserved, and makes recommendations to replace lost environmental resources. But equally important is the planning principle of concentrating development in areas where infrastructure already exists rather than creating sprawl developments that eliminate additional natural resources farther from the urban centers. By redeveloping underutilized land at the Metro Station, forested watersheds in the Agricultural Preservation and Open Space region of northern and western Montgomery County are preserved. These up-County ecosystems provide environmental benefits to the entire area, including clean water for the Potomac River, large-scale provision of clean air, carbon sequestration, flood attenuation, and high-quality aquatic and terrestrial habitat for animals and plant communities.

Energy Conservation

Montgomery County has made great strides in developing policies that help balance development and environmental protection, including requirements for detaining and treating stormwater runoff to protect aquatic habitats and water quality, and forest conservation regulations that are designed to preserve forests where possible and replant forests to mitigate forest lost to development. One area where significant opportunities for improvement remain is in energy conservation and clean energy generation. Conserving energy reduces air pollution and atmospheric carbon emissions. It reduces the demand on an ageing electrical delivery system and reduces operating costs. Effective energy conservation is both economical and beneficial to human health. There are two areas of focus for energy conservation: building energy and transportation energy.

Conservation of energy and clean energy generation in buildings depends on site design, building design, building construction including materials and systems, and building operation. While building construction is primarily the purview of the Montgomery County Department of Permitting Services, site design and building design are both planning concerns. Site designs that orient buildings to maximize opportunities for passive solar lighting and heating provide the optimal situation for energy conservation. In addition, building orientations that are optimal for passive solar energy frequently are also optimal for orientation of solar energy panels for clean energy generation. Building design should include properly oriented shading features to reduce solar heating in warm weather. Building heights and orientations in this Metro station area lend themselves to efficient placement of photovoltaic systems to harvest solar energy and convert it to electricity. This Plan recommends that planners and developers monitor the advances in energy conservation and clean energy generation, and incorporate improvements in these areas whenever possible.

Transportation energy use can be reduced by providing non-auto alternatives that allow people to get to their significant destinations on foot, by bicycle, or by transit. Safe and attractive pedestrian paths and bikeways should be integrated into all master plans and site plans. Transportation energy use can also be reduced by mixed-use communities that allow people to meet their basic needs without having to travel long distances by car. The location of the Grosvenor developments directly adjacent to the Grosvenor Metro station increases the opportunities for people who live within the Master Plan area to commute by transit, substantially decreasing per capita vehicle miles travelled by automobile.

Greenhouse Gas Modeling

Montgomery County Code Chapter 18A-15 requires the Planning Board to model the carbon footprint of planning areas as part of a master plan or sector plan. Montgomery County Code Chapter 33A-14 requires the Planning Board to estimate the carbon footprint of areas in a master or sector plan, and to make recommendations for carbon emissions reductions. Carbon footprint is calculated by estimating the greenhouse gas (ghg) emissions from construction and operation of the potential development.

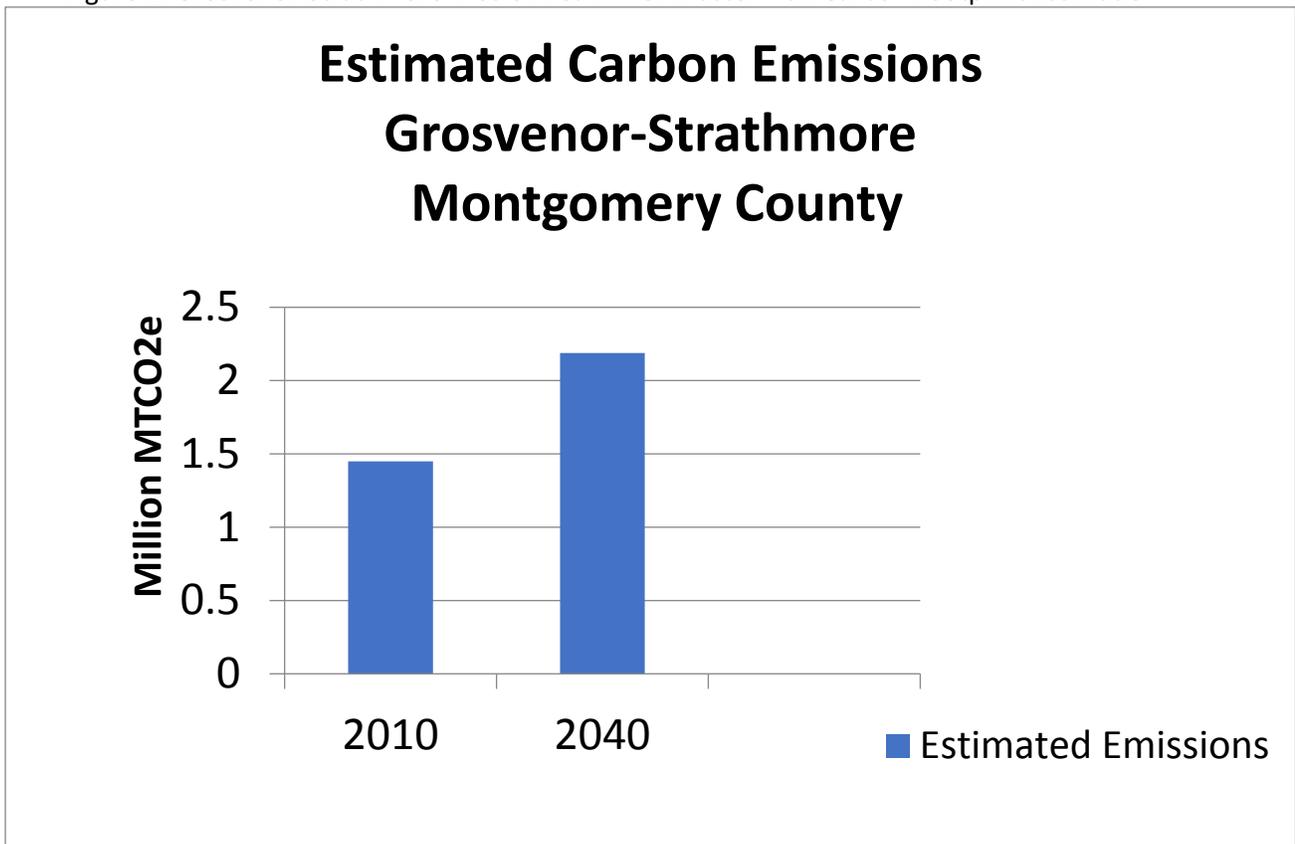
In projecting total emissions for an area, there are three main components to greenhouse gas emissions: embodied energy emissions, building energy emissions, and transportation emissions. Embodied emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape

disturbance (by both soil disturbance and changes in above ground biomass). Energy emissions from buildings include lighting, heating, cooling and ventilation, as well as operation of computers and appliances, printers, etc. Transportation emissions are released by the operation of cars, trucks, buses, motorcycles, etc. Results are given for the total life of the development from construction to demolition, and are given in metric tons of carbon dioxide equivalents (MTCO₂e).

Grosvenor Master Plan GHG Emissions Analysis

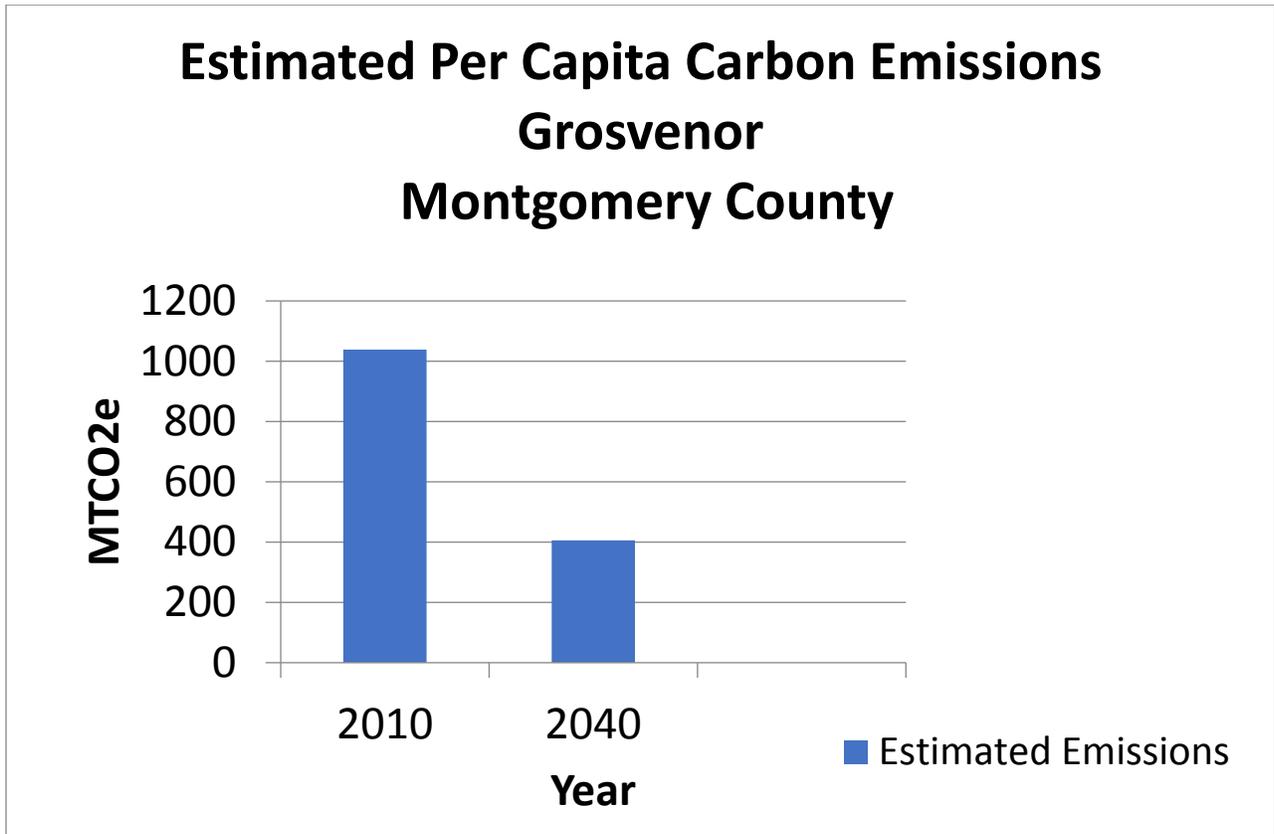
Because master plans focus on areas that are most appropriate for new development or redevelopment, the increased numbers of housing units and non-residential spaces naturally result in an overall increase in greenhouse gas emissions, and this Plan is no exception. The carbon footprint estimation shows an increase in total greenhouse gas emissions of about 34 percent above the existing condition. When considered on a per capita basis, however, the carbon footprint estimation shows a significant decline in per capita greenhouse gas emissions of about 61 percent below existing. Recommendations for reducing ghg emissions are included in the Plan’s Sustainability chapter.

Figure 1: Grosvenor-Strathmore Metro Area Minor Master Plan Carbon Footprint Estimation*



*In Millions of Metric Tons CO₂ Equivalents, for the lifetime of the plan

Figure 2. Grosvenor-Strathmore Metro Area Minor Master Plan Estimate Per Capita Carbon Footprint*



*In Metric Tons CO2 Equivalent, Lifetime)