Montgomery Planning

CLIMATE ASSESSMENT TEMPLATE UPDATE (BRIEFING)

Description

County Bill 3-22 requires that, starting in March 2023, the Planning Board must submit a Climate Assessment of each Zoning Text Amendment, master plan, and master plan amendment to the District Council. The bill also requires that at least once every 2 years, the Planning Board must review the Climate Assessment Template and update the template as needed. Staff will brief the Planning Board on the proposed updates to the template. These updates are technical in nature and do not alter the basic requirements of climate assessments or any other aspects of Bill 3-22.

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Khalid Afzal, Special Projects Coordinator, Director's Office, 301-495-4650

Staff Contact
Khalid.afzal@montgomeryplanning.org
301-495-4650

Planning Board Information
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Introduction

On July 25, 2022, the Montgomery County Council signed Bill 3-22, "Climate Assessments" into law. The bill requires assessments of climate impacts for county bills, zoning text amendments (ZTAs) and master plans and master plan amendments (collectively referred to as master plans). As a result of the bill, Montgomery Planning is responsible for conducting climate assessments for ZTAs and master plans, and the Office of Legislative Oversight (OLO) is responsible for conducting climate assessments for county bills.

The goal of Bill 3-22 is to enhance the County Council's understanding of the potential impacts of proposed legislation and master plans on climate change. Climate assessments for ZTAs and master plans are required to be submitted to the County Council at least seven days prior to their hearing, and must include:

1. the sources of information, assumptions, and methodologies used;
2. a description of variables that could affect the assessment;
3. if a ZTA, master plan or bill is likely to have no climate impact, why that is the case;
4. the potential positive or negative effects, if any, of the ZTA, master plan, or bill upon climate change;
5. quantitative or qualitative evaluations of the identified effects upon greenhouse gas emissions, sequestration, and carbon drawdown;
6. quantitative or qualitative evaluations of the identified effects upon community resilience and adaptative capacity; and
7. each climate assessment must identify amendments or other recommendations, if any, that would reduce or eliminate any anticipated negative effects of the ZTA, master plan, or bill upon carbon dioxide removal, sequestration, carbon drawdown, community climate resilience, and adaptive capacity.

Bill 3-22 required that "the Planning Board must develop and publish online a climate assessment template to guide the development of climate assessments for zoning text amendments, master plans, and master plan amendments."

Planning staff, with the help of its consultant, ICF Inc, (ICF) developed a methodology and a template to conduct climate assessments of ZTAs and master plans as required by Bill 3-22, which was approved by the Montgomery County Planning Board On December 8, 2022. The approved Climate Assessment Template and Quantitative Assessment Tool (or Quant Tool), and Additional Resources, along with all climate assessments conducted so far (six master plans and 19 ZTAs) are posted on the Montgomery Planning web site at https://montgomeryplanning.org/planning/climate-assessment-of-zoning-text-amendments-and-master-plans/

Starting in March 2023, Montgomery Planning has conducted climate assessment of ZTAs and master plans using the following tools:

Template for Climate Assessment of ZTAs
Template for Climate Assessment of Master Plans
Checklist of Impacts for Community Resilience and Adaptive Capacity

Checklist of Impacts for GHG Emissions and Sequestration
Determining Relationships to County Climate Priorities
Quantitative Assessment Tool

Templates are used to create the final reports for climate assessments, which are transmitted to the County Council and posted on Montgomery Planning's climate assessments web site.

Checklists are detailed worksheets used by Montgomery Planning staff in conducting climate assessments of master plans and ZTAs as a first step before using the templates to produce final reports.

The Quantitative Assessment Tool (Quant Tool) is designed to be used where a quantitative assessment of a proposed master plan or ZTA is warranted. So far, this tool has been used only for master plans. All 19 ZTA assessments conducted in the past two years have not lent themselves to a quantitative assessment due to the difficulty of determining what physical changes could take place as a result of a ZTA (how many buildings could be built, how much land disturbance cold occur, how many trees could be lost or planted, how many more VMTs, etc.).

Proposed (2025) Update

Bill 3-22 also requires that "at least once every two years, the Planning Board must review the template and update the template as needed." Montgomery Planning Staff initiated a review of the climate assessment template and the associated tools in order to determine what, if any changes should be made to the climate assessments, as currently conducted by the Montgomery Planning staff.

Montgomery Planning engaged ICF, who had developed the original assessment tools and templates, to help review the current assessment tools and propose any changes needed to the assessment tools and methodology. This report contains a summary of the proposed changes to update the climate assessment tools based on the staff experience of using these tools in the past two years.

The proposed update includes changes to the Quant Tool as well as the two check lists (Checklist of Impacts for Community Resilience and Adaptive Capacity, and Checklist of Impacts for GHG Emissions and Sequestration), and the two templates (one for ZTAs and one for master plans). All the changes are technical in nature and do not alter the basic requirements of climate assessments or any other aspects of Bill 3-22.

Proposed Changes to the Quant Tool

ICF recommends several changes to the Quant Tool in the proposed update, including a full data refresh wherever new data are available, changes to parameters and assumptions based on new reports or literature, and changes to the representation of carbon stock changes between the Baseline and Master Plan results in visualizations and summary tables to clarify enhanced carbon stocks.

Data Refresh

Wherever possible, tool data is updated where new data are available. The data refresh includes:

1. Update of kg CO2e/ft2 for office buildings, commercial buildings and residential homes from EC3 and GREET 2022 Building Module data.

2. Update of average building square footage for residential building use types from the 2020 Residential Energy Consumption Survey (RECS) (2022 tool used the 2015 Survey). Commercial buildings average building square footage were not updated as the 2018 Commercial Building Energy Consumption Survey (CBECS) remains current.

3. Update of average building energy consumption for:

    a. Residential buildings using the 2020 RECS data.
    b. Commercial buildings using underlying data for the Building Energy Performance Standards (BEPS) Technical Report, supplied by the Montgomery County Department of Environmental Protection (DEP).

4. Update to the average building life span for single family homes based on data from the Census New Housing Construction report for 2020 and RECS Existing Housing Stock data for 2020. The average building life span for multi-family units was considered for an update but the new data would change the estimated lifespan from 71 years to 38 years, potentially due to incomplete data, therefore an average lifespan for multi-family units was kept at 71 years.

5. Updated Montgomery County population data and updated total waste generated, recycling and compostables data based on the Maryland Department of the Environment Resource Management Program Annual Report 2022 data.

6. Updated waste emission factor values for landfilled mixed municipal solid waste (MSW) and composted mixed organic waste.

7. Updated people per unit for estimating transportation emissions using 2023 MWCOG Cooperative Forecasts data on populations and households.

8. Annual VMT values and on road vehicle stocks were not updated in the 2025 based on discussions with Montgomery Planning staff noting that the most current available values were already implemented in the 2022 tool.

9. EV energy economy was updated using AFLEET data on the kWh / mile for passenger cars and passenger trucks.

10. Forest above, below, and soil organic carbon stock values in tons carbon/hectare using USDA 2022 data. The most current default values from IPCC are used for grassland, green roofs, non-forest tree cover, and wetlands/meadows. Default carbon values for turfgrass were explored for updates as detailed in the following section.

Literature reviews

Land Cover and Management Literature Reviews

ICF conducted a limited literature review to assess whether the green roof carbon stock values used in the 2022 tool should be updated. A key finding was that what the 2009 study used was most appropriate, as other research was not as regionally relevant. Additionally, a limited literature review was conducted to assess whether the turf grass or non-forest tree carbon stock values should be updated. Key findings of this assessment were:

I. the 2022 tool values are in the middle of the range of relevant literature and ICF does not recommend any updates at this time; and
II. more recent values of non-forest tree cover carbon stocks are still appropriate (the 2022 tool used 2022 values).

Building Embodied Emissions Literature Review

The 2022 tool relied on dated lifecycle emission factor for pavement embodied emissions estimates from concrete and asphalt pavement. Updated emission factors were estimated based on data sourced from the latest peer-reviewed literature. These updated emission factors represent a decrease of 8.1 percent and an increase of 1.1 percent for these factors, respectively.

Building Embodied Emissions

Updates described in the Data Refresh and Literature Reviews sections above.

Building Energy Emissions

Building Use Types

Building use types serve as important building groupings to which energy use intensity data should be aggregated. The energy use intensity (EUI) determines emissions per square foot of each building use type and has three key components: electricity EUI, gas EUI, both of which combine to produce site EUI. Data on electricity and gas components of the EUI were sourced from an Excel workbook provided by DEP, available for 65 unique building uses and aggregated to 18 building use types. ICF explored whether the building use types could be simplified to facilitate the resources required to develop and enter input data when using the tool. ICF determined that if building uses were further aggregated, the blended EUIs would result in the loss of some accuracy in estimating emissions. Montgomery Planning staff agreed with ICF's recommendation that the building use types should not be changed, and therefore, no change is proposed.

Average Building Life Span

Average building life span is a key assumption for estimating lifetime GHG emissions. The national average building life span was estimated in the 2022 tool by dividing all new privately owned housing units (completed and under construction) by the existing housing stock. In addition to the update to the average building life span for single family homes detailed in the first section of this report, the

average building life span for multi-family units was considered for the proposed update. Updating the underlying data for multi-family units would change the estimated lifespan from 71 years to 38 years. Due to incomplete updated data on existing housing stocks, ICF recommended, and Montgomery Planning staff agreed, to maintain an average lifespan of 71 years for multi-family units as previously estimated in the 2022 tool. The average lifespan for all residential units was estimated using 2025 updated data for single family homes and 2022 tool data for multi-family units, resulting in an average lifetime of 88 years.

Electricity Fuel Mix and Emission Factor Assumptions

The electricity fuel mix and emission factor assumptions are not proposed for an update as the 2022 tool used the most current data source.

Building Waste Emissions

Updates described in the data refresh section above.

Transportation Emissions

EV Penetration

Montgomery County DEP data on electric vehicle (EV) penetration shows an EV penetration of 4.54% in 2024. The 2022 tool value had EV penetration at 1% starting in 2018 with an annual increase of 1%, estimating an EV penetration of 6% in 2024. ICF proposes to update the starting EV penetration rate to reflect historical EV adoption rates as reported by DEP, which will result in adjustment of annual increment from 1% to 0.59%.

The 2022 tool predicted 2060 will be the year that 42% of the on-road vehicles will be EVs. If the new updates are implemented (0.59% EV penetration rate) the EV penetration in 2060 would be 28%. There are no Montgomery County updates to the BEPS EE and ZNC targets per the latest BEPS report and communication with DEP staff.

Land Cover and Management Carbon Stocks

Land Carbon Stocks and Visualization

The proposed changes include updates to the excel tool's "MP Calcs and EF's" and "Dashboard" tabs to ensure that the difference between baseline carbon stocks and MP carbon stocks is clearly communicated. The proposed update also adds notes, and uses the terms gross and net where relevant, updates the existing bar graph and generates a new figure for the Dashboard.

1. Existing bar graph updates: Additional carbon stocks (Baseline Carbon Stocks – Master Plan Carbon Stocks) are now shown as a below zero value. All emissions are shown as above zero values, but a new net emissions bar was included to illustrate how much of the emissions would be offset by the additional carbon stocks.

2. New graph: A waterfall graph was developed to show each individual source of emissions and the comparative net and gross emissions.

A new table is included on the master plan calculations tab to show the difference in lifetime carbon stocks in the master plan relative to the baseline. Carbon flux estimates are not currently included in the tool.

Proposed Changes to the Checklists and the Templates

In addition to the changes proposed to the Quant Tool, the proposed update includes minor changes to the two checklists, the guidance for determining relationships to county climate priorities, and the master plan and ZTA climate assessment report templates. These changes include the addition of clarifying notes at the beginning of the checklists and the determining relationships to county climate priorities guidance; addition of a column for indeterminate impacts and a column for notes in the checklists; clarifying notes in the *Community Resilience* and *Adaptive Capacity* checklist headings; and related clarifying notes in the master plan and ZTA templates.

Methodological Updates

No methodological changes are made in the proposed update. The 2022 template methods were considered current, and the proposed data refresh updates information that feeds into emission factors.

Impacts of the Proposed Changes to the Quant Tool

To demonstrate the difference the proposed changes to the Quant Tool would make to the GHG estimates, ICF developed a representative "test case" and input test case values into both the 2022 tool and the proposed (2025) update to the Quant Tool.

The test case analysis showed that building lifetime energy emissions would be affected most significantly by the proposed updates, showing a reduction of 24.5% in estimated emissions. The change in building lifetime energy emissions is driven by a marked decrease in building energy use intensity (EUI) values for 2023 which represent the average building consumption of electricity and natural gas per unit of building square footage in units of thousand British Thermal Units per square foot (kBTU/sq.ft.).

Building waste and lifetime transportation emissions showed a minor increase and decrease in ***estimated*** emissions, of 3.6% and 0.9% respectively. Building waste emissions are driven by an increase in the total population of Montgomery County updated value for 2023 from the 2016 population, and updated waste emission factors. Lifetime transportation emissions decreased, despite an adjusted decrease in the electric vehicle (EV) penetration rate. This is due to the lower observed population change and the projected annual population leading to lower estimated drivers on the road, compared to previous higher modeled population projections.

Lifetime building embodied emissions and lifetime carbon stocks show a minor increase of 2.8% and 1.7% in estimated emissions, respectively, due to emission factors based on newer and more accurate sources.

The overall impact of the proposed update on total emissions estimates using a test case was a 19.4% reduction in estimated emissions. The decreasing energy use intensity for residential buildings had the greatest overall impact on the change in emissions estimates between the current (2022) and the proposed update (2025).

Potential Future Improvements

Annual Carbon Flux from Land Use Methods and Factors

ICF reviewed the July 2020 report, *Examining the Role of Forests and Trees in Montgomery County's Greenhouse Gas Inventory,* to assess whether any values could be implemented in the proposed updates. The report covers carbon flux values, but the tool currently only has capacity to estimate the lifetime difference in carbon stocks based purely on the area of land allocated to each land use type. Estimating land use emissions is complex and time consuming beyond the scope of this update. Therefore, ICF recommends that inclusion of a method for estimating annual and lifetime cumulative carbon flux and stocks be considered in a future tool update. The method should be aligned with Intergovernmental Panel on Climate Change (IPCC) guidance and the U.S. national inventory methods and could include the flux values developed in the 2020 report, *Examining the Role of Forests and Trees in Montgomery County's Greenhouse Gas Inventory*.

Data Center Emissions

Montgomery Planning staff met with two members of the *Climate Action Coalition Montgomery Count*y, who have been involved with climate assessment initiative from the very beginning. They recommended exploring how to assess the climate impacts of data centers, if they are included in a master plan in the future since it is understood that data centers contribute significantly to energy related GHG emissions. Emissions from energy use of data centers are reported in MWCOG inventories. This could be another item to be explored in a future update.

Agriculture Emissions

Members of the *Climate Action Coalition Montgomery Count*y also inquired about analyzing agricultural emissions. Agriculture emissions sources include livestock emissions from digestive processes and breakdown of manure methane and nitrogen, and crop emissions from nitrogen and organic based fertilizers, crop residues, and other soil amendments such as limestone and urea. Controlled burning also generates GHG emissions. However, most area master plans contain very little agricultural activity, so a decision could be made on a case-by-case basis as to whether this source should be included. Agriculture emissions are reported in MWCOG inventories.

Attachments

Attachment A: County Bill 3-22
https://apps.montgomerycountymd.gov/ccllims/DownloadFilePage?FileName=2744_1_21388_Bill_3-22_Signed_20220725.pdf

Attachment B: Checklist of Impacts for Community Resilience and Adaptive Capacity Proposed Edits-Revised-5-23-25

Attachment C: Checklist of Impacts for GHG Emissions and Sequestration Proposed Edits-Revised-5-23-25

Attachment D: Climate Assessment Master Plan Template Proposed Edits-Revised-5-23-25

Attachment E: Climate Assessment ZTA Template Proposed Edits-Revised-5-23-25

Attachment F: Determining Relationships to County Climate Priorities Proposed Edits-Revised-5-23-25

Attachment G: Consultant's Summary Report

Attachment B

Community Resilience and Adaptive Capacity Checklist

(Revised, June 2025)

The first step in a community resilience and adaptive capacity assessment for a ZTA or master plan involves an initial applicability review and directional impact assessment. This includes considering whether the ZTA or master plan will influence activities that may result in changes in community resilience and adaptive capacity. It also includes an evaluation to qualify whether these activities that may be influenced may have a positive or negative impact on community resilience and adaptive capacity. If the impact for an activity is indeterminate, then note this on the checklist and provide an explanation in the assessment narrative. If the impact for an activity can be either positive or negative, then check both the positive and negative impact boxes and provide an explanation in the assessment narrative. While the checklist provides a starting point, it is not a comprehensive list of all potential community resilience and adaptive capacity-related activities for a specific ZTA or master plan. Planning staff should supplement climate assessments with additional data and information as appropriate. The checklist also does not cover how much of an impact may be involved and how it might relate to other impacts, which should be part of the qualitative narrative of the climate assessment. As noted in this checklist, some of the factors overlap with factors in the GHG Emissions and Sequestration checklist. The checklist below revises Table 8 in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022.* For more information regarding ~~this checklist,~~ definitions of terms and factors, and additional guidance in preparing a narrative assessment, see pages 29 – 43 in ~~Table 8 and associated text in~~ the *Final Report~~: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF~~, December 1, 2022.*

Does the ZTA/Master Plan concern any of the following factors: *(Indicate if there is no anticipated impact, or if an impact is indeterminate because you cannot say whether there will be an impact or not.)*			*If there is an anticipated impact, are changes to that factor expected to have a positive, ~~or~~ negative, both, or either positive or negative impact~~,~~ on community resilience or adaptive capacity? (The assessment narrative should indicate minor, moderate, major, a combination, or a range of possible impacts based on the location and extent of potential changes that could occur under the ZTA or Master Plan.)*		
Community Resilience (Change in the factor reduces (positive impact) or increases (negative impact) people or infrastructure experiencing a hazard) **Exposure-Related Factors**	**No Impact**	**Indeter-minate**	**Positive Impact**	**Negative Impact**	**Comments**
Activity in flood risk areas	☐	☐	☐	☐	
Activity in urban heat island	☐	☐	☐	☐	
Exposure to other hazards (e.g., storms, wind, drought)	☐	☐	☐	☐	
Other: _____	☐	☐	☐	☐	

Community Resilience (Change in the factor reduces (positive impact) or increases (negative impact) people or infrastructure experiencing a hazard) **Sensitivity-Related Factors**	**No Impact**	**Indeter-minate**	**Positive Impact**	**Negative Impact**	**Comments**
Change to forest cover*	☐	☐	☐	☐	
Change to non-forest tree canopy*	☐	☐	☐	☐	
Change to quality or quantity of other green areas (e.g., wetlands, meadows, turf)*	☐	☐	☐	☐	
Change to impacts of heat (e.g., cool pavements, cool roofs, air conditioning, energy efficiency improvements)*	☐	☐	☐	☐	
Change in perviousness*	☐	☐	☐	☐	
Change in stormwater management system treatments	☐	☐	☐	☐	
Change to water quality or quantity	☐	☐	☐	☐	
Change to air quality	☐	☐	☐	☐	
Infrastructure design decisions (e.g., sizing, materials)*	☐	☐	☐	☐	
Other: _____	☐	☐	☐	☐	
Adaptive Capacity (Change in the factor increases (positive impact) or decreases (negative impact) ability to respond and bounce back) **Adaptive Capacity Factors**	**No Impact**	**Indeter-minate**	**Positive Impact**	**Negative Impact**	**Comments**
Change to accessibility or prevalence of community and public spaces (e.g., libraries, air-conditioned cooling centers)	☐	☐	☐	☐	
Change to emergency response and recovery capabilities	☐	☐	☐	☐	
Change in access to transportation	☐	☐	☐	☐	

Change to accessibility or prevalence of local food sources and other goods	☐	☐	☐	☐	
Change in availability or distribution of economic and financial resources (e.g., employment, income equality, business size and diversity)	☐	☐	☐	☐	
Change to community connectivity (e.g., social connections, sense of place and belonging)	☐	☐	☐	☐	
Change in distribution of resources and support	☐	☐	☐	☐	
Other: _____	☐	☐	☐	☐	

*Overlaps with a greenhouse gas emissions sector or activity

Greenhouse Gas (GHG) Emissions and Sequestration Checklist

(Revised, June 2025)

The first step in a GHG emissions and sequestration assessment for a ZTA or master plan involves an initial applicability review and directional impact assessment. This includes considering whether the ZTA or master plan will influence activities that may result in changes in GHG emissions or sequestration. It also includes an evaluation to qualify whether these activities that may be influenced may have a positive or negative impact on GHG emissions or sequestration. While the checklist provides a starting point, it is not a comprehensive list of all potential GHG and sequestration related activities for a specific ZTA or master plan. Planning staff should supplement climate assessments with additional data and information as appropriate. The checklist also does not cover how much of an impact may be involved and how it might relate to other impacts, which should be part of the qualitative narrative of the climate assessment, or quantitative analysis if applicable. As noted in this checklist, some of the factors overlap with factors in the Community Resilience and Adaptive Capacity checklist. The checklist below revises Table 1 in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022.* For more information regarding ~~this checklist,~~ definitions of terms and factors, and additional guidance in preparing a narrative assessment, see pages 8 – 17 in ~~Table 1 and associated text in~~ the *Final Report*, ~~*: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF,*~~ *December 1, 2022.* The ~~is document~~ *Final Report* also provides guidance for quantitative assessments, if applicable.

Does the ZTA/master plan ~~e~~affect any of the following activities? *(Indicate if there is no anticipated impact, or if an impact is indeterminate because you cannot say whether there will be an impact or not.)*			*If there is an anticipated impact, is the activity likely to have a positive, ~~or~~ negative, both, or either positive or negative impact on GHG emissions and sequestration? (The assessment narrative should indicate minor, moderate, major, a combination, or a range of possible impacts based on the location and extent of potential changes that could occur under the ZTA or Master Plan.)*		
Transportation Emissions	**No Impact**	**Indeter-minate**	**Positive Impact**	**Negative Impact**	**Comments**
Vehicle miles traveled by type (personal vehicles, commercial trucks or vehicles, rideshare, school buses, motorcycles)	☐	☐	☐	☐	
Number of trips (including considering single occupancy or carpool trips)	☐	☐	☐	☐	
Non-vehicle modes of transportation (scooter, bikes, walking)	☐	☐	☐	☐	
Public transportation use (public bus and Metrorail)*	☐	☐	☐	☐	
Electric vehicle infrastructure access (i.e., charging stations)	☐	☐	☐	☐	
Building Embodied Emissions	**No Impact**	**Indeter-minate**	**Positive Impact**	**Negative Impact**	**Comments**
Building certifications (e.g., LEED)*	☐	☐	☐	☐	
Building square footage	☐	☐	☐	☐	
Building life span	☐	☐	☐	☐	

Pavement infrastructure*	☐	☐	☐	☐	
Material waste produced	☐	☐	☐	☐	
Use of green building materials	☐	☐	☐	☐	

Energy Emissions	No Impact	Indeter-minate	Positive Impact	Negative Impact	Comments
Electricity usage (including distributed and renewable energy)	☐	☐	☐	☐	
Stationary fuel usage (natural gas, fuel oil, or LPG)	☐	☐	☐	☐	
Electricity efficiency (kilowatt-hour per square foot)*	☐	☐	☐	☐	
Stationary fuel efficiency (BTU per square foot)*	☐	☐	☐	☐	
Land Cover Change & Management Sequestration	**No Impact**	Indeter-minate	Positive Impact	Negative Impact	Comments
Area of forest*	☐	☐	☐	☐	
Area of non-forest tree canopy (i.e., number of trees on the ground, or percent of tree canopy cover per acre)*	☐	☐	☐	☐	
Area of green cover (i.e., meadow, grassland, turf, wetland, etc.)*	☐	☐	☐	☐	
Implementation of nature-based solutions[1]* *If available, please list the relevant solutions implemented:*	☐	☐	☐	☐	

[1] **Nature-Based Solutions** – sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience. Examples include green roofs and bioretention.

* Overlaps with a Community Resilience factor.

Montgomery Planning

CLIMATE ASSESSMENT FOR [MASTER PLAN TITLE]

[Template Revised: June 2025]

[Note: This template is a basic framework for the content and structure of a climate assessment. The assessor, however, can supplement the assessment as appropriate with additional information and graphics.]

PURPOSE OF CLIMATE ASSESSMENTS

The purpose of the Climate Assessments is to evaluate the anticipated impact of master plans and zoning text amendments (ZTAs) on the county's contribution to addressing climate change. These assessments will provide the County Council with a better understanding of the potential climate impacts and implications of proposed master plans and ZTAs, at the county level. The scope of the Climate Assessments is limited to addressing climate change, specifically the effect of land use recommendations in master plans and ZTAs on greenhouse gas (GHG) emissions, ~~and carbon~~ sequestration, ~~and how actions proposed by master plans and ZTAs could improve the county's adaptive capacity to climate change and increase~~ community resilience and adaptive capacity, and the county's Climate Action Plan (CAP) actions.

While co-benefits such as health and cost savings may be discussed, the focus is on how proposed master plans and ZTAs may impact ~~GHG emissions and community resilience~~the climate-related considerations mentioned above.

SUMMARY

[For example: The Montgomery County Planning Board anticipates that [Master Plan X will have no, indeterminate, ~~slight~~minor, moderate, ~~large~~ major, a combination, or a range of positive or negative] impacts on the county's goals of addressing greenhouse gas emissions, carbon sequestration, and ensuring resilience and adaptive capacity of our communities.

BACKGROUND AND PURPOSE OF MASTER PLAN X

[Discussion of what this Master Plan does, what issues are being addressed, what geographies are covered, etc.… --- *should be provided by the lead master plan review coordinator*]

VARIABLES THAT COULD AFFECT THE ASSESSMENT

[List the climate-related and non-climate related variables that were considered in the assessment. Climate related variables include the various greenhouse gas reduction, sequestration, resilience, and adaptive capacity activities in the March 2025 updated climate assessment checklists (updates of Tables 1 and 8~~)~~ contained in the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County*~~(~~).]

CLIMATE-RELATED VARIABLES

[For example, greenhouse gas, sequestration, resilience-related, and adaptive capacity-related variables.]

OTHER VARIABLES

[For example, non-climate related variables related to the master plan.]

ANTICIPATED IMPACTS

[High level summary of what is anticipated (see ~~Tables 1 and 8 and associated text~~the March 2025 updated GHG and Sequestration, and the Community Resilience and Adaptive Capacity checklists) and additional guidance found in *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County*. [No, indeterminate, ~~slight~~minor, moderate, ~~large~~ major, a combination, or a range of potential positive or negative] impacts on greenhouse gas emissions, sequestration, community resilience, and adaptive capacity as described in more detail below.] *If there are no anticipated impacts, it may be feasible to delete the two sub-sections below and just add a few sentences here summarizing no impacts to some or all areas of assessment.*

GREENHOUSE GAS EMISSIONS, CARBON SEQUESTRATION, AND DRAWDOWN

[For example: The [Master Plan X is anticipated to have [no, indeterminate, ~~slight~~minor, moderate, ~~large~~major, a combination, or a range of~~]~~ [positive or negative] impacts on greenhouse gas emissions and carbon sequestration. Note: The *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County* indicates that carbon sequestration, drawdown, and reduction are generally used interchangeably. The *Recommendations* document uses the term sequestration.]

[Provide explanation for the assessment. For example: Were any activities in the greenhouse gas and sequestration checklist (~~Table 1~~ see March 2025 updated GHG Emissions and Sequestration checklist guidance) identified as having a positive or negative impact? What are the associated uncertainties? Is there an anticipated timeline of impacts – does this involve a change in policy or practice that would

have immediate impacts or does this change requirements only for future/new things which would lengthen the impacts? Was any other literature review done as a result of the initial checklist that provides reference points on the subject? How does the master plan relate to the county's Climate Action Plan (CAP) GHG goals and reduction strategies, and Thrive Montgomery 2050 recommendations? Are there any options to reduce potential GHG emissions or increase sequestration? If modeling (GHG Quant Tool as described in the *Recommendations* and Quant Tool documentation) was involved in the assessment include appropriate summaries of the results and how they affect the assessment.]

COMMUNITY RESILIENCE AND ADAPTIVE CAPACITY

[For example: The [Master Plan X is anticipated to have [no, indeterminate, ~~slight~~minor, moderate, ~~large~~major, a combination, or a range of~~]~~ [positive or negative] impacts on community resilience and adaptive capacity].

[Provide explanation for the assessment. For example: were any activities in the resilience and adaptive capacity checklist (~~Table 8~~see March 2025 updated Community Resilience and Adaptive Capacity checklist guidance) ~~get~~ identified as having a positive or negative or other type of impact? What are the associated uncertainties? Is there an anticipated timeline of impacts – does this involve a change in policy or practice that would have immediate impacts or does this change requirements only for future/new things which would lengthen the impacts? Was any other literature review done as a result of the initial checklist that provides reference points on the subject? Is there a tie to CAP or Thrive recommendations? Are there any options to reduce potential negative impacts?]

RELATIONSHIP TO GREENHOUSE GAS REDUCTION, ~~AND~~ SEQUESTRATION, AND OTHER RELEVANT ACTIONS CONTAINED IN THE MONTGOMERY COUNTY CLIMATE ACTION PLAN (CAP)

[Assess whether each applicable activity factor for the master plan relates to a core greenhouse gas emission, ~~or~~ sequestration, or other relevant action within the most recent version of the county's Climate Action Plan (CAP)~~,~~. ~~and~~ If so, note if that action will have no, indeterminate, minor, moderate, major, a combination, or a range of positive or negative impacts on implementing the action,~~has a relatively high, medium, or low reduction potential~~ also noting any actions that are relevant to but not addressed in the master plan that could inform any recommended amendments to the master plan ~~as evaluated within the CAP~~ (see the March 2025 updated *Determining Relationships to County Climate Priorities* guidance sheet, ~~Table 2~~ and guidance in preparing a narrative assessment~~associated text contained~~ on page 17 in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022*~~)~~. For more information regarding the Climate Action Plan and other potentially relevant actions Climate Action Plan actions

not covered in the Determining CAP Relationships guidance sheet , see the *Montgomery County Climate Action Plan , June 2021.*)]

RECOMMENDED AMENDMENTS

The Climate Assessment Act requires the Planning Board to offer appropriate recommendations such as amendments to the proposed [Master Plan X] or other mitigating measures that could help counter any identified negative impacts through this Climate Assessment.

SOURCES OF INFORMATION, ASSUMPTIONS, AND METHODOLOGIES USED

[The climate assessment for [Master Plan X] was prepared using the methodology for master plans contained within the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, December 1, 2022*.]

[Did the checklist process prompt additional literature review? If so, cite the relevant literature. If modeling was involved (GHG Quant Tool) provide model citation. Were any assumptions made that are not covered by the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, December 1, 2022*? If so, summarize them and how they relate to the climate assessment.]

Montgomery Planning

CLIMATE ASSESSMENT FOR [ZTA ##-##, NAME OF ZTA]

[Template REVISED: June 2025]

[NOTE: THIS TEMPLATE IS A BASIC FRAMEWORK FOR THE CONTENT AND STRUCTURE OF A CLIMATE ASSESSMENT. THE ASSESSOR, HOWEVER, CAN SUPPLEMENT THE ASSESSMENT AS APPROPRIATE WITH ADDITIONAL INFORMATION AND GRAPHICS.]

PURPOSE OF CLIMATE ASSESSMENTS

The purpose of the Climate Assessments is to evaluate the anticipated impact of master plans and zoning text amendments (ZTAs) on the county's contribution to addressing climate change. These assessments will provide the County Council with a better understanding of the potential climate impacts and implications of proposed master plans and ZTAs, at the county level. The scope of the Climate Assessments is limited to addressing climate change, specifically the effect of land use recommendations in master plans and ZTAs on greenhouse gas (GHG) emissions, ~~and~~ sequestration, ~~and how actions proposed by master plans and ZTAs could improve the county's adaptive capacity to climate change and increase~~ community resilience and adaptive capacity, and the county's Climate Action Plan (CAP) actions.

While co-benefits such as health and cost savings may be discussed, the focus is on how proposed master plans and ZTAs may impact ~~GHG emissions and community resilience~~the climate-related considerations mentioned above.

SUMMARY

[For example: The Montgomery County Planning Board anticipates that [ZTA ##-## will have no, indeterminate, ~~slight~~minor, moderate, ~~large~~ major, a combination, or a range of positive or negative] impacts on the county's goals of addressing greenhouse gas emissions, carbon sequestration, and ensuring resilience and adaptive capacity of our communities.

BACKGROUND AND PURPOSE OF ZTA ##-##

[Discussion of what this ZTA does, why it was introduced, what issues are being addressed, what geographies are covered, etc.… --- *should be provided by the lead ZTA review coordinator*]

VARIABLES THAT COULD AFFECT THE ASSESSMENT

[List the climate-related and non-climate related variables that were considered in the assessment. Climate related variables include the various GHG reduction, sequestration, resilience, and adaptive capacity activities in the March 2025 updated climate assessment checklists (~~see~~ updates of Tables 1 and 8 ~~and associated text)~~ contained in the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, or other variables identified in the assessment*~~)~~.]

CLIMATE-RELATED VARIABLES

[For example: greenhouse gas, sequestration, resilience-related, and adaptive capacity-related variables.]

OTHER VARIABLES

[For example: non-climate related variables pertaining to the ZTA.]

ANTICIPATED IMPACTS

[High level summary of what is anticipated based on the checklists (see ~~Tables 1 and 8 and associated text~~ the March 2025 updated GHG and Sequestration, and the Community Resilience and Adaptive Capacity checklists) and additional guidance found in *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County*. [No, indeterminate, ~~slight~~minor, moderate, ~~large~~ major, a combination, or a range of positive or negative] impacts on greenhouse gas emissions, sequestration, community resilience, and adaptive capacity as described in more detail below. Note if any of the activities or variables involved are quantifiable or indeterminate] *If there are no anticipated impacts, it may be feasible to delete the two sub-sections below and just do 1-2 sentences here summarizing no impacts to some or all areas of assessment.*

GREENHOUSE GAS EMISSIONS, CARBON SEQUESTRATION, AND DRAWDOWN

[For example: The [ZTA ##-##] is anticipated to have [no, indeterminate, ~~slight~~minor, moderate, ~~large~~major, a combination, or a range of~~]~~ ~~[~~positive or negative] impacts on greenhouse gas emissions and carbon sequestration. Note: The *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County* indicates that carbon sequestration, drawdown, and reduction are generally used interchangeably. The *Recommendations* document uses the term sequestration.]

[Provide an explanation for the assessment. For example: Were any activities in the greenhouse gas and sequestration checklist (see ~~Table 1~~March 2025 updated GHG Emissions and Sequestration checklist guidance) identified as having a positive or negative impact? What are the associated uncertainties? Is there an anticipated timeline of impacts – does this involve a change in policy or

practice that would have immediate impacts or does this change requirements only for future/new things which would lengthen the impacts? Was any other literature review done as a result of the initial checklist analysis that provides reference points on the subject? Does the ZTA relate to the county's Climate Action Plan (CAP) GHG goals and reduction strategies, and Thrive Montgomery 2050 recommendations? Are there any options to reduce potential GHG emissions or increase sequestration? If modeling (GHG Quant Tool as described in the *Recommendations* and Quant Tool documentation) was involved in the assessment include appropriate summaries of the results and how they affect the assessment.]

COMMUNITY RESILIENCE AND ADAPTIVE CAPACITY

[For example: The [ZTA ##-## is anticipated to have [no, indeterminate, ~~slight~~minor, moderate, ~~large~~ major, a combination, or a range of~~]~~ ~~[~~positive or negative] impacts community resilience and adaptive capacity].

[Provide an explanation for the assessment. For example, were any activities in the resilience and adaptive capacity checklist (~~Table 8~~see March 2025 updated Community Resilience and Adaptive Capacity checklist guidance) identified as having a positive or negative or other type of impact? What are the associated uncertainties? Is there an anticipated timeline of impacts – does this involve a change in policy or practice that would have immediate impacts or does this change requirements only for future/new things which would lengthen the impacts? Was any other literature review done as a result of the initial checklist that provides reference points on the subject? Is there a tie to CAP or Thrive recommendations? Are there any options to reduce potential negative impacts?]

RELATIONSHIP TO GREENHOUSE GAS REDUCTION, ~~AND~~ SEQUESTRATION, AND OTHER RELEVANT ACTIONS CONTAINED IN THE MONTGOMERY COUNTY CLIMATE ACTION PLAN (CAP)

[Assess whether each applicable activity factor for the ZTA relates to a core greenhouse gas emission, ~~or~~ sequestration, or other relevant action within the most recent version of the county's Climate Action Plan (CAP)~~;~~. ~~and~~ If so, note if that action will have no, indeterminate, minor, moderate, major, a combination, or a range of positive or negative impacts on implementing the action, ~~has a relatively high, medium, or low reduction potential as evaluated within the CAP~~also noting any CAP actions that are relevant to but not addressed in the ZTA that could inform any recommended amendments to the ZTA (see the March 2025 updated *Determining Relationships to County Climate Priorities* guidance sheet~~Table 2~~ and guidance in preparing a narrative assessment ~~associated text~~ on page 17 in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022*. For more information regarding the Climate Action Plan actions not covered in the Determining CAP Relationships guidance sheet, see the *Montgomery County Climate Action Plan , June 2021.*)]

RECOMMENDED AMENDMENTS

The Climate Assessment Act requires the Planning Board to offer appropriate recommendations such as amendments to the proposed [ZTA ##-##], or other mitigating measures that could help counter any identified negative impacts through this Climate Assessment.

SOURCES OF INFORMATION, ASSUMPTIONS, AND METHODOLOGIES USED

[The climate assessment for [ZTA ##-##} was prepared using the methodology for ZTAs contained within the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, December 1, 2022*.]

[Did the checklist process prompt additional literature review? If so, cite the relevant literature. If modeling was involved (GHG Quant Tool) provide model citation. Were any assumptions made that are not covered by the *Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, December 1, 2022*? If so, summarize them and how they relate to the climate assessment.]

Determining Relationships to County Climate Priorities

(Revised, June 2025)

Climate assessments include assessing whether each applicable activity factor for a ZTA or master plan relates to core greenhouse gas (GHG) reduction, sequestration, or other relevant actions within the most recent version of the County's Climate Action Plan (CAP), and. ilf so, noteing in the assessment if the action factor will have no, indeterminate, minor, moderate, major, a combination, or a range of positive or negative impacts on implementing has a relatively high, medium, or low reduction potential the action, as designated in the Climate Action Planalso noting any CAP actions that are relevant to but not addressed in the ZTA or master plan that could inform any recommended amendments to the ZTA or master plan. The table below reproduces Table 2 in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022, and* provides the fulla partial list of potentially relevant Climate Action Plan GHG reduction actions, their designated GHG reductions potential (from the Climate Action Plan) and the relationship to identified ZTA or master plan GHG impacting activities as listed in the Greenhouse Gas and Sequestration Checklist. While this table provides a starting point, it does not include a comprehensive list of all potential relevant ZTA/master plan GHG impacting activities, sequestration, or other climate-related CAP activities that could apply to a specific ZTA or master plan. Planning staff should supplement climate assessments with additional data and information as appropriate, including GHG and sequestration-related actions, and other applicable Climate Action Plan actions not included in in the table below.

Please Note: This guidance revises the text associated with Table 2 in the *Final Report, ICF, December 1, 2022.* For more information regarding this table and guidance in preparing a narrative assessment, see page 17 in Table 2 and associated text in the *Final Report: Climate Assessment Recommendations for Master Plans and Zoning Text Amendments in Montgomery County, ICF, December 1, 2022*. For more information regarding the Climate Action Plan and other Climate Action Plan actions potentially relevant to the master plan or ZTA, but not covered in the table below, see the *Montgomery County Climate Action Plan, June 2021.*

Activity factor relationships to GHG reduction and carbon sequestration actions from the 2021 County Climate Action Plan

Climate Action Plan action	Climate Action Plan assessed GHG reduction potential	Relevant ZTA / master plan checklist GHG and Carbon Sequestration activities
E-1: Community Choice Energy Program	High	Electricity usage
E-2: Private Building Solar Photovoltaic Code Requirements	Medium	Electricity usage
E-3: Promote Private Solar Photovoltaic Systems	Medium	Electricity usage
E-4: Public Facility Solar Photovoltaic Installations and Groundwork	Low	Electricity usage
B-1: Electrification Requirements for Existing Commercial and Public Buildings	High	Electricity usage, Stationary fuel usage, Efficiency
B-2: Electrification Requirements for Existing Residential Buildings	High	Electricity usage, Stationary fuel usage, Efficiency
B-3: Energy Performance Standard for Existing Commercial and Multifamily Buildings	High	Electricity usage, Stationary fuel usage, Efficiency
B-4: Electrification Incentives for Existing Buildings	High	Electricity usage, Stationary fuel usage, Efficiency
B-5: All-Electric Building Code for New Construction	High	Electricity usage, Stationary fuel usage, Efficiency

B-6: Disincentivize and/or Eliminate Natural Gas in New Construction	High	Electricity usage, Stationary fuel usage, Efficiency
B-7: Net Zero Energy Building Code for New Construction	High	Building certifications, Electricity usage, Stationary fuel usage
T-1: Expand Public Transit	Medium	Vehicle miles traveled, number of trips, Public transportation use
T-2: Expand Active Transportation and Micromobility Network	Medium	Vehicle miles traveled, number of trips, Non-vehicle modes of transportation
T-3: Private Vehicle Electrification Incentives and Disincentives	Medium	Electric vehicle infrastructure access, Electricity usage
T-4: Constrain Cars in Urban Areas, Limit Major New Road Construction	Medium	Vehicle miles traveled, number of trips
T-5: Zero Emissions Public Buses and School Buses	Medium	Public transportation use, Electric vehicle infrastructure access, Electricity usage
T-6: Electrify County and Public Agencies Fleet	Medium	Electric vehicle infrastructure access, Electricity usage
T-7: Expand the Electric Vehicle Charging Network	Medium	Electric vehicle infrastructure access, Electricity usage
T-8: Transportation Demand Management and Telework Strategies	Low	Vehicle miles traveled, number of trips, Non-vehicle modes of transportation
T-9: Traffic Management Systems	Low	Vehicle miles traveled, number of trips, Non-vehicle modes of transportation
T-10: Electric Vehicle Car Share Program for Low-Income Communities	Low	Electric vehicle infrastructure access, Electricity usage
T-11: Off-Road Vehicle and Equipment Electrification	Low	Electricity usage
S-1: Retain and Increase Forests	Not assessed (NA)	Area of forest
S-2: Retain and Increase Tree Canopy	NA	Area of non-forest tree canopy
S-3: Restore and Enhance Meadows and Wetlands	NA	Area of green cover, Nature-based solutions
S-4: Regenerative Agriculture	NA	Not assessed for ZTAs and master plans
S-5: Restore Soil Fertility, Microbial Activity, and Moisture Holding Capacity	NA	Not assessed for ZTAs and master plans
S-6: Whole-System Carbon Management and Planning	NA	Area of green cover, Nature-based solutions

Note: GHG reduction potentials were assessed in the June 2021 County Climate Action Plan. Within this plan the following definitions for reductions are used: High: >1,000,000 MT CO_2e, Medium: 500,000-1,000,000 MT CO_2e, and Low: <500,000 MT CO_2e. Actions that had no associated GHG reduction potential are not included in the table above. Carbon sequestration potentials were not assessed for the actions outlined in the County Climate Action Plan. Note that the Climate Action Plan does not include actions that explicitly address reducing embodied GHG emissions for buildings.
https://www.montgomerycountymd.gov/climate/Resources/Files/climate/climate-action-plan.pdf