Draft Takoma Park Minor Master Plan Amendment
Review and Comments Testimony
September 14th 2023 Public Hearing

Paul Chrostowski, Ph.D. QEP
7708 Takoma Avenue, Takoma Park 20912[1]

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Summary and Recommendations

Thank you for the opportunity to review and comment on the Draft Takoma Park Minor Master Plan Amendment (MMPA) document including appendices and supporting information. The following comments are provided to the Planning Department (PD) as written testimony for the September 14th public hearing and also to other decision makers decision makers in the hopes that development in this area can be conducted in an environmentally sustainable fashion and allow City and County to meet climate and other environmental goals and objectives[2]. Details are included in the ensuing pages.

- The development contemplated in the MMPA area as written likely will result in a severe environmental impact and prevent the attainment of climate goals.
- The PD should undertake a comprehensive environmental assessment covering greenhouse gas (GHG) emissions, water quantity and quality, urban heat island effect, geotechnical characterization, and chemical contamination. This assessment should be publicly transparent and performed with consultation with stakeholders, and subject to independent peer review. The MMPA process should be paused until the assessment is completed and any subsequent problem resolution are completed.
- Assessment of GHG emissions should be conducted using the conceptual site model life cycle analysis approach and include emissions from demolition and construction as well as operation, maintenance, and end-of-life. This assessment should include a discussion of the probability that City and County can reach their net-zero goals if the development proceeds.
- A strategic plan is needed for stormwater management in the MMPA area including the impacts on relic Brashears Run, Sligo Creek, and Long Branch. These subwatersheds need better delineation. Goals for permeability, evapotranspiration, soil storage, water quality, and active treatment should be discussed. Before and during construction runoff contaminated with sediment

[1] Paul.chrostowski@icloud.com; 301-585-8062

[2] In these comments, “City” refers to the City of Takoma Park Maryland and “County” refers to Montgomery County Maryland.

and petroleum-related pollutants should be monitored and compared to the goals.

- Maple Avenue is particularly vulnerable to flooding and this problem will only increase as climate change alters rainfall patterns and amounts. Currently, there is no comprehensive flood vulnerability for Maple Avenue and adjacent low-lying areas. This information gap should be corrected prior to implementation of the MMPA.
- A geotechnical and seismic stability study should be performed on the WAH property adjoining Sligo Creek and on areas along Maple Ave proposed for large multi-use development.
- An Environmental Site Assessment based on ASTM guidelines should be conducted for the WAH site. The extent of asbestos, lead, and PCB contamination should be delineated.

Introduction

Allow me to introduce myself. I am a long-time resident of Takoma Park and an even longer time resident of Montgomery County. In addition, I am a credentialed environmental professional. After an undergraduate multidisciplinary science education at U.C. Berkeley, I was awarded an M.S. in Environmental Science and a Ph.D. in Environmental Engineering and Science from Drexel University. I am a registered Qualified Environmental Professional (QEP No. 02970014) and have over 40 years of experience in solving environmental problems for a diverse client base. I currently operate an environmental consultancy in Takoma Park. I have served on Montgomery County's Energy and Air Quality Advisory Committee, Takoma Park's Committee on the Environment, FOSC's Board of Directors and Takoma Stormwater Solutions. These comments were produced *pro bono* in the interests of enhancing public welfare and the natural environment. I have no conflicts of business or interest in any of the topics covered herein.

General Comments

Implementation of the MMPA could result in as many as 3,500 residential units in Takoma Park. Given current census data, on average, this would represent an additional 8,890 people added to a population of 17,462 (2021 data). Redevelopment and management activities would occur over about 12% of the total land area of Takoma Park[3] and include two major transportation ways (Maple and Flower Avenues) and two water bodies (Sligo and Long Branch Creeks) The activities contemplated in the MMPA would include demolition of buildings and hardscape, construction of new buildings (of up to 120-150 ft in height) and hardscape, renovation of park land and waterways, roadway and walkway reconfiguration and creation of new utility infrastructure. Although a timeline has not been proposed for implementation, recent experience in Takoma DC and Silver Spring suggests that a duration of decades of

[3] The MMPA documents give the plan area variously as 132 and 155.59 acres. The basis of these numbers was not provided.

construction activity would be likely. There is a very high potential for such a significant project to cause environmental impacts, especially regarding climate change, biodiversity, and water management.

Both Montgomery County and the City of Takoma Park have recognized states of climate change emergencies and have adopted goals related to climate change mitigation, adaptation, and resilience. Takoma Park has also been certified by Sustainable Maryland and hopes to maintain this certification. Greenhouse gas emissions and natural resources (including watershed and stormwater management) are integral components of this certification. Takoma Park has completed several greenhouse gas inventories and aspires to attain "net-zero" greenhouse gas emissions by 2035[4].

Stormwater, flood potential, and climate change are inextricably entwined in Takoma Park[5]. Stormwater management is recognized as a serious problem in Takoma Park and surrounding areas. The City has no strategic plan for the management of stormwater[6]. Sligo Creek, a tributary of the Anacostia River, runs through Takoma Park and through the MMPA area. It is buffered from surrounding development by the Sligo Stream Valley Park (SVP). The creek suffers from poor water quality and is subject to flooding in Takoma Park. Further, the SVP in this area is a highly degraded forest with poor biological diversity and a preponderance of alien invasive species. Much of the MMPA area is within an existing urban heat island (UHI). Depending on meteorologic conditions, this UHI spreads and is continuous with UHIs in Silver Spring, MD, and Takoma DC—both areas subject to rapid urban development. The Cadmus report[7] discussed the inequitable effects of the Takoma Park UHI on minorities and senior citizens. All these factors point to the need for a comprehensive detailed analysis of potential environmental impacts prior to approval and implementation of the MMPA.

In 2020, the Takoma Park City Council passed the Climate Emergency Response Framework as a formal resolution (No. 2020-6). This framework is, in essence, a contract between the City and its residents. Among other things, this resolution calls for:

- Continuing the City's commitment to protection and healthy growth of the urban forest and tree canopy for both climate mitigation and resilience. Currently, Takoma Park's urban tree canopy stands at 58% and the resolution clearly calls for this goal to be met or exceeded. An increase in canopy is also called for in the Cadmus report. This goal cannot be met by the urban canopy proposal in the MMPA.
- Improved stormwater management for both public space and stormwater flows on and between private property. The uncertainties present in Appendix D for

[4] The term "net-zero" was not defined in the implementing resolution (Resolution 2020-6)
[5] Borneman, C. et al. 2020. Stormwater Planning Under Climate Change Report. Prepared for Takoma Park Public Works. Drexel University, Philadelphia, PA.
[6] Takoma Stormwater Solutions. Proposed Plan for Developing a Stormwater Resilience Strategic Plan in Takoma Park. January 2022.
[7] 2019 "Resilience and Adaptation Memo—Developed to inform the Sustainability and Climate Action Plan" prepared for the City by Cadmus ("Cadmus report")

Brashears Run, Long Branch Creek and the WAH site show that current hydrology is not well understood, and it is difficult to see how the City's objectives can met without such understanding.

- Greenhouse gas capture and sequestration. There are no plans in the MMPA for these processes. A quantitative assessment by credential environmental professionals needs to occur for the City to meet its goals.
- Supporting community-led adaptation and mitigation efforts as feasible. The community has not been invited to take part in the MMPA climate assessment.

These topics all need to be candidly and transparently addressed in any environmental assessment.

Appendix D: Environment to the MMPA Draft does not satisfy these needs. Many of the statements in the document are not substantiated by citation or analysis. A substantial amount of work has been conducted over several decades by the City of Takoma Park and independent stakeholders to identify environmental threats associated with climate change and inappropriate development. Unfortunately, this work does not seem to have been relied upon in drafting Appendix D. For example, the 2019 "Resilience and Adaptation Memo—Developed to inform the Sustainability and Climate Action Plan" prepared for the City by Cadmus ("Cadmus report") presents a blueprint for sustainable action. This report contains recommendations regarding extreme heat, storms, drought, and flooding which have been accepted by the City as a component of its sustainability priorities and which are directly relevant to MMPA development. Any development or zoning changes should be consistent with this blueprint if Takoma Park hopes to attain environmental sustainability. Although Appendix D presents a general qualitative description of the MMPA area, it does not contain sufficient information to determine if the proposed development would prevent City and County from attaining net-zero greenhouse gases, what the impact might be on stormwater quantity, quality, and potential impacts to Sligo Creek, and how it could impact the urban heat island. To do this, an environmental impact assessment is needed. This assessment should be quantitative when data are available, utilize all readily available data, build on what already is known, and involve stakeholders in a transparent and open fashion. The remainder of these comments focuses on specific topics—both those included in Appendix D and those that should be included for a comprehensive analysis. Recommendations are provided for each topic.

<u>Greenhouse Gas Emissions</u>

Takoma Park has committed to a goal of "100% reduction of greenhouse gas (GHG) emissions by 2035" and "net zero greenhouse gas emissions by 2035"[8]. Similar goals have been stated by Montgomery County. "Net zero" And "100% reduction" are not exactly the same and the City has not defined "net zero", however, a working definition has been provided by Oxford University researchers as "CO_2-induced warming halts

[8] Resolution 2020-6

when net anthropogenic CO_2 emissions halt (that is, CO_2 emissions reach net zero"[9]. The City and County goals apply to GHG, not just CO_2, so we can expand this definition to define net zero greenhouse gas emissions to include all significant greenhouse gases--CO_2, methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), and ozone (O_3). In simple terms, attaining Takoma Park's goals will mean that none of these gases can be emitted after New Year's day 2035. Current GHG emissions estimates for Takoma Park are not readily available (and may not exist). An inventory conducted in 2017 showed total emissions (CO_2, CH_4,N_2O) of 129,824 MT CO_2e and a population of 17,885 people for an average per capita emission rate of 7.26 MT CO_2e per person annually. COG presented a summary of area GHG emissions for 2020 in which they reported average per capita emissions of 7.3 MT CO_2e per person in Takoma Park annually[10]. Thus, it appears that there was no change in Takoma Park GHG emissions over this three-year period. Assumming 8,890 new residents as above and that the average new resident behaves similarly to the average 2020 Takoma Park resident. Even this simple calculation suggests that implementation of the development permitted in the MMPA will result in an additional 64,897 MT CO_2e or an annual total of 194,721 MT CO_2e that will need to be removed annually to attain net-zero within 11 years.

This, of course, is an oversimplification, but it illustrates one component of the application of the basic principle of impact analysis that environmental impacts depend on population, consumption (or affluence), and technology. The PD has committed to producing a refined climate assessment prior to the MMPA being submitted to County Council, although it is not part of the public process and will be conducted without stakeholder input. Communication with PD staff shows that there will be several significant omissions in this analysis including the release of GHG during construction and the disposal of materials. Like GHG emissions associated with residential energy use, fossil fuels used during demolition, transportation, and construction may be both direct and/or indirect. For example, use of natural gas in residential appliances can result in the direct emission of CO_2 and CH_4; use of electricity from non-renewable sources can result in emissions from fossil fuel power plants. Similarly the use of gasoline, liquefied natural gas, diesel, and propane by construction equipment will result in direct emissions. Another source of GHG emissions can be embodied in materials used in construction. For example, concrete, steel, wood, and composites used as structural materials all were produced by processes that emit greenhouse gases. In Nordic countries, steel framing on a building emits 209 kg CO_2/cubic meter while concrete framing emits 602 kg CO_2/cubic meter[11]. Quantitative analysis is most appropriate for a master plan of this size. Based on documentation and a spreadsheet model from the PD, it[12] appears that these direct, indirect, and embodied GHG

[9] Fankhauser, S. et al. 2022. The meaning of net zero and how to get it right. Nature Climate Change 12:15-21.
[10] MWCOG 2022. Community-wide greenhouse gas inventory summary: Takoma Park, MD. COG did not publish the underlying data so this inventory cannot be independently verified at this time.
[11] Bahrami, A. et al. 2022. Carbon dioxide emissions from various structural frame materials of single-family houses in Nordic countries. Int Jour Innovative Res Sci Studies 5:112.
[12] ICF 2022. Climate assessment recommendations for master plans and zoning text amendments in Montgomery County. Prepared for MNCPPC.

emissions can readily be quantified for the development permitted by the MMPA. Careful peer review can determine if the model used to estimate these emissions was appropriately parameterized.
Emissions are highly dependent on the materials used for construction. This is illustrated by a recent study from Norway that compared GHG emissions from a standard concrete building to a wood laminate building over a 60-year assumed lifetime[13]:

Construction system	**Reinforced concrete and steel**	**Cross laminated timber**
Number of stories	5	8
Number of units	31	47
Interior gross area (square meter)2376.1	2376.1	3784.8
GHG emissions (kg CO2e/square meter)	801.5	696.6

The take-home lesson from this is that considerably more housing can be built without increasing CO_2 emissions by the choice of sustainable materials. In conducting its climate assessment, it is recommended that the PD build a conceptual site model of development in the MMPA area and determine GHG emissions from several construction scenarios over the building life cycle. The model would develop several scenarios that would contain different buildings, infrastructure, open space etc. based on current construction practices and materials. Demolition of existing structures should be included in all scenarios unless there is an opportunity for adaptive reuse. Each of these scenarios can then be evaluated quantitatively for GHG emissions (and other air pollutants as appropriate). The results of this exercise could allow choice among various scenarios based on minimization of environmental impact in addition to information could be used to imposing conditions over construction of these projects and, ultimately, a modification of relevant building codes.

A complete analysis should include the entire life cycle of the building from demolition and site preparation through construction, occupancy, maintenance, and end-of-life disposal or re-use. A useful component of the climate analysis would be the Boston Climate Resilience Checklist[14] that was recommended to Takoma Park in the Cadmus report.

Focusing on the former WAH campus as an example, a significant amount of demolition and site preparation will be required. Based on measurements obtained using MCAtlas, current buildings on this site have a combined footprint of about 160,000 square feet with heights extending to seven stories. In addition to buildings, there is significant hardscape and specialized utility structures throughout the site – the City of Takoma Park estimates that the site is 54% impervious while an independent investigation

[13] Eliassen, A.R. et al. 2019. Comparative LCA of a concrete and steel apartment building and a cross laminated timber apartment building. IOP Conf Ser: Earth Environ Sci. 323.
[14] Climate Resiliency Report Checklist (google.com)

estimates it is 80% impervious[15]. All these structures will require demolition, sorting, transportation and recycling and disposal if the full extent of the zoning modifications in the MMPA is implemented. Diesel heavy equipment is a major emitter of CO_2 (in addition to criteria air pollutants such as particulate matter and nitrogen oxides). Equipment likely to be used at the site for demolition and site preparation includes backhoes, excavators, bulldozers, hydraulic hammers, cranes, loaders, trucks, graders, and generators. Data from a North Carolina State University study shows that each piece of heavy equipment averages about 25.4 kg CO_2 per hour. Demolition of a single building with a concrete foundation could employ some 10 pieces of equipment and emit approximately 500 MT CO_2 annually[16]. These emissions would need to be multiplied by the number of buildings/hardscape to be demolished at a single time, the time to accomplish this, and the emissions from hauling demolished materials to a C&D landfill or recycling center. Similar emissions from equipment would occur during construction of buildings, hardscape, and infrastructure. The PD should take these emissions into account along with those calculated using the spreadsheet model.

Good public policy, principles of open government, and a formal resolution by the Takoma Park City Council all dictate that any climate assessment needs to be performed in the public eye. The current plans are for the climate assessment to be conducted after the public hearing on this MMPA. This assessment would then be transmitted to the County council without any opportunity for public scrutiny or peer review. Not only does the public deserve to know what is being assessed in this process, but members of the public, non-governmental organizations, and peer reviewers may have access to important information and expertise not readily available to PD staff. The Takoma Park 2020 Climate Emergency Response Framework makes this quite clear: “Include a transparent and inclusive public process to gather public input, increase community engagement, and ensure that community members and local businesses have opportunities to participate.”

<u>Stormwater Management, Water Quantity, Water Quality</u>

Stormwater and Climate Change are inextricably intertwined in Takoma Park as elsewhere. A warming climate and shifts in global circulation systems will result in heavier and more intense storms of short duration, requiring a paradigm shift in current stormwater management doctrine. The City has recognized the importance of climate change impacts to stormwater and commissioned two academic studies to investigate this phenomenon[17]. These studies both concluded that there will be a significant increase in precipitation associated with design storms of varying recurrence intervals due to climate change and recommended inclusion of these larger precipitation

[15] Sorvalis, G. 2016. Maximizing landscape performance at Adventist Hospital: Healing the people, healing Sligo Creek. Master Landscape Architecture thesis. Univ of MD.
[16] Frey, H.C. et al. 2020. Results of a comprehensive field study of fuel use and emissions of nonroad diesel construction equipment. Transportation Research Record, Feb 17, 2010. Other data from EPA’s *Exposure Factors Handbook* and *Means Building Construction Cost Data* (2015).
[17] Borneman, C. et al. 2020; Coelho, G. de A. & Ferreira, C.M. 2022. Assessing how to prioritize stormwater infrastructure projects under a changing climate. George Mason University.

amounts in future planning and design. This is consistent with Activity 3.2.2 of the Maryland Department of Environment's adaptation and resilience recommendations: "Integrate climate change considerations into all applicable planning processes to minimize the impacts of climate change associated water hazard risks.[18]" One of these studies also recommended that the City should create a comprehensive model including the entire stormwater system in order to identify localized areas which may be prone to backups and flooding as a result of climate change.

Takoma Park has a history of inadequate stormwater management as documented by the independent watchdog group Takoma Stormwater Solutions (https://www.takomastormwatersolutions.net/). In addition to documenting past and current water management problems in the City, this group evaluated the potential impact of climate change on stormwater and proposed that the City develop a strategic plan for stormwater and flood response consistent with the climate impact study recommendations. The City has opted for a different approach that focuses on stormwater impact hotspots rather than a holistic subwatershed approach. Stormwater management in Takoma Park is not a public process and currently there is no mechanism that will inform the public regarding stormwater management in the MMPA area. The ongoing study being conducted by the City did not include input from stakeholders.

The Takoma Park subwatershed is a component of the Sligo Creek watershed and is divided into 5 catchment areas or sub-basins. Two of these, popularly known as the Brashear's Run and Long Branch catchments have boundaries that extend outside of the City limits into Silver Spring and Washington DC. Both are tributaries of Sligo Creek which is a tributary of the Northwest Branch of the Anacostia River. Takoma Park holds a Municipal Separate Stom Sewer System (MS4) permit and operates its own compliance program independent of Montgomery County. The majority of Takoma Park's stormwater management budget appears to be used for MS4 compliance activities. In general, Takoma Park follows County and State guidance for stormwater management. The City has the authority to impose more stringent standards and has exercised this authority in the past. From an institutional standpoint, stormwater management in the City is invested in the form of the City Council formally sitting as the Stormwater Board, which has "all rights and powers necessary for the collection and disposal of stormwaters within the City and shall have the power to implement stormwater management programs"[19]. As such, the Board could, for example, impose more stringent standards for redevelopment of impervious areas than required by the State and County.

Brashear's Run and its underground drainage network are a focus of Appendix D. In general, this catchment drains most of what is Takoma Park's Ward 1 along with contributions from Washington DC's Ward 4 and Silver Spring. This is a significant

[18] MDE 22022. Maryland Climate Adaptation and Resilience Framework Recommendations 2021-2030.
[19] Takoma Park City Charter Article XI. Stormwater management. January 2, 2002.

tributary system, however, the information in this section is incomplete and erroneous. The term “Brashear’s Run” (“BR”) really represents several entities—a historical free flowing stream with probable headwaters located in Washington DC (Spring Street) near the Takoma Metro station and at least 4 significant tributaries, a system of storm drains, culverts, catch basins, and conveniences that has largely replaced the free-flowing stream, and the Maple Avenue outfalls into Sligo Creek. The BR system has been at least partially defined although uncertainties remain. It drains about 550 ac of Takoma Park which is 41% of Takoma Park’s area and 13% of total Sligo drainage. The Maple Ave outfall system is the biggest single point of stormwater discharge in Takoma Park.

Maple Ave basically lies in a basin/valley that is topographically bounded by ridges proximate to Carroll, Eastern, Hodges Heights, and Takoma Avenues and drains to Sligo Creek. Sligo Creek reaches flood stages regularly. That fact, along with historical data showing that Brashears Run meandered across the valley floor prior to the construction of Maple, underscores the conclusion that Maple Avenue and the buildings along it are vulnerable to flooding. This is supported by observations of flooding along Maple at Sligo Creek and the area opposite the Takoma Park Library near the Prince of Peace Assisted Living Facility. The recent Floodplain District Permit 393218 approved by the County Department of Permitting Services for the new Takoma Park Library at Maple & Philadelphia Avenues identified 14 buildings within the 100-year floodplain, even without considering the increased impacts associated with climate change. The 2009 Flood Mitigation Plan prepared by the City has been found to be inconsistent with the Floodplain Study prepared for the Takoma Park Library renovation[20], Flood Factor® analysis and resident observations. Recently, The 2019 Cadmus report recommended an update to the Flood Mitigation Plan. This update has not yet occurred but is a necessity for understanding the future hazards to Maple Avenue and the buildings in this area.

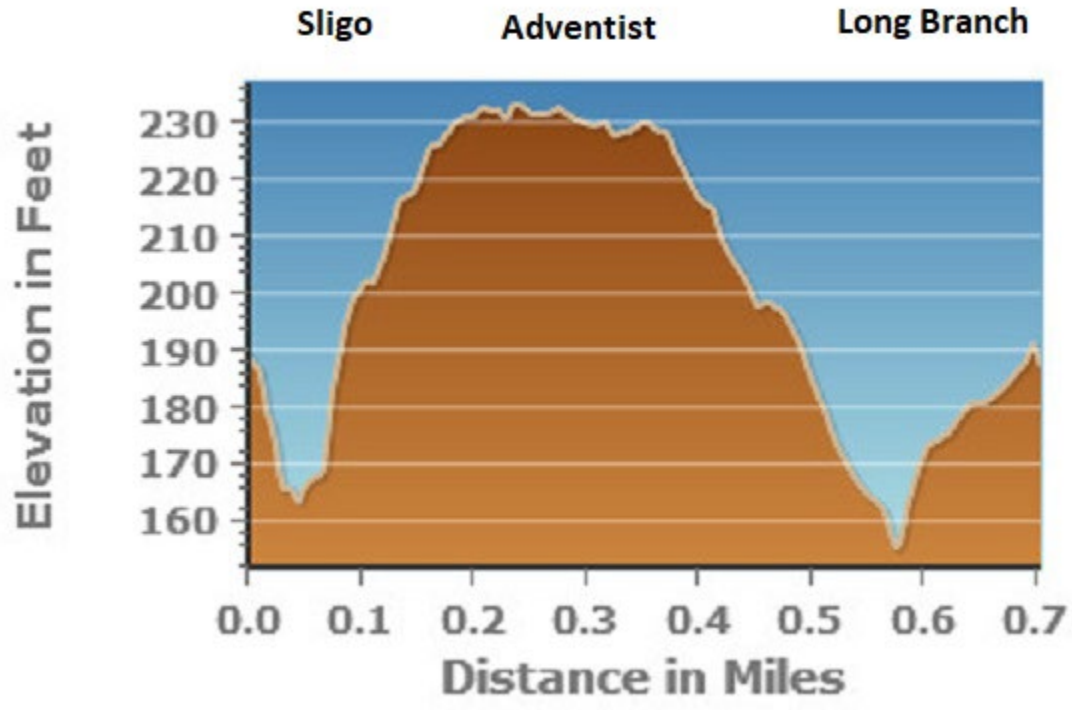
The map in Appendix D was not prepared by a water management professional, is inconsistent with the historical record, and has not been validated. The ultimate headwaters of Brashear’s Run are not well known since they are at least partially located outside of Takoma Park (District of Columbia, Silver Spring). A study performed for the City in 2012[21] revealed major uncertainties about Brashears sources including drains on Piney Branch Road, the WMATA Takoma Metro Station, Belle Ziegler Park/Montgomery College, and Blair Road. This study concluded that the stormwater mapping layers in the City were incorrect or deficient and require updating. As noted above, The flow rates in Brashears Run have not been measured and the contributions of the various sources is unknown as are the flows at the outfalls. The Brashear’s Run

[20] Delon Hampton & Assoc. 2020. Hydrologic and hydraulic analysis for the Takoma Park public library. Prepared for City of Takoma Park; Chrostowski, OP.C. 2021. Preliminary technical review: Takoma Park library project floodplain and water management. Memorandum to Takoma Park Mayor, City Council, and Staff.

[21] Center for Watershed Protection. 2012. Field findings memorandum: Maple Ave. outfall pollution source tracking. Takoma Park MD.

outfall is often highly contaminated by suspended sediment and enteric bacteria in addition to other water quality indicators. Measurements obtained by FOSC in 2022-23 showed total coliform bacteria on average exceeding 1,000 cfu/100 mL and ranging up to 8,600 cfu/mL, indicating substantial contamination at this outfall. In April 2023, the FOSC field team found elevated chloride, chlorine, nitrogen, and phosphorous in addition to a milky appearance and substantial amounts of trash and debris at this outfall. Both E. coli and enterococci often exceed state and federal standards in dry weather screening[22] conducted by the City of Takoma Park at this outfall. Since flowrates are not measured, the mass loading cannot be estimated. A significant amount of information regarding Brashear's Run and the Maple Avenue system is available and should be consulted. This section of Appendix D should be rewritten to reflect known uncertainties and that delineation of Brashear's Run be included as an objective of the MMPA.

From a topographic standpoint, much of the MMPA to the north of Sligo Creek (including the Adventist properties and Flower Avenue) stands on a plateau between Sligo and Long Branch creeks as shown in the figure, below[23]:



Runoff from the development area including the Hospital and University campuses and adjacent streets can directly enter these water bodies. Stormwater impinging on the

[22] Bay & Land Consultants 2019. Dry weather screening, analysis, & evaluation of outfalls report. Prepared for City of Takoma Park.
[23] Adapted from MCAtlas.

WAH campus is largely unmanaged. The only available study of the hydrology of the WAH site is by Sorvalis[24] who notes:

"Based on an analysis of Google Earth, 80% of Adventist Hospital's campus is impervious consisting of rooftops and parking lots, and pitches towards a steep slope leading directly down to Sligo Creek. Based on the slope and impervious surfaces, the campus delivers a great deal of stormwater to the creek during heavy rain events. Even during small rains, stormwater is delivered directly to the steep slope above the creek through a number of outfalls, causing erosion and sedimentation of the creek. As excessive stormwater erodes the creek, pollutants from the parking lot harm the creek's water quality".

In addition to direct overland flow, groundwater from the upland area including WAH and University campuses discharges to Sligo Creek through seeps and springs.

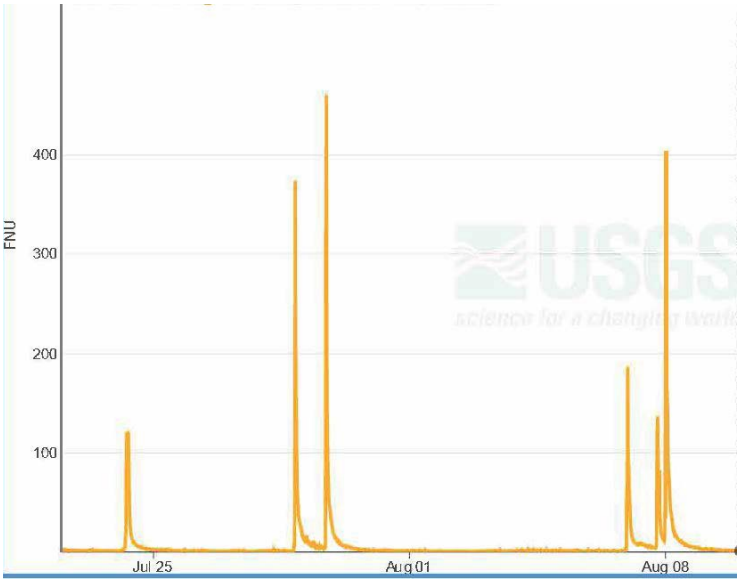
Any development that will take place on the WAH campus will need to be carefully managed to avoid pollution and hydrodynamic impacts to Sligo Creek during construction and subsequent occupancy. The soils at the site have not been characterized and are merely classified as "urban". Because of this, the ability of these soils to support significant water management features that rely on infiltration is unknown. The soils on the slope from the WAH campus to Sligo Creek have been characterized as Bricklow-Blocktown channery loams with 15-25% slope. This soil type is highly erodible and has a very high runoff potential. The complexity of the site suggests that it may not be amenable to the Maryland Department of the Environment environmental site design (ESD) approach. Water management at the WAH site, especially considering the impact of climate-change induced rainfall, may require both gray and green infrastructure including underground storage, treatment, and metered release to adequately protect Sligo Creek and the Anacostia River. In addition to the tributaries and direct overland flow, Sligo Creek is a gaining stream with a baseline flow provided by groundwater. There have been no groundwater studies in Takoma Park or surrounding areas in the Sligo watershed, creating even more uncertainty for future stormwater management. Long Branch Creek was not discussed in Appendix D; however, it is likely to be impacted by construction activities in the MMPA considering the topographic relationship between the MMPA area and the Long Branch stream valley. Residents in this area have long suffered from the effects of stormwater runoff which could be exacerbated by uphill construction.

The PD should provide a source and any calculations supporting the Impervious surfaces figure (Appendix D p.8). Including protected areas such as parks in this estimate tends to lessen the severity of the runoff problem here. Various estimates of impervious surface for the former WAH campus range from 54% to 80%. Uncontrolled and untreated runoff from these surfaces discharges to Sligo Creek down slopes of up to ±25%. In the past there have been several incidents of water pollution attributed to

[24] Sorvalis, G. 2016. Op cit.

these discharges. Monitoring at local sites (Maple Avenue and Jackson Ave outfalls) has revealed elevated levels of pollutants including suspended sediment and enteric bacteria.

Water management in Takoma Park is split between Stormwater (Takoma Park jurisdiction) and floodplain and erosion and sediment control (County DPS jurisdiction). I have observed that existing erosion and sediment practices are not adequate for the protection of the creek, especially for major construction projects such as the Purple Line and Montgomery College. In addition to my personal observations, there has been a stream of complaints reported by FOSC's Water Watchdog Program. These observations are supported by data from the USGS monitoring station at Maple Avenue downstream of Purple Line construction at Wayne Avenue as seen in the figure, below:



These data may be compared to a typical baseline for this station of <10 FTU indicating that erosion of sediment is posing a hazard to aquatic life.

It is recommended that Appendix D be expanded to include specific goals, objectives, and conditions for adequate erosion control during construction associated with the MMPA. Erosion may be monitored by installing real-time turbidity meters on Sligo and Long Branch Creeks. All activities potentially impacting Sligo Creek should be conducted in accordance with the Sligo Creek Subwatershed Action Plan[25] and in consultation with stakeholders including the Friends of Sligo Creek.

Geotechnical Considerations

A portion of the WAH site between Maple Avenue and the Carroll Avenue bridge sits atop a steep escarpment that is immediately adjacent to the Sligo SVP, Sligo trail, and Sligo Creek. Although an accurate topographic survey needs to be conducted, in

[25] Anacostia Watershed Restoration Partnership. 2015.

places, the slope appears to be up to 25% with drops of up to 40 feet between the crest and the streambed. Currently, the area atop the escarpment is terraced and built up by buildings set back from the edge and substantially smaller than those contemplated by the MMPA rezoning. The soil conditions under the hardscape in general and along the escarpment in particular have not been characterized (no geotechnical investigation) and were likely disturbed by cut and fill operations during the construction of the original hospital buildings The MMPA for this location ("Site 23") would allow buildings up to 120 ft in height. The MMPA does not appear to require a buffer between a building and the edge of the escarpment. Depending on construction materials, this hypothetical building could weigh tens of thousands of tons. The soils at this location have not been characterized and there is no evidence to suggest that the escarpment could support these masses. This raises concerns that the slope area leading down to the trail and creek is sufficiently unstable that it could result in displacement and slides from construction of large and heavy buildings without adequate stabilization and setback.

As noted above, the bed of the relic Brashears Run has not been well delineated, although it is believed that it roughly coincides with Maple Avenue between Philadelphia Avenue and Sligo Creek[26]. Engineering drawings of the stormwater management system associated with Maple Avenue show a highly complex system of conveyances (pipelines, inlets, etc.) underlying streets, sidewalks, some buildings, undeveloped land, and parking lots. For example, the Essex House Apartments (7777 Maple) has some 4 stormwater pipelines running under its parking lot; the hardscape between the Takoma Park Community Center and Piney Branch Elementary is situated over a veritable maze of stormwater structures. The uncertainty and complexity of underground utilities in this area in addition to uncertainty regarding relic stream channels also makes this area geotechnically uncertain and its suitability to support large buildings may be questionable.

A geotechnical and seismic stability assessment should be conducted using ASTM standards or equivalence prior to a final decision of the rezoning of this area to determine if the sites are geotechnically compatible with the proposed structures. This should involve both field, geophysical, and laboratory testing as appropriate to ensure that development would not result in hazards to public safety. The seismic classification should also be reported. All results should be publicly released. In addition to assisting in determining soil stability and load-bearing capacity, a geotechnical study will yield information regarding water infiltration (percolation) and soil-water storage capacity that is necessary for stormwater management at the WAH site.

[26] Prior to the building of Maple Avenue, Brashear's Run meandered considerably between what was then Niagara and Cumberland Avenues. No information is available to determine the fate of the channels once this part of Takoma Park was developed.

Potential Chemical and/or Radionuclide Contamination

The original structure at the WAH site was the Washington Sanitarium, built in 1907. The facility underwent significant expansion in 1916, 1940,1950, 1962, 1973 (main hospital building), and 1977. This period is notable for the use of lead in paint, asbestos in a variety of insulating activities, and polychlorinated biphenyls (PCBs) in building materials such as caulk. Over this period, WAH furnished long-term and acute care in addition to conducting research. In addition to typical medical, surgical, and radiological therapies, the hospital operated a laboratory (figure below) and an on-site power plant. During this time, the release of chemicals and radionuclides to the environment was largely unregulated in the United States.

1928 Photograph of WAH Laboratory

Incidents of chemical release from the facility have been noted as recently as the past few decades. Hospitals are documented sources of environmental contamination by chemicals including adhesives, antiseptics, detergents, petroleum, drugs, soaps, stains, and waxes. Specific contaminants include aniline dyes, pathogenic microorganisms, heavy metals, formaldehyde, picric acid, solvents, and alcohols[27]. A recent development project at a former hospital site in New York State involved remediation of trichloroethene, mercury, lead, cadmium, and polycyclic aromatic hydrocarbons[28]. Radionuclides were also used at the WAH during the period where there was little or no federal or state regulation of these materials. Given the period of operation and the types of services provided, there is a high potential for chemical contamination of structures and underlying soils at this location. Demolition and site preparation could result in release of these materials to the air and stormwater with subsequent exposure of nearby residents and the waters of Sligo Creek. Due to this, an Environmental Site

[27] Shineldecker, C.L.1992. Handbook of Environmental; Contaminants: A Guide for Site Assessments. Lewis Publishers.
[28] NYSDEC. Former Corning Hospital Suite # C851049. February 2018.

Assessment compliant with ASTM guidance[29] should be undertaken prior to finalization of the MMPA to determine what contamination may exist and the necessity for remediation or containment prior to construction. The public should be informed of the presence of any hazardous materials and the potential for release during demolition and construction.

Conclusions and Recommendations

Redevelopment in the MMPA area in accordance with the recommended zoning changes, could result in the most significant impact to the environment of any such project ever undertaken in Takoma Park. Yet, this draft MMPA has been proposed without any environmental impact assessment or meaningful involvement of stakeholders in addressing question associated with environmental sustainability and environmental health including climate change, water quality and quantity management, the urban heat island, biodiversity, and site chemical contamination. Public involvement is an integral component of Maryland's Climate Adaptation and Resilience Framework, Montgomery County's 2021 Climate Action Plan, and Takoma Park's 2020 Climate Emergency Response Framework. These factors all lead to the inescapable conclusion that the MMPA should not be finalized until an environmental impact assessment has been conducted with complete transparency and public involvement including independent peer review. Some specific comments on the draft plan that should be addressed in any environmental assessment include:

- Assessment of GHG emissions should be conducted using the conceptual site model approach and including emissions from demolition and construction. This assessment should include a discussion of the probability that City and County can reach their net-zero goals if the development proceeds.
- A strategic plan for stormwater management in the MMPA area including the impacts on relic Brashears Run, Sligo Creek, and Long Branch. These subwatersheds need better delineation. A comprehensive floodplain delineation incorporating future effects of climate change is needed for Maple Avenue. Goals for permeability, evapotranspiration, soil storage, water quality, and active treatment should be discussed. Before and during construction runoff contaminated with sediment and petroleum-related pollutants should be monitored and compared to the goals.
- A geotechnical and seismic stability study should be performed on the WAH property adjoining Sligo Creek and on areas along Maple Ave proposed for large multi-use development.
- An environmental site assessment for potential soil contamination with chemicals and radionuclides associated with over 100 years of operation of a hospital facility at the WAH campus should be conducted with stakeholder input.

[29] Phase I ASTM E-1527-21; Phase 2 ASTM E1903-19