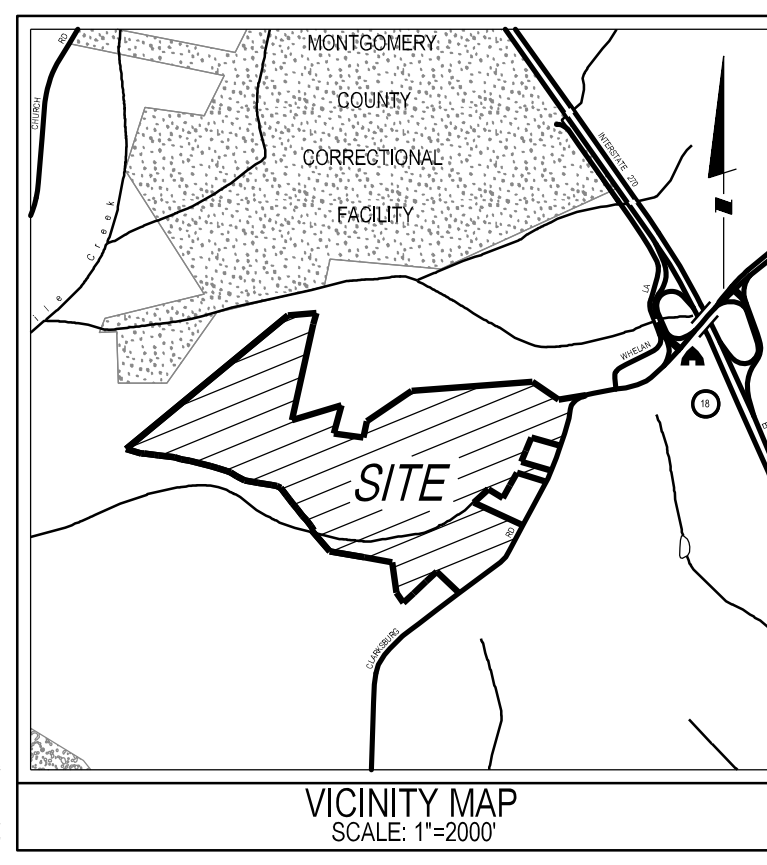


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 COLUMBIA, MD 21046  
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 MARK ANDERSON

**PROFESSIONAL CERTIFICATION**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
 LICENSE NO. \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

- Site Specific Guidelines for Converting Paved Areas into Pervious Greenpace**
- The Applicant has prepared the following guidelines that include typical practices for the removal of pavements and deconsolidation of underlying soils to promote vegetative growth and infiltration of stormwater, while minimizing impacts to forest and natural resources in the project area. These guidelines are based on an adopted/amended (Sept 2017) from M-NCPPC Department of Parks document dated 10/2/2009. Specifically, these procedures have been altered to better match the particular conditions at the Clarksburg Chase property and the conditions for restoration discussed with M-NCPPC Parks Staff during an on-site meeting held on January 10, 2024.
1. Prior to starting construction, contact Miss Utility to clear all existing utilities within work area. Please note that a private utility location firm may be required to locate private utilities not marked by Miss Utility. Coordinate any utility disconnections and/or abandonments with appropriate utility company.
  2. Prior to beginning, ensure all required permits have been obtained. If the disturbed area exceeds 5,000 square feet (SF) or earth movement exceeds 100 cubic yards (CY), a Sediment Control Permit will be required from the Montgomery County Department of Permitting Services (MCDPS). Additional approvals may be required from the Department of Planning of M-NCPPC and/or the Maryland Department of the Environment (MDE), depending on the location of the project relative to streams, wetlands, and other natural resources. Please note, that even when the project does not require formal permitting, standard sediment control and tree protection practices should be used.
  3. Conduct a pre-construction meeting with appropriate personnel from the contracting company, Applicant, and any agency having jurisdiction over the proposed construction activities, including the M-NCPPC inspector. The limit of disturbance (LOD) and access route should be identified, and a final set of approved plans should be available for review and discussion. The LOD may be field adjusted with the approval of the M-NCPPC inspector to minimize impacts to adjacent natural resources.
  4. Field locate and install Tree Protection Measures on trees greater than 16" diameter at breast height (DBH) within 25' of the proposed LOD and any significant or specimen trees that project a Critical Root Zone (CRZ) into the LOD. Install perimeter sediment controls around work area per the approved plans. Schedule work when favorable weather conditions are forecasted over the anticipated period of construction. In the event that poor weather conditions develop or if work is suspended for more than 2-3 days, the work area should be covered or otherwise stabilized with a temporary seed and straw mulch.
  5. Remove existing pavements (and subbase, if applicable), and other impervious materials in accordance with the approved plans, the project intent, and field direction by Applicant's representative and inspectors.
  6. Deconsolidate soils throughout areas of former imperviousness extending 2-feet beyond previous limits where feasible to promote vegetative growth while minimizing impacts to existing forest and natural resources.
  7. Once soil is deconsolidated and approved by Applicant's representative and inspectors, apply approved natural seed mix over disturbed area and install straw mulch. Thoroughly water seeded area to establish good stand of vegetation. Note that if project is on M-NCPPC property (or area to be dedicated to M-NCPPC), establishment of vegetation shall be in accordance with Planting Requirements for Land-Disturbing Activities and Related Mitigation on M-NCPPC Montgomery County Parkland and latest standards of M-NCPPC.
  8. Once vegetation is established (and with approval of inspectors) remove sediment controls, tree protection fencing, and any miscellaneous debris throughout site.

CLARKSBURG CHASE IMPERVIOUS CALCULATION	
<b>ZONE:</b>	RNC
Area under Application for Impervious (AC)	136.18
Area under Application for Impervious (SF)	5,932,016
6% Impervious Cap (SF)	355,921

Units - Total 100 units	
<b>Single Family 49 units</b>	
Single Family Type 1 (2274 s.f.) X 22 units	50,050.00
Single Family Type 1 End Unit (2290 s.f.) X 6 units	13,740.00
Single Family Type 2 (2031 s.f.) X 13 units	26,403.00
Single Family Type 2 End Unit (2047 s.f.) X 8 units	16,376.00
20' TH (20' W x 40.33' L @ 807 s.f.) - 18 units	14,526.00
20' TH End Unit (20.33' W x 40.33' L @ 820 s.f.) - 18 units	14,760.00
16' TH (16' W x 36.33' L @ 581 s.f.) - 13 units	7,553.00
Patio - Single Family (10 x 12 = 120 S.F.) - 49 units	5,880.00

Driveways	
Single Family - 49 units	32,560.00
20' TH - 39 units	14,450.00
16' TH MPDU - 13 units	2,565.00
Driveway to adjacent property	1,660.00

Leadwalks	
Single Family Leadwalks (3.5' x 7.5') - 49 units	1,287.00
20' TH - 39 units	2,586.00
16' TH MPDU - 13 units	682.00
Walls	362.00

Onsite Roadway & Sidewalk	
Roadways	84,722.00
Alleys	19,998.00
Curbs	5,856.00
Sidewalk	32,286.00
Bikepath	6,600.00
<b>Proposed Impervious (SF)</b>	<b>354,902.00</b>
<b>Proposed Impervious (AC)</b>	<b>8.15</b>
<b>Proposed Impervious (%)</b>	<b>5.98%</b>

**LEGEND**

	SINGLE FAMILY UNIT (ALL TYPES)
	20' TOWNHOUSE
	16' TOWNHOUSE
	OPTIONAL PATIO
	STOOP
	SIDEWALK / LEADWALK
	DRIVEWAY
	ROAD / CURB
	BIKE PATH
	EXISTING ACCESS DRIVE TO BE REMOVED (17,019 SF)

**IMPERVIOUS EXHIBIT**  
**CLARKSBURG CHASE**  
 CLARKSBURG (04) ELECTION DISTRICT, MONTGOMERY COUNTY, MARYLAND

TAX MAP EV 123	ZONING CATEGORY: RNC
WSBC 200' SHEET 231 NW 14	OVERLAY ZONE: CLARKSBURG WEST ENVIRONMENTAL
SITE DATUM HORIZONTAL: NAD83 VERTICAL: NAVD83	WATER / SEWER DAT: W3 / S3
DATE: 8/5/2024	DESIGNED: _____
CHECKED: _____	CONNECTION: _____
SHEET 1	OF 1
PROJECT NO. 1548-38-00	

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REFERENCE GRID: A B C D E F G H I J K L M N O

**PLANNING DEPARTMENT USE ONLY (E-PLANS)**

1. Management of Natural Resources
  - A. Minimize Erosion and Sediment Transport
    - i) Established vegetative cover over the entire CMP area.
    - ii) Provide Urban to Woodland transect between the developed area and the forested area.
      - a) Establish mow areas within the CMP area surrounding the development
      - b) The remainder of the CMP area shall be designated as a no mow area and be planted with a native pollinator friendly seed mix.
    - iii) Maintain existing drainage patterns.
  - B. Minimize pollution to Receiving Waters
    - i) Stormwater from development is treated using ESD BMP's prior to discharging.
    - ii) Minimize use of herbicides and fertilizers.
    - iii) Reestablish forest within the expanded riparian stream buffers adjacent to CMP area.
  - C. Forest Management
    - i) Identify trees impacted by disease or pests such as Emerald Ash Borer (EAB) and remove if located near a trail or other area of potential hazard.
    - ii) Develop and implement invasive species management plan.
2. Preservation of Pervious Land Cover
  - A. No new impervious pavement allowed within CMP area.
    - i) All trails shall be natural surface.
  - B. Removal and revegetation of impervious areas within CMP area previously used for agricultural activities.
3. Compatibility with ALL Adjacent Land Uses
  - A. Develop Urban to Woodland Transect Between Developed Area and Forested Areas
    - i) Developed Area - Lawn - Meadow - Edge Woodlands - Dense Woodlands

**CONSERVATION MANAGEMENT SEQUENCE:**

- Existing Impervious Removal:**
1. As part of any clearing, grading, or construction, the Applicant shall remove impervious surfaces and restore these areas to a fully pervious condition, as part of the initial phase of development as shown on the Clarksburg Chase - Impervious Exhibit. The removal and restoration of pervious surfaces must follow the MNCPPC Department of Parks & Recreation Guidelines for converting Paved Areas into Pervious Greenspace. M-NCPPC Forest Conservation Inspection Staff must be present at a pre-work meeting prior to the removal of the impervious surfaces.

- Conservation Management Plan (CMP):**
1. Implementation of the approved Conservation Management Plan, specifically meadow planting preparation, shall occur upon stabilization of the site following mass grading approved under the Sediment and Erosion Control Permit from the Montgomery County Department of Permitting Services.
  2. Meadow planting required under the approved Conservation Management Plan must begin during the first growing season following the release of the Sediment and Erosion Control Permit from the Montgomery County Department of Permitting Services for the Subject Property.

- Forest Conservation - Stream Valley Buffer Plantings:**
1. The development must comply with the Final Forest Conservation Plan No. F20240180, approved as part of this Site Plan.
  2. The Applicant must install the Afforestation/Reforestation plantings as shown on the approved FCP, within the first planting season following the release of the Sediment and Erosion Control Permit from the Montgomery County Department of Permitting Services for the Subject Property, or as directed by the M-NCPPC Forest Conservation Inspection Staff and Department of Parks Staff. Flexibility in the timing of the planting may be required to allow for the required stream restoration work to occur.

- Stream Restoration**
1. The Stream Restoration Plan must be reviewed and approved by the Department of Parks through the Park Construction permit review process. The stream restoration work shall not occur prior to all upstream areas draining to the stream having been permanently stabilized or the release of the Sediment and Erosion Control Permit from the Montgomery County Department of Permitting Services for the Subject Property.

- Notes:**
1. See sheet 1 for planting sizes, details, and notes.
  2. Trees and shrubs shall be provided with deer protection.
  3. See sheet 2 and 3 for enlarged plans of the CMP Area.
  4. Tree caging is to be removed from any land that is to be conveyed.
  5. The Conservation Management Areas under HOA control are to be managed by an MNCPPC approved Maintenance and Management Agreement.
  6. Site preparation, installation, establishment, and maintenance of the Park Dedicated, Conservation Management Areas will be conducted before land is conveyed to Parks.



Clarksburg Chase - Parkland Plant Schedule							
Key	Qty	Botanical Name	Common Name	Size	Spacing	Type	Remarks
<b>Deciduous Trees (Shade)</b>							
CAB	4	<i>Carpinus betulus</i>	European Hornbeam	3" Cal., 12' Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
FGR*	2	<i>Fagus grandiflora</i>	American Beech	3 1/2" Cal., 12 Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
GVD	1	<i>Gymnocladus dioica</i>	Kentucky Coffeetree	3" Cal., 12' Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
LST*	3	<i>Liquidambar styraciflu</i>	Sweetgum	3 1/2" Cal., 12 Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
QBI*	3	<i>Quercus bicolor</i>	Swamp White Oak	3 1/2" Cal., 12 Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
<b>Ornamental Trees</b>							
BND	9	<i>Betula nigra</i> 'BNMTF'	Dura-Heat River Birch	2 1/2" Cal., 10' Ht.	As Shown	B&B	Multi-Stem, Full, Well Balanced
CCM	1	<i>Cercis canadensis</i> 'Merlot'	Merlot Eastern Redbud	2 1/2" Cal., 10' Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
CEC	1	<i>Cornus florida</i> 'Cherokee Chief'	Flowering Dogwood	2 1/2" Cal., 10' Ht.	As Shown	B&B	Single-Stem, Full, Well Balanced
<b>Shrubs</b>							
Adv	33	<i>Azalea</i> 'Delaware Valley White'	Delaware Valley Azalea	24" Ht.	30" O.C.	Cont.	Dense, Full
Cah	22	<i>Clethra alnifolia</i> 'Hummingbird'	Summersweet	30" Ht.	42" O.C.	Cont.	Dense, Full
Hma	17	<i>Hydrangea macrophylla</i> 'All Summer Beauty'	Bigleaf Hydrangea	30" Ht.	42" O.C.	Cont.	Dense, Full
Ivs	50	<i>Itea virginica</i> 'Sprich'	Little Henry Sweetspire	18" Ht.	36" O.C.	Cont.	Dense, Full

\*Note: Mitigation Trees planted within Planting Area. See FCP #F20240180 (Sheet 11 and Sheet 21)

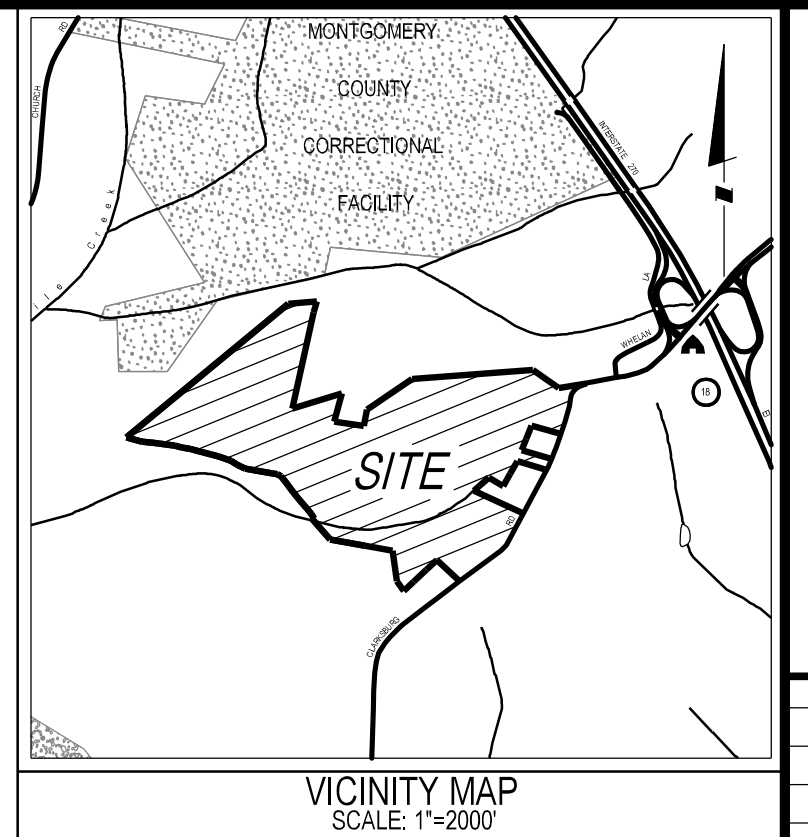
**LEGEND**

- BOUNDARY LINE
- PERNNIAL OR INTERMITTENT STREAM
- EPHEMERAL STREAM
- STREAM VALLEY BUFFER
- WETLAND
- WETLAND BUFFER
- FOREST SAVE AREA
- FOREST PLANTING AREA
- TREE MITIGATION PLANTING AREA
- PARK DEDICATION LINE
- CONSERVATION MANAGEMENT AREA RESTRICTED MOW/POLLINATOR MEADOW MIX
- CONSERVATION MANAGEMENT AREA MOW/LAWN
- EXISTING CONTOURS

**DEVELOPER'S CERTIFICATE**

The undersigned agrees to execute all the features of the Approved Final Forest Conservation Plan No. F20240180 including, financial bonding, forest planting, maintenance, and all other applicable agreements.

Developer's Name: US HOME, LLC  
 Contact Person or Owner: MARK ANDERSON  
 Address: 7035 ALBERT EINSTEIN DR., SUITE 200, COLUMBIA, MD 21046  
 Phone and Email: (443) 206-5737



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 MARK ANDERSON

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LICENSE NO. \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

COVER SHEET  
 CONSERVATION MANAGEMENT PLAN  
 CLARKSBURG CHASE

TAX MAP EV 123	ZONING CATEGORY: RNC
WSBC 200' SHEET 231 NW 14	OVERLAY ZONE: CLARKSBURG WEST ENVIRONMENTAL
SITE DATUM HORIZONTAL: NAD83 VERTICAL: NAVD83	WATER / SEWER DATUM: W3 / S3
DATE: 8/7/2024	DESIGNED: _____
1" = 200'	CHECKED: _____
SHEET 1 OF 6	CONNECTION / NCS
PROJECT NO. 1548-36-00	

July 25, 2023

Maxwell Potember  
Land Entitlements Manager  
Lennar  
14280 Park Meadow Dr. Ste. 108  
Chantilly, VA 20151

Re: King Family Farm  
Revised Traffic Noise Analysis

Max:

This report summarizes the revised traffic noise analysis for the King Family Farm project in Montgomery County, MD. This analysis was revised with the latest site layout.

## 1. Executive summary

A site survey was performed and sound levels were measured in the locations shown in Figure 3 for over two days. Traffic volumes were counted briefly at the beginning and end of the survey. The Traffic Noise Model was used to model existing conditions. The output sound levels compared acceptably well to the measured sound levels. A traffic forecast was developed based on forecasts provided by the state DOT. The Traffic Noise Model was used to predict future noise levels in outdoor recreation areas and at the facades of residences.

The design goals are to ensure that the Day-Night Average Sound Level (DNL) not exceed 60 dB in usable outdoor areas such as rear and sometimes side yards, or 45 dB inside residences.

The future DNL due to traffic will be 55 dB or lower in outdoor activity areas on the site which meets the county goal of 60 dB or lower. No noise barriers are required. The future DNL due to traffic at the houses on the loudest floor will be 62.3 dB or lower. Standard building construction can reduce outdoor noise levels approximately 19 to 25 dB. The indoor DNL due to traffic will therefore be 37 to 43 dB at the loudest house (i.e., lot 48) which meets the county goal of 45 dB. No architectural noise mitigation measures are required.

## 2. Introduction

Hush Acoustics LLC was contracted by Lennar to perform sound level measurements on the site and to model future traffic noise levels. This analysis was based on the Pre-Preliminary Plan 720230020 Clarksburg Chase dated July 2021 (revised September 2022). This drawing shows proposed townhouse and single-family house locations, existing and proposed ground elevations, and the location and elevation of the existing Clarksburg Road pavement closest to the site. The site is located along the southwest side of Clarksburg Road at Gosnell Farm Drive. A vicinity map is included as Figure 1.



**Figure 1. Vicinity Map**

Per conversations with Montgomery County Park and Planning staff we understand that Montgomery County uses the 1983 Staff Guidelines to evaluate transportation noise impacts for proposed residential land development. The guidelines provide outdoor DNL criteria as a function of both site location and community type. Per the map (see Figure 2), which is used for general reference purposes only, the site location is close to the border between the 55- and 60-dB goals. Per Table 2-1 of the guidelines, the DNL goal should be 60 dB in “most areas of the County where suburban densities predominate.” (The stricter goal of 55 dB is used in permanent rural areas of the County where residential zoning is for five or more acres per dwelling unit, and the least strict goal of 65 dB is used along “major highway corridor areas where ambient levels are such that application of a stricter guideline would be infeasible...”). Considering that the built houses would be in a suburban community (certainly well less than 5 acres per dwelling unit) not directly along a busy highway, we are interpreting the 60 dB guideline to apply at this site. Although the Staff Guidelines say the noise level goals apply at the building line, from conversations with county staff we learned that they should be evaluated in usable outdoor areas such as rear and sometimes side yards, as well as common recreation areas. The Montgomery County Staff Guidelines also state that the interior noise guideline is a DNL of 45 dB.



Figure 2. 1983 Staff Guidelines Map

### 3. Site survey

The purposes of the site survey are as follows:

1. to collect noise level data on the site. Noise level data are useful for the following reasons:
  - a. to validate the noise model
  - b. to determine how the hourly average sound levels compare to the Day-Night Average Sound Levels (DNL). The DNL is the noise metric used by Montgomery County, MD. However, the Traffic Noise Model (TNM) uses the hourly average sound level. For locations mostly impacted by traffic noise, the relationship between the DNL and loudest hour average sound level is relatively constant. The measured sound levels are useful for determining this relationship.
  - c. to identify any significant non-traffic noise sources.
2. to observe traffic conditions such as prevailing speeds, classifications (i.e., percentages of automobiles, trucks, buses, and motorcycles), and directional distributions. Many of these parameters are not well documented in traffic studies. The prevailing speed often differs from the posted speed limit.

3. to observe road conditions such as locations and timing of traffic flow control devices (e.g., traffic signals, stop signs, and toll booths), and the pavement type.
4. to observe site conditions not represented on the site plan such as the presence and height of existing noise barriers along the road right-of-way.

The purpose of the site survey was not to determine how loud it will be at the proposed buildings. That is performed using the computerized noise modeling discussed below.

### 3.1 Sound level measurement procedure

Larson Davis model 831 sound level meters were installed in the locations indicated in Figure 3 from approximately 10:30 am on Wednesday May 19, 2021, through 2 pm on Friday May 21, 2021. The sound level meters were programmed to report average, maximum, and minimum A-weighted sound levels during each one-minute interval. In addition, the meters were programmed to record audio files each time a loud noise event occurred over 70 dBA at location M1 and 68 dBA at location M2. The meters were chained to trees and the microphones were attached to poles 28 to 30 feet above the ground.

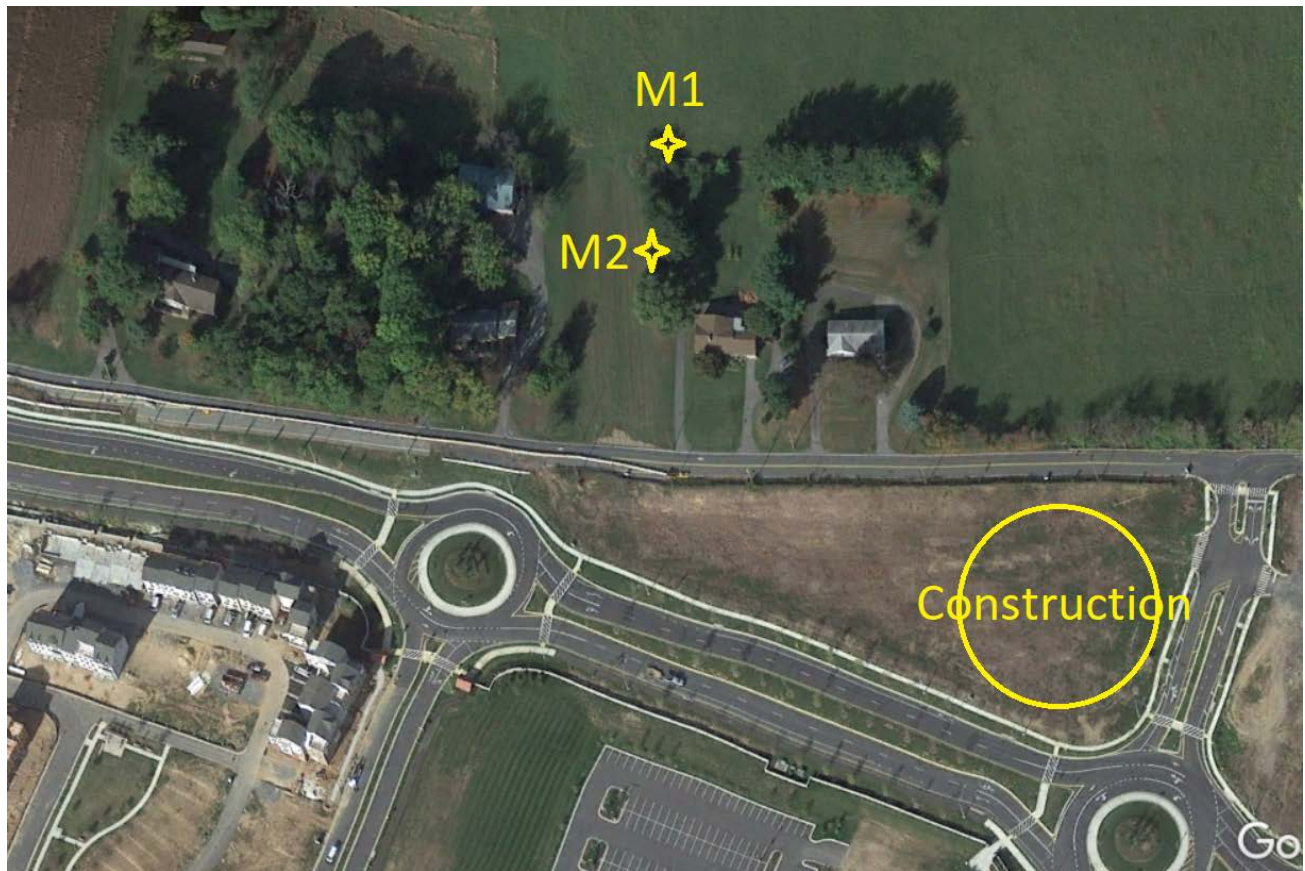


Figure 3. Sound Level Meter Locations

### 3.2 Site observations

The site currently has a field and is sloping down away from Old Clarksburg Road. The main noise source on the site is birds and to a lesser extent construction on the site across Old Clarksburg Road (see Figure 3). There is also some sound from traffic on Clarksburg Road. There is virtually no traffic on Old Clarksburg Road since it only serves a few houses remaining after the construction of the new Clarksburg Road.

There are no traffic signals on Clarksburg Road in the vicinity of the site. The posted speed limit on Clarksburg Road is 35-40 mph far from the site, and 20 mph in the two traffic circles and between them.

### 3.3 Measured sound levels

Average sound levels during five-minute intervals were calculated based on the measured one-minute average sound levels. Figure 4 presents the resulting five-minute average sound levels. Hourly average sound levels were calculated based on the five-minute average sound levels. Figure 5 presents the hourly average sound levels. The Day-Night Average Sound Levels (DNL) were calculated for each full calendar day. Table 1 presents the DNL and loudest-hour average sound level, and the difference between the two, for each calendar day.

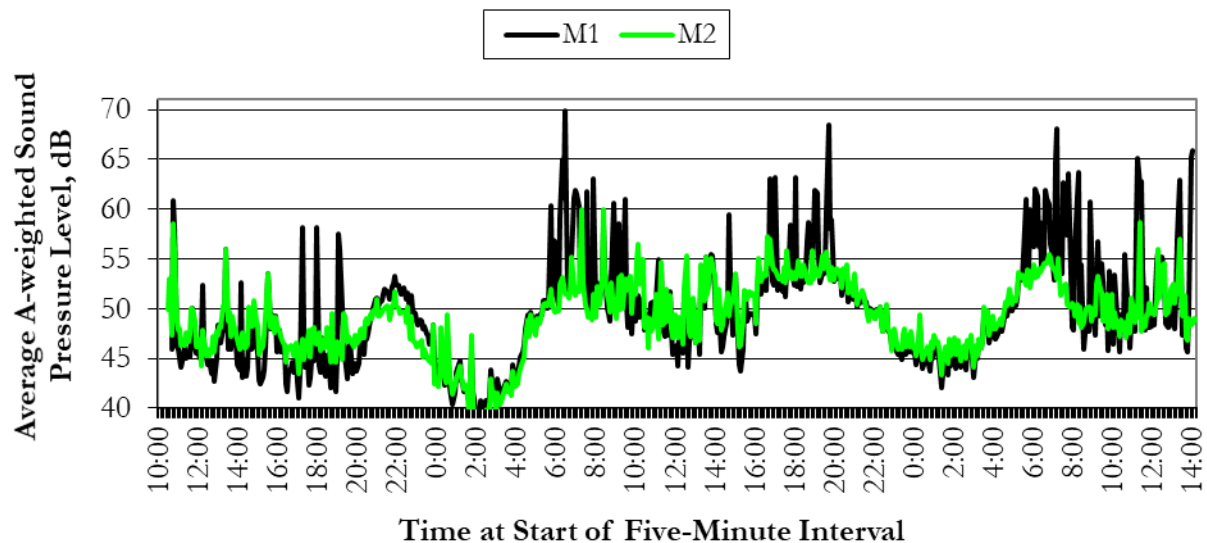


Figure 4. Five-Minute Average Sound Levels

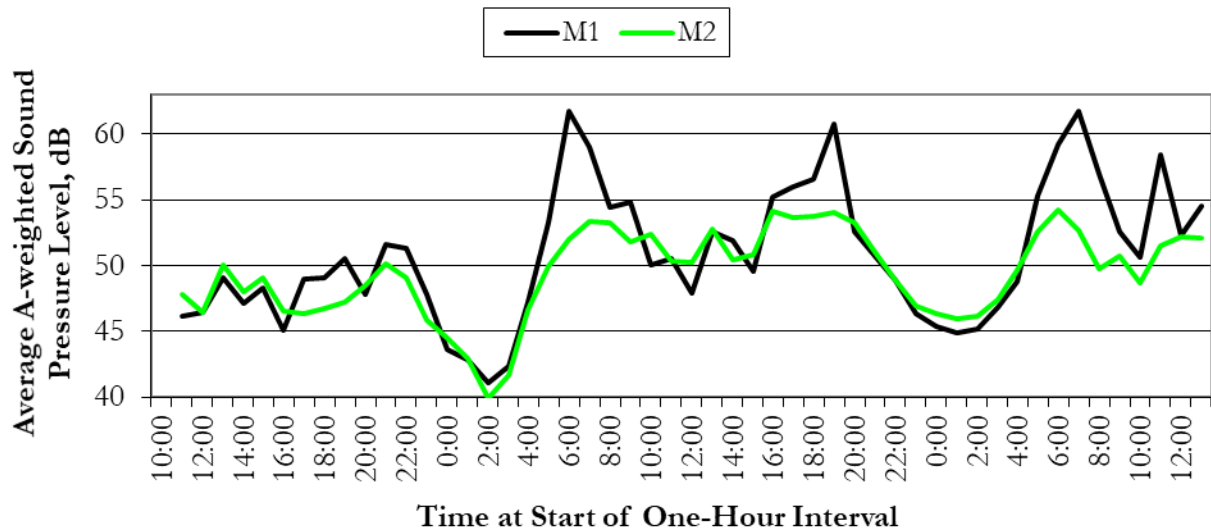


Figure 5. Hourly Average Sound Levels

Table 1. Measured DNL and Loudest-Hour Average Sound Levels, dB

Day, Date	DNL		Loudest-Hour Average Sound Level		DNL Minus Loudest-Hour Average	
	M1	M2	M1	M2	M1	M2
Wed., May 19, 2021			51.6	50.1		
Thu., May 20, 2021	60.0	55.1	61.7	54.2	-1.7	0.9
Fri. May 21, 2021			61.7	54.2		

Sound levels were significantly elevated on many occasions. 603 audio files were created at location M1 since the sound level exceeded 70 dB on those occasions. Likewise, 24 audio files were created at location M2 since the sound level exceeded 68 dB on those occasions. We listened to the audio files and determined they were due to the following:

- **At location M1:**
  - Hundreds of events due to birds
  - 13 events due to a loud banging noise on the farm
- **At location M2:**
  - 12 events were due to a loud banging noise on the farm
  - 5 events were due to loud cars or trucks
  - 4 events were due to backup beepers on the site, lawn mowing
  - 2 events were due to birds
  - 1 event was due to a siren

Clearly, the overall sound level at location M1 was controlled by birds. The measured DNL at this location does not represent traffic noise at all.



### 3.4 Traffic counts

Traffic volumes were counted during ten- or fifteen-minute intervals for each direction of traffic on Clarksburg Road at the start and end of the survey. From these volumes the hourly average traffic volumes were extrapolated. Table 2 presents the extrapolated hourly traffic volumes. Automobiles include pickup trucks, passenger cars hauling trailers, and vans. Medium trucks are six-wheeled cargo vehicles with two axles. Heavy trucks are cargo vehicles with three or more axles. Speeds were determined using a hand-held radar gun. The median speeds for dozens of vehicles are listed in Table 2; speeds within the traffic circle were 18 mph.

**Table 2. Extrapolated Hourly Traffic Volumes and Prevailing Speeds**

Day, Date and Time	Lanes	Speed (mph)	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles
Wed. May 19, 2021 10:46-11:01 am	Clarksburg SB	33	196	8	4	0	0
	Clarksburg NB	28	240	4	12	0	0
	In Circle	18					
Fri. May 21, 2021 1:52-2:02 pm	Clarksburg SB	-	216	0	18	36	0
	Clarksburg NB	-	360	0	0	0	0

### 3.5 Weather

Weather can affect both the propagation of sound from a roadway, as well as produce sound by rustling leaves or causing wind or rain noise at the microphone. For these reasons, weather conditions were documented during the survey. Hourly weather information was obtained from the National Weather Service for Frederick Municipal Airport (KFDK). The following precipitation and wind faster than 10 mph were noted:

- During the traffic counts on May 19 at 10:47 am: wind from the SSW at 6 mph
- May 20 at 5:47 to 7:47 pm: wind from the ESE to SE at 7 to 13 (gusting to 16) mph
- Just before the traffic counts on May 21 at 1:47 pm: wind from the WSW at 6 mph

## 4. Outdoor noise modeling

### 4.1 TNM overview

In the United States, roadway traffic noise levels are typically analyzed using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM). The current version is 2.5. The output from TNM is the hourly average sound level at the receivers. The program allows input of the following information:

- Coordinates of selected points along the road centerlines
- Pavement width and type
- Hourly volumes and speeds of autos, medium trucks, heavy trucks, buses, and motorcycles for each road segment

- Locations of traffic flow control devices such as stop signs, traffic signals, and toll booths at the start of roads
- Coordinates and heights of evaluation points (receivers)
- Coordinates of ground elevations in selected locations (terrain lines)
- The default ground type
- Coordinates of existing and proposed objects that shield the site such as noise walls and buildings (barriers)
- Coordinates, height and spacing between buildings of rows of buildings which partially shield the site (building rows)

Not used for this project:

- Road locations that are elevated (structure roadways)
- Coordinates and height of areas covered with thick evergreen forest (tree zones)
- Coordinates and ground material in selected locations (ground zones)

## 4.2 TNM validation

The traffic volumes and speeds presented in Table 2 were input into TNM. This TNM run is called the validation run. Following is a list of included parameters:

- The traffic volumes and speeds presented in Table 2 were used, although the speed for traffic within the circles was 18 mph.
- Traffic leaving the circles was assumed to accelerate from 18 mph up to either 28 or 33 mph depending on the direction.
- Each direction of travel of Clarksburg Road was modeled as an individual road in TNM. The locations and elevations of selected points along the road, and the width of the road, were taken from a combination of the concept grading plan and Google Earth.
- Per FHWA guidance, road pavement was modeled as “Average.”
- Old Clarksburg Road was included as a road in TNM without traffic to define the ground elevation and include the ground type.
- A terrain line was added just to the southeast of Old Clarksburg Road to model the change in elevation.
- Barriers were included representing the 3 existing houses and barn on the site.
- The default ground type was lawn.

The output sound levels were then compared to the sound levels measured during the traffic counts. Table 3 presents this comparison, disregarding sound levels measured during the following anomalous events:

- For both locations M1 and M2 at 10:49, 10:50, and 10:53 am on Wednesday when there were loud banging noises on the farm (and audio files created to identify the sounds)
- For location M1 at 2:00 and 2:01 pm on Friday when there were loud birds near the meter (and audio files created to identify the sounds)

**Table 3. Comparison of TNM Validation Run Output and Measured Sound Levels, dB**

	M1	M2
Measured During Wednesday Traffic Counts	48.9	49.3
TNM for Wednesday Traffic Counts	45.9	49.5
TNM Minus Measured for Wednesday Traffic Counts	-3.0	0.2
Measured During Friday Traffic Counts	48.9	48.4
TNM for Friday Traffic Counts	48.6	51.8
TNM Minus Measured for Friday Traffic Counts	-0.3	3.4

It can be seen from Table 3 that TNM produced sound levels between 3.0 dB lower than and 3.4 dB greater than were measured. The accepted level of accuracy of TNM is +/- 3 dB. The lower bound is within this range, while the upper bound is a bit over this range. This means that, if anything, TNM is yielding somewhat excessive sound levels.

#### 4.3 Future traffic conditions

The following traffic information was obtained from a consultant for the Maryland Department of Transportation (MDOT):

- It is expected that the Old Clarksburg Road volume would have shifted to the newly completed Clarksburg Road.
- The Average Daily Traffic (ADT) volume on MD 121 was 12,000 in 2017 and will be 25,100 in 2040.
- The K Factor was 8.86% with a direction split of 51.92% northbound during the peak-hour.
- MDOT provided 2017 48-hour classified traffic counts for Old Clarksburg Road. The peak-hour was 3-4 pm. During this hour, traffic included 3.22% medium trucks, 2.25% heavy trucks, 0.44% buses, and 0.27% motorcycles.

We applied the peak-hour and direction factors to the 2040 ADT of 25,100 to yield peak-hour volumes of 1,155 northbound and 1,069 southbound. We then applied the 2017 vehicle type classifications. The resulting forecast traffic volumes are presented in Table 4. It can be seen from Tables 2 and 4 that the forecast traffic volumes are much higher than those observed during the site visits. We used the same speeds as for the validation run of 33 mph SB and 28 mph NB on Clarksburg Road, with 18 mph within the circles.

**Table 4. Year 2040 Loudest-Hour Traffic Volumes**

Lanes	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles	Prevailing Speed (mph)
Clarksburg SB	1,003	34	24	5	3	33
Clarksburg NB	1,083	37	26	5	3	28

#### 4.4 Future traffic noise modeling

TNM was run using the traffic volumes and speeds presented in Table 4. All parameters from the validation runs were retained, with the following changes:

- Traffic volumes in Table 4 were used
- Building rows representing the proposed single-family houses were added
- Barriers representing the proposed townhouses were added
- Receivers were located at proposed residences and elsewhere on the site, five feet high generally on the site and 19 feet high at the single-family houses and 30 feet at the townhouses to represent noise levels at upper floor windows
- The proposed road into the site was added without traffic to define the ground elevation

#### 4.5 Future outdoor traffic noise levels

It can be seen from Table 2 that the DNL at location M2 was 0.9 dB greater than the loudest-hour average sound level for May 20, 2021. The future loudest-hour average sound levels were output from TNM. We assumed that in the year 2040 the DNL would be approximately 1 dB greater than the loudest-hour average sound level. This assumption is equivalent to assuming that the percentage of traffic traveling on Clarksburg Road at night (between 10 p.m. and 7 a.m.) in the future would match the percentage that occurred during the noise monitoring period.

The resulting year 2040 DNL are presented in Figures 6 and 7. It can be seen from Figure 6 that the DNL at a height of 5 feet will be 55 dB or lower in rear yards and other recreation areas (which is well lower than the county goal of 60 dB). No outdoor noise mitigation measures (e.g., noise walls or berms) are required.

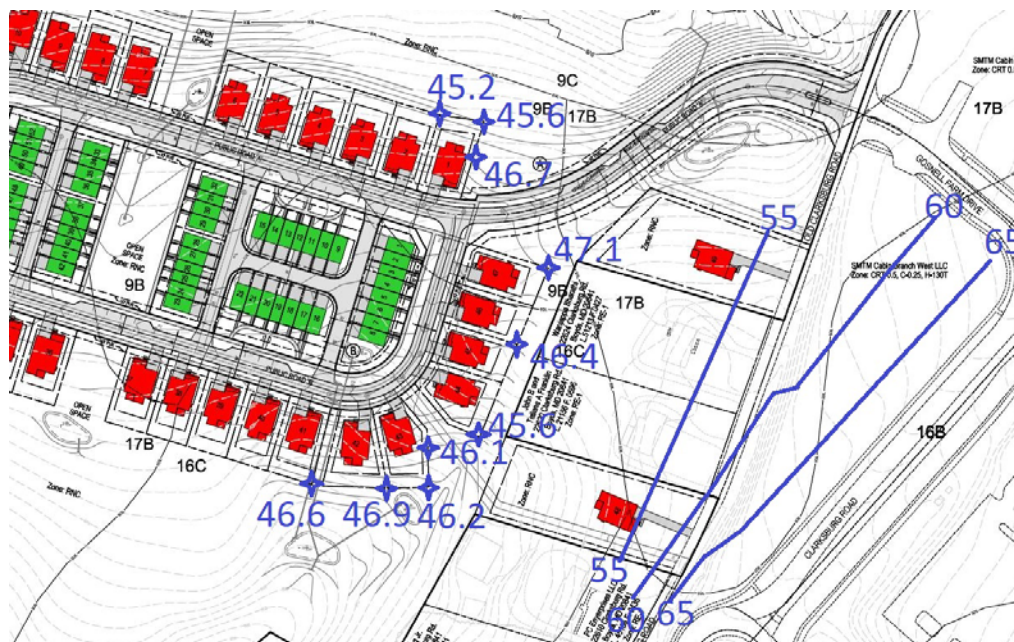
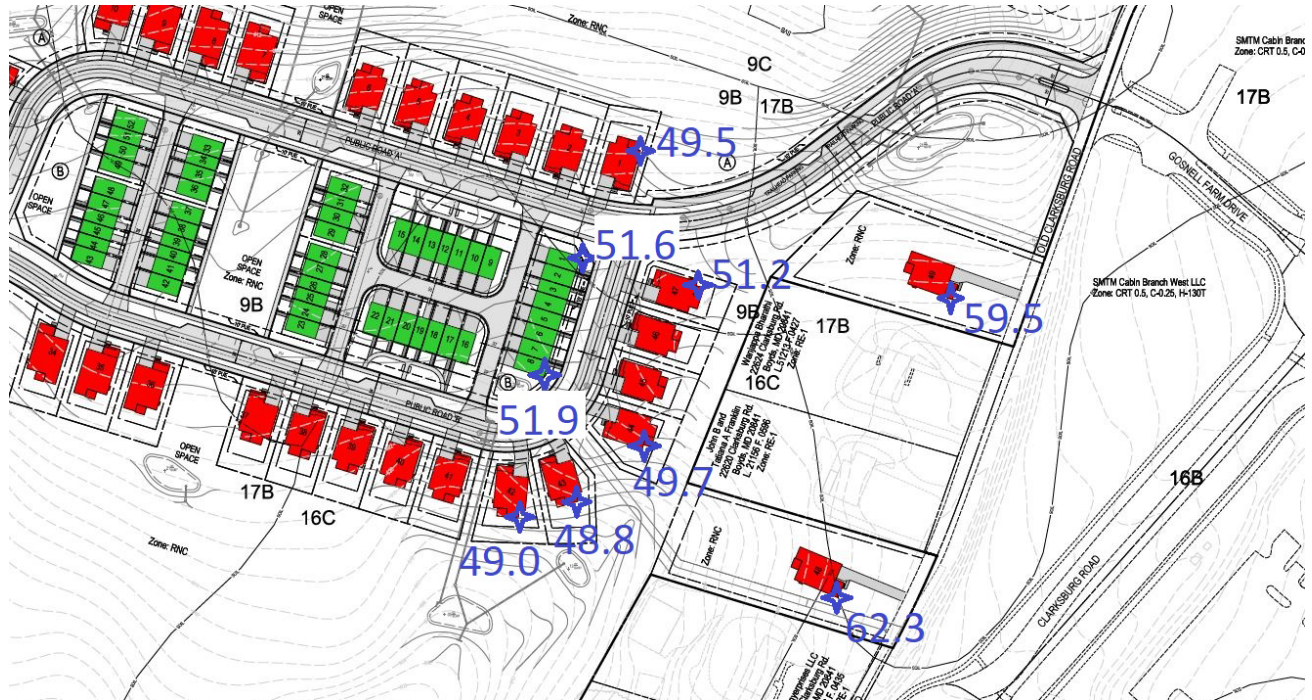


Figure 6. Year 2040 DNL, dB, Five Feet High



**Figure 7. Year 2040 DNL, dB, at Facades of Residences on Top Floor**

It can be seen from Figure 7 that the DNL at the top floor (which is always the loudest floor at long distances from a road such as these) will be 51.9 dB or lower at most houses, 59.5 dB at lot 49, and 62.3 dB at lot 48. Standard building construction can reduce outdoor noise levels approximately 19 to 25 dB. This means the indoor DNL due to traffic will be 37 to 43 dB at the loudest house (i.e., lot 48). Clearly, the indoor DNL due to traffic will be far below the county goal of 45 dB. No architectural noise mitigation measures are required.

If you have any questions, please contact me at 703/534-2790 or via e-mail at [Gary@HushAcoustics.com](mailto:Gary@HushAcoustics.com).

Sincerely,

Gary Ehrlich, P.E.  
Principal

