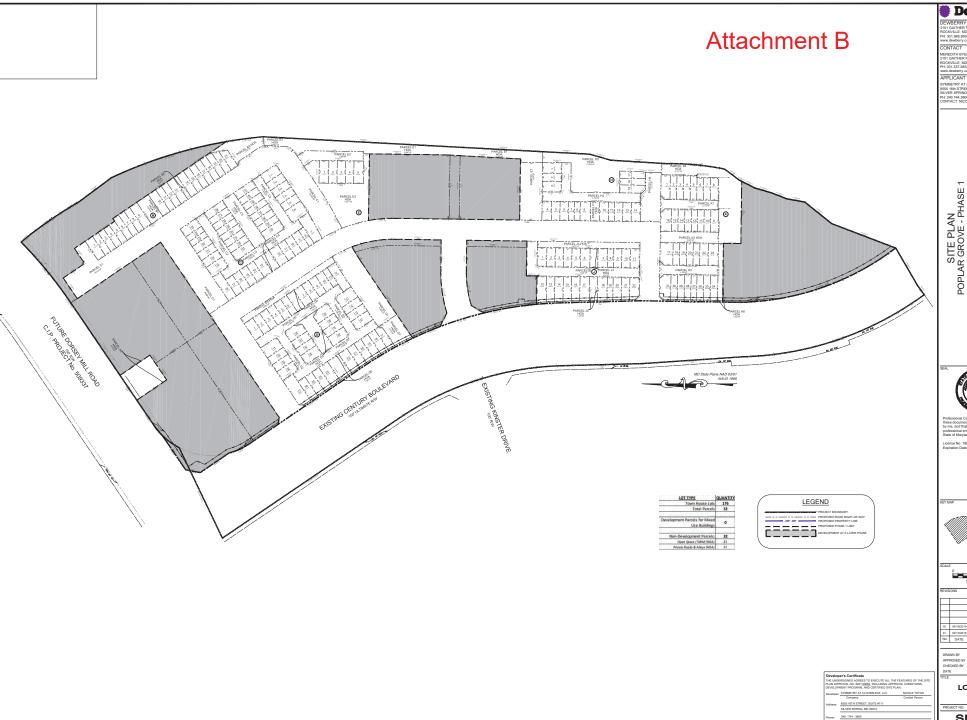


Dewberry



REVISIONS				
02.	04/19/2019	WB	Revised per 2nd Round	
01.	02/13/2019	PJN	Comments Addressed DRC Comments	
No.	DATE	BY	Description	

SHEET NO. 07-PREL-120190040-100



Dewberry

DEWBERRY ENGINEERS INC. 2101 GAITHER ROAD SUITE 340 ROCKVILLE, MD 20850 PH: 301.948,8300 FX: 301.258.7607 www.dewberry.com

MEREDITH BYER
2101 GAITHER ROAD SUITE 340
ROCKVILLE, MD 20850
PH: 301-337-2857
www.dewberry.com

APPLICANT / DEVELOPER

P850 L.18516 F.226, Parcel P L.18516 F.226, Parcel B L.45143 498, Outh-Parcel S. L.18516 F.226
AND TOWNER COUNTY, MARYLAND
ZHI ELECTION DISTINCT
ZARONEN TANAMERICAL SITE PLAN POPLAR GROVE - PHASE 1



SCALE 1" = 30'					
VISIONS					
2.	04/19/2019	WB	Revised per 2nd Round Comments		
n.	02/13/2019	PJN	Addressed DRC Comments		
io.	DATE	BY	Description		

DRAWN BY PJN

APPROVED BY JMC

CHECKED BY MLB

DATE 04/19/2018

LOT PLAN

SP-100

SHEET NO. 07-SITE-820190060-100

Attachment C

67-34-E

BOULEVARD 3 CRYSTAL ROCK CENTURY PROPOSED TO BE DEDIGATED BY FUTURE PLAT N. 113, (91,760 V. -72,663,558 DRIVE W 1)1.485.422 V -73.357.714 LOT 1 - PHASE 2 CLOVERLEAF CENTER PLAT BOON 172 - FLAT NO. 15303 LOT 3 - PHASE 2 CLOVERLEAF CENTER FLAT BOOK 172 - PLAT NO. 16305 SURVEYOR'S CERTIFICATE OWNER'S DEDICATION I HEREBY DERTIFY TO THE BEST OF MY MNOWLEDGE AND BELIEF THAT THE PLAT SHOWN HEREDN IS CORRECT, THAT IT IS RIGHT-OF-AY DEDICATION ON PART OF THE LAND CONVEYED TO DERANDOGE GERMANIONA ASSOCIATES FROM FAIRCHILD INDUSTRIES, INCORPORATED BY A DEED RECORDED GOTOGER (0.) 987 IN LIBER 7992 AT FOLLO 587, ANDRO THE LAND RECORDS OF MONTGOMERY COUNTY, MARYLAND. VE. CREAMORE DERMANTOWN ASSOCIATES, OWNERS OF THE PROPERTY BHOWN HEREON. HEREOY DEDIGATE TO FUBLIC USE AS A TRANSIT RAY FOR THE CORRIDOR COTTES TRANSITURAY A. 50° TRANSIT RIGHT-OF-WAY TO BE INFECTIATELY ADJACENT, CONTIGUOUS, PARALLEL AND CONCENTRIC TO THE EASTERLY RIGHT-OF-WAY LIKE OF PROPOSED AND EXISTING CONTIGUES. ASSOCIATES. SAID DEDIGATION SHALE BE SUBJECT TO THE PROVISIONS OF SECTION 49-52 THROUGH 49-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CORE 1884 N. 54 THROUGH 189-584 OF THE MONTGOMERY COUNTY CO TOTAL AREA CONTAINED WITHIN THE TRANSIT RIGHT-DF-WAY IS 2,93832 ACRES OF LAND. DATE: 8-22-96 RATHOND H. KILE
PROPERTY LINE SURVEYOR
HD. REGISTRATION NO. 370 FURTHER, WE HEREBY RESERVE AN EASEMENT FOR INGRESS/EGRESS AND UTILITIES FROM THE PUBLIC RIGHT-0F-WAY THROUGH THE ENTIRETY OF THE TRANSIT RIGHT-0F-WAY AS NECESSARY FOR THE DEVELOPMENT OF THE ADJACENT PROPERTIES. THERE ARE NO SUITS OR ACTIONS AT LAW, LEASES, LIENS, MORTGAGES OR TRUST AFFECTING THE PROPERTY SHOWN MEMEON. DATE: August 20, 1996 CREAMORE GERMANTOWN ASSOCIATES BY: MOREFAIR LIMITED PARTNERSHIP BY: BA + FM. INC. ATTEST TO S WORLD DONALD MANEKIN ALL TERMS, CONDITIONS, ADREFIENTS, LIMITATIONS, AND REQUIREMENTS ASSOCIATED VITH ANY PRELIMINARY PLAN. SITE PLAN. PROJECT PLAN OR OTHER PLAN. ALLOWING DEVELOPMENT OF THIS PROPERTY, APPROVED BY THE HONGOUREN COUNTY PLANNING BOARD ARE INTENDED TO SURVIVE AND NOT BE EXTINGUISHED BY THE RECORDATION OF THIS PLAT UNLESS EXPRESSY CONTEMPLATED BY THE PLAN AS APPROVED. THE OFFICIAL PUBLIC OFTIES FOR ANY SUCH PLAN ARE NAINTAINED BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE PLANNING BOARD AND AVAILABLE FOR PUBLIC REVIEW DURING NORMAL BUSINESS MORE BY THE BUSINESS BY THE BUSINE MONTGORERY COUNTY MARYLAND DEPARTMENT OF PERMITTING SERVICES ONTGOMERY COUNTY, MARYLAND DEPARTMENT OF ENVIRONMENTAL PROTECTION APPROVEDE SEPTEMBER 12, 1996 APPROVED DESEMBER 10,1996 PROVED DECEMBER 14,1994 RECORDED : DALARIAN ASST SECRETARI-TAEASURER
N.N.T.F. 4 P.T. HECORD NO. 600 - 75 297035 PLAT BOOK Robert ! Hubban PLAT NO. . . FOR DIRECTOR

CREAMORE GERMANTOWN ASSOCIATES-

50" R/W FOR CORRIDOR CITIES TRANSITWAY 2.10090 ACRES

PLAT No 20279

Attachment C 2



LIBER 7992 FOLIO 567

-50' R/W FOR CORRIDOR CITIES TRANSITUAY 0.83742 AC. CENTURY BOULEVARD N 110.724 MS 13.29 P 134.39 -CREAMORE GERMANTOWN ASSOCIATES -LIBER 7992 FOLIO 587



VICINITY MAP SCALE: 1'=2000'

NOTE:

THE SOURCE OF THE 100-YEAR FLOODFLAIN SHOWN HEREON WAS TAKEN FROM THE CLOVENLEAF CENTER FLOODFLAIN STUDY BY HODEF ON FEBRUARY 10, 1993. PRELIMINARY PLAN #1-86156 NAS PROFOSED TRIFLE ARCH CULVERTS CROSSING CENTURY BOLLEVARD.

FLOODPLAIN CERTIFICATION

I HEREBY CERTIFY THAT THE LIMITS OF THE 100-YEAR FLOODPLAIN SHOWN ON THIS RECORD PLAT IS AN ADCURATE REFLECTION AS TRANSFERED FROM THE FLOODPLAIN STUDY REFERENCED ELSEWHERE ON THIS PLAT.

CURVE DATA DELTA RADIUS TANGENT CHORD BEARING CHORD DIST. LENGTH 19:19:30 448.00 151.10 76.28 N 29°07°44°U 150.39 36*17"31" 685.00 421.93 217.90 N 19.06-09-h 321391461 825.00 470.31 241.74

115.29 463.97 46'21'12" 215,00 173.94 92,05 N 10.26, 22.A 169.23 0"15"08" 11.389.16 50.00 25.00 N 51*34'37*E

DEDICATION OF A

50' TRANSIT RIGHT-OF-WAY FOR THE CORRIDOR CITIES TRANSITVAY

ON THE PROPERTY OF

CREAMORE GERMANTOWN ASSOCIATES

RECORD PLAT

SECOND ELECTION DISTRICT MONTGOMERY COUNTY, MARYLAND

SCALE: 1" * 200' AUGUST . 1996

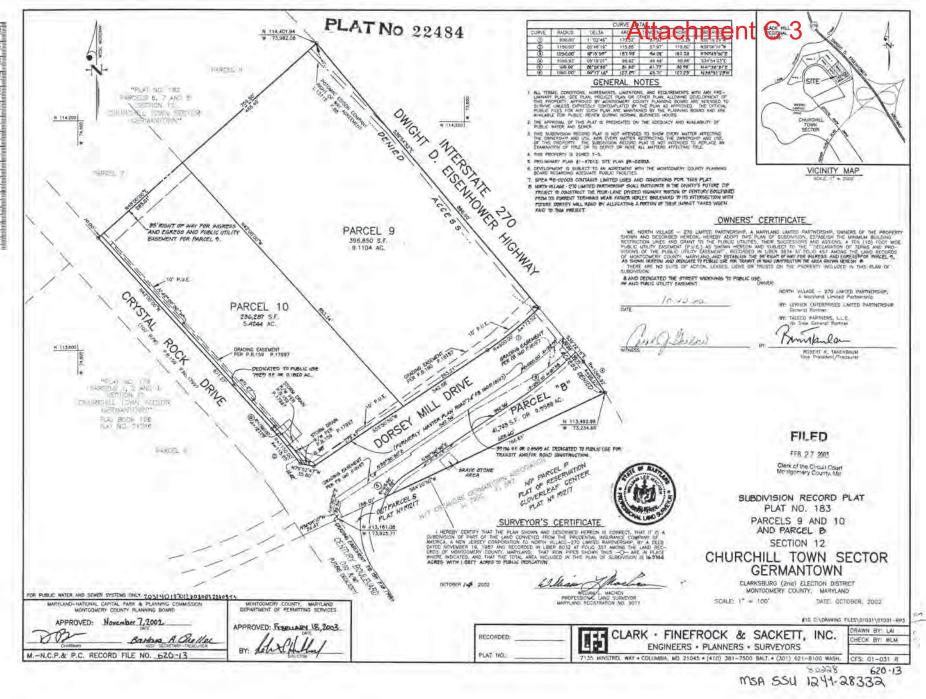


PATTON HARRIS RUST & ASSOCIATES, PZ 399 FAIR RIDGE DRIVE PO 50, 30 VIRGINIA 22036 FAIR-AX VIRGINIA 22036 1701 237-8700 (FAX: 703) 255-3962

MSA 354 1849-7112

FILED JAN 1 7 1997

and Vice President





DEC 1 8 2013

MCPB No. 15-149
Provisional Adequate Public Facilities Determination for Transportation Symmetry at Cloverleaf
Date of Hearing: December 10, 2015

RESOLUTION

WHEREAS, the Montgomery County Council approved the 2012-2016 Subdivision Staging Policy ("SSP") to serve as guidelines for the administration of the Montgomery County Adequate Public Facilities Ordinance; and

WHEREAS, in the SSP, the Council delegated to the Montgomery County Planning Board and its staff all necessary administrative decisions not covered by the SSP and authorized the Board to adopt and amend its own guidelines and technical material to administer the SSP's Local Area Transportation Review and Transportation Policy Area Review; and

WHEREAS, on June 16, 2011, the Planning Board approved standards for the use of the Provisional Adequate Public Facilities ("PAPF") process for individual applications not within a development district where the applicant provides accelerated public infrastructure through private investment; and

WHEREAS, under Montgomery County Code Chapters 8 and 50, the Montgomery County Planning Board is authorized to make an Adequate Public Facilities determination; and

WHEREAS, on January 5, 2015, Symmetry at Cloverleaf, LLC ("Applicant") filed an application ("Application") for approval of a PAPF determination for the transportation impacts associated with a vehicle trip maximum generated by a theoretical development on 25.39 acres in the CR-2.0, C-1.75, R-1.0, H-145T Zone, located at the northwest corner of Father Hurley Boulevard and Dwight D. Eisenhower Highway (I-270) ("Subject Property") in the 2009 Germantown Employment Area Sector Plan ("Sector Plan") area; and

WHEREAS, Planning Board staff ("Staff") issued a memorandum to the Planning Board, dated November 30, 2015, setting forth its analysis and recommendation for approval of the Application subject to certain conditions ("Staff Report"); and

WHEREAS, on December 10, 2015 the Planning Board held a public hearing on the Application, and at the hearing the Planning Board heard testimony and received evidence submitted for the record on the Application; and

WHEREAS, at the hearing, the Planning Board voted to approve the Application, subject to certain conditions, by the vote certified below.

NOW, THEREFORE, BE IT RESOLVED THAT the Planning Board approves a Provisional Adequate Public Facilities determination for the transportation impacts associated with the theoretical development of Subject Property, subject to the following conditions:¹

- The validity period for this Provisional Adequate Public Facilities (PAPF) test for transportation is 85 months from the date of mailing of the Planning Board Resolution.
- 2. Calculation of the number of vehicle trips generated from the Subject Property in future applications must use trip rates found in the January 2013 Local Area Transportation Review and Transportation Policy Area Review Guidelines. Internal capture reductions must be calculated using the National Cooperative Highway Research Program (NCHRP) Report 684, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments. Pass-by reductions must be calculated using the 3rd edition of the Institute of Transportation Engineering Trip Generation Handbook.
- The Applicant is limited to a development level equal to or less than 1,558 AM net peak hour trips or 1,762 PM net peak hour trips, whichever threshold is met first. The net total trips in the AM or PM peak hour includes internal trip and pass-by trip reductions.
 - a. Additionally, at total buildout, AM inbound trips to the Subject Property are limited to no more than 70% and no less than 60% of the total AM peak hour trips.
 - b. Additionally, at total buildout, PM inbound trips to the Subject Property are limited to no more than 45% and no less than 30% of the total PM peak hour trips.
- 4. The total background vehicle traffic, which includes existing traffic and approved but unbuilt development, and the background improvements at the intersections analyzed in the traffic impact analysis, will not be changed ("frozen") for the duration of the 85 month PAPF validity period for the Subject Property.

¹ For the purpose of these conditions, the term "Applicant" shall also mean the developer, the owner, or any successor in interest to the terms of this approval.

- At the preliminary plan stage, the Applicant must submit conceptual plans, or make reference to plans previously submitted to the M-NCPPC, for the proposed improvements listed as follows:
 - A second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard.
 - A striped second southbound left turn lane on Observation Drive at Ridge Road.
 - c. The Dorsey Mill Road bridge over I-270.
 - d. A second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive.
 - e. At Crystal Rock Drive and Kinster Drive: one through/left lane, one through lane, and one right turn lane on northbound Crystal Rock Drive. On southbound Crystal Rock Drive the lane configuration must include one through/left lane and one through/right lane.
 - f. A traffic signal and applicable improvements needed to install the signal at Crystal Rock Drive and Kinster Drive and Century Boulevard and Kinster Drive/proposed site entrance.
- 6. When deemed necessary by the Planning Board in its approval of a future application for development of the Subject Property, the following improvements must be completed:
 - Constructing a second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard.
 - Striping a second southbound left turn lane on Observation Drive at Ridge Road.
 - c. Constructing the Dorsey Mill Road bridge over I-270.
 - d. Constructing a second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive.
 - e. Reconstructing the northbound and southbound approaches of the Crystal Rock Drive and Kinster Drive intersection to include one through/left lane, one through lane, and one right turn lane on northbound Crystal Rock Drive. On southbound Crystal Rock Drive the lane configuration must include one through/left lane and one through/right lane. Adjustments to the number of lanes or intersection configuration can be made as determined with future applications for the development of the Subject Property or by the Montgomery County Department of Transportation (MCDOT).

The above improvements may be constructed solely by the Applicant, by the Applicant in concert with public agencies or neighboring landowners, or solely by others with development approvals also conditioned on the construction of the improvements.

- 7. The Applicant must submit a traffic signal warrant analysis with any preliminary plan for the Subject Property for the intersections of 1) Century Boulevard and Kinster Drive/proposed site entrance and 2) Crystal Rock Drive and Kinster Drive. If a traffic signal is warranted, then the Applicant must construct the signal and associated improvements when identified by the Planning Board in its approval of a future application for development of the Subject Property.
- The Applicant is responsible for any pedestrian or bicycle improvements identified with future applications for development of the Subject Property as required by the Planning Board.
- The Applicant must satisfy the Adequate Public Facilities Transportation Policy Area Review (TPAR) test by making a TPAR payment, equal to 25% of the applicable development impact tax, to the Montgomery County Department of Permitting Services (MCDPS). MCDPS may determine the extent to which the Applicant is eligible for TPAR credit.
- 10.At the preliminary plan stage the Applicant must demonstrate substantial compliance with the comments contained in the MCDOT letter dated November 18, 2015, except for comment #1 in the Summary section of the letter.

BE IT FURTHER RESOLVED that having considered the recommendations and findings of its Staff as presented at the hearing and as set forth in the Staff Report, which the Board hereby adopts and incorporates by reference (except as modified herein), and upon consideration of the entire record, the Planning Board FINDS, with the conditions of approval, that:

 The Applicant is eligible for a transportation PAPF determination for providing accelerated public transportation infrastructure through private investment.

The Applicant requested approval of a transportation PAPF determination for funding and constructing, with MCDOT, the Century Boulevard extension under Father Hurley Boulevard and along the entire frontage of the Subject Property. As part of the most recent preliminary plan approval for the Subject Property, the previous owner was required to participate in the County's future CIP project to construct the four-lane divided Century Boulevard from Father Hurley Boulevard to Dorsey Mill Road. The Applicant purchased the property in 2001 and assumed the previous owner's obligations under the conditions in the preliminary plan, which expired at the end of 2007. Despite the expiration of the APF determination included in the preliminary plan, the Applicant continued to work with MCDOT and provided funds for the construction of the road.

Consistent with the standards it approved on June 16, 2011, the Planning Board finds that through the Applicant's investment, the construction of the Century Boulevard

extension was significantly accelerated, and the value of the extension provided a timely private investment in public infrastructure. And based on the Restated Road Participation Agreement between the Applicant and Montgomery County regarding the extension of Century Boulevard, the Board finds that no reimbursement for the Applicant's investment in the extension will occur beyond that otherwise provided for in the law.

Finally, the 85 month validity period for this transportation PAPF determination takes into account the fact that the Applicant has not provided a proposed project schedule, and thus has demonstrated no need under Section 50-20(c)(3)(B) of the Subdivision Regulations for a longer validity period. As conditioned above, the validity period for this transportation PAPF determination will begin on the mailing date of this Resolution.

2. Public transportation facilities will be adequate to support and service the trips generated by the proposed development.

Site Access

There are no approved vehicular access points for the Subject Property, although there are two vehicular aprons that were paved when Century Boulevard was extended under Father Hurley Boulevard to the north. One is a potential full movement access at Kinster Drive and Century Boulevard, and the second is a right-in/right-out to Century Boulevard between Kinster Drive and Father Hurley Boulevard. The vehicular points of access will be fully evaluated at the initial Preliminary Plan submittal.

Conformance to the Sector Plan

The Sector Plan states that the Subject Property is suitable for a mix of uses with a minimum of 60 percent employment and a maximum of 40 percent residential. The Sector Plan calls for 1.0 FAR of a mix of uses; however, there was a subsequent District Map Amendment G-956 that approved a Commercial Residential zoning at a 2.0 FAR (CR-2.0). The 2.0 FAR mix of uses is consistent with the proposed density allowed. The land use and associated mix of uses is not part of this Application and thus will be reviewed for Sector Plan consistency with a future development application.

Master-Planned Roadway, Bikeway, and Transit Corridor

The Sector Plan contains the following recommendations for frontage roadway and bicycle facilities:

- Century Boulevard:
 - A business district street (B-10) with four divided travel lanes (two lanes in each direction) and a right-of-way of 134 feet.
 - A shared use path (SP-66)

- A 50-foot transitway for the future Corridor Cities Transitway (CCT)
- Dorsey Mill Road extended:
 - A business district street (B-14) with four travel lanes (two in each direction) and a right-of-way of 150 feet.
 - A 50-foot shared transitway for the future CCT

The 2005 Countywide Bikeways Functional Master Plan is currently being updated. It is likely, as part of the update of the Bikeways Master Plan, that the bicycle recommendation of a shared use path on Century Boulevard will be upgraded to separated bike lanes on each side of the road.

The Dorsey Mill Road extended bridge Mandatory Referral (MR2016007) over I-270 is proposed to have separated bicycle lanes (also known as a cycle track) on both sides of the road and a shared use path on the south side of the road. This is consistent with the current recommendation in the Sector Plan but also provides an enhancement with separated bicycle lanes.

The CCT runs along the western and northern edge of the Subject Property as noted on the roadways listed above. In addition, there is a shared use path (SP-66) planned along the entire segment of the CCT from the Shady Grove Metrorail Station to Clarksburg Town Center. The Sector Plan also has a CCT station on Century Boulevard in front of the Subject Property with a 250-space park and ride facility.

Public Transit Service

Ride-on Route 83 and 98 provide bus service within close proximity of the Subject Property. Route 83 provides service every 30 minutes Monday through Sunday from the Holy Cross Germantown Hospital to the Germantown Transit Center. The closest Route 83 bus stop is located a little more than a quarter mile away at Kinster Drive and Crystal Rock Drive. Route 98 also provides service every 30 minutes Monday through Sunday from the Germantown Transit Center to the Kingsview Park and Ride in the vicinity of the Subject Property. The route has a few different routing options during the peak commuting period and the weekend to provide service to the Germantown Community Center and Maryland SoccerPlex Championship Stadium. The closest Route 98 bus stop is located at Father Hurley Boulevard and Waters Landing, which is more than a half mile from the Subject Property.

Pedestrian and Bicycle Facilities

The only existing pedestrian facility along the property frontage is on Century Boulevard, which consists of a five-foot wide sidewalk and green panel. Lead-in sidewalks from the adjacent streets and other Master Plan facilities will be reviewed with any development application for the Subject Property.

Local Area Transportation Review (LATR)

A traffic study dated August 17, 2015 and revised November 11, 2015 was submitted to determine the impact of the theoretical development on the area transportation system. Nineteen intersections were identified as critical intersections for analysis to determine whether they meet the applicable congestion standard. The intersections are located in the Germantown Town Center Policy Area with a Critical Lane Volume (CLV) standard of 1,600 and in the Germantown West Policy Area with a CLV standard of 1,450. As shown in the Staff Report, two of the intersections will exceed the acceptable CLV standard under the total future condition with the hypothetical development on the Subject Property.

The two intersections with failing CLVs are Crystal Rock Drive & Kinster Drive/Waters Landing Drive and Crystal Rock Drive & Father Hurley Boulevard. The Applicant has proposed the addition of a second eastbound left turn lane on Father Hurley Boulevard at Crystal Rock Drive in addition to the background improvement of a second northbound right turn lane on Crystal Rock. In order to address the failing CLV condition at Crystal Rock Drive & Kinster Driver/Waters Landing Drive, the Applicant has proposed modifications to the northbound and southbound approaches on Crystal Rock Drive, in addition to the installation of a traffic signal. The proposed lane modifications on Crystal Rock Drive, at buildout, include one through/left lane, one through lane, and one right turn lane on the northbound approach to the intersection. On the southbound approach, the Applicant has proposed one through/left lane and one through/right lane.

The Applicant has also assumed the striping of a second left turn lane on Observation Drive at Ridge Road (MD 27) and the Dorsey Mill Road bridge extension across I-270 in the background traffic condition in addition to the second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard as noted above.

This transportation PAPF determination is conditioned on the future provision of these improvements at a time to be determined with the approval of any preliminary plan submitted for the Subject Property.

Due to the nature of this Application, the total background vehicle traffic, which includes existing traffic and approved but unbuilt development, and the background improvements at the intersections analyzed in the traffic impact analysis, will not be changed for the duration of the 85 month PAPF validity period for the Subject Property. The total background vehicle traffic is "frozen" for the purposes of determining the mitigation measures needed due to the maximum number of vehicle trips included in this Application in order to satisfy the roadway capacity needed for APF. The "frozen" total background traffic is not to be used to determine the need for traffic signals that have been identified in the conditions associated with this Application or other safety improvements that could arise as the result of subsequent applications.

Transportation Policy Area Review (TPAR)

The proposed development will require a TPAR payment to MCDPS at building permit of 25% of the transportation impact tax because the site is located within the Germantown West Policy Area with an inadequate transit capacity. MCDPS may determine the extent to which the Applicant is eligible for TPAR credit for its role in extending Century Boulevard.

Conclusion

As conditioned, the transportation PAPF for the theoretical development, with a maximum of 1,558 AM net peak hour trips or 1,762 PM net peak hour trips, will satisfy the LATR and TPAR requirements of the Adequate Public Facilities (APF) review. This is also contingent upon AM inbound trips, at total buildout of the Subject Property, being limited to no more than 70% and no less than 60% of the total AM peak hour trips. For PM inbound trips, the Subject Property, at total buildout, is limited to no more than 45% and no less than 30% of the total PM peak hour trips.

This PAPF determination is for transportation impacts only. All other public facilities and services including schools, water and sewer service, electric, telecommunication, police, fire, and health services available to serve the Subject Property will be reviewed with a future application.

BE IT FURTHER RESOLVED, that any party authorized by law to take an administrative appeal must initiate such an appeal within thirty days of the date of this Resolution, consistent with the procedural rules for the judicial review of administrative agency decisions in Circuit Court (Rule 7-203, Maryland Rules).

CERTIFICATION

This is to certify that the foregoing is a true and correct copy of a resolution adopted by the Montgomery County Planning Board of the Maryland-National Capital Park and Planning Commission on motion of Commissioner Fani-González, seconded by Vice Chair Wells-Harley, with Chair Anderson, Vice Chair Wells-Harley, and Commissioners Presley and Fani-González voting in favor, and Commissioner Dreyfuss absent, at its regular meeting held on Thursday, December 10, 2015, in Silver Spring, Maryland.

Casey Anderson, Chair

Montgomery County Planning Board

Development

Table 1: Vehicle Trip Generation

General Retail sq. ft. (M-NCPPC)

Internal Capture w/ Residential

General Office sq. ft. (M-NCPPC)

Internal Capture w/ Residential

Residential Multifamily units (M-NCPPC)

Residential Townhome units (M-NCPPC)

Internal Capture w/ Office

Pass-by (34% reduction)

Net External Retail Trips

Internal Capture w/ Retail

Net External Office Trips

Internal Capture w/ Retail

Internal Capture w/ Office

Total Net External Trips

Net External Residential Trips

SF/Units
125,000

AM Peak Hour

Out

141

-37

-35

67

137

-38

99

306

62

-4

357

523

Total

294

-6

-75

<u>-73</u>

140

1,055

-75

973

383

75

-6

445

1,558

In

612

-61

-49

-171

331

156

-11

138

296

72

-147

-15

206

675

In

153

-4

-38

-38

73

918

-37

874

77

13

88

1,035

625,000

950

150

PM Peak Hour

Out

564

-147

-11

-138

268

764

-15

-49

700

152

35

-61

119

1,087

Total

1,176

-208

-60

-309

599

920 -22

-60

838

448

107

-208

-22

325

1,762

MCPB No. 18-099 Sketch Plan No. 320180220 Poplar Grove Date of Hearing: October 4, 2018

NOV 0 5 2018

RESOLUTION

WHEREAS, under Section 59-7.1.2 of the Montgomery County Zoning Ordinance, the Montgomery County Planning Board is authorized to review sketch plan applications; and

WHEREAS, on June 26, 2018, Symmetry at Cloverleaf LLC ("Applicant") filed an application for approval of a sketch plan for construction of up to 686,000 square feet of residential use and 520,000 square feet of commercial use on 19.41 acres of CR 2.0, C-1.75, R-1.0, H-145T and Germantown Transit Mixed Use Overlay Zone zoned-land, located on the east side of Century Boulevard between Father Hurley Boulevard and the future Dorsey Mill Road ("Subject Property") in the Germantown West Policy Area and 2009 Germantown Employment Area Sector Plan ("Sector Plan") area; and

WHEREAS, Applicant's sketch plan application was designated Sketch Plan No. 320180220, Poplar Grove ("Sketch Plan" or "Application"); and

WHEREAS, following review and analysis of the Application by Planning Board staff ("Staff") and other governmental agencies, Staff issued a memorandum to the Planning Board, dated September 21, 2018, setting forth its analysis and recommendation for approval of the Application subject to certain binding elements and conditions ("Staff Report"); and

WHEREAS, on October 4, 2018, the Planning Board held a public hearing on the Application at which it heard testimony and received evidence submitted for the record on the Application; and

WHEREAS, on October 4, 2018, the Planning Board voted to approve the Application subject to conditions on the motion of Commissioner Cichy, seconded by Commissioner Fani-Gonzalez, with a vote of 4-0; Commissioners Anderson, Cichy, Fani-Gonzalez, and Patterson voting in favor and Commissioner Dreyfuss absent.

Approved as to Legal Sufficiency:

8787 Georgia Avenue Sover Spring, Wardland 20910 Phone: 301.495.4605 Fax: 301.495.1320

NOW, THEREFORE, BE IT RESOLVED that the Planning Board approves Sketch Plan No. 320180220, Poplar Grove, subject to the following binding elements and conditions:¹

- A. <u>Binding Elements</u>. The following site development elements are binding under Section 59-7.3.3.F of the Montgomery County Zoning Ordinance:
 - 1. Maximum density and height;
 - 2. Approximate location of lots and public dedications;
 - 3. General location and extent of public open space;
 - 4. General location of vehicular access points; and
 - 5. Public benefit schedule.

All other elements are illustrative.

- B. Conditions. This approval is subject to the following conditions:
 - 1. Density

The Sketch Plan is limited to a maximum of 1,206,000 square feet of total development including up to 520,000 square feet of commercial development and up to 686,000 square feet of residential development.

2. Height

The development is limited to a maximum height of 145 feet, as shown on the Sketch Plan.

3. <u>Incentive Density</u>

The development must be constructed with the public benefits listed below, unless modifications are made under Section 59.7.3.3.I. Total points must equal at least 100 and be chosen from at least four categories as required by Section 59.4.5.4.A.2. The requirements of Division 59.4.7 and the *CR Zone Incentive Density Implementation Guidelines* must be fulfilled for each public benefit. Final points will be established at Site Plan approval. The categories approved for refinement at site plan are the following:

- a. Transit Proximity, achieved from the future Germantown Town Center Corridor Cities Transitway ("CCT") station;
- b. Connectivity and Mobility, achieved through advanced dedication and wayfinding;
- c. Quality Building and Site Design through Exceptional Design, Historic Resource Protection, and Public Open Space; and

¹ For the purpose of these binding elements and conditions, the term "Applicant" shall also mean the developer, the owner or any successor(s) in interest to the terms of this approval.

d. Protection of the Natural Environment, achieved through building lot termination, vegetated area, and cool roof.

4. Site Design and Public Benefits

- a. Prior to Preliminary Plan approval for Block J, the Applicant must choose between either townhouse or multi-family development.
- b. At the time of each site plan approval, the Applicant must submit the necessary documentation showing how the plans satisfy the Zoning Ordinance and Incentive Density Implementation Guideline requirements, including meeting the following phased criteria:
 - i. Explaining how each site plan contributes to meeting the Exceptional Design goals established by the Sketch Plan;
 - ii. Tracking for how much Common and Public Open Space has been provided out of the total required by the Sketch Plan;
 - iii. Placement and language on the proposed wayfinding; and
 - iv. Calculations on what the pro-rata share of Building Lot Terminations (BLTs) required is for that site plan.

5. Historic Resources

- a. Prior to the submission of a Preliminary Plan, the Applicant must stake the suspected location of the Waters Family burial site on the Subject Property, show the suspected location of the burial site on the Preliminary Plan documents, and submit a resource inventory of existing and suspected burial site elements, and the results of the archaeological investigations conducted to identify potential grave locations and cemetery boundaries, consistent with the requirements of Chapter 50.
- b. Prior to approval of a Preliminary Plan, the Applicant must finish all necessary archeological investigations to finalize the location and size of the burial site and identify any additional resources on the Subject Property related to the burial site. All archeological work shall be completed by a qualified professional archeologist using a scope of work approved by Staff. The Preliminary Plan must also reflect a separate parcel for the Waters Memorial Park which shall fully encompass the burial site, develop with Staff a long-term maintenance program for maintaining the burial site including a plan for any potential relocations of resources to the site from elsewhere within the Subject Property, develop a process for protecting the burial site during future construction activities, and coordinate with MCDOT on the possible relocation of remains (at the County's cost) located on MCDOT property to burial site in the Waters Memorial Park.
- c. Prior to Planning Board approval of any site plan or site plan amendment containing the Waters Memorial Park, the Applicant must present all planned improvements for the cemetery and the Waters Memorial Park to

the Historic Preservation Commission (HPC). The HPC may issue a recommendation to the Planning Board on the work planned in the Park.

d. The Applicant shall establish ingress easements providing public access to the Waters Cemetery on the plat(s) for the first phase of development.

6. Open Space

The Applicant must provide a minimum of 150,000 square feet of Public Open Space and a minimum of 40,000 square feet of Common Open Space on-site per the design criteria listed in the Zoning Ordinance. The final location, design and sizes of the open spaces will be finalized at Site Plans.

7. Building Lot Terminations (BLTs)

Prior to release of the first building permit within each phase of development, the Applicant must provide proof of purchase and/or payment for the required BLTs associated with that phase.

8. Moderately Priced Dwelling Units (MPDUs)

The Applicant must provide on the Subject Property a minimum of 12.5% of the total units as Moderately Priced Dwelling Units. The development must provide MPDUs in accordance with Chapter 25A.

9. Transportation

At the time of Preliminary Plan, the Applicant must address the following:

a. Submit a design exception package including the necessary cross-sections and justifications for approving the Garden Street, Public Street A, Public Street B2, and Kinster Drive as public streets.

b. Provide the appropriate justification to Staff, including anticipated road cross-sections and construction standards, for all other streets shown on the Sketch Plan as private.

c. Complete the dedication of approximately 7.74 acres to complete the right-of-way for Century Boulevard.

10. Future Coordination for Site Plan

In addition to any other requirements for Preliminary Plans under Chapter 50 and Site Plans under Chapter 59, the following must be addressed when filing a Preliminary or Site Plan, as appropriate:

- a. Ensure adequate Fire and Rescue access to all buildings and structures;
- b. Provide full detail for all Public and Common Open Spaces;
- c. Provide for pedestrian access to the Property through the proposed areas of open space in addition to sidewalks along the three vehicle access points;
- d. Submit a Noise analysis;

- e. Submit a Transportation Impact Statement showing the proposed development is at or under the maximum number of trips approved by the provisional APF determination;
- f. SWM concept plan submittal and approval as part of the preliminary plan, and subsequent SWM plan with site plans;
- g. Coordination with MCDOT and M-NCPPC on the necessary design exceptions for implementing the public streets, where applicable;
- h. Show compliance with the Recreation Guidelines for all residential development phases.
- i. Site Plans shall identify areas intended for interim uses including what necessary site improvements are proposed and what uses may be allowed within the interim use areas.
- j. On the Preliminary Plan, the Applicant shall officially designate location(s) for future CCT park-and-ride parking. The Preliminary Plan shall include a condition that commissions a maximum three year-long study, beginning from the date of the approval of the Sketch Plan, coordinated by MCDOT regarding the needs, timing and funding of a potential CCT park-and-ride location on the Subject Property. Should the Applicant find a user of the space subject to the three year-long study period, the Applicant may return to the Planning Board prior to the end of the three-year period with a Site Plan for determination at that time as to whether CCT park-and-ride is necessary to be incorporated.

BE IT FURTHER RESOLVED that having given full consideration to the recommendations and findings of its Staff as presented at the hearing and set forth in the Staff Report, which the Planning Board hereby adopts and incorporates by reference (except as modified herein), and upon consideration of the entire record and all applicable elements of the Zoning Ordinance, the Board finds that as conditioned the necessary elements of the Sketch Plan are appropriate in concept and appropriate for further review at site plan and that:

1. The Sketch Plan meets the objectives, general requirements, and standards of the Zoning Ordinance.

Development Standards

The Subject Property includes approximately 19.41 net acres zoned CR 2.0, C-1.75, R-1.0, H-145T and is in the Germantown Transit Mixed Use Overlay Zone. The data table below demonstrates the Application's conformance to the applicable development standards of the zone.

Sketch Plan Data Table				
Development Standard	Permitted/Required	Approved		
Gross Tract Area	n/a	27.15 acres		
Net Lot Area	n/a	19.41 acres		
Density (GFA/ FAR)*				
Residential Density	1 FAR (1,182,690 sq ft)	Up to 0.58 FAR (686,000 sq ft)		
Commercial Density	1.75 FAR (2,069,707 sq ft)	Up to 0.44 FAR (520,000 sq ft)		
Total FAR/GFA	2 FAR (2,365,380 sq ft)	Up to 1.02 FAR (1,206,000		
		sq ft)		
Max. Building Height	145 ft	145 ft		
Min. Site Wide Public Open	10% of Multi-Family &			
Space	Commercial Site Area ²			
if Block J is townhomes	10% (44,807 sq ft)	40% (150,000 sq ft)		
If Block J is Multi-family	10% (50,412 sq ft)	30% (150,000 sq ft)		
Min. Site Wide Common Open	10% of Townhouse Site			
Space	Area ³			
If Block J is townhomes	10% (39,755 sq. ft.)	10% (40,000 sq ft)		
If Block J is Multi-family	10% (34,150 sq ft.)	11% (40,000)		
MPDUs	12.5% Min	12.5% or more		

a. General Requirements

i. Site Access

The Sketch Plan provides for adequate site access to the approved uses. Vehicle access to the Subject Property will be provided by three separate locations connecting the new internal streets to Century Boulevard. The network of public and private streets and alleys provide each townhouse unit with access to a private garage, and the multi-family and office buildings access to parking garages. Pedestrian and bicycle access is provided with sidewalks located along both sides of all internal streets and is enhanced further with connections through proposed open spaces, an upgraded shared use path along Century Boulevard, and a trail that will traverse the eastern side of the Subject Property.

ii. Parking, Queuing, and Loading

The Sketch Plan provides the general location for the necessary parking and loading areas. Each townhouse unit will include a twocar garage which will accommodate the minimum required parking for one-family residential dwellings. The multi-family buildings will

² If Block J is townhomes, Public Open Space requirements are based on 448,069 sq. ft. of site area. If Block J is Multi-Family, Public Open Space requirements are based on 504,122 sq. ft. of site area. ³ If Block J is townhomes, Common Open Space requirements are based on 397,554 sq. ft. of site area. If Block J is Multi-Family, Common Open Space requirements are based on 341,501 sq. ft. of site area.

each have a parking garage either above or below grade which will be sized to meet the minimum parking for each building. A below grade parking garage is also planned to provide parking for the office buildings located in the northern part of the Subject Property. Loading locations have been identified for each use requiring loading including the multi-family, retail and office buildings that largely locates the loading in alleys or within the accompanying parking garage.

iii. Open Space and Recreation

The Sketch Plan provides for locations and quantities of open space that adequately meets the requirements of the zone. Common Open Space is the open space requirement for townhouse building type in CR zones and is required to equal at least 10% of the total area developed as townhomes. The Sketch Plan identifies where the Subject Property will accommodate the 10% minimum requirement for Common Open Space. Public Open Space is required for all other building types in CR zones, also at a minimum of 10% of the total area not developed as townhomes. The Sketch Plan can accommodate a minimum of 150,000 square feet of Public Open Space, which is well in excess of the approximately 50,000 square feet required by the zone. The excess of Public Open Space may be utilized as an incentive density public benefit. requirements will be reviewed at the time of future site plans, but space is available in the provided open space areas to accommodate recreational needs.

iv. General Landscaping and Outdoor Lighting
Landscaping and outdoor lighting will be reviewed more thoroughly
at the time of future site plans, but the Sketch Plan anticipates
providing the necessary street trees along all streets and using
landscaping and urban gardening in the areas of open space as part
of the urban farming theme for the development.

b. Intent Standards of the CR Zone

i. Implement the recommendations of applicable master plans.

The Sketch Plan substantially conforms to the recommendations of the 2009 Germantown Employment Area Sector Plan ("Sector Plan"). The Sector Plan's vision statement states "This Plan establishes a vision that will transform Germantown's central employment corridor into a vibrant town center and mixed-use uptown districts. The Germantown of the future will be the center

of business and community life in upper Montgomery County." The Sector Plan further envisions Germantown completing an economic core, increasing employment, and organizing development around transit. Further areawide recommendations include a zoning strategy for mixed use development and a vision for establishing an urban form which includes interconnecting transportation options, creating gathering spaces, establishing centers, and creating meaningful street character.

The Subject Property is located in the North End District of Germantown, for which the Sector Plan provides specific recommendations, including clustering development at the future CCT station. The Sector Plan also recommends that the Subject Property develop at an average density of 1.0 FAR with a mix of uses, including 60% employment and 40% residential, to locate retail near transit and along Century Boulevard, and to take advantage of visibility from I-270. The future land use map also identifies the Subject Property as a location for creating an urban open space accessible to Century Boulevard. In addition, there is a planned need for possible parking for the future CCT station and the Sector Plan stated it should be provided by private development adjacent to the planned stops.

The Sketch Plan substantially conforms to the goals and recommendations mentioned above. The Sketch Plan proposes a new mixed-use community that will provide opportunities for employment, retail and housing, all centered around the future CCT station with a proposed FAR of 1.02. The highest intensity of uses will be closest to the CCT station, and the general orientation of the buildings will provide a highly activated street edge along Century Boulevard, including clear access to the proposed retail uses. A large urban open space will be constructed between the four buildings closest to the CCT station with direct access to Century Boulevard that spans the entire width of the Subject Property including the proposed Waters Memorial Park. The Applicant has identified where they would be able to meet the required CCT parking by identifying the future parking garage under blocks A and B as the most likely location. As conditioned in this Resolution, additional detail will be provided at time of Preliminary Plan.

While the Sketch Plan does not provide 60% employment uses as recommended by the Sector Plan, the Board finds that providing 55% residential and 45% employment uses is in keeping with the

> intent statements of the Sector Plan and is consistent with other nearby approvals on other mixed-use projects. The Sketch Plan is accordingly in substantial conformance with the Sector Plan.

ii. Target opportunities for redevelopment of single-use commercial areas and surface parking lots with a mix of uses.

While this Application is not re-developing an existing single-use commercial site, it is proposing a new mixed-use community with no surface parking at full build-out.

iii. Encourage development that integrates a combination of housing types, mobility options, commercial services, and public facilities and amenities, where parking is prohibited between the building and the street.

The Sketch Plan will facilitate a combination of housing types including one-family and multi-family options, including providing new MPDU units. The Subject Property's adjacency to the CCT and the location of the higher intensity uses near the future station will encourage transit mobility, and the new shared use paths along Century Boulevard and Dorsey Mill Road will enhance the area bicycle network. The centralized area of retail will provide an opportunity for small maker businesses and restaurant users to locate within the community, providing services to both new and existing residences. The current Sketch Plan drawings show building placement consistent with prohibiting parking between the buildings and the street.

iv. Allows a flexible mix of uses, densities, and building heights appropriate to various settings to ensure compatible relationships with adjoining neighborhoods.

The Sketch Plan uses the design flexibility and mix of uses allowed in the CR zone with the various types of housing, retail and office uses proposed, enabling compatible relationships with surrounding development. Density on the Subject Property is highest in the north, near the future CCT station and existing approved employment uses, and lower toward the south, farther from transit and opposite from the existing townhomes west of Century Boulevard. The high-rise employment uses adjacent to the future CCT transit station and Dorsey Mill Road overpass provide visibility from the highway and are adjacent to other planned and approved

employment uses. The taller building heights also allow for more flexibility in protecting the Waters Cemetery in the Waters Memorial Park. Most of the remaining residential buildings will be five or fewer stories tall, with nearly half of the Subject Property developed with two to three story tall townhouses. This is in character with the existing townhouse condominiums located on the west side of Century Boulevard. Slightly taller buildings fronting along Century Boulevard keeps an appropriate scale to the road considering the width, and the narrower internal streets will be framed with slightly shorter buildings.

v. Integrate an appropriate balance of employment and housing opportunities.

The Sketch Plan will integrate an appropriate balance of employment and housing in this area of Germantown. The Sector Plan identified the Subject Property for substantial employment uses and this Application provides over 500,000 square feet of commercial uses, which is substantial and is balanced with the amount of housing proposed for the Subject Property. Much of the existing development in the area is single use commercial; therefore, the proposed residential uses are consistent with the intent of the Sector Plan.

vi. Standardize optional method development by establishing minimum requirements for the provision of public benefits that will support and accommodate density above the standard method limit.

The Sketch Plan will provide the required public benefits from a minimum of four categories to achieve the desired incentive density above the standard method limit, as described further in finding 7.

2. The Sketch Plan substantially conforms to the recommendations of the Sector Plan.

As discussed above, the Sketch Plan substantially conforms to the recommendations of the Sector Plan.

3. The Sketch Plan satisfies, under Section 7.7.1.B.5 of the Zoning Ordinance, the binding elements of any development plan or schematic development plan in effect on October 29, 2014.

The Sketch Plan is not subject to a development plan or schematic development plan.

4. The Sketch Plan satisfies the green area requirement in effect on October 29, 2014.

The Sketch Plan is not subject to a development plan or schematic development plan.

5. The Sketch Plan achieves compatible internal and external relationships between existing and pending nearby development.

The Sketch Plan proposes uses and intensities that will achieve compatible internal and external relationship between existing and pending nearby development, as described in greater detail above.

6. The Sketch Plan provides satisfactory general vehicular, pedestrian, and bicyclist access, circulation, parking, and loading.

As described above, the Application provides satisfactory general access, circulation, parking and loading.

7. The Sketch Plan proposes an outline of public benefits that supports the requested incentive density and is appropriate for the specific community.

Taking into account the considerations in Section 59-4.7.1.B, including the recommendations and objectives of the Sector Plan and any applicable design guidelines, the Incentive Density Implementation Guidelines, the size and configuration of the site and its relationship to adjacent properties, similar public benefits nearby, and additional enhancements related to the individual public benefits, the Planning Board finds that the following outline of public benefits supports the Applicant's request for incentive density and is appropriate for the community surrounding the site. Final determination of public benefit point values will be determined at Site Plan(s).

Public Benefit	Incentive Density Points		
	Max Allowed	Approved in Concept	
59.4.7.3C: Transit Proximity			
Transit Proximity	30	30	
59.4.7.3C: Connectivity and Mobility			
Advanced Dedication	30	30	
Wayfinding	10	5	
59.4.7.3E: Quality of Building and Site Desig	n		

Exceptional Design	10	5
Historic Resource Protection	20	10
Public Open Space	20	7
59.4.7.3F: Protection and Enhancement	of the Natural En	ivironment
Cool Roof	10	5
Vegetated Area	10	10
BLTs	30	30
TOTAL		132

Transit Proximity

Transit Proximity: The Applicant requests 30 points for the category of transit proximity. Transit proximity points are available based on the existing or planned transit level of service, the property zoning, and proximity to the transit facility. The Subject Property is in a CR zone, is adjoining a planned Corridor City Transitway stop with approximately 95% of the Subject Property within ¼ mile of the planned facility, and the transit level of service is Level 2 (planned bus line with a dedicated path). The Board approves the request for points in this category.

Connectivity and Mobility

Advanced Dedication: The Applicant requests 30 points for providing advanced dedication of Century Boulevard along the Property's western side. The gross tract area of the Subject Property is 27.15 acres, and the Applicant previously provided 7.74 acres of right-of-way for Century Boulevard resulting in a net tract area of 19.41 acres. The Board approves the request for points in this category.

Wayfinding: The Applicant requests five points for providing wayfinding that helps orient visitors to the various amenities throughout and adjacent to the Property. Points of interest would include the Waters Memorial Park and cemetery, the community park, the orchard, the retail at the core of the Maker District, the future CCT station, and could include directions to Black Hill Regional Park and the Germantown Town Center. Because of the Subject Property's size and attributes, the Board approves the request for points in this category.

Quality of Building and Site Design

Exceptional design: The Applicant is requesting 5 out of 10 possible points for providing exceptional design. The Sketch Plan establishes a community that showcases the agricultural past of the land, protects the existing cemetery, creates a new landmark in Germantown and introduces a unique

form such as urban farming to the area. The Board supports the request for points in this category.

Historic Resource Protection: The Applicant requests 10 of the possible 20 points for historic resource protection. Incentive density points are eligible for preserving or enhancing a historic resource designated in the Master Plan for Historic Preservation or the Locational Atlas and Index of Historic Sites by providing improvements and signage, integrating context appropriate landscaping and protecting important viewsheds. The existing Waters Family Cemetery is proposed for protection and enhancement as part of the Sketch Plan, including incorporating it into the Waters Memorial Park which will include improved access, interpretive signage, and landscaping. The Board approves the request for points in this category.

Public Open Space: The Applicant is requesting seven points for providing public open space in excess of the minimum open space requirements of the zone. The Zoning Ordinance requires a minimum of 10% Public Open space for the portion of the Subject Property used for multi-family and commercial development and a minimum of 10% Common Open Space for the portion of the Subject Property occupied by townhome development. The Sketch Plan shows the Applicant is providing approximately 100,000 square feet more Public Open Space than is required and eligible for points. The Board approves the request for points in this category.

Protection and Enhancement of the Natural Environment

Building Lot Termination (BLT): The Applicant requests 30 points for the purchase of BLT easements or equivalent payment. BLTs are generally required for every 31,500 square feet of gross floor area comprising the 7.5% incentive density floor area. Because this Application is in the Germantown Transit Mixed Use Overlay, the Zoning Ordinance requires that BLTs be purchased for 50% of the incentive density floor area. The Sketch Plan calls for up to 591,345 square feet of incentive density resulting in up to 9.3864 necessary BLTs. The Board approves the request for points in this category.

Cool Roof: The Applicant has requested five points for providing a cool roof. A cool roof must not be vegetated and have a minimum solar reflectance index of 75 on roof slopes below a ratio of 2:12. The Zoning Ordinance suggests a maximum of five points for providing a cool roof on properties greater than one acre in size. The Board approves the request for points in this category.

Vegetated Area: The Applicant is requesting a total of 10 points for providing vegetated area on the Subject Property that contains a minimum of 12 inches of soil, covering at least 5,000 square feet of area. The Applicant is requesting the full 10 points available because they are exceeding the zoning code minimum requirements by including the vegetated area as a part of excess open space and plans to use it as community garden area with a maintenance program. The Board approves the request for points in this category.

8. The Sketch Plan establishes a feasible and appropriate phasing plan for all structures, uses, rights-of-way, sidewalks, dedications, public benefits, and future preliminary and site plan applications.

The Sketch Plan includes a phasing plan for the provision of the structures, uses, rights-of-way, sidewalks, dedications, public benefits and probable future applications. The Sketch Plan is divided into four sections; 1A, 1B, 2 and 3. Phases 1A and 1B are residential and predominantly townhouse phases. They may be built together as one large phase or separately as two distinct phases. The first phase will include all of the public streets on the Subject Property, and all the necessary Common Open Space will be provided in conjunction to the construction of the townhomes. Phase 2 would complete the commercial retail/restaurant uses in the center of the Subject Property and would likely be built after the residential phases are completed. The final phase, phase 3 is the high density residential and office development adjacent to the CCT. This phase is highly dependent on the CCT being funded and built. The Applicant will submit a Preliminary Plan to establish the rights-of-way, private streets and development parcels immediately following the Sketch Plan, with the necessary Site Plans to follow as each phase is ready to develop. Public benefits and the calculated points are phased so that each phase provides approximately 1/3 of the total points based on the amenities and designs provided with each phase.

BE IT FURTHER RESOLVED that the Board's approval of a sketch plan is in concept only and subject to further review at site plan, when, based on detailed review the Board may modify the Sketch Plan's binding elements or conditions based on the Montgomery County Code, the Sector Plan, or other requirements; and

BE IT FURTHER RESOLVED that this Resolution incorporates by reference all evidence of record, including maps, drawings, memoranda, correspondence, and other information; and

BE IT FURTHER RESOLVED that all binding site development elements shown on the latest version of Sketch Plan No. 320180220, Poplar Grove, received by M-NCPPC

as of the date of the Staff Report, are required, except as modified by the above conditions of approval; and

BE IT FURTHER RESOLVED that this Resolution constitutes the written opinion of the Board in this matter, and the date of this Resolution is NOV 0 5 2018 (which is the date that this Resolution is mailed to all parties of record); and

CERTIFICATION

This is to certify that the foregoing is a true and correct copy of a resolution adopted by the Montgomery County Planning Board of the Maryland-National Capital Park and Planning Commission on motion of Commissioner Cichy, seconded by Vice Chair Dreyfuss, with Chair Anderson, Vice Chair Dreyfuss, and Commissioner Cichy voting in favor, and Commissioners Fani-González and Patterson absent at its regular meeting held on Thursday, October 25, 2018, in Silver Spring, Maryland.

Casey Anderson, Chair

Montgomery County Planning Board

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320180220 - Poplar Grove

Attachment E



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Poplar Grove

Private Street Request Preliminary Plan #120190040 Revised June 3, 2019

Per Section 50-4.3.E.4 of the Subdivision Regulations, an applicant may request that a road be private rather than public, provided that the Montgomery County Department of Transportation ("MCDOT") "determines that the proposed road is not needed to maintain area circulation, provide continuous corridors to serve the general public and quasi-public needs such as communication, utility, and future potential transportation or other systemic needs that serve the public on a long-term basis, and is not needed to be part of the network modeled for area capacity". The applicant must provide a list of proposed design elements that do not meet public road standards, including context-sensitive road design standards or a previously approved Design Exception, and justify why those design elements are necessary for the proposed development. Thus, we provide the following justification for certain private streets within the Poplar Grove site.

Poplar Grove is an ambitiously designed subdivision, which strives to merge the site's traditional agriculture/farming origins with a modern, urban, future transit-proximate feel. Based on the site constraints, a standard grid network or looping street system is not feasible throughout the site. A gas easement is located at the rear (along the eastern property line), there is extreme grade change from one side of the site to the other (with the grade generally falling north to south), and a large stormwater facility for Century Boulevard further encumbers the southern end of the site. Thus, private streets are needed in several locations within the site to create the urban feel within the tight constraints of the site and to accommodate the unique vision for this "agri-hood" community that the applicant is seeking to create.

Specifically, the proposed private streets east of the "Garden Street" spine road are proposed to be private primarily because they end in dead ends (essentially against the I-270 southbound exit ramp for Father Hurley Boulevard). The site is too narrow to loop these streets into a continuous network. These proposed private streets are by the very nature of their dead ends not needed to maintain area circulation, not needed for continuous corridors to serve public or quasi-public infrastructure needs, and are not part of the network modeled for area capacity.

Through ongoing coordination with MCDOT, the Montgomery County Department of Permitting Services ("MCDPS"), and the Maryland-National Capital Park and Planning Commission ("MNCPPC"), we have worked to meet the needs of all agencies. Per the request of MNCPPC, we have provided a public road loop through the community (i.e., Garden Street and connections on the west side of it to Century Boulevard). The private streets to the east of Garden Street will look, feel and operate like the public streets proposed on this project. These streets (both public and private) have modifications from the standard MC-2005.01 section. Alleys follow the standards set in MC-200.01 and MC-201.01.

As noted, as part of the subdivision for Poplar Grove, a public road system has been provided. This includes Garden Street, as well as the portions of Street A, Street B and Kinster Drive located between Century Boulevard and Garden Street. This public road network links the community to Century Boulevard. Design Exceptions have been requested for the cross sections of the public streets to provide a more urban designed community that provides space for the agriculture/farming/gardening theme. Where public streets transition to private streets, the same road cross section is utilized to maintain consistency.

The following streets are requested to be private (see overall street location exhibit and cross sections attached to this request):

- Street A, east of Garden Street
- Street B, east of Garden Street
- Street C
- Street E
- Alleys 1-8

Proposed Design Elements That Do Not Meet Public Road Standards:

Street A

• <u>A: Proposed Modification:</u>

Reduced Right-of-Way: Modifications to MC-2005.01 include the following resulting in 4' reduction to Street Parcel:

- 1.5' curb offset is not provided along outbound lane (1.5' reduction)
- o 2' maintenance strip provided within 6' sidewalk (north side) (2' reduction)
- o 5' sidewalk (south side) adjacent to residential lots (1' reduction)
- Landscape strip increased to 6.5' (0.5' increase)

Private Street A terminates in a private street, and thus itself is required to be private. This termination is considered adequate for a private street.

Modification to Intersection Chokers Guideline approved 3/19/2003 has been modified on private streets by a reduction in the distance (20' to 8' minimum) from the point of curvature closest to the intersection to the nearest parking space. The configuration shown for parallel parking on private streets allows adequate distance for pedestrian crossing with adequate driver visibility of the pedestrians when pulling in or out of the space. On street A this occurs past the intersection with Garden Street and prior to the intersection with Street C. A car parking in space closest to Garden Street should not have any interaction with the crosswalk located at Garden Street because the car will pull passed the space and back into the space. A car parking in this space closest with the intersection with Street C may need to pull forward near or into the cross walk, but it would have full visibility of the crosswalk (in the same way a car driving through the intersection would have visibility of the crosswalk). In neither scenario will cars be backing up into a pedestrian route.

• B: Rationale:

To provide a more urban designed community that provides space for the gardening/environmental theme for Public Street A.

The external lane width was narrowed to provide a more urban designed community feel and to allow a more accessible and walkable feel to the entrances of townhouses located along this street. The sidewalks adjacent to townhouse development were reduced to 5' to be in scale with the residential development.

The configuration shown for parallel parking on private streets allows adequate distance for pedestrian crossing with adequate driver visibility of the pedestrians when pulling in or out of the space.

• <u>C: Measures evaluated to avoid the need for the modification(s) and why they were determined unacceptable:</u>

This project was initially designed with full lane widths. However, through that design, we realized that the full-width lanes gave a more suburban feel and did not create the urban context we sought (or, that is desired by the CR zoning of the site and its future proximity to transit), and negatively impacted the feasibility of specific development parcels.

In addition, we were unable to provide the space for utilities required outside of the right-of-way along this corridor. In providing narrower street widths, the overall right-of-way is reduced to improve feasibility on an already-constrained site and allow more space for utility easements within the private parcels, all while creating an urban character consistent with Montgomery County's historic farming villages, which inspired the project.

A second iteration of this layout proposed 10' lanes and 1' maintenance strips. Per feedback from MNCPPC and MCDOT, the lanes and maintenance strips were increased as shown on the current plans.

• D: Anticipated impact on vehicular, bicycle and pedestrian traffic:

Providing reduced road width will have the following impact:

- o Narrower road widths will help slow traffic.
- Narrower road width will encourage walkability making pedestrians feel safer crossing the street and more engaged with the other side of the site.
- E: Perceived benefit to the public and private sectors if the modification is permitted.

Dense, walkable development and ample walking/biking pathway is provided, in line with the Master Plan vision and the goals for Poplar Grove.

Street B

• <u>A: Proposed Modification:</u>

Reduced Right-of-Way: Modifications to MC-2005.01 include the following resulting in 12' reduction to Street Parcel:

- No Parking Lane is provided (8' reduction)
- o 1.5' curb offset is not provided along outbound lane (1.5' reduction)
- 1' maintenance strips provided on north side (1' reduction)
- o 5' sidewalks on both sides adjacent to residential lots (2' reduction)
- Landscape strip increased to 6.5' (0.5' increase)

Street B terminates 49' after Alley 5.

Driveway (Street Separation): Measured from edge of curb radii to curb radii, the distance between Alley 5 and Garden Street is 26'. In addition, Alleys 5 and 7 are offset 15' measured from centerline to centerline.

• B: Rationale:

To provide a more urban designed community that provides space for the gardening/environmental theme for Public Street B.

The external lane width was narrowed to provide a more urban designed community feel and to allow a more accessible and walkable feel to the entrances of townhouses located along this street. The sidewalks adjacent to townhouse development were reduced to 5' to be in scale with the residential development.

The extension of Private Street B past Alley 5 provides frontage for the three townhouses located along this street and also provides adequate fire access to this street. The use of this street past Alley 5 will be very limited. This portion of the street will really function like an alley, and thus the proposed termination is adequate and safe.

In order to provide rear access to the townhouse units along the garden street, a rear alley that provides vehicular access is necessary to be located in line with the rear of these units. Proximity to the intersection should not create a significant safety issue. Vehicles will be approaching the intersection at low speed, likely preparing to stop (or accelerating from stop). In addition, there will be adequate sight distance from the roadway. This reduces the likelihood of vehicle conflicts with driveway vehicles.

Alleys 5 and 7 are not able to align due to utility separation requirements and fire access for units located on Alley 8. It is not anticipated that there would be any cross traffic from Alley 5 to Alley 7.

• <u>C: Measures evaluated to avoid the need for the modification(s) and why they were determined unacceptable:</u>

This project was initially designed with full lane widths. However, through that design, we realized that the full-width lanes gave a more suburban feel, did not create the urban context we sought (or, that is desired by the CR zoning of the site and its future proximity to transit), and negatively impacted the feasibility of specific development parcels.

In addition, we were unable to provide the space for utilities required outside of the right-of-way along this corridor. In providing narrower street widths, the overall right-of-way is reduced to improve feasibility on an already-constrained site and allow more space for utility easements within the private parcels, all while creating an urban character consistent with Montgomery County's historic farming villages, which inspired the project.

A second iteration of this layout proposed 10' lanes and 1' maintenance strips. Per feedback from MNCPPC and MCDOT, the lanes and maintenance strips were increased as shown on the current plans.

Initially, Alleys 5 and 6 both had two connections to Garden Street. This caused a multitude of crossings on the Garden Street which broke up the continuity of the Garden Street elements as well as posed constant road crossings for pedestrians. By shifting one access from both Alleys 5 and 6 onto Street B (Alley 5 connects to the private street), the Garden Street has a more rhythmic and more walkable feel.

• D: Anticipated impact on vehicular, bicycle and pedestrian traffic:

Providing reduced road width will have the following impact:

- o Narrower road widths will help slow traffic.
- Narrower road width will encourage walkability making pedestrians feel safer crossing the street and more engaged with the other side of the site.

Private Street B extends for a short distance past Alley 5. This extension only serves three residential units, and thus provides an adequate turnaround for this short section of street. These areas will be no parking zones, and thus not encumber maneuverability within these areas. Mail and delivery truck access will be limited, but will be possible utilizing Alley 5.

No impact on vehicular, bicycle or pedestrian traffic is anticipated from street separation provided.

The termination of Private Street B past Alley 5 provides emergency turnaround access.

• E: Perceived benefit to the public and private sectors if the modification is permitted.

Dense, walkable development and ample walking/biking pathway is provided, in line with the Master Plan vision and the goals for Poplar Grove.

Street C

• A: Proposed Modification:

Reduced Right-of-Way Adjacent to Driveways: Modifications to MC-2005.01 include the following resulting in 12' reduction to Street C Right of Way from 31+00 to Station 37+00:

- o 1.5' curb offset is not provided along outbound lane (1.5' reduction)
- o 10' lanes provided (2' reduction)
- o 1.5' maintenance strip provided on EB side, none provided on WB side (2.5' reduction)
- o 5' sidewalks on eastbound side, 4' sidewalk on WB side (3' reduction)
- o 3' landscape strip on westbound side adjacent to driveways (3' reduction)

Reduced Right-of-Way: Modifications to MC-2005.01 include the following resulting in 7' reduction to Street C Parcel from 37+00 to Station 41+71:

- o 1.5' curb offset is not provided along outbound lane (1.5' reduction)
- o 10' lanes provided (2' reduction)
- o 1' maintenance strips provided on each side (2' reduction)
- o 5' sidewalks on both sides adjacent to residential lots (2' reduction)
- Landscape strip increased to 6.5' (0.5' increase)

Private Street C to the west of the Garden Street terminates at Alley 2 at the western end of the street. At the northern end of Street C, the road terminates in a T turnaround.

Street separation between Alley 1 and Street A is 36' measured between closest points of curvature. Separation between Alley 1 and Alley 3 is 62'.

Modification to Intersection Chokers Guideline approved 3/19/2003 has been modified on private street C by a reduction in the distance (20' to 8' minimum) from the point of curvature closest to the intersection to the nearest parking space. The configuration shown for parallel parking on private streets allows adequate distance for pedestrian crossing with adequate driver visibility of the pedestrians when pulling in or out of the space. On street C, this occurs before and after intersections with Street A, Alley A1, Alley A2, Garden Street and Alley 2D. There are no formal crosswalks at these intersections except for Garden Street. East of Garden Street, the distance meets the 20' requirement. To the west of Garden Street, the distance is 12'. A car parking in this space closest to the eastern side of Garden Street should not have any interaction with the crosswalk located at Garden Street because the car will pull passed the space and back into the space. Thus, in none of the instances where this distance is reduced will cars be backing up into a pedestrian route.

Lastly, Street C has a curve with a road centerline radius of 45'.

B: Rationale:

The external lane width was narrowed to provide a more urban designed community feel and to allow a more accessible and walkable feel to the entrances of townhouses located along this street. The sidewalks adjacent to townhouse development were reduced to 5' to be in scale with the residential development.

The section of Private Street C with frontload townhouses has a modified section to maintain a maximum 14' driveway length to the adjacent lots to the east. By minimizing the landscape width and sidewalk width, we are able to achieve a driveway length that is either less than 14' from curb to garage or long enough to have 18' past the sidewalk. This section discourages parking that would block sidewalk use. In areas between townhouse sticks, the sidewalk is extended to 5'. This does not reduce the landscape strip further.

Although this street does not provide a cul-de-sac at the terminus, it continues the grid of streets and alleys by tying into Alley 2. This helps develop the interconnecting street network. At the northern end of Street C, the 60' T turnaround provides adequate access for emergency and fire vehicles.

In order to provide rear access to the townhouse units along the Garden Street, a rear alley that provides vehicular access is necessary to be located in line with the rear of these units. Proximity to the intersection should not create a significant safety issue. Vehicles will be approaching the intersection at low speed, likely preparing to stop (or accelerating from stop). In addition, there will be adequate sight distance from the roadway. This reduces the likelihood of vehicle conflicts with driveway vehicles.

The 90 degree turn along Street C allows the dense grid network to continue. A 100' centerline radius would have created a more meandering street scape that would have looked very suburban. The units lost along Street C would have resulted in the rears of the towns that face the Mews on Alley 1C to be exposed. In addition, the radius would have conflicted with Alley 1C, which would have made it difficult to provide rear-loaded townhouses. By utilizing this tight turn along this street, the grid is preserved. The street meets fire access requirements. Warning signs with advisory speed limits will be provided in both directions prior to this curve.

• <u>C: Measures evaluated to avoid the need for the modification(s) and why they were determined unacceptable:</u>

This project was initially designed with full lane widths. However, through that design, we realized that the full-width lanes gave a more suburban feel and did not create the urban context we sought, and negatively impacted the feasibility of specific development parcels.

In addition, we were unable to provide the space for utilities required outside of the right-of-way along this corridor. In providing narrower street widths, the overall right-of-way is reduced to improve feasibility on an already-constrained site and allow more space for utility easements within the private parcels, all while creating an urban character consistent with Montgomery County's historic farming villages, which inspired the project.

Based on the requirements for street separation along Century Boulevard, Street C cannot connect into Century Boulevard at the western end of the street. At the northern end of Street C, the terminus is located at an elevation under the proposed bridge for Dorsey Mill Road. Thus, a connection here is not feasible either.

A T turnaround option was developed at Street C and Alley 3. This layout decreased the size of the park and presented a more suburban look. In addition a traffic circle layout was also provided to staff for their review. In the end, the current layout with speed control measures provides the best urban condition.

• <u>D: Anticipated impact on vehicular, bicycle and pedestrian traffic</u>

Providing reduced road width will have the following impact:

- o Narrower road widths will help slow traffic.
- o Narrower road width will encourage walkability making pedestrians feel safer crossing the street and more engaged with the other side of the site.

There are no anticipated impacts on vehicular, bicycle or pedestrian traffic. Vehicles should be able to safely maneuver at the ends of these roads – either by turning into the Alley 2 (or into the garage for block F, or by turning around in the 60' T turnaround or into the garage in Block A. No impact on vehicular, bicycle or pedestrian traffic is anticipated from street separation provided.

E: Perceived benefit to the public and private sectors if the modification is permitted.

The benefit to the public is an uninterrupted pedestrian route along this street. If the full section was provided, vehicles would park in a way that blocks the sidewalk. In addition, by allowing streets to terminate into alleys creates a tight grid network that encourages walkability and an

urban feel. By allowing the turnaround at the northeast corner of the site, we are overcoming a grade disconnect to allow connection to multiple underground parking lots. Dense, walkable development and ample walking/biking pathway is provided, in line with the Master Plan vision and the goals for Poplar Grove.

Street E

• A: Proposed Modification:

Reduced Right of Way Adjacent to Driveways: Modifications to MC-2005.01 include the following resulting in 7' reduction to Street C Parcel from 31+00 to Station 37+00:

- o 1.5 curb offset is not provided along outbound lane (1.5' reduction)
- o 10' lanes provided (2' reduction)
- o 1' Maintenance strips provided on each side (2' reduction)
- o 5' sidewalks on both sides adjacent to residential lots (2' reduction)
- Landscape strip increased to 6.5' (0.5' increase)

Street E terminates 57' after Alley 5.

Street separation between Alley 5 and Garden Street 26' measured between closest points of curvature.

B: Rationale:

The external lane width was narrowed to provide a more urban designed community feel and to allow a more accessible and walkable feel to the entrances of townhouses located along this street. The sidewalks adjacent to townhouse development were reduced to 5' to be in scale with the residential development.

The extension of Private Street E past Alley 5 provides frontage for the four townhouses located along this street and also provides adequate fire access to this street. Vehicular access to these units is also provided from the alley. The use of this street past Alley 5 will be very limited. This portion of the street will really function like an alley, and thus the proposed termination is adequate and safe.

In order to provide rear access to the townhouse units along the Garden Street, a rear alley that provides vehicular access is necessary to be located in line with the rear of these units. Proximity to the intersection should not create a significant safety issue. Vehicles will be approaching the intersection at low speed, likely preparing to stop (or accelerating from stop). In addition, there will be adequate sight distance from the roadway. This reduces the likelihood of vehicle conflicts with driveway vehicles.

• <u>C: Measures evaluated to avoid the need for the modification(s) and why they were determined unacceptable:</u>

This project was initially designed with full lane widths. However, through that design, we realized that the full-width lanes gave a more suburban feel and did not create the urban context we

sought (or, that is desired by the CR zoning of the site and its future proximity to transit), and negatively impacted the feasibility of specific development parcels.

In addition, we were unable to provide the space for utilities required outside of the right-of-way along this corridor. In providing narrower street widths, the overall right-of-way is reduced to improve feasibility on an already-constrained site and allow more space for utility easements within the private parcels, all while creating an urban character consistent with Montgomery County's historic farming villages, which inspired the project.

Initially, Alleys 5 and 6 both had two connections to Garden Street. This caused a multitude of crossings on the Garden Street which broke up the continuity of the Garden Street elements as well as posed constant road crossings for pedestrians. By shifting one access from both Alleys 5 and 6 onto Street E (Alley 5 connects to the private street), the Garden Street has a more rhythmic and more walkable feel.

• D: Anticipated impact on vehicular, bicycle and pedestrian traffic:

Providing reduced road width will have the following impact:

- o Narrower road widths will help slow traffic.
- Narrower road width will encourage walkability making pedestrians feel safer crossing the street and more engaged with the other side of the site.

Vehicular access to the townhouse units is provided via Alley 5. The termination of Private Street E past Alley 5 provides emergency turnaround access.

No impact on vehicular, bicycle or pedestrian traffic is anticipated from street separation provided.

• E: Perceived benefit to the public and private sectors if the modification is permitted.

Dense, walkable development and ample walking/biking pathway is provided, in line with the Master Plan vision and the goals for Poplar Grove.

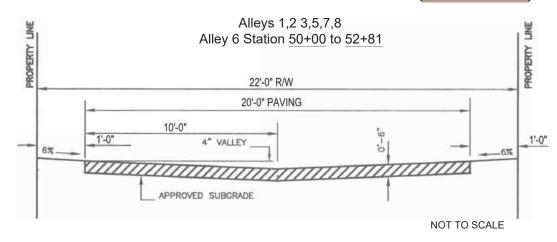
Alleys

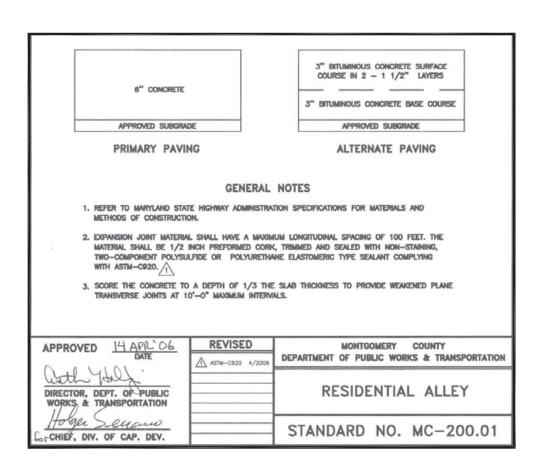
• A: Proposed Modification:

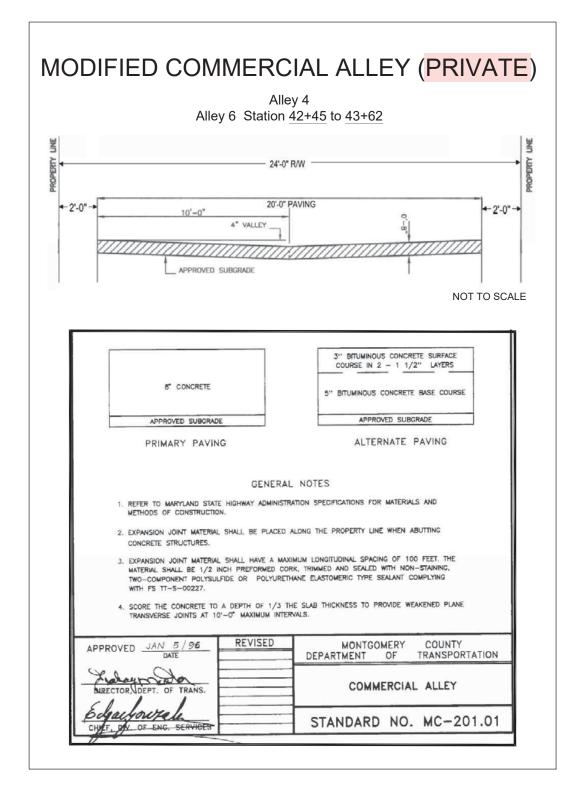
Alleys are designed to public alley standards, but are connected to private streets in some instances, and thus, will be private. Alleys 4 which serves commercial uses will be built to commercial alley standards. As the alley sections are in concurrence with the public alley standards, no design exceptions are requested.



MODIFIED RESIDENTIAL ALLEY (PRIVATE)







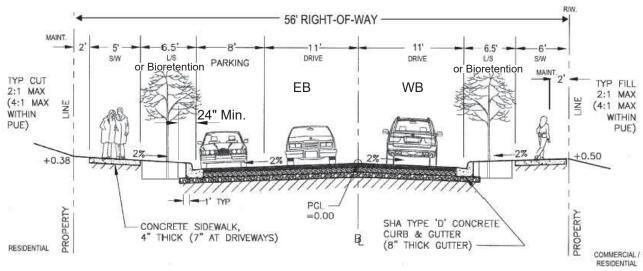


Poplar Grove

Germantown, MD

STREET A - TWO LANE W/ PARKING ONE SIDE (PUBLIC / PRIVATE)

Public Street Station 1+00 to 3+84 Private Street Station 3+84 to 6+48



* WHEN ADJACENT TO PARKING, BIORETENTION TO BE A MIN. OF 24" FROM CURB

NOT TO SCALE

Paving Detail	Design Data	GEOMETRIC DESIGN SHALL CONFORM TO MOST "GREEN BOOK" METHODS.	RECENT AASHTO								
3" BITUMINOUS CONCRETE	TARGET SPEED (MPH)	SUPERELEVATION DISTRIBUTION	MAX GRADE								
SURFACE (TWO EQUAL LAYERS)	25* NONE (-2% MAX) 8%										
5" BITUMINOUS CONCRETE BASE	5" BITUMINOUS CONCRETE BASE 30 NONE (-2% MAX) 8%										
8" GRADED AGGREGATE BASE (TWO EQUAL LAYERS)											
APPROVED SUBGRADE	* MIN ALLOWABLE & RADII ** SUBURBAN OR RURAL O										
General Notes											
LATEST EDITION OF THE MARYLA CONSTRUCTION.	ND STATE HIGHWAY ADMINISTRATION	SPECIFICATIONS SHALL APPLY FOR MATERIALS	AND METHODS OF								
 PUBLIC UTILITY EASEMENTS (PUBLIC DESCRIPTION OF THE PUBLIC PUBLIC	 PUBLIC UTILITY EASEMENTS (PUEs) ARE SUBJECT TO "DECLARATIONS OF TERMS AND PROVISIONS OF PUBLIC UTILITY EASEMENTS" RECORDED AS LIBER 3834, FOLIO 457 IN THE LAND RECORDS OF MONTGOMERY COUNTY. 										
 STANDARD ELEVATION AT PROPE 	3. STANDARD ELEVATION AT PROPERTY LINE, RELATIVE TO PGL, SHALL NOT VARY AT DRIVEWAYS.										
 PAVING DETAIL DEPICTS THE MIN PAVING DESIGN USING SHA METI 	 PAVING DETAIL DEPICTS THE MINIMUM REQUIRED SECTION. IF SUFFICIENT SUBGRADE SUPPORT IS NOT ASSURED, AN ENGINEERED PAVING DESIGN USING SHA METHODOLOGY WILL BE REQUIRED. 										
AS MASTER PLANNED BIKEWAYS,	5. NOTE THAT WITHIN A GIVEN CONTEXT, THIS STANDARD MAY NEED TO BE MODIFIED TO PROVIDE ADDITIONAL REQUIRED FEATURES SUCH AS MASTER PLANNED BIKEWAYS, AUXILIARY LANES AT INTERSECTIONS, OR STORMWATER MANAGEMENT FACILITIES. ADDITIONAL RIGHT—OF—WAY MAY BE NECESSARY TO ACCOMMODATE SUCH FEATURES.										
 NOTE THAT ROADWAY SECTION IS COUNTY REVIEW AND APPROVAL. 	NOT SYMMETRICAL RELATIVE TO E	BASELINE, ACTUAL ORIENTATION OF LEFT AND RIC	GHT IS SUBJECT TO								
 SELECTION OF APPROPRIATE TAR APPROVAL. APPROVED TARGET A 	GET SPEED (EQUAL OR SLIGHTLY NO DESIGN SPEEDS MUST APPEAR	LESS THAN DESIGN SPEED) IS SUBJECT TO COU ON CONSTRUCTION DRAWINGS.	INTY REVIEW AND								
 ALL UNPAVED AREAS WITHIN THE LANDSCAPING. 	LIMITS OF DISTURBANCE SHALL E	BE STABILIZED WITH ESTABLISHED GRASS TURF O	OR APPROVED								
9. STREET TREES OF APPROVED TY	PE, SIZE AND SPACING SHALL BE	PLANTED AT LOCATIONS SHOWN.									
	STANDARD DEVELOPED AND IMPLEMENTED IN CONFORMANCE WITH COUNCIL RESOLUTION 16-809 ADOPTED DEC. 9, 2008 MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION										
DIRECTOR, DEPARTMENT OF TRANSP	ORTATION DATE C/z1/2012	BUSINESS DISTRICT STREET 2 LANES WITH PARKING ON ONE SIDE									
CHIEF, DIVISION OF TRANSPORTATIO	N ENGINEERING / DATE	STANDARD NO. MC-2005.01									

NOTES:

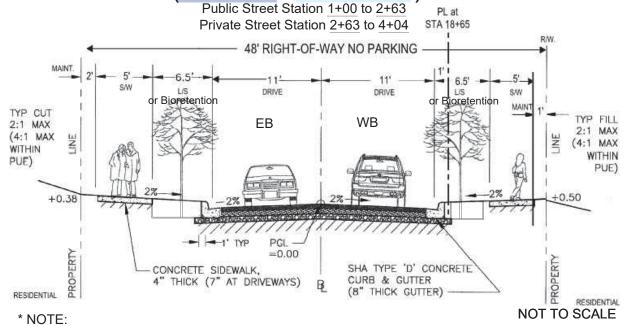
Engineers Inc.

- TYPICAL STREET SECTIONS FOR PUBLIC STREETS ARE MODIFIED FROM THE BUSINESS DISTRICT STREET (MC-2005.01) STANDARD.
- ALL STREET PAVEMENTS WILL BE DESIGNED TO BUSINESS DISTRICT STREET (MC-2005.01) STRUCTURAL STANDARDS.
- ALL ROADS HAVE BEEN DESIGNED TO MEET AASHTO STANDARDS.

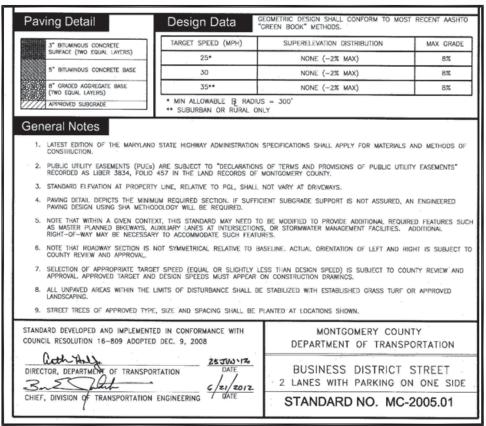


STREET B - TWO LANE NO PARKING

(PUBLIC / PRIVATE)



RIGHT OF WAY DECREASES TO 36.5' BETWEEN STATIONS 18+65 TO 19+04 TO ALLOW FOR DRIVEWAYS. THERE IS NO SIDEWALK ON THE NORTH SIDE FOR THIS SECTION.



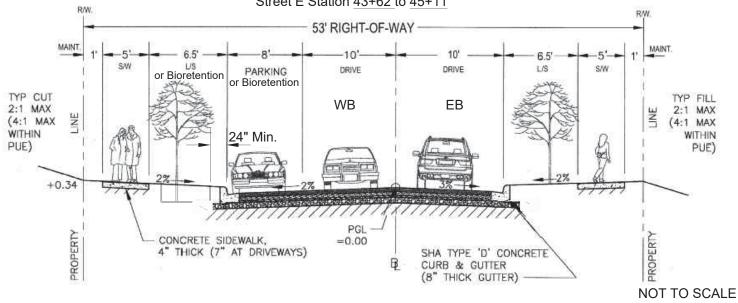
NOTES:

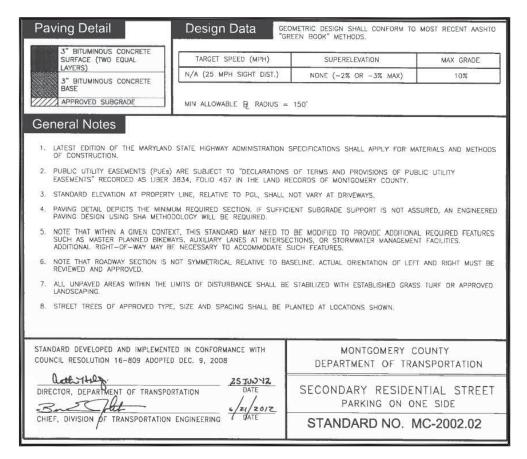
Engineers Inc.

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- ALL ROADS HAVE BEEN DESIGNED TO MEET AASHTO STANDARDS.



Street C Station 37+00 to 41+71 Street E Station 43+62 to 45+11





NOTES:

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- ALL ROADS HAVE BEEN DESIGNED TO MEET AASHTO STANDARDS.



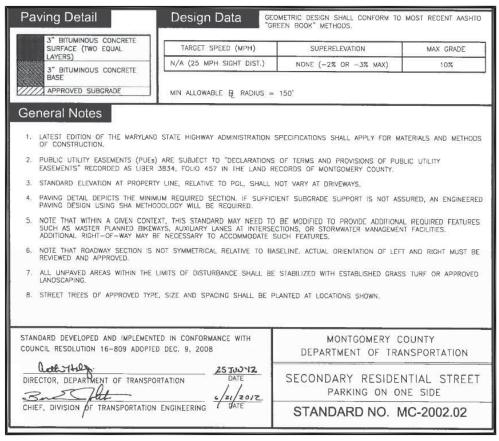
APPLICANT: Symmetry at Cloverleaf, LLC

RESIDENTIAL

TWO LANE PARKING W/ ADJ. DRIVEWAY PRIVATE

Street C Station 31+00 to 37+00 48' RIGHT-OF-WAY MAINT 1.5 -10' 10 4' SAV DRIVE L/S PARKING DRIVE S/W or Bioretention or Bioretention TYP CUT TYP FILL **WB** EB 2:1 MAX 2:1 MAX (4:1 MAX DRIVEWAY (4:1 MAX WITHIN WITHIN 24" Min. PUE) PUE) +0.50 +0.34PGL PROPERTY CONCRETE SIDEWALK, =0.00THICK (7" AT DRIVEWAYS) SHA TYPE 'D' CONCRETE CURB & GUTTER COMMERCIAL / (8" THICK GUTTER)

- * SIDEWALK INCREASES TO 5FT BETWEEN LOTS 9 & 10B AND 13 & 14B.
- **DRIVEWAYS TO BE 12' MAX. FROM CURB OR 18' MIN. FROM BACK OF
- ***WHEN ADJACENT TO PARKING, BIORETENTION TO BE A MIN. OF 24" FROM CURB



NOTES:

Engineers Inc.

- TYPICAL STREET SECTIONS FOR PUBLIC STREETS ARE MODIFIED FROM THE BUSINESS DISTRICT STREET (MC-2005.01)
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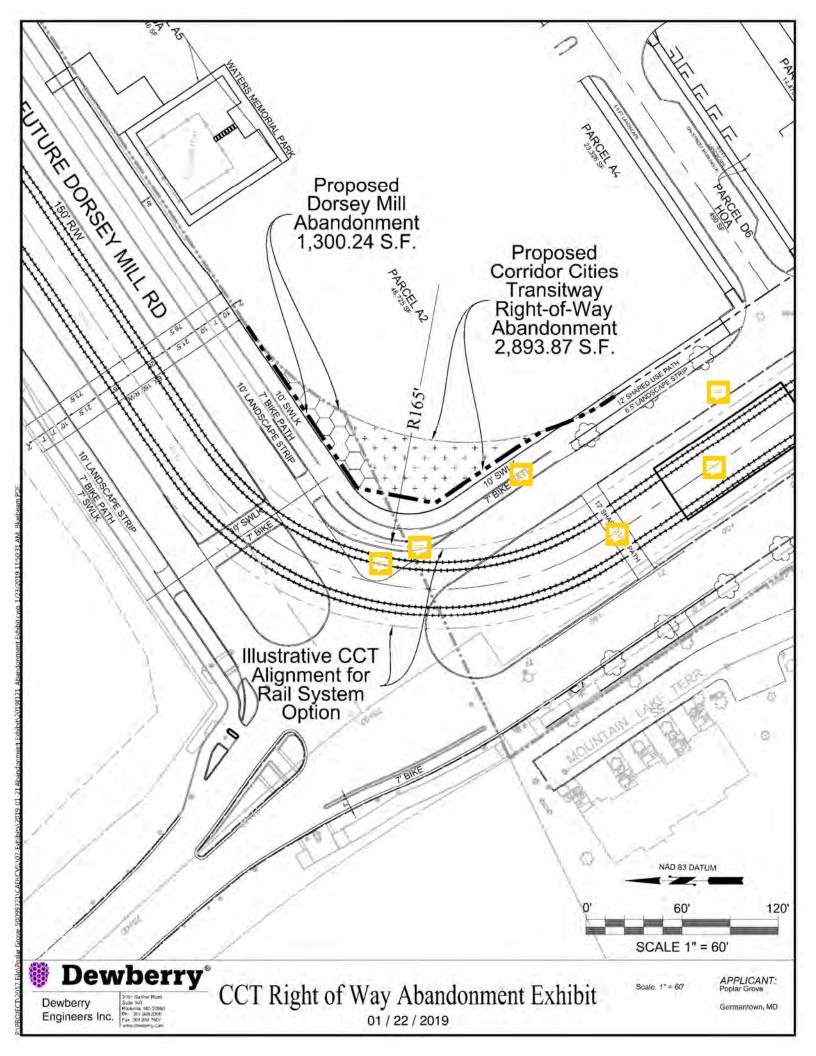
RESIDENTIAL

NOT TO SCALE

(4) foot wide area. The conduit will serve the exact same purpose as the Section 59-4.3.I.3.b requirement, but is more practical in accommodating the tight constraints of the site. This request does not conflict with the General Plan, and the waiver is only being requested for the areas where narrowness of the site and other constraints present create practical difficulty in accommodating a four (4) foot wide area.

VI. THE ABANDONMENT

Section 49-68 of the Montgomery County Code (the "County Code"), permits an applicant to petition the Planning Board to abandon a right-of-way if such right-of-way "has not been in public use" (as opposed to action by the Montgomery Council when such a right-of-way is in public use). Section 49-68 provides that the petition must take the form of a preliminary plan for the subdivision of land. The Preliminary Plan reflects a small portion (approximately 4,200 square feet) of the previously dedicated right-of-way for the CCT adjacent to Dorsey Mill Road, located at the northwestern corner of the Property, that is proposed for abandonment. This area was previously dedicated by Plat No. 20279 in 1996, based on the then-envisioned alignment for the CCT. However, the CCT alignment has since shifted, and the right-of-way to be required narrowed. The proposed area of abandonment is not in any public use and it has not been improved to any degree (e.g., no paving, curb, etc.); it is merely unimproved dirt and brush at this time. Furthermore, the area proposed to be abandoned will not be needed for public use due to the shifting of the alignment of the CCT. Both Century Boulevard and the Dorsey Mill Road bridge were designed around, and the former built around, a CCT alignment in the middle of each respective roadway. The Applicant has included with the Application a sketch and description of the area proposed to be abandoned, as well as an exhibit reflecting the CCT vehicle turning radii from the Century Boulevard median (that can also accommodate an articulated bus) - this was studied as part of the review of the plans for the Dorsey Mill Road and bridge and referred to MTA as part of that process. The turning movements reflected in the attached exhibit demonstrate how the proposed right-of-way sweep is no longer needed. MCDOT is currently reviewing the exhibit to assess how the intersection can accommodate light rail, cars, and bicycles. The Applicant is awaiting MCDOT's response as to whether they will support the proposed abandonment.





TECHNICAL MEMORANDUM

To: Maryland State Highway Administration

Montgomery County Department of Transportation

Montgomery County Planning Board

From: David B. Samba P.E., PTOE

Kimley-Horn and Associates, Inc.

Date: December 6, 2018

Subject: Signal Warrant Study

Poplar Grove - Germantown, Maryland

Introduction

This memorandum serves as an evaluation for the warrants of a traffic signal at the intersection of Century Boulevard and Kinster Drive and the intersection of Crystal Rock Drive and Kinster Drive. These signal warrant analyses have been requested by Montgomery County Planning Board (MCPB) staff and Maryland State Highway Administration (SHA) staff in association with the Preliminary Plan of Subdivision (Preliminary Plan) / Site Plan Application for Phase 1 (Site Plan) submission for the Poplar Grove mixed-use development in the Germantown area of Montgomery County, Maryland.

A Local Area Transportation Review traffic impact study (TIS) (dated November 2015) was prepared to describe the resulting traffic impacts and required mitigations related to the development of the Poplar Grove mixed-use residential, office, and retail community in Germantown, Maryland.

Following the preparation of the TIS, a Preliminary Adequate Public Facilities (PAPF) approval was granted by MCPB for the development in December 2015. This PAPF approval established maximum trip generation levels for the site (1,558 during the AM peak hour and 1,762 during the PM peak hour). The PAPF also identified specific transportation network improvements and further studies that would be needed to mitigate the impacts of future traffic on area streets. Related to this memorandum, the PAPF approval called for a signal warrant analysis at the intersection of Century Boulevard and Kinster Drive and at the intersection of Crystal Rock Drive and Kinster Drive.

In 2018, an application for Sketch Plan approval was submitted for the subject property. At a public hearing on October 4, 2018, the Montgomery County Planning Board voted to approve the Sketch Plan, permitting development of up to 1,206,000 square feet of total development, including up to 686,000 square feet of residential development (up to 350 multi-family residential units and up to 208 townhouses) and up to 520,000 square feet of non-residential development.

The Applicant is now submitting for Preliminary Plan as well Site Plan for development of Phase I (the townhouse neighborhoods). While 208 townhouses were approved by the Sketch Plan, the Applicant is now proposing construction of 190 townhouses. As part of the current submittal, the Applicant is required to conduct the two signal warrant analyses described in the PAPF approval. An additional



signal warrant analysis at the intersection of Century Boulevard and (future) Dorsey Mill Road was also requested during the Development Review Committee (DRC) process for Sketch Plan.

This memorandum provides an overview of existing conditions in 2018 and the results of the traffic signal warrant analyses with the addition of the proposed mixed-use development. Signal warrant studies were conducted for a typical weekday which is appropriate given the peak hours of traffic for the potential mix of uses.

Description of Subject Intersections

The following summarizes the geometry and traffic volumes at the subject unsignalized intersections.

Century Boulevard and Kinster Drive

The intersection of Century Boulevard and Kinster Drive is currently a t-intersection located approximately 0.22 miles north of the Father Hurley Boulevard Bridge over Century Boulevard and approximately 0.3 miles east of the intersection of Kinster Drive and Crystal Rock Drive. Century Boulevard is a north-south, four-lane, divided roadway. Century Boulevard serves as the north and south legs of the intersection. The speed limit on Century Boulevard is 35 miles per hour. Kinster Drive is an east-west, two-lane, divided street with on-street parking along both sides of the street. Kinster Drive serves as the west leg of the intersection. The speed limit along Kinster Drive is 30 miles per hour.

The northbound approach to the intersection is comprised of two through lanes and one left turn lane with approximately 225 feet of effective storage. The southbound approach to the intersection is comprised of one through lane, one shared through and right turn lane, and one left turn lane with approximately 100 feet of effective storage. The southbound left turn lane only serves U-turn movements currently. The eastbound approach to the intersection is comprised of a single shared through, right, and left turn lane.

The proposed Poplar Grove mixed-use development will be located immediately to the east of this intersection. An extension of Kinster Drive will serve as the primary site driveway and the site's only full movement site access point (i.e. the only location where site generated traffic can directly turn left from the site onto Century Boulevard). Two other site accesses (both right-in, right-out driveways) will be located to the north and south of this intersection.

Kinster Drive and Crystal Rock Drive

The intersection of Kinster Drive is located approximately 0.31 miles north of the intersection of Father Hurley Boulevard and Crystal Rock Drive and approximately 0.3 miles west of the intersection of Century Boulevard and Kinster Drive. Kinster Drive is an east-west, two-lane, divided street with on-street parking along both sides of the street. Kinster Drive/Waters Landing Drive serve as the east and west legs of the intersection, respectively. The speed limit along Kinster Drive/Waters Landing Drive is 30 miles per hour. In the vicinity of the intersection, Crystal Rock Drive is a north-south, three lane, undivided roadway with parking along one side of the street. Crystal Rock Drive serves as the north and south legs of the intersection. The speed limit on Crystal Rock Drive is 35 miles per hour.



The northbound approach to the intersection is comprised of a single shared through and right turn lane and one left turn lane with approximately 155 feet of effective storage. The southbound approach to the intersection is comprised of a single shared through, right, and left turn lane. The eastbound approach to the intersection is comprised of a single shared through and right turn lane and a left turn lane with approximately 180 feet of effective storage. The westbound approach is comprised of a single shared through, right, and left turn lane.

Century Boulevard and (future) Dorsey Mill Road

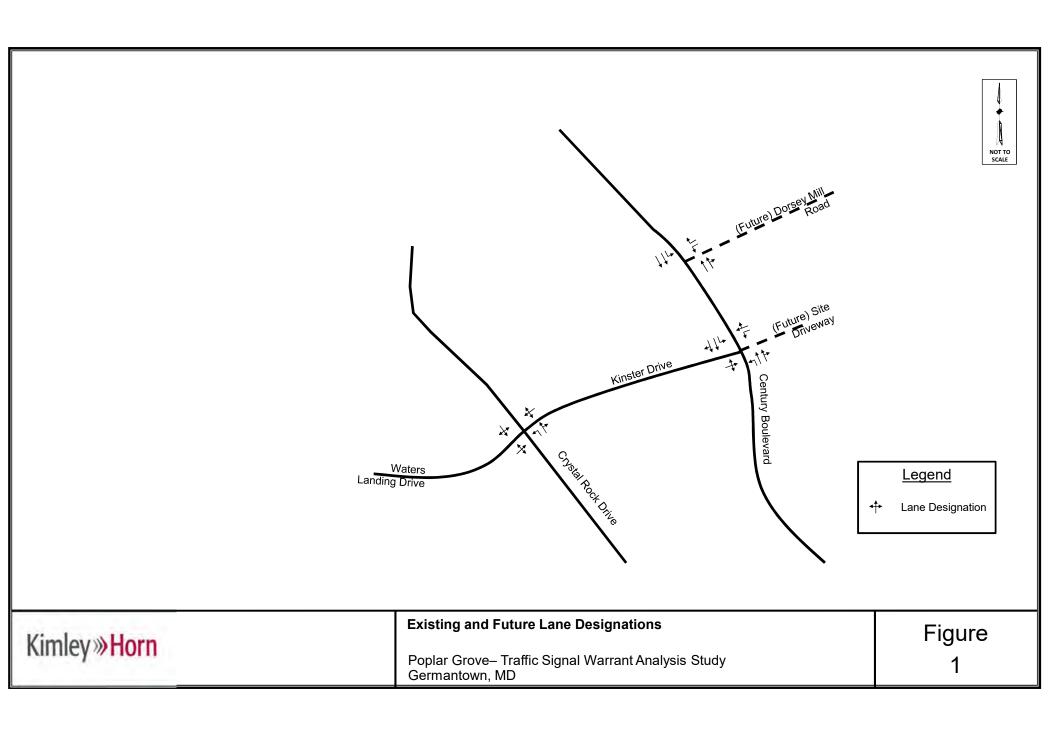
A planned Montgomery County Department of Transportation project calls for the approximate 1,500-foot extension of Dorsey Mill Road from Century Boulevard to Milestone Center Drive, crossing I-270 (to be funded and constructed by others). Per the Germantown Employment Area Sector Plan (Sector Plan), the improvements will provide a new 4-lane divided roadway. As part of this project, the intersection of Century Boulevard and Dorsey Mill Road will be constructed in close proximity to the northwest corner of the proposed site.

The future t-intersection (based on the design shown on the amended Black Hill Preliminary Plan submission dated August 2018) will be located approximately 0.15 miles north of the intersection of Century Boulevard and Kinster Drive. Century Boulevard is a north-south, four-lane, divided roadway. Century Boulevard will serve as the north and south legs of the intersection. The speed limit on Century Boulevard is 35 miles per hour. Future Dorsey Mill Road will be an east-west, four lane divided roadway. Dorsey Mill Road will form the east leg of the intersection and would likely have a speed limit of 30 miles per hour based on the existing Dorsey Mill Road posted speed limit.

The northbound approaches to the intersection would likely be comprised of a through lane and a shared through and right turn lane. The southbound approaches to the intersection would likely be comprised of a through lane and a shared through and left turn lane. The westbound approach to the intersection would likely be comprised of a left turn lane and a right turn lane.

The Applicant understands that the Montgomery County Department of Transportation is planning on installing a traffic signal at the intersection of Century Boulevard/Dorsey Mill Road as part of the Dorsey Mill Road/bridge construction project. As such, no formal signal warrant analyses have been conducted or are described within this memorandum for this intersection as it is the Applicant's understanding that this will be conducted/provided by others.

Figure 1 shows the lane designations at the subject intersections.





Existing Traffic Volumes

Traffic volumes used in this evaluation were collected for the two existing study intersections on Tuesday, October 9th, 2018. Turning movement count (TMC) data was obtained at 15-minute intervals from 7:00 AM until 7:00 PM. **Figure 2** summarizes the hourly existing traffic volumes at each study intersection during these time periods. **Appendix A** contains the traffic count data sheets.

Background Traffic Volumes

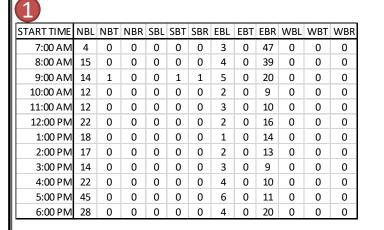
Background traffic volumes represent future traffic that would travel through the area intersections without the proposed development. This signal warrant analysis considered the traffic generated by the full build-out of the Black Hill development. Montgomery County Planning Board (MCPB) transportation staff provided an updated list of approved and unbuilt developments in the vicinity of Poplar Grove. Of those developments, only Black Hill would substantially affect the study area intersections. This assumption is consistent with the trip assignment assumptions considered in both the traffic study and signal warrant analyses prepared for Black Hill and consistent with the November 2015 traffic study prepared for Poplar Grove.

The Black Hill development is located to the north and northwest of the proposed site. Trips generated for the approved Black Hill development were based on the trip rates that were in effect at the time of the approval, per MCPB staff guidance. They are also based on an updated number of assisted living beds, also per MCPB guidance. The resulting AM and PM peak hour trips for the site are shown in **Table 1.**

Table 1: Peak Hour Trip Generation for Approved and Unbuilt Developments

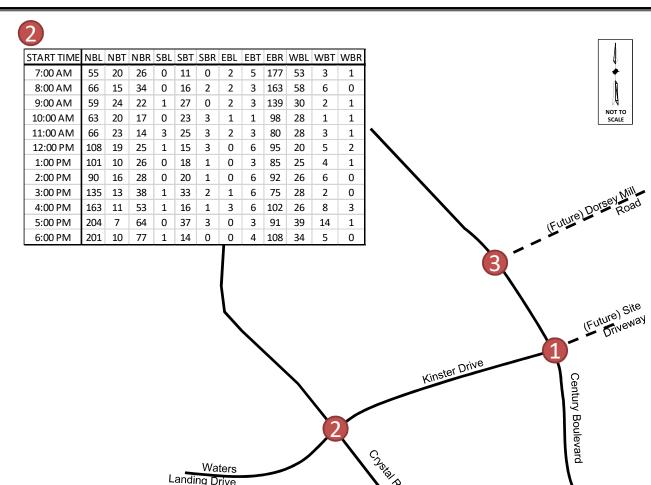
Land Has and Quantity	Data/Farmula	АМ	PM Peak Hour							
Land Use and Quantity	Rate/Formula In		Out	Total	In	Out	Total			
Black Hill Development										
General Office – 1,097,800 SF	AM: 1.7 * KSF - 8 PM: 1.44 * KSF + 20	1,616	242	1,858	272	1,329	1,601			
Hotel – 350 rooms	AM: .56 * Rooms PM: .59* Rooms	120	76	196	110	97	207			
Neighborhood retail – 91,400 SF	No external trips	-	-	-	-	-	-			
Assisted Living – 140 beds	AM: 0.03 * Beds PM: 0.06 * Beds	1	3	4	5	3	8			
Garden Mid-Rise – 1049 DU	AM: 0.40 * Units +3 0.47 * Units + 1	85	338	423	326	167	493			
·	Total	1,822	659	2,481	713	1,596	2,309			

These peak hour trips were converted to daily trips and assigned to the study intersections based on the distributions of daily traffic and the directional distribution of traffic described in the November 2015 traffic study and consistent with the methodology of the Black Hill 2016 signal warrant analysis (See **Appendix B**). The resulting hourly approved and unbuilt development peak hour trips are shown on Figure 3.



	2	
	2	
_	_	

START TIME	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0

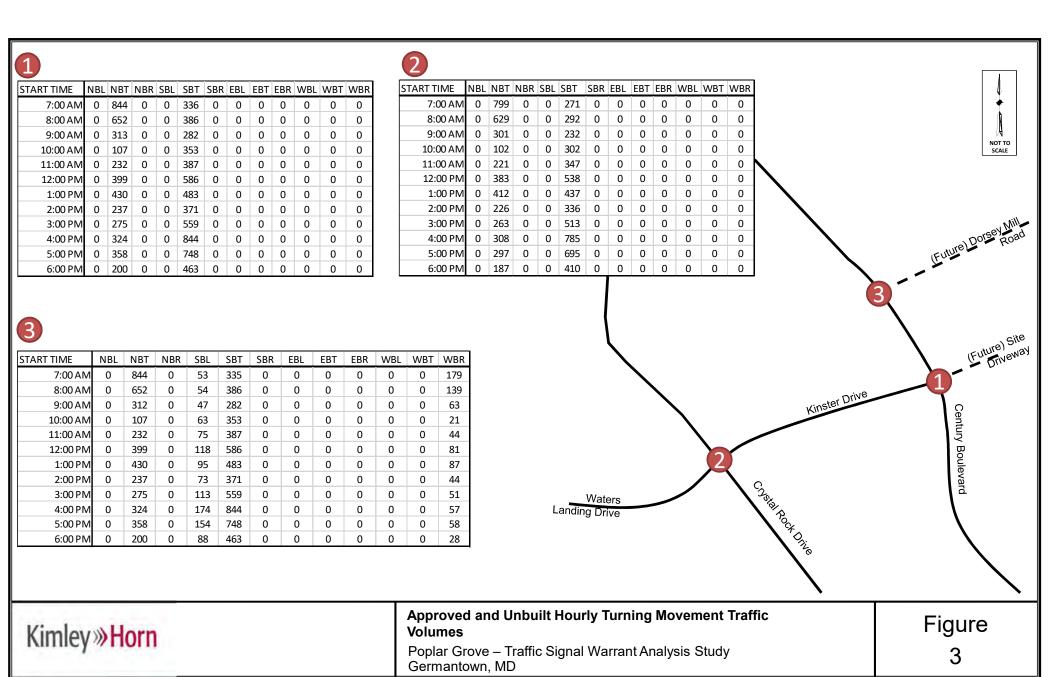


Kimley»Horn

Existing Hourly Turning Movement Traffic Volumes

Poplar Grove – Traffic Signal Warrant Analysis Study Germantown, MD

Figure





Site Generated Trips

The peak hour vehicle trips generated by the proposed Poplar Grove Preliminary Plan / Phase 1 Site Plan densities were calculated in accordance with approved PAPF methodologies. The trips associated with full build-out of Poplar Grove are shown in **Table 2**. The trips associated with Phase 1 Site Plan build-out of Poplar Grove are shown in **Table 3**.

Table 2: Full-Build Out Peak Hour Trips based on Preliminary Plan / Site Plan Densities

Land Use	Description	Intensi	ity	AM	Peak H	our	PM Peak Hour		
Code				Total	In	Out	Total	In	Out
820	General Retail (>50 KSF) w/ Grocery	60,000	SF	173	90	83	693	360	333
	Internal Capture w/ Residential			-3	-2	-1	-123	-36	-87
	Internal Capture w/ Office			-52	-28	-24	-36	-29	-7
	External Retail Trips			118	60	58	534	295	239
	Pass-By	@	34%	-40	-20	-20	-181	- 100	-81
	Net External Retail Trips			78	40	38	353	195	158
710	General Office	460,000	SF	774	673	101	682	116	566
	Internal Capture w/ Residential			-4	-4	0	-12	-4	-8
	Internal Capture w/ Retail			-52	-24	-28	-36	-7	-29
	External Office Trips			718	645	73	634	105	529
221	Mid-Rise Apartments (>75 units)	350	DU	143	29	114	166	110	56
220	Townhouses (>100 units)	190	DU	96	16	80	126	84	42
	Combined Residential Trips			239	45	194	292	194	98
	Internal Capture w/ Retail			-3	-1	-2	-123	-87	-36
	Internal Capture w/ Office			-4	0	-4	-12	-8	-4
	External Residential Trips			232	44	188	157	99	58
	Total External Site-Generated Trips			1,028	729	299	1,325	499	826

Table 3: Phase 1 Site Plan Peak Hour Trips based on Preliminary Plan / Site Plan Densities

	Land Use	Description	Intensity		AM	Peak H	our	PM Peak Hour		
	Code				Total	In	Out	Total	In	Out
Ì	220	Townhouses (>100 units)	190	DU	96	16	80	126	84	42

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As shown in Table 2, when applying the approved PAPF methodology to the proposed Preliminary Plan / Phase 1 Site Plan densities, a total of 1,028 external AM peak hour trips and 1,325 external PM peak hour trips is anticipated for the full build-out of Poplar Grove. The resulting full build-out and Phase 1 hourly trips for the site (based on distributions of daily traffic shown in Appendix A) are shown in **Table 4** and **Table 5**, respectively.

Table 4: Hourly Site Trips (Full Build-Out)

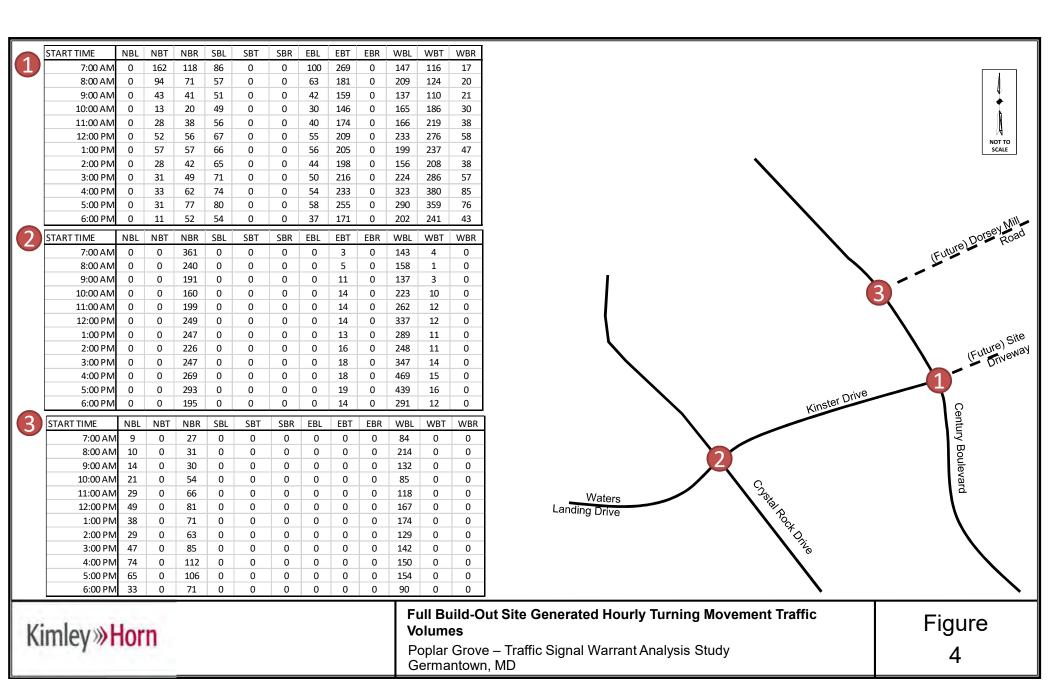
From	То	Full Build-Out						
FIOIII	10	In	Out	Total				
7:00 AM	8:00 AM	406	370	776				
8:00 AM	9:00 AM	483	399	882				
9:00 AM	10:00 AM	370	370 310					
10:00 AM	11:00 AM	295	295 460					
11:00 AM	12:00 PM	381	518	899				
12:00 PM	1:00 PM	485	675	1160				
1:00 PM	2:00 PM	483	579	1062				
2:00 PM	3:00 PM	429	488	917				
3:00 PM	4:00 PM	476	682	1158				
4:00 PM	5:00 PM	531	932	1463				
5:00 PM	6:00 PM	594	866	1460				
6:00 PM	7:00 PM	398	587	985				

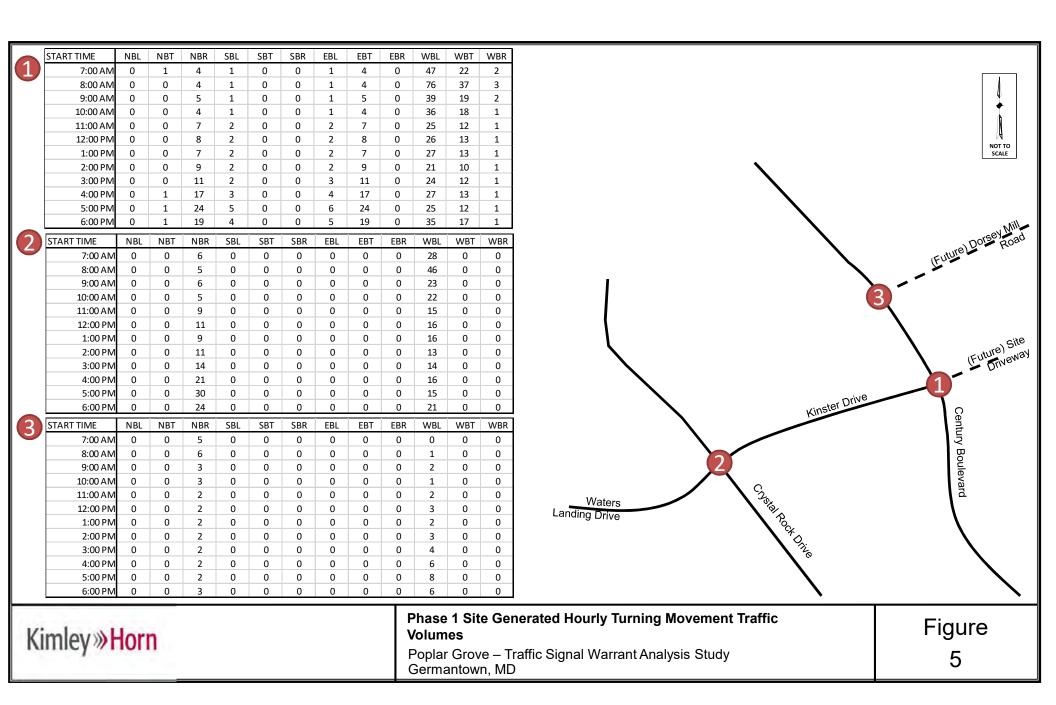
Table 5: Hourly Site Trips (Phase 1 Site Plan)

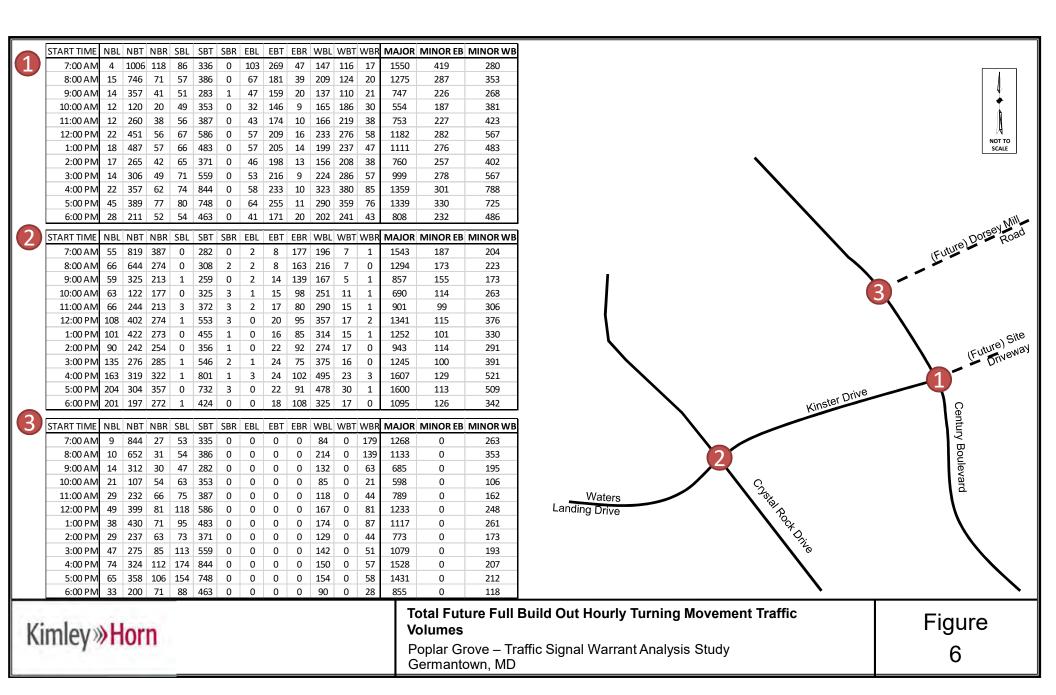
From	То	Pha	se 1 Build-	Out
FIOIII	10	In	Out	Total
7:00 AM	8:00 AM	9	116	125
8:00 AM	9:00 AM	13	128	141
9:00 AM	10:00 AM	18	65	83
10:00 AM	11:00 AM	14	61	75
11:00 AM	12:00 PM	26	42	68
12:00 PM	1:00 PM	30	44	74
1:00 PM	2:00 PM	26	46	72
2:00 PM	3:00 PM	32	35	67
3:00 PM	4:00 PM	39	40	79
4:00 PM	5:00 PM	58	46	104
5:00 PM	6:00 PM	84	42	126
6:00 PM	7:00 PM	67	58	125

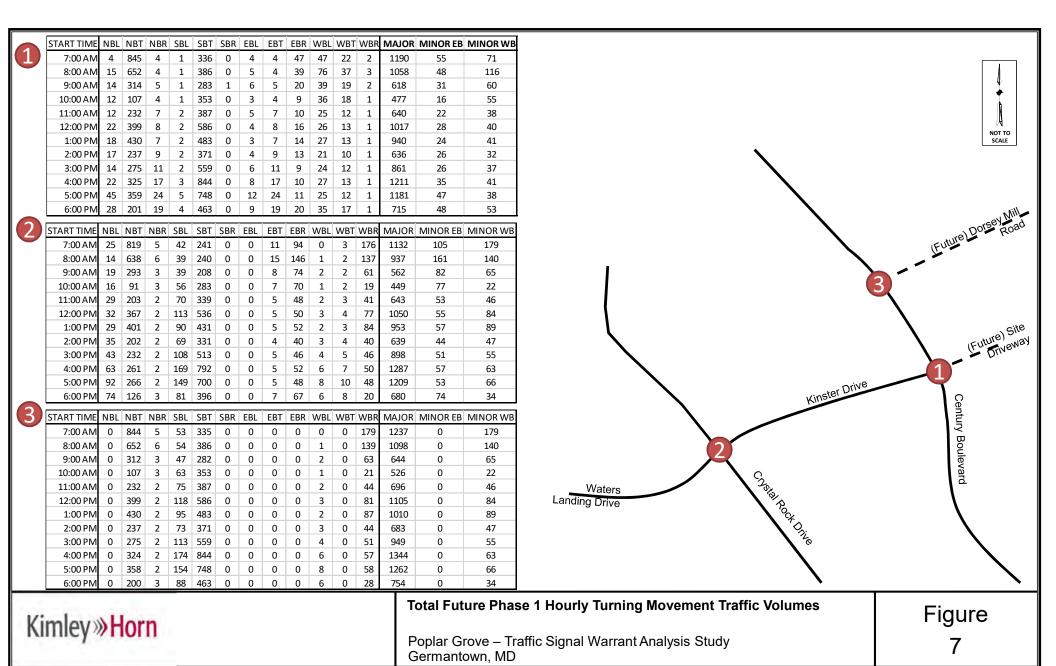


The hourly traffic volumes generated by the proposed mixed-use development were assigned to the area roadways based upon the directional distributions established in the November 2015 TIS. The distributions are shown in **Appendix C**. The hourly site generated trips are at study intersections shown on **Figures 4 and 5**, **respectively**, for full build-out and Phase 1 densities. These trips were added to the background traffic volumes to result in total future traffic volumes. The total future traffic volumes are shown on **Figures 6 and Figure 7**, **respectively**, for full build-out and Phase 1 Site Plan densities.











Signal Warrant Evaluation

The following sections of this memorandum describe the signal warrant evaluation conducted for the proposed mixed-use Poplar Grove development along Century Boulevard.

Warrant Descriptions

A traffic signal may be justified if one or more of the traffic signal warrants in the Manual on Uniform Traffic Control Devices, 2009 Edition (2009 MUTCD) is satisfied. The nine traffic signal warrants are listed below:

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.
- Warrant 3, Peak Hour.
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- · Warrant 6, Coordinated Signal System.
- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.
- Warrant 9, Intersection Near a Grade Crossing.

A signal generally should not be installed without an intersection having satisfied any of the above warrants. However, if one or more warrants are satisfied, this does not necessarily indicate that a signal should be installed. Other factors (spacing between signalized intersections, additional delay and queueing on mainline roadways, etc.) may suggest that the introduction of a signal at the location may be detrimental to area traffic flow. These factors may be considered or evaluated as part of a full engineering study.

Each of the warrants is described in greater detail in the following section.

Warrant 1 – Eight-Hour Vehicular Volume

Warrant 1, is intended for application where either a large volume of intersecting traffic is the principal reason to consider installing a traffic signal (Condition A), or where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street (Condition B). The warrant may also be applied for a combination of Conditions A and B. It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Warrant 1 is satisfied when, for each of any eight hours of an average day, the vehicles per hour on both approaches of the major street and the corresponding vehicles per hour on the higher volume minor street approach exceed the thresholds provided in Table 4C-1 of the 2009 MUTCD for Condition A, Condition B, or a combination of Conditions A and B.

Warrant 2 - Four-Hour Vehicular Volume

Warrant 2 is intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic signal.



Warrant 2 is satisfied when, for each of any four hours of an average day, the plotted points representing the vehicles per hour on both approaches of the major street and the corresponding vehicles per hour on the higher volume minor street approach all fall above the curve provided in Figures 4C-1 or 4C-2 of the 2009 MUTCD.

Warrant 3 - Peak Hour

Warrant 3 is intended to be applied where minor street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time Warrant 3 is met under two conditions:

Condition A

Condition A is met when all three of the following statements are true for the same one-hour period of an average day.

- A. The total stopped time delay experienced by the stop controlled minor street approach (one approach) exceeds 4 vehicle hours for a one-lane approach or 5 vehicle hours for a two-lane approach,
- B. The volume on the same minor street approach equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
- C. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches

Condition B

Condition B is satisfied when, for any one hour of an average day, the plotted point representing the vehicles per hour on both approaches of the major street and the corresponding vehicles per hour on the higher volume minor street approach falls above the curve provided in Figures 4C-3 or 4C-4 of the 2009 MUTCD.

Warrant 4 - Pedestrian Volume

Warrant 4 is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. This warrant is satisfied when one of the following criteria is met:

- A. For each of any 4 hours on an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street all fall above the curve in Figure 4C-5 of the 2009 MUTCD; or
- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7 of the 2009 MUTCD.



Warrant 5 - School Crossing

Warrant 5 is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students. **This warrant was not applicable to this signal warrant analysis.** No significant school crossings exist or are envisioned in proximity to the subject intersections.

Warrant 6 - Coordinated Signal System

Warrant 6 is intended for application in coordinated signal system where the installation of traffic control signals where they may not be needed but benefit corridor operations in order to maintain proper platooning of vehicles. **This warrant was not applicable to this signal warrant analysis**. A coordinated signal system does not exist in proximity to the study intersections.

Warrant 7 - Crash Experience

Warrant 7 is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal. This warrant is satisfied when all of the following criteria are met:

- A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
- B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
- C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 of the 2009 MUTCD, or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

This warrant was not applicable to this signal warrant analysis. Based on the recent construction of the extension of Century Boulevard and the future planned extension of Dorsey Mill Road, the recent crash history is not especially relevant to the conditions that will be in effect when Poplar Grove is built and occupied. The traffic patterns and movements associated with the future transportation improvements and developments (both Poplar Grove and Black Hill) will result is substantially different traffic volumes and associated crash risk.

Warrant 8 – Roadway Network

Warrant 8 is intended for application in a roadway network where installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow. This



warrant shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

- A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.
- B. It includes rural or suburban highways outside, entering, or traversing a city.
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

This warrant was not applicable to this signal warrant analysis. The study intersections under consideration in this analysis would not be considered as the common intersections of major routes.

Warrant 9 - Intersection Near a Grade Crossing

Warrant 9 is intended for application at an intersection near a grade (railroad) crossing. Warrant 9 is met under two criteria:

- A. The center of the track is within 140 feet of the stop or yield line on the intersection approach; and
- B. During the highest hour of railroad traffic, volumes on the major street (total, both approaches) and the minor street (one direction, approaching the intersection) plot above the applicable curve of either Figure 4C-9 or 4C-10 of the 2009 MUTCD.

This warrant was not applicable to this signal warrant analysis. No railroad crossings are in the immediate vicinity of study intersections.

Signal Warrant Analysis

This section summarizes the signal warrant analyses for the full build-out and Phase 1. Many of the thresholds contained in the MUTCD warrants are dependent on the characteristics of the intersections, including number of approach lanes, whether the community is isolated, and the 85th percentile speed. For these analyses, Century Boulevard and Crystal Rock Drive are the major roadways with at least two lanes in each direction. Kinster Drive and the site driveway are assumed to be the minor roadways with one approach lane in each direction. Germantown is a suburban community with a population of 90,676 according to 2013 Census data. Additionally, the major streets are assumed to have 85th percentile speeds less than 40 miles per hour. As such, the following signal



warrant analyses are based upon volume thresholds for communities having a population of greater than 10,000 and 85th percentile speeds on the major street less than 40 mph. The warrant analyses were conducted for a typical weekday.

Signal Warrant Analyses Results

Table 6 shows the results of the traffic signal warrant analysis for the total future weekday traffic volumes at the study intersections under full build-out (FB) and Phase 1 (PH1) conditions.

Table 6: Traffic Signal Warrant Analysis

Intersection	Warrant 1 – Eight-Hour Vehicular Volume		Warrant 2 – Four-Hour Vehicular Volume		Warra Peak Vehio Volu	Hour cular	Warrant 4 – Pedestrian Volume		
	FB	PH1	FB	PH1	FB	PH1	FB	PH1	
Century Boulevard and Kinster Drive	S	NS	S	NS	S	NS	S	NS	
Crystal Rock Drive and Kinster Drive	S	NS	S	S	S	NS	NS	NS	

S-Satisfied; NS-Not Satisfied

Appendix D contains signal warrant analysis summary worksheets with traffic volumes, volume thresholds, and analysis results for the three traffic volume warrants (Warrants 1, 2, and 3). The signal warrant analysis summary worksheets show the following:

Warrant 1 - Eight-Hour Warrant

- Condition A (intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal)
 - Century Boulevard and Kinster Drive
 - Full build-out volumes exceed the volume thresholds for 11 hours (warrant satisfied)
 - Phase 1 volumes do not exceed the volume thresholds for any hour
 - Crystal Rock Drive and Kinster Drive
 - Full build-out volumes exceed the volume thresholds for 12 hours (warrant satisfied)
 - Phase 1 volumes only exceed the volume thresholds for 2 hours
- Condition B (intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street)
 - Century Boulevard and Kinster Drive
 - Phase 1 volumes only exceed the volume thresholds for 1 hour
 - Crystal Rock Drive and Kinster Drive



- Phase 1 volumes only exceed the volume thresholds for 8 hours (warrant satisfied)
- Combination Condition (intended for applications where both Condition A and B apply)
 - Century Boulevard and Kinster Drive
 - Phase 1 volumes do not exceed the volume thresholds for any hour
 - o Crystal Rock Drive and Kinster Drive
 - Phase 1 volumes only exceed the volume thresholds for 2 hours

Warrant 2 - Four-Hour Warrant

- Century Boulevard and Kinster Drive
 - o Full build-out volumes exceed the volume thresholds for 12 hours (warrant satisfied)
 - o Phase 1 volumes do not exceed the volume thresholds for any hour
- Crystal Rock Drive and Kinster Drive
 - o Full build-out volumes exceed the volume thresholds for 11 hours (warrant satisfied)
 - Phase 1 volumes exceed the volume thresholds for 4 hours (warrant satisfied)

Warrant 3 – Peak Hour Warrant

- Century Boulevard and Kinster Drive
 - o Full build-out volumes exceed the volume thresholds for 10 hours (warrant satisfied)
 - Phase 1 volumes do not exceed the volume thresholds for any hour
- Crystal Rock Drive and Kinster Drive
 - Full build-out volumes exceed the volume thresholds for 8 hours (warrant satisfied)
 - Phase 1 volumes do not exceed the volume thresholds for any hour

Warrant 4 was evaluated to determine if the number of pedestrians would warrant a traffic signal at this location. The traffic count data shows that the maximum number of pedestrians crossing Century Boulevard in any hour was 9 pedestrians and crossing Crystal Rock Drive in any hour was 10 pedestrians; both of these pedestrian volumes are less than the minimum criteria for both Conditions A and B of Warrant 4. It is noted that the Phase 1 development of the site is not anticipated to change this condition.

Recognizing the mixed use-oriented nature of the site, it may be assumed that the retail portions of the site would stimulate additional pedestrian crossing across Century Boulevard. Similarly, should the Corridor Cities Transitway (CCT) be in operation, pedestrian crossings to and from the transit station and the site would likely be significant. For this reason, it is assumed that the pedestrian volumes will satisfy the minimum criteria for both Conditions A and B of Warrant 4 under the full build-out scenario.

Warrants 5, 6, 7, 8, and 9 are not applicable to this analysis.



Sensitivity Analysis

A sensitivity analysis was performed to determine what level of development beyond Phase 1 conditions would satisfy warrants for a traffic signal at the intersection of Century Boulevard and Kinster Drive. It is noted that this sensitivity analysis was conducted only based on potential changes to the Poplar Grove development level; in all cases the full build out of Black Hill was assumed. Based on the analysis, the following development levels will satisfy warrants for a traffic signal:

- 100 percent townhouse development (190 units) and 97 percent multifamily development (340 units)
 - o 235 AM trips (44 in, 191 out), 287 PM Trips (190 in, 97 out)
- 100 percent townhouse development (190 units), 50 percent multifamily development (175 units), and 6 percent office development (27,600 SF)
 - 206 AM trips (64 in, 142 out), 261 PM trips (145 in, 116 out)
- 100 percent townhouse development (190 units), 25 percent multifamily development (88 units), and 8 percent office development (36,800 SF)
 - 187 AM trips (71 in, 116 out), 235 PM trips (121 in, 114 out)
- 100 percent townhouse development (190 units), 38 percent multifamily development (133 units), and 20 percent retail development (12,000 SF)
 - 183 AM trips (43 in, 140 out), 281 PM trips (174 in, 107 out)



Conclusions

Traffic signal warrant analyses were performed under total future conditions at the intersections of Century Boulevard and Kinster Drive and Crystal Rock Drive and Kinster Drive in relation to the proposed mixed-use Poplar Grove development.¹ The following signal warrants were included in the study:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume

Warrants 4, 5, 6, 7, 8, and 9 were not applicable to this study.

As a result of this analysis, it is shown that, under full build-out conditions Warrants 1, 2, and 3 are satisfied at both study intersections. Additionally, under full build-out conditions, Warrant 4 is likely to be satisfied at the intersection of Century Boulevard and Kinster Drive due to the attraction of on-site retail and the attraction of the planned CCT station.

As a result of this analysis, it is shown that, under Phase 1 conditions, only the warrants for a traffic signal at the intersection of Crystal Rock Drive and Kinster Drive are satisfied (Warrant 2).

It is important to note that the analysis, findings, and recommendations contained herein assume the full build-out of Black Hill. Should the build-out of Black Hill not occur in full, or should it be significantly delayed, the need for signals at the subject intersections may be affected. Therefore, given the long-term build out of the Poplar Grove development and other nearby development (i.e. Black Hill) and the number of other transportation variables in the area (i.e. the CCT), it is recommended that the Applicant, MCDOT, and MCPB collaborate to establish trip thresholds for the installation of traffic signals. As such, it may be prudent to reassess the signal warrant analyses in the future, for example at the time of each subsequent site plan for Poplar Grove (or an amendment thereto), once the development level and phasing of both Black Hill and Poplar Grove are more established.

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¹ The Applicant understands that the Montgomery County Department of Transportation is planning on installing a traffic signal at the intersection of Century Boulevard/Dorsey Mill Road as part of the Dorsey Mill Road/bridge construction project. As such, no formal signal warrant analyses have been conducted or are described within this memorandum for this intersection as it is the Applicant's understanding that this will be conducted/provided by others.



Appendix A

Existing Turning Movement Count Data

CARS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

12 Hr Totals

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Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

Star Rating: 4

Location: Montgomery County, Maryland

Entered by: BGJ

Counted by: VCU

CARS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

Location: Montgomery County, Maryland

Entered by: BGJ

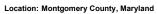
	Lo	cation:	_			Marylan					red by:							ating: 4		Sec. Grids	
TIME	on:	TRAFFIC Century				on:	TRAFFI Century	C FROM Bouleva			on:	TRAFF	IC FROM	I EAST		on:	TRAFF Kinster	IC FROM Drive	I WEST		TOTAL N+S +
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	47	0	0	3	50	53
7:15 - 8:15	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	55	0	0	2	57	60
7:30 - 8:30	0	0	0	0	0	0	0	4	2	6	0	0	0	0	0	55	0	0	4	59	65
7:45 - 8:45	0	0	0	0	0	0	0	7	3	10	0	0	0	0	0	46	0	0	5	51	61
8:00 - 9:00	0	0	0	0	0	0	0	8	6	14	0	0	0	0	0	39	0	0	4	43	57
8:15 - 9:15	0	0	0	0	0	0	0	8	6	14	0	0	0	0	0	27	0	0	6	33	47
8:30 - 9:30	0	0	0	0	0	0	0	9	6	15	0	0	0	0	0	23	0	0	3	26	41
8:45 - 9:45	0	0	0	0	0	0	0	9	6	15	0	0	0	0	0	26	0	0	2	28	43
9:00 - 10:00	0	0	0	0	0	0	0	10	4	14	0	0	0	0	0	19	0	0	2	21	35
9:15 - 10:15	0	0	0	0	0	0	0	10	4	14	0	0	0	0	0	17	0	0	1	18	32
9:30 - 10:30	0	0	0	0	0	0	0	7	3	10	0	0	0	0	0	18	0	0	1	19	29
9:45 - 10:45	0	0	0	0	0	0	0	7	1	8	0	0	0	0	0	11	0	0	1	12	20
10:00 - 11:00	0	0	0	0	0	0	0	10	1	11	0	0	0	0	0	8	0	0	1	9	20
10:15 - 11:15	0	0	0	0	0	0	0	10	1	11	0	0	0	0	0	7	0	0	1	8	19
10:30 - 11:30	0	0	0	0	0	0	0	14	3	17	0	0	0	0	0	4	0	0	1	5	22
10:45 - 11:45	0	0	0	0	0	0	0	11	3	14	0	0	0	0	0	8	0	0	2	10	24
11:00 - 12:00	0	0	0	0	0	0	0	8	4	12	0	0	0	0	0	10	0	0	2	12	24
11:15 - 12:15	0	0	0	0	0	0	0	13	6	19	0	0	0	0	0	13	0	0	1	14	33
11:30 - 12:30	0	0	0	0	0	0	0	10	6	16	0	0	0	0	0	14	0	0	1	15	31
11:45 - 12:45	0	0	0	0	0	0	0	13	6	19	0	0	0	0	0	12	0	0	1	13	32
12:00 - 1:00	0	0	0	0	0	0	0	18	4	22	0	0	0	0	0	16	0	0	2	18	40
12:15 - 1:15	0	0	0	0	0	0	0	17	2	19	0	0	0	0	0	13	0	0	2	15	34
12:30 - 1:30	0	0	0	0	0	0	0	20	0	20	0	0	0	0	0	13	0	0	2	15	35
12:45 - 1:45	0	0	0	0	0	0	0	18	1	19	0	0	0	0	0	16	0	0	2	18	37
1:00 - 2:00	0	0	0	0	0	0	0	14	3	17	0	0	0	0	0	13	0	0	1	14	31
1:15 - 2:15	0	0	0	0	0	0	0	11	5	16	0	0	0	0	0	17	0	0	2	19	35
1:30 - 2:30	0	0	0	0	0	0	0	9	5	14	0	0	0	0	0	18	0	0	2	20	34
1:45 - 2:45	0	0	0	0	0	0	0	11	4	15	0	0	0	0	0	13	0	0	1	14	29
2:00 - 3:00	0	0	0	0	0	0	0	14	3	17	0	0	0	0	0	11	0	0	2	13	30
2:15 - 3:15	0	0	0	0	0	0	0	12	2	14	0	0	0	0	0	7	0	0	1	8	22
2:30 - 3:30	0	0	0	0	0	0	0	14	2	16	0	0	0	0	0	5	0	0	2	7	23
2:45 - 3:45	0	0	0	0	0	0	0	13	3	16	0	0	0	0	0	9	0	0	2	11	27
3:00 - 4:00	0	0	0	0	0	0	0	12	2	14	0	0	0	0	0	9	0	0	2	11	25
3:15 - 4:15	0	0	0	0	0	0	0	15	1	16	0	0	0	0	0	10	0	0	3	13	29
3:30 - 4:30	0	0	0	0	0	0	0	19	1	20	0	0	0	0	0	12	0	0	2	14	34
3:45 - 4:45	0	0	0	0	0	0	0	24	1	25	0	0	0	0	0	10	0	0	2	12	37
4:00 - 5:00	0	0	0	0	0	0	0	21	1	22	0	0	0	0	0	10	0	0	3	13	35
4:15 - 5:15	0	0	0	0	0	0	0	28	3	31	0	0	0	0	0	12	0	0	5	17	48
4:30 - 5:30	0	0	0	0	0	0	0	28	3	31	0	0	0	0	0	11	0	0	7	18	49
4:45 - 5:45	0	0	0	0	0	0	0	36	2	38	0	0	0	0	0	12	0	0	8	20	58
5:00 - 6:00	0	0	0	0	0	0	0	42	3	45	0	0	0	0	0	11	0	0	6	17	62
5:15 - 6:15	0	0	0	0	0	0	0	34	1	35	0	0	0	0	0	11	0	0	4	15	50
5:30 - 6:30	0	0	0	0	0	0	0	35	1	36	0	0	0	0	0	14	0	0	3	17	53
5:45 - 6:45	0	0	0	0	0	0	0	25	1	26	0	0	0	0	0	12	0	0	3	15	41
6:00 - 7:00	0	0	0	0	0	0	0	28	0	28	0	0	0	0	0	20	0	0	4	24	52
PEAK HOUR	_	-	-	-	-	_	-		-		_	-	-	-	-		-	-			
7:30 - 8:30	0	0	0	0	0	0	0	4	2	6	0	0	0	0	0	55	0	0	4	59	65
5:00 - 6:00	0	0	0	0	0	0	0	42	3	45	0	0	0	0	0	11	0	0	6	17	62

MEDIUMS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

Date: October 09, 2018 Weather: Warm, Light Rain Tuesday

Star Rating: 4



Entered by: BGJ

Counted by: VCU

	Lo	ocation:	Montgo	omery C	County, I	Marylan	ıd			Ente	ered by:	BGJ					Star Ra	ating: 4		x Cards	
TIME	on:	TRAFFIC				on:	TRAFFI Century	C FROM Bouleva			on:	TRAFF	IC FROM	I EAST		on:	TRAFF Kinster	IC FROM Drive	WEST		TOTAL N+S
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
AM	_	_			_		_	_	_	_					_	_		_	_	_	
7:00 - 7:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:15 - 7:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:30 - 7:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:45 - 8:00	0	0		0	0		0	1	0	1					0	0		0	0	0	1
8:00 - 8:15	0	0		0	0		0	1	0	1					0	0		0	0	0	1
8:15 - 8:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:30 - 8:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:45 - 9:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:00 - 9:15	0	0		0	0		0	0	0	0					0	1		1	0	2	2
9:15 - 9:30	1	0		0	1		0	0	0	0					0	0		0	0	0	1
9:30 - 9:45	0	1		0	1		1	0	0	1					0	0		0	1	1	3
9:45 - 10:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
0:00 - 10:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
10:15 - 10:30	0	0		0	0		0	0	0	0					0	1		0	0	1	1
10:30 - 10:45	0	0		0	0		0	0	0	0					0	0		0	1	1	1
10:45 - 11:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:00 - 11:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:15 - 11:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:30 - 11:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 12:00	0	0		0	0		0	0	0	0					0	0		0	1	1	1
2:00 - 12:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:15 - 12:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:30 - 12:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:45 - 1:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:00 - 1:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:15 - 1:30	0	0		0	0		0	0	0	0					0	1		0	0	1	1
1:30 - 1:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 2:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:00 - 2:15	0	0		0	0		0	0	0	0					0	1		0	0	1	1
2:15 - 2:30	0	0		0	0		0	0	0	0					0	1		0	0	1	1
2:30 - 2:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:45 - 3:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:00 - 3:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:15 - 3:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:30 - 3:45	0	0		0	0		0	0	0	0					0	0		0	1	1	1
3:45 - 4:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:00 - 4:15	0	0		0	0		0	0	0	0					0	0		0	1	1	1
4:15 - 4:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:30 - 4:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:45 - 5:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:00 - 5:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:15 - 5:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:30 - 5:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:45 - 6:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:00 - 6:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:15 - 6:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:30 - 6:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:45 - 7:00	0	0		0	0	l	0	0	0	0					0	0		0	0	0	0

MEDIUMS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

5:00 - 6:00 0

Counted by: VCU

Date: October 09, 2018 Weather: Warm, Light Rain Tuesday

The Traffic Group

			Kinste								eather:		Light R	ain					Ĩ	itoup	
	Lo	ocation:	_			Marylan					red by:							ating: 4		v.Carly	
T114F	on:	TRAFFI Century		NORTH		on:	TRAFFI Century		SOUTH ard		on:	TRAFF	IC FROM	/ EAST		on:	TRAFF Kinster	IC FROM	I WEST		TOTA N+S
TIME	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E + W
1 Hr Totals																					
7:00 - 8:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
7:15 - 8:15	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2
7:30 - 8:30	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2
7:45 - 8:45	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2
8:00 - 9:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	2
8:30 - 9:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	3
8:45 - 9:45	1	1	0	0	2	0	1	0	0	1	0	0	0	0	0	1	0	1	1	3	6
9:00 - 10:00	1	1	0	0	2	0	1	0	0	1	0	0	0	0	0	1	0	1	1	3	6
9:15 - 10:15	1	1	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	4
9:30 - 10:30	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	1	2	4
9:45 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2
10:00 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1 1	2	2
10:15 - 11:15 10:30 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1
10:45 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:15 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:30 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:45 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
12:00 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
12:45 - 1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
1:00 - 2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
1:15 - 2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
1:30 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
1:45 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
2:00 - 3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
2:15 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
2:30 - 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 - 3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
3:00 - 4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
3:15 - 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
3:30 - 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
3:45 - 4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
4:00 - 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
4:15 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 - 5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 - 6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 - 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HOUR																					

HEAVY TRUCKS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

Intersection of: Century Boulevard and: Kinster Drive

Date: October 09, 2018 Weather: Warm, Light Rain Tuesday

Location: Montgomery County, Maryland

Entered by: BGJ

	Lo	ocation:	Montgo	mery C	County,	Marylan	ıd			Ente	red by:	BGJ					Star Ra	ating: 4		x Cary	
TIME	on:	TRAFFIC Century				on:	TRAFFI Century		SOUTH ard		on:	TRAFF	IC FROM	I EAST		on:	TRAFF Kinster	IC FROM Drive	WEST		TOTAL N+S +
AM	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
7:00 - 7:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
	0	0			0		0	0	0	0						0		0	0		0
7:15 - 7:30 7:30 - 7:45		0		0				0							0	0			0	0	0
	0			0	0		0		0	0					0			0		0	
7:45 - 8:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:00 - 8:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:15 - 8:30	0			0	0		0	0	0	0					0			0	0	0	0
8:30 - 8:45	0	0		0	0		0	0	0	0					0	0			0	0	0
8:45 - 9:00	0	0		0	0		0	0	0	0					0	0		0		0	0
9:00 - 9:15										0					0	-			0		
9:15 - 9:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:30 - 9:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:45 - 10:00	0	0		0	0		0	0	0	0					0	0		1	0	1	1
10:00 - 10:15	0	0		0	0		0	0	1	1					0	0		0	0	0	1
10:15 - 10:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
10:30 - 10:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
10:45 - 11:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
11:00 - 11:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
11:15 - 11:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
11:30 - 11:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
11:45 - 12:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:00 - 12:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:15 - 12:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:30 - 12:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:45 - 1:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:00 - 1:15	0	0		0	0		0	1	0	1					0	0		0	0	0	1
1:15 - 1:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:30 - 1:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 2:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:00 - 2:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:15 - 2:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:30 - 2:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:45 - 3:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:00 - 3:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:15 - 3:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:30 - 3:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:45 - 4:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:00 - 4:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:15 - 4:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:30 - 4:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:45 - 5:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:00 - 5:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:15 - 5:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:30 - 5:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:45 - 6:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:00 - 6:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:15 - 6:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:30 - 6:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:45 - 7:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12 Hr Totals	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	1	0	1	3

HEAVY TRUCKS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

Counted by: VCU

Date: October 09, 2018 Weather: Warm, Light Rain



Location: Montgomery County, Maryland

Entered by: BGJ

Star Rating: 4

Tuesday

	Lo	cation:	_			Marylan					ered by:							ating: 4		S. C.C.Ma	
TIME	on:	TRAFFIC Century				on:	TRAFFI Century	C FROM Bouleva			on:	TRAFF	IC FROM	I EAST		on:	TRAFF Kinster	IC FROM Drive	I WEST		TOTAL N+S
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 - 8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 - 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 - 8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 - 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
9:15 - 10:15	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	2
9:30 - 10:30	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	2
9:45 - 10:45	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	2
10:00 - 11:00	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
10:15 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 1:15	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
12:30 - 1:30	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
12:45 - 1:45	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
1:00 - 2:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
1:15 - 2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 - 3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 - 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 - 3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 - 4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 - 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 - 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 - 4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 - 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 - 5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 - 6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 - 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HOUR	5	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	U	
7:30 - 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J.UU - 0.UU	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

BICYCLES TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard

Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

Location: Montgomery County, Maryland

Entered by: BGJ

Counted by: VCU

е	ered by: BGJ	Star Rating:
	TRAFFIC FROM FAST	TRAFFIC FRO

	LC	cation:		NORTH		waryian		C FROM	COLITY		ered by:		IC FROM	A EAST		ı		ating: 4	WEST		TOTAL
TIME	on:	Century				on:	Century				on:	IKAFI	IC FROM	II EASI		on:	Kinster		I WEST		N+S
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
AM																					
7:00 - 7:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:15 - 7:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:30 - 7:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
7:45 - 8:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:00 - 8:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:15 - 8:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:30 - 8:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
8:45 - 9:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:00 - 9:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:15 - 9:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:30 - 9:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
9:45 - 10:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
0:00 - 10:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
0:15 - 10:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
0:30 - 10:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
0:45 - 11:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:00 - 11:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:15 - 11:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:30 - 11:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 12:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:00 - 12:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:15 - 12:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:30 - 12:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12:45 - 1:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:00 - 1:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:15 - 1:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:30 - 1:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 2:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:00 - 2:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:15 - 2:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:30 - 2:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
2:45 - 3:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:00 - 3:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:15 - 3:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:30 - 3:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
3:45 - 4:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:00 - 4:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:15 - 4:30	0	0		0	0		0	0	0	0					0	0		0	0	0	0
4:30 - 4:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
1:45 - 5:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:00 - 5:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:15 - 5:30	0	1		0	1		0	0	0	0					0	0		0	0	0	1
5:30 - 5:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
5:45 - 6:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:00 - 6:15	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:15 - 6:30	0	0		0	0		1	1	0	2					0	0		0	0	0	2
6:30 - 6:45	0	0		0	0		0	0	0	0					0	0		0	0	0	0
6:45 - 7:00	0	0		0	0		0	0	0	0					0	0		0	0	0	0
12 Hr Totals	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	3

BICYCLES TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

Counted by: VCU

Date: October 09, 2018 Weather: Warm, Light Rain Tuesday

Location: Montgomery County, Maryland

Entered by: BGJ

	LC		_		ounty,	waryian					erea by:							ating: 4			
TIME	on:	Century	C FROM Bouleva			on:	Century	C FROM Bouleva			on:	TRAFF	IC FROM	/ EAST		on:	TRAFF	IC FROM Drive	I WEST		TOTAL N+S +
TIME	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 - 8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 - 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 - 8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 - 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 - 2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 - 2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						-															
2:00 - 3:00 2:15 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	-		0	0	0	-		0	0	0		0	0	0			0		0		
2:30 - 3:30	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0
2:45 - 3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 - 4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 - 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 - 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 - 4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 - 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 5:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 - 5:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 - 6:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 - 6:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 - 6:30	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	2
5:45 - 6:45	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	2
6:00 - 7:00	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	2
PEAK HOUR																					<u> </u>
7:30 - 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 6:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PEDESTRIAN AND BICYCLE OBSERVATIONS - SUMMARY

Intersection of: Century Boulevard
and: Kinster Drive
Location: Montgomery County, Maryland

Counted by: VCU Date: October 09, 2018

Weather: Warm, Light Rain
Entered by: BGJ

Tuesday



L	ocation: Montgomery County,		ered by: BGJ	Star Rating: 4
		TH LEG Boulevard	SOUT Century E	H LEG
TIME	Pedestrians	Bicycles	Pedestrians	Bicycles
AM				
7:00 - 7:15	0	0	0	0
7:15 - 7:30	0	0	4	0
7:30 - 7:45	0	0	0	0
7:45 - 8:00	1	0	1	0
8:00 - 8:15	1	0	0	0
8:15 - 8:30	2	0	0	0
8:30 - 8:45	0	0	0	0
8:45 - 9:00	2	0	0	0
9:00 - 9:15	2	0	0	0
9:15 - 9:30	0	0	0	0
9:30 - 9:45	0	0	1	0
9:45 - 10:00	0	0	0	0
10:00 - 10:15	0	0	0	0
10:15 - 10:30	0	0	2	0
10:30 - 10:45	0	0	2	0
10:45 - 11:00	2	0	0	0
11:00 - 11:15	0	0	0	0
11:15 - 11:30	0	0	0	0
11:30 - 11:45	1	0	0	0
11:45 - 12:00	0	0	0	0
12:00 - 12:15	0	0	1	0
		-		
12:15 - 12:30	1 1	0	0	0
12:30 - 12:45	0		0	0
12:45 - 1:00	0	0		
1:00 - 1:15		0	0	0
1:15 - 1:30	0	0	0	0
1:30 - 1:45	0	0	0	0
1:45 - 2:00	0	0	0	0
2:00 - 2:15	0	0	0	0
2:15 - 2:30	0	0	0	0
2:30 - 2:45	0	0	0	0
2:45 - 3:00	2	0	0	0
3:00 - 3:15	0	0	0	0
3:15 - 3:30	0	0	0	0
3:30 - 3:45	0	0	0	0
3:45 - 4:00	0	0	0	0
4:00 - 4:15	0	0	0	0
4:15 - 4:30	0	0	0	0
4:30 - 4:45	0	0	1	0
4:45 - 5:00	0	0	0	0
5:00 - 5:15	2	0	0	0
5:15 - 5:30	0	0	0	0
5:30 - 5:45	0	0	2	0
5:45 - 6:00	0	0	3	0
6:00 - 6:15	0	0	1	0
6:15 - 6:30	2	0	0	0
6:30 - 6:45	0	0	2	0
6:45 - 7:00	4	0	0	0
TOTALS	23	0	20	0

PEDESTRIAN AND BICYCLE OBSERVATIONS - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive Location: Montgomery County, Maryland Counted by: VCU

Date: October 09, 2018

Weather: Warm, Light Rain

Entered by: BGJ

Tuesday



	EAST	LEG	WEST Kinste	LEG r Drive
	Pedestrians	Bicycles	Pedestrians	Bicycles
AM				
7:00 - 7:15			1	0
7:15 - 7:30			1	0
7:30 - 7:45			0	0
7:45 - 8:00			4	0
8:00 - 8:15			2	0
8:15 - 8:30			2	0
8:30 - 8:45			1	0
8:45 - 9:00			3	0
9:00 - 9:15			3	0
9:15 - 9:30			0	0
9:30 - 9:45			1	1
9:45 - 10:00			0	0
10:00 - 10:15			0	0
10:15 - 10:30			0	0
10:30 - 10:45			0	0
10:45 - 11:00			1	0
11:00 - 11:15			1	0
11:15 - 11:30			2	0
11:30 - 11:45			1	0
11:45 - 12:00			2	0
12:00 - 12:15			2	0
12:15 - 12:30			6	0
12:30 - 12:45			1	0
12:45 - 1:00			1	0
1:00 - 1:15			0	0
1:15 - 1:30			0	0
1:30 - 1:45			0	0
1:45 - 2:00			0	0
2:00 - 2:15			0	0
2:15 - 2:30			0	0
2:30 - 2:45			1	0
2:45 - 3:00			2	0
			0	0
3:00 - 3:15				
3:15 - 3:30			0	0
3:30 - 3:45			0	0
3:45 - 4:00			1	0
4:00 - 4:15			1	0
4:15 - 4:30			0	0
4:30 - 4:45			1	0
£	AST LEG		WESTLEG	
3:15 - 3:30			0	0
5:15 - 5:30			2	0
5:30 - 5:45			4	0
5:45 - 6:00			1	0
6:00 - 6:15			2	0
6:15 - 6:30			0	0
6:30 - 6:45			3	0
6:45 - 7:00			3	0
TOTALS	0	0	56	1

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard and: Kinster Drive

Counted by: VCU
Date: October 09, 2018
Weather: Warm, Light Rain
Entered by: BGJ

Tuesday

Star Rating: 4

Location: Montgomery County, Maryland
TRAFFIC FROM NORTH

	on:	TRAFFI	C FROM			on:	TRAFFI Century	C FROM			on:	TRAFF	IC FROM	I EAST		on:	TRAFF Kinster	IC FROM	I WEST		TOTAL N+S
TIME	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	+ E+W
AM	RIGHT	IIIKU	LEFT	0-114	TOTAL	RIGHT	IIIKU	LEFT	0-114	TOTAL	KIGHT	IIIKU	LEFT	0-114	TOTAL	RIGHT	THRU	LEFT	0-114	TOTAL	L . W
7:00 - 7:15	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	8	0	0	1	9	11
7:15 - 7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	1	9	9
7:30 - 7:45	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	13	0	0	0	13	14
7:45 - 8:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	18	0	0	1	19	20
8:00 - 8:15	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	16	0	0	0	16	19
8:15 - 8:30	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	8	0	0	3	11	14
8:30 - 8:45	0	0	0	0	0	0	0	3	2	5	0	0	0	0	0	4	0	0	1	5	10
8:45 - 9:00	0	0	0	0	0	0	0	1	3	4	0	0	0	0	0	11	0	0	0	11	15
9:00 - 9:15	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	5	0	1	2	8	10
9:15 - 9:30	1	0	0	0	1	0	0	3	1	4	0	0	0	0	0	4	0	0	0	4	9
9:30 - 9:45	0	1	0	0	1	0	1	3	2	6	0	0	0	0	0	7	0	0	1	8	15
9:45 - 10:00	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	4	0	1	0	5	8
10:00 - 10:15	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	2	0	0	1	3	6
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	6
10:30 - 10:45	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	1	1	4
10:45 - 11:00	0	0	0	0	0	0	0	5	1	6	0	0	0	0	0	1	0	0	0	1	7
11:00 - 11:15	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	0	1	2	4
11:15 - 11:30	0	0	0	0	0	0	0	4	2	6	0	0	0	0	0	2	0	0	0	2	8
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	5	5
11:45 - 12:00	0	0	0	0	0	0	0	2	2	4	0	0	0	0	0	3	0	0	1	4	8
12:00 - 12:15	0	0	0	0	0	0	0	7	2	9	0	0	0	0	0	4	0	0	0	4	13
12:15 - 12:30	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	3	0	0	0	3	6
12:30 - 12:45	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	0	1	3	6
12:45 - 1:00	0	0	0	0	0	0	0	7	0	7	0	0	0	0	0	7	0	0	1	8	15
1:00 - 1:15	0	0	0	0	0	0	0	7	0	7	0	0	0	0	0	1	0	0	0	1	8
1:15 - 1:30	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	0	0	4	8
1:30 - 1:45	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	5	0	0	1	6	8
1:45 - 2:00	0	0	0	0	0	0	0	3	2	5	0	0	0	0	0	4	0	0	0	4	9
2:00 - 2:15	0	0	0	0	0	0	0	3	2	5	0	0	0	0	0	6	0	0	1	7	12
2:15 - 2:30	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	5	0	0	0	5	7
2:30 - 2:45	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	3
2:45 - 3:00	0	0	0	0	0	0	0	6	1	7	0	0	0	0	0	2	0	0	1	3	10
3:00 - 3:15	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	1	3
3:15 - 3:30	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	2	0	0	1	3	7
3:30 - 3:45	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	4	0	0	1	5	8
3:45 - 4:00	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	2	0	0	1	3	8
4:00 - 4:15	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	2	0	0	2	4	8
4:15 - 4:30	0	0	0	0	0	0	0	8	0	8	0	0	0	0	0	4	0	0	0	4	12
4:30 - 4:45	0	0	0	0	0	0	0	7	1	8	0	0	0	0	0	2	0	0	0	2	10
4:45 - 5:00	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	4	6
5:00 - 5:15	0	0	0	0	0	0	0	11	2	13	0	0	0	0	0	4	0	0	3	7	20
5:15 - 5:30	0	0	0	0	0	0	0	8	0	8	0	0	0	0	0	3	0	0	2	5	13
5:30 - 5:45	0	0	0	0	0	0	0	15	0	15	0	0	0	0	0	3	0	0	1	4	19
5:45 - 6:00	0	0	0	0	0	0	0	8	1	9	0	0	0	0	0	1	0	0	0	1	10
6:00 - 6:15	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	4	0	0	1	5	8
6:15 - 6:30	0	0	0	0	0	0	0	9	0	9	0	0	0	0	0	6	0	0	1	7	16
6:30 - 6:45	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	1	0	0	1	2	7
6:45 - 7:00	0	0	0	0	0	0	0	11	0	11	0	0	0	0	0	9	0	0	1	10	21
12 Hr Totals	1	1	0	0	2	0	1	190	33	224	0	0	0	0	0	218	0	2	37	257	483

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Century Boulevard

Counted by: VCU Date: October 09, 2018

Tuesday

and: Kinster Drive

Weather: Warm, Light Rain

THE CIVIL 19 CHI				Monta		`auntı	Mondor	. d				reatner:		Ligiti Ka	aın			Ctor D	atina. 4	(stoup	
Part		L				ounty,	waryiar		C EDOM	SUITH		erea by:		IC EDON	/ EAST		ı					
The Troub	TIME	on:					on:					on:	INAFF	IC FROM	II EAST		on:			I WEST		N + S +
7.00 - 6.00 0	4 11. 7.4.1.	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
7.15 - 8.15		•		•		•											47	•			50	
7.30.830 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																						
7.445							-					-										
800-900 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																						
8159-615							-															
839-939 1																						
845-945		0		0		0					14			0					1			
9.00 - 10.00		1	0	0	0		0	0		6	15	0	0	0	0	0	24	0	1		28	
9:15-10-15	8:45 - 9:45	1	1	0	0	2	0	1	9	6	16	0	0	0	0	0	27	0	1	3	31	49
930-1030 0 0 1 0 0 0 0 0 1 0 0 1 7 4 12 0 0 0 0 0 0 19 0 0 1 2 22 35 945-1045 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9:00 - 10:00	1	1	0	0	2	0	1	10	4	15	0	0	0	0	0	20	0	2	3	25	42
9.45 - 10.45	9:15 - 10:15	1	1	0	0	2	0	1	10	5	16	0	0	0	0	0	17	0	1	2	20	38
10.00 - 11:00	9:30 - 10:30	0	1	0	0	1	0	1	7	4	12	0	0	0	0	0	19	0	1	2	22	35
10:15 - 11:15	9:45 - 10:45	0	0	0	0	0	0	0	7	2	9	0	0	0	0	0	12	0	1	2	15	24
10:15 - 11:15	10:00 - 11:00	0	0	0	0	0	0	0	10	2	12	0	0	0	0	0	9	0	0	2	11	23
10.45 - 11.45		0	0	0	0	0	0	0	10	1	11	0	0	0	0	0	8	0	0	2	10	
11:00 - 12:00	10:30 - 11:30	0	0	0	0	0	0	0	14	3	17	0	0	0	0	0	4	0	0	2	6	23
11:00 - 12:00	10:45 - 11:45	0	0	0	0	0	0	0	11	3	14	0	0	0	0	0	8	0	0	2	10	24
11:15-12:15			0					0						0		0						
11:30 - 12:30																						
11:45 - 12:45																						
12:00-1:00							-						-									
12:15 - 1:15							-															
12:30-1:30																						
12:45 - 1:45							-															
1:00 - 2:00																						
1:15-2:15							-															
1:30 - 2:30																						
1:45 - 2:45																						
2:00 - 3:00																						
2:15 - 3:15																						
2:30 - 3:30													-					-				
2:45 - 3:45																						
3:00 - 4:00		0	0			0	0				16	0	0	0					0			
3:15-4:15		0			0		0				16	0				0	9		0			
3:30 - 4:30																						
3:45 - 4:45	3:15 - 4:15	0	0	0	0	0	0	0	15	1	16	0	0	0	0	0	10	0	0	5	15	31
4:00-5:00 0 0 0 0 0 0 21 1 22 0 0 0 0 0 4 14 36 4:15-5:15 0 0 0 0 0 28 3 31 0 0 0 0 0 5 17 48 4:30-5:30 0 0 0 0 0 28 3 31 0 0 0 0 11 0 0 7 18 49 4:45-5:45 0 0 0 0 0 36 2 38 0 0 0 12 0 0 8 20 58 5:00-6:00 0 0 0 0 0 42 3 45 0 0 0 11 0 0 8 20 58 5:15-6:15 0 0 0 0 0 34 1 35 0 0 0 11 0 0 4 15 50	3:30 - 4:30	0	0	0	0	0	0	0	19	1	20	0	0	0	0	0	12	0	0	4	16	36
4:15-5:15 0 0 0 0 0 0 28 3 31 0 0 0 0 0 5 17 48 4:30-5:30 0 0 0 0 0 28 3 31 0 0 0 0 0 7 18 49 4:45-5:45 0 0 0 0 0 36 2 38 0 0 0 0 11 0 0 8 20 58 5:00-6:00 0 0 0 0 0 42 3 45 0 0 0 11 0 0 6 17 62 5:15-6:15 0 0 0 0 0 34 1 35 0 0 0 11 0 0 6 17 62 5:30-6:30 0 0 0 0 3 1 36 0 0 0 11 0 0 4 15 50 5:45-6:	3:45 - 4:45	0	0	0	0	0	0	0	24	1	25	0	0	0	0	0	10	0	0	3	13	38
4:30 - 5:30 0 0 0 0 0 0 28 3 31 0 0 0 0 0 7 18 49 4:45 - 5:45 0 0 0 0 0 0 36 2 38 0 0 0 0 0 8 20 58 5:00 - 6:00 0 0 0 0 0 42 3 45 0 0 0 0 11 0 0 6 17 62 5:15 - 6:15 0 0 0 0 0 34 1 35 0 0 0 11 0 0 6 17 62 5:30 - 6:30 0 0 0 0 0 35 1 36 0 0 0 14 0 0 3 17 53 5:45 - 6:45 0 0 0 0 0 25 1 26 0 0 0 0 0 3 15 41 <td>4:00 - 5:00</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>21</td> <td>1</td> <td>22</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>10</td> <td>0</td> <td>0</td> <td>4</td> <td>14</td> <td>36</td>	4:00 - 5:00	0	0	0	0	0	0	0	21	1	22	0	0	0	0	0	10	0	0	4	14	36
4:45-5:45 0 0 0 0 0 0 36 2 38 0 0 0 0 0 8 20 58 5:00-6:00 0 0 0 0 0 0 42 3 45 0 0 0 0 11 0 0 6 17 62 5:15-6:15 0 0 0 0 0 34 1 35 0 0 0 0 11 0 0 4 15 50 5:30-6:30 0 0 0 0 0 35 1 36 0 0 0 14 0 0 3 17 53 5:45-6:45 0 0 0 0 0 25 1 26 0 0 0 12 0 0 3 15 41 6:00-7:00 0 0 0 0 28 0 28 0 0 0 0 0 4 24 52	4:15 - 5:15	0	0	0	0	0	0	0	28	3	31	0	0	0	0	0	12	0	0	5	17	48
5:00 - 6:00	4:30 - 5:30	0	0	0	0	0	0	0	28	3	31	0	0	0	0	0	11	0	0	7	18	49
5:15 - 6:15 0 0 0 0 0 0 0 0 0 34 1 35 0 0 0 0 0 11 0 0 4 15 50 5:30 - 6:30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 14 0 0 0 3 17 53 5:45 - 6:45 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4:45 - 5:45	0	0	0	0	0	0	0	36	2	38	0	0	0	0	0	12	0	0	8	20	58
5:30 - 6:30 0 0 0 0 0 0 0 0 35 1 36 0 0 0 0 0 14 0 0 3 17 53 53 5:45 - 6:45 0 0 0 0 0 0 0 0 0 0 0 0 12 0 0 3 15 41 6:00 - 7:00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5:00 - 6:00	0	0	0	0	0	0	0	42	3	45	0	0	0	0	0	11	0	0	6	17	62
5:30 - 6:30 0 0 0 0 0 0 0 0 35 1 36 0 0 0 0 0 14 0 0 3 17 53 53 5:45 - 6:45 0 0 0 0 0 0 0 0 0 0 0 0 12 0 0 3 15 41 6:00 - 7:00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5:15 - 6:15	0	0	0	0	0	0	0	34	1	35	0	0	0	0	0	11	0	0	4	15	50
5:45 - 6:45 0 0 0 0 0 0 0 0 25 1 26 0 0 0 0 0 12 0 0 3 15 41 6:00 - 7:00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0	0	0	0	0	0	0	35	1	36	0	0	0	0	0	14	0	0	3	17	53
6:00 - 7:00 0 0 0 0 0 0 0 28 0 28 0 0 0 0 0 0 20 0 0 4 24 52 PEAK HOUR 7:30 - 8:30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 55 0 0 4 59 67		0	0	0	0	0	0	0		1	26	0	0	0	0	0	12	0	0		15	
PEAK HOUR																						
7:30 - 8:30 0 0 0 0 0 6 2 8 0 0 0 0 4 59 67		-	-	-	-	-			-		-			-	-							
		0	0	0	0	0	0	0	6	2	8	0	0	0	0	0	55	0	0	4	59	67
	5:00 - 6:00	0	0	0	0	0	0	0	42	3	45	0	0	0	0	0	11	0	0	6	17	62

CARS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland Counted by: VCU

Date: October 09, 2018 Weather: Warm, Light Rain Entered by: BGJ Tuesday



	L	cation.	wontgo	mery c	County,	waryian	ia				ered by:	BGJ					Star K	ating: 5		x Cardo	
TIME	on:	TRAFFIC Crystal I				on:	TRAFFI Crystal I	C FROM Rock Dri			on:	TRAFF Kinster	IC FROM	I EAST		on:	TRAFF Waters I	C FROM anding			TOTA N+S
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
AM																					
7:00 - 7:15	0	2	0	0	2	2	2	14	0	18	0	0	11	0	11	47	1	0	0	48	79
7:15 - 7:30	0	3	0	0	3	3	6	8	1	18	0	0	17	1	18	49	0	1	0	50	89
7:30 - 7:45	0	0	0	0	0	7	5	11	0	23	0	0	8	0	8	36	1	0	0	37	68
7:45 - 8:00	0	2	0	0	2	12	2	12	0	26	0	2	14	0	16	40	3	0	0	43	87
8:00 - 8:15	0	3	0	0	3	12	0	11	0	23	0	0	12	0	12	36	0	0	0	36	74
8:15 - 8:30	1	2	0	0	3	6	2	15	0	23	0	1	21	0	22	34	1	1	0	36	84
8:30 - 8:45	0	2	0	0	2	3	2	15	0	20	0	2	17	0	19	41	0	0	0	41	82
8:45 - 9:00	1	5 1	0	0	6	12	3 7	13	0	28	0	2	6	1	9	47	2	0	1 0	50	93
9:00 - 9:15	0		0	0	1	6		14		27	0	0	9	1	10	48	0			48	86
9:15 - 9:30	0	2	0	0	2	1	1	11	0	13	0	0	4	0	4	31	2	0	0	33	52
9:30 - 9:45	0	2 4	0	0	2	9	4	14	0	27	0	0	10	1	11	32	0	0	0	32	72
9:45 - 10:00	0	-	0	0	4	1	0	17	0	18	0	0	5	0	5	23	1	1	0	25	52
10:00 - 10:15	1	4	0	0	5	3	3	11	0	17	0	-	6	0	6	20	0	1	0	21	49
10:15 - 10:30	1	2	0	0	3	5	2	15	0	22	0	0	6	0	6	22	1	0	0	23	54
10:30 - 10:45	0	4	0	0	4	3	2 4	16	0	21	0	0	9	0	9	27	0	0	0	27	61
10:45 - 11:00	1	2			3	3		17	0	24	-	1	5	2	8	25		0		25	60
1:00 - 11:15	2	5	0	0	7	4	3	14	0	21	0	1	7	0	8	21	0	1	0	22	58
11:15 - 11:30	0	1	1	0	2	2	2	12	0	16	0	0	5	0	5	11	0	1	0	12	35
1:30 - 11:45	1	7	1	0	9	1	2	14	0	17	1	0	5	0	6	21	2	0	0	23	55
1:45 - 12:00	0	2	0	0	2	5	7	23	0	35	0	0	10	0	10	24	1	0	0	25	72
2:00 - 12:15	0	2	0	0	2	5	3	25	0	33	1	2	5	0	8	25	3	0	0	28	71
2:15 - 12:30	1	4	0	0	5	4	4	28	0	36	1	1	7	0	9	22	2	0	0	24	74
2:30 - 12:45	1	8	0	0	9	7	3	14	0	24	0	1	4	0	5	19	1	0	0	20	58
12:45 - 1:00	0	0	1	0	1 2	8 7	4	36	0	48	0	1	4	0	5	27 22	0	0	0	27 22	81
1:00 - 1:15	-	2	0				2	25	0	34		•	6 4		8 7			0	0		66
1:15 - 1:30 1:30 - 1:45	0	3 5	0	0	3 5	9	3 1	31 20	0	43 27	0	2	7	1 0	7	20 17	0 1	0	0	20 18	73
	1	5 5	0	0	5 6		1	20 24	0		0	1	6	0	7	24	2	0	0	26	57 68
1:45 - 2:00 2:00 - 2:15	0	3	0	0	3	4 7	3	13	0	29 23	0	1	6	0	7	20	3	0	0	23	56
2:15 - 2:30	0	0	0	0	0	4	2	24	0		0	2	6		8	-	1	0	0	23 19	57
2:15 - 2:30	0	3	0	0	3	7	2	24 18	0	30 27	0	1	6	0	7	18 23	0	0	0	23	60
2:45 - 3:00	1	3 13	0	0	3 14	8	5	26	0	39	0	1	7	0	8	26	1	0	0	23 27	88
3:00 - 3:15	1	4	0	0	5	5	3	22	0	30	0	0	6	0	6	24	1	0	1	26	67
3:15 - 3:30	0	16	0	0	16	9	5	35	0	49	0	0	9	0	9	12	2	0	0	14	88
3:30 - 3:45	0	5	1	0	6	8	3	35	0	46	0	0	11	0	11	18	1	0	0	19	82
3:45 - 4:00	0	4	0	0	4	14	1	36	0	51	0	1	2	0	3	14	2	0	0	16	74
4:00 - 4:15	0	5	0	0	5	14	4	40	0	58	1	0	5	0	6	21	1	0	0	22	91
4:15 - 4:30	1	4	0	0	5	14	1	48	0	63	1	1	7	0	9	23	1	1	0	25	102
4:30 - 4:45	0	3	0	0	3	11	3	33	0	47	0	3	9	0	12	25	2	0	0	27	89
4:45 - 5:00	0	2	1	0	3	13	2	36	0	51	1	3	5	0	9	25	2	2	0	29	92
5:00 - 5:15	1	13	0	0	14	14	2	45	0	61	0	5	5	0	10	25	0	0	0	25	110
5:15 - 5:30	0	3	0	0	3	15	2	61	0	78	0	3	8	0	11	23	2	0	0	25	117
5:30 - 5:45	2	14	0	0	16	15	3	39	0	57	0	4	8	1	13	20	1	0	0	21	107
5:45 - 6:00	0	4	0	0	4	20	0	57	0	77	1	2	17	0	20	21	0	0	0	21	122
6:00 - 6:15	0	5	0	0	5	22	2	51	0	75	0	0	11	1	12	30	0	0	0	30	122
6:15 - 6:30	0	1	1	0	2	19	5	55	0	79	0	1	5	0	6	19	0	0	0	19	106
6:30 - 6:45	0	3	0	0	3	20	2	48	0	70	0	1	10	0	11	30	2	0	0	32	116
6:45 - 7:00	0	1	0	0	1	16	1	44	0	61	0	3	7	0	10	25	2	0	0	27	99
0.40 7.00			J	0	'	.0		77	9	01	1	9		5	.0	20	-	-	5	-1	33

CARS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

	Lo	ocation:	Montgo	omery C	County,	Marylan	d			Ente	red by:	BGJ					Star R	ating: 5	(Moup	
			C FROM					C FROM					IC FROM	M EAST				IC FROM			TOTAL
TIME	on:	Crystal	Rock Dri	ive		on:	Crystal	Rock Dri	ve		on:	Kinster	Drive			on:	Waters	Landing	Drive		N + S +
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	7	0	0	7	24	15	45	1	85	0	2	50	1	53	172	5	1	0	178	323
7:15 - 8:15	0	8	0	0	8	34	13	42	1	90	0	2	51	1	54	161	4	1	0	166	318
7:30 - 8:30	1	7	0	0	8	37	9	49	0	95	0	3	55	0	58	146	5	1	0	152	313
7:45 - 8:45	1	9	0	0	10	33	6	53	0	92	0	5	64	0	69	151	4	1	0	156	327
8:00 - 9:00	2	12	0	0	14	33	7	54	0	94	0	5	56	1	62	158	3	1	1	163	333
8:15 - 9:15	2	10	0	0	12	27	14	57	0	98	0	5	53	2	60	170	3	1	1	175	345
8:30 - 9:30	1	10	0	0	11	22	13	53	0	88	0	4	36	2	42	167	4	0	1	172	313
8:45 - 9:45	1	10	0	0	11	28	15	52	0	95	0	2	29	3	34	158	4	0	1	163	303
9:00 - 10:00	0	9	0	0	9	17	12	56	0	85	0	0	28	2	30	134	3	1	0	138	262
9:15 - 10:15	1	12	0	0	13	14	8	53	0	75	0	0	25	1	26	106	3	2	0	111	225
9:30 - 10:30	2	12	0	0	14	18	9	57	0	84	0	0	27	1	28	97	2	2	0	101	227
9:45 - 10:45	2	14	0	0	16	12	7	59	0	78	0	0	26	0	26	92	2	2	0	96	216
10:00 - 11:00	3	12	0	0	15	14	11	59	0	84	0	1	26	2	29	94	1	1	0	96	224
10:15 - 11:15	4	13	0	0	17	15	11	62	0	88	0	2	27	2	31	95	1	1	0	97	233
10:30 - 11:30	3	12	1	0	16	12	11	59	0	82	0	2	26	2	30	84	0	2	0	86	214
10:45 - 11:45	4	15	2	0	21	10	11	57	0	78	1	2	22	2	27	78	2	2	0	82	208
11:00 - 12:00	3	15	2	0	20	12	14	63	0	89	1	1	27	0	29	77	3	2	0	82	220
11:15 - 12:15	1	12	2	0	15	13	14	74	0	101	2	2	25	0	29	81	6	1	0	88	233
	2			0		15			0	121		3	27	0	33	92	8	0	0	100	272
11:30 - 12:30		15	1		18	-	16	90			3 2						7	•			
11:45 - 12:45	2	16	0	0	18	21	17	90	0	128		4	26	0	32	90		0	0	97	275
12:00 - 1:00	2	14	1	0	17	24	14	103	0	141	2	5	20	0	27	93	6	0	0	99	284
12:15 - 1:15	2	14	1	0	17	26	13	103	0	142	2	4	21	0	27	90	3	0	0	93	279
12:30 - 1:30	1	13	1	0	15	31	12	106	0	149	1	5	18	1	25	88	1	0	0	89	278
12:45 - 1:45	0	10	1	0	11	30	10	112	0	152	1	4	21	1	27	86	1	0	0	87	277
1:00 - 2:00	1	15	0	0	16	26	7	100	0	133	1	4	23	1	29	83	3	0	0	86	264
1:15 - 2:15	1	16	0	0	17	26	8	88	0	122	0	4	23	1	28	81	6	0	0	87	254
1:30 - 2:30	1	13	0	0	14	21	7	81	0	109	0	4	25	0	29	79	7	0	0	86	238
1:45 - 2:45	1	11	0	0	12	22	8	79	0	109	0	5	24	0	29	85	6	0	0	91	241
2:00 - 3:00	1	19	0	0	20	26	12	81	0	119	0	5	25	0	30	87	5	0	0	92	261
2:15 - 3:15	2	20	0	0	22	24	12	90	0	126	0	4	25	0	29	91	3	0	1	95	272
2:30 - 3:30	2	36	0	0	38	29	15	101	0	145	0	2	28	0	30	85	4	0	1	90	303
2:45 - 3:45	2	38	1	0	41	30	16	118	0	164	0	1	33	0	34	80	5	0	1	86	325
3:00 - 4:00	1	29	1	0	31	36	12	128	0	176	0	1	28	0	29	68	6	0	1	75	311
3:15 - 4:15	0	30	1	0	31	45	13	146	0	204	1	1	27	0	29	65	6	0	0	71	335
3:30 - 4:30	1	18	1	0	20	50	9	159	0	218	2	2	25	0	29	76	5	1	0	82	349
3:45 - 4:45	1	16	0	0	17	53	9	157	0	219	2	5	23	0	30	83	6	1	0	90	356
4:00 - 5:00	1	14	1	0	16	52	10	157	0	219	3	7	26	0	36	94	6	3	0	103	374
4:15 - 5:15	2	22	1	0	25	52	8	162	0	222	2	12	26	0	40	98	5	3	0	106	393
4:30 - 5:30	1	21	1	0	23	53	9	175	0	237	1	14	27	0	42	98	6	2	0	106	408
4:45 - 5:45	3	32	1	0	36	57	9	181	0	247	1	15	26	1	43	93	5	2	0	100	426
5:00 - 6:00	3	34	0	0	37	64	7	202	0	273	1	14	38	1	54	89	3	0	0	92	456
5:15 - 6:15	2	26	0	0	28	72	7	208	0	287	1	9	44	2	56	94	3	0	0	97	468
5:30 - 6:30	2	24	1	0	27	76	10	202	0	288	1	7	41	2	51	90	1	0	0	91	457
5:45 - 6:45	0	13	1	0	14	81	9	211	0	301	1	4	43	1	49	100	2	0	0	102	466
6:00 - 7:00	0	10	1	0	11	77	10	198	0	285	0	5	33	1	39	104	4	0	0	108	443
PEAK HOUR		.0	•	,	• • •			.50	,	200		,		'	55	.54	*	,	,	.00	.40
8:15 - 9:15	2	10	0	0	12	27	14	57	0	98	0	5	53	2	60	170	3	1	1	175	345
5:15 - 6:15	2	26	0	0	28	72	7	208	0	287	1	9	44	2	56	94	3	0	0	97	468

MEDIUMS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland Counted by: VCU

Date: October 09, 2018 Weather: Warm, Light Rain Entered by: BGJ Tuesday



	Lo	ocation:	Montgo	omery C	County,	Marylan	ıd			Ente	ered by:	BGJ					Star Ra	ating: 5		Scory	
TIME	on:	TRAFFIC Crystal I		NORTH ive		on:	TRAFFI Crystal I	C FROM Rock Dr			on:	TRAFF Kinster	IC FROM	I EAST		on:		IC FROM anding			TOTAL N+S +
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
AM						_		_													_
7:00 - 7:15	0	0	0	0	0	2	0	2	0	4	0	0	1	0	1	2	0	0	0	2	7
7:15 - 7:30	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	2	0	0	0	2	5
7:30 - 7:45	0	1	0	0	1	0	1	1	0	2	0	0	1	0	1		0	1	0	2	6
7:45 - 8:00	0	1	0	0	1	0	3	4	0	7	0	1	0	0	1	0	0	0	0	0	9
8:00 - 8:15	0	0	0	0	0	0	2	4	0	6	0	0	1	0	1	1	0	0	0	1	8
8:15 - 8:30	0	0 2	0	0	0 2	1	2	1 2	0	4	0	1 0	0	0	1 0	2	0	0	0	2 2	7 9
8:30 - 8:45		2								5	-									0	
8:45 - 9:00	0		0	0	2	0 2	1	5	0	6	0	0 1	0	0	0	0	0	0 1	0		8
9:00 - 9:15	0	4	0	0	4		3	1		6	0	-	0		1	2	0		0	3	14
9:15 - 9:30	0	5	0	0	5	1	0	1	0	2	1	0	0	0	1	2	0	0	0	2	10
9:30 - 9:45	0	2	0	0	2	2	3	0	0	5	0	1	0	0	1	1	0	0	0	1	9
9:45 - 10:00	0	7	0	0	7	0	4	1	0	5	0	0	0	0	0	0	0	0	0	0	12
0:00 - 10:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2
0:15 - 10:30	0	4	0	0	4	1	1	2	0	4	0	0	0	0	0	0	0	0	0	0	8
0:30 - 10:45	0	3	0	0	3	1	3	1	0	5	1	0	0	0	1	2	0	0	0	2	11
0:45 - 11:00	0	2	0	0	2	1	2	1	0	4	0	0	0	0	0	0	0	0	0	0	6
1:00 - 11:15	0	2	0	0	2	1	3	0	0	4	0	0	0	0	0	1	0	0	0	1	7
1:15 - 11:30	0	2	1	0	3	0	1	2	0	3	0	0	1	0	1	0	0	0	0	0	7
1:30 - 11:45	0	3	0	0	3	0	2	0	0	2	0	0	0	0	0	2	0	0	0	2	7
1:45 - 12:00	0	1	0	0	1	1	1	1	0	3	0	2	0	0	2	0	0	0	0	0	6
2:00 - 12:15	0	1	0	0	1	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	4
2:15 - 12:30	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2
2:30 - 12:45	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	1	0	0	0	1	4
12:45 - 1:00	1	0	0	0	1	0	3	1	0	4	0	0	0	0	0	0	0	0	0	0	5
1:00 - 1:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:15 - 1:30	0	1	0	0	1	0	0	1	0	1	0	0	1	0	1	1	0	0	0	1	4
1:30 - 1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
1:45 - 2:00	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
2:00 - 2:15	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2	0	0	0	2	4
2:15 - 2:30	0	0	0	0	0	1	0	3	0	4	0	0	1	0	1	2	1	0	0	3	8
2:30 - 2:45	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	1	0	0	0	1	5
2:45 - 3:00	0	0	0	0	0	1	0	5	0	6	0	1	0	0	1	0	0	0	0	0	7
3:00 - 3:15	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	4
3:15 - 3:30	1	1	0	0	2 1	1	1	3 1	0	5	0	1	0	0	1	1	0	0	0	1	9
3:30 - 3:45	0	1	0	0	-	1	0	-	0	2	0	0	0	0	0	4	0		0	4	
3:45 - 4:00	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	2
4:00 - 4:15	0	1	0	0	1	1	0	2	0	3	0	1	0	0	1	3	0	0	0	3	8
4:15 - 4:30	0	0	0	0	0	0	1	-	0	2	0	0	0	0	0		0	0	0	2	4
4:30 - 4:45	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	3
4:45 - 5:00 E:00 E:15	0	1	0	0	1	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	4
5:00 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	1	1
5:15 - 5:30 5:45	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
5:30 - 5:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0		0	0	0	1	2
5:45 - 6:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
6:00 - 6:15	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	5
6:15 - 6:30	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
6:30 - 6:45	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	2
6:45 - 7:00	0	2	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3
2 Hr Totals	2	57	1	0	60	19	50	64	0	133	2	9	6	0	17	51	1	2	0	54	264

MEDIUMS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

Star Rating: 5

Group

Location: Montgomery County, Maryland

Entered by: BGJ

HEAVY TRUCKS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland Date: October 09, 2018 Weather: Warm, Light Rain Entered by: BGJ Tuesday

The Truffic

					Waters							Warm,	Light R	ain					i	inup	(i
	Lo	cation:	Montgo	omery C	ounty, l	Marylan				Ente	red by:							ating: 5		A Court	
TIME	on:	TRAFFI Crystal	C FROM Rock Dri			on:	TRAFFI Crystal	C FROM Rock Dri			on:	TRAFF Kinster	IC FROM	I EAST		on:		IC FROM Landing			TOTA N+S
IIWIE	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E + V
AM																					
7:00 - 7:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
7:15 - 7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 - 7:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 - 8:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 - 8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 - 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 - 8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 - 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
9:45 - 10:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
10:15 - 10:30	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:00 - 11:15	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
11:15 - 11:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 - 11:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 - 1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 - 1:30	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:30 - 1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 - 2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 - 2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 - 3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 - 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 - 3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 - 4:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:00 - 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 - 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 - 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 - 5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 - 5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 - 6:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 - 6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 - 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.70 1.00	0	8	1	0	9	0	7	0	0	7	1	0	0	0	1	1	0	0	0	1	18

HEAVY TRUCKS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive

Counted by: VCU

Date: October 09, 2018

Weather: Warm, Light Rain

Tuesday

The Traffic Group

Location: Montgomery County, Maryland

/ Maryland Entered by: RG

Entered by: BGJ

	LC	ocation:	_			waryian					erea by:							ating: 5	1		
TIME	on:	TRAFFI Crystal	C FROM Rock Dri			on:	TRAFFI Crystal	C FROM Rock Dr			on:	TRAFF Kinster	IC FROM	I EAST		on:		IC FROM Landing			TOTAL N+S
IIIVIC	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3
7:15 - 8:15	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:30 - 8:30	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:45 - 8:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 - 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 - 9:45	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
9:00 - 10:00	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
9:15 - 10:15	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	4
9:30 - 10:30	0	1	1	0	2	0	4	0	0	4	0	0	0	0	0	1	0	0	0	1	7
9:45 - 10:45	0	1	1	0	2	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	5
10:00 - 11:00	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	5
10:15 - 11:15	0	2	0	0	2	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	6
10:30 - 11:30	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	4
10:45 - 11:45	0	3	0	0	3	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	5
11:00 - 12:00	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	4
11:15 - 12:15	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
11:30 - 12:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 1:30	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12:45 - 1:45	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:00 - 2:00	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:15 - 2:15	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
1:30 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 - 3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 - 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 - 3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 - 4:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:15 - 4:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 - 4:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 - 4:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:00 - 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 - 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 - 5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 - 6:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 - 6:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 - 6:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 - 6:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HOUR		J	J	J	J	J	J	J	J	J	٦	J	J	J	J	J	J	J	J	U	J
8:15 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 - 6:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
J. 10 - 0. 10	U	- 1	U	U		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	

BICYCLES TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland

5:00 - 5:15

5:15 - 5:30

5:30 - 5:45

5:45 - 6:00

6:00 - 6:15

6:15 - 6:30

6:30 - 6:45

6:45 - 7:00

12 Hr Totals

n

n

0 0

1 0

0 0

0 0

n

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0 0

0 0

n

n

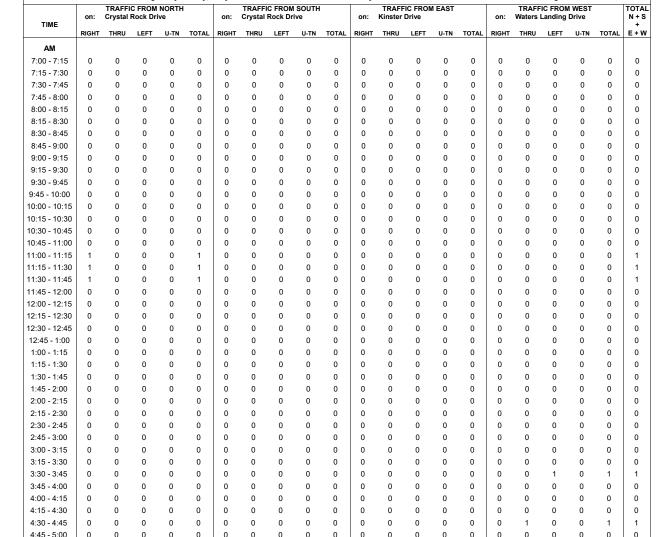
n

0 0

n

Counted by: VCU Date: October 09, 2018

Weather: Warm, Light Rain Entered by: BGJ Tuesday





BICYCLES TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

THRU LEFT

0 1

Star Rating: 5

TRAFFIC FROM WEST

Group

U-TN TOTAL

N+S

E + W

Ω

Location: Montgomery County, Maryland

n

0 0

n

7:30 - 8:30

7:45 - 8:45

8:00 - 9:00

8:15 - 9:15

8:30 - 9:30

8:45 - 9:45

9:00 - 10:00

9:15 - 10:15

9:30 - 10:30

9:45 - 10:45

10:00 - 11:00

10:15 - 11:15

10:30 - 11:30

10:45 - 11:45

12:30 - 1:30

12:45 - 1:45

2:30 - 3:30

4:45 - 5:45

5:15 - 6:15

n

 Entered by: BGJ

TRAFFIC FROM NORTH TRAFFIC FROM SOUTH TRAFFIC FROM EAST on: Crystal Rock Drive on: Crystal Rock Drive on: Kinster Drive on: Waters Landing Drive TIME RIGHT THRU LEFT U-TN TOTAL RIGHT THRU LEFT U-TN TOTAL RIGHT THRU LEFT U-TN TOTAL RIGHT 1 Hr Totals 7:00 - 8:00 7:15 - 8:15

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n n

11:00 - 12:00 11:15 - 12:15 n Ω Ω n Λ n n n n 11:30 - 12:30 11:45 - 12:45 12:00 - 1:00 12:15 - 1:15

1:00 - 2:00 1:15 - 2:15 1:30 - 2:30 Λ 1:45 - 2:45 2:00 - 3:00 n n Λ n Λ Ω n n n n 2:15 - 3:15

2:45 - 3:45 3:00 - 4:00 3:15 - 4:15 3:30 - 4:30 3:45 - 4:45 Ω 4:00 - 5:00 4:15 - 5:15 4:30 - 5:30

5:00 - 6:00 Ω Ω Ω 5:15 - 6:15 n n Λ n Ω n Ω 5:30 - 6:30 5:45 - 6:45 6:00 - 7:00 PEAK HOUR 8:15 - 9:15

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PEDESTRIAN AND BICYCLE OBSERVATIONS - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland

Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday



	and: Kinster Drive - Waters Location: Montgomery County, N		meather: warm, Light Rain intered by: BGJ	Star Rating: 5
	NORTH	H LEG	SOU	TH LEG
TIME	Crystal Ro Pedestrians	ock Drive Bicycles	Crystal I Pedestrians	Rock Drive Bicycles
	reuestrians	Bicycles	reuestrans	Bicycles
AM		_	_	_
7:00 - 7:15	1	0	0	0
7:15 - 7:30	0	0	1	0
7:30 - 7:45	1	0	0	0
7:45 - 8:00	1	0	0	0
8:00 - 8:15	2	0	1	0
8:15 - 8:30	0	0	0	0
8:30 - 8:45	1	0	0	0
8:45 - 9:00	0	0	0	0
9:00 - 9:15	1	0	0	0
9:15 - 9:30	0	0	0	0
9:30 - 9:45	1	0	0	0
9:45 - 10:00	1	0	0	0
10:00 - 10:15	0	0	1	0
10:15 - 10:30	0	0	0	0
10:30 - 10:45	0	0	0	0
10:45 - 11:00	1	0	0	0
11:00 - 11:15	0	0	1	0
11:15 - 11:30	2	0	2	0
11:30 - 11:45	1	0	0	0
11:45 - 12:00	0	0	0	0
12:00 - 12:15	1	0	0	0
12:15 - 12:30	0	0	0	0
12:30 - 12:45	3	0	0	0
12:45 - 1:00	0	0	0	0
1:00 - 1:15	1	0	0	0
1:15 - 1:30	0	0	0	0
1:30 - 1:45	1	0	0	0
1:45 - 2:00	0	0	0	0
2:00 - 2:15	0	0	0	0
	1	0	0	0
2:15 - 2:30	0			-
2:30 - 2:45		0	1	0
2:45 - 3:00	5	0	1	0
3:00 - 3:15	0	0	0	0
3:15 - 3:30	0	0	0	0
3:30 - 3:45	1	0	0	0
3:45 - 4:00	1	0	0	0
4:00 - 4:15	0	0	0	0
4:15 - 4:30	0	0	0	0
4:30 - 4:45	1	0	1	0
4:45 - 5:00	1	0	3	0
5:00 - 5:15	2	0	1	0
5:15 - 5:30	1	0	0	0
5:30 - 5:45	2	0	0	0
5:45 - 6:00	2	0	2	0
6:00 - 6:15	1	0	1	0
6:15 - 6:30	4	0	0	0
6:30 - 6:45	3	0	0	0
6:45 - 7:00	1	0	0	0
TOTALS	45	0	16	0

PEDESTRIAN AND BICYCLE OBSERVATIONS - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland

Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain Entered by: BGJ

Tuesday





	EAST LE Kinster Dr		WEST L Waters Landi	
	Pedestrians	Bicycles	Pedestrians	Bicycles
AM				
7:00 - 7:15	0	0	0	0
7:15 - 7:30	0	0	1	0
7:30 - 7:45	4	0	2	0
7:45 - 8:00	1	0	0	0
8:00 - 8:15	0	0	2	0
8:15 - 8:30	0	0	0	0
8:30 - 8:45	0	0	3	0
8:45 - 9:00	0	0	2	0
9:00 - 9:15	0	0		0
		·	1	
9:15 - 9:30	0	0	0	0
9:30 - 9:45	1	0	0	0
9:45 - 10:00	2	0	1	0
10:00 - 10:15	0	0	0	0
0:15 - 10:30	0	0	0	0
0:30 - 10:45	0	0	0	0
10:45 - 11:00	1	0	0	0
11:00 - 11:15	1	0	0	0
11:15 - 11:30	1	0	0	0
1:30 - 11:45	0	0	1	0
1:45 - 12:00	0	0	1	0
2:00 - 12:15	0	0	1	0
2:15 - 12:30	0	0	2	0
12:30 - 12:45	3	0	0	0
12:45 - 1:00	0	0	0	0
1:00 - 1:15	1	0	0	0
1:15 - 1:30	0	0	2	0
	0	*	2	
1:30 - 1:45		0		0
1:45 - 2:00	0	0	0	0
2:00 - 2:15	1	0	1	0
2:15 - 2:30	1	0	0	0
2:30 - 2:45	0	0	2	0
2:45 - 3:00	2	0	0	0
3:00 - 3:15	0	0	0	0
3:15 - 3:30	0	0	0	0
3:30 - 3:45	0	0	1	0
3:45 - 4:00	2	0	1	0
4:00 - 4:15	0	0	1	0
4:15 - 4:30	0	0	0	0
4:30 - 4:45	0	0	0	0
4:45 - 5:00	4	0	1	0
5:00 - 5:15	0	1	1	0
5:15 - 5:30	0	0	3	0
5:30 - 5:45	0	0	6	0
5:45 - 6:00	2	0	0	0
6:00 - 6:15	1	0	1	0
		*		
6:15 - 6:30	0	0	3	0
6:30 - 6:45	0	0	4	0
6:45 - 7:00 TOTALS	2 30	0	4 50	0

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Location: Montgomery County, Maryland

Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

		and:	Kinste	r Drive -	- Waters	Landir	ng Drive			W	eather:	Warm,	Light R	ain					i	Situp	
	Lo	cation:	Montg	omery C	County,	Marylar	nd			Ente	red by:	BGJ						ating: 5		Newdy	
TIME	on:		IC FROM Rock Dr	I NORTH		on:		IC FROM Rock Dri			on:	TRAFF Kinster	FIC FROM Drive	/ EAST		on:		IC FROM Landing			TOTA N+S
111111	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E + V
AM																					
7:00 - 7:15	0	2	0	0	2	4	2	16	0	22	1	0	12	0	13	49	1	0	0	50	87
7:15 - 7:30	0	3	0	0	3	3	7	10	1	21	0	0	17	1	18	51	0	1	0	52	94
7:30 - 7:45	0	2	0	0	2	7	6	12	0	25	0	0	9	0	9	37	1	1	0	39	75
7:45 - 8:00	0	4	0	0	4	12	5	16	0	33	0	3	14	0	17	40	3	0	0	43	97
8:00 - 8:15	0	3	0	0	3	12	2	15	0	29	0	0	13	0	13	37	0	0	0	37	82
8:15 - 8:30	1	2	0	0	3	7	4	16	0	27	0	2	21	0	23	36	1	1	0	38	91
8:30 - 8:45	0	4	0	0	4	3	5	17	0	25	0	2	17	0	19	43	0	0	0	43	91
8:45 - 9:00	1	7	0	0	8	12	4	18	0	34	0	2	6	1	9	47	2	0	1	50	101
9:00 - 9:15	0	5	0	0	5	8	10	15	0	33	0	1	9	1	11	50	0	1	0	51	100
9:15 - 9:30	0	7	0	0	7	2	1	12	0	15	1	0	4	0	5	33	2	0	0	35	62
9:30 - 9:45	0	4	0	0	4	11	9	14	0	34	0	1	10	1	12	33	0	0	0	33	83
9:45 - 10:00	0	11	1	0	12	1	4	18	0	23	0	0	5	0	5	23	1	1	0	25	65
10:00 - 10:15	1	4	0	0	5	3	4	11	0	18	0	0	6	0	6	22	0	1	0	23	52
10:15 - 10:30	1	7	0	0	8	6	5	17	0	28	0	0	6	0	6	22	1	0	0	23	65
10:30 - 10:45	0	7	0	0	7	4	5	17	0	26	1	0	9	0	10	29	0	0	0	29	72
10:45 - 11:00	1	5	0	0	6	4	6	18	0	28	0	1	5	2	8	25	0	0	0	25	67
11:00 - 11:15	2	7	0	0	9	5	8	14	0	27	0	1	7	0	8	22	0	1	0	23	67
11:15 - 11:30	0	4	2	0	6	2	3	14	0	19	0	0	6	0	6	11	0	1	0	12	43
11:30 - 11:45	1	11	1	0	13	1	4	14	0	19	1	0	5	0	6	23	2	0	0	25	63
11:45 - 12:00	0	3	0	0	3	6	8	24	0	38	0	2	10	0	12	24	1	0	0	25	78
12:00 - 12:15	0	3	0	0	3	5	3	27	0	35	1	2	5	0	8	26	3	0	0	29	75
12:15 - 12:30	1	4	0	0	5	4	4	30	0	38	1	1	7	0	9	22	2	0	0	24	76
12:30 - 12:45	1	8	0	0	9	8	5	14	0	27	0	1	4	0	5	20	1	0	0	21	62
12:45 - 1:00	1	0	1	0	2	8	7	37	0	52	0	1	4	0	5	27	0	0	0	27	86
1:00 - 1:15	0	2	0	0	2	7	3	25	0	35	1	1	6	0	8	22	0	0	0	22	67
1:15 - 1:30	0	4	0	0	4	9	4	32	0	45	0	2	5	1	8	21	0	0	0	21	78
1:30 - 1:45	0	5	0	0	5	6	1	20	0	27	0	0	7	0	7	18	1	0	0	19	58
1:45 - 2:00	1	7	0	0	8	4	2	24	0	30	0	1	6	0	7	24	2	0	0	26	71
2:00 - 2:15	0	4	0	0	4	7	4	13	0	24	0	1	6	0	7	22	3	0	0	25	60
2:15 - 2:30	0	0	0	0	0	5	2	27	0	34	0	2	7	0	9	20	2	0	0	22	65
2:30 - 2:45	0	3	0	0	3	7	5	19	0	31	0	1	6	0	7	24	0	0	0	24	65
2:45 - 3:00	1	13	0	0	14	9	5	31	0	45	0	2	7	0	9	26	1	0	0	27	95
3:00 - 3:15	1	5	0	0	6	5	3	23	0	31	0	0	6	0	6	26	1	0	1	28	71
3:15 - 3:30	1	17	0	0	18	10	6	38	0	54	0	1	9	0	10	13	2	0	0	15	97
3:30 - 3:45	0	6	1	0	7	9	3	36	0	48	0	0	11	0	11	22	1	0	0	23	89
3:45 - 4:00	0	5	0	0	5	14	1	38	0	53	0	1	2	0	3	14	2	0	0	16	77
4:00 - 4:15	0	6	0	0	6	15	4	42	0	61	1	1	5	0	7	24	1	0	0	25	99
4:15 - 4:30	1	4	0	0	5	14	2	49	0	65	1	1	7	0	9	25	1	1	0	27	106
4:30 - 4:45	0	3	0	0	3	11	3	34	0	48	0	3	9	0	12	27	2	0	0	29	92
4:45 - 5:00	0	3	1	0	3 4	13	2	38	0	53	1	3	5	0	9	26	2	2	0	30	96
5:00 - 5:15	1	ა 13	0	0	14	14	2	36 45	0	53 61	0	5 5	5 5	0	9 10	26	0	0	0	26	111
							2				-						2		0		
5:15 - 5:30 5:30 5:45	0	4 15	0	0	4 17	15 15	3	62 39	0	79 57	0	3	8	0	11	23	1	0	0	25 22	119 109
5:30 - 5:45 5:45 - 6:00	2	15	0	0		15 20	0	39 58	0	57 70	0	4 2	8 17	1 0	13	21 21	0	0	0		
		5	0		5				0	78					20					21	124
6:00 - 6:15	0	7	0	0	7	22	2	51	0	75	0	0	11	1	12	33	0	0	0	33	127
6:15 - 6:30	0	1	1	0	2	19	5	56	0	80	0	1	5	0	6	19	0	0	0	19	107
6:30 - 6:45	0	3	0	0	3	20	2	49	0	71	0	1	10	0	11	31	2	0	0	33	118
6:45 - 7:00	0	3	0	0	3	16	1	45	0	62	0	3	7	0	10	25	2	0	0	27	102
12 Hr Totals	19	255	8	0	282	424	188	1310	1	1923	11	59	386	9	465	1305	49	11	2	1367	4037

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Intersection of: Crystal Rock Drive and: Kinster Drive - Waters Landing Drive Counted by: VCU Date: October 09, 2018 Weather: Warm, Light Rain

Tuesday

					Waters		-					Warm,	∟ight R	aın			O4	-4!	. i	inup	
	Lo		Montgo C FROM	-	County, I	warylan		C FROM	COLITY		red by:		IC FROM	MEACT		1		ating: 5	,	0.000	TOTAL
TIME	on:		Rock Dr			on:		Rock Dri			on:	Kinster		WIEASI		on:		Landing			N+S
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	E+W
1 Hr Totals																					
7:00 - 8:00	0	11	0	0	11	26	20	54	1	101	1	3	52	1	57	177	5	2	0	184	353
7:15 - 8:15	0	12	0	0	12	34	20	53	1	108	0	3	53	1	57	165	4	2	0	171	348
7:30 - 8:30	1	11	0	0	12	38	17	59	0	114	0	5	57	0	62	150	5	2	0	157	345
7:45 - 8:45	1	13	0	0	14	34	16	64	0	114	0	7	65	0	72	156	4	1	0	161	361
8:00 - 9:00	2	16	0	0	18	34	15	66	0	115	0	6	57	1	64	163	3	1	1	168	365
8:15 - 9:15	2	18	0	0	20	30	23	66	0	119	0	7	53	2	62	176	3	2	1	182	383
8:30 - 9:30	1	23	0	0	24	25	20	62	0	107	1	5	36	2	44	173	4	1	1	179	354
8:45 - 9:45	1	23	0	0	24	33	24	59	0	116	1	4	29	3	37	163	4	1	1	169	346
9:00 - 10:00	0	27	1	0	28	22	24	59	0	105	1	2	28	2	33	139	3	2	0	144	310
9:15 - 10:15	1	26	1	0	28	17	18	55	0	90	1	1	25	1	28	111	3	2	0	116	262
9:30 - 10:30	2	26	1	0	29	21	22	60	0	103	0	1	27	1	29	100	2	2	0	104	265
9:45 - 10:45	2	29	1	0	32	14	18	63	0	95	1	0	26	0	27	96	2	2	0	100	254
10:00 - 11:00	3	23	0	0	26	17	20	63	0	100	1	1	26	2	30	98	1	1	0	100	256
10:15 - 11:15	4	26	0	0	30	19	24	66	0	109	1	2	27	2	32	98	1	1	0	100	271
10:30 - 11:30	3	23	2	0	28	15	22	63	0	100	1	2	27	2	32	87	0	2	0	89	249
10:45 - 11:45	4	27	3	0	34	12	21	60	0	93	1	2	23	2	28	81	2	2	0	85	240
11:00 - 12:00	3	25	3	0	31	14	23	66	0	103	1	3	28	0	32	80	3	2	0	85	251
11:15 - 12:15	1	21	3	0	25	14	18	79	0	111	2	4	26	0	32	84	6	1	0	91	259
11:30 - 12:30	2	21	1	0	24	16	19	95	0	130	3	5	27	0	35	95	8	0	0	103	292
11:45 - 12:45	2	18	0	0	20	23	20	95	0	138	2	6	26	0	34	92	7	0	0	99	291
12:00 - 1:00	3	15	1	0	19	25	19	108	0	152	2	5	20	0	27	95	6	0	0	101	299
12:15 - 1:15	3	14	1	0	18	27	19	106	0	152	2	4	21	0	27	91	3	0	0	94	291
12:30 - 1:30	2	14	1	0	17	32	19	108	0	159	1	5	19	1	26	90	1	0	0	91	293
12:45 - 1:45	1		1	0	13	30	15	114	0	159	1	4	22	1	28	88	1	0	0	89	289
1:00 - 2:00	1	11 18	0	0	19	26	10	101	0	137	1	4	24	1	30	85	3	0	0	88	274
			0									4							0		267
1:15 - 2:15 1:30 - 2:30	1	20 16	0	0	21 17	26 22	11 9	89 84	0	126	0	4	24 26	1 0	29 30	85 84	6	0	0	91	254
			-							115							8	-		92	_
1:45 - 2:45	1	14	0	0	15	23	13	83	0	119	0	5	25	0	30	90	7	0	0	97	261
2:00 - 3:00	1	20	0	0	21	28	16	90	0	134	0	6	26	0	32	92	6	0	0	98	285
2:15 - 3:15	2	21	0	0	23	26	15	100	0	141	0	5	26	0	31	96	4	0	1	101	296
2:30 - 3:30	3	38	0	0	41	31	19	111	0	161	0	4	28	0	32	89	4	0	1	94	328
2:45 - 3:45	3	41	1	0	45	33	17	128	0	178	0	3	33	0	36	87	5	0	1	93	352
3:00 - 4:00	2	33	1	0	36	38	13	135	0	186	0	2	28	0	30	75	6	0	1	82	334
3:15 - 4:15	1	34	1	0	36	48	14	154	0	216	1	3	27	0	31	73	6	0	0	79	362
3:30 - 4:30	1	21	1	0	23	52	10	165	0	227	2	3	25	0	30	85	5	1	0	91	371
3:45 - 4:45	1	18	0	0	19	54	10	163	0	227	2	6	23	0	31	90	6	1	0	97	374
4:00 - 5:00	1	16	1	0	18	53	11	163	0	227	3	8	26	0	37	102	6	3	0	111	393
4:15 - 5:15	2	23	1	0	26	52	9	166	0	227	2	12	26	0	40	104	5	3	0	112	405
4:30 - 5:30	1	23	1	0	25	53	9	179	0	241	1	14	27	0	42	102	6	2	0	110	418
4:45 - 5:45	3	35	1	0	39	57	9	184	0	250	1	15	26	1	43	96	5	2	0	103	435
5:00 - 6:00	3	37	0	0	40	64	7	204	0	275	1	14	38	1	54	91	3	0	0	94	463
5:15 - 6:15	2	31	0	0	33	72	7	210	0	289	1	9	44	2	56	98	3	0	0	101	479
5:30 - 6:30	2	28	1	0	31	76	10	204	0	290	1	7	41	2	51	94	1	0	0	95	467
5:45 - 6:45	0	16	1	0	17	81	9	214	0	304	1	4	43	1	49	104	2	0	0	106	476
6:00 - 7:00	0	14	1	0	15	77	10	201	0	288	0	5	33	1	39	108	4	0	0	112	454
PEAK HOUR																					
8:15 - 9:15	2	18	0	0	20	30	23	66	0	119	0	7	53	2	62	176	3	2	1	182	383
5:15 - 6:15	2	31	0	0	33	72	7	210	0	289	1	9	44	2	56	98	3	0	0	101	479



Appendix B

Black Hill Data

Local Area Transportation Review and Policy Area Mobility Review (LATR & PAMR)

BLACK HILLS (FORMERLY CRYSTAL ROCK) MIXED-USE T.O.D. Montgomery County, Maryland

December 4, 2014

Prepared for: Black Hills Germantown, LLLP

TRIP GENERATION FOR BACKGROUND DEVELOPMENTS

TRIP RATES / FORMULAE	IN/OUT
General Office (Montgomery County, < 25 ksf)	
Morning Trips = (1.38 x KSF)	87/13
Evening Trips = (2.24 x KSF)	17/83
General Office (Montgomery County, ≥ 25 ksf)	
Morning Trips = (1.70 x KSF) - 8	87/13
Evening Trips = (1.44 x KSF) + 20	17/83
Retail, No Major Food Chain (Montgomery County, <50 ksf)	
Morning Trips = 25% x Evening Trips	52/48
Evening Trips = ((12.36xKSF))x(105+.002(200-KSF))	52/48
Single-Family Units (Montgomery County, <75 Units)	
Morning Trips = (0.95 x Units)	25/75
Evening Trips = (1.11 x Units)	64/36
Single-Family Units (Montgomery County, ≥75 Units)	
Morning Trips = (0.62 x Units) + 25	25/75
Evening Trips = (0.82 x Units) + 21	64/36
Townhouse/Sigle Family Attached Units (Montgomery County, <100 Units)	
Morning Trips = (0.48 x Units)	17/83
Evening Trips = (0.83 x Units)	67/33
Townhouse/Sigle Family Attached Units (Montgomery County, ≥100 Units)	
Morning Trips = (0.53 x Units) - 5	17/83
Evening Trips = (0.48 x Units) + 35	67/33
Garden/Mid-Rise Apartments <10 stories (Montgomery County, <75 Units)	
Morning Trips = (0.44 x Units)	20/80
Evening Trips = (0.48 x Units)	66/34
Garden/Mid-Rise Apartments <10 stories (Montgomery County, ≥75 Units)	
Morning Trips = (0.40 x Units) + 3	20/80
Evening Trips = (0.47 x Units) + 1	66/34
Day Care Center (Students, ITE-565)	
Morning Trips = 0.80 x Students	53/47
Evening Trips = 0.82 x Students	47/53
Church (ksf, ITE-560)	
Morning Trips = 0.56 x ksf	62/38
Evening Trips = 0.55 x ksf	48/52



EXHIBIT 4
TRIP GENERATION FOR
BACKGROUND DEVELOPMENTS

RIP TOTALS		S				
AIP TOTALS	MOI	RNING PEAK	HOUR	EVEN	ING PEAK H	OUR
Salar Security I	IN	OUT	TOTAL	IN	OUT	TOTAL
. Tapestry (120050950)						
ingle-Family Units (Montgamery County, <75	Units)					
66 units	16	47	63	47	26	73
. Clarksburg Village (120010300)						7.5
ngle-Family Units (Montgomery County, ≥75	Units)					
450 units	76	228	304	250	140	390
arden/Mid-Rise Apartments <10 stories (Mo				250	240	330
168 units	15	59	74	53	28	81
etail, No Major Food Chain (Montgomery Co				23	20	51
6,000 sq.ft.	6	5	11	22	20	42
TAXABLE PARTY CONTROL OF THE P						
Pass-by Trips	-3	-3 2	<u>-6</u>	-14	-13	-27
New Trips	3	2	5	8	7	15
Montgomery College Germantown (12011	0380)					
neral Office (Montgomery County)	7530	327	12840	44	1572	500
80,000 sq.ft.	111	17	128	23	112	135
Goddard Child Day Care - Clarksburg (120)	10020)	633	100			
y Care Center (Students, ITE-565)	200		t daily care p			
283 students	69	61	130	109	123	232
Pass-by Trips	-47	-41	-88	-80	-90	-170
New Trips	22	20	42	29	33	62
abin Branch (120031100C and DPA No. 1	2.021 1/					
Contract to the contract of th	3-02)					
sidential	A. C.					
gle-Family Units (Montgomery County, ≥75	Units)					
938 units	152	455	607	506	284	790
vnhouse/Sigle Family Attached Units (Mon	tgomery	County, ≥100	Units)			
581 units	52	251	303	210	104	314
rden/Mid-Rise Apartments <10 stories (Mo	ntgomery	County, ≥75		11.44	-1785	
367 units	30	120	150	114	59	173
Subtotal	234	826	1060	830	447	1277
	-20	-41	-61			
Less internal to Retail 115%				-//	-/1	- 1/15
Less Internal to Retail (15%)				-74 -125	-71 -52	-145
Less Internal to Employment (15%)	-35	-124	-159	-125	-53	-178
						20.00
Less Internal to Employment (15%) New Residential Trips	-35	-124	-159	-125	-53	-178
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P)	<u>-35</u> 179	-124 661	<u>-159</u> 840	-125	-53	-178
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services	-35 179 (>150 Un	-124 661 nits, Montgom	- <u>159</u> 840 ery County)	- <u>125</u> 631	<u>-53</u> 323	<u>-178</u> 954
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P)	<u>-35</u> 179	-124 661	<u>-159</u> 840	-125	-53	-178
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services	-35 179 (>150 Un	-124 661 nits, Montgom	- <u>159</u> 840 ery County)	- <u>125</u> 631	<u>-53</u> 323	<u>-178</u> 954
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total	-35 179 (>150 Un	-124 661 nits, Montgom 26	- <u>159</u> 840 ery County) 40	-125 631	<u>-53</u> 323	<u>-178</u> 954
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment	-35 179 (>150 Un 14 193	-124 661 nits, Montgom 26 687	-159 840 ery County) 40 880	-125 631 30 661	- <u>53</u> 323 25 348	-178 954 55 1009
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total ammercial/Employment 34,000 sq.ft. Retail	-35 179 (>150 Un 14 193	-124 661 nits, Montgom 26 687	- <u>159</u> 840 ery County) 40	-125 631	<u>-53</u> 323	<u>-178</u> 954
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment	-35 179 (>150 Un 14 193 55 220	-124 661 nits, Montgom 26 687 50 82	-159 840 ery County) 40 880	-125 631 30 661	25 348 202	-178 954 55 1009
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail	-35 179 (>150 Un 14 193	-124 661 nits, Montgom 26 687	-159 840 ery County) 40 880	-125 631 30 661	- <u>53</u> 323 25 348	-178 954 55 1009
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center	-35 179 (>150 Un 14 193 55 220	-124 661 nits, Montgom 26 687 50 82 132	-159 840 ery County) 40 880 105 302	30 661 218 258	25 348 202 290	-178 954 55 1009 420 548
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%)	-35 179 (>150 Un 14 193 55 220 275 -41	-124 661 nits, Montgom 26 687 50 82 132 -20	-159 840 sery County) 40 880 105 302 407 -61	30 661 218 258 476 -71	25 348 202 290 492 -74	55 1009 420 548 968 -145
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%)	-35 179 (>150 Un 14 193 55 220 275 -41 -41	-124 661 nits, Montgom 26 687 50 82 132 -20 -20	-159 840 ery County) 40 880 105 302 407 -61 -61	30 661 218 258 476 -71 -71	25 348 202 290 492 -74 -53	55 1009 420 548 968 -145
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20	-159 840 sery County) 40 880 105 302 407 -61	30 661 218 258 476 -71	25 348 202 290 492 -74	55 1009 420 548 968 -145
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20 -20	-159 840 ery County) 40 880 105 302 407 -61 -61	30 661 218 258 476 -71 -71	25 348 202 290 492 -74 -53	55 1009 420 548 968 -145
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92	-159 840 ery County) 40 880 105 302 407 -61 -61 285	30 661 218 258 476 -71 -71 334	25 348 202 290 492 -74 -53 365	55 1009 420 548 968 -145 -124 699
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P) ependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft.	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20 -20	-159 840 ery County) 40 880 105 302 407 -61 -61	30 661 218 258 476 -71 -71	25 348 202 290 492 -74 -53	55 1009 420 548 968 -145
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P) ependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92	-159 840 ery County) 40 880 105 302 407 -61 -61 285	30 661 218 258 476 -71 -71 334	25 348 202 290 492 -74 -53 365	55 1009 420 548 968 -145 -124 699
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (5/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft.	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92	-159 840 ery County) 40 880 105 302 407 -61 -61 285	30 661 218 258 476 -71 -71 334	25 348 202 290 492 -74 -53 365	55 1009 420 548 968 -145 -124 699
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. tel Rooms (ITE-310)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193) 913 955	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150	30 661 218 258 476 -71 -71 334 156	25 348 202 290 492 -74 -53 365 760 898	55 1009 420 548 968 -145 -124 699 916
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. tel Rooms (ITE-310) 87,500 sq.ft.	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150	30 661 218 258 476 -71 -71 334 156 159	25 348 202 290 492 -74 -53 365 760 898	55 1009 420 548 968 -145 -124 699 916 1057
Less Internal to Employment (15%) New Residential Trips vice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. tel Rooms (ITE-310) 87,500 sq.ft. sployment Subtotal	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263	30 661 218 258 476 -71 -71 334 156 159	25 348 202 290 492 -74 -53 365 760 898 35 1693	55 1009 420 548 968 -145 -124 699 916 1057
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) lependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. tel Rooms (ITE-310) 87,500 sq.ft. sployment Subtotal Internal to Residential (15%)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906 -124	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263 -159	30 661 218 258 476 -71 -71 334 156 159 37 352 -53	25 348 202 290 492 -74 -53 365 760 898 35 1693 -125	55 1009 420 548 968 -145 -124 699 916 1057 72 2045 -178
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. stel Rooms (ITE-310) 87,500 sq.ft. inployment Subtotal Internal to Residential (15%) Internal to Retail (15%)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906 -124 -20	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195 26 357 -35 -41	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263 -159 -61	30 661 218 258 476 -71 -71 334 156 159 37 352 -53 -53	25 348 202 290 492 -74 -53 365 760 898 35 1693 -125 -71	55 1009 420 548 968 -145 -124 699 916 1057 72 2045 -178 -124
Less Internal to Employment (15%) New Residential Trips rvice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips meral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. search & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. stel Rooms (ITE-310) 87,500 sq.ft. inployment Subtotal Internal to Residential (15%)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906 -124	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263 -159	30 661 218 258 476 -71 -71 334 156 159 37 352 -53	25 348 202 290 492 -74 -53 365 760 898 35 1693 -125	55 1009 420 548 968 -145 -124 699 916 1057 72 2045 -178
Less Internal to Employment (15%) New Residential Trips ervice/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total mmercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips eneral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. esearch & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. otel Rooms (ITE-310) 87,500 sq.ft. inployment Subtotal Internal to Residential (15%) Internal to Retail (15%) Net Employment Trips	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906 -124 -20 1762	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195 26 357 -35 -41 281	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263 -159 -61 2043	-125 631 30 661 218 258 476 -71 -71 334 156 159 37 352 -53 -53 246	25 348 202 290 492 -74 -53 365 760 898 35 1693 -125 -71 1497	-178 954 55 1009 420 548 968 -145 -124 699 916 1057 72 2045 -178 -124 1743
Less Internal to Employment (15%) New Residential Trips Price/Public Use (S/P) dependent Living with min Support Services 500 units New Residential and S/P Trip Total Dommercial/Employment 34,000 sq.ft. Retail 450,000 sq.ft. Outlet Center Subtotal Less Internal to Residential (15%) Less Internal to Employment (15%) Net Retail Trips Peneral Office (Montgomery County, ≥ 25 ksf, 622,000 sq.ft. Desearch & Dev. Center (ksf, ITE-760) 1,226,500 sq.ft. Dotal Rooms (ITE-310) 87,500 sq.ft. Internal to Residential (15%) Internal to Residential (15%) Internal to Retail (15%)	-35 179 (>150 Un 14 193 55 220 275 -41 -41 193 913 955 38 1906 -124 -20	-124 661 nits, Montgom 26 687 50 82 132 -20 -20 92 136 195 26 357 -35 -41	-159 840 ery County) 40 880 105 302 407 -61 -61 285 1049 1150 64 2263 -159 -61	30 661 218 258 476 -71 -71 334 156 159 37 352 -53 -53	25 348 202 290 492 -74 -53 365 760 898 35 1693 -125 -71	55 1009 420 548 968 -145 -124 699 916 1057 72 2045 -178 -124



 Trips for Cabin Branch obtained from Montgomery County. A copy is included in Appendix A. EXHIBIT 4 CONT'D TRIP GENERATION FOR BACKGROUND DEVELOPMENTS

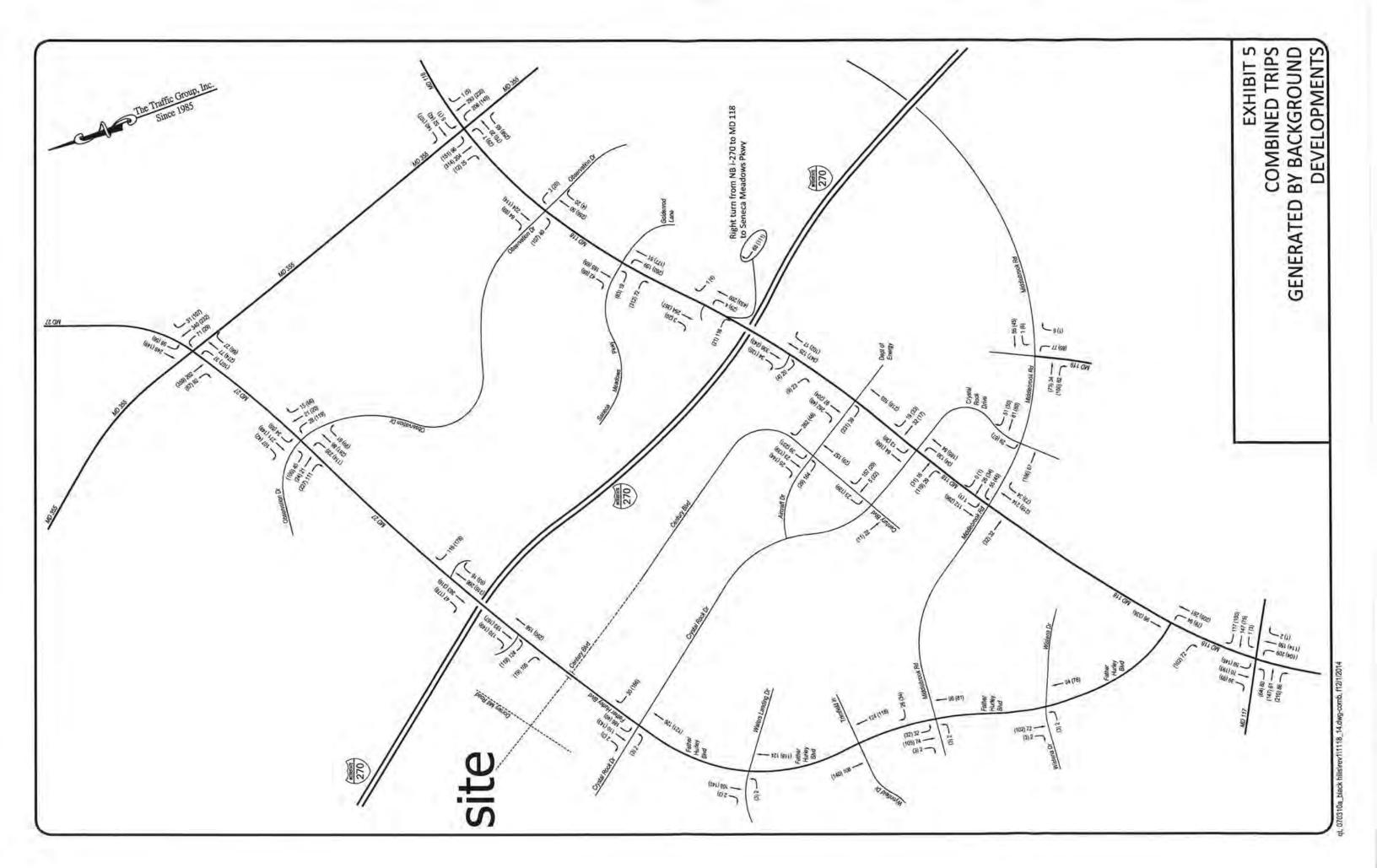
TRIP GENERATION FOR BACKGROUND DEVELOPMENTS

1 County, <1 9 36 51 10090) 0 ksf) 12	TOTAL dersections) 2 00 Units) 11 278	1 12 45	OUT 1 6 217	2 18 262
1 County, <1 9 36 51 10090) 0 ksf) 12	2 00 Units) 11 278	12	6	18
9 36 51 10090) 0 ksf) 12	278	12 45	6	18
9 36 51 10090) 0 ksf) 12	278	12 45	6	18
9 36 51 10090) 0 ksf) 12	278	45		
9 36 51 10090) 0 ksf) 12	278	45		
51 1 0090) 0 ksf) 12		45		
51 1 0090) 0 ksf) 12			217	262
51 1 0090) 0 ksf) 12			217	262
51 1 0090) 0 ksf) 12			-	
10090) 0 ksf) 12	392			
10090) 0 ksf) 12	392	C1		
10090) 0 ksf) 12	322	D-1	297	358
0 ksf) 12		91	421	330
12				
	26	54	49	103
-7	-15	-35	-32	-67
5	11	19		
3	11	19	17	36
74	236	20	100	225
31	236	38	188	226
100	226	770	740	3,60
180	375	779	719	1498
<u>-58</u>	<u>-120</u>	-265	-244	-509
122	255	514	475	989
	ACCUPANT.			
y County, ≥	The second secon			
122	152	116	60	176
50	383	60	291	351
12	91	18	86	104
3	22	6	31	37
2	3	2	1	3
			-	-
	22	6	29	35
	2	3 22	3 22 6	



EXHIBIT 4 CONT'D TRIP GENERATION FOR BACKGROUND DEVELOPMENTS

qt, 070310a_black hills\rev1\trips1.xls-backtrips2, f11/19/14



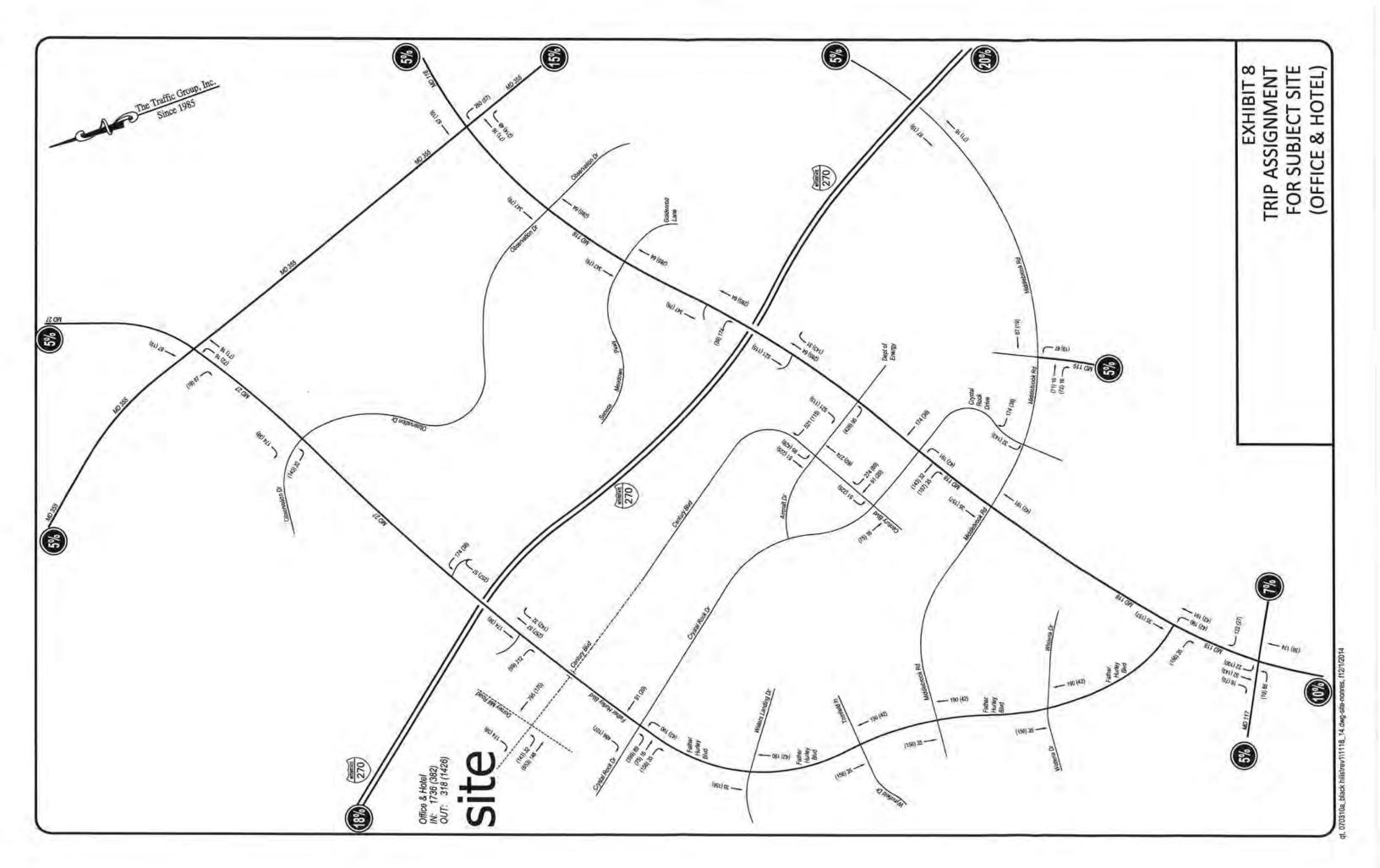
TRIP GENERATION FOR BLACK HILLS

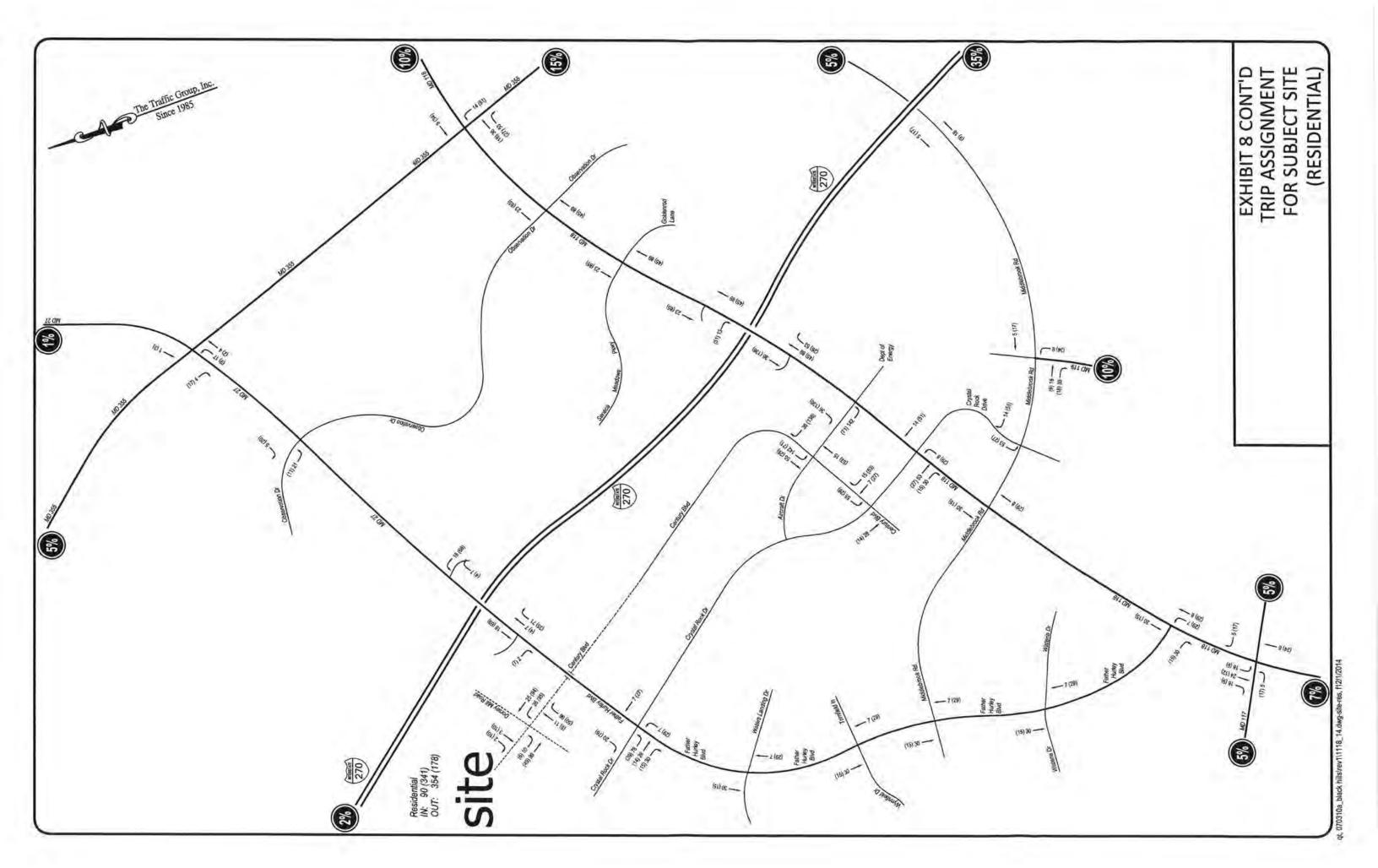
TRIP RATES / FORMULAE	IN/OUT	
General Office (Montgomery County, ≥ 25 ksf)	100	
Morning Trips = (1.70 x KSF) - 8	87/13	
Evening Trips = (1.44 x KSF) + 20	17/83	
Hotel Rooms (ITE-310)		
Morning Trips = 0.56 x Rooms	61/39	
Evening Trips = 0.59 x Rooms	53/47	
Assisted Living Facilities (Beds, Montgomery County)		
Morning Trips = 0.03 x Beds	35/65	
Evening Trips = 0.06 x Beds	61/39	
Garden/Mid-Rise Apartments <10 stories (Montgomery County, ≥75 Units)		
Morning Trips = (0.40 x Units) + 3	20/80	
Evening Trips = (0.47 x Units) + 1	66/34	

TRIP TOTALS	MOR	MORNING PEAK HOUR		EVE	NING PEAK H	IOUR
	IN	OUT	TOTAL	IN	OUT	TOTAL
General Office (Montgon	nery County, ≥ 25	ksf)				
1,097,800 sq.ft.	1616	242	1858	272	1329	1601
Neighborhood Retail, 91, Hotel Rooms (ITE-310)	400 SF, No externa	ıl trips, servic	ce site only.			
350 rooms	120	76	196	110	97	207
Assisted Living Facilities (Beds, Montgome	ry County)				
102 beds	2	1	3	3	3	6
Garden/Mid-Rise Apartm	ents <10 stories (Montgome	ry County, ≥75	Units)		
440 units	36	143	179	137	71	208
Garden/Mid-Rise Apartm	ents <10 stories (Montgome	ry County, ≥75	Units)		
647 units	52	210	262	201	104	305
Total Trips	1826	672	2498	723	1604	2327



EXHIBIT 7 TRIP GENERATION FOR SUBJECT SITE





Dorsey Mill Road

Montgomery County, Maryland January 13, 2016

Traffic Signal Warrant Analysis

Prepared for:

Dewberry

Brandon J. Fritz 2101 Gaither Road Suite 340 Rockville, Maryland 20850



	Black Hills - Office			
	1,097,800 sf. ft. ADT - 12,109			
Time	In	Out	In	Out
7:00 AM	7.8%	1.1%	945	133
8:00 AM	8.2%	1.0%	993	121
9:00 AM	3.6%	1.4%	436	170
10:00 AM	1.0%	2.2%	121	266
11:00 AM	2.3%	3.0%	279	363
12:00 PM	4.4%	5.0%	533	605
1:00 PM	4.9%	3.9%	593	472
2:00 PM	2.2%	3.0%	266	363
3:00 PM	2.5%	4.8%	303	581
4:00 PM	2.6%	7.6%	315	920
5:00 PM	2.3%	6.7%	279	811
6:00 PM	0.7%	3.4%	85	412

Black Hills - Hotel					
2,860	350 Rooms ADT - 2,860				
Out	In	Out	In	Time	
31	223	1.1%	7.8%	7:00 AM	
29	235	1.0%	8.2%	8:00 AM	
40	103	1.4%	3.6%	9:00 AM	
63	29	2.2%	1.0%	10:00 AM	
86	66	3.0%	2.3%	11:00 AM	
143	126	5.0%	4.4%	12:00 PM	
112	140	3.9%	4.9%	1:00 PM	
86	63	3.0%	2.2%	2:00 PM	
137	72	4.8%	2.5%	3:00 PM	
217	74	7.6%	2.6%	4:00 PM	
192	66	6.7%	2.3%	5:00 PM	
97	20	3.4%	0.7%	6:00 PM	
	66 126 140 63 72 74	3.0% 5.0% 3.9% 3.0% 4.8% 7.6% 6.7%	2.3% 4.4% 4.9% 2.2% 2.5% 2.6% 2.3%	11:00 AM 12:00 PM 1:00 PM 2:00 PM 3:00 PM 4:00 PM 5:00 PM	



EXHIBIT A-2
PROJECTED HOURLY TRAFFIC VOLUMES
FOR NEARBY DEVELOPMENTS

	Black Hills - Assisted Living Facilities			
	102 beds ADT - 271			
Time	In	Out	In	Out
7:00 AM	0.8%	6.6%	2	18
8:00 AM	1.1%	7.3%	3	20
9:00 AM	1.5%	3.7%	4	10
10:00 AM	1.2%	2.5%	3	7
11:00 AM	2.2%	2.4%	6	7
12:00 PM	2.5%	2.5%	7	7
1:00 PM	2.2%	2.6%	6	7
2:00 PM	2.7%	2.0%	7	5
3:00 PM	3.3%	2.3%	9	6
4:00 PM	4.9%	2.6%	13	7
5:00 PM	7.1%	2.4%	19	7
6:00 PM	5.7%	3.4%	15	9

	Black Hills - Garden/Mid-Rise Apartments			
	1,087	units	ADT -	6,711
Time	In	Out	In	Out
7:00 AM	0.8%	6.6%	53	441
8:00 AM	1.1%	7.3%	73	488
9:00 AM	1.5%	3.7%	101	251
10:00 AM	1.2%	2.5%	81	170
11:00 AM	2.2%	2.4%	150	162
12:00 PM	2.5%	2.5%	169	165
1:00 PM	2.2%	2.6%	148	175
2:00 PM	2.7%	2.0%	179	136
3:00 PM	3.3%	2.3%	220	155
4:00 PM	4.9%	2.6%	328	176
5:00 PM	7.1%	2.4%	474	163
6:00 PM	5.7%	3.4%	383	229



EXHIBIT A-2 CONT'D PROJECTED HOURLY TRAFFIC VOLUMES FOR NEARBY DEVELOPMENTS

	Symmetry at Cloverleaf - Office			
	625,000	sf. ft.	ADT -	6,894
Time	In	Out	In	Out
7:00 AM	7.8%	1.1%	538	76
8:00 AM	8.2%	1.0%	565	69
9:00 AM	3.6%	1.4%	248	97
10:00 AM	1.0%	2.2%	69	152
11:00 AM	2.3%	3.0%	159	207
12:00 PM	4.4%	5.0%	303	345
1:00 PM	4.9%	3.9%	338	269
2:00 PM	2.2%	3.0%	152	207
3:00 PM	2.5%	4.8%	172	331
4:00 PM	2.6%	7.6%	179	524
5:00 PM	2.3%	6.7%	159	462
6:00 PM	0.7%	3.4%	48	234

Symmetry at Cloverleaf - Retail			
125,000	sf. ft.	ADT -	7,851
In	Out	In	Out
0.5%	0.3%	28	15
1.4%	0.5%	71	26
2.9%	1.1%	148	54
3.8%	3.3%	197	168
3.8%	4.2%	197	218
3.8%	4.1%	197	212
3.5%	3.8%	179	194
4.5%	3.9%	233	202
4.8%	4.8%	249	246
4.9%	5.2%	251	269
5.2%	5.5%	267	285
3.7%	4.2%	192	215
	0.5% 1.4% 2.9% 3.8% 3.8% 3.5% 4.5% 4.5% 4.9% 5.2%	125,000 sf. ft. In Out 0.5% 0.3% 1.4% 0.5% 2.9% 1.1% 3.8% 3.3% 3.8% 4.2% 3.8% 4.1% 3.5% 3.8% 4.5% 3.9% 4.8% 4.8% 4.9% 5.2% 5.2% 5.5%	125,000 sf. ft. ADT - In Out In 0.5% 0.3% 28 1.4% 0.5% 71 2.9% 1.1% 148 3.8% 3.3% 197 3.8% 4.2% 197 3.8% 4.1% 197 3.5% 3.8% 179 4.5% 3.9% 233 4.8% 4.8% 249 4.9% 5.2% 251 5.2% 5.5% 267



EXHIBIT A-2 CONT'D PROJECTED HOURLY TRAFFIC VOLUMES FOR NEARBY DEVELOPMENTS

		Symmetry at Cloverle	eaf - Townhouses	5
	150	units	ADT -	915
Time	In	Out	In	Out
7:00 AM	0.8%	6.6%	7	60
8:00 AM	1.1%	7.3%	10	67
9:00 AM	1.5%	3.7%	14	34
10:00 AM	1.2%	2.5%	11	23
11:00 AM	2.2%	2.4%	20	22
12:00 PM	2.5%	2.5%	23	22
1:00 PM	2.2%	2.6%	20	24
2:00 PM	2.7%	2.0%	24	19
3:00 PM	3.3%	2.3%	30	21
4:00 PM	4.9%	2.6%	45	24
5:00 PM	7.1%	2.4%	65	22
6:00 PM	5.7%	3.4%	52	31

	Symmet	ry at Cloverleaf - Gard	den/Mid-Rise Ap	artments
	950	units	ADT -	5,881
Time	In	Out	In	Out
7:00 AM	0.8%	6.6%	46	386
8:00 AM	1.1%	7.3%	64	428
9:00 AM	1.5%	3.7%	89	220
10:00 AM	1.2%	2.5%	71	149
11:00 AM	2.2%	2.4%	132	142
12:00 PM	2.5%	2.5%	148	144
1:00 PM	2.2%	2.6%	130	153
2:00 PM	2.7%	2.0%	157	119
3:00 PM	3.3%	2.3%	193	136
4:00 PM	4.9%	2.6%	288	154
5:00 PM	7.1%	2.4%	415	143
6:00 PM	5.7%	3.4%	336	201



EXHIBIT A-2 CONT'D PROJECTED HOURLY TRAFFIC VOLUMES FOR NEARBY DEVELOPMENTS



Attachment C

Poplar Grove Data

Traffic Impact Analysis

Symmetry at Cloverleaf Germantown, MD

Prepared for: Symmetry at Cloverleaf, LLC

August 17, 2015

Revised November 11, 2015

© Kimley-Horn & Associates, Inc. 2015

Table 3. Distribution of Site-Gene	erated Trip)S	
To/From	Office	Residential	Retail*
I-270 North of Germantown	18%	2%	5%
via Crystal Rock - Father Hurley - 1-270 Interchange	18%	2%	5%
I-270 South of Germantown	20%	35%	5%
via Crystal Rock - Father Hurley - 1-270 Interchange	15%	20%	5%
via Century - Aircraft - MD 118 - I-270 Interchange	5%	15%	0%
Local Roads East of Germantown	30%	31%	10%
via Dorsey Mill Rd - Observation Dr - Father Hurley to East	10%	6%	10%
via Century Blvd - Aircraft Dr - MD 118 to East	20%	25%	0%
Local Roads South of Germantown	10%	15%	10%
via Century Blvd - Crystal Rock Dr to South	5%	10%	5%
via Crystal Rock Dr to South	5%	5%	5%
Local Roads West of Germantown	22%	17%	20%
Via Crystal Rock - Father Hurley to West	11%	8.5%	15%
via Century - Crystal Rock - MD 118	11%	8.5%	5%
Local Roads within Study Area	0%	0%	50%
via Waters Landing to West (residential developments)			10%
via Crystal Rock - Father Hurley -Wynnfield Drive to North (residential developments)			5%
via Crystal Rock - Father Hurley -Country Ridge Dr to South (residential developments)			5%
via Crystal Rock - Father Hurley - Middlebrook Rd to North (residential developments)			5%
via Crystal Rock - Father Hurley - Middlebrook Rd to South (residential developments)			5%
via Crystal Rock - Father Hurley - Wisteria Dr to North (residential developments)			5%
via Crystal Rock - Father Hurley - Wisteria Dr to South (residential developments)			5%
via Crystal Rock (to Cloverleaf Center to Waters Landing to residential developments)			5%
via Dorsey Mill Rd - Observation Dr (residential developments)			5%
Total	100%	100%	100%



Appendix D

Signal Warrant Analysis Worksheets

Poplar Grove - Germantown TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME: Century Boulevard and Kinster Drive COUNT DATE: 10/9	INTERSECTION NAME:
---	--------------------

INTERSECTION CONDITION: Full Build Out of Poplar Grove and Black Hills

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N N

					WARRA	NT 1, Cond	lition A	WARR	ANT 1, Cond	lition B		WARR	ANT 1, Co	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	Α	С	CONDITION	В	WARRANT	WARRANT 3
			вотн	HIGHEST	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн		
			APPROACHES	APPROACH	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET		
THRESHOL			I		600	200		900	100		480	160		720	80			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	1,550	419	Υ	Y	Y	Y	Y	Y	Y	Y	Υ	Y	Υ	Y	Y	Υ
08:00 AM	TO	09:00 AM	1,275	353	Y	Υ	Y	Y	Y	Y	Y	Y	Υ	Y	Υ	Y	Y	Υ
09:00 AM	TO	10:00 AM	747	268	Υ	Υ	Υ		Y		Y	Υ	Υ	Y	Υ	Υ		
10:00 AM	TO	11:00 AM	554	381		Υ			Υ		Υ	Υ	Υ		Υ			
11:00 AM	TO	12:00 PM	753	423	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
12:00 PM	TO	01:00 PM	1,182	567	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
01:00 PM	TO	02:00 PM	1,111	483	Υ	Υ	Υ	Υ	Y	Y	Y	Υ	Υ	Υ	Υ	Y	Y	Υ
02:00 PM	то	03:00 PM	760	402	Υ	Υ	Υ		Y		Y	Υ	Υ	Υ	Υ	Υ	Υ	
03:00 PM	то	04:00 PM	999	567	Υ	Υ	Υ	Υ	Y	Υ	Y	Υ	Υ	Y	Υ	Υ	Υ	Υ
04:00 PM	то	05:00 PM	1,359	788	Υ	Υ	Υ	Y	Y	Y	Y	Υ	Υ	Y	Υ	Υ	Y	Υ
05:00 PM	TO	06:00 PM	1,339	725	Υ	Υ	Υ	Y	Y	Y	Y	Υ	Υ	Y	Υ	Υ	Y	Υ
06:00 PM	TO	07:00 PM	808	486	Υ	Υ	Υ		Y		Y	Υ	Υ	Y	Υ	Y	Y	Υ
07:00 PM	TO	08:00 PM																
			12,437	5,862			11			7			12			11	10	8
	8 HOURS NEEDED				ED	8 HC	URS NEED	ED	8 HOURS OF BOTH COND. A AND COND. B NEEDED						HRS NEEDE	1 HR NEEDED		
					s	ATISFIED		NO.	T SATISFII	ED			SATI	SFIED			SATISFIED	SATISFIED

Poplar Grove - Germantown TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
--------------------	---------------------------------------	-------------	-----------

INTERSECTION CONDITION: Full Build Out of Poplar Grove and Black Hills

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N n

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARF	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A		CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET											
THRESHOL	D VALU	ies —		-	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	1,543	204	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
08:00 AM	TO	09:00 AM	1,294	223	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
09:00 AM	TO	10:00 AM	857	173	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y		
10:00 AM	TO	11:00 AM	690	263	Y	Y	Y		Y		Y	Υ	Y		Y		Y	
11:00 AM	TO	12:00 PM	901	306	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
12:00 PM	TO	01:00 PM	1,341	376	Y	Υ	Y	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Υ
01:00 PM	TO	02:00 PM	1,252	330	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Υ
02:00 PM	TO	03:00 PM	943	291	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
03:00 PM	TO	04:00 PM	1,245	391	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Υ
04:00 PM	TO	05:00 PM	1,359	788	Y	Υ	Y	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y
05:00 PM	TO	06:00 PM	1,600	509	Y	Υ	Y	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Υ
06:00 PM	TO	07:00 PM	1,095	342	Y	Υ	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Υ
07:00 PM	TO	08:00 PM																
			14,120	4,196			12			10			12			11	11	8
					8 HC	URS NEED	ED	8 HOURS NEEDED			8 HO	URS OF BC	TH CONE	. A AND C	4 HRS NEEDED	1 HR NEEDED		
					8	ATISFIED		8	SATISFIED				SATI	SFIED			SATISFIED	SATISFIED

Poplar Grove - Germantown TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 1 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N N

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARF	RANT 1, Co	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A		CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D VALU	JES —		-	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	1,190	71	Υ			Υ			Υ			Υ	Υ	Υ		
08:00 AM	TO	09:00 AM	1,058	116	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
09:00 AM	TO	10:00 AM	618	60	Y						Y				Y			
10:00 AM	TO	11:00 AM	477	55														
11:00 AM	TO	12:00 PM	640	38	Y						Y							
12:00 PM	TO	01:00 PM	1,017	40	Y			Y			Y			Y				
01:00 PM	TO	02:00 PM	940	41	Y			Y			Y			Y				
02:00 PM	TO	03:00 PM	636	32	Y						Y							
03:00 PM	TO	04:00 PM	861	37	Y						Y			Y				
04:00 PM	TO	05:00 PM	1,211	41	Y			Y			Y			Y				
05:00 PM	TO	06:00 PM	1,181	47	Y			Y			Y			Y				
06:00 PM	TO	07:00 PM	715	53	Y						Y							
07:00 PM	TO	08:00 PM																
			10,544	631			0			1			0			2	0	0
			8 HOURS NEEDED 8 HOURS NEEDED			ED	8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED				
					NO.	T SATISFIE	ED	NO.	T SATISFIE	ΞD	NOT SATISFIEI			ATISFIED			NOT SATISFIED	NOT SATISFIE

Poplar Grove - Germantown TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive
--------------------	---------------------------------------

COUNT DATE: 10/9/2018

INTERSECTION CONDITION:

Full Build Out of Black Hills AND Phase 1 of Poplar Grove

MAJOR STREET: MINOR STREET: Crystal Rock Drive Kinster Drive

OF APPROACH LANES: # OF APPROACH LANES:

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	ANT 1, Co	mbination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	4	C	ONDITION	В	WARRANT 2	WARRANT 3
			вотн	HIGHEST	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн		
			APPROACHES	APPROACH	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET		
THRESHOL	D VALU	JES —		—	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	1,188	184	Υ	Υ	Υ	Y	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM	TO	09:00 AM	1,059	168	Υ	Υ	Υ	Y	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	
09:00 AM	TO	10:00 AM	672	144	Υ				Y		Υ	Y	Υ		Y			
10:00 AM	TO	11:00 AM	535	100					Y		Υ				Y			
11:00 AM	TO	12:00 PM	711	85	Υ				Y		Υ				Y			
12:00 PM	TO	01:00 PM	1,103	101	Υ			Y	Y	Υ	Υ			Y	Y	Υ		
01:00 PM	TO	02:00 PM	1,014	88	Υ			Y	Y	Υ	Υ			Y	Y	Υ		
02:00 PM	TO	03:00 PM	728	98	Υ				Y		Υ			Y	Y	Υ		
03:00 PM	TO	04:00 PM	1,012	82	Y			Y	Υ	Υ	Y			Y	Υ	Υ		
04:00 PM	TO	05:00 PM	1,359	111	Y			Y	Υ	Υ	Y			Y	Υ	Υ	Υ	
05:00 PM	TO	06:00 PM	1,337	94	Y			Y	Υ	Υ	Y			Y	Υ	Υ	Υ	
06:00 PM	TO	07:00 PM	924	112	Y			Y	Υ	Υ	Y			Y	Y	Υ		
07:00 PM	TO	08:00 PM																
			11,642	1,367			2			8	3 9					9	4	0
					8 HOURS NEEDED 8 HOURS NEEDED					8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED	
					NO.	T SATISFIE	ΕD	s	ATISFIED				NOT SA	TISFIED			SATISFIED	NOT SATISFIED



MEMORANDUM

To: Nicole Totah

From: David Samba, PE, PTOE

Kimley-Horn and Associates, Inc.

Date: July 23, 2019

Sensitivity testing to identify trip triggers for the construction of traffic signals at (1) the

Subject: intersection of Crystal Rock Drive and Kinster Drive and at (2) the intersection of

Century Boulevard and Kinster Drive

This memorandum presents the results of queuing and delay analyses at the intersections of Crystal Rock Drive/Kinster Drive and Century Boulevard/Kinster Drive in Germantown, Maryland. These analyses have been prepared as part of the Poplar Grove Preliminary Plan submission.

The previous PAPF approval (December 2015) for Poplar Grove required that with a Preliminary Plan of Subdivision for Poplar Grove, the Applicant submit traffic signal warrant analyses. The Applicant previously provided these warrant analyses and the Montgomery County Department of Transportation (MCDOT) indicated that they believe both traffic signals should be provided with the first phase of development of Poplar Grove.

The Applicant strongly disagrees that these signals are necessary as part of Phase I. Moreover, the Applicant is very concerned that the obligation for the signal at Crystal Rock Drive/Kinster Drive is being entirely paced on the Applicant and that Black Hill has no obligation with respect to this signal. Note that during the PM peak hour, Full Build-out of Black Hill, which MCDOT asked the Applicant to include its analyses, adds 1,246 trips to the intersection, while Phase 1 of Poplar Grove adds only 45 trips to this intersection. It is not until Full Build-out of Poplar Grove that 614 trips are added to the intersection, less than half of the Full Build-out Black Hill Trips. The Applicant plans to raise this issue at its Planning Board Hearing on September 5.

Based on the conditions written into the PAPF approval for Poplar Grove, the construction of a signal at these intersections at the appropriate time would be the responsibility of the Poplar Grove developer. Based on the analyses contained herein, it is suggested that requirements and responsibilities for the signal at Crystal Rock Drive and Kinster Drive, specifically, should be reassessed if/when the Black Hill development approval is up for reconsideration.

MCDOT has requested additional traffic analyses to demonstrate the current and forecast traffic conditions at the subject intersections. The findings of this memorandum may be used to identify timing for the consideration of a traffic signal at each intersection.



Background

Poplar Grove will be a new mixed-use development in Germantown, Maryland.

At Phase 1, the development will contain approximately 190 townhomes and generate 96 trips during the AM peak hour and 127 trips during the PM peak hour.

At an illustrative Phase 2, the development will contain approximately 190 townhomes, 105 multifamily dwelling units, and 30,879 square feet of retail and generate 256 trips during the AM peak hour and 495 trips during the PM peak hour.

At Full Build-out, the development will contain approximately 190 townhomes, 297 multifamily dwelling units, 435,000 square feet of office, and 85,700 square feet of retail and generate 1,053 trips during the AM peak hour and 1,447 trips during the PM peak hour.

The mixed-use (office, hotel, residential, retail) and partially built-out Black Hill property is located to the north of Poplar Grove. At Full Build-out, Black Hill will generate 2,481 trips during the AM peak hour and 2,309 trips during the PM peak hour.

For context, Full Build-out of Black Hill generates 136 percent more trips (+1,428) than full Build-out of Poplar Grove during the AM peak hour. Full Build-out Black Hill generates 60 percent more trips (+862) than Full Build-out Poplar Grove during the PM peak hour.

Signal warrant analyses were conducted for each intersection as part of the Preliminary Plan submittal. The results of the signal warrant analyses indicated that, at the intersection of Crystal Rock Drive and Kinster Drive, a traffic signal is warranted at Phase 1 of the Poplar Grove development. The results of the signal warrant analyses indicated that, at the intersection of Century Boulevard and Kinster Drive, a traffic signal is warranted at Full Build-out of the Poplar Grove development.

It is noted that both analyses were conducted assuming full Build-out of Black Hill.

Based on the conditions written into the PAPF approval for Poplar Grove, the construction of a signal at these intersections at the appropriate time would be the responsibility of the Poplar Grove developer. Based on the analyses contained herein, it is suggested that requirements and responsibilities for the signal at Crystal Rock Drive and Kinster Drive, specifically, should be reassessed if/when the Black Hill development approval is up for reconsideration.

It is noted however that the <u>need</u> for the signals would be contingent on the volume of traffic at each intersection (which is disproportionately impacted by Black Hill-related traffic, compared to Poplar Grove related traffic).

As such, the Poplar Grove developer has asked MCDOT (and M-NCPPC) consider the appropriate timing and need for the signals with respect to the planned development levels of Poplar Grove AND Black Hill (as opposed to assuming 100% Black Hill development has occurred and only basing the timing on the development of Poplar Grove).



Methodology

The purpose of this analysis is to determine the operational impacts of the current two-way stop control condition of the two delineated intersections under existing and future traffic volume scenarios. MCDOT advised that one measure of impact would be to document the queuing along Kinster Drive. MCDOT indicated preference for no scenario to show queuing back to Alpine Drive/Ireland Ct. Alpine Drive/Ireland Court is located 740 feet east of Crystal Rock Drive and 625 feet west of Century Boulevard.

Analyses were conducted using Synchro traffic software. Traffic count data from October 9, 2018 was summarized and used to establish existing traffic conditions.

Traffic projections for Black Hill and Poplar Grove were calculated based on the latest development programs and using the LATR trip generation methodology that was in place at the time of the PAPF approval of Poplar Grove (this methodology was a conditioned requirement of the PAPF approval).

95th percentile vehicle queuing was calculated for the AM and PM peak hours for the following scenarios:

- Existing Conditions
- Phase 1 Poplar Grove with no further Black Hill
- Phase 1 Poplar Grove with Full Build-Out Black Hill

The results are as follows:

Crystal Rock Drive and Kinster Drive - Queuing in feet

Scenario and Movement	AM Peak Hour	PM Peak Hour
Existing Conditions		
Eastbound Left	0	0
Eastbound Thru/Right	17.5	5
Westbound Left	10	12.5
Westbound Thru/Right	0	2.5
Phase 1 Poplar, No Further dev	elopment of Black Hill	
Eastbound Left	0	0
Eastbound Thru/Right	17.5	5
Westbound Left	15	12.5
Westbound Thru/Right	0	2.5
Phase 1 Poplar, Full Black Hill		
Eastbound Left	2.5	0
Eastbound Thru/Right	30	32.5
Westbound Left	150	1,320
Westbound Thru/Right	2.5	10



Century Boulevard and Kinster Drive - Queuing in feet

Scenario and Movement	AM Peak Hour	PM Peak Hour
Existing Conditions		
Eastbound Left/Thru/Right	0	2.5
Westbound Left	0	0
Westbound Thru/Right	0	0
Phase 1 Poplar, No Further deve	elopment of Black Hill	
Eastbound Left/Thru/Right	0	10
Westbound Left	0	12.5
Westbound Thru	2.5	2.5
Westbound Right	0	0
Phase 1 Poplar, Full Black Hill		
Eastbound Left/Thru/Right	2.5	35
Westbound Left	150	10
Westbound Thru	2.5	15
Westbound Right	0	0

Based on the analyses, there is only one scenario at one of the two studied intersections in which queuing spills back to Alpine/Ireland:

At the intersection of Kinster Drive and Crystal Rock Drive, during the PM peak hour, and only when Full Build-out of Black Hill is achieved in combination with Phase 1 Poplar Grove, queuing will spill back to Alpine/Ireland. For context, under this scenario Poplar Grove is only adding 45 trips to the subject intersection while Black Hill is adding 1,246 trips to the intersection.

There is no Phase 1 Poplar Grove development scenario in which the traffic conditions at Century Boulevard and Kinster Drive result in spillback to Alpine Drive/Ireland Court.

From Kimley-Horn's perspective, a better measure to document impacts is delay. Delay, more than queuing, is more readily felt and understood by the community. Kimley-Horn proposes that the traffic volumes that correspond to intolerable delay conditions at the side street approaches should be used to establish thresholds for the consideration of a traffic signal. For a residential condition, Kimley-Horn proposes that 35 seconds or more of delay, which corresponds to Level of Service (LOS) "E", is intolerable. Vehicle delay was calculated for the AM and PM peak hours for multiple scenarios to identify the scenario just under intolerable delay conditions.

Crystal Rock Drive and Kinster Drive – Vehicle Delay in Seconds

Scenario and Movement	AM Peak Hour	PM Peak Hour	
Existing Conditions			
Eastbound Left	B – 10.1	A – 0.0	
Eastbound Thru/Right	A – 9.2	A – 9.1	



Westbound Left	B – 13.0	C – 17.8
Westbound Thru/Right	B – 10.5	B – 14.0
Phase 1 Poplar, No Further deve	elopment of Black Hill	
Eastbound Left	B – 10.1	A – 0.0
Eastbound Thru/Right	A – 9.2	A – 9.1
Westbound Left	B – 13.6	C – 18.2
Westbound Thru/Right	B – 10.6	B – 11.0
Phase 1 Poplar, Full Black Hill		
Eastbound Left	D – 31.9	A – 0.0
Eastbound Thru/Right	B – 12.6	C – 20.0
Westbound Left	F – 189.1	F – 3727
Westbound Thru/Right	D – 28.2	E – 47.7
Phase 1 Poplar, 43% Black Hill	(AM Trigger)	
Eastbound Left	C – 15.2	
Eastbound Thru/Right	B – 10.3	
Westbound Left	D – 28.0	
Westbound Thru/Right	C – 15.0	
Phase 1 Poplar, 16% Black Hill	(PM Trigger)	
Eastbound Left		A – 0.0
Eastbound Thru/Right		A – 9.9
Westbound Left		D – 29.9
Westbound Thru/Right		C – 16.2

Century Boulevard and Kinster Drive - Vehicle Delay in Seconds

Scenario and Movement	AM Peak Hour	PM Peak Hour
Existing Conditions		•
Eastbound Left/Thru/Right	A – 0.0	A – 8.7
Westbound Left	A – 0.0	A – 0.0
Westbound Thru/Right	A – 0.0	A – 0.0
Phase 1 Poplar, No Further deve	elopment of Black Hill	
Eastbound Left/Thru/Right	A – 0.0	A – 0.0
Westbound Left	A – 0.0	A – 0.0
Westbound Thru	A – 9.1	A – 9.7
Westbound Right	A – 0.0	A – 0.0
Phase 1 Poplar, Full Black Hill		
Eastbound Left/Thru/Right	E – 43.8	E – 41.3
Westbound Left	C – 16.4	D – 26.5
Westbound Thru	B – 13.9	E – 36.2
Westbound Right	A – 0.0	A – 8.0
Phase 1 Poplar, 90% Black Hill ((AM Trip Trigger)	



Eastbound Left/Thru/Right	D – 29.8	
Westbound Left	C – 15.4	
Westbound Thru	B – 13.4	
Westbound Right	A – 0.0	
Phase 1 Poplar, 53% Black Hill ((PM Trip Trigger)	
Eastbound Left/Thru/Right		D – 25.2
Westbound Left		D – 26.9
Westbound Thru		D -33.5
Westbound Right		A – 9.0
Phase 2 Poplar, 48% Black Hill ((PM Trip Trigger)	
Eastbound Left/Thru/Right		D – 25.2
Westbound Left		D – 26.9
Westbound Thru		D –33.5
Westbound Right		A-9.0

Based on the above delays the following trip triggers were identified and are proposed for consideration:

- Crystal Rock Drive and Kinster Drive
 - AM Peak Hour: 43% of Black Hill (1,066 AM Trips) + Phase 1 of Poplar (96 AM Trips)
 OR Phase 1 of Poplar (96 AM Trips) + when the total entering intersection volume =
 904 vehicles during a single hour during the AM Peak Period
 - PM Peak Hour: 16% of Black Hill (369 PM Trips) + Phase 1 of Poplar (127 PM Trips)
 OR Phase 1 of Poplar (127 PM Trips) + when the total entering intersection volume =
 676 vehicles during a single hour during the PM Peak Period
- Century Boulevard and Kinster Drive
 - AM Peak Hour: 90% of Black Hill (2,233 AM Trips) + Phase 1 of Poplar (96 AM Trips)
 OR Phase 1 of Poplar (96 AM Trips) + when the total entering intersection volume = 1396 vehicles during a single hour during the AM Peak Period
 - PM Peak Hour: 53% of Black Hill (1223 PM Trips) + Phase 1 of Poplar (127 PM Trips) OR Phase 1 of Poplar (127 PM Trips) + when the total entering intersection volume = 1107 vehicles during a single hour during the PM Peak Period
 - PM Peak Hour: 48% of Black Hill (1107 PM Trips) + Phase 2 of Poplar (495 PM Trips) OR Phase 2 of Poplar (495 PM Trips) + when the total entering intersection volume = 1118 vehicles during a single hour during the PM Peak Period

Based on the above finding the following conditions are proposed:

At Crystal Rock and Kinster:

At the time of approval of a Site Plan for Poplar Grove that triggers, cumulatively 96 AM or 127 PM external trips, the Applicant and Staff shall evaluate the then-current Black Hill trip



generation and the then current hourly entering volumes at the intersection of Crystal Rock Drive and Kinster Drive. If Black Hill trip generation is below 1066 AM or 369 PM trips or if no single hour during the AM peak period exceeds 904 entering vehicles or if no single hour during the PM peak period exceeds 676 entering vehicles, the Applicant shall not be required to construct or contribute to the construction of a traffic signal at the intersection of Crystal Rock Drive and Kinster Drive at that time. At the time of approval of each successive future Site Plan application for Poplar Grove, the Applicant and Staff shall reevaluate the then-current Black Hill trip generation to determine whether the 1066 AM or 369 PM trip threshold has been met and also shall evaluate the hourly count of entering traffic at the intersection to determine whether the 904 AM and 676 PM entering traffic volume threshold has been met. The Applicant will contribute to the construction of a traffic signal in proportion to its contribution of traffic at the intersection if:

- The trip triggers tied to the Applicant's site plan have been achieved (96 AM or 127 PM Site trips) AND the trip triggers tied to Black Hill have been achieved (1,066 AM or 369 PM trips)
- The trip triggers tied to the Applicant's site plan have been achieved (96 AM or 127 PM Site trips) AND a total intersection entering volume of 904 AM vehicles and 676 PM vehicles is achieved during a single hour in the AM or PM peak period.

At Century Boulevard and Kinster:

At the time of approval of a Site Plan for Poplar Grove that triggers, cumulatively 96 AM or 495 PM external trips, the Applicant and Staff shall evaluate the then-current Black Hill trip generation and the then current hourly entering volumes at the intersection of Century Boulevard and Kinster Drive. If Black Hill trip generation is below 2233 AM or 1107 PM trips or if no single hour during the AM peak period exceeds 1396 entering vehicles or if no single hour during the PM peak period exceeds 1118 entering vehicles, the Applicant shall not be required to construct or contribute to the construction of a traffic signal at the intersection of Century Boulevard and Kinster Drive at that time. At the time of approval of each successive future Site Plan application for Poplar Grove, the Applicant and Staff shall reevaluate the then-current Black Hill trip generation to determine whether the 2233 AM or 1107 PM trip threshold has been met and also shall evaluate the hourly count of entering traffic at the intersection to determine whether the 1396 AM and 1118 PM entering traffic volume threshold has been met. The Applicant will contribute to the construction of a traffic signal in proportion to its contribution of traffic at the intersection if:

- The trip triggers tied to the Applicant's site plan have been achieved (96 AM or 495 PM Site trips) AND the trip triggers tied to Black Hill have been achieved (2,233 AM or 1,107 PM trips)
 OR
- The trip triggers tied to the Applicant's site plan have been achieved (96 AM or 495 PM Site trips) AND a total intersection entering volume of 1,396 AM vehicles and 1,118 PM vehicles is achieved during a single hour in the AM or PM peak period.

Kimley » Horn

TECHNICAL MEMORANDUM

To: Maryland National Capital Park and Planning Commission (M-NCPPC)

From: David B. Samba P.E., PTOE

Kimley-Horn and Associates, Inc.

Date: September 13, 2019

Subject: Trip Generation, CLV Analysis, Signal Warrant Analysis, and Testing of Trip

Triggers for Conditions of Approval Poplar Grove – Germantown, Maryland

Introduction

This memorandum has been prepared as part of the Preliminary Plan and Phase I Site Plan Application for Poplar Grove in Germantown, Maryland. The purpose of this memorandum is to address questions from Maryland-National Capital Park and Planning Commission (M-NCPPC) staff and to provide back-up data and calculations to support the development of trip triggers for study area intersection improvements.

This memorandum contains the following:

- Preliminary Adequate Public Facilities (PAPF) Background
- Trip Generation Methodology
- Development Densities and resulting Trip Generation (by Phase)
- Critical Lane Volume (CLV) results at subject intersections (by Phase)
- Signal Warrant Analysis Results at subject Intersections (by Phase)
- Trip Triggers for improvements at subject intersections (With Full Build-out of all Pipeline Development)
- Trip Triggers for improvements at subject intersections (Alternative Approach to Pipeline Development)

Preliminary Adequate Public Facilities (PAPF) Background

Following the preparation of a traffic impact study (TIS) dated November 2015, a PAPF approval was granted by the Montgomery County Planning Board in December 2015 for the Poplar Grove site. This PAPF approval established maximum trip generation levels for the site (1,558 during the AM peak hour and 1,762 during the PM peak hour). The PAPF also identified specific conditions that described the possible transportation network improvements that were needed to address and mitigate the impacts of the maximum future traffic envisioned. These proposed improvements were identified in Condition 6 and Condition 7 of the PAPF approval; the <u>timing and actual need</u> of these improvements, relative to the actual build-out program and phasing of Poplar Grove, was left to the Planning Board to address at the time of future development applications.



PAPF Condition 6 is written below:

<u>When deemed necessary by the Planning Board</u> in its approval of a future application for development of the subject property, the following improvements must be completed (emphasis added):

- a) Constructing a second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard
- b) Striping a second southbound left turn lane on Observation Drive at Ridge Road
- c) Constructing the Dorsey Mill Road bridge over I-270
- d) Constructing a second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive
- e) Reconstructing the northbound and southbound approaches of the Crystal Rock Drive and Kinster Drive to include one through/left lane, one through lane, and one right turn lane on northbound Crystal Rock Drive. On southbound Crystal Rock Drive, the lane configuration must include one through/left lane and one through/right lane. Adjustment to the number of lanes or intersection configuration can be made as determined with future applications of the development of the subject property or by Montgomery County Department of Transportation (MCDOT).

The above improvements may be constructed solely by the Applicant, by the Applicant in concert with public agencies or neighboring landowners, or solely by others with development approvals also conditioned on the construction of the improvements.

PAPF Condition 7 is written below:

The Applicant must submit a traffic signal warrant analysis with any preliminary plan for the Subject Property for the intersections of 1) Century Boulevard and Kinster Drive/proposed site entrance and 2) Crystal Rock Drive and Kinster Drive. If a traffic signal is warranted, then the Applicant must construct the signal and associated improvements when identified by the Planning Board in its approval of a future application for development of the Subject Property (emphasis added).

It is noted that while Condition 6 and Condition 7 identify the ultimate improvements based on background, pipeline, and this project, as required, the Planning Board is charged with determining **when** the improvements are necessary.

It is also noted that Condition 6b and 6c of the PAPF have previously been identified as constructed or to be constructed by others and as such they are not discussed within this memorandum.



Trip Generation Methodology

Condition 2 of the PAPF established the trip generation methodology to be used for all future applications for the Poplar Grove site. PAPF Condition 2 is written below:

Calculation of the number of vehicle trips generated from the Subject Property in future applications must use trip rates found in the January 2013 Local Area Transportation Review and Transportation Policy Area Review Guidelines. Internal capture reductions must be calculated using the National Cooperative Highway Research Program (NCHRP) Report 684, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments. Pass-by reductions must be calculated using the 3rd edition of the Institute of Transportation Engineering Trip Generation Handbook.

This trip generation methodology was used as part of the approved November 2015 TIS, which in turn was the basis of approval for the transportation conditions associated with the overall PAPF.

Trip rates from Appendix 1 of the 2013 LATR are shown in Figure 1, Figure 2, and Figure 3 for the specific land uses that are part of the Poplar Grove Preliminary Plan and Phase I Site Plan. Rates or equations highlighted in yellow correspond to those used in the previous and current analyses.

It is noted that the specific equation or rate that is used is dependent both on land use and on density (square footage, units, or rooms).

Figure 1: General Office Trip Generation Rates/Equations (LATR)

Table 1-1: General Office

Applicable Size	Formula/Rate	Dire	ectional	l Distribution		
Under 25,000 sf GFA	25 000 of GFA AM: T = 1.38(A)				М	
Officer 25,000 st GTA	PM: $T = 2.24(A)$	Enter	Exit	Enter	Exit	
25,000 sf GFA and over	AM: $T = 1.70(A) - 8$ PM: $T = 1.44(A) + 20$	87%	13%	17%	83%	
Over 300,000 sf GFA with special characteristics (See Table B-1)	AM: T = 1.70(A) + 115 PM: T = 1.44(A) + 127					
Within 1,000-foot radius of Metrorail station and outside the Beltway (D)	AM: Deduct P = 50% total trips from "T" PM: Deduct P = 4 (1000-D)/100 from "T"					

T = weekday peak-hour vehicle tripsP = percentage reduction in trips (P/100)

A = gross floor area (GFA) of building in 1,000 sf

D = straight line distance (in feet) from the main entrance to station



Figure 2: Retail Trip Generation Rates/Equations (LATR)

Table 1-2: General Retail

Applicable Size	Formula/Rate*		ectional	Distribution		
All since according to the state of	AM: Use 25% of the weekday evening peak-		AM		М	
All sizes except convenience retail hour trips		Enter	Exit	Enter	Exit	
Under 50,000 sf GLA	PM: T = 12.36(A)	52%	48%	52%	48%	
From 50,000 sf up to 200,000 sf GLA	PM: T = 7.43(A) + 247					
Over 200,000 sf GLA	Special analysis required by applicant or use two times applicable ITE rate					
Convenience retail not part of a shopping center or groups of stores	AM and PM: Use applicable ITE formula/rate					

T = weekday peak-hour vehicle trips
*For no major food chain store, deduct (P):

Figure 3: Residential Trip Generation Rates/Equations (LATR)

Table 1-4: Residential

Applicable Size	Foi	mula/Rate	Dire	ectional	tional Distribution		
	Under 75 units 75 units or over		Α	AM		М	
Single-Family Detached	AM: T = 0.95 (U)	AM: $T = 0.62 (U) + 25$	Enter	Exit	Enter	Exit	
	PM: T = 1.11 (U)	PM: $T = 0.82 (U) + 21$	25%	75%	64%	36%	
	Under 100 units	100 units and over	А	М	PM		
Townhouses	AM: T = 0.48 (U)	AM: $T = 0.53 (U) - 5$	Enter	Exit	Enter	Exit	
	PM: $T = 0.83$ (U)	PM: $T = 0.48 (U) + 35$	17%	83%	67%	33%	
	Under 75 units	75 units and over	AM		PM		
Garden and Low-Rise Apartments	AM: T = 0.44 (U)	AM: $T = 0.40 (U) + 3$	Enter	Exit	Enter	Exit	
	PM: T = 0.48 (U)	PM: $T = 0.47 (U) + 1$	20%	80%	66%	34%	
	Under 100 units 100 units and over		А	М	Р	М	
High-Rise Apartments	AM: T = 0.40 (U)	AM: $T = 0.29 (U) + 11$	Enter	Exit	Enter	Exit	
	PM: T = 0.46 (U)	PM: $T = 0.34$ (U) + 12	25%	75%	61%	39%	

T = weekday peak-hour vehicle trips

Note: For residential units in the Bethesda, Friendship Heights, and Silver Spring CBD Policy Areas, use Appendix 3. For residential units in all other Metro Station Policy Areas, the number of trips in Table 1-4 may be reduced by 18 percent.

As described in the 2015 TIS, internal capture reductions were assumed because of the likelihood that the mix of uses on the site would allow people to make various trips, such as visiting an on-site retail establishment from their home or work, without having to leave the property.

Internal capture trips are calculated based on the NCHRP 684 methodology. This methodology identifies the amount of internal capture that can be expected between a pair of land uses. For any given land use pair, two internal capture rates are considered: the rate "from Land Use A to Land Use B" and the rate "to Land Use B from Land Use A". These rates are applied to the gross "entering" or gross "exiting" trips generated by each land use. The smaller resulting internal capture volume between the two land uses is applied to both uses and subtracted from the gross trips of each use to result in external trips for each use.

A = gross leasable area (GLA) of building in 1,000 sf P = 0.05 + 0.002 (200-A)

U = housing units



Table 1 shows the applicable internal capture rates from NCHRP 684.

Table 1

NO	CHRP Internal Capture Rate	AM Rate	PM Rate	Applies To
Retail - Residential	From Retail to Residential	14%	26%	Retail Out
Retail	To Residential from Retail	2%	46%	Residential In
Sic	From Residential to Retail	1%	42%	Residential Out
- 8	To Retail from Residential	17%	10%	Retail In
9	From Retail to Office	29%	2%	Retail Out
Offlice	To Office from Retail	4%	31%	Office In
Retail -	From Office to Retail	28%	20%	Office Out
Ref	To Retail from Office	32%	8%	Retail In
<u> </u>	From Residential to Office	2%	4%	Residential Out
intia	To Office from Residential	3%	57%	Office In
Residential Office	From Office to Residential	1%	2%	Office Out
R _e	To Residential from Office	0%	4%	Residential In

Based on the 2015 TIS, a pass-by reduction of 34 percent was applied to the external trips generated by the retail land uses. As a result, the net new external retail trips for the Poplar Grove site are equal to the gross trips generated by the retail land use minus the internal capture trips with residential land uses minus the internal capture trips with office land uses minus the retail-pass by trips.

For the purposes of this analysis and the conditions to be developed, the number of <u>net new</u> <u>external trips (i.e. trips with allowed reductions)</u> is the critical number with respect to setting trip triggers.

Development Densities and Resulting Trip Generation by Phase

Poplar Grove is currently being considered for phased development. The current phasing and development densities are shown in Table 2.

Table 2: Poplar Grove Development Density Summary

Phase	Development Quantity – By Phase	Development Quantity – Cumulative
Phase IA	70 Townhomes	70 Townhomes
Phase IB	Phase IB 106 Townhomes 176 Townhom	
Phase II		176 Townhomes
	75 Multifamily Units	75 Multifamily Units
	50,000 SF Retail	50,000 SF Retail
Phase III		176 Townhomes
	290 Multifamily Units	365 Multifamily Units
	35,000 SF Retail	85,000 SF Retail
	435,000 SF Office	435,000 SF Office



The current phasing and resulting trip generation by phase is shown in Table 3 to Table 6

Table 3: Phase IA Trip Generation

Description	Inte	ensity	AM P	eak F	lour	PM P	eak H	lour
			Total	In	Out	Total	In	Out
General Retail (<50 KSF) w/ Grocery	0	SF	0	0	0	0	0	0
Internal Capture w/ Residential			0	0	0	0	0	0
Internal Capture w/ Office			0	0	0	0	0	0
External Retail Trips			0	0	0	0	0	0
Pass-By	@	34%	0	0	0	0	0	0
Net External Retail Trips			0	0	0	0	0	0
General Office (<25 KSF)	0	SF	0	0	0	0	0	0
Internal Capture w/ Residential			0	0	0	0	0	0
Internal Capture w/ Retail			0	0	0	0	0	0
External Office Trips			0	0	0	0	0	0
Apartments (<75 units)	0	DU	0	0	0	0	0	0
Townhouses (<100 units)	70	DU	34	6	28	58	39	19
Combined Residential Trips			34	6	28	58	39	19
Internal Capture w/ Retail			0	0	0	0	0	0
Internal Capture w/ Office			0	0	0	0	0	0
External Residential Trips			34	6	28	58	39	19
Net New External Site-Generated Trips			34	6	28	58	39	19



Table 4: Phase IB Trip Generation

Description	neration Inte	nsity	AM P	eak H	our	PM Peak Hour			
			Total	In	Out	Total	In	Out	
General Retail (<50 KSF) w/ Grocery	0	SF	0	0	0	0	0	0	
Internal Capture w/ Residential			0	0	0	0	0	0	
Internal Capture w/ Office			0	0	0	0	0	0	
External Retail Trips			0	0	0	0	0	0	
Pass-By	@	34%	0	0	0	0	0	0	
Net External Retail Trips			0	0	0	0	0	0	
General Office (<25 KSF)	0	SF	0	0	0	0	0	0	
Internal Capture w/ Residential			0	0	0	0	0	0	
Internal Capture w/ Retail			0	0	0	0	0	0	
External Office Trips			0	0	0	0	0	0	
Apartments (<75 units)	0	DU	0	0	0	0	0	0	
Townhouses (≥100 units)	176	DU	88	15	73	119	80	39	
Combined Residential Trips			88	15	73	119	80	39	
Internal Capture w/ Retail			0	0	0	0	0	0	
Internal Capture w/ Office			0	0	0	0	0	0	
External Residential Trips			88	15	73	119	80	39	
Net New External Site-Generated Trips			88	15	73	119	80	39	

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Table 5: Phase II Trip Generation

Site Trip	Generation								
Description	Inten	sity	AM Peak Hour			PM Peak Hour			
			Total	ln	Out	Total	In	Out	
General Retail (≥50 KSF) w/ Grocery	50,000	SF	155	81	74	619	322	297	
Internal Capture w/ Residential			-1	-1	0	-69	-21	-48	
Internal Capture w/ Office			0	0	0	0	0	0	
External Retail Trips			154	80	74	550	301	249	
Pass-By	@ 34%		-52	-27	-25	-187	- 102	-85	
Net External Retail Trips			102	53	49	363	199	164	
General Office (<25 KSF)	0	SF	0	0	0	0	0	0	
Internal Capture w/ Residential			0	0	0	0	0	0	
Internal Capture w/ Retail			0	0	0	0	0	0	
External Office Trips			0	0	0	0	0	0	
Apartments (≥75 units)	75	DU	33	7	26	36	24	12	
Townhouses (≥100 units)	176	DU	88	15	73	119	80	39	
Combined Residential Trips			121	22	99	155	104	51	
Internal Capture w/ Retail			-1	0	-1	-69	-48	-21	
Internal Capture w/ Office			0	0	0	0	0	0	
External Residential Trips			120	22	98	86	56	30	
Net New External Site-Generated Trips			222	75	147	449	255	194	



Table 6: Phase III Trip Generation

	Generation							
Description	Intens	ity	AM F	Peak H	our	PM F	Peak H	our
			Total	In	Out	Total	In	Out
General Retail (>50 KSF) w/ Grocery	85,000	SF	220	114	106	879	457	422
Internal Capture w/ Residential			-3	-2	-1	-130	-41	-89
Internal Capture w/ Office			-52	-27	-25	-45	-37	-8
External Retail Trips			165	85	80	704	379	325
Pass-By	@ 34%		-56	-29	-27	-240	- 129	- 111
Net External Retail Trips			109	56	53	464	250	214
General Office	435,000	SF	732	637	95	646	110	536
Internal Capture w/ Residential			-4	-4	0	-12	-4	-8
Internal Capture w/ Retail			-52	-25	-27	-45	-8	-37
External Office Trips			676	608	68	589	98	491
Apartments ≥75 units)	365	DU	149	30	119	173	114	59
Townhouses (≥100 units)	176	DU	88	15	73	119	80	39
Combined Residential Trips			237	45	192	292	194	98
Internal Capture w/ Retail			-3	-1	-2	-130	-89	-41
Internal Capture w/ Office			-4	0	-4	-12	-8	-4
External Residential Trips			230	44	186	150	97	53
Net New External Site-Generated Trips			1015	708	307	1203	445	758

A summary of the discrete and the cumulative net new external trips, by phase, is shown in Table 7. In the discrete column, the numbers represent the number of additional trips generated by the specific phase in order to equal the cumulative total trips expected by the end of that phase.

Table 7: Discrete and Cumulative Poplar Grove Trips by Phase

Phase	Trip Quantity - Discrete		Trip Quantity – Cumulative		
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	
Phase IA	34	58	34	58	
Phase IB	54	61	88	119	
Phase II	134	330	222	449	
Phase III	793	754	1015	1203	

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Critical Lane Volume (CLV) results at subject intersections (by Phase)

As part of the 2015 TIS, the critical lane volume (CLV) methodology was used to assess the transportation conditions at study area intersections. This methodology was also the basis for identifying intersections to be improved based on exceeding the Germantown Policy Area congestion standard of 1425 CLV.

Using this methodology, a CLV analysis was prepared for the intersections that are the subject of the lane and geometry improvements discussed in Conditions 6A, 6D, 6E:

- Crystal Rock Drive and Kinster Drive
- Crystal Rock Drive and Father Hurley Boulevard

For the purposes of this section of the analysis, the following CLVs shown in Table 8 and Table 9 at each intersection show results based on the current¹, 75 percent, and full build-out of pipeline trips, respectively. An additional iteration of analyses was conducted based on a conservative yet realistic build-out of pipeline trips (75 percent build-out). The resulting CLVs under this scenario are also included in Table 8 and 9. A description of the utilized conservative yet realistic build-out of pipeline trips analysis is contained in a later section of this memo.

Values in red indicate CLVs that are over the congestion standard. CLV evaluation sheets are included as Attachment A.

Table 8: Crystal Rock Drive and Kinster Drive CLV Analysis by Phase

Crystal Rock Drive and Kinster	AM Peak Hour			PM Peak Hour		
Drive	Current	75%	Full	Current	75%	Full
Phase IA of Poplar Grove	363	897	1110	378	1043	1304
Phase IB of Poplar Grove	379	916	1129	385	1050	1311
Phase II of Poplar Grove	466	1020	1233	547	1211	1472
Phase III of Poplar Grove	851	1405	1618	942	1512	1773

Table 9: Crystal Rock Drive and Father Hurley Boulevard CLV Analysis by Phase

Crystal Rock Drive and Father	AM Peak Hour			PM Peak Hour		
Hurley Boulevard	Current	75%	Full	Current	75%	Full
Phase IA of Poplar Grove	928	1126	1231	1300	1491	1567
Phase IB of Poplar Grove	933	1132	1237	1307	1497	1573
Phase II of Poplar Grove	939	1141	1271	1426	1617	1693
Phase III of Poplar Grove	978	1252	1382	1560	1750	1826

-

¹ The current build-out of pipeline development is represented by approved building permits (this information is contained in a "Running Site Plan Tabulation" on Sheet C0.01 of 82018011A, the most recently approved Site Plan for Black Hill).



Based on this analysis:

- Crystal Rock Drive and Kinster Drive
 - When considering the current build-out of pipeline development, the CLV threshold is never exceeded at the intersection of Crystal Rock Drive and Kinster Drive, through the full build-out of Poplar Grove
 - When considering the full build-out of pipeline development, the CLV threshold is exceeded at the intersection of Crystal Rock Drive and Kinster Drive between Phase IB and the completion of Phase II of Poplar Grove based on the PM peak hour CLVs, and between Phase II and the completion of Phase III of Poplar Grove based on the AM peak hour CLVs
- Crystal Rock Drive and Father Hurley Boulevard
 - When considering the current build-out of pipeline development, the CLV threshold is exceeded at the intersection of Crystal Rock Drive and Father Hurley Boulevard between Phase IB and Phase II of Poplar Grove based on PM peak hour CLVs
 - When considering the full build-out of pipeline development, the CLV threshold is exceeded at the intersection of Crystal Rock Drive and Father Hurley Boulevard without any development on the Poplar Grove site based on PM peak hour CLVs

Signal Warrant Analysis Results at Subject Intersections (by Phase)

PAPF Condition #7 required the completion of signal warrant analyses at the subject intersections. Volume Warrants 1, 2, and 3 were evaluated as part of this analysis for the following subject intersections:

- Crystal Rock Drive and Kinster Drive
- Century Boulevard and Kinster Drive

Warrant 1 is the 8-Hour Warrant, Warrant 2 is the 4-Hour Warrant, and Warrant 3 is the Peak Hour Warrant.

For the purposes of this section of the analysis, Table 10 and Table 11 show warrant results at each intersection assuming the current build-out of pipeline development based on approved building permits, assuming 75 percent build-out of pipeline development and also assuming the <u>full build-out</u> of pipeline development, respectively.

Signal warrant evaluation sheets are included as Attachment B.



Table 10: Crystal Rock Drive and Kinster Drive Signal Warrants by Phase

Crystal Rock Drive	Pipeline Development Status						
and Kinster Drive	Current	75%	Full				
Phase IA of	Not Warranted	Not Warranted	Warranted (8-Hour & 4-				
Poplar Grove			Hour)				
Phase IB of	Not Warranted	Not Warranted	Warranted (8-Hour & 4-				
Poplar Grove			Hour)				
Phase II of	Not Warranted	Warranted (8-Hour)	Warranted (8-Hour, 4-Hour,				
Poplar Grove			& Peak Hour)				
Phase III of	Warranted	Warranted (8-Hour, 4-Hour,	Warranted (8-Hour, 4-Hour,				
Poplar Grove	(Peak Hour)	& Peak Hour)	& Peak Hour)				

Table 11: Century Boulevard and Kinster Drive Signal Warrants by Phase

Century Boulevard	Pipeline Development Status						
and Kinster Drive	Current	75%	Full				
Phase IA of	Not Warranted	Not Warranted	Not Warranted				
Poplar Grove							
Phase IB of	Not Warranted	Not Warranted	Not Warranted				
Poplar Grove							
Phase II of	Not Warranted	Not Warranted	Not Warranted				
Poplar Grove							
Phase III of	Not Warranted	Warranted (4-Hour & Peak	Warranted (8-Hour, 4-Hour,				
Poplar Grove		Hour)	& Peak Hour)				

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Improvement Trip Triggers at subject intersections (With Full Buildout of Pipeline Development)

As previously stated, capacity-improving mitigations at intersections are considered when the congestion standard (1425 CLV in Germantown) is exceeded. Based on this, the following are the results when assuming the full build-out of pipeline development

- A capacity-improving mitigation is needed at the intersection of Crystal Rock Drive and Kinster
 Drive between Phase IB and the completion of Phase II based on the PM peak hour CLVs and
 also needed between Phase II and the completion of Phase III based on the AM peak hour
 CLVs
 - Based on sensitivity testing (see Attachment C), the capacity-improving mitigation is needed when Poplar Grove generates 629 new external AM peak hour trips and 352 new external PM peak hour trips
- A capacity-improving mitigation is needed at the intersection of Crystal Rock Drive and Father Hurley Boulevard <u>prior to any development of Poplar Grove based on PM peak hour CLVs</u>
- Signal warrants are satisfied at the intersection of Crystal Rock Drive and Kinster Drive <u>prior</u> to any development of Poplar Grove
- Signal warrants are satisfied at the intersection of Century Boulevard and Kinster Drive between Phase II and Phase III of Poplar Grove.
 - Based on sensitivity testing (see Attachment D), the signal is warranted when Poplar Grove generates 409 new external AM peak hour trips and 574 new external PM peak hour trips.



Improvement Trip Triggers at subject intersections (Alternative Approach to Pipeline Development)

While the methodology to determine the **theoretical need** for intersection improvements considers all future traffic (including traffic generated by approved yet unbuilt, i.e. pipeline development), an alternative approach could be taken to identify **a more realistic timing** of improvements.

If, for example, certain approved and unbuilt development does not build-out to the full approved level or build-out at a pace significantly slower than anticipated, real improvements for a real cost could be designed and constructed to address theoretical capacity issues that are never actually realized or that are realized much later than would otherwise be expected given the actual build-out of approved and unbuilt development.

The PAPF approval clearly stated that the Planning Board is charged with identifying the timing for improvement implementation. As such, the following additional data and analyses have been conducted to identify more realistic trip triggers for the subject improvements for the Planning Board's consideration.

Condition 6A: Second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard

The following background statements are relevant:

- This improvement is also a condition of approval for the Black Hill development.
- The trip trigger for Black Hill is 22 percent of development related trips (i.e. when Black Hill generates 550 AM peak hour trips and 512 PM peak hour trips)
 - Based on site plan approvals, Black Hill is currently approved for 487 AM and 504 PM peak hour trips. This represents 19.5 percent and 21.7 percent of anticipated AM and PM peak hour trips, respectively.
 - Based on approved building permits, Black Hill has building permit approval for 311 AM peak hour trips amd 317 PM peak hour trips. This represents 12 percent and 14 percent of anticipated AM and PM peak hour trips.

Based on the current development density of Black Hill, an improvement at this intersection is needed between Phase IB and the completion of Phase II of Poplar Grove based on PM peak hour CLVs. Based on sensitivity testing (see Attachment E), the improvement is needed when Poplar Grove generates 446 PM peak hour trips.



Condition 6D: Second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive

The following background statements are relevant:

- The improvement discussed in Condition 6A has a high likelihood of being triggered and completed by Black Hill prior to reaching the trip triggers for Poplar Grove
 - Once condition 6A is completed, it will create additional capacity at the intersection, significantly delaying the need for improvement 6D

Based on the full development density of Black Hill and assuming Condition 6A is in place, an improvement at this intersection is needed between Phase II and the completion of Phase III of Poplar Grove based on PM peak hour CLVs. Based on sensitivity testing (see Attachment F), the improvement is needed when Poplar Grove generates 1,004 PM Peak Hour trips.

Condition 6E: Reconstruct the northbound and southbound approaches of the Crystal Rock Drive and Kinster Drive

The following background statement is relevant:

 Under current build-out of pipeline development, this improvement would not be triggered, even with the full build-out of Poplar Grove

The applicant believes that a conservative yet realistic build-out of pipeline trips should be used to assess the timing for the signal at this intersection; as such, the applicant assumes an acceleration of pipeline development to more than three (3) times the amount of pipeline development that has currently been issued site plan approval (75% of total development trips).

Assuming this acceleration of the current pace of pipeline development, an improvement at this intersection is needed between Phase II and the completion of Phase III of Poplar Grove based on PM peak hour CLVs (See **Attachment G**) when Poplar Grove generates 1,009 PM Peak Hour trips.

Condition 7: Signals at Crystal Rock Drive/Kinster Drive and at Century Boulevard/Kinster Drive

Crystal Rock Drive and Kinster Drive

The following background statements are relevant:

- At the intersection of Crystal Rock Drive and Kinster Drive, the primary motivation for the
 installation of a signal would be to mitigate the challenges of exiting Kinster Drive or Waters
 Landing Drive onto Crystal Rock Drive. The difficulty in executing these movements are directly
 related to the amount of northbound and southbound through traffic
 - The significant majority of northbound and southbound traffic at this intersection will be generated by the anticipated build-out of pipeline development. Specifically, if the pipeline development does not build-out fully, a traffic signal at this intersection may not be warranted until much later than anticipated due to the lower volumes of northbound and southbound traffic



The applicant believes that a conservative yet realistic build-out of pipeline trips should be used to assess the timing for the signal at this intersection; as such, the applicant assumes an acceleration of pipeline development to more than three (3) times the amount of pipeline development that has currently been issued site plan approval (75% of total development trips).

Assuming this acceleration of the current pace of pipeline development, a signal at this intersection is needed between Phase IB and the completion of Phase II of Poplar Grove (see **Attachment H**); specifically, a signal is warranted **when Poplar Grove generates 205 AM peak hour trips and 384 PM peak hour trips.**

Century Boulevard and Kinster Drive

Assuming full build-out of pipeline development, the signal is warranted when Poplar Grove generates 409 new external AM PM Peak Hour trips and 574 new external PM Peak Hour trips (based on full build-out of Black Hill).

The applicant believes that a conservative yet realistic build-out of pipeline trips should be used to assess the timing for the signal at this intersection; as such, the applicant assumes an acceleration of pipeline development to more than three (3) times the amount of pipeline development that has currently been issued site plan approval (75% of total development trips).

Assuming this acceleration of the current pace of pipeline development, a signal at this intersection is needed between Phase II and the completion of Phase III of Poplar Grove (See Attachment I); specifically, a signal is warranted when Poplar Grove generates 671 AM peak hour trips and 835 PM peak hour trips.



Trip Trigger Summary

Table 12 summarizes the trip triggers based on full build-out of pipeline development and based on the Applicant recommendations.

Table 12: Full Build-Out of Pipeline Development Trip Trigger and Applicant Recommended Trip Trigger Summary

Condition	Trip Trigger based on Full Build-Out of Pipeline Development	Applicant Recommended Trip Trigger	Notes
Condition 6A: Second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard	First Building Permit of Phase IA (i.e. improvement needed prior to any build-out of Poplar Grove)	446 PM peak hour trips	
Condition 6D: Second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive	First Building Permit of Phase IA ((i.e. improvement is needed prior to any build-out of Poplar Grove)	1,004 PM peak hour trips	
Condition 6E: Reconstruct the northbound and southbound approaches of the Crystal Rock Drive and Kinster Drive	629 AM Peak Hour Trips 352 PM Peak Hour Trips	1,009 PM peak hour trips	Applicant assumes conservative yet realistic build-out of pipeline trips; an acceleration of
Condition 7 (Crystal Rock Drive/Kinster Signal)	First Building Permit of Phase IA ((i.e. improvement is needed prior to any build-out of Poplar Grove)	205 AM Peak Hour Trips 384 PM Peak Hour Trips	pipeline development to more than three (3) times the amount of pipeline development that
Condition 7 (Century Boulevard/Kinster Signal)	409 AM Peak Hour Trips 574 PM Peak Hour Trips	671 AM Peak Hour Trips 835 PM Peak Hour Trips	has currently been issued site plan approval



Attachment A CLV Calculations by Phase

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD

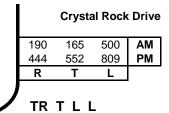


Intersection of: Crystal Rock Drive Date: September 10, 2019

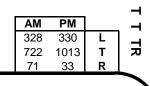
and: Father Hurley Boulevard

Conditions: Phase III Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard





R 811 538 T 967 989 L 800 274 AM PM

Father Hurley Boulevard

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Split Phase?

NB N SB N EB N

WB N

Can	acity	Anal	veie-
Oup	ucity	Allai	y SiS

Morning Peak Hour								
	Appr	oach Vol	umes	+0	pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	520	0.530	276	500	0.530	265	0	
								541
SB	355	0.530	188	24	1.000	24	0	
EB	793	0.370	293	800	0.530	424	0	
								841
WB	967	0.530	513	328	1.000	328	0	
CLV Total =							1382	
				Lev	el of Se	rvice (L	OS) =	

Evening Peak Hour								
	Арр	roach Vo	lumes	+ 0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	197	0.530	104	809	0.530	429	543	
								972
SB	996	0.530	528	72	1.000	72	0	
EB	1046	0.370	387	274	0.530	145	0	
								854
WB	989	0.530	524	330	1.000	330	0	
CLV Total =							1826	
				Lev	el of Se	rvice (L	OS) =	

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD

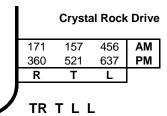


Intersection of: Crystal Rock Drive Date: September 10, 2019

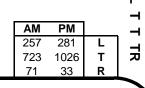
and: Father Hurley Boulevard

Conditions: Phase II Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard





R 606 490 T 968 1003 L 800 274 AM PM

Father Hurley Boulevard

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Split Phase?

NB N SB N EB N

WB

C_{2}	pacity	Ana	lveie-
∪a	pacity	Alla	17212-

Morning Peak Hour												
	Appr	oach Vol	umes	+ Opposing Lefts			Right Turn	AM				
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV				
NB	488	0.530	259	456	0.530	242	0					
								501				
SB	328	0.530	174	24	1.000	24	0					
EB	794	0.370	294	800	0.530	424	0					
								770				
WB	968	0.530	513	257	1.000	257	0					
CLV Total =												
Level of Service (LOS) =												

Evening Peak Hour											
	Арр	roach Vo	olumes	+ Opposing Lefts			Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	184	0.530	98	637	0.530	338	542				
								880			
SB	881	0.530	467	72	1.000	72	0				
EB	1059	0.370	392	274	0.530	145	0				
								813			
WB	1003	0.530	532	281	1.000	281	0				
CLV Total =											

Level of Service (LOS) =

Century Park PAPF Silver Spring, MD

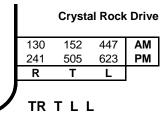


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase IB Poplar / Full Build Black Hill Analyst: Kimley-Horn

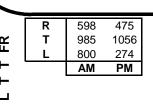
LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard

7		PM	AM
	L	146	223
ᄝ	Т	1075	733
	R	33	71
~			





Father Hurley Boulevard

L T T R

L T R

AM 24 482 157

PM 72 165 761

Crystal Rock Drive

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Split Phase?

NB N SB N EB N

WB N

Capacity Analysis-

			Morni	ing Pea	ak Hour			
	Appr	oach Vol	umes	+0	pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	482	0.530	255	447	0.530	237	0	
								492
SB	282	0.530	149	24	24 1.000 24			
EB	804	0.370	297	800	0.530	424	0	
								745
WB	985	0.530	522	223	1.000	223	0	
CLV Total =								
				Lev	el of Se	rvice (L	OS) =	

Evening Peak Hour											
	Арр	roach Vo	lumes	+0	efts	Right Turn	PM				
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	165	0.530	87	623	0.530	330	537				
								867			
SB	746	0.530	395	72	1.000	72	0				
EB	1108	0.370	410	274	0.530	145	0				
								706			
WB	1056	0.530	560	146	1.000	146	0				
	CLV Total =										

Century Park PAPF Silver Spring, MD

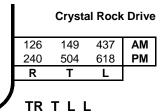


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase IA Poplar / Full Build Black Hill Analyst: Kimley-Horn

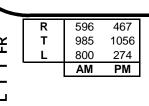
LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard

-		PM	AM	
	L	142	222	
ᄁ	Т	1075	733	
	R	33	71	
_				





Father Hurley Boulevard

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Split Phase?

NB N SB N

> EB N WB N

Capacity	Analysis-
----------	------------------

			Morn	ing Pea	ak Hour			
	Approach Volumes			+0	pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL x LUF = Total			Check	CLV
NB	481	0.530	255	437	0.530	232	0	
								487
SB	275	0.530	146	24	1.000	24	0	
EB	804	0.370	297	800	0.530	424	0	
								744
WB	985	0.530	522	222	1.000	222	0	
CLV Total =								
				Lev	el of Se	rvice (L	OS) =	

			Ever	ing Pea	ak Hour			
	Арр	roach Vo	lumes	+ 0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	163	0.530	86	618	0.530	328	537	
								865
SB	744	0.530	394	72	1.000	72	0	
EB	1108	0.370	410	274	0.530	145	0	
								702
WB	1056	0.530	560	142	1.000	142	0	
	CLV Total =							
				Lev	el of Se	rvice (L	OS) =	

Century Park PAPF Silver Spring, MD

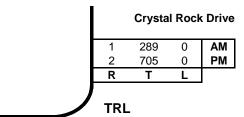


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

Conditions: Phase III Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

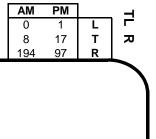


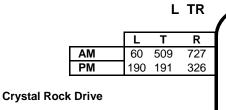
R 0 2 T 10 22 L 248 851 AM PM

Kinster Drive



Waters Landing Drive





Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Morning Peak Hour											
	Appro	oach Vol	umes	+0	pposing L	Right Turn	AM				
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	1236	1.000	1236	0	1.000	0	0				
								1236			
SB	290	1.000	290	60	1.000	60	0				
EB	8	1.000	8	248	1.000	248	126				
								382			
WB	258	1.000	258	0	1.000	0	0				
CLV Total =											
				Lev	el of Se	rvice (L	OS) =				

Spill Pha	15e :
NB	N
SB	Ν
EB	Ν
WB	Ν

			Ever	ing Pea	ak Hour			
	App	roach Vo	lumes	+ 0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	517	1.000	517	0	1.000	0	0	
								897
SB	707	1.000	707	190	1.000	190	0	
EB	18	1.000	18	851	1.000	851	0	
								876
WB	875	1.000	875	1	1.000	1	0	
	CLV Total =							
				Lev	el of Se	rvice (L	OS) =	

Century Park PAPF Silver Spring, MD

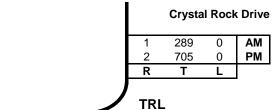


Intersection of: Crystal Rock Drive Date: September 10, 2019

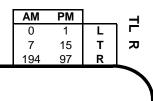
and: Kinster Dr / Waters Landing Dr

Conditions: Phase II Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



R 0 2
T 9 17
L 172 5555



Waters Landing Drive

Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

Split Phase?

NB N

SB N

EB N

WB N

			Morn	ing Pea	ak Hour			
	Approach Volumes			+0	pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	927	1.000	927	0	1.000	0	0	
								927
SB	290	1.000	290	60	1.000	60	0	
EB	7	1.000	7	172	1.000	172	127	
								306
WB	181	1.000	181	0	1.000	0	0	
CLV Total =								
				Lev	el of Se	rvice (L	OS) =	

			⊨ver	iing Pea	ak Hour					
	Арр	roach Vo	olumes	+ O	pposing L	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	423	1.000	423	0	1.000	0	0			
								897		
SB	707	1.000	707	190	1.000	190	0			
EB	16	1.000	16	555	1.000	555	0			
								575		
WB	574	1.000	574	1	1.000	1	0			
	CLV Total =									
	Level of Service (LOS) =									

Evening Book Hour

Kinster Drive

Century Park PAPF Silver Spring, MD

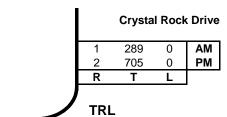


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

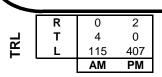
Conditions: Phase IB Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Waters Landing Drive





Kinster Drive

 AM
 PM

 0
 1

 3
 6

 194
 97

 R

L TR

L T R

AM 60 509 371

PM 190 191 116

Crystal Rock Drive

Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

			Morn	ing Pea	ak Hour	•		
	Appr	oach Vol	umes	+0	pposing L	_efts	Right Turn	AM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	880	1.000	880	0	1.000	0	0	
								880
SB	290 1.000 290 60 1.000 6						0	
EB	3	1.000	3	115	1.000	115	131	
								249
WB	119	1.000	119	0	1.000	0	0	
	CLV Total =							
				Lev	el of Se	rvice (L	OS) =	

Split Phase?

NB N

SB N

EB N

WB N

			Ever	ing Pea	ak Hour				
	App	roach Vo	lumes	+ 0	pposing L	efts	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	307	1.000	307	0	1.000	0	0		
						897			
SB	707	1.000	707	190	1.000	0			
EB	7	1.000	7	407	1.000	407	0		
								414	
WB	B 409 1.000 409 1 1.000 1 0								
CLV Total =									
Level of Service (LOS) =									

Century Park PAPF Silver Spring, MD

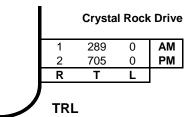


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

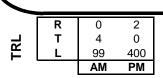
Conditions: Phase IA Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Waters Landing Drive





Kinster Drive

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ן ≓	Г	1	0 3 194	
\mathcal{D}	Т	6 97	3	
	R	97	194	
1				

Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

			Morn	ing Pea	ak Hour			
	Appr	oach Vol	umes	+0	pposing L	_efts	Right Turn	AM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	877	1.000	877	0	1.000	0	0	
								877
SB	290	1.000	290	60	1.000	60	0	
EB	3	1.000	3	99	1.000	99	131	
								233
WB	103 1.000 103 0 1.000 0 0							
·	CLV Total =							
				Lev	el of Se	rvice (L	OS) =	

NB N
SB N
EB N
WB N

			Even	ing Pea	ak Hour				
	App	roach Vo	lumes	+0	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV		
NB	293	1.000	293	0	1.000	0	0		
								897	
SB	707	1.000	707	190	1.000	0			
EB	7	1.000	7	400	1.000	400	0		
								407	
WB	402	1.000	402	1	1.000	1	0		
	CLV Total =								
				Lev	el of Se	rvice (L	OS) =		

Century Park PAPF Silver Spring, MD

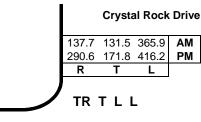


Intersection of: Crystal Rock Drive Date: September 10, 2019

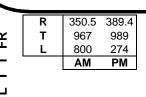
and: Father Hurley Boulevard

Conditions: Phase III Poplar / Current Build Black Hill Analyst: Kimley-Horn

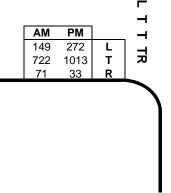
LANE USE + TRAFFIC VOLUMES



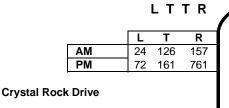




Father Hurley Boulevard



Father Hurley Boulevard



Split Phase? NB N

SB N

EB N

WB N

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Capacity Analysis-

			Morn	ing Pea	ak Hour	•				
	Appr	oach Vol	umes	+0	pposing L	_efts	Right Turn	AM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	126	0.530	67	366	0.530	194	0			
								261		
SB	269 0.530 143 24 1.000 24 0						0			
EB	793	0.370	293	800	0.530	424	0			
								717		
WB	967	0.530	513	149	1.000	149	0			
CLV Total =										
	Level of Service (LOS) =									

			Even	ing Pea	ak Hour			
	Арр	roach Vo	lumes	+0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	161	0.530	85	416	0.530	221	543	
								764
SB	462	0.530	245	72	1.000	72	0	
EB	1046	0.370	387	274	0.530	145	0	
								796
WB	989	0.530	524	272	1.000	272	0	
CLV Total =								

Century Park PAPF Silver Spring, MD

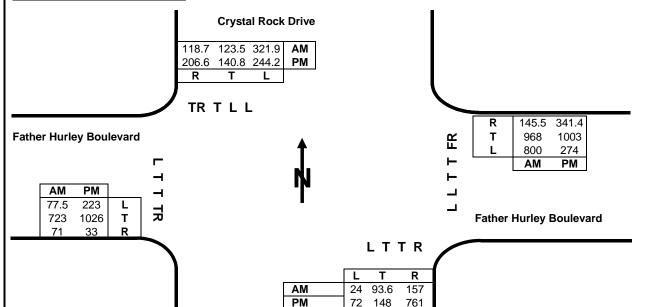


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase II Poplar / Current Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

Split Phase? NB N

SB N

EB N

WB N

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Crystal Rock Drive

			Morn	ing Pea	ak Hour	1				
	Appr	oach Vol	umes	+0	pposing L	_efts	Right Turn	AM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	94	0.530	50	322	0.530	171	0			
								221		
SB	242	0.530	128	24	1.000	24	0			
EB	794	0.370	294	800	0.530	424	0			
								718		
WB	968	968 0.530 513 78 1.000 78 0								
	CLV Total =									
	Level of Service (LOS) =									

			Even	ing Pea	ak Hour				
	Арр	roach Vo	olumes	+0	pposing L	efts	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV		
NB	148	0.530	78	244	0.530	129	542		
						671			
SB	347	7 0.530 184 72 1.000 72							
EB	1059	0.370	392	274	0.530	145	0		
								755	
WB	1003 0.530 532 223 1.000 223 0								
CLV Total =									
				Lev	el of Se	rvice (L	OS) =		

Century Park PAPF Silver Spring, MD

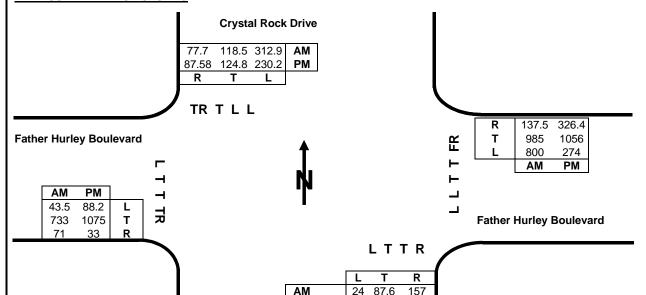


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase IB Poplar / Current Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

Split Phase? NB N

SB N

EB N

WB N

72 129

761

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

PM

Crystal Rock Drive

			Morn	ing Pe	ak Hour				
	Appr	oach Vol	umes	+ C	pposing L	_efts	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	88	0.530	46	313	0.530	166	0		
								212	
SB	196	196 0.530 104 24 1.000 24 0					0		
EB	804	0.370	297	800	0.530	424	0		
								721	
WB	985 0.530 522 44 1.000 44 0								
	CLV Total =								
				Lev	el of Se	rvice (L	.OS) =		

			Even	ing Pea	ak Hour				
	Арр	roach Vo	lumes	+0	pposing L	efts	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	129	0.530	68	230	0.530	122	537		
							659		
SB	212 0.530 113 72 1.000 72					0			
EB	1108	0.370	410	274	0.530	145	0		
								648	
WB	3 1056 0.530 560 88 1.000 88 0								
CLV Total =									
Level of Service (LOS) =									

Century Park PAPF Silver Spring, MD

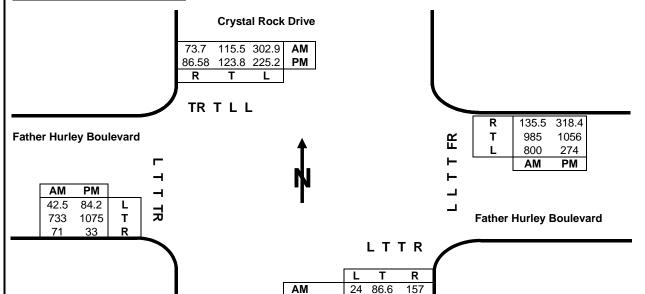


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase IA Poplar / Current Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES



Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

Split Phase? NB N

SB N

EB N

WB

72 127

761

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

PM

Crystal Rock Drive

			Morn	ing Pea	ak Hour				
	Appr	oach Vol	umes	+0	pposing L	efts	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	87	0.530	46	303	0.530	161	0		
								207	
SB	189	0.530	100	24	1.000	24	0		
EB	804	0.370	297	800	0.530	424	0		
								721	
WB	985	0.530	522	43	1.000	43	0		
	CLV Total =								
				Lev	el of Se	rvice (L	OS) =		

	Evening Peak Hour										
	Арр	roach Vo	lumes	+ Opposing Lefts			Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	127	0.530	67	225	0.530	119	537				
								656			
SB	210	0.530	111	72	1.000	72	0				
EB	1108	0.370	410	274	0.530	145	0				
								644			
WB	1056	0.530	560	84	1.000	84	0				
	CLV Total =										
				Lev	el of Se	rvice (L	OS) =				

Century Park PAPF Silver Spring, MD

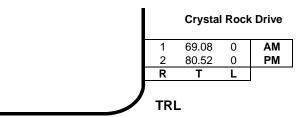


Intersection of: Crystal Rock Drive Date: September 10, 2019

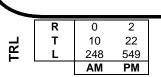
and: Kinster Dr / Waters Landing Dr

Conditions: Phase III Poplar / Current Build Black Hill Analyst: Kimley-Horn

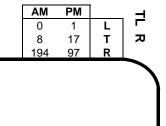
LANE USE + TRAFFIC VOLUMES



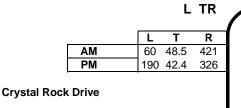
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Kinster Drive



Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

			Morr	ning Pe	ak Hou	ır		
	Appr	oach Vol	umes	+ C	Right Turn	AM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	469	1.000	469	0	1.000	0	0	
								469
SB	70	1.000	70	60	1.000	60	0	
EB	8	1.000	8	248	1.000	248	126	
								382
WB	258	1.000	258	0	1.000	0	0	
CLV Total =								851
				Lev	el of Se	rvice (L	OS) =	

Split Phase?

NB N
SB N
EB N
WB N

	Evening Peak Hour											
	Approach Volumes + Opposing Lefts				efts	Right Turn	PM					
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV				
NB	368	1.000	368	0	1.000	0	0					
								368				
SB	83	1.000	83	190	1.000	190	0					
EB	18	1.000	18	549	1.000	549	0					
								574				
WB	573	1.000	573	1	1.000	1	0					
						CLV T	otal =	942				
	Level of Service (LOS) =											

Century Park PAPF Silver Spring, MD

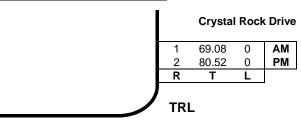


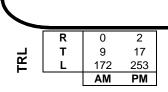
Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

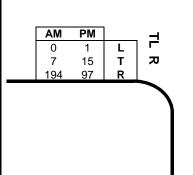
Conditions: Phase II Poplar / Current Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

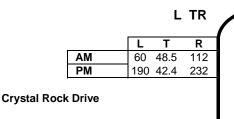




Kinster Drive



Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

			Morn	ing Pe	ak Hour	i			
	Appr	oach Vol	Volumes + Opposing Lefts				Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	160	1.000	160	0	1.000	0	0		
								160	
SB	70	1.000	70	60	1.000	60	0		
EB	7	1.000	7	172	1.000	172	127		
								306	
WB	181	1.000	181	0	1.000	0	0		
						CLV 1	otal =	466	
Level of Service (LOS) -									

Split Phas	se?
NB	N
SB	Ν
EB	Ν
WR	N

	Evening Peak Hour										
	App	Approach Volumes + Opposing Lefts				efts	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	274	1.000	274	0	1.000	0	0				
								274			
SB	83	1.000	83	190	1.000	190	0				
EB	16	1.000	16	253	1.000	253	0				
								273			
WB	272	1.000	272	1	1.000	1	0				
						CLV T	otal =	547			
	Level of Service (LOS) =										

Century Park PAPF Silver Spring, MD

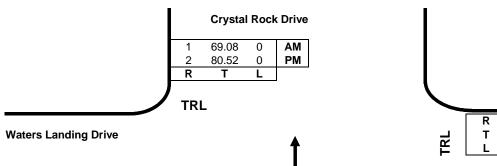


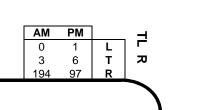
Intersection of: Crystal Rock Drive Date: September 10, 2019

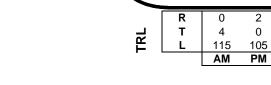
and: Kinster Dr / Waters Landing Dr

Conditions: Phase IB Poplar / Current Build Black Hill Analyst: Kimley-Horn

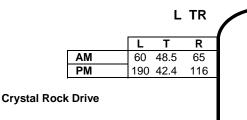
LANE USE + TRAFFIC VOLUMES







Kinster Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

			Morn	ing Pe	ak Hour				
	Appr	oach Vol	umes	+ C	pposing L	Right Turn	AM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV	
NB	113	1.000	113	0	1.000	0	0		
								130	
SB	70	1.000	70	60	1.000	60	0		
EB	3	1.000	3	115	1.000	115	131		
								249	
WB	119	1.000	119	0	1.000	0	0		
	-					CLV 7	otal =	379	
Level of Service (LOS) =									

Split Phas	se?
NB	Ν
SB	Ν
EB	Ν
WR	N

	Evening Peak Hour										
	App	Approach Volumes + Opposing Lefts				efts	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	158	1.000	158	0	1.000	0	0				
								273			
SB	83	1.000	83	190	1.000	190	0				
EB	7	1.000	7	105	1.000	105	0				
								112			
WB	107	1.000	107	1	1.000	1	0				
						CLV T	otal =	385			
	Level of Service (LOS) =										

Century Park PAPF Silver Spring, MD

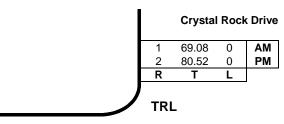


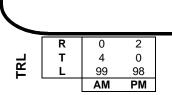
Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

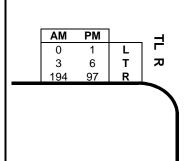
Conditions: Phase IA Poplar / Current Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

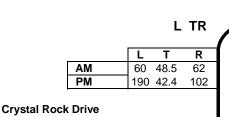




Kinster Drive



Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

	Morning Peak Hour											
	Appr	oach Vol	umes	+ Opposing Lefts			Right Turn	AM				
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV				
NB	110	1.000	110	0	1.000	0	0					
								130				
SB	70	1.000	70	60	1.000	60	0					
EB	3	1.000	3	99	1.000	99	131					
								233				
WB	103	1.000	103	0	1.000	0	0					
						CLVI	otal =	363				

Split Pha	se?
NB	Ν
SB	Ν
EB	Ν
WR	N

Evening Peak Hour										
	App	Approach Volumes + Opposing Lefts				efts	Right Turn	PM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	144	1.000	144	0	1.000	0	0			
								273		
SB	83	1.000	83	190	1.000	190	0			
EB	7	1.000	7	98	1.000	98	0			
								105		
WB	100	1.000	100	1	1.000	1	0			
		•				CLV T	otal =	378		
				Lev	el of Se	rvice (L	OS) =			

Century Park PAPF Silver Spring, MD

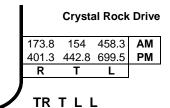


Intersection of: Crystal Rock Drive Date: September 10, 2019

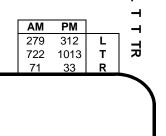
and: Father Hurley Boulevard

Conditions: Phase III Poplar / 75% Build Black Hill Analyst: Kimley-Horn

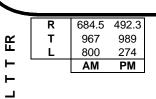
LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard







Father Hurley Boulevard

> Split Phase? NB N

> > SB N

EB N

WB

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Capacity Analysis-

			Morn	ing Pe	ak Hour	•		
	Appr	oach Vol	umes	+ C	Right Turn	AM		
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	409	0.530	217	458	0.530	243	0	
								460
SB	328	0.530	174	24	1.000	24	0	
EB	793	0.370	293	800	0.530	424	0	
								792
WB	967	0.530	513	279	1.000	279	0	
			CLVI	otal =	1252			

Level of Service (LOS) =

			Even	ing Pea	ak Hour			
	Арр	roach Vo	olumes	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV	
NB	185	0.530	98	700	0.530	371	543	
								914
SB	844	0.530	447	72	1.000	72	0	
EB	1046	0.370	387	274	0.530	145	0	
								836
WB	989 0.530 524 312 1.000 312							
	-					CLV T	otal =	1750

Century Park PAPF Silver Spring, MD

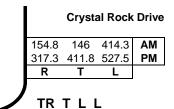


Intersection of: Crystal Rock Drive Date: September 10, 2019

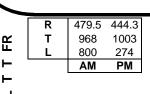
and: Father Hurley Boulevard

Conditions: Phase II Poplar / 75% Build Black Hill Analyst: Kimley-Horn

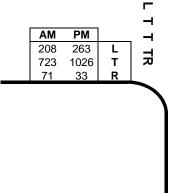
LANE USE + TRAFFIC VOLUMES



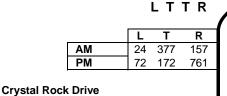




Father Hurley Boulevard



Father Hurley Boulevard



Split Phase? NB Ν

> SB Ν

> ΕB Ν

WB Ν

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Capacity Analysis-

	AM
ί	CLV
	CLV
	420
	420

			Even	ing Pea	ak Hour			
	Арр	roach Vo	olumes	pposing L	efts	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	Check	CLV		
NB	172	0.530	91	528	0.530	280	542	
								822
SB	729	0.530	386	72	1.000	72	0	
EB	1059	0.370	392	274	0.530	145	0	
								795
WB	1003	0.530	263	0				
				· · · · · ·	•	CLV T	otal =	1617

Level of Service (LOS) =

			Morn	ing Pe	ak Hour	i		
	Appr	oach Vol	umes	+ C	pposing L	efts	Right Turn	AM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	377	0.530	200	414	0.530	220	0	
								420
SB	301	0.530	159	24	1.000	24	0	
EB	794	0.370	294	800	0.530	424	0	
								721
WB	968	0.530	513	208	1.000	208	0	
	='					CLV 7	otal =	1141

Century Park PAPF Silver Spring, MD

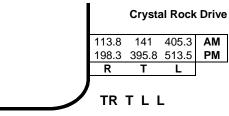


Intersection of: Crystal Rock Drive Date: September 10, 2019

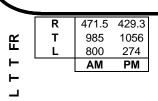
and: Father Hurley Boulevard

Conditions: Phase IB Poplar / 75% Build Black Hill Analyst: Kimley-Horn

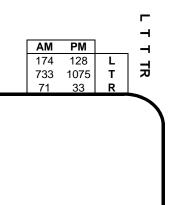
LANE USE + TRAFFIC VOLUMES



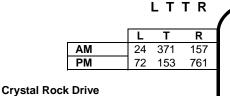




Father Hurley Boulevard



Father Hurley Boulevard



Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Split Pha	se?
NB	N
SB	Ν
EB	Ν
WB	Ν

			Morn	ing Pea	ak Hour			
	Appr	oach Vol	umes	+ O	pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	371	0.530	196	405	0.530	215	0	
								411
SB	255	0.530	135	24	1.000	24	0	
EB	804	0.370	297	800	0.530	424	0	
								721
WB	985	0.530	522	174	1.000	174	0	
			·			CLV 1	otal =	1132
				Lev	el of Se	rvice (L	.OS) =	

			Even	ing Pea	ak Hour			
	Арр	roach Vo	olumes	+0	pposing L	efts	Right Turn	PM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	153	0.530	81	514	0.530	272	537	
								809
SB	594	0.530	315	72	1.000	72	0	
EB	1108	0.370	410	274	0.530	145	0	
								688
WB	1056	0.530	560	128	1.000	128	0	
						CLV T	otal =	1497
				Lev	el of Se	rvice (L	OS) =	

Century Park PAPF Silver Spring, MD

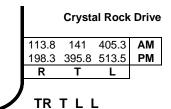


Intersection of: Crystal Rock Drive Date: September 10, 2019

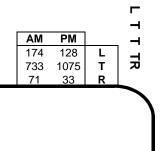
and: Father Hurley Boulevard

Conditions: Phase IA Poplar / 75% Build Black Hill Analyst: Kimley-Horn

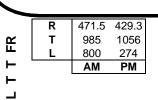
LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard







Father Hurley Boulevard

Split Phase?

SB N

EB N

WB

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Capacity Analysis-

			Morn	ing Pe	ak Hour			
	Appr	oach Vol	umes	+ Opposing Lefts			Right Turn	AM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	371	0.530	196	405	0.530	215	0	
								411
SB	255	0.530	135	24	1.000	24	0	
EB	804	0.370	297	800	0.530	424	0	
								721
WB	985	0.530	522	174	1.000	174	0	
						CLV 1	otal =	1132

Level of Service (LOS) =

			Even	iiiig rea	ak moui			
	Арр	roach Vo	olumes	+ 0	pposing L	efts	Right Turn	PM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	153	0.530	81	514	0.530	272	537	
								809
SB	594	0.530	315	72	1.000	72	0	
EB	1108	0.370	410	274	0.530	145	0	
								688
WB	1056	0.530	560	128	1.000	128	0	
	-					CLV T	otal =	1497

Level of Service (LOS) =

Evening Book Hour

Century Park PAPF Silver Spring, MD



Intersection of: Crystal Rock Drive

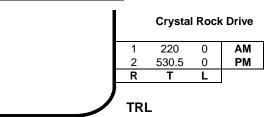
and: Kinster Dr / Waters Landing Dr

Conditions: Phase III Poplar / 75% Build Black Hill

Date: September 10, 2019

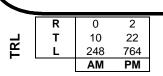
Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

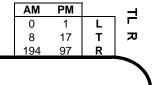


Waters Landing Drive





Kinster Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

Morning Peak Hour													
	Appro	oach Vol	umes	+ C	pposing L	Right Turn	AM						
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV						
NB	1023	1.000	1023	0	1.000	0	0						
								1023					
SB	221	1.000	221	60	1.000	60	0						
EB	8	1.000	8	248	1.000	248	126						
								382					
WB	258	1.000	258	0	1.000	0	0						
	CLV Total =												
				Lev	el of Se	rvice (I	OS) =						

Split Phase?
NB N
SB N
EB N

WB N

			Even	ing Pea	ak Hour			
	App	roach Vo	olumes	+ O	pposing L	efts	Right Turn	PM
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV	
NB	471	1.000	471	0	1.000	0	0	
								723
SB	533	1.000	533	190	1.000	190	0	
EB	18	1.000	18	764	1.000	764	0	
								789
WB	788	1.000	788	1	1.000	1	0	
	-		•	-		CLV T	otal =	1512
				Lev	el of Se	rvice (L	OS) =	

Century Park PAPF Silver Spring, MD

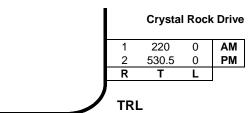


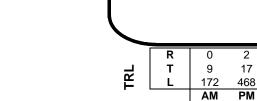
Intersection of: Crystal Rock Drive Date: September 10, 2019

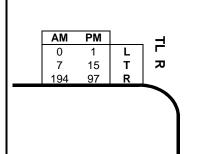
and: Kinster Dr / Waters Landing Dr

Conditions: Phase II Poplar / 75% Build Black Hill Analyst: Kimley-Horn

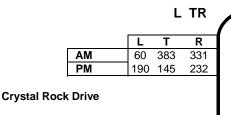
LANE USE + TRAFFIC VOLUMES







Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

306

Capacity Analysis-

1.000

181

Dir NB

> SB EB

WB

		•	ak Hour	ing Pea	Morn		
AM	Right Turn	_efts	pposing L	+0	umes	oach Vol	Appr
CLV	Check	= Total	x LUF	VOL	= Total	x LUF	VOL
	0	0	1.000	0	714	1.000	714
714							
	0	60	1.000	60	221	1.000	221
	127	172	1.000	172	7	1.000	7

CLV Total = 1020 Level of Service (LOS) =

Split Phase? NB N SB N EB N

WB N

			Even	ing Pea	ak Hour			
	App	roach Vo	olumes	+0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	377	1.000	377	0	1.000	0	0	
								723
SB	533	1.000	533	190	1.000	190	0	
EB	16	1.000	16	468	1.000	468	0	
								488
WB	B 487 1.000 487 1 1.000 1 0							
CLV Total =								
Level of Service (LOS) =								

Kinster Drive

Century Park PAPF Silver Spring, MD

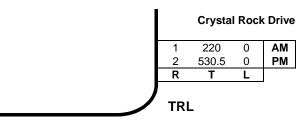


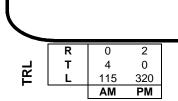
Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

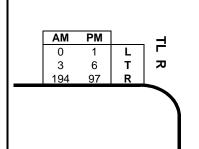
Conditions: Phase IB Poplar / 75% Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

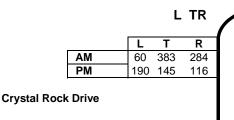




Kinster Drive



Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

916

Capacity Analysis-

1.000

119

Dir NB

> SB EB

WB

Morning Peak Hour									
Approach Volumes + Opposing Lefts Right Turn							AM		
VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
667	1.000	667	0	1.000	0	0			
							667		
221	1.000	221	60	1.000	60	0			
3	1.000	3	115	1.000	115	131			
							249		

CLV Total = Level of Service (LOS) =

Split Phase? NB N SB N EB N

WB

			Even	ing Pea	ak Hour			
	App	roach Vo	olumes	+0	pposing L	efts	Right Turn	PM
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	261	1.000	261	0	1.000	0	0	
								723
SB	533	1.000	533	190	1.000	190	0	
EB	7	1.000	7	320	1.000	320	0	
WB	322	1.000	322	1	1.000	1	0	
CLV Total =								
Level of Service (LOS) =								

Century Park PAPF Silver Spring, MD

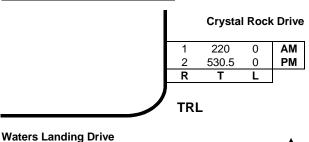


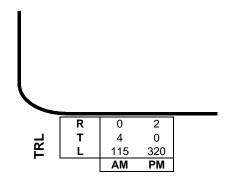
Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

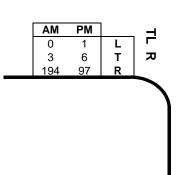
Conditions: Phase IA Poplar / 75% Build Black Hill Analyst: Kimley-Horn

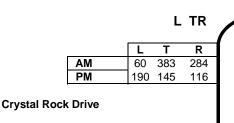
LANE USE + TRAFFIC VOLUMES





Kinster Drive





Split Phase? NB N

SB N

EB N

WP

1.000

322

322

Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

			Morn	ing Pea	ak Hour			
	Approach Volumes + Opposing Lefts						Right Turn	AM
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV	
NB	667	1.000	667	0	1.000	0	0	
								667
SB	221	1.000	221	60	1.000	60	0	
EB	3	1.000	3	115	1.000	115	131	
								249
WB	119	1.000	119	0	1.000	0	0	
CLV Total =							916	

Level of Service (LOS) =

WD	IN											
	Evening Peak Hour											
	App	Right Turn	PM									
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV				
NB	261	1.000	261	0	1.000	0	0					
								723				
SB	533	1.000	533	190	1.000	190	0					
EB	7	1.000	7	320	1.000	320	0					
								327				

CLV Total = 1050 Level of Service (LOS) =



Attachment B Signal Warrant Evaluation Sheets by Phase

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N n

				WARRA	ANT 1, Cond	dition A	WARRANT 1, Condition B WARRANT 1, Combination Warrant			Varrant							
		MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
		BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VA	ALUES -		—	600	150		900	75		480	120		720	60			
06:00 AM TC	O7:00 A	Л															
07:00 AM TC	1A 00:80 C	1,402	191	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ
08:00 AM TC	O 09:00 A	1,226	182	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
09:00 AM TC	O 10:00 A	M 811	237	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
10:00 AM TC	D 11:00 A	707	281	Υ	Υ	Υ		Υ		Υ	Υ	Υ		Υ		Y	
11:00 AM TC) 12:00 PI	924	352	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
12:00 PM TC	01:00 PI	1,314	300	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ
01:00 PM TC	02:00 PI	1,204	269	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y
02:00 PM TC	03:00 PI	935	364	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y
03:00 PM TC	04:00 PI	1,228	477	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Y
04:00 PM TC	O 05:00 PI	1,324	651	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y	Υ	Y	Υ
05:00 PM TC	O6:00 PI	1,464	326	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Y
06:00 PM TC	07:00 PI	900	112	Υ			Υ	Υ	Υ	Υ			Υ	Y	Υ		
07:00 PM TC	08:00 PI	1															
		13,439	3,742			11			10			11			11	11	8
				8 HC	OURS NEED	DED	8 HC	OURS NEED	DED	8 HO	URS OF BC	TH CONE	. A AND C	OND. B NEE	DED	4 HRS NEEDED	1 HR NEEDED
					SATISFIED		5	SATISFIED				SATI	SFIED			SATISFIED	SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
IIII IIII IIII IIII IIII IIII IIII IIII IIII	oryonal record prive and randor prive	000111 271121	10/0/2010

INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N

				WARRA	ANT 1, Cond	dition A	WARR	ANT 1, Cond	dition B		WARR	ANT 1, C	ombination V	Varrant			
		MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
		BOTH APPROACHE	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD '	VALUES			600	150		900	75		480	120		720	60			
06:00 AM	TO 07:00	AM MA															
07:00 AM	TO 08:00	1,219	188	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM 1	TO 09:00	1,092	173	Y	Y	Y	Y	Υ	Y	Υ	Υ	Y	Υ	Υ	Y	Υ	
09:00 AM	TO 10:00	742	155	Y	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
10:00 AM 7	TO 11:00	627 627	120	Y				Υ		Υ	Υ	Υ		Υ			
11:00 AM 7	TO 12:00	PM 802	138	Y				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
12:00 PM 1	TO 01:00	PM 1,193	131	Y			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
01:00 PM 1	TO 02:00	PM 1,098	128	Y			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
02:00 PM 1	TO 03:00	PM 837	129	Y				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
03:00 PM 1	TO 04:00	PM 1,126	149	Y			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
04:00 PM 1	TO 05:00	PM 1,474	166	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
05:00 PM 1	TO 06:00	PM 1,456	189	Y	Y	Υ	Υ	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Y	Y
06:00 PM 1	TO 07:00	PM 1,008	149	Y			Υ	Υ	Y	Y	Υ	Υ	Y	Y	Υ	Υ	
07:00 PM 1	TO 08:00	PM															
		12,674	1,815	4		5			8			12			11	8	2
					DURS NEED			DURS NEED		8 HOURS OF BOTH COND. A AND COND. B NEEDED			DED	4 HRS NEEDED	1 HR NEEDED		
				NO	T SATISFII	ED	8	SATISFIED	1			SAT	SFIED			SATISFIED	SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018

INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 1 of Poplar Grove

MAJOR STREET:	Crystal Rock Drive		# OF APPROACH LANES:	2
MINOR STREET:	Kinster Drive		# OF APPROACH LANES:	1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N
n

					WARRA	NT 1, Cond	dition A	WARR	ANT 1, Cond	lition B		WARR	ANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	ONDITION	В	WARRANT 2	WARRANT 3
			BOTH	HIGHEST	MAJOR	MINOR	вотн	MAJOR	MINOR	BOTH	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн		
			APPROACHES	APPROACH	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET		
THRESHOL	D VALU	JES	ı		600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	919	184	Υ	Υ	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
08:00 AM	TO	09:00 AM	830	168	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
09:00 AM	TO	10:00 AM	540	144					Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	433	100					Υ						Υ			
11:00 AM	TO	12:00 PM	570	85					Υ		Υ				Υ			
12:00 PM	TO	01:00 PM	873	101	Υ				Υ		Υ			Υ	Υ	Υ		
01:00 PM	TO	02:00 PM	803	88	Υ				Υ		Υ			Υ	Υ	Υ		
02:00 PM	TO	03:00 PM	588	98					Υ		Υ				Υ			
03:00 PM	TO	04:00 PM	818	82	Υ				Υ		Υ			Υ	Υ	Υ		
04:00 PM	TO	05:00 PM	1,086	111	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
05:00 PM	TO	06:00 PM	1,088	94	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
06:00 PM	TO	07:00 PM	774	112	Υ	,			Υ		Υ	,		Υ	Υ	Υ		
07:00 PM	TO	08:00 PM																
			9,322	1,367		<u> </u>	2			3		<u> </u>	3			8	1	0
					8 HC	URS NEED	ED	8 HC	OURS NEED	DED 8 HOURS OF BOTH COND. A AND COND. B NEEDED				DED	4 HRS NEEDED	1 HR NEEDED		
					NO.	T SATISFII	ED	NO	T SATISFII	FD			NOT S	ATISFIED			NOT SATISFIED	NOT SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Full Build Out of Black Hills and Phase 3 of Poplar Grove

 MAJOR STREET:
 Century Boulevard
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A		CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET											
THRESHOL	LD VALU	JES —		→	600	200		900	100		480	160		720	80			
06:00 AM	ТО	07:00 AM																
07:00 AM	то	08:00 AM	1,384	276	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
08:00 AM	TO	09:00 AM	1,167	230	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
09:00 AM	TO	10:00 AM	676	313	Υ	Υ	Υ		Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	569	369		Υ			Υ		Υ	Υ	Υ		Υ			
11:00 AM	TO	12:00 PM	777	500	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
12:00 PM	TO	01:00 PM	1,158	422	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y
01:00 PM	TO	02:00 PM	1,035	354	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
02:00 PM	TO	03:00 PM	741	503	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
03:00 PM	TO	04:00 PM	976	705	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y
04:00 PM	TO	05:00 PM	1,324	651	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
05:00 PM	TO	06:00 PM	1,230	413	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
06:00 PM	TO	07:00 PM	691	24	Υ						Υ							
07:00 PM	TO	08:00 PM																
			11,728	4,760			10			7			11			9	9	6
					8 HC	OURS NEED	ED	8 HC	OURS NEED	ED	8 HO	URS OF BC	TH CONE	D. A AND C	OND. B NEE	DED	4 HRS NEEDED	1 HR NEEDED
					8	SATISFIED		NO	T SATISFIE	ΕD			SAT	ISFIED			SATISFIED	SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Century Boulevard
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, Co	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD V	VALUE	s —			600	150		900	75		480	120		720	60			
06:00 AM T	ГО	07:00 AM																
07:00 AM T	ГО	08:00 AM	1,202	125	Υ			Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM T	ГО	09:00 AM	1,066	93	Υ			Υ	Υ	Y	Υ			Υ	Υ	Υ		
09:00 AM T	ГО	10:00 AM	637	111	Υ				Υ		Υ				Υ			
10:00 AM T	ГО	11:00 AM	503	123					Y		Υ	Υ	Υ		Υ			
11:00 AM T	ГО	12:00 PM	664	127	Υ				Y		Υ	Υ	Υ		Υ			
12:00 PM T	ГО	01:00 PM	1,041	133	Υ			Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
01:00 PM T	ГО	02:00 PM	962	121	Υ			Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ		
02:00 PM T	ГО	03:00 PM	665	151	Υ	Υ	Υ		Υ		Υ	Υ	Υ		Υ			
03:00 PM T	ГО	04:00 PM	892	158	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
04:00 PM T	ГО	05:00 PM	1,240	167	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Y	
05:00 PM T	ГО	06:00 PM	1,209	185	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
06:00 PM T	ГО	07:00 PM	733	146	Υ				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
07:00 PM T	ТО	08:00 PM																
			10,814	1,640			4			6			10			8	4	0
					8 HOURS NEEDED		8 HOURS NEEDED			8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED	
					1	T SATISFII			T SATISFII		0.110			SFIED			SATISFIED	NOT SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Full Build Out of Black Hills AND Phase 1 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	dition A	WARR	ANT 1, Cond	lition B		WARR	RANT 1, Co	ombination V	Varrant	·		
			MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D V/ALL	150	APPROACHES	APPROACH	600	150	IVIEI	900	75	IVIEI	480	120	IVIEI	720	60	IVIEI		
06:00 AM	TO	07:00 AM			600	150		900	75		400	120		720	60			
	TO		894	66	V						Y			V		Υ		
07:00 AM	TO	MA 00:80			T V						Y				T	· ·		
08:00 AM		09:00 AM	796	106	Ť				ĭ		ĭ			Ť	Ť	Ť		
09:00 AM	TO	10:00 AM	468	54														
10:00 AM	TO	11:00 AM	362	51							.,							
11:00 AM	TO	12:00 PM	485	35							Y							
12:00 PM	TO	01:00 PM	772	36	Υ						Υ			Υ				
01:00 PM	TO	02:00 PM	711	38	Υ						Υ							
02:00 PM	TO	03:00 PM	482	29							Y							
03:00 PM	TO	04:00 PM	651	34	Υ						Y							
04:00 PM	TO	05:00 PM	917	38	Υ			Υ			Υ			Υ				
05:00 PM	TO	06:00 PM	903	45	Υ			Υ			Υ			Υ				
06:00 PM	TO	07:00 PM	550	48							Υ							
07:00 PM	TO	08:00 PM																
			7,991	580			0			0			0			2	0	0
					0.116	NIDO NEED)FD	0.116	NIDO NEED		0.110	UD0 05 D0	TH COME		OND DAIE	.DED	A LIDO NICEDED	4 LID NIEEDED
						OURS NEED T SATISFII			OURS NEED T SATISFII		8 HO	UKS OF BO		O. A AND CO ATISFIED	OND. B NEE	יטבט	4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIE

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Current Build Out of Black Hills AND Phase 3 of Poplar Grove

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N n

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET											
THRESHOL	D VALU	JES —		—	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	523	191		Υ			Υ		Υ	Υ	Υ		Υ			
08:00 AM	TO	09:00 AM	479	182		Υ			Υ			Υ			Υ			
09:00 AM	TO	10:00 AM	371	237		Υ			Υ			Υ			Υ			
10:00 AM	TO	11:00 AM	387	281		Υ			Υ			Υ			Υ			
11:00 AM	TO	12:00 PM	434	352		Υ			Υ			Υ			Υ			
12:00 PM	TO	01:00 PM	500	300		Υ			Υ		Υ	Υ	Υ		Υ			
01:00 PM	TO	02:00 PM	455	269		Υ			Υ			Υ			Υ			
02:00 PM	TO	03:00 PM	445	364		Υ			Υ			Υ			Υ			
03:00 PM	TO	04:00 PM	545	477		Υ			Υ		Υ	Υ	Y		Υ		Y	
04:00 PM	TO	05:00 PM	374	651		Υ			Υ			Υ			Υ		Y	Y
05:00 PM	TO	06:00 PM	657	326	Υ	Υ	Y		Υ		Υ	Υ	Y		Υ		Y	
06:00 PM	TO	07:00 PM	398	112					Υ						Υ			
07:00 PM	TO	08:00 PM																
			5,568	3,742			1			0			4			0	3	1
					8 HC	OURS NEED	ED	8 HC	OURS NEED	ED	8 HO	URS OF BO	TH CONE	D. A AND CO	OND. B NEE	DED	4 HRS NEEDED	1 HR NEEDED
					NO.	T SATISFII	ED	NO	T SATISFIE	ED			NOT S	ATISFIED			NOT SATISFIED	SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018

INTERSECTION CONDITION: Current Build Out of Black Hills AND Phase 2 of Poplar Grove

MAJOR STREET: Crystal Rock Drive # 0F APPROACH LANES: 2
MINOR STREET: Kinster Drive # 0F APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N n

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	ANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D VALL	IFS —	ALLIKOACILO	ATTROACT	600	150	IVILI	900	75	IVILI	480	120	IVILI	720	60	IVIL		
06:00 AM		07:00 AM																
07:00 AM	TO	08:00 AM	336	187		Υ			Υ			Υ			Υ			
08:00 AM	TO	09:00 AM	340	173		Υ			Υ			Υ			Υ			
09:00 AM	TO	10:00 AM	292	153		Υ			Υ			Υ			Υ			
10:00 AM	TO	11:00 AM	295	112					Υ						Υ			
11:00 AM	TO	12:00 PM	300	124					Υ			Υ			Υ			
12:00 PM	TO	01:00 PM	367	117					Υ						Υ			
01:00 PM	TO	02:00 PM	337	116					Υ						Υ			
02:00 PM	TO	03:00 PM	332	116					Υ						Υ			
03:00 PM	TO	04:00 PM	427	133					Υ			Υ			Υ			
04:00 PM	TO	05:00 PM	488	149					Υ		Υ	Υ	Υ		Υ			
05:00 PM	TO	06:00 PM	632	171	Υ	Υ	Υ		Υ		Υ	Υ	Υ		Υ			
06:00 PM	TO	07:00 PM	494	135					Υ		Υ	Υ	Υ		Υ			
07:00 PM	TO	08:00 PM																
			4,640	1,686			1			0			3			0	0	0
						URS NEED T SATISFII			OURS NEED T SATISFII		8 HO	URS OF BO). A AND CO ATISFIED	OND. B NEE	DED	4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive		COUNT DATE:	10/9/2018
INTERSECTION CONDITION:	Current Build Out of Black Hills AND Phase 1 of Po	oplar Grove		
MAJOR STREET:	Crystal Rock Drive		# OF APPROACH LANES:	2

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

Kinster Drive

MINOR STREET:

N	
n	

OF APPROACH LANES:

				WARRANT 1, Co			dition A	WARRA	NT 1, Cond	ition B		WARR	ANT 1, Co	mbination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	ONDITION	В	WARRANT 2	WARRANT 3
			BOTH	HIGHEST	MAJOR	MINOR	вотн	MAJOR	MINOR	BOTH	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн		
			APPROACHES	APPROACH	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET		
THRESHOLD	VALU	ES —		_	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	308	184		Υ			Υ			Υ			Υ			
08:00 AM	TO	09:00 AM	311	168		Υ			Υ			Υ			Υ			
09:00 AM	TO	10:00 AM	232	144					Υ			Υ			Υ			
10:00 AM	TO	11:00 AM	215	100					Υ						Υ			
11:00 AM	TO	12:00 PM	221	85					Υ						Υ			
12:00 PM	TO	01:00 PM	288	101					Υ						Υ			
01:00 PM	TO	02:00 PM	265	88					Υ						Υ			
02:00 PM	ТО	03:00 PM	238	98					Υ						Υ			
03:00 PM	ТО	04:00 PM	328	82					Υ						Υ			
04:00 PM	TO	05:00 PM	387	111					Υ						Υ			
05:00 PM	ТО	06:00 PM	528	94					Υ		Υ				Υ			
06:00 PM	ТО	07:00 PM	420	112					Υ						Υ			
07:00 PM	TO	08:00 PM																
	3,741 1,367		1,367			0			0			0			0	0	0	
					8 HC	URS NEED	ED	8 HC	URS NEED	ED	8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
					NO	T SATISFII	ED	NO.	T SATISFIE	D			NOT SA	TISFIED			NOT SATISFIED	NOT SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME: Century Boulevard and Kinster Drive COUNT DATE: 10/9/20
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INTERSECTION CONDITION: Current Build Out of Black Hills AND Phase 3 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

			WARRA	ANT 1, Cond	ition A	WARR	ANT 1, Cond	lition B		WARR	J					
	MAJOR ST	MINOR ST							С	ONDITION	4	(CONDITION	В	WARRANT	WARRANT 3
	BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
UES —		→	600	200		900	100		480	160		720	80			
07:00 AM																
08:00 AM	452	276		Υ			Υ			Υ			Υ			
09:00 AM	377	230		Υ			Υ			Υ			Υ			
10:00 AM	227	313		Υ			Υ			Υ			Υ			
11:00 AM	240	369		Υ			Υ			Υ			Y			
12:00 PM	289	500		Υ			Υ			Υ			Y			
01:00 PM	338	422		Υ			Υ			Υ			Y			
02:00 PM	277	354		Υ			Υ			Υ			Υ			
03:00 PM	262	503		Υ			Υ			Υ			Υ			
04:00 PM	305	705		Y			Υ			Υ			Y		Υ	
05:00 PM	374	651		Y			Υ			Υ			Y		Υ	
06:00 PM	365	413		Y			Υ			Υ			Υ			
07:00 PM	235	24														
08:00 PM																
	3,741	4,760			0			0			0			0	2	0
			0 110	NIDO NEED	ED	0 ⊔(NIDO NEED	ED	0 HC	UIDS OF BO	TH COND) A AND C	OND BAILE	DED	HDC NEEDE	1 HR NEEDED
									0 HC	OKS OF BC						
	08:00 AM 09:00 AM 10:00 AM 11:00 AM 12:00 PM 01:00 PM 02:00 PM 03:00 PM 04:00 PM 05:00 PM 06:00 PM 07:00 PM	BOTH APPROACHES 07:00 AM 08:00 AM 452 09:00 AM 377 10:00 AM 227 11:00 AM 240 12:00 PM 289 01:00 PM 338 02:00 PM 277 03:00 PM 262 04:00 PM 305 05:00 PM 374 06:00 PM 365 07:00 PM 235 08:00 PM	BOTH APPROACHES APPROACH UES ───────────────────────────────────	MAJOR ST BOTH APPROACHES O7:00 AM 08:00 AM 08:00 AM 10:00 AM 10:00 AM 227 313 11:00 AM 240 369 12:00 PM 289 500 01:00 PM 338 422 02:00 PM 277 354 03:00 PM 262 503 04:00 PM 305 705 05:00 PM 374 651 06:00 PM 374 651 06:00 PM 374 07:00 PM 235 24 08:00 PM 3,741 4,760	MAJOR ST BOTH APPROACHES MINOR ST HIGHEST APPROACH MAJOR STREET MINOR STREET UES ★ 600 200 07:00 AM 452 276 Y 09:00 AM 377 230 Y 10:00 AM 227 313 Y 11:00 AM 240 369 Y 12:00 PM 289 500 Y 01:00 PM 338 422 Y 02:00 PM 277 354 Y 03:00 PM 262 503 Y 04:00 PM 305 705 Y 05:00 PM 374 651 Y 06:00 PM 365 413 Y 07:00 PM 235 24 08:00 PM 3,741 4,760 8 HOURS NEED	BOTH APPROACHES APPROACH STREET STREET WHIT MET UES	MAJOR ST BOTH APPROACHES MINOR ST APPROACH MAJOR STREET BOTH STREET MAJOR STREET UES → 600 200 900 07:00 AM 08:00 AM 452 276 Y 09:00 AM 377 230 Y 10:00 AM 227 313 Y 11:00 AM 240 369 Y 12:00 PM 289 500 Y 01:00 PM 338 422 Y 02:00 PM 277 354 Y 03:00 PM 262 503 Y 04:00 PM 305 705 Y 05:00 PM 374 651 Y 06:00 PM 365 413 Y 07:00 PM 235 24 08:00 PM 3,741 4,760 8 8 HOURS NEEDED 8 HO	MAJOR ST BOTH APPROACHES MINOR ST HIGHEST APPROACH MAJOR STREET MAJOR STREET MAJOR STREET MINOR STREET MINOR STREET	MAJOR ST BOTH APPROACHES MINOR ST HIGHEST APPROACH MAJOR STREET MINOR STREET BOTH MET MAJOR STREET MINOR STREET BOTH MET MAJOR STREET MINOR STREET BOTH MET 07:00 AM 452 276 Y Y Y 09:00 AM 377 230 Y Y Y 10:00 AM 227 313 Y Y Y 11:00 AM 240 369 Y Y Y 12:00 PM 289 500 Y Y Y 01:00 PM 338 422 Y Y Y 02:00 PM 277 354 Y Y Y 03:00 PM 262 503 Y Y Y 04:00 PM 305 705 Y Y Y 05:00 PM 374 651 Y Y Y 06:00 PM 365 413 Y Y Y 08:00 PM 3,741 4,760 8 HO	MAJOR ST BOTH APPROACHES MINOR ST HIGHEST APPROACH MAJOR STREET MINOR STREET BOTH MET MAJOR STREET MINOR STREET MAJOR STREET MINOR STREET MAJOR STREET MINOR STREET MAJOR STREET MINOR STREET MAJOR STREET MINOR STREET MAJOR STREET MINOR STREET MAJOR STREET MAJOR STREET MINOR STREET MAJOR STREET MAJOR STREET	MAJOR ST HIGHEST APPROACHES APPROAC	MAJOR ST HIGHEST APPROACHES APPROACH STREET STREET MAJOR STREET STREET STREET STREET MAJOR STREET STREET STREET MAJOR STREET ST	MAJOR ST BOTH HIGHEST APPROACH STREET STREET	MAJOR ST HIGHEST APPROACHES APPROACHES MAJOR STREET STREET	MAJOR ST BOTH APPROACHES MAJOR STREET MAJOR	MAJOR ST BOTH APPROACHS APPROACH STREET STRE

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Current Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Century Boulevard
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

				WARRA	ANT 1, Cond	lition A	WARR	ANT 1, Cond	lition B		WARF	RANT 1, Co	ombination V	Varrant			
		MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
		BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD V	ALUES -			600	150		900	75		480	120		720	60			
06:00 AM TO	O 07:00 AM	1															
07:00 AM TO	O 08:00 AM	269	122					Υ			Υ			Υ			
08:00 AM TO	O 09:00 AM	274	92					Υ						Υ			
09:00 AM TO	O 10:00 AN	186	101					Υ						Υ			
10:00 AM TO	O 11:00 AN	171	109					Υ						Υ			
11:00 AM T	O 12:00 PN	1 173	113					Υ						Y			
12:00 PM TO	O 01:00 PN	1 218	119					Υ						Υ			
01:00 PM T	O 02:00 PN	1 201	108					Υ						Υ			
02:00 PM T0	O 03:00 PN	182	135					Υ			Υ			Υ			
03:00 PM TO	O 04:00 PN	216	140					Υ			Υ			Υ			
04:00 PM T0	O 05:00 PN	1 286	150		Υ			Υ			Υ			Υ			
05:00 PM T0	O 06:00 PN	1 339	166		Υ			Υ			Υ			Υ			
06:00 PM TO	O 07:00 PN	1 275	132					Υ			Υ			Υ			
07:00 PM TO	O 08:00 PN	1															
		2,790	1,487			0			0			0			0	0	0
		8 HOURS NEEDED NOT SATISFIED					8 HOURS NEEDED NOT SATISFIED			URS OF BC	TH COND	4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIEI				

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: Current Build Out of Black Hills AND Phase 1 of Poplar Grove

 MAJOR STREET:
 Century Boulevard
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	dition B		WARF	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							C	CONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD	VALUES	; —		→	600	150		900	75		480	120		720	60			
06:00 AM	то (07:00 AM																
07:00 AM	то (MA 00:80	257	66											Υ			
08:00 AM	то (09:00 AM	267	106					Υ						Υ			
09:00 AM 1	ТО	10:00 AM	169	54														
10:00 AM	то	11:00 AM	148	51														
11:00 AM 1	ТО	12:00 PM	152	35														
12:00 PM 7	TO (01:00 PM	197	36														
01:00 PM 1	TO (02:00 PM	182	38														
02:00 PM 1	то (03:00 PM	156	29														
03:00 PM 1	то (04:00 PM	189	34														
04:00 PM 1	то (05:00 PM	259	38														
05:00 PM 1	TO (06:00 PM	314	45														
06:00 PM 1	то (07:00 PM	258	48														
07:00 PM 1	TO (08:00 PM																
			2,548	580			0			0			0			0	0	0
					8 HC	OURS NEED	ED	8 HC	OURS NEED	DED	8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
					NO	T SATISFIE	ΞD	NO	T SATISFII	ED			NOT S	ATISFIED		NOT SATISFIED	NOT SATISFIE	

Based on 2009 MUTCD

INTERSECTION NAME: Crystral Rock Drive and Kinster Drive COUNT DATE: 10/9/2018

INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 3 of Poplar Grove

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N n

					WARRA	ANT 1, Cond	dition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST	MAJOR STREET	MINOR	BOTH	MAJOR	MINOR STREET	BOTH MET	MAJOR STREET	MINOR	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
TUDEQUO	D \/ALL	150	APPROACHES	APPROACH	600	STREET	MET	STREET 900	75	IVIEI	480	STREET 120	IVIEI	720		IVIEI		
THRESHOLD					600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM	4.000		V	V	V					V		V		_	ν	
07:00 AM	TO	08:00 AM	1,082	191	Y	ī	Y	Y	Y	Y	Y	Y	Y	Y	- '	Y	· · · · · · · · · · · · · · · · · · ·	
MA 00:80	TO	09:00 AM	947	182	'	Y	Y	Y	Y	Y	'	Y	Y	Y	Y	Y	Υ	
09:00 AM	TO	10:00 AM	649	237	Y	Y	Y		ı		Y	ī	Ţ		Y			
10:00 AM	TO	11:00 AM	585	281		Υ			Υ		Υ	Υ	Y		Υ			
11:00 AM	TO	12:00 PM	753	352	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Y	Υ	Υ	Y	
12:00 PM	TO	01:00 PM	1,037	300	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Y
01:00 PM	TO	02:00 PM	949	269	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
02:00 PM	TO	03:00 PM	766	364	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
03:00 PM	TO	04:00 PM	994	477	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ
04:00 PM	TO	05:00 PM	973	651	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
05:00 PM	TO	06:00 PM	1,166	326	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ
06:00 PM	TO	07:00 PM	721	112	Υ				Υ		Υ			Υ	Υ	Υ		
07:00 PM	TO	08:00 PM																
			10,622	3,742			10			7			11			10	9	4
					8 HC	OURS NEED	DED	8 HOURS NEEDED			8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
						SATISFIED		NO	T SATISFII	ED			SATI	SFIED			SATISFIED	SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Crystal Rock Drive
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N

					WARRA	NT 1, Cond	dition A	WARRA	NT 1, Cond	ition B		WARR	ANT 1, Co	mbination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	С	ONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D VALI	JES —	711 1 1107101120	<u>→ , , , , , , , , , , , , , , , , , , ,</u>	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	ТО	08:00 AM	951	188	Y	Y	Υ	Y	Υ	Υ	Υ	Y	Υ	Y	Y	Υ	Υ	
08:00 AM	TO	09:00 AM	864	173	Υ	Υ	Υ		Υ		Υ	Y	Υ	Y	Y	Υ		
09:00 AM	TO	10:00 AM	610	155	Υ	Y	Υ		Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	525	120					Υ		Υ	Υ	Υ		Υ			
11:00 AM	TO	12:00 PM	661	138	Υ				Υ		Υ	Υ	Υ		Υ			
12:00 PM	TO	01:00 PM	964	131	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ		
01:00 PM	TO	02:00 PM	887	128	Υ				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
02:00 PM	TO	03:00 PM	697	129	Υ				Υ		Υ	Υ	Υ		Υ			
03:00 PM	TO	04:00 PM	933	149	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Y	Y	Υ		
04:00 PM	TO	05:00 PM	1,203	166	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Y	
05:00 PM	TO	06:00 PM	1,209	189	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y	Υ	Y	
06:00 PM	TO	07:00 PM	860	149	Y				Υ		Υ	Y	Y	Y	Υ	Y		
07:00 PM	TO	08:00 PM																
			10,364	1,815			5			5			12			8	3	0
					8 HOURS NEEDED				OURS NEED		8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
						T SATISFII	ED	NO.	T SATISFII	D			SATI	SFIED			NOT SATISFIED	NOT SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
INTERSECTION CONDITION:	75% Build Out of Black Hills AND Phase 1 of Poplar Grove		

MAJOR STREET:	Crystal Rock Drive		# OF APPROACH LANES:	2
MINOR STREET:	Kinster Drive		# OF APPROACH LANES:	1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N
n

					WARRA	NT 1, Cond	lition A	WARR	ANT 1, Cond	lition B		WARR	ANT 1, C	ombination \	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D VALU	JES			600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM		X														
07:00 AM	TO	08:00 AM	919	184	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM	TO	09:00 AM	830	168	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
09:00 AM	TO	10:00 AM	540	144					Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	433	100					Y						Υ			
11:00 AM	TO	12:00 PM	570	85					Υ		Υ				Υ			
12:00 PM	TO	01:00 PM	873	101	Υ				Υ		Υ			Υ	Υ	Υ		
01:00 PM	TO	02:00 PM	803	88	Υ				Y		Υ			Y	Υ	Υ		
02:00 PM	TO	03:00 PM	588	98					Υ		Υ				Υ			
03:00 PM	TO	04:00 PM	818	82	Υ				Υ		Υ			Υ	Υ	Υ		
04:00 PM	TO	05:00 PM	1,086	111	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
05:00 PM	TO	06:00 PM	1,088	94	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
06:00 PM	TO	07:00 PM	774	112	Υ				Υ		Υ			Υ	Υ	Υ		
07:00 PM	TO	08:00 PM																
			9,322	1,367			2			3			3			8	1	0
					8 HOURS NEEDED			8 HOURS NEEDED			URS OF BO			OND. B NEE	DED	4 HRS NEEDED	1 HR NEEDED	
				NO.	T SATISFII	ED	NOT SATISFIED			1		NOT S	ATISFIED			NOT SATISFIED	NOT SATISFIED	

Based on 2009 MUTCD

INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 3 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D VALU	ies —		—	600	200		900	100		480	160		720	80			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	1,030	276	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM	TO	09:00 AM	857	230	Υ	Υ	Y		Υ		Υ	Υ	Y	Y	Υ	Υ		
09:00 AM	TO	10:00 AM	498	313		Υ			Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	430	369		Υ			Υ			Υ			Υ			
11:00 AM	TO	12:00 PM	592	500		Υ			Υ		Υ	Υ	Υ		Υ		Υ	
12:00 PM	TO	01:00 PM	863	422	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Υ	
01:00 PM	TO	02:00 PM	762	354	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Υ	
02:00 PM	TO	03:00 PM	560	503		Υ			Υ		Υ	Υ	Υ		Υ		Y	
03:00 PM	TO	04:00 PM	725	705	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
04:00 PM	TO	05:00 PM	973	651	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Y
05:00 PM	TO	06:00 PM	898	413	Υ	Υ	Y		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
06:00 PM	TO	07:00 PM	492	24							Υ							
07:00 PM	TO	08:00 PM																
			8,680	4,760			7			2			10			7	8	2
						OURS NEED T SATISFII			OURS NEED T SATISFII		8 HO	URS OF BO). A AND CO ATISFIED	OND. B NEE	DED	4 HRS NEEDED SATISFIED	1 HR NEEDED SATISFIED

Based on 2009 MUTCD

INTERSECTION NAME: Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 2 of Poplar Grove

 MAJOR STREET:
 Century Boulevard
 # OF APPROACH LANES:
 2

 MINOR STREET:
 Kinster Drive
 # OF APPROACH LANES:
 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	NT 1, Cond	lition A	WARRA	ANT 1, Cond	lition B		WARR	RANT 1, C	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	(CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLI	D VALU	JES —		→	600	150		900	75		480	120		720	60			
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	907	125	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ		
08:00 AM	TO	09:00 AM	805	93	Υ				Υ		Υ			Υ	Υ	Y		
09:00 AM	TO	10:00 AM	487	111					Υ		Υ				Υ			
10:00 AM	TO	11:00 AM	388	123					Υ			Υ			Υ			
11:00 AM	TO	12:00 PM	509	127					Υ		Υ	Υ	Υ		Υ			
12:00 PM	TO	01:00 PM	796	133	Υ				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
01:00 PM	TO	02:00 PM	733	121	Υ				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
02:00 PM	TO	03:00 PM	512	151		Υ			Υ		Υ	Υ	Υ		Υ			
03:00 PM	TO	04:00 PM	683	158	Υ	Υ	Y		Υ		Υ	Υ	Υ		Υ			
04:00 PM	TO	05:00 PM	948	167	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Y	Υ	
05:00 PM	TO	06:00 PM	933	185	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	
06:00 PM	TO	07:00 PM	569	146					Υ		Υ	Υ	Υ		Υ			
07:00 PM	TO	08:00 PM																
			8,270	1,640			3			3			9			6	2	0
					8 HC	URS NEED	ED	8 HOURS NEEDED			8 HOURS OF BOTH COND. A AND COND. B NEEDED						4 HRS NEEDED	1 HR NEEDED
NOT SATISFIED						ED	NOT SATISFIED					NOT S	ATISFIED			NOT SATISFIED	NOT SATISFIED	

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 1 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

					WARRA	ANT 1, Cond	dition A	WARR	ANT 1, Cond	lition B		WARR	RANT 1, Co	ombination V	Varrant			
			MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOL	D V/ALL	150	APPROACHES	APPROACH	600	150	IVIE	900	75	IVIEI	480	120	IVIEI	720	60	IVIEI		
06:00 AM	TO	07:00 AM			600	150		900	75		400	120		720	60			
	TO		894	66	V						Y			V		Υ		
07:00 AM	TO	MA 00:80			T V						Y				T	· ·		
08:00 AM		09:00 AM	796	106	Ť				ĭ		ĭ			Ť	Ť	Ť		
09:00 AM	TO	10:00 AM	468	54														
10:00 AM	TO	11:00 AM	362	51							.,							
11:00 AM	TO	12:00 PM	485	35							Y							
12:00 PM	TO	01:00 PM	772	36	Υ						Υ			Υ				
01:00 PM	TO	02:00 PM	711	38	Υ						Υ							
02:00 PM	TO	03:00 PM	482	29							Y							
03:00 PM	TO	04:00 PM	651	34	Υ						Y							
04:00 PM	TO	05:00 PM	917	38	Υ			Υ			Υ			Υ				
05:00 PM	TO	06:00 PM	903	45	Υ			Υ			Υ			Υ				
06:00 PM	TO	07:00 PM	550	48							Υ							
07:00 PM	TO	08:00 PM																
			7,991	580			0			0			0			2	0	0
					0.116	NIDO NEED)FD	0.116	NIDO NEED		0.110	UD0 05 D0	TH COME		OND DAIE	.DED	A LIDO NICEDED	4 LID NIEEDED
					8 HOURS NEEDED NOT SATISFIED			8 HOURS NEEDED NOT SATISFIED			8 HOURS OF BOTH COND. A AND COND. B NEEDED NOT SATISFIED						4 HRS NEEDED NOT SATISFIED	1 HR NEEDED NOT SATISFIE



Attachment C

Kinster Drive and Crystal Rock Drive CLV Sensitivity Test

1		Site Trij	o Genera	tion			ı		
Land Use			-	AM	Peak Hour	PM Peak Hour			
Code	Description	Intens	ity	Total	In	Out	Total	In	Out
820	General Retail (>50 KSF) w/ Grocery	70,000	SF	192	100	92	767	399	368
	Internal Capture w/ Residential			-3	-2	-1	-129	-40	-89
	Internal Capture w/ Office			-22	-11	-11	-39	-32	-7
	External Retail Trips			167	87	80	599	327	272
	Pass-By	@	34%	-57	-30	-27	-203	-111	-92
	Net External Retail Trips			110	57	53	396	216	180
710	General Office	189,725	SF	315	274	41	293	50	243
,	Internal Capture w/ Residential		~-	-4	-4	0	-9	-4	-5
	Internal Capture w/ Retail			-22	-11	-11	-39	-7	-32
	External Office Trips			289	259	30	245	39	206
221	Mid-Rise Apartments (>75 units)	365	DU	149	30	119	173	114	59
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			237	45	192	292	194	98
	Internal Capture w/ Retail			-3	-1	-2	-129	-89	-40
	Internal Capture w/ Office			-4	0	-4	-9	-5	-4
	External Residential Trips			230	44	186	154	100	54
	Total Site-Generated Trips			629	360	269	795	355	440
	Total Site-Generated Trips (including pa	ss-by)		686	390	296	998	466	532

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD



2

18

679

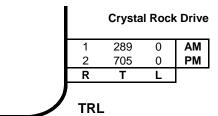
Kinster Drive

Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

Conditions: Phase III Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES

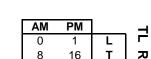


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557

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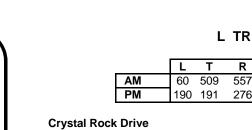


97

R

Waters Landing Drive

194



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

Split Phase? SB Ν EΒ Ν WB

	Morning Peak Hour											
	Appro	oach Vol	umes	+0	pposing L	_efts	Turn	AM				
Dir	VOL	x LUF	= Total	VOL	Check	CLV						
NB	1066	1.000	1066									
				1								
SB	290	1.000	290	60 1.000 60 0								
EB	8	1.000	8	225 1.000 225 126								
								359				
WB	235	1.000	235	235 0 1.000 0 0								
						CLV T	otal =	1425				
				Lev	el of Se	rvice (L	.OS) =					

			Ever	ing Pea	ak Hour						
	App	roach Vo	Right Turn	PM							
Dir	VOL	x LUF	= Total	VOL	x LUF	Check	CLV				
NB	467	1.000	467	0	0						
						897					
SB	707	1.000	707	190	1.000	0					
EB	17	1.000 17 679 1.000 679 0									
								700			
WB	VB 699 1.000 699 1 1.000 1 0										
						CLV T	otal =	1597			
				Lev	el of Se	rvice (L	OS) =				

		Site Tri	p Genera				T		
Land Use					Peak Hour	I		A Peak Ho	1
Code	Description	Intens	-	Total	In	Out	Total	In	Out
820	General Retail (<50 KSF) w/ Grocery	18,175	SF	118	61	57	472	245	227
	Internal Capture w/ Residential			-1	-1	0	-69	-21	-48
	Internal Capture w/ Office			0	0	0	0	0	0
	External Retail Trips			117	60	57	403	224	179
	Pass-By	@	34%	-39	-20	-19	-137	-76	-61
	Net External Retail Trips			78	40	38	266	148	118
710			J.	0					
710	General Office		SF	0	0	0	0	0	0
	Internal Capture w/ Residential			0	0	0	0	0	0
	Internal Capture w/ Retail			0	0	0	0	0	0
	External Office Trips			0	0	0	0	0	0
221	Mid-Rise Apartments (>75 units)	75	DU	33	7	26	36	24	12
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			121	22	99	155	104	51
	Internal Capture w/ Retail			-1	0	-1	-69	-48	-21
	Internal Capture w/ Office			0	0	0	0	0	0
	External Residential Trips			120	22	98	86	56	30
	Total Site-Generated Trips			198	62	136	352	204	148
	Total Site-Generated Trips (including pas	ss-by)		237	82	155	489	280	209

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD

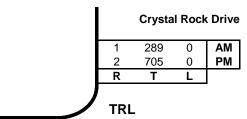


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Kinster Dr / Waters Landing Dr

Conditions: Phase II Poplar / Full Build Black Hill Analyst: Kimley-Horn

LANE USE + TRAFFIC VOLUMES





R 0 2
T 8 12
L 161 513
AM PM

Kinster Drive

AM	PM		-
0	1	Г	7
6 194	13	Т	70
194	97	R	
			1

Waters Landing Drive

Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

			Morni	ing Pe	ak Hour						
	Appr	oach Vol	umes	+ C	pposing L	_efts	Right Turn	AM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV			
NB	916	1.000	916	0	0						
					916						
SB	290	1.000	290	0							
EB	6	1.000	6	6 161 1.000 161 128							
								295			
WB	169	1.000	169	0	1.000	0	0				
	CLV Total =										
				Lev	el of Se	rvice (L	OS) =				

Split Pha	ase?
NB	N
SB	Ν
EB	Ν
WB	Ν

			Even	ing Pea	ak Hour					
	App	roach Vo	lumes	+0	pposing L	efts	Right Turn	PM		
Dir	VOL	x LUF	= Total	VOL	Check	CLV				
NB	390	1.000	390	0	1.000	0	0			
					897					
SB	707	1.000	707	190	0					
EB	14	1.000	14	513 1.000 513 0						
								528		
WB	527	1.000	527	1	1.000	1	0			
			·			CLV T	otal =	1425		
				Lev	el of Se	rvice (L	OS) =			



Attachment D

Kinster Drive and Century Boulevard Signal Warrant Sensitivity Test

Land Use				AM	Peak Hour	•	PN	M Peak Ho	ur
Code	Description	Intensi	ity	Total	In	Out	Total	In	Out
820	General Retail (>50 KSF) w/ Grocery	52,960	SF	160	83	77	640	333	307
	Internal Capture w/ Residential			-2	-1	-1	-96	-30	-66
	Internal Capture w/ Office			-12	-6	-6	-33	-27	-6
	External Retail Trips			146	76	70	511	276	235
	Pass-By	@	34%	-50	-26	-24	-174	-94	-80
	Net External Retail Trips			96	50	46	337	182	155
710	General Office	100,000	SF	162	141	21	164	28	136
/10	Internal Capture w/ Residential	100,000	31	-3	-3	0	-6	-3	-3
	•								-27
	Internal Capture w/ Retail			-12	-6	-6	-33	-6	
	External Office Trips			147	132	15	125	19	106
221	Mid-Rise Apartments (>75 units)	201	DU	83	17	66	95	63	32
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			171	32	139	214	143	71
	Internal Capture w/ Retail			-2	-1	-1	-96	-66	-30
	Internal Capture w/ Office			-3	0	-3	-6	-3	-3
	External Residential Trips			166	31	135	112	74	38
	Total Site-Generated Trips			409	213	196	574	275	299
	Total Site-Generated Trips (including pa	ss-hv)		459	239	220	748	369	379

Based on 2009 MUTCD

INTERSECTION CONDITION: Full Build Out of Black Hills and Trip Trigger of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

				WARRA	ANT 1, Cond	lition A	WARRA	NT 1, Cond	lition B		WARR	RANT 1, Co	mbination V	Varrant			
		MAJOR ST	MINOR ST							С	ONDITION	A	C	CONDITION	В	WARRANT 2	WARRANT 3
		вотн	HIGHEST	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн	MAJOR	MINOR	вотн		
		APPROACHES	APPROACH	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET	STREET	STREET	MET		
THRESHOLD VALU	JES —			600	200		900	100		480	160		720	80			
06:00 AM TO	07:00 AM																
07:00 AM TO	08:00 AM	1,233	128	Υ			Υ	Υ	Y	Υ			Υ	Υ	Υ		
08:00 AM TO	09:00 AM	1,093	140	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
09:00 AM TO	10:00 AM	646	150	Υ				Υ		Υ				Υ			
10:00 AM TO	11:00 AM	515	165					Υ		Υ	Υ	Υ		Υ			
11:00 AM TO	12:00 PM	684	193	Υ				Υ		Υ	Υ	Υ		Υ			
12:00 PM TO	01:00 PM	1,058	174	Υ			Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ		
01:00 PM TO	02:00 PM	980	154	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Y		
02:00 PM TO	03:00 PM	679	203	Y	Υ	Υ		Υ		Υ	Υ	Υ		Υ			
03:00 PM TO	04:00 PM	909	256	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
04:00 PM TO	05:00 PM	1,260	246	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
05:00 PM TO	06:00 PM	1,200	185	Y			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
06:00 PM TO	07:00 PM	691	24	Υ						Υ							
07:00 PM TO	08:00 PM																
		10,948	2,018			3			7			7			7	3	0
				1													
				8 HC	URS NEED	ED	8 HC	URS NEED	ED	8 HO	URS OF BC	TH COND	. A AND CO	OND. B NEE	DED	4 HRS NEEDED	1 HR NEEDED
				NO.	T SATISFIE	ED	NO.	T SATISFII	ΞD				TISFIED			NOT SATISFIED	NOT SATISFIED



Attachment E Condition 6A Trip Trigger Sensitivity Test

		Site Tri	p Genera	tion					
Land Use				AM	Peak Hour	•	PN	M Peak Ho	our
Code	Description	Intens	sity	Total	In	Out	Total	In	Out
820	General Retail (<50 KSF) w/ Grocery	49,715	SF	154	80	74	614	319	295
	Internal Capture w/ Residential			-1	-1	0	-69	-21	-48
	Internal Capture w/ Office			0	0	0	0	0	0
	External Retail Trips			153	79	74	545	298	247
	Pass-By	@	34%	-52	-27	-25	-185	-101	-84
	Net External Retail Trips			101	52	49	360	197	163
710	General Office		SF	0	0	0	0	0	0
	Internal Capture w/ Residential			0	0	0	0	0	0
	Internal Capture w/ Retail			0	0	0	0	0	0
	External Office Trips			0	0	0	0	0	0
221	Mid-Rise Apartments (>75 units)	75	DU	33	7	26	36	24	12
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			121	22	99	155	104	51
	Internal Capture w/ Retail			-1	0	-1	-69	-48	-21
	Internal Capture w/ Office			0	0	0	0	0	0
	External Residential Trips			120	22	98	86	56	30
	Total Site-Generated Trips			221	74	147	446	253	193
	Total Site-Generated Trips (including pa	ss-bv)		273	101	172	631	354	277

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD

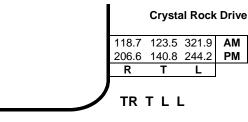


Intersection of: Crystal Rock Drive Date: September 10, 2019

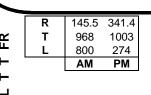
and: Father Hurley Boulevard

Conditions: Phase II Poplar / Current Build Black Hill Analyst: Kimley-Horn

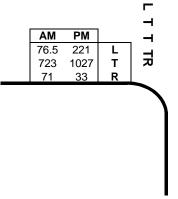
LANE USE + TRAFFIC VOLUMES



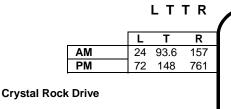




Father Hurley Boulevard



Father Hurley Boulevard



Split Phase?

SB N

EB N

WB

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Capacity Analysis-

	Morning Peak Hour													
	Approach Volumes			+0	pposing L	Right Turn	AM							
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV						
NB	94	0.530	50	322	0.530	171	0							
								221						
SB	242	0.530	128	24	1.000	24	0							
ЕВ	794	0.370	294	800	0.530	424	0							
								718						
WB	968	0.530	513	77	1.000	77	0							
CLV Total =														

Level of Service (LOS) =

			Even	ing Pea	ak Hour			
	Арр	roach Vo	olumes	+0	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	148	0.530	78	244	0.530	129	542	
								671
SB	347	0.530	184	72	1.000	72	0	
EB	1060	0.370	392	274	0.530	145	0	
								753
WB	1003	0.530	532	221	1.000	221	0	
	<u>-</u>					CLV T	otal =	1424

Level of Service (LOS) =



Attachment F Condition 6D Trip Trigger Sensitivity Test

Site Trip Generation

	Site Trip Generation												
Land Use				AM	Peak Hour	r	PN	M Peak Ho	our				
Code	Description	Intensi	ity	Total	In	Out	Total	In	Out				
820	General Retail (>50 KSF) w/ Grocery	69,000	SF	190	99	91	760	395	365				
	Internal Capture w/ Residential			-3	-2	-1	-129	-40	-89				
	Internal Capture w/ Office			-41	-21	-20	-39	-32	-7				
	External Retail Trips			146	76	70	592	323	269				
	Pass-By	@	34%	-50	-26	-24	-201	-110	-91				
	Net External Retail Trips			96	50	46	391	213	178				
710	General Office	342,500	SF	574	499	75	513	87	426				
	Internal Capture w/ Residential			-4	-4	0	-12	-4	-8				
	Internal Capture w/ Retail			-41	-20	-21	-39	-7	-32				
	External Office Trips			529	475	54	462	76	386				
221	Mid-Rise Apartments (>75 units)	365	DU	149	30	119	173	114	59				
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39				
	Combined Residential Trips			237	45	192	292	194	98				
	Internal Capture w/ Retail			-3	-1	-2	-129	-89	-40				
	Internal Capture w/ Office			-4	0	-4	-12	-8	-4				
	External Residential Trips			230	44	186	151	97	54				
	Total Site-Generated Trips			855	569	286	1004	386	618				
	Total Site-Generated Trips (including pas	ss-by)		905	595	310	1205	496	709				

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD

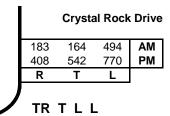


Intersection of: Crystal Rock Drive Date: September 10, 2019

and: Father Hurley Boulevard

Conditions: Phase III Poplar / Full Build Black Hill Analyst: Kimley-Horn

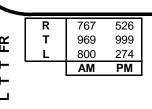
LANE USE + TRAFFIC VOLUMES



Father Hurley Boulevard

_				
_		PM	AM	
1 _	L	302	309	
X	Т	1022	723	
	R	33	71	
_~	T R	-	723 71	





Father Hurley Boulevard

L T T R R

L T R

AM 24 512 157

PM 72 192 761

Comment(s): This represents the Total Future Conditions with the Background Improvements, but not the final recommended improvement of a 2nd EBL lane.

PM NB right-turn check = 761*0.53 - 274*0.53 - (513-380)*0.53

Crystal Rock Drive

Split Phase?

WB

NB N SB N EB N

Capacity Analysis-

			Morn	ing Pea	ak Hour			
	Appr	Approach Volumes			pposing L	Right Turn	AM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	512	0.530	271	494	0.530	262	0	
								533
SB	347	0.530	184	24	1.000	24	0	
EB	794	0.370	294	800	0.530	424	0	
								823
WB	969	0.530	514	309	1.000	309	0	
						CLV T	otal =	1356
				Lev	el of Se	rvice (L	OS) =	

Evening Peak Hour										
	Approach Volumes			+ 0	pposing L	Right Turn	PM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	192	0.530	102	770	0.530	408	185			
								593		
SB	950	0.530	504	72	1.000	72	0			
EB	1055	0.370	390	274	0.530	145	0			
								831		
WB	999	0.530	529	302	1.000	302	0			
						CLV T	otal =	1424		

Level of Service (LOS) =



Attachment G Condition 6E Trip Trigger Sensitivity Test

		Site Trip	Genera	tion			ı		
Land Use				AM	Peak Hour		PM Peak Hour		
Code	Description	Intens	ity	Total	In	Out	Total	In	Out
820	General Retail (>50 KSF) w/ Grocery	70,000	SF	192	100	92	767	399	368
	Internal Capture w/ Residential			-3	-2	-1	-129	-40	-89
	Internal Capture w/ Office			-41	-21	-20	-39	-32	-7
	External Retail Trips			148	77	71	599	327	272
	Pass-By	@	34%	-50	-26	-24	-203	-111	-92
	Net External Retail Trips			98	51	47	396	216	180
710	General Office	342,500	SF	574	499	75	513	87	426
	Internal Capture w/ Residential			-4	-4	0	-12	-4	-8
	Internal Capture w/ Retail			-41	-20	-21	-39	-7	-32
	External Office Trips			529	475	54	462	76	386
221	Mid-Rise Apartments (>75 units)	365	DU	149	30	119	173	114	59
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			237	45	192	292	194	98
	Internal Capture w/ Retail			-3	-1	-2	-129	-89	-40
	Internal Capture w/ Office			-4	0	-4	-12	-8	-4
	External Residential Trips			230	44	186	151	97	54
	Total Site-Generated Trips			857	570	287	1009	389	620
	Total Site-Generated Trips (including pas	ss-by)		907	596	311	1212	500	712

CRITICAL LANE VOLUME (CLV) METHODOLOGY

Century Park PAPF Silver Spring, MD



Intersection of: Crystal Rock Drive

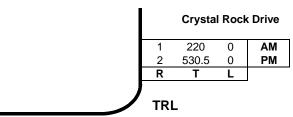
and: Kinster Dr / Waters Landing Dr

Conditions: Phase III Poplar / 75% Build Black Hill

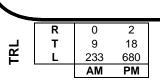
Date: September 10, 2019

Analyst: Kimley-Horn

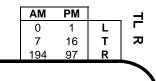
LANE USE + TRAFFIC VOLUMES



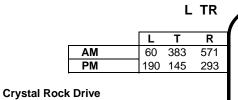
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Kinster Drive



Waters Landing Drive



Comment(s): Stop-controlled for EB and WB approaches. Two-phase operation assumed per LATR guidelines. WB approach is modeled as TLR but functions more like TL + TR.

Capacity Analysis-

Morning Peak Hour										
	Appr	oach Vol	umes	+ 0	pposing L	Right Turn	AM			
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV		
NB	954	1.000	954	0	1.000	0	0			
								954		
SB	221	1.000	221	60	1.000	60	0			
EB	7	1.000	7	233	1.000	233	127			
								367		
WB	242	1.000	242	0	1.000	0	0			
			·	· · ·		CLV T	otal =	1321		
	Level of Service (LOS) =									

Split Phase?							
NB	N						
SB	N						
FB	N						

WB N

			Even	ing Pea	k Hour			
	Approach Volumes			+ O	pposing L	Right Turn	PM	
Dir	VOL	x LUF	= Total	VOL	x LUF	= Total	Check	CLV
NB	438	1.000	438	0	1.000	0	0	
								723
SB	533	1.000	533	190	1.000	190	0	
EB	17	1.000	17	680	1.000	680	0	
								701
WB	700	1.000	700	1	1.000	1	0	
CLV Total =								1424
				Lev	el of Se	rvice (L	OS) =	



Attachment H

Condition 7 (Crystal/Kinster) Trip Trigger Sensitivity Test

1		Site Tri	p Genera	tion			ı		
Land Use			_	AM	Peak Hour	:	PM Peak Hour		
Code	Description	Intens	Intensity		In	Out	Total	In	Out
820	General Retail (<50 KSF) w/ Grocery	36,900	SF	130	68	62	521	271	250
	Internal Capture w/ Residential			-1	-1	0	-69	-21	-48
	Internal Capture w/ Office			0	0	0	0	0	0
	External Retail Trips			129	67	62	452	250	202
	Pass-By	@	34%	-44	-23	-21	-154	-85	-69
	Net External Retail Trips			85	44	41	298	165	133
710	General Office		SF	0	0	0	0	0	0
/10			SF			0	0	0	_
	Internal Capture w/ Residential			0	0		_	_	0
	Internal Capture w/ Retail			0	0	0	0	0	0
	External Office Trips			0	0	0	0	0	0
221	Mid-Rise Apartments (>75 units)	75	DU	33	7	26	36	24	12
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39
	Combined Residential Trips			121	22	99	155	104	51
	Internal Capture w/ Retail			-1	0	-1	-69	-48	-21
	Internal Capture w/ Office			0	0	0	0	0	0
	External Residential Trips			120	22	98	86	56	30
	Total Site-Generated Trips			205	66	139	384	221	163
	Total Site-Generated Trips (including pa	ss-bv)		249	89	160	538	306	232

Based on 2009 MUTCD

INTERSECTION NAME:	Crystral Rock Drive and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 2 of Poplar Grove

MAJOR STREET: Crystal Rock Drive # OF APPROACH LANES: 2
MINOR STREET: # OF APPROACH LANES: 1

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

N

			WARRA	ANT 1, Cond	dition A	WARRANT 1, Condition B			WARRANT 1, Combination Warrant									
			MAJOR ST	MINOR ST							С	ONDITION	A	C	ONDITION	В	WARRANT 2	WARRANT 3
			BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES —				600	150		900	75		480	120		720	60				
06:00 AM	TO	07:00 AM																
07:00 AM	TO	08:00 AM	946	187	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	
08:00 AM	TO	09:00 AM	858	172	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
09:00 AM	TO	10:00 AM	598	153		Υ			Υ		Υ	Υ	Υ		Υ			
10:00 AM	TO	11:00 AM	509	112					Υ		Υ				Υ			
11:00 AM	TO	12:00 PM	645	119	Υ				Υ		Υ				Υ			
12:00 PM	TO	01:00 PM	948	113	Υ			Υ	Υ	Υ	Υ			Υ	Υ	Υ		
01:00 PM	TO	02:00 PM	872	111	Υ				Υ		Υ			Υ	Υ	Υ		
02:00 PM	TO	03:00 PM	678	112	Υ				Υ		Y				Υ			
03:00 PM	TO	04:00 PM	913	128	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ		
04:00 PM	TO	05:00 PM	1,182	143	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
05:00 PM	TO	06:00 PM	1,187	165	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	Υ	Υ	Υ	
06:00 PM	TO	07:00 PM	844	130	Υ				Υ		Υ	Υ	Υ	Y	Υ	Υ		
07:00 PM	TO	08:00 PM																
10,180 1,645			3			5			7 8					3	0			
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOI	URS OF BO	TH COND	. A AND CO	OND. B NEE	4 HRS NEEDED	1 HR NEEDED	
					NO.	T SATISFII	ED	NOT SATISFIED			NOT SATISFIED						NOT SATISFIED	NOT SATISFIED



Attachment I

Condition 7 (Century/Kinster) Trip Trigger Sensitivity Test

Land Use				AM	Peak Hour	PM Peak Hour				
Code	Description	Intensi	ity	Total	In	Out	Total	In	Out	
820	General Retail (>50 KSF) w/ Grocery	70,000	SF	192	100	92	767	399	368	
	Internal Capture w/ Residential			-3	-2	-1	-129	-40	-89	
	Internal Capture w/ Office			-26	-13	-13	-39	-32	-7	
	External Retail Trips			163	85	78	599	327	272	
	Pass-By	@	34%	-56	-29	-27	-203	-111	-92	
	Net External Retail Trips			107	56	51	396	216	180	
710	General Office	219,000	SF	364	317	47	335	57	278	
710	Internal Capture w/ Residential	219,000	31	-4	-4	0	-10	-4	-6	
	<u>*</u>				-					
	Internal Capture w/ Retail			-26	-13	-13	-39	-7	-32	
	External Office Trips			334	300	34	286	46	240	
221	Mid-Rise Apartments (>75 units)	365	DU	149	30	119	173	114	59	
220	Townhouses (>100 units)	176	DU	88	15	73	119	80	39	
	Combined Residential Trips			237	45	192	292	194	98	
	Internal Capture w/ Retail			-3	-1	-2	-129	-89	-40	
	Internal Capture w/ Office			-4	0	-4	-10	-6	-4	
	External Residential Trips			230	44	186	153	99	54	
	Total Site-Generated Trips			671	400	271	835	361	474	
	Total Site-Generated Trips (including pa	727	429	298	1038	472	566			

Based on 2009 MUTCD

INTERSECTION NAME:	Century Boulevard and Kinster Drive	COUNT DATE:	10/9/2018
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INTERSECTION CONDITION: 75% Build Out of Black Hills AND Phase 3 of Poplar Grove

MAJOR STREET: Century Boulevard # OF APPROACH LANES: 2
MINOR STREET: Kinster Drive # OF APPROACH LANES: z

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): 85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N):

			WARRA	VARRANT 1, Condition A		WARRANT 1, Condition B			WARRANT 1, Combination Warrant						ļ ļ		
		MAJOR ST	MINOR ST							CONDITION A		CONDITION B			WARRANT 2	WARRANT 3	
		BOTH APPROACHES	HIGHEST APPROACH	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET	MAJOR STREET	MINOR STREET	BOTH MET		
THRESHOLD VALUES		-	-	600	200		900	100		480	160		720	80			
06:00 AM TO 07:	':00 AM																
07:00 AM TO 08:	3:00 AM	933	194	Υ			Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ		
08:00 AM TO 09:	:00 AM	812	176	Υ				Υ		Υ	Υ	Υ	Υ	Υ	Υ		
09:00 AM TO 10:	:00 AM	481	223		Υ			Υ		Υ	Υ	Υ		Υ			
10:00 AM TO 11:	:00 AM	399	248		Υ			Υ			Υ			Υ			
11:00 AM TO 12:	::00 PM	535	313		Υ			Υ		Υ	Υ	Υ		Υ			
12:00 PM TO 01:	:00 PM	804	271	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
01:00 PM TO 02:	2:00 PM	732	233	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ		
02:00 PM TO 03:	3:00 PM	525	319		Υ			Υ		Y	Υ	Υ		Υ			
03:00 PM TO 04:	:00 PM	690	425	Υ	Υ	Υ		Υ		Υ	Υ	Υ		Υ		Υ	
04:00 PM TO 05	:00 PM	941	399	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	
05:00 PM TO 06:	:00 PM	885	282	Υ	Υ	Υ		Υ		Υ	Υ	Υ	Υ	Υ	Υ	Y	
06:00 PM TO 07:	:00 PM	492	24							Υ							
07:00 PM TO 08:	:00 PM																
8,229 3,107		5		2		10 6					3	0					
				8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS OF BOTH COND. A AND COND. B NEEDED					4 HRS NEEDED	1 HR NEEDED	
		NOT SATISFIED			NOT SATISFIED			NOT SATISFIED					NOT SATISFIED	NOT SATISFIED			

ROAD PARTICIPATION AGREEMENT

(Dorsey Mill Road Bridge)

THIS AGREEMENT ("Agreement") is made this day of _______, 2014, by and among BLACK HILLS GERMANTOWN, LLLP, a Maryland limited liability partnership ("Black Hills"), and MONTGOMERY COUNTY, MARYLAND, a body corporate and politic and a political subdivision of the State of Maryland (the "County") (Black Hills and the County sometimes together being referred to as the "Parties").

RECITALS:

- A. Black Hills is the fee simple owner of certain property located in Germantown, Maryland, as shown by cross-hatching on the tax map attached to and made a part of this Agreement as **Exhibit "A"** (the "Black Hills Tract").
- B. The Montgomery County Planning Board (the "Planning Board") has approved a preliminary subdivision plan for the Black Hills Tract (the "Black Hills Preliminary Plan") providing for the development of approximately 1,098,000 square feet of office space, 91,400 square feet of retail space, 243,240 square feet of hotel space, 1,518 multi-family residential units, and 100 assisted living units on the Black Hills Tract.
- Century Boulevard from their current termini south of the Black Hills Tract. Black Hills is obligated to dedicate and build these two road extensions along with a new road, Dorsey Mill Road, from Century Boulevard eastward to the I-270 right-of-way. Dorsey Mill Road will continue over I-270 via a bridge and roadway extension to the east to connect with existing Observation Drive (the "Bridge"), all to be designed by Black Hills and to be constructed by the County. The Bridge, which includes the connections to Dorsey Mill Road, is shown on the plan attached to and made a part of this Agreement as **Exhibit "B"**.
- D. Black Hills and the County have determined that the most efficient and expeditious manner of constructing the Bridge is for Black Hills to design the Bridge and obtain permits for its construction. Once permitted, the County will construct the Bridge pursuant to its Capital Improvement Project program.

NOW, THEREFORE, in consideration of the foregoing Recitals, each of which is incorporated into and made a part of this Agreement, and the mutual covenants of the Parties set forth below, and for other good and valuable consideration, the receipt and sufficiency of which each of the Parties acknowledges, Black Hills and the County agree as follows:

ARTICLE 1: Description of Work; Responsibility

1.1 <u>Scope of Work.</u> The work which is the subject of this Agreement is the design of the Bridge as described in Section 2.2, along with obtaining required governmental approvals

and permits for its construction. The Bridge includes the design of all of the improvements to be shown on the "Plans" (defined in Section 2.1), as may be modified in accordance with Section 2.5.

1.2 <u>Responsibilities of the Parties.</u> Black Hills shall be responsible for designing the Bridge and obtaining governmental approvals and permits, at its sole cost and expense, as further described in this Agreement. The County shall be responsible for the construction of the Bridge after all necessary construction permits have been obtained.

ARTICLE 2: Planning and Design of the Improvements

- 2.1 <u>Engineering.</u> Black Hills shall retain, at its sole expense, a professional engineering firm (the "Project Engineer") with demonstrated experience in highway bridge design to prepare the agreed upon plans and specifications for the Bridge in accordance with the Scope hereinafter defined (such plans and specifications being referred to collectively as the "Plans"). Among other things, the Plans shall show the alignment of and rights-of-way required for the Bridge. The County shall have the right to consent to Black Hills' choice of the Project Engineer, which consent will not be unreasonably withheld.
- 2.2 <u>Scope of Design.</u> The Project Engineer's Bridge design shall be based upon a conceptual design scope agreed upon in writing by the County, Black Hills, and other relevant agencies, including, but not limited to, the Maryland State Highway Administration ("Scope"). The Scope shall contemplate that Dorsey Mill Road from Century Boulevard to Observation Drive will be designed and built as a 4 lane roadway, together with designated lanes for the possible future Corridor Cities Transitway, all within a 150 foot right-of-way as recommended in the 2009 Germantown Employment Area Sector Plan. The Scope shall also include a possible widening of I-270. Additionally, the concept of northbound/southbound exit ramps from I-270 on the north side of the Bridge will be explored, but it will not be a formal part of the final design or permit acquisition.
- 2.3 <u>Contract and Insurance.</u> Prior to Black Hills entering into an agreement with the Project Engineer, Black Hills shall submit a design agreement and the Project Engineer's Certificate of Insurance to the County for approval. Black Hills shall require the Project Engineer to maintain insurance consistent with the County's Office of Procurement's published requirements as well as Errors and Omissions coverage if such coverage is not included in the Office of Procurement's published requirements. In addition, the design agreement must include language permitting its assignment from Black Hills to the County, so that the County can assume the role of owner to construct the Bridge after the design has been satisfactorily completed and the necessary permits obtained.
- 2.4. <u>County and Permit Approvals.</u> Black Hills shall submit the Bridge construction plans to the Montgomery County Division of Engineering Services for review and approval at the completion of the preliminary (35%, 50%, 75%) and final design stages. In addition, Black Hills and its Project Engineer shall use commercially reasonable efforts to obtain all other required governmental approvals and permits for the Bridge's construction (except for funding approvals from the County, which shall be the County's responsibility) once the Plans are

sufficiently complete for such purposes. Once the permits are obtained, it shall be the County's responsibility to maintain them in full force and effect.

- 2.5 <u>SHA Approvals.</u> In addition to the County and Permit approvals set forth in 2.4 above, since the Bridge will cross an Interstate Highway, the design process must comply with the formal review and approval of the Maryland State Highway Administration ("SHA"). Accordingly, the Parties agree to abide by SHA's "Formal Review Stages of Projects", as shown in **Exhibit "C"**.
- 2.6 <u>Modifications of Plans.</u> Black Hills shall have the right to recommend changes to the Plans, as Black Hills may deem appropriate. All such changes shall be subject to the written approval of the County and the SHA in accordance with Article 7 below, or as otherwise specified by SHA in **Exhibit C**.

ARTICLE 3: Performance of the Work

3.1 Commencement and Completion.

- (a) Black Hills shall commence design of the Bridge not later than two (2) months from the date of this Agreement (the "Outside Commencement Date").
- (b) After commencing design of the Bridge, Black Hills shall cause the work to be diligently prosecuted so that the agreed upon design of the Bridge is substantially completed in eight (8) months after the commencement of the work (the "Outside Completion Date"), subject to delays for County and other agencies' approvals.
- (c) All work shall be performed in a good and workmanlike manner, in substantial conformance with the Scope, in compliance with all applicable laws and regulatory requirements of the County, and using the Maryland State Highway Standards and Specifications and other specifications approved by the County for this project and furnished to Black Hills in writing concurrently with the execution of this Agreement.
- 3.2 <u>Construction Procedures.</u> The following procedures applicable to Public Facilities Road Participation Projects, as established by the County Department of Transportation ("DOT"), shall be applicable to the work performed under this Agreement:
- (a) Upon completion of the Plans satisfactory to the County, and upon an appropriate assignment of the Plans by Black Hills to the County, the Plans shall become the sole property of the County and may be relied upon by the County to construct the Bridge in accordance therewith. Upon such assignment, Black Hills shall have no further liability to the County for the design of the Bridge.
- (b) Pursuant to the requirements of Chapter 11B of the Montgomery County Code (2004), as amended, notice is given of the statutory provisions set forth on **Exhibit "D"** attached to and made a part of this Agreement.

ARTICLE 4: Costs and Credits

- 4.1 <u>Project Costs.</u> The "Project Costs" means all out of pocket charges, expenses and fees incurred by Black Hills to third parties in connection with the design of the Bridge, including all costs eligible for impact tax credits under Section 52- 55 of the Montgomery County Code. Project Costs shall not include legal fees. At Black Hills' request, the County Department of Transportation ("MCDOT") will certify the amount of Project Costs upon submission by Black Hills of appropriate documentation.
- 4.2 <u>Impact Tax Credits.</u> MCDOT agrees to certify impact tax credits to Black Hills for all Project Costs eligible for impact tax credits pursuant to Section 52-55 of the Montgomery County Code ("Impact Tax Credits"). Such Impact Tax Credits may be used by Black Hills as credits against building permit fees due for construction of structures on the Black Hills Tract, all as permitted by Section 52-55 of the Montgomery County Code. No impact tax credits will be certified by the MCDOT unless and until the Bridge design has been satisfactorily completed and the necessary permits obtained.

ARTICLE 5: Information

5.1 <u>Progress Reports.</u> Following commencement of design of the Bridge, Black Hills at least bi-monthly shall meet with the County for the purpose of reviewing the progress of the Bridge design or shall provide to the County written progress reports reasonably describing the work performed since the last report and setting forth the estimated percentage of completion of design of the Bridge. Meetings shall be held at a place and time mutually selected by Black Hills and the County. For informational purposes only (and not for approval), Black Hills shall furnish to the County copies of the notice to proceed given by Black Hills to the Project Engineer.

ARTICLE 6: Default

- 6.1 Failure to Commence or Complete Work.
- (a) If, for reasons other than "Force Majeure" (defined in Section 9.5), Black Hills fails to commence design of the Bridge on or before the Outside Commencement Date, fails to diligently prosecute the Bridge design after commencement of design, or fails to complete the Bridge design on or before the Outside Completion Date, the County may give written notice to Black Hills of its failure to perform its obligations under this Agreement. If Black Hills does not cure the default within thirty (30) days following receipt of the notice, the County may assume the role of Black Hills with respect to the design of the unfinished portion of the Bridge by giving written notice to this effect to Black Hills. If, however, the default is not reasonably susceptible of being cured within thirty (30) days, Black Hills shall have such additional time to cure the default as may be reasonable, provided that Black Hills commences its efforts to cure the default within the initial thirty (30) day period and thereafter diligently prosecutes those efforts to completion. For the purposes of this Section 6.1(a), Black Hills shall be deemed to

have failed to diligently prosecute the Bridge design if Black Hills, after commencement of design, ceases performance of the work for more than thirty (30) consecutive days without the written consent of the County and for reasons other than Force Majeure. In the event the County assumes that the role of Black Hills under this Section 6.1(a):

- (i) The County shall undertake design of the unfinished portion of the Bridge design and shall have all of the rights and responsibilities of Black Hills set forth in this Agreement relating to such design (but the County shall not be deemed to have assumed any liability of Black Hills which accrued under this Agreement prior to the date the County assumed the role of Black Hills).
- (ii) Black Hills shall be required to pay to the Project Engineer all Project Costs incurred to the date that the County assumes Black Hills' role.
- (iii) Black Hills shall be required to satisfy or remove any and all mechanic's liens or other claims for payment that may have been filed by contractors or suppliers for work performed in connection with the Bridge design.
- (iv) Black Hills shall immediately deliver to the County the Plans and all other materials in the possession or control of Black Hills relating to the Bridge.
- (v) At the request of the County, Black Hills shall assign to the County any other agreements relating to the Bridge as may be designated by the County.
- (vi) Upon completion of the Bridge design by the County, Black Hills shall pay to the County, in addition to any other amounts payable under Section 6.1(a)(ii), all costs incurred by the County to complete the design plus an administrative and mobilization fee equal to ten percent (10%) of the Project Costs incurred by the County after the County took over the work.
- (vii) Black Hills shall not be eligible for Impact Tax Credits for any costs incurred prior to the date that the County assumes Black Hills' role.
- (b) The right to take over the Bridge design, recover the amounts due from Black Hills under Sections 4.2 and 6.1(a), and otherwise enforce the provisions of Section 6.1(a) shall be the County's sole right or remedy in the event that Black Hills fails to commence or complete the Bridge design as required or otherwise fails to perform or cause the performance of the work in accordance with this Agreement. Except for the amounts due under Section 6.1(a), the County shall not be entitled to recover damages from Black Hills, for delay or otherwise, for any such failure. Despite the foregoing, nothing in the Section 6.1(b) shall be construed to limit the County's rights and remedies in the event of negligence, fraud intentional misconduct, or misapplication of funds by Black Hills. Further, nothing contained in this Section 6.1(b) shall be construed to prohibit the County from obtaining injunctive relief to enforce the provisions of this Agreement.

(c) The County, at its sole discretion, may discontinue any work on the Bridge if Black Hills fails to commence or complete the design of the Bridge, as contemplated in Section 6.1

ARTICLE 7: Approval Procedure

3.1 Submissions to the County. Wherever under this Agreement any materials or matters are required to be submitted by Black Hills to the County for approval, then, unless otherwise expressly provided in this Agreement, such approval shall not be unreasonably withheld, delayed, or conditioned. Within twenty (20) business days after receipt from Black Hills of any such material or matter, the County shall give written notice to Black Hills approving or disapproving the material or matter submitted within the authority of the County. If the County fails to respond within twenty (20) business days, then the matter shall be deemed approved by the County. Such approval is subject to the Project Engineer obtaining approvals from the other permitting agencies, including the Maryland State Highway Administration and the Federal Highway Administration as it relates to any crossing or access point approval over, to, or from Interstate 270 (I-270).

ARTICLE 8: County Bridge Construction

8.1 Upon Black Hills timely completion of the Bridge design and when all permits and approvals for the construction of the Bridge have been obtained, or sooner as determined in MCDOT's sole and absolute discretion, DOT agrees to use diligent and commercially reasonable efforts to obtain County Capital Improvement Program ("CIP") budget approval for construction of the Bridge. Upon obtaining CIP budget approval and contingent upon the appropriation of County funds, the County will use diligent and commercially reasonable efforts to construct the Bridge pursuant to the completed design and the obtained permits and approvals.

ARTICLE 9: General

- 9.1 <u>Maryland Law.</u> This Agreement, and the rights and obligations of the Parties under this Agreement, shall be governed by the laws of the State of Maryland, without regard to principles of conflicts of laws.
- 9.2 <u>Amendments.</u> Amendments, modifications, supplements or changes to this Agreement shall be in writing, signed by all Parties.
- 9.3 <u>Severability.</u> Each provision of this Agreement is intended to be severable. If any term or provision of this Agreement shall be determined by a court of competent jurisdiction to be illegal or invalid for any reason whatsoever, such provision shall be severed from the Agreement and shall not affect the validity of the remainder of this Agreement.
- 9.4 <u>Headings</u>. Headings are intended only as a matter of convenience and for reference and in no way define, limit or describe the scope or intent of this Agreement.

- 9.5 Force Majeure. Despite any other provision of this Agreement, the obligations of the Parties under this Agreement shall be extended for a period of time equal to any period of prevention, delay or stoppage due to strikes; riots; insurrection; war; invasion; acts of terrorism; homeland security emergencies; fire, flood, or other casualty; natural disasters; unavailability of labor or materials, through means other than failure to order or procure; severely and unusually adverse weather conditions, delay in receipt of necessary governmental permits or approvals despite diligent pursuit of same, or other causes beyond the reasonable control of either Party ("Force Majeure").
- 9.6 <u>Assignment.</u> This Agreement is binding upon and shall inure to the benefit of the Parties and their successors and assigns. In the event of any collateral assignment or transfer of this Agreement by Black Hills to a <u>bona fide</u> mortgagee, the mortgagee shall have no liability or obligation under this Agreement unless and until the mortgagee acquires fee simple ownership of the Black Hills Tract through foreclosure or a deed in lieu of foreclosure.
- 9.7 <u>Notices.</u> All notices and other communications under this Agreement shall be in writing and shall be deemed duly given if (a) personally delivered (provided a signed written receipt is obtained), (b) sent by reputable commercial courier (provided a signed written receipt is obtained), (c) sent by certified mail, return receipt requested, first class, postage prepaid, or (d) transmitted by telecopy (provided evidence of transmission is obtained and the original of the notice is, on the same day, sent to the addressee by one of the foregoing methods of delivery). Notices shall be addressed as follows:

If to Black Hills:

Alan Gottlieb Chief Operating Officer Lerner Enterprises 2000 Tower Oaks Blvd., Eighth Floor Rockville, Md. 20852-4208 301-692-2600

With copies to:

Jeffrey Guelcher, Esq. General Counsel Lerner Enterprises 2000 Tower Oaks Blvd, 8th fl. Rockville, Md. 20852-4208

James D. Policaro P. E.
Lerner Enterprises
Vice President/Development Services
2000 Tower Oaks Blvd., 8th fl.
Rockville, MD 20852-4208
Telephone No.: (301) 692-2375
Telecopier No.: (301) 692-2631

Robert G. Brewer, Jr. Lerch, Early & Brewer, Chtd. 3 Bethesda Metro Center, Suite 460 Bethesda, MD 20814 Telephone No.: (301) 657-0165

Telecopier No.: (301) 657-0165 Telecopier No.: (301) 347-1772

If to the County:

Arthur Holmes, Jr.
Director, Mont. Co. Dept. Transportation 101 Monroe St., 10th fl.
Rockville, Md. 20850

With a copy (that does not constitute notice) to:

Edgar A. Gonzalez, P.E. Deputy Dir. for Transportation Policy 101 Monroe St., 10th fl. Rockville, Md. 20850

Office of the County Attorney for Montgomery County, Maryland 101 Monroe Street, 3rd Floor Rockville, MD 20850 Attn: Eric C. Willis, Associate County Attorney

Each party shall be responsible for notifying the other party of any change of address and telecopier number.

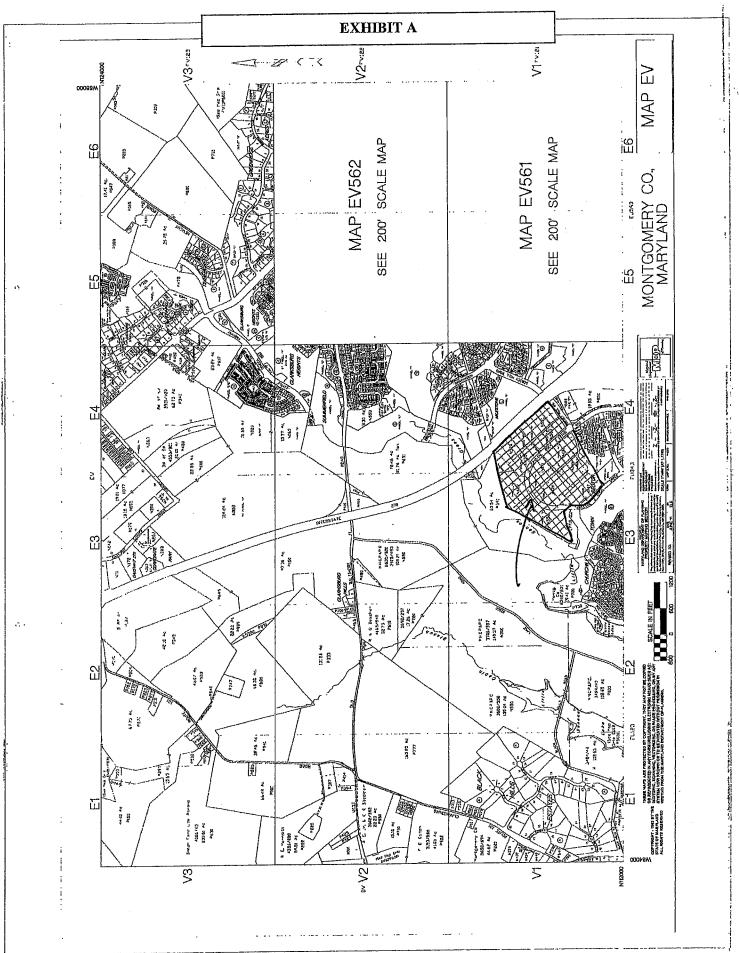
- 9.8 <u>Mechanic's Liens</u>. Black Hills will hold harmless the County against any mechanic's liens or other claims for payment filed or made by contractors or suppliers for work or materials furnished at the direction of Black Hills in connection with the Bridge design.
- 9.9 <u>Relationship of the Parties.</u> This Agreement does not create any partnership, joint venture or other similar relationship among or between any of the Parties, but is merely a means to perform certain improvements benefiting the Parties.
- 9.10 <u>Entire Agreement</u>. This Agreement contains the entire agreement among the Parties regarding the design of the Bridge and the grant of impact tax credits in connection therewith.
- 9.11 <u>Binding Effect.</u> This Agreement shall be binding upon and inure to the benefit of the Parties and their successors and assigns.

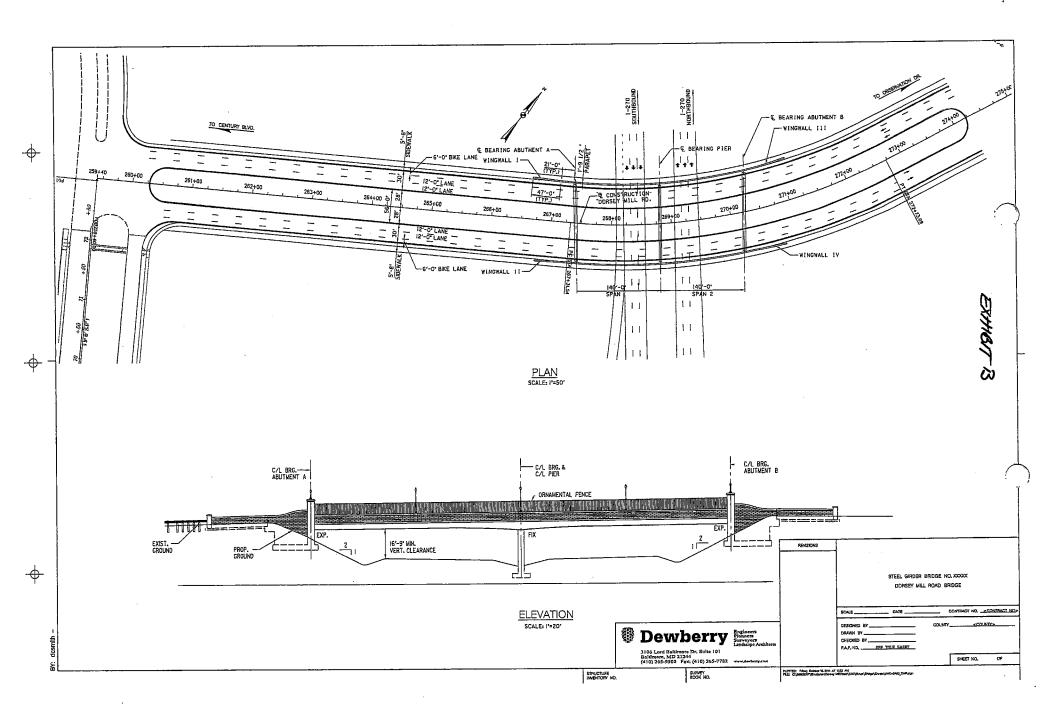
- 9.12 <u>Authority</u>. Black Hills represents and warrants to the County that it has full power and authority to enter into and carry out this Agreement, without the need for obtaining any further approvals or consents (except for the governmental approvals contemplated by this Agreement).
- 9.13 <u>County Funds.</u> County funds will only be authorized for the purposes set forth in this Agreement upon execution of this Agreement by the Chief Administrative Officer of the County or his designee and appropriation of funds by the Montgomery County Council.
- 9.14 No Waiver. Except where time periods are expressly provided in this Agreement for the exercise of rights or remedies, no failure or delay by Black Hills or the County in exercising any of their rights or remedies under this Agreement shall result in any waiver of those rights or remedies with respect to any then existing or subsequently occurring breach or default by the other party.
- 9.15 <u>Indemnification.</u> Any obligation or liability of the County arising in any way from this Agreement is limited by the damage caps and notice requirements stated in the Local Government Torts Claims Act, Md. Code Ann., Cts. & Jud. Proc. §§ 5-301, et seq. (2002 Repl. Vol.) (the "LGTCA"); Md. Code Ann. Art. 25A, § 1A (2003 Repl. Vol.); and Md. Code Ann., Cts. & Proc. § 5-509 (2002 Repl. Vol.), (together, the "County Indemnification Statutes"), all as amended from time to time. Any indemnification given by the County in this Agreement is not intended to create any rights or causes of action in any third parties or to increase the County's liability above the caps provided in the County Indemnification Statutes, as applicable.
- 9.16 No waiver of Governmental Authority. Nothing in this Agreement may be interpreted to be a waiver of the County's governmental authority or as a waiver of the requirement for Black Hills to comply with all County laws, regulations, policies or standard procedures, including, but not limited to, the Montgomery County Procurement Regulations (if applicable) and all permitting processes required under County law. This Agreement is not intended as an approval of any plans or permit applications.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be signed, sealed, and delivered by their duly authorized representatives the day and year first above written.

WITNESS:	BLACK HILLS GERMANTOWN, LLLP By: Lerner Corporation
A /	Its managing agent
6/01	By: Name: Alan H. Gottlieb Title: Chief Operating Officer
Julie L. White	MONTGOMERY COUNTY MARYLAND, a political subdivision of the State of Maryland By: Brown Bell-bears of Title: Assistant Chief Administrative Officer
	RECOMMENDED
	By: Name: AT R. Roshdieh Title: Director, Department of Transportation Date: 1/20/15
	APPROVED AS TO FORM AND LEGALITY:
	OFFICE OF THE COUNTY ATTORNEY
	By: Name: Eric willis Title: Associate County Attorney Date: 1/12/15





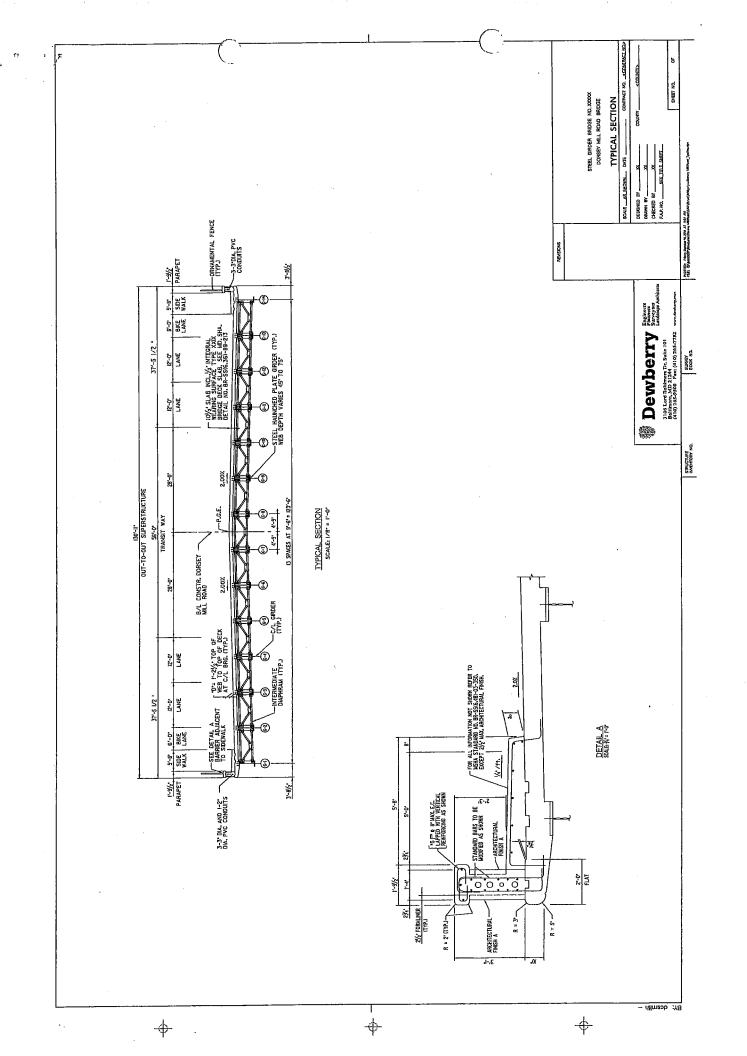


EXHIBIT C

STATE HIGHWAY ADMINISTRATION

FORMAL REVIEW STAGES OF PROJECTS



Maryland Department of Transportation

STATE HIGHWAY ADMINISTRATION DIVISION OF BRIDGE DEVELOPMENT

POLICY AND PROCEDURE MEMORANDUM

OP-76-10(G)

OFFICE PROCEDURES

MEMO NO.

EST LUM 4/19/76 DEPUTY CHIEF ENGR. BRIDGE DEVEL

DATE: April 19, 1976 *REVISED:* Oct. 8, 1986

SHEET 1 OF 4

SUBJECT

FORMAL REVIEW STAGES OF PROJECTS

EFFECTIVE DATE:

Immediately

AUTHORITY:

Earle S. Freedman, Deputy

Chief Engineer - Bridge Development

PERSONNEL AFFECTED:

All Design Groups Leaders

CONSULTANTS TO COMPLY WITH: Yes

DIRECTIVE. Each structure on all projects developed in the Bureau of Bridge Design or managed by same, must go through the following review stages and formal approval received before commencing any additional work affected by that review.

- 1. Preliminary Type, Size & Location (Pre. T.S.&L.)
- 2. Preliminary Investigation (P.I.)
- 3. Type, Size & Location (T.S.GL.)
- 4. Foundation Review
- 5. Structural Review
- 6. Final Review
- 7. Plans, Specifications & Estimate (P.S.&E.)

Composition of data required at each review stage:

Pre-T.S.SL.;

All material to be prepared on standard Bureau of Bridge Design linens bearing in mind that the ultimate goal is to use all material developed at this stage as part of the final contract drawings.

- a. General Plan(s) showing all pertinent dimensions.
- b. Elevation(s) showing pertinent clearances.
- c. General Notes.
- d. Typical section(s) of all main structural units.
- e. No foundation data required at this stage.

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Maryland Department of Transportation

STATE HIGHWAY ADMINISTRATION DIVISION OF BRIDGE DEVELOPMENT

MEMO NO.

WEMO NO.

OP-76-10(G)

POLICY AND PROCEDURE MEMORANDUM

DATE:

April 19, 1976 **REVISED** Oct. 8, 1986

OFFICE PROCEDURES

SHEET 2 OF 4

SUBJECT:

FORMAL REVIEW STAGES OF PROJECTS

DIRECTIVE (Continued)

- f. Preliminary hydrological and hydraulic computations should accompany this submission. If applicable.
- g. Data covering alternates considered prior to recommending scheme(s) (if applicable).

Three (3) copies of this submission shall be prepared and forwarded for approval.

2. P.I.;

Same as Pre-T.S.&L., except that any changes resulting from inhouse reviews, Public Hearings, final hydrological computations, etc. are incorporated in this submission. Also readway plan(s), profile, typical road section, preliminary Traffic Control Plans, as well as preliminary estimate of construction cost.

The number of copies to be submitted will vary with each project and shall be determined by the State Design Project Engineer.

3. T.S.&L.:

This submission shall incorporate all comments and revisions resulting from Pre-T.S.&L. and P.I. reviews and shall include a revised preliminary cost estimate.

Three (3) copies of this submission shall be prepared and forwarded for approval.

4. Foundation Review:

Same as T.S.&L., except that boring and drive test sheets and seismic data shall be complete and foundation types recommended. Substructure foundation plans must be incorporated, which shall include whether or not piles are required, types of piles (need for pile tips) and/or spread footings, with the approximate bottom of footing elevations for all support units. It should also include existing and finished ground line elevations at each support unit.

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Maryland Department of Transportation

STATE HIGHWAY ADMINISTRATION DIVISION OF BRIDGE DEVELOPMENT

POLICY AND PROCEDURE MEMORANDUM

OFFICE PROCEDURES

MEMO NO.

OP-76-10(G)

DATE!

April 19, 1976

REVISED: Oct. 8, 1986

SHEET 3 OF 4

SUBJECT:

FORMAL REVIEW STAGES OF PROJECTS

DIRECTIVE (Continued)

A foundation report shall be prepared in accordance with P.P.M. No. D-79-17(4). If the foundation information is available at the T.S.&L. stage, a combined T.S.&L. - Foundation will be acceptable.

Three (3) copies of this submission shall be prepared and forwarded for approval.

5. Structural Review:

The structural review plans shall consist of a set of contract drawings of each structure that are complete with all the details and special features of the project. All design for the structure must be completed and checked before this submission is made, however, the Plans need not be completely checked. Also included shall be:

- a. Detailed cost estimate of construction.
- b. Rough draft of Special Provisions.

6. Final Review Stage:

The final review submission shall consist of the following:

- a. Complete set of plans, including any road sheets, etc. that are part of the proposed contract, at a stage of completion equivalent to that of structural review.
- b. Complete revised Special Provisions for total project.
- Flyers not to be included.

 c. Revised cost estimate for project. Must include all items, all quantities for each item, and a total estimate for the project, including lump sum breakdowns.
- Must be checked.

 d. Final cost estimate. The SHA computer input form shall be completed prior to the P.S.&E. submission and forwarded to the Bureau of Bridge Design so that the Schedule of Prices (quantity sheets) which appear in the Invitation for Bids can be produced by the computer and returned to the Consultant for inclusion in his P.S.&E. submission.

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SUBJECT:

Maryland Department of Transportation

STATE HIGHWAY ADMINISTRATION DIVISION OF SMOGE DEVELOPMENT

POLICY AND PROCEDURE MEMORANDUM

OFFICE PROCEDURES

MEMO NO.

OP-76-10(G)

FORMAL REVIEW STAGES OF PROJECTS

DATE: April 19, 1976

REVISED: Oct. 8, 1986

SHEET 4 OF 4

DIRECTIVE (Continued)

The number of copies to be submitted will vary with each project and shall be determined by the Bureau of Bridge Design Project Engineer.

7. P.S.SE.:

This submission shall incorporate all revisions resulting from structural review and final review comments, as well as the final checking stage for the project. All data submitted at this stage must be completed and checked ready for advertising.

a. Complete set of plans.

b. Complete Invitation for Bids Booklet, including Title Sheet, Table of Contents page numbers, and numbers for the remainder of the booklet. All sheet numbering will be done by Bureau of Bridge Design personnel. (All material shall be on plain white bond paper.)

c. Two (2) sets of prints of cross-sections for contractors'

use in constructing approach roadways.

d. Lump Sum Break-Down Sheets: All lump sum structure items shall be broken down into the quantities that they are composed of and typewritten sheets indicating this breakdown shall be part of the P.S.SE. submission.

The P.S.SE. submission of a Consultant shall consist of four (4) complete sets of prints of contract drawings, the complete master copy of the Invitation for Bids Booklet, and five (5) sets of prints of the lump sum breakdown sheets.

VMA 612 340

RESTATED ROAD PARTICIPATION AGREEMENT

(Century Boulevard)

RECITALS:

- A. Symmetry is the owner of a parcel of land located in Germantown, Maryland, as shown or described on **Exhibit "A"** attached to and made a part of this Agreement (the "Symmetry Parcel").
- B. Located immediately to the north of the Symmetry Parcel is a parcel of land owned by North-Village-270 Limited Partnership ("North Village").
- C. Symmetry, North Village, and the County entered into a Road Participation Agreement, dated March 11, 2004 (the "Prior Agreement"), providing for the construction of Century Boulevard from its present terminus at or near Father Hurley Boulevard to future Dorsey Mill Road (the "Project").
- D. Under the Prior Agreement, Symmetry was to design and construct the Project and the County was to pay a share of the cost of the Project. North Village was a party to the Prior Agreement to acknowledge its separate obligations to further extend Century Boulevard beyond the northern limits of the Project and construct a segment of future Dorsey Mill Road at a later time and not as part of the Project. North Village was also a party to the Prior Agreement to acknowledge its arrangement to convey to Symmetry a portion of North Village's parcel, containing approximately 0.96 acres (the "Exchange Parcel"), in exchange for being excused from any obligation to contribute to the cost of the Project. This arrangement is set forth in greater detail, and the Exchange Parcel is further described, in an Agreement to Convey Land, dated January 21, 2004, between North Village and Symmetry (the "Conveyance Agreement"). A memorandum giving notice of the Conveyance Agreement is recorded among the Land Records for Montgomery County, Maryland (the "Land Records") at Liber 27244, folio 156.
 - E. Construction of the Project has not yet commenced.
- F. Symmetry and the County now desire that construction of the Project proceed expeditiously, with the County to construct the Project and Symmetry to pay a share of the cost of the Project. To that end, Symmetry and the County have determined that the Prior Agreement should be terminated and replaced by a new agreement which restates the construction and cost sharing obligations of Symmetry and the County in regard to the Project. Since the new agreement will not impose any obligations upon North Village, it is not necessary that North Village join in the new agreement as a full party but only to reconfirm its obligations under the

Conveyance Agreement and to acknowledge certain limited matters as expressly set forth in this Agreement.

G. Accordingly, Symmetry and the County are entering into this Agreement to set forth the new agreement between them regarding the construction of the Project. North Village is joining in the execution of this Agreement to acknowledge the termination of the Prior Agreement, to reaffirm its obligation to convey the Exchange Parcel to Symmetry pursuant to the Conveyance Agreement (as amended as provided below), and for such other limited purposes as are expressly set forth. Concurrent with the execution of this Agreement, Symmetry and North Village are entering into an amendment of the Conveyance Agreement to take account of the termination of the Prior Agreement and modify the terms of the Conveyance Agreement to make them consistent with the terms of this Agreement. North Village remains obligated to convey the Exchange Parcel to Symmetry pursuant to the amended Conveyance Agreement, and, as consideration for such conveyance, North Village will have no obligation to contribute any amount to the cost of the Project.

NOW, THEREFORE, in consideration of the foregoing Recitals, each of which is incorporated into and made a part of this Agreement, and the mutual covenants of Symmetry and the County set forth below, and for other good and valuable consideration, the receipt and sufficiency of which each of the parties acknowledges, Symmetry and the County agree as follows:

ARTICLE 1. Prior Agreement; North Village Agreements

- 1.1. <u>Termination</u>. As of the Effective Date, the Prior Agreement is terminated and of no further force or effect and Symmetry, the County, and North Village are released from and discharged of any and all liability or obligation to one another under or with respect to the Prior Agreement.
- 1.2. Consent by North Village. North Village agrees and consents to the termination of the Prior Agreement in accordance with Section 1.1 and acknowledges that such termination shall not affect the Conveyance Agreement, except as set forth in the amendment to the Conveyance Agreement being executed by North Village and Symmetry concurrently with this Agreement, and that North Village shall convey the Exchange Parcel to Symmetry in accordance with the Conveyance Agreement, as so amended.
- 1.3. Easements Over Exchange Parcel. Until such time as the Exchange Parcel has been conveyed to Symmetry, North Village agrees that, upon written direction by Symmetry given in accordance with Section 6.1(d), North Village shall grant to the County or the County's designees such perpetual and temporary easements on, over, and across the Exchange Parcel as may be reasonably required by the County to facilitate the construction, maintenance, and use of the Project, including, but not limited to, grading, slope, sediment control, storm drainage, utility and temporary construction easements. All such easements shall be granted without charge and free of liens and encumbrances.

1.4. North Village Joinder. North Village has joined in the execution of this Agreement solely to evidence its agreement with the terms of the Recitals relating to North Village and the terms of this Article 1. Provided that North Village grants the easements described in Section 1.3 above, if necessary, and conveys the Exchange Parcel to Symmetry, the County and Symmetry acknowledge that North Village shall have no obligation to construct or contribute to the cost of constructing the Project.

ARTICLE 2. Description of Work; Responsibilities of the Parties

- 2.1. Scope of Work. The work which is the subject of this Agreement is the design and construction of the Project, i.e., the extension of Century Boulevard, as a four (4) lane divided road, from its present terminus at or near Father Hurley Boulevard to its intersection with future Dorsey Mill Road in Germantown, Maryland. The Project shall consist of all work necessary to construct the improvements shown in the "Plans" (defined in Article 3), including, without limitation, (a) the performance of all clearing and grading and the installation of all utility lines, storm drainage lines, landscaping, and other improvements in the public right-ofway for the Project (to include a 12" water line and 8" sanitary sewer line), (b) the relocation of existing natural gas, fiber optic, telephone, cable, and other utility lines as may be necessitated by the construction of the Project, (c) the construction of all retaining walls and end walls as may be necessitated by the construction of the Project, and (d) the construction of all storm water management facilities necessary to serve the improvements being constructed as part of the Project, including a bottomless arch culvert and related appurtenances (the "Culvert System"). However, the Project shall not include (i) any transit facilities or transit-related improvements (although the parties acknowledge that the Project has been designed to accommodate the future installation of such facilities and improvements as part of the Corridor City Transitway) or (ii) any improvements or systems which the County elects to install in connection with the Project which are not customary for County roads of this type or which are not essential for the Project to serve its ordinary function as a public thoroughfare carrying vehicular traffic (e.g., speed cameras) (the "Excluded Items").
- 2.2. <u>Responsibilities of the Parties</u>. Prior to the Effective Date, Symmetry caused the Project to be designed, as further described below. From and after the Effective Date, the County shall be responsible for constructing the Project and Symmetry shall be responsible for reimbursing to the County a portion of the costs incurred by the County to construct the Project, all in accordance with this Agreement.

ARTICLE 3. Planning and Design of the Improvements

3.1. Engineering in General. Prior to the Effective Date, Symmetry caused the engineering firm of Dewberry & Davis LLC (the "Project Engineer") to prepare the plans and specifications for the Project (the "Plans"), except as otherwise provided in Section 3.2. The Plans have been reviewed and accepted by the County and are listed on Exhibit "B" attached to and made a part of this Agreement. Symmetry makes no representation or warranty about the Plans, including any representation or warranty regarding the correctness, sufficiency, or legal compliance of the Plans or the adequacy or fitness of any improvements depicted in the Plans for any particular purpose and shall have no liability for any errors or omissions in the Plans.

Symmetry shall have its rights to the Plans assigned to the County, together with the Project Engineer's professional liability obligations relating to the Plans, provided that the County executes and delivers the necessary documents required by the Project Engineer in connection with the assignment (which documents shall be reasonably satisfactory to Symmetry and the County).

- 3.2. <u>Design of the Culvert System</u>. The Plans prepared and approved to date provide for the preliminary design of the Culvert System (the "Preliminary Culvert Design") but not the design of the balance of the Culvert System (the "Final Culvert Design"). The Final Culvert Design will be prepared by the General Contractor as a design/build item pursuant to the Construction Contract awarded for the Project in accordance with Section 4.2. At such time as the Final Culvert Design is accepted, the term "Plans" shall be deemed to include the plans depicting such Final Culvert Design.
- 3.3. Credited Costs. Prior to the Effective Date, Symmetry has paid directly to the Project Engineer the costs of preparing and finalizing the Plans. Such costs shall not be part of the Shared Project Costs (defined in Section 7.2) and shall not be credited against the Symmetry Cap (defined in Section 7.1), except as otherwise expressly provided in this Section. Despite the preceding sentence and despite anything else contained in this Agreement, the following costs now or hereafter incurred by Symmetry (the "Qualified Soft Costs") shall be credited against the Symmetry Cap: (a) one-half of the costs for the Preliminary Culvert Design, (b) one-half of the costs for the design of retaining wall #4, (c) all costs to obtain Planning Commission approval of the amendment of certain forest conservation easements required for the construction of the Project, and (d) all costs related to the Existing Permits and Approvals incurred by Symmetry after the Permit Cost Transfer Date [as such terms are defined in Section 5.2(a)]. The known amounts of the Qualified Soft Costs as of December 31, 2011 are set forth on Exhibit "C" attached to and made a part of this Agreement. All of the costs to prepare and finalize the Final Culvert Design shall be Shared Project Costs and, as such, shall be paid as provided in Section 7.1, with the portion paid by Symmetry to be credited against the Symmetry Cap.
- 3.4. Modifications of Plans. Following the Effective Date, the County shall have the right to cause the Project Engineer to make changes to the Plans if necessary for the proper and efficient construction of the Project, provided that Symmetry's prior written approval shall be required for any changes which would (a) materially alter the scope of the Project from that shown in the Plans listed on **Exhibit "B"**, (b) when taken together with all previous changes, increase the cost of the Project by more than five percent (5%), unless such excess will be paid entirely by the County, (c) when taken together with all previous changes, delay the completion of the Project by more than ninety (90) days, (d) alter in any way the access to the Symmetry Parcel provided by the Project, or (e) materially and adversely affect the development or use of the Symmetry Parcel (collectively, "Symmetry Impact Changes described in clauses (a) (c) in its reasonable discretion and the Symmetry Impact Changes described in clauses (d) and (e) in its sole discretion. However, if any change is necessary for bona fide public safety reasons in the reasonable discretion of the County, the County may make such change without Symmetry's approval, provided that the County, in implementing the change, shall use reasonable efforts to

minimize the adverse impact of the change upon Symmetry and the Symmetry Parcel. If the unreasonable withholding of approval by Symmetry results in delays to the Project, any contractor claims for such delays shall constitute Shared Project Costs. In no event shall any changes to the Plans or additional costs associated with contractor claims increase the Symmetry Cap. The County shall promptly provide to Symmetry copies of all changes which are proposed to be made to the Plans. The costs incurred to the Project Engineer for modifying the Plans in accordance with this Section shall constitute Shared Project Costs. As used in this Agreement, the term "Plans" shall mean the Plans as modified from time to time in accordance with this Section.

3.5. <u>Limits of Symmetry's Design Obligations</u>. As of the Effective Date, Symmetry's responsibility with respect to the design of the Project has been fully satisfied. The County, as the party overseeing the construction of the Project, shall be responsible for managing any further review of the Plans required by other governmental agencies, any modifications to the Plans (whether required by governmental agencies or otherwise), any further engineering or technical services required for the Project (including, without limitation, administration of the Construction Contract), any requests for information submitted by any contractors bidding or working on the Project, any inspections required for the Project, and all other engineering matters relating to the Project. The costs of dealing with all such issues shall be Shared Project Costs (and not costs payable by Symmetry solely).

ARTICLE 4. Contracting for the Work

- 4.1. Bidding. As soon as practicable after the County has acquired all rights-of-way and easements from parties other than Symmetry that are required for the construction and use of the Project, but in no event later than six (6) months from the Effective Date, the County shall advertise for bids for the construction of the Project under the County's standard procurement procedures. The County shall pursue such rights-of-way and easements in accordance with Section 6.2. The County shall give Symmetry prior written notice of the bid solicitation. The bid solicitation shall require that bidders itemize their bids so that the Non-Shared Costs may be readily ascertained and allocated between Symmetry and the County in accordance with Section 7.3. Representatives of Symmetry shall be given reasonable advance written notice of and shall be permitted to attend the County's opening of the bids. In accordance with the County's procurement regulations, the County, in its sole discretion, may accept the lowest bid from a responsive and responsible bidder. If the low bid is not accepted by the County, the County shall either award the contract to the next lowest responsive and responsible bidder or re-advertise the Project in accordance with the County's existing procurement regulations.
- 4.2. <u>Construction Contract</u>. The County shall select a bid and enter into a construction contract for the Project (the "Construction Contract") within ninety (90) days after advertising or re-advertising for bids, subject to any extension as may be required under Montgomery County Procurement Regulations. The bidder awarded the Construction Contract is referred to in this Agreement as the "General Contractor".

4.3. <u>Change Orders</u>. Change orders shall be handled in accordance with the Procedures for Processing Change Orders as stipulated in Section 11 of the County Procurement Regulations, Montgomery County Code (1994), as amended. In addition, if any change orders or field changes would result in Symmetry Impact Changes, such change orders or field changes shall be subject to Symmetry's approval in the same manner as is provided in Section 3.4, subject, however, to the County's right to institute change orders that are necessary for bona fide public safety reasons in accordance with Section 3.4. No modifications to the Construction Contract, change orders, or field changes shall increase the Symmetry Cap.

ARTICLE 5. Performance of the Work

5.1. Commencement and Completion.

- (a) The County shall commence construction of the Project within thirty (30) days after entering into the Construction Contract, but no later than twenty-four (24) months from the Effective Date (the "Outside Commencement Date").
- (b) After commencing construction of the Project, the County shall cause the work to be diligently and continuously performed so that the Project shall be Substantially Complete within eighteen (18) months after the commencement of the work (the "Outside Completion Date"). "Substantially Complete" means that (i) the Project has been fully constructed in accordance with the Plans and any change orders as provided for in this Agreement, except for minor punch list items which do not impair the use of the Project for its intended purposes and items of a cosmetic nature which are reasonably deferred because of seasonal conditions, such as street trees and landscaping (the "Follow-Up Items"), and (ii) the Project is opened for public travel. The County shall complete all Follow-Up Items at such time as may be customary for newly constructed roads similar to the Project. However, the County shall use good faith efforts, to the extent feasible, to coordinate the completion of the Follow-Up Items with Symmetry's development plans for the Symmetry Parcel, with the intent of minimizing the potential for damage to the Follow-Up Items which may be caused by the development activities upon the Symmetry Parcel.
- (c) If requested by either party, Symmetry and the County shall execute written memoranda confirming the dates that the Project is commenced and/or Substantially Complete.

5.2. Standards of Performance.

(a) Prior to the Effective Date, Symmetry, at its own expense, has obtained the permits and approvals required for the construction of the Project which are listed as Permits 1 - 5 on Exhibit "D" (which does not include the Water Line Permit as described in Section 5.4) attached to and made a part of this Agreement (the "Existing Permits and Approvals"). The Existing Permits and Approvals are in Symmetry's name. From and after the Effective Date, the County shall cause the Project Engineer to maintain the Existing Permits and Approvals in full force and effect and in good standing and to renew or extend the same as necessary. Provided that the necessary transfer forms have been or will be delivered to the

County by Symmetry, the County shall promptly proceed to effectuate the transfer of the Existing Permits and Approvals to the County or the General Contractor, as indicated on Exhibit "D". The County shall promptly advise Symmetry if any additional forms or documents are required from Symmetry in order to accomplish the transfer. Symmetry shall reasonably cooperate in the renewal, extension, and transfer of the Existing Permits and Approvals. From and after the Effective Date, the County shall obtain in its own name, or cause the General Contractor to obtain in the name of the County or General Contractor, any additional permits and approvals, whether Federal, State, or County, which may be required for the construction of the Project, including, without limitation, those listed as Permits 6 and 7 on Exhibit "D" (collectively, the "Additional Permits and Approvals"). All costs incurred by Symmetry with respect to the Existing Permits and Approvals through April 8, 2011 (the "Permit Cost Transfer Date") shall be borne solely by Symmetry. All costs incurred by Symmetry or the County with respect to the Existing Permits and Approvals from and after the Permit Cost Transfer Date, as well as all costs incurred by the County with respect to the Additional Permits and Approvals, shall be Shared Project Costs (and, as such, Symmetry's share shall be credited against the Symmetry Cap). Despite this Section 5.2(a), Symmetry shall be solely responsible for obtaining, at is sole cost, the Water Line Permit and such permit shall name Symmetry as the permittee, as provided in Section 5.4.

- (b) All work shall be completed in accordance with Montgomery County Department of Transportation standards for quality control. Symmetry does not provide any warranty or assurance as to whether the soil on which the Project is to be constructed is suitable for use in the construction of the Project or as to any other matter relating to the site conditions prevailing on or adjacent to the Symmetry Parcel and the County and the General Contractor shall rely solely on their own investigation of the site conditions. Notwithstanding the preceding sentence, any additional grading work, including, without limitation, the replacement or compaction of fill, required as a result of conditions discovered in the field shall be Shared Project Costs.
- (c) Except as may be located within the limits of the intended public right-of-way for the Project and any easements granted by Symmetry in connection with the Project and as may be done in such areas in accordance with the Plans, the County shall not remove any soil from, deposit any soil upon, or otherwise disturb any soil contained within the Symmetry Parcel. The County shall not place any construction debris or other debris upon the Symmetry Parcel. The County shall not allow the General Contractor or any subcontractors to do any of the actions which the County is prohibited to do under this Section 5.2(c). Although the Plans do not contemplate the placement of fill on easement areas located on the Symmetry Parcel, if the Plans change or if changes are otherwise made pursuant to Section 4.3 so as to require such fill, the County shall assure that the soils used are clean and Class 1 soils and that such soils are compacted to a modified 95% proctor, AASHTO T-180.
- 5.3. <u>Bonds</u>. Other than as set forth in Section 5.4, Symmetry shall not be required to post any bonds or other security in connection with the Project. The bid package for the Project, however, may require the contractor awarded the construction contract to post with the County or other public agencies, the bonds ordinarily required by the County in connection with such work.

- 5.4. Special Provisions Relating to Water Line Construction. The Project includes construction of a water line in the right-of-way for Century Boulevard that will exclusively serve the Symmetry Parcel (the "Symmetry Water Line"). Symmetry shall be responsible for obtaining the permit from the Washington Suburban Sanitary Commission (the "WSSC") required for the construction of the Symmetry Water Line (the "Water Line Permit"). The costs of obtaining the Water Line Permit and any costs related to engineering, surveying, bonding, constructing, or obtaining WSSC inspections of the Symmetry Water Line (collectively, the "Water Line Costs") shall be borne solely by Symmetry. The General Contractor shall construct the Symmetry Water Line as part of the Project and shall take all actions necessary for the installation and completion of such line according to the Plans and the Water Line Permit. Except for the costs of obtaining the Water Line Permit, including any bonding costs, which shall be paid directly by Symmetry to the WSSC, the County shall advance, when due, all other Water Line Costs and such Water Line Costs shall ultimately be reimbursed by Symmetry as part of the payment of Symmetry's Cost Share under Section 7.4. Although Symmetry shall solely bear the Water Line Costs, all Water Line Costs paid by Symmetry shall be credited against the Symmetry Cap. The County shall keep Symmetry reasonably apprised of its anticipated timing for commencing the Project and shall in any event provide written notice to Symmetry of its intent to issue a notice to proceed to the General Contractor at least ninety (90) days prior to the issuance of such notice. If, despite the ninety (90) day notice, Symmetry has not obtained the Water Line Permit at least thirty (30) days prior to the time the County is ready to issue the notice to proceed, the County shall consult with Symmetry and the parties shall act collaboratively in an effort to obtain the issuance of the Water Line Permit so as to avoid delay in the start of the Project. If, despite such collaborative efforts, Symmetry does not obtain the Water Line Permit prior to the date set forth on the County's notice of its intention to issue a notice to proceed, the County may issue the notice to proceed on the date previously noticed and construct the Project without the Symmetry Water Line.
- 5.5. <u>Insurance</u>. The County shall cause the General Contractor to maintain in effect, at all times from and after the commencement of work until the final completion of work, a policy of commercial general liability insurance as may be required by the County's bid solicitation and in accordance with County procurement regulations. Such insurance shall provide coverage against claims on account of death, bodily injury or property damage that may arise from or be occasioned by the construction of the Project. The policy shall name as additional insureds Symmetry and any mortgagee of Symmetry of which the County is notified in writing and shall not be canceled, materially amended, or failed to be renewed without at least ten (10) days' prior written notice to Symmetry and each mortgagee covered. At or before the time that construction commences under this Agreement, and thereafter not less than thirty (30) days before the expiration date of the policy, the County shall deliver to Symmetry evidence that such coverage is in effect or has been renewed, as the case may be, together with reasonable evidence of the payment of the premium for the policy.
- 5.6. <u>Indemnity</u>. The County agrees to indemnify and hold harmless Symmetry, and its members, managers, agents, employees, and affiliates (collectively, the "Symmetry Parties"), from and against any and all losses, damages, liabilities, actions, suits, claims and expenses, including, without limitation, reasonable attorneys' fees, litigation costs, and investigative costs, incurred by any of the Symmetry Parties as the result of (a) any death, bodily

injury, or property damage arising from or relating to the construction of the Project, (b) any claims for payment by any third party supplying labor, material, equipment, or services in connection with the Project, including, without limitation, any claims seeking to establish mechanic's, materialmen's or other liens against the Symmetry Parcel for nonpayment, and (c) any other matter arising out of or related to the County's construction of the Project, unless due to the negligence or intentional misconduct of any Symmetry Parties. In no event, however, shall the County be liable to Symmetry for punitive damages. This indemnification is limited by the notice requirements and damages caps stated in the Local Government Tort Claims Act, Md. Code Ann., Cts. & Jud. Proc. § 5-301, et seq. (1974, 2002 Repl. Vol.), as amended from time to time, to the extent applicable as a matter of law, and is not intended to create any rights in any third parties. Nothing in this Section shall be deemed to limit Symmetry's obligation to contribute Symmetry's Cost Share of the Shared Project Costs to the County as provided in Article 7.

5.7. <u>Maintenance</u>. When the Project is Substantially Complete, the Project shall constitute a public road and the County shall thereafter maintain the Project, at its sole expense, in the customary manner for a public road.

ARTICLE 6. Rights-of-Way and Easements.

6.1. <u>Dedications and Easements from Symmetry.</u>

- At such time as a project plan (if applicable), preliminary (a) subdivision plan, final site plan, and final plat of subdivision providing for the development of the Symmetry Parcel as contemplated by Symmetry (collectively, the "Entitlements") have been finally approved, or at such earlier time as Symmetry may elect in its sole discretion, Symmetry shall dedicate to public use, without charge, those portions of the Symmetry Parcel required for the right-of-way for the Project (as such right-of-way is shown in the Plans). It is the intent of the parties that Symmetry will receive full credit for the density attributable to the gross land area which it dedicates and that such density may be used in the development of the balance of the Symmetry Parcel. If requested, the County shall reasonably support Symmetry in obtaining the density credit from the Montgomery County Planning Board in connection with the Entitlements sought by Symmetry. For the purposes of this Section, the Entitlements shall be deemed to have been finally approved at such time as all of the Entitlements have been approved by the applicable governmental authorities and all appeal periods from such approvals have expired without any appeals having been filed or if filed, with such appeals having resulted in a final determination which affirms the approval of the Entitlements.
- (b) Subject to the terms of this Section 6.1(b), within thirty (30) days prior to commencement of construction of the Project, Symmetry shall grant to the County, without charge, the easements and/or rights of entry on, over, and across the Symmetry Parcel shown on the Plans. The location of all such easements shall be in accordance with the Plans and the form and substance of the instruments granting such easements shall be subject to the reasonable approval of Symmetry.

(c) The Plans provide for the construction of a storm water management facility (including sand filter) on the Symmetry Parcel to handle the storm water runoff from the Project and the Symmetry Parcel as developed (the "Storm Water Facility"). The County shall construct the Storm Water Facility as part of the Project. Following completion by the County, Symmetry or its assignee shall maintain the Storm Water Facility, at its sole expense, in good condition and repair unless and until the Storm Water Facility is dedicated to public use as set forth below in this Section, except that the County shall in all events be obligated to correct or cause the General Contractor to correct, without expense to Symmetry, any defects in the original construction of the Storm Water Facility. If the Entitlements or Symmetry's development plans for the Symmetry Parcel make it necessary for the Storm Water Facility to be altered, Symmetry, at its sole expense, shall have the right to make such alterations, provided that the alterations do not materially impair the use of the Storm Water Facility for its intended purposes. Notwithstanding the foregoing, if under applicable law, regulation, or policy, the County (i.e., the County's Department of Environmental Protection) customarily maintains storm water management facilities serving development similar to that to be located on the Symmetry Parcel, the County shall assume the maintenance of the Storm Water Facility, once the development is completed, at its sole expense. In addition, Symmetry shall have the right, at any time, to dedicate the Storm Water Facility to the County (in which case the Storm Water Facility shall be incorporated into the right-of-way for the Project), subject, however, to the customary inspection performed by the County before accepting dedications of storm water management facilities constructed on private land. Upon Symmetry's election to make such a dedication and provided that the Storm Water Facility is then in good condition and repair as reasonably determined by the County as a result of its inspection, the County shall accept the dedication and the County (i.e., the County's Department of Environmental Protection) shall maintain the Storm Water Facility in accordance with applicable law, at its sole expense, in good condition and repair thereafter. Since the County is the party responsible for the construction of the Storm Water Facility, the County shall not be entitled to rely upon any defects or nonconformance in original construction as a ground for refusing to accept the dedication of the Storm Water Facility. Although the County is responsible for the construction of the Storm Water Facility, Symmetry shall rough grade the area of the Symmetry Parcel upon which the Storm Water Facility is to be located and the surrounding areas so as to facilitate the County's construction. The grading shall be performed in substantial accordance with the rough grading plans prepared by the Project Engineer, as amended, and in a timely manner so as not to delay the County's construction of the Project. All costs associated with such grading (the "Storm Water Facility Grading Costs") shall be paid by Symmetry and credited against the Symmetry Cap. The known amounts of the Storm Water Facility Grading Costs incurred by Symmetry as of February 24, 2012 are set forth on Exhibit "E" attached to and made a part of this Agreement.

(d) As used in this Section 6.1, references to the "Symmetry Parcel" shall be deemed to include the Exchange Parcel at such time as Symmetry acquires fee simple title to the Exchange Parcel. If, prior to that time, the County seeks any easements with respect to the Exchange Parcel, the County shall request such easements from Symmetry. Provided that such easements comply with the requirements of Section 6.1(b), Symmetry shall direct North Village to grant the easements to the County as contemplated in Section 1.3. Any dedication

from the Exchange Parcel shall be made by Symmetry at the time indicated in Section 6.1(a) for the dedication from the Symmetry Parcel.

6.2. Rights-of-Way and Easements from Third Parties. The County shall obtain, at its sole expense, from all applicable third parties all rights-of-way and easements required for the Project other than those being provided from the Symmetry Parcel and Exchange Parcel. The costs of acquiring such third-party rights-of-way and easements shall not be part of the Shared Project Costs but shall be borne solely by the County. If necessary, the County may use its "quick take" powers to acquire such rights-of-way and easements. The County shall use its best efforts to obtain such rights-of-way and easements in a timely manner so that the advertisement for bids may proceed as soon as reasonably possible after the Effective Date, but in all events by the date set forth in Section 4.1.

ARTICLE 7. Allocation of Costs

- 7.1. Payment Responsibilities. The County shall pay all of the costs of the Project, when and as due, to the parties supplying labor, materials, services, equipment, or third party rights-of-way and easements for the Project, except for (a) the costs of the Project Engineer to prepare and finalize the Plans as previously paid by Symmetry, and (b) the costs for the Existing Permits and Approvals incurred through the Permit Cost Transfer Date as previously paid by Symmetry. Symmetry shall reimburse to the County, in the manner set forth in Section 7.4, thirty-five percent (35%) of the Shared Project Costs (defined in Section 7.2) ("Symmetry's Cost Share"). However, in any and all events, Symmetry's Cost Share shall not exceed Four Million Dollars (\$4,000,000) in the aggregate (the "Symmetry Cap"). The following amounts shall not be counted against the Symmetry Cap: (i) the costs paid by Symmetry to the Project Engineer to prepare and finalize the Plans, except as otherwise provided in Section 3.3, and (ii) the costs incurred by Symmetry with respect to the Existing Permits and Approvals through the Permit Cost Transfer Date. The Qualified Soft Costs (see Section 3.3), the Water Line Costs (see Section 5.4), and the Storm Water Facility Grading Costs [see Section 6.1(c)] shall be credited against the Symmetry Cap.
- 7.2. <u>Shared Project Costs</u>. Except as otherwise provided in Section 7.3, "Shared Project Costs" means the following:
- (a) All direct construction costs incurred by the County pursuant to the terms of the Construction Contract and the costs of any change orders and field changes authorized by the County in accordance with this Agreement.
- (b) All costs paid by the County to install new utility lines, (except the Symmetry Water Line) in or adjoining the right-of-way for the Project (i.e., utility lines not in place as of the Effective Date) but not costs to relocate existing utility lines in or adjoining such right-of-way or to avoid or minimize such relocation by implementing alternative measures to relocation. All costs to relocate existing utilities or implement alternative measures shall be the County's sole obligation as provided in Section 7.3.

- (c) The costs paid by the County to construct or modify storm drainage systems and storm water management facilities to handle the storm water runoff from the Project and/or the Symmetry Parcel, as well as to construct the sand filter to handle the storm water runoff from Father Hurley Boulevard as shown in the Plans.
- (d) All engineering, surveying, supervisory, inspection, shop drawing review, and certification fees, if any, paid by the County to unaffiliated third parties in connection with the Project, including, without limitation, the costs of preparing and finalizing the Final Culvert Design as provided in Section 3.3 and the costs of any modifications to the Plans as provided in Section 3.4. These sums shall not include any costs of the Plans incurred by Symmetry prior to the Effective Date.
- (e) Except as otherwise provided in Section 5.4 of this Agreement (i.e., except for the Water Line Permit), all license and permit fees paid by Symmetry or the County to any governmental entity in connection with the Project from and after the Permit Cost Transfer Date, provided, however, that any such fees paid by the County to any County agencies or governmental entities shall be customary and usual for public road projects similar to the Project.
- (f) The salaries paid during the period of construction to County employees who supervise the construction of the Project in the field ("Employee Expenses"). Such salaries shall be pro rated as necessary if such employees are also engaged in work activities unrelated to the construction of the Project so that only the portion of their salaries properly allocable to their actual involvement in the construction of the Project shall be deemed Employee Expenses and included in Shared Project Costs.

7.3. Non-Shared Costs.

- (a) The County shall be solely responsible for the following costs, without reimbursement or contribution by Symmetry (the "County Non-Shared Costs"): (i) the costs of acquiring all rights-of-way and easements necessary for the Project, other than those to be granted from the Symmetry Parcel and Exchange Parcel in accordance with Section 6.1, or to take alternative actions to avoid or minimize such acquisitions, (ii) the costs of relocating all existing utilities in or adjoining the right-of-way for the Project, or to implement alternative measures to avoid or minimize such relocation, (iii) any amounts covered by any indemnity given by the County under this Agreement, (iv) all profit, overhead expense, and administrative fee or expense payable to the County for its own services under this Agreement, except as expressly provided in Section 7.2(f), and (v) all Shared Project Costs in excess of the Symmetry Cap. The County Non-Shared Costs shall be excluded from Shared Project Costs.
- (b) Symmetry shall be solely responsible for the following costs, without reimbursement or contribution by the County (the "Symmetry Non-Shared Costs"): (i) all costs relating to the dedication of land from the Symmetry Parcel for the right-of-way for the Project as provided in Section 6.1, (ii) all costs relating to the granting of all necessary easements over, across or through the Symmetry Parcel for the construction, operation and maintenance of the Project as provided in Section 6.1, (iii) the Water Line Costs (although the Water Line Costs,

except for the cost of obtaining and bonding the Water Line Permit, shall be advanced by the County and reimbursed by Symmetry, with all Water Line Costs being credited against the Symmetry Cap, as provided in Section 5.4), (iv) the Storm Water Facility Grading Costs [although the Storm Water Facility Grading Costs shall be credited against the Symmetry Cap as provided in Section 6.1(c)], (v) the costs paid by Symmetry prior to the Effective Date relating to the preparation and finalizing of the Plans, except as otherwise provided in Section 3.3, (vi) all costs incurred by Symmetry with respect to the Existing Permits and Approvals through the Permit Cost Transfer Date, and (vii) all costs and/or fees relating solely to the development of the Symmetry Parcel, including, without limitation, sewer and water connection and hook-up fees.

7.4. Symmetry's Payment.

- (a) Symmetry's Cost Share shall be paid as provided in this Section
- The first installment of Symmetry's Cost Share (the "Initial (b) Installment") shall be paid upon the later to occur of the following (the "Initial Payment Date"): (i) twelve (12) months after the County issues a notice to proceed to the General Contractor and the General Contractor actually commences work on the ground, or (ii) March 31, 2013. At least thirty (30) days before the Initial Payment Date, the County shall submit to Symmetry a written statement itemizing in reasonable detail the Shared Project Costs paid by the County through the date of the statement (the "Initial Cost Statement"). The Initial Cost Statement shall be accompanied by copies of invoices and reasonable proof of payment of these invoices. If the Initial Cost Statement or accompanying materials are not timely delivered to Symmetry, Symmetry shall have thirty (30) days from receipt of the complete set of documents for these Shared Project Costs to pay the Initial Installment and the Initial Payment Date shall be deemed extended to such date (but in no event shall Symmetry be required to make any payment or shall the Initial Payment Date be deemed to occur before March 31, 2013). The amount of the Initial Installment shall be thirty-five percent (35%) of the Shared Project Costs reflected in the Initial Cost Statement, but not more than Five Hundred Thousand Dollars (\$500,000). The Qualified Soft Costs shall be credited against the Initial Installment. In addition, in the event that Symmetry, prior to the rendering of the Initial Cost Statement, has paid any Water Line Permit Costs, Storm Water Facility Grading Costs, or Shared Project Costs (e.g., costs incurred on or after the Permit Cost Transfer Date with respect to the Existing Permits and Approvals), Symmetry shall receive credit for such amounts against the Initial Installment (and against succeeding installments of Symmetry's Cost Share to the extent necessary to receive full credit for such amounts) upon reasonable proof of payment as determined by the County. All amounts paid by and credited to Symmetry under this Section 7.4(b) shall be counted against the Symmetry Cap.
- (c) Within one hundred eighty (180) days after the Project is Substantially Complete, the County shall furnish to Symmetry a written accounting itemizing in reasonable detail the total Shared Project Costs for the entire Project, plus the Water Line Costs, actually incurred by the County (the "Final Accounting"). The Final Accounting may include, however, a reasonable estimate, based upon prices contained in the Construction Contract, of the

7.4.

costs that will be incurred for any Follow-Up Items not yet completed. The Final Accounting shall be accompanied by supporting materials of the type required to accompany the Initial Cost Statement, including reasonable proof of the County's payment of all Shared Project Costs and Water Line Costs already incurred by the County and itemized in the Final Accounting. The Final Accounting shall be certified as true and correct by the County's contract administrator on behalf of the County and shall include a statement of the outstanding balance of Symmetry's Cost Share after application of the Initial Installment paid by Symmetry under Section 7.4(b) ("Symmetry's Cost Balance"). If the Final Accounting includes an estimate of the costs of Follow-Up Items not yet completed, the Final Accounting shall be updated and recertified to reflect the actual costs for these items when known and a copy of the updated and recertified Final Accounting, accompanied by additional documentation supporting any adjusted costs for the Follow-Up Items, shall be promptly furnished by the County to Symmetry. The amount of Symmetry's Cost Balance shall be adjusted as necessary to reflect the updated costs of the Follow-Up Items. In no event shall Symmetry's Cost Balance exceed the Symmetry Cap less the amounts paid and credited as the Initial Installment under Section 7.4(b). The Initial Cost Statement and Final Accounting shall be subject to review and objection by Symmetry as provided in Section 7.5.

- Symmetry's Cost Balance shall be paid in five (5) equal installments. The first such installment shall be due eighteen (18) months after the date upon which the Project is Substantially Complete and each of the remaining four (4) installments shall be due every nine (9) months thereafter until Symmetry's Cost Balance has been paid in full. Any remaining unpaid amount of Symmetry's Cost Balance shall be paid in full on December 31, 2018 (the "Final Payment Date"). If, however, despite the provisions of this Agreement, the County commences construction of the Project later than July 1, 2012, the Final Payment Date shall be extended by a period of time equal to the period from July 1, 2012 to the date that construction is actually commenced. Commencing on the Initial Payment Date and continuing until Symmetry's Cost Balance has been paid in full, simple interest shall accrue on the unpaid amount of Symmetry's Cost Balance at a rate equal to the face rate of interest payable on the County's general obligation bonds having an issuance date closest to but before March 31, 2011, plus one percent (1%). Accrued interest shall be paid at the time that each installment of Symmetry's Cost Balance is due and shall not be counted against the Symmetry Cap. Symmetry may prepay all or any part of Symmetry's Cost Balance at any time, without penalty or other charge. All accrued unpaid interest on the amount so prepaid shall be due at the time of the prepayment.
- (e) Despite the terms of Section 7.4(d), if Symmetry sells fifty-one (51%) or more of the net land area of the Symmetry Parcel to a transferee other than an Affiliated Entity (defined below) and the settlement of such sale occurs after the Project is Substantially Complete and Symmetry's Cost Balance has been determined in accordance with Section 7.4(c), the entire unpaid balance of Symmetry's Cost Share shall be paid by Symmetry to the County at the time of the settlement. The term "Affiliated Entity" means an entity which, directly or indirectly, controls, is controlled by, or is under common control with Symmetry, Symmetry LLC, the principals of Symmetry LLC, or any member of the Totah family. For the purposes of this Agreement, the "net land area of the Symmetry Parcel" shall be deemed to be the gross land area of the Symmetry Parcel, less any dedications required for the Project or other

public purposes. Neither the grant of a mortgage, deed of trust, or other security interest against all or any portion of the Symmetry Parcel, nor the modification, extension, or consolidation of the same, nor a transfer of title pursuant to a foreclosure or deed in lieu of foreclosure, shall be deemed to be a sale for the purposes of this Section.

- (f) At the time of each payment by Symmetry under this Agreement, the County shall provide to Symmetry a written receipt acknowledging the payment.
- 7.5. Verification of Cost Statements. Symmetry shall have the right to verify all written statements provided to it by the County setting forth the Shared Project Costs. In that regard, the County shall afford to Symmetry, and its representatives, auditors, and other consultants, from time to time, upon reasonable advance notice, reasonable access to the County's books and records relating to the Project and the Shared Project Costs and shall cooperate with Symmetry to promptly provide additional information relating to the same as Symmetry may reasonably request. If Symmetry disagrees with any item set forth in the Initial Cost Statement or Final Accounting, Symmetry may object in writing to the item. To be valid, any such objection shall be delivered to the County within one hundred twenty (120) days after Symmetry receives the statement containing the objectionable charge and shall be accompanied by a detailed statement of the basis for the objection. Within fifteen (15) days after any such objection, the County and Symmetry shall meet and attempt in good faith to resolve their differences. If they are unable to reach a mutually acceptable resolution within thirty (30) days after the objection is made, the parties may mutually elect to pursue arbitration as provided in Section 9.6.

ARTICLE 8. Information

8.1. Progress Reports. Following commencement of construction of the Project, the County shall hold monthly meetings with its General Contractor for the purpose of reviewing the progress of the Project. The County shall inform Symmetry of the dates and times of such meetings and Symmetry may attend such meetings in its sole discretion. Meetings will generally be held at the construction field office. However, if the location changes, the County will notify Symmetry of the new meeting location. Prior to commencement of construction of the Project, the County shall keep Symmetry reasonably apprised of developments concerning the Project. For informational purposes, the County shall furnish to Symmetry a copy of the advertisement for bids, the notice awarding the Construction Contract, the notice to proceed, and any other written notices given by the County regarding the Project promptly after publishing or giving the same.

ARTICLE 9. Default

9.1. Remedies. If either party defaults under this Agreement and fails to cure the default within fifteen (15) days after receipt of written notice from the other party specifying the default, the non-defaulting party shall have such rights and remedies for that default as may be available at law or in equity. In addition, the County shall have the remedy provided for in Section 9.2 in the case of a payment default by Symmetry.

- 9.2. Contract Lien. If Symmetry fails to pay any part of Symmetry's Cost Share, or accrued interest on the same, when due and payable under this Agreement and the failure is not cured within the fifteen (15) day cure period provided for in Section 9.1, then subject to Section 9.6, the County may proceed to create and enforce a lien against the Symmetry Parcel to obtain payment of the overdue sum in accordance with the Maryland Contract Lien Act (Section 14-201 et seq. of the Real Property Article of the Annotated Code of Maryland, as amended) (the "Act"). A lien created under the Act shall have priority from the date that a statement of lien is recorded by the County in the Land Records in accordance with the Act.
- 9.3. <u>Rights of Mortgagees</u>. If the County has been furnished in writing with the name and address of Symmetry's mortgagee with respect to the Symmetry Parcel prior to giving notice of default to Symmetry, the County shall provide a copy of each notice of default to such mortgagee simultaneously with giving the notice of the default to Symmetry and the mortgagee shall have the same period of time to cure the default as Symmetry, plus fifteen (15) days. The mortgagee, however, shall have no obligation to effectuate or attempt to effectuate a cure. The County agrees to accept performance by any mortgagee of any covenant, condition, or agreement required to be performed under this Agreement by Symmetry with the same force and effect as though performed by Symmetry.
- 9.4. Security. Symmetry covenants that, unless it delivers Additional Security to the County in accordance with Section 9.5, it will not encumber the Symmetry Parcel with any deeds of trust or mortgages securing, in the aggregate, a total principal indebtedness outstanding at any one time greater than an amount equal to (a) the Market Value of the Symmetry Parcel (defined below), less (b) the maximum amount of Symmetry's Cost Share then remaining unpaid under this Agreement (the "Mortgage Cap"). This restriction shall automatically terminate upon payment in full of Symmetry's Cost Share. The "Market Value of the Symmetry Parcel" means the value of the Symmetry Parcel as of a date not earlier than six (6) months prior to the granting of the deed of trust or mortgage then intended to be granted, as determined by an appraisal of the Symmetry Parcel performed by a professional appraiser qualified as an MAI or having similar credentials and obtained by Symmetry, at its own expense.
- 9.5. Additional Security. Symmetry shall have the right (but not the obligation), at any time, to deliver to the County a bond or letter of credit as security for the payment of all or any part of Symmetry's Cost Share (the "Additional Security"). The Additional Security shall name the County as beneficiary. If the Additional Security is in the form of a bond, it shall be issued by a surety on the County's list of approved corporate sureties. If the Additional Security is in the form of a letter of credit, it shall be issued by a bank maintaining branch offices in the Washington, D.C. metropolitan area and Symmetry shall keep the letter of credit in full force and effect until the Additional Security is required to be returned to Symmetry in accordance with this Agreement. If, at any time, Symmetry desires to grant a mortgage or deed of trust against the Symmetry Parcel that would cause the Mortgage Cap to be exceeded, Symmetry may deliver Additional Security to the County in an amount equal to or greater than the amount by which the Mortgage Cap would be exceeded and, upon such delivery, Symmetry shall have the right to grant such mortgage or deed of trust notwithstanding that the Mortgage Cap will be exceeded. If any Additional Security is posted with the County, then, as payments are made from time to time thereafter against the unpaid balance of Symmetry's Cost

Share, Symmetry shall have the right to reduce the amount of the Additional Security by the amount of such payments. If any Additional Security is posted with the County and Symmetry is in default under this Agreement beyond the applicable cure period, the County shall be entitled to draw upon the Additional Security to the extent (and only to the extent) of the delinquent amount due from Symmetry and apply such amount to the delinquency. To the extent not drawn upon, the Additional Security shall be returned to Symmetry for cancellation within five (5) business days following payment in full of Symmetry's Cost Share. Despite any other provision of this Agreement, if, at any time, the amount of Additional Security held by the County is equal to or greater than the full outstanding balance of Symmetry's Cost Share, the County shall no longer have the right to create and enforce a lien against the Property under the Act and Symmetry shall be free to encumber the Property with deeds of trust or mortgages without regard to the Mortgage Cap. Further, Symmetry shall have the right to bond off any lien or claim of lien filed by the County against the Symmetry Parcel by delivering Additional Security to the County in the amount of the lien or claimed lien.

Arbitration of Certain Issues. Despite anything else contained in this Agreement, if any dispute between the parties arises about whether any cost incurred by the County is properly includable as a Shared Project Cost under the terms of this Agreement or whether the Initial Cost Statement or Final Accounting are correct, then, at the mutual election of the parties, such dispute may be submitted to binding arbitration in accordance with the Commercial Arbitration Rules (the "Rules") of the American Arbitration Association (the "AAA") then in effect. The arbitration shall be held before a single disinterested arbitrator in a location in Montgomery County, Maryland which is mutually agreed upon by the parties. The parties shall cooperate in pursuing such arbitration promptly following either party's request for arbitration. Upon initiation of an arbitration proceeding by either party, the parties shall promptly obtain a list of commercial arbitrators made available by the AAA with expertise in land development and/or commercial construction matters. Within seven (7) days after receipt of the list, the parties shall attempt to agree upon the arbitrator. If they are unable to so agree within that time, the selection of the arbitrator shall be made in accordance with the Rules. The hearing before the arbitrator shall be held as soon as practicable thereafter, but not later than thirty (30) days after selection of the arbitrator, unless the schedule of the arbitrator does not so permit. The arbitrator shall make a good faith effort to conclude the hearing within two (2) business days after its commencement and shall not be bound by the formal rules of evidence or civil procedure but shall consider all documents and oral testimony in the manner of a reasonable businessperson in the conduct of his or her ordinary affairs. The arbitrator shall determine as part of his or her decision an allocation of responsibility between the parties for the payment of the costs of the arbitration and the attorneys' fees incurred by the parties in regard to the arbitration. The decision of the arbitrator shall be in writing, shall include a statement of the reasons for the arbitrator's determination, and shall be deemed final, binding and conclusive upon the parties. The appropriate judgment, order or other judicial relief (whether legal or equitable) may be entered in any court of competent jurisdiction to enforce the decision rendered by the arbitrator.

ARTICLE 10. Approval Procedure

10.1. Submissions for Approval. Wherever under this Agreement any materials or matters are required to be submitted by either party to the other for approval ("Approval Materials"), then, unless otherwise expressly provided in this Agreement, such approval shall not be unreasonably withheld or conditioned. In any given case, the party seeking the approval is referred to as the "Submission Party" and the party whose approval is sought is referred as the "Approval Party". Within twenty (20) business days after the Approval Party receives the Approval Materials and a written notice requesting approval of the same from the Submission Party, the Approval Party shall give written notice to the Submission Party approving or disapproving the Approval Materials. If the Approval Party fails to give any notice within the twenty (20) business day period and if thereafter the Submission Party gives a second written notice to the Approval Party requesting approval of the Approval Materials and the Approval Party fails to give notice to the Submission Party approving or disapproving the same within ten (10) business days after its receipt of the second notice, the Approval Party shall conclusively be deemed to have approved the Approval Materials. To be effective, the second notice must describe the Approval Materials for which approval is requested and contain the following statement in bold print: "If you fail to approve or disapprove such materials within ten (10) business days after your receipt of this notice, you will be deemed to have approved such materials." If the Approval Party timely disapproves any Approval Materials, it shall specify its objections in writing and the parties shall thereafter promptly meet and attempt, in good faith, to resolve their differences.

ARTICLE 11. Impact Tax Credits; No Special Assessments

- 11.1. Impact Tax Credits. To the extent allowed under applicable laws and regulations of the County, Symmetry shall be entitled to impact tax credits for its contributions to the Project as set forth in this Agreement (the "Credits"). The Credits shall be useable and assignable as provided by such laws and regulations. If requested by Symmetry, the Montgomery County Department of Transportation will execute and deliver a separate impact tax credit agreement, certifications, and/or other such documents as necessary to confirm the amount, effectiveness, and validity period of the Credits, provided the same shall be in accordance with applicable laws and regulations.
- 11.2. Special Assessments. Symmetry's Cost Share, together with Symmetry's payment of design costs as provided in this Agreement, constitute Symmetry's complete contribution to the cost of the Project. The Montgomery County Department of Transportation will not pursue a Special Benefit Assessment or like assessment against the Symmetry Parcel resulting from and based upon the construction of the Project.

ARTICLE 12. Adequate Public Facilities Requirements.

12.1. Pursuant to applicable policies of the Montgomery County Planning Board (the "Planning Board"), Symmetry has applied to the Planning Board for appropriate credit for Symmetry's participation in the Project which shall be taken into account at such time as Symmetry seeks approvals from the Planning Board for the development of the Symmetry Parcel

(the "Provisional APF Approval"). The Provisional APF Approval sought by Symmetry includes credit for meeting adequate public facilities requirements. The County agrees to cooperate with and support Symmetry in its efforts to obtain the Provisional APF Approval, as well as density credit for dedications in accordance with applicable laws and regulations, as reasonably requested by Symmetry. Symmetry acknowledges, however, that the County cannot guarantee that the Planning Board will grant the Provisional APF Approval.

ARTICLE 13. County Funding.

13.1. <u>Appropriation</u>. The Project is included in the County's Capital Improvements Program Budget as currently applicable. However, any obligations of the County or Symmetry arising under this Agreement that require the expenditure of money are expressly subject to the appropriation and encumbrance of funds for the full Project by the Montgomery County Council, in the absence of which the County and Symmetry shall have no liability for such obligations.

ARTICLE 14. Miscellaneous.

- and inure to the benefit of the County, Symmetry, and their respective successors and assigns, and shall run with the land of the Symmetry Parcel, subject to the following. If Symmetry conveys a portion of the Symmetry Parcel to another party, then, so long Symmetry continues to own at least fifty percent (50%) or more of the net land area of the Symmetry Parcel, all of the rights and obligations of Symmetry under this Agreement shall belong solely to Symmetry and none of such rights may be enforced by the owner of any other portion of the Symmetry Parcel and none of such obligations shall be binding upon such other owner or its portion of the Symmetry Parcel, except to the extent that Symmetry expressly assigns such rights or obligations to such owner by written instrument recorded in the Land Records.
- 14.2. <u>Controlling Law</u>. This Agreement, and the rights and obligations of the parties under this Agreement, shall be governed by the laws of the State of Maryland, without regard to principles of conflicts of laws.
- 14.3. <u>Amendments</u>. This Agreement may not be modified except by written amendment signed by Symmetry and the County or their respective successors and assigns.
- 14.4. <u>Severability</u>. Each provision of this Agreement is intended to be severable. If any term or provision of this Agreement shall be determined by a court of competent jurisdiction to be illegal or invalid for any reason whatsoever, such provision shall be severed from this Agreement and shall not affect the validity of the remainder of this Agreement.
- 14.5. <u>Headings</u>. Headings are intended only as a matter of convenience and for reference and in no way define, limit or describe the scope or intent of this Agreement.
- 14.6. <u>Assignment</u>. Subject to Sections 7.4(e) and 14.1, Symmetry, its successors and assigns, may assign any of Symmetry's rights, interests, or obligations under this Agreement. In the event of any collateral assignment of this Agreement by Symmetry to a

mortgagee, the mortgagee shall have no liability or obligation under this Agreement unless and until the mortgagee acquires fee simple ownership of the Symmetry Parcel.

14.7. Notices. All notices and other communications under this Agreement shall be in writing and shall be deemed duly given if (a) personally delivered (provided a signed written receipt is obtained), (b) sent by reputable commercial overnight courier (provided a signed written receipt is obtained), (c) sent by certified mail, return receipt requested, first class, postage prepaid, or (d) transmitted by telecopier (provided evidence of transmission is obtained and the original of the notice is, on the same day, sent to the addressee by one of the foregoing methods of delivery). Notices shall be addressed as follows:

If to Symmetry:

c/o Symmetry LLC 8611Second Avenue Suite 3A Silver Spring, Maryland 20910 Attn: Nicole Totah, Manager Telephone No.: (240) 744-3600 Telecopier No.: (240) 744-3609

With a copy to:

Andrew M. Goldstein, Esquire Linowes and Blocher LLP 7200 Wisconsin Avenue, Suite 800 Bethesda, Maryland 20815 Telephone No.: (301) 961-5154 Telecopier No.: (301) 654-2801

If to the County:

Department of Transportation
Montgomery County, MD
101 Monroe Street, 10th Floor
Rockville, Maryland 20850
Attn: Edgar A. Gonzalez
Deputy Director for Transportation Policy

Telephone No.: 240-777-7185 Telecopier No.: 240-777-7277 With a copy (that does not constitute notice) to:

Office of the County Attorney for Montgomery County, Maryland 101 Monroe Street, 3rd Floor Rockville, Maryland 20850

Attn: Eric C. Willis, Assistant County Attorney

Telephone No.: 240-777-6700 Telecopier No.: 240-777-6705

Each party shall be responsible for notifying the other party of any change of address and telecopier number.

- 14.8. <u>Non-Interference</u>. The parties shall cooperate with one another in good faith and shall not interfere with the other party's activities under this Agreement to ensure that the Project is constructed in an orderly and expeditious manner.
- 14.9. <u>Relationship of the Parties</u>. This Agreement does not create any partnership, joint venture or other similar relationship between the parties, but is merely a means to perform certain improvements benefiting the parties.
- 14.10. <u>Entire Agreement</u>. This Agreement contains the entire agreement between Symmetry and the County regarding the construction of the Project.
- 14.11. Authority. Each party represents and warrants to the other party that it has full power and authority to enter into and carry out this Agreement, without the need for obtaining any further approvals or consents (except for the governmental approvals contemplated by this Agreement). COUNTY FUNDS WILL ONLY BE AUTHORIZED FOR THE PURPOSES SET FORTH IN THIS AGREEMENT UPON EXECUTION OF THIS AGREEMENT BY AN ASSISTANT CHIEF ADMINISTRATIVE OFFICER OF THE COUNTY. UPON SUCH EXECUTION, THIS DOCUMENT SHALL BECOME A BINDING AGREEMENT UPON THE COUNTY.
- 14.12. <u>Estoppel Certificates</u>. Within ten (10) business days after request by Symmetry, the County shall execute and deliver to Symmetry and/or its lender an estoppel certificate stating (a) whether this Agreement is in full force and effect, (b) whether this Agreement has been amended (and if so, identifying the amendment), (c) to its knowledge, the amounts owed under this Agreement and whether any defaults exist under this Agreement, and (d) such other matters as may reasonably be requested.
- 14.13. <u>No Third Party Beneficiary</u>. Nothing contained in this Agreement shall be deemed to create rights or obligations accruing to the benefit of, or enforceable by, any entity or person not a party to this Agreement, including, without limitation, any contractors, subcontractors or other parties providing labor, services, or materials in connection with the Project.
- 14.14. <u>No Waiver</u>. Except where time periods are expressly provided in this Agreement for the exercise of rights or remedies, no failure or delay by Symmetry or the County

in exercising any of their rights or remedies under this Agreement shall result in any waiver of those rights or remedies with respect to any then existing or subsequently occurring breach or default by the other party.

- 14.15. No Deemed Approval of Plans. Nothing in this Agreement may be interpreted to be a waiver of the County's governmental authority or as a waiver of the requirement for Symmetry to comply with all County laws, regulations, policies or standard procedures in the development of the Symmetry Parcel, including, but not limited to, all permitting processes required under County law. This Agreement is not intended as an approval of any plans or permit applications for the development of the Symmetry Parcel.
- 14.16. <u>Effectiveness</u>. This Agreement shall not be effective until signed by Symmetry, the County, and North Village and the Effective Date of this Agreement shall be the last date upon which each of such parties has so signed.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be signed, sealed, and delivered by their duly authorized representatives the day and year first above written.

WITNESS:

SYMMETRY AT CLOVERLEAF, LLC, a Maryland limited liability company

Symmetry, LLC, Manager

Ву:

Mary y. Burder July L. Whole

MONTGOMERY COUNTY, MARYLAND, a political subdivision of the State of Maryland

RAMOUA BELL-PEGNSON

Title: Assistant Chief Administrative Officer

RECOMMENDED:

Name: Arthur Holmes

Title: Director, Department of Transportation

APPROVED AS TO FORM AND LEGALITY:

4/2/12

OFFICE OF THE COUNTY ATTORNEY

Name: Eric Willis

Title: Assistant County Aftorney

STATE OF MONGLOND
On this de day of Johnson, 2012, before me, the undersigned officer, personally appeared Nicole Total who acknowledged herself to be the Manager of SYMMETRY, LLC, a Maryland limited liability company, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged that she, in such capacity, executed the same for the purposes therein contained by signing the name of SYMMETRY, LLC.
IN WITNESS WHEREOF I hereunto set my hand and official seal. **Mulian H. Alanson** Notary Public My commission expires: 1-1-/2
COUNTY OF MONTGOMERY COUNTY, MARYLAND. To Wit: On this the day of Antone with least of Montgomers, who acknowledged herself himself to be the Assistant Chief Administrative Officer of Montgomery County, Maryland, a political subdivision of the State of Maryland, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged that she/he, in such capacity, executed the same for the purposes therein contained by signing the name of MONTGOMERY COUNTY, MARYLAND.
IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

CONSENT OF NORTH VILLAGE-270 LIMITED PARTNERSHIP

North Village-270 Limited Partnership executes this Agreement solely for the purposes set forth in Section 1.4 of this Agreement.

NORTH VILLAGE-270 LIMITED PARTNERSHIP,

a Maryland limited partnership

By: LERNER ENTERPRISES, LLC, a Maryland limited liability company

By: Edward L. Cohen , Manager

WHITHIN WAY TO WAY

COUNTY OF to Wit:

On this 29th day of the content of the undersigned officer, personally appeared EDWARD L. COHEN, who acknowledged himself to be a Manager of Lerner Enterprises, LLC, a Maryland limited liability company, general partner of NORTH VILLAGE-270 LIMITED PARTNERSHIP, a Maryland liability partnership, and acknowledged that he, in such capacity, executed the same for the purposes therein contained by signing on

IN WITNESS WHEREOF I hereunto set my hand and official seal.

behalf of NORTH VILLAGE-270 LIMITED PARTNERSHIP.

My commission expires: 2516

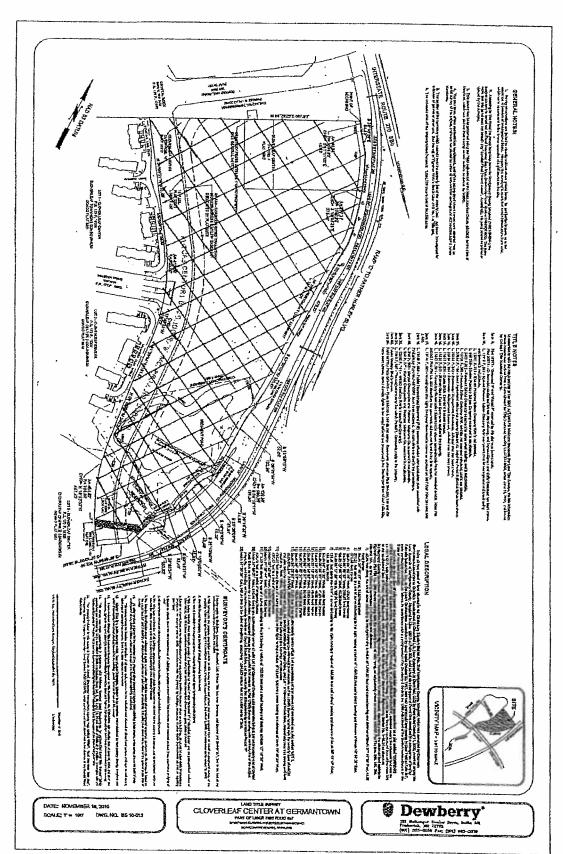


EXHIBIT B CENTURY BLVD List of Final, Approved Plans Accepted By the Referenced Entities MCDOT CIP Project No. 501115

Sheet Number	Title	MCDOT Approved	MCDOT Approved MCDPS Approved, MNCPPC Signed for Approved Technical but not Signed Administrative	MNCPPC Approved but not Signed	WSSC Approved
			4 T T T T T T T T T T T T T T T T T T T		
Ľ	Title Sheet	X	×		AND THE PROPERTY OF THE PROPER
2	Earthwork, Legend & Abbreviations	X			нед - де замей не воли де дей предоставление безодения делига (ДОО) предоставление по технология по
ណុ	Typical Sections & Details	×	ARCHINA, QUITTA ANNO ATTO ATTO ATTO ATTO ATTO ATTO A	en e	erimmen en e
6	Geometric Layout	×			на до удух на тенноски поставальный дамена до
788	Plan Sheets	×	Байдарда Афа Афа Байна от темпенен надага се постава до Афа Дайда Афа Афа Темпенен байта.	ер и посила на ОССАН МЕНТЕРИИ В ВОГОТОВНИТЕ В В В	одендобинознаницуницинумуницинального для отголивальный обфервото
9	Roadway Profile	×			
Ö	Approved Grade Establishment Plans	×			
11	Super Elevation Tables	X	ane canadishibiji (Malio) 1979 in istalaid Cashadquerre quye men mensooning dishalatan j		
12-14	Storm Drain Profiles & Details	×			
15-16	Culvert Profile & Details	×			
17-18	Erosion & Sediment Control Details &		×		
A STATE OF THE PARTY OF THE PAR	Notes				
and the same of th	Erosion & Sediment Control Composite				
19	Plan		×		
20-29	Erosion & Sediment Control Plans		×		
30	Flow Splitter Structure & Details		×		
31-32	Stormfliter Details		×		
33	Baysaver Details		×		
34-35	Surface Sand Filter No. 1 Plan & Profile		×		-

	Charles AND NAME OF THE PROPERTY OF THE PROPER	And the contract of the contra	eparationus accessibility of a proper proper property and a property of the second sec	W TO COME STATE OF THE PROPERTY OF THE PROPERT	an filigente com a mara Angal (1999) se persone menero a que o a menor acomo de discopa (1990). I
36-37	Stolling of Management roll Details		, and a section of the section of th	and the second s	a di dama di mangangga paga paga paga paga paga paga p
	Stormwater Management Landscaping	And the second s	×	edektering er det er	
38-39	Plan		Printer Survey Control of the Contro		work had delegated by the control of
	Stormwater Management Checklists &	Accessore the design of the continues of	×	A CASE OF THE ACT OF THE PARTY	do por esta consequence
40	SWM Soil Baring Lags		sahilinenosul		emprepage agrave
	Retaining Walls No. 1 to No. 4 Plans &				
41-45	Elevations	×			m someteed)
	Culvert, End Walls EW-1 and EW-2	намина палужения для до до положения от верей на представля на представ	терия на при		
46-51	Plans, Elevations & Details	×			man diguna migaj
	Retaining Walls No. 1 to No. 4 Details			The second state of the second	да фадра футобите ситема инсерсацију и и и дела да постана пред пред пред пред пред пред пред пред
52-58	and Schedules	×			
***************************************	Retaining Walls No. 1 to No. 4 Boring				
59-64	and Drive Tests	×			
	Culvert, End Walls EW-1 and EW-2				
65-67	Boring and Drive Tests	×			
	SHA Standards for Retaining Walls and				
68-73	Culvert End Walls	×			
74-78	Workzone Traffic Control Plan	×			
79-80	Signing Plans	×			
81-82	Pavement Marking Plans	×			
83-86	Street Light Plans	×			
87-88	Street Tree Plans	×			
89-92	Final Stablization Plans	×			
93-95	WSSC Waterline Plans				X
96-97	Final Forest Conservation Plans			×	- Paramanan Marketinin in Amerika in Marketinin in Marketini in M
1-33	Cross Sections	×	Andreas de la companya del companya de la companya de la companya del companya de la companya del la companya del la companya de la companya del la com	elle i lääkki kunsanna valainin kalainin kalainin kalainin kalainin kalainin kunsanna kalainin kunsanna kalain	Applications on the continue of the continue o
T-S	Right-of-Way Plats	×			

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EXHIBIT C

CENTURY BLVD.

KNOWN QUALIFIED SOFT COSTS AS OF DECEMBER 31, 2011

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Item#	Item /Description	Vendor	Cost		% Credit		Credit
H	Soil Boring Stakeout (4 Borings)	Dewberry	\$ 50	8	50%	5	250.00
2	Soll Borings	Freestate Drilling	\$ 3,032,40	2,40	50%	⟨⟩ ·	1,516.20
w	Soil Analysis	GeoLab	\$ 2,500.00	0.00	50%	()- ·	1,250.00
4	Culvert 30% Design	Dewberry	\$ 59,000.00	0.00	50%	S)	29,500.00
UT	Utility Location	A/I Data	\$ 6,250.00	0.00	50%	₹>	3,125.00
RETAIN	RETAINING WALL#4						
Item#	Item / Description	Vendor	Cost		% Credit		Credit
<u>ś</u> à	Soil Boring Stakeout (8 borings)	Dewberry	\$ 1,000.00		50%	\$	500.00
2	Soil Borings	Freestate Drilling	\$ 1,938.00	3.00	50%	ふ	969.00
w	Soil Analysis	Geolab	\$ 1,350.00	00,0	50%	s.	675.00
4	Retaining Wall #4 Design	Dewberry	\$ 18,450.00	0.00	50%	-th-	9,225.00
FOREST	FOREST CONSERVATION EASEMENT						
Item #	Item / Description	Vendor	Cost	%	% Credit		Credit
شا ا	Forest Conseration Easement resolution with P&P	Linowes & Blocher	\$ 7,707.50	.50	100%	-CS-	7,707.50 *
) N	Forest Conservation Easement Coordination	Dewberry	\$ 1,965.00	.00	100%	S	1,965.00
· w	Work on release of Forest Conservation Easements	Dewberry	\$ 1,200.00	00.	100%	is.	1,200.00
4	Revise Meets & Bounds to abandon Forest Cons Esmnt	Dewbery	\$ 2,200.00	00.	100%	-C>-	2,200.00
CT	Coordination of Partial Release Document	Dewberry	\$ 3,750.00	00.	100%	₩.	3,750.00
*Cap of	*Cap of \$20,000 requested by MCDOT for legal expenses relating to forest conservation resolution	est conservation resolution					
PERMIT	PERMIT COSTS AFTER PERMIT COST TRANSFER DATE (APRIL 8, 2011)						
Item#	Item / Description	Vendor	Cost	Cost % Credit	Cradit	_	Credi

ω	2	ሥ	Item #
Dewberry Coordination of Utilities with MCDOT	Cost for Dewberry to coordinate new MDE NOI Permit	Coordination of extension of MDE Permit to 8/25/2012	Item # Item /Description
Dewberry	Dewberry	Ecotone	Vendor
\$	S	÷s>	
742.50	750.00	2,312.50	Cost
100% \$	100% \$	100% \$	% Credit
742.50	750.00	2,312.50	Credit

Page 1 of 3

EXHIBIT D CENTURY BLVD LIST OF EXISTING PERMITS & APPROVALS REQUIRED & STATUS AS OF EFFECTIVE DATE

		<u> </u>) pus	
c) Corp of Eng. MDSPGP-3	b) MDE Nontidal Wetlands and Watterways Permit	12	MC Floo	
×	×			
06-NT. 0250/200664 628	06-NT- 0250/200664 628	06MO0117	297179	
12/31/2013	8/25/2012	6/30/20)1 (Expired)	3/20/2012	Date
Yes, MCDOT to submit	Yes, MCDOT to submit	Yes, MCDOT to submit	Yes, MCDOT to submit	transferred from
MCDOT	MCDOT	MCDOT	MCDOT	be on the Remail
US Corp of Engineers extended their General Permit-5 (MDSPGP-3), under which this project obtained its Non-idal Wetlands and Waterway Permit, resulting in the Non-idal Wetlands and Waterway Permit extension through December 31, 2013. All work needs to be completed by December 31, 2013, or a new permit will be necessary under MDSPGPA or alternate Coms	MDE has extended the expiration of the Wedands and Waterway Permit by I year to August 25, 2012 and revised the permittee to Symmetry at Cloverleaf, LLC	MCDOT to apply for new MDE NOI permit in its name, since former permit expired as of Effective Date	According to Rick Brush, the existing MCDPS Flood Plain District Permit can be transferred to MCDOT.	
On January 24, 2011, Symmetry submitted to No Cost MCDOT the letter to Corps of Englitters requesting transfer of the MDSPGP-3 authorization to MCDOT's name, for MCDOT's signature, It is MCDOT's espensibility to forward the letter to Corps of Engineers and coordinate name change, as well as a rany act and into a of near the processor.	On January 24, 2011, Symmeny provided MCDOT with a letter addressed to Ms. Andi Camabaugh, MDE, to request transfer of the Nontidal Wetlands and Waterways Permit from Symmetry At Clovetleat, LLC to MCDOT. MCDOT esponsibility to sign and submit this letter, and coordinate name change for permit. If will also be MCDOT's responsibility to extend the permit past responsibility to extend the permit past August 25, 2012.	Symmetry filled out the Transfer of Authorization form along with Continuation form and submitted to MCDOT on Lanuary 24, 2011 for their signature and submitted to MCDT on the submitted by MCDOT. In December 2011, Dewberry prepared a new MDE permit application for an NOI permit, which was forwarded to MCDOT on February 24, 2012. MCDOT is responsible to sign and submit application and print of approved Sediment Control Plan to MDE for approval and issuance of the Permit, as well as to obtain any necessary extensions thereto.	Symmetry filled out MCDPS application for Floodplain District Permit and forward application to MCDOT for their signature on famury 24, 2011 for MCDOT to submit to MCDPS. MCDOT responsibility to submit for revised germit with MCDPS, and to obtain any necessary extensions.	
No Cost	No Cost	No cost to MCDOT	Symmetry provided MCDOT. Symmetry provided MCDOT with a check for \$703.00 fee + 10% automation fee for total fee of \$803.00 fanuary 14, 2011, which was re-issued on February 15, 2012 and neceived by MCDOT on February 16, 2012, as confirmed by Gary Johnson of MCDOT.	

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WSSC, SEP Permit	NNCP&PC Forest Conservation Plan	Sediment Control Permit:	R e mili
×	×	×	200
DA4188Z05	319881500 old plan approval number.	225228	Permit No.
No expiration date	NA	3/20/2012	Exp) ration
N O	obuin	Silt/SWM Pians have been approved by MCDPS with MCDOT as the Owner.	Nyseurope Thirdferred from Ymmetry to County
Symmetry	MCDOT	MCDOT	De on the Bernit
Symmetry need to fill System Extension Permit Application and submit to WSSC. Then WSSC will issue the SEP Permit or SEP Permit can be on hold amil contractor is selected then contractor will apply for the permit. For the name change on the application, Symmetry can fill out the semification and forwarded to the	Project had an approved Forest Conservation Plan (FCP), but it needs to be amended due to changes to the culvert outfall channel. Devoberry has propared the Metes & Bounds Descriptions and Skeethes for the Cloverleaf Center, Lots 2 & 3 for the Abandonment of the existing Forest Conservation Easements on Lots 2 & 3. A "Partial Release & Abandonment of Easement" was prepared by Symmetry's attorneys, Linowes & Blocher, and with the Metes & Bounds Descriptions & Sketches shove referenced, submitted to MACPPC for review, approval, signature by MACPPC's Attorney, and recordation in the Land records. The area of the existing FCP easements to be released is to be mitigated offsite at a 2:1 intio or 0.22 acres s, by the MDCOT Advanced Reforestution Project. MCDOT still working with Dewberry, Linowes & Blocher and MNCP&P to complete this work.	The SWM and Silt plans have been approved by MCDPS. The Permit will be issued by MCDPS to MCDOT after the NEW SWM Easement & Covenant signed by Symmetry & MCDPS, and then recorded in the Land Records.	permit review procedure.
Symmetry needs to do the following: 1) Mylars need to be updated to current standards as follows: a. Update approved sediment control plan to issue new silt sticker b. Update owner information	Dewberry has prepared the neets and bounds to release a part of the existing Forest Conservation Plan on Cloverleaf lots 2 & 3 and forward to Symmetry and MCDOT in 2010; Linowes & Blocher has prepared "Partial Rebeate & Abandonment of Eastement" and submitted to MCDOT and MNCP&P in Fall 2011. In mid-Rebrary 2012, Rich Weaver of MNCPPC forwarded the Partial Release to Linowes & Blocher to revise and return the revised document to MNCPPC legal staff to review. Linowes & Blocher to provide a draft revision by the end of February. It is MCDOT's responsibility to have MNCCPC sign the Partial Release document, record in Land Records, and have MNCPPC capt the Partial Release document of the Partial R	Symmetry to sign and notarize SWM Easement and Covenants for submittal to MCDPS for signature and recordation in Land Records. It is MCDOT's responsibility to obtain permit once SWM Easement and Covenants signed and submitted to MCDPS, as well as any extensions necessary thereto.	
Including but Not Limited To: 1) WSSC fee of to Transfer Ownership \$150.00 2) WSSC fee for Minor Plan Revisions \$950.00 3) SEP fee and bond amount a. Construction Inspection amount is \$14,791.72 b. Performance Bond amount is	Revised PCP approval outstanding.	On January 14, 2011, Symmetry provided MCDOT with a check for \$105, which is the recording fee, This check was re-fusued on Pebruary 15, 2012 and received by MCDOT on February 16, 2012, as continued by Gary Johnson of MCDOT.	

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Roadside Tree Permit

TBD

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Utility Permits

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Page 3 of 3	
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C.	

EXHIBIT E CENTURY BLVD KNOWN SWM FACILITY GRADING COSTS AS OF FEBRUARY 24, 2012

VENDOR	DESCRIPTION	AN	<u>10UNT</u>
ENGINEERING		-	innered the second seco
DEWBERRY & DAVIS	ROUGH GRADING SEDIMENT CONTROL PLAN	\$	4,500.00
DEWBERRY & DAVIS	ROUGH GRADING SEDIMENT CONTROL PLAN	\$	1,500.00
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	543.75
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	453.75
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	206.25
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	577.50
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	1.567.50
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	247.50
DEWBERRY & DAVIS	T&M BILLING FOR MEETINGS	\$	1,072.50
DEWBERRY & DAVIS	TEMPORARY CONSTRUCTION ENTRANCE PLAN	\$	2,100.00
DEWBERRY & DAVIS	REVIEW PIPING ISSUE 24" CMP	\$	4,280.00
DEWBERRY & DAVIS	SITE STAKEOUT SERVICES	\$	6,950.00
1900 of the Berlin (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909) (1909)		\$	23,998.75
SOIL ANALYSIS			
GEOTECHNICAL LAB	TESTING AND INSPECTION	\$	1,106.80
GEOTECHNICAL LAB	SOIL TESTING	\$	404.40
PERMIT COORDINATION		\$	1,511.20
ECOTONE		\$	3,437.50
	COORDINATE APROVALS WITH MDE, US ARMY CORPS-FOR ROUGH GRADING WORK UNDER MDE PERMIT THAT EXPIRED AUGUST 2011	•	
	ON ONE WOLL IN THE LAINED ACCOST 2011	\$	3,437.50
PERMIT FEES		A.,	J/437.30
ROUGH GRADING			
MONTGOMERY COUNTY	INITIAL REVIEW FEE	\$	2,084,50
MONTGOMERY COUNTY	INITIAL REVIEW FEE (ADDITIONAL AMOUNT DUE)	\$	3,002.88
MONTGOMERY COUNTY	REVISED ROUGH GRADING PLAN REVIEW FEE	\$	4,576.00
MONTGOMERY COUNTY	PERMIT FEE	\$	11,870.55
MONTGOMERY COUNTY	CASH BOND	Š	5,273.00
TEMPORARY ENTRANCE	war burn	Ŷ	الكاءوة الأحراد
MONTGOMERY COUNTY	PERMIT REVIEW FEE	\$	256.20
MONTGOMERY COUNTY	CASH BOND	\$	5,200.00
MONTGOMERY COUNTY	PERMIT FEE	\$	597.79
11.00.14.1.00.00.00.00.00.00.00.00.00.00.00.00.0		- ? \$	32,860.92
CONSTRUCTION			
Z CONTRACTING	ROUGH GRADING SEDIMENT CONTROL WORK - Phase 1	\$	120,932.45
Z CONTRACTING	PIPE LINING CHANGE ORDER	\$	28,486.00
Z CONTRACTING	SAFETY FENCE	\$	4,000.00
ADMINISTRATIVE		Ş	153,418.45
FALCON EXPRESS	MAILING OF APPLICATION AND CHECK FOR ROUGH GRADING	\$	0 12
AMERICAN REPROGRAPHICS	COPIES OF ROUGH GRADING/SEDIMENT CONTROL PLAN	\$ \$	8.13
AMERICAN REPROGRAPHICS	COPIES OF ROUGH GRADING/SEDIMENT CONTROL PLAN		31.50
FALCON EXPRESS	MAILING OF ROUGH GRADING PERMIT	\$ \$	32.05 8.00
Notice in the second section of the second section of the second section is a second section of the second section of the second section is a second section of the second section of the second section of the second sec		\$	79.68
CONSTRUCTION MANAGEMEN			
BASIM KATTAN	CONSTRUCTION MANAGEMENT	<u>\$</u>	10,225.00
		\$	10,225.00
TOTAL ROUGH GRADING COST	STO DATE	Ś	225,531.50
		maseronopol	

Note: There may be additional incurred, but unbilled, expenses as of February 24, 2012.

Attachment L

Revised: 29 March 2019 Originally dated: 24 April 2018



Poplar Grove Phase I Noise Analysis

Montgomery County, Maryland

Report #180424 Project #SAC1801

For: Symmetry at Cloverleaf, LLC

By: Kody Snow



1 EXECUTIVE SUMMARY

Phoenix Noise & Vibration has conducted an analysis of roadway noise impact upon the proposed Poplar Grove development in Montgomery County, Maryland. Upon completion, the development will consist of eight multistory residential buildings, townhomes, and community parks and pool throughout the site.

This study was limited to noise impact from surrounding roadways, primarily I-270, I-270 ramps, Father Hurley Boulevard, and Century Boulevard. Additionally, the future Dorsey Mill Road extension and bridge have been included in this analysis. The proposed Corridor Cities Transitway (CCT) was not included in this analysis, as there is insufficient information on the expected noise impact of the future transit system upon the Poplar Grove development as of the date of this analysis. This noise analysis included:

- On-site 24-hour noise level measurements.
- Computer modeling.
- Determination of future roadway noise levels.
- Preliminary mitigation recommendations to meet Montgomery County's residential noise regulations.

Noise impact at Poplar Grove will vary with height; therefore, impact has been presented at multiple elevations to show how the noise level changes with height throughout the site. Impact is presented in varying levels of noise indicating the future roadway noise level. All calculated noise levels are "mitigated," accounting for the presence of existing buildings, significant structures, and surrounding topography, as well as all future site buildings and topography. Structures along roadways act as noise barriers, providing protection from noise exposure and reducing the impact and extent of any potential mitigation required, if any, to comply with Montgomery County's noise regulations.

Montgomery County's noise regulations within this area of the County require that future transportation noise levels within outdoor activity areas be below 60 dBA Ldn. It is recommended that an exception be made due to the feasibility of achieving this requirement and the substantial growth that has occurred along the I-270 corridor since the inception of the noise regulations, which are dated June 1983. This exception would require noise levels in outdoor areas throughout the site to be maintained below 65 dBA Ldn, and also allow for minimal areas to be exposed to a noise level up to 70 dBA Ldn.

Future transportation noise levels within some of the site's outdoor activity areas will be above 65 dBA Ldn, primarily those areas nearest I-270. To reduce noise levels throughout the outdoor areas a 20-foot-tall noise barrier will need to be constructed along I-270. The proposed noise barrier has been evaluated within the Maryland State Highway (MDSHA) right-of-way and will require further coordination with MDSHA. Due to the proposed site plan and the topography of the site relative to the roadway, this location has been determined to be most feasible. With the construction of the noise barrier, noise levels will be reduced by up to 8 dBA within some locations and most areas throughout the site will be exposed to noise levels below 65 dBA Ldn.



Due to noise impact from I-270 and other surrounding roadways, most of the site's future buildings will be impacted by transportation noise levels greater than 65 dBA Ldn. Future transportation noise levels will be greatest for those buildings nearest I-270, noise impact will be up to 77 dBA Ldn upon the office building closest to future Dorsey Mill Road and I-270, as well as the small row of townhomes nearest I-270. All buildings at the future development will require further analysis to determine if proposed building architecture will be capable of maintaining indoor noise levels at the required 45 dBA Ldn indoor limit. This analysis can only be conducted once well-developed architectural plans for the residences to be offered throughout the site are available. Final mitigation designs will be detailed following the selection of a builder for the site and availability of architectural plans.



2 Noise Terminology

2.1 dB vs. dBA

While the standard unit of measurement for sound is the decibel (dB), discussions of noise impacting the human ear use "dBA." The "A" refers to a frequency weighting network used to simulate the human ear's unequal sensitivity to different frequencies. The A-weighted noise level is therefore more representative of a human's perception of a noise environment than the unweighted overall noise level in dB and is currently used in most all environmental noise studies.

2.2 Ldn vs. Leq

The day-night average noise level, or Ldn, is the equivalent sound pressure level averaged over a 24-hour period, obtained by adding 10 dB to sound pressure levels measured from 10:00 p.m. to 7:00 a.m. This 10 dB "penalty" accounts for the added sensitivity caused by noise generated during the nighttime hours.

The Ldn is NOT a measurement of the instantaneous noise level. It is very possible to have several short term events (tractor trailer, emergency vehicle siren, car horn, etc.) which generate a relatively high noise level (e.g. 85 dBA) during a given time period, yet have a more moderate overall Ldn value (e.g. 65 dBA Ldn).

The equivalent-continuous sound level, or Leq, is the sound level averaged over a given time period. The Leq does not include any penalties or adjustments.

2.3 Summing Noise Levels

Noise levels from multiple sources do not add arithmetically; i.e. when two noise sources generate 60 dB individually, they do not produce 120 dB when combined. Noise levels are measured using a logarithmic scale; therefore they must be summed logarithmically. In the decibel scale, two identical, non-coherent noise sources having the same noise level produce a 3 dB increase above the condition of one source alone (i.e. two 80 dB lawnmowers running at the same time generates 83 dB).

Similarly, two different noise sources with a difference of 10 dB in their individual levels results in no measureable increase in noise when they are combined. Put another way, the quieter noise source does not increase the overall noise generated by the louder source; i.e. adding an 80 dB lawnmower into a noise environment where a 90 dB lawnmower is already running does not increase the noise level above 90 dB.



3 Noise Regulation

Traffic noise impact for proposed residential developments in Montgomery County is governed by Table 2-1 (reprinted in Table 1) on page 8 of the *Staff Guidelines for the Consideration of Transportation Noise Impacts In Land Use Planning and Development* (June 1983). Accompanying this table is Map 2-1 (see Figure 1), indicating outdoor noise level requirements not to be exceeded throughout the County.

Table 1: Maximum Levels for Exterior Noise & Building Line¹ For Noise Sensitive Land Uses (Table 2-1).

Guideline Value	Area of Application
Ldn = 55 dBA	This guideline is suggested as an appropriate goal in permanent rural areas of the County where residential zoning is for five or more acres per dwelling unit and background levels are low enough to allow maintenance of a 55 dBA Level. This guideline is consistent with Federal, State, and County goals for residential areas.
Ldn = 60 dBA	This is the basic residential noise guideline which will be applied in most areas of the County where suburban densities predominate. Maintenance of this level will protect health and substantially prevent activity interference both indoors and outdoors. Noise attenuation measures will be recommended to allow attainment of this level.
Ldn = 65 dBA	This guideline will generally be applied in the urban ring, freeway, and major highway corridor areas, where ambient levels are such that application of a stricter guideline would be infeasible or inequitable. Significant activity interference will occur outdoors and indoors if windows are partially opened, but available evidence indicates hearing is adequately protected. Noise attenuation measures will be strongly recommended to attain this level.

¹ Building line as used here refers to habitable structures only. It does not include garages, sheds, or recreational accessory buildings.

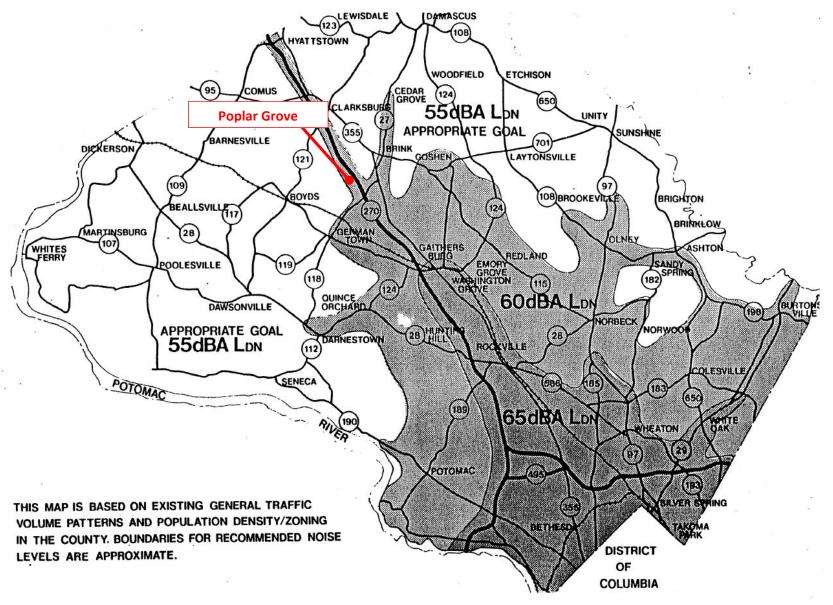
According to Map 2-1, Poplar Grove is located within the 60 dBA Ldn noise zone, indicating that noise levels in outdoor activity areas throughout the site should be maintained at or below 60 dBA Ldn. Due to the growth along the I-270 corridor and the associated increase in yearly traffic volumes since 1983, and the location of the site relative to the roadway, the 65 dBA Ldn guideline value would be more appropriate for this site.

As noted within Table 1, the 60 dBA Ldn guideline is intended for "areas of the County where suburban densities predominate." Alternatively, the 65 dBA Ldn guideline is applied to proposed residential areas along "major highway corridor areas where ambient levels are such that application of a stricter guideline would be infeasible," such as Poplar Grove. Therefore, the 60 dBA Ldn guideline value would be more applicable for more rural roadways within the County where noise from I-270 and other major roadways do not contribute to a proposed development's overall noise level.

Any outdoor area exposed to future transportation noise levels above 65 dBA Ldn typically requires further analysis to determine the mitigation designs necessary to comply with this requirement. When outdoor noise levels exceed the recommended guideline value, Montgomery County also requires an analysis of indoor noise levels in residential buildings. According to Sections 2.2.2 and 2.2.3 of the *Staff Guidelines*, any residential building impacted by noise levels above 65 dBA Ldn must be evaluated to certify that the building structure will be capable of maintaining indoor noise levels at 45 dBA Ldn.



Figure 1: Map 2-1 from Staff Guidelines for the Consideration of Transportation Noise Impacts In Land Use Planning and Development (June 1983).





4 SITE DESCRIPTION

Poplar Grove (approximate development outline shown in red in Figure 2) is located between I-270 and Century Boulevard and is additionally bound by Father Hurley Boulevard to the south. There are also plans for the construction of a bridge over I-270 to connect Dorsey Mill Road (located to the north) and Century Boulevard adjacent to the site. In the vicinity of the site, I-270 is composed of three northbound and three southbound lanes, while Century Boulevard is composed of two northbound and two southbound lanes. Father Hurley Boulevard is composed of three lanes in the eastbound and westbound directions.

The existing Century Boulevard alignment may be altered during the possible construction of the Corridor Cities Transitway (CCT).

Figure 2: Existing site (outlined in red) and surroundings. Aerial image dated April 14, 2016, courtesy of Google Earth.





5 Noise Measurements

On March 26 - 27, 2018, Phoenix Noise & Vibration conducted an on-site noise measurement survey to determine existing transportation noise levels throughout the site. This involved continuous noise level measurements and monitoring for one 24-hour period. Measurements were made using three Norsonic Type 118 and three Norsonic Type 140 Precision Integrating Sound Level Meters. All meters were calibrated prior to the survey traceable to National Institute of Standards and Technology (NIST). Each meter meets the ANSI S1.4 standard for Type 1 sound level meters.

During the 24-hour measurement, noise levels were recorded and averaged over five-minute time intervals. Noise measurements were then used to calculate the site's 24-hour average day-night noise level (Ldn), which includes the 10 dBA penalty for noise levels measured during nighttime hours.

Noise level measurements were made at the locations shown on Drawing 1 of the Appendix. Measurements were made at 5 feet ("ground level", GL) and 25 feet ("upper level", UL) above existing grade to account for the roadway noise level as it varies with height above the ground. Measurement results are presented in Table 2.

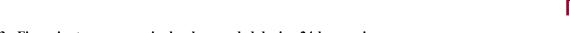
Measurement	Measured Noise Level
Location	(dBA Ldn)
A GL	81
A UL	82
B UL	68
C GL	62
C UL	63
D UL	62

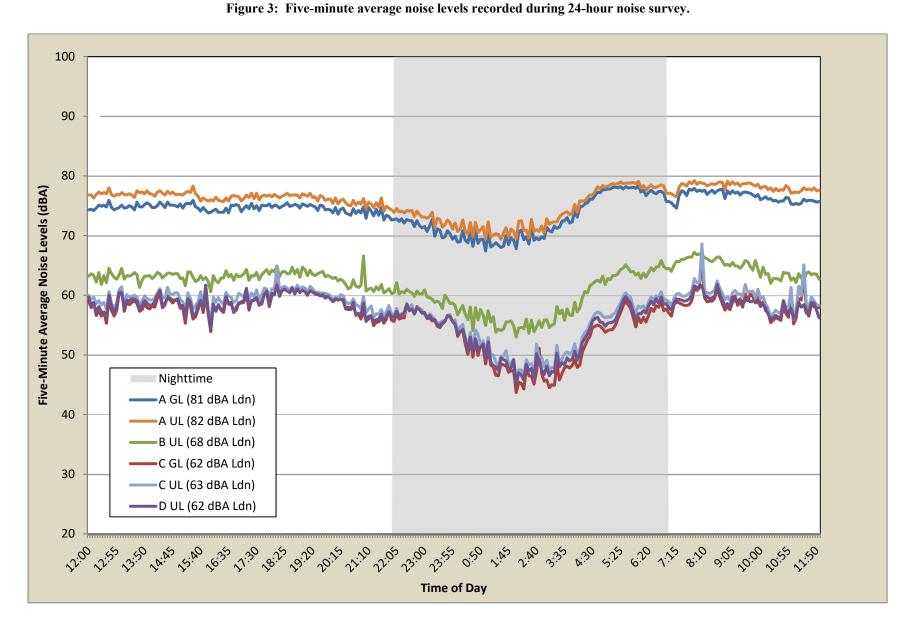
Table 2: 24-hour noise measurement results.

Figure 3 presents the survey results graphically, showing the noise level as measured in five-minute increments throughout the survey. Figure 3 indicates the actual measured values over the 24-hour period. While the 10 dBA nighttime penalty is not shown graphically, it was included in the Ldn calculations.

Note the similarity in the profile of the existing noise levels measured at all measurement locations throughout the 24-hour period, indicating that I-270 is the primary noise source, not Century Boulevard or Father Hurley Boulevard.









6 COMPUTER MODELING

The existing and future sites were computer modeled using the CadnaA software program, a three-dimensional noise propagation model capable of determining the noise level impact from multiple noise sources across vertical and horizontal surfaces while accounting for factors such as topography, surface reflections, and roadway data (traffic volumes, speeds, and vehicle classifications, etc.). Noise levels can be presented either in spot locations or as noise contours of equal value throughout a defined surface area.

6.1 Current Model

A current model was developed to simulate the existing site and its surroundings using information provided on the site's existing site plan, the Montgomery County GIS, and data collected during the 24-hour measurement survey, inputting existing topography, roadway alignments, and buildings. Roadway noise levels were calibrated using the on-site noise measurements by adjusting the modeled input until the modeled noise level output matched the measured values.

6.2 Future Model

A future model was developed by altering the calibrated current model to include projected roadway data, future Dorsey Mill Road and bridge, and the future information for the Poplar Grove development (topography, building layout, and building heights).² Changes to any of the future site input used in this analysis, including site layout, building heights (particularly those closest to I-270), site topography, and projected Dorsey Mill Road data, may alter the resulting noise propagation throughout the site, and should be reevaluated upon availability of this information.

The future model calculated the site's projected noise level contours at 5 and 25 feet above grade. Noise contours at five feet above grade represent the noise impact in outdoor activity areas and upon first floors of the planned residential units, while the noise contours at 25 feet account for the noise impact upon upper floors of the residences. Noise contours at 5 and 25 feet are shown on Drawings 2 and 3 of the Appendix, respectively.

The future noise impact was also calculated across all future building facades (shown on Drawing 4 of the Appendix). The varying colors on the building elevations on Drawing 4 represent the future noise impact at that location. Note how the noise level changes with respect to height and orientation to the roadways. Additionally, while not yet discussed, the location of a proposed 20-foot-tall noise barrier is also indicated on the drawing. The presented noise levels on the future building facades also account for noise reduction provided by the noise barrier.

All noise levels presented on Drawings 2, 3, and 4 are "mitigated" noise levels, calculated in the presence of future site topography and all buildings, as well as all existing surrounding buildings, topography, and significant structures. Mitigated noise levels account for the effect of buildings,

¹ Provided by Gensler.

² Conceptual site grading and building heights were provided by Gensler.



barriers, and other significant structures in reducing and reflecting roadway noise propagation and are more representative of the noise level actually experienced at a specific location.

6.3 Roadway Data

Existing average annual weekday traffic (AAWDT) volumes, vehicle percentages, and nighttime percentages for I-270, Father Hurley Boulevard, and Century Boulevard were based upon the most recent data published by the Maryland State Highway Administration (MDSHA). MDSHA does not typically provide future traffic data; therefore, a conservative, 2% increase in traffic compounded annually until 2038 was assumed.³ Additionally, MDSHA does not maintain data for Century Boulevard. Existing data for Century Boulevard was estimated based on observations kept throughout the on-site noise measurements.

Future traffic volumes for Dorsey Mill Road and Century Boulevard were based upon a traffic study completed for the roadways,⁴ which calculated future morning and evening peak hour traffic volumes for Dorsey Mill Road at the intersection of Century Boulevard. The traffic study did not calculate an AAWDT for Dorsey Mill Road and Century Boulevard; therefore, it was assumed that the peak hour volume represented 9% of the total AAWDT.⁵ The traffic study also did not provide estimated nighttime or truck volumes; thus a 15% nighttime volume and truck percentage of 5% was used for the roadway. All necessary traffic data for the roadways is provided in Table 3.

Roadway	2016 AAWDT	2018 AAWDT	2038 AAWDT	Nighttime Volume %	Truck %	Posted Speed Limit (mph)
I-270 Northbound	-	54,067	80,341	20	12	55
I-270 Southbound	-	57,819	85,916	24	12	55
I-270 SB to Father Hurley Boulevard WB	3,761	-	5,814	10	2	50
I-270 SB to Father Hurley Boulevard EB	2,731	-	4,222	14	7	50
Father Hurley Boulevard WB to I-270 SB	10,491	-	16,219	23	4	30
Ridge Road to I-270 NB	2,471	-	3,820	11	9	55

Table 3: Roadway traffic data used in the computer models.

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³Montgomery County typically requires that roadway noise impact studies be conducted using the projected traffic volumes 20 years from the date of the study.

⁴ 2038 AAWDTs used for Century Boulevard and Dorsey Mill Road were taken from a Traffic Signal Warrant Analysis (TSWA) dated January 13, 2016 by The Traffic Group. The TSWA was completed for the future Century Boulevard and Dorsey Mill Road intersection. The traffic volumes represent the projected volumes with full buildout of all know development projects within the area. The TWSA was prepared for Dewberry, located in Rockville, Maryland and was obtained from Gwo-Ruey Hwang of Montgomery County Department of Transportation.

⁵ The peak hour typically represents 9% of the AAWDT within Montgomery County.



Table 3:	Roadway t	traffic data	used in the	computer models.
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Roadway	2016 AAWDT	2018 AAWDT	2038 AAWDT	Nighttime Volume %	Truck %	Posted Speed Limit (mph)
Father Hurley Boulevard	41,881	-	64,747	7	2	35
Century Boulevard	-	1,280	10,251	7	0	30
Dorsey Mill Road	-	-	3,168	15	5	40

6.4 Future Noise Impact

Drawing 2 of the Appendix (noise level contours at 5 feet above future grade) indicates that future roadway noise levels will be above 65 dBA Ldn within the outdoor areas of the development nearest I-270. Mitigation will be necessary to reduce exterior noise levels to below 65 dBA Ldn within the outdoor activity areas of the site (see "Section 8.1" below).

Drawings 3 and 4 of the Appendix indicate that future residences at Poplar Grove will be impacted by noise levels above 65 dBA Ldn. Future roadway noise impact will be greatest for those residences nearest I-270. More specifically the office building nearest I-270 and Dorsey Mill Road will be exposed to noise levels of up to 77 dBA Ldn, as well as the small row of townhomes nearest the I-270 SB exit ramp to Father Hurley Boulevard.

Residences exposed to noise levels above 65 dBA Ldn require further analysis (see "Section 0" below) to determine the mitigation measures necessary to comply with Montgomery County's indoor noise regulation.

7 CORRIDOR CITIES TRANSITWAY

The Corridor Cities Transitway (CCT) is a proposed Bus Rapid Transit (BRT) line that will run from the Shady Grove Metro station to the COMSAT facility in Clarksburg. Under the currently planned alignment, the CCT will travel down the median of Century Boulevard and Dorsey Mill Road along the entire western and northern property boundary of Poplar Grove.

The project is being overseen by the Maryland Transit Administration (MTA) and is currently planned in two phases:

- Phase I: a nine-mile corridor from the Shady Grove Metro station to the Metropolitan Grove MARC station.
- Phase II: a six-mile future extension from the Metropolitan Grove MARC station to the COMSAT facility in Clarksburg. While Phase II is still intended to be constructed as part of the CCT, as of the date of this analysis MTA has not started designing this phase, nor is there a begin construction or completion date. According to MTA, all CCT planning, development, and funding is being directed towards Phase I, not Phase II.



Multiple environmental impact studies have been completed for the CCT, two of which included projected noise impact from CCT operations along the transit corridor. In May 2002, the Draft Environmental Impact Statement (DEIS) presented expected noise levels due to the CCT at select locations along Phases I and II of the corridor using light rail as the mode of transportation, while in May 2009, the Alternatives Assessment/Environmental Assessment (AA/EA) provided a similar noise study using BRT as the mode of transportation. Both of these studies provided projected CCT noise levels at locations along the CCT; however no noise levels were calculated for the CCT along Century Boulevard.

According to Rick J. Kiegel with the MTA Office of Planning and Programming, any noise level projections presented in these previous noise studies for Phase II of the CCT are no longer valid and should not be used in this analysis of noise impact upon Century for the following reasons:⁶

- None of the transit noise receptor sites included in the two previous CCT noise studies are close enough to Century.
- The noise assessment results are based on surrounding land use which would have changed since the 2002 DEIS and the 2009 AA/EA.
- MTA has no design or construction schedule for Phase II of the CCT.
- There is no operations plan (frequency, duration of service, etc.) in place for buses in this segment of the CCT.
- The bus fleet, if and when this segment is in operation, could have very different noise abatement measures in place that could influence noise levels.

Additionally, a more recent environmental study for the CCT has been published (report dated August 2017). A copy of Appendix F (technical reports) has been requested so that the Noise and Vibration Technical Report of the study can be reviewed. Based upon initial review of the information available for the more recently published report, it appears that this study only addresses the Phase I portion of the CCT.

While CCT noise may impact the site, the CCT has not been accounted for in this analysis due to insufficient information regarding the noise output from Phase II of the transit project. Furthermore, at the time of this analysis, there is no set start or completion date for Phase II, there is not even a set start date to begin the design, and there is no funding, such that Phase II of the CCT may never be constructed within the 20 year time range of this noise analysis.

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⁶ According to email correspondence between Phoenix Noise & Vibration and Mr. Kiegel on September 21, 2015.



8 MITIGATION

According to Montgomery County's noise regulations for residential development, residential sites and buildings impacted by noise levels above 65 dBA Ldn require further analysis to determine the mitigation measures necessary to maintain noise levels in outdoor activity areas and indoor living spaces at 65 and 45 dBA Ldn, respectively.

8.1 Outdoor Noise Levels

Drawing 2 indicates that noise levels throughout the site will be above 65 dBA Ldn within the outdoor activity areas nearest I-270 and the I-270 ramp. Mitigation will be required to reduce noise levels within these areas. It is proposed that a 20-foot-tall noise barrier approximately 1,120 feet in length be constructed along I-270 and the I-270 ramp. See Drawing 5 of the Appendix for the location of the noise barrier and the future noise contours.

The barrier has been evaluated within the MDSHA right of way and will require further coordination with MDSHA. This location was selected due to the proposed site design and the topographic changes that occur between the site and I-270. Furthermore, when designing a noise barrier, it is most effective to place the noise barrier nearest the noise source (e.g. I-270) or nearest the receiver (e.g. proposed residential homes). Note that the later of the two options was evaluated and was found infeasible for the site design.

Future ground level noise levels with the construction of the proposed noise barrier are presented on Drawing 5. With the construction of the noise barrier, only a small portion of the site will be exposed to noise levels up to 70 dBA Ldn and a majority of the site will be mitigated to below 65 dBA Ldn. The areas impacted by noise levels greater than 65 dBA Ldn at the ground level are as follows:

- Parcel B
 - o Farming/Production
 - o The rear of the townhomes facing I-270, Lots 1-21.
- Parcel C
 - o The fronts of townhomes on Lots 1-8, 43, and 44.
 - o The rears of townhomes on Lots 1, 2, and 44.
 - o The side of townhomes on Lots 9 and 44.
- Parcel E
 - o The entire community park.
 - o All facades of the townhomes perpendicular to the I-270 ramp.
 - o The rear of the townhomes parallel to the I-270 ramp.
- Parcel H
 - o The front of townhomes on Lots 1, 2, and 17-19.
 - o The rear of townhomes on Lots 1 and 8-10.
 - o The side of the townhome on Lot 1.
 - o The playground.



8.2 Indoor Noise Levels

8.2.1 Building Shell Analysis

Drawing 6 of the Appendix presents the facades of the future buildings that are impacted by transportation noise levels greater than 65 dBA Ldn. Residential buildings exposed to noise levels above 65 dBA Ldn (at any height) require further analysis to determine whether the proposed building construction will be capable of maintaining indoor noise levels below 45 dBA Ldn. This evaluation, or "building shell analysis," calculates a room's indoor noise level based upon its exterior noise level, the Sound Transmission Class (STC) ratings⁷ of its various building components, the amount of exposed exterior wall area, and the room's size and finish.

Modifications to standard building construction may not be necessary for all units impacted by future noise levels above 65 dBA Ldn. It is possible that the proposed standard building construction will provide sufficient noise reduction to maintain the required 45 dBA Ldn indoor noise level for outdoor noise levels above 65 dBA Ldn; however the proposed building construction must be evaluated to determine the need for modifications.

A detailed evaluation of the proposed architecture for the Poplar Grove future buildings cannot be conducted at this time, as a builder for the site and well-developed architectural drawings (floor plans, unit plans, building elevations, window/door schedule) are not yet available; therefore the specific mitigation designs (i.e. wall, window, and door STC ratings) required for residential units to comply with Montgomery County's indoor noise level limit, if necessary, cannot yet be accurately determined.

When a builder has been selected and architectural drawings are available, noise impact will be analyzed for each residence impacted by transportation noise levels above 65 dBA Ldn. Likewise, mitigation requirements will also be provided for each residence individually where necessary. Calculating minimum STC ratings specific to each residence reduces "overbuilding" (i.e. installing windows/doors with unnecessarily high STC ratings).

To aid in the early phases of the design process and provide information on the factors that influence noise reduction in residential buildings, general mitigation design guidelines and explanations are provided in Section 8.2.3.

8.2.2 Other Mitigation Methods

The indoor noise limit is typically maintained using modifications to proposed building construction, as this is more feasible and reasonable than lowering the noise level at residences below the outdoor limit using exterior site features, such as a noise barrier. To be effective, a noise barrier must at a minimum be tall enough to block the line of sight from the noise receiver, in this case the highest floor of the residence, to the noise source, in this case the vehicles using the roadways. This is the height at which the noise barrier just begins to reduce noise impact, and not necessarily the height required to reduce noise impact below the outdoor limit.

Poplar Grove Phase I Noise Analysis

⁷ The STC rating is a single number value which describes a building element's (wall, window, door, roof, etc.) ability to reduce noise transmission from one side of the partition to the other.



For example, a 37-foot tall townhome directly along a roadway which is at grade with the slab elevation of the townhome is impacted by roadway noise up to 70 dBA Ldn at the top floor. A 25-foot tall noise barrier between the roadway and townhome might be necessary to block the line of sight from the top floor to the vehicles using the roadway, yet the 25-foot tall noise barrier only reduces noise impact upon the top floor by 5 dBA to 65 dBA Ldn. The noise barrier would need to be even taller, maybe as tall or taller than the townhome, to strictly reduce the noise impact upon the townhome from 70 dBA Ldn to below the 60 dBA Ldn outdoor limit.

Reducing indoor noise levels below 45 dBA Ldn can typically be accomplished through upgraded windows and doors and sometimes slight modifications to exterior wall construction. These types of architectural modifications, even throughout a large residential site, are typically more feasible and reasonable than constructing a noise barrier along the entire property boundary as tall as the residences. Although, with the high levels of noise impact upon the Poplar Grove development nearest I-270, it may be beneficial to use a barrier to reduce noise impact upon future residences, which would help make the proposed building modifications more feasible.

8.2.3 STC Rating Requirements

The noise reduction provided by a building structure, and the resulting indoor noise level, are primarily dependent upon the percentage of the exterior wall surface area occupied by "non-wall" items and the STC ratings of these items. These items, typically windows and doors, act as "holes" in what would otherwise be a relatively effective exterior wall, significantly reducing its ability to prevent noise transmission. Consequently the exterior surface area occupied by windows and doors is a significant issue. This information is recorded and tracked so that the STC ratings of exterior elements can be adjusted accordingly until the required indoor noise level is achieved.

While the wall construction is also an important factor, the "holes" in the wall (i.e. the windows and doors) must be addressed first if the noise reduction of the overall building shell is to be significantly increased and the indoor noise level decreased. This can be accomplished by reducing the size of existing windows/doors and/or increasing the STC ratings of windows/doors.

Table 4 and Table 5 illustrate this concept, indicating window/door STC rating requirements based upon the window/door (or glass) area when using either cementitious/Hardi panel or brick/masonry exterior walls. The STC ratings shown are those necessary to maintain indoor noise levels at 45 dBA Ldn when using that specific exterior wall construction.

The values included in Table 4 and Table 5 were calculated using one generic room (15 feet x 15 feet, carpeted room with two walls exposed to noise) to demonstrate the concept of varying window/door percentages and the resulting effect on required STC ratings. Values in Table 4 and Table 5 **should not** be universally applied to outdoor noise impact upon Poplar Grove residences; however they can be used to gain a general idea of the window/door STC ratings to be expected based upon the level of noise impact upon a building elevation. Actual STC ratings

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⁸ STC ratings were calculated assuming exterior walls constructed of one layer of 5/8" interior gypsum board, 2" x 4" wood study with 3.5" fiberglass batt insulation, one layer of ½" exterior plywood, and the specified exterior wall finish.



will depend upon interior room finishes and characteristics, room/building orientation with respect to the noise source, building geometry, etc.

Table 4: Hypothetical window/door STC ratings with cementitious or Hardi panel exterior walls.

	Percentage of Exterior Wall Area Occupied by Windows/Doors				
	20%	40%	60%	80%	
Outdoor Noise	Required Window/Door STC Rating Necessary to Maintain Indoor Noise Levels Below 45 dBA Ldn				
Impact (dBA Ldn)	(When Using Cementitious or Hardi Panel Exterior Wal				
≤ 65	25	25	27	28	
70	28	30	32	33	
75	35	37	38	39	
80 ^A	-	-	-	-	

Note:

Table 5: Hypothetical window/door STC ratings with brick/masonry exterior walls.

	Percentage of Exterior Wall Area Occupied by Windows/Doors				
	20%	40%	60%	80%	
Outdoor Noise Impact (dBA Ldn)	Required Window/Door STC Rating Necessary to Maintain Indoor Noise Levels Below 45 dBA Ldn (When Using Brick/Masonry Exterior Walls)				
≤ 65	25	25	27	28	
70	27	30	32	33	
75	32	35	37	38	
80	38	40	42	43	

STC ratings apply to one individual element. The composite STC rating is the overall STC rating of a partition with multiple elements (e.g. a wall with a window) and is always controlled by the building element with the lowest individual STC rating. In residential construction, this is almost always the glass (windows and doors); therefore the percentage of the exterior wall occupied by glass becomes critical. This also means the amount of outdoor noise heard inside a unit is primarily dependent on the glass percentage and STC rating, not the wall STC rating.

In other words, when the glass occupies such a significant portion of the exterior wall, increasing the wall STC rating even drastically will not decrease the indoor noise level. Increasing the composite STC rating of the partition must be accomplished by first addressing the "weakest link" in the partition (the glass).

Note that when windows and/or doors occupy a high percentage of the impacted façade, substantially higher window/door STC ratings than those typically used in standard construction

A. Due to the limited STC rating achievable by the exterior wall, the window/door STC ratings will be significantly high (>50 STC), which means that the construction of the exterior wall will need to be modified to increase the wall's STC rating.



(usually around 25 STC) may be required depending upon the noise level impact. For reference, STC ratings greater than approximately 33 STC require either laminated glass, increased airspace between glass panes, or varying glass pane thicknesses.

9 Conclusion

Poplar Grove residences will be exposed to future roadway noise levels up to 77 dBA Ldn. While this represents a high level of noise impact, compliance with Montgomery County's residential noise regulations can be achieved through modifications to proposed building plans.

Due to high noise levels generated by I-270, roadway noise levels will be above 65 dBA Ldn within the outdoor areas located nearest I-270 and the I-270 ramp. To mitigate noise levels within these outdoor areas, a noise barrier has been designed within the MDSHA right-of-way adjacent to I-270 and the I-270 ramp. The noise barrier will be approximately 1,120 feet in length and 20 feet tall. With the construction of the proposed noise barrier, noise levels will be reduced by up to 8 dBA within some locations of the site.

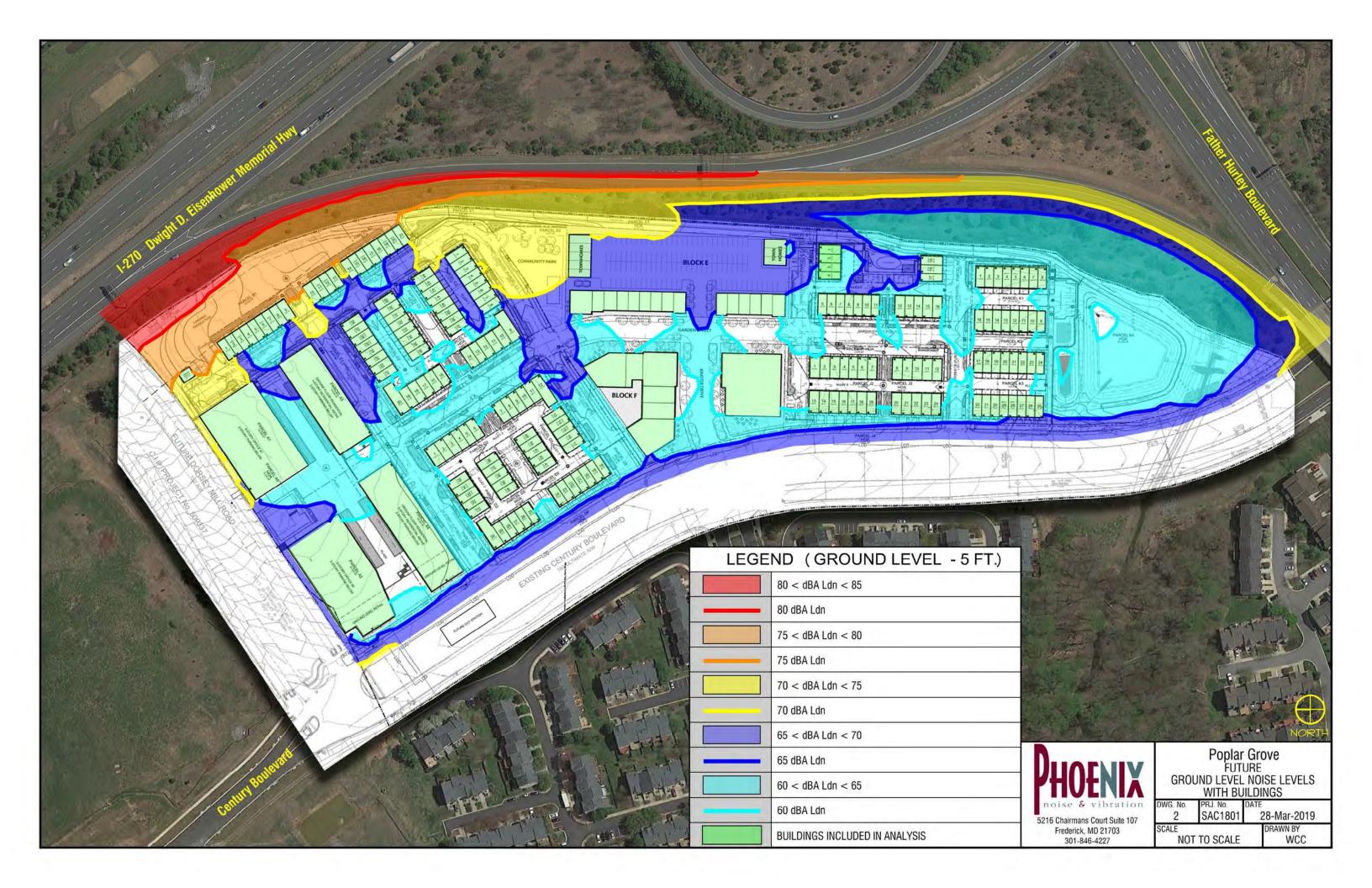
Most future residences at Poplar Grove will be exposed to future roadway noise levels above 65 dBA Ldn. While noise impact upon these residences will be above the recommended outdoor noise level of 65 dBA Ldn, compliance with Montgomery County's residential 45 dBA Ldn interior noise level requirement can be achieved through modifications to proposed building construction. Depending upon the noise level specific to each residence, modifications may include only increased window/door STC ratings or adjustments to exterior wall construction and upgraded windows/doors. Further analysis is required to determine the exact mitigation designs necessary, which will be established once a builder has been selected and architectural plans (building elevations, window/door schedule, unit plans) for the future residential buildings are available.

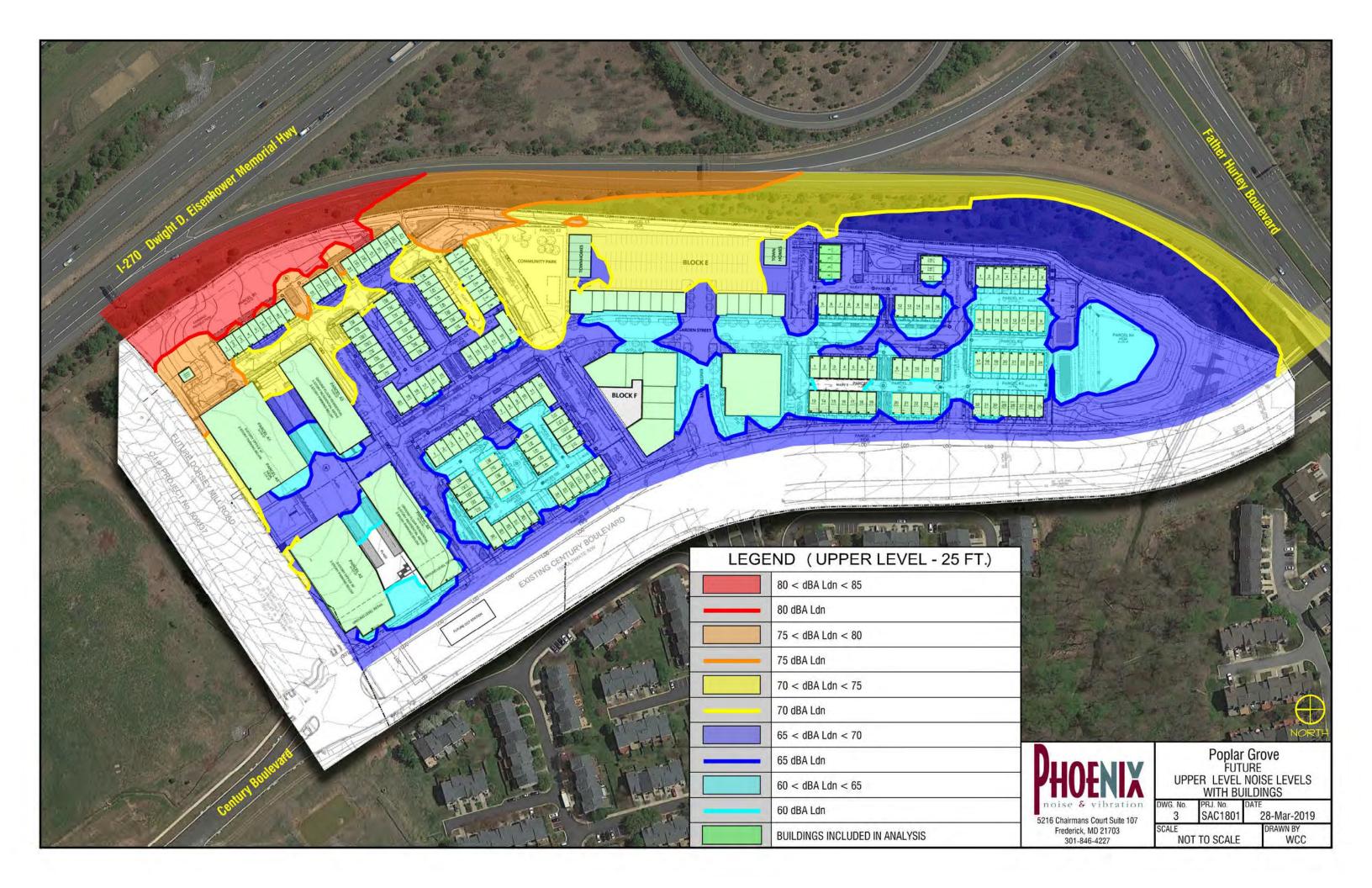
Please Note: The results of this Phase I Noise Analysis have been based upon the site information made available at the time of this study, including existing and proposed topography, projected roadway traffic volumes, and the proposed ultimate building layout and building heights. Should any of this information be altered, additional analysis will be required to determine if the results and recommendations presented herein are capable of reducing outdoor and indoor noise levels to comply with Montgomery County's noise level requirements for residential development.

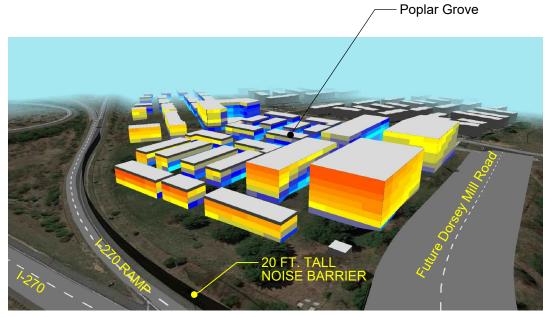


APPENDIX

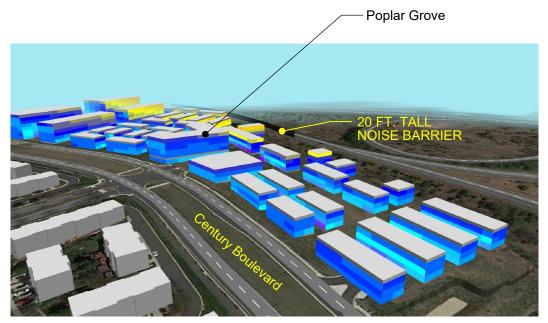








(1) Looking Southwest



 $\begin{tabular}{ll} \hline \end{tabular} \begin{tabular}{ll} Looking Northeast \\ \hline \end{tabular}$

Future Mitigated Transportation Noise Levels (dBA Ldn)



2 Looking Southeast



(4) Looking Northwest

Poplar Grove





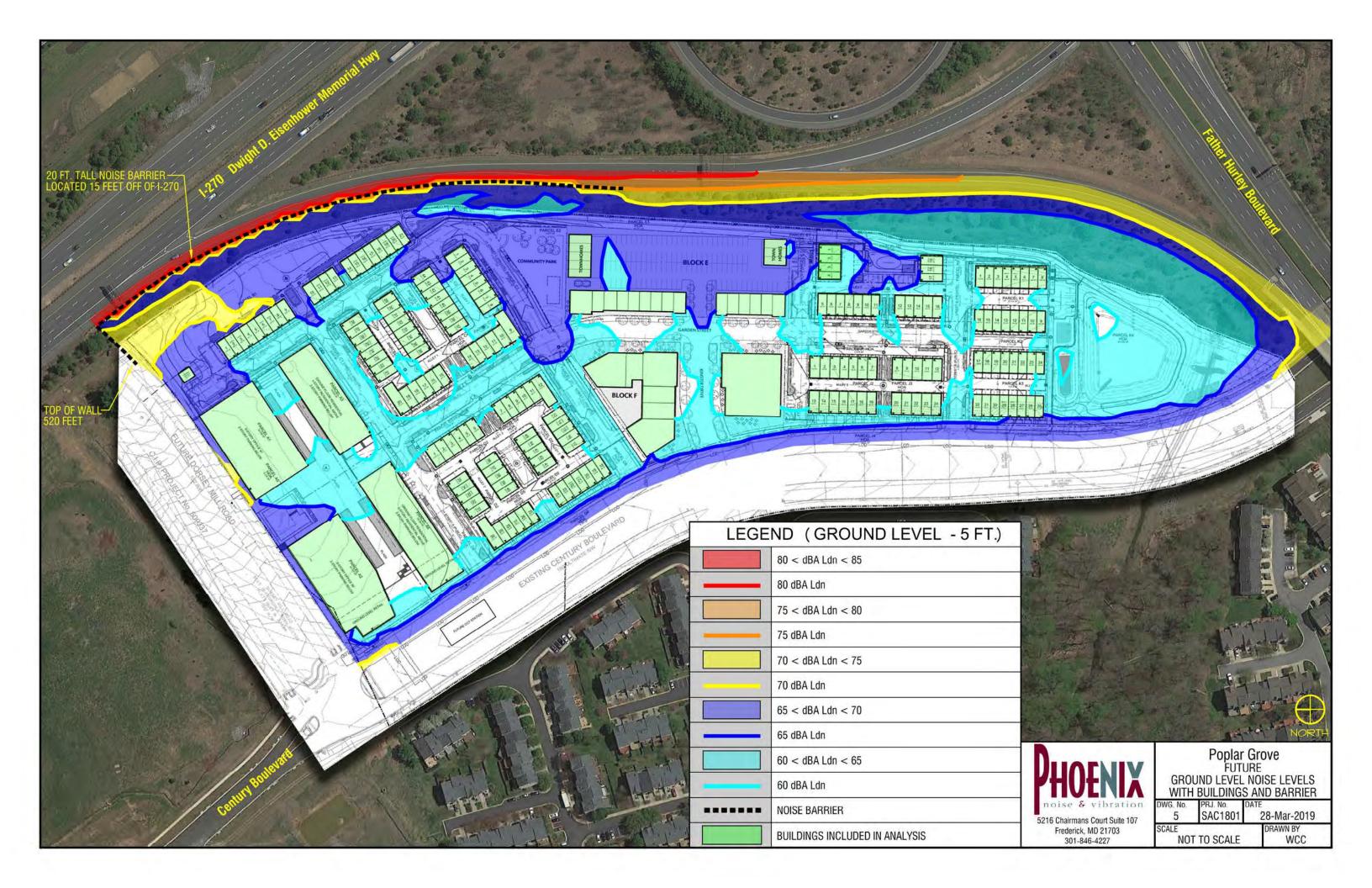
Poplar Grove FUTURE TRANSPORTATION NOISE IMPACT SAC1801 28-Mar-2019

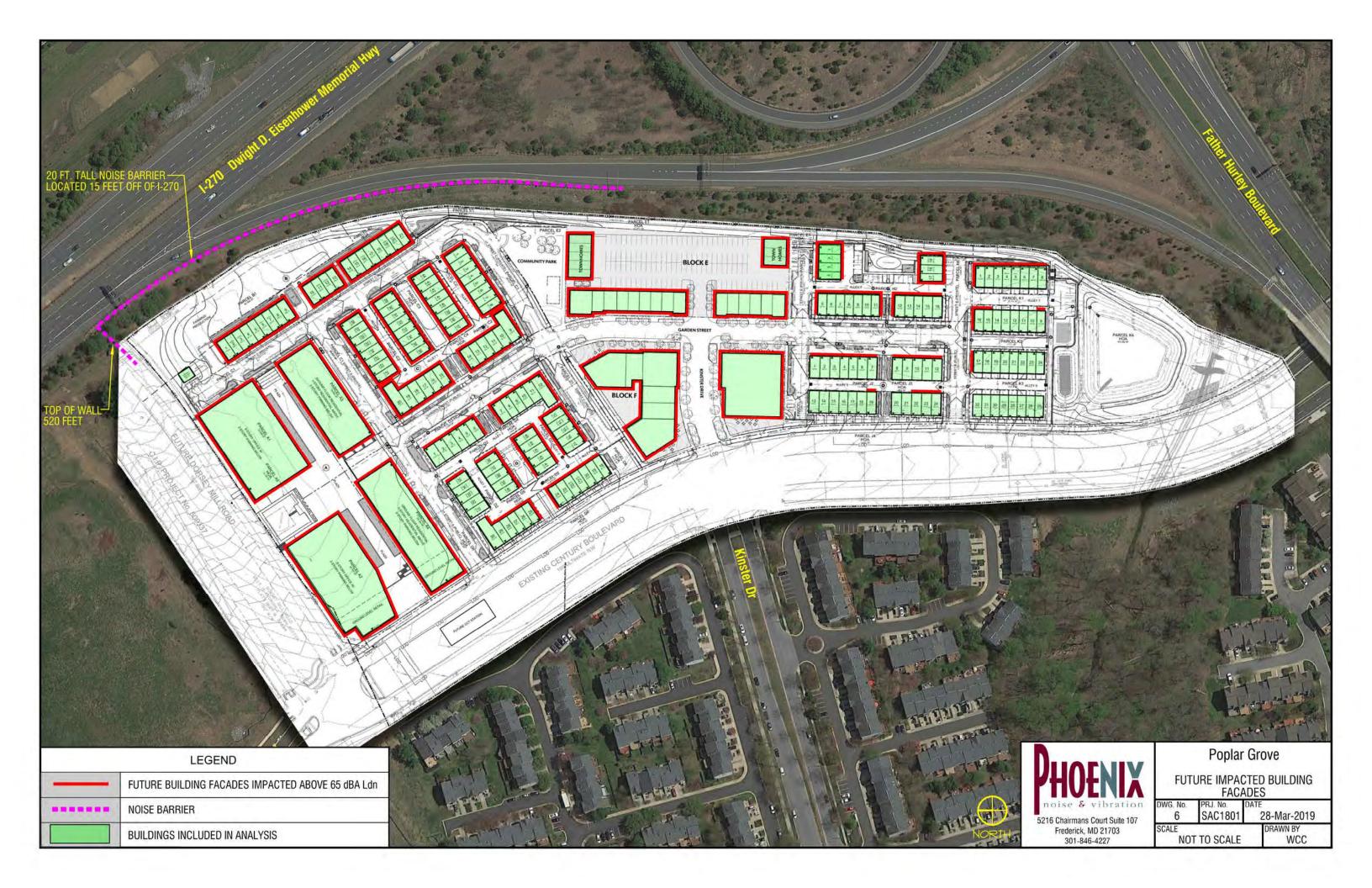
WCC

NOT TO SCALE

77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50

KEYPLAN







Department of Permitting Services Fire Department Access and Water Supply Comments

DATE:

31-Jan-19

TO:

Joanne Cheok

Dewberry

FROM:

Marie LaBaw

RE:

Poplar Grove

820190060 120190040

PLAN APPROVED

- 1. Review based only upon information contained on the plan submitted 31-Jan-19 .Review and approval does not cover unsatisfactory installation resulting from errors, omissions, or failure to clearly indicate conditions on this plan.
- 2. Correction of unsatisfactory installation will be required upon inspection and service of notice of violation to a party responsible for the property.

*** Rear loaded four story towns with rear access to main living space ***

*** Hydrant spacing to be corrected, reviewed, and approved prior to Phase 2 Site Plan ***

Attachment N



Mark Elrich County Executive Al R. Roshdieh Director

September 19, 2019

Mr. Benjamin Berbert, Planner Coordinator Area 3 Planning Division The Maryland-National Capital Park & Planning Commission 8787 Georgia Avenue Silver Spring, Maryland 20910-3760

REVISED

RE:

Preliminary Plan & Design Exceptions Preliminary Plan No. 120190040

Poplar Grove

Dear Mr. Berbert:

We have completed our review of the revised preliminary plan uploaded to eplans on August 2, 2019. A previous version of this plan was reviewed by the Development Review Committee (DRC) at its meeting on December 4, 2018. This letter only changes Condition #9. We recommend approval of the plan subject to the following comments:

All Planning Board Opinions relating to this plan or any subsequent revision, project plans or site plans should be submitted to the Montgomery County Department of Permitting Services in the package for record plats, storm drain, grading or paving plans, or application for access permit. This letter and all other correspondence from this department should be included in the package.

Design Exceptions

1. A-1 – Allow Shared Use Path in lieu of 8-foot sidewalk and 8-foot bike lane - Century Boulevard: Century Boulevard was built in advance of this project, at the County's request, to the standards at that time. As a result, there is an existing 6-foot sidewalk along the frontage of the proposed project. The Corridor Cities Transitway project specifies an 8-foot sidewalk and 8-foot bike lane along the east side of Century Boulevard. The applicant is proposing a 12-foot, shared-use path along the Century Boulevard frontage in lieu of the proposed 8-foot sidewalk and 8-foot bike lane with. Three feet of the proposed shared-use path will be located outside the right-of-way in a 4-foot wide public improvement easement (PIE).

MCDOT Response: Given that the majority of the Century Boulevard roadway section is already existing, and the remaining right-of-way space is limited along the project frontage, the applicant's proposal for a 12-foot, shared-use path in lieu of a separate sidewalk and bike lane is acceptable.

Mr. Benjamin Berbert Preliminary Plan No. 120190040 September 19, 2019 Page 2

MCDOT **approves** this Design Exception.

- 2. A-2 Modification of Context Sensitive Road Section Garden Street: The applicant is proposing a more urban theme and Garden Street concept for this project with a privately maintained activity/garden zone on the west side of the right-of-way. To accommodate the activity/garden zone as well as provide all the aspects standard public road section, the applicant is proposing to modify MCDOT Standard No. MC-2005.01 from a 60-foot to a 50-foot right-of-way. The applicant is proposing the following street section:
 - 6-foot sidewalk
 - 8-foot parking section
 - two 11-foot travel lanes
 - 6.5-foot stormwater management/tree panel
 - 6-foot sidewalk
 - 1.5' maintenance strip

<u>MCDOT Response</u>: MCDOT **approves** this Design Exception. The proposed road is not in the master plan and the applicant is meeting the urban road code standards. The applicant's proposed section will replace the typical tree panel with a privately-maintained activity/garden zone that will enhance the project and promote walkability.

- 3. <u>A-3 Modification of Context Sensitive Road Section Public Street A:</u> In keeping with the urban theme and Garden Street concept described above in the "A-2" modification request, and to promote accessibility and walkability to the townhouse entrances along this street, the applicant is proposing to modify MCDOT Standard No. MC-2005.01 from a 60-foot to a 56-foot right-of-way. The applicant is proposing the following street section:
 - 2-foot maintenance strip
 - 5-foot sidewalk
 - 6.5-foot stormwater management/tree panel
 - 8-foot parking section
 - two 11-foot travel lanes
 - 6.5-foot stormwater management/tree panel
 - 6-foot sidewalk

<u>MCDOT Response:</u> MCDOT **approves** this Design Exception. The proposed road is not in the master plan and the applicant is meeting the urban road code standards. The applicant's proposed section will enhance the urban theme and promote walkability and accessibility to the townhomes along this street.

- 4. A-4 Modification of Context Sensitive Road Section Kinster Drive: In keeping with the urban theme and Garden Street concept described above in the "A-2" modification request, the applicant is proposing to modify MCDOT Standard No. MC-2005.01 from a 60-foot to a 61-foot right-of-way. Also, the proposed modifications will increase walkability and reduce queueing for vehicles leaving the site. The applicant is proposing the following street section:
 - 1.5-foot maintenance strip
 - 6-foot sidewalk

Mr. Benjamin Berbert Preliminary Plan No. 120190040 September 19, 2019 Page 3

- 6.5-foot tree panel
- three 11-foot travel lanes (the northernmost travel lane will be for a right-turn only onto Century Boulevard)
- 6.5-foot tree panel
- 6-foot sidewalk
- 1.5-foot maintenance strip

<u>MCDOT Response</u>: MCDOT **approves** this Design Exception. The proposed street is not shown in the master plan and the project meets the urban road code standards. The applicant's proposed section will promote walkability and reduce queueing for vehicles leaving the site.

- 5. A-5 Modification of Context Sensitive Road Section Public Street B: In keeping with the urban theme and Garden Street concept described above in the "A-2" modification request and to reduce impervious area by eliminating parallel parking, the applicant is proposing to modify MCDOT Standard No. MC-2005.01 from a 60-foot to a 48-foot right-of-way. The applicant is proposing the following street section:
 - 2-foot maintenance strip
 - 5-foot sidewalk
 - 6.5-foot stormwater management/tree panel
 - two 11-foot travel lanes
 - 6.5-foot stormwater management/tree panel
 - 5-foot sidewalk 1-foot maintenance strip

<u>MCDOT Response:</u> MCDOT **approves** this Design Exception. The proposed street is not listed in the master plan and meets the urban road code standards. The applicant's proposed section will reduce impervious area and maintain the urban theme.

6. Right-of-Way Truncation Reduction (Street A, Street B & Kinster Drive at Garden Street intersections): The applicant is seeking a waiver from the standard truncation requirement for the three (3) public road intersections with the Garden Street. Under Section 50-4.3.E.2.f.iii of the County Code, the right-of-way of corner lots at an intersection are required to be truncated by straight lines joining points twenty-five (25) feet from the theoretical property line intersection in each quadrant.

<u>MCDOT Response</u>: The right-of-way truncations are required per County Code Section 50.4.3.E.2.f.iii, which the Planning Board has the authority to specify a greater or lesser truncation. Therefore, MCDOT defers to them for this requirement.

7. <u>Stormwater Management Devices in the Public Right-of-Way:</u> The applicant is proposing bioretention planters within portions of the public right-of-way.

<u>MCDOT Response:</u> A Design Exception is not needed to install stormwater management in the County right-of-way for any road. Final details of the stormwater management facilities will be approved by DPS at the permit stage.

Significant Plan Review Comments

8. Per County Code Section 50.4.3.E.4.c., "Private roads must be built to the construction specifications of the corresponding public road concerning paving detail and design data, including surface depth and structural design. The road must be designed in accordance with sound engineering principles for safe use, including horizontal and vertical alignments for the intended target speed; adequate typical sections for vehicles, pedestrians, and bicyclists; compliance with the Americans with Disabilities Act; drainage and stormwater management facilities; intersection spacing and driveway locations; parking; lighting; landscaping or street trees; and utilities. The width and cross section of a private road must meet the right-of-way specified in a master plan or be equal to the corresponding public road standard unless modified by the Board."

The applicant proposes private streets in this development since they do not meet County Code design standards. The private streets that are shown are not listed in the master plan and not needed for general circulation. MCDOT does not recommend the proposed private streets become public as designed on the preliminary plan (and documented in a letter dated June 3, 2019, titled "Private Streets Request"). We support the request of the private streets subject to execution and recordation of a Declaration of Restrictive Covenants (for private roads). The deed reference for this document will be identified on the record plat.

- 9. The applicant must satisfy all conditions in the December 10, 2015 Preliminary Adequate Public Facilities (PAPF) Planning Board resolution MCPB No. 15-149. In accordance with the timing mechanisms identified below, the Applicant must ensure construction of the following off-site improvement(s) by satisfying the below listed MCDOT requirements. Peak hour trip totals shall be calculated based upon each development type allowed using the trip generation rates included in the Planning Board resolution:
 - A. Prior to the issuance of the 71st building permit for any townhouse dwelling, the Applicant must install the traffic signal at the intersection of Kinster Drive and Crystal Rock Drive, with the signal poles and boxes located in a location that can accommodate the ultimate intersection configuration as described below in condition 10.D.
 - B. Prior to issuance of issuance of any building permit 124th building permit for any townhouse dwelling, the Applicant must construct and have inspected as complete by MCDOT a traffic signal at the intersection of Kinster Drive and Century Boulevard.
 - C. Prior to issuance of any building permits that result in a cumulative 352 PM peak hour trips from the Subject Property, the Applicant must reconstruct the northbound and southbound approaches of Crystal Rock Drive at Kinster Drive to include one through/left lane, one through lane and one right turn lane on northbound Crystal Rock Drive, and on southbound Crystal Rock Drive the lane configuration must include one through/left lane and one through/right lane or submit for review and construction to M-NCPPC and MCDOT an alternative improvement that adequately addresses intersection capacity at this intersection.

- D. Prior to issuing any building permits that result in a cumulative 446 PM peak hour trips from the Subject Property, the Applicant must either construct or provide documentation that permit and bond has been posted to construct a second northbound right turn lane on Crystal Rock Drive at Father Hurley Boulevard;
- E. Prior to issuance of any building permits that result in a cumulative 1,004 PM peak hour trips from Poplar Grove, the Applicant must construct a second left turn lane on eastbound Father Hurley Boulevard at Crystal Rock Drive or submit for review and construction to M-NCPPC and MCDOT an alternative improvement that adequately addresses intersection capacity at this intersection.
- 10. The storm drain analysis was reviewed and deemed acceptable to MCDOT. Prior to record plats, the existing Inlet I-2 on Century Boulevard will need to be increased to a 20-foot throat length. The existing inlet at the proposed entrance to Public Street B will need to be reconfigured to a manhole, as shown as MH-32 on the plan. The applicant will need to coordinate with the future Dorsey Mill Road Capital Improvement Project (CIP No. 509337) for the uncaptured runoff in the Century Boulevard right-of-way that flows north to the intersection of Century Boulevard and future Dorsey Mill Road.
- 11. The proposed abandonment of 3,964.09 square feet, as shown in the attached May 23, 2019 (Attachment A) is acceptable to this Department. The existing dedication is not needed for site access nor any known or future circulation requirements. Approval is subject to the granting of any necessary vehicular, pedestrian, drainage, or public utility easements. The Planning Board should make a determination if this abandonment needs to go through County Council approval.

This potential right-of-way abandonment will reserve needed right-of-way for future implementation of the master planned two-way separated bike lanes (SBL) along the south side of Dorsey Mill Road and the east side of Century Boulevard that are recommended in the December 2018 *Montgomery County Bicycle Master Plan*. Attachment A also depicts the modifications of the proposed pedestrian/bicycle facilities and connections at the southeast corner of the intersection of Century Boulevard and Dorsey Mill Road, including the connection of the proposed 12-foot shared use path by Poplar Grove on the east side of Century Boulevard. The attached May 23, 2019 Attachment B depicts the future two-way SBL and sidewalk on the east side of Century Boulevard. In addition, the proposed finished grade of the Symmetry at Cloverleaf property for the Poplar Grove project in this area must allow for the construction of the future two-way SBL and sidewalk without a retaining wall along the east side of the future sidewalk. Contact Mr. Eric Willis of our Transportation Engineering Section if the Planning Board determines that the abandonment needs County Council approval. Mr. Willis can be reached at eric.willis@montgomerycountymd.gov or 240-777-7255.

- 12. The proposed adjacent Poplar Grove 8-story building shown on the preliminary plan shall allow for a 10-foot public utility easement (PUE).
- 13. The applicant must relocate the graves within the Dorsey Mill Road right-of-way into the Waters Memorial Park, with no compensation from the County to the Symmetry at Cloverleaf. The County

will be responsible for the costs of the grave reinternment and associated work. The timing of the relocation will be determined by MCDOT prior to issuance of any right-of-way permit. Contact Mr. Eric Willis of our Transportation Engineering Section regarding relocating the graves. Mr. Willis can be reached at 240-777-7255 or at eric.willis@montgomerycountymd.gov.

- 14. On the certified preliminary plan, remove the County certifications from all private street crosssection details.
- 15. The applicant will be required to build the twelve (12) foot wide shared-use path along the Century Boulevard frontage. The timing of this improvement will be determined prior to issuance of the right-of-way permit.
- 16. The applicant has identified space at the north end of the site, adjacent to the future Corridor Cities Transitway (CCT) station, for potential, future Park-and-Ride facilities for up to 250 parking spaces. MCDOT has three years from the date of the Sketch Plan approval to determine the need, funding and timing mechanisms of this facility. However, if a user is found for the space in the interim, then the applicant has the right to present a site plan application for this space to the Planning Board. Contact Mr. Dan Hibbert of our Transit Services section prior to issuance of the record plat regarding the park and ride lot. Mr. Hibbert can be reached at dan.hibbert@montgomerycountymd.gov or at 240-777-5806.
- 17. Per the December 15, 2014, Road Participation Agreement between Black Hills Germantown, LLP (Black Hills) and Montgomery County, Maryland, the Black Hill project will be responsible for the Dorsev Mill Road improvements along the Poplar Grove site frontage.
- 18. The Applicant shall implement the following recommendations for implementing transportation demand management elements on the Subject Property:
 - a. On the Certified Preliminary Plan, identify the possible location of two bikeshare locations, on private property or open space, sized to accommodate a typical 19 dock station that measures 53 feet by 7 feet, and has at least 4 or more hours of direct solar exposure. These stations shall be located near or in the Maker District and the Mixed-Use Transit Oriented Districts (Phases II & III);
 - b. Provide a point of contact to facilitate MCDOT outreach and promotion of non-auto modes of commuting and region-wide programs to the on-site population (employees and residents);
 - c. The Applicant shall provide one bikeshare station or other facility for share-use mobility devices with any development in Phase II, and one bikeshare station or other facility for share-use mobility devices with any development in Phase III unless the Applicant provides proof of coordination that MCDOT and that MCDOT has determined that a bikeshare station is not required, in which case the applicant shall provide bike racks, a repair station, other bicycle-supporting improvements or facility that supports the use and orderly-storage of shared-use mobility devices as deemed suitable by MCDOT and MNCPPC;
 - Displays and monitors that include real time transit, static transportation/transit, and other TDM-related information shall be provided in the lobby space for each multi-family or office building; and

e. At least two exterior real time transit displays shall be provided in highly trafficked areas, one each in the Maker District and the Mixed-Use Transit Oriented district.

Standard Plan Review Comments

- 19. Provide full width dedication and construction of all interior public streets.
- 20. Grant necessary slope and drainage easements. Slope easements are to be determined by study or set at the building restriction line.
- 21. No steps, stoops, retaining walls, private stormwater management or other permanent structures for the development are allowed in the County right-of-way.
- 22. Size storm drain easement(s) prior to record plat. No fences will be allowed within the storm drain easement(s) without a revocable permit from the Department of Permitting Services and a recorded Maintenance and Liability Agreement.
- 23. The owner will be required to submit a recorded covenant for the operation and maintenance of private streets, storm drain systems and/or open space areas prior to MCDPS approval of the record plat. The deed reference for this document is to be provided on the record plat.
- 24. In all underground utility installations, install identification tape or other "toning" device approximately two feet above the utility.
- 25. Grade establishments for all new public streets and/or pedestrian paths must be approved by MCDPS prior to submission of the record plat.
- 26. The sight distance study has been accepted. A copy of the accepted Sight Distance Evaluation certifications form is enclosed for your information and reference.
- 27. Provide a minimum five-foot continuous clear path (no grates) sidewalk along all public streets.
- 28. Provide on-site handicap access facilities, parking spaces, ramps, etc. in accordance with the Americans with Disabilities Act.
- 29. This project falls within the Bicycle Pedestrian Priority Area (BPPA). Therefore, all driveways should be at-grade with the sidewalk and then drop down to meet the street elevation.
- 30. If the proposed development will alter any existing street lights, signage and/or pavement markings along Century Boulevard, please contact Mr. Dan Sanayi of our Traffic Engineering Design and Operations Section at (240) 777-2190 for proper executing procedures. All costs associated with such relocations shall be the responsibility of the applicant.
- 31. Coordinate with Mr. John Thomas of our Transportation Engineering Section regarding the twelvefoot shared-use path along the Century Boulevard site frontage and the two-way separated bike

lanes on the Dorsey Mill Road site frontage. Mr. Thomas can be contacted at <u>john.thomas@montgomerycountymd.gov</u> or at 240-777-7240.

- 32. Contact Mr. Wayne Miller of our Division of Transit Services to determine if any future bus stops for RideOn will be provided along your Century Boulevard site frontage. Mr. Miller can be reached at wayne.miller2@motgomerycountymd.gov or 240-777-5800.
- 33. Trees in the County rights of way spacing and species to be in accordance with the applicable MCDOT standards. Tree planning within the public right of way must be coordinated with DPS Right-of-Way Plan Review Section.
- 34. Permit and bond will be required as a prerequisite to DPS approval of the record plat. The permit may include, but not necessarily be limited to the following improvements:
 - A. Curbs, gutters, storm drain & appurtenances, twelve-foot shared-use path, sidewalks, handicap ramps, and street trees along Century Boulevard.
 - B. Paving, curbs, gutters, storm drain & appurtenances, sidewalks, handicap ramps, and street trees along all internal public streets.
 - C. Permanent monuments and property line markers, as required by Section 50-4.3(G) of the Subdivision Regulations.
 - D. Erosion and sediment control measures as required by Montgomery County Code 19-10(02) and on-site stormwater management where applicable shall be provided by the Developer (at no cost to the County) at such locations deemed necessary by the Department of Permitting Services (DPS) and will comply with their specifications. Erosion and sediment control measures are to be built prior to construction of streets, houses and/or site grading and are to remain in operation (including maintenance) as long as deemed necessary by the DPS.
 - E. The developer shall provide street lights in accordance with the specifications, requirements, and standards prescribed by the MCDOT Division of Traffic Engineering and Operations.

Thank you for the opportunity to review this sketch plan. If you have any questions or comments regarding this letter, please contact me at william.whelan@montgomerycountymd.gov or (240) 777-2173.

Sincerely,

William Whelan

William Whelan Development Review Team

Office of Transportation Policy

Enclosures (3)

Attachment A Attachment B Sight Distances

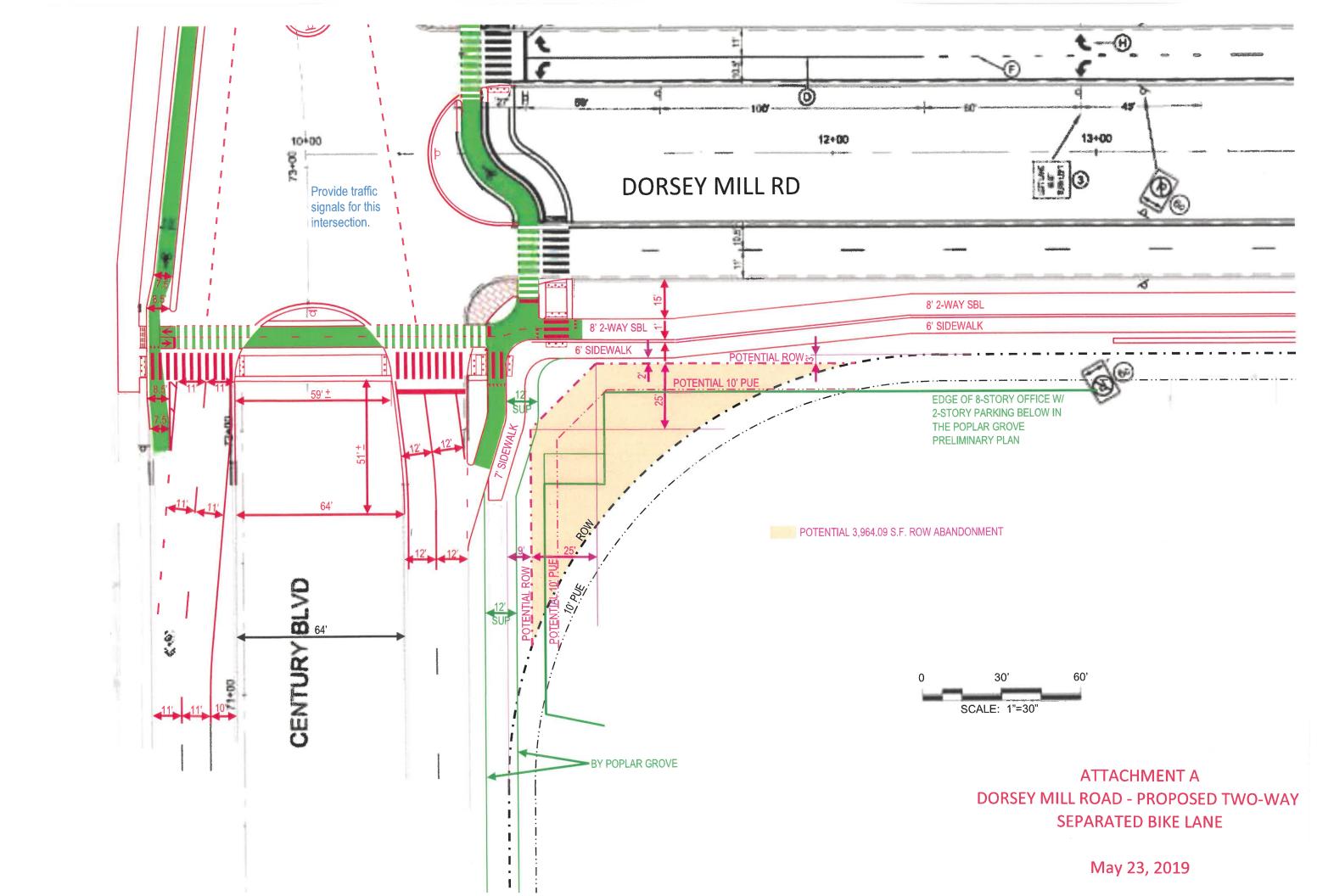
cc: Plan letters notebook

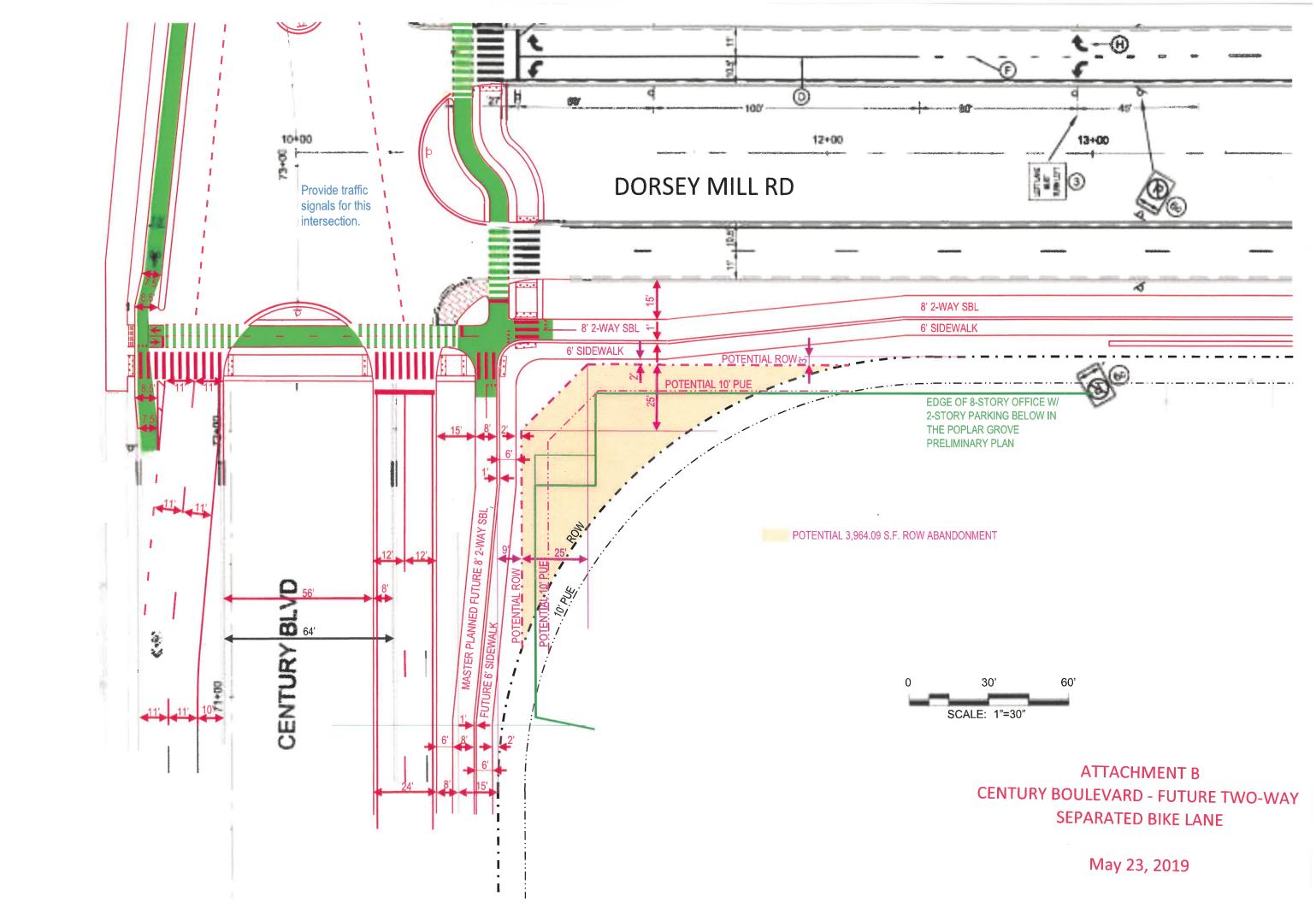
cc-e: Nicole Totah Symmetry at Cloverleaf, LLC

Meredith Byer Dewberry

Heather Dlhopolsky Linowes and Blocher, LLP

Sandra Pereira MNCP&PC Sandra Brecher MCDOT CSS Beth Dennard MCDOT CSS John Thomas MCDOT DTE Sam Farhadi MCDPS RWPR Mark Terry MCDOT DTEO Wayne Miller MCDOT DTS Dan Hibbert MCDOT DTS Tim Cupples MCDOT DTE Greg Hwang MCDOT DTE Dan Sheridan MCDOT DTE Eric Willis MCDOT DTE **Barry Fuss** MCDOT DTE







MONTGOMERY COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
DEPARTMENT OF PERMITTING SERVICES

SIGHT DISTANCE EVALUATION

Poplar Grove	Preliminary Plan Number:	1-120190040
/ Boulevard	Master Plan Road Classification:	BUSINESS Primary
35mph		
OK?	Sight Distance (feet) Right440 Left697	OK2
C	omments:	
GUIDELINI	ES	
Required Sight Distance in Each Direction* 150' 200' 200' 250' 325' 400' 475' 550' *Source: AASHTO	centerline of the drive street) 6' back from the or edge of traveled we intersecting roadway 2.75' above the road visible. (See attached	a point on the eway (or side ne face of curb ay of the where a point surface is
ormation is accurate a	nd Approved	
	GUIDELIN Required Sight Distance in Each Direction* 150' 200' 200' 250' 325' 400' 475' 550' *Source: AASHTO	Master Plan Road Classification: Street B2

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MONTGOMERY COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
DEPARTMENT OF PERMITTING SERVICES

SIGHT DISTANCE EVALUATION

Facility/Subdivision Name:	Poplar Grove	Preliminary Plan Number: 1-12019004	
Street Name: Century Bo	ulevard	Master Plan Road Classification:	BUSINES
Posted Speed Limit: 35	mph		
Street/Driveway #1 (Public Stre	eet A	Street/Driveway #2 ()
Sight Distance (feet) Right 298 Left 391	OK?	Sight Distance (feet) OK? Right Left	
Comments:		Comments:	
Classification or Posted Speed (use higher value) Tertiary - 25 mph Secondary - 30 Business - 30 Primary - 35 Arterial - 40 (45) Major - 50 (55)	GUIDEL Required Sight Distance in Each Direction 150' 200' 200' 250' 325' 400' 475' 550' *Source: AASH	Sight distance is reperted by the street of the distrect of th	at a point on the lriveway (or side m the face of curb d way of the vay where a point and surface is
I hereby certify that this inform was collected in accordance of signature 18095 PLS/P.E. MD Reg. No.	nation is accurate	and Approve	

Form Reformatted: March, 2000

Attachment O



Marc Elrich County Executive

Hadi Mansouri Acting Director

July 3, 2019

Mr. Arinze Chiejina Dewberry Engineers, Inc. 2101 Gaither Road Suite 340 Rockville, MD 20850

Re:

STORMWATER MANAGEMENT CONCEPT for Poplar Grove Preliminary Plan and SITE DEVELOPMENT STORMWATER MANAGEMENT PLAN for Phase One Site

SE Corner of Century Blvd. and Future Dorsey

Mill Road

Preliminary Plan: #120190040

Site Plan for Phase One: #820190060

SM File #: 284303 Tract Size: 19.36 ac

Zone: CR2.0, C-1.75, R-1.0, H145T (Germantown Transit Mixed Use Overlay) Total Concept Area for PP: 19.16 ac Total Concept Area for Phase One: 13.01 Parcel(s): Parcel 850 (L.18516 F. 226), Parc

Parcel(s): Parcel 850 (L.18516 F. 226), Parcel P (L. 18516 F. 226), Parcel B (l. 45143 F.498 and

Out-parcel S (L.18516 F. 226)

To be subdivided into Fee Simple TH lots, Public right-of-way, parcels for future development and parcels for private roadways, alleys and open

space

Watershed: Little Seneca Creek

Dear Mr. Chiejina:

Based on a review by the Department of Permitting Services (DPS) Review Staff, the Stormwater Management Concept for Poplar Grove is hereby **acceptable**. The Site Development Stormwater Plan for Phase One of the above-mentioned Preliminary Plan is also hereby found to be **acceptable**.

The concept proposes to meet required stormwater management goals of Environmental Site Design to the Maximum Extent Practicable (ESD to the MEP) via green roof, 18 micro-bioretention facilities and eight proprietary water quality structures with underground storage. In addition, an existing pond at the south end of the property will also be retrofitted. Full SWM requirements for the proposed development will be met through a combination of the proposed facilities and the increased storage in the pond. The pond and an existing surface sand filter facility will continue to provide required management for existing Century Blvd.

The following items will need to be addressed during the detailed sediment control/stormwater management plan stage:



255 Rockville Pike, 2nd Floor, Rockville, Maryland 20850 | 240-777-0311 www.montgomerycountymd.gov/permittingservices

- 1. This Site Development Stormwater Management Plan (SDP) approval applies to Phase One ONLY. Prior to Planning Board approval of any future Site Plan phases, this stormwater management concept must be formally revised, and an approved SDP Approval letter must be issued by DPS for each for each additional phase. The SDP revision submittal must specifically refer to the appropriate phase.
- 2. A detailed review of the stormwater management computations will occur at the time of detailed plan review.
- 3. An engineered sediment control plan must be submitted for this development.
- 4. The current conceptual approval does not include storing the maximum allowable surface depth in the micro-bioretention practices. Try to provide maximized ponding in the micro-bioretention facilities at detailed plan stage.
- 5. All filtration media for manufactured best management practices, whether for new development or redevelopment, must consist of MDE approved material.
- 6. Use the latest MCDPS design criteria at the time of plan submittal.
- 7. Micro-bioretention facilities within the public right-of-way must be off line and separate from the public storm drain system. Pipes will not be permitted to be placed under stormwater management facilities in the public right-of-way.
- 8. Landscaping in areas located within the stormwater management easement which are shown on the approved Landscape Plan as part of the approved Site Plan are for illustrative purpose only and may be changed at the time of detailed plan review of the Sediment Control/Storm Water Management plans by the DPS, Water Resources Section.
- Access for maintenance and inspection of all stormwater management facilities must be demonstrated on the detailed plans and included in easements, if necessary, prior to plan approval. Access will not be permitted to be provided through buildings except for green roofs.
- 10. Micro-bioretention facilities in the public right-of-way, and collection and conveyance of runoff into them, must be approved by DPS Right-of-Way prior to Sediment Control/SWM Plan approval.
- 11. Any disturbance of the 100-year floodplain or the 25 foot BRL will require a Floodplain District Permit.
- 12. Site Development Stormwater Plans for future phases must be designed in compliance with this Stormwater Management Concept and submitted as revisions to approved concept SM#284303. No stormwater management waivers will be granted for this project.
- 13. Facilities that include structural elements such as walls and underground structures require design by a qualified professional. The design is to be coordinated with the stormwater management design and must function for all potential conditions including when the facility is emptied for maintenance. Plans sets must include facility specific details and sections. Include structural computations with the detailed plan review submission.

Mr. Arinze Chienjina July 3, 2019 Page 3 of 3

- 14. When the functioning, construction, maintenance or potential future removal of a stormwater management facility impacts other permitted structural improvements such as buildings, foundations or retaining walls, the stormwater management facility must be accurately shown on all applicable plans. In these cases, Structural Construction plans must be approved prior to Sediment Control and Stormwater Management Plan approval.
- 15. This approval assumes that the retrofitted pond will be determined by MDE to be a low-hazard facility. Hazard classification of the modified pond embankment must be verified by MDE prior to approval of sediment control plans.

This list may not be all-inclusive and may change based on available information at the time.

Payment of a stormwater management contribution in accordance with Section 2 of the Stormwater Management Regulation 4-90 is not required.

This letter must appear on the sediment control/stormwater management plan at its initial submittal. The concept approval is based on all stormwater management structures being located outside of the Public Utility Easement, the Public Improvement Easement, and the Public Right of Way unless specifically approved on the concept plan. Any divergence from the information provided to this office; or additional information received during the development process; or a change in an applicable Executive Regulation may constitute grounds to rescind or amend any approval actions taken, and to reevaluate the site for additional or amended stormwater management requirements. If there are subsequent additions or modifications to the development, a separate concept request shall be required.

If you have any questions regarding these actions, please feel free to contact Mary Fertig at 240-777-6202.

Sincerely,

Mark C. Etheridge, Manager Water Resources Section

Division of Land Development Services

MCE: mmf

CC:

N. Braunstein MNCPPC Benjamin Berbert MNCPPC Rebecca Torma, MCDOT William Whalen, MCDOT Sam Farhadi, DPS SM# 284303

Preliminary Plan: #120190040 ESD: Required/Provided 106,625 cf / 25,875 cf PE: Target/Achieved: 2.08"/0.50" STRUCTURAL: Required/Provided 80,750cf/ 80,959cf WAIVED: n/a

Site Plan for Phase One: #820190060 ESD: Required/Provided 73,435 cf / 5,355cf PE: Target/Achieved: 2.08"/0.15" STRUCTURAL: Required/Provided 68,080 cf/ 80,959 cf WAIVED: n/a



DEPARTMENT OF HOUSING AND COMMUNITY AFFAIRS

Isiah Leggett
County Executive

Clarence J. Snuggs *Director*

May 16, 2019

Mr. Benjamin Berbert Area 3 Division Montgomery County Planning Department 8787 Georgia Avenue Silver Spring, Maryland 20910

Re: Poplar Grove

Preliminary Plan No. 120190040

Site Plan No. 820190060

Dear Mr. Berbert:

The Montgomery County Department of Housing and Community Affairs (DHCA) has reviewed the above referenced plans and recommends Approval, with the following comments:

- At site plan for the multi-family sections, provide DHCA with the bedroom mix for the MPDUs and market rate units. The multi-family MPDUs should be distributed proportionately among the three multi-family buildings.
- In the MPDU Agreement to Build for Phase 1 of this development, DHCA may require that certificates of use and occupancy on some market units be held back until certificates of use and occupancy have been issued for all MPDUs, if necessary to ensure proper phasing of the MPDUs and market rate units.
- The MPDU townhouses must have at least 3 bedrooms and 1.5 baths, and every bedroom must be no more than one level away from a full bath.

Sincerely,

Lisa S. Schwartz, Manager

Affordable Housing Programs Section

cc: Meredith Byer, Dewberry

S:\Files\recurring\Housing\MPDU\Developments\Poplar Grove\Poplar Grove DHCA Letter_5-16-2019.docx

Division of Housing

Affordable Housing Common Ownership Communities Landlord-Tenant Affairs Multifamily Housing



HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Sandra I. Heiler Chairman

Date: May 14, 2019

MEMORANDUM

TO: Casey Anderson, Chair, Montgomery County Planning Board

Members of the Montgomery County Planning Board

FROM: Sandra I. Heiler

Chairman, Montgomery County Historic Preservation Commission

SUBJECT: Preservation Plan for Zachariah Waters Family Cemetery, Application Numbers: 120190040 and

820190060

The Montgomery County Historic Preservation Commission (HPC) is pleased to provide comments on the preservation plan proposed for the Zachariah Waters Family Cemetery at Poplar Grove presented by Symmetry at Cloverleaf, LLC on April 10, 2019. The HPC is generally supportive of the current approach and plans to add a park, and offers the following comments for Planning Board consideration of the Poplar Grove preliminary and site plans:

- 1. The markers need to provide a map showing the relationship of the cemetery to nearby related historic sites (mill, house, etc.) along with more history of Zachariah Waters, especially his Revolutionary War service. The park should put the development in historical context.
- 2. The applicant should continue to cooperate with Historic Preservation staff and the Germantown Historical Society (which can provide appropriate documentation for map and history).
- 3. The applicant needs to create a detailed first phase maintenance plan in addition to later detailed plans for maintenance of cemetery and related park.
- 4. The first phase of the proposed Waters Cemetery park development should include interpretive signage and visitor benches at a minimum.
- 5. Development plans need to include possibility of interment of skeletal remains from the MCDOT highway project.
- 6. Development plans should account for the possibility of other skeletal remains uncovered elsewhere on this large site—will they remain in place? Be interred in the Waters cemetery? Elsewhere? (The family has been accounted for—what about the 22 people held in slavery?)
- 7. What is the relationship between the nearby office buildings and the cemetery/park site?





HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Sandra I. Heiler Chairman

The HPC wishes to remain involved with the development of future preservation plans for the cemetery, and looks forward to reviewing a revised proposal.

Sincerely,

Chairman Historic Preservation Commission

Landrad . Xkiler

cc: Nicole Totah, Symmetry at Cloverleaf, LLC Heather Dlhopolsky, Linowes and Blocher LLP Sandra Pereira, Montgomery County Planning Department





PHASE I AND PHASE II
ARCHEOLOGICAL INVESTIGATIONS ASSOCIATED WITH PORTIONS OF PROPOSED POPLAR GROVE IN THE VICINITY OF THE WATERS FAMILY CEMETERY LOCATED AT THE INTERSECTION OF KINSTER DRIVE AND CENTURY BOULEVARD IN GERMANTOWN, MONTGOMERY COUNTY, MARYLAND

April 18, 2019

by

Phillip J. Hill, Ph.D.

Prepared by: Archeological Testing and Consulting, Inc. 12025 Remington Drive Silver Spring, Maryland 20902

Prepared for: Symmetry at Cloverleaf, LLC 8555 16th Street, Suite 711 Silver Spring, Maryland 20910

ARCHEOLOGICAL TESTING AND CONSULTING, INC.

PHASE I AND PHASE II
ARCHEOLOGICAL INVESTIGATIONS ASSOCIATED WITH
PORTIONS OF PROPOSED POPLAR GROVE
IN THE VICINITY OF THE WATERS FAMILY CEMETERY
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KINSTER DRIVE AND CENTURY BOULEVARD
IN GERMANTOWN, MONTGOMERY COUNTY, MARYLAND

April 18, 2019

Phillip J. Hill DN: CN = Phillip J. Hill DN: CN = Phillip J. Hill C = US, O = ATC, Inc. Date: 2019.04.22 10:50:57 -04'00'

Phillip J. Hill, Ph.D. Principal Investigator

by

Phillip J. Hill, Ph.D.

Archeological Testing and Consulting, Inc. 12025 Remington Drive Silver Spring, Maryland 20902

for

Symmetry at Cloverleaf, LLC 8555 16th Street, Suite 711 Silver Spring, Maryland 20910

MANAGEMENT SUMMARY

Archeological Testing and Consulting, Inc. (ATC, Inc.) of Silver Spring, Maryland was contracted by Symmetry at Cloverleaf, LLC (the client) to conduct Phase I and Phase II archeological investigations of a northern portion of proposed "Poplar Grove" which contained the Waters family cemetery. The greater 10-acre development property, which contains the cemetery, is located at the intersection of Kinster Drive and Century Boulevard in Germantown, Montgomery County, Maryland. The survey was conducted at the request of the Montgomery County Department of Planning, Historic Preservation Division (MCDP-HPD). The investigation was conducted between March and April 2019.

The overall archeological investigation consisted of documentary research and three consecutive sessions of fieldwork. Research established that the subject property was part of a much larger plantation and later farmstead owned, occupied, and utilized by the Waters family during the eighteenth and nineteenth century. Several members of the Waters family were buried within the northern portion of the subject property between 1824 and 1864. The cemetery is known to include Zachariah Waters, the son of William Waters, Sr., the patriarch of the family, the son's wife, Anna Waters, and their three children, Tilghman, Baker, and Courtney Waters.

Cultural resource research established that five archeological sites and four historic properties recorded with the Maryland Historical Trust were located within a 1-mile radius of the study area. However, none of these prehistoric or historic resources was found to lie within or adjacent to the property containing the study area. However, the nearby historic property known as the "Waters Log House" (MIHP M:19-2) was associated with the family interred within the cemetery.

The overall fieldwork included mechanical excavation on two occasions, shovel testing, and the hand excavation of four identified soil anomalies. Designated as Features 1 through 4, they were thought to have potential cemetery associations. Upon further study, Feature 1 was classified as a large modern trash pit or dump, Feature was thought to be the decomposed remnants of a tree base and associated root system, and Feature 3 had a probable pre-development function, perhaps consisting of a back-filled shaft to a modern soil per test. Only Feature 4 appeared to have a probable cemetery association. Although it was hexagonal in shape, the feature was too large, lacking in depth, and absent of burial-related materials to be a grave. Furthermore, the feature exhibited evidence of being exposed to intense fire *in situ*. All of these defining aspects of Feature 4 made its functional interpretation speculative at best. Because of its close proximity to the cemetery fence enclosure, it was concluded that the feature was probably cemetery-related and should be preserved and protected. However, with the absence of human remains, the feature did not warrant re-interment within the Waters family cemetery fence enclosure.

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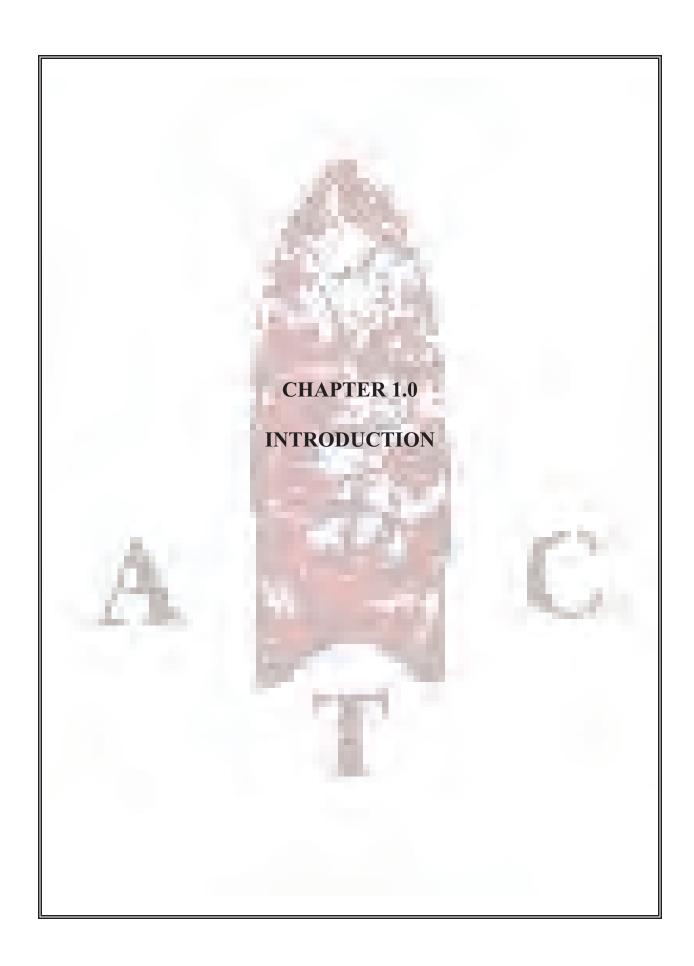
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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Archeological Testing and Consulting, Inc. (ATC, Inc.) of Silver Spring, Maryland was contracted by Symmetry at Cloverleaf, LLC (the client) to conduct Phase I and Phase II archeological investigations associated with selected portions of proposed Poplar Grove in the vicinity of the Waters family Cemetery (see Appendix A, Staff Resumes). The 10-acre+/- property is located at the intersection of Kinster Drive and Century Boulevard in Germantown, Montgomery County, Maryland (Figure 1-1). The survey was conducted at the request of the Montgomery County Department of Planning, Historic Preservation Division (MCDP-HPD).

Two ground penetrating radar (GPR) surveys were previously conducted on the Poplar Grove property by GeoModel, Inc. in September 2017 and June 2018. The goal was to identify unmarked graves. The earlier investigation examined the northern extent of the subject property and a contiguous proposed road improvement right-of-way connected with the construction of a bridge to span Interstate 270 (I-270). (See GeoModel, Inc. 2017.) This GPR survey area included a small section of land surrounding the Waters family cemetery. The 2018 GPR study surveyed the much larger remaining portion of the 10-acre+/- property (GeoModel, Inc. 2018). The earlier study identified ten soil anomalies within the subject property, situated in and in close proximity to the Waters family cemetery. Five of these anomalies were actual graves located within the enclosed cemetery. The remaining five soil disturbances were thought to have a potential burial function. The 2018 study found no additional soil anomalies with burial-related possibilities. Thus, the potential for additional graves outside of the cemetery fence enclosure appeared to be confined to the earlier northern portion of the subject property, herein referred to as the study area.

As a result of the 2017 GPR survey, the five features located outside of the cemetery fence enclosure required further study. The overall archeological goal was to determine the function and possible burial relationship of these soil anomalies. Two followup archeological investigations were initiated upon completing the GPR studies. Through mechanical trenching, the first study sought to examine the five soil anomalies previously identified within the study area (see Appendix B, Management Summary I). Upon examining these features, it was established that three warranted additional work as part of a Phase II level of study. These soil anomalies were designated as Features 1 (F1), 2 (F2), and 3 (F3). (See Figure 1-2.) The second archeological investigation, employing shovel testing and additional mechanical trenching, sought to establish the horizontal boundaries of the Waters family cemetery (see Appendix C, Management Summary II, and Appendix D, Shovel Testing Soil Profiles). Addressed was whether the cemetery extended beyond the fence enclosure. If new features were discovered, they too were to be studied in a third archeological investigation. Upon completing the second fieldwork session, one additional feature was identified, resulting in a total of four soil anomalies to be more intensively examined. This fourth soil anomaly was designated as Feature 4 (F4). (See Figure 1-2.)

The overall objective of the third archeological investigation, as presented herein, was to

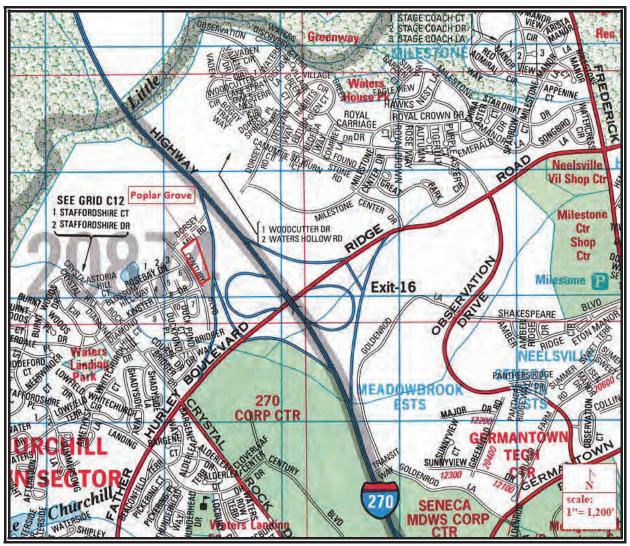


Figure 1-1. Section of the ADC Map of Montgomery County, Maryland Depicting the Approximate Location of Proposed Poplar Grove

determine the function and possible cemetery relationship of Features 1 through 4 through the application of Phase II level field methods and procedures. The scope of work presented below was designed to meet the standards and guidelines set forth by the Maryland Historical Trust, as outlined in Standards and Guidelines for Archeological Investigations in Maryland (see Shaffer and Cole 1994). The three archeological investigations were conducted between October 2018 and April 2019. A brief description of the scope of work employed during the third archeological investigation is presented below.

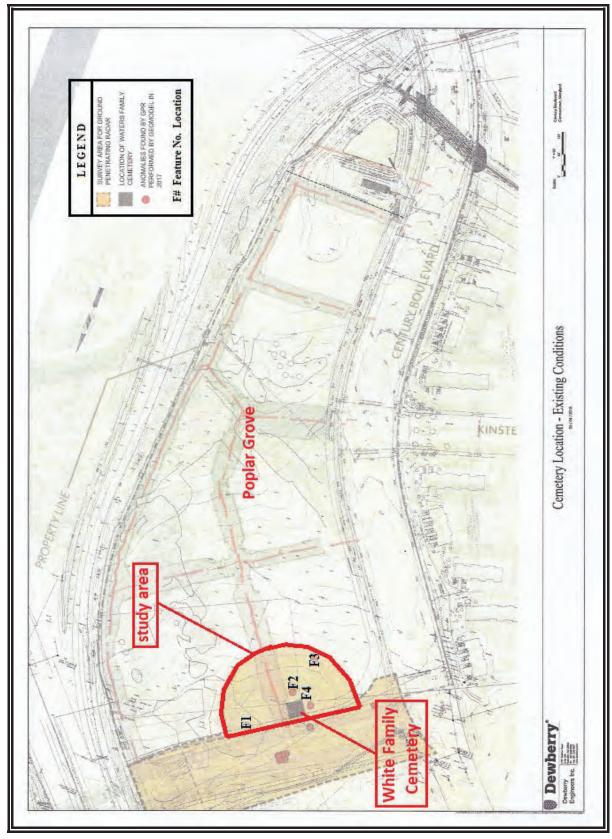


Figure 1-2. Map of Proposed Poplar Grove Depicting the Boundaries of the Study Area and the Locations of Features 1 through 4

1.2 SCOPE OF WORK

1.2.1 Task 1: Documentary Research

Documentary research was conducted with the goal of developing an environmental-historical-cultural context for the study area. This context served as a predictive and interpretive model for the overall investigation.

1.2.2 Task 2: Fieldwork III - Hand Excavation

Upon completing mechanical trenching and shovel testing, four identified features required further investigation to establish their function and possible cemetery association. This task involved the manual excavation of the features using a systematic and controlled approach.

1.2.3 Task 3: Site Recordation

After receiving client approval and at the judgment of MCDP-HPD, any archeological sites identified upon completing the fieldwork tasks were to be recorded with the Maryland Historical Trust (MHT). Any assigned site numbers were to be incorporated into the technical report. MCDP-HPD concluded that this task would be completed at a later date under its initiation.

1.2.4 Task 4: Artifact Processing

All artifacts recovered during the fieldwork tasks were to be transported to the laboratory facility in Silver Spring, Maryland for processing. Artifact processing was to consist of the following sub-tasks: (1) cleaning, (2) drying, (3) labeling, (4) sorting and analyzing, (5) cataloging, and (6) packaging. However, judgment was employed in eliminating some of these tasks.

1.2.5 Task 5: Meetings and Correspondence

Meetings and correspondence were required throughout the overall investigation. During the final stage of the field investigation, a meeting was warranted between ATC, client, and MCDP-HPD staff. Correspondence was also necessary with the client in order to provide periodic updates on the progress of the investigation. Correspondence with the client and MCDP-HPD would also be warranted if cemetery-related features were discovered during the final subsurface investigation.

1.2.6 Task 6: Report Preparation

A technical report was prepared and forwarded to the client for submission to the Montgomery County Department of Planning, Historic Preservation Division for review. If warranted, any reviewer comments were addressed in a final document submission. The technical document outlined study objectives, methods, results, and recommendations.

1.2.7 Task 7: Material Disposition

If requested by MCDP-HPD, all study materials, including artifacts and field and laboratory documentation, would be transported to the appropriate curation facility for permanent storage upon submitting the technical report.

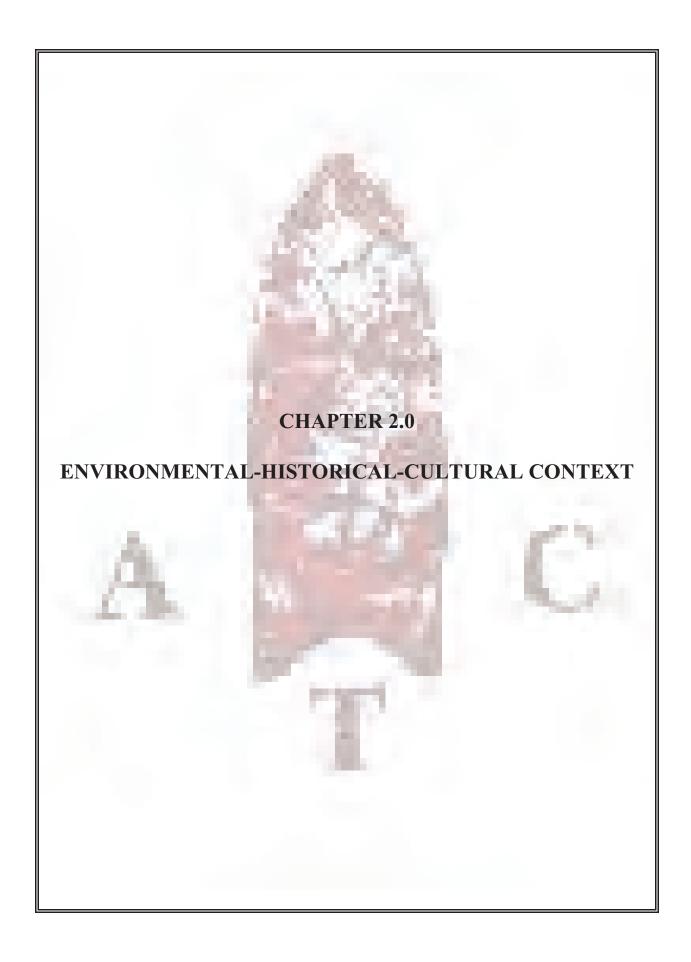
1.3 PROJECT STAFF

The scope of work outlined in this technical report was completed by the professional staff of Archeological Testing and Consulting, Inc. (see Appendix A for key staff resumes). Phillip J. Hill, Ph.D., served as Project Manager, Principal Investigator, and Field and Lab Supervisor. Dr. Hill was also the author of the technical report.

1.4 REPORT ORGANIZATION

The technical report was organized into the following sections and chapters:

- * Management Summary,
- * Chapter 1: Introduction,
- * Chapter 2: Environmental-Historical-Cultural Context,
- * Chapter 3: Archeological Investigation Methods, Results and Interpretations,
- * Chapter 4: Summary and Recommendations,
- * Chapter 5: References Cited,
- * Appendices.



2.0 ENVIRONMENTAL-HISTORICAL-CULTURAL CONTEXT

2.1 ENVIRONMENTAL SETTING

The proposed Poplar Grove property, in which the study area lies, is composed of 10 acres of land located at the intersection of Kinster Drive and Century Boulevard in Germantown, Montgomery County, Maryland. The property is accessed by the latter street. Interstate 270 is situated just east of the subject property. Father Hurley Boulevard is located to the south. Black Hill Regional Park lies to the west/northwest.

The Poplar Grove property is located within the Piedmont physiographic province. The property is also situated within the northeastern portion of the 1953 Germantown, Maryland U.S.G.S. 7.5' Quadrangle Map (Figure 2-1). Little Seneca Creek is fed by several unnamed tributaries to the north of the subject property. Another unnamed tributary of the creek is more closely located to the south of the property. The stream becomes Great Seneca Creek as it meanders several miles through Seneca Creek State Park to the south/southwest, which eventually terminates into the Potomac River north of Lowes Island in Loudoun County, Virginia. Because of its association with Seneca Creek and the Potomac River, the property is linked to Unit 12--the Piedmont Province Potomac River Drainage--of the Maryland Archeological Research Unit Map (Figure 2-2).

Montgomery County is situated in the central-western part of Maryland (Brown and Dyer 1995:1). The county is bounded to the southwest and west by the Potomac River. Frederick County marks its northwestern boundary. Montgomery is bordered by Maryland's Howard and Prince George's counties to the northeast and southeast, respectively. The land mass of Montgomery County is approximately 316,500 acres or nearly 495 square miles.

Nearly all of Montgomery County lies within the Piedmont physiographic province (Brown and Dyer 1995:2). As a very old eroded mountainous upland, this province consists of rolling terrain dissected by numerous rivers and connecting streams. The county is drained by the Potomac and Patuxent rivers and their associated tributaries (Brown and Dyer 1995:3). The streams typically flow in a northwest-to-southeast direction.

The underlying bedrock of Montgomery County is primarily composed of metamorphic stone of the Paleozoic age. Consolidated sedimentary rock of Triassic age is present in the basin of the western portion of the county. Only a small eastern part of the county lies within the Coastal Plain province and is characteristically covered by an unconsolidated sediment geology. The eastern two-thirds of Piedmont Montgomery County consists of a heterogeneous assemblage of rock referred to as the *Wissahickon Group*. This geological assemblage varies from coarse-grained gneiss to micaceous schist. This geology also includes veins of quartz.

The lowest elevation in Montgomery County is approximately 52 feet above sea level (asl) (See Brown and Dyer 1995:3.) The highest elevations nearly reach 900 feet and lie in the northwestern portion of the county. The average gradient change is 29 feet per mile. The elevations

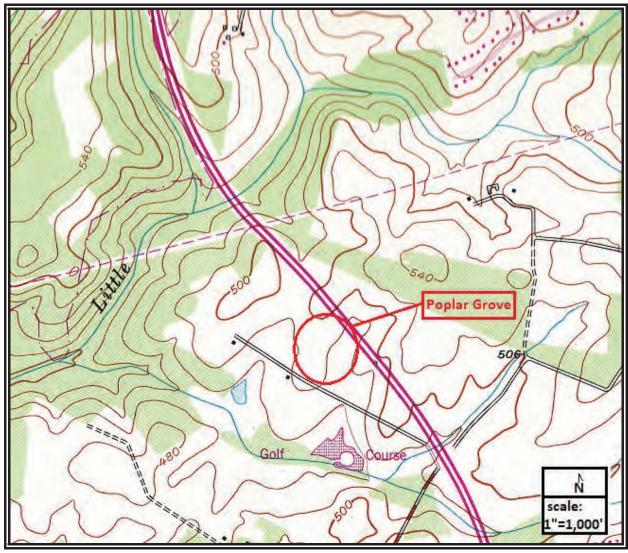


Figure 2-1. Section of the 1953 Germantown, Maryland U.S.G.S. 7.5' Quadrangle Map Depicting the General Location of the Poplar Grove Property

of the study area lie between 460 and 480 feet asl. The Waters family cemetery is situated in the northern part of the property. This part represents the terrain with the highest elevations.

Montgomery County is overlain by six broad soil associations (Brown and Dyer 1995:General Soil Map). The soil association overlying Poplar Grove and vicinity is referred to as the Brinklow-Baile-Occoquan Association (Brown and Dyer 1995: General Soil Map). The specific soil type overlying the study area and vicinity is known as the *Occoquan loam, 3 to 8 percent slopes* (17b). This soil is characteristically deep and well-drained (Brown and Dyer 1995:27). It can be commonly found on broad ridgetops and smooth side slopes.

Approximately two-thirds of Montgomery County is composed of farmland and residential

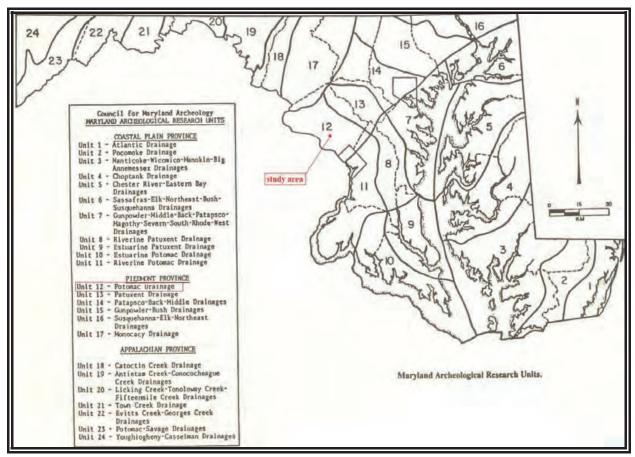


Figure 2-2. Unit 12 of the Council for Maryland Archeology Maryland Archeological Research Unit Map Depicting the Approximate Location of the Study Area

development (Brown and Dyer 1995:1). This use of the land has greatly impacted the natural flora that once covered the county. Nearly all of Poplar Grove is open and covered in closely cropped grass and weeds (Figure 2-3). Apparently, the subject property was once part of a golf course that was abandon sometime between 1953 and 1979 (see Figure 2-1). Prior to that use, it served as agricultural fields to a much larger farmstead and, prior to the Civil War, a plantation operation.

2.2 HISTORIC CONTEXT

2.2.1 General History of Montgomery County

Contact and Early Settlement (1608 - 1700) The first European known to have visited the land now comprising Montgomery County was Captain John Smith. He sailed an exploratory mission up the Potomac in 1608. During his expedition, he encountered two Native American tribes which included the Piscataway. Smith's mission was to explore the Chesapeake Bay region rather than lay down settlements; though numerous English traders visited the area following his expedition and several years passed before white settlers arrived permanently in Maryland (M-NCPPC)



Figure 2-3. Photograph Depicting the Open Grassy Setting of the Study Area with the Overgrown Waters Family Cemetery

1992:49).

European settlement of Maryland began in 1634 when the first group of 140 colonists landed near the Potomac River. The settlers, led by Governor Leonard Calvert, established relations with the Piscataway. Hoping the English would become an ally against the Susquehannock to the north, the Piscataway sold an established village to the settlers. Upon this acquisition St. Mary's City was founded (Virta 1998). Within thirty years of the founding of St. Mary's City, plantations and farms lined the nearby Patuxent and Potomac rivers (M-NCPPC 1992).

The future Frederick, Montgomery, and Prince George's counties were initially part of Calvert County which was established in 1654. By 1696, Prince George's County was established. At first, European settlers shared their territory with the Piscataway who retreated to areas along Piscataway Creek By 1697, most Piscataway moved north to Pennsylvania. Indian raids were a constant source of trouble for European settlers located along Rock Creek and the Anacostia and

Patuxent rivers. Provincial patrols were created to protect these early settlers, however, the raids soon subsided as more settlers moved into these frontier lands (Virta 1998).

Rural Agricultural Intensification (1700 - 1800) The soils of present-day Montgomery County were suitable for tobacco growing. The rapid settlement of the area can be attributed to the successful cultivation of this commodity. Both wealthy planters and small farmers cultivated tobacco and the provincial economy was entirely dependant on this crop. Tobacco became a currency of sorts and was measured by the pound and used as payment for taxes and other debt (Virta 1998). Although attempts were made to establish mills on the waterways and iron mines on the upper Patuxent, the county remained predominantly agricultural throughout the eighteenth century (M-NCPPC 1992).

The Maryland Proprietors began granting land in the area of Montgomery County in 1688. A small number of tracts were granted between 1688 and 1715, but the bulk of land grants occurred in the years after that time period. Despite these beginnings, there were no public roads west of Rock Creek, even by 1720 (MacMaster and Hiebert 1976). Grants in this region were given primarily to wealthy tobacco merchants and traders who could afford the huge uncleared tracts and had good income from other ventures. Some of these owners subdivided and leased their frontier property in order to have land cleared and earn profits from tenant income (MacMaster and Hiebert 1976). Tobacco was the economic mainstay of Montgomery County throughout most of the eighteenth century. The lands in the western part of the county were first favored for settlement by enterprising tobacco farmers and land speculators because of their proximity to the Potomac River, River Road, and Rock Creek.

While port towns quickly rose in southern Prince George's County along its various waterways, town development in what is now Montgomery County occurred at a slower pace. Old Indian trails became the first crude roads to and from the frontier, and some small settlement were founded where these byways intersected (Ballweber 1994). Immigration was encouraged in the early 1730s (MacMaster and Hiebert 1976). German and Swiss settlers, as well as others from the Mid-Atlantic colonies of New York, New Jersey, and Pennsylvania arrived in great numbers. By the 1730s, widespread grain cultivation begun in the inland areas of present-day Montgomery County. To process the grain, mills were built along inland waterways.

Just over a month after the Declaration of Independence was signed, the Maryland Constitutional Convention divided Frederick County into three smaller counties: Frederick, Montgomery, and Washington. Montgomery County contained 14,418 citizens at its inception, with 10,000 of that number being white and the rest black (Sween and Offutt 1999). The new county had eleven hundreds at its founding, all of which had been transferred from Frederick County (MacMaster and Hiebert 1976). Population in Montgomery County declined following the Revolutionary War. The long years of tobacco planting had depleted the soil. Population in Montgomery County further declined in 1790 when the State of Maryland ceded a portion of the county to the United States government for the establishment of Washington, D.C. (Sween and Offutt 1999).

Agricultural-Industrialism (1800 - 1870) The depletion of fertile soils in Montgomery County became a crisis in the early 1800s. As the quality of the soil worsened, farmers gave up and began abandoning their farms for new land elsewhere. The world tobacco market declined during the period between 1794 and 1815. The inland areas of the county were also hurt by the lack of easy access to markets (MacMaster and Hiebert 1976). By 1800, Thomas Moore and other members of the Quaker farming community at Sandy Spring began experimenting with new fertilizers, diversification of crops, deeper plowing, and crop rotation. They formed the Sandy Spring Farmers' Society in 1799 to disseminate their findings and to educate other farmers on how to reclaim soil viability. In Montgomery County, wheat replaced tobacco as the primary crop by 1850 (Ballweber 1994). Corn was also grown, and some farmers raised herds of cattle, sheep, and hogs for market (MacMaster and Hiebert 1976). Road conditions in the early 1800s had not improved much from the earlier century and the lack of maintained roads hindered the efforts of inland farmers to get their products to market. Several roads were constructed in the county in the first half of the nineteenth century. The roads were later named Old Georgetown Road, Rockville Pike, and Georgia Avenue.

Montgomery County remained almost entirely rural through the Civil War Period. The lack of a railroad line and dependence on roads for transportation, commerce, and communication led to the development of numerous small crossroads villages during the first half of the nineteenth century. These villages included the settlements of Mechanicsville (later Olney), Laytonsville, Colesville, Ashton, and Fairland in the easternmost part of the county (Sween and Offutt 1999). Schools, churches, post offices, and stores formed the hub of many of these small communities, which periodically featured blacksmith and wheelwright shops, as well as a sawmill, gristmill, and tavern.

Industrial Decline (1870 - 1930) Montgomery County changed drastically in the years after the Civil War. The elimination of slavery led to the establishment and growth of centralized black communities populated by former slaves. They now farmed and worked in industry. Those who farmed tilled their own land or worked as sharecroppers or tenant farmers. Some black communities grew up near established industrial sites (M-NCPPC 1992).

Despite the newfound freedom for black residents, the elimination of slavery also had a dramatic effect on the county economy. The labor shortage on the farm resulted in low agricultural yields and the subdivision of many large parcels into smaller farms (Spero et al. 1996). Montgomery County, which had greatly diversified its crops before the Civil War, had become a major producer of wheat by 1880. By that time, farmers were benefitting from the newfound availability of lime fertilizer (Spero et al. 1996).

Though the idea of a railroad through Montgomery County from Georgetown to the B&O line at Frederick had been discussed as early as 1853, the Civil War put a stop to its planning (Spero et al. 1996). Plans were revived in the years after the war and changes were made so the line would run from Washington through Rockville to link with the B&O at Point of Rocks when it was completed in 1873. The greater availability of fertilizers and diversification into dairy and truck farming brought increased prosperity to Montgomery County.

Local developers soon saw the potential for creating new communities along the rail lines. Washington's burgeoning economy and the increased frequency of rail service now made it possible for people to live in Montgomery County and work in the city. Small communities soon rose around railroad stations and mushroomed into suburban towns in the 1870s, 1880s, and 1890s. Commuter culture shaped the development of Montgomery County after 1900. Rail lines, suburban street cars, and eventually the automobile and highways combined to create the foundations of the present-day suburbs and pushed bedroom communities further into the countryside. By the 1920s, suburbs were no longer exclusively residential, but had become self-sustaining communities with shops, services, and community buildings (Spero et al 1996).

Modern Period (1930 - Present) Montgomery County's increased suburbanization and new land uses led to a nearly 50 percent decrease in the number of farms between 1920 and 1959 (Spero et al. 1996). Federal facilities were also established in Montgomery County during this period. In 1937, the David Taylor Model Basin (now the Navel Ship Research and Development Center) was begun at Carderock. The Bethesda Navel Hospital (1942) and the National Institute of Health (1938) were established along Wisconsin Avenue and the Navel Ordnance Laboratory moved to the White Oak area of Silver Spring in 1948. In addition, Montgomery County was the first county in Maryland to establish a community college, now known as Montgomery College, which was founded in 1946 and now has multiple campuses, including Germantown and Takoma Park (MacMaster and Hiebert 1976).

Road improvements gained increasing importance as automobiles became more affordable and began to proliferate. Roads were built and improved in increasing numbers from World War I era onward. After 1930, automobiles eclipsed public transit as a commuting option and most of the suburban streetcar lines ceased operations in the 1930s. The Capital Beltway (I-495) was constructed in the early 1960s which provided a convenient link between the suburbs surrounding Washington, D.C. In its early days, the Beltway marked the line between the suburban and rural parts of the county. However, suburban creep continued beyond the Beltway in years later (Virta 1998). The last years of the twentieth century saw increased economic growth and diversity. Businesses, like homebuyers, were attracted by the benefits of residing in Montgomery County and established additional office parks, shopping centers, and other commercial locations. Though some residents saw increased business and residential development as a problem, the county was and still is a prosperous, diverse, and vibrant place to live and work (Virta 1998).

2.2.2 Specific History of the Waters Property

William Waters Sr., the patriarch of the family, owned hundreds of acres of land in what is now known as Germantown, Maryland in the second half of the eighteenth century. He was born in 1716 and died in 1788 (Soderberg 2017). He was married to Mary Harris and together they had a total of eight children. The property remained unoccupied until William gave lands to three of his sons: Zachariah, Basil, and William Jr. Each had received about 500 acres of land in the 1780s. Zachariah was the first to move to later Germantown and settled at "Poplar Grove" with his wife



Figure 2-4. Photograph Depicting the Better-maintained Waters Family Cemetery with Four Exposed Headstones

Anna Baker in 1787. His two brothers occupied farms directly east and west which were named "Pleasant Fields" and "Water's Place." All three properties were mainly part of an original land grant known as "Conclusion." The three brothers built and began operating grist and saw mills along Little Seneca Creek where they process their crops which included wheat and flax. Zachariah built a miller's house and his own larger house on the family property using slave labor.

Zachariah and Anna had three children. Baker Waters (1779-1846) was the oldest and married Rachal Cooke Magruder. They never had children. Tilghman Waters (1784-1864), the middle child, married Eleanor Magruder Briscoe and also remained childless. The youngest, Courteney Waters (1798-1853) never married. Baker initially inherited the plantation at his father's death in 1824, which at the time consisted of 190 acres. Tilghman inherited the plantation at Baker's death in 1846. Having no direct heirs, the plantation was passed onto his nephew Dr. Washington Waters in 1864. The only stipulation was that Washington erect an iron fence around the family cemetery and place tombstones for himself, his wife, his brother and sister, and his parents.

The family cemetery currently contains headstones for Zachariah Waters (d. 1824), Anna Waters (d. 1837), Tilghman Waters (d. 1864), and Baker Waters (d.1846). (See Figure 3-4.) Although buried there as well, the headstone of Courtney Waters' (d. 1853) is now missing. All of these family members were buried within the enclosed cemetery area during the early to middle of the nineteenth century (Maryland Historical Trust [MHT], MIHP M:19-2). Apparently, the land set aside for the family cemetery once extended to the northeast of the five burials, but was eventually cultivated. In accordance with a directive stated in Tilghman's will dated 1864, an iron railing was to be installed around the family burials. An account by relative Robert Waters, a child at the time, the railing no longer stood by the early twentieth century.

According to a recent sketch of the later named William A. Waters farm, the Waters family cemetery was situated just west of I-270 (Figure 3-5). West of the cemetery was a dirt road leading to the Waters log house which was built in the early nineteenth century. The house was occupied by Baker Waters until 1846 (MHT, MIHP M:19-2). Ellen Waters, his sister-in-law, lived there many more years following Baker's death (Figure 3-6). She continued to operate the family grist and saw mills during her stay. Ellen had married Dr. Washington Waters following her husband Tilghman's death in 1864.

The sketch of the William A. Waters farm also depicts the site of William's home just west of the family cemetery and the dirt road leading to the log house (see Figure 3-5). Well to the south of William's home site and family cemetery was another cemetery containing slave burials. This cemetery sat just north of Little Seneca Creek.

The Waters lost the family estate in 1885 after defaulting on a mortgage loan (MHT, MIHP M:-19-2). William A. Waters repurchased the lost family farm nine years later. Following his acquisition, William restored the brick and log houses, the former serving as his residence and the later used as a tenant house for farm laborers. After the sale of the family farm three more times, the property owner in the early 1970s razed the main brick house, leaving the log house as a residence for a property caretaker. This structure was apparently demolished fairly recently. All that remains is a mound of terrain lying adjacent to new residential developments.

2.3 CULTURAL RESOURCE RESEARCH

2.3.1 Cultural Resource Surveys

The research results indicate that three cultural resource investigation areas lie within a 1-mile radius of the study area (see Table 2-1). The dates of these studies lie between 1981 and 1995. None of these investigation areas overlaps with the boundaries of the study area. The closest survey area lies just west of the subject property (see Table 2-1, Thomas and Archibald 1981). Based on these reconnaissance surveys, it appears that the near vicinity of the study area has only a light to moderate history of surface investigation.

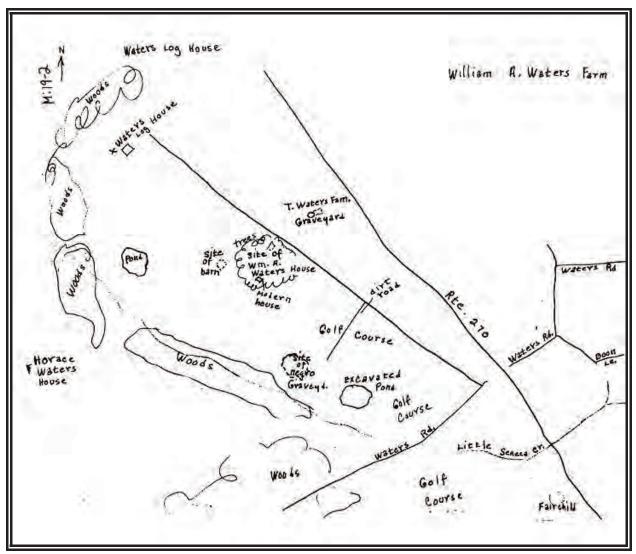


Figure 2-5. Recent Sketch of the William A. Waters Farm Depicting the Family Cemetery and Other Developments

Table 2-1. Inventory of Cultural Resource Surveys

COMPLETED SURVEY	LOCATION
Grenhorn & O'Mara 1995	north of the study area and east of I-270
Thomas and Archibald 1981	south and east of the study area on both sides of I-270
Kavanaugh 1981	directly west of the study area



Figure 2-6. Section of the 1865 Martenet and Bond Map of Montgomery County, Maryland Depicting the Ellen Waters Residence

2.3.2 Archeological Sites

Research findings indicate that five recorded archeological sites are known to exist within a 1-mile radius of the study area (see Table 2-2). By broad temporal affiliation, the inventory includes the following: prehistoric (n=1), and historic (n=4). The sole prehistoric resource is an artifact scatter affiliated with the Late Archaic Sub-period. The historic resources overlap with a late eighteenth through twentieth-century time period. The inventory includes a house foundation, two farmsteads, and a nineteenth-century grist and saw mill and millers house. None of the prehistoric or historic resources are located within or adjacent to the study area. The closest resource is the Kavanaugh II site (18MO181) which consists of a house foundation located just south of the study area. Site 18MO461, consisting of a mill and mill house, is associated with the Waters family. This site sits approximately 4/5 of a mile to the west.

Table 2-2. Inventory of Archeological Sites

SITE NUMBER	SITE NAME	LOCATION	SITE DESCRIPTION
18MO181	Kavanaugh II	just south of the study area	historic: house foundation
18MO408	Pleasant Fields	3/5 mile to the northeast	historic: late 18 th to mid-19th-century farmstead
18MO461	Waters Mill and Millers House	4/5 mile to the west	historic: 19 th -century grist and saw mill and miller's house
18MO472	Site 6	3/5 mile to the north	prehistoric: Late Archaic lithic scatter
18MO539	Black Hill House and Barn	1 mile west of the study area	historic: 19th-/20th-century farmstead house and barn [NR ineligible]

2.3.3 Historic Properties

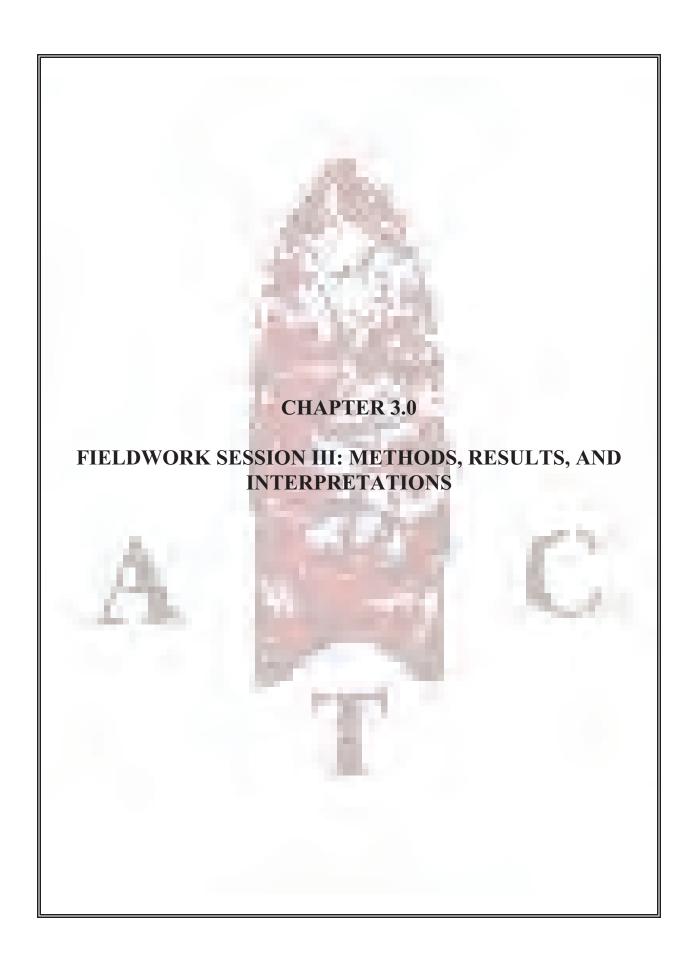
The results of the cultural resource research indicate that four historic properties are located within a 1-mile radius of the study area (see Table 2-3). The inventory includes two houses, a dairy farm, and a technology center. These architectural resources overlap with a late eighteenth-century through 1966 time period. None of these historic properties overlaps with the study area. However, the Waters Log House (M:19-2) is situated directly to the west. This dwelling appears to no longer stand. The other three resources are located at least 3/5 of a mile away.

Table 2-3. Inventory of Historic Properties

MARYLAND INVENTORY NUMBER	RESOURCE NAME	LOCATION	RESOURCE DESCRIPTION
M:19-2	Waters Log House	located just west of the study area	early 19 th -century 2-1/2-story log and frame house and part of the William A. Waters 19 th -century farm
M:19-3	Horace Waters House	3/5 mile to the south of the study area	1787-1790 2-1/2-story Federal style farmhouse and survivor of the William Waters, Jr. property [NR eligible]
M:19-29	Seneca Ayr Farm	9/10 mile to the north of the study area	20 th -century working dairy farm [NR ineligible]
M:19-43	Sherman Fairchild Technology Center	½ mile south of the study area	1966 technology center

2.4 EXPECTED RESULTS

After completing the documentary research task, the study area was thought to have a high potential for containing historic archeological resources. These resources may be cemetery-related or have another function. This assessment is based on an extensive agricultural history of occupying and utilizing the once much larger property. The high potential is also related to the presence of the Waters family cemetery within the study area. Because the cemetery area was once expanded, the identification of additional burials beyond the fence enclosure is possible. In terms of prehistoric potential, although the study area is composed of a sought-after upland location for short-term resource procurement camps, the landform is perhaps too far away from potable water. The cemetery is situated at least 1/4 of a mile to the north of an unnamed tributary of Little Seneca Creek which would have made the study area much less habitation friendly.



3.0 FIELDWORK SESSION III: METHODS, RESULTS, AND INTERPRETATIONS

3.1 FIELD AND LABORATORY METHODS AND PROCEDURES

The objective of Field Session III was to examine four soil anomalies or features though a subsurface investigation. These features were designated as Features 1 through 4. If cultural, this objective sought to establish the function and possible cemetery association of these features.

The subsurface investigation involved the systematic and controlled manual excavation of either an entire feature or a portion of a feature. This decision was based on feature size and field judgement. The excavation process involved the careful use of a flat shovel and trowel with the resulting soils screened on-site using 1/4-inch hardware mesh. Whether historic or not, all artifacts were bagged with provenience information inscribed on the fronts of the bags. For Features 2 and 4, the entire soil anomalies were to be excavated using the bisection approach. This involve excavating half of the feature at a time and documenting the various stages of excavation through digital photography and hand sketch. This included both plan views and sectional or vertical views. As an example, soil profiles were documented. This included recording soil colors and textures using the Munsell color chart book and the subjective interpretation of the soils' consistency of clay, silt, sand, and gravel. All artifacts were retrieved from the field and processed in the lab with the final goal of assessing artifact type and possible relationship to function.

3.2 DOCUMENTARY RESEARCH RESULTS

3.2.1 Historical Research Results

William Waters Sr., the patriarch of the family, owned hundreds of acres of land in what is now known as Germantown in the second half of the eighteenth century. The farmland remained unoccupied until William gave portions of the property to three of his sons, including Zachariah, Basil, and William, Jr. Each of these his son received about 500 acres of land in the 1780s. Zachariah was the first to move to later Germantown and settled at "Poplar Grove" with his wife Anna Baker in 1787. His two brothers followed thereafter and occupied farms directly east and west by the names "Pleasant Fields" and "Water's Place," respectively. All three properties were part of an original land grant known as "Conclusion." The three brothers built their residences and began operating newly constructed grist and saw mills on the family property. The mills were situated along Little Seneca Creek where they process their crops which included wheat and flax. Zachariah built a miller's house and his own larger house on the family property using slave labor.

Zachariah and Anna had three children. Baker Waters (1779-1846) was the oldest and married Rachal Cooke Magruder. They had no children. Tilghman Waters (1784-1864), the middle child, married Eleanor Magruder Briscoe and also remained childless. The youngest of the three, Courteney Waters (1798-1853), never married. Baker initially inherited the plantation at his father's death in 1824, which at the time consisted of 190 acres. Tilghman inherited the plantation at Baker's death in 1846. Having no direct heirs, the plantation was passed onto Tilghman's nephew, Dr.

Washington Waters, in 1864. The only stipulation was that Washington erect an iron fence around the family cemetery and place tombstones for himself, his wife, his brother and sister, and his parents. The family cemetery is known to contain the remains of Zachariah Waters, Anna Waters, Tilghman Waters, Baker Waters, and Courtney Waters. Following relative William A. Waters acquisition of the family farm and the restoration of buildings in 1894, the property was acquired by individuals outside of the Waters family.

3.2.2 Cultural Resource Research Results

Research found that three cultural resource survey areas were located in the near vicinity of the study area. The time period of these investigations was between 1981 and 1995. None of the survey locations, however, were determined to overlap with the Poplar Grove property. The closest was situated directly west of the study area. The research results also found that five archeological sites and four historic properties recorded with the Maryland Historical Trust were located within this 1-mile search radius. None of these prehistoric or historic resources were determined to lie within or adjacent to the study area. The closest resources were Site 18MO181 and the Waters Log House (M:19-2). The former was classified as a historic house foundation. Little else was documented on this resource. The historic property was classified as a nineteenth-century 2-1/2-story log and frame house. This resource was part of the William A. Waters nineteenth-century farm.

3.3 ARCHEOLOGICAL FIELDWORK RESULTS AND INTERPRETATIONS

3.3.1 Overview of Fieldwork Session III

In total, Field Session III involved the excavation or partial excavation of four soil anomalies or features. Features 1, 2, and 3 were exposed during trenching in the first archeological investigation (see Appendix B; see Table 3-1). This involved the excavation of Trenches 1 (T1), 3 (T3), and 5 (T5). The three soil anomalies were initially identified during the first GPR survey. Feature 4 was discovered while conducting in the second archeological investigation (see Appendix C; see Table 3-1). During this fieldwork session, trenching sought to establish the horizontal boundaries of the Waters family cemetery beyond the surrounding fence enclosure. With the possible exception of Feature 4, none of the soil anomalies was thought to have the shape or size of a typical grave shaft feature. The only way to determine the function and possible cemetery association of these soil anomalies was to manually excavate the features in whole or partial form. Presented below are the details associated with the excavation of the four features.

Table 3-1. Inventory of Exposed Features

NEW FEATURE DESIGNATION	GPR DESIGNATION	TRENCH LOCATION	
Feature 1 (F1)	FSI Soil Anomaly 10 (GPR 10)	FSI Trench 1 (T1)	
Feature 2 (F2)	FSI Soil Anomaly 12 (GPR 12)	FSI Trench 3 (T3)	
Feature 3 (F3)	FSI Soil Anomaly 4 (GPR 4)	FSI Trench 5 (T5)	
Feature 4 (F4)	n/a	FSII Trench 6 (T6)	

^{*}FS# = field session number

3.3.2 Excavation Results Associated with Features 1 through 4

Feature 1 (F1) Feature 1 (F1) was identified during the first ground penetrating radar (GPR) survey (see Appendix B). The soil anomaly was further examined during the first archeological investigation and re-exposed during the second archeological investigation (see Appendices B and C). The final archeological investigation, as presented herein, sought to excavate the feature in order to determine its function and possible cemetery association.

Feature 1 was located in the northeastern portion of the study area (see Figure 1-2). The natural setting consisted the edge of a wooded area situated between I-270 and the open grassy field containing the Waters family cemetery. Of the four soil anomalies of interest, this feature was the furthest away from the cemetery enclosure at approximately 120 feet to the east.

Feature 1 had a somewhat irregular to semi-circular shape (Figure 3-1). Its general horizontal dimension was 6-1/2 feet by 6 feet. Because of its large size, a 2-foot excavation square was strategically placed near the center of the soil anomaly. This positioning helped insure that a representative sample of soils and artifacts were examined.

Upon exposing the feature with a backhoe for the second time, it was determined to be a surface-oriented anomaly. Excavation established that the feature extended to a depth below surface of 23 inches (Figure 3-2). The feature soils were composed of a 7.5yr 3/3 dark brown fine sandy clay loam. Several modern artifacts were recovered from the lower portions of this stratum (Figure 3-3). The inventory included an auto oil filter, an electric cable cut into two pieces, and two fragments of cellophane. The stratum below the feature was excavated to a depth of 30-1/2 inches below surface. This inorganic soil horizon was classified as subsoil and consisted of a 10yr4/3 brown fine sandy clay with dense gravel in the form of eroded bedrock or saprolite.

Feature 1 was classified as a modern trash pit because of its artifact content, size and shape, surface exposure, and vertical extent. This feature lacked any justifiable primary context with the surrounding landscape. The soil anomaly clearly had no association with the Waters family cemetery. The most reasonable explanation for the presence of this modern dump was its possible relationship



Figure 3-1. Photograph Depicting a Plan View of Unexcavated Feature 1

with the property's former use as a golf course or agricultural field. Fairly recent drive-by discard on the property by a nearby household was another possible explanation.

Based on the information provided, Feature 1 is not considered to be cemetery-related. With its modern affiliation, no further archeological work is recommended for this feature.

Feature 2 (F2) Feature 2 (F2) was also identified during the first ground penetrating radar (GPR) survey (see Appendix B). The soil anomaly was further examined during the first archeological investigation and re-exposed during the second archeological investigation as well (see Appendices B and C). The final archeological investigation, which is presented herein, sought to excavate the feature in order to establish its function and possible connection with the Waters family cemetery.

Feature 2 was located in the approximate center of the study area (see Figure 1-2). The natural setting surrounding this feature was open and covered with grass. The Waters family

cemetery was situated about 30 feet north of the feature. Of the four soil anomalies of interest, this feature was the second closest to the burials, yielding only to Feature 4.

Feature 2 had an irregular and semi-triangular shape (Figure 3-4). Its horizontal dimension was 38 inches in length and tapering between 9-1/2 and 20 inches in width. Because of its small size, the entire feature was excavated. Using the bisection approach, the feature was excavated according to north and south halves.

Prior mechanical excavation established that the feature was approximately 17-1/2 inches below ground surface. Though manual excavation, the feature matrix extended an additional depth of 20-1/2 inches. The bottom or base of the feature had a vertical extent of 38 inches below ground surface (Figure 3-5). The feature matrix was composed of a 10yr 4/4 dark yellowish brown loam. This matrix was absent of artifacts. The stratum encompassing the feature consisted of a 5yr 4/6 yellowish red

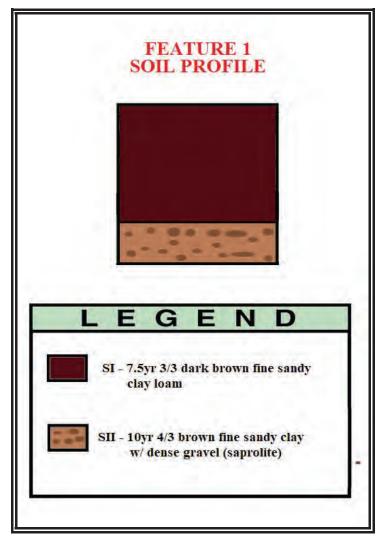


Figure 3-2. Feature 1 Soil Profile

loamy clay. Interestingly, the organic soils in the feature tapered toward the base and may have continued further in depth. Manual excavation by trowel was too difficult to chase this deep, tapering portion. A similar organic vein traveled horizontally near the base of excavation. Based on its irregular shape, depth, lack of artifacts, and tapering areas, the feature was classified as an old decomposed tree base and root system with tap root.

According to the above evidence, Feature 2 is not thought to be cultural and may not have had an association with the Waters family cemetery. The only possible association is a past embellishment of the burial landscape. Accordingly, no further archeological work is recommended for Feature 2.

Feature 3 (F3) As with the previously discussed soil anomalies, Feature 3 (F3) was discovered during the first ground penetrating radar (GPR) survey (see Appendix B). This soil



Figure 3-3. Photograph Depicting Modern Materials Recovered from Feature 1 [A=plastic-coated cable, B=car oil filter, C=cellophane]

anomaly was further examined during the first archeological investigation and then re-exposed during the second archeological investigation (see Appendices B and C). The final archeological investigation, presented herein, had the goal of excavating the feature in order to determine its function and possible cemetery connection.

Feature 3 was located in the southwestern portion of the study area (see Figure 1-2). As with Feature 2, the natural setting surrounding Feature 3 was an open, grassy field. Like Feature 1, Feature 3 was relatively far from the Waters family cemetery fence enclosure at approximately 120 feet.

Of all of the soil anomalies in the inventory, Feature 3 had the most regular form with a large rectangular shape (Figure 3-6). Its horizontal dimension was 12 feet in length and 5 feet 10 inches in width. Because of its large size, a 3-foot excavation square was strategically placed near the center of the soil anomaly. Because of the excessive depth of the feature, the unit dimension was cut in half in order to create a step to help facilitate the excavation process by trowel and dust pan. The overarching goal was to reach the base of this feature and then into subsoil.

Upon exposing Feature 3 with a backhoe for the second time, the depth of this soil anomaly was determined to be approximately 18 inches below ground surface. Manual excavation established that the feature extended to a depth of 63 inches below surface (Figure 3-7). The bottom of the feature was unable to be reached because of this extreme depth. The soil profile associated with the



Figure 3-4. Photograph Depicting Unexcavated Feature 2

feature consisted of two strata with an excavation of 63 inches below surface. Two strata were exposed during the mechanical trenching task and included top soil overlying inorganic fill. Similar fill soils continued throughout the remaining 46 inches of excavation depth. In general, the fill matrix contained numerous lenses composed of highly organic silty loam and inorganic loamy clay. This mottled matrix included a 10yr 4/4 dark yellowish brown silty loam, 7.5yr 4/4 brown fine sandy clay with dense gravel, and 5yr 4/6 yellowish red fine sandy clay. The gravel, in the form of

eroded bedrock or saprolite, apparently had a profound effect on the texture of the fill soils, particularly as depth increased. A single piece of clear window glass was recovered near the bottom of the feature matrix.

Feature was classified as a developmentrelated soil anomaly. Based on prior experience, the feature was thought to be a back-filled shaft to a soil perc test associated with earlier predevelopment plans for the property. This interpretation was based on its form, i.e., large and rectangular in shape for the ease of excavation by backhoe, deep into very old soils, and absent of cultural remains other than a single piece of window pane glass. Perhaps the soil test was completed upon the abandonment of the golf course. This event would have marked time a when development consideration might have been considered.

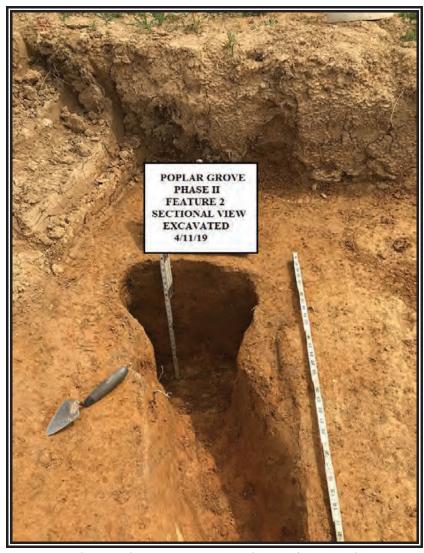


Figure 3-5. Photograph Depicting a Sectional View of Excavated Feature 2

Based on the information provided, Feature 3 appears to be cultural, but modern in temporal affiliation. Therefore, the feature is not considered to be cemetery-related, nor does it have a historic function. Because of its modern affiliation, no further archeological work is recommended for Feature 3.

Feature 4 (F4) Feature 4 (F4) was missed by the initial ground penetrating radar (GPR) survey. The soil anomaly was instead discovered during mechanical trenching involved with delineating the horizontal boundaries of the Waters family cemetery beyond the boundaries of the fence enclosure (see Appendix C; Figure 1-2). The feature was covered for later study upon concluding the second archeological investigation. The third archeological investigation, presented

herein, sought to excavate Feature 4 and establish its function and possible connection with the cemetery.

Feature 4 was located at the northern terminus of Trench 6 (T6); the trench nearly abutted the south corner of the fence (see Appendix C:3). The natural setting surrounding this feature was open and covered in grass with the cemetery located just to the north. Feature 4 was the closest of the four soil anomalies to the cemetery.

Because Feature 4 appeared to have a possible association with the adjacent cemetery, the excavation and documentation processes were more extensive and carefully applied. In terms of the former, Trench 6 was extended an additional 22 inches northward to actually abut the fence enclosure corner. The continuation of



Figure 3-6. Photograph Depicting a Plan View of Unexcavated Feature 3

the feature necessitated the enlargement of the trench. The feature was bisected into north and south halves prior to the excavation process. The goal was excavate the south half first and then the northern portion. The size and nature of the feature prompted a complete excavation of the soil anomaly. This goal was halted, however, after flat shoveling an approximate inch of feature matrix in the southern half. In addition, two small exploratory windows were excavated into the feature matrix. The first window (Window 1 or W1) was strategically placed near the middle of the feature, but within the southern half where prior excavation had occurred. The window had a dimension of 12 inches by 12 inches. The goal was to excavate into subsoil and determine the vertical extent of the feature.

During the initial archeological investigation, mechanical excavation accidentally removed the upper portion of Feature 4. The field monitor was unprepared to encounter such a feature directly

below a 12-inch plowzone layer. Luckily, the full depth of the feature was still preserved below the plowzone in the extended portion of Trench 6. This portion of the feature matrix was where the second window (Window 2 or W2) was excavated. The window extended to the northern wall of the trench thereby appearing in a followup soil profile. The dimension of the second window was 22" in length and 12" in width. An important goal was to see if the thicker matrix generated grave-related artifacts not found during the 1-inch excavation depth in the southern half of the feature.

Upon completing the excavation process, several findings were discovered about Feature 4. After extending Trench 6, it was established that the feature length was at least 144 inches north to south (Figure 3-8). Excavation was halted because the northern extend of the feature abutted the south corner of the



Figure 3-7. Photograph Depicting a Sectional View of Partially Excavated Feature 3

cemetery fence enclosure. Feature 4 was assumed to extend further into the fence enclosure with an unknown additional length. A plan view of the feature showed a hexagonal shape which was thought to be similar in form to some of the grave shaft stains encountered in the past by the author of this report. Interestingly, most of the outline or contour of the feature was marked by a hard-packed band of redden clay. This same soil type was found in the central window excavation at the base of the feature. Chunks of charcoal were found in the feature matrix. Both of these findings indicated that the feature was burned *in situ* for some unexplainable reason. Apparently, the fire was sufficiently intense to alter the iron content of the subsoil surrounding the feature.

According to the excavation of Window 1 (W1), the remnant matrix in the southern half of the feature had a thickness of approximately 3 inches (Figure 3-9). A 2-inch additional depth was

excavated into the subsoil. In Window 2 (W2) of the extension of Trench 6, the thickness of the feature was about 7-1/2 inches. The soils were screened on-site using 1/4-inch hardware mesh. The matrix screened from the southern half only produced a single hand-wrought nail and chunks of charcoal. This nail was commonly type manufactured prior to the 1790s (Nelson 1968). This temporal assessment indicated that Feature 4 was older than the nineteenthcentury burial in the Waters Family Cemetery. Clearly, the feature pre-dated the last time the property was plowed and the cemetery fence enclosure was erected.

examined once Feature 4 was exposed. This includes three samples. The thermally altered outer contour of the feature consisted of a 2.5yr 4/6 red fire-hardened fine sandy clay.

Soil samples were



Figure 3-8. Photograph Depicting a Plan View of Unexcavated Feature 4

The feature matrix was composed of a mottled 10yr 4/3 brown and 5yr 4/6 yellowish red clayey loam. The stratum surrounding the feature consisted of a 7.5yr 4/6 strong brown fine sandy clay. This same inorganic subsoil was encountered throughout the base of excavation for Trench 6, as well as underneath Feature 4 and its thermally altered lower layer. The soil profile associated with Feature 4 was composed of two strata and the matrix of Feature 4 with a depth of 20 inches below ground surface (Figure 3-10). The uppermost stratum (Stratum I) consisted of a 10yr 4/3 brown fine sandy loam with a thickness of 12-1/2 inches. This stratum was classified as an old plowzone layer, the same soil horizon covering nearly all of the study area. The overall property, barring the cemetery itself, may have been cultivated for the last time between 1953 and 1979 (see Figure 2-1). On the sides of and below the feature was subsoil. This bottom stratum (Stratum II) was composed of a 5yr 4/6 yellowish red fine sandy clay. Feature 4, lying below the plowzone and surrounded by subsoil,

was composed of a mottled 10yr 3/3 dark brown, 10yr 4/3 brown, and 2.5yr 4/6 red clayey loam with gravel. The feature matrix also contained minor chunks of charcoal.

A few interpretive statements are warranted upon excavating Feature 4. The earlier evidence suggested that the feature was cemetery-related and a probable grave shaft stain. This interpretation was based on the feature's hexagonal shape, recovery of a hand-wrought nail in its matrix, and its very close proximity to marked graves. However, the feature's depth directly below a 12-inch plowzone layer, its extensive length of over 145 inches, and the lack of grave-related materials, such as bone, teeth, coffin hardware, and clothing remains, suggest an alternative interpretation of function. Clearly, the feature was exposed to extensive heat. This condition is also



Figure 3-9. Photograph Depicting a Partial Excavation of Feature 4

anomalous to a human burial unless cremation was involved. Originally, cremation was considered a possibility. However, the various elements associated with this feature suggested otherwise. Most importantly was the absence of burial artifacts. One possible, far-fetched explanation is ideotechnic in nature. This explanation indicates that Feature 4 may have had an ideological, religious, or spiritual function. However, this interpretation would be difficult if not impossible to prove.

Currently, Feature 4 remains partially intact within the study area. Following the final archeological investigation, the feature now lies protected and covered with durable sheet plastic and overlying plywood. Trench 6 and Trench 6 Extended are ready to be back-filled so that the feature is buried and preserved in perpetuity.

3.4 CONCLUSIONS AND RECOMMENDATIONS

Upon the completion of archeological three investigations of the study area containing the Water family cemetery, four soil anomalies or features were discovered. Through hand excavation, Feature 1 was classified as a modern dump or trash pit, Feature 2 represented a decomposed base of a tree with root system, and Feature 3 appeared to be modern and development-related as a backfilled shaft to a possible soil perc test. Only Feature 4 was thought to be cemetery-related, although not considered to be a grave shaft stain. Its actual function remains speculative to date. Because the feature is partially intact and has a probable cemetery association, it is recommended that it remain preserved and protected and included as part of the Waters family cemetery. Since the feature is not a grave, its not recommended that the contents be re-interred within the cemetery enclosure. However, the feature should lie within a protected boundary area surrounding the fence enclosure.

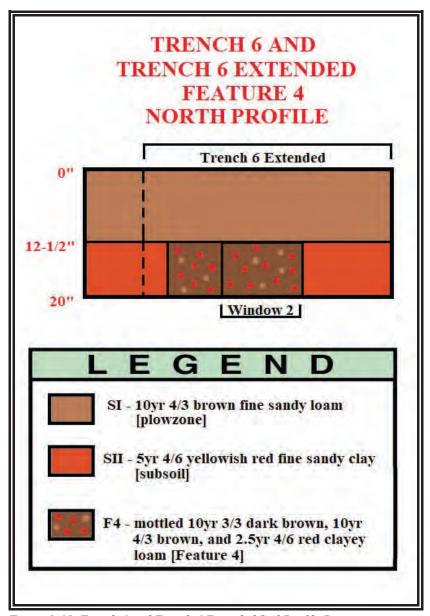
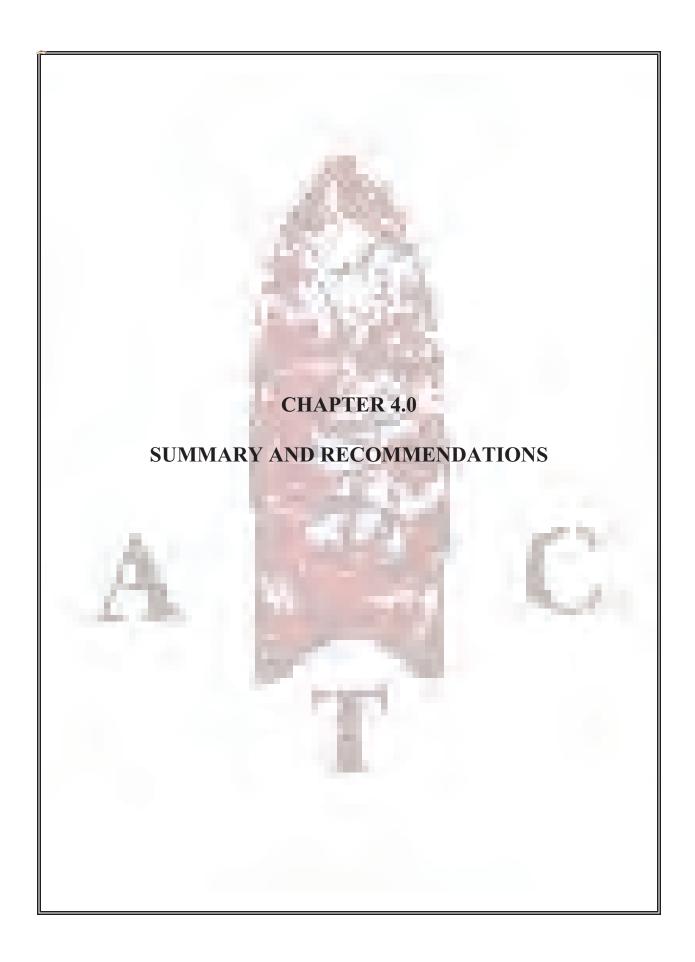


Figure 3-10. Trench 6 and Trench 6 Extended Soil Profile Depicting a Portion of Feature 4



4.0 SUMMARY AND RECOMMENDATIONS

Phase I and II archeological investigations of the proposed Poplar Grove property study area consisted of documentary research and three consecutive sessions of fieldwork. Research established that the subject property was part of a much larger plantation and later farmstead owned, occupied, and utilized by the Waters family during the eighteenth and nineteenth century. Utilization included a grist and saw mill operation off the subject property. Several members of the Waters family were buried within the 10-acre property now scheduled to be developed as "Poplar Grove." Located within the study area at the northern end of the property, the Waters family cemetery included Zachariah Waters, the son of William Waters, Sr., the patriarch of the family, the son's wife, Anna Waters, and their three children, Tilghman, Baker, and Courtney Waters. All five were buried in the family burial plot between 1824 and 1864.

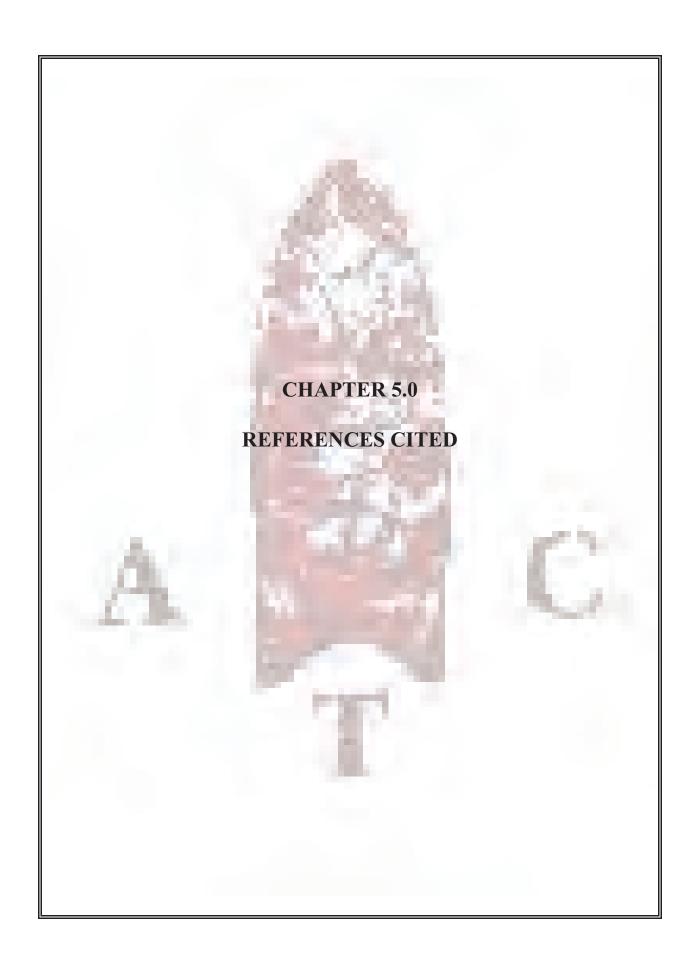
Cultural resource research established that three archeological surveys and five archeological sites and four historic properties, recorded with the Maryland Historical Trust, were located within a 1-mile radius of the study area. None of these survey areas or prehistoric and historic resources were found to lie within or adjacent to the property containing the study area. One of the historic properties, however, was closely associated with the Water family and was known as the "Waters Log House" (MIHP M:19-2).

The overall fieldwork included the mechanical excavation of trenches containing seven soil anomalies previously identified during an initial ground penetrating radar (GPS) survey. Three of these anomalies were designated as Features 1, 2, and 3 and warranted additional archeological work. Additional mechanical trenching and shovel testing around the Waters family cemetery enclosure sought to examine study area soils, recover artifacts, and delineate the horizontal boundaries of the cemetery beyond the protective fence. This field session resulted in the identification of another soil anomaly designated as Feature 4. Only a few historic artifacts were recovered and were thought to be confined to a disturbed plowzone layer. The final archeological investigation, the results of which are presented in this report, further examined these four features and sought to determine their functions and possible cemetery associations. The field methods involved systematic and controlled hand excavations of the whole or portions of the four features.

Feature 1 was examined by excavating a 2-foot square near its center because of its large size and anticipated results. The subsurface investigation established that the feature had a depth of 23 inches below ground surface. The feature matrix contained modern materials which included rubber-coated cable wire, a car oil filter, and cellophane. It was concluded that the feature was cultural, but not affiliated with the historic period. No further work was recommended for this feature. Feature 2 was completely excavated because of its small size. The feature was identified at 17-1/2 inches below ground surface and extended to a final depth of 38 inches. Because of the feature's depth, irregular shape, and lack of cultural materials, it was thought to be a natural disturbance to the soils, perhaps fossilizing the remains of a decomposed tree and its associated roots. This tree may have once embellished the landscape surrounding the cemetery. Feature 3 was the largest of the four soil anomalies and had a rectangular shape. The final depth of excavation was approximately 63 inches

below ground surface, yet the vertical extent of the feature was never reached. The feature was classified as cultural yet modern and was thought to be a pre-development disturbance to the soils and may have been a back-filled shaft to a soil perc test.

Feature 4 was the only soil anomaly thought to have a potential cemetery association. Upon cleaning the surface of the feature, it was found to have a hexagonal shape with a minimal length of 145 inches. The feature was determined to further extend under the fence enclosure of the Waters family cemetery. The feature was also found to have a clay-hardened red soil band outlining its contour. Through an exploratory window excavation, the feature apparently contained the same packed red soil at its base. This aspect, as well as the presence of charcoal chunks in its matrix indicated that Feature 4 underwent intensive fire in situ sometime in the past. Interestingly, the feature was first identified directly under a 12-inch plowzone layer. Through a partial excavation of the feature, which included two exploratory windows excavations and a 1-inch excavation depth in the south half, it was concluded that Feature 4 was not a grave. The size, depth, and lack of graverelated materials supported this interpretation. It was concluded that the feature was probably associated with the cemetery because of its close proximity. With little support and much speculation, Feature 4 was thought to have an ideotechnic function, i.e., having to do with ideology, religion, and/or spirituality. Based on the above findings, it was concluded that Feature 4 did not contain human remains and, therefore, did not warrant re-interment within the Waters family cemetery enclosure. However, it was recommended that the feature remain in situ and be covered and preserved within the protective area surrounding the fence enclosure.



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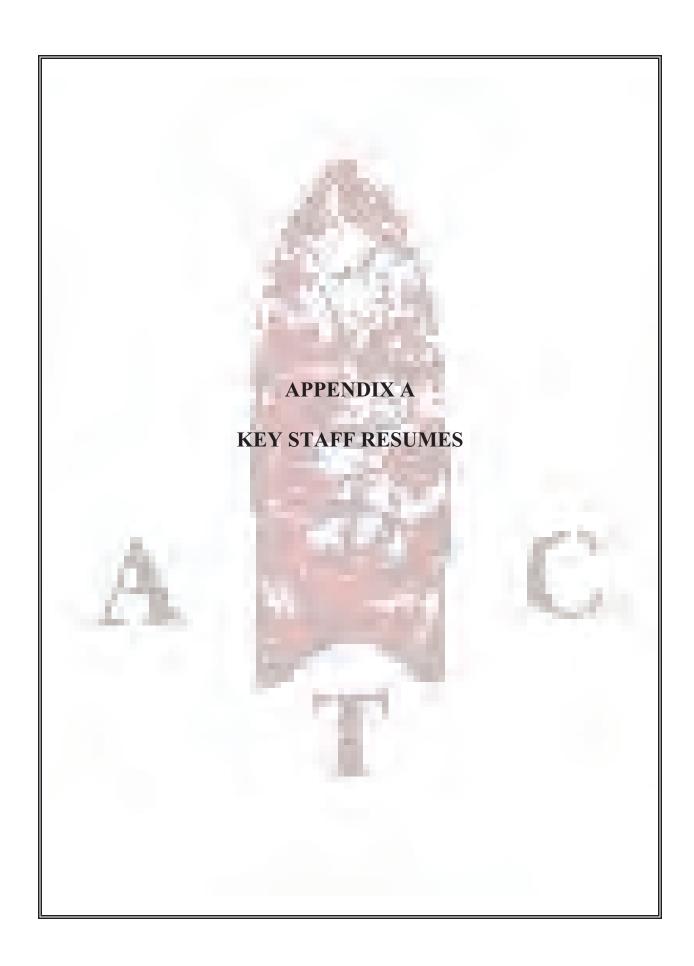
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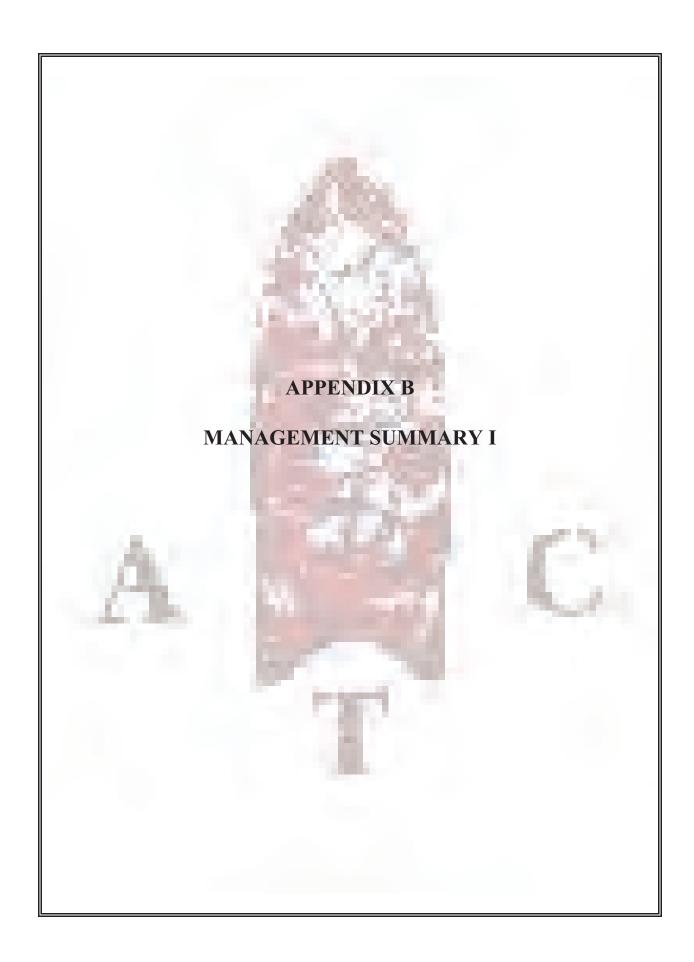
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1996 to Present: Archeological Testing and Consulting, Inc., Silver Spring, Maryland

- Business/Project Manager Primary responsibilities include: corporate promotion and the development of new clients, maintenance of existing clients, submission and follow-up of technical/cost proposals, project staffing, budgeting and purchasing, and bookkeeping and payroll.
- Principal Investigator Major responsibilities include: the planning and implementation of Phase I, Phase II, and Phase III archeological investigations in the Middle Atlantic region; staff evaluation; client contact; laboratory management; field photography; technical report preparation; and project presentation.
- Researcher Primary responsibilities include: the planning and implementation of research-oriented archeological projects, analyses of cultural materials, technical report preparation, academic and institutional presentations, and publication.
- Specialized skills include: computer and software application operations, project mapping by surveyor's transit, indigenous faunal analysis, and lithic analysis and stone tool technology interpretation.
- 1992 to 1994: Thunderbird Archeological Associates, Incorporated, Woodstock, Virginia
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- 1989 to 1992: Thunderbird Archeological Associates, Incorporated
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A PHASE I ARCHEOLOGICAL INVESTIGATION OF FIVE SOIL ANOMALIES LOCATED IN THE VICINITY OF THE WATERS FAMILY CEMETERY WITHIN THE POPLAR GROVE PROPERTY IN GERMANTOWN, MONTGOMERY COUNTY, MARYLAND

MANAGEMENT SUMMARY I

by

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October 17, 2018

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1.0 INTRODUCTION

On behalf of Symmetry at Cloverleaf, LLC (the client), Archeological Testing and Consulting, Inc. (ATC) was asked to conduct a limited Phase I archeological investigation of five soil anomalies located within Poplar Grove in the vicinity of the Waters family cemetery (Figure 1). These five soil disturbances were identified by a Ground Penetrating Radar survey conducted in September 2017. The survey sought to identify anomalies thought to be potential graves associated with the nearby Waters family cemetery.

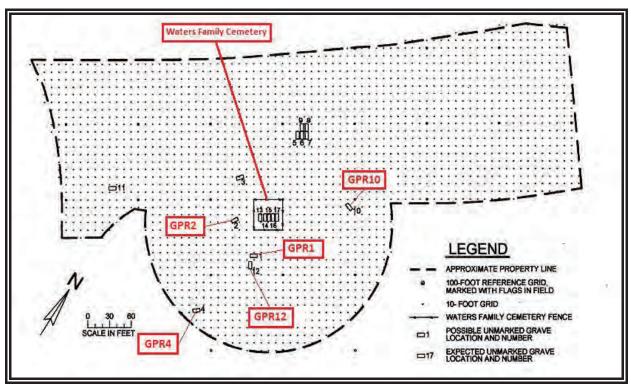


Figure 1. Ground Penetrating Radar Survey Map with GPR Soil Anomalies

The archeological investigation primarily involved a subsurface investigation to further explore these ground disturbances in order to make a better assessment of their possible cemetery function. Mechanical trenching was employed as the subsurface investigation method. Presented below is a brief description of the field methods used.

2.0 FIELD METHODS

Mechanical trenching was the chosen subsurface method employed in the field. The goal was to expeditiously remove old plowzone soils in order to determine the nature and extent of these soil disturbances. Questions addressed in the field were two-fold: (1) Did these soil anomalies continue below the organic soil horizon?, and (2) Were these soil disturbances possible grave shaft features?.

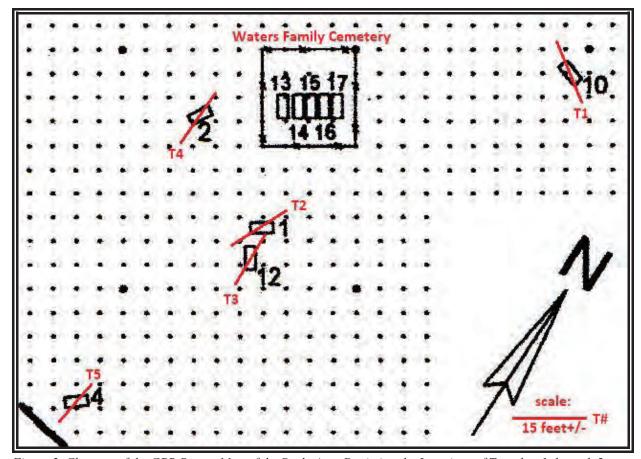


Figure 2. Close-up of the GPR Survey Map of the Study Area Depicting the Locations of Trenches 1 through 5

The trenching methodology involved a backhoe, operator, two laborers, and an archeologist monitoring the field operations. The backhoe bucket was wide and toothless to maximize the results of the trench excavations. One trench was excavated per soil anomaly location. Each trench had a length of approximately 16 feet. The trenches were strategically placed diagonally over the soil anomalies in order to maximize the amount of disturbance area exposed (Figure 2). The average length of these soil disturbances was 5 feet. Thus, an additional 5 feet was excavated on each end of the disturbance for conservative coverage. The approximate width of the trenches was 3 feet which provided a sufficient window toward properly examining the anomalies. The endpoints of the trenches were marked with field flags and marked with consecutive trench numbers. The numbering scheme consisted of Trenches 1 (T1) through 5 (T5).

The soils were carefully removed from each trench using an approximate depth increment of 5 inches. The organic soils were removed first, followed by several inches of subsoil. The excavated soils were placed along one side of a trench. The backhoe bucket was agitated over the waste pile in order to help in the uncontrolled collection of artifacts if present. Although the overall goal of the subsurface investigation was to locate burial-related resources, if artifacts and/or cultural features of another function were recovered or exposed, they too were to be documented and

potentially recorded as an archeological site with the Maryland Historical Trust.

Once a trench was excavated, it underwent a routine of documentation. This included a plan view photograph of the base of a trench. This procedure was followed by the recordation of one soil profile per trench unit. The profiling process included a description of the various strata encountered, their colors and textures, and measurements in inches of their thicknesses or depths. Digital photography was also used to document the soil profiles. If a trench was found to lack anomalous soils below the organic soil horizon, it was backfilled once the documentation process was completed. If a soil disturbance continued into subsoil, it was completely exposed and then documented. Full exposure typically involved expanding the width of a trench in selected areas. A flat shovel and trowel were continuously employed to remove loose soils and clean the bases of trenches. The latter tool served to prepare all identified disturbances or features for documentation by scraping them clean. The documentation process involved taking horizontal and vertical measurements, describing the texture and color of surface soils, and photographing a scaled plan view of each feature. Once documented, sheet plastic was placed over each feature prior to backfilling the remaining open trenches. Orange pin flags were used to mark the surface locations of these buried features for relocation purposes.

3.0 FIELD RESULTS

3.1 GENERAL RESULTS

The fieldwork at Poplar Grove was initiated with a pedestrian survey or walkover followed by a subsurface investigation. The walkover sought to locate the Waters family cemetery and isolate the locations of the five soil anomalies identified during the Ground Penetrating Radar survey. These ground disturbances were designated during the survey as GPR1, GPR2, GPR4, GPR10, and GPR12.

The subsurface investigation involved the mechanical excavation of five (5) 16-foot+/trenches (see Table 1). The trenches were consecutively numbered as Trenches 1 (T1) through 5 (T5). These units were placed diagonally across the lengths of the soil anomalies. During the excavation process, the overlying stratigraphy was found to be composed of an old plowzone layer overlying subsoil. Three of the five excavated units contained soil disturbances below the disturbed plowzone layer (Figure 3). The other two trenches produced negative results (Figure 4). These soil anomalies were classified as features and designated as Features 1 (F1) through 3 (F3). The association of these features with trenches, GPR soil anomalies, and location are presented in the table below. This table is followed by the specific results of the fieldwork.

Table 1. Feature Inventory

FEATURE NO.	TRENCH ASSOCIATION	GPR ASSOCIATION	CEMETERY ORIENTATION
Feature 1	Trench 1	GPR10	well east of the cemetery
Feature 2	Trench 3	GPR12	just south of the cemetery
Feature 3	Trench 5	GPR4	southwest of the cemetery

3.2 SPECIFIC RESULTS

3.2.1 Trench 1

Trench 1 (T1) was located well east of the Waters family cemetery, along the edge of a wooded area adjacent to Interstate 270 (see Figure 2). The trench was strategically placed over GPR10. Upon excavating the trench it was determined that the soil anomaly remained present below the organic soil horizon. The soil disturbance was designated as Feature 1 (F1). The trench width was expanded in sections in order to accommodate the size of the feature.

The organic soil horizon was classified as an old plowzone layer and had a thickness of 10-1/2 inches. This disturbed soil layer was composed of a dark grayish brown loam (Figure 5). The feature extended vertically into the bottom subsoil layer. This bottom stratum consisted of a yellowish brown loamy clay.



Figure 3. Photograph Depicting Excavated Trench 3 Depicting Feature

The plan view of Feature 1 was square in shape and had a horizontal dimension of 5'7" by 4'1" (Figure 6). Upon identification, the below-surface depth of the feature was 1'7". After exposing the horizontal limits of the feature, it was not thought to be an unmarked grave location. The

potential existed, however, that the feature actually contained the interment of two individuals. No artifacts were recovered from the excavated soils during the trenching process. It is recommended that Feature 2 undergo hand excavation in order to determine its function.

3.2.2 Trench 2

Trench 2 was situated just south of the Waters family cemetery within an open field setting (see Figure 2). The trench was strategically placed GPR1. across Upon conducting the excavation of the trench, it was discovered that the vertical extent of the feature was confined to plowzone soils. The feature may have been a surfaceoriented depression. It was indeterminate whether the anomaly had a natural or cultural function.



Figure 4. Photograph Depicting Excavated Trench 4 Absent of a Feature

The soils associated with this trench unit consisted of two strata with an excavation depth of 19 inches below surface (Figure 7). The upper plowzone layer contained a brown clayey loam with a thickness of 10-1/2 inches. The bottom subsoil layer was composed of a yellowish brown loamy clay. A 7-1/2-inch depth was excavated into this bottom soil horizon. No artifacts were recovered from the excavation of the trench and its waste pile. Because this trench location is absent of a feature, no further archeological work is warranted.

3.2.3 Trench 3

Trench 3 (T3) was located to the south of the Waters family cemetery (see Figure 2). The trench setting was an open field. The trench was strategically placed over GPR12. After the

excavation of the trench, it was found that the soil anomaly remained present below the upper organic soil horizon. The anomaly was designated as Feature 2 (F2). The trench width was expanded in order to fully expose the feature.

The upper organic soil horizon was classified as an old plowzone layer with a somewhat deflated thickness of 8-1/2 inches. The disturbed soil laver was composed of a dark grayish brown loam (Figure 8). The bottom stratum was subsoil and consisted of a yellowish brown loamy clay. The shape of the feature was semitriangular (Figure 9). Its length measured 3' and its maximum width was 1'10". The feature was identified at a depth of 1'3" below surface. Given the shape of Feature 2, it was not thought to be a grave shaft. No artifacts were recovered from the excavated soils. It is recommended that Feature 2 undergo further examination through hand excavation.

3.2.4 Trench 4



Figure 5. Trench 1 Soil Profile

Trench 4 was situated just west of the Waters family cemetery and sat within an open field (see Figure 2). The trench was strategically placed across GPR2. During the excavation of the trench, it was determined that the soil anomaly was confined to an upper disturbed plowzone layer. The feature may have been a surface-oriented depression. Whether the anomaly was natural or cultural in function was unknown.

The soil profile documented for this trench consisted of two strata with an excavation depth of 18-1/2 inches below surface (Figure 10). The upper plowzone layer was composed of a brown clayey loam with dense gravel and had a thickness of 11-1/2 inches. The bottom subsoil layer consisted of a yellowish red loamy clay. A 7-inch depth was excavated into this bottom stratum. No artifacts were recovered during trench excavation and its associated waste pile. Because the trench is absent of a feature, no further archeological work is warranted.

3.2.5 Trench 5

Trench 5 (T5) was situated well southwest of the Waters family cemetery (see Figure 2). The

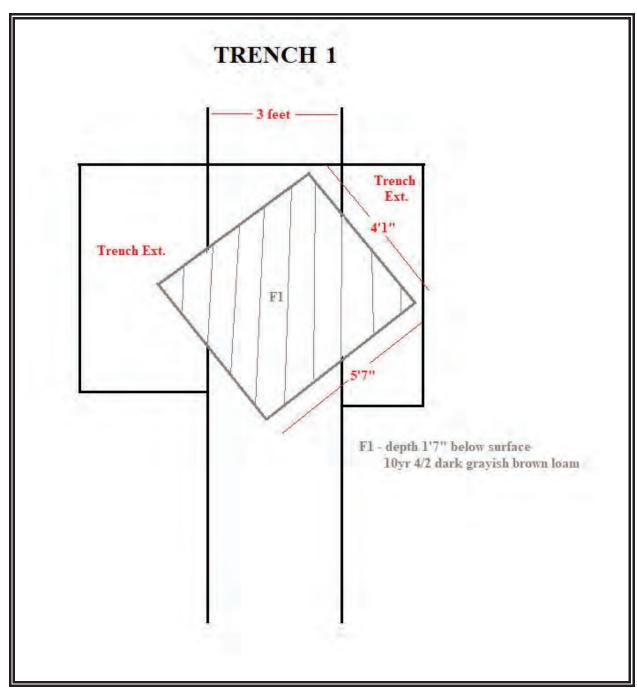


Figure 6. Feature 1 Plan View Drawing

trench was located within an open field. The unit was strategically placed over GPR4. Upon excavating the trench it was determined that the soil anomaly continued vertically below the organic soils. The soil anomaly was designated as Feature 3 (F3). The width of the trench was expanded around the feature area in order to fully expose the disturbance.

The organic soil horizon was classified as an old plowzone layer and had a thickness of 14 inches. The layer appeared to be inflated, perhaps associated with its slight down-hill location. The plowzone layer was composed of a brown loam (Figure 11). Below the plowzone was subsoil which consisted of a yellowish red loamy clay. A 6-inch depth was excavated into this bottom stratum.

The plan view of the feature presented a near square shape (Figure 12). The horizontal dimension of the feature measured 5'7" by 4'1". During its discovery, the below-surface depth of the feature was 1'9". After exposing the horizontal limits of the feature, it was not thought to be a burial shaft because of its size and shape. It was considered slightly possible, however, that the feature accounted for the burial of two individuals. No artifacts were recovered from the soils during the excavation process. It is recommended that this feature undergo hand excavation in order to establish its function.



Figure 7. Trench 2 Soil Profile

4.0 STUDY CONCLUSIONS

During mechanical trenching across five GPR-discovered soil anomalies, three features were exposed within the subsoil layer. Two were large and square-shaped. The third was semi-triangular in shape and relatively small. None of these features appeared to have a rectangular grave shaft shape. However, the function of these features remained unknown following the excavation process. No artifacts were recovered from the excavated soils and associated waste pile. Thus, the study area appeared to be absent of an archeological site. It was recommended that the three identified features undergo hand excavation in order to establish their functions.



Figure 8. Trench 3 Soil Profile

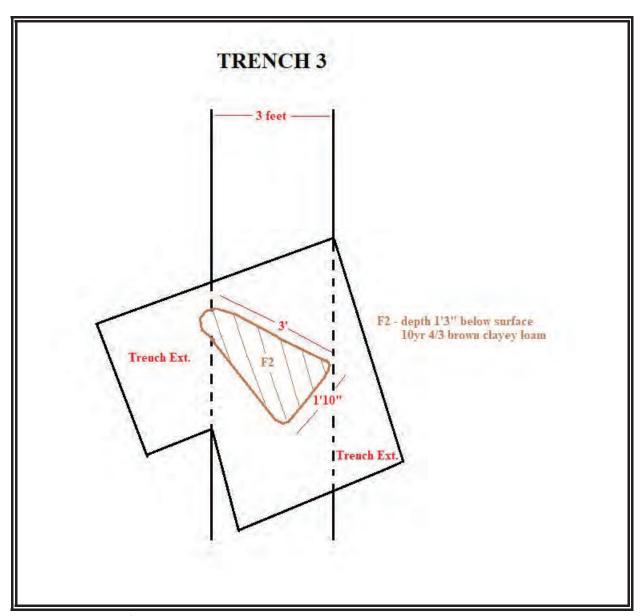


Figure 9. Feature 2 Plan View Drawing

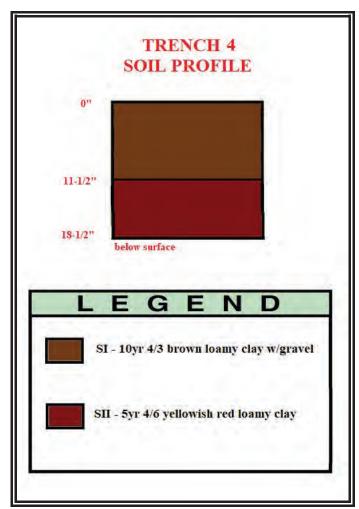


Figure 10. Trench 4 Soil Profile

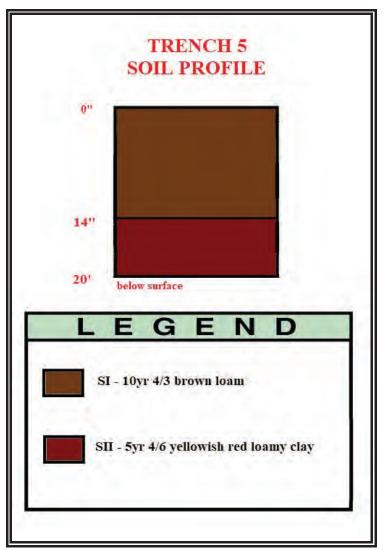


Figure 11. Trench 5 Soil Profile

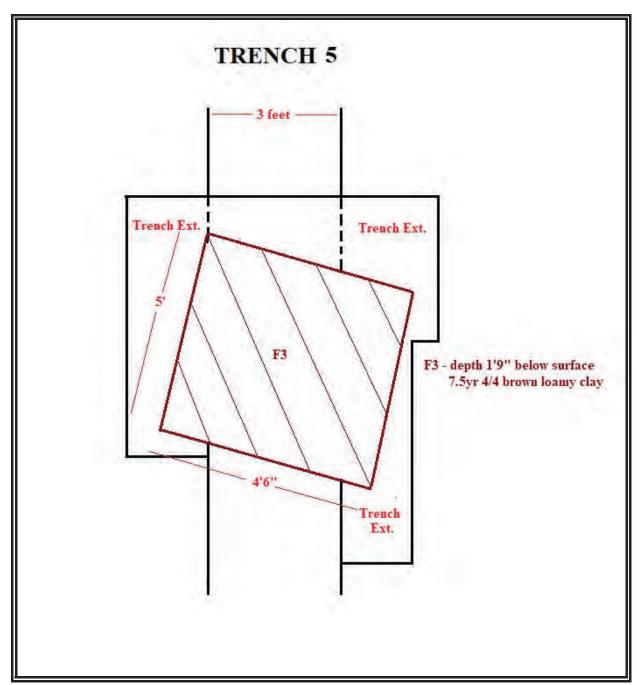


Figure 12. Feature 3 Plan View Drawing

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- Principal Investigator Major responsibilities include: the planning and implementation of Phase I, Phase II, and Phase III archeological investigations in the Middle Atlantic region; staff evaluation; client contact; laboratory management; field photography; technical report preparation; and project presentation.
- Researcher Primary responsibilities include: the planning and implementation of research-oriented archeological projects, analyses of cultural materials, technical report preparation, academic and institutional presentations, and publication.
- Specialized skills include: computer and software application operations, project mapping by surveyor's transit, indigenous faunal analysis, and lithic analysis and stone tool technology interpretation.

1992 to 1994: Thunderbird Archeological Associates, Incorporated, Woodstock, Virginia

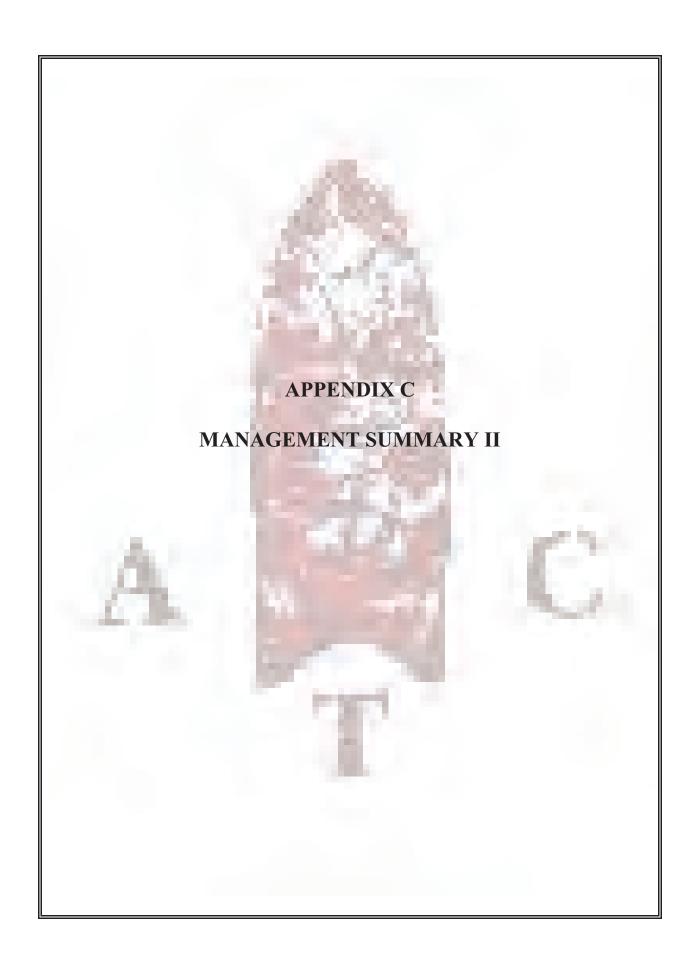
Supervisory Archeologist - Major responsibilities included: the planning and implementation of Phase I and Phase II archeological investigations in the Middle Atlantic region, field staff supervision; project mapping, and report preparation. Supervised the high profile "Disney America Project" in Prince William County, Virginia.

1989 to 1992: Thunderbird Archeological Associates, Incorporated

Field and Laboratory Technician - Primary responsibilities included: Phase I, Phase II, and Phase III level field excavations of historic and prehistoric sites in the Middle Atlantic region; field recordation; and laboratory processing and analysis of associated artifact recoveries.

TEACHING EXPERIENCE

Montgomery College, Rockville and Germantown, Maryland: Adjunct Faculty Position Spring, 1998 through Spring, 2003



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A PHASE I /II ARCHEOLOGICAL INVESTIGATION OF A SELECTED AREA AROUND THE WATERS FAMILY CEMETERY WITHIN THE POPLAR GROVE PROPERTY IN GERMANTOWN, MONTGOMERY COUNTY, MARYLAND

MANAGEMENT SUMMARY II

(Second Field Session)

by

Phillip J. Hill, Ph.D.

March 20, 2019

Prepared by: Archeological Testing and Consulting, Inc. 12025 Remington Drive Silver Spring, Maryland 20902

Prepared for: Symmetry at Cloverleaf, LLC 8555 16th Street, Suite 711 Silver Spring, Maryland 20910

1.0 INTRODUCTION

On behalf of Symmetry at Cloverleaf, LLC (the client), Archeological Testing and Consulting, Inc. (ATC) was asked to conduct an a Phase I/II archeological investigation of a selected area around the Waters Family Cemetery within proposed "Poplar Grove." The proposed residential development is located on Century Boulevard in Germantown, Montgomery County, Maryland (Figure 1). The property contains the nineteenth-century Waters Family Cemetery consisting of four known graves enclosed in a black iron wrought fence. The overall investigation was requested by the Historic Preservation Program of the M-NCPPC Montgomery County Planning Department.

Prior the archeological investigation, the subject property was examined through ground penetrating radar (GPR) on two occasions. The goal was to locate additional cemetery resources that may lie buried within the property. The result was the isolation of five soil anomalies with potential cemetery-related significance. The initial archeological investigation sought to located these anomalous soil features, expose their dimensions, and determine whether additional archeological work was needed. As part of the Phase I archeological survey, mechanical trenching established that only three of these selected areas contained soil anomalies below the surface. It was recommended that all three features undergo additional study in order to determine their functions and potential significance. This recommendation is part of a Phase II archeological evaluation of the cemetery area and will be addressed in a third field work session.

As an extension of the archeological survey noted above, a request was made to define the horizontal limits of the Waters Family Cemetery. It was thought that a potential existed for the presence of unmarked graves outside of the boundaries of the existing cemetery fence enclosure. This new fieldwork was to involve additional mechanical trenching in the search for grave shaft features beyond the fence. Presented below are the field methods and procedures, fieldwork results, and conclusions and recommendations associated with delimiting the boundaries of the cemetery.

2.0 FIELD METHODS

The second session of fieldwork was conducted between March 18 and 20 of 2019. The main goal was to establish the horizontal boundaries of the Waters Family Cemetery. Mechanical trenching was selected as the method of excavation because it was the most expeditious approach in the search for unmarked graves. Prior to initiating the subsurface investigation a grid system of trench lines was placed around the cemetery area (Figure 2). The grid consisted of thirty trench locations, i.e., Trenches 6 (T6) through 35 (T35), marked by orange pins at each unit's termini. The consecutive trench numbers began with six (T6) because five trenches were previously designated during the initial field work session.

As normally encountered, the gravestone positions within the cemetery were oriented to the southeast for spiritual and solar exposure purposes. The grid was therefore oriented diagonally to the cemetery using a grid-north orientation for the trench lines. This diagonal trenching approach was thought to have the greatest chance of intersecting with unmarked burials if they existed. The

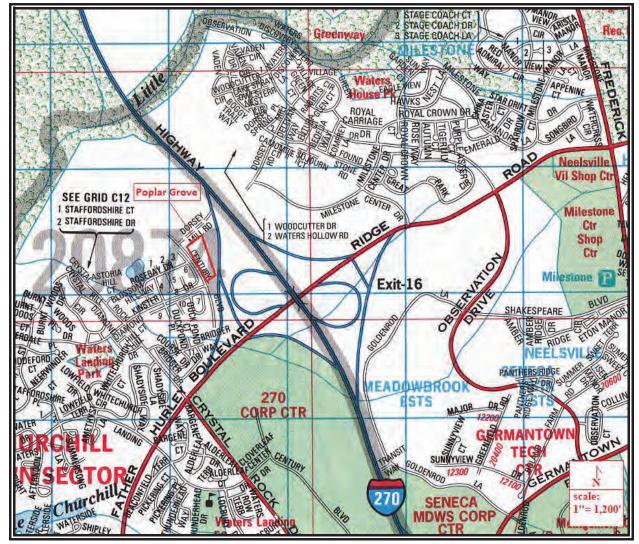


Figure 1. Section of the ADC Map of Montgomery County, Maryland Depicting the Location of the Poplar Grove Development Property

distance between trench lines was set at approximately 6 feet. With a bucket width of at least 36 inches no more than 4 or 5 feet of untested ground would lie between the excavated units. As it turned out, the bucket width of the excavator employed was a 48-inch toothless bucket. Thus, in order to accommodate the closeness of the grid trench lines, some of the trench locations were combined in order to avoid excavating the entire area surrounding the cemetery. The trench lines combined to implement this procedure included the following: T9/T10, T13/T14, T18/T19, T24/T25, and T28/T32 (see Figure 2). In addition, some of the trench lines were excavated at the center of the bucket, while others were placed to the left or right of center.

The trenching team included an excavator operator, laborer, and trenching monitor. The operator and monitor worked hand-in-hand in the search for additional burial features and other soil

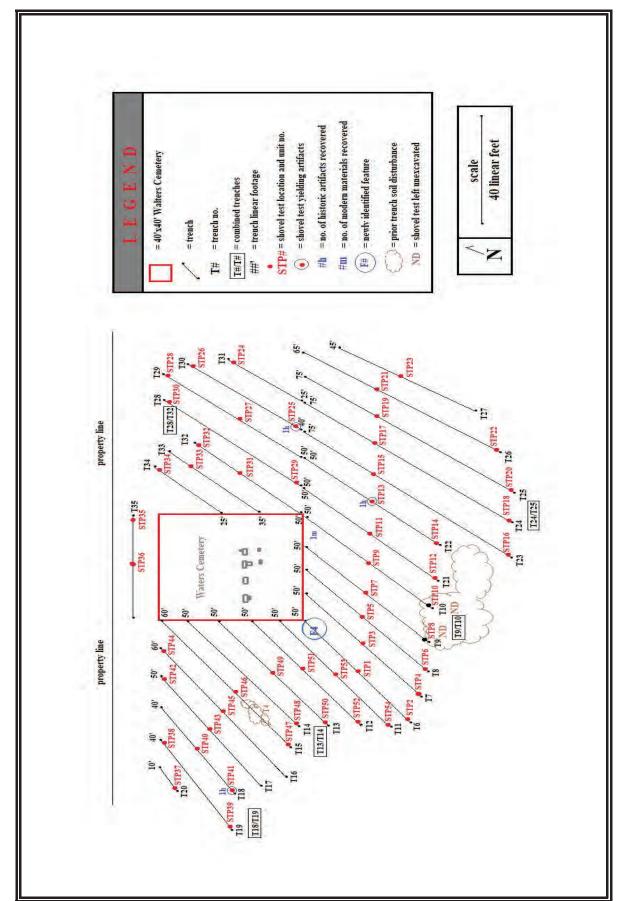


Figure 2. Field Map Depicting Trench Lines, Shovel Tests, Artifact Densities, and Feature Locations

anomalies thought to have cultural functions. The laborer used a flat shovel in order to scape and clean the base of excavation for each trench. Dr. Phillip J. Hill, serving as the monitor, used a trowel to more closely examine potential soil features (see Appendix A). He also documented the fieldwork tasks through the preparation of a scaled field map, taking photographs of trench floors and associated soil profiles, and recording the soil textures and colors for selected portions of each excavated trench.

Prior to initiating the digging of trenches, one or two shovel tests were excavated per trench line within the grid. The goal was to initially examine the soils and then screen for artifacts on-site using 1/4-inch hardware mesh. All soil documentation during profiling employed the Munsell color chart system. Soil texture was subjective in nature and was described by the consistency of clay, silt, sand, and gravel. The number of shovel tests excavated per trench line was based on the length (lf) of the trench. The range in the length of these units varied from 10 to 75 feet with the goal of extending the grid at least 50 feet from the cemetery fence in three of the four cardinal directions (see Figure 2). The northern direction was shortened to 10 feet because of a property boundary line. The longer units involved the excavation of two shovel tests and singles for the relatively shorter units. In total, fifty-four shovel tests were excavated prior to the trenching task. The shovel tests were designated as Shovel Test 1 (STP1) through Shovel Test 54 (STP 54).

If any new potential cultural features were identified, they were to be thoroughly exposed and readied for the third fieldwork session (Phase II). This involved covering the soil anomalies with sheet plastic, sloping extra space for drainage, and placing plywood over the ground surface for protection purposes. The three previously identified soil anomalies, i.e., Features 1, 2 and 3, were prepared for additional study as well. All excavated shovel test and trench locations were back-filled upon completing the documentation process. Presented below are the results, conclusions, and recommendations associated with the completion of the fieldwork tasks.

3.0 FIELD RESULTS AND CONCLUSIONS

3.1 GENERAL RESULTS

The general fieldwork results are two-fold and include those involving shovel testing, as well as those associated with mechanical trenching. The grid containing trench lines to be excavated consists of thirty locations. These locations contain a total of fifty-four excavated shovel test units. The soils associated with these shovel tests contain a consistent stratigraphy composed of an organic plowzone overlying inorganic subsoil. The plowzone varies in thickness based on active erosional and depositional processes. The artifact recovery connected with shovel testing includes three isolated historic artifacts. Whether the distribution of these artifacts forms an archeological site is up to interpretation.

Trench excavation associated with the delineation of the cemetery resource represents the follow-up fieldwork task. As noted above, the grid consists of thirty trench lines. Using an excavator toothless bucket with a 48-inch width, the combining of several trench lines as single excavation

units explains why only twenty-five excavated trenches are represented in the findings. As with shovel testing, two general soil horizons are identified in this subsurface action, including a plowzone overlying subsoil. In addition to examining overlying soils, this method of excavation sought to recover artifacts and locate additional soil anomalies or intact cultural features and, in particular, grave shaft features. The material recovery associated with examining excavated soil waste piles includes a single artifact. This minor recovery adds to the existing artifact assemblage for the overall investigation of the cemetery area. In addition, systematic and controlled trenching includes the identification of an additional soil anomaly that may be an intact cultural feature. Presented below are the specific results of the two subsurface investigation approaches, beginning with the shovel testing task.

3.2 SPECIFIC RESULTS

3.2.1 Shovel Test Results

A total of fifty-four shovel tests form the initial units excavated in the second field session within the cemetery area. Each trench line includes one or two of these shovel test locations. The shovel tests were strategically placed within the trench lines in order to more completely test the cemetery area. As noted above, the associated artifact recovery includes three specimens retained for analysis. The provenience of these artifacts is connected with the following trenches: Trench 18 (T18), Trench 22 (T22), and Trench 30 (T30). (See Figure 2.) The distance between artifacts from the positive unit of Trench 22 (T22) is between 30 and 110 feet. By type and quantity, the material recovery includes the following: whiteware (n=1), ironstone (n=1), and nail (n=1). (See Table 1.) The whiteware sherd is an undecorated body fragment. The ironstone is classified as a body sherd with a molded basket weave design. The nail is fragmented, highly corroded, and unidentifiable as to type. However, it is likely machine-cut given its general shape. This collection of materials is thought to represent low-density, highly dispersed trash or field scatter. Based on the types of materials collected, a temporal assessment of post-1820 is assigned to the assemblage. This is based on the recovery of whiteware. An ending date of the artifact scatter may be 1865 with the rapid decline in use of ironstone. Thus, the field scatter may date between 1820 and 1865, at time compatible with the interment of Waters family members. Presented below are the soil profiles associated with the three shovel tests with positive artifact recoveries.

Table 1. Artifact Inventory

ARTIFACT PROVENIENCE	ARTIFACT TYPE	TEMPORAL AFFILIATION	QUANTITY
Trench 18/STP41	molded ironstone	historic	1
Trench 22/STP13	unidentified nail type	historic	1
Trench 30/STP25	whiteware	historic	1
Trench 9/10 combined	molded soda bottle glass	modern	1

Shovel Test 13 (STP13) is located in Trench 22 (T22) at the center of this 50-foot linear unit (see Figure 2). The trench is situated approximately 20 feet southeast of the southeast corner of the cemetery fence. The shovel test is composed of two strata with an excavation depth of 15-1/2 inches below surface (Figure 3). The upper stratum (Stratum I) consists of a 10yr 4/4 dark yellowish brown loam with a thickness of 12-1/2 inches. This stratum is classified as a somewhat inflated plowzone layer. The recovery of a corroded nails is associated with this disturbed, organic stratum. The bottom stratum (Stratum II) is composed of a 7.5yr 5/6 strong brown loamy clay. A 3-inch excavation depth is connected with this inorganic soil horizon.

Shovel Test 25 Shovel Test 25 (STP25) is located in Trench 30 (T30) at the southern extent of this 40-foot linear unit (see Figure 2). The trench is situated approximately 30 feet east of the cemetery fence. The shovel test is composed of two strata with an excavation depth of 16 inches below surface (Figure 4). The upper stratum (Stratum I) consists of a 10y 4/4 dark yellowish brown clayey loam with a thickness of 13 inches. This stratum is classified as an inflated plowzone layer. This disturbed organic stratum is associated with the recovery of a single undecorated whiteware body fragment. The bottom stratum (Stratum II) is composed of a 7.5yr 5/6 strong brown loamy clay. A 3inch excavation depth is connected with this inorganic soil horizon.

Shovel Test 41 Shovel Test 41 (STP41) is located at the southern extent of Trench 18 (T18) (see Figure 2). The length of the trench is 40 feet and is positioned

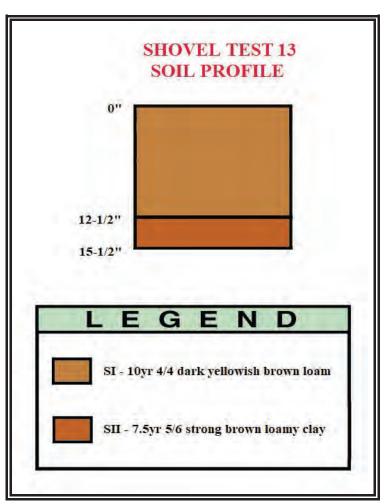


Figure 3. Shovel Test 13 Soil Profile

approximately 60 feet west of the cemetery fence. The shovel test is composed of two strata and has an excavation depth of 14 inches below surface (Figure 5). The upper stratum (Stratum I) consists of a 10y 4/3 brown fine sandy loam with gravel and has a thickness of 11 inches. This stratum is classified as a disturbed plowzone layer. The artifact recovered from this stratum is a molded ironstone body fragment. The bottom stratum (Stratum II) is composed of a 7.5yr 4/6 strong brown loamy clay with a 3-inch additional excavation depth. This stratum is classified as a culturally sterile

inorganic soil horizon.

3.2.2 Trench Excavation Results

The follow-up trenching task involves the excavation of twenty-five single and combined trench lines (see Figure 2). These linear excavation units range in length from 10 to 75 feet. The depth of these trenches varies from 15-1/2 to 31 inches below ground surface. This difference in total depth reflects field judgement, excavator control, and thickness variation in strata related to various stratigraphy development processes. Interestingly, very little in the form of cultural resource identification is associated with this subsurface investigation task. The only material recovery is a single body fragment of clear, molded, and modern soda bottle glass recovered from the northern extent of combined Trench 9/10 (T9/10). This provenience location lies just south of the cemetery fence. The other find is a soil anomaly located at northern extent of Trench 6 (T6). (See Figure 2.) This feature location abuts the southwestern corner of the cemetery fence. The feature lies 13 inches below ground surface. The

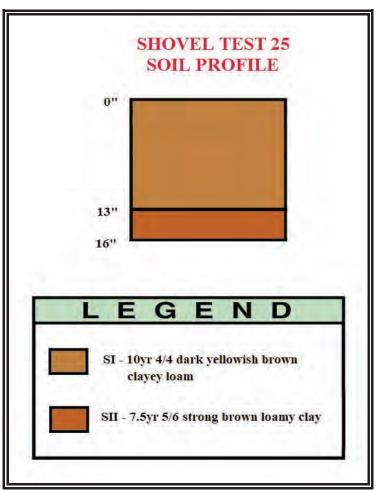


Figure 4. Shovel Test 25 Soil Profile

feature has an orientation north-to-south which is diagonal to the Waters Family Cemetery headstones purposely positioned in a southeastern direction. This observation suggests that the feature, whether cultural or natural, may not be a grave shaft stain. The soil anomaly is designated as Feature 4 (F4), a consecutive number following the three features discovered during the prior GPR study and first session of fieldwork.

Feature 4 (F4) has a horizontal dimension of 110 inches north-to-south and 36 inches east-to-west (Figure 6). This dimension appears to be larger than expected for a typical grave shaft in that it suggests the interment of an individual of at least 7 feet in stature. This information also supports a non-burial feature. In addition, the feature does not have a well defined rectangular shape. It should be noted that there are a preponderance of false positive feature stains within the study area (Figure

7). This plethora of stains can be attributed to the various horizontal and vertical changes in gravelly and clayey soils running throughout the depths below the plowzone. As would be expected, none of these stratigraphic changes represent mottled organic and inorganic soils as burial backfill or straight-line dissections between such fill and natural soil horizons. Presented below are the stratigraphy and associated data characterizing Trench 6 (T6) and Feature 4 (F4).

The soils generally observed within Trench 6 (T6) consist of two strata with an excavation depth of at least 17½ inches below surface (Figure 8). The upper stratum (Stratum I) consists of a 10yr 4/3 brown silty loam with a thickness of 11-1/2-inch below surface. This disturbed plowzone layer is absent of artifact finds. The initial vertical provenience of Feature 4 (F4) lies just below this plowzone layer. The bottom stratum (Stratum II) is composed of a 7.5yr 4/6 strong brown loamy clay.

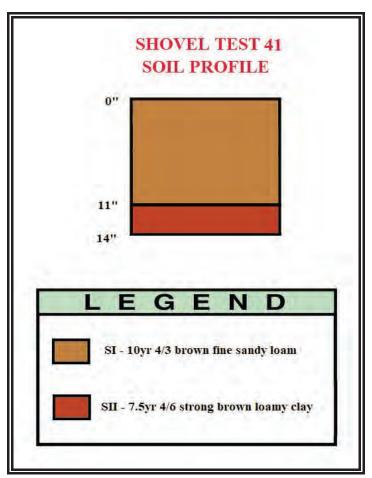


Figure 5. Shovel Test 41 Soil Profile

A 6-inch excavation depth is associated with this culturally sterile bottom stratum. The color and texture of the subsoil changes at a depth of 25 inches below surface in the greater southern portion of the trench where excavation depths increase. Presented below are a few conclusions and recommendations upon completing the second session of fieldwork at the Waters Family Cemetery area.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The overlying stratigraphy encountered within the study area consists of a plowzone overlying subsoil. The minor recovery of three historic artifacts is confined to these disturbed soils and represents a very limited field or trash scatter dating to the early-middle nineteenth century. The distribution and density of these materials is thought to be too widely scattered and low to meet the criteria followed here toward the identification of a new archeological site. For the purposes of this study, the criterion for the definition of an archeological site is the recovery of three or more prehistoric or historic artifacts from a single excavation unit or contiguous units. Given the distance of 30 to 110 feet between the recovered historic artifacts, this criterion is not met. Neither historic



Figure 6. Photograph Depicting a Plan View of Feature 4 (F4)within Trench 6 (T6)

or prehistoric materials finds are associated with the excavation of trenches. Only one soil anomaly appears to have been identified during this subsurface excavation task. Although the anomaly does not appear to be human-burial-related, its classification as cultural or natural is currently unknown. Because the feature development process and function are unknown, it is recommended that this soil anomaly undergoes hand excavation as part of a Phase II investigation in the third session of fieldwork. The goal is to determine if this feature is cultural, burial-related, and potentially significant as an archeological resource.



Figure 7. Photograph Depicting a Complexity of Subsoil in a Selected Soil Profile and Trench Floor

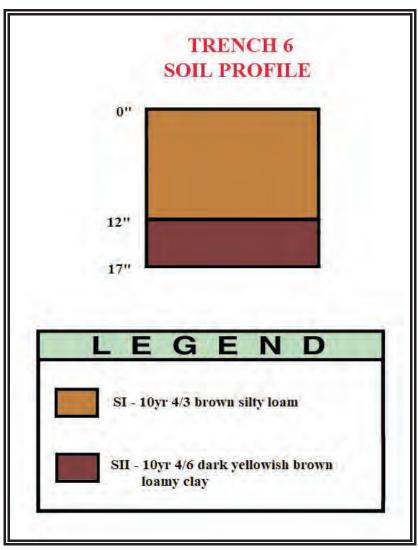


Figure 8. Trench 6 Soil Profile

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EDUCATION

The Catholic University of America, Washington, D.C., Ph.D., Anthropology, 1996. Dissertation: *An Analysis of the Williamson Site: Examination of Intrasite Variation, Overall Site Function, and Settlement Pattern Position of a Paleoindian Period Site.*

The American University, Washington, D.C., M.A., Anthropology, 1985.

University of Maryland, College Park, Maryland, B.S., Business Administration, 1978.

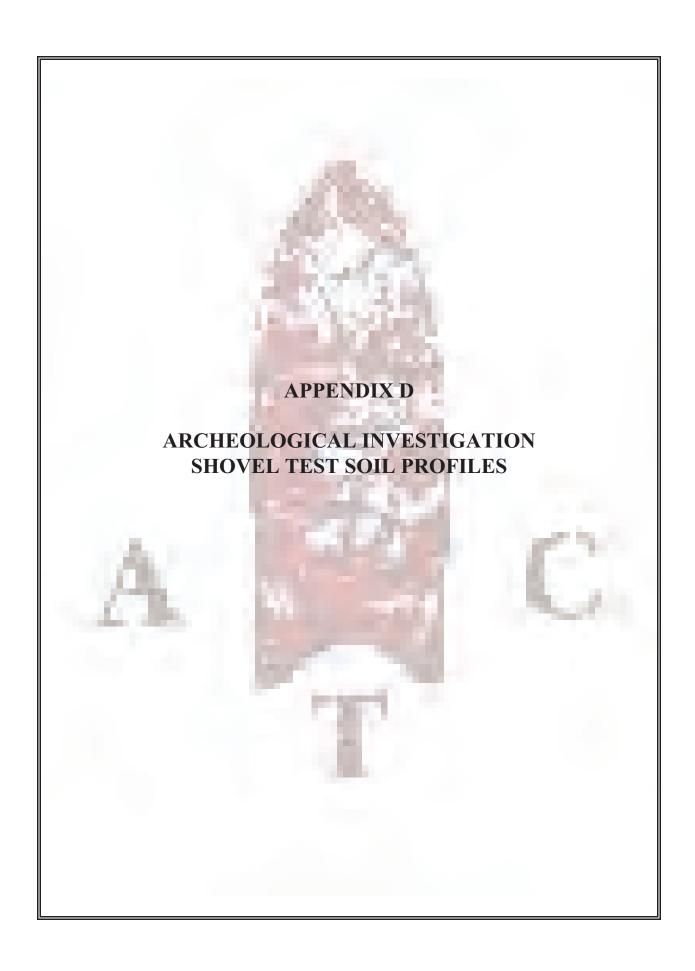
PROFESSIONAL HISTORY

1996 to Present: Archeological Testing and Consulting, Inc., Silver Spring, Maryland

- Business/Project Manager Primary responsibilities include: corporate promotion and the development of new clients, maintenance of existing clients, submission and follow-up of technical/cost proposals, project staffing, budgeting and purchasing, and bookkeeping and payroll.
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TEACHING EXPERIENCE

Montgomery College, Rockville and Germantown, Maryland: Adjunct Faculty Position Spring, 1998 through Spring, 2003.



ARCHEOLOGICAL INVESTIGATION SHOVEL TEST SOIL PROFILES

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
1 T6	10yr 4/4 dark yellowish brown clayey loam 0-10-1/2"	7,5yr 5/6 strong brown loamy clay 10-1/2-13-1/2"	
2 T6	10yr 4/4 dark yellowish brown clayey loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-13-1/2"	
3 T7	10yr 4/4 dark yellowish brown clayey loam 0-10"	7.5yr 5/6 strong brown loamy clay 10-13"	
4 T7	10yr 4/4 dark yellowish brown clayey loam 0-12-1/2"	7.5yr 5/8 strong brown loamy clay 12-1/2-15-1/2"	
5 T8	10yr 4/4 dark yellowish brown loam 0-12"	7.5yr 4/6 strong brown loamy clay 12-15-1/2"	
6 Y8	10yr 4/4 dark yellowish brown loam 0-10"	7.5yr 4/6 strong brown loamy clay 10-13"	
7 T9	10yr 4/4 dark yellowish brown loam 0-11-1/2"	7.5yr 4/6 strong brown loamy clay 11-1/2-14-1/2"	
8 T9	shovel test unexcavated	Trench 2 ground disturbance	
9 T10	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-13-1/2"	
10 T10	shovel test unexcavated	Trench 2 ground disturbance	

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
11 T21	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-13-1/2"	
12 T21	unexcavated shovel test location	Trench 2 ground disturbance	
13 T22	10yr 4/4 dark yellowish brown loam 0-12-1/2"	7.5yr 5/6 strong brown loamy clay 12-1/2-15-1/2"	
14 T22	10yr 4/4 dark yellowish brown loam 0-11-1/2"	7.5yr 5/6 strong brown loamy clay 11-1/2-14-1/2"	
15 T23	10yr 4/4 dark yellowish brown loam 0-11-1/2"	7.5yr 4/6 strong brown loamy clay 11-1/2-14-1/2"	
16 T23	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-13-1/2"	
17 T24	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-14"	
18 T24	10yr 4/4 dark yellowish brown loam 0-13"	7.5yr 5/6 strong brown loamy clay 13-16"	
19 T25	10yr 4/4 dark yellowish brown clayey loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-13-1/2"	
20 T25	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-14"	

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
21 T26	10yr 4/4 dark yellowish brown loam 0-11-1/2"	7.5yr 5/6 strong brown loamy clay 11-1/2-14-1/2"	
22 T26	10yr 4/4 dark yellowish brown loam 0-11-1/2"	7.5yr 5/6 strong brown loamy clay 11-1/2-14"	
23 T27	10yr 4/4 dark yellowish brown clayey loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-14-1/2"	
24 T31	10yr 4/4 dark yellowish brown clayey loam 0-12-1/2"	7.5yr 5/6 strong brown loamy clay 12-1/2-15-1/2"	
25 T30	10yr 4/4 dark yellowish brown loam 0-13"	7.5yr 5/6 strong brown loamy clay 13-16"	
26 T30	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 5/6 strong brown loamy clay 10-1/2-14"	
27 T29	10yr 4/4 dark yellowish brown loam 0-13-1/2"	7.5yr 5/6 strong brown loamy clay 13-1/2-16-1/2"	
28 T29	10yr 4/4 dark yellowish brown clayey loam 0-11"	7.5yr 5/6 strong brown loamy clay 11-14"	
29 T28	10yr 4/4 dark yellowish brown clayey loam 0-9-1/2"	7.5yr 5/6 strong brown loamy clay 9-1/2-13"	
30 T28	10yr 4/4 dark yellowish brown loam 0-12"	7.5yr 5/6 strong brown loamy clay 12-15"	

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
31 T32	10yr 4/4 dark yellowish brown loam 0-13-1/2"	7.5yr 5/6 strong brown loamy clay 13-1/2-16-1/2"	
32 T32	10yr 4/4 dark yellowish brown loam 0-11"	7.5yr 4/6 strong brown loamy clay 14"	
33 T33	10yr 4/4 dark yellowish brown sandy clay loam 0-11"	7.5yr 5/6 strong brown loamy clay 11-14"	
34 T34	10yr 4/4 dark yellowish brown sandy loam 0-10-1/2"	10yr 3/6 dark yellowish brown loamy clay 10-1/2-13-1/2"	
35 T35	10yr 4/4 dark yellowish brown sandy loam 0-10"	10yr 3/6 dark yellowish brown loamy clay 10-13"	
36 T35	10yr 4/4 dark yellowish brown loam 0-11"	10yr 4/6 dark yellowish brown loamy clay 11-15"	
37 T20	10yr 4/4 dark yellowish brown loam 0-8-1/2"	7.5yr 4/6 strong brown loamy clay 8-1/2-11-1/2"	excavation halted - impenetrable rock
38 T19	10yr 4/3 brown clayey loam w/gravel 0-8"	7.5yr 4/6 strong brown loamy clay 8-12"	
39 T19	10yr 4/3 brown clayey loam w/ gravel 0-9-1/2"	7.5yr 4/6 strong brown loamy clay 9-1/2-12-1/2"	
40 T18	10yr 4/3 brown clayey loam w/ gravel 0-10-1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-13-1/2"	

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
41 T18	10yr 4/3 brown sandy loam w/gravel 0-11"	7.5yr 4/6 strong brown loamy clay 11-14"	
42 T17	10yr 4/3 brown sandy loam 0-11-1/2"	7.5yr 4/6 strong brown loamy clay 11-1/2-14-1/2"	
43 T17	10yr 4/3 brown sandy loam 0-10-1/2"	10yr 4/6 dark yellowish brown loamy clay 10-1/2-11-1/2"	excavation halted - impenetrable rock
44 T16	10yr 4/4 dark yellowish brown loam 0-11"	7.5yr 4/6 strong brown loamy clay 11-14"	
45 T16	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-13-1/2"	
46 T15	shovel test unexcavated	Trench 4 ground disturbance	
47 T15	10yr 4/3 brown clayey loam 0-9-1/2"	excavation halted - impenetrable rock	
48 T14	10yr 4/4 dark yellowish brown loam 0-9-1/2"	7.5yr 4/6 strong brown loamy clay 9-1/2-13"	
49 T13	10yr 4/4 dark yellowish brown clayey loam 0-11"	10yr 3/6 dark yellowish brown loamy clay 11-12"	excavation halted - impenetrable rock
50 T13	10yr 4/4 dark yellowish brown loam 0-10-1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-13-1/2"	

SHOVEL TEST NO. TRENCH ASSOCIATION	STRATUM I	STRATUM II	STRATUM III+
51 T12	10yr 4/3 brown loam 0-10-1/2"	10yr 3/6 dark yellowish brown loamy clay 10-1/2-13-1/2"	
52 T12	10yr 4/3 brown loam 0-10-1/2"	excavation halted - impenetrable rock	
53 T11	10yr 4/4 dark yellowish brown clayey loam 0-13"	7.5yr 4/6 strong brown loamy clay 13-16"	
54 T11	10yr 4/4 dark yellowish brown clayey loam 0-10 -1/2"	7.5yr 4/6 strong brown loamy clay 10-1/2-13-1/2"	