

County Council Of Howard County, Maryland

2010 Legislative Session

Legislative Day No. 8

Resolution No. 97-2010

Introduced by: The Chairperson at the request of the County Executive

A RESOLUTION revising Chapter 4, Adequate Public Facilities Test Evaluation Requirements, of Volume III (Roads and Bridges) of the Design Manual in order to amend the standards and specifications relating to the adequate public facilities evaluation specific to Downtown Columbia.

Introduced and read first time _____, 2010.

By order _____
Stephen LeGendre, Administrator

Read for a second time at a public hearing on _____, 2010.

By order _____
Stephen LeGendre, Administrator

This Resolution was read the third time and was Adopted___, Adopted with amendments___, Failed___, Withdrawn___, by the County Council on _____, 2010.

Certified By _____
Stephen LeGendre, Administrator

NOTE: text in strike-out indicates deletions from existing law; TEXT IN SMALL CAPITALS indicates additions to existing law; Double strike-out indicates material deleted by amendment; Underlining indicates material added by amendment.

1 **WHEREAS**, in accordance with Section 18.210 of the Howard County Code, the
2 Design Manual sets forth Howard County’s technical standards for the design and
3 construction of roads and highways in Howard County; and
4

5 **WHEREAS**, on February 1, 2010, following several public hearings and
6 worksessions, the Howard County Council adopted Bill 58-2009 which approved an
7 amendment to General Plan 2000, known as the Downtown Columbia Plan for the
8 purpose of revitalizing and redeveloping Downtown Columbia; and
9

10 **WHEREAS**, in order to fully implement the Plan, additional legislation is
11 required, including amendments to the Adequate Public Facilities Act (the “Act”); and
12

13 **WHEREAS**, specifically, the Downtown Columbia Plan states that Act
14 amendments should eliminate the “Constrained Facilities” provision so that, in the future,
15 all roads serving Downtown Columbia will be subject to the Act; establish a more urban
16 level of service standard for evaluating all County-controlled intersections serving
17 Downtown Columbia; and assure safe and efficient pedestrian and bicycle access and
18 circulation; and
19

20 **WHEREAS**, pursuant to Council Bill No. ____-2010, the Department of Planning
21 and Zoning has recommended amendments to the Act in accordance with the Downtown
22 Columbia Plan; and
23

24 **WHEREAS**, pursuant to Council Resolution No. ____-2010, the list of constrained
25 road facilities in Howard County is proposed to be amended in accordance with the
26 Downtown Columbia Plan; and
27

28 **WHEREAS**, the Director of the Department of Public Works has proposed a
29 revision to Chapter 4, Adequate Public Facilities Test Evaluation Requirements, of Volume
30 III (Roads and Bridges) of the Design Manual in accordance with changes to the Act and
31 the Downtown Columbia Plan; and
32

1 **WHEREAS**, the Public Works Board approved the revision at their meeting on
2 or about July 13, 2010.

3

4 **NOW, THEREFORE, BE IT RESOLVED** by the County Council of Howard
5 County, Maryland this ____ day of _____, 2010 that it amends Chapter 4,
6 Adequate Road Facilities Test Evaluation Requirements, of Volume III (Roads and
7 Bridges) of the Design Manual as shown in the attached Exhibit A.

8

9 **AND BE IT FURTHER RESOLVED**, by the County Council of Howard
10 County, Maryland that the Director of the Department of Public Works is authorized to
11 publish Chapter 4 and to make any modifications necessary to the Table of Contents or to
12 correct obvious errors in section references and numbers, capitalization, spelling,
13 grammar, headings, and other similar matters.

14

15 **AND BE IT FURTHER RESOLVED**, by the County Council of Howard
16 County Maryland, that the revisions to Chapter 4, Adequate Road Facilities Test
17 Evaluation Requirements, of Volume III (Roads and Bridges) shall be effective when
18 Council Bill No. ____-2010 is effective.

CHAPTER 4**ADEQUATE [[ROAD]] TRANSPORTATION FACILITIES TEST EVALUATION REQUIREMENTS****4.1 Purpose**

This chapter of the Design Manual provides the guidelines for the preparation of the portion of the Traffic Study required pursuant to the Adequate Public Facilities requirements of the Subdivision and Land Development Regulations. The purpose of this portion of the Traffic Study is to determine the level of service of intersections and critical roadway segments within an impact area of a proposed subdivision or land development when the project is phased or completed.

The intent of the Adequate Public Facilities requirements is to direct new development to areas where road facilities are adequate and to require mitigation where deficiencies exist. The developer is required to analyze the intersections and critical links in the vicinity of the proposed development and pass the test for adequate road facilities as a condition of subdivision and land development approval.

4.2 GENERAL COUNTY Requirements**A. Projects Requiring Evaluation/Traffic Study OUTSIDE OF THE DOWNTOWN COLUMBIA AREA**

An Adequate Road Facilities Test Evaluation is required in most cases for property going through the subdivision and/or land development process and is to be submitted with the first submission to the County. The development must pass the test or have an approved mitigation plan, if necessary, to proceed through the process. This evaluation will show the traffic conditions on the collector and higher classified highway intersections in the vicinity of the project. The evaluation will be based upon the scheduled phase and/or completion year of the project. All projects that are not classified as comprehensive or phased are classified as Conventional Projects and the analysis time frame will be three years (e.g., 2005 - 2008) from the first submission to the County. Projects that are zoned new town, planned golf course community, mixed use, AND R-A-15 are considered comprehensive projects and/or phased. For comprehensive and phased projects, the developer is required to submit a phasing and completion schedule, which will be the basis for establishing the test years.

FOR PROJECTS WITHIN THE BOUNDARIES OF DOWNTOWN COLUMBIA, THE STANDARDS AND EVALUATION REQUIREMENTS FOUND IN SECTION 4.9 WILL BE USED IN PLACE OF THOSE FOUND IN THIS SECTION (SECTION 4.2 A THROUGH C). ALL OTHER SECTIONS OF THIS CHAPTER WILL APPLY AS NOTED.

B. Level of Service

The intersection level of service (LOS) standard for County-controlled intersections is LOS D. FOR ALL State-controlled intersections THE LEVEL OF SERVICE STANDARD IS LOS E. The LOS EVALUATION SHALL BE for the overall intersection.

THE INTERSECTION STANDARD FOR DOWNTOWN COLUMBIA CAN BE FOUND IN SECTION 4.9.

C. Study Area

Projects are required to evaluate the designated intersections in the impact area of the site. The impact area of a project is defined BELOW. PROJECTS WITHIN DOWNTOWN COLUMBIA SHALL REFER TO SECTION 4.9

- IN PLANNED SERVICE AREA FOR PUBLIC WATER AND SEWER - In that portion of the County in the Planned Service Area for Public Water and Sewer, an “Impact Area” means an area up to one and one-half road miles in all directions from each project entrance on a County or State road, but not beyond the intersection of a major collector or higher classified road with a major collector or higher classified road. The first intersection in all directions that meets this definition shall be evaluated.
- IN NO-PLANNED SERVICE AREA FOR PUBLIC WATER AND SEWER - In that portion of the County in the No-Planned Service Area for Public Water and Sewer, an “Impact Area” means an area up to two road miles in all directions from each project entrance on a County or State road, but not beyond the intersection of a minor collector or higher classified road with a minor collector or higher classified road. The first intersection in all directions that meets this definition shall be evaluated.

When a project’s impact area crosses the Planned Service Area Boundary, the boundary limitations and intersection evaluation criteria will change to the applicable standards of the service area entered.

Classifications of the roadway segments in the intersections will be governed by the General Plan Highways Map. The General Plan Highways Map will be used to establish which intersections will be analyzed in the Adequate Road Facilities Test Evaluation except as provided in Section 4.4.

4.3 Traffic Volumes

An Adequate Facilities Test Evaluation will be conducted in accordance with the procedures and technical standards identified in Chapter 5. SPECIFIC REFERENCE IS MADE TO THE LATEST EDITIONS OF THE FOLLOWING PUBLICATIONS: ITE TRIP GENERATION HANDBOOK, ITE TRANSPORTATION IMPACT ANALYSIS FOR SITE DEVELOPMENT, AND ITE TRIP GENERATION. Each intersection is required to be analyzed for the end of each

scheduled phase and/or scheduled completion year of the project. The intersection will be tested with the traffic volumes that consist of the following components:

A. Existing Traffic Volumes

Existing traffic volumes that have been field counted at the intersection as of the date the developer submits the application for approval of the project to the Department of Planning and Zoning.

B. Projected Site-Generated Traffic Volumes

The project's projected site-generated traffic volumes at the intersection in the scheduled phase and/or completion years. SITE-GENERATED PEAK HOUR TRIPS SHALL BE ESTIMATED BASED ON THE LATEST EDITION OF TRIP GENERATION, PUBLISHED BY THE INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) OR TRIP GENERATION STUDIES APPROVED BY HOWARD COUNTY STAFF.

C. Projected Background Development

1. Unrecorded Previously Approved Development

Traffic volumes projected for the intersection from other proposed subdivisions and site development plans that have passed the test for adequate road facilities prior to the submission of the application for approval of the project but not yet recorded (if not previously counted).

2. Recorded Previously Approved Development

Traffic volumes generated by subdivisions or site development plans that were recorded or approved prior to submission of the application for approval of the project and are scheduled to be completed before or during the scheduled phase and/or completion year of the proposed project (if not previously counted).

3. Background Traffic Growth Rate

Background traffic growth of 3% per year compounded for up to three years or other rate if adequate traffic data exists to support a change. Comprehensive or phased projects will use a background traffic growth of 6% compounded per year beyond year three in the study. The developer may propose or the Department may require different background traffic growth rates if validated field counts and other traffic data about the intersection support a different rate.

4.4 Roadway Conditions

The analysis of the intersections shall be based upon:

A. Existing Roadway Conditions

Actual existing intersection conditions in existence as of the date the developer submits the application for approval to the Department of Planning and Zoning for the project.

B. Proposed Roadway Conditions

New road facilities or improvements to existing road facilities that are included in developer's mitigation plans submitted prior to date of application of the project to the Department of Planning and Zoning. These plans shall be included in the evaluation if they are scheduled to be completed before or during the scheduled phase, and/or completion year of the proposed project.

C. Proposed Capital Program Improvements

New road facilities or improvements to existing road facilities identified in the County's current Capital Program or extended Capital Program as defined in Title 22 of the Howard County Code and/or the Maryland Consolidated Transportation Program for which sufficient funds have been included so that the facilities will be substantially completed before or during the scheduled phase and/or completion year of the project, unless the Director of Public Works determines that such facilities or improvements are not likely to be completed by that time.

4.5 GENERAL COUNTY Mitigation Requirements

When the analysis of an intersection indicates OPERATIONS will be below the adopted STANDARDS of SECTIONS 4.2, the developer shall revise the project with one or more of the following actions LISTED BELOW. INTERSECTIONS AND ROADWAYS WITHIN DOWNTOWN COLUMBIA SHALL FOLLOW THE GUIDELINES SET FORTH IN SECTION 4.9.

A. Project Schedule Deferment

Defer the project until a future date when the Adequate Road Facilities Test Evaluation indicates that the level of service standard will not be exceeded.

B. Project Scope Reduction

Reduce the scope of the proposed project to meet the level of service standard.

C. Roadway/Intersection Mitigation Plan

Develop a mitigation plan for the intersection(s) that will increase the capacity on road facilities in the impact area so that the level of service after construction of the project would be equal to the level of service if the project had not been constructed but not more than the minimum level of service. Mitigation means the funding of improvements by the developer, approved by the Department, to off-site road

facilities. Mitigation measures may include any intersection capacity improvement except grade-separation of the roadways and ramps within the intersection or improvements to the through lanes of intermediate arterial and higher classified roads. Please note the following:

- Existing Traffic Signal Modification: For existing traffic signal(s), mitigation may initially appear possible by adjustments in the signal phasing and/or timing. In reality, this is rarely possible due to signal coordination, storage of queued vehicles, etc. The developer is required to obtain advance approval from the agency responsible for the existing traffic signal maintenance prior to proposing modification to signal as a mitigation measure.
- Grade Separation: When grade separation of the intersection is the only viable mitigation alternative, full mitigation will not be required. When grade separation of an intersection or improvement to the through lanes is the only feasible alternative to providing mitigation, the County will program these improvements into the Capital Improvement Budget request for consideration of adoption. This request will be based upon receiving a payment in lieu of the cost of the partial mitigation from the developer.

1. Shared Developer Mitigation Plan

When two or more developers are proposing mitigation plans for the same intersection, the Department will apportion the improvements between the parties based upon their proportion of the critical movements in the intersection. In the event that the timing of the development, technical infeasibility, or other factors do not allow the apportionment of the improvements, the Department shall collect from each developer the proportionate cost of the improvements corresponding to the development's proportion of the critical movements in the intersection. The funds collected will satisfy the developer's obligation for mitigation for the affected intersection. These funds will be collected on the basis that these funds will be programmed into a future Capital Project for the purpose of improving the intersection to mitigate the traffic generated by the multiple projects.

2. Capital Project Impact

When a developer's mitigation plan is proposed with a time frame that shows that a future capital project by the State and/or County will remove or negate the intersection improvements, the Department may waive the improvements and collect the estimated construction costs of the mitigation. These funds will then be programmed into a future Capital Project. Alternately, the improvements may be delayed to a certain date if a major facilities agreement is executed guaranteeing the improvements and the time schedule. If a proposed mitigation plan provides only temporary improvements due to proposed improvement plans for the road facility by others, a waiver may be granted for the improvements if the waiver does not cause traffic safety problems. In the event that a waiver is granted, the developer will be required to enter into a major facilities agreement to pay the

cost of mitigation to the County, which will be used to help fund the cost of a Capital Project for future road facility improvements.

3. Constrained Roadway Impact

When a developer is required to evaluate a traffic capacity-constrained road facility, the Adequate Road Facilities Test Evaluation is still required. In the event that the level of service is below the standards in this manual, a mitigation plan is required. However, mitigation will be required to the extent that the mitigation plan improvements do not have a negative impact on the physical and right-of-way characteristics that have caused the constrained road facility to be designated. The developer may obtain the listing of constrained road facilities from the Department. The listing of constrained road facilities will be established by a resolution of the Howard County Council.

4.6 **Transitional Requirements**

If a project in the submission process has received sketch plan, preliminary plan, or final plan approval prior to the effective date of the Adequate Public Facilities Ordinance, an Adequate Road Facility Test Evaluation is not required provided that the project continues to meet the milestones established in the subdivision regulations.

If a project passes the test but is deferred because it cannot receive a school allocation, the Department may require an update of the data for Adequate Road Facility Test Evaluation and accompanying mitigation plan provided that the changes to the plan do not increase the cost of mitigation.

Once a subdivision has passed the Adequate Road Facilities Test Evaluation, no further approval for adequate road facilities for that project is required provided that the project's milestones are met, the developer executes a developer agreement and/or major facilities agreement for the proposed mitigation plan, the project is recorded, and in the case of site development plans, the traffic volume from the project does not exceed the traffic volume in the traffic study that formed the basis for passing the test during the subdivision plan approval process. If the traffic volume exceeds the volumes in the subdivision traffic study, the site development plan will be tested for the excess traffic.

HOWEVER, PROJECTS WITHIN DOWNTOWN COLUMBIA ARE SUBJECT TO A 5-YEAR MONITORING STUDY CONDUCTED AND ISSUED BY THE COUNTY. SPECIFICALLY, IN CASES WHERE A SITE DEVELOPMENT PLAN IS SUBMITTED IMMEDIATELY AFTER THE ISSUE DATE OF THE COUNTY STUDY, AND WHERE, BASED ON THE FINDINGS OF THE COUNTY STUDY, TRAFFIC DATA AT TEST INTERSECTIONS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ASSUMPTIONS PROJECTED BY THE TRAFFIC STUDY THAT FORMED THE BASIS FOR PASSING THE ADEQUATE ROAD FACILITY TEST DURING THE FDP STAGE OF THE SUBDIVISION PROCESS, THEN THE FDP TRAFFIC STUDY SHALL BE MODIFIED USING THE MOST RECENTLY ISSUED 5-YEAR MONITORING DATA AS A GUIDE. THIS MODIFIED STUDY SHALL THEN BE USED AS THE BASIS FOR PASSING THE ADEQUATE ROAD FACILITY TEST FOR EACH SITE DEVELOPMENT

PLAN SUBMITTED AFTER THE COUNTY STUDY ISSUANCE DATE. A SDP SUBMITTED PRIOR TO THE ISSUANCE OF THE FIRST COUNTY 5-YEAR STUDY SHALL BE SUBJECT TO THE TRAFFIC STUDY SUBMITTED WITH THE APPROVED FDP. SEE SECTION 4.9.4 MONITORING.

4.7 Exemptions

Projects which do not generate any traffic are exempt from the requirement of submitting and passing the Adequate Road Facilities Test Evaluation. Site Development Plans which do not increase the traffic beyond what is already generated from the site at the time of application are exempt from submitting and passing the Adequate Road Facilities Test Evaluation. In order to obtain the exemption, an affidavit must be submitted and approved which provides an explanation of why no additional traffic is generated.

The following projects are exempt from the requirements of passing the Adequate Road Facilities Test Evaluation:

A. Exempt Non-Residential Projects

1. Non-Residential Subdivision Plans
 - a. A non-residential resubdivision (see subdivision regulations)
 - b. An exempt Government Facility, as follows:
 - 1) A facility to be owned or operated by the Federal Government, State Government, Howard County Public Schools, or any agency thereof.
 - 2) A facility owned by Howard County or any agency thereof where essential County Government services are provided, including police services, fire prevention and suppression services, emergency medical services, highway maintenance, detention facilities, water treatment and supply, sewage disposal and treatment, and solid waste disposal.
2. Non-Residential Site Development Plans
 - a. An exempt Government Facility as defined in Section 4.7.A.1.b.2). above.

B. Exempt Residential Projects

1. Parcel Divisions (see Subdivision and Land Development Regulations)
2. Exempt Divisions (see Subdivision and Land Development Regulations)
3. Subdivisions in agricultural preservation districts for dwellings of the owner or the owner's child(ren).

4. Residential Resubdivisions (see Subdivision and Land Development Regulations) that do not increase the unit of housing units allowed.
5. Minor Subdivisions
6. Residential Site Development Plans PREVIOUSLY TESTED IN THE SUBDIVISION PROCESS for single family attached and detached housing.

4.8 Approval Requirements

A. Subdivision Approval

Once a subdivision has been approved for Adequate Road Facilities, no further approval for Adequate Road Facilities for that project is required during the subdivision or site development plan approval process, provided that:

1. The developer continues to meet all required milestones;
2. The developer executes a major facilities agreement for any proposed mitigation;
3. The project proceeds to recordation and is recorded; and,
4. The traffic volume from the project in the site development plan traffic study does not exceed the traffic volume in the projected traffic study that formed the basis for passing the Adequate Road Facilities Test during the subdivision plan approval process. If the traffic volume in the site development plan exceeds the traffic volume in the subdivision traffic study, the site development plan will be tested for the excess traffic only. THIS PROVISION DOES NOT APPLY IN DOWNTOWN COLUMBIA.

EXCEPTION:

PROJECTS WITHIN DOWNTOWN COLUMBIA ARE SUBJECT TO A 5-YEAR MONITORING STUDY CONDUCTED AND ISSUED BY THE COUNTY. SPECIFICALLY, IN CASES WHERE A SITE DEVELOPMENT PLAN IS SUBMITTED IMMEDIATELY AFTER THE ISSUE DATE OF THE COUNTY STUDY, AND WHERE, BASED ON THE FINDINGS OF THE COUNTY STUDY, TRAFFIC DATA AT TEST INTERSECTIONS ARE FOUND TO DIFFER SIGNIFICANTLY FROM THE ASSUMPTIONS PROJECTED BY THE TRAFFIC STUDY THAT FORMED THE BASIS FOR PASSING THE ADEQUATE ROAD FACILITY TEST DURING THE FDP STAGE OF THE SUBDIVISION PROCESS, THEN THE FDP TRAFFIC STUDY SHALL BE MODIFIED USING THE MOST RECENTLY ISSUED 5-YEAR MONITORING DATA AS A GUIDE. THIS MODIFIED STUDY SHALL THEN BE USED AS THE BASIS FOR PASSING THE ADEQUATE ROAD FACILITY TEST FOR EACH SITE DEVELOPMENT PLAN SUBMITTED AFTER THE COUNTY STUDY ISSUANCE DATE. A SDP SUBMITTED PRIOR TO THE ISSUANCE OF THE FIRST COUNTY 5-YEAR STUDY SHALL BE SUBJECT TO THE TRAFFIC STUDY SUBMITTED WITH THE APPROVED FDP. SEE SECTION 4.9.4 MONITORING.

B. Site Development Plan

Once a site development plan has been approved for Adequate Road Facilities, no further approval for Adequate Road Facilities is required, provided that the developer executes a developer agreement and/or a major facilities agreement for any proposed mitigation OR AS STIPULATED IN THE EXCEPTION ABOVE.

4.9 REQUIREMENTS – DOWNTOWN COLUMBIA

4.9.1 EVALUATION REQUIREMENTS

A. PROJECTS REQUIRING EVALUATION/TRAFFIC STUDY

THIS SECTION SHALL BE USED IN PLACE OF SECTION 4.2, REQUIREMENTS, FOR DEVELOPMENT PROJECTS LOCATED WITHIN DOWNTOWN COLUMBIA AS DEFINED IN THE NEW TOWN ZONING REGULATIONS. ALL OTHER SECTIONS OF CHAPTER 4 REMAIN APPLICABLE TO THE PROJECTS AS NOTED.

AN ADEQUATE ROAD FACILITIES EVALUATION CONSISTS OF A SERIES OF TESTS AND IS REQUIRED FOR MOST PROPERTY GOING THROUGH THE SUBDIVISION AND/OR LAND DEVELOPMENT PROCESS. IT IS TO BE SUBMITTED WITH THE FIRST SUBMISSION TO THE COUNTY. THIS EVALUATION DETERMINES THE DEVELOPMENT IMPACT ON TRAFFIC CONDITIONS IN THE VICINITY OF THE PROJECT AND WILL BE BASED UPON THE SCHEDULED PHASE AND/OR COMPLETION YEAR OF THE PROJECT. THE DEVELOPMENT MUST PASS THE TESTS OR HAVE AN APPROVED MITIGATION PLAN TO PROCEED THROUGH THE PROCESS. DEVELOPMENTS LOCATED WITHIN DOWNTOWN ARE CONSIDERED COMPREHENSIVE AND/OR PHASED PROJECTS. THE DEVELOPER IS REQUIRED TO SUBMIT A PROJECT CONSTRUCTION PHASING AND ANTICIPATED OCCUPANCY SCHEDULE THAT WILL BE THE BASIS FOR ESTABLISHING THE TEST YEARS AND THE SCHEDULE FOR THE COMPLETION OF ANY REQUIRED MITIGATION. CONSTRUCTION OR IMPLEMENTATION OF IMPROVEMENTS IN THE MITIGATION PLAN MUST APPROPRIATELY COINCIDE WITH THE PHASING AND OCCUPANCY SCHEDULE.

B. VEHICLE LEVEL OF SERVICE TEST

1. MINIMUM TRIP THRESHOLD

ALL NEW DEVELOPMENTS IN DOWNTOWN COLUMBIA PROJECTED TO GENERATE 20 OR MORE NET PEAK HOUR TRIPS MUST SUBMIT A TRAFFIC STUDY. DEVELOPMENTS PROJECTED TO GENERATE LESS THAN 20 NET PEAK HOUR TRIPS MAY BE REQUIRED TO SUBMIT A TRAFFIC STUDY IF THE EXISTING CRITICAL LANE VOLUME (CLV) AT THE TEST INTERSECTION IS GREATER THAN CLV 1500. THE CLV MAY BE DETERMINED BY COUNTY MONITORING STUDIES OR THE MOST RECENTLY ACCEPTED AND APPROVED APF STUDY.

2. IMPACT AREA

AT A MINIMUM, THE TRAFFIC STUDY SHALL DETERMINE THE CLV OF THE NEAREST INTERSECTION IN ALL DIRECTIONS AND THE NEXT CLOSEST SIGNALIZED INTERSECTIONS IN ACCORDANCE WITH TABLE 1 BELOW.

TABLE 1 - SIGNALIZED INTERSECTIONS TO BE INCLUDED IN THE TRAFFIC STUDY

NET PEAK HOUR SITE TRIPS	MINIMUM NUMBER OF SIGNALIZED INTERSECTIONS IN EACH DIRECTION
20 – 100	1
101 – 500	2
501 – 800	3
801 – 1500	4
>1500	5

THE IMPACT AREA IS LIMITED TO INTERSECTIONS WITHIN THE CORDON LINE AS IT IS DEFINED IN SECTION 4.9.5. ADDITIONAL INTERSECTIONS OR SIGNIFICANT DRIVEWAY LOCATIONS WITHIN THE CORDON LINE AND IMPACTED BY THE NEW DEVELOPMENT MAY BE REQUIRED IN THE TRAFFIC STUDY BY THE DEPARTMENT OF PLANNING AND ZONING AND DEPARTMENT OF PUBLIC WORKS. IN THE EVENT THAT THE MINIMUM NUMBER OF SIGNALIZED INTERSECTIONS TO BE TESTED, AS INDICATED IN TABLE 1, EXTENDS BEYOND THE CORDON LINE THEN ONLY THOSE INTERSECTIONS WITHIN THE CORDON LINE WILL BE EVALUATED REGARDLESS OF NUMBER.

3. INTERSECTION STANDARD

THE INTERSECTION STANDARD IN THE DOWNTOWN AREA SHALL NOT EXCEED CLV 1600 FOR THE OVERALL INTERSECTION. THIS STANDARD IS SUBJECT TO A TRANSITIONAL CLV REQUIREMENT. DURING THE TRANSITION PHASE TO CLV 1600, ALL DOWNTOWN INTERSECTION TESTING AND MITIGATION WILL BE SUBJECT TO THE FOLLOWING:

- (A) ALL DOWNTOWN INTERSECTIONS MUST BE MITIGATED PER SECTION 4.9.2 USING AN INITIAL CLV OF 1500.
 - (1) IN THE EVENT THE SUM OF EXISTING AND PROJECTED BACKGROUND TRAFFIC VOLUMES (TOTAL PROJECTED BACKGROUND TRAFFIC)

RESULT IN A CLV EXCEEDING 1500 BEFORE THE ADDITION OF SITE GENERATED TRAFFIC, THEN THE ACCEPTABLE CLV STANDARD FOR MITIGATION AT THE SUBJECT INTERSECTION WILL BE THE CLV AS DETERMINED BY TOTAL PROJECTED BACKGROUND TRAFFIC.

(2) IF IT IS DETERMINED BY DPZ/DPW THAT:

- (I) AN INTERSECTION CANNOT BE IMPROVED TO THE APPLICABLE CLV STANDARD AS DESCRIBED ABOVE OR,
- (II) THE PROPOSED IMPROVEMENT TO ATTAIN THE APPLICABLE CLV STANDARD DOES NOT SATISFY THE DESIGN BALANCE AS FURTHER DISCUSSED IN SECTION 4.9.2 OR
- (III) MITIGATION OF THE INTERSECTION TO THE APPLICABLE CLV STANDARD WOULD REQUIRE THE CONSTRUCTION OF AN IMPROVEMENT WHICH DPZ, IN CONSULTATION WITH DPW, FINDS NOT TO BE NECESSARY TO MAINTAIN AN INTERSECTION CLV OF NO MORE THAN 1600 AT THE TIME OF FULL BUILDOUT OF THE DOWNTOWN COLUMBIA PLAN,

THEN, THE APPLICABLE CLV STANDARD WILL INCREASE BY INCREMENTS OF 50 UNTIL AT LEAST ONE OF THE CONDITIONS ABOVE IS NO LONGER TRUE.

- (B) THE ADJUSTED INTERSECTION CLV WILL THEN BECOME THE NEW ACCEPTED CLV STANDARD FOR THAT INTERSECTION AND WILL BE USED FOR ALL SUBSEQUENT EVALUATIONS UNTIL IT CAN AGAIN BE DEMONSTRATED THE INTERSECTION CANNOT BE MITIGATED TO THE CLV STANDARD OR SATISFY THE DESIGN BALANCE, AT WHICH TIME THE CLV WILL INCREASE BY INCREMENTS OF 50 UNTIL EITHER CONDITION IS SATISFIED.
- (C) IN NO CASE SHALL THE INCREMENTAL ADJUSTMENT OF THE INTERSECTION CLV EXCEED 1600.
- (D) WHEN ANALYZING INTERSECTIONS FOR THE TRAFFIC STUDY, THE LATEST VERSION OF MARYLAND STATE HIGHWAY ADMINISTRATION'S (MSHA) CRITICAL LANE VOLUME (CLV) ANALYSIS PROCEDURES MUST BE USED. THE METHODOLOGY WILL FIT MOST INTERSECTION CONFIGURATIONS AND CAN BE VARIED EASILY FOR SPECIAL SITUATIONS AND UNUSUAL CONDITIONS. THE METHODOLOGY IS ALSO DESCRIBED IN THE APPENDIX OF THIS CHAPTER.

4. QUEUING ANALYSIS TEST

IN ADDITION TO A CLV TEST AT APPLICABLE INTERSECTIONS, A QUEUING ANALYSIS SHALL ALSO BE PERFORMED ON ALL APPROACHES OF THE SAME INTERSECTIONS,

AND SHALL INCLUDE LEFT TURN AND THROUGH MOVEMENTS. QUEUE LENGTH SHALL BE CALCULATED DURING THE WEEKDAY PEAK HOURS USING THE PROCEDURES FOUND IN THE APPENDIX. FOR SIGNALIZED INTERSECTION SPACING GREATER THAN 300 FEET, THE QUEUE SHALL NOT EXCEED 80 PERCENT OF THE DISTANCE BETWEEN SIGNALIZED INTERSECTIONS. FOR SIGNALIZED INTERSECTION SPACING LESS THAN 300 FEET, THE QUEUE SHALL NOT EXCEED MORE THAN 90 PERCENT OF THE DISTANCE TO AN ADJACENT SIGNALIZED INTERSECTION.

QUEUEING ANALYSES WHICH EXCEED THE SPECIFIED STANDARD SHALL BE TREATED AS INSUFFICIENT CAPACITY AND MUST BE ADDRESSED UNDER THE MITIGATION PLAN.

5. TRAFFIC VOLUMES

AN ADEQUATE FACILITIES TEST EVALUATION WILL BE CONDUCTED IN ACCORDANCE WITH THE SCOPE, PROCEDURES AND TECHNICAL STANDARDS IDENTIFIED IN CHAPTER 5. SPECIFIC REFERENCE IS MADE TO THE LATEST EDITIONS OF THE FOLLOWING PUBLICATIONS: ITE TRIP GENERATION HANDBOOK, ITE TRANSPORTATION IMPACT ANALYSIS FOR SITE DEVELOPMENT, AND ITE TRIP GENERATION.

SITE-GENERATED PEAK HOUR TRIPS SHALL BE ESTIMATED BASED ON THE LATEST EDITION OF TRIP GENERATION, PUBLISHED BY THE INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) OR TRIP GENERATION STUDIES APPROVED BY HOWARD COUNTY STAFF. NET PEAK HOUR TRIPS ARE DEFINED AS SITE-GENERATED TRIPS MINUS APPROPRIATE REDUCTIONS FOR INTERNAL TRIPS, NON-AUTO TRIPS (I.E., TRANSIT, BIKE, WALKING, AND/OR OTHER NON-AUTO TRIPS), TRANSPORTATION DEMAND MANAGEMENT (TDM) TRIP REDUCTIONS, AND PASS-BY/DIVERTED-LINK TRIPS IN ACCORDANCE WITH THE REFERENCES SITED ABOVE. TEST INTERSECTIONS IN THE IMPACT AREA, AS DESCRIBED BY TABLE 1, ARE REQUIRED TO BE ANALYZED FOR THE END OF EACH SCHEDULED PHASE AND/OR SCHEDULED COMPLETION YEAR OF THE PROJECT. SECTION 4.3, TRAFFIC VOLUMES, IS APPLICABLE TO INTERSECTIONS WITHIN DOWNTOWN COLUMBIA AND SHALL BE USED TO DETERMINE TRAFFIC VOLUMES.

6. ROADWAY CONDITIONS

THE ANALYSIS OF INTERSECTIONS SHALL BE BASED UPON THE GUIDELINES PREVIOUSLY ESTABLISHED IN SECTION 4.4 ROADWAY CONDITIONS, PARTS A THROUGH C.

C. PEDESTRIAN AND BICYCLE LEVEL OF SERVICE TESTS

ALL NEW DEVELOPMENTS MUST SATISFY A PEDESTRIAN LEVEL OF SERVICE (PLOS) NO LESS THAN PLOS C. AND A BICYCLE LEVEL OF SERVICE (BLOS) NO LESS THAN BLOS C FOR ANY STUDY SEGMENT IDENTIFIED AS A BICYCLE ROUTE ON THE

BICYCLE AND PEDESTRIAN CIRCULATION PLAN IN THE DOWNTOWN COLUMBIA PLAN OR A COUNTY APPROVED BICYCLE PLAN. THE STUDY MUST EVALUATE EXISTING AND PROPOSED SIDEWALKS, CROSSINGS AND BICYCLE FACILITIES ALONG THE STUDY SEGMENT.

THE PEDESTRIAN LEVEL OF SERVICE (PLOS) AND BICYCLE LEVEL OF SERVICE (BLOS) SHALL BE CALCULATED AS SHOWN IN THE APPENDIX. HOWEVER, IF IT IS THE FINDING OF DPZ/DPW THAT (i) A REASONABLE ALTERNATIVE BICYCLE OR PEDESTRIAN ROUTE EXISTS OR IS PROPOSED, OR (ii) MEETING THE BLOS OR PLOS STANDARD WOULD NEGATIVELY IMPACT THE BLOS, PLOS, OR THE DESIGN BALANCE AS FURTHER DISCUSSED IN SECTION 4.9.2, THEN THE BLOS OR PLOS TEST, AS APPROPRIATE, IS DEEMED SATISFIED.

D. TRANSPORTATION DEMAND MANAGEMENT STATEMENT

A TRANSPORTATION DEMAND MANAGEMENT (TDM) STATEMENT SHALL BE PROVIDED WITH EACH TRAFFIC STUDY. THE STATEMENT WILL DISCUSS APPROPRIATE STRATEGIES FOR THE DEVELOPMENT PROGRAM PLANNED IN THE FDP OR SDP, HOW THEY MAY BE IMPLEMENTED, AND HOW THE PROPOSED SELECTED STRATEGIES AND IMPLEMENTATION WOULD COMPLEMENT THE EXISTING DOWNTOWN TRANSPORTATION DEMAND MANAGEMENT PLAN. THE STATEMENT SHOULD ALSO DISCUSS THE STATUS OF PAST INITIATIVES, IF APPLICABLE. STATEMENTS SHALL ADDRESS STRATEGIES TO REDUCE AUTOMOBILE TRAVEL AND PROMOTE ALTERNATIVE MEANS OF MOBILITY TO AND FROM THE PROPOSED DEVELOPMENT. A TYPICAL STATEMENT WILL ENCOURAGE ALTERNATIVE MEANS OF MOBILITY THROUGH PROMOTIONAL INCENTIVES AND PROGRAMS, TRANSIT CONTRIBUTIONS, AND OFF-SITE BICYCLE AND PEDESTRIAN FACILITIES IMPROVEMENTS OR OTHER MEASURES. THE SCALE OF THE TDM STATEMENT SHALL REFLECT THE NUMBER OF TRIPS GENERATED BY THE DEVELOPMENT AND THE REMAINING CAPACITY OF THE TRANSPORTATION FACILITY.

4.9.2 DOWNTOWN COLUMBIA MITIGATION REQUIREMENTS

IN ORDER TO OBTAIN DEPARTMENTAL APPROVAL, THE MITIGATION PLAN SHALL ADDRESS THE FINDINGS OF THE VEHICLE, PEDESTRIAN AND BICYCLE LEVEL OF SERVICE TESTS AS WELL AS THE INCLUSION OF THE TDM STATEMENT. ALL MITIGATION PLANS ARE REQUIRED TO INCORPORATE A DESIGN BALANCE BETWEEN SAFETY, MOBILITY, MODES OF TRANSPORTATION, SCALE AND CHARACTER OF THE SURROUNDING AREA, AESTHETICS, AND THE COUNTY GENERAL PLAN.

IF IT IS THE FINDING OF THE DIRECTORS OF PLANNING AND ZONING AND PUBLIC WORKS THAT A PROPOSED MITIGATION PLAN DOES NOT SATISFACTORILY ADDRESS THE DESIGN BALANCE DESCRIBED ABOVE THEN THE COUNTY RESERVES THE RIGHT TO REQUIRE MODIFICATIONS TO THE PROPOSED MITIGATION PLAN.

ALSO, THE DEVELOPER SHALL BE REQUIRED TO SUBMIT A PHASING AND COMPLETION SCHEDULE. IMPLEMENTATION OF IMPROVEMENTS IN THE MITIGATION PLAN MUST APPROPRIATELY COINCIDE WITH THE SIGNIFICANT MILESTONES IN THE PHASING AND COMPLETION SCHEDULE THAT REQUIRED THE MITIGATION.

A. MITIGATION OPTIONS: WHEN ANALYSIS OF AN INTERSECTION INDICATES CLV VALUES EXCEEDING THE REQUIREMENTS OF SECTION 4.9.1.B.3: INTERSECTION STANDARD, THE DEVELOPER SHALL REVISE THE PROJECT AS INDICATED BY THE FOLLOWING.

1. ROADWAY/INTERSECTION MITIGATION PLAN

DEVELOP A MITIGATION PLAN FOR THE INTERSECTION(S) THAT WILL INCREASE THE CAPACITY ON ROAD FACILITIES IN THE IMPACT AREA SO THAT THE LEVEL OF SERVICE AFTER CONSTRUCTION OF THE PROJECT WILL BE EQUAL TO OR BETTER THAN THE LEVEL OF SERVICE/CLV REQUIRED UNDER SECTION 4.9.1.B.3. MITIGATION MEANS FULL FUNDING OF IMPROVEMENTS BY THE DEVELOPER, APPROVED BY THE DEPARTMENT, TO OFF-SITE ROAD FACILITIES. MITIGATION MEASURES MAY INCLUDE ANY INTERSECTION CAPACITY IMPROVEMENT EXCEPT GRADE-SEPARATED ROADWAYS AND RAMPS WITHIN INTERSECTIONS, OR IMPROVEMENTS TO THROUGH LANES OF ROADS CLASSIFIED AS INTERMEDIATE ARTERIALS OR HIGHER. PLEASE NOTE THE FOLLOWING:

(A) **EXISTING TRAFFIC SIGNAL MODIFICATION:** FOR EXISTING TRAFFIC SIGNAL(S), MITIGATION MAY INITIALLY APPEAR POSSIBLE BY ADJUSTMENTS IN THE SIGNAL PHASING AND/OR TIMING. IN REALITY, THIS IS RARELY POSSIBLE DUE TO SIGNAL COORDINATION, STORAGE OF QUEUED VEHICLES, ETC. THE DEVELOPER IS REQUIRED TO OBTAIN ADVANCE APPROVAL FROM THE AGENCY RESPONSIBLE FOR THE EXISTING TRAFFIC SIGNAL MAINTENANCE PRIOR TO PROPOSING MODIFICATION TO A SIGNAL AS A MITIGATION MEASURE.

(B) **GRADE SEPARATION:**

(1) CONSTRUCTION OF A THIRD GRADE-SEPARATED INTERCHANGE ON ROUTE 29 SHALL NOT BE REQUIRED TO ACHIEVE A CLV OF LESS THAN 1600.

(2) WHEN GRADE-SEPARATED ROADWAYS OR ARTERIAL THROUGH LANE IMPROVEMENTS ARE THE ONLY VIABLE MITIGATION ALTERNATIVES, FULL MITIGATION WILL NOT BE REQUIRED BY THE DEVELOPER BUT MAY BE PROVIDED. IF FULL MITIGATION IS NOT PROVIDED THEN FINAL DEPARTMENT SIGNATURE OF THE APPROVED SITE DEVELOPMENT PLAN WILL NOT OCCUR UNTIL:

- (3) THE PROJECT IS FULLY FUNDED IN THE APPROVED CAPITAL BUDGET WITH CONSTRUCTION INITIATING WITHIN 3 YEARS AFTER BUDGET APPROVAL AND
- (4) A MAJOR FACILITIES AGREEMENT HAS BEEN EXECUTED OUTLINING THE IMPROVEMENT COST SHARE, COMPARATIVE CONSTRUCTION SCHEDULES BETWEEN THE IMPROVEMENT AND THE DEVELOPMENT PROJECT, AND OTHER TERMS AND CONDITIONS AS APPLICABLE BETWEEN THE PARTIES.

THE TIME FRAME TO REACH THE MAJOR FACILITIES AGREEMENT WILL BE 3 YEARS FROM THE DATE OF THE SITE DEVELOPMENT PLAN SUBMISSION. IF AN AGREEMENT CANNOT BE EXECUTED WITHIN THAT TIME THEN ANY OF THE FOLLOWING MAY BE CONSIDERED:

- (I) A 1-YEAR EXTENSION MAY BE GRANTED,
- (II) TERMS OF THE AGREEMENT MAY BE MUTUALLY MODIFIED BY THE PARTIES,
- (III) A MODIFIED SITE DEVELOPMENT PLAN MAY BE SUBMITTED,
- (IV) THE SITE DEVELOPMENT PLAN MAY BE WITHDRAWN WITHOUT PREJUDICE.

2. NON-AUTOMOBILE TRIP CREDITS: IN ORDER TO ENHANCE PEDESTRIAN SAFETY AND TO ENCOURAGE TRANSIT AND BICYCLE USE, TRIP CREDITS ARE ALLOWED IF A DEVELOPER IMPROVES AN EXISTING OR PROVIDES A NEW NON-AUTOMOBILE (PEDESTRIAN, BICYCLE, TRANSIT OR TRANSPORTATION DEMAND MANAGEMENT) FACILITY OR PROGRAM ACCORDING TO TABLE 2. USE OF THE TRIP CREDITS IS AT THE DISCRETION AND APPROVAL OF THE DEPARTMENT OF PLANNING AND ZONING AS DEEMED TO PROMOTE MOBILITY IN AND AROUND THE DOWNTOWN AREA.

NON- AUTOMOBILE TRANSPORTATION FACILITY	TRIP CREDIT/PER PEAK HOUR TRIP
100 LINEAR FEET OF OFF-SITE FIVE-FOOT WIDE SIDEWALK	5
100 LINEAR FEET OF OFF-SITE EIGHT-FOOT WIDE BIKE PATH	5
OFF-SITE CURB EXTENSION/PEDESTRIAN REFUGE ISLAND/ HANDICAP RAMP	2
OFF-SITE ACCESSIBLE PEDESTRIAN PUSHBUTTONS (SET OF TWO EACH LEG)	3
OFF-SITE COUNTDOWN PEDESTRIAN SIGNAL HEAD (SET OF TWO EACH LEG)	3
OFF-SITE SIGNALIZED PEDESTRIAN CROSSWALK (INCLUDES APS, COUNTDOWN HEADS, PAVEMENT MARKINGS EACH LEG)	7
BIKE RACK (SET OF 8)	2
BUS SHELTER	3
INFORMATION KIOSK	2
BIKE LOCKERS (SET OF 8)	3
REAL-TIME TRANSIT INFORMATION SIGN	2
STATIC TRANSIT INFORMATION SIGN	0.5
BUS PULLOUT	3
MAXIMUM TRIP CREDITS	50

TABLE 2: NON-AUTOMOBILE TRIP CREDITS

3. PROJECT SCOPE REDUCTION

REDUCE THE SCOPE OF THE PROPOSED PROJECT TO MEET THE LEVEL OF SERVICE STANDARD.

4. PROJECT SCHEDULE DEFERMENT

DEFER THE PROJECT UNTIL A FUTURE DATE WHEN THE ADEQUATE ROAD FACILITIES TEST EVALUATION INDICATES THAT THE LEVEL OF SERVICE STANDARD WILL NOT BE EXCEEDED.

D. SPECIAL CONSIDERATIONS

1. SHARED DEVELOPER MITIGATION PLAN

(A) WHEN TWO OR MORE DEVELOPERS ARE PROPOSING SEPARATE MITIGATION PLANS FOR THE SAME NON-GRADE SEPARATED INTERSECTION OR NON-ARTERIAL THROUGH LANE, THE DEPARTMENT MAY APPORTION THE IMPROVEMENTS BETWEEN THE PARTIES BASED UPON THEIR PROPORTION OF THE CRITICAL MOVEMENTS IN THE INTERSECTION. IN THE EVENT THAT TIMING OF THE DEVELOPMENT, TECHNICAL INFEASIBILITY, OR OTHER FACTORS DO NOT ALLOW THE APPORTIONMENT OF THE IMPROVEMENTS, THE DEPARTMENT SHALL COLLECT FROM EACH DEVELOPER THE PROPORTIONATE COST OF THE IMPROVEMENTS CORRESPONDING TO THE DEVELOPMENT'S PROPORTION OF THE CRITICAL MOVEMENTS IN THE INTERSECTION. THE FUNDS COLLECTED WILL SATISFY THE DEVELOPER'S OBLIGATION TO MITIGATE THE AFFECTED INTERSECTION. THESE FUNDS WILL BE COLLECTED ON THE BASIS THAT THEY WILL BE PROGRAMMED INTO A FUTURE CAPITAL PROJECT FOR THE PURPOSE OF MITIGATING TRAFFIC GENERATED BY THE MULTIPLE PROJECTS AT THE TEST INTERSECTIONS. HOWEVER, FINAL APPROVAL OF THE SITE DEVELOPMENT PLAN WILL NOT OCCUR UNTIL:

- (1) THE PROJECT IS FULLY FUNDED IN THE APPROVED CAPITAL BUDGET WITH CONSTRUCTION INITIATING WITHIN 3 YEARS AFTER BUDGET APPROVAL, AND
- (2) A MAJOR FACILITIES AGREEMENT HAS BEEN EXECUTED OUTLINING THE IMPROVEMENT COST SHARE, COMPARATIVE CONSTRUCTION SCHEDULES BETWEEN THE IMPROVEMENT AND THE DEVELOPMENT PROJECT, AND OTHER TERMS AND CONDITIONS AS APPLICABLE BETWEEN THE PARTIES.

THE TIME FRAME TO REACH THE MAJOR FACILITIES AGREEMENT WILL BE 3 YEARS FROM THE DATE OF THE SITE DEVELOPMENT PLAN SUBMISSION. IF AN AGREEMENT CANNOT BE EXECUTED WITHIN THAT TIME, THEN ANY OF THE FOLLOWING MAY OCCUR:

- (I) A 1-YEAR EXTENSION MAY BE GRANTED,
- (II) TERMS OF THE AGREEMENT MAY BE MUTUALLY MODIFIED BY THE PARTIES,
- (III) A MODIFIED SITE DEVELOPMENT PLAN MAY BE SUBMITTED,

(IV) THE SITE DEVELOPMENT PLAN MAY BE WITHDRAWN WITHOUT PREJUDICE.

(B) ALTERNATIVELY, DEVELOPERS OF MULTIPLE PROJECTS MAY JOINTLY PROPOSE A MITIGATION PLAN FOR PURPOSES OF MEETING THE ADEQUATE ROAD TEST REQUIREMENT. EACH MITIGATION PLAN MUST INDICATE THE PARTICIPANTS IN THE PLAN; WHICH PARTICIPANT(S) WILL BE RESPONSIBLE FOR IMPLEMENTING THE PLAN AND CONSTRUCTING ANY REQUIRED TRANSPORTATION IMPROVEMENT; AND HOW THE TRANSPORTATION CAPACITY TO BE CREATED WILL BE APPORTIONED AMONG THE PLAN PARTICIPANTS.

4.9.3 OTHER RELEVANT SECTIONS

OTHER RELEVANT SECTIONS OF THE ADEQUATE ROAD PUBLIC FACILITIES TEST EVALUATION REQUIREMENTS THAT APPLY TO DEVELOPMENTS IN DOWNTOWN COLUMBIA ARE LISTED HERE FOR CLARITY.

4.6 TRANSITIONAL REQUIREMENTS

4.7 EXEMPTIONS

4.8 APPROVAL REQUIREMENTS

4.9.4 MONITORING

THE COUNTY WILL CONDUCT INDEPENDENT TRAFFIC MONITORING STUDIES EVERY 5 YEARS. THE FIRST MONITORING STUDY WILL OCCUR 5 YEARS AFTER SUBMISSION OF THE FIRST SUBDIVISION PLAN (FDP) FOR THE DOWNTOWN COLUMBIA AREA. THE FINAL STUDY WILL BE ISSUED AS SPECIFIED IN THE HOWARD COUNTY CODE. THE DATE THE STUDY IS ISSUED WILL BE THE ISSUANCE DATE FOR PURPOSES OF SECTION 4.6 TRANSITIONAL REQUIREMENTS AND SECTION 4.8, APPROVAL REQUIREMENTS. THE MONITORING STUDIES WILL BE A COMPREHENSIVE ASSESSMENT OF EXISTING TRANSPORTATION FACILITIES WITHIN THE DOWNTOWN COLUMBIA AREA. THE PURPOSE OF THE MONITORING STUDY WILL BE TO VALIDATE AND/OR RECALIBRATE PROJECTIONS MADE IN THE REDEVELOPMENT TRAFFIC STUDY (SEPTEMBER 2008 COLUMBIA TOWN CENTER GENERALIZED TRAFFIC STUDY) AND/OR SUBSEQUENT STUDIES SUBMITTED WITH FUTURE SUBDIVISION FINAL DEVELOPMENT PLANS AND/OR SITE DEVELOPMENT PLANS, AND THAT FORM THE BASIS OF THE PROPOSED DEVELOPMENT PROGRAM. REFER TO SECTIONS 4.6 AND 4.8 THE APPLICATION OF THE MONITORING STUDY TO THE FDP AND SDP SUBMITTAL PROCESS.

THE STUDY WILL INCLUDE AN ANALYSIS OF THE FOLLOWING:

TRAFFIC SIGNAL OPTIMIZATION

COMPREHENSIVE TRAFFIC STUDY – HCM AND CLV

CORDON LINE STUDY –

TOTAL IN/OUT,
HISTORICAL GROWTH,
DIRECTIONAL SPLIT,
VEHICLE CHARACTERIZATION,
VEHICLE OCCUPANCY,
ANALYZE DOWNTOWN TDM DATA PROVIDED BY OTHERS

INTERCHANGE RAMP WEAVES AND MERGES

TRAVEL DEMAND SUB-AREA MODELING

THE STUDIES WILL MEASURE OR VALIDATE:

INTERSECTION STANDARD – DPW

TRIP DISTRIBUTION/DIVERSION – DPW

MODAL SPLIT – DPW/DPZ

INTERNAL TRIP CAPTURE RATE – DPW WITH TDM DATA SUPPLIED BY OTHERS

BACKGROUND TRAFFIC RATE – DPW
(DEFINED ON PG 3, SECTION 4.3.C.3)

REGIONAL TRANSPORTATION IMPACTS INCLUDING INTERCHANGES

WHEN THE MONITORING STUDY INDICATES SIGNIFICANT DIFFERENCES BETWEEN COUNTY DETERMINED VALUES AND THOSE USED IN THE DEVELOPMENT TRAFFIC STUDIES, THE DEVELOPER SHALL REVISE THE TRAFFIC STUDY WITH ONE OR MORE OF THE FOLLOWING ACTIONS:

1. OBTAIN NEW DATA FOR ALL INTERSECTIONS IN THE DEVELOPMENT IMPACT AREA TO RECALCULATE THE CLV.
2. MODIFY BACKGROUND TRAFFIC GROWTH RATE.
3. MODIFY INTERNAL TRIP RATE
4. MODIFY MODAL SPLIT REDUCTIONS
5. MODIFY PASS-BY TRIP RATE – ESTIMATIONS SUPPLIED BY TDM DATA
6. REEVALUATE TRIP DISTRIBUTION/DIVERSION PERCENTAGES

BASED ON THE NEW DATA FOR THE TRAFFIC STUDY AND THE SUBSEQUENT REEVALUATION OF INTERSECTIONS IN THE IMPACT AREA, THE DEVELOPER SHALL REVISE THE MITIGATION PLAN AS OUTLINED IN SECTION 4.9.2.

4.9.5 CORDON LINE

THE CORDON LINE DEFINES THE BASIC LIMITS OF TRAFFIC STUDIES WITHIN DOWNTOWN COLUMBIA. ADDITIONALLY, THE CORDON LINE IDENTIFIES CRITICAL LOCATIONS TO MONITOR TOTAL AMOUNTS OF TRAFFIC ENTERING AND LEAVING THE DOWNTOWN AREA (SEE FIGURE 2).

CURRENT BASE LINE TRIPS ARE MAINTAINED AND AVAILABLE FROM THE DEPARTMENT OF PLANNING AND ZONING. NET PEAK HOUR TRIPS GENERATED BY EACH NEW DEVELOPMENT WILL BE ADDED TO THE CURRENT BASE LINE AND SHALL NOT EXCEED THE APPLICABLE CAP ESTABLISHED BY BACKGROUND, GROWTH AND TOTAL NEW DEVELOPMENT TRIP VOLUME. CURRENT CORDON LINE LOCATIONS ARE AS FOLLOWS:

1. LITTLE PATUXENT PARKWAY EAST OF COLUMBIA ROAD
2. COLUMBIA ROAD JUST NORTH OF LITTLE PATUXENT PARKWAY
3. WEST RUNNING BROOK ROAD JUST NORTH OF LITTLE PATUXENT PARKWAY
4. WINDSTREAM JUST NORTH OF GOVERNOR WARFIELD PARKWAY
5. TWIN RIVERS ROAD JUST NORTH OF GOVERNOR WARFIELD PARKWAY
6. LITTLE PATUXENT PARKWAY JUST WEST OF GOVERNOR WARFIELD PARKWAY/BANNEKER
7. HICKORY RIDGE ROAD JUST WEST OF BROKEN LAND PARKWAY
8. BROKEN LAND PARKWAY SOUTH OF HICKORY RIDGE
9. SOUTH ENTRANCE ROAD JUST SOUTH OF LITTLE PATUXENT PARKWAY

AS NEWLY CONSTRUCTED ROADWAYS INTERSECT THE CORDON LINE, NEW ROADWAY LOCATIONS SHALL BE ADDED.

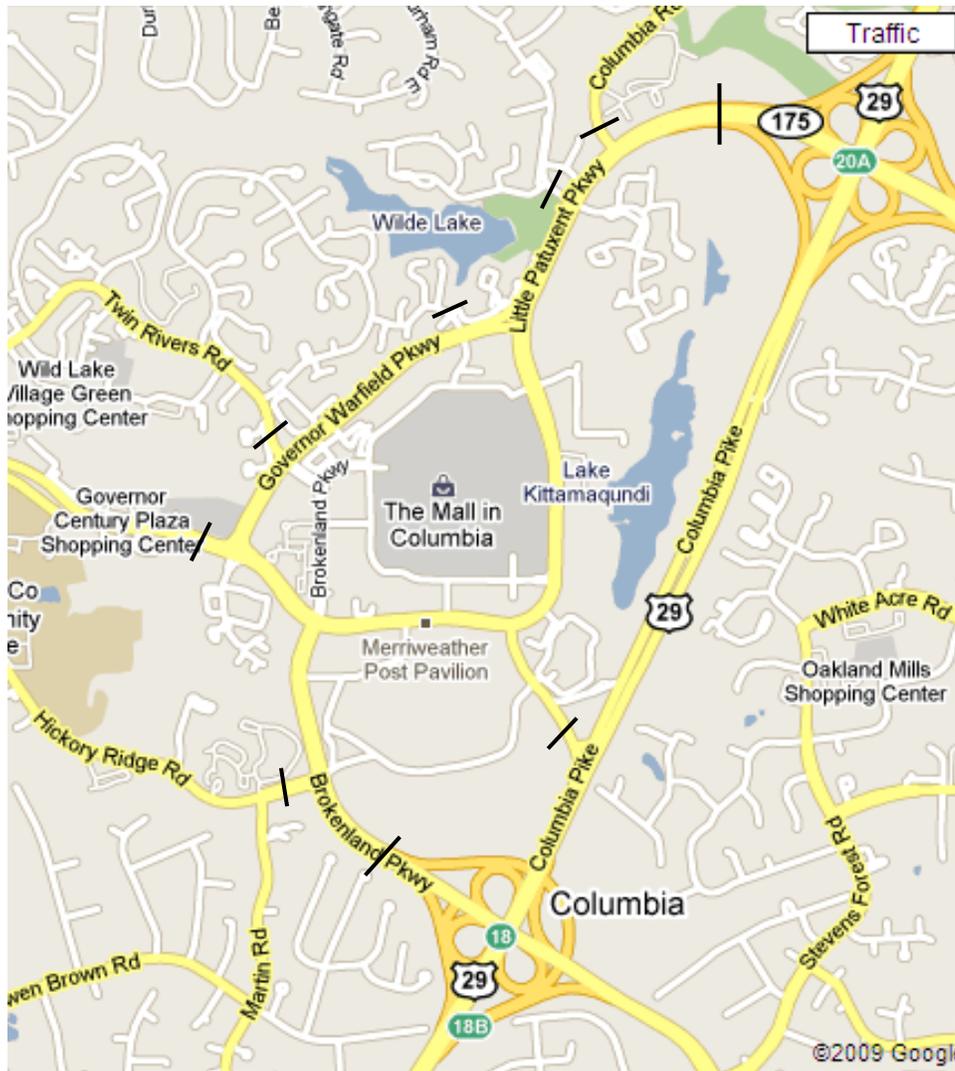


FIGURE 1 - CORDON LINE LOCATIONS

4.9.6 APPENDIX

I. CRITICAL LANE VOLUME ANALYSIS

AN APPLICANT CAN USE THE FOLLOWING PROCEDURE AT SIGNALIZED OR UNSIGNALIZED INTERSECTIONS. FOR UNSIGNALIZED INTERSECTIONS, A TWO-PHASE OPERATION SHOULD BE ASSUMED. THE TRAFFIC VOLUMES USED IN THE ANALYSIS ARE THOSE APPROACHING THE INTERSECTION AS DETERMINED IN EACH STEP OF THE TRAFFIC STUDY (EXISTING, EXISTING PLUS BACKGROUND, AND EXISTING PLUS BACKGROUND PLUS SITE). THE FOLLOWING STEPS DESCRIBE HOW TO DETERMINE THE CLV OF AN INTERSECTION WITH A SIMPLE TWO-PHASE SIGNAL OPERATION.

- STEP 1. DETERMINE THE SIGNAL PHASING, NUMBER OF LANES, AND THE TOTAL VOLUME ON EACH ENTERING APPROACH TO AN INTERSECTION AND THE TRAFFIC MOVEMENT PERMITTED IN EACH LANE.
- STEP 2. SUBTRACT FROM THE TOTAL APPROACH VOLUME ANY RIGHT-TURN VOLUME THAT OPERATES CONTINUOUSLY THROUGHOUT THE SIGNAL CYCLE, (A FREE-FLOW RIGHT-TURN BY-PASS). ALSO, SUBTRACT THE LEFT-TURN VOLUME IF IT IS PROVIDED WITH AN EXCLUSIVE LANE.
- STEP 3. DETERMINE THE MAXIMUM VOLUME PER LANE FOR EACH APPROACH BY MULTIPLYING THE VOLUME CALCULATED IN STEP 2 BY THE APPROPRIATE LANE-USE FACTOR SELECTED FROM THE LANE USE FACTOR TABLE BELOW. (NOTE: DO NOT COUNT LANES ESTABLISHED FOR EXCLUSIVE USE SUCH AS RIGHT- OR LEFT-TURN STORAGE LANES – THE LANE USE FACTOR FOR A SINGLE EXCLUSIVE USE LANE IS 1.00.)
- STEP 4. SELECT THE MAXIMUM VOLUME PER LANE IN ONE DIRECTION (E.G., NORTHBOUND) AND ADD IT TO THE OPPOSING (E.G., SOUTHBOUND) LEFT TURN VOLUME.
- STEP 5. REPEAT STEP 4 BY SELECTING THE MAXIMUM VOLUME PER LANE IN THE OPPOSITE DIRECTION (E.G., SOUTHBOUND) AND THE OPPOSING (E.G., NORTHBOUND) LEFT-TURN VOLUME.
- STEP 6. THE HIGHER TOTAL OF STEP 4 OR STEP 5 IS THE CRITICAL VOLUME FOR PHASE ONE (E.G., NORTH-SOUTH).
- STEP 7. REPEAT STEPS 4 THROUGH 6 FOR PHASE TWO (E.G., EAST-WEST).
- STEP 8. SUM THE CRITICAL LANE VOLUMES FOR THE TWO PHASES TO DETERMINE THE CLV FOR THE INTERSECTION. (NOTE: AT SOME INTERSECTIONS, TWO OPPOSING FLOWS MAY MOVE ON SEPARATE PHASES. FOR THESE CASES, EACH PHASE BECOMES A PART OF THE INTERSECTION'S CLV.)

SPECIAL CASES

WHERE THE RIGHT LANE IS DEVOTED TO THE EXCLUSIVE USE OF RIGHT TURN VEHICLES, A MAXIMUM LANE VOLUME SHOULD BE COMPUTED SEPARATELY FOR THROUGH MOVEMENTS AND RIGHT TURN MOVEMENTS. IF A RIGHT TURN PHASE OVERLAP IS PROVIDED WITH A LEFT TURN PHASE ON THE CROSS STREET, SUBTRACT THE OVERLAPPING LEFT TURN VOLUME FROM THE RIGHT TURN VOLUME. THE HIGHEST OF THE THROUGH OR RIGHT TURN LANE VOLUMES SHOULD BE ADDED TO THE OPPOSING LEFT TURN VOLUME, EXCEPT WHERE SIGNIFICANT RIGHT TURNS ON RED OCCUR.

FREE RIGHT

A FREE RIGHT TURN IS ONE WHICH IS NOT CONTROLLED BY THE TRAFFIC SIGNAL OR STOP SIGN. NORMALLY THE MOVEMENT IS ISOLATED BY A CHANNELIZING ISLAND AND CONTROLLED BY A YIELD SIGN. IF THE RIGHT TURN MOVEMENT IS SERVICED BY AN EXCLUSIVE RIGHT TURN LANE OF SUFFICIENT LENGTH THAT RIGHT TURNING VEHICLES ARE NOT PART OF THE QUEUE OF THRU VEHICLES, THE RIGHT TURNING VOLUMES CAN BE EXCLUDED FROM THE CRITICAL LANE ANALYSIS. KNOWLEDGE OF THE INTERSECTION CAN BE USED TO COMBINE A SUFFICIENT NUMBER (PERCENT) OF THE RIGHT TURNS WITH THE THRU TRAFFIC TO REFLECT ACTUAL PEAK HOUR OPERATIONS. IN THE ABSENCE OF SUCH KNOWLEDGE A QUEUING ANALYSIS COULD BE DONE. AS A RULE-OF-THUMB 150 FEET OF EXCLUSIVE RIGHT TURN LANE WILL PERMIT EXCLUDING ALL RIGHT TURNS; LESS THAN 50 FEET WILL REQUIRE THAT ALL RIGHTS BE INCLUDED. DISTANCES WITHIN THAT RANGE SUGGEST THAT A PORTION OF THE RIGHT TURN VOLUME BE INCLUDED.

RIGHT TURN ON RED

THE NUMBER OF VEHICLES WHICH CAN TAKE ADVANTAGE OF THE RTOR FEATURE VARY GREATLY BASED ON SITE AND TRAFFIC CHARACTERISTICS. AT HIGHER VOLUME INTERSECTIONS, AS THE LEVEL-OF-SERVICE DIMINISHES, FEW GAPS ARE GENERALLY AVAILABLE FOR RTOR. UNLESS OBSERVATIONS OF THE RTOR OPERATIONS SUPPORT EXCLUDING SOME RIGHT TURNS FROM THE CRITICAL LANE ANALYSIS, THIS FEATURE WILL NORMALLY NOT BE CONSIDERED.

NO SEPARATE LEFT TURN LANE

ON MULTI-LANE APPROACHES WITH NO SEPARATE LEFT TURN LANE THE IMPACT OF LEFT TURNING TRAFFIC MAY BE SIGNIFICANT, ESPECIALLY ON HIGH VOLUME ROADWAYS. TYPICALLY THE LEFT LANE OPERATES AS A LEFT TURN LANE WITH NEARLY ALL THRU TRAFFIC AVOIDING THIS LANE. CALCULATIONS FOR SUCH AN APPROACH SHOULD BE AS FOLLOWS:

THE LEFT TURN VOLUME WILL BE ADJUSTED USING THE PCE FACTOR (SHARED LANE) OF THE 1985 HCM PAGES 9-35. THE OPPOSING VOLUME WILL BE TOTAL THROUGH TRAFFIC AND RIGHTS. WHEN THE ADJUSTED LEFT TURN VOLUME IS GREATER THAN THE REMAINING VOLUME BEING INCLUDED IN THE ANALYSIS, THE LEFT MOST LANE WILL BE CONSIDERED AN EXCLUSIVE LEFT TURN LANE. THE ANALYSIS WILL PROCEED WITH THAT ASSUMPTION. FOR OTHER CASES THE RESULTING LEFT TURN VOLUME WILL BE ADDED TO THE REST OF THE APPROACH VOLUME AND THE APPROPRIATE LANE USE FACTOR APPLIED TO THE TOTAL.

ONE LANE APPROACHES

WHERE A BYPASS OF LEFT TURNING VEHICLE IS AVAILABLE THE ONE LANE APPROACH SHOULD BE TREATED AS IF THERE IS A SEPARATE LEFT TURN LANE. IF NO BYPASS AREA IS AVAILABLE TRAFFIC ON THE ONE LANE APPROACH CAN PROCEED ONLY WHEN THERE IS NO VEHICLE WAITING TO TURN LEFT. THIS CASE SHOULD BE ANALYZED USING PCE (SHARED

LANE) EQUIVALENCIES (1985 HCM PAGES 9-35) TO MODIFY THE LEFT TURN VOLUMES. THE RESULTING TOTAL WILL BE ADDED TO THE REST OF THE APPROACH VOLUME AND THE APPROPRIATE LANE USE FACTOR APPLIED.

DOUBLE LEFT TURN LANES

BOTH THE ACCESS TO THE DOUBLE LEFT TURN LANE AND MOVEMENTS MADE IMMEDIATELY AFTER THE LEFT TURN WILL INFLUENCE THE DISTRIBUTION OF TRAFFIC BETWEEN THE AVAILABLE LANES. GENERALLY THE DISTRIBUTION IS LESS BALANCED THAN FOR THRU LANES; THUS THE RECOMMENDED LANE USE FACTOR OF 0.60. VARIATIONS OBSERVED AT SPECIFIC SITES MAY SUGGEST THE USE OF DIFFERENT FACTOR FOR THIS MOVEMENT.

LANE USE FACTORS

LANE USE FACTORS ARE TO BE AS FOLLOWS:

NUMBER OF LANES	FACTOR
1	1.00
2	.55
3	.40
4	.30
DBL L.T	.60

TABLE 2 - LANE USE FACTORS

II. CALCULATING QUEUE LENGTH

FOR SIGNAL CYCLE LENGTH **LESS THAN** 120 SECONDS

- $QUEUE\ LENGTH = 1.25 \times VOLUME$

FOR SIGNAL CYCLE LENGTH **GREATER THAN** 120 SECONDS

PROCEDURES FOR DETERMINING QUEUE LENGTHS AT SIGNALIZED AND UNSIGNALIZED INTERSECTIONS:

A. SIGNALIZED INTERSECTIONS

THIS PROCEDURE CAN BE USED AT INTERSECTIONS WITH EXISTING SIGNALS AND INTERSECTIONS WHERE IT IS FELT A SIGNAL MAY BE INSTALLED.

1. PERFORM CRITICAL LANE ANALYSIS
2. SELECT CYCLE LENGTH
 - USE EXISTING TIMING IF AVAILABLE
 - IF TIMING IS NOT AVAILABLE, USE THE SUGGESTED CYCLE LENGTHS

RECOMMENDED MAXIMUM CYCLE LENGTHS			
LOS	2 PHASE	3-5PHASE	6-8 PHASE
A	90	100	120
B	90	100	120
C	100	120	135
D	120	135	150
E	135	150	165
F	150	165	180

TABLE 3 - RECOMMENDED MAXIMUM CYCLE LENGTHS

3. NOTE: THESE CYCLE LENGTHS ARE TO BE USED AS A GUIDE, KNOWLEDGE OF THE INTERSECTION MAY RESULT IN USING A HIGHER OR LOWER CYCLE.
4. USE POISSON DISTRIBUTION CHART/FORMULA TO DETERMINE MAXIMUM NUMBER OF VEHICLES PER CYCLE OF A SPECIFIC MOVEMENT.

FORMULA:

$$Avg. Veh/Cycle = \frac{Critical Lane Volume (veh/hr) \times Cycle Length (sec)}{3600 (sec/hr)}$$

5. ASSUME A VEHICLE LENGTH OF 25 FT.

6. ONCE THE AVERAGE VEHICLES PER CYCLE (SPECIFIC MOVEMENT) IS DETERMINED, THE CHART CAN BE USED TO FIND THE MAXIMUM VEHICLES PER CYCLE FOR THAT MOVEMENT.
7. THE QUEUE LENGTH WILL BE THE MAXIMUM VEHICLES PER CYCLE TIMES 25 FT. PER VEHICLE.
8. IT IS NOTED THAT THE CHART ENDS AT AN AVERAGE OF 20 VEHICLES PER CYCLE. IN CASES WHERE THE AVERAGE NUMBER OF VEHICLES PER CYCLE EXCEEDS 20 THE FOLLOWING FORMULA CAN BE USED TO DETERMINE THE QUEUE LENGTH. THIS FORMULA CAN ALSO BE USED IN LIEU OF THE CHART.

$$Q = \text{Avg. No. of Veh} \times 1.4(\text{Surge Factor}) \times 25\text{ft.}$$

POISSON DISTRIBUTION	
AVERAGE NO. OF VEHICLE PER CYCLE	MAXIMUM NO. OF VEHICLE PER CYCLE
0.1 - 0.3	1
0.4 - 0.8	2
0.9 - 1.3	3
1.4 - 1.9	4
2.0 - 2.6	5
2.7 - 3.2	6
3.3 - 3.9	7
4.0 - 4.7	8
4.8 - 5.4	9
5.5 - 6.1	9
6.2 - 6.9	10
7.0 - 7.7	11
7.8 - 8.4	12
8.5 - 9.2	13

POISSON DISTRIBUTION	
AVERAGE NO. OF VEHICLE PER CYCLE	MAXIMUM NO. OF VEHICLE PER CYCLE
9.3 - 10.0	14
10.1 - 10.8	15
10.9 - 11.6	16
11.7 - 12.4	17
12.5 - 13.2	18
13.3 - 14.0	19
14.1 - 14.9	20
15.0 - 15.7	21
15.8 - 16.5	22
16.6 - 17.3	23
17.4 - 18.2	24
18.3 - 19.0	25
19.1 - 19.8	26
19.9 - 20.0	27

TABLE 4 - POISSON DISTRIBUTION FOR VEHICLES PER CYCLE

B. UNSIGNALIZED INTERSECTION

THIS PROCEDURE CAN BE USED AT ISOLATED INTERSECTIONS WHERE IT IS FELT A SIGNAL WILL NOT BE PLACED. IF THERE IS ANY CHANCE THAT A SIGNAL MAY BE PLACED AT AN INTERSECTION, THE PROCEDURE FOR SIGNALIZED INTERSECTIONS SHOULD BE USED.

1. DETERMINE THE CRITICAL GAP NEEDED FOR THE MOVEMENT (FROM CHART) THIS CHART IS ALSO FOUND IN THE 1985 HCM UNSIGNALIZED INTERSECTIONS.

VEHICLE MANEUVER AND TYPE OF CONTROL	AVERAGE RUNNING SPEED, MAJOR ROAD			
	30 MPH		55 MPH	
	NUMBER OF LANES ON MAJOR ROAD			
	2	4	2	4
RT FROM MINOR ROAD				
STOP	5.5	5.0	5.5	5.0
YIELD	6.5	5.5	6.5	5.5
LT FROM MAJOR ROAD	5.0	5.5	5.5	6.0
CROSS MAJOR ROAD				
STOP	6.0	5.5	6.5	6.0
YIELD	7.5	6.5	8.0	7.0
LT FROM MINOR ROAD				
STOP	6.5	6.0	7.0	6.5
YIELD	8.0	7.0	8.5	7.5

TABLE 5 - BASIC CRITICAL GAP FOR PASSENGER CARS, SEC

2. NOTE: IF RESTRICTED SIGHT DISTANCE EXISTS ADD ONE SECOND TO THE GAP NEEDED. WHERE AVERAGE RUNNING SPEEDS ARE BETWEEN 30 MPH AND 55 MPH, INTERPOLATE.

3. DETERMINE AVERAGE GAP BETWEEN OPPOSING VEHICLES

$$\text{AVERAGE GAP BETWEEN OPPOSING VEHICLE} = 3600 \text{ SEC} / (\text{VOLUME PER/HOUR})$$

4. IF THE AVERAGE GAP IS GREATER THAN THE GAP NEEDED FOR THE MANEUVER THE SAME PROCEDURE AS SIGNALIZED INTERSECTIONS CAN BE USED WITH THE CYCLE LENGTH EQUAL TO THE CRITICAL GAP REQUIRED (FROM CHART) PLUS 4 SECONDS (START UP TIME).

5. IF THE AVERAGE GAP IS LESS THAN OR EQUAL TO THE GAP NEEDED, THIS MANEUVER SHOULD BE ANALYZED AS IF A SIGNAL WERE IN PLACE.

III. PEDESTRIAN AND BICYCLE IMPACT TEST

A PEDESTRIAN LEVEL OF SERVICE (PLOS) AND BICYCLE LEVEL OF SERVICE (BLOS) SHALL BE COMPUTED USING THE PLOS AND BLOS EQUATIONS AND THE PEDESTRIAN AND BICYCLE LOS CATEGORIES FROM TABLE 6 BELOW. THE ACCEPTABLE PLOS AND BLOS FOR DOWNTOWN COLUMBIA IS PLOS C AND BLOS C.

UNLIKE THE PLOS AND BLOS METHODOLOGIES DESCRIBED IN THE HIGHWAY CAPACITY MANUAL, THESE METHODOLOGIES TAKE INTO ACCOUNT THE EXISTENCE OF SIDEWALKS, LATERAL SEPARATION OF PEDESTRIANS FROM MOTORIZED VEHICLES, AVERAGE EFFECTIVE WIDTH OF THE OUTSIDE THROUGH LANE, MOTORIZED VEHICLE VOLUMES, MOTORIZED VEHICLE SPEEDS, HEAVY VEHICLE (TRUCK) VOLUMES, AND PAVEMENT CONDITION. IF IT IS THE FINDING OF DPZ/DPW THAT (i) A REASONABLE ALTERNATIVE BICYCLE OR PEDESTRIAN ROUTE EXISTS OR IS PROPOSED, OR (ii) MEETING THE BLOS OR PLOS STANDARD WOULD NEGATIVELY IMPACT THE BLOS, PLOS, OR THE DESIGN BALANCE AS FURTHER DISCUSSED IN SECTION 4.9.2, THEN THE BLOS OR PLOS TEST, AS APPROPRIATE, IS DEEMED SATISFIED.

THE PEDESTRIAN LEVEL OF SERVICE (PLOS) SCORE IS CALCULATED USING THE FOLLOWING EQUATION:

$$\text{PLOS SCORE} = -1.2276 \ln[(W_{OL} + W_L + (F_p \times \%OSP)) + ((F_b \times W_B) + F_{SW} \times W_s)] + 0.0091 (\text{VOL}_{15}/L) + 0.0004 \text{SPD}^2 + 6.0468$$

WHERE:

PLOS =	PEDESTRIAN LEVEL OF SERVICE SCORE
LN =	NATURAL LOG
W_{OL} =	WIDTH OF OUTSIDE LANE
W_L =	WIDTH OF SHOULDER OR BICYCLE LANE
F_p =	ON-STREET PARKING EFFECT COEFFICIENT (=0.20)
%OSP =	PERCENT OF SEGMENT WITH ON-STREET PARKING
F_b =	BUFFER AREA BARRIER COEFFICIENT (=5.37 FOR TREES SPACED 20 FEET ON CENTER)
W_B =	BUFFER WIDTH (DISTANCE BETWEEN EDGE OF PAVEMENT AND SIDEWALK, FEET)
F_{SW} =	SIDEWALK PRESENCE COEFFICIENT (= 6 - 0.3 W_s)
W_s =	WIDTH OF SIDEWALK

VOL₁₅ = VOLUME OF MOTORIZED VEHICLES IN THE PEAK 15 MINUTE PERIOD

L = TOTAL NUMBER OF DIRECTIONAL THROUGH LANES

SPD = AVERAGE RUNNING SPEED OF MOTORIZED VEHICLES TRAFFIC (MI/HR)

THE BICYCLE LEVEL OF SERVICE (BLOS) IS CALCULATED USING THE FOLLOWING EQUATION:

$$\text{BLOS SCORE} = \frac{0.507 \ln(\text{VOL}_{15}/L) + 0.199\text{SP}_T(1+10.38\text{HV})^2 + 7.066(1/\text{PR}_5)^2 - 0.005(W_E)}{2 + 0.760}$$

WHERE:

BLOS = BICYCLE LEVEL OF SERVICE SCORE

LN = NATURAL LOG

VOL₁₅ = VOLUME OF DIRECTIONAL MOTORIZED VEHICLES IN THE PEAK 15 MINUTE TIME PERIOD

L = TOTAL NUMBER OF DIRECTIONAL THROUGH LANES

SP_T = EFFECTIVE SPEED FACTOR = 1.1199 LN(SP_p - 20) + 0.8103

SP_p = POSTED SPEED LIMIT (A SURROGATE FOR AVERAGE RUNNING SPEED)

HV = PERCENTAGE OF HEAVY VEHICLES

PR₅ = FHWA'S FIVE POINT PAVEMENT SURFACE CONDITION RATING

W_E = AVERAGE EFFECTIVE WIDTH OF OUTSIDE THROUGH LANE

WHERE:

W_E = W_v - (10FT X %OSP) WHERE W₁ = 0

W_E = W_v + W₁(1 - 2X %OSP) WHERE W₁ > 0 & W_{PS} = 0

W_E = W_v + W₁ - 2(10 X %OSP) WHERE W₁ > 0 & W_{PS} > 0

AND A BICYCLE LANE EXISTS

WHERE:

W_T = TOTAL WIDTH OF OUTSIDE LANE (AND SHOULDER) PAVEMENT

$\%OSP$ = PERCENTAGE OF SEGMENT WITH OCCUPIED ON-STREET PARKING

W_1 = WIDTH OF PAVING BETWEEN THE OUTSIDE LANE STRIPE AND THE EDGE OF PAVEMENT

W_{ps} = WIDTH OF PAVEMENT STRIPED FOR ON-STREET PARKING

W_v = EFFECTIVE WIDTH AS A FUNCTION OF TRAFFIC VOLUME

LEVEL OF SERVICE	PLOS/BLOS SCORE
A	≤ 1.5
B	>1.5 AND ≤ 2.5
C	>2.5 AND ≤ 3.5
D	>3.5 AND ≤ 4.5
E	>4.5 AND ≤ 5.5
F	>5.5

TABLE 6 - PEDESTRIAN AND BICYCLE LOS CATEGORY