

I. GENERAL

A. Definitions.

In this subtitle the following terms have the meanings indicated.

1. **A.A.S.H.T.O.** - American Association of State Highway and Transportation Officials.
2. **Boulevard** – a road whose travel lanes are divided by an open area that is typically landscaped for aesthetic purposes.
3. **Commercial Entrance** - any paved entrance with curb and gutter fillets required for any commercial development.
4. **Comprehensive Plan** - the current Comprehensive Plan of Queen Anne’s County, Maryland maintained by the Department of Planning and Zoning.
5. **Cul-de-sac** - a street that has:
 - (a) Only one end open for vehicular traffic; and
 - (b) An appropriate turnaround for vehicles.
6. **Department** - the Department of Public Works of Queen Anne's County.
7. **Design Engineer** – Engineer representing the Developer by preparing subdivision or site plans.
8. **Developer** - any person, contractor or other agent of the person who commences to effect a development involving construction of or upgrading of roads for that person or another person.
9. **Director** - the Director of Public Works of Queen Anne's County.
10. **Engineer** - the Chief Roads Engineer for the Roads Division of the Department.
11. **Outlot** - a parcel of land in a subdivision that has been included on a preliminary or final plat, but not designated as a buildable lot.
12. **Private Road** - "Private road" means an improved road or right-of-way held and/or maintained in private ownership and which is not a component of the County, State or Federal road systems.
13. **Residential Road** - a road:
 - (a) other than a major thoroughfare; and
 - (b) Intended primarily for providing access to abutting residential properties.
14. **Road** - means a public or private way for vehicular traffic including a right-of-way, street, avenue, drive, lane, terrace, boulevard, circle, highway, or other similar term.
15. **Roads Board** - the Roads Board for Queen Anne's County.

16. **Roads Design Manual** – the “Roads Design and Construction Standards Manual of Queen Anne’s County, also referred to herein as the “Design Manual”.
17. **Rural Road** - a road that is intended to primarily provide access to agricultural land, woodlands, and to residential or commercial areas outside of County Growth Areas as defined in the Comprehensive plan.
18. **S.H.A.** - the Maryland State Highway Administration.
19. **SHA Specifications** - the Standard Specifications for Construction & Materials, January 2001, Maryland Department of Transportation, State Highway Administration.
20. **Speed Change Lane** - an auxiliary lane, including tapered areas, primarily for the acceleration, deceleration or passing of vehicles entering or leaving through-traffic lanes or for bypass lanes.
21. **Standards**
 - (a) The Standards as contained in the “Roads Design and Construction Standards Manual of Queen Anne’s County”; or
 - (b) If no County standards exist, then SHA standards.
22. **Subdivision** - the division of a lot, tract, or parcel of land into two or more lots, plots, parcels, sites, or other divisions of land.
23. **Suitable outfall**
 - (a) An existing crossroad pipe, which may need to be increased in size at the developer's expense;
 - (b) Tidal water; or
 - (c) A stream of a size and nature to accommodate the additional flow with no adverse impact.
24. **Surety** - any form of security including bond, escrow, deposit, collateral, property, or instrument of credit in an amount and form satisfactory to the County Commissioners.

B. Flexibility in Design.

The underlying intent of this manual is to provide a framework within which the experienced design engineer will have latitude for creativity in the layout and design of the road systems and their various components. This Design Manual establishes the minimum design requirements. The design engineer is required to use professional skill, experience and judgment to develop the most feasible and practical design for the planned facility.

Final determination concerning a development project with respect to road issues (i.e., classification) will be made by the Department, in accordance with County Code, the transportation element of the Comprehensive Plan and this Design Manual.

C. Road Classifications.

1. ***Principal Arterial.***

This type of facility provides for high volume travel. It is a controlled access facility. Service to abutting land is subordinate to travel service.

2. ***Minor Arterial.***

This type of facility provides service for intra-area travel (between principal traffic generators such as towns, employment nodes, Growth Areas). Service to abutting land is subordinate to travel service.

3. ***Major Collector.***

This type of facility provides access to both property and traffic circulation within residential neighborhoods and commercial/industrial areas. The system collects traffic from minor collectors and local roads, serves residential neighborhoods and disperses traffic to the arterial system.

4. ***Minor Collector.***

This type of facility provides access from local neighborhoods and rural communities to developed areas and traffic generators.

5. ***Local Road.***

This type of facility includes all roads not included in other classifications. These roads facilitate direct access to abutting land, connect to the higher order roadways, and offer the lowest level of mobility.

- (a) Local Road Type I for Rural Areas – Provides direct driveway access to abutting properties within a residential area. Serves up to 20 lots.
- (b) Local Road Type II for Rural Areas – Provides direct driveway access to abutting properties within a residential area. May have a series of cul-de-sacs or dead end streets. Serves up to 200 lots.
- (c) Local Road Type III for Rural Areas in Critical and Sensitive Areas – Provides direct driveway access to abutting properties within a residential area in a designated critical or sensitive area. Serves up to 20 lots.
- (d) Private Road for Rural Areas – Provides direct driveway access to abutting properties. Serves up to 5 lots or existing parcels, with no through traffic permitted.
- (e) Local Road Type IV for Growth Areas – Provides direct driveway access to abutting properties. May have a series of cul-de-sacs, dead end streets, loop street or a connector between two local roads.
- (f) Local Road Type V for Growth Areas – Provides direct access to local roads and driveway access to abutting properties, internal distribution of trips within neighborhoods or non-residential areas.
- (g) Boulevard – Provides access to local and/or state roads for one or more neighborhoods or non-residential areas. Trip length 1-3 miles.
- (h) Commercial Road-Light Duty – Provides direct driveway access to abutting commercial properties.
- (i) Commercial Road-Heavy Duty – Provides direct access to local and/or state roads for commercial traffic, and internal distribution of trips within commercial areas.

D. Limits of Work.

1. *Farthest property line.*

The limits of work within a subdivision area will generally be set at the farthest property line.

2. *Improvement of roads.*

Roads shall be improved to provide access to all areas within the limits of work.

3. *Outlot.*

If the limit of work extends to an outlot, it must be extended to the far line of the outlot.

4. *Intersection; turnarounds.*

- (a) If the proposed construction ends at an intersection of an existing or dedicated road, the intersection shall be completed.
- (b) If there are no existing or dedicated intersecting roads, temporary or permanent turnarounds shall be provided in accordance with approved standards.

E. County Roads.

The Department may require a developer to improve or upgrade an existing County Road when a development occurs to ensure that:

- 1. Consistent planning, design and construction standards are met;
- 2. The road is suitable for the nature of the traffic proposed by the development; and
- 3. All public safety concerns are addressed.

The nature of the improvements or upgrades may include but are not limited to resurfacing, installation of traffic control devices or lighting, intersection realignments, right-of-way dedication, road widening, sidewalks or pedestrian paths, entrance or access improvements and drainage improvements.

F. Design Modification.

The County may grant a modification from any requirement of this Roads Design Manual, if there are exceptional circumstances applicable to the site, such that strict adherence to the provisions of this Roads Design Manual will result in unnecessary hardship and not fulfill the intent of the Roads Design Manual. A written request for modification shall state the specific modifications sought and reasons for their granting; however, all modifications still must adhere to good engineering practices and must maintain consistency with County Code and other regulations.

Design modifications shall be directed to the Engineer. The Engineer shall consult with the Queen Anne's County Fire Chiefs Association and other applicable agencies to determine if the modifications are acceptable.

II. GEOMETRIC DESIGN PRINCIPLES

A. General.

1. *Contents of design.*

The design of roads includes:

- (a) General layout;
- (b) Alignment;
- (c) Grades;
- (d) Paving widths;
- (e) Type of pavement; and
- (f) Drainage facilities.

2. *Comprehensive Plan.*

All highway, street, and road layout shall conform to the Comprehensive Plan.

3. *Effective and efficient development.*

All highway, street, and road layout shall be designed to obtain the most effective and efficient development of the site and adjoining areas.

4. *Recognition of existing topography.*

The street plan shall:

- (a) Give suitable recognition to existing topography; and
- (b) Attempt to preserve trees, provide for good drainage, develop natural building sites, and provide a safe and efficient travel pattern, without loss of natural aesthetic value.

5. *Alignment and elevation.*

When determining alignment and elevation of traffic ways, the design engineer shall consider:

- (a) The requirements for utilities, including storm drainage facilities where required; and;

- (b) Any unusual aspects of the design such as railroad crossings, channelization, and similar factors.

6. ***Items not covered by subtitle.***

If an item is not covered by this subtitle, the designer shall refer to the latest edition of the A.A.S.H.T.O. publication "A Policy on Geometric Design of Highways and Streets" and SHA Specifications.

7. ***State Highway Administration standards.***

All construction and materials required by this subtitle shall be in accordance with the SHA specifications unless stated otherwise in the Roads Design Manual.

B. Intersections.

1. ***Angle of intersection.***

- (a) As nearly as possible, streets shall intersect each other at right angles.
- (b) Unless otherwise approved by the Engineer, the angle of an intersection may not be less than 70 degrees.

2. ***Intersections with State roads.***

- (a) Intersections with State roads and arterial highways shall be spaced at intervals in accordance with SHA policies.
- (b) Access to State roads must be approved by the Office of Engineering Access Permits Division of SHA.

3. ***Number of intersections.***

The number of intersections of collector, residential, and other County streets shall be kept to a minimum.

4. ***Sight distances.***

- (a) Intersections shall be designed with adequate sight distance and the area shall be kept free of obstacles.
- (b) For commercial and residential streets, the corner sight distances shall be a minimum of 200 feet and desirably should be 300 feet or more.
- (c) For rural roads, the corner sight distance shall be a minimum of 500 feet.

5. ***Curb radius.***

The curb radius at intersections shall be a minimum of 30 feet. In commercial areas, the curb radius at intersections shall be a minimum of 30 feet and desirably should be a parallel curve of sufficient radii to accommodate the largest vehicles expected.

6. ***Right-of-way radius.***

Intersections shall have right of way radius fillets of 25 feet.

C. Horizontal Curves.

1. ***Road centerlines -- Change in direction; horizontal curves.***

Where road centerlines change direction, they shall be connected by a horizontal curve with a radius to insure a minimum horizontal sight distance in accordance with Table 1 in Appendix I.

2. ***Minimum length.***

The minimum length of a horizontal curve shall be 100 feet.

3. ***Street alignment.***

Street alignment in commercial areas should be commensurate with the topography but shall be as direct as possible.

4. ***Tangent.***

A tangent of at least 100 feet shall be used between reverse curves except in unusual situations.

D. Vertical Curves.

1. ***When required.***

To avoid abrupt change in vertical alignment when passing from one grade to another, a vertical curve shall be used at the grade intersection. When the absolute value of the grade change is less than or equal to one percent, no vertical curve shall be necessary.

2. ***Sag curves.***

(a) On sag curves, the minimum vertical curve length shall be governed by criteria set by A.A.S.H.T.O. for headlight sight distance.

(b) A sag vertical curve shall be long enough so that the light beam distance is the same as the stopping sight distance.

(c) Minimum stopping sight distances shall be in accordance with Table 1 of Appendix I.

3. ***Crest curves.***

- (a) On crest curves, the minimum vertical curve length shall be determined by the criteria set by A.A.S.H.T.O. for minimum lengths of crest vertical curves as determined by stopping sight distance.
- (b) Minimum stopping sight distances shall be in accordance with Table 1 of Appendix I.

E. Grades.

1. ***Allowable grades.***

The maximum allowable grade on any road shall be 6%. The minimum allowable grade on any road shall be 0.5%.

2. ***Cul-de-sacs.***

To meet the criteria for cul-de-sacs, grades across the circular portions of cul-de-sacs shall be designed to provide for appropriate drainage.

3. ***Intersection.***

- (a) At an intersection of two roads or streets, the normal typical section of the priority street shall continue through the intersection without a break.
- (b) The crown of the other street shall be warped from its normal section to connect to the edge of the priority street.
- (c) Where two streets of equal importance intersect, both street crowns shall be warped from their normal section so that the centerline elevations of both streets are identical at the intersection.

F. Superelevation and Warping.

1. ***Commercial and Residential Roads.***

Horizontal curves of commercial and residential roads shall not be superelevated or warped unless directed by the Engineer.

2. ***Local Collector Roads & Boulevards.***

Horizontal curves of local collector and boulevard roads shall be superelevated in accordance with A.A.S.H.T.O. criteria or as directed by the Engineer.

G. Sight Distance.

1. ***Vertical and horizontal curves.***

Vertical and horizontal curves shall be designed for at least the minimum stopping sight distance.

2. ***Passing sight distance.***

Design for passing sight distance is not applicable on commercial or residential streets but shall be provided at least once every mile on collector roads.

H. Cul-de-Sacs.

1. ***Radius of paved circular portion.***

A radius of 50 feet shall be considered the standard for the paved circular portion of the cul-de-sac, with a 30-foot reverse radius between the street and circle. In unusual situations, a radius of 45 feet for the paved circular portion of the cul-de-sac, with a 25-foot reverse radius between the street and circle may be acceptable.

2. ***Radius of right-of-way.***

The right-of-way of a cul-de-sac shall have a minimum radius of 70 feet.

I. Entrances.

1. ***Width.***

(a) Residential Applications.

(1) For entrances on closed section roads the maximum entrance width is 20 feet and the minimum entrance width is 10 feet.

(2) For entrances on open section roads the maximum entrance width is 35 feet and the minimum entrance width is 15 feet.

(b) Commercial Applications.

(1) For entrances on closed section roads the maximum entrance width is 40 feet and the minimum entrance width is 35 feet.

(2) For entrances on open section roads the maximum entrance width is 40 feet and the minimum entrance width is 35 feet.

2. ***Location of entrances.***

An entrance culvert on an open section road may not be closer than five feet to the next abutting property line. At a minimum, the centerline of any new entrance shall be located from the nearest edge of paving of an intersecting street as follows:

(a) Residential Entrance – 45 feet to 60 feet depending upon use.

(b) Commercial Entrance – 60 feet to 125 feet depending upon use.

3. ***Pipe.***

- (a) Pipe sizes for entrances shall be sized by the design engineer and shown on the road plans.
- (b) The owner or developer shall supply the entrance pipe.
- (c) The minimum cover on a pipe shall be 12 inches.
- (d) The minimum diameter of a pipe shall be 12 inches or an oval equivalent.

J. Speed Change Lanes.

Speed change lanes at an entrance to or within a proposed development may be required for subdivisions of more than 5 lots and for commercial development. Additional use shall be based upon the ultimate size of the proposed development, and the potential function of the streets and roads.

K. Traffic Calming.

Traffic calming measures such as roundabouts, speed humps, signage etc. may be considered for roads and may be required by the Department on selected roads. They shall be subject to the approval of the Department on a case-by-case basis, after consulting with the County Fire Chief's Association and other applicable agencies.

III. CONTRACT DRAWINGS

A. General.

1. Contents of plan.

Plans for road layout and construction submitted to the Department for approval shall:

- (a) be signed and sealed by a professional engineer registered in the State of Maryland;
- (b) have street layouts prepared on sheets separate from utilities;
- (c) provide an approval block for each plan sheet for approval by the Department;
- (d) be prepared on standard size County standard plan sheets (24" x 36") of reproducible mylar; and
- (e) cross reference drawing numbers of other plans being prepared for the improvement at the same time.

B. Title Sheet.

The title sheet shall include:

- (a) the name and section of the subdivision;
- (b) the election district, County, and State;

- (c) contact information of the owner such as full name, address, phone number, etc.;
- (d) the certification of the professional engineer by signature and seal;
- (e) an approval block; and
- (f) a vicinity map with 1-inch = 2000-feet scale and the names of development roads and adjacent roads clearly labeled.

C. Typical Sections.

1. ***Conformance with Standard Details.***

Typical sections of each type of proposed street to be constructed shall conform with the typical sections described in Section IV and depicted in Appendix III of this Design Manual.

2. ***Required information.***

The sections shall include:

- (a) right-of-way width;
- (b) utility and sidewalk easements;
- (c) dimensions for stabilized sub-base;
- (d) paving and sidewalk details; and
- (e) finish grading specifications.

D. Contents of Plan.

1. ***In general.***

The plan shall contain the information required by this section and will be organized in the following general order:

- (a) Title sheet
- (b) Road plans
- (c) Water and Sewer plans
- (d) Storm Drain plans
- (e) Storm Water Management plans
- (f) Sediment and Erosion Control plans
- (g) Standard Details
- (h) Landscape plans

2. ***Street names.***

- (a) The names of all streets shall be lettered clearly along the centerline or along one property line, whichever is more convenient.
- (b) All names on each drawing shall be placed in the same relative position.

3. ***Widths of rights-of-way, pavements, and easements.***

- (a) Widths of existing and proposed rights-of-way and pavements for each street shall be shown by dimensioning.
- (b) Slope easements, where established, utility and sidewalk easements and rights-of-way that intersect streets shall be shown by dimensioning.

4. ***Topography.***

- (a) The plan shall show accurately the location of all structures and topography at one-foot intervals, including poles, trees, hedges, property markers and suitable outfalls.
- (b) This topography shall be carried at least:
 - (1) 100 feet beyond right-of-way lines;
 - (2) 200 feet beyond the ends of streets; and
 - (3) 200 feet in each direction from an intersection.
- (c) Topography will be consistent with NAVD88 for benchmark information and NAD83-91 coordinates; and at least two separate control points will be shown on the plans with northing and easting data accurate to 0.01 foot and elevation data accurate to 0.05 foot.

5. ***Coordinates, bearings, and ties.***

- (a) Bearings of street centerlines and coordinates of centerline P.C.s and P.T.s and of intersecting street centerline P.I.s shall be shown along the respective centerlines.
- (b) In addition, all P.I.s, P.C.s, and P.T.s and other points that are needed to reestablish the centerline of the street shall be referenced to permanent features or guarded hub stakes that will not be disturbed before the completion of all work.
- (c) The location and description of all reference points and the distance or angles to the centerline control points shall be shown on all street drawings.

6. ***Horizontal curve information.***

Centerline curve information for each horizontal curve shall be tabulated on the plan in the following order:

Δ	=	0	'	"	(External Angle)
Dc	=	0	'	"	(Degree of Curve)
R	=	.	Feet		(Centerline Radius)
T	=	.	Feet		(Tangent Length)
L	=	.	Feet		(Length of Curve)

E	=	.	Feet	(External)
M	=	.	Feet	(Middle Ordinate)

7. ***Stationing.***

- (a) Stationing along the surveyed centerlines of tangents shall be in even 50-foot stations, indicated by a small circle and the station number.
- (b) Stationing along horizontal curves shall be done in the same manner.
- (c) Where lines have not been surveyed, stations shall be shown by tick marks.
- (d) P.C.s and P.T.s and radius points of cul-de-sacs or horizontal curves shall be indicated by a small double circle on the centerline, and their stations shown to the nearest hundredth of a foot.
- (e) Stations of P.C.s and P.T.s of curbs on circular portions of cul-de-sacs shall be shown on the plan.
- (f) P.I.s of intersecting street centerlines shall be indicated by a small circle on the centerline of the intersection, and the equality to the nearest hundredth of a foot shall be lettered underneath the circle.

8. ***P.I.s of curb lines.***

The points of intersection of curb lines shall be indicated by small linked crosses, and shall be identified underneath as N.E., N.W., S.W., or S.E.

9. ***Direction of drainage.***

- (a) Arrows approximately one-half inch long shall be drawn around all curb returns and at all critical drainage points to indicate the direction of surface water flow in ditches, gutters or inlets.
- (b) Wherever the slope of a gutter is reversed from the street slope, a note to that effect shall appear on the plan.
- (c) A grading plan for an intersection shall be submitted indicating the exact location of the low point with a computed elevation shown on the plan when:
 - (1) an inlet adjacent to a curb return is to be set to such an elevation that it serves as the low point along the curb return; and
 - (2) the grades of the intersecting streets are such that a true picture of the top curb grade in the inlet area is not feasible on the profile.

10. ***Storm drainage.***

- (a) The design engineer shall indicate on the street plans the proposed storm drainage systems, including size and type of all pipes including entrance pipes (if applicable) in the right-of-way.
- (b) The storm drainage shall be shown schematically with drainage structures and direction of flow.

E. Profiles.

1. ***Top curb grade and centerline grade.***

- (a) Top curb grade (closed sections) and centerline grade (open sections) submitted for approval shall be shown by a clear line and designated "top curb grade" and "proposed centerline grade".
- (b) On profiles where the grades are warped, both grades shall be shown by a solid line with a note designating each.
- (c) Circles shall be used on profile grade lines to designate vertical curve P.V.C.s and P.V.T.s of top curb lines or centerlines.
- (d) P.V.I.s shall be shown by a triangular symbol.
- (e) All percents of grades shall be shown to two decimal places.

2. ***Previously established top curb grade and centerline grade.***

- (a) Where a grade line shown on a drawing is taken from a previously established grade, it shall be designated as "established top curb grade" or "established centerline grade".
- (b) The date established and the design drawing number of the previously established grades shall be noted on the profile.
- (c) On existing pavement, grades shall be field surveyed.

3. ***Existing ground profiles at centerline.***

- (a) The profile of the existing ground along the centerline of a proposed street shall be shown by dashed lines.
- (b) The existing ground profiles shall be labeled as existing ground profiles, and the date of the field survey shall be indicated.

4. ***Vertical curves.***

- (a) A vertical curve shall be shown on profiles as a smooth curve between tangents.

- (b) Although vertical curves are parabolic curves with radii, these curves may be represented with a standard circular curve template.
- (c) The correct templates for given vertical curves will be tangent at the P.V.C. and P.V.T. and will pass through the computed middle ordinate elevation at the P.I.
- (d) Computation of the middle ordinate and the low or high point on the vertical curve is required.

5. ***Top curb grades for cul-de-sacs.***

Top curb grades for cul-de-sacs shall be shown as profiles running linearly around the perimeter of the cul-de-sac curb including the approach returns.

6. ***Top curb grade of intersecting streets.***

- (a) Top curb grades for standard curb returns of intersecting streets shall be shown on profiles along the horizontal tangents from the P.C.s of the curb lines to the P.I.s of the curb lines.
- (b) Where returns exceed a 35-foot radius, or when a drainage problem is evident, top curb grades shall be shown independently as profiles running linearly around the circumference of the curb line as directed by the Department.

7. ***Stationing and elevations.***

- (a) Stations of all points of intersection of curb lines and pavement edges shall be determined at right angles to the centerline.
 - (b) A face of curb line shall not be extended to intersect a centerline at a skew in order to establish a station.
- (c) Throughout profiles, elevations shall be shown for each 50-foot station with additional elevations every 25 feet throughout horizontal and vertical curves. When possible, the profile will be located below the road plan on the same sheet with stations on the plan view aligned with the profile to the extent possible.
- (d) Stationing shall be at the points on the profile indicated under paragraph (c) above.
- (e) All elevations shall be referenced to the U.S. Coast and Geodetic Survey NAVD88.
- (f) Elevations shall be computed and shown to the hundredths of a foot.
- (g) Where curbs are warped, separate elevations shall be given for each curb and shall be identified as N.T.C., S.T.C., E.T.C., and W.T.C.
- (h) Stationing and elevations shall be shown for all curb return P.I.s and vertical curve P.C.s and P.T.s.

- (i) Points of intersection of curb lines shall be designated P.I.N.E., P.I.N.W., P.I.S.E., and P.I.S.W. to correspond with the plan.

8. ***Extension of profiles.***

- (a) At any point where a proposed street is an extension of an existing street, or if it is to be extended in the future, the profile of the existing centerline or top curb shall be shown for at least another 200 feet and the elevation of the curb noted.
- (b) To define clearly the situation, all street profiles shall be extended a sufficient distance of at least 200 feet beyond the limits of construction, except for a profile ending at a tee intersection.
- (c) Where profiles must be broken and continued on the same or other sheets, a minimum of 50 feet of profile shall be repeated.

9. ***Profiles of entrances to parking areas.***

- (a) Where profiles are required by the Department, these profiles shall show the finished top of curb grade or centerline grade for all entrances to parking areas independently and apart from the profiles of proposed streets and thoroughfares.
- (b) The top of curb elevations or centerline grade for entrances to parking areas shall be clearly labeled and flow arrows depicted.

F. Scales.

1. ***Plan views.***

Plan views shall be drawn at a scale of 1 inch = 40 feet.

2. ***Profiles.***

Profiles shall be drawn with a horizontal scale of 1 inch = 40 feet and with a vertical scale of 1 inch = 4 feet.

G. Traffic Control Devices.

For residential and commercial developments as determined by the Department, traffic control devices will be required on the plan. These traffic control devices include signs and pavement markings which shall serve to warn, guide, and/or regulate vehicular and pedestrian traffic and are required to assure the maximum safety and efficiency of the roadway network. All traffic control devices shall be designed and located in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.

H. Estimate of Quantities.

The design engineer for the development shall furnish estimates of all quantities and costs including contingent items to complete all work as shown on the contract drawings. These shall include but not be limited to road construction, drainage facilities, and storm water management facilities.

I. Check List.

The design engineer shall use the checklist shown as Table 2 as an aid to determine whether or not the listed items have been properly completed on the plan. One copy shall be submitted to the County with the plans.

J. Copies of Plans and As-built Plans.

The developer or the design engineer shall provide the Department with 6 paper copies and two Mylar copies of the approved road plan and one Mylar copy of the approved subdivision plat. After the construction of the development is complete, the developer shall submit hard-copy as-built plans executed by the design engineer and an electronic copy of the as-built plans in AutoCAD 2000.

IV. TYPICAL SECTION

A. Right-of-Way.

1. ***Minimum widths*** - The minimum widths of rights-of-ways shall be in accordance with Table 1.
2. ***Wider widths*** - The Department may require a right-of-way to have a wider width for unusual drainage or traffic situations.

B. Curb and Gutter.

Approved curb and gutter details are depicted in Appendix III. Special designs may be used with prior approval from the Department.

1. ***Inlets.***
 - (a) Inlets shall be located where dictated by topography and street grades to provide adequate drainage.
 - (b) Inlets may not be spaced farther than 300 feet apart or from the nearest grade break.
 - (c) Inlets shall be located prior to intersections to preclude drainage thru the intersection.
2. ***Minimum curb radius at intersections.***

The minimum curb radius at an intersection shall be as stated in Section II part B of this design manual.

3. ***Handicapped access.***

All curbs and gutters shall provide openings for handicapped access.

C. Storm Drainage.

1. ***Closed storm drainage system -- When required.***

When curb and gutter are required per the road classification outlined in Table I and depicted in Appendix III, a closed storm drainage system also is required.

2. ***When proposed grade less than 1% .***

When the proposed grade is less than 1% in any area of an open storm drainage ditch, including roadside, inlet, and outlet ditches, the Director or Engineer may require a closed storm drainage system with curb and gutter or paved open ditches.

3. ***Storm drainage plan.***

When required, a storm drainage plan shall be prepared by a registered Maryland professional engineer and submitted to the Department for approval. The system will be designed using the rational method and a flow tabulation chart must be shown on the plans. Drainage Profiles must include designed flow rate, velocity, storage and the hydraulic gradient elevation.

4. ***10-year storm criteria.***

A storm water system shall be designed for not less than a 10-year storm criteria.

5. ***Equipment standards.***

(a) Inlets, manholes, grates, and other equipment shall be of a type found in Appendix III or in SHA specifications.

(b) All pipe used in a closed storm drainage system in the travel portion of the roadway shall be reinforced concrete class IV.

D. Sidewalks.

1. ***Standards.***

Sidewalks shall be provided as shown on the Standard Details in Appendix III.

2. ***Width.***

The typical width of a sidewalk shall be five feet.

3. ***Handicap ramps.***

Sidewalks shall have a sufficient number of handicap ramps.

4. ***Installation.***

Installation of sidewalks will be coordinated with the County during the pre-construction meeting to establish the optimum time when sidewalks should be installed to minimize their destruction caused by construction activities and entrance installation.

5. ***Maintenance.***

As sidewalks are located outside the right-of-way, they shall not be maintained by the County and a mechanism for maintenance needs to be presented by the developer.

E. Parking.

Parking shall not be permitted along residential street types I, III, Private, IV and Boulevards shown in Appendix III.

1. ***When required.***

In the event that on-street parking is proposed, parallel parking lanes shall be provided in addition to the details shown in Appendix III.

(a) For heavy-duty commercial roads, the minimum parking lane width shall be 11 feet, including the gutter pan.

(b) For all other roads, the minimum parking lane width shall be 9 feet, including the gutter pan.

2. ***Off-street parking.***

In commercial and multi-residential areas, off-street parking is required per the County zoning ordinance.

F. Guardrail.

1. ***Location.***

As directed by the Engineer, guardrails shall be placed where there is hazard to motorists and pedestrians, including along sections of road with steep side slopes and at the approaches to overcrossing structures.

2. ***Standards.***

Guardrails shall meet S.H.A. specifications.

G. Shoulders.

Shoulders shall be required as shown on the typical sections in the Standard Details in Appendix III.

H. Mailboxes.

Mailboxes, newspaper boxes, and similar items may not:

1. have their faces closer than 12 feet from the center line of the road; or
2. be erected in the ditchline.

Gang-type mailboxes shall be allowed upon approval from the Engineer. Details and specifications for this style of mailbox will need to be submitted to the Department and its location clearly indicated on the plans. Use of this type of mailbox may require additional roadside construction to facilitate its use.

I. Trees Within Right of Way.

1. *General.*

Trees are to be considered a valuable resource for the development of a community and for roadway networks. For trees to be retained as part of the site planning and construction process every effort should be made to select a roadway alignment and utilize construction protection techniques that preserve valuable trees. The design engineer is expected to specify proper methods of tree preservation along roadway cuts or fills that will be in compliance with Maryland Department of Natural Resources policies and the Maryland Roadside Tree Law (§5-401). For trees to be planted within the right-of-way, species shall be selected in order to promote variation in texture, color and form and to be compatible with the scale of the roadway, intersections, adjacent improvements, and any underground or overhead utilities.

2. *Location.*

Planted trees shall be installed at the distances specified below to maintain safety and prevent interference with utility structures within the right-of-way. Trees shall not obstruct or obscure any traffic control devices or sight distance. Locate trees a minimum distance of:

- (a) 30 feet from any intersection
- (b) 25 feet from a traffic or directional sign
- (c) 25 feet from a light or utility pole
- (d) 10 feet from an entrance drive or alley
- (e) 5 feet from a drain, drain inlet structure
- (f) 5 feet from an open space access strip or easement
- (g) 5 feet from any underground utility.

3. *Tree Selection.*

When selecting trees for a particular location the following items shall be addressed:

- (a) Tree species planted within the County right of way shall be shown on the plans and be approved by the Department.
- (b) Trees shall fit the space limitations when matured. The species, ultimate size of the tree and the canopy desired should be compatible with the size of the right-of-way and the road classification.
- (c) Trees shall survive the environmental stresses of the proposed location. The tree species selected should be considered for branching habits, local soil and rainfall, native pests, salt tolerance and disease.

- (d) Spacing of trees along the right-of-way shall be determined based on the mature canopy spread of the tree specie.
- (e) Trees with a mature canopy spread of 35 feet in diameter are preferred over those with a mature canopy spread of less than 35 feet.
- (f) Every effort should be made to diversify tree species along the roadway to provide for long term survival of the landscape should one species suffer from disease or insect outbreak.
- (g) No specie of conifer trees will be permitted in the right of way.

4. ***Open Section Road.***

Trees planted within the right-of-way of an open section road shall be planted near the edge of the right-of-way outside the back slope of the ditch. If the back slope of the ditch ends at the edge of the right-of-way, trees shall not be allowed within the right of way.

5. ***Closed Section Road.***

Trees planted within the right-of-way of a closed section road shall be planted 3 feet from the back of the curb and at least 3 feet from any sidewalk.

J. Street Lights.

Street lights shall be the sole responsibility of the respective private owners (subdivision housing associations, commercial establishments, etc.) and local municipalities. The County shall not provide or maintain street lights. Special safety lighting (lighting at intersections, rail crossings, etc.) may be required by other regulations or by the County as determined on a case-by-case basis. Should street lights be desired by the Developer, they shall be included on the plan.

K. Traffic Control Devices.

All traffic control devices shall be shown on the plans, be funded by the developer and be installed by the Department prior to acceptance of the roadway(s) into the County maintenance system. All “Stop” signs shall be installed as soon as possible before the installation of asphalt surface treatment or hot-mix asphalt base course, but not so soon as to interfere with road construction operations. All traffic control devices shall be designed and located in accordance with the latest edition of the Manual on Uniform Traffic Control Devices.

At the entrance to a new roadway a sign identifying the road as a private roadway and under construction shall be placed. This sign will be funded by the developer and placed by the Department. The sign shall be 48 inches by 48 inches with black lettering on an orange reflective background and shall state “Caution – Uncompleted Road Not Publicly Maintained”. The developer’s name and a contact phone number shall also appear on the sign.

L. Cross Sections and Quantities.

Cross sections for roadways and thoroughfares that are to be widened as a result of development shall be taken at least every 50 feet and at all noticeable terrain breaks when required by the Department. The centerline and profile grade line shall be stationed correspondingly. The design engineer shall provide quantity estimates for roadways. These estimates shall include all quantities of grading, paving, curb and gutter, etc., and shall be submitted to the Department in tabulated form.

M. Sidewalks and Bike and Pedestrian Paths.

Areas requiring sidewalks are shown in the standard details in Appendix III. The typical pedestrian walk width shall be five feet. Where there will be a large number of pedestrians, the sidewalks will be made sufficiently wide to accommodate the anticipated pedestrian demand.

N. Fences.

Fences shall not be allowed in the right-of-way.

V. CONSTRUCTION METHODS & STANDARDS

A. Street Pavement.

1. *General standards.*

Except for asphalt surface treatment, all paving shall be performed in accordance with S.H.A. specifications.

2. *Standards for surface treatment.*

Surface treatment shall be performed in accordance with County standards.

3. *Pavement type, thickness, and width.*

Pavement type, thickness, and width shall be as shown on the Standard Details In Appendix III.

B. Inspection Schedule.

At a minimum, regular inspections shall be made and documented at the following specified stages of construction:

1. pre-construction inspection; prior to initiation of any grading activity
2. perimeter drainage inspection
3. upon completion of excavation to sub-grade prior to placement of the stabilized base;
4. during placement of stabilized base structural fill, concrete and installation of culvert pipes and storm drain inlets.
5. prior to and during installation of all utilities;
6. during backfill of foundations, public water and sewer lines and utility trenches;
7. during paving or surface treatment operations;

8. upon completion of final grading and establishment of permanent stabilization;
9. final inspection.

The developer or the contractor shall notify the Roads Division 48 hours before needing an inspection.

C. Required Phase of Construction

1. *In general.*

A developer shall perform the phases of construction required by this section in the order listed in this section.

2. *Perimeter sediment control and stabilized construction entrance.*

The developer shall put in place perimeter sediment control and a stabilized construction entrance.

3. *Construction stake out.*

- (a) The developer shall stake out the construction area.
- (b) The developer shall place grade stakes at 50-foot intervals at the right-of-way line and maintain the stakes until final acceptance.
- (c) The face of the stake toward the road shall have a cut mark, and the back face shall have road stations.

4. *Box out to sub-grade.*

The developer shall box out the road to the sub-grade.

5. *Ditches.*

- (a) The developer shall cut all ditches to grade, topsoil and seed. Site conditions may warrant the use of additional soil stabilization measures such as curlex, hydroseeding, etc.
- (b) At this phase the developer shall call for an inspection.

6. *Base material.*

- (a) A laboratory analysis is required before placement of the base material.
- (b) The developer shall place base material.

7. *Fine grading base.*

- (a) The developer shall fine grade the base for treatment or paving.

(b) At this phase the developer shall call for an inspection.

8. ***Treatment or paving of surface.***

(a) The developer shall treat or pave the surface.

(b) The County may require asphalt or stone samples to be tested.

9. ***Final inspection.***

After completion of construction, the County shall conduct a final inspection.

10. ***Acceptance of deed.***

Once the road is constructed and approved, the deed will be accepted by the Roads Board in accordance with Section 23-303 of the County Code.

D. Triple-Course Asphalt Surface Treatment.

1. ***Standards.***

Triple-course asphalt surface treatment shall conform with the following specifications:

(a) all aggregate shall be Maryland #7 in size and be spread with a self-propelled aggregate spreader;

(b) asphalt shall be CRS-2 polymer, obtained from an approved vendor; and

(c) the rates of application shall be:

(1) for the first and second coat:

a. aggregate, 40 to 50 pounds per square yard; and

b. asphalt, one-half gallon per square yard; and

(2) for the third coat:

a. aggregate, 25 to 35 pounds per square yard;

b. asphalt, one-half gallon per square yard.

2. ***County inspector.***

(a) The County Inspector shall witness all applications.

(b) The developer shall provide notice of an application to the County Inspector at least two days before the application.

E. Maintenance of Traffic During Construction.

When construction is to be conducted in an existing road in the County maintenance system, a traffic control plan shall be submitted by the developer and approved by the County before construction can be initiated. This completed traffic control plan, including but not limited to the schedule of

construction operations as related to traffic maintenance, the number and widths of lanes to be open during various periods of the day, and the alignment, grade, typical section, and construction details of temporary detour roads, must be in accordance with the Manual on Uniform Traffic Control Devices and be included in the plans.

VI. DEVELOPER RESPONSIBILITIES

A. Easements.

1. *When grant required.*

The developer shall grant easements wherever necessary for public utility, storm drainage, or similar purposes.

2. *Width.*

All easements shall be of sufficient width to maintain the facility placed in the easement.

3. *Structures prohibited.*

A building, appurtenance, or other permanent structure may not be erected or placed on any easement area.

B. Traffic Control Devices.

1. *Provided by County.*

The County shall provide, install and maintain traffic control devices at the expense of the developer to insure uniformity throughout the County. The developer will be responsible for contacting the Department to schedule sign placement as soon as possible but so as not to interfere with construction.

2. *Payment to County.*

(a) The developer shall pay for the provision, erection and maintenance of the signs until the road is officially accepted by the County.

(b) The developer shall be charged only for the actual costs of providing, erecting and maintaining the signs.

C. Fees and Security.

The developer shall submit all approved fees and securities in accordance with Section 23-311 of the County Code to the Department and County Attorney for approval.

D. Right-of-Way Deed.

1. ***Required.***

The developer shall prepare, approve, and execute a right-of-way deed granting the County the right-of-way in fee simple.

2. ***Content.***

The deed should mention all easements and should refer to the plat as recorded in the land records of the County.

E. Inspection and Review Fee.

1. ***Required.***

The developer shall pay an inspection and review fee before the Department may grant permission to start construction.

2. ***Amount.***

The fee shall be 6% of the estimated cost of the improvements.

F. Other Requirements.

The developer is solely responsible for meeting all requirements of all County, State, and federal agencies before starting any land disturbance.

G. Performance of Construction.

1. ***In accordance with approved plans.***

Construction shall be in strict accordance with the approved plans.

2. ***Deviation.***

(a) If significant revisions are necessary during the course of construction, as-built plans shall be submitted.

(b) Any deviation from the plans without written approval from the County is grounds for:

(1) refusing to accept the road; and

(2) using the performance surety to rectify the situation if the developer or the developer's agent refuses to do so in a timely manner.

H. Acceptance and Recordation of Deed.

Once the road is constructed and accepted:

1. The Roads Board shall accept the deed by their signature; and
2. The deed shall be recorded in the land records at the developer's expense.

I. Performance Surety and Labor and Material Payment Surety.

1. ***Required.***

Before the Department may grant permission to start construction, an applicant for a permit shall provide a performance surety bond and a labor and material payment surety bond.

2. ***Amount.***

The performance surety bond and the payment surety bond shall each be in the amount of 125% of the estimated cost of the improvements.

3. ***Terms and conditions.***

The performance surety bond and the payment surety bond shall:

- (a) Be conditioned on the contractor complying in all respects with the terms and conditions of this subtitle and the specifications; and
- (b) Indemnify the County against all cost, damages, injury, or loss to which the County may be subjected by reason of any wrongdoing, misconduct, want of care or skill, negligence, or default on the part of the developer or contractor.

4. ***Execution.***

The performance surety bond and the payment surety bond shall both be executed with the same company or bank.

5. ***Approval.***

Before acceptance, the Director and County Attorney shall approve the performance surety bond and the payment surety bond.

J. When Surety Becomes Insufficient or Unsatisfactory.

1. ***Notice.***

Whenever the County determines that the surety provided is insufficient or unsatisfactory, the County shall notify the permit holder.

2. ***New surety.***

- (a) Within ten days after the notice, the permit holder shall deliver to the County new surety bonds that:

(1) Meet the requirements of this Design Manual; and

(2) Are satisfactory to the County.

(b) The duty of the permit holder continues as often as the County requires new surety bonds with a satisfactory surety.

3. ***Failure to furnish surety.***

If a permit holder fails to provide a surety bond within ten days after receiving notice, the Department may not approve any further work.

K. Letters of Credit.

1. ***In place of surety bond.***

A permit holder may use a letter of credit as surety in place of a surety bond if the County accepts the conditions of the letter of credit.

2. ***Periodic reduction.***

A letter of credit may be reduced periodically to reflect satisfactory progress.

3. ***Reduction at final acceptance.***

(a) At the time of final acceptance, the letter of credit shall be reduced to 5% of its original value.

(b) The 95% reduction may not be granted until:

(1) The road construction is fully inspected and approved; and

(2) The road right-of-way is deeded to the County in fee simple, along with the granting of any applicable easements, as approved by the County Attorney, and recorded in the land records of the County at the grantor's expense.

4. ***Retainage.***

(a) The 5% shall be a retainage and shall be kept in force for one year after the acceptance of the road into the County system.

(b) A maintenance bond in the same amount shall also suffice.