

- E. The developer shall pay for the cost of installation.
- F. Bonding for the cost of installation shall be required.
- G. The street light plan shall be shown on the site plan or construction plans and coordinated with the City Engineer.
- H. Street light installation shall be in conformance with VDOT specifications. The style shall be approved by the City Engineer.

402.00 INFORMATION TO BE PROVIDED ON CONSTRUCTION PLANS

402.01 Curb-Cut Ramps:

- A. Policy on Ramps for the Handicapped.
 - 1. All residential developments shall provide standard curb-cut ramps located to conform to VDOT Standards or this Manual.
 - 2. In parking lots for commercial and industrial site plans, standard curb-cut ramps shall be located at the major crosswalks. Where site plan sidewalks are constructed at various vertical elevations, a curb cut ramp shall be installed at each entrance elevation.
 - 3. Churches, schools, and appropriate public facilities site plans shall provide standard curb-cut ramps as required by the Director.
 - 4. All ramps shall be designed in accordance with and Sections 315.00 and 615.00 of the Virginia Uniform Statewide Basic Building Code. VDOT Road and Bridge Specifications.
- B. Location of Ramps for the Handicapped.
 - 1. Indicate locations of curb-cut ramps for handicapped persons as specified by the VDOT standards.
 - 2. At entrances utilizing a CG-10A entrance, the sidewalk may be ramped down to the travelled way.
 - 3. A CG-9D commercial entrance may be utilized in lieu of the CG-10A entrance. This standard raises the entrance to the level of the sidewalk, and allows the passage of pedestrians

across the entrance without the need of a step down.

402.02 Guard Rail and Paved Ditch Requirements: The following note must be added to the plan:

"A joint inspection will be held with the developer and City representatives to determine if and where guard rail and/or paved ditches will be needed. Further, the developer will be responsible for providing guard rail and paved ditches as determined by this joint inspection." Refer to VDOT guard rail and paved ditch specifications.

402.03 Entrance Requirements:

- A. Indicate all driveway entrances and the size, length and type of driveway entrance culvert where applicable on subdivision plans or lot grading plans.
- B. CG-11 entrances shall be used for subdivision street connections.
- C. CG-10A entrances shall be used for all commercial entrances of parking bays, parking courts, townhouses, etc.
- D. CG-9D entrances may be used for commercial entrances where a ramp for handicapped persons is required.
- E. Reference to nearest intersections in both directions.
- F. Site distance must be labeled and proof of such shall be verified through a profile.

402.04 Proposed Street Construction: The plan shall include either a typical section or a reference to a specific standard and pavement design. Final pavement design shall be determined after CBR testing is completed to determine bearing capacity of the roadbed. The following items must be shown on the construction plan.

- A. Indicate stations every one hundred feet (100') on centerlines at points of curvature, points of intersections, at subdivision or section limits and at turn around radius points.
- B. Show profile of building restriction lines on the plan. Where there is no building restriction line show profile 25' from the right-of-way

line. Any profile greater than 25 feet shall require approval by the Director.

- C. Show existing centerline profiles for two hundred feet (200') minimum distance to insure proper grade tie when proposed street is an extension of or connects with an existing street.
- D. Show centerline profile of existing street for three hundred and fifty (350') feet or longer if necessary to insure that appropriate sight distance is achieved; to right and left of proposed connection when a proposed street intersects with an existing street.
- E. Show centerline and building restriction line profiles extended three hundred feet (300') beyond property line or boundary on all streets providing for access to adjoining property.
- F. Grade line of proposed street construction to include:
 - 1. Percent of grade. Minimum grade for curb and gutter shall be 0.5%. Maximum grade of street construction shall be as specified in standards for each typical section. Minimum grade for streets without curb and gutter is 1%.
 - 2. Elevations at beginning and end of all vertical curves.
 - 3. Length of vertical curves with elevation, sight distances and stations of points of vertical intersection (P.V.I.).
 - 4. Elevations computed every 25'.
 - 5. Elevations at all centerline intersections of streets and at all street centerline intersections with boundaries of subdivision.
 - 6. Point of finished grade on typical section (i.e., centerline, top of curb, etc.).
 - 7. Finish elevations of all sanitary sewer and water manholes that are in the paved area of a street.
- G. Indicate all roadside ditches in plan view and profile view where depth of cut is not in conformance with typical sections. Indicate all paved roadside ditches in plan view.
- H. Show proposed and existing culverts, storm sewer crossings, sanitary

sewer crossings, and utility crossings on street profiles at proper location and grade.

- I. When a proposed street parallels or is located near an existing stream or open drainage way, furnish profiles of top of bank of stream, computed water elevations and invert (or flow line) of stream or open drainage way. Show relation of proposed street grade to existing profiles of stream or open drainage way. Whenever street construction is proposed within the 100-year flood plain the requirements of Section 507 must be met.
- J. Grade profiles of proposed curb and gutter construction in cul-de-sacs to be computed along face of curb starting at the beginning of the curb return, following the face of curb around the cul-de-sac and then to the end of the return opposite the point of beginning. Grade ties of the proposed street, before entering the cul-de-sac grade shall be shown on each end of the cul-de-sac grade profile to insure proper grade connection. Other approved methods may be used subject to approval of the Director.
- K. Building restriction line profiles for cul-de-sacs shall be radial to the existing profile at face of curb and proposed curb grade.
- L. If a cul-de-sac is to be used as a turnaround at the temporary end of a street the proposed grade and existing profiles shall be carried through to provide for the future extension of the proposed street a distance of three hundred feet (300') beyond the property line. Final lot grading of the proposed extension shall be shown on the grading plan.
- M. Street construction shall be for the full frontage of all lots.
- N. All street construction, including sidewalks, must be within the dedicated street right-of-way. Grading or filling may be done in adjoining easements.
- O. Maximum centerline grade of a permanent cul-de-sac shall not exceed five percent (5%). The cross slope of the street for cul-de-sac will be a minimum of 1/4":1'.
- P. If a difference exists in elevations on proposed curb grades, identify curb elevations as: top of right curb and top of left curb.
- Q. Provide standard street landings on plans to provide adequate sight

distance. Standard landings are required for the minor (less VPD) street at all intersections.

- R. Lot grading plans must provide for adequate vehicular clearances.
- S. Indicate profiles of centerline of street and spot elevations for both left and right curb returns at intersections of streets to assure proper transition from one street to the other.
- T. Show connection to proposed VDOT construction when necessary.
 - 1. VDOT approval is required on all plans and revisions within VDOT right-of-way, and all plans and revisions that are to be accepted into the state system.
 - 2. Indicate state route numbers of existing streets. Show symmetrical transition of pavement at intersection with existing street. Transitions shall be a minimum of fifty feet (50') from the end of the curb return to the existing edge of pavement. This is a minimum requirement. A longer transition turn lane may be required.
- U. A VDOT permit will be required prior to any construction within the right of way or new access being connected to state system.

402.05 Design Requirements: The following procedures and use of tables 4-1 and 4-2 should be followed in the design of all streets and street connections, including commercial entrances.

- A. Determine the speed of the street in question. On new streets the design speed for sight distance consideration is based on the projected A.D.T. as shown in the following chart:

Projected A.D.T.	0-400	401-1000	1001-4000	4001-7000	7001-15,000
Design Speed(MPH)	20	25	30	40	45

- B. Design each new street so that all horizontal and vertical curves meet the minimum stopping sight distance outlined in Table 4-1, and the minimum passing sight distance outlined in Table 4-2. The alignment of all new streets has to meet these minimums with the exception that sag vertical curves are required to provide not less than the sight distance given in Table 4-1. Sight distances shall be calculated for all ranges of algebraic difference in grade based on a headlight height of two

feet (2') and a one degree (1°) upward divergence of the headlight beams. Standard VDOT "K" values will be used.

- C. After each street has been designed to meet the criteria in Tables 4-1 and 4-2 below, then each intersection needs to be checked to see that the criteria in Table 4-3 is achieved as well as other intersectional items such as standard landings, channelization, etc. It is also necessary that each connection to existing streets is checked to ensure these distances are achieved. The verification of this sight distance should be done graphically checking both the horizontal and vertical alignments. Sight distance will be shown along the line of sight.

TABLE 4-1

STOPPING SIGHT DISTANCE

Height of Eye:	3.50		Height of Object: 0.5'					
Design Speed	20	25	30	35	40	45	50	55
Minimum Sight Distance	125	150	200	240	275	325	400	450
Desirable Sight Distance	125	150	200	250	325	400	475	550

Use desirable values as the minimum values on all roads which carry in excess of 5500 VPD.

TABLE 4-2

SIGHT DISTANCES ALONG MAJOR STREETS AT INTERSECTION WITH
MINOR STREETS, CROSSOVERS, AND COMMERCIAL ENTRANCES

Height of Eye:	3.50'	Height of Object:	4.25'
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Design Speed (MPH)	20	25	30	35	40	45	50	55
	200	250	300	350	400	450	500	550
2,3&4 lane major street								

The term "Major Street" refers to the highest V.P.D. of the two (2) intersecting streets.

For median widths greater than sixty feet (60') each street can be considered separately.

The sight distances should be noted on the profile sheet on all vertical curves and on the plan sheets for all horizontal curves and for all the intersections. Profiles of existing streets must be shown a minimum of three hundred fifty feet (350') or the applicable sight distance in each direction along the main street.

Minimum crossover spacing for arterial roadways shall be 500 feet.

402.06 Other information to be shown on the plans:

- A. Show turnarounds where required and location of City required utilities.
- B. Indicate paved ditches when required at edge of street and at toe of fill; show easements where necessary. Include computations for determining the need for paved ditches.
- C. Indicate 3:1 maximum slope at end of street construction with necessary easement shown on the Plan.
- D. Show and provide slope and maintenance easement where required by VDOT.
- E. Indicate the erosion control protection to be provided at the end of construction of curb and gutter.
- F. Indicate the typical cross section for public and private streets, access aisles and parking areas. Where a typical section is approved, provide details on plans.
 - 1. Typical sections and geometric design criteria for streets shall conform to this Manual.
- G. Indicate cul-de-sacs at the ends of all dead-end streets. The minimum

pavement radius in the cul-de-sacs shall be forty-five feet (45') to the face of curb on edge of pavement.

- H. Show sidewalks where required in accordance with this Manual.
- I. Show traffic barricade signs where required.
- J. The following typical notes should be shown on all plans:
 - 1. Subbase depth is based on CBR value of 5. Soil tests of subgrade will be performed for actual determination of required subbase thickness prior to the placement of subbase.
 - 2. A smooth grade shall be maintained from centerline of existing road to proposed curb and gutter to preclude the forming of false gutters and/or the ponding of any water on the roadway.

403.00 PRELIMINARY STREET PLANNING

403.01 General Requirements: All streets on preliminary subdivision plats and also any streets in apartment, commercial and industrial developments, which are to be dedicated for public use, shall be designed to comply with the geometric standards of this Manual and current VDOT geometric standards. These standards require that design be based on traffic usage.

- A. In order to determine the proper street cross-section to use and to facilitate review and approval of preliminary plats, the following information shall be provided for each street intersection:
 - 1. The number of vehicles per day entering and leaving the intersection shall be noted on each leg of each street in each direction.
 - 2. The proposed street right-of-way, together with the proposed width of street (face of curb to face of curb or edge of pavement to edge of pavement) for each block on every street in the subdivision, is to be shown.
 - 3. All street construction shall be within the dedicated street right-of-way. Easements shall not be accepted to make up the minimum required right-of-way if any construction is proposed thereon. Slope construction easements shall be provided where required.
- B. The following information shall be shown for all streets which intersect the exterior boundary of the subdivision and which will provide access